

# Public Health Surveillance Unit



**An Investment in Regional Public Health  
- Highlights from the First Five Years**

**2007-2012**

A report of the Public Health Surveillance Unit, Vancouver Coastal Health, coordinated by Dr. Jat Sandhu, Sara Forsting and Eleni Kefalas.

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**An Investment in Regional Public Health  
Highlights from the First Five Years**

**2007-2012**



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# Foreword

The goal of public health is to improve the health of populations rather than individuals. The ability to monitor the health of populations is therefore as critical to the practice of public health as is the monitoring of patients' vital signs in our hospitals.

In 2007, Vancouver Coastal Health lacked the dedicated resources and expertise to fully undertake the critical functions of population health assessment and disease surveillance. With the 2010 Winter Olympics on the horizon, and expectations from the International Olympic Committee (IOC) and the World Health Organization (WHO) for a world-class public health surveillance system in Vancouver Coastal Health, the Office of the Chief Medical Health Officer established the Public Health Surveillance Unit (PHSU).

Primary goals of this new unit were to provide world-class, real time surveillance during the Olympic Games, develop an injury surveillance system, and provide expertise and support to Medical Health Officers for public health practice.

Five years later, thanks to the leadership and expertise of Dr. Jat Sandhu, Regional Director of the PHSU, and a highly skilled and productive team, those goals have been met and exceeded. As a result, in 2010, Accreditation Canada recognized the PHSU and its Health Watch bulletin as an innovative and leading practice in Canada.

The achievements of the past five years remind us of the importance of continued investment in local public health surveillance, in order to support our primary public health goal of reducing the health inequities in the populations we serve.



Dr. Patricia Daly  
Vice-President Public Health and  
Chief Medical Health Officer  
Vancouver Coastal Health Authority

# Welcome

This report shares highlights from the first five years of the PHSU at Vancouver Coastal Health. It offers an insight into who we are and the work we do.

We are a unique resource for public health intelligence and an essential partner for good public health practice. As a regional resource in supporting public health much of the work is through collaborations with other program areas and key leaders in public health decision making.

The Unit has matured through circumstances and the infusion of methodological rigour to provide credence that measurement is the basis for progress.

Our successes include:

- Strengthening the epidemiological science underpinning local responses to communicable disease outbreaks and other acute events.
- Embracing technology in creating legacy surveillance systems for the 2010 Winter Olympics that continue to monitor the state of public health in the region.
- Supporting and assuring the quality of program-level decisions through timely and accurate data to monitor and evaluate initiatives.
- Building credible multisectoral alliances to promote a shared vision, planning and innovation for achieving healthy communities.
- Contributing to diverse public health capacity building activities at regional, provincial, national and international levels.

As we embark on the next five years, we seek to further our promising work by supporting programs and partners to deliver health service improvements and gains in population health status.

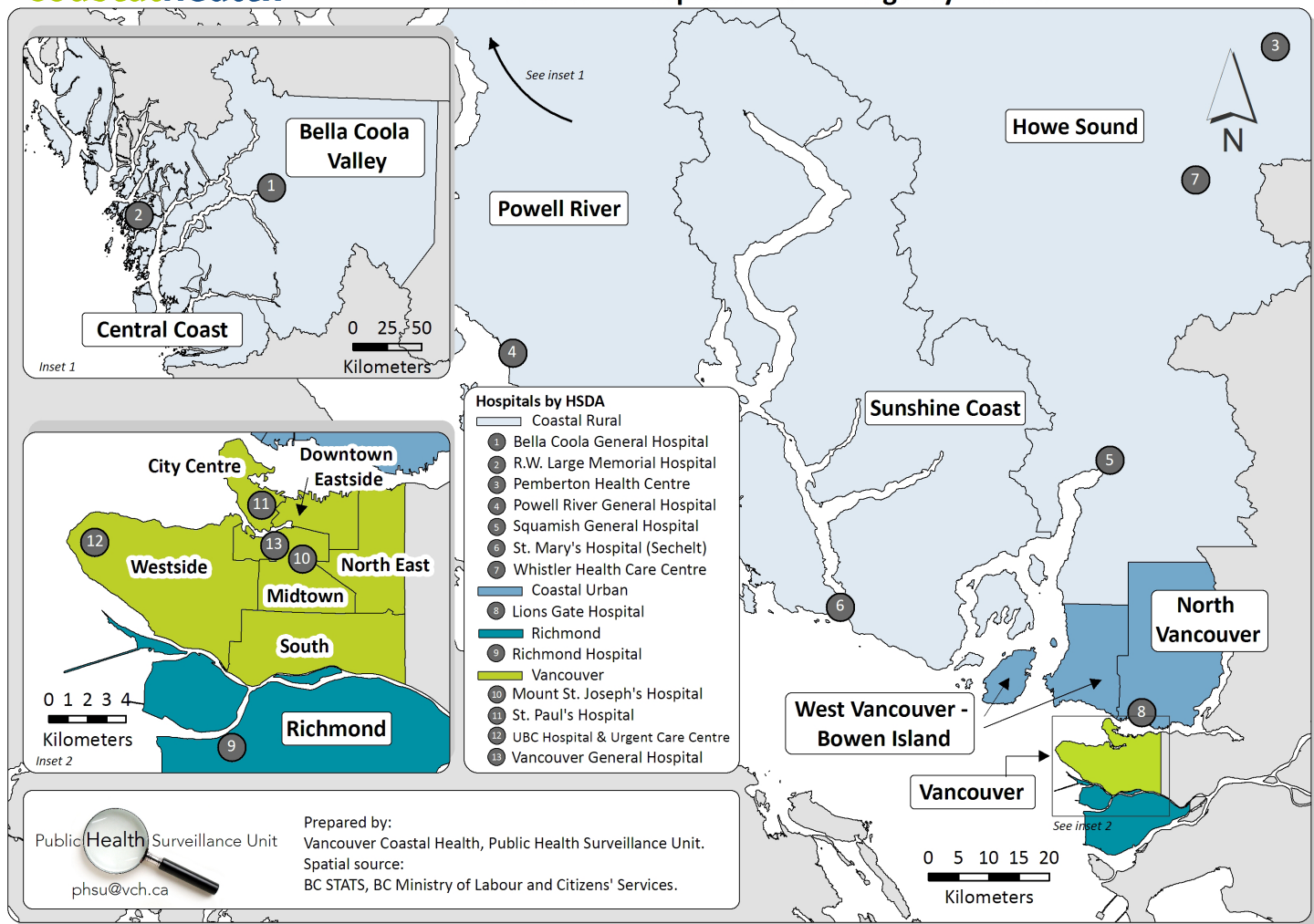


Dr. Jat Sandhu  
Regional Director  
Public Health Surveillance Unit  
Office of the Chief Medical Health Officer  
Vancouver Coastal Health Authority

# Our Region



## Vancouver Coastal Health Authority Acute Care Hospitals with Emergency Rooms



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The Vancouver Coastal Health Authority (VCH) is one of five geographically distinct health authorities in British Columbia (BC). The VCH region covers a large geographic area and includes both urban and rural communities. It is comprised of three health service delivery areas (HSDA): North Shore/Coast Garibaldi (i.e. Coastal Urban and Coastal Rural), Richmond, and Vancouver.

The Vancouver HSDA is further divided into six local health areas (LHA), and the North Shore/Coast Garibaldi HSDA is further divided into seven (two LHAs in Coastal Urban and five in Coastal Rural). The estimated 2012 VCH population is 1.2 million, approximately 25% of BC's population.



# Introduction

The PHSU was established in 2007 by the Chief Medical Health Officer (CMHO) and Vice-President of Public Health. As a unique entity among health authorities in BC, the mandate for the Unit is to support VCH's overall goal of promoting better health for our communities. This preventive goal is achieved in part through the provision of the best possible information on health and the determinants of health, through disease surveillance, health assessment, epidemiological investigations and knowledge transfer.

**Disease surveillance:** This entails the collection, analysis and interpretation of data originating from a variety of sources to monitor trends in communicable and non-communicable diseases. The aggregated information helps identify at-risk populations where unusual disease burden or specific risk factors may warrant public health interventions.

**Health assessment:** Identifying community-level health and social characteristics, monitoring population health status, describing inequities, and assessing progress towards established program objectives are important aspects of performance measurement, priority setting and engagement with the populations we serve.

**Epidemiological investigations:** The Unit is an active partner in providing leadership on investigations of communicable disease outbreaks and adverse health clusters. This requires comprehensive, methodologically sound and efficient gathering of standardized information to allow epidemiological assessment that informs timely public health decision making. Together with continual surveillance, this informs implementation of effective control and preventative strategies.

**Knowledge transfer:** To strengthen the public health system through supporting program monitoring and evaluations, developing best practices, collaborating on research, and building public health capacity. Regular forums, electronic dissemination and contribution to teaching and training are important avenues for engaging our colleagues and stakeholders on the importance of public health intelligence.

The Unit is located within the Office of the CMHO and is currently made up of a team of epidemiologists, public health information analysts, an administrative assistant and a federal field epidemiologist (Canadian Field Epidemiology Program). In addition, it regularly hosts medical students, Masters in Public Health (MPH) practicum students, and Public Health and Preventive Medicine residents to work on projects related to the Unit's core functions.

# Surveillance

A number of surveillance systems have been established over the past five years, some temporary and many permanent, to monitor the health status of VCH residents. These systems are designed to complement each other and, when reviewed collectively, provide a picture of the health of VCH residents. The core surveillance systems include:

- Notifiable communicable diseases
- Emergency room surveillance (VCH hospitals)
- BC HealthLink calls (VCH residents)
- Suspected foodborne illness complaints
- Outbreaks in licensed facilities
- Drug overdoses

The systems help to better understand what our communities are experiencing with regard to communicable disease burden and other acute events that may necessitate public health intervention.

## Notifiable communicable diseases

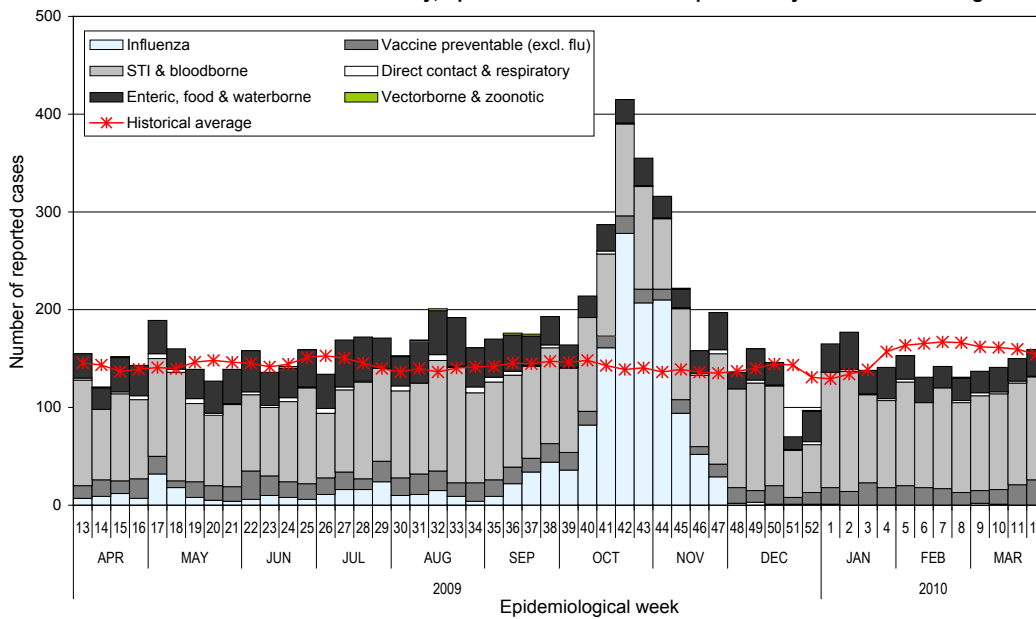
Routine communicable disease surveillance is conducted to identify the incidence of new disease onset and to initiate public health follow-up to prevent further disease transmission. Regular monitoring of trends in communicable diseases facilitates detection of disease outbreaks, subsequent monitoring of applied control measures, identification of at-risk populations, and development of more targeted prevention strategies.

Mandatory notification of cases of communicable disease is required by the legislated BC Health Act Communicable Disease Regulation 4/83 O.C. 6/83. All laboratory-confirmed notifiable diseases are reported to health jurisdictions by private and hospital laboratories. Suspected or clinical notifiable diseases are reported by physicians, hospitals, laboratories, and the general public (Figure 1).

Surveillance is carried out on a weekly basis for a predefined list of notifiable lab-confirmed and clinical diseases. The surveillance process involves a series of steps which include extracting, cleaning, analyzing and summarizing the data which are available through the Primary Access Information System (PARIS), a community based electronic health record. A series of detection algorithms are applied to the summary data to determine whether weekly counts have exceeded a certain threshold in relation to recent weeks of activity, or historical baseline. Any aberration alerts generated are validated and followed up as required. Weekly surveillance notifications are aggregated into a regional monthly report (Figure 2).

