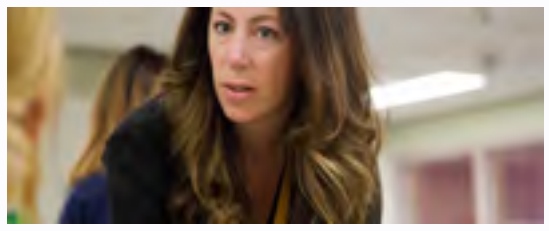
ANNUAL REPORT 2015-2016

EXECUTIVE SUMMARY

SURVEILLANCE

HAND HYGIENE

PROJECTS &
COLLABORATIONS



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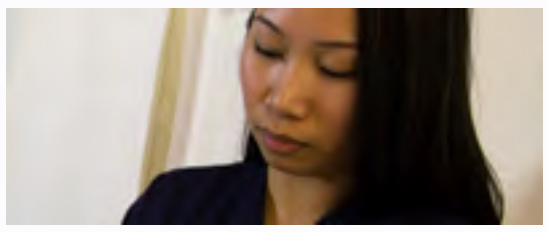

EDUCATION &
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Infection Prevention and Control (IPAC) at Providence Health Care (PHC) strives to provide the best and highest quality care to the populations we serve.

This year, we developed a new vision: *stop preventable infections.*

Our purpose is to protect everyone at PHC, including patients, residents and our staff, from preventable infections and to improve health outcomes with our partners in health care.

IPAC is responsible for a number of activities including tracking infections through the development and maintenance of surveillance systems, responding to outbreaks, providing infection prevention expertise and guidelines to the PHC community, and creating and measuring innovative solutions to practical IPAC challenges.

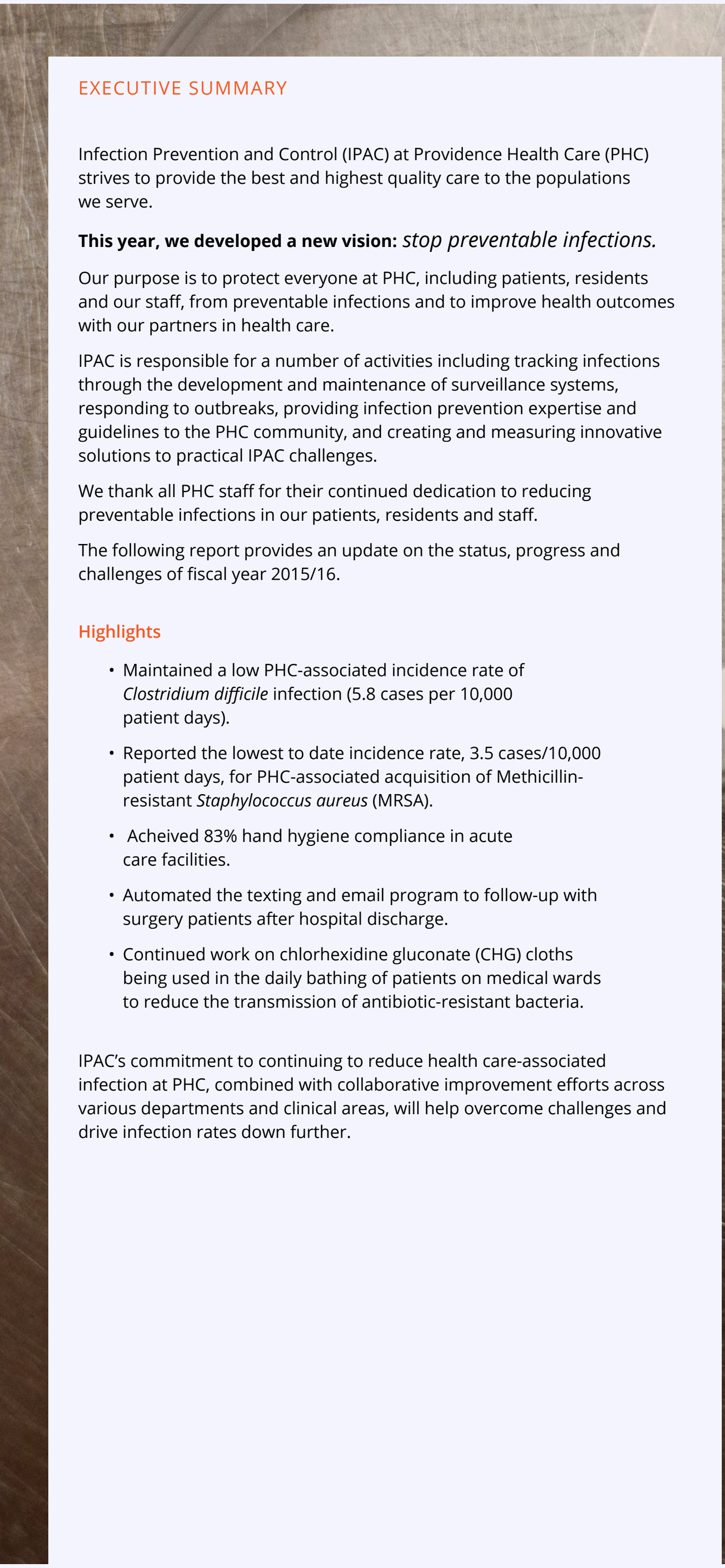
We thank all PHC staff for their continued dedication to reducing preventable infections in our patients, residents and staff.

The following report provides an update on the status, progress and challenges of fiscal year 2015/16.

Highlights

- Maintained a low PHC-associated incidence rate of *Clostridium difficile* infection (5.8 cases per 10,000 patient days).
- Reported the lowest to date incidence rate, 3.5 cases/10,000 patient days, for PHC-associated acquisition of Methicillin-resistant *Staphylococcus aureus* (MRSA).
- Acheived 83% hand hygiene compliance in acute care facilities.
- Automated the texting and email program to follow-up with surgery patients after hospital discharge.
- Continued work on chlorhexidine gluconate (CHG) cloths being used in the daily bathing of patients on medical wards to reduce the transmission of antibiotic-resistant bacteria.

IPAC's commitment to continuing to reduce health care-associated infection at PHC, combined with collaborative improvement efforts across various departments and clinical areas, will help overcome challenges and drive infection rates down further.



SURVEILLANCE

SURGICAL SITE INFECTION (SSI) SURVEILLANCE
Colorectal
Cardiac
Caesarean section
Orthopedic

BACTERIA
Clostridium difficile Infection (CDI)
Methicillin-Resistant Staphylococcus aureus (MRSA)
Vancomycin-Resistant Enterococci (VRE)
Carbapenemase Producing Organisms (CPO)
Mycobacterium Tuberculosis (TB)

DEVICE ASSOCIATED INFECTIONS
Central Line-Associated Bloodstream Infection (CLABSI)

Photo: Loupe & Marker

SURVEILLANCE

SURGICAL SITE INFECTION (SSI) SURVEILLANCE

The primary goal of surgical site infection (SSI) surveillance is to prevent SSIs.

To achieve this goal, the baseline SSI rate is required to assess the magnitude of the problem. By monitoring SSI rates over time, we can identify clusters of infections and overall trends. Analysis and interpretation of these trends allow us to identify potential problems and implement appropriate preventative and corrective measures. SSI surveillance data is provided to surgeons and other members of the surgical team as education and an intervention to prevent SSIs.

Each SSI case is classified as either organ space, superficial or deep-incisional. The standard SSI definitions we use are from the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN). Each case of SSI is reviewed by an Infection Control Practitioner (ICP) and confirmed by an IPAC physician. The methods for identifying cases for each SSI surveillance system are slightly different and are described within each section.

Post-discharge surveillance remains a challenge for all SSI surveillance programs; however, we have developed innovative approaches to post-discharge surveillance, such as our C-section post-discharge surveillance program.

COLORECTAL SURGERY

Background

IPAC collaborated with the Division of General Surgery at St. Paul's Hospital to conduct SSI surveillance following colorectal surgery.

Cases are detected through weekly rounds with the surgery team. Confirmed cases are signed off by the surgeon.

Outcome

There were 404 colorectal surgeries in 2015/16: 234 colon and 170 rectal.

There were 61 colorectal SSIs: 26 colon and 35 rectal.

The colorectal SSI rate for 2015/16 was 15.1 per 100 procedures.

Of the 26 colon SSI cases, infections were classified as:

- 69% organ space (18 infections)
- 23% superficial (six infections)
- 8% deep-incisional (two infections)

Among the 35 rectal SSI cases, infections were classified as:

- 57% organ space (20 infections)
- 20% superficial (seven infections)
- 23% deep-incisional (eight infections)

This year's colorectal SSI rate (15.1 per 100 procedures) was similar to the rate in 2014/15 (12.3 per 100 procedures, p=0.27).

Photo: Loupe & Marker

What we are working on

Post-discharge surveillance remains a challenge, and we are working with PHC's National Surgical Quality Improvement Program (NSQIP) team to improve case finding.

Additionally, we now have two years of baseline colorectal surgery SSI rates and the opportunity to follow results after implementation of many prevention strategies in the perioperative phases of surgery.

We would like to thank members in the Division of General Surgery for their continued partnership in the colorectal SSI surveillance program.

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 three years. Cases are identified by weekly review of the consults seen by the Infectious Diseases service and through cardiac nurse practitioners notifying IPAC of any suspected SSI, via a dedicated phone line.

Outcome

772 CABG and cardiac valve replacement surgeries were performed at PHC during 2015/16. There were 14 cardiac SSI cases.

- The SSI overall rate was 1.8 per 100 procedures.
- During the post-operative hospital stay, the SSI rate was 1.2 per 100 procedures (nine cases) and 0.6 per 100 procedures during the post-discharge period (five cases).

Among the 14 cardiac SSI cases, infections were classified as:

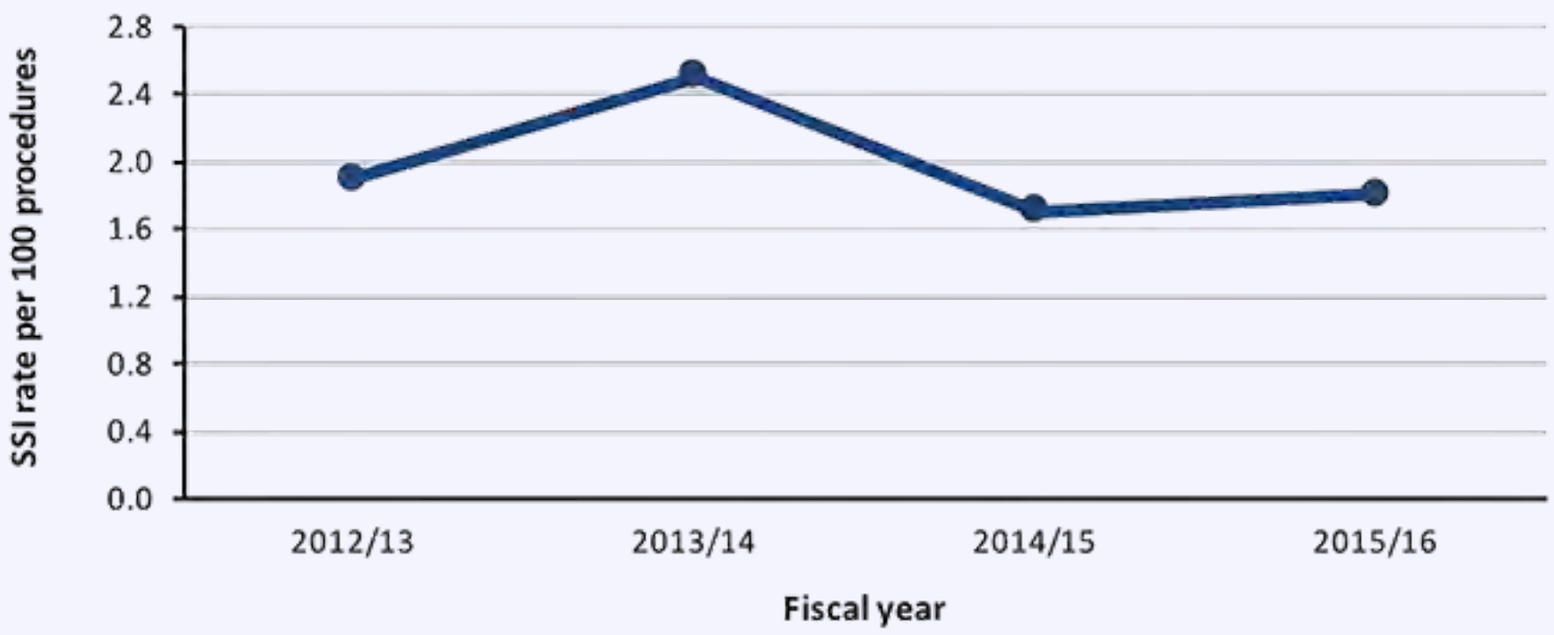
- 36% organ space (five cases)
- 50% superficial (seven cases)
- 14% deep-incisional (two cases)

What we are working on

IPAC is working with the Division of Cardiac Surgery to assess the feasibility of enhancing cardiac SSI surveillance to include post-discharge electronic follow-up by automated text message and email.

Figure 1

SSI rate per 100 procedures following CABG and valve surgery, 2012/13 to 2015/16



CAESAREAN SECTION (C-SECTION) SURGERY

Background

Since 2008/2009, IPAC has been working with the Department of Obstetrics and Gynecology to conduct SSI surveillance following a C-section.

For this procedure specifically, post-discharge surveillance is critical as a patient's length of stay postsurgery is short. To help address this, post-discharge surveillance, issued 30-days after C-section surgery, was initiated in 2012/2013.

Cases are found through daily rounds, review of readmissions, visits to the emergency room, and post-discharge surveillance, which includes surveying patients via mail-in forms, phone calls, emails, and texts.

In 2015/16, IPAC implemented a web-based platform that will automatically email and text patients to enhance the systematic approach and accuracy for detecting SSIs.

Outcome

• 614 C-sections were performed at St. Paul's Hospital in 2015/16.

• 536 (87%) women responded to the post-discharge surveillance.

• 19 SSIs were identified.

• The SSI rate was 3.1 per 100 procedures.

Infections were classified as:

- 37% organ space (7 infections)
- 63% superficial (12 infections)

Two (11%) SSI cases were captured before discharge and 17 (89%) were captured during the postdischarge period. Of the post-discharge SSI, three (18%) cases were determined by readmission to hospital, three (18%) by telephone, and 11 (65%) by email or text.

