INFECTION PREVENTION AND CONTROL

Annual Report 2011/2012

Providence HEALTH CARE

How you want to be treated.

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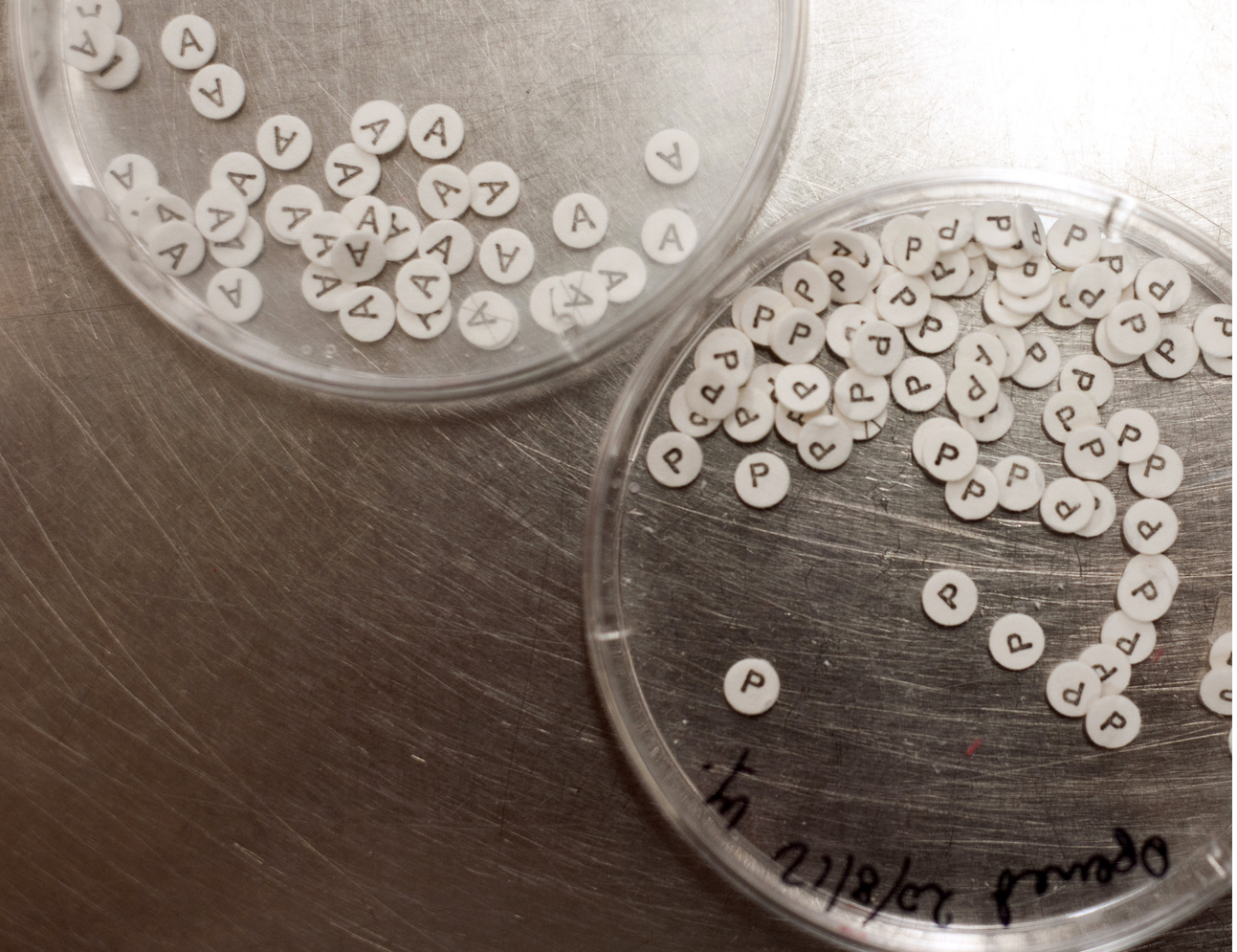
Cover photo: Test tubes for identifying pathogenic enteric bacteria



EXECUTIVE SUMMARY

Infection Prevention and Control (IPAC) at Providence Health Care is pleased to announce an increase in hand hygiene compliance this fiscal year, **reaching an overall compliance rate of 80% in Fiscal Quarter 4**. A number of new hand hygiene projects were launched this year, including an expanded "Ask me if I've cleaned my hands" campaign, as well as a successful project engaging key medical staff as hand hygiene champions. Continued efforts are already underway to maintain this high rate of hand hygiene compliance.

IPAC continues to broaden its surveillance scope. In collaboration with the Division of Cardiac Surgery and the Surgical Program, we developed a surgical site infection (SSI) surveillance program for patients undergoing cardiac surgery. We have also been working closely with the Department of Obstetrics and Gynecology to expand post-discharge SSI surveillance following Caesarean section.

Refining current surveillance programs to ensure high data quality is as important as launching new surveillance initiatives. This year, we enhanced tuberculosis (TB) surveillance by including daily monitoring of suspected and confirmed TB cases. Furthermore, processes for other surveillance programs have been updated to ensure the data collection process is consistent, comprehensive, relevant and efficient.

