



# Infection Prevention and Control

Annual Report 2010–2011





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# Executive Summary

This year, Infection Prevention and Control (IPAC) focused on expanding and improving reporting of surveillance and research data to multiple stakeholders. Reporting demands of IPAC-related data to local, regional and provincial stakeholders have increased substantially this fiscal year. At Providence Health Care (PHC), we provide quarterly unit-level data of hand hygiene compliance, monthly cases of Methicillin-Resistant *Staphylococcus aureus* (MRSA), monthly cases of Vancomycin-Resistant Enterococci (VRE) and monthly cases *Clostridium difficile* infection (CDI). We also send this information electronically (on a quarterly basis) to senior leadership, operations leaders and decision support at PHC, as well as to Vancouver Coastal Health. We continue to strive to provide data in a relevant and timely manner.

Rates of healthcare-associated infections (HAI) reflect a multitude of factors, including infection control practices, laboratory diagnostics, surveillance system refinements and hand hygiene compliance among health care workers. In 2010/11, we saw a slight decrease in MRSA rates, from a rate of 0.7 to 0.6 cases/1000 patient-days. VRE rates decreased significantly from 2.4 cases/1000 patient-days in 2009/10 to a rate of 1.7 cases/1000 patient-days. Compared to the previous fiscal year, CDI rates increased slightly (albeit not statistically significant) from 1.2 to 1.3 cases/1000 patient-days.

This year, the rate of central line-associated blood stream infections (CLABSI) in the intensive care unit (ICU) decreased significantly from 2.6 to 0.2 per 1000 catheter-days. There was also a decrease in rates for our surgical site infection (SSI) surveillance initiatives. The SSI rate among women who underwent Caesarean section at PHC decreased significantly in fiscal year 2010/11 from 0.8 to 0.2 per 100 procedures per year. Among individuals who underwent hip or knee replacement procedures, SSI rates also decreased, from 1.4 to 0.8 per 100 procedures per year. We look forward to continuously refining these new initiatives in fiscal year 2011/2012, and introducing a surveillance project in collaboration with the cardiac surgery team at PHC.

With regard to knowledge translation of our research findings, IPAC presented data from the Infection Control Champion project (now Link Nurses) to local, provincial, national and international audiences. This program has been expanded to all PHC facilities and we are delighted to have over one hundred trained Link Nurses at the present time. The Link Nurse program was awarded a top innovation award at the Excellence in BC Health Care Awards, and was also described as a “leading practice” by Accreditation Canada this year.



From top: St. Paul's Hospital, Mount Saint Joseph Hospital, Brock Fahrni Pavilion, Honoria Conway.



# Introduction to Infection Prevention and Control (IPAC)

Infection Prevention and Control (IPAC) is consistent with the Values and Mission of Providence Health Care (PHC).

The Vision of the IPAC team is to create and sustain a culture in which infection prevention and control is integrated into all aspects of care at all PHC facilities.

The Mission of the IPAC team is to be dedicated to the prevention and control of health care-associated infections in a supportive working environment. 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 carried out using the initiatives described below.

## 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 provide a means of determining 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.

## 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.

## OUTBREAK MANAGEMENT

In collaboration with Vancouver Coastal Health Public Health, 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.

## EDUCATION

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

## RESEARCH

IPAC conducts research in order to support the integration of evidence-based practices into daily practice, and to evaluate the effectiveness of current strategies at PHC.

## POLICIES AND PROCEDURES

IPAC continuously reviews, develops, and implements policies and procedures to guide evidence-based best practices.

# Hand Hygiene

Hand hygiene (hand-washing with soap and water or using an alcohol-based hand rub) is considered the most important measure for preventing the spread of bacteria and viruses in health care settings. However, overall compliance with hand hygiene among health care professionals is known to be suboptimal.<sup>1</sup>

## Major hand hygiene activities for the fiscal year included:

- the expansion of unit feedback boards;
- engagement with front-line staff on hand hygiene slogans;
- educational postcards highlighting the first moment of the 5 moments of hand hygiene;
- Infection Control Practitioners (ICP) led huddles on units focusing on hand hygiene;
- the display of point of care alcohol-based hand rub on acute units;
- online hand hygiene education modules for nurses and allied health, and mandatory hand hygiene education modules for physicians.

Monitoring hand hygiene is an essential component of programs aimed at improving compliance. PHC has conducted observational hand hygiene audits since 2005. Systematic quarterly hand hygiene audits were started in the third fiscal quarter of 2008/09. ICPs measure compliance by direct observation of staff, and compliance is calculated using the following formula:

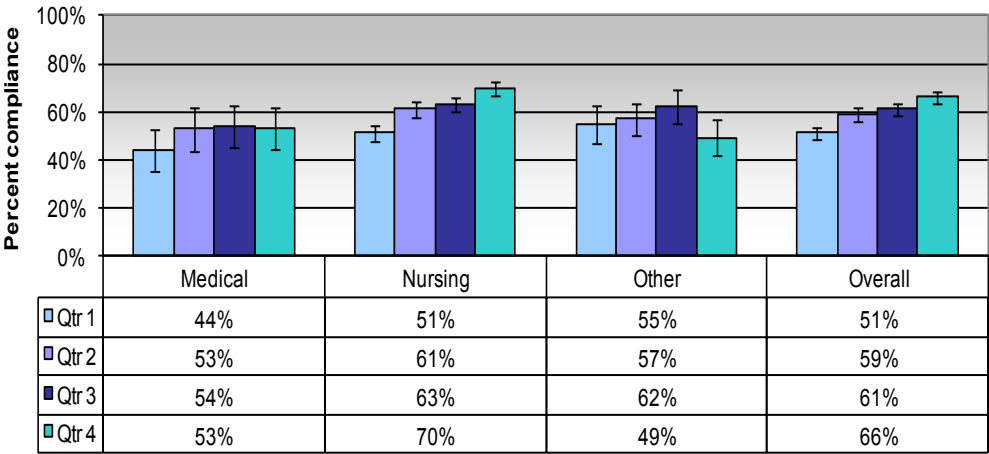
$$\% \text{ Compliance} = \frac{\# \text{ hand hygiene events}}{\# \text{ opportunities}} \times 100$$

Overall hand hygiene compliance was 59% for fiscal year 2010/11. Compliance varied by unit, health care worker type, and facility. Compared to last fiscal year, overall hand hygiene compliance improved steadily and significantly in 2010/11 and ranged from 51% in Quarter 1 to 66% in Quarter 4 (Figure 1). Our findings are consistent with published North American rates.<sup>1</sup> Further initiatives to improve compliance are being implemented.



- 1 Wet hands with warm running water.
- 2 Apply soap and rub hands together, covering all surfaces of hands and fingers, for at least 15 seconds.
- 3 Rinse hands and dry with disposable towel.
- 4 Use disposable towel to turn off the faucet.

**FIGURE 1**  
Hand hygiene compliance by health care  
worker type, 2010/11.



# Methicillin-Resistant *Staphylococcus aureus* (MRSA)

MRSA is an antibiotic resistant bacterium that can be transmitted in health care and community settings. Most patients are colonized with MRSA rather than infected. MRSA has the potential to cause serious infections for which treatment options are limited.

