

British Columbia Annual Summary of Reportable Diseases

2011



BC Centre for Disease Control
An agency of the Provincial Health Services Authority

Cover images clockwise from top left are to depict shellfish farm and shellfish related illness; Hepatitis A virus; salmonella related to chicken and eggs; and mumps vaccination.



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Above photo: BC Centre for Disease Control, 655 West 12th Avenue, Vancouver BC V5Z 4R4

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Contents

2011 Highlights	6	Cyclosporiasis	70
BC Map by Health Service Delivery Area	9	Shigatoxigenic <i>E. coli</i> (STEC) Infection	72
Diseases Preventable by Vaccination		Giardiasis	75
<i>Haemophilus influenzae</i> type b (Hib), invasive	12	Hepatitis A	78
Influenza	14	Listeriosis	81
Measles	19	Salmonellosis	84
Meningococcal Disease, invasive	21	Typhoid Fever	
Mumps	24	Paratyphoid Fever	
Pertussis	26	Shigellosis	89
Pneumococcal Disease, invasive	28	<i>Vibrio parahaemolyticus</i>	92
Rubella and Congenital Rubella Syndrome	30	Yersiniosis	95
Tetanus	32	Outbreaks of Gastroenteritis	98
Sexually Transmitted and Bloodborne Pathogens		Vectorborne and Zoonotic Diseases	
HIV	34	Leptospirosis	100
AIDS	36	Lyme Disease	101
Chlamydia (genital)	38	Malaria	103
Gonorrhea (genital)	40	Rabies, exposure incidents	105
Hepatitis B	42	Tularemia	109
Hepatitis C	46	West Nile Virus	110
Infectious Syphilis	48	Environmental Pathogens	
Diseases Transmitted by Direct Contact and Respiratory Routes		<i>Cryptococcus gattii</i>	112
Streptococcal Disease, invasive, Group A	52	Legionellosis	114
Tuberculosis	54	Reportable Communicable Diseases in BC	118
Antimicrobial Resistant Organism Surveillance in BC	56	2011 BC Selected Reportable Disease Case Reports by Health Service Delivery Area	120
Enteric, Food and Waterborne Diseases		2011 BC Selected Reportable Disease Case Rates by Health Service Delivery Area	122
Amebiasis	60	Sources and Explanatory Remarks	124
Botulism	63	Contributors	126
Campylobacteriosis	64		
Cryptosporidiosis	67		

2011 Highlights

Vaccine Preventable Diseases

We saw a resurgence of two vaccine preventable diseases in BC in 2011. First was a large outbreak of mumps leading to 132 cases being reported in the province. The outbreak started in January in the ski resort of Whistler and spread to the Lower Mainland, peaking in the first week of July. The outbreak was primarily in under or unimmunized young adults with the highest rates in those 20-29 years of age. This outbreak follows two years of low levels that in turn followed an outbreak in 2008. Prior to that less than 10 cases of mumps had been reported annually for the previous five years.

The second outbreak of note was a prolonged hepatitis A outbreak in central Vancouver Island. This outbreak started in October of 2010 and continued through the first 12 weeks of 2011. Seventy-seven cases were associated with the outbreak in 2011, predominately children under the age of 10. Twenty-eight non-outbreak related cases were mostly associated with travel to hepatitis A endemic countries, particularly Mexico and India.

Five cases of invasive Hib disease were reported in 2011 compared to a single case in 2010. However all five cases were in adults with no cases in children (who are routinely immunized in BC) reported. There was a slight increase in reported cases of invasive meningococcal disease with 15 reported in 2011; after a 10 year low of 12 cases reported in 2010. Importantly, there were no cases of serogroup C disease reported in 2011; BC implemented an immunization program for meningococcal C disease in 2003. There were 10 cases of measles reported in 2011 a decrease from the outbreak related 78 cases reported in 2010 but higher than the number of cases seen between 2002 and 2009 (zero to four cases per year).