Visit the PHSU Disease Surveillance website at: [www.vch.ca/your\\_health/disease\\_surveillance/](http://www.vch.ca/your_health/disease_surveillance/)

**Communicable disease notifications by disease category and epidemiological week.**  
**Vancouver Coastal Health Authority, April 2009 - March 2010 compared to 5-year historical average**



Source: Vancouver Coastal Health, Public Health Surveillance Unit (PARIS & IPHIS). Data as of October 15, 2012.  
 Prepared by: Vancouver Coastal Health, Public Health Surveillance Unit.

Figure 1. Snapshot of notifiable communicable diseases for 2009/2010. Influenza reports during this period were almost exclusively due to pH1N1.



**Notifications of Infectious Diseases**  
**Monthly Summary Report**  
**July 2012**



Vancouver Coastal Health Authority		Cases by Month				Current Month Cases by Health Service Delivery Area*				Year to Date Cases		Monthly Rate (95% CI) <sup>†</sup>	
Disease	July	June	May	April	Coastal Rural	Coastal Urban	Richmond	Vancouver	2012	2011	Current Month	Same Period Previous Year	
Amebiasis	23	16	18	0	0	2	2	19	106	99	2.0 (1.2 - 2.8)	1.8 (1.0 - 2.6)	
Campylobacteriosis	53	60	49	0	11	8	12	22	344	304	4.6 (3.4 - 5.8)	4.4 (3.2 - 5.6)	
Cryptococcus	1	3	0	0	0	0	0	1	7	8	<0.1 (0.0 - 0.3)	<0.1 (0.0 - 0.3)	
Cryptosporidiosis	3	0	0	0	0	3	0	0	6	9	0.3 (0.0 - 0.6)	0.0 (0.0 - 0.0)	
Cyclosporiasis	2	5	1	0	0	0	0	2	9	8	0.2 (0.0 - 0.4)	0.3 (0.0 - 0.6)	
<i>E. coli</i> - verotoxigenic	2	1	7	0	1	1	0	0	18	11	0.2 (0.0 - 0.4)	0.0 (0.0 - 0.0)	
Giardiasis	31	13	14	0	3	6	2	20	114	125	2.7 (1.7 - 3.6)	1.3 (0.6 - 2.0)	
Hepatitis A	0	0	0	0	0	0	0	0	3	9	0.0 (0.0 - 0.0)	0.2 (0.0 - 0.4)	
Hepatitis E	0	0	0	0	0	0	0	0	0	0	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	
Listeriosis	0	1	1	0	0	0	0	0	3	1	0.0 (0.0 - 0.0)	<0.1 (0.0 - 0.3)	
Paratyphoid Fever	0	0	0	0	0	0	0	0	1	3	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	
Salmonellosis <sup>‡</sup>	34	21	19	0	0	4	11	19	154	158	3.0 (2.0 - 3.9)	3.4 (2.3 - 4.4)	
Shigellosis	11	7	2	0	1	1	1	8	43	32	1.0 (0.4 - 1.5)	0.4 (0.1 - 0.8)	
Typhoid Fever	0	0	1	0	0	0	0	0	2	5	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	
<i>Vibrio parahaemolyticus</i>	6	0	0	0	2	2	0	2	7	7	0.5 (0.1 - 0.9)	0.4 (0.0 - 0.7)	
Yersiniosis	20	19	17	0	1	6	3	10	122	103	1.7 (1.0 - 2.5)	2.0 (1.2 - 2.8)	
Dengue Fever	0	0	0	0	0	0	0	0	0	0	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	
Lyme Disease	0	1	0	0	0	0	0	0	1	4	0.0 (0.0 - 0.0)	0.2 (0.0 - 0.4)	
Malaria	0	2	2	0	0	0	0	0	7	9	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	
West Nile virus - confirmed	0	0	0	0	0	0	0	0	0	1	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	

Prepared by: Vancouver Coastal Health, Public Health Surveillance Unit, October 9, 2012.

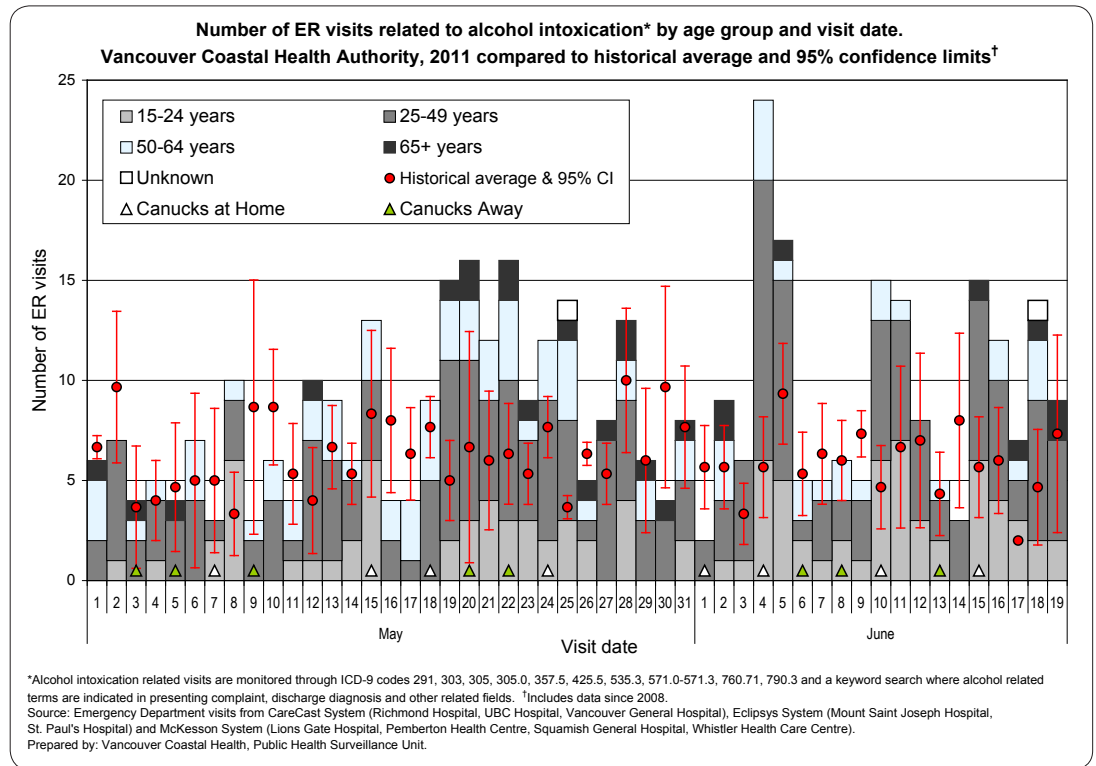
Figure 2. Example of monthly summary report, July 2012.

# Emergency departments

The emergency department surveillance system was established in 2009 to monitor injury occurrence and communicable disease syndromes ahead of the Vancouver 2010 Winter Olympic and Paralympic Games. Injuries in particular were identified as a key public health priority and this system was an integral part of strengthening routine injury surveillance in the region.

Visits to emergency rooms (ER) from nine of 13 acute care hospitals across the region provide coverage for approximately 95% of the population in our health jurisdiction. A comparable set of data fields from each site's information system are extracted daily and sent electronically by secure file transfer protocols to the PHSU secure drive. Each week, approximately 6,000 visits seen across all sites are summarized by hospital site, specific injury, mental health and substance misuse occurrences, and communicable disease syndromes. Statistical aberration alerts generated determine whether increases above preceding and historical weeks of activity exist. Aberration alerts are then validated and followed up as required. For injury surveillance, this near real-time surveillance to monitor injury occurrence is a significant departure from the traditional practice of using administrative data. Several situations have confirmed the immense value of local ER data for routine surveillance that can guide public health messaging (Figure 3 and 4).

Figure 3. Monitoring of alcohol intoxication during the 2011 Stanley Cup Playoffs.



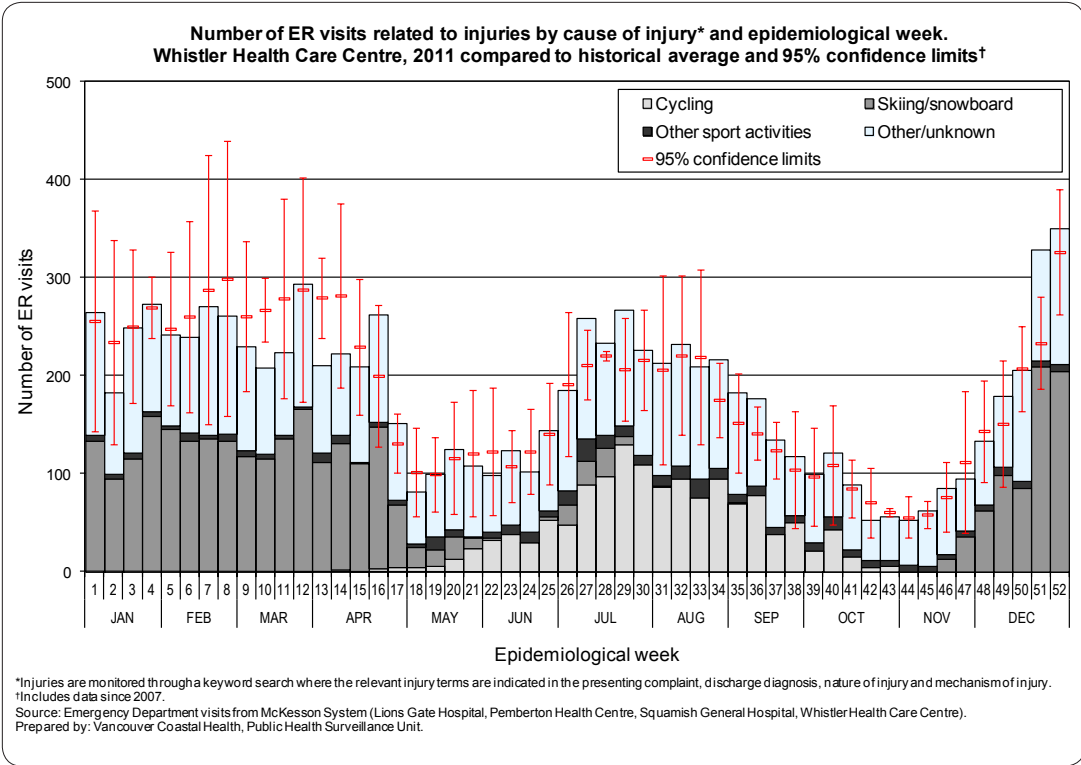


Figure 4. Seasonal variation of injuries seen at Whistler Health Care Centre, 2011.



**Recognition:** Tim Chu, PHSU Public Health Information Analyst, was the recipient of the Innovation Award at the *2011 Canadian Injury Prevention & Safety Promotion Conference*. The award recognized the innovative development of an injury surveillance system from VCH emergency room visits. This work addressed a significant challenge in injury prevention, namely timely access to information that informs positive public health action.

In photo from left to right: Dr. Jat Sandhu, Tim Chu, Dr. Patricia Daly, Dr. Eric Graftstein (Regional Department Head, VCH/PHC Emergency Medicine).