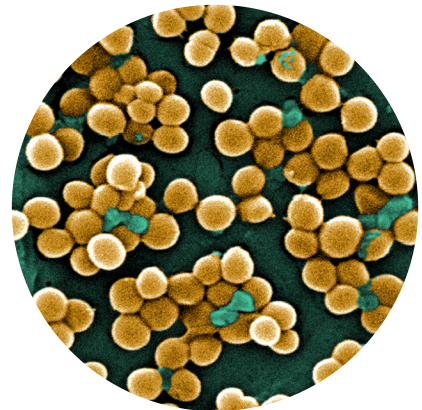
In 2010/11, 674 new cases of MRSA were identified at PHC facilities. Over half (56%) of these cases were seen in outpatient clinics or emergency departments and were not admitted to PHC. 135/674 (20%) of cases were classified as PHC-associated cases. 117/135 (87%) of these cases were associated with transmission in acute care wards at St. Paul's Hospital or Mount Saint Joseph Hospital, corresponding to an overall incidence rate of 0.6 cases/1000 patient days (95% Confidence Interval [CI]: 0.5 – 0.7).

This corresponds to a 7% decrease in the rate of PHC-associated MRSA cases compared to last year, and a 69% decrease compared to 2002/03 (Figure 2,  $p < 0.05$ ). As displayed in Figure 3, the rate at MSJ (0.4 cases/1000 patient-days) was significantly lower than the rate at SPH (0.7 cases/1000 patient-days,  $p < 0.05$ ).

Overall, the incidence rate of PHC-associated MRSA cases has decreased during the preceding nine years. Interestingly, PHC rates have decreased despite ongoing community transmission of MRSA, and the introduction of a highly transmissible “community-associated” MRSA strain (“CMRSA-10” or “USA300”) to the hospital setting. Recently conducted laboratory research indicates strain displacement, whereby over 30% of hospital-onset MRSA cases were attributed to the USA300 strain.

Declines in MRSA rates are multi-factorial in origin, and likely reflect improved infection control practices among health care professionals. Additionally, improved molecular testing, laboratory detection and turnaround times have contributed to decreasing rates.

In 2010/11, 56% of the PHC-associated cases were identified through hospital screening programs. The remaining cases (44%) were identified by culturing a clinical specimen.

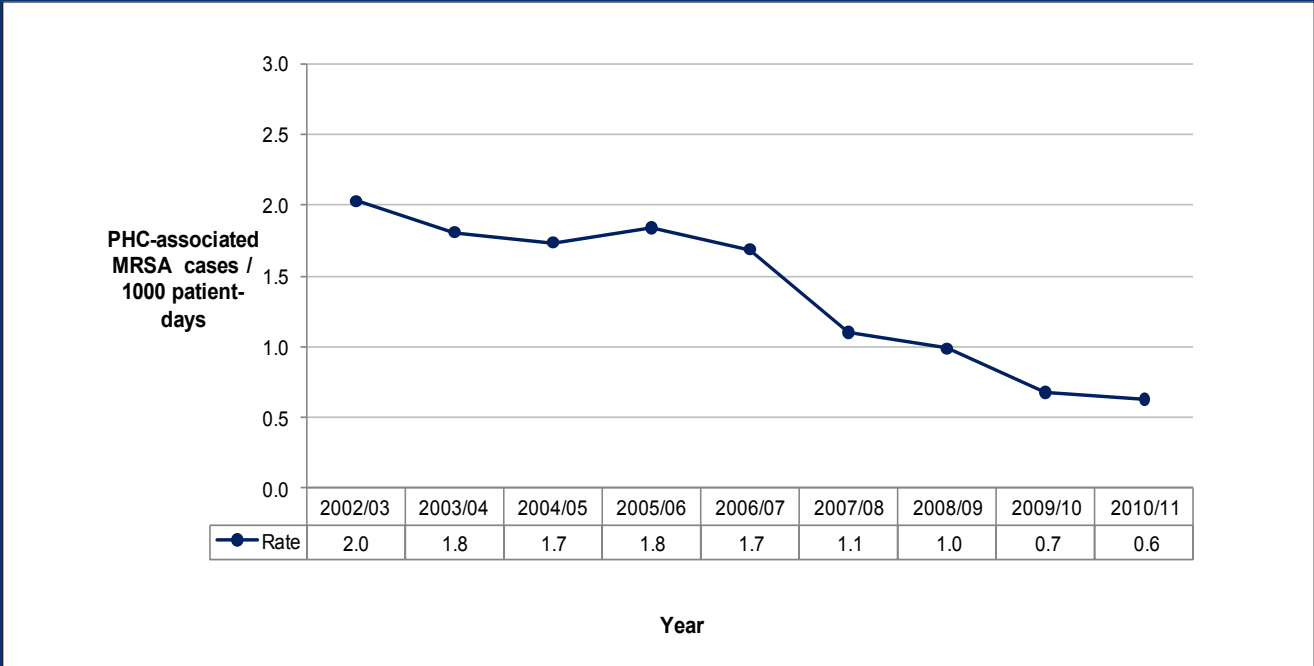


This 2005 scanning electron micrograph (SEM) depicted numerous clusters of methicillin-resistant *Staphylococcus aureus* bacteria, commonly referred to by the acronym, MRSA; Magnified 9560x.