Healthcare-associated infection rates reflect a multitude of factors, including laboratory practices, surveillance system refinements, infection control awareness, hand hygiene compliance and practices among healthcare workers. In 2011/12, we saw a slight (but statistically insignificant) increase in Methicillin-resistant *Staphylococcus aureus* (MRSA) rates, from a rate of 0.6/1000 patient-days to 0.8 cases/1000 patient-days. Vancomycin-resistant enterococci (VRE) rates significantly decreased from 1.7 cases/1000 patient-days to a rate of 1.5 cases/1000 patient-days in 2011/12 ($p < 0.05$). Compared to the previous fiscal year, *Clostridium difficile* infection (CDI) rates decreased from 1.3 to 1.1 cases/1000 patient-days (statistically insignificant).

We appreciate and recognize the involvement — and ultimately the ownership of IPAC practices and principles — by the PHC community. Your continued support is integral to the sustainability and improvement of our work.

Sincerely,
The Infection Prevention and Control Team

INTRODUCTION TO INFECTION PREVENTION AND CONTROL

St. Paul's Hospital

Mount Saint Joseph Hospital

St. Vincent's: Brock Fahrni

St. Vincent's: Langara

Holy Family Hospital

Youville Residence

Infection Prevention and Control (IPAC) is aligned 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 healthcare-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 healthcare-associated infections using standardized case definitions is critical to the prevention and control of infectious agents. At PHC, the objectives of surveillance 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 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.

Pediculus humanus (body louse)

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 healthcare-associated infections. Overall compliance with hand hygiene among healthcare professionals, however, is known to be suboptimal.[1]

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

- expansion of unit feedback boards
- engagement of front-line staff in developing hand hygiene slogans
- educational postcards highlighting the first of "5 Moments" for hand hygiene
- ICP led huddles on units focusing on hand hygiene
- increased point of care alcohol-based hand rub dispensers
- hand hygiene education modules for nurses and hand hygiene education modules for physicians were enhanced and expanded
- "Ask Me" poster campaign
- Physician Hand Hygiene Champions

Monitoring hand hygiene is an essential component of programs aimed at improving compliance. PHC has been monitoring compliance since 2005. Systematic quarterly hand hygiene audits, based on "gold standard" methodology developed by the World Health Organization, began in the third Fiscal Quarter of 2008/09. Infection control practitioners 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 69% for fiscal year 2011/12. Compliance varied by unit, healthcare worker type, and facility. **Compared to last fiscal year, overall hand hygiene compliance improved steadily and significantly in 2011/12 and increased from 65% in Quarter 1 to 80% in Quarter 4 (Figure 1).** Further initiatives to sustain and improve compliance above 80% are currently being implemented.

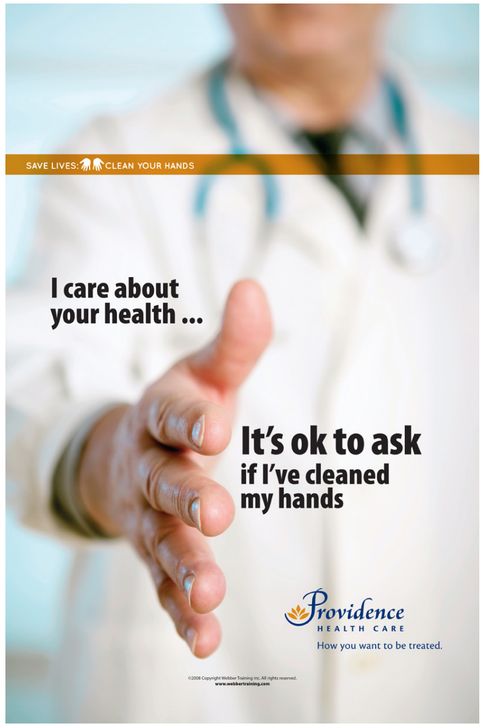
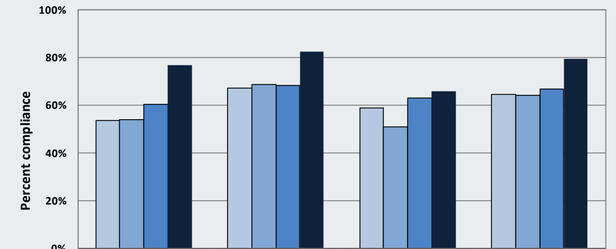


FIGURE 1: HAND HYGIENE COMPLIANCE BY HEALTHCARE WORKER TYPE, 2011/12



	Medical	Nursing	Other	Overall
Qtr 1 11/12	54%	67%	59%	65%
Qtr 2 11/12	54%	69%	51%	64%
Qtr 3 11/12	61%	68%	63%	67%
Qtr 4 11/12	77%	83%	66%	80%

Based on our previous audits and published systematic reviews, physicians (as a group) consistently underperform hand hygiene when compared to other healthcare worker groups. To engage physicians in significantly improving hand hygiene compliance at PHC, the **Physician Hand Hygiene Champions** project was launched with grant funding provided by the British Columbia Medical Association Shared Care and Specialist Services Redesign Committee. The purpose of this project was to improve physician hand hygiene compliance by investigating physicians' knowledge, attitudes, barriers and enablers to perform hand hygiene. Findings from this project will allow for the development of targeted interventions aimed at improving physician hand hygiene compliance. This project successfully recruited 103 PHC physician hand hygiene champions. Many of these physicians have since initiated locally relevant quality improvement projects in different clinical settings and have continued to act as positive hand hygiene role models for medical trainees and other healthcare workers. For the first time since our systematic auditing when initiated, medical staff did not have significantly lower hand hygiene compliance compared to other healthcare workers.

METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

Laboratory methods for identifying MRSA

MRSA is an antibiotic resistant bacterium that can be transmitted in healthcare and community settings. MRSA has the potential to cause serious infections for which treatment options are limited. More patients are colonized rather than infected with MRSA. Medically complex patients, those with more chronic diseases, and those who undergo invasive procedures or who have prosthetic devices are at higher risk for MRSA infection. The primary mode of transmission within healthcare facilities is via the hands of healthcare workers. The data presented below represent newly identified cases of MRSA among patients admitted to a PHC facility.

In 2011/12, 810 new cases of MRSA were identified at PHC facilities. Over half of these cases were seen in outpatient clinics (or emergency department visits). More precisely, 162/810 (20%) were classified as PHC-associated; and further, 138/162 (85%) of these cases were associated with transmission on acute care wards at St. Paul's Hospital or Mount Saint Joseph Hospital corresponding to an overall incidence rate of 0.8 cases/1000 patient-days (95% CI: 0.6, 0.9) (Figure 2).

This corresponds to a 15% increase (statistically insignificant) in the rate of PHC-associated MRSA cases compared to last fiscal year, and a 55% statistically significant decrease compared to 2006/07 ($p < 0.05$).

Overall, the rate at MSJ (1.0 cases/1000 patient-days) was significantly higher than the rate at SPH (0.7 cases/1000 patient-days, $p < 0.05$) (Figure 3). This difference is likely related to intensified screening which occurred on medical units at MSJ.

Overall, the incidence rate of PHC-associated MRSA cases has shown a downward trend over the preceding six years. The decline in MRSA rates is multi-factorial in origin, and to an extent reflects improved infection control practices among healthcare professionals. Additionally, improved molecular testing, accelerated laboratory result turn-around times, and downward MRSA trends in the community may have contributed to decreasing rates.

In 2011/12, over half (56%) of the PHC-associated cases were identified through hospital screening programs. The remaining cases were identified from clinical specimens.

To address the problem of poor adherence to Antibiotic Resistant Organisms (ARO) screening among high-risk admitted patients, IPAC (in collaboration with the Emergency Department) developed universal MRSA screening for patients admitted to Medicine units at St. Paul's Hospital. We are currently conducting an analysis to determine the impact and the sustainability of this project.

FIGURE 2:
INCIDENCE RATE OF PHC-ASSOCIATED MRSA IN ACUTE CARE FACILITIES, 2006/07 TO 2011/12

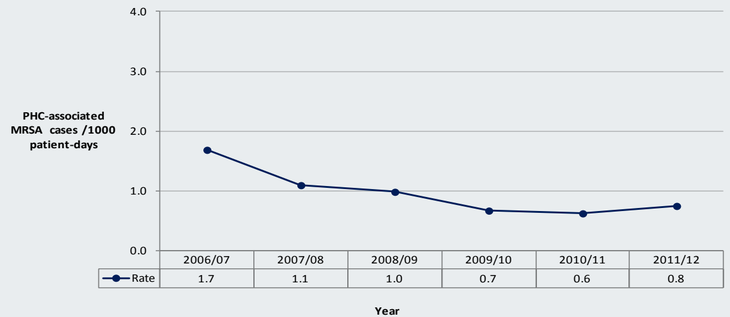
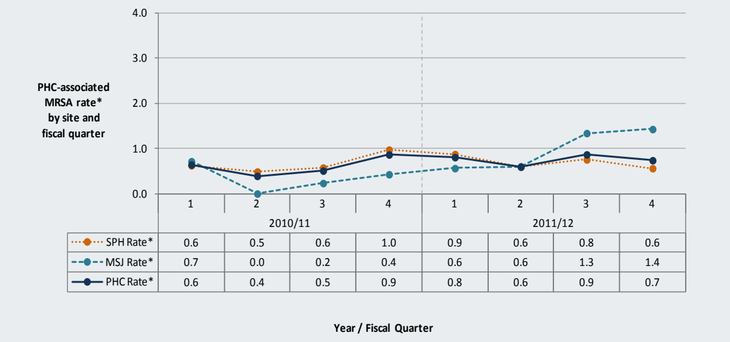
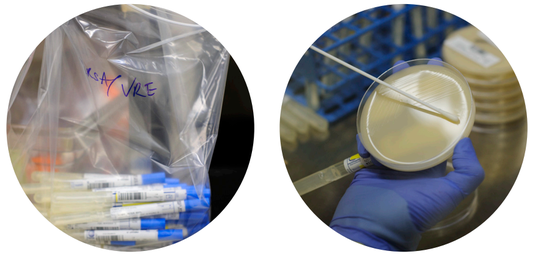


FIGURE 3:
INCIDENCE RATE OF PHC-ASSOCIATED MRSA BY SITE AND FISCAL QUARTER, 2010/11 AND 2011/12



Note: * number of cases / 1000 patient-days

VANCOMYCIN-RESISTANT ENTEROCOCCI (VRE)



Swabs for VRE testing

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

In 2011/12, 351 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), and 281/351 (80%) of cases were classified as PHC-associated. **Of these, 267 (95%) were associated with transmission on acute care wards at either MSJ or SPH, corresponding to an incidence rate of 1.4 cases/1000 patient-days (95% CI: 1.4, 1.7) (Figure 4). This is significantly lower than the 2010/11 rate of 1.7 (95% CI: 1.4, 2.1) ($p < 0.05$). This decrease was observed at SPH but not at MSJ.** Overall, the incidence rate at MSJ increased significantly from 0.5 (95% CI: 1.9, 2.9) in 2010/11 to 1.2 (95% CI: 0.3, 0.8, $p < 0.05$) in 2011/12, while the incidence rate at SPH decreased significantly from 2.0 (95% CI: 1.8, 2.3) to 1.5 (95% CI: 1.3, 2.0, $p < 0.05$) (Figure 5). At MSJ, a small VRE outbreak occurred on a medical unit and this contributed to the significant increase in VRE cases at this site, especially in Fiscal Quarter 4. Interventions to control the outbreak included: intensified screening for VRE upon admission; increased frequency of hand hygiene audits, transmission based precautions audits and environmental cleaning audits; enhanced use of chlorhexidine for bathing patients colonized or infected with VRE; increased education for front-line staff; and improved cohorting of patients.

In 2011/12, the majority (68%) of PHC-associated cases were identified through hospital screening programs. The remaining cases were identified through clinical specimens. Severe infections due to VRE remain an uncommon occurrence. Overall, VRE incidence rates have decreased by 44% since 2006/07.

In consultation with a health economist and biostatistician, we are currently conducting an analysis on the attributable cost of VRE colonization and/or infection. The results of this analysis will help guide future directions regarding the scope of our VRE control program.

FIGURE 4:
INCIDENCE RATE OF PHC-ASSOCIATED VRE IN ACUTE CARE FACILITIES, 2006/07 TO 2011/12

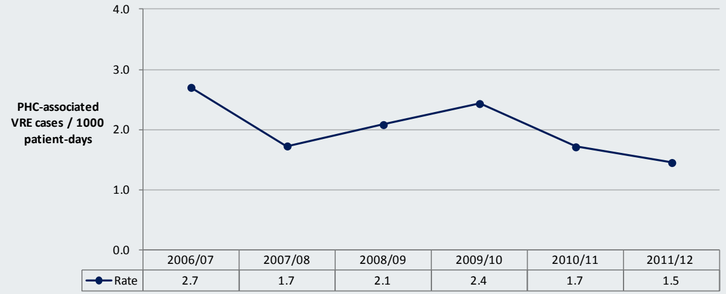
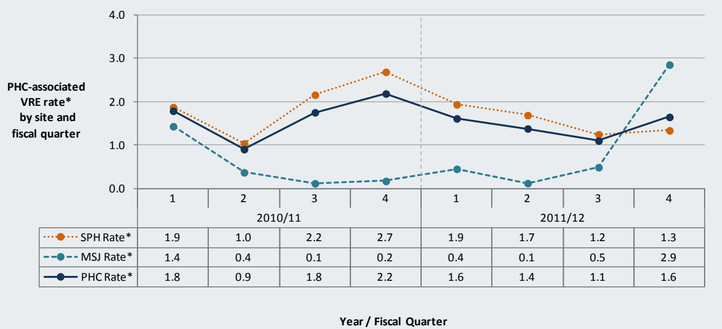


FIGURE 5:
INCIDENCE RATE OF PHC-ASSOCIATED VRE BY SITE AND FISCAL QUARTER, 2010/11 AND 2011/12



Note: * number of cases / 1000 patient-days

CLOSTRIDIUM DIFFICILE INFECTION (CDI)

Clostridium difficile infection (CDI) is the most common cause of healthcare-associated infectious diarrhea. CDI can present as mild diarrhea, but occasionally progresses to a severe infection resulting in serious complications such as toxic megacolon and even death. CDI is known to be more common in hospitalized persons who are > 65 years old and those who have been on antibiotics in the preceding three months.[4] Enhanced surveillance for CDI began at PHC on January 1, 2007, and polymerase chain reaction (PCR) for diagnosis of CDI was implemented in fiscal period 6 of 2010/11. To minimize the spread of infection, measures such as appropriate hand hygiene, stringent environmental cleaning/disinfection, and judicious use of antibiotics need to be implemented. This year, members of the IPAC team contributed to the development of provincial guidelines and tools for the prevention and control CDI.

In 2011/12, 397 new cases of CDI were identified at PHC. 264 (66%) of these were classified as PHC-associated cases. Of these, 224 (85%) were associated with either SPH or MSJ, corresponding to an incidence rate of 1.1 cases/1000 patient-days (95% CI: 1.0, 1.3). **This is a slight, but not statistically significant, decrease from 2010/11 (Figure 6).** As shown in Figure 7, the incidence rate of CDI at MSJ and SPH remained relatively unchanged over the four Fiscal Quarters of 2011/12.

Complications related to CDI in the 30 days following diagnosis are considered an indicator of the severity of illness, and are also closely monitored as part of our surveillance program. In 2011/12, 2 cases (0.5%) were admitted to the ICU, 1 case (0.3%) underwent a colectomy, and 1 case (0.3%) was diagnosed with toxic megacolon. In addition, CDI was determined to be a probable contributing factor in the death of 2 (0.5%) cases. This case fatality rate is consistent with rates from other facilities in Canada.[5]

In order to engage front-line staff in basic infection prevention and control interventions, IPAC has started monitoring patient placement in the selected acute care wards. Infection Control Practitioners (ICPs) are providing medical wards at SPH and MSJ with a visual map of the unit identifying patients with *Clostridium difficile* infection. The bed maps also identify patients with MRSA and VRE colonization/infection. The goal is to minimize mixed cohorting of patients on the hospital wards. ICPs also actively follow patients with CDI to ensure that contact precautions are followed, and communicate regularly with housekeeping staff to ensure enhanced environmental cleaning and disinfection is initiated.

Testing for *Clostridium difficile*

Using PCR, we examined a subsample of CDI cases to determine strain type. Epidemiologic differences of CDI were identified when PCR was used to differentiate between mutant and wild type strains. This type of molecular testing provides a more accurate classification of CDI cases. In addition, we are collaborating with an epidemiologic consulting firm to create a CDI burden of illness model for Canada.

Recently, IPAC physicians were selected to participate in a multi-centre randomized controlled trial comparing a novel antibiotic with vancomycin for the treatment of CDI. The study will likely start recruiting patients in the winter of 2012.

FIGURE 6:
INCIDENCE RATE OF PHC-ASSOCIATED CDI CASES IN ACUTE CARE FACILITIES, 2006/07 TO 2011/12

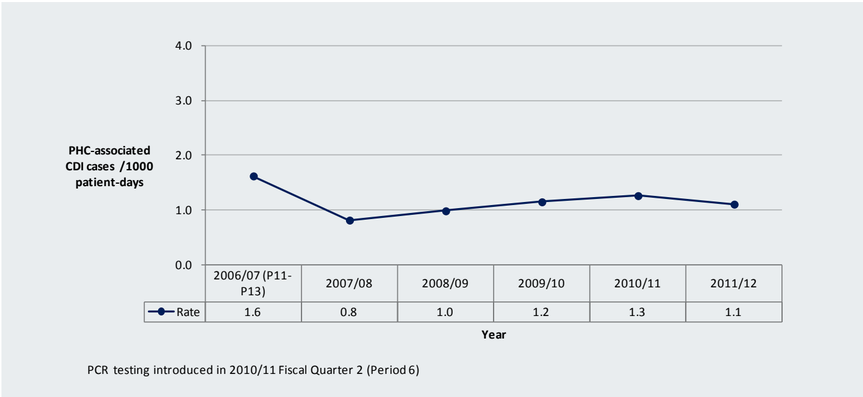
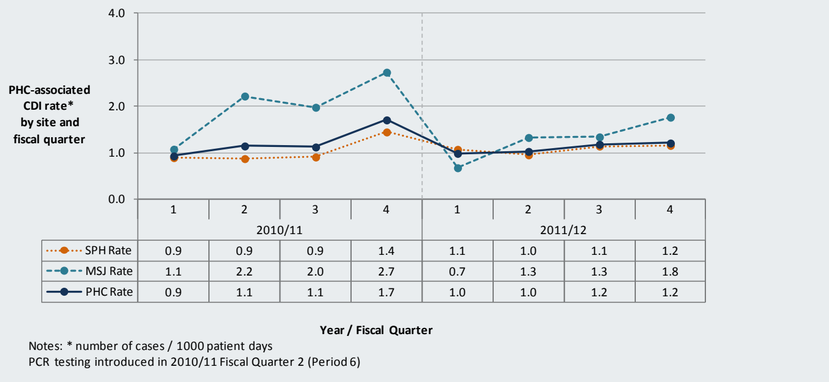
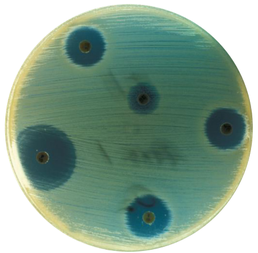


FIGURE 7:
PHC-ASSOCIATED CDI CASES BY SITE AND FISCAL QUARTER, 2010/11 AND 2011/12



SURGICAL SITE INFECTION (SSI) SURVEILLANCE



Staphylococcus aureus, antibiotic susceptibility test

Although surgical techniques have advanced over the years, surgical site infections (SSI) continue to be a major source of post-operative morbidity, longer hospital stays, increased healthcare costs, and readmissions to hospital. SSI surveillance has been identified as a key priority for IPAC and the PHC Surgical Program, and is an Accreditation Canada required organizational practice.

Surgical site infections are identified following the development of an infection at the site of surgery within a specified period of time following the procedure. For most surgeries, 30 days is the standard follow-up period; however, this can be extended to one year if a prosthetic device or material has been placed (e.g., prosthetic joint or heart valve). The case definitions used for SSI surveillance are consistent with those from the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN).

In collaboration with the Department of Surgery and the Surgical Program, IPAC has developed an electronic and semi-automated SSI surveillance system. Instead of conducting universal surveillance on all surgical procedures performed at PHC, IPAC's SSI surveillance programs are targeted to selected high-volume or high-risk procedures.[6] Procedures currently under surveillance include: Caesarean sections, hip and knee arthroplasties, and open heart surgery (starting 2012).

Caesarean section: In 2008/09, Infection Prevention and Control worked with the Department of Obstetrics and Gynecology to pilot surveillance for SSI following Caesarean section. Fiscal year 2009/10 was the first complete year of this surveillance initiative. The Caesarean section SSI rate for fiscal year 2009/10 was 0.79 per 100 procedures per year. For year 2010/11, this rate has decreased significantly to 0.16 per 100 procedures per year. **In 2011/12 the Caesarean section SSI rate was 0.29 per 100 procedures per year.** This rate is well below the pooled mean from NHSN.

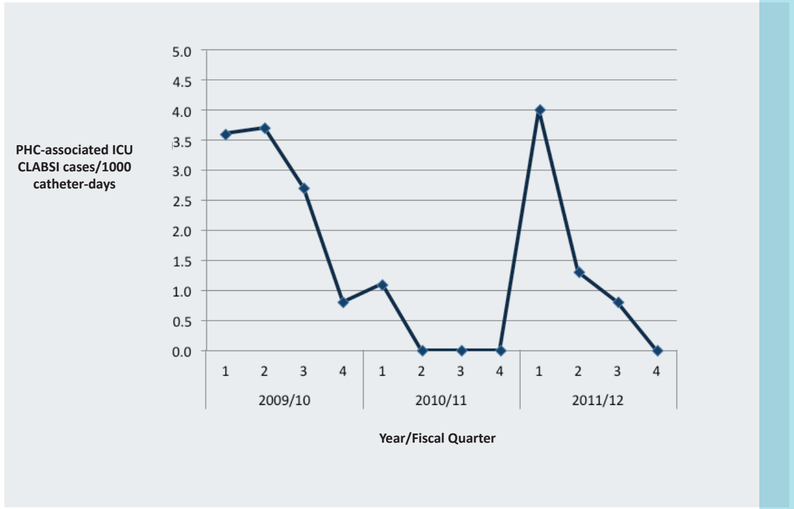
Although challenging, it is important to implement a post-discharge surveillance program for SSI. A large percentage of SSI occur in the post-discharge period, particularly with the recent trend toward shorter hospital stays.[7] PHC has been collaborating with BC Women's Hospital in developing a post-discharge surveillance system for SSI following Caesarean section. The post-discharge surveillance project was piloted at the end of fiscal year 2011/12, and we anticipate further expansion of post-discharge surveillance in the coming year.

Hip and knee arthroplasty: Surveillance for SSI following hip and knee replacement surgeries began in 2007. This initiative was developed as a partnership between IPAC and the PHC Department of Orthopedic Surgery. The annual rate of SSI was 1.4 per 100 procedures per year in 2009/10 and significantly decreased to 0.52 per 100 procedures per year ($p < 0.05$) in 2010/11. **This fiscal year, the SSI rate was determined to be 0.50 per 100 procedures, which is consistent with the previous year (2010/11).**

Cardiac surgery procedures: In 2011/12, the Infection Prevention and Control (IPAC) team worked closely with the Division of Cardiac Surgery and the Surgical Program to develop a Cardiac Surgery SSI surveillance system. Procedures under surveillance will include coronary artery bypass graft surgery, as well as cardiac valve replacement surgery. Data from the first year of surveillance will be presented in next year's annual report.

CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTION (CLABSI) SURVEILLANCE

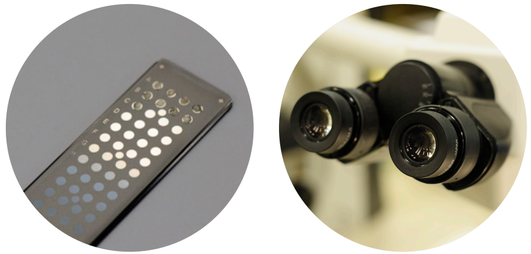
FIGURE 8: PHC-ASSOCIATED CLABSI BY FISCAL QUARTER, 2009/10 – 2011/12



Central line-associated bloodstream infections (CLABSI) result in prolonged hospital stay, increased healthcare costs and excess patient morbidity. Intensive care unit (ICU) patients are particularly vulnerable to CLABSI. [8] Surveillance for CLABSI is an important component of hospital prevention and control activities. Using standardized case definitions and methodology, IPAC (in partnership with the ICU) has developed a sensitive and timely CLABSI surveillance system. The ICU has focused its efforts in decreasing CLABSI by enhancing education provided to those inserting central lines and implementing well established prevention bundles.