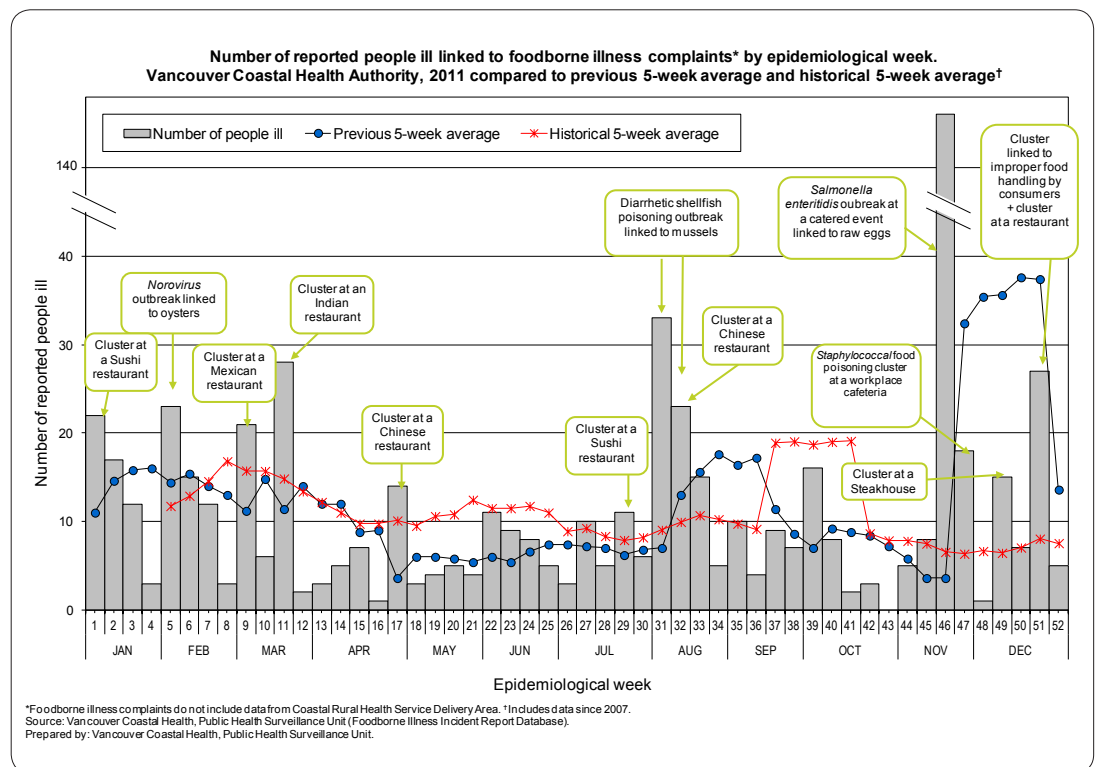
# Foodborne illness complaints

Surveillance of suspected foodborne illness (FBI) complaints provides an early indicator of potential enteric disease activity in the community that may require public health intervention.

An FBI complaint occurs when a member of the public suspects that exposure to a restaurant or food source led to the development of an enteric illness. The public may report the incidents to the restaurant or VCH; these are then collated by the Unit. A regional electronic FBI complaints data management system was developed by PHSU to help manage, monitor and analyze these complaints.

The system has captured the initial notifications of several outbreaks or serious health events, including a *Norovirus* outbreak with five distinct clusters following consumption of raw oysters from the same harvesting site (2010), a hospitalization due to staphylococcal toxin from contaminated meat (2010), and diarrhetic shellfish poisoning (DSP) from mussels (2011) (Figure 5).

Figure 5. Monitoring the burden of FBI complaints in the community, 2011.



# Overdoses

The BC Coroners Service issued a warning in May 2011 of an increase in the number of heroin-related deaths in the Lower Mainland due to more potent street heroin in circulation. This coincided with increasing visits related to overdose and substance misuse observed through the PHSU emergency department surveillance system (Figure 6). Together with the increase observed at the Vancouver Supervised Injection Site (Insite), a more detailed overdose surveillance system was developed comprising both the ER and Insite visits for heroin overdoses. A weekly overdose surveillance summary is now circulated to the Provincial Harm Reduction Committee for situational awareness.

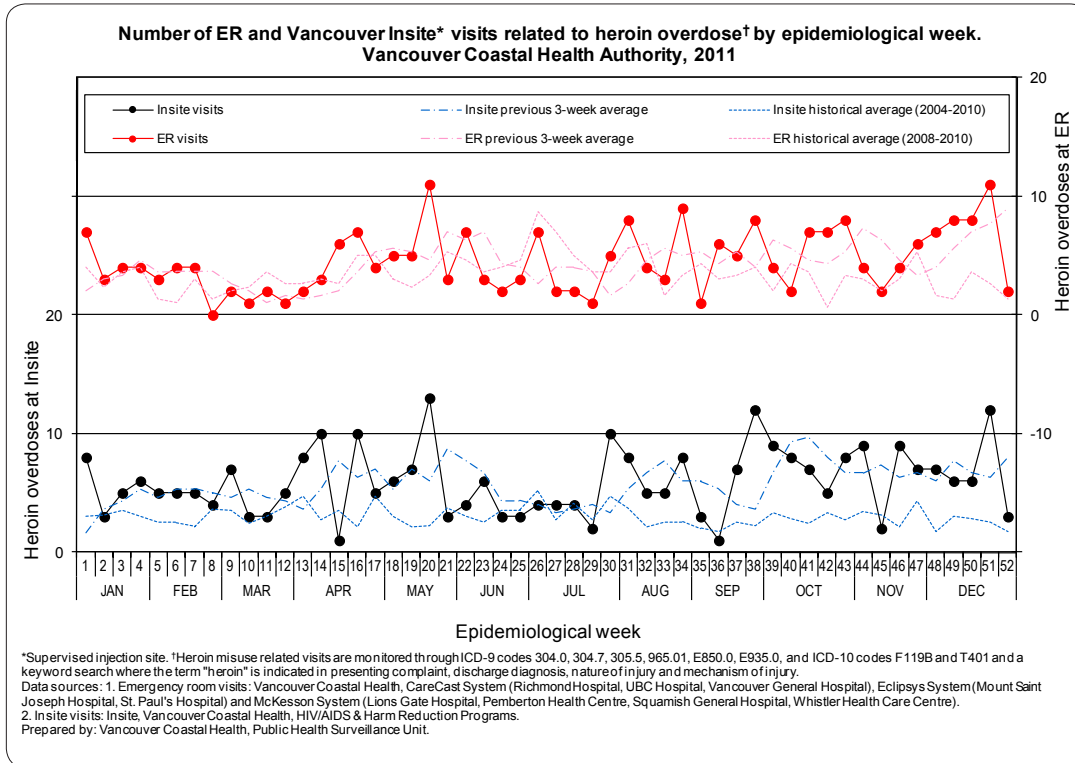


Figure 6. Heroin overdoses seen in VCH facilities, 2011.

# Surveillance highlight

## Pandemic influenza (pH1N1)

In the fall of 2009, VCH staff were mobilized to prepare for and respond to the second wave of the pandemic influenza (pH1N1). Several of the surveillance systems that were enhanced or newly developed for the 2010 Winter Olympics were used to monitor the arrival and spread of pH1N1 in the health authority. The school absenteeism surveillance system was first to signal its arrival, and the spread was monitored using BC HealthLink calls, ER visits and the notifiable communicable disease reports (Figure 7). Additional surveillance systems were set up with front line partners to monitor hospitalizations and deaths caused by influenza. Together with tracking of vaccination uptake for pH1N1 from primary care clinics, this extensive monitoring informed the VCH Pandemic Steering Committee on the burden and spread of disease in our communities, and facilitated decisions on allocation of medical and public health resources.

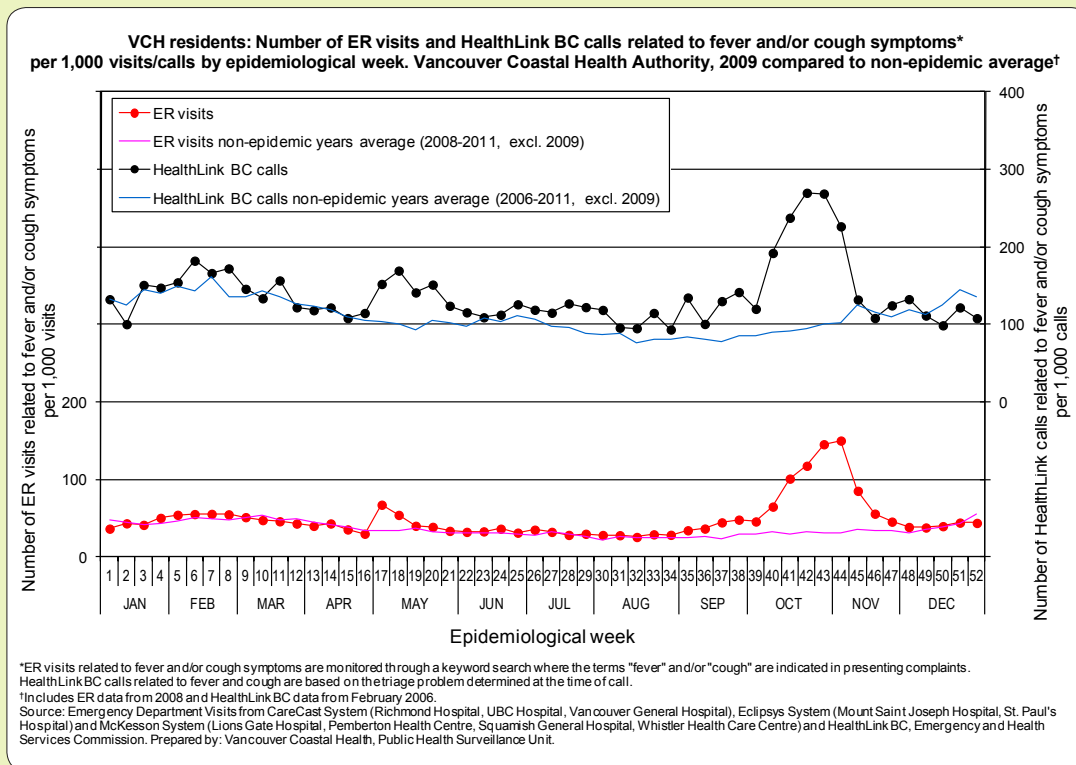


Figure 7. Impact of pandemic influenza pH1N1 on the health system.



# Health Assessment

Periodic health assessments of communities and specific populations are conducted to identify health and social characteristics, monitor population health status and assess progress towards program objectives. The fundamental goal is to maintain and improve the health status of the entire population, and to reduce health inequities among population groups.

This work is often done in collaboration with a range of stakeholders to ensure appropriate community-level evidence is gathered, as well as to facilitate access to relevant data sources. Further assistance with the appropriate use and interpretation of data on socio-demographic, community factors, health utilization and health outcomes is provided. Programs across the organization and community partners regularly use these resources to plan and prioritize initiatives for the populations they serve.

## Community health profiles

VCH community health profiles collate information about community characteristics, health status and health resource use within the defined health administrative boundaries such as LHAs or HSDAs. These provides an easily accessible information resource, in the context of the overall health authority and the province, that serves to engage key community leaders and organizations in the strategic planning of community health issues and concerns.

Each profile features health and social data from a number of sources including localized routine surveillance data and various administrative data from Statistics Canada, the BC Statistics Agency, the BC Vital Statistics Agency and the BC Ministry of Health.

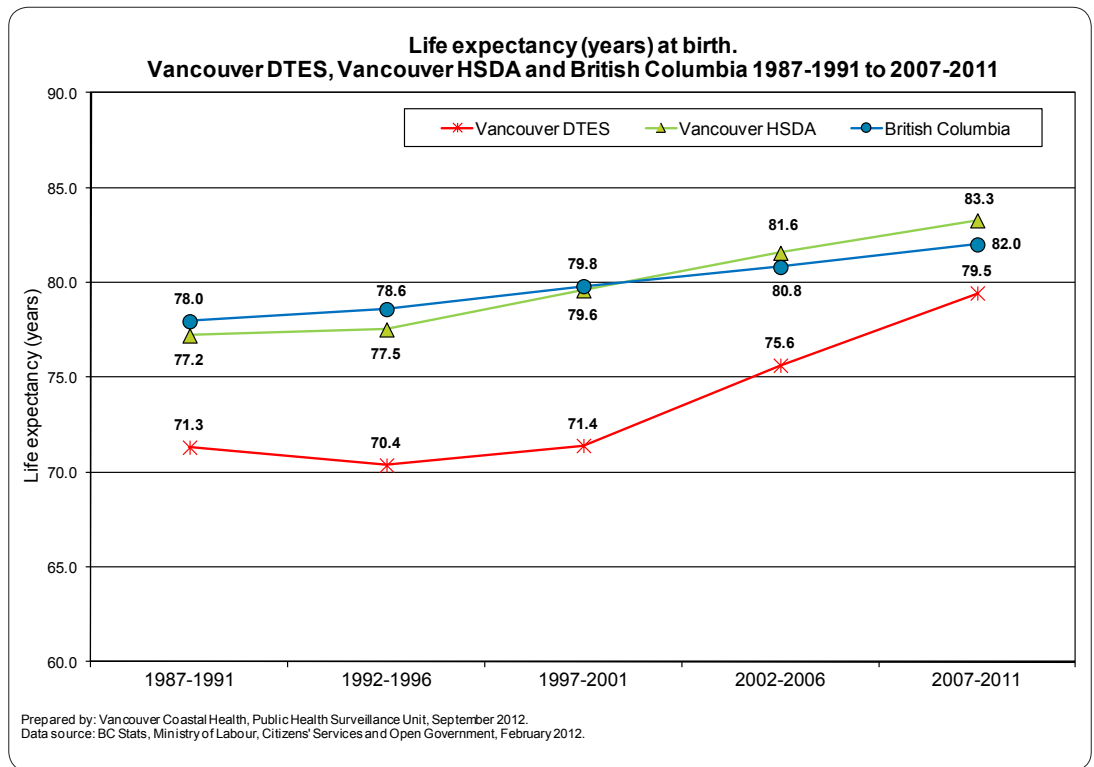
In 2009, a neighbourhood-level health profile was created for the core Downtown Eastside (DTES), an impoverished urban neighbourhood that is affected by significant burden of communicable disease, substance misuse, addiction and mental health issues. This summary profile is a frequently used resource by community organizations and the media for monitoring the strides made by VCH and its partners in reducing premature mortality in one of Canada's most deprived neighbourhoods (Figure 8).