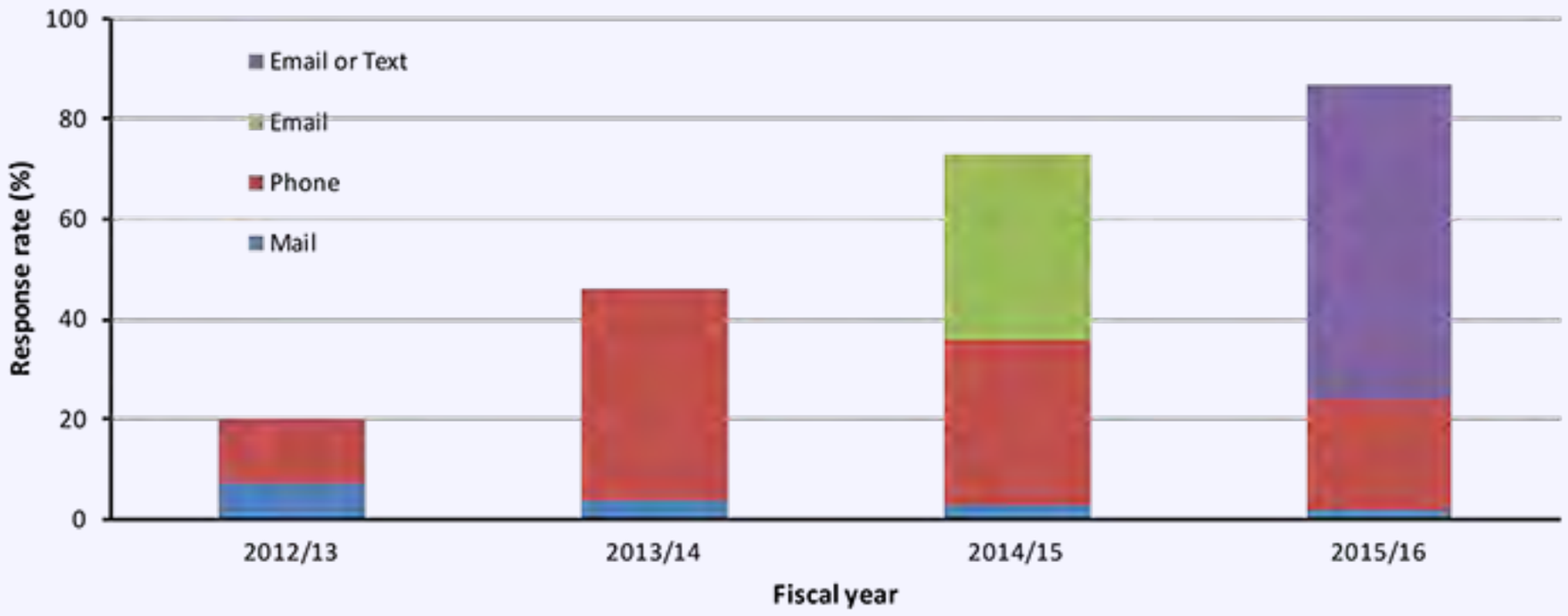
This year's post-discharge surveillance response rate (87%) was statistically significantly higher than in 2014/15 (73%, $p<0.001$). The SSI rate this year (3.1 per 100 procedures) was statistically significantly higher than the SSI rate in 2014/15 (1.2 per 100 procedures, $p=0.03$). The increased ability to reach patients via text and emails may have contributed to the increased SSI rate in 2015/16.

What we are working on

As far as we know, St. Paul's Hospital is the only hospital in Canada to use automated texting and email for post-discharge surveillance. We hope to expand this tool for other forms of post-discharge surveillance.

Figure 2

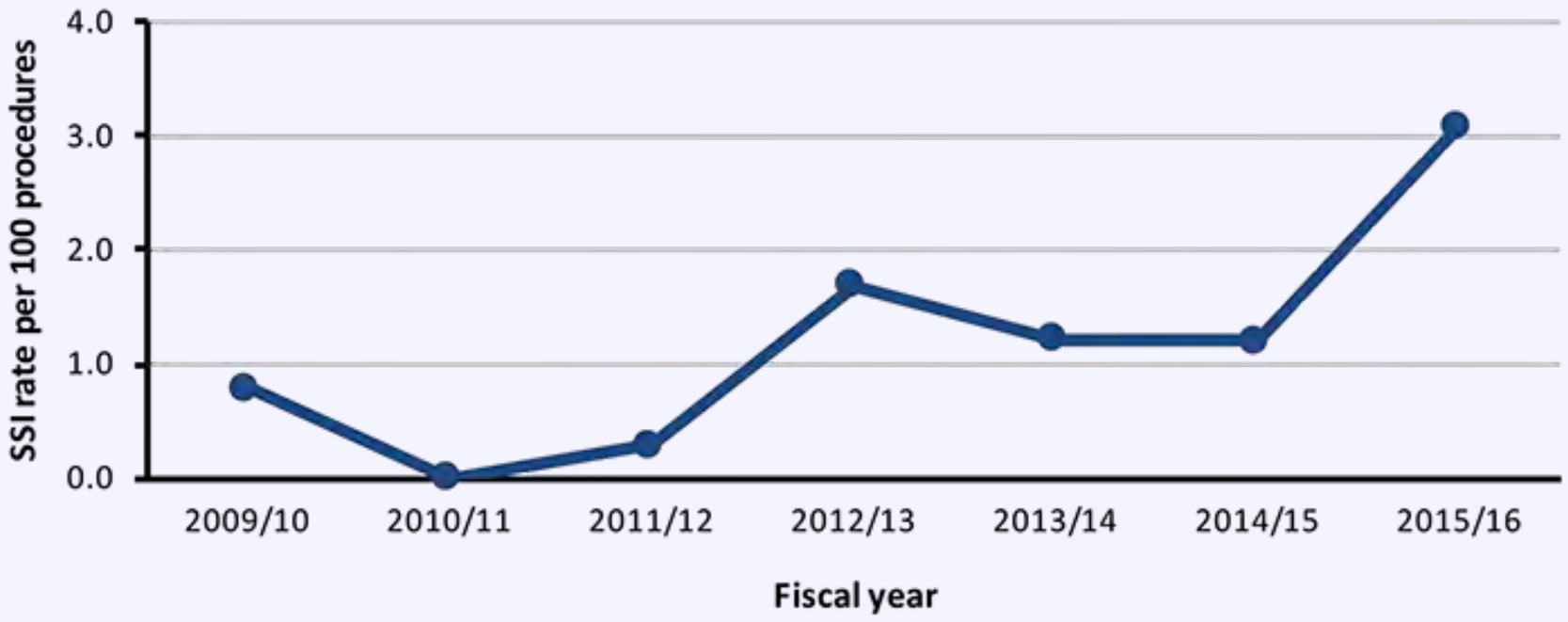
Post-discharge surveillance response rate for caesarean section patients, 2012/13 to 2015/16



*Note: *Post-discharge surveillance initiated in 2012/13*

Figure 3

SSI rate per 100 procedures following caesarean section, 2009/10 to 2015/16



ORTHOPEDIC SURGERY

Background

In collaboration with the Department of Orthopedic Surgery, IPAC started its first SSI surveillance initiative at PHC in 2007 with hip and knee replacement procedures ("arthroplasties"). Cases are currently identified by the orthopedic surgeons' quarterly review of all hip and knee arthroplasties.

Additionally, cases are identified by the Medical Microbiology laboratory based on clinical specimens. For this SSI surveillance program, we rely mostly on reporting by the orthopedic surgeons.

Outcome

• 92 hip and knee arthroplasties were done by participating surgeons this fiscal year.

• There were 0 SSI.

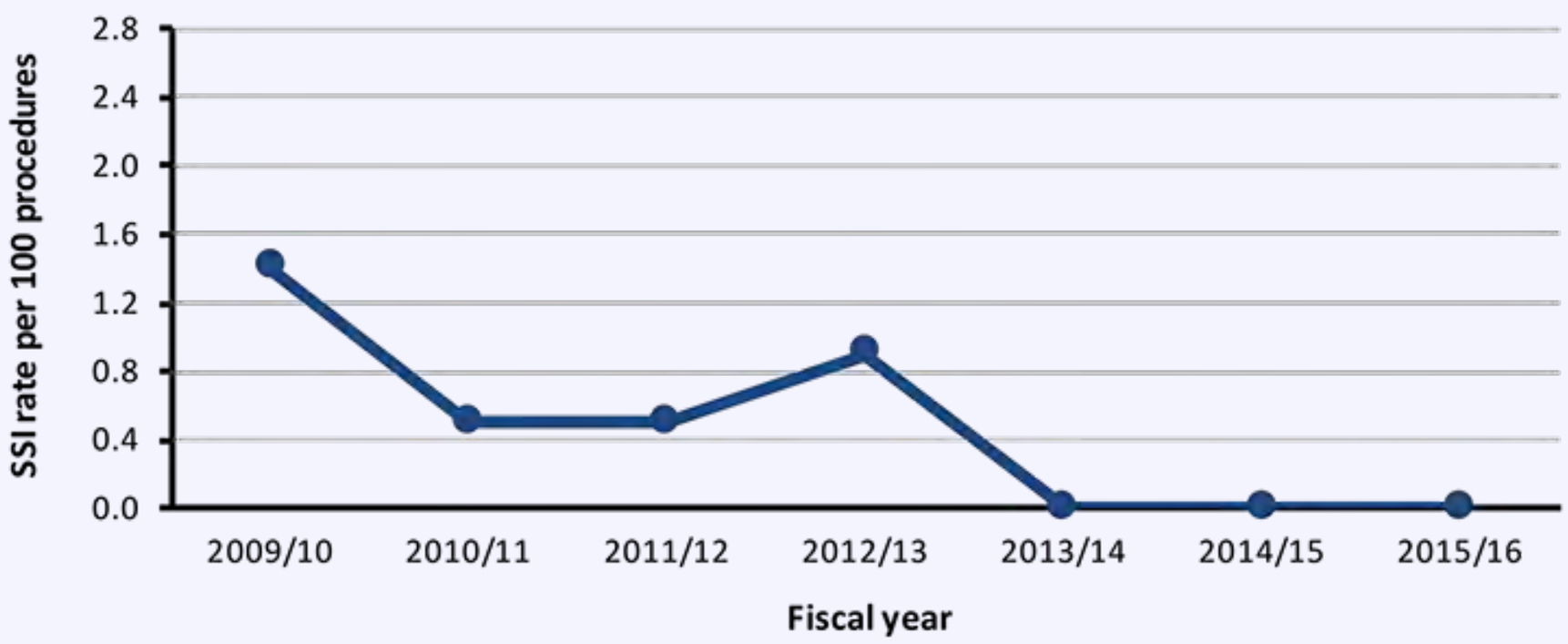
What we are working on

We need to work with orthopedic surgeons to review the process for this SSI surveillance program and potentially add automated texting and email for surveillance post-discharge.

The feasibility of automated post-discharge surveillance will be determined using surveys to assess this patient population's familiarity and acceptance with using texting and email for communications.

Figure 4

SSI rate per 100 procedures following hip or knee arthroplasty, 2009/10 to 2015/16


SSI rate per 100 procedures
2.8
2.4
2.0
1.6
1.2
0.8
0.4
0.0
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
Fiscal year

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BACTERIA

CLOSTRIDIUM DIFFICILE INFECTION (CDI)

METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

VANCOMYCIN RESISTANT ENTEROCOCCI (VRE)

CARBAPENEMASE PRODUCING ORGANISMS (CPO)

MYCOBACTERIUM TUBERCULOSIS (TB)

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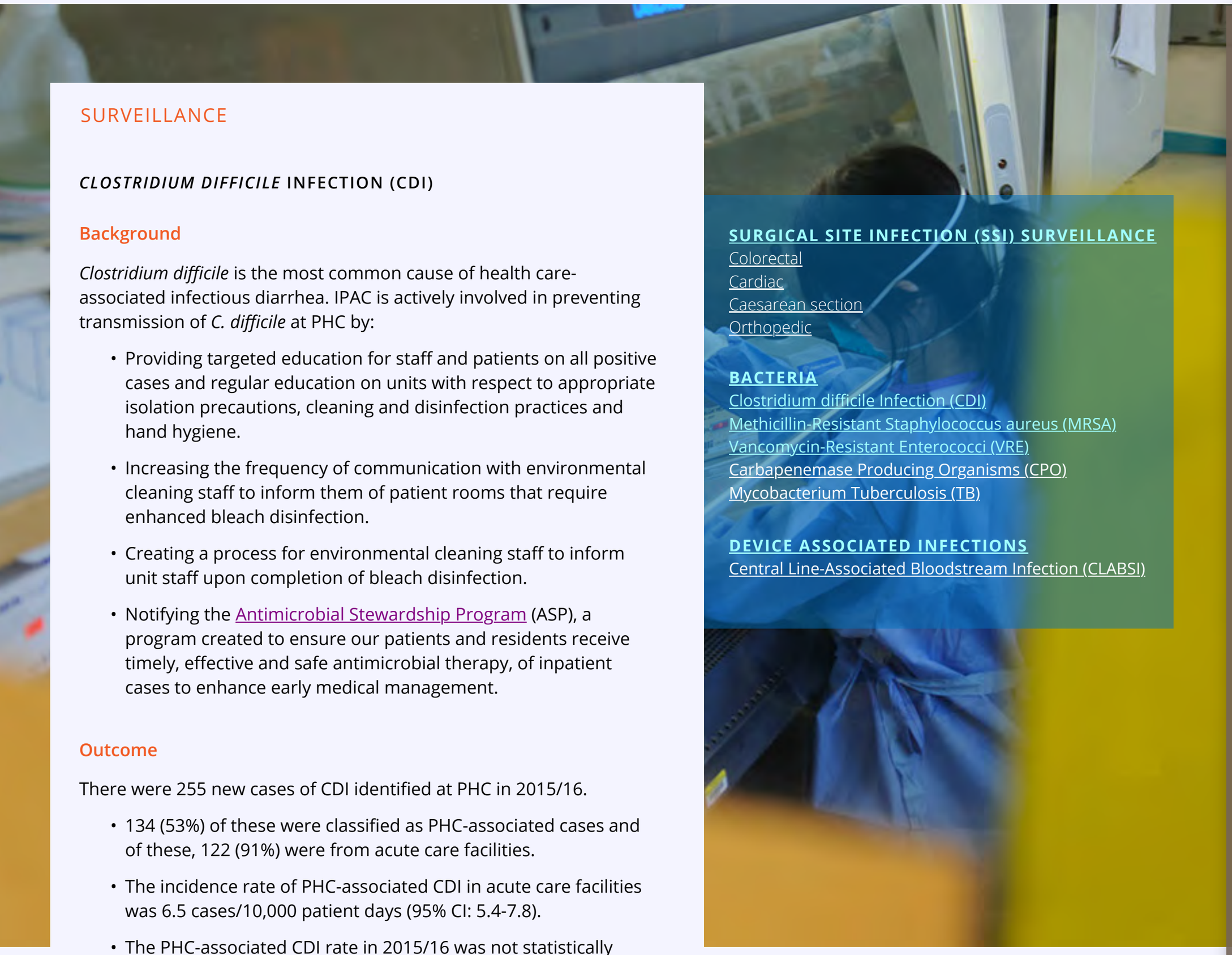
Photo: Loupe & Marker



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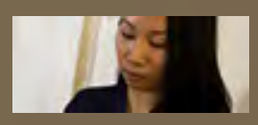
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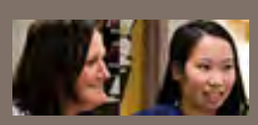
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CLOSTRIDIUM DIFFICILE INFECTION (CDI)

Background

Clostridium difficile is the most common cause of health care-associated infectious diarrhea. IPAC is actively involved in preventing transmission of *C. difficile* at PHC by:

- Providing targeted education for staff and patients on all positive cases and regular education on units with respect to appropriate isolation precautions, cleaning and disinfection practices and hand hygiene.
- Increasing the frequency of communication with environmental cleaning staff to inform them of patient rooms that require enhanced bleach disinfection.
- Creating a process for environmental cleaning staff to inform unit staff upon completion of bleach disinfection.
- Notifying the Antimicrobial Stewardship Program (ASP), a program created to ensure our patients and residents receive timely, effective and safe antimicrobial therapy, of inpatient cases to enhance early medical management.