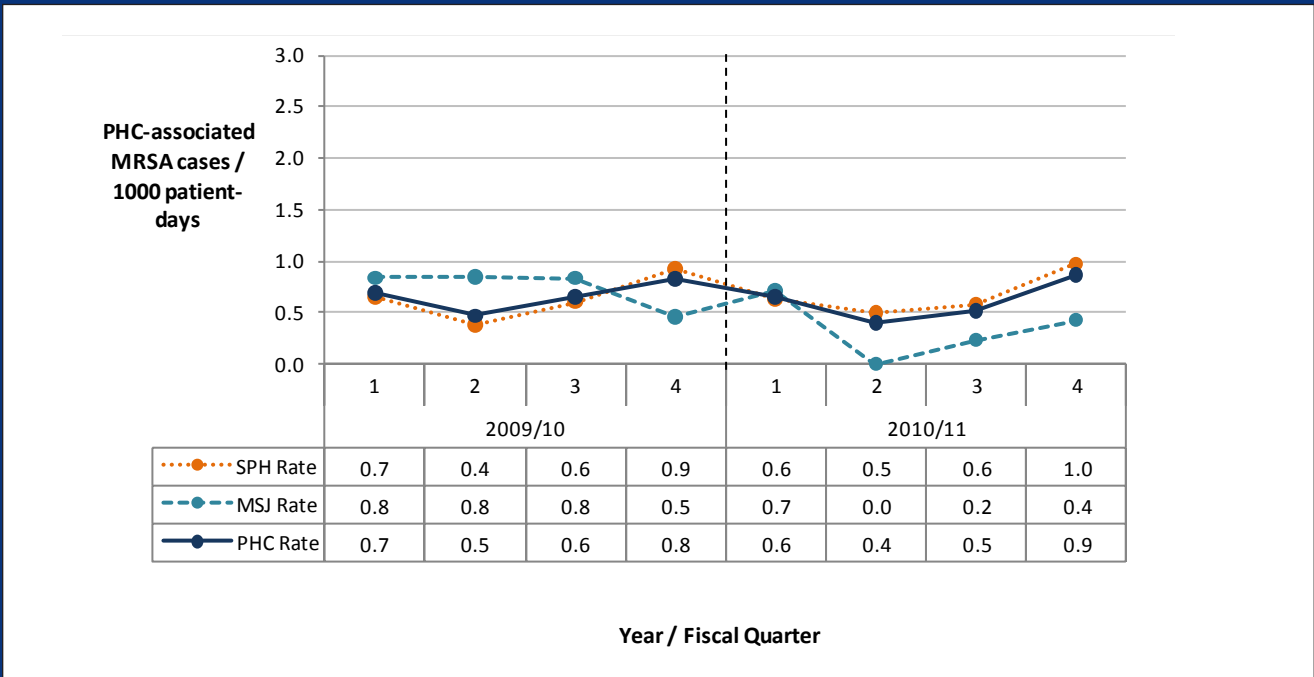


This 2005 photograph depicted a cutaneous abscess on the knee of a prison inmate, which had been caused by methicillin-resistant *Staphylococcus aureus* bacteria. *S. aureus* bacteria are amongst the populations of bacteria normally found existing on one's skin surface. However, over time, various populations of these bacteria have become resistant to a number of antibiotics. These antibiotics include methicillin and other more common antibiotics such as oxacillin, penicillin and amoxicillin.

**FIGURE 2**  
Incidence rate of PHC-associated MRSA in acute care facilities, 2002/03 to 2010/11.



**FIGURE 3**  
Incidence rate of PHC-associated MRSA by site and fiscal quarter, 2009/10 and 2010/11.





# Vancomycin-Resistant Enterococci (VRE)

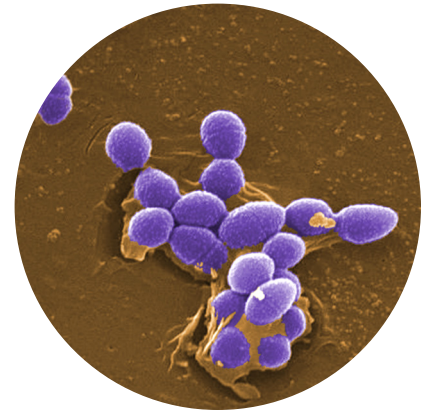
VRE refers to certain strains of enterococci that are resistant to the antibiotic vancomycin, making infections caused by VRE more difficult to treat. Most patients are colonized with VRE rather than infected.

In 2010/11, 413 new cases of VRE were identified at PHC. Nearly all of these cases (84%) were admitted to a PHC facility (as opposed to being seen as outpatients). 327/413 (79%) of cases were classified as PHC-associated. Of these, 320 (98%) were associated with transmission in acute care wards at either Mount Saint Joseph Hospital or St. Paul's Hospital, corresponding to an incidence rate of 1.7 cases/1000 patient days (95% CI: 1.5 – 1.9) (Figure 4). This is significantly lower than the 2009/10 rate of 2.4 (95% CI: 2.2 – 2.7).

This decrease was seen at both St. Paul's Hospital and Mount Saint Joseph Hospital. As seen in Figure 5, the incidence rate at Mount Saint Joseph Hospital decreased significantly from 2.3 (95% CI: 1.9 – 2.9) in 2009/10 to 0.4 (95% CI: 0.3 – 0.8,  $p < 0.05$ ) in 2010/11, while the incidence rate at St. Paul's Hospital decreased significantly from 2.5 (95% CI: 2.2 – 2.7) to 2.0 (95% CI: 1.8 – 2.3,  $p < 0.05$ ). A sustained decrease in the number of cases at MSJ has contributed to the overall decrease of VRE at PHC.

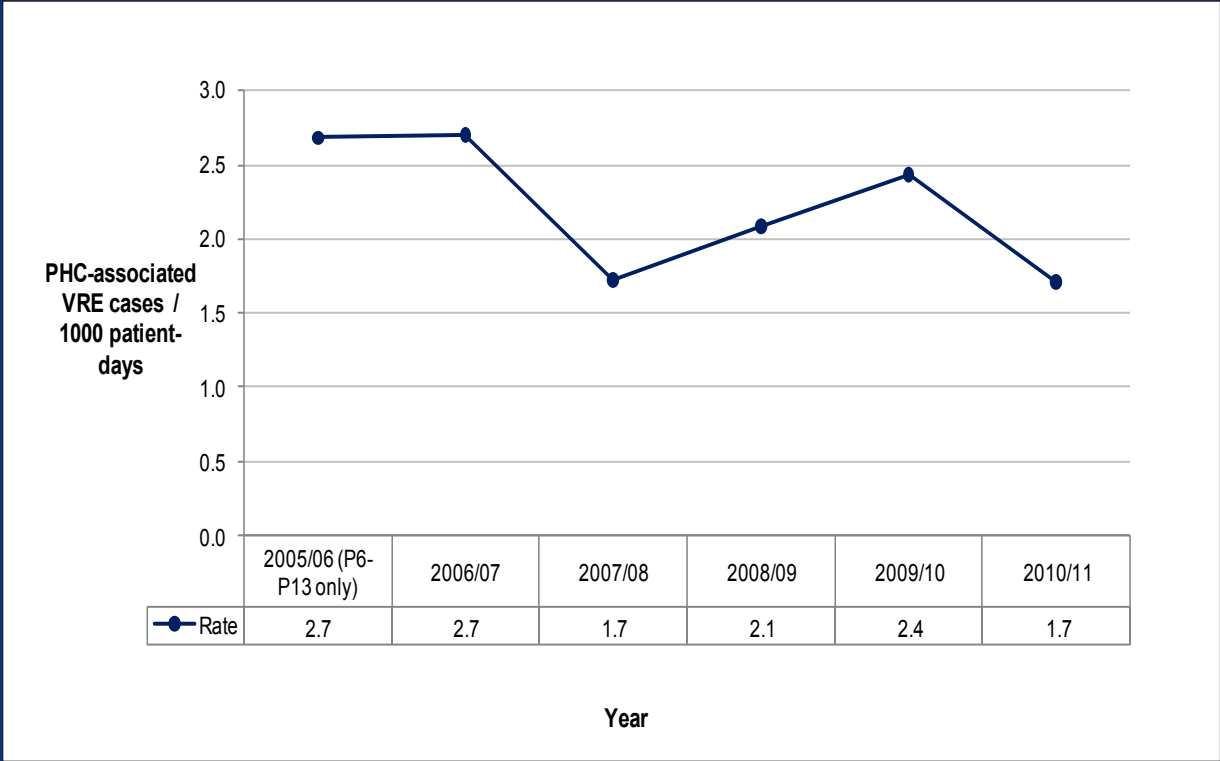
Overall, VRE incidence rates have decreased by 37% since 2006/07.

In 2010/11, the majority (68%) of PHC-associated cases were identified through hospital screening programs. The remaining (32%) were identified by culturing a clinical specimen. Severe infections due to VRE remain a relatively uncommon occurrence.

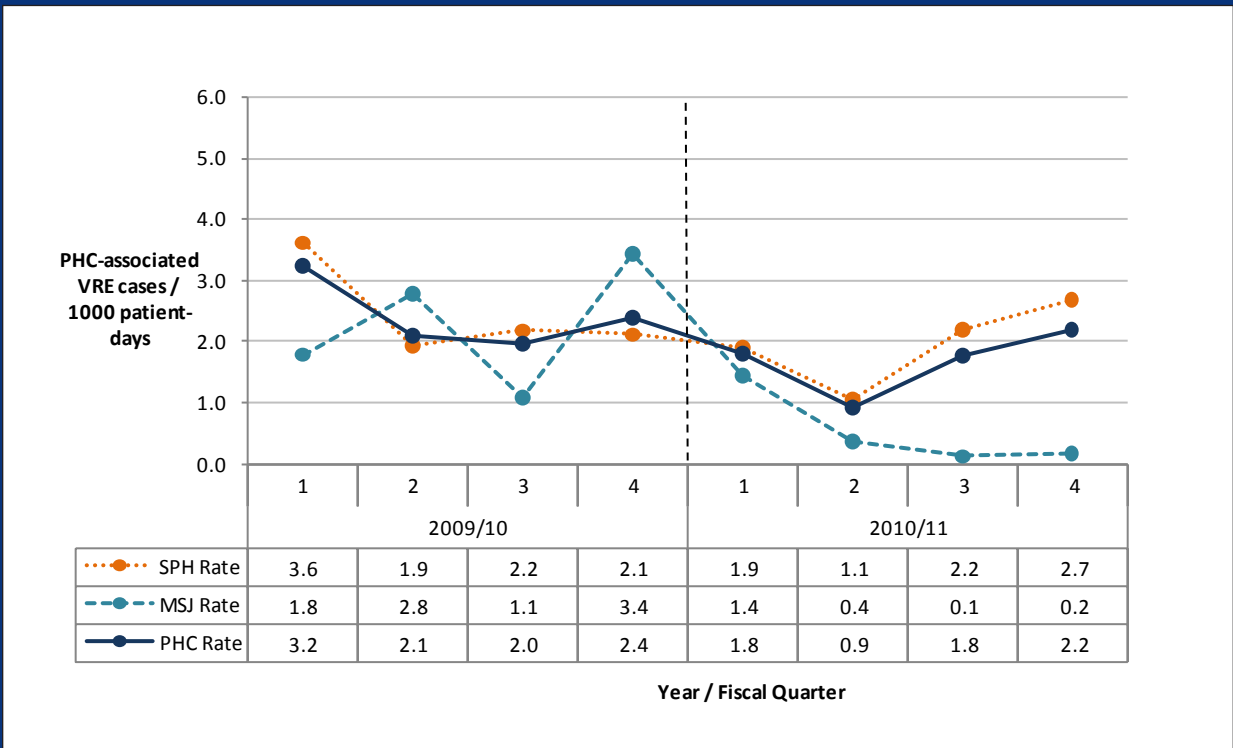


This scanning electron micrograph (SEM) depicted large numbers of Gram-positive *Enterococcus faecalis* bacteria. Enterococci, a leading cause of nosocomial bacteremia, surgical wound infection, and urinary tract infection, are becoming resistant to many standard therapies. New rapid surveillance methods are highlighting the importance of examining enterococcal isolates at the species level.

**FIGURE 4**  
 Incidence rate of PHC-associated VRE in acute care facilities,  
 2005/06 to 2010/11.



**FIGURE 5**  
 Incidence rate of PHC-associated VRE by site  
 and fiscal quarter, 2009/10 and 2010/11.



# *Clostridium difficile* infection (CDI)

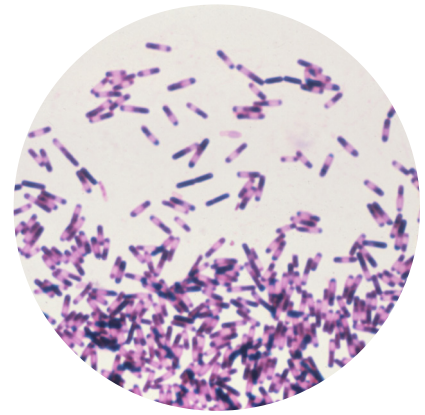
*Clostridium difficile* is a bacterium known to cause diarrhea and has the potential to cause more serious complications such as fulminant colitis and death. CDI is one of the most common infections acquired in health care settings, as the physical environment plays a more important role in transmission of CDI than other HAIs.<sup>2,3</sup> CDI is also known to be more common in hospitalized persons aged >65 years.<sup>4</sup> Enhanced surveillance for CDI began at PHC on January 1, 2007.

In 2010/11, 332 new cases of CDI were identified at PHC. 247 (74%) of these were classified as PHC-associated cases. Of these, 233 (94%) were associated with either St. Paul's Hospital or Mount Saint Joseph Hospital, corresponding to an incidence rate of 1.3 cases/1000 patient days (95% CI: 1.1 – 1.4). This represents a slight, but not statistically significant, increase from 2009/10 (Figure 6,  $p=0.16$ ). This slight increase in CDI rate may reflect improved case detection, following the implementation of a more sensitive laboratory diagnostic assay.

As described in Figure 7, in 2010/11, the incidence rate of CDI was significantly higher at Mount Saint Joseph Hospital (2.1, 95% CI: 1.6 – 2.6) than at St. Paul's Hospital (1.1, 95% CI: 0.9 – 1.2,  $p<0.05$ ). This is consistent with previous years and may be due to the medically complicated geriatric population that is seen at MSJ. In addition to the population characteristics at MSJ, overcrowding and suboptimal cohorting of patients were contributing factors to the increase in CDI seen at MSJ in Quarters 2, 3 and 4. Multiple control measures have been implemented and the rate of CDI has subsequently decreased.