# Vancouver's Downtown Eastside gets new lease on life

Signs of hope and renewal in Canada's poorest neighbourhood

Image source: Maclean's, October 15, 2012

Figure 8. Improvement in life expectancy in Vancouver - DTES.



## Immunization coverage assessment (2-year old children)

Immunization coverage for two-year old children is a stated performance indicator for health authorities in BC. In order to determine immunization coverage rates for VCH, periodic surveys are required as the majority of immunizations are provided by private physicians who do not report back to public health. Immunization coverage rates assessed by periodic surveys provide a more accurate coverage assessment than that provided by existing immunization registries, particularly for urban jurisdictions where physicians are a major partner in immunization service delivery.

VCH conducted a series of immunization coverage surveys of two-year old children from the 2003, 2006 and 2009 birth cohorts in the region. The main objective of these surveys was to obtain a valid and representative estimate of two-year old immunization coverage, for children (by their 2<sup>nd</sup> birthday) residing within VCH (Figure 9). The survey design explored differences in coverage by geography, adherence to the childhood immunization schedule, and socio-demographic characteristics.

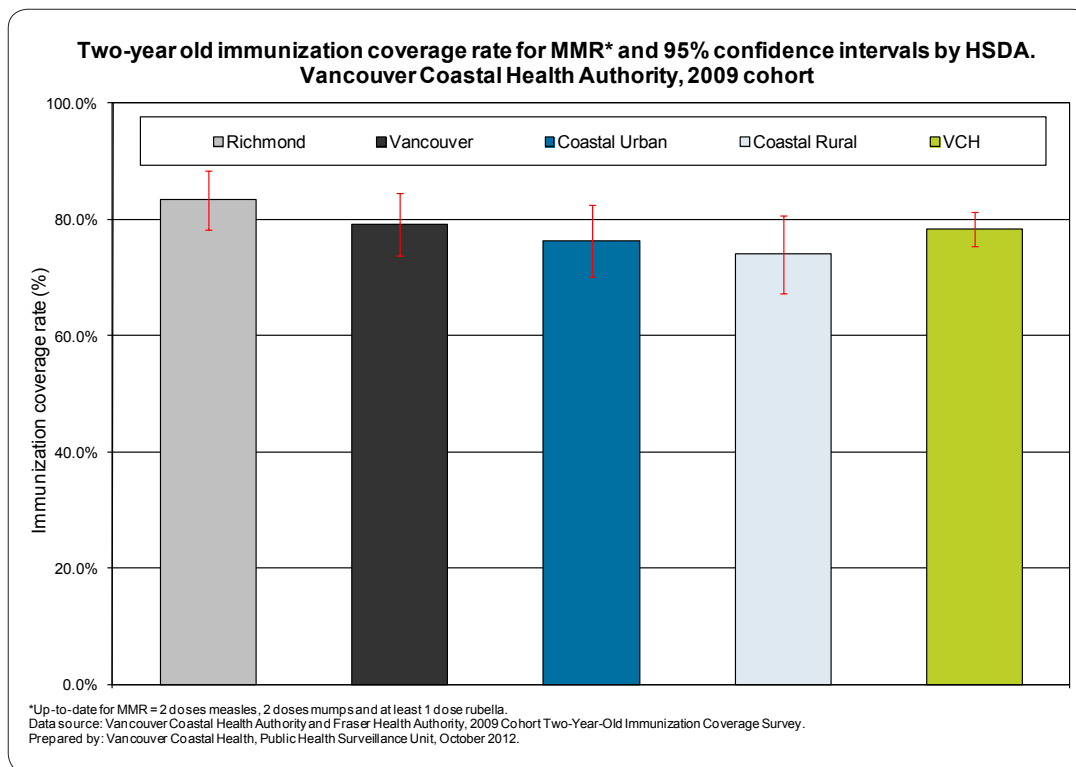


Figure 9. Adherence to BC immunization schedule for infants.

Visit the Immunize BC website at: [www.immunizebc.ca](http://www.immunizebc.ca)

# Healthy Richmond

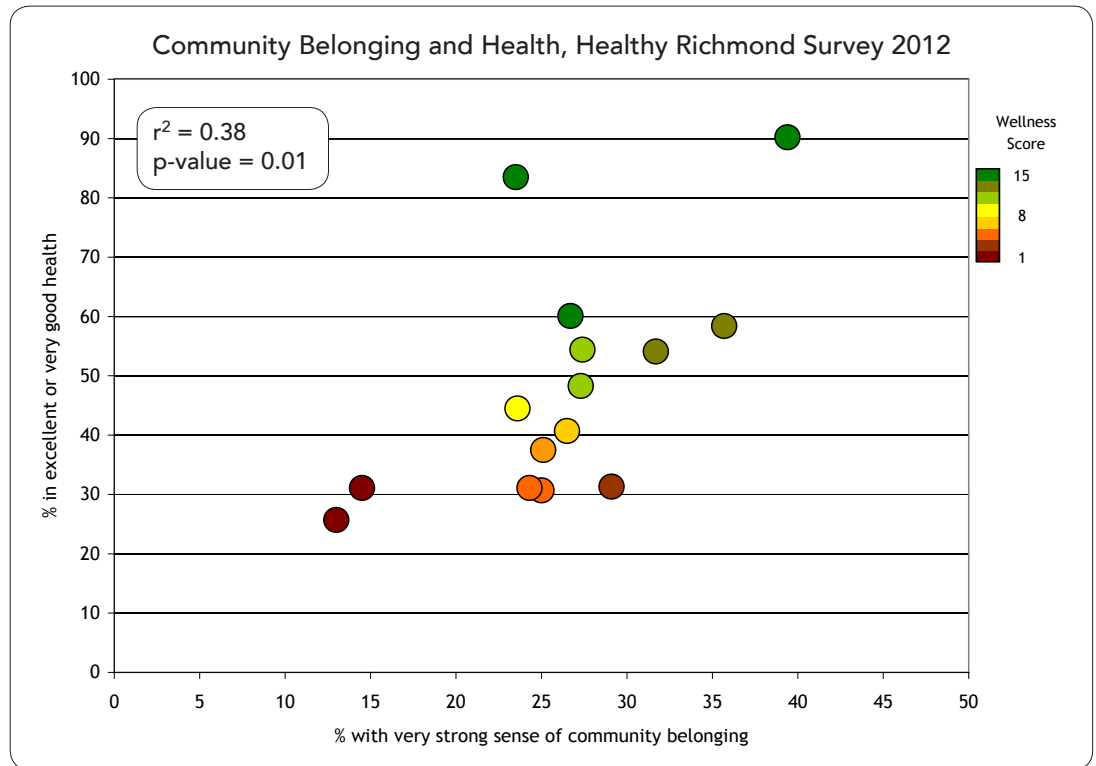
In February 2012, a ten-day online and field survey aimed at collecting local level health and wellness information about the population of Richmond was conducted. The information was gathered to develop and guide health promotion programming in Richmond, and to support both the Richmond Community Wellness Strategy and Healthy Families BC initiative in VCH.

The survey was offered in multiple languages and asked questions related to community participation, behavioural lifestyle risk factors, health status and socio-demographic characteristics. Over the course of the survey period, 3,641 residents aged 18+ years completed the survey. This 2% sample of the adult Richmond population was representative by age, gender and ethnicity at the neighbourhood level, thereby permitting analyses of population subgroups of interest.

Results were shared with relevant VCH programs, the City of Richmond Public Agency Partners, and other relevant community stakeholders. The need to strengthen community belonging was highlighted and provided a new focal point in efforts to promote the health of the Richmond community (Figure 10).



Figure 10. Strong sense of community belonging associated with better health and more positive lifestyle traits (i.e. Wellness Score).



# North Shore Community Wellness Survey

The North Shore Community Wellness Survey was conducted in late Fall 2012 to fill an existing gap in local level health and wellness information, and to support the strategic direction of the North Shore Congress Child and Family Friendly Community Charter. The Charter was developed in 2011 by local governments, education boards and the health authority as a commitment to work together to create broad, equitable access to the conditions that help children and families thrive.

The survey, administered both online and in person, included content themes chosen to explore the concept that healthy children are raised within healthy families with the support of healthy communities. In total, 3,420 residents aged 18+ years completed the survey. This 2% sample of the adult population of the North Shore, was representative of neighbourhood zones by age, sex and ethnicity.

The results revealed that making the healthy choice the easy choice was hindered for certain segments of the North Shore population such as recent immigrants, young adults, and parents. Barriers related to their social, economic and physical environment prevented many from fully availing themselves of opportunities for physical activity, healthy food access, transportation choices, and affordable childcare. In addition, the need to invest in strategies that increased sense of community belonging was highlighted as this had positive impacts on health and wellness (Figure 11).

## Your Health Our Priority



VCH & community partners want to serve you better

Complete the North Shore Community Wellness survey and enter to win an iPad, Grouse Mountain passes or a grocery gift card!

[www.vch.ca/NorthShoreSurvey](http://www.vch.ca/NorthShoreSurvey)



15 minutes of your time will help us shape your community and improve services.

Complete the survey by December 16<sup>th</sup>.

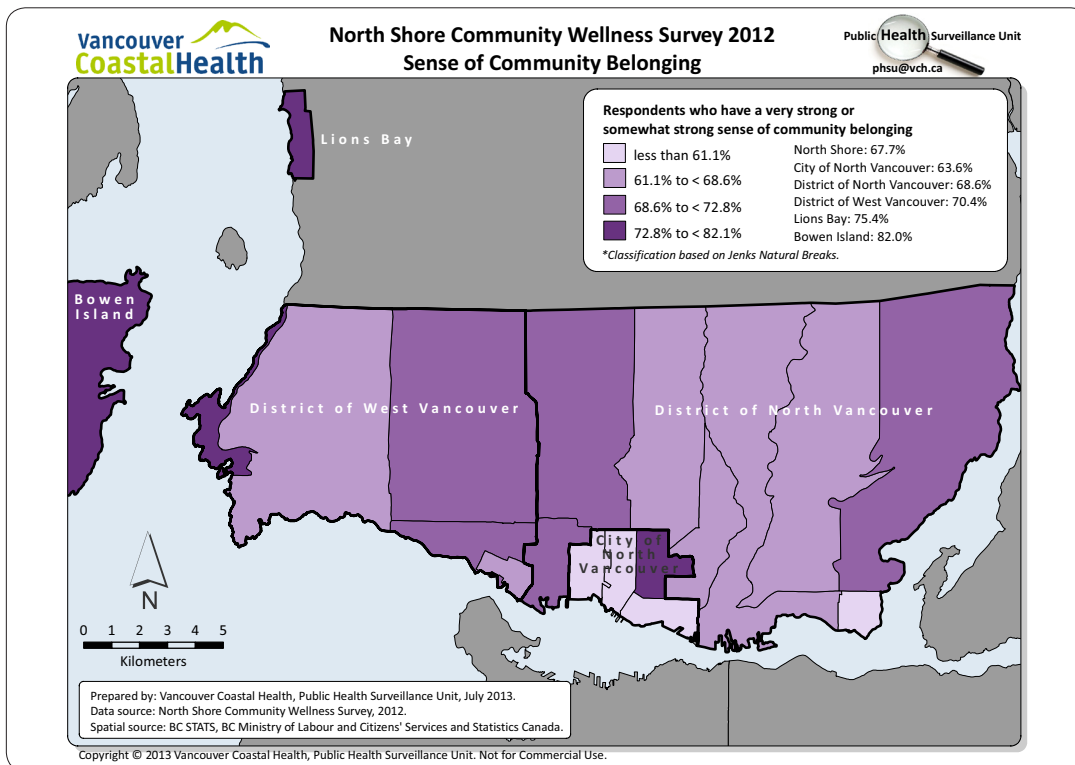


Figure 11. Strong or somewhat strong sense of community belonging among adult North Shore residents, 2012.

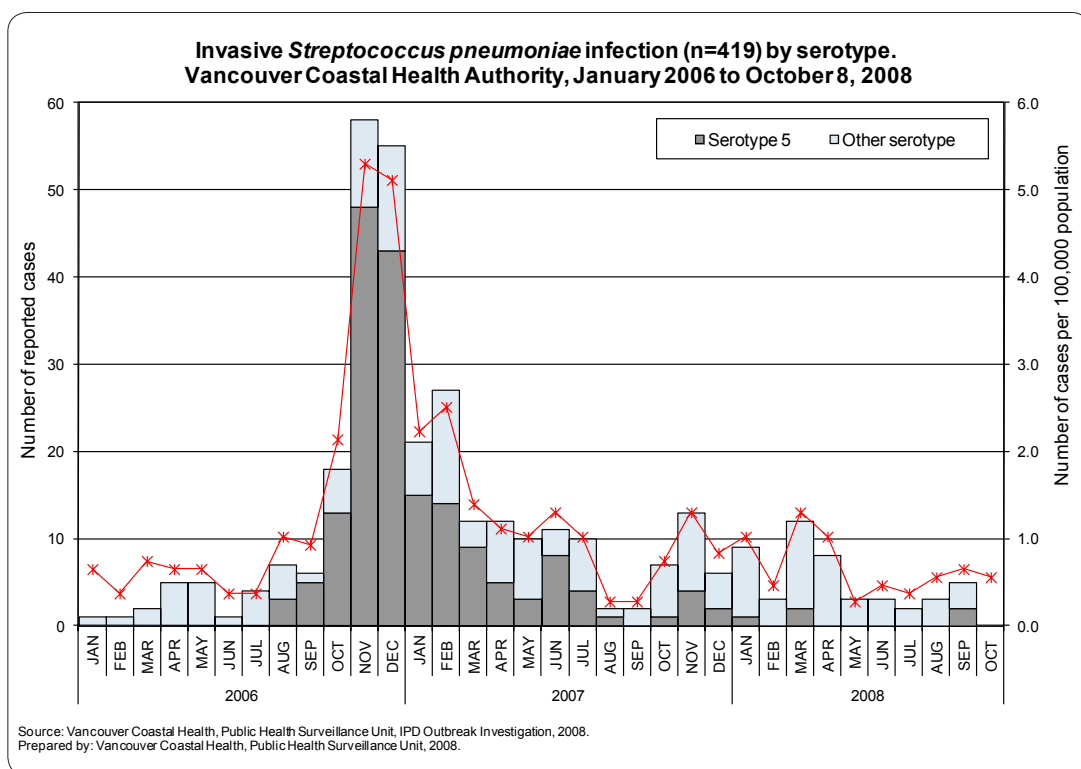
# Epidemiological Investigations

The Unit plays an integral supporting and coordination role in outbreak investigations by assisting with tracking cases; developing tools for standardized case information collection; orienting the outbreak in terms of person, place and time; assisting with case follow-up; providing regular descriptive epidemiological summaries to the outbreak team and partners; and conducting analytical epidemiological studies for risk factor identification. Since 2007, PHSU team members have helped investigate over 40 outbreaks and cluster inquiries.

## Downtown Eastside invasive pneumococcal disease outbreak

A large community outbreak of invasive pneumococcal disease (IPD) caused by a single serotype occurred in Vancouver during the winter months of 2006-2007 (Figure 12). IPD is caused by *Streptococcus pneumoniae*, and in this case, specifically serotype 5. The outbreak was centered in the DTES neighbourhood of Vancouver with over 250 cases identified, the majority with pneumonia requiring hospitalization. Many of these individuals had underlying chronic conditions and other factors which put them at increased risk for severe symptoms, including renal disease, pulmonary disease, HIV/AIDS, substance misuse and drug addiction. Additionally, the majority of cases were either homeless or resided in single room occupancy (SRO) hotels or shelters. The investigation identified crack cocaine use with sharing of pipes or mouthpieces as an important vector for this outbreak. The findings of this investigation informed a change in the provincial policy for the eligibility of the publicly funded pneumococcal vaccine to include homeless individuals, occupants of SRO hotels and illicit drug users.

Figure 12. Epidemic curve highlighting the introduction of serotype 5 pneumococcal infection, and the subsequent immunization blitz (poster below) to curb the outbreak.



## Campylobacter among mountain bike racers

In June 2007, several hundred participants in an annual mountain bike race in Squamish reported experiencing gastrointestinal illness in the days post race. Initial notification was via discussions on a web forum, popular with race participants, detailing their symptoms several days before laboratory reports indicated the causative pathogen as *Campylobacter jejuni*. An outbreak investigation was initiated to determine the source and comprised an environmental sampling along the race course and an online questionnaire to the approximately 700 individuals involved with the race. Among respondents, 42% reported experiencing diarrhoeal illness following the race. The collective evidence from the environmental, microbiological and epidemiological analysis indicated mud exposure as the likely cause. In particular, ingestion of mud likely contaminated by animal fecal matter along the race course was the most probable cause of illness. A number of practical recommendations were given to race organizers, including closing the trail to domestic animals prior to the race and reviewing the course for any obvious signs of environmental contamination.



In photo shown above is a bike race competitor covered in mud.

## Escherichia coli from petting barn at fair

In the summer of 2009, an animal petting barn at a Vancouver fair was linked to cases of *E. coli* O157: H7 infection. At least 17 people, primarily children under 12 years of age, who visited the barnyard petting area became ill. Five children were hospitalized as a result of their infections. Children in particular are susceptible, experiencing severe episodes of illness with bloody diarrhoea and occasionally kidney failure. The subsequent investigation revealed that the source of the infection was exposure to the petting barn, and the bacterium (matched by genetic fingerprint) causing the outbreak was found only in the bedding material in the main petting barn enclosure. Recommendations related to the layout and upkeep of the petting barn enclosure, as well as visitor education, were made to the fair organizers for operations in subsequent years.



**THE GLOBE AND MAIL** 

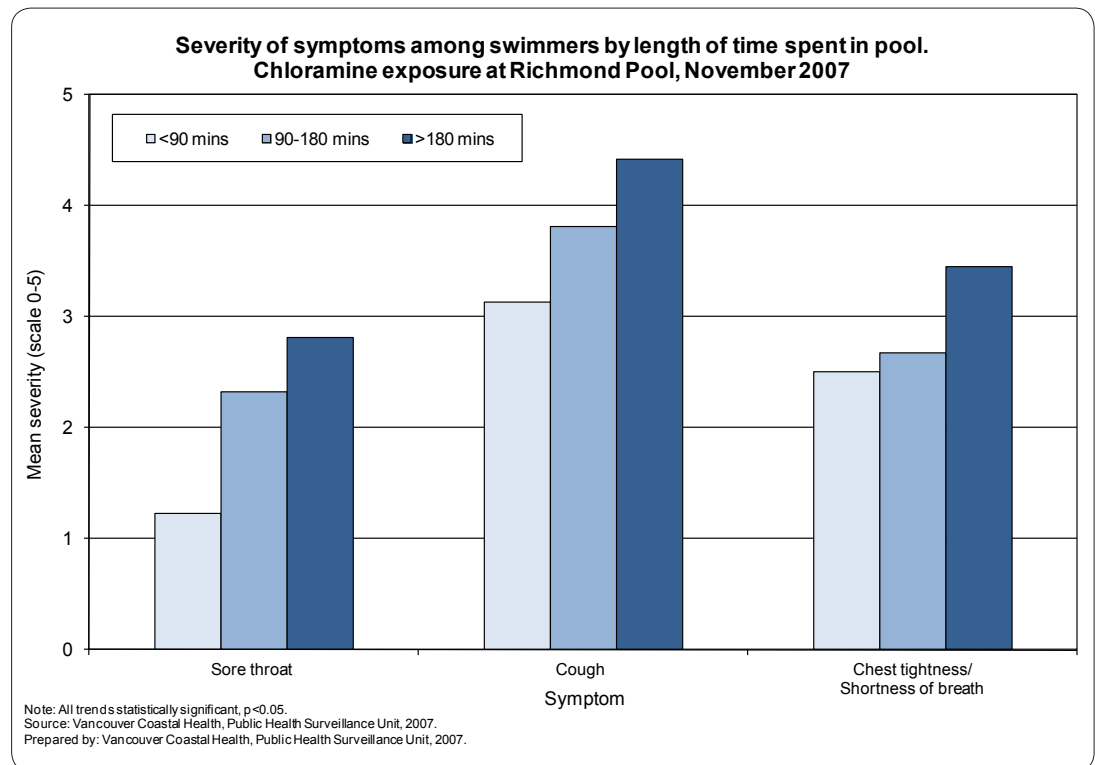
### PNE linked to 13 cases of E. Coli

Image source: Globe & Mail, September 15, 2009

## Chloramine exposure at Richmond pool

Following a large swim meet in November 2007, many competitors, officials and spectators reported experiencing severe respiratory, eye and skin irritation. Upon further investigation by means of an online survey, over 80% of respondents reported eye or respiratory symptoms (Figure 13). An on-site inspection by Environmental Health Officers revealed that the heating, ventilation and air conditioning (HVAC) system malfunctioned over the weekend of the swim meet, resulting in a lack of external fresh air being supplied to the interior of the building. At the same time, the high bathing load in the pool contributed to excessive formation of chloramines (reaction of free chlorine with organic substances) in the water and above the pool surface. This resulted in sustained poor air quality that triggered the observed health complaints. Several recommendations related to facility maintenance, operations and emergency procedures were made to prevent similar situations in the future.

Figure 13. Among swimmers, severity of symptoms experienced associated with duration of time in pool.





# Mumps outbreak in Whistler

Between February and October 2011, VCH experienced an outbreak of mumps, predominantly clustered among young adults, initially in Whistler but later in surrounding municipalities. Whistler is a popular ski and outdoor activities destination north of Vancouver that attracts international visitors. Nearly 60% of cases with links to Whistler were employed either by the mountain resort or in the hospitality and retail sector. These sectors employ a largely seasonal workforce from many different countries across the globe. The international, transient nature of this population, along with close living quarters for resort employees, provided optimal conditions for the outbreak to progress. In particular, transmission among initial Whistler-linked cases was primarily by sharing marijuana joints, cigarettes, drinks, and utensils. In total, 112 cases of mumps were reported (Figure 14). The median age of cases was 27 years (range 0 to 57 years) and 62% were male. The majority of cases (87%) were part of a cohort born between 1970 and 1995, before infant booster doses of mumps-containing vaccine (MMR) were routinely administered in most parts of the world. Therefore, publicly funded vaccine was offered at the Whistler Community Health Centre and designated pharmacies to all individuals born between 1970 and 1995 who had not received two doses of mumps-containing vaccine. Additionally, targeted immunization clinics were held at worksites or common housing buildings. Subsequent to the outbreak being declared over in October 2011, targeted immunization clinics at staff orientations for incoming seasonal workers in the Resort Municipality of Whistler have become an annual occurrence.



Poster above adapted and used with permission from Nova Scotia Department of Health.

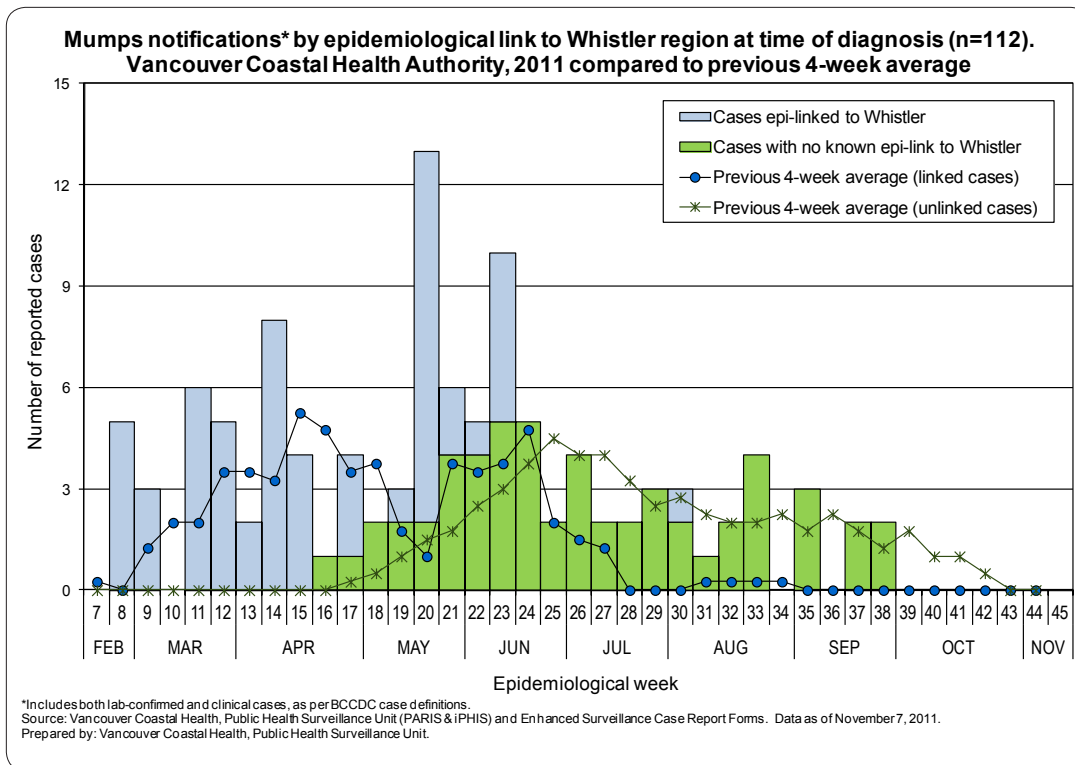


Figure 14. Epidemiological curve for the mumps outbreak in VCH, 2011.

# Salmonella affects corporate event

An outbreak of gastrointestinal illness was reported following a corporate event held in Vancouver in November 2011. Initial notification and follow-up suggested close to one third of the 313 guests in attendance experienced gastrointestinal symptoms. An online questionnaire to collect exposure history based on the set dinner menu served at the event was distributed to all guests and the 35 staff working that evening. Of those who responded to the survey (72%), 145 individuals matched the outbreak case definition thereby reflecting an overall attack rate of 58% among attendees of the event. Food-specific attack rates and risk ratios identified tiramisu as the most likely source of infection. The on-site public health inspection confirmed the pooling of raw eggs and the lack of a cooking step in the tiramisu recipe amplified both exposure and illness risk. Laboratory testing showed that both the stool samples from ill individuals and leftover tiramisu from the event were positive for the same strain of *Salmonella enteritidis* (with matching genetic fingerprint). This outbreak occurred in the midst of an increase in *S. enteritidis* cases observed since 2008 (Figure 15); where, as a consequence, the batching of raw eggs and serving them without a cook step was no longer permitted in commercial food establishments.



## Salmonella Outbreak and Eggs

Right now, there is an ongoing outbreak of *Salmonella* (food poisoning) in the lower mainland and in BC. Eggs are the most likely cause of this outbreak.

Fraser Health and Vancouver Coastal Health Environmental Health Officers have identified many restaurants and other food establishments illegally using poor quality eggs. These eggs are easily identified as cracked and dirty, and are a problem because they pose an increased risk of transmitting diseases (such as *Salmonella*) to people handling or consuming them.

Commercial egg producers employ a wide range of quality and safety control systems during production, storage, and distribution that greatly reduce the risk of bacterial contamination. In contrast, people selling eggs at a discount rate (usually through door to door sales with no identifiable business name) often obtain their eggs from sources where these safety controls are not in place. In many cases, the eggs have been rejected by the legitimate market due to quality concerns. To reduce the risk of *Salmonella* infection all eggs used in restaurants and other food establishments must be purchased from a reputable supplier; the eggs must be clean with no cracks and be kept refrigerated.

### Tips for decreasing risk

Eggs are a healthy source of protein and do not need to be avoided. Proper care must be taken with eggs to avoid *Salmonella*. Restaurants and other food establishments can decrease the risk of *Salmonella* to staff and patrons by:

- Purchasing their eggs from reputable sources;
- Using grade A or B eggs that are clean and not cracked or dirty;
- Whenever possible, thoroughly cooking all eggs and foods containing eggs;



- Using pasteurized eggs in foods where eggs are served raw or undercooked;
- Keeping eggs refrigerated;
- Washing hands after handling eggs;
- Preventing contact with other foods while preparing eggs;
- Avoid "pooling" of eggs - cracking large numbers of eggs into a single container for large scale production of product.

Please note *Salmonella* can be transmitted from one person to another so remember to always wash your hands. ■

## BC Announces New Program for Restaurant Operators

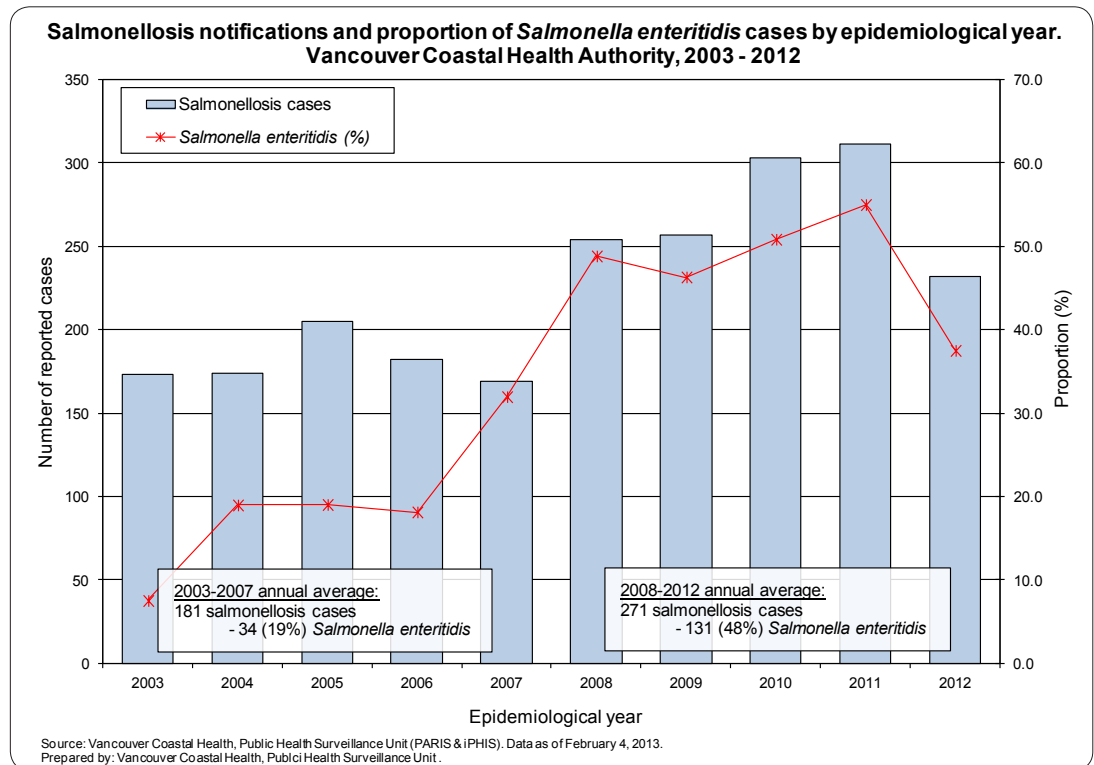
On August 10th, 2011, Health Minister Michael de Jong announced the *Informed Dining* program, a new voluntary nutrition information program for restaurants in BC. The program is the first of its kind in Canada and was developed by the Province of British Columbia in collaboration with both the Canadian and BC Restaurant and Foodservices Associations, and the Heart and Stroke Foundation of Canada.

Participating restaurants will provide their guests with nutrition information (with a focus on calories and sodium content) for all standard menu items upon request before, or at the point of, ordering in the restaurant. This information may be provided as a menu insert, brochure, or poster.

Continued on page 2 ....

Image source: Vancouver Coastal Health  
[www.vch.ca/media/FoodSafetyUpdate\\_January2012.pdf](http://www.vch.ca/media/FoodSafetyUpdate_January2012.pdf)

Figure 15. Increase in *S. enteritidis* cases since 2008.



# Pertussis outbreak

In 2012, BC experienced a resurgence of pertussis disease with rates of disease not seen in almost a decade. Outbreaks of pertussis occurred in VCH, a neighbouring health authority and the state of Washington. Historically, local pertussis activity increases every three to four years with the last large increase in 2000.

Over 270 cases of pertussis were reported in VCH in 2012. Among cases aged less than 20 years, 46% were up-to-date for pertussis immunizations at time of illness, 20% were underimmunized and 30% were not immunized. The highest rate of cases was seen in pre-adolescence, those aged 10-13 years, with 142 cases per 100,000 population (Figure 16). Among this age group, 66% of cases were fully immunized. Among all cases, five hospitalizations and zero deaths were observed. A pre-emptive, publicly-funded vaccination campaign was initiated, offering pertussis vaccine initially to Aboriginal residents and health care workers working with young children, before further expansion to include all adults in contact with young children. Given the waning immunity, particularly in the pre-adolescent booster age group, discussions are underway to optimize pertussis vaccination strategies.

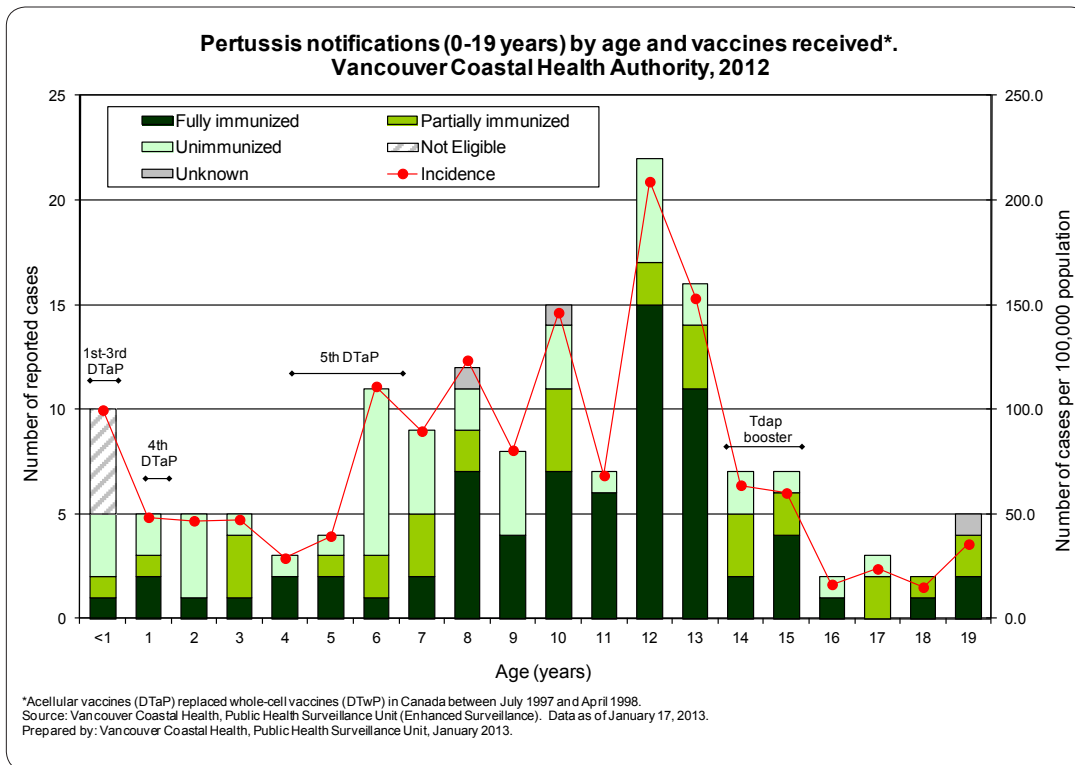


Figure 16. Age-specific incidence of pertussis cases by immunization status.

# Knowledge Transfer

A primary objective of the Unit is to be a regional resource for making public health information available and accessible to health professionals and stakeholders for use in practice, planning and policy-making. This includes collaborative work on program evaluations, outbreak investigations, community health assessments, routine surveillance, performance measurements and research outputs that can inform the effectiveness of public health practice. While such purposeful knowledge transfer can catalyze and facilitate innovation in other program areas, it also serves to build capacity for interpreting and using data for the purposes of measuring progress towards public health goals.

Placing these findings into the hands of key decision makers in a timely, accessible and useful manner is done through several different means including direct dissemination of reports to practitioners and stakeholders, postings on the VCH website, and hosting a quarterly forum on current and topical areas of the Unit's work.

## Evaluation

Supporting program performance management by conducting relevant and rigorous evaluation is part of the Unit's mandate. Effective program evaluation is a systematic way to improve and account for public health actions. There is tremendous power in measuring performance to address important elements of a program's objectives, operations, and outcomes. With timely engagement of program leaders and stakeholders it shows the extent of progress and achievement of objectives against agreed strategic goals.

**Seek and Treat for Optimal Prevention (STOP) of HIV/AIDS:** The STOP HIV/AIDS Project was a three-year pilot (February 2010 – March 2013) funded by the BC Ministry of Health to expand HIV testing, treatment and support with the goal of reducing HIV transmission in Vancouver and Prince George, the project pilot locations. In Vancouver, in particular, a number of testing, treatment and public health management initiatives were undertaken to change the course of the HIV epidemic. These initiatives included expanding targeted HIV testing, launching wide-scale routine HIV testing in acute care settings, enhancing public health follow-up of all new HIV diagnoses and developing partnerships among service providers to improve the overall patient experience across the HIV care continuum.

The Unit provided ongoing support for the monitoring and evaluation of a number of these initiatives. Through a partnership with the BC Centre for Excellence in HIV/AIDS, data linkage techniques were used to individually match patient testing and treatment records creating a unique longitudinal dataset of the HIV care continuum within Vancouver. In the VCH STOP HIV/AIDS Quarterly Monitoring Report, population-level HIV-specific indicators representing all phases of the HIV patient journey were monitored to examine the impact of STOP HIV/AIDS initiatives within Vancouver.

STOP HIV/AIDS Quarterly Monitoring Reports are available online at:  
[www.vch.ca/your\\_health/disease\\_surveillance/hiv-aids/](http://www.vch.ca/your_health/disease_surveillance/hiv-aids/)



As a component of the evaluation of the Acute Care Strategy, administrative datasets were used for ongoing monitoring of routine HIV testing in Vancouver hospitals. The STOP HIV/AIDS Acute Care Report provided hospital and service level measures of HIV testing effectiveness.

Both reports allowed for timely dissemination of information necessary to guide strategic decision making and had, for example, been used to identify local geographies that remained hard to reach in terms of access to HIV testing, and socio-demographic characteristics of HIV positive individuals that impacted their continued engagement in HIV care and treatment.

Overall, the monitoring reports provided early insight into the impact of effective screening and early detection of HIV to show that timely access and engagement in treatment can reduce community viral load with consequent benefits for reducing HIV transmission risk (Figure 17).

Visit the STOP HIV/AIDS website at: [www.itsdifferentnowbc.org](http://www.itsdifferentnowbc.org)

Image source: Vancouver Coastal Health  
[www.vch.ca/media/Public%20posters.pdf](http://www.vch.ca/media/Public%20posters.pdf)

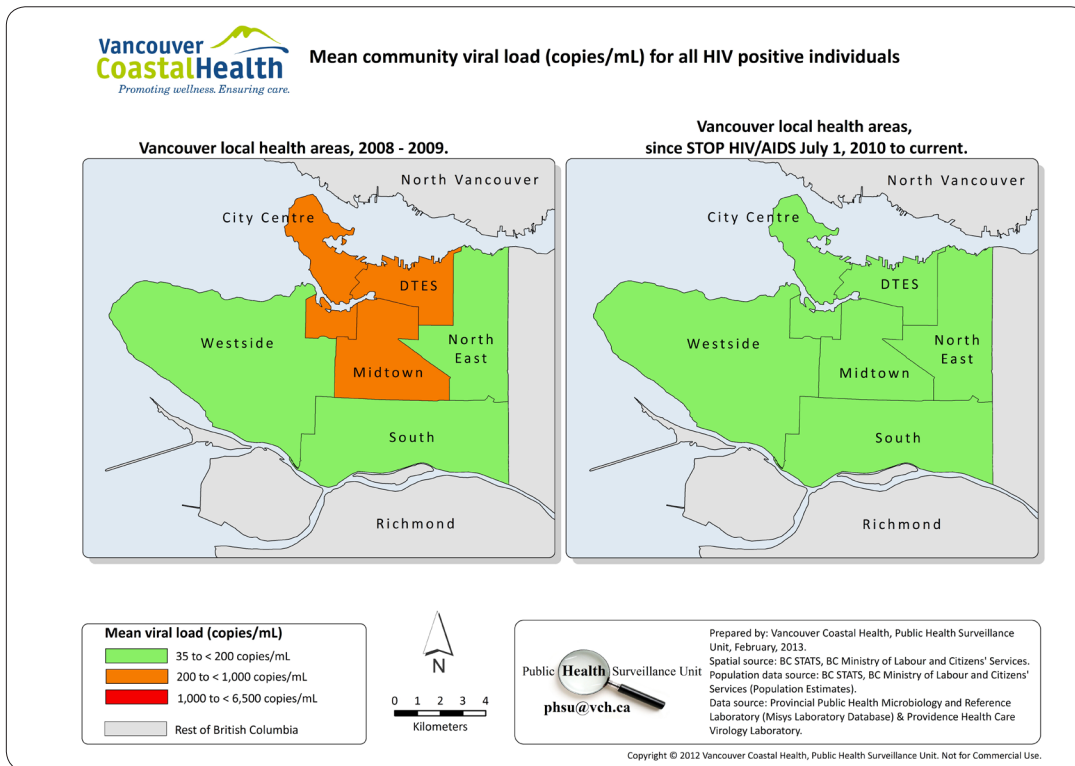
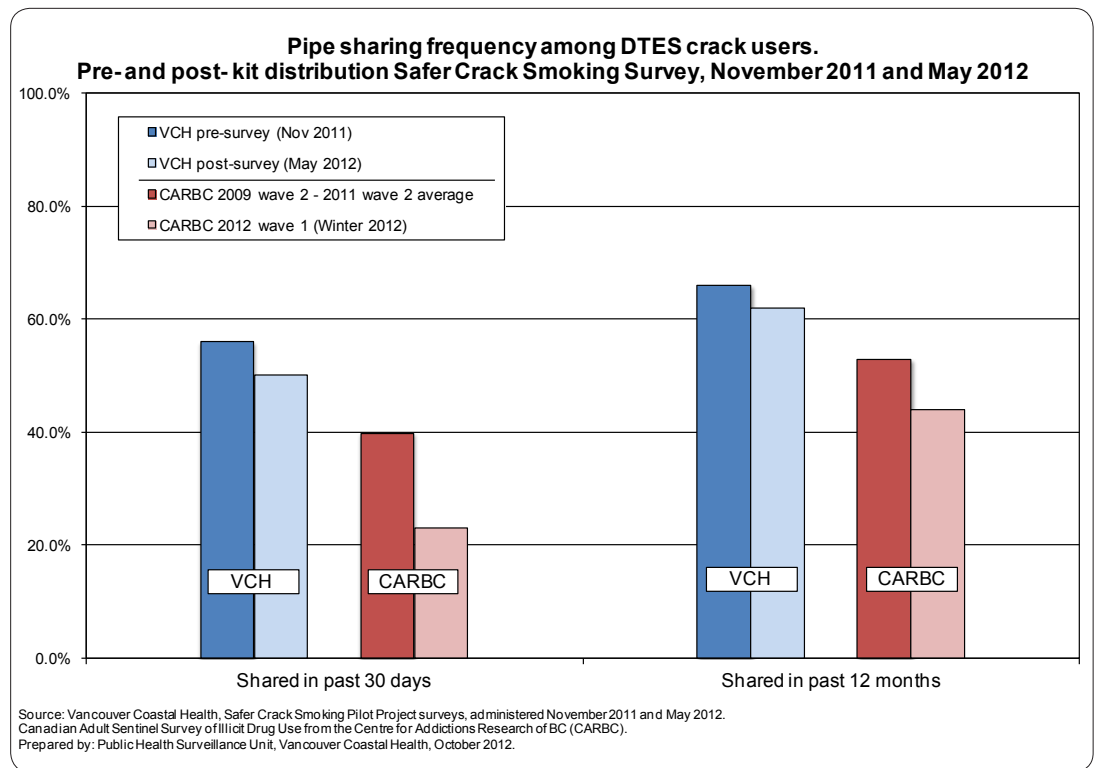


Figure 17. Significant change in mean community viral load in Vancouver LHAs since the launch of STOP HIV/AIDS.

**Downtown Eastside safer smoking pilot study:** Between December 2011 and October 2012, a pilot project to expand safer crack smoking supply distribution and education in the Vancouver DTES neighbourhood was conducted. VCH and local partner agencies distributed safer crack smoking kits and organized enhanced safer smoking education initiatives. The evaluation of the project examined the effectiveness of supplies and education in reducing high risk crack smoking practices and preventing crack smoking-related harms. A pre- and post-kit distribution safer smoking survey was administered to crack smokers in the DTES. The survey examined smoking behaviours, including smoking frequency, supplies, access, sharing practices and health issues (Figure 18).

Figure 18. The percentage of individuals who reported sharing a crack pipe decreased after the safer smoking pilot was initiated.



The qualitative evaluation of the project involved conducting interviews with safer smoking kit users and distributors. Information collected during the interviews was used to better understand the experience of pilot project participants. Overall, the pilot indicated that demand for the supplies was high and that engagement with users was positive. The safer smoking supplies the pilot provided reduced the number of injuries users experienced and clients shared their supplies less, which is important in reducing the potential risk of disease transmission. The evaluation was used by the pilot study advisory committee and VCH leadership to request provincial funding to expand the provision of safer smoking supplies.

## Dissemination

**PHSU Forum:** In 2010, the Unit began hosting quarterly forums as a means to share the outputs of projects that team members are involved with. At each forum, Unit staff, or collaborative project leads, present findings from project evaluations, recently investigated outbreaks and health assessment initiatives. The forum is an opportunity for public health colleagues to learn more about the Unit's work and engage in discussion that informs practice and provide further direction to ongoing projects.

**Health Watch:** For daily public health status reporting during the 2010 Winter Olympic and Paralympic Games, the Unit created the Health Watch bulletin that covered disease surveillance, health system impact, food service closures, air and water quality indicators, emergency management advisories and health promotional messages. In collaboration with Communicable Disease Control, Environmental Health, Health Emergency Management, Medical Health Officers, and Communications & Public Affairs, the bulletin drew upon timely and relevant information to provide a public health status overview for the region. The bulletin continues to be produced on a monthly basis following positive feedback post-Games. Since its inception in Fall 2009, over 75 Health Watch reports, including daily reports during the Games period, have been created and released to the public.

Visit the PHSU Health Watch website at:  
[www.vch.ca/your\\_health/disease\\_surveillance/health-watch/](http://www.vch.ca/your_health/disease_surveillance/health-watch/)



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### Summary

Outbreak of *Salmonella braenderup* leads to recall of mangoes in Canada and the USA.

Increased number of cases of *Vibrio parahaemolyticus* associated with consumption of raw oysters

Increased social support leads to better health!

This month's health promotion message:

**Strengthen Your Social Ties and Community Connectedness**

All data herein should only be used with reference to the "2012 Health Watch prepared by Vancouver Coastal Health, Public Health Surveillance Unit".



## Building public health capacity

The Unit contributes to public health capacity building through teaching, mentoring and supervising graduate students, medical students and residents via affiliations with academic institutions (University of British Columbia, Simon Fraser University and University of Victoria), and field epidemiologists from the Canadian Field Epidemiology Program (Public Health Agency of Canada). In addition, regular contributions are made to graduate school lectures in epidemiology and public health; development and facilitation of national and international workshops on topics in applied epidemiology and public health practice; and presentations at various peer-reviewed scientific conferences.

**Student practicums:** The Unit regularly hosts Master of Public Health (MPH) practicum students for 12-week placements that provide students with a supervised field experience in public health settings, bridging the theory from course work to development of skills in public health practice. Specifically, in the areas of disease surveillance, health assessment, epidemiological investigations and evaluation.

**Medical residents:** The Unit supports the development of the Public Health and Preventive Medicine postgraduate residency training through hosting elective rotations for specific investigations or health assessments, as well as supporting broader projects related to population health.

**Canadian Field Epidemiology Program (CFEP) placements:** Since 2007, the Unit has been a recognized placement site for the Canadian Field Epidemiology Program of the Public Health Agency of Canada. The two-year program trains public health professionals in applied epidemiology that permits rapid response to diverse public health issues. The placement site provides the field epidemiologist with the mentoring and opportunities to develop critical competencies in epidemiologic process, communication and professionalism. An important component of assessing competency is the evaluation of an existing surveillance system to assess its public health merit. These evaluations have included examination of a specific reportable communicable disease and injury indicators from routine emergency room surveillance.



## Data requests

The provision of aggregated and de-identified record level data to internal and external stakeholders is governed by privacy policies and guidelines. The number and nature of these requests have increased significantly since the Unit's inception (Figure 19). Often these requests entail custom data extraction and analytical support, and therefore the associated time for each request can be lengthy.

Summary of requests:

- 20% of requests are from external partners.
- 25% of requests are for supporting Medical Health Officers in their statutory roles.
- 45% of requests are from public health programs internal to VCH.
- 10% of requests are from other parts of the organization.