Pertussis continued to be reported at its lowest rates in 20 years with a decline in cases from 125 in 2010 to 58 in 2011. The cumulative incidence rate in 2011 was 1.3 per 100,000 population, which is the lowest recorded since 1990. There was however, a localized increase in pertussis in the Fraser Health Authority at the tail-end of 2011. The rate of invasive pneumococcal disease (IPD) remained relatively stable from 2010 to 2011. Among cases aged less than 5 years where serotyping results were available, 11% (3/28) were due to serotypes covered by the pneumococcal conjugate 7-valent vaccine (PCV-7) which was in use in BC from 2003 through 2010 and 50% (14/28) were due to the 6 additional serotypes covered by the pneumococcal conjugate 13-valent vaccine (PCV-13) which was introduced in June 2010. A single case of rubella in an adult was reported in 2011 after an outbreak of nine adult cases in 2010; this reflects a return to previously seen low levels of one or two cases reported annually.

In the 2011/12 season, overall influenza activity was below expected levels and distinguished also by the absence of an obvious peak with instead extended low-level activity throughout. Influenza A/H3N2 was the predominant influenza virus detected throughout the season accompanied by an increasing proportion of A(H1N1) pdm09 and influenza B detection in the middle of the season.

Sexually Transmitted and Bloodborne Pathogens

The rate of new positive HIV tests continued to decrease slightly in 2011 with 289 new cases reported and AIDS cases similarly decreased to the lowest levels in 10 years with 72 cases reported. These trends likely reflect a true decrease in disease incidence largely driven by a decrease in new

2011 Highlights (continued)

positive HIV tests in people who use injection drugs. Despite the overall decrease, rates were higher in Vancouver Coastal and Northern Interior Health reflecting increased testing efforts as part of the Seek and Treat for Optimum Prevention (STOP) pilot project in these two health authorities.

Chlamydia rates in British Columbia decreased slightly in 2011 with 11,730 cases reported compared to 11,846 in 2010. Despite this slight decrease, the overall trend in chlamydia infection rates has been increasing since 1999 with the highest reported rates in women 15-24 years of age.

There has also been an overall increasing trend in rates of gonorrhea in BC with 1573 cases reported in 2011 compared to 1321 in 2010. Reasons for this increasing trend in gonorrhea rates are not clear. Infectious syphilis numbers also increased in 2011 with 193 cases reported, up from 155 in 2010. This was a reversal of a declining trend over the previous five years with 2010 rates being the lowest reported in 10 years.

Acute hepatitis B increased slightly in 2011 from 11 cases in 2010 to 15 cases reported in 2011; however, this is nearly half the number of cases reported in 2009 (27) fitting with a general trend of decline over the past decade. A continued modest decline in the rate of hepatitis C was also observed.

Diseases Transmitted by Direct Contact and Respiratory Routes

Invasive group A streptococcal disease reports increased in 2011 after a decline the previous two years. Highest rates were observed in children 1-9 years of age and adults over 60 years of age.

After having the historic lowest reported rates of tuberculosis in 2010 there was an increase of seven percent (to 268

cases) in 2011. Fraser South, Northern Interior, Richmond and Vancouver health service delivery areas had rates that exceeded the provincial average. As in prior years, rates in men exceed those in women at ages 40 years and older; with the highest rates in men over 60 years of age.

Antimicrobial Resistant Organisms

BCCDC continues to track antibiotic utilization and rates of antibiotic resistance with partners throughout the province.

The main observations of note during 2010 were:

- the percent of *S. aureus* isolates that are methicillin resistant (MRSA) decreased to 17.1% down from 30.5% in 2007.
- *Streptococcus pneumoniae* isolates have demonstrated a stable rate of resistance to erythromycin since 2007, with 31.4% of all tested isolates demonstrating resistance against erythromycin in 2011..
- Stabilization of resistance among most Gram positive organisms has been evident in recent years. The most worrisome trends continue to be among the extended spectra of resistance among Gram negatives..
- Antimicrobial utilization rates overall have stabilized or declined from a peak in 2005 with clearest reductions in utilization for childhood respiratory infections – the main targets of the Do Bugs Need Drugs? Program.