Complications related to CDI in the 30 days following diagnosis are also closely monitored as an indicator of the severity of illness. In 2010/11, 7 cases (3%) were admitted to the ICU; 4 (1%) underwent a colectomy; and 3 (1%) were diagnosed with toxic megacolon. In addition, CDI was determined to be a probable contributing factor in the death of 7 (3%) cases. This case fatality rate is consistent with rates reported from other facilities in Canada.<sup>5</sup>

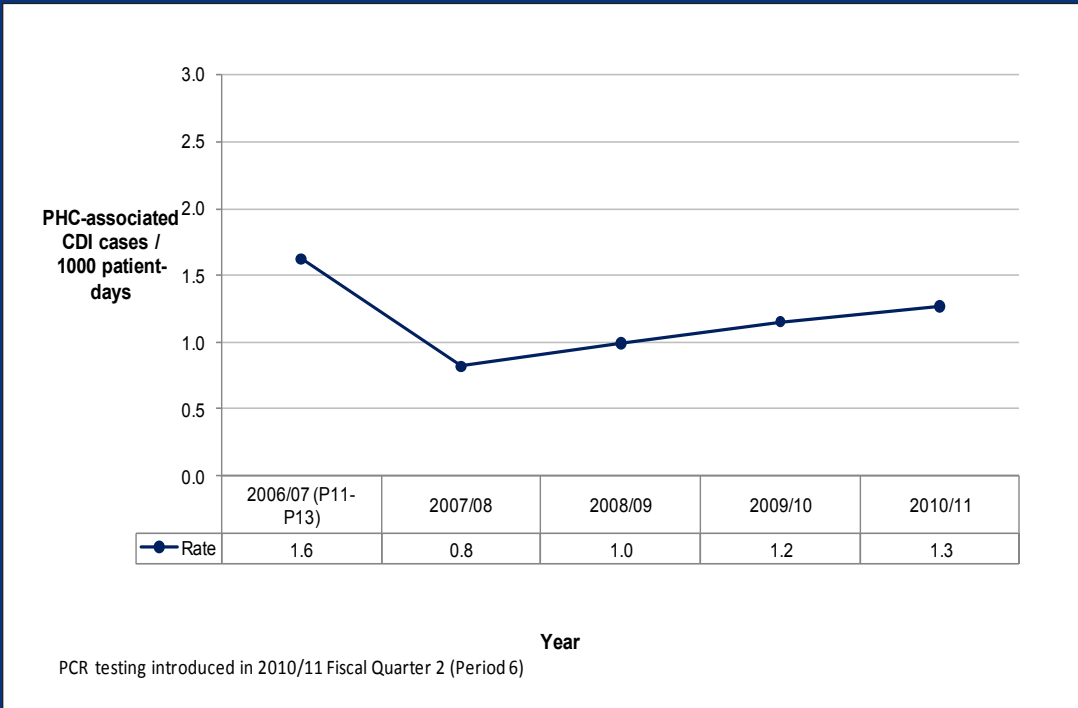
Given the morbidity and mortality associated with CDI, IPAC has spent considerable effort on increasing the awareness of CDI and improving laboratory detection. We updated our management guidelines and increased educational activities. Also, the laboratory method of detection changed to polymerase chain reaction (PCR) in August 2010.



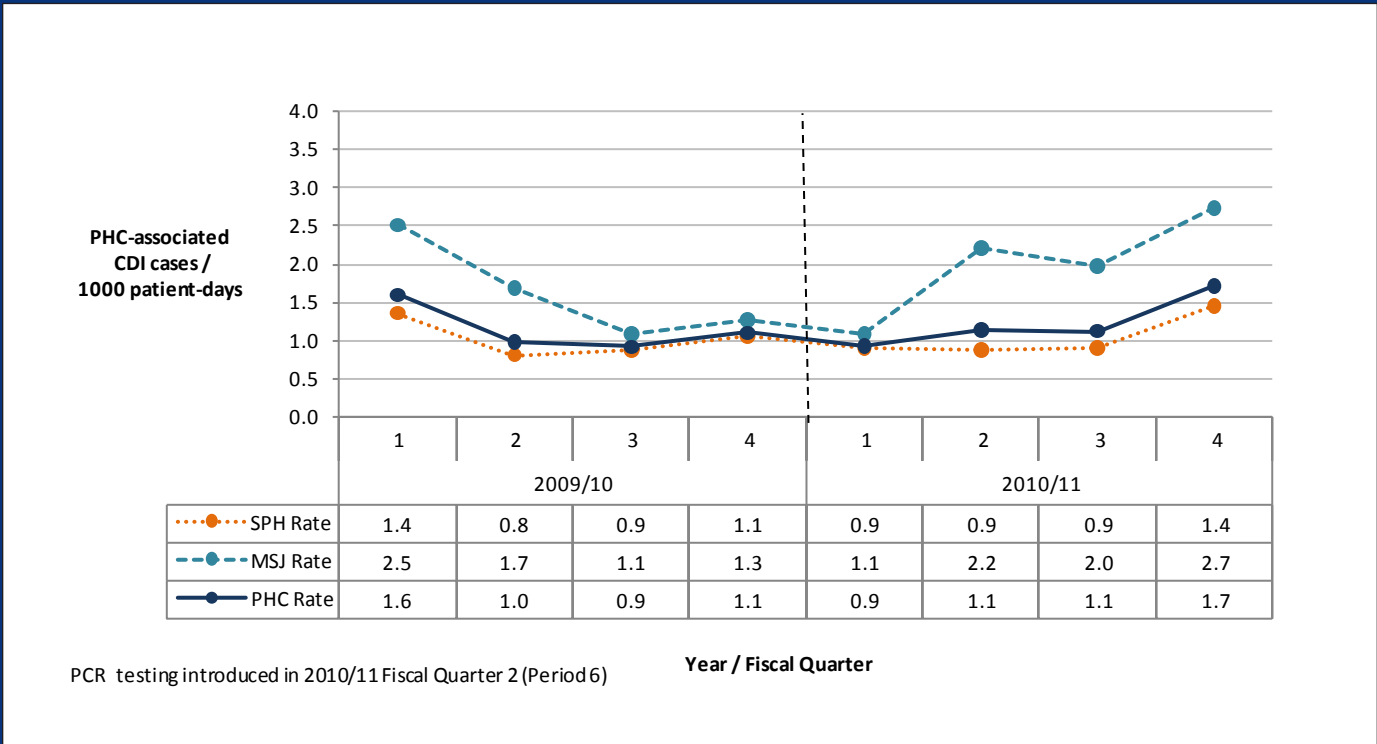
*Clostridium difficile*, impression smear from anaerobically-incubated blood agar, 72-hour.



**FIGURE 6**  
Incidence rate of PHC-associated CDI cases in acute care facilities, 2006/07 to 2010/11.



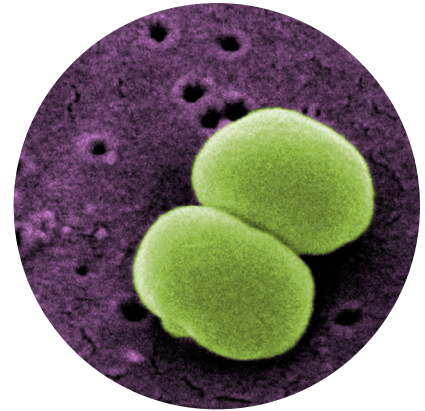
**FIGURE 7**  
PHC-associated CDI cases by site and fiscal quarter, 2009/10 - 2010/11.



# Central Line-Associated Bloodstream Infection (CLABSI) Surveillance

In addition to increasing patient morbidity, central line-associated bloodstream infections (CLABSI) can result in longer hospital stays and increased health care costs. Intensive care unit (ICU) patients are particularly vulnerable to CLABSI.<sup>6</sup> Surveillance for CLABSI is an important component of hospital prevention and control activities. Using standardized case definitions and methodology, IPAC — in collaboration with ICU — has developed a sensitive and timely CLABSI surveillance system.