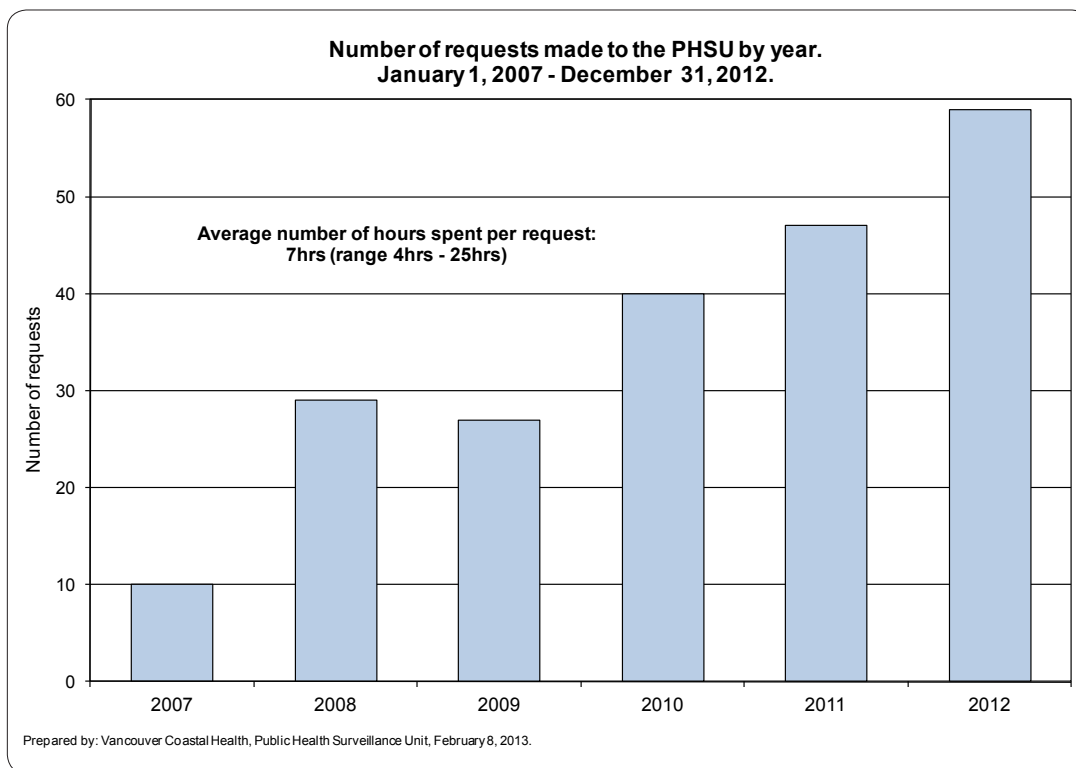


Figure 19. Data requests made to the PHSU since 2007.

# 2010 Vancouver Olympics & Legacies

In 2010, Vancouver and Whistler were host to the XXI Olympic and X Paralympic Winter Games. All games venues, including athletes' villages, sport arenas and outdoor celebration venues were located within Vancouver Coastal Health's jurisdiction. In partnership with the International Olympic and Paralympic Committees (IOC/IPC), and the local organizing Committee (VANOC), VCH provided a range of acute care, public health and health emergency management services for the Games that ensured the health of the Olympic family, athletes and visitors. The Unit was responsible for daily surveillance reports, coordination of emerging information streams and supporting the executive leadership in their effort to make the 2010 Winter Games successful.

## Surveillance systems

The Games provided a unique opportunity for the Unit to enhance its developing surveillance systems and network. In particular, there was an emphasis on ensuring comparable data elements with standardized and timely entry; establishing a minimum of two year historical baseline standards for each system; secure electronic data transfer that facilitated automation of analysis and reporting; engaging relevant stakeholders on rationale and validation of outputs; and appropriately trained surge capacity for the duration of the Games. The Olympics were also the impetus to introduce new surveillance systems such as ER visits and BC HealthLink call volumes. These systems, as well as enhancements to existing systems, were made with the long-term goal of enhancing public health surveillance capacity that would serve as a surveillance legacy for the region after the Games.

In addition, two temporary systems were put in place during the Games that had very specific time-limited purposes. Firstly, the Unit coordinated a daily call-out to a diverse range of partners and front-line personnel to identify emerging or new issues that informed situational awareness. Secondly, visit data from the polyclinics for athletes and Games staff were examined to monitor the situation inside the Athletes' villages.

## Health Watch

Health Watch (page 26) was created as a tool for communicating the wide range of daily public health updates to the IOC, IPC, VANOC and our public health partners during the games. The bulletin was well received by partners in the health and non-health sectors at the local, regional, provincial, national and international level. The bulletin continues as a legacy of the Games with a monthly publication that is available on the Unit's website.

## Health system impact

There was no significant impact on health services due to Games visitors. With the large crowds in downtown Vancouver during the Olympic Games, a small increase in injury-related visits was seen at the designated Olympic spectator hospital (St. Paul's Hospital). These visits were primarily due to falls, assaults and public intoxication.

## Outbreaks

Two outbreaks were investigated during the Games period. The first was a *Norovirus* outbreak at an Olympic workforce temporary housing camp near Squamish. The Unit, in coordination with Environmental Health staff, reported on the progression of the outbreak. Given the widespread community transmission of *Norovirus* preceding the Games, the close living quarters in this camp most likely contributed to this outbreak. The second outbreak occurred after the games and included the importation of measles disease into the community. Twenty-two cases of measles were reported to public health following the close of the Paralympic Games. Cases occurred primarily among underimmunized or unimmunized individuals, which was consistent with the concurrent case reports from neighbouring health jurisdictions. The Unit coordinated the management of case information and provided regular descriptive epidemiological summaries to public health partners.

## Building public health capacity

The Games offered a unique opportunity to invest in VCH's public health, surveillance and epidemiological capacity. The enhanced and newly established surveillance systems remain as a Games legacy. They continue to have direct relevance to the Unit's daily work and are used each week to monitor the health of our community.

In addition to developing and enhancing the skills related to mass gathering surveillance of the Unit and its front-line partners, the enhanced infrastructure has given public health a higher profile in the region and with external partners.

## Sharing lessons learned

Lessons learned were shared with a range of future host jurisdictions for Olympics (London 2012, Sochi 2014, Rio de Janeiro 2016), World Cup (Brazil 2014), other major sporting events (Laos East Asian Games 2010, Halifax 2011 Canada Winter Games, Poland/Ukraine UEFA Euro 2012) and non-sporting events (Toronto G20 Summit 2010) to help with their preparations.

The Unit continues to share our experience planning for and working on the 2010 Winter Olympic and Paralympic Games with public health colleagues in Canada by facilitating workshops on mass gathering surveillance in partnership with the Public Health Agency of Canada.



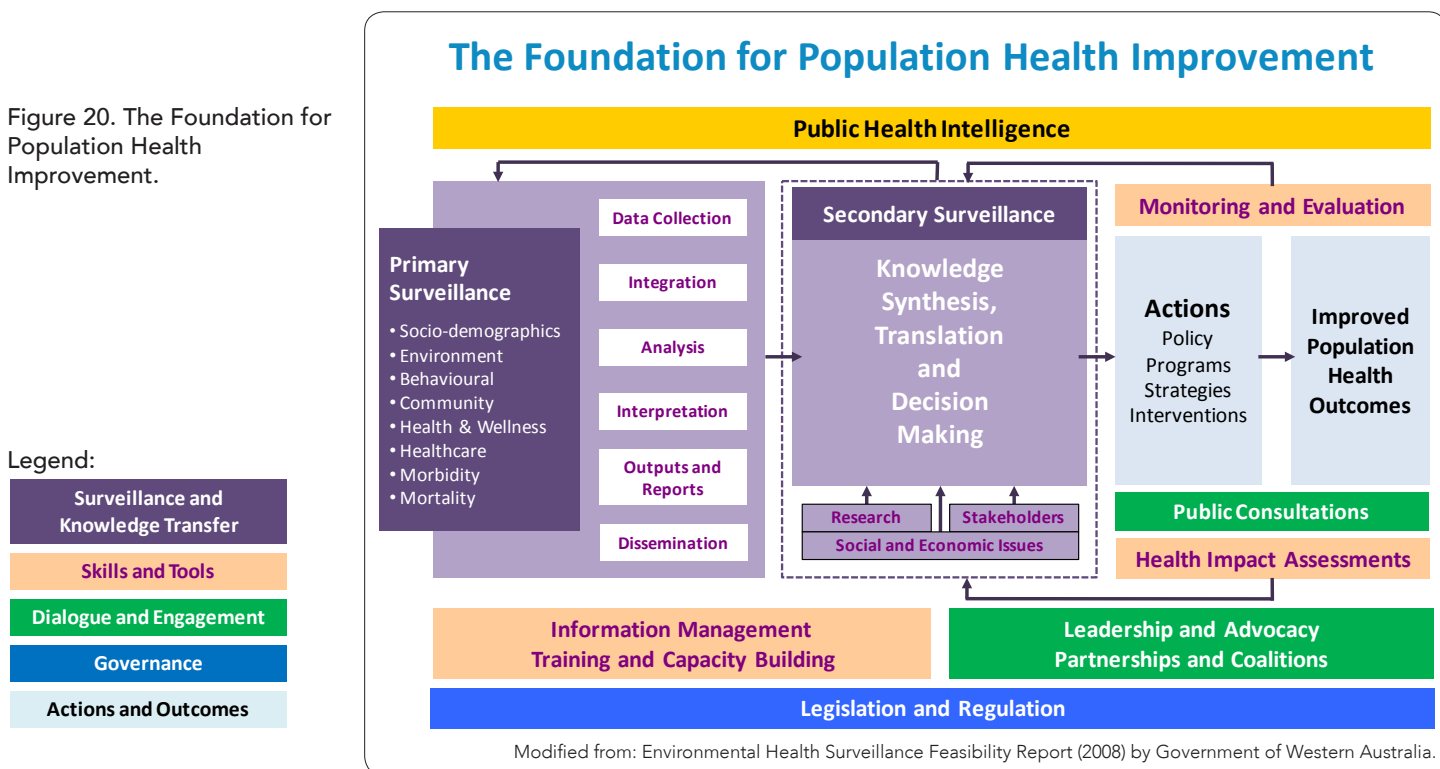
# Looking Ahead

This report demonstrates that an essential public health function for fulfilling the stewardship responsibilities of population health monitoring is effective and timely public health surveillance that informs the control, reduction and prevention of diseases and determinants that impact health and well-being.

Our integrated approach to disease surveillance, health assessment, and evaluation activities has allowed us to build on existing resources and develop capacity to maintain systems that are efficient, sustainable and meeting the goals of a broad range of stakeholders. Many of the examples outlined in this report contribute to providing the transparent and easily understood information that fosters greater accountability for performance in population health improvement.

While the Unit has demonstrated its public health merit, the need for better and consistent measures at all levels to inform those who work to improve the health of the population is great. To meet this need consistently, a more integrated and coordinated structure for public health intelligence as a key supporting foundation for population health improvement is required (Figure 20).

Figure 20. The Foundation for Population Health Improvement.



Such a comprehensive and inclusive approach would yield system-wide benefits for programs and services that include:

- Focusing on measurement that demonstrates 'effectiveness of practice'.
- Building capacity for interpretation and knowledge translation.
- Defining and support the roles of stakeholders in measuring accountability.
- Providing insight on the 'return on investment' for specific initiatives.
- Fostering innovation as a by-product of measurement.
- Greater understanding of issues to support decision-making.
- Developing strengthened partnerships in which gaps in data will become more apparent and subsequent data collections improved.

Alongside the strong and comprehensive effort to implement a population-level approach to health is the need for measurement across the spectrum of the medical, social, economic and physical environment determinants of health and well-being.

With that objective in mind, My Health My Community was launched in 2013 to examine at a local level how lifestyle, environment, neighbourhood characteristics and community interactions affect our health and quality of life. This initiative will be a vital assessment of the health of the Lower Mainland communities in British Columbia.

Increasing the quality of life for residents of our communities will require addressing those elements of the social, economic and physical environment that give rise to inequalities in health and well-being.

Making population health data available should galvanize and promote participation and responsibility on the part of the public and non-health sector stakeholders who have roles to play in improving population health. Appropriate advocacy, good data and regular measurement can provide the basis for action and accountability on the determinants of health and the improvement of health equity.

Establishing policies that positively influence the conditions in which we live, learn, work and play will have a lasting influence on building healthier communities with improved population health status.

Visit the My Health My Community website at:  
[www.myhealthmycommunity.org](http://www.myhealthmycommunity.org)



my Health  
my Community



Help Shape Your Community  
[myhealthmycommunity.org](http://myhealthmycommunity.org)



**Vancouver Coastal Health**  
Providing solutions. Strengthening lives.

**fraserhealth**  
Better health. Best in health care.

Office of Health  
and Access to Care  
Faculty of Medicine  
Health Strategy Office

# Acknowledgements

The Unit has benefitted from a number of important collaborations in fulfilling its mandate. These projects have largely been conducted by the core Unit members, supplemented by temporary staff, practicum students, residents and field epidemiologists. However, the nature of the work requires extensive consultation and collaborations with other program areas in ensuring the direction and validity of our endeavours. Our gratitude to all those that have contributed over the years, and not just those listed below.

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Tanya Lo (2007-2008, 2011-present)

Julia Tait (2009-2010)

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John Hamilton (2009-2010, 2012)

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Carson Lam (2011-2012), University of British Columbia

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Jin Feng Liu (2011), University of British Columbia

Mei Zhang (2012), University of British Columbia

Nerissa Tai (2012), Simon Fraser University

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Siavish Jaferi (2009)

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Brian Ng (2011)

Emily Newhouse (2012)

John Omura (2012)