Outcome

There were 255 new cases of CDI identified at PHC in 2015/16.

- 134 (53%) of these were classified as PHC-associated cases and of these, 122 (91%) were from acute care facilities.
- The incidence rate of PHC-associated CDI in acute care facilities was 6.5 cases/10,000 patient days (95% CI: 5.4-7.8).
- The PHC-associated CDI rate in 2015/16 was not statistically significantly different compared to last fiscal year (p=0.44).
- The CDI incidence rate at Mount Saint Joseph Hospital (MSJ) was 9.4 cases/10,000 patient days (95% CI: 6.5-13.1). This rate was similar to the last fiscal year (8.4 cases/10,000 patient days, 95% CI: 5.7-12.0, p=0.67).
- The CDI incidence rate at St. Paul's Hospital (SPH) was 5.8 cases/10,000 patient days (95% CI: 4.7-7.2). This rate was similar to the last fiscal year (5.3 cases/10,000 patient days, 95% CI: 4.2 to 6.6, p=0.51).

CDI complications in the 30 days following diagnosis are considered an indicator of the severity of illness and are monitored as part of our surveillance program. In 2015/16, 8 (3%) cases were admitted to the ICU. No cases were associated with toxic megacolon or colectomy.

Of the 122 PHC-associated CDI cases in acute care facilities in 2015/16, 14 (11%) were asymptomatic patients who were considered colonized with *C. difficile.* Excluding these cases, the CDI rate was 5.8 cases/10,000 patient days (95% CI: 4.7-7.0). The CDI rate excluding colonized patients was not statistically significantly different than the rate including colonizations (p=0.36).

Issue

There has been an increasing awareness of the changing epidemiology of CDI and the potential for acquisition of *C. difficile* outside of health care-associated settings.[1,2] Patients can be colonized with *C. difficile* prior to entering our hospitals and remain asymptomatic without clinical disease, only to develop CDI after

receiving antibiotics in hospital.[3] As a result, some CDI cases that are acquired in the community are misclassified as health care-associated CDI, which may overestimate health care-associated CDI rates.

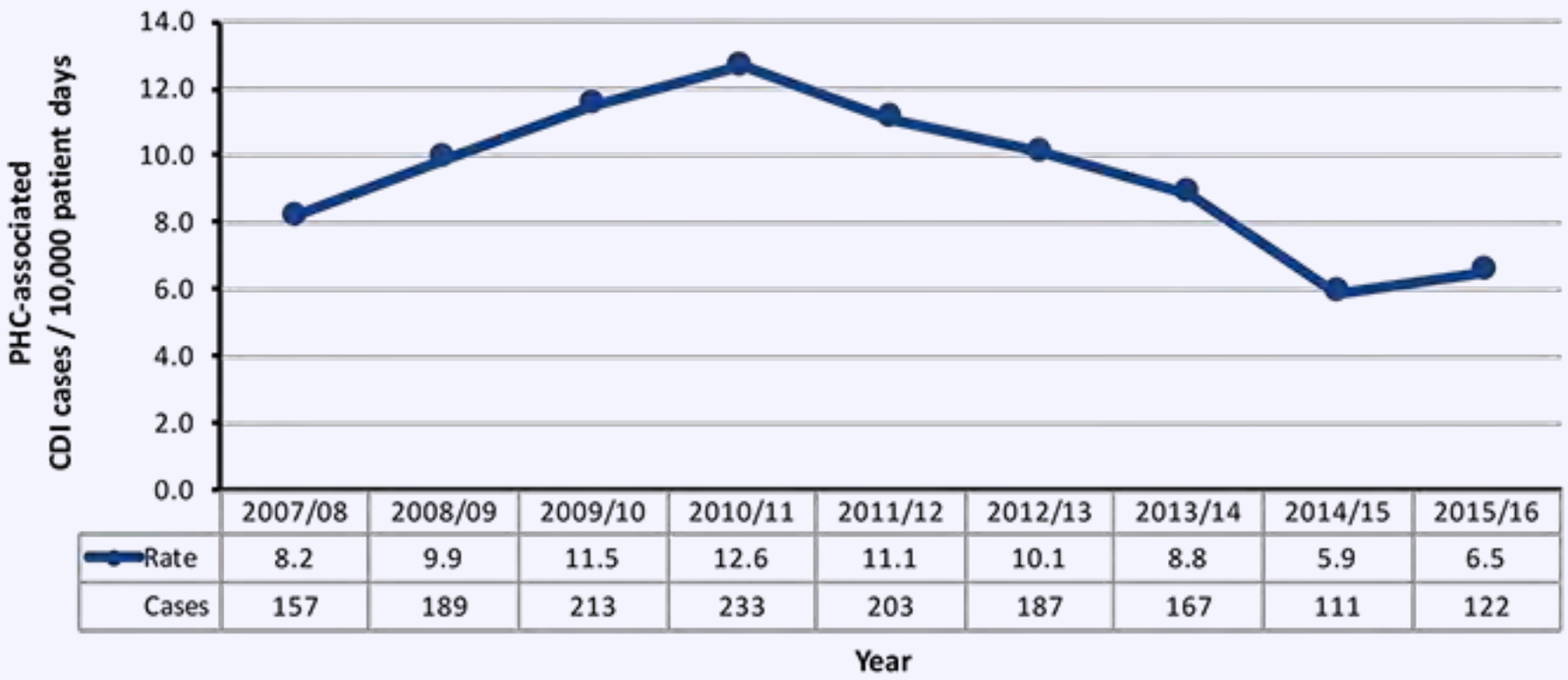
What we are working on

IPAC continues to collaborate with the PHC ASP. This collaboration ensures that upon an inpatient's new positive *C. difficile* Polymerase Chain Reaction (PCR) result, the ASP pharmacist and physician receive real-time alerts, which optimizes antimicrobial therapy.

Next year, we plan to include all laboratory confirmed cases in our communication to ASP so that outpatients can also be followed and treated in a timely manner if necessary.

Figure 5

PHC-associated CDI incidence rate in acute care facilities, 2007/08 to 2015/16



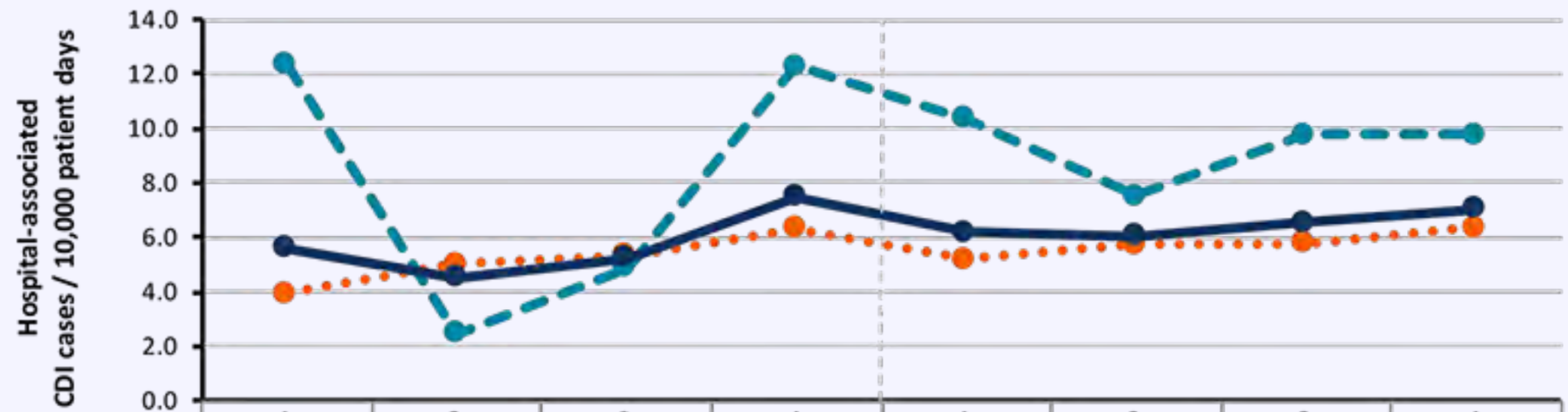
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Rate	8.2	9.9	11.5	12.6	11.1	10.1	8.8	5.9	6.5
Cases	157	189	213	233	203	187	167	111	122

Year

PCR testing introduced in 2010/11 Fiscal Quarter 2 (Period 6)

Figure 6

PHC-associated CDI incidence rate by acute care facility site and fiscal quarter, 2014/15 and 2015/16



	1	2	3	4	1	2	3	4
	2014/15				2015/16			
SPH Rate	3.9	5.0	5.3	6.3	5.2	5.7	5.8	6.4
MSJ Rate	12.3	2.4	4.9	12.3	10.3	7.5	9.8	9.8
PHC Rate	5.6	4.5	5.2	7.5	6.2	6.1	6.5	7.0
SPH Cases	13	17	19	31	17	19	20	32
MSJ Cases	10	2	4	15	8	6	8	12
PHC Cases	23	19	23	46	25	25	28	44

Fiscal quarter

References

[1] *Magill SS, Edwards JR, Bamberg W, Beldavs ZG, Dumyati G, Kainer MA, Lynfield R, Maloney M, McAllister-Hollod L, Nadle J, Ray SM, Thompson DL, Wilson LE, Fridkin SK; Emerging Infections Program Healthcare-Associated Infections and Antimicrobial Use Prevalence Survey Team. Multistate point-prevalence survey of health care-associated infections. N Engl J Med. 2014. 370(13):1198-208.*

[2] *Eyre DW, Cule ML, Wilson DJ. Diverse sources of* C. difficile *infection identified on whole genome sequencing. N Engl J Med. 2013. 369: 1195-1205.*

[3] Koo HL, Van JN, Zhao M, Ye X, Revell PA, Jiang ZD, Grimes CZ, Koo DC, Lasco T, Kozinetz CA, Garey KW, DuPont HL. Real-time polymerase chain reaction detection of asymptomatic Clostridium difficile colonization and rising C. difficile-associated disease rates. Infect Control HospEpidemiol. 2014. 35(6):667-73.

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Photo: Loupe & Marker

SURVEILLANCE

METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

Background

MRSA are antibiotic-resistant bacteria that are transmissible in hospital, long-term care and community settings.

Colonization with MRSA places patients at risk for developing serious and difficult-to-treat MRSA infections.[1] In hospital, MRSA infections are associated with increased length of stay, higher mortality and increased costs.

Early identification of patients colonized with MRSA through admission screening and prompt implementation of infection control measures can prevent transmission of MRSA. Admission screening at St. Paul's Hospital (SPH) and Mount Saint Joseph Hospital (MSJ) is risk-factor based, except for in General Medicine and ICU where all patients are screened. In the ICU, patients are screened on admission and subsequently at weekly intervals. All newly identified MRSA cases trigger subsequent screenings of patient's roommates.

Outcome

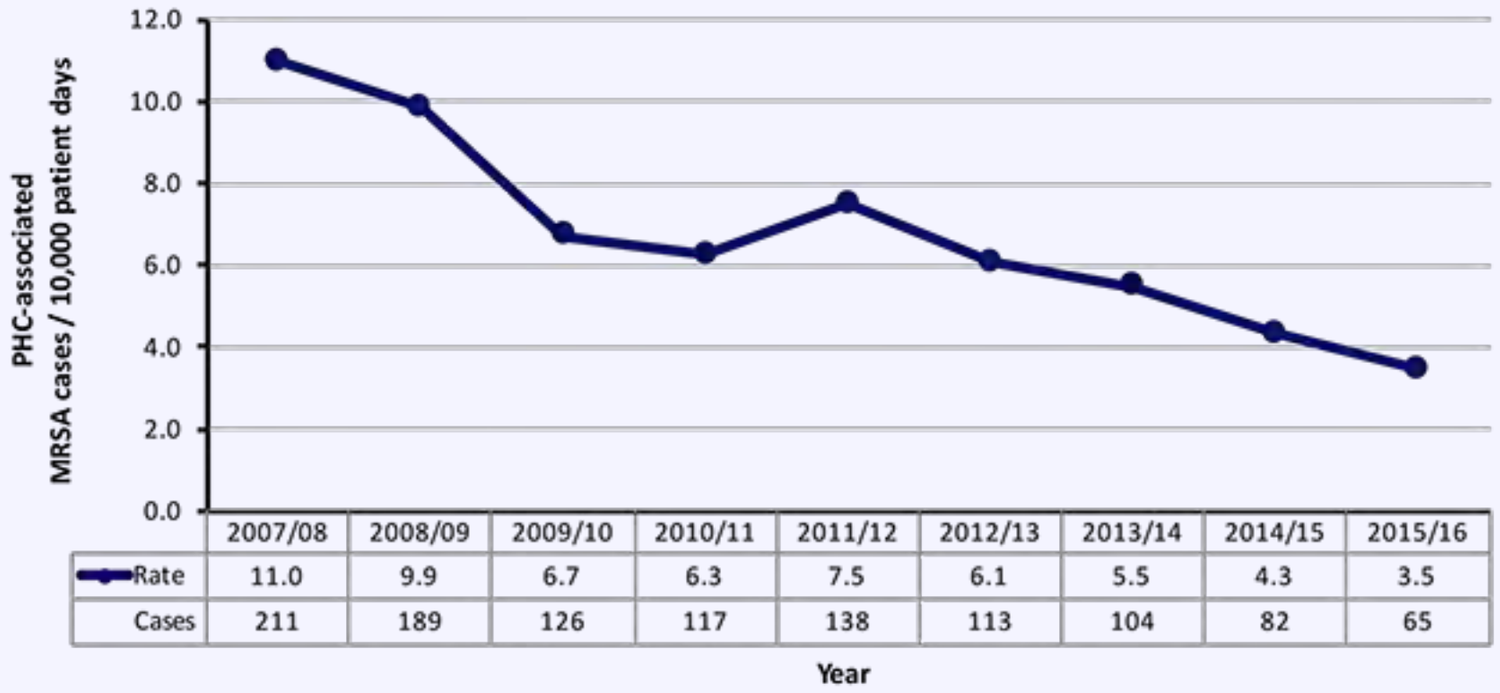
- In 2015/16, there were 692 new cases of MRSA identified at PHC facilities.
- 9% (65 cases) were classified as PHC-associated.
- The PHC-associated incidence rate was 3.5 cases/10,000 patient days (95% CI: 2.7-4.4).
- The PHC-associated MRSA rate in 2015/16 was not statistically significantly different compared to last fiscal year (p=0.18).
- 54% of PHC-associated cases were identified through hospital admission screening programs and contact tracing, while remaining cases were identified from clinical specimens.

What we are working on

IPAC continues to work closely with leaders and frontline staff of the Emergency and Medicine Departments to ensure timely ordering and collection of the admission screens. In an effort to further prevent MRSA transmission in hospital, there has been an ongoing evaluation of antiseptic cloths used for patient bathing on select SPH Medicine units during the 2015/16 fiscal year. Read more about this initiative.