On January 1, 2009, the IPAC team began piloting a semi-electronic, semi-automated surveillance system that tracks the rates of CLABSI in the ICUs at St. Paul's Hospital and Mount Saint Joseph Hospital. We now have two complete years of data. In the ICU for fiscal year 2009/10, the CLABSI rate was 2.6 per 1000 catheter-days. The CLABSI rate for fiscal year 2010/11 was 0.2 per 1000 catheter-days; this is significantly lower than the previous fiscal year ( $p < 0.05$ ). We are currently piloting an expanded CLABSI system that captures CLABSI cases outside the ICU for fiscal year 2011/12.



Scanning Electron Micrograph (SEM)  
of *Staphylococcus epidermidis*.

# Surgical Site Infection (SSI) Surveillance

Surgical site infections (SSI) can result in substantial post-operative morbidity, longer hospital stays, and increased health care costs. SSI surveillance has been identified as a key priority for IPAC and is a required Accreditation Canada standard.

In collaboration with the Department of Surgery, the IPAC team has developed an electronic and semi-automated SSI surveillance system. Rather than monitoring all procedures in a given hospital, it is generally accepted that SSI surveillance should target high-risk, high-volume, and potentially high-impact activities.<sup>7</sup> At PHC, SSI surveillance currently focuses on joint replacement surgeries and Caesarean sections. IPAC will expand surveillance to other selected procedures in the coming years.

In collaboration with the cardiac surgery team at PHC, we are in the process of developing an SSI surveillance system for cardiac surgeries.

In 2008/09, Infection Prevention and Control worked with the Department of Obstetrics and Gynaecology to pilot surveillance for SSI following Caesarean section at the time of hospital discharge. Fiscal year 2009/10 was the first complete year of data collection for this surveillance initiative; therefore, we have now collected data for two complete years. The Caesarean section SSI rate for fiscal year 2009/10 was 0.8 per 100 procedures per year. For year 2010/11, this rate decreased significantly to 0.2 per 100 procedures per year. This rate is well below the pooled mean from National Health and Safety Network (NHSN).

Although challenging, it is important to adopt a post-discharge surveillance program for SSI. A large percentage of SSI occur post-discharge, particularly with the recent trend toward shorter hospital stays, and a complete SSI surveillance system should include a post-discharge component.<sup>8</sup> PHC has been collaborating with BC Women's Hospital and other community partners on the development of a post-discharge surveillance system for SSI following Caesarean section. We plan to pilot post-discharge surveillance in 2011/12.

Data collection on hip and knee replacement surgeries began in 2007. This initiative was developed by orthopaedic surgeons at PHC in collaboration with IPAC. The annual rate of SSI was 1.4 per 100 procedures per year in 2009/10 and decreased significantly to 0.5 per 100 procedures per year ( $p < 0.05$ ) in 2010/11.





# Pulmonary Tuberculosis (TB)

Tuberculosis (TB) is caused by a bacterium called *Mycobacterium tuberculosis*. TB is spread primarily via aerosolization of respiratory secretions when someone with active pulmonary (or laryngeal) disease coughs or sneezes.

The risk of TB transmission in health care settings is driven by the prevalence of disease in the community and the effectiveness of prevention and control measures. The most important determinant of transmission risk in hospitals is the number of patients with active TB being cared for in the facility. Patients suspected or known to have active pulmonary TB are placed on airborne precautions to reduce the risk of transmission. A facility is considered to have a higher risk of TB transmission if six or more individuals are seen with active TB annually.<sup>9</sup>

In 2010/11, 13 cases of pulmonary tuberculosis were diagnosed at PHC acute care facilities, 7 (54%) were among admitted patients. Among hospitalized patients, 29% were placed on precautions within 4 hours and 57% had roommates identified for TB follow-up. Two cases of nosocomial transmission were suspected at PHC this year, resulting from a complicated case of pulmonary TB in the previous fiscal year. Interventions were put in place to ensure no additional transmission occurred. No cases were identified in residential care facilities.

PHC cares for a relatively high number of TB cases in BC. In this fiscal year, we collaborated with the Renal Program at PHC and BCCDC to establish a TB screening protocol that incorporates emerging diagnostic technology.



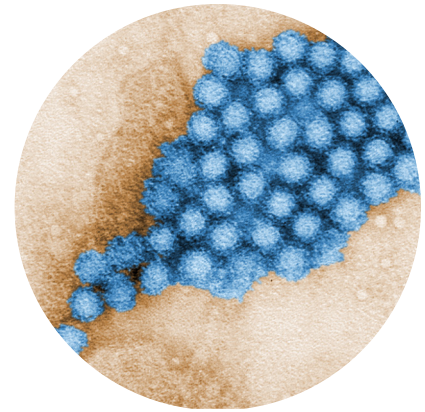
Under a high magnification of 15549x, this colorized scanning electron micrograph (SEM) depicted some of the ultrastructural details seen in the cell wall configuration of a number of *Mycobacterium tuberculosis* bacteria. As an obligate aerobic organism *M. tuberculosis* can only survive in an environment containing oxygen. This bacterium ranges in length between 2 - 4 microns, and a width between 0.2 - 0.5 microns.

# Outbreaks

All PHC facilities are monitored for respiratory and gastrointestinal outbreaks. Surveillance allows for the early detection of clusters so that outbreak control measures can be implemented, and the risk of further transmission reduced. The frequency, duration and severity of outbreaks depend on the type of organisms circulating in the community, which varies each season.

In 2010/11, 1 respiratory outbreak and 4 gastrointestinal outbreaks were identified at PHC facilities (Tables 1 and 2). The respiratory outbreak occurred on the HIV/AIDS ward at St. Paul's Hospital, and was caused by influenza A H1N1. A contributing factor to this outbreak was unexpectedly low influenza vaccination coverage among healthcare workers. On average, gastrointestinal outbreaks lasted 11 days (range: 5-22 days). All gastrointestinal outbreaks were caused by laboratory confirmed norovirus.

Outbreaks are declared in collaboration with Vancouver Coastal Health Communicable Disease Control. The following control measures were implemented for all outbreaks: closing the unit/facility to admissions or transfers; cohorting patient/resident cases together; excluding staff cases from work; restricting visitors; limiting group activities; and enhanced cleaning of the unit/facility. Recently, improved laboratory detection of influenza and norovirus using in-house developed molecular methods has allowed for rapid implementation of containment and control strategies.



This transmission electron micrograph (TEM) revealed some of the ultrastructural morphology displayed by norovirus virions, or virus particles. Noroviruses are a group of related, single-stranded RNA, nonenveloped viruses that cause acute gastroenteritis in humans. Norovirus was recently approved as the official genus name for the group of viruses previously described as "Norwalk-like viruses" (NLV).

**TABLE 1**

Respiratory outbreaks at PHC facilities, 2006/07 – 2010/11.

| Year    | NUMBER OF OUTBREAKS |             |          | NUMBER OF CASES |                     |         | CAUSATIVE ORGANISM |         |
|---------|---------------------|-------------|----------|-----------------|---------------------|---------|--------------------|---------|
|         | Total               | Residential | Acute    | Total           | Residents /patients | Staff   | Influenza          | Other   |
| 2010/11 | 1                   | 0 (0%)      | 1 (100%) | 3               | 2 (67%)             | 1 (33%) | 1 (100%)           | 0 (0%)  |
| 2009/10 | 0                   | 0 (0%)      | 0 (0%)   | 0               | 0 (0%)              | 0 (0%)  | 0 (0%)             | 0 (0%)  |
| 2008/09 | 2                   | 2 (100%)    | 0 (0%)   | 25              | 20 (80%)            | 5 (20%) | 2 (100%)           | 0 (0%)  |
| 2007/08 | 4                   | 4 (100%)    | 0 (0%)   | 116             | 107 (92%)           | 9 (8%)  | 2 (50%)            | 2 (50%) |
| 2006/07 | 4                   | 4 (100%)    | 0 (0%)   | 84              | 82 (98%)            | 2 (2%)  | 3 (75%)            | 1 (25%) |

**TABLE 2**

Gastrointestinal outbreaks at PHC facilities, 2006/07 – 2010/11.

| Year    | NUMBER OF OUTBREAKS |             |          | NUMBER OF CASES |                     |          | CAUSATIVE ORGANISM |         |
|---------|---------------------|-------------|----------|-----------------|---------------------|----------|--------------------|---------|
|         | Total               | Residential | Acute    | Total           | Residents /patients | Staff    | Norovirus          | Other   |
| 2010/11 | 4                   | 1 (25%)     | 3 (75%)  | 59              | 39 (66%)            | 20 (34%) | 4 (100%)           | 0 (0%)  |
| 2009/10 | 2                   | 2 (100%)    | 0 (0%)   | 56              | 50 (89%)            | 6 (11%)  | 2 (100%)           | 0 (0%)  |
| 2008/09 | 6                   | 2 (33%)     | 4 (67%)  | 103             | 80 (78%)            | 23 (22%) | 6 (100%)           | 0 (0%)  |
| 2007/08 | 6                   | 0 (0%)      | 6 (100%) | 48              | 28 (58%)            | 20 (42%) | 3 (50%)            | 3 (50%) |
| 2006/07 | 10                  | 5 (50%)     | 5 (50%)  | 214             | 124 (58%)           | 90 (42%) | 5 (50%)            | 5 (50%) |

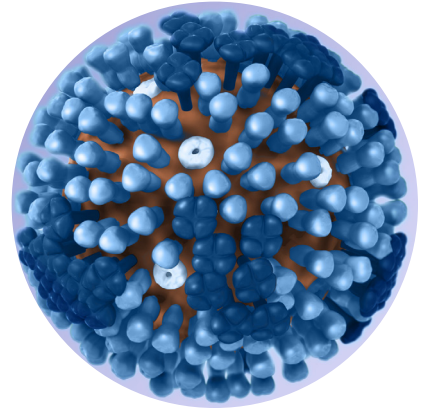
# Influenza

Every year, influenza infections result in a significant number of hospitalizations and deaths. The elderly, pregnant women and those with underlying medical conditions are at increased risk for influenza-related complications. In 2010/11, consistent with years 2008/09 and 2009/10, nearly all of the residents at PHC residential care facilities were vaccinated against influenza (Figure 8).

Health care workers are also at an increased risk of acquiring and transmitting the influenza virus. Influenza immunization is the most effective way to protect health care workers and the people they care for. Despite the benefits of the influenza vaccine, coverage rates among health care workers remain low. The reported level of coverage, however, is likely an underestimation of immunization coverage among staff, as staff may have received the vaccine from outside the hospital program and did not report vaccination to Occupational Health & Safety.

In 2010/11, the percent of acute care staff immunized against influenza increased slightly for seasonal influenza (50%; n = 2419). Additionally, 471 (64%) residential care staff at PHC facilities were immunized against seasonal influenza (Figure 8). Although these coverage rates are far from ideal, they are consistent with those reported in other health care facilities in BC.

IPAC is working closely with Occupational Health & Safety and VCH Communicable Disease Control to implement evidence-based approaches to improve vaccination rates. In addition to receiving the influenza vaccine, health care workers are encouraged to always practice good hand hygiene and to stay home from work if they have influenza-like symptoms.

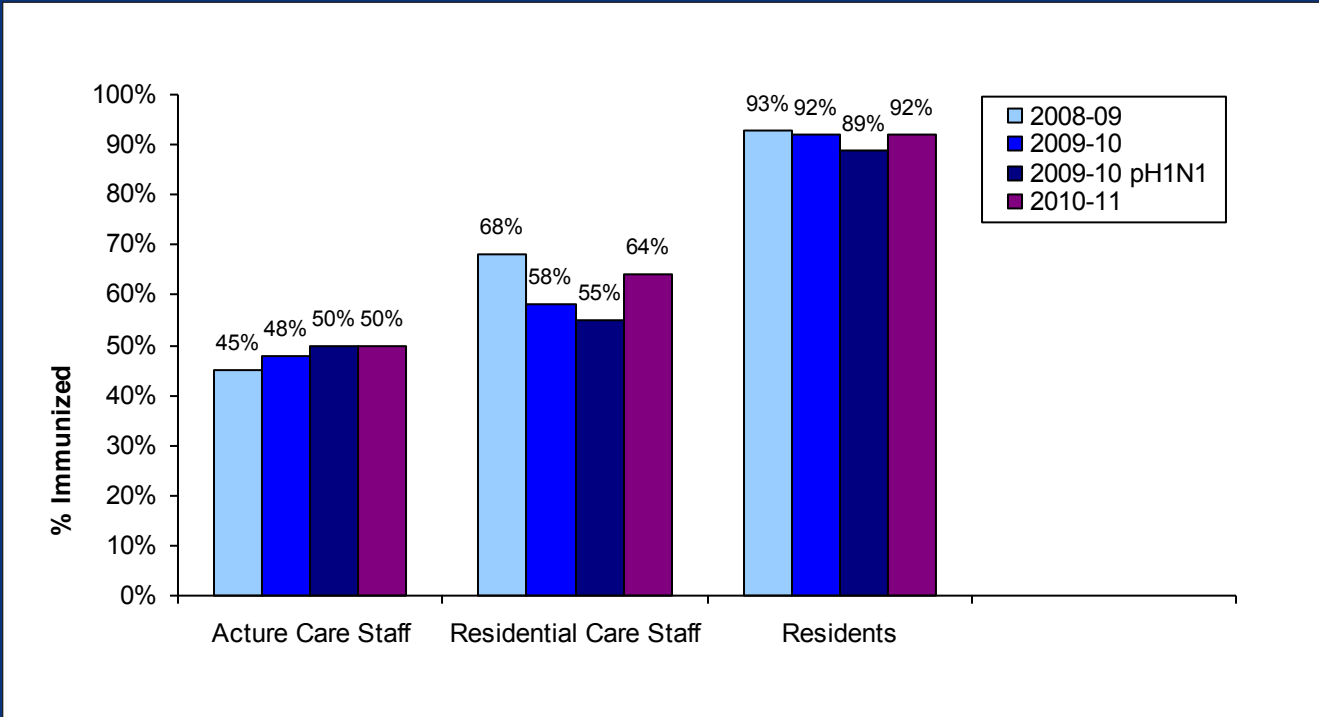


This illustration provides a 3D graphical representation of a generic influenza virion's ultrastructure, and is not specific to a seasonal, avian or 2009 H1N1 virus.