Enteric, Food and Waterborne Diseases

Campylobacter remained the most frequently reported enteric infection with 1722 cases reported; the rate in 2011 although slightly increased remains similar to rates seen since 2004. Rates of cryptosporidiosis and cyclosporiasis continued to decrease and remain at a 10 year low with only 53 and 23 cases, respectively, reported in 2011. Rates of shigella infections were also stable with 111 cases reported; similar to 2010.

2011 Highlights (continued)

Salmonellosis rates increased again in 2011 for the fourth year in a row with 1103 cases reported; this is driven by observed increases in reports of *S. Enteritidis*. An ongoing investigation of *S. Enteritidis* continued in 2011. Over 200 cases were investigated in 2011 and over 800 cases have been investigated since May 2008. The investigation continues to point to eggs as the most likely source of illness. The largest number of cases resided in the lower mainland which is reflected in the higher rates in these geographic areas and occurred during the summer months accounting for a summer peak in cases.

Higher rates of *V. parahaemolyticus* infections were seen again in 2011 with 42 cases reported compared to 39 cases in 2010. The majority of cases were reported during the annual summer peak when ocean temperatures are highest and facilitate bacterial growth. Cases were mostly associated with consumption of raw or undercooked shellfish.

Rates of listeriosis increased from 15 cases in 2010 to 19 cases reported in 2011. Rates were highest among adults over the age of 60 and one neonatal case was reported.

Vectorborne and Other Zoonotic Diseases

No cases of West Nile Virus were reported in BC in 2011 reflecting the cooler summer weather and reduced mosquito numbers.

There were 20 cases of clinical or laboratory confirmed Lyme Disease reported in BC in 2011. This is an increase compared to previous years and is likely related to ongoing communication with health care providers and increased awareness of the disease and reporting.

Environmental Fungi

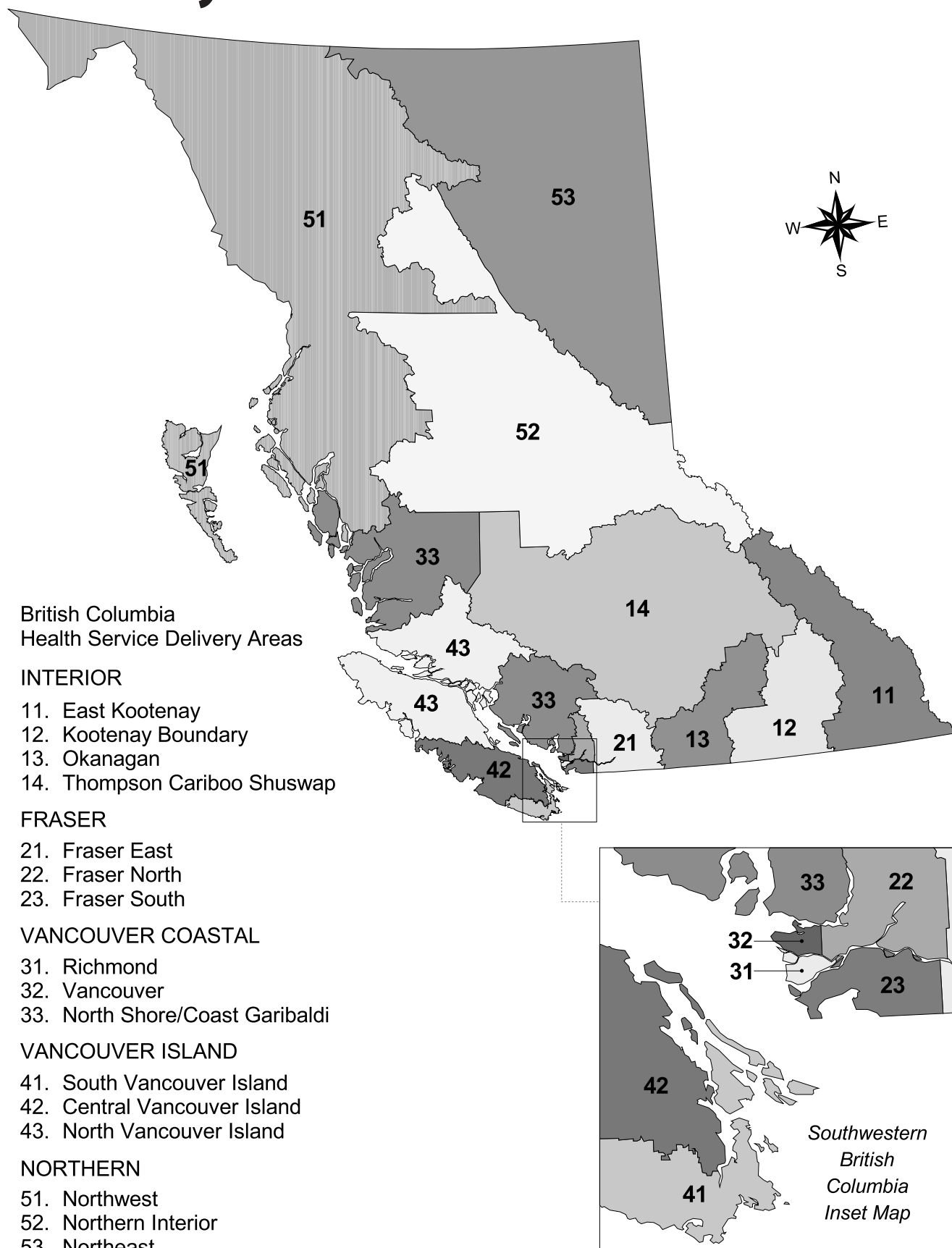
Cryptococcus gattii infections continue to be observed in British Columbia with an increase in reported infections in 2011 to 23 cases from 18 in 2010. Rates of infection have remained stable for the last four years at 0.5 per 100,000 population. As in previous years, all cases were in adults and the highest rates were reported from Central and North Vancouver Island. Acquisition of *C. gattii* continues to be primarily from the lower mainland and Vancouver Island.

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British Columbia Health Services Delivery Areas



DISEASES PREVENTABLE BY VACCINATION



Haemophilus influenzae type b (Hib), invasive

Influenza

Measles

Meningococcal Disease, invasive

Mumps

Pertussis

Pneumococcal Disease, invasive

Rubella

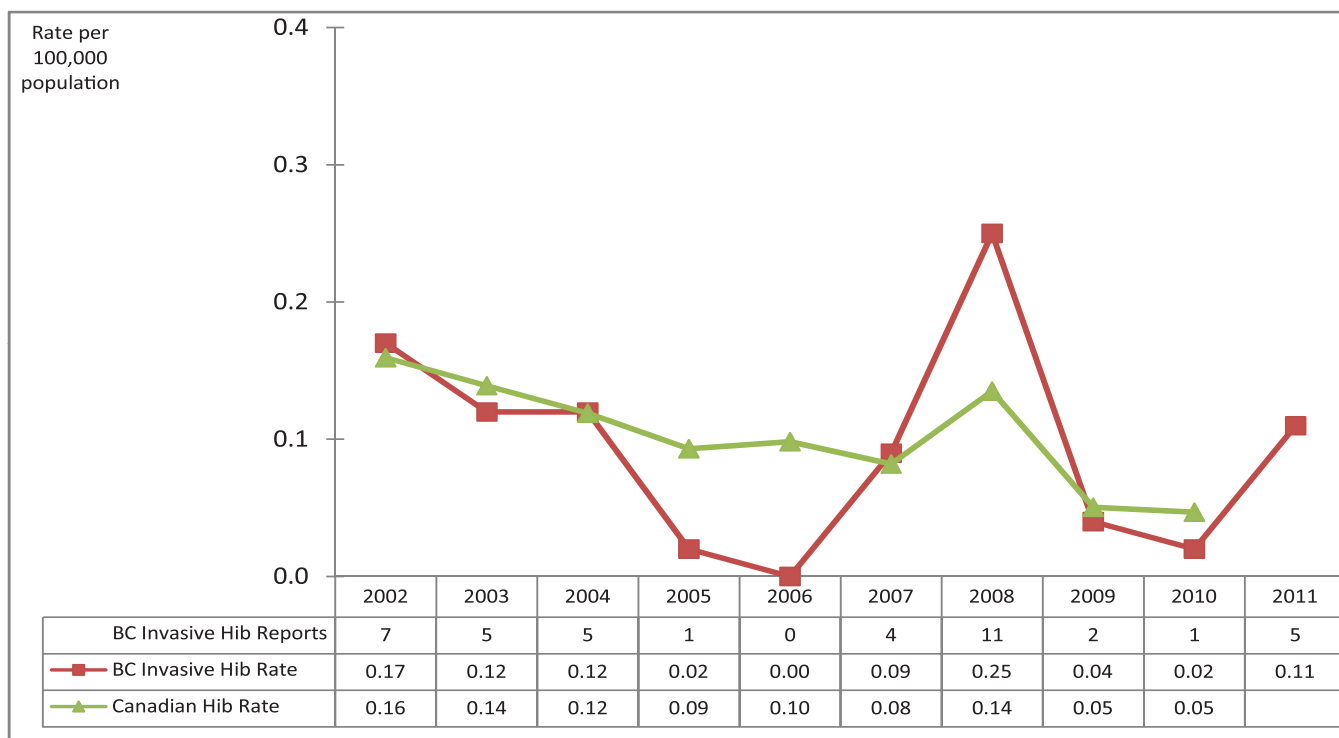
Tetanus

Haemophilus influenzae type b (Hib), invasive

Five cases of invasive *Haemophilus influenzae* type b (Hib) disease were reported in 2011. No cases were reported in children, and the 5 cases were in four males and one female aged 38 to 70 years. Hib vaccine is routinely given in infancy with a booster dose in the second year of life. Its use in adults is limited to those with select high risk medical

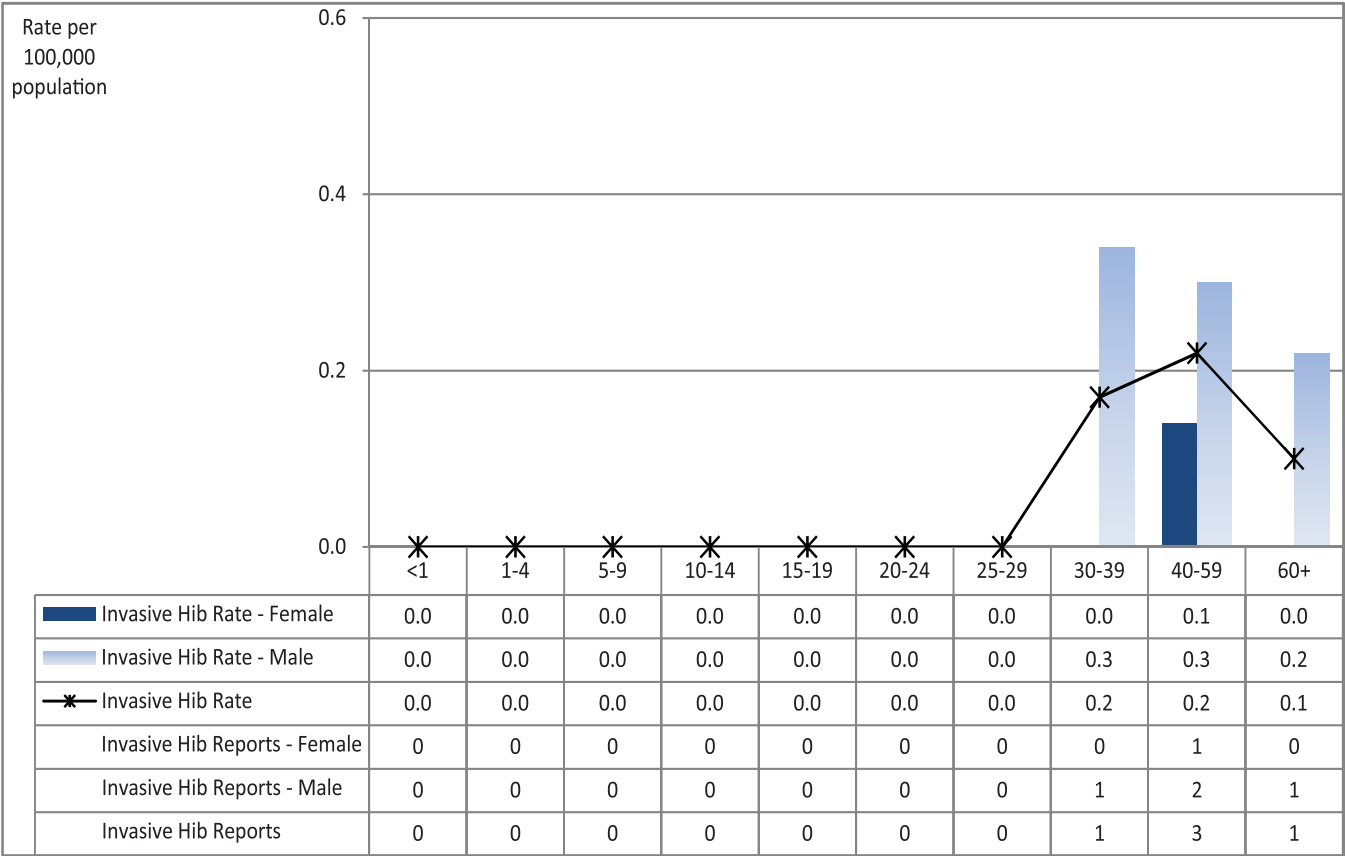
conditions. Hib disease has declined dramatically since the introduction of Hib vaccines in the early 1990s, with a small residual burden of illness almost exclusively in adults.

1.1 Haemophilus influenzae type b (Hib), invasive Rates by Year, 2002-2011



*

1.2 *Haemophilus influenzae* type b (Hib) invasive Rates by Age Group and Sex, 2011



Influenza

Influenza surveillance in BC mainly consists of collection, analysis and reporting of influenza activity in the community tracked through a composite of (1) sentinel influenza-like-illness (ILI) cases; (2) Medical Service Plan influenza visits; (3) laboratory diagnoses including detailed subtype and strain characterization; and (4) facility outbreak notifications.

Surveillance is year-round in BC with a new monitoring period typically commencing the first week of October (week 40) and continuing through the end of September (week 39) the following year. **This report includes surveillance data from week 12 of the 2010/11 season (starting March 20, 2011) through week 17 of the 2011/12 season (ending April 28, 2012).**

Summary

Historically, the peak in influenza activity has occurred between late December and early February, followed by a substantial decline in late March or early April. In the 2011/12 season, overall influenza activity was below expected levels and distinguished also by the absence of an obvious peak with instead extended low-level activity throughout. Influenza A/H3N2 was the predominant influenza virus detected throughout the season accompanied by an increasing proportion of A(H1N1)pdm09 and influenza B detection in the middle of the season.

Sentinel Physicians Surveillance

BC sentinel physician surveillance for the 2011/12 influenza season consisted of 47 active sentinel sites representing all regional health authorities of BC. Generally, the proportion of patