

Infection Prevention and Control Providence Health Care



2007/08 Annual Report



How you want to be treated.

Table of Contents

Executive Summary	3
Introduction to Infection Prevention and Control (IPAC).....	4
Hand Hygiene	5
Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA)	6
Vancomycin-Resistant Enterococci (VRE).....	7
<i>Clostridium difficile</i>-Associated Disease (CDAD)	8
Pulmonary Tuberculosis (TB)	9
Outbreaks	10
Influenza Immunization Coverage	11
Education.....	12
Infection Control Champions	13
Surgical Site Infection Surveillance.....	13
References	14
Appendices	15
Appendix A: Infection Prevention and Control Team	15
Appendix B: Providence Health Care Facilities	15
Appendix C: Definitions.....	16

Executive Summary

Infection prevention and control (IPAC) is an important part of Providence Health Care's (PHC) commitment to improve patient safety. Health care settings present some inherent risk for acquiring infections, as patients with complicated medical conditions and weakened immune systems come together to receive care. However, with the implementation of various infection prevention and control strategies, we have been successful in reducing the risk of health care-associated infections at PHC.

This past year, we saw decreasing trends in the rate of new cases (incidence) of MRSA, VRE, and *Clostridium difficile* with rates of 1.1 cases/1000 patient days, 1.7 cases/1000 patient days and 0.8 cases/1000 patient days, respectively. These decreasing trends are likely a result of a multitude of factors, including improved hand hygiene, enhanced laboratory detection, refined surveillance systems, and more infection control awareness and practices among health care professionals.

We are also very pleased to announce the relaunch of the *Clean Hands for Life*[™] campaign across PHC. Overall, hand hygiene compliance increased through the first phase of the campaign by 50%. Proper hand hygiene is one of the most important measures to prevent infections. The hand hygiene campaign has been very successful in raising hand hygiene awareness, as well as improving access to alcohol hand rub and handwashing stations.

We strive to improve our control strategies when responding to outbreaks of influenza-like illness and viral gastroenteritis. In 2007/08, four respiratory outbreaks and six gastrointestinal outbreaks were identified in PHC facilities, and were primarily caused by influenza and norovirus, respectively. For each outbreak identified, control measures were successful in reducing the risk of further transmission.

We look forward to the coming year with new initiatives underway to sustain a culture that promotes infection prevention and control strategies at PHC. The success of infection prevention and control is dependent on the involvement of front-line health care professionals, physicians, hospital administrators, patients, residents and visitors. We thank everyone who has contributed to the IPAC initiatives and look forward to continuing our successful collaboration.

Sincerely,

The Infection Prevention and Control Team

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 for 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:

1. Detect cases through enhanced screening so that appropriate precautions can be implemented.
2. Detect infectious diseases outbreaks in order to implement control measures.
3. Monitor trends in PHC-associated transmission, and provide a means of determining when interventions are required.
4. Determine the burden of specific infectious diseases to PHC.
5. Evaluate and enhance 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. Where other patients, residents, or staff may have been exposed before a case was identified, contact tracing is conducted to ensure that the disease was not transmitted to others.

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 within a PHC facility. For each outbreak declared, control measures are promptly implemented.

Environmental hygiene: IPAC works with multidisciplinary teams to implement environmental infection control strategies. This includes planning for construction projects, and advising on environmental decontamination and cleaning procedures.

Education is provided to staff and resources are provided to patients and visitors in order to increase awareness around appropriate IPAC measures. Education is provided via classes, presentations, consultations, and the IPAC website.

Research is conducted 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 are continuously reviewed, developed, and implemented in order to guide the best evidence-based IPAC practices.

Hand Hygiene

Hand hygiene (hand-washing with soap and water or using alcohol 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 low [1]. PHC continuously strives to improve compliance rates through a process of evaluation, assessment and interventions.

EVALUATION and ASSESSMENT

In October 2005, the *Clean Hands for Life*TM campaign was launched in collaboration with Vancouver Coastal Health and Bayer HealthCare (Canada). The goal of the campaign was to improve hand hygiene compliance by promoting awareness through posters, promotional materials, and educational sessions. Access to alcohol hand rub was greatly improved by distributing portable hand gel bottles and mounting additional wall-mounted gel dispensers. The campaign was shown to be successful in improving overall hand hygiene compliance rates by approximately 50%. Compliance rates varied by unit and activity.

INTERVENTIONS

In 2007/08, the following interventions were implemented:

- ➔ Relaunch of the *Clean Hands for Life*TM campaign, including interactive educational sessions across PHC
- ➔ Measurement of compliance using an improved hand hygiene audit tool
- ➔ Feedback of hand hygiene compliance rates to PHC staff
- ➔ Online hand hygiene module designed specifically for medical staff
- ➔ Increased accessibility to hand washing stations and alcohol hand rub
- ➔ Product change from alcohol hand gel to foaming alcohol hand rub
- ➔ Hand hygiene questionnaire to health care workers to guide future interventions (Tables 1 and 2)

Hand Hygiene Feedback - What PHC health care workers are saying:

Table 1. Why don't people in your unit perform hand hygiene as often as they should?

Reason	N	%
Too busy	297	34
Supplies not accessible	163	18
Forget	154	17
Tired	74	8
Don't know importance	63	7
Damages skin	60	7
Other	74	8
All	885	100

Table 2. What do you think would improve hand hygiene?

Solution	N	%
Improve accessibility	124	31
Education	78	20
Personal commitment	65	16
Increase awareness	50	13
Better products	34	9
Remind each other	26	7
Monitor and enforce	22	6
All	399	100

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

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

In 2007/08, 1182 new cases of MRSA were identified at PHC facilities. Over half (53%) of these cases were seen in outpatient clinics or emergency departments and were not admitted to PHC. 222/1182 (19%) cases were classified as PHC-associated cases. 211/222 (95%) of these cases were identified at St. Paul's Hospital or Mount Saint Joseph corresponding to an overall incidence of 1.1 cases/1000 patient days (95% CI: 0.9, 1.3). The rate did not differ between the two acute care hospitals.

This corresponds to a 35% decrease in PHC-associated MRSA cases compared to last year (Figure 1). The reason for this decrease is likely multifactorial, including improved identification of cases associated with other facilities, resulting in a relative decrease in the number of cases that

previously were classified as PHC-associated. Other factors for this decreasing trend include improved infection control awareness and practices, such as hand hygiene, among health care professionals. Overall, the incidence of PHC-associated MRSA cases has remained stable or decreased during the previous six years (Figure 1).

The number of MRSA cases (whether acquired in a hospital or the community) continues to pose a challenge in health care settings. Overall, those who were MRSA positive accounted for 15% of all patient days at PHC. This is a slight increase from a prevalence of 12% in 2004/05.

Hospital screening programs have been successful at detecting new cases. In 2007/08, over half (55%) of the PHC-associated cases were identified through hospital screening programs. The remainder (45%) were identified by culturing a clinical specimen. 13/222 (6%) of PHC-associated cases developed an MRSA bloodstream infection.

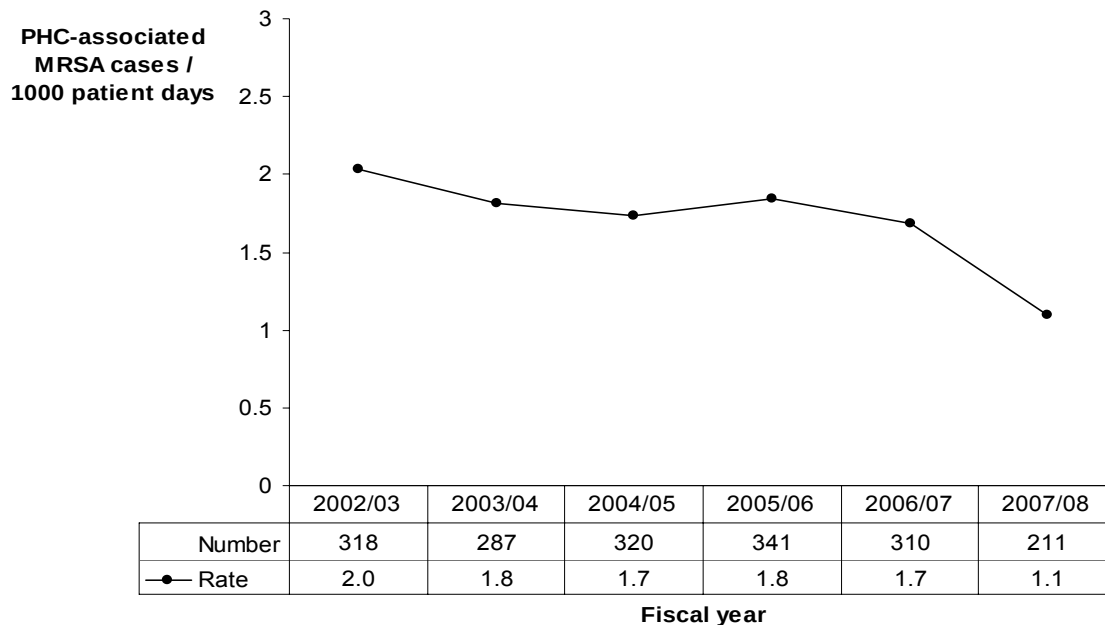


Figure 1. Incidence of PHC-associated MRSA cases in acute care facilities, 2002/03 to 2007/08.

Vancomycin-Resistant Enterococci (VRE)

VRE refers to certain strains of enterococci that are resistant to the antibiotic vancomycin, making infections more difficult to treat. VRE was first identified as being transmitted within Providence Health Care facilities in the fall of 2004.

In 2007/08, 433 new cases of VRE were identified at PHC. Nearly all of these cases (95%) were admitted to a PHC facility, as opposed to being seen only as outpatients. 332/433 (77%) cases were classified as PHC-associated cases, corresponding to an incidence of 1.7 cases/1000 patient days (95% CI: 1.5, 1.9) (Figure 2). The incidence was significantly higher at St. Paul's Hospital (2.0, 95% CI: 1.7, 2.2) compared to Mount Saint Joseph Hospital (0.9, 95% CI: 0.6, 1.2).

This corresponds to a 36% decrease in PHC-associated VRE cases compared to last year (Figure 2). The reason for this decrease is likely multifactorial, including improved identification of cases associated with other facilities, resulting in a relative decrease in the number of cases that

previously were classified as PHC-associated. Other factors for this decreasing trend include improved infection control awareness and practices, such as hand hygiene, among health care professionals. Overall, the incidence of PHC-associated VRE cases has remained stable and may be slightly decreasing (Figure 2).

The number of VRE cases (whether acquired in a hospital or elsewhere) continues to pose a challenge in health care settings. Overall, those who were VRE positive accounted for 10% of all patient days at PHC. This is an increase from a prevalence of only 2% in 2004/05.

Hospital screening programs have been successful at detecting new cases. In 2007/08, the clear majority (84%) of PHC-associated cases were identified through hospital screening programs. The remainder (16%) were identified by culturing a clinical specimen. 3/332 (<1%) of PHC-associated cases developed a VRE bloodstream infection.

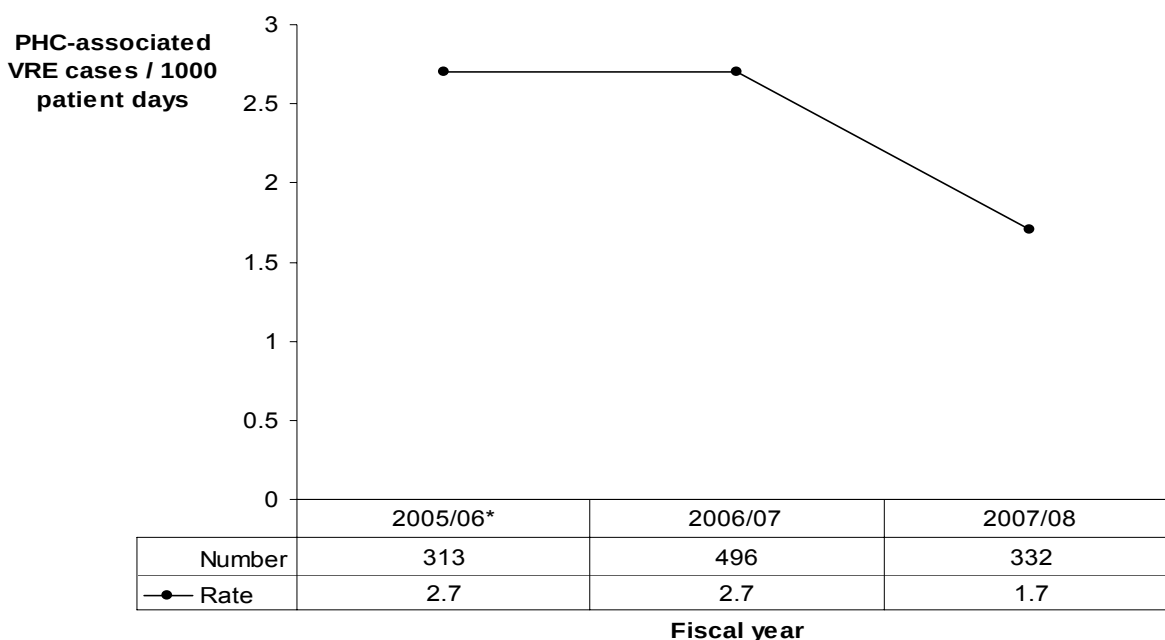


Figure 2. Incidence of PHC-associated VRE cases in acute care facilities, 2005/06 to 2007/08.

*Data available for fiscal periods 6-13 only (August 12, 2005 – March 31, 2006)

Clostridium difficile-Associated Disease (CDAD)

Clostridium difficile is a bacterium that may result in diarrhea and has the potential to cause more serious intestinal complications. *Clostridium difficile*-associated disease (CDAD) is one of the most common infections acquired in health care settings [2;3]. Enhanced surveillance for CDAD began at PHC on January 1, 2007.

In 2007/08, 232 new cases of CDAD were identified at PHC. 165 (71%) of these were classified as PHC-associated cases, corresponding to an incidence rate of 0.8 cases/1000 patient days (95% CI: 0.7, 0.9). The incidence was slightly – but not significantly – higher at Mount Saint Joseph Hospital (1.0, 95% CI: 0.7, 1.3) compared to St. Paul's Hospital (0.8, 95% CI: 0.7, 0.9).

Overall there was a decreasing trend in the incidence of CDAD cases in 2007/08 (Figure 3).

As an indicator of the severity of illness, complications related to CDAD in the 30 days following diagnosis are also closely monitored. In 2007/08, 3 cases (1%) were admitted to the ICU; 27 cases (12%) had treatment failure, 3 (1%) underwent a colectomy, 2 (1%) were diagnosed with toxic megacolon, and 9 (4%) were readmitted with CDAD. In addition, it was evaluated that CDAD was a likely contributing factor in the death of 17 (7%) cases. This case fatality rate is consistent with rates reported from other facilities in Canada [4].

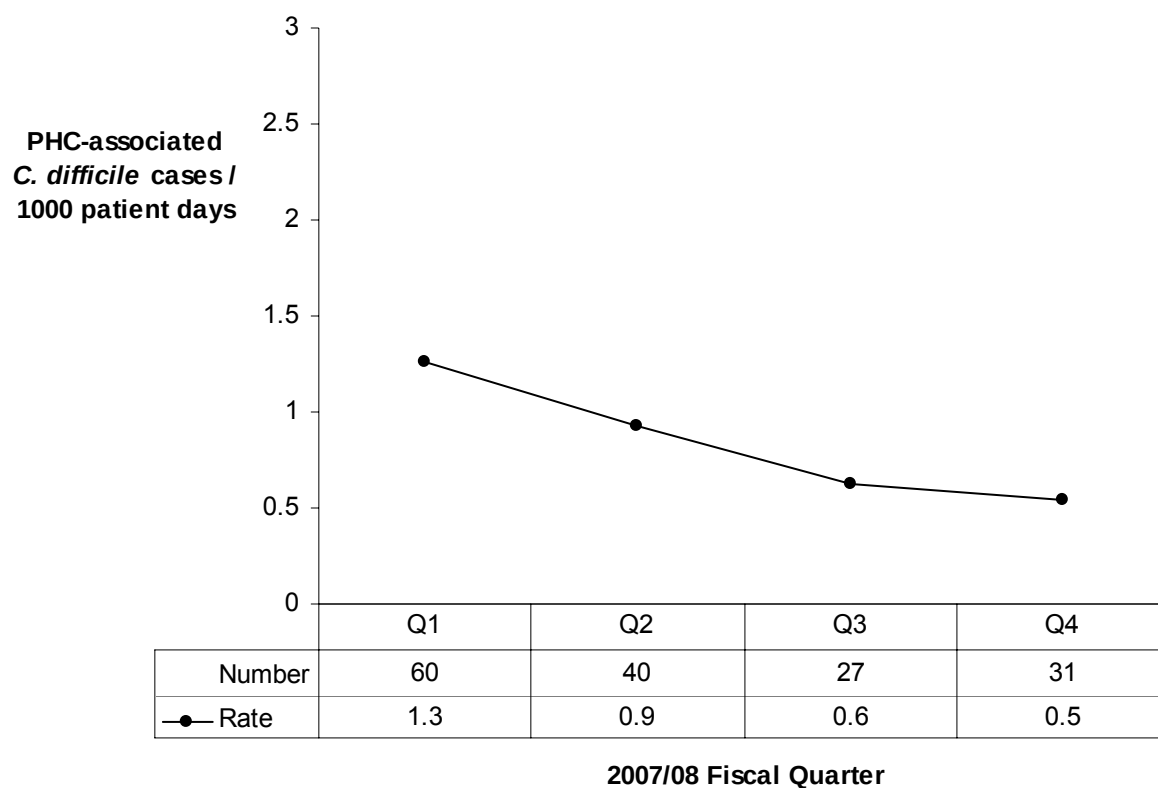


Figure 3. Incidence of PHC-associated *C. difficile* cases in acute care facilities, 2007/08.

Pulmonary Tuberculosis (TB)

Tuberculosis (TB) is caused by a bacterium called *Mycobacterium tuberculosis*. It is spread primarily via the airborne route when someone with active pulmonary TB 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 implemented. If a patient is suspected or known to have active pulmonary TB, the patient is placed on airborne precautions to reduce the risk of further transmission. A facility is considered to have a high risk of TB transmission to health care professionals if six or more individuals are seen with active TB annually [5].

In 2007/08, 27 cases of pulmonary tuberculosis were seen at PHC acute care facilities (Table 3). No cases were identified in residential care facilities.

Although PHC cares for a relatively high number of TB cases, no cases of TB acquired within a PHC facility were identified. The majority (67%) of cases were effectively screened and placed on airborne precautions immediately upon admission and throughout their stay at PHC. The remaining cases (33%) required contact tracing either among other patients and/or among staff with whom they had been in contact (Table 3).

Table 3. Pulmonary tuberculosis (TB) cases identified in PHC acute care facilities, 2007/08.

Facility	TB cases		TB cases requiring contact tracing	
	N	%	N	%
St. Paul's	13	48	6	46
Mount Saint Joseph	14	52	3	23
Total	27	100	9	33

Outbreaks

Surveillance allows for the early detection of case clusters so that outbreak control measures can be implemented and the risk of further transmission reduced. The frequency, duration and severity of outbreaks that develop vary each season depending on the type of organisms circulating in the community.

In 2007/08, 4 [respiratory outbreaks](#) and 6 [gastrointestinal outbreaks](#) were identified at PHC facilities (Tables 4 and 5). On average, gastrointestinal outbreaks lasted 9 days (range: 5-13 days) and respiratory outbreaks lasted 13 days (range: 7-20 days).

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

Table 4. Respiratory outbreaks at PHC facilities, 2004/05 – 2007/08.

Year	Number of Outbreaks			Number of Cases			Causative Organism	
	Total	Residential	Acute	Total	Residents /patients	Staff	Influenza	Other
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%)
2005/06	1	1 (100%)	0 (0%)	10	9 (90%)	1 (10%)	1 (100%)	0 (0%)
2004/05	3	3 (100%)	0 (0%)	52	52 (100%)	0 (0%)	3 (100%)	0 (0%)

Table 5. Gastrointestinal outbreaks at PHC facilities, 2004/05 – 2007/08.

Year	Number of Outbreaks			Number of Cases			Causative Organism	
	Total	Residential	Acute	Total	Residents /patients	Staff	Norovirus	Other
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%)
2005/06	6	5 (83%)	1 (17%)	105	72 (69%)	33 (31%)	3 (50%)	3 (50%)
2004/05	11	7 (64%)	4 (36%)	207	163 (79%)	44 (21%)	5 (45%)	6 (55%)

Influenza Immunization Coverage

Every year, influenza infections result in a significant number of hospitalizations and deaths. The elderly and those with underlying medical conditions are at increased risk for influenza-related complications. **This year, nearly all of the residents at PHC residential care facilities were vaccinated against influenza (Figure 4).**

Health care professionals are also at an increased risk of getting and spreading the influenza virus due to their close contact with patients and residents. Influenza immunization is the most effective way to protect health care professionals and the people they care for. Despite the benefits of the influenza vaccine, coverage rates among health care professionals remain low.

In 2007/08, 1689 (39%) acute care staff and 510 (69%) residential care staff at PHC facilities were immunized against influenza (Figure 4). Although these coverage rates are less than ideal, they are consistent with those reported in other health care facilities within Vancouver Coastal Health.

IPAC is working closely with PHC 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 professionals are encouraged to always practice good hand hygiene and to stay home from work if they have influenza-like symptoms.

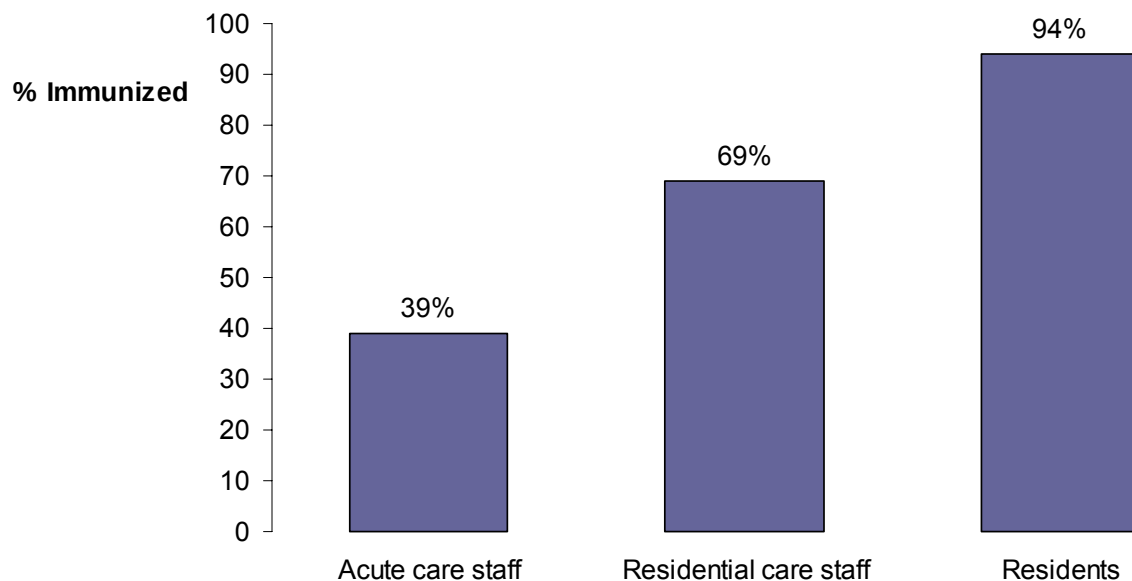


Figure 4. Influenza immunization coverage rates among PHC staff and residents, 2007/08.

Education

The Infection Prevention and Control (IPAC) team strives to continuously provide PHC staff with relevant education, based on current evidence-based recommendations. Messages are communicated using various strategies with the goal to promote a culture in which infection prevention and control 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 physicians deliver educational sessions to physicians, residents, and medical students.