Figure 7

PHC-associated MRSA incidence rate in acute care facilities, 2007/08 to 2015/16



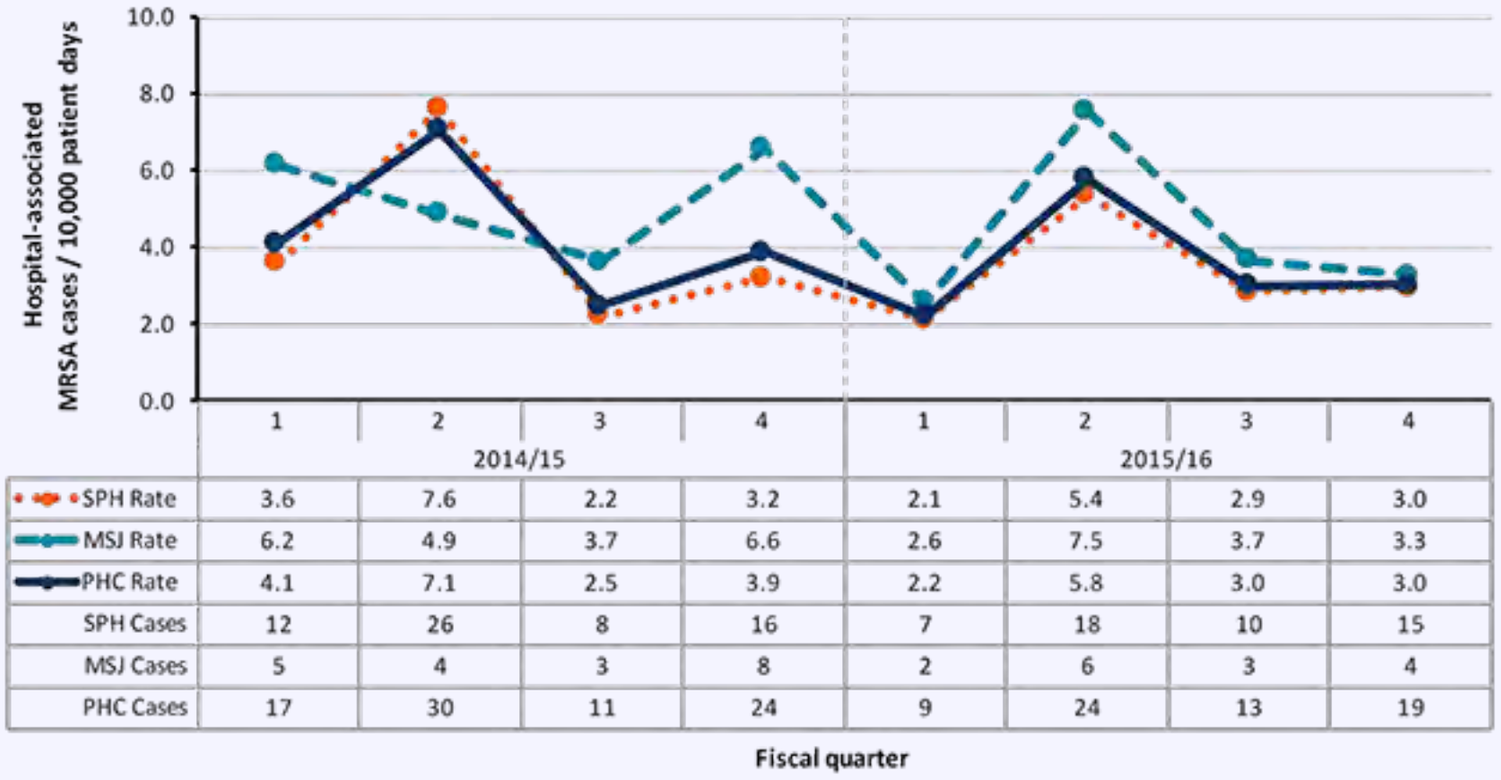


Figure 8

PHC-associated MRSA incidence rate by acute care facility site and fiscal quarter, 2014/15 to 2015/16

Reference

[1] *MacFadden DR, Elligsen M, Robicsek A, Ricciuto DR, Daneman N. Utility of prior screening for methicillin-resistant Staphylococcus aureus in predicting resistance of S. aureus infections. CMAJ. 2013;185(15):E725-30.*

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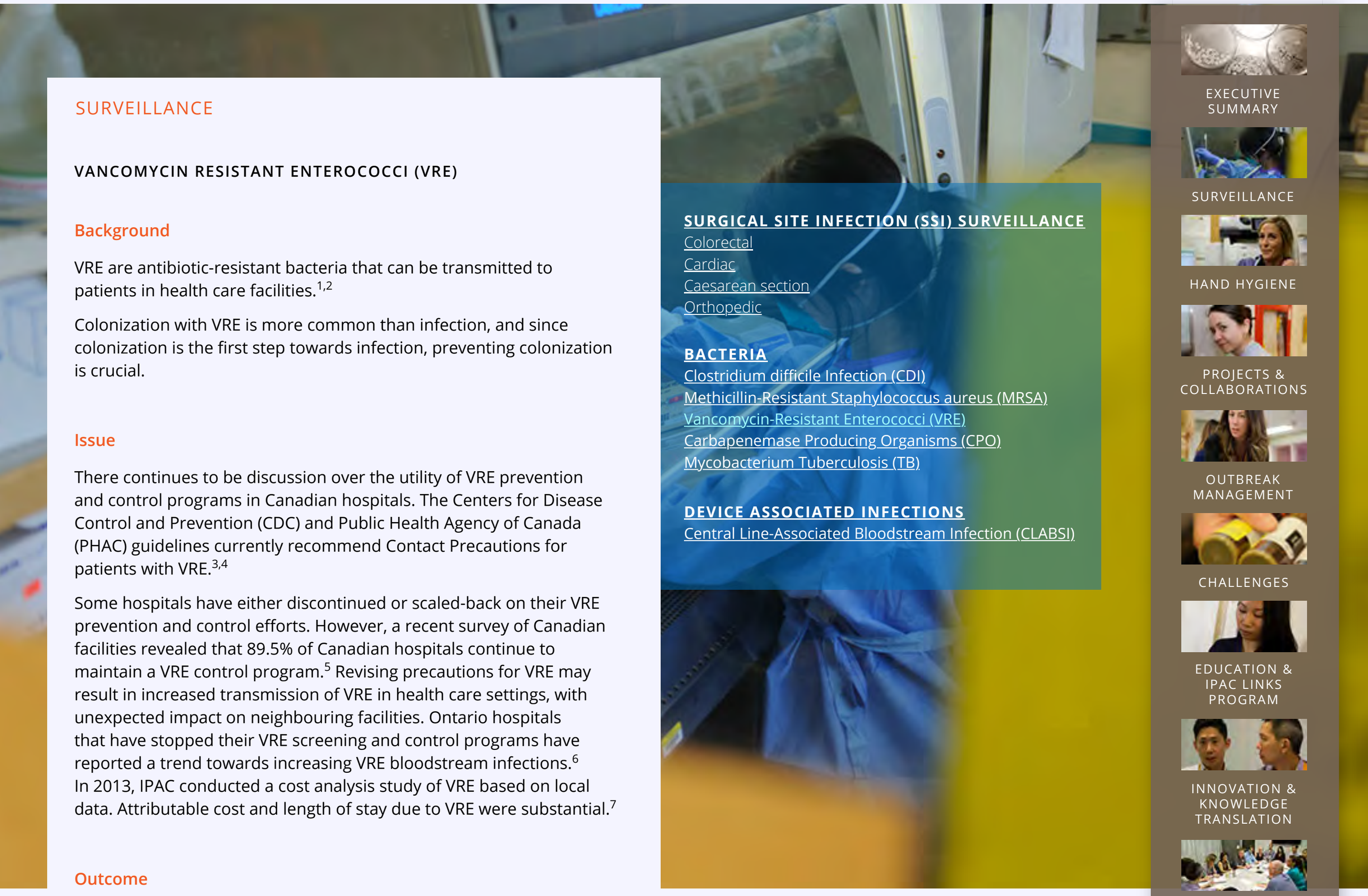


SURVEILLANCE

VANCOMYCIN RESISTANT ENTEROCOCCI (VRE)

Background

VRE are antibiotic-resistant bacteria that can be transmitted to patients in health care facilities.[1,2]

Colonization with VRE is more common than infection, and since colonization is the first step towards infection, preventing colonization is crucial.

Issue

There continues to be discussion over the utility of VRE prevention and control programs in Canadian hospitals. The Centers for Disease Control and Prevention (CDC) and Public Health Agency of Canada (PHAC) guidelines currently recommend Contact Precautions for patients with VRE.[3,4]

Some hospitals have either discontinued or scaled-back on their VRE prevention and control efforts. However, a recent survey of Canadian facilities revealed that 89.5% of Canadian hospitals continue to maintain a VRE control program.[5] Revising precautions for VRE may result in increased transmission of VRE in health care settings, with unexpected impact on neighbouring facilities. Ontario hospitals that have stopped their VRE screening and control programs have reported a trend towards increasing VRE bloodstream infections.[6] In 2013, IPAC conducted a cost analysis study of VRE based on local data. Attributable cost and length of stay due to VRE were substantial.[7]

Outcome

- There were 568 new cases of VRE identified at PHC facilities.
- 58% (331 cases) were classified as PHC-associated.
- The PHC-associated incidence rate was 17.6 cases/10,000 patient days (95% CI: 15.7-19.6).
- The PHC-associated VRE rate in 2015/16 was not statistically significantly different compared to last fiscal year (p=0.5).
- 82% of PHC-associated cases were identified through hospital admission screening programs and contract tracing while remaining cases were identified through clinical specimens.

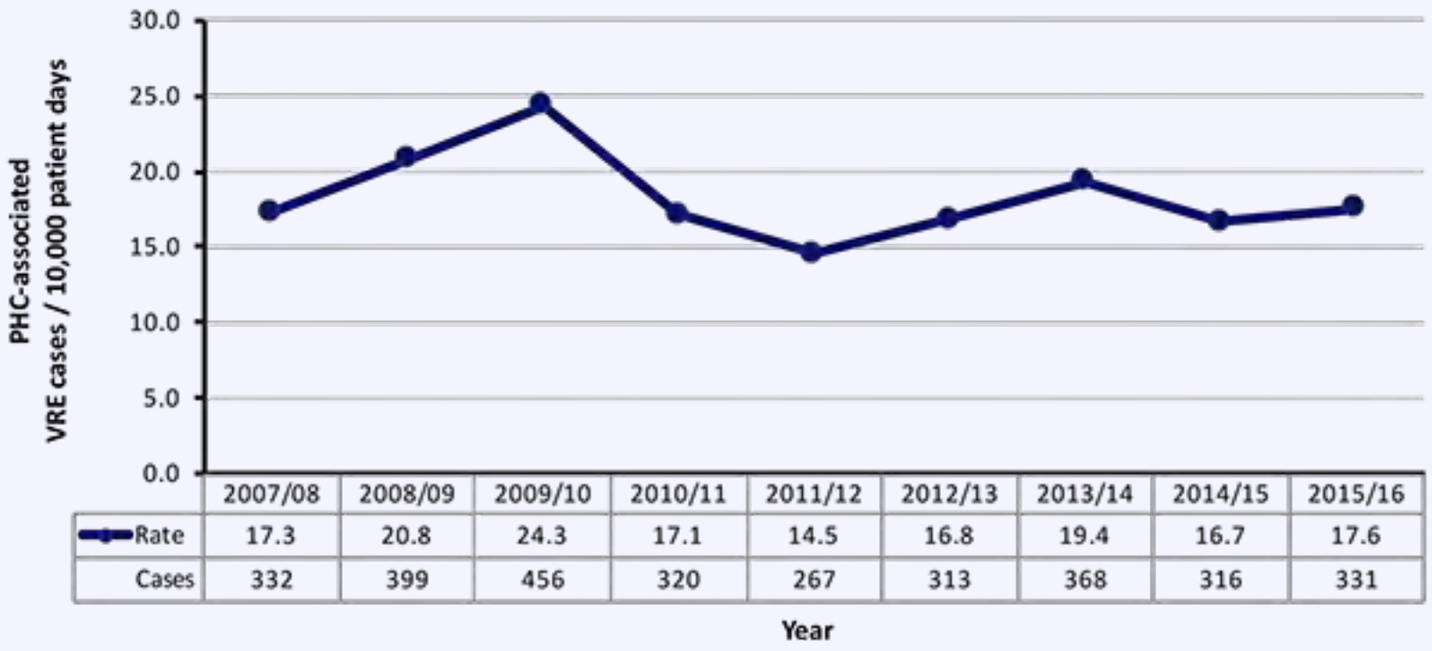
What we're working on

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

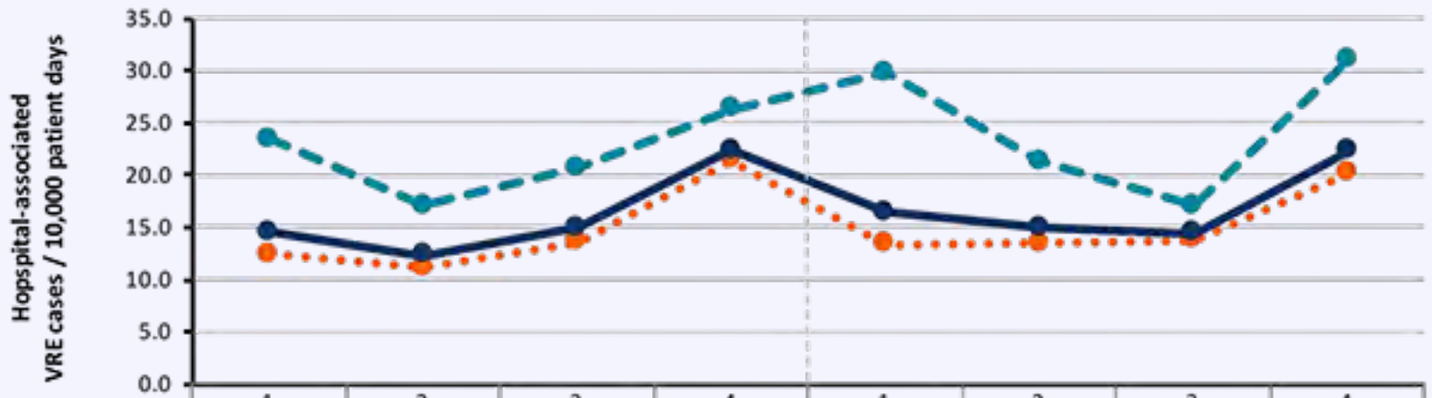
Figure 9

PHC-associated VRE incidence rate in acute care facilities, 2007/08 to 2015/16

Photo: Loupe & Marker



	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Rate	17.3	20.8	24.3	17.1	14.5	16.8	19.4	16.7	17.6
Cases	332	399	456	320	267	313	368	316	331



	1	2	3	4	1	2	3	4
	2014/15				2015/16			
SPH Rate	12.4	11.1	13.6	21.4	13.3	13.4	13.7	20.2
MSJ Rate	23.4	17.1	20.7	26.2	29.8	21.3	17.1	31.0
PHC Rate	14.5	12.3	14.9	22.4	16.4	14.9	14.4	22.3
SPH Cases	41	38	49	106	44	45	48	102
MSJ Cases	19	14	17	32	23	17	14	38
PHC Cases	60	52	66	138	67	62	62	140

Figure 10

PHC-associated VRE incidence rate by acute care facility site and fiscal quarter, 2014/15 to 2015/16

References

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[2] *Murray, B. E. Vancomycin resistant enterococcal infections. N Engl J Med. 2000. 342: 710–21.*

[3] *Siegel JD, Rhinehart E, Jackson M, et al. The Healthcare Infection Control Practices Advisory Committee (HICPAC). Management of Multidrug-Resistant Organisms In Healthcare Settings. 2006.*

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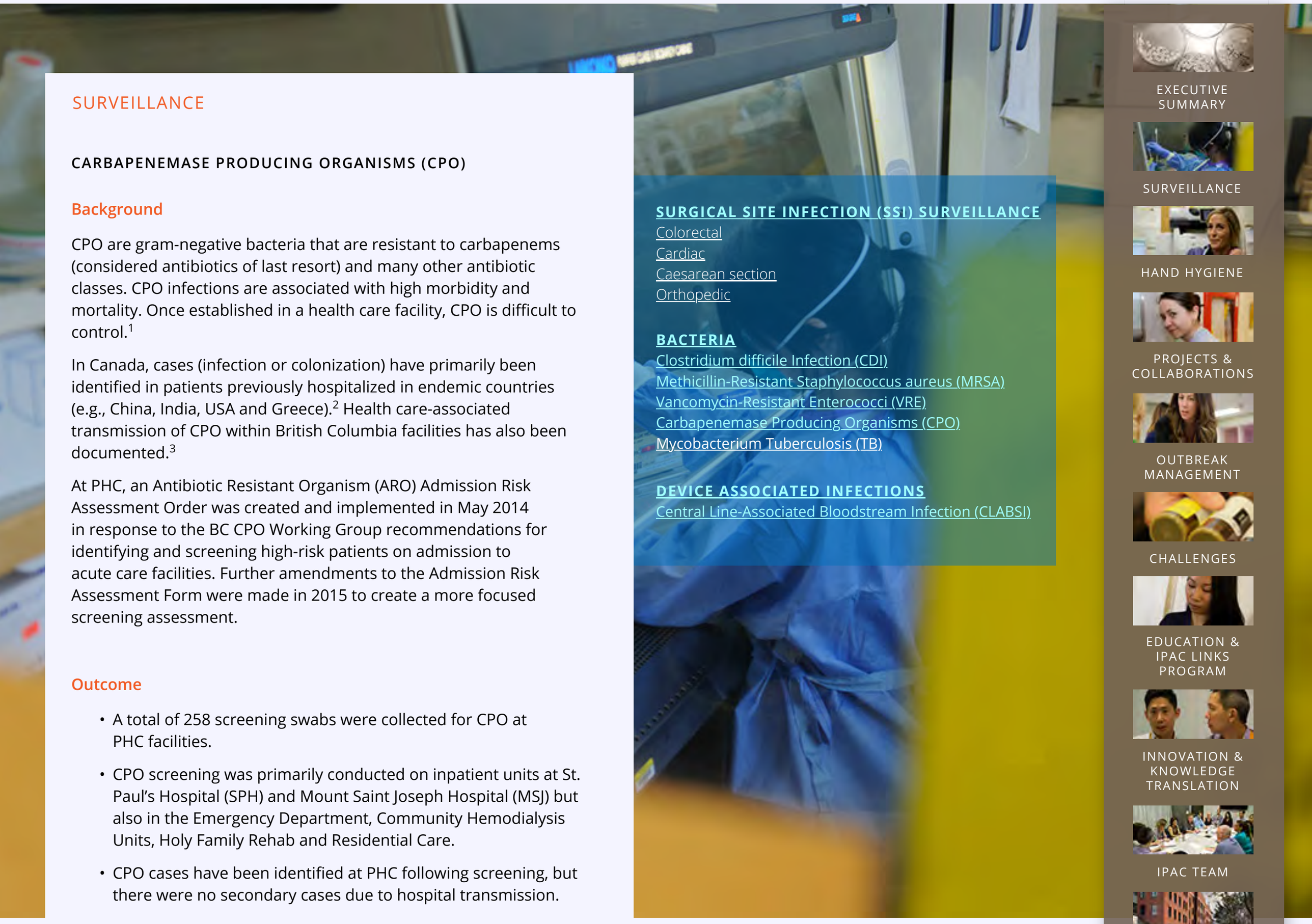

SURVEILLANCE

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. Once established in a health care facility, CPO is difficult to control.[1]

In Canada, cases (infection or colonization) have primarily been identified in patients previously hospitalized in endemic countries (e.g., China, India, USA and Greece).[2] Health care-associated transmission of CPO within British Columbia facilities has also been documented.[3]

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 2015 to create a more focused screening assessment.

Outcome

- A total of 258 screening swabs were collected for CPO at PHC facilities.
- CPO screening was primarily conducted on inpatient units at St. Paul's Hospital (SPH) and Mount Saint Joseph Hospital (MSJ) but also in the Emergency Department, Community Hemodialysis Units, Holy Family Rehab and Residential Care.
- CPO cases have been identified at PHC following screening, but there were no secondary cases due to hospital transmission.

What we're working on

PHC continues to collaborate with other health authorities to maintain a provincial approach to preventing CPO transmission in health care facilities in British Columbia.

References

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Photo: Loupe & Marker

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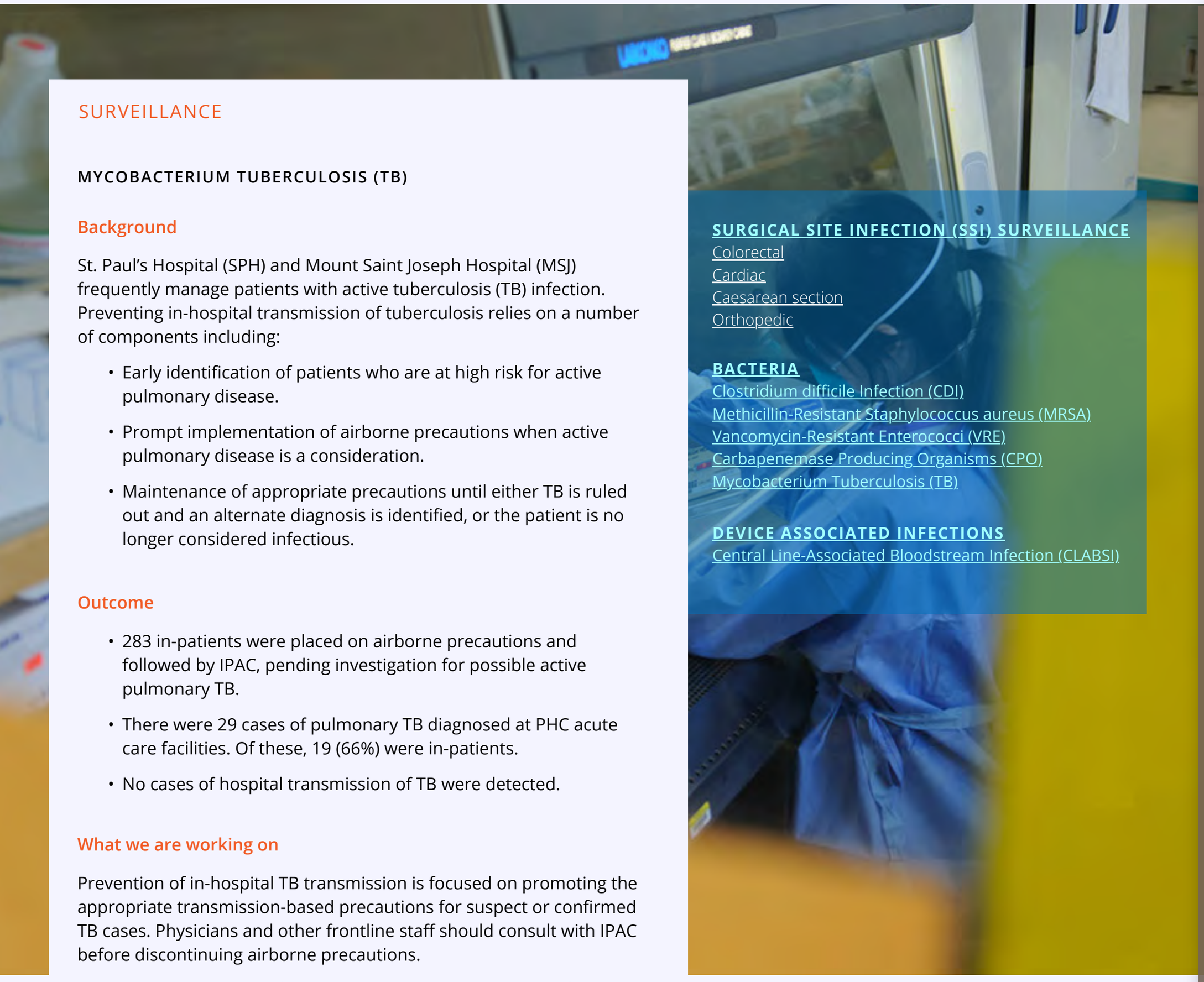

SURVEILLANCE

MYCOBACTERIUM TUBERCULOSIS (TB)

Background

St. Paul's Hospital (SPH) and Mount Saint Joseph Hospital (MSJ) frequently manage patients with active tuberculosis (TB) infection. Preventing in-hospital transmission of tuberculosis relies on a number of components including:

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

Outcome

- 283 in-patients were placed on airborne precautions and followed by IPAC, pending investigation for possible active pulmonary TB.
- There were 29 cases of pulmonary TB diagnosed at PHC acute care facilities. Of these, 19 (66%) were in-patients.
- No cases of hospital transmission of TB were detected.

What we are working on

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

We continue to improve the Assessment, Communication and Education (ACE) tool to guide risk assessments and standardize ICP documentation and recommendations. We also work closely with Vancouver Coastal Health (VCH) Public Health, Occupational Health & Safety (OHS) and Workplace Health Call Centre (WHCC) to align our efforts in contact tracing.

Photo: Loupe & Marker

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SURVEILLANCE

DEVICE-ASSOCIATED INFECTIONS

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 stays and increased patient morbidity and mortality.[1]

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

Outcome

- There were six CLABSI in 2015/16 and the rate of infection was 1.3 cases per 1,000 catheter days.
- This rate is similar to the rate from last year (1.4 cases per 1,000 catheter days).
- The most common CLABSI organism (3/6) for 2015/2016 was *Enterococcus faecium*.

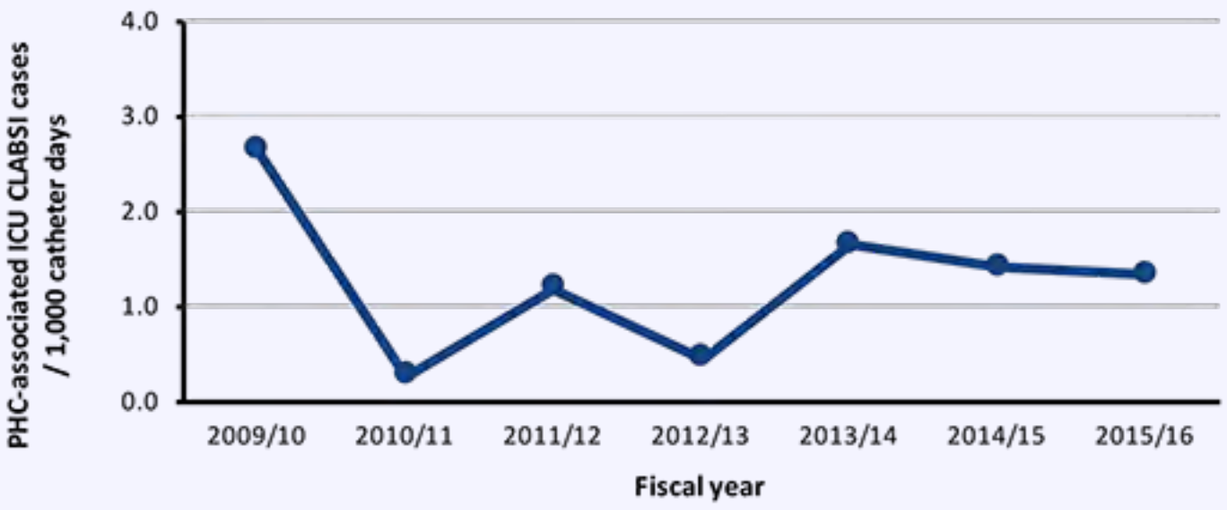
What we are working on

IPAC continues to promote best practices in reducing the risk of infection for ICU patients, as well as monitoring and analyzing CLABSI cases. Our efforts continue to be focused on sharing the surveillance information with the ICU to advance the education provided for those inserting and maintaining central lines.

Photo: Loupe & Marker

Figure 11

PHC-associated ICU CLABSI incidence rate by fiscal year, 2009/10 to 2015/16



*Note: *PCR testing was introduced in 2010/11 Fiscal Quarter 2 (Period 6)*

Reference

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HAND HYGIENE

Background

It is estimated that in developed countries, five to ten per cent of patients admitted to acute care hospitals acquire an infection.[1] In high-risk settings, such as an ICU, more than one-third of patients can be affected. Effective hand hygiene is the single most important strategy to prevent health care-associated infections.

The Ministry of Health target for hand hygiene compliance is 80%. PHC's target is 85%.

Issue

Compliance with hand hygiene among health care professionals is a challenge. At PHC, we continue to make improvements in hand hygiene compliance and practices.

This past year, major hand hygiene educational and promotional activities at PHC included:

- Expansion of hand hygiene zones, identified by "Clean Hand Zone" signage.
- Expansion of hand hygiene audits to residential care.
- Unit based responsibility for hand hygiene performance results.
- Emphasis on hand hygiene "before" patient contact (currently the area where compliance rates are lowest).
- Continuation of the health care workers' "It's OK to Ask" pledge (a commitment to being reminded by patients and colleagues if there are missed hand hygiene opportunities).
- Role modeling and staff engagement by IPAC Links.

Outcome

In 2015/16, average PHC hand hygiene compliance across all health care workers in acute care facilities was:

- 83% "before" and "after" patient contact combined
- 74% "before" patient contact
- 89% "after" patient contact

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

- 78% "before" and "after" patient contact combined
- 64% "before" patient contact
- 89% "after" patient contact

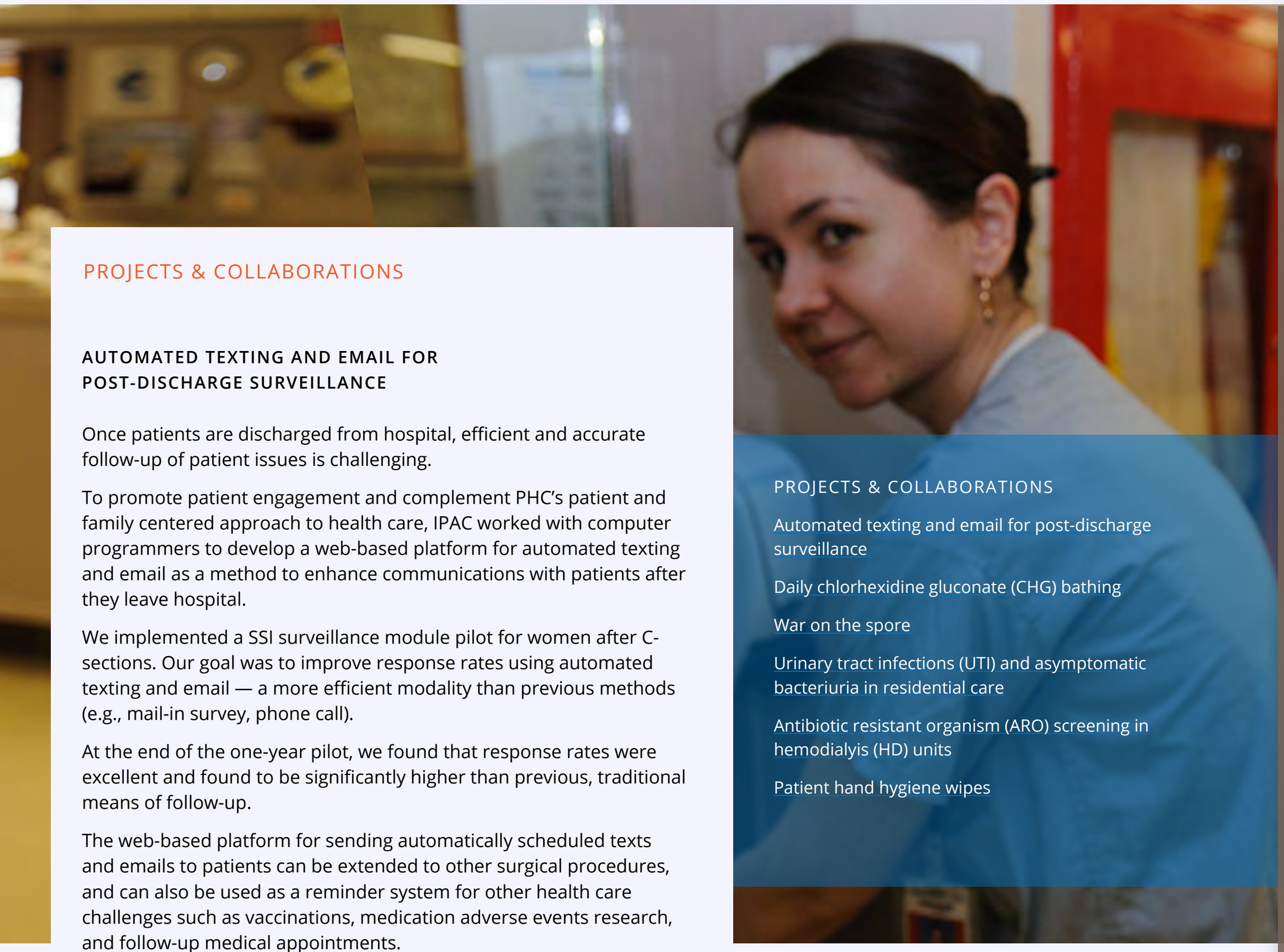
What we are working on

For 2016/17, hand hygiene "before" patient contact will be the PHC focus for improvement to reach PHC's target.

Reference

[1] *World Health Organization. 2009. WHO Guidelines on Hand Hygiene in Health Care.*

Photos: BoldFish Video and HEABC



PROJECTS & COLLABORATIONS

AUTOMATED TEXTING AND EMAIL FOR POST-DISCHARGE SURVEILLANCE

Once patients are discharged from hospital, efficient and accurate follow-up of patient issues is challenging.

To promote patient engagement and complement PHC's patient and family centered approach to health care, IPAC worked with computer programmers to develop a web-based platform for automated texting and email as a method to enhance communications with patients after they leave hospital.

We implemented a SSI surveillance module pilot for women after C-sections. Our goal was to improve response rates using automated texting and email — a more efficient modality than previous methods (e.g., mail-in survey, phone call).

At the end of the one-year pilot, we found that response rates were excellent and found to be significantly higher than previous, traditional means of follow-up.

The web-based platform for sending automatically scheduled texts and emails to patients can be extended to other surgical procedures, and can also be used as a reminder system for other health care challenges such as vaccinations, medication adverse events research, and follow-up medical appointments.

We will be testing new applications for the platform and welcome input from other health care workers on the use of this platform to improve efficiency in following patients after they leave hospital.

DAILY CHLORHEXIDINE GLUCONATE (CHG) BATHING

Preventing transmission of MRSA and VRE in hospital is challenging, particularly at PHC because of the following factors:

- A limited availability of single bed rooms.
- A patient population at risk for being colonized with these organisms.
- A high nursing workload with many competing demands.

Chlorhexidine gluconate (CHG) is an antiseptic that is effective against MRSA and VRE. Pre-packaged CHG impregnated cloths were evaluated for medical inpatients at St. Paul's Hospital (SPH) as a novel way to accomplish the following:

- Complement existing strategies to prevent hospital-associated transmission of MRSA and VRE.
- Improve the frequency of patient bathing.
- Reduce health care worker workload required for patient bathing.

PHC IPAC has collaborated with the Medicine Program to implement this quality improvement initiative. Initial analyses showed a 55% and 36% reduction of hospital-associated MRSA and VRE, respectively. Further investigation is being conducted to assess the sustainability of daily CHG bathing in Medicine.

PROJECTS & COLLABORATIONS

Automated texting and email for post-discharge surveillance

Daily chlorhexidine gluconate (CHG) bathing

War on the spore

Urinary tract infections (UTI) and asymptomatic bacteriuria in residential care

Antibiotic resistant organism (ARO) screening in hemodialyis (HD) units

Patient hand hygiene wipes

Photo: Loupe & Marker

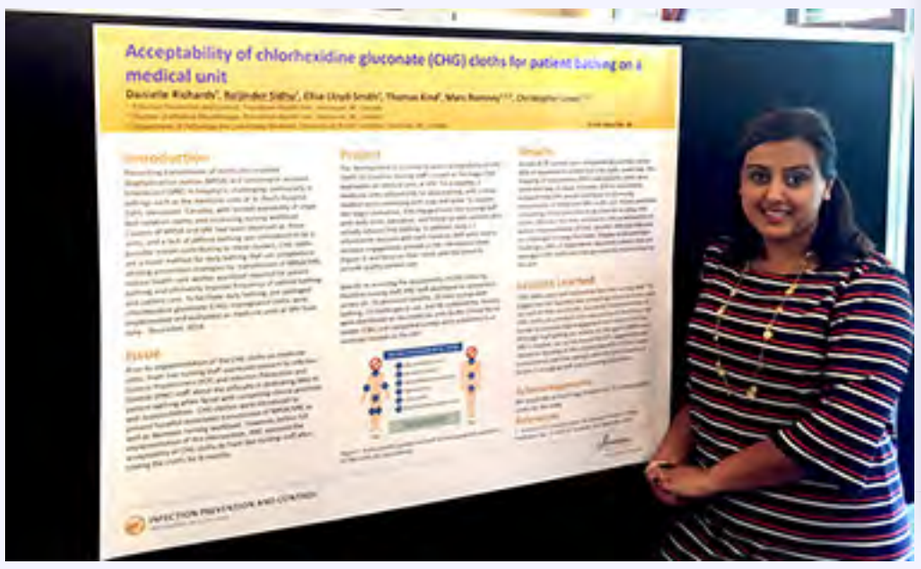


Photo: BoldFish Video and HEABC

WAR ON THE SPORE

Antimicrobial use is a key risk factor for *Clostridium difficile* infection (CDI).

This year, we continued the "War on the Spore" collaboration with the PHC Antimicrobial Stewardship Program (ASP).

From Monday to Friday, ICPs notified the ASP team of all patients and residents with a laboratory diagnosis of CDI. This collaboration facilitated timely patient assessments to ensure appropriate use of antibiotics and treatment of CDI.

For 2016/17, we are expanding this collaboration to include outpatients and discharged patients with the aim to reduce readmissions and emergency visits for CDI-related complications.

URINARY TRACT INFECTIONS (UTI) AND ASYMPTOMATIC BACTERIURIA IN RESIDENTIAL CARE

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

The main goal of this project is to reduce the number of urine cultures collected from residents at PHC residential care homes.

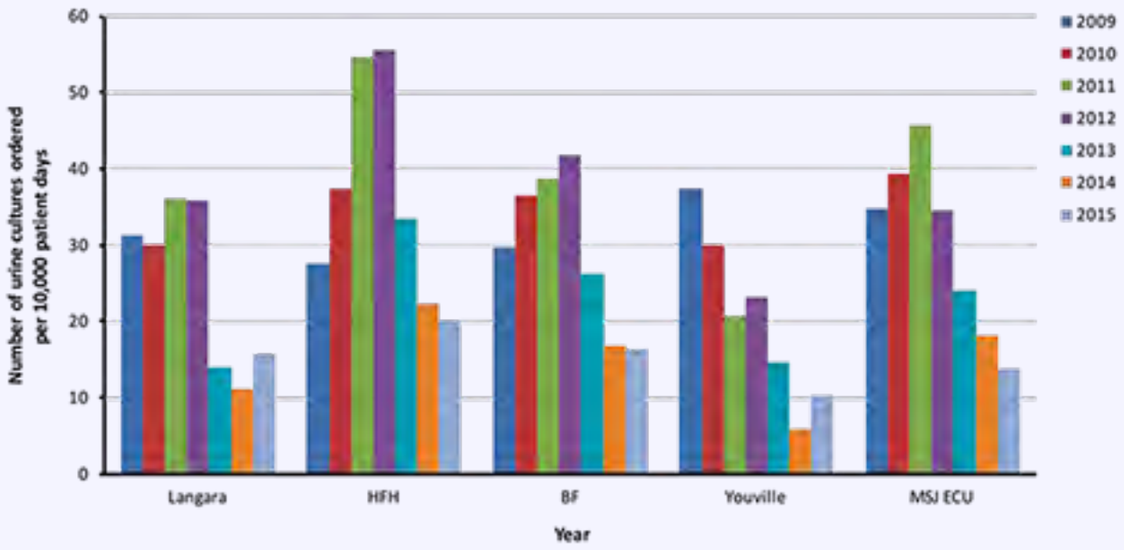
In the first year of this study, IPAC focused on providing audit and feedback to nurses and physicians for all urine cultures collected at St. Vincent's: Langara's residence from January to December 2013. This substantially reduced the number of urine cultures ordered and collected and ultimately reduced antimicrobial use for asymptomatic bacteriuria.

The audit and feedback were stopped, but data continued to be collected regarding the total number of urine cultures ordered and collected at the residential care sites. Follow-up over the years was done to see if the initial intensive audit and feedback, and education, for the residential care facilities would be sustained without having IPAC actively reviewing orders for urine cultures. Antmicrobial use also decreased for suspected UTIs.

Below we have included the number of urine cultures/10,000 resident days dating back to 2009 to show the significant decrease in urine cultures ordered. The most significant decrease was seen at Langara, where the most intense audit and feedback interventions occurred. We will continue to monitor urine culture testing and repeat the interventions as required.

Figure 12

Urine cultures ordered per 10,000 patient days in PHC residential care facilities, 2009 to 2015



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

ANTIBIOTIC RESISTANT ORGANISM (ARO) SCREENING IN HEMODIALYSIS (HD) UNITS

In collaboration with PHC's hemodialysis program, IPAC has been conducting Antibiotic Resistant Organism (ARO) screens for the In-Centre Community Dialysis Unit (ICDU) and Community Dialysis

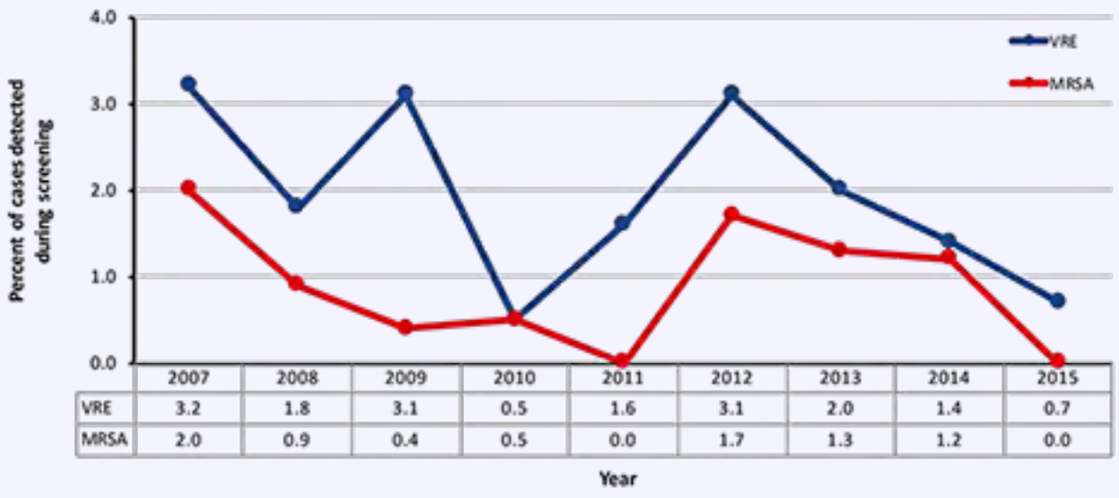
Units (CDU) since 2007.

The goal of this screening is to:

- Examine ARO prevalence and incidence in HD units.
- Identify new patients with an ARO so that contact precautions can be implemented.

Figure 13

Percent of new cases of VRE and MRSA identified in In-Centre Dialysis Unit (ICDU) during screening periods, 2007 to 2015



	2007	2008	2009	2010	2011	2012	2013	2014	2015
VRE	3.2	1.8	3.1	0.5	1.6	3.1	2.0	1.4	0.7
MRSA	2.0	0.9	0.4	0.5	0.0	1.7	1.3	1.2	0.0

PATIENT HAND HYGIENE WIPES

Patient and resident hand hygiene is an important step in preventing the spread of infection in health care facilities. Hospitalized patients and residents are often unable to perform hand hygiene independently for reasons of incapacity or immobility and therefore rely on health care workers to encourage and assist them to perform this task.

In June 2015, IPAC initiated a 4-week distribution trial of patient hand wipes before meals on the Urban Health Unit at St. Paul's Hospital (SPH). Staff perceptions were assessed with pre and post-trial surveys. The trial was found to be successful with 93% of staff saying that they liked the convenience of the wipes and 80% feeling that continued use of these wipes would improve patient engagement in their own care. The wipes are now routinely offered before meals on the Urban Health Unit.

IPAC has expanded the hand wipe trial to residential care at St. Vincent's: Langara and a medical/surgical unit at Mount St. Joseph Hospital (MSJ). The initiative was also shown to be successful in these patient care environments, with both areas choosing to continue providing the wipes before meals after trial completion.

IPAC would like to take the patient/resident hand wipe initiative PHC-wide and are currently engaging with key stakeholders to discuss feasibility and develop a coordinated strategy for implementation.

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OUTBREAK MANAGEMENT

INFLUENZA OUTBREAKS

There was one laboratory confirmed influenza outbreak in 2015/16, which was in a residential care home. The outbreak was caused by influenza A.

In 2014/15, there were nine influenza outbreaks in PHC facilities (three in acute care and six in residential care).

One potential reason for the decline in the number of outbreaks was that the 2015/16 influenza vaccine was more effective against influenza A (H1N1) pdm09 (64% [95% CI 44-77%]) compared to 2014/15.[1,2]

GASTROENTERITIS OUTBREAKS

One gastroenteritis outbreak was managed in 2015/16. The outbreak was not laboratory confirmed, and lasted five days.

Outbreak Management

Based on outbreak activity in 2014/15, both respiratory and gastrointestinal outbreak protocols at PHC were revised. In tandem, IPAC focused outbreak education on improving frontline awareness of signs and symptoms, rapid containment of symptomatic patients/residents, and communication within the clinical team.

As a result, IPAC saw frequent communication between care teams and our practitioners. This improved our awareness of potential problems allowing ICPs to more fully support the identification, containment and rollout of outbreak measures.

The management and containment of outbreaks would not be successful without strong collaboration from a diverse multidisciplinary team, including site and unit leadership, nursing, physicians, allied health, laboratory staff, pharmacy, and support services, such as housekeeping and food services.

Photo: BoldFish Video and HEABC

Opportunities Arising from Outbreak Debriefings

After each outbreak, the outbreak management team meets to identify strengths and opportunities for improvement in the management of future outbreaks.

Opportunities for improvement continue to include:

- Communication of outbreak status to families and visitors (including education and signage related to outbreak precautions).
- Clarification of patient, resident, and health care worker movement on and off of a unit under outbreak precautions.
- Timely staff and resident annual influenza vaccinations, as well as ensuring appropriate precautions implemented for unvaccinated staff.

References

[1] *Chambers C, Skowronski DM, Sabaiduc S, et al. Interim estimates of 2015/16 vaccine effectiveness against influenza A(H3N2)pdm09, Canada, 2009. Euro Surveill. 2016. 21(11). pii: 30168.*

[2] *Skowronski DM1, Chambers C, Sabaiduc S, et al. Interim estimates of 2014/15 vaccine effectiveness against influenza A(H3N2) from Canada's Sentinel Physician Surveillance Network, January 2015. Euro Surveill. 2015. 0(4). pii: 21022.*

CHALLENGES

TIMELINESS OF ANTIBIOTIC RESISTANT ORGANISM ADMISSION SCREENING

PHC has a policy for screening high-risk patients for Antibiotic Resistant Organisms (AROs), including MRSA, VRE and CPO, upon admission to hospital.

For Medicine units, all patients are screened for MRSA and VRE as the majority of these patients often have at least one risk factor.

PHC's Emergency and Medicine programs made immense improvements in screening for AROs within 12 hours of admission (up to 72 hours). The improvement stems from a process developed in 2014/2015, when the issue of inconsistent ordering and collecting of screening swabs was identified by IPAC and Antimicrobial Stewardship Program (ASP). This resulted in delays in implementing appropriate precautions, unintended mixed cohorting in multi-bed rooms and prescription of inappropriate empiric antibiotics.

ASYMPTOMATIC *CLOSTRIDIUM DIFFICILE* COLONIZATION

Asymptomatic *C. difficile* colonization refers to patients who test positive for *C. difficile* by a laboratory method but do not have symptoms of infection.

Antibiotic treatment is not recommended for those colonized with *C. difficile*. To help decrease the incorrect over-diagnosis of CDI, stool specimen collection for *C. difficile* testing should be limited to individuals with symptoms.

IPAC continues to work with frontline staff to only order stool for *C. difficile* polymerase chain reaction (PCR) in those with symptoms of CDI (≥ 2 loose stools in the previous 24 hours). If a patient has loose stools for other obvious reasons (e.g., laxative use), *C. difficile* testing is not recommended.

Laboratory testing for *C. difficile* does not differentiate between colonization and infection, and clinical correlation is always required.

FEEDBACK BOARDS

IPAC continues to use feedback boards to disseminate quarterly hand hygiene audit results and monthly MRSA, VRE and CDI surveillance findings at the unit level. Feedback boards aim to provide timely data that is relevant to stakeholders.

This past year, IPAC created a working group to improve the feedback boards by revisiting formatting, style and placement on the units. This working group focused on engaging the appropriate stakeholders, including IPAC Links, for frontline support and feedback.

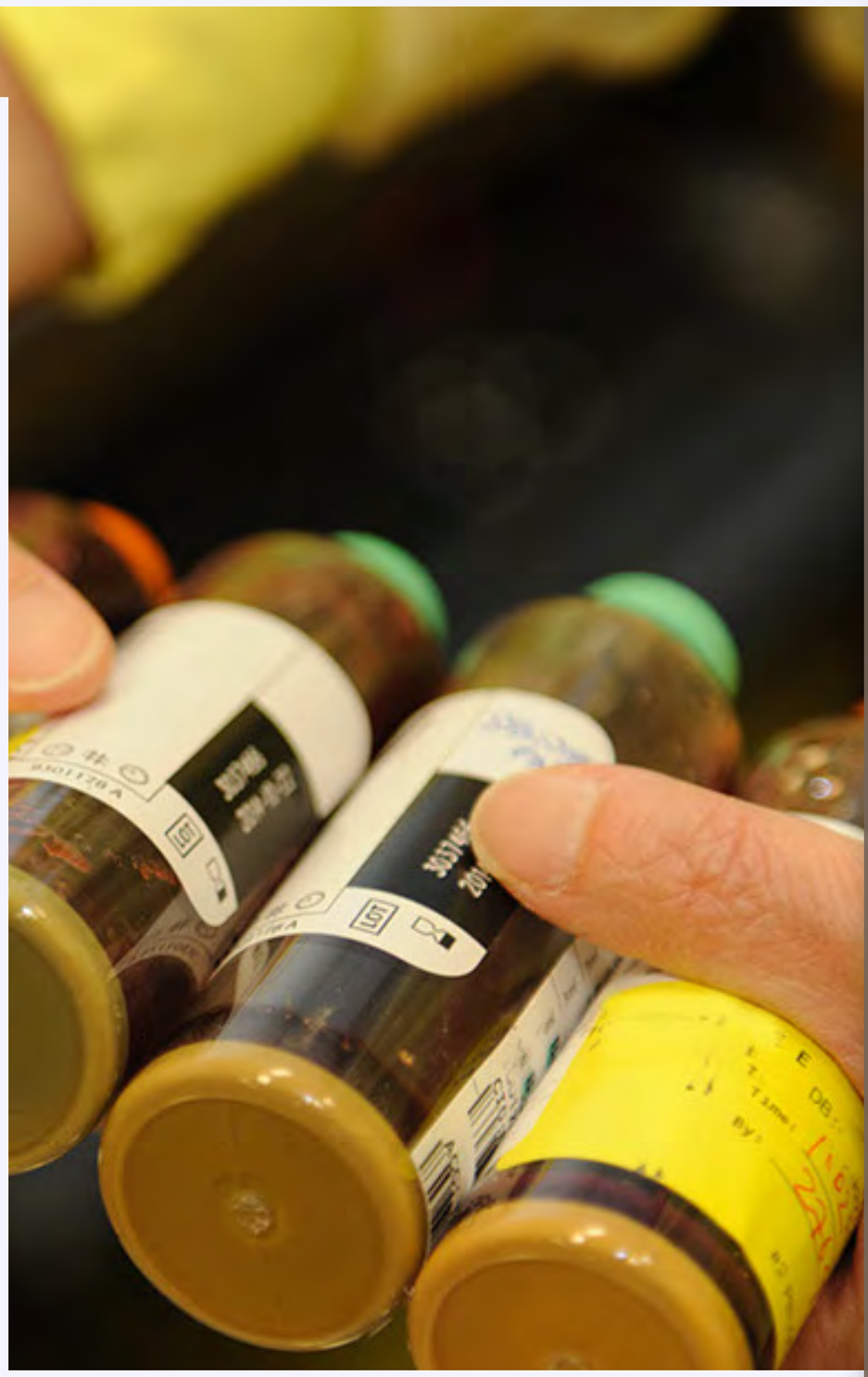

Photo: Loupe & Marker

EDUCATION & IPAC LINKS PROGRAM

EDUCATION OPPORTUNITIES PROVIDED BY IPAC

The PHC IPAC Links Program plays an integral role in promoting multidisciplinary engagement and ownership of infection control issues at the unit level. The current role of the Links program has expanded to include social workers, lab technicians, respiratory therapists and ward aides, in addition to the large component of nurses.

The Links Program orientation provides staff an opportunity to learn about broader infection control-related topics such as cleaning and disinfection, medical microbiology and adult learning strategies. “Links” engage with fellow staff members by acting as role models and being visible advocates for IPAC. The Links also enable individuals and their teams to learn more about infection prevention practice and to engage with their local ICP.

A quarterly newsletter entitled "The Bug Brief" provides current and up-to-date information about IPAC topics, with specific focus on the unit level.

The PHC IPAC Links Program now boasts over 275 trained Links. The Links sustain the initiative through their commitment to infection control practices and their enthusiastic engagement on their respective units.

This past year, IPAC supported the Infection Prevention and Control Department at Fraser Health in starting their own Links program. The sharing of the IPAC Links Program model supports best practice throughout the province to promote patient safety.

IPAC encourages those who wish to become a Link to contact our department.

Photo: BoldFish Video and

INNOVATION AND KNOWLEDGE TRANSLATION

IPAC ABSTRACT PRESENTATIONS

Automated text and email improves surveillance for Caesarean section surgical site infections.

V. Leung, M. McNaughton, C. Lowe, K. Laporte, D Puddicombe, M Romney, and E. Lloyd-Smith. 2016 AMMI Canada/CACMID Annual Conference. Vancouver, British Columbia. March 30 – April 2, 2016. ***Winner of the Association of Medical Microbiology and Infectious Disease (AMMI) Canada Incubator Competition.***

Further building on electronic methods for post-discharge surveillance of surgical site infections (SSI), we implemented automated email and texting to follow-up with patients after Caesarean section. Response rates rose to 87%. Automated surveillance improved SSI detection while saving time required by ICPs to investigate by conventional means.

Acceptability of chlorhexidine gluconate (CHG) cloths for patient bathing on a medical unit.

D. Richards, B. Sidhu, E. Lloyd-Smith, T. Kind, M. Romney, C. Lowe. IPAC Canada 2015 National Education Conference. Victoria, British Columbia. May 15 – 18, 2016. ***Winner of the IPAC Canada 2015 National Education Conference Best Poster Award.***

Nursing perceptions were assessed after introduction of CHG cloths for preventing the transmission of MRSA and VRE on medical units. 81% of staff surveyed felt the cloths decreased bathing times and 88% shared a desire to have the cloths permanently on the unit.

Improved accuracy of surgical site infection surveillance utilizing email for post-discharge follow-up among women who undergo Caesarean section.

E. Lloyd-Smith, C.F. Lowe, M. McNaughton, M.G. Romney and V. Leung. IDWeek 2015. San Diego, California. October 7 – 11, 2015.

Post-discharge surveillance for surgical site infections (SSI) after Caesarean section was enhanced by incorporating emails for electronic follow-up, in addition to conventional phone calls and mail surveys. Response rates increased from 20% with mail surveys to 73% via email, enabling IPAC to detect significantly more SSI, including deep incisional and organ space infections.

Daily chlorhexidine gluconate bathing for medical inpatients: Reducing the incidence of hospital-associated MRSA and VRE.

C. F. Lowe, E. Lloyd-Smith, B. Sidhu, A. Sharma, D. Richards, T. Kind, V. Leung and M.G. Romney. IDWeek 2015. San Diego, California. October 7 – 11, 2015.

Daily chlorhexidine gluconate (CHG) bathing has been utilized in critical care for the prevention of MRSA and VRE transmission, but limited data is available for medical units. After a six-month assessment, hospital-associated MRSA (15.9 vs. 4.5, p=0.016) and VRE (30.7 vs. 15.6, p=0.036) was decreased in comparison to units using soap and water for patient bathing.

Assessment of chlorhexidine gluconate (CHG) resistance in the setting of suboptimal compliance of CHG use on medical inpatient units.

Photo: BoldFish Video and HEABC

C.F. Lowe, G. Ritchie, B. Sidhu, A. Sharma, W. Jang, A. Wong, V. Leung, S. Champagne, E. Lloyd-Smith and M.G. Romney. IDWeek 2015. San Diego, California. October 7 – 11, 2015.

Compliance with daily CHG bathing is a challenge outside of critical care. To assess for the potential of inducing CHG resistance in *S. aureus* due to non-compliance, IPAC collaborated with the St. Paul's Hospital (SPH) Medical Microbiology laboratory to implement an in-house developed PCR for CHG resistance. No significant differences in the detection of CHG resistance genes were identified between the units utilizing CHG compared to soap and water.

Decreased rates of hospital-associated MRSA and VRE with daily chlorhexidine gluconate bathing for medical inpatients.

C. F. Lowe, E. Lloyd-Smith, B. Sidhu, A. Sharma, D. Richards, T. Kind, V. Leung and M.G. Romney. 2016 AMMI Canada/CACMID Annual Conference. Vancouver, British Columbia. March 30 – April 2, 2016.

The results of a 15-month prospective crossover study on medical inpatient units at SPH regarding daily CHG bathing were presented. Hospital-associated MRSA was decreased by 55% and VRE by 36% in units utilizing daily CHG bathing compared to soap and water. Further study will be needed for the use of daily CHG bathing on medical units as maintenance of compliance is critical to its effectiveness in preventing hospital-associated infections.

Assessment of the development of chlorhexidine gluconate resistance in Staphylococcus aureus on Medical inpatient units.

C.F. Lowe, G. Ritchie, B. Sidhu, A. Sharma, W. Jang, A. Wong, V. Leung, S. Champagne, E. Lloyd-Smith and M.G. Romney. 2016 AMMI Canada/CACMID Annual Conference. Vancouver, British Columbia. March 30 – April 2, 2016.

CHG resistance was further analyzed in this follow-up study, utilizing both an in-house PCR for CHG resistance genes (qacA/B and smr) and agar dilution for hospital-associated S. aureus identified during the 15-month study. One isolate was non-susceptible to CHG (8µg/mL). For facilities implementing daily CHG bathing in non-critical care, ongoing surveillance for CHG resistance should be conducted.

INFECTION PREVENTION AND CONTROL (IPAC) TEAM

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

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

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

The practices of the IPAC team are based on sound scientific principles. Infection control services are provided to PHC with structure and authority in collaboration with local, regional and provincial partners.

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

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

Top row left to right: Jim Curtin, Brenda Carroll, Kelsi Laporte, Baljinder Sidhu, Ted Pincock; **middle row left to right:** Danielle Richards, Thomas Kind, Christopher Lowe, Victor Leung; **bottom row left to right:** David Puddicombe, Mary McNaughton, Camilia Palacios, Luz Vierneza, Sean Shakeraneh, Michael Payne.

Photos: BoldFish Video and HEABC

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Thomas Kind, RN
Infection Control Practitioner

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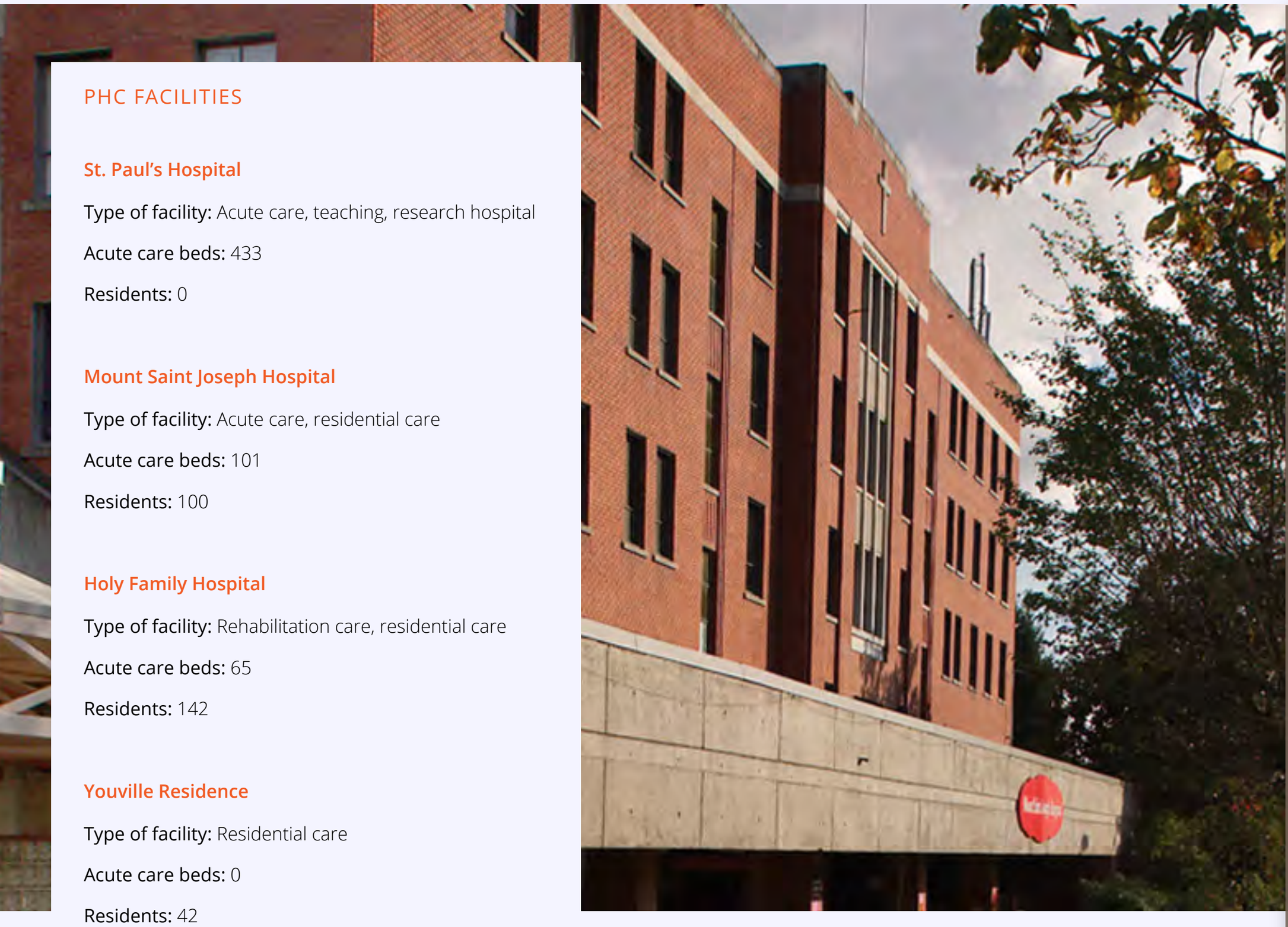


PHC FACILITIES

St. Paul's Hospital

Type of facility: Acute care, teaching, research hospital

Acute care beds: 433

Residents: 0

Mount Saint Joseph Hospital

Type of facility: Acute care, residential care

Acute care beds: 101

Residents: 100

Holy Family Hospital

Type of facility: Rehabilitation care, residential care

Acute care beds: 65

Residents: 142

Youville Residence

Type of facility: Residential care

Acute care beds: 0

Residents: 42

Clients: 32

St. Vincent's: Langara

Type of facility: Residential care

Acute care beds: 0

Residents: 197

Clients: 20

St. Vincent's: Honoria Conway-Heather

Type of facility: Assisted living

Acute care beds: 0

Tenants: 68

St. Vincent's: Brock Fahrni

Type of facility: Residential care

Acute care beds: 0

Residents: 148

St. Michael's Centre

Type of facility: Residential care

Acute care beds: 0

Residents: 144

St. John Hospice

Type of facility: Hospice care

Acute care beds: 0

Residents: 12

Granville Youth Health Clinic

Type of facility: Primary care, outreach care

Acute care beds: 0

Residents: 0

Crosstown Clinic

Type of facility: Addictions clinic

Acute care beds: 0

Residents: 0

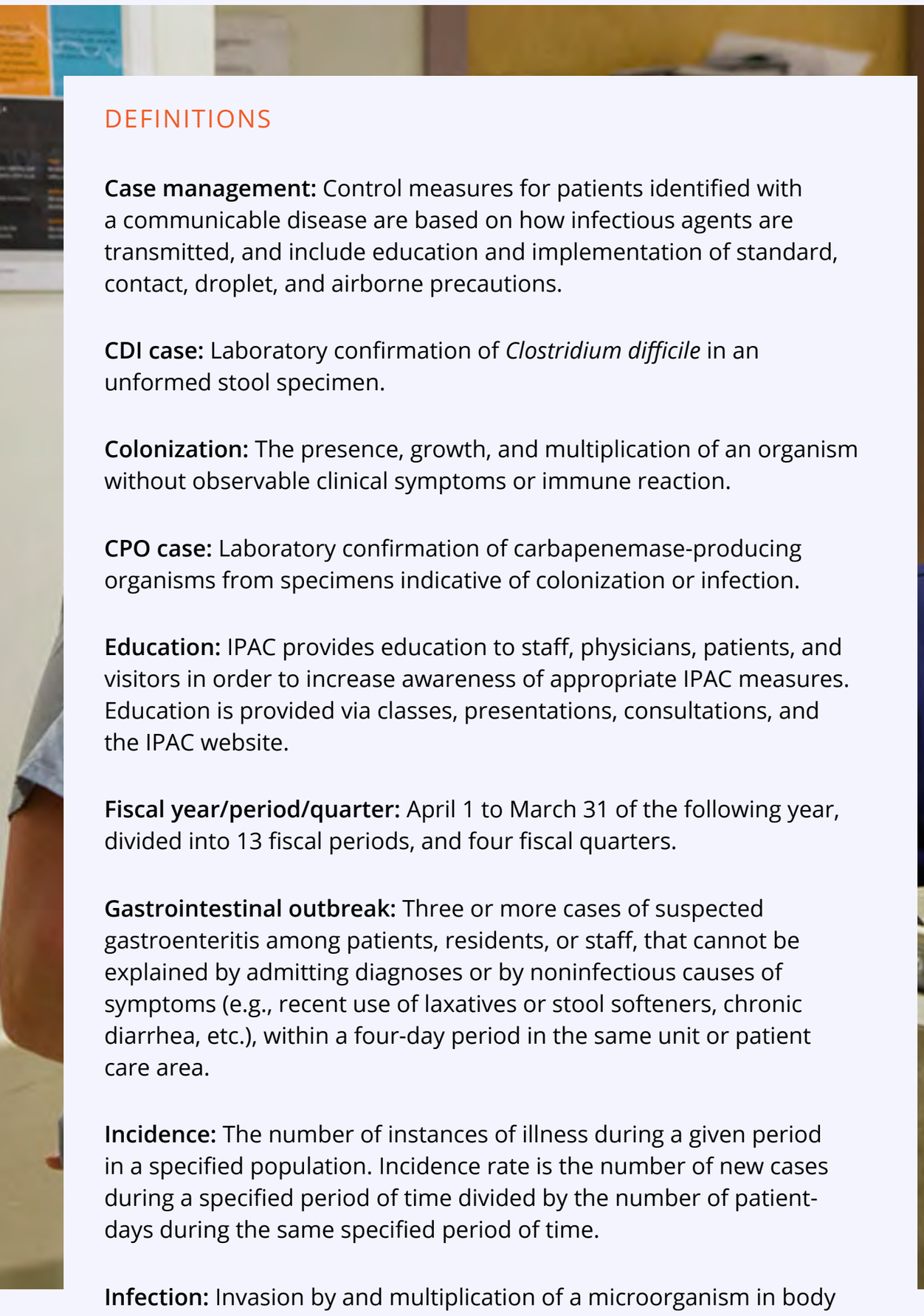
Community Dialysis Clinics

Type of facility: Dialysis clinics

Acute care beds: 0

Residents: 0

Locations: North Shore, East Vancouver, Vancouver, Richmond, Sechelt, Powell River, and Squamish



DEFINITIONS

Case management: Control measures for patients identified with a communicable disease are based on how infectious agents are transmitted, and include education and implementation of standard, contact, droplet, and airborne precautions.

CDI case: Laboratory confirmation of *Clostridium difficile* in an unformed stool specimen.

Colonization: The presence, growth, and multiplication of an organism without observable clinical symptoms or immune reaction.

CPO case: Laboratory confirmation of carbapenemase-producing organisms from specimens indicative of colonization or infection.

Education: IPAC provides education to staff, physicians, patients, and visitors in order to increase awareness of appropriate IPAC measures. Education is provided via classes, presentations, consultations, and the IPAC website.

Fiscal year/period/quarter: April 1 to March 31 of the following year, divided into 13 fiscal periods, and four fiscal quarters.

Gastrointestinal outbreak: Three or more cases of suspected gastroenteritis among patients, residents, or staff, that cannot be explained by admitting diagnoses or by noninfectious causes of symptoms (e.g., recent use of laxatives or stool softeners, chronic diarrhea, etc.), within a four-day period in the same unit or patient care area.

Incidence: The number of instances of illness during a given period in a specified population. Incidence rate is the number of new cases during a specified period of time divided by the number of patient-days during the same specified period of time.

Infection: Invasion by and multiplication of a microorganism in body tissue resulting in clinical manifestations of disease.

Intra-operative: Refers to the time during surgery.

MRSA case: Laboratory confirmation of Methicillin-Resistant *Staphylococcus aureus* from specimens indicative of colonization or infection

Nosocomial: Refers to an infection that is acquired in hospital.

Non PHC-associated case: Admitted for <72 hours in a PHC facility AND has not been admitted to a PHC facility within the preceding four weeks (for MRSA, we will use the preceding 12 months for PHC IPAC Annual Report 2015-2016 regional and provincial reporting). The assumption is that these cases were acquired in the community or in another health care facility other than PHC.

Outbreak management: In collaboration with Vancouver Coastal Health Communicable Disease Control, 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 an outbreak is declared.

Patient days: The sum of the number of patients admitted at a facility for each day of a defined period. Patient-days are used as denominators in rate calculations; they define the period at risk for a specific population over a defined period. For *C. difficile* rates,

Photo: Loupe & Marker

acute care inpatient-days exclude newborns (patients < 1 year of age).

Perioperative: Refers to the time before (preoperative), during (intraoperative) and after (postoperative) surgery.

PHC-associated case: Admitted for ≥72 hours in a PHC facility or admitted to a PHC facility within the preceding four weeks. For MRSA, the preceding 12 months will be used for regional and provincial reporting purposes.

Respiratory outbreak: Two or more cases of influenza-like illness (e.g., fever, chills, headache, myalgia, sore throat, cough, nasal congestion, etc.) among patients, residents, or staff within a one-week period in the same unit or patient care area.

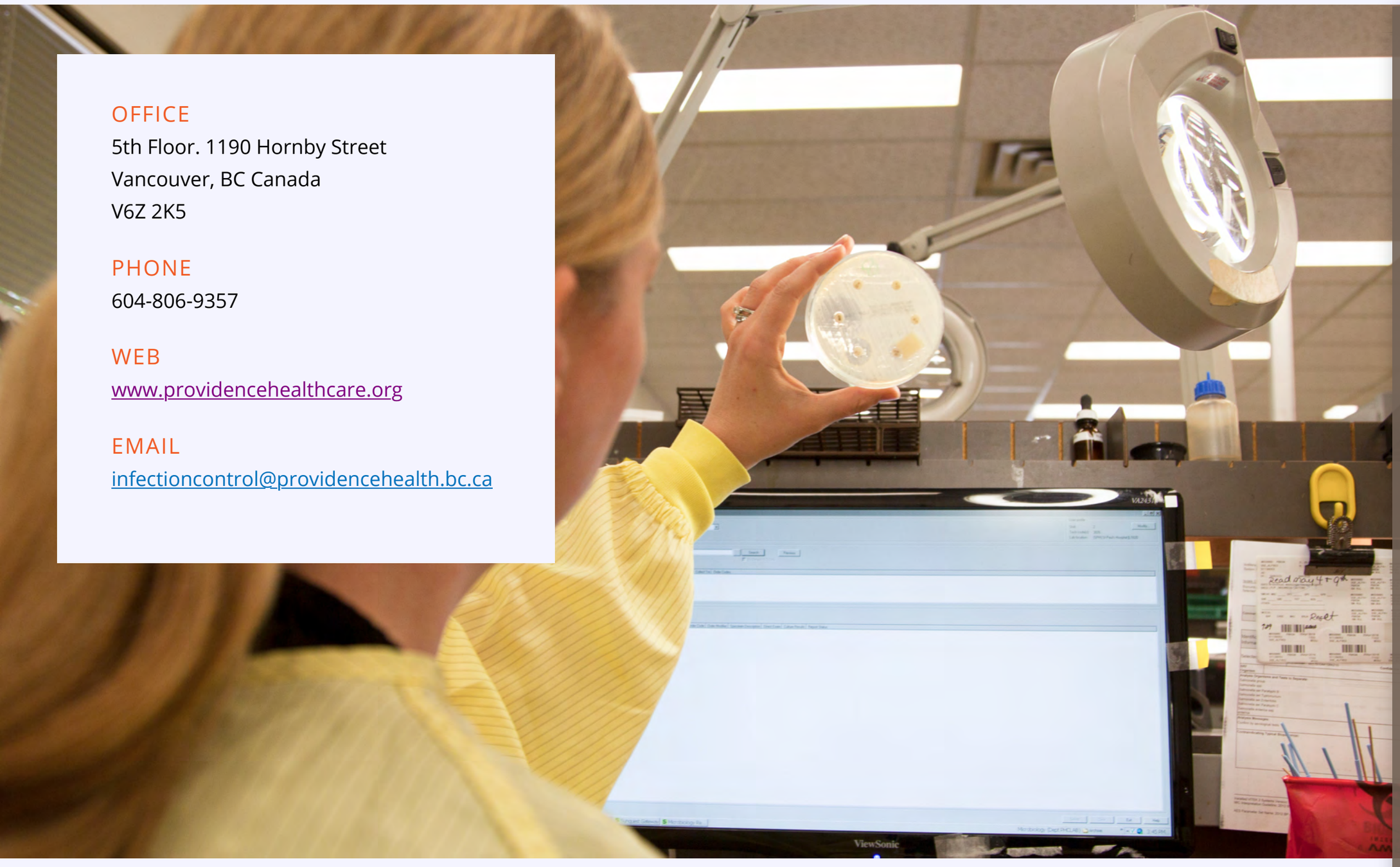
Surveillance: Monitoring health care-associated infections using standardized case definitions is critical to the prevention and control of hospital-based transmission of infectious agents. At PHC, the objectives of surveillance for PHC-associated infections are to:

- Detect cases through enhanced screening so that appropriate interventions can be implemented.
- Detect outbreaks of infectious diseases in order to implement control measures.
- Monitor trends in PHC-associated transmission, and determine when interventions are required.
- Interpret trends with a focus on hospital-specific data as opposed to inter-hospital comparisons.
- Determine the burden of specific infectious diseases at PHC.
- Evaluate and improve interventions.

Statistically significant: When the estimate of the observed degree of association between independent variables is unlikely to be due to chance. A p-value less than 0.05 is usually used to indicate that a result is statistically significant.

VRE case: Laboratory confirmation of vancomycin-resistant enterococci from specimens indicative of colonization or infection.

95% confidence interval (CI): An interval estimate of a variable such as a mean, proportion, or rate, that has a 95% probability of containing the true value of the variable.



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