FIGURE 8

Influenza immunization coverage rates among PHC staff and residents, 2008/09, 2009/10, 2010/11.



# Education

The Infection Prevention and Control (IPAC) team continuously strives to provide PHC staff with relevant education, based on current evidence-based recommendations. Messages are communicated using various strategies with the goal of promoting a culture in which IPAC is integrated into all aspects of care.

Educational resources, such as the infection control manual, information brochures, results from current research, and links to online courses, are made readily accessible to all PHC staff via the IPAC intranet website. Moreover, approximately 600 IPAC pocket cards are given out throughout the year.

The IPAC team provides consultations on a daily basis to address patient-, procedure- or unit-specific concerns. IPAC delivers educational sessions to all new employees at PHC. IPAC physicians advise primarily through phone consultations, regular ward visits, and IPAC rounds.

ICPs deliver the bulk of infection control education sessions at PHC. In the past year, the IPAC team delivered over 155 hours of education sessions, reaching over 2000 staff (Table 3). This year, most of the education delivered was on hand hygiene and general infection control. The percent of education time spent on hand hygiene and general infection control was substantially higher than in recent years.



**TABLE 3**

IPAC educational sessions by number of hours and participants reached, 2010/11.

| Type of education                      | HOURS / YEAR |            | PARTICIPANTS/YEAR |            |
|----------------------------------------|--------------|------------|-------------------|------------|
|                                        | N            | %          | N                 | %          |
| Link Nurse workshops                   | 10           | 6          | 64                | 3          |
| New employee orientation               | 19           | 12         | 781               | 33         |
| Hand hygiene                           | 39           | 25         | 216               | 9          |
| General infection control              | 44           | 28         | 655               | 28         |
| Transmission-based precautions         | 5            | 3          | 103               | 4          |
| Influenza                              | 4            | 3          | 44                | 2          |
| Antibiotic resistant organisms         | 7            | 4          | 80                | 3          |
| <i>Clostridium difficile</i> infection | 5            | 3          | 96                | 4          |
| Gastrointestinal outbreaks             | 11           | 7          | 175               | 7          |
| Other                                  | 13           | 9          | 147               | 7          |
| <b>Total</b>                           | <b>157</b>   | <b>100</b> | <b>2361</b>       | <b>100</b> |

# Link Nurse

The Link Nurse program was established following the successful evaluation of the Infection Control Champions (ICC) project [a project which was led by IPAC and funded by the Canadian Institutes of Health Research (CIHR)]. The ICC project goal was to evaluate the feasibility and cost-effectiveness of supporting local front-line nurses in infection control leadership initiatives.

Stakeholders considered the project a success and the ICC project was renamed and re-launched as the Link Nurse program. The Link Nurse program has been adopted and implemented across all PHC facilities. Importantly, a distributed model of infection control promotes local ownership of infection control issues.

This fiscal year, IPAC focused on disseminating our findings from the ICC project and increasing awareness of the Link Nurse program. We focused our knowledge translation efforts on disseminating research findings to front-line staff across PHC. Research findings were also presented to infection control teams in BC and Ontario. To reach an international and academic audience, we presented our results at two international infection control conferences.

The Link Nurse program was mentioned as a PHC leading practice by Accreditation Canada. In addition, the Link Nurse program was awarded a Health Employers Association of BC **Award of Merit**, Top Innovation (Affiliate).





# Appendix A

## Infection Prevention and Control Team

**Marc Romney, MD**

IPAC Medical Director / Medical Microbiologist

**Howard Green, MBA**

Leader, Infection Control

**Jim Curtin, RN CIC**

Infection Control Practitioner

**Mary McNaughton, RN MSA CIC**

Infection Control Practitioner

**Craig Pienkowski, RN**

Infection Control Practitioner

**Celia Ambery, RN**

Infection Control Practitioner

**Wayne Gilbert, RN**

Infection Control Practitioner

**Azra Sharma, MLT MSc**

Infection Control Practitioner

**Sylvie Champagne, MD**

Medical Microbiologist

**Christopher Sherlock, MD**

Medical Microbiologist

**Victor Leung, MD**

IPAC Physician / Medical Microbiologist

**Elisa Lloyd-Smith, PhD**

Epidemiologist

**Luz Vierende**

Administrative Assistant

## Appendix B

### Providence Health Care Facilities

| NAME                        | TYPE OF FACILITY                    | ACUTE CARE BEDS | RESIDENTS  |
|-----------------------------|-------------------------------------|-----------------|------------|
| St. Paul's Hospital         | Acute care                          | 541             | 0          |
| Mount Saint Joseph Hospital | Acute care<br>Residential care      | 120             | 100        |
| St. Vincent's Hospitals     |                                     |                 |            |
| —Brock Fahrni Pavilion      | Residential care                    | 0               | 148        |
| —Langara                    | Residential care                    | 0               | 221        |
| Holy Family Hospital        | Rehabilitation/<br>Residential care | 75              | 142        |
| Youville Residence          | Residential care                    | 0               | 84         |
| Marion Hospice              | Hospice Care                        | 0               | 12         |
| <b>Total</b>                |                                     | <b>736</b>      | <b>707</b> |

# Appendix C: Definitions

## SURVEILLANCE DEFINITIONS

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

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

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

**MRSA case:** Laboratory confirmation of methicillin-resistant *Staphylococcus aureus* from specimens indicative of colonization or infection.

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

**For MRSA, VRE and *C. difficile* cases, the following sub-classifications are made:**

**PHC-associated case:** Admitted for  $\geq 72$  hours in a PHC facility OR admitted to a PHC facility within the preceding 4 weeks.

**Non PHC-associated case:** Admitted for  $< 72$  hours in a PHC facility AND has not been admitted to a PHC facility within the preceding 4 weeks. The assumption is that these cases were acquired in the community or in another health care facility other than PHC.

**Patient days:** The number of patients currently admitted at a facility by day (counts are usually conducted at midnight) and multiplied by the number of days in a given time period. Patient days are used as denominators in the calculation of rates to adjust for length of stay. For MRSA and VRE rates, acute care (including newborns) patient days are used as the denominator. For *C. difficile* rates, acute care patient days exclude newborns.

**Fiscal year/period:** April 1 to March 31 of the following year, divided into 13 fiscal periods, and 4 fiscal quarters.

**95% Confidence Interval (CI):** An interval estimate of the rate with 95% degree of certainty.

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## OUTBREAK DEFINITIONS

**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 (i.e., recent use of laxatives or stool softeners, chronic diarrhea, etc.), within a four-day period in the same unit or patient care area.

**Respiratory outbreak:** Two or more cases of influenza-like illness (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.

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