Infection control practitioners (ICPs) also deliver educational sessions across PHC.

In the past year, the IPAC team delivered at least 123 hours of educational sessions, reaching over 2800 staff (Table 6).

Table 6. IPAC educational sessions by number of hours and participants reached, 2007/08.

Type of education	Hours / year		Participants / year	
	N	%	N	%
Infection Control Champions workshops	56	46	9	0.3
New employee orientation	14	11	1200*	42.8
Hand hygiene	13	10	977	34.8
General infection control	10	8	93	3.3
Transmission-based precautions	9	8	199	7.1
Influenza	7	5	164	5.8
Antibiotic resistant organisms	4	4	50	1.8
Gastrointestinal outbreaks	3	2	41	1.5
Student/resident orientation	2	2	16	0.6
Other	5	4	57	2.0
Total	123	100	2806	100.0

*Number of orientation participants estimated from previous fiscal years

Infection Control Champions

The Infection Control Champions (ICC) project is led by IPAC and funded by the Canadian Institutes of Health Research (CIHR). The ICC project goal is to evaluate the feasibility and cost-effectiveness of supporting local front-line nurses in infection control leadership initiatives.

The objective of the project is to supply each clinical unit with its own IPAC expert, which will then lead to a greater sense of ownership of IPAC issues and improve overall staff and patient safety. This initiative is consistent with our mission to create and sustain a culture in which infection prevention and control is integrated into all aspects of care.

The ICC front-line nurse is given dedicated time away from his/her regular duties to promote, teach, monitor, and motivate other health care professionals on his/her unit to implement best IPAC practices. Other initiatives stemming from the ICC project include the development of an ICC blog, and ICC support for the *Clean Hands for Life™* campaign.

The overall impact of the ICC initiative will be assessed using a randomized-controlled trial whereby nine wards have an ICC, while nine wards receive standard IPAC education. The effectiveness of the project at improving IPAC knowledge, increasing hand hygiene compliance rates, and lowering rates of PHC-associated infections will be evaluated.

Surgical Site Infection Surveillance

Surgical site infections (SSIs) can result in longer hospital stays and increased health care costs. Although not all infections are preventable, studies have shown that surveillance is one of the most important factors in the prevention of health care associated infections, including SSIs [6].

The IPAC team, in collaboration with the Department of Surgery, has developed an

electronic, and semi-automated surveillance system for surgical site infections (SSI).

The system was piloted and full implementation for high-risk orthopedic surgeries began in 2008. In 2008/09, the goal is to expand SSI surveillance for selected surgical procedures across PHC acute care facilities.

References

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- [6] Haley RW. The scientific basis for using surveillance and risk factor data to reduce nosocomial infection rates. J Hosp Infect 1995 Jun;30 Suppl:3-14.

Appendices

Appendix A: Infection Prevention and Control Team

Name	Position
Marc Romney, MD	IPAC Medical Director / Medical Microbiologist
Jim Curtin, RN	Infection Control Practitioner
Mary McNaughton, RN	Infection Control Practitioner
Craig Pienkowski, RN	Infection Control Practitioner
Stuart Gray, RN	Infection Control Practitioner
Wayne Gilbert, RN	Infection Control Practitioner
Mark Hull, MD	Infection Control Physician, Acute Care
Debbie Jacobson, MD	Infection Control Physician, Residential Care
Sylvie Champagne, MD	Medical Microbiologist
Christopher Sherlock, MD	Medical Microbiologist
Jeremy Etherington, MD	Vice President, Medical Affairs
Renée Sebastian, MSc	Health Care 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	568	0
Mount Saint Joseph Hospital	Acute care Residential care	137	100
St. Vincent's Hospitals			
Brock Fahrni Pavilion	Residential care	0	148
Langara	Residential care	0	221
Holy Family Hospital	Rehabilitation care Residential care	75	142
Youville Residence	Residential care	0	84
Marion Hospice	Hospice Care	0	12
Total		780	707

Appendix C: Definitions

Surveillance definitions

CDAD case: Laboratory confirmation (positive toxin or culture with evidence of toxin production) 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 ≥ 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.

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.