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 three complete years of data (Figure 8). In the ICU for fiscal year 2009/10, the CLABSI rate was 2.6 per 1000 catheter-days and 0.2 per 1000 catheter-days for fiscal year 2010/11. The CLABSI rate for fiscal year 2011/12 was 1.1 per 1000 catheter-days. [Note: based on a relatively low sample size in our CLABSI surveillance, we see intrinsic variability when rates are examined on a quarterly basis.]

OUTBREAK MANAGEMENT



Emerging and traditional diagnostic technology

All PHC facilities are monitored for outbreaks of respiratory and gastrointestinal infections. Surveillance allows for the early detection of clusters so that control measures can be implemented swiftly. Outbreaks are declared in collaboration with Vancouver Coastal Health Communicable Disease Control.

Recently, improved laboratory detection of influenza and norovirus using molecular methods has allowed for rapid implementation of control strategies. The frequency, duration and severity of outbreaks depend on the type of organisms circulating in the community.

The following control measures are implemented to prevent and control nosocomial outbreaks:

- prompt laboratory detection of the etiologic agent
- early involvement of the IPAC team to support frontline staff
- thorough review of each patient case and strict adherence to outbreak case definitions
- isolation of affected patients in private rooms (or cohorting of patients if private rooms not available)
- closure of the affected patient unit or ward
- enhanced surveillance for the duration of the outbreak
- targeted staff education to reinforce the need to implement syndromic based precautions
- exclusion of sick staff from the workplace
- restriction of visitors and postponement of group activities
- enhanced environmental cleaning in the unit/facility

In 2011/12, 4 respiratory outbreaks and 4 gastrointestinal outbreaks were identified at PHC facilities (Tables 1 and 2). On average, respiratory outbreaks lasted 10 days (range: 5-14 days). All of the respiratory outbreaks occurred in residential care. On average, gastrointestinal outbreaks lasted 11 days (range: 7-15 days). Two gastrointestinal outbreaks were identified in acute care and 2 were identified in residential care. All gastrointestinal outbreaks were caused by laboratory confirmed norovirus.

TABLE 1

Respiratory outbreaks at PHC facilities, 2006/07 – 2011/12

	NUMBER OF OUTBREAKS			NUMBER OF CASES			CAUSATIVE ORGANISM	
Year	Total	Residential	Acute	Total	Residents/ patients	Staff	Influenza	Other
2011/12	**4**	**4 (100%)**	**0 (0%)**	**55**	**46 (84%)**	**9 (16%)**	**4 (100%)**	**0 (0%)**
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 – 2011/12

	NUMBER OF OUTBREAKS			NUMBER OF CASES			CAUSATIVE ORGANISM	
Year	Total	Residential	Acute	Total	Residents/ patients	Staff	Norovirus	Other
2011/12	**4**	**2 (50%)**	**2 (50%)**	**80**	**51 (64%)**	**29 (36%)**	**4 (100%)**	**0 (0%)**
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%)

PULMONARY TUBERCULOSIS (TB)

Cultures of mycobacteria

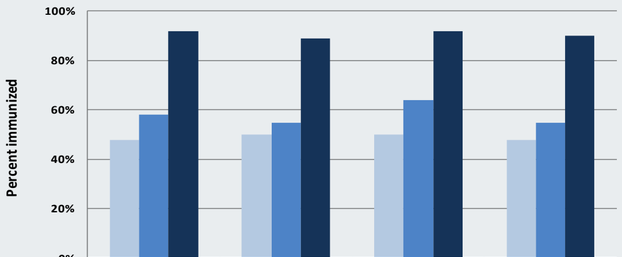
Tuberculosis (TB) is caused by the bacterium *Mycobacterium tuberculosis*. TB is spread primarily via aerosolization of respiratory secretions when someone with active pulmonary disease coughs or sneezes.

The risk of TB transmission in healthcare 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.[10]

In 2011/12, 23 cases of pulmonary tuberculosis were diagnosed at PHC acute care facilities; 12 (52%) were among admitted patients. Among hospitalized patients, 50% were placed on precautions within 4 hours and 42% had roommates who required TB exposure follow-up. No nosocomial transmission of TB was detected in 2011/12. No cases were identified in residential care facilities.

PHC provides care for a relatively high number of TB cases. In this fiscal year, we initiated an enhanced system to ensure that all patients with suspected pulmonary TB are placed on airborne precautions in a timely manner. ICPs have also been more involved in assessing the appropriateness of discontinuing airborne precautions. To further characterize the risk of TB transmission at PHC, the IPAC team, in consultation with multiple hospital services, has developed an institutional TB risk assessment. The findings from this assessment will help prioritize the key areas for improvement with regards to mitigating risk of TB transmission at PHC.

INFLUENZA



	2009-10	2009-10 pH1N1	2010-11	2011-12
Acute Care Staff	48%	50%	50%	48%
Residential Care Staff	58%	55%	64%	55%
Residents	92%	89%	92%	90%

FIGURE 9:
INFLUENZA IMMUNIZATION COVERAGE RATES AMONG PHC STAFF AND RESIDENTS, 2009/10, 2010/11, AND 2011/12

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 2011/12, and consistent with previous years, nearly all of the residents at PHC residential care facilities were vaccinated against influenza (Figure 9).

Healthcare workers are also at an increased risk of acquiring and transmitting the influenza virus. Influenza immunization is the most effective way to prevent the spread of influenza. Despite the benefits of the influenza vaccine, vaccine uptake rates among healthcare workers remain low. In 2011/12, the percent of acute care staff immunized against influenza decreased slightly for seasonal influenza vaccine (48%; n = 2191). Additionally, 469 (55%) residential care staff at PHC facilities were immunized against seasonal influenza (Figure 9). Although these coverage rates are far from ideal, they are consistent with those reported in other healthcare facilities in BC.

IPAC is working closely with Occupational Health & Safety and VCH Communicable Disease Control to implement innovative approaches to improve vaccination rates. Mandatory influenza vaccination of healthcare workers or wearing a surgical mask is expected to be introduced in 2012/13. In addition to receiving the influenza vaccine, healthcare workers are encouraged to always practice hand hygiene, respiratory etiquette, and to stay home from work if they have influenza-like symptoms.

EDUCATION

The Infection Prevention and Control (IPAC) team strives to provide PHC staff with timely and 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.

In addition, 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 provide consultations through telephone interactions, regular ward visits, resident teaching sessions and IPAC rounds.

Infection control practitioners (ICPs) deliver the bulk of infection control education sessions at PHC. **In the past year, the IPAC team delivered over 113 hours of education sessions, reaching over 1900 staff (Table 3).** This year, most of the education delivered was on hand hygiene and basic infection prevention and control principles. The percent of education time spent on hand hygiene and general infection control was substantially higher than in recent years.

A new education module for the upcoming fiscal year will focus on the prevention of catheter-associated urinary tract infections.

TABLE 3

IPAC educational sessions by number of hours and participants reached, 2011/12

	HOURS / YEAR		PARTICIPANTS/YEAR	
Type of education	**N**	**%**	**N**	**%**
IPAC Links workshops	16	14	27	1
New employee orientation	18	16	668	35
Hand hygiene	37	34	596	31
Transmission-based precautions	5	4	131	7
Influenza/Gastrointestinal outbreaks	6	5	95	5
Antibiotic resistant organisms	10	9	122	7
Clostridium difficile infection	7	6	89	5
Other	14	12	175	9
Total	**113**	**100**	**1903**	**100**

IPAC LINKS

IPAC Links was established following the successful implementation and evaluation of the Infection Control Champions (ICC) project, a study 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. Local stakeholders also considered the project a success and the ICC project was renamed and re-launched as the IPAC Links program. Since its inception, IPAC has trained 124 individuals to the Link Program.

Building upon the previous accomplishments of IPAC Links, the scope of the program was broadened considerably, and an additional 17 new healthcare workers were recruited to serve as Links. Based upon a distributed model of infection prevention and control, the Links program now includes Social Workers, Licensed Practical Nurses, Respiratory Therapists, Laboratory Technologists, Ward Aides, Radiology Technicians, as well as Registered Nurses.

In addition to the general orientation sessions, updates are presented through IPAC held education in-services and a monthly newsletter entitled *The Bug Brief*.

Many Links have been playing a pivotal role in a number of local Infection Control issues including: changes to the physical layout of the unit, increasing access to point of care alcohol-based hand rub, engaging staff in hand hygiene peer reviews, improving compliance with ARO screening and transmission-based precautions, and promoting educational material and surveillance data on unit feedback boards.

APPENDIX A: INFECTION PREVENTION AND CONTROL TEAM

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IPAC Medical Director / Medical Microbiologist

Howard Green, MBA
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Camillia Palacios
Nursing Clerk

Luz Vierneza
Administrative Assistant

Sylvie Champagne, MD
Medical Microbiologist

Christopher Sherlock, MD
Medical Microbiologist

APPENDIX B: PROVIDENCE HEALTH CARE FACILITIES

NAME	TYPE OF FACILITY	ACUTE CARE BEDS	RESIDENTS
St. Paul's Hospital	Acute care	435	0
Mount Saint Joseph Hospital	Acute care Residential care	101	100
St. Vincent's Hospitals			
—Brock Fahrni Pavilion	Residential care	0	148
—Langara	Residential care	0	217
Holy Family Hospital	Rehabilitation care Residential care	75	142
Youville Residence	Residential care	0	79
Marion Hospice	Hospice Care	0	12
Total		**612**	**698**

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 CDI cases, the following sub-classifications are made:

PHC-associated case: Admitted for ≥72 hours in a PHC facility OR admitted to a PHC facility within the preceding 4 weeks/12 months.

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/12 months. The assumption is that these cases were acquired in the community or in another healthcare 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.

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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and p. 23 (IPAC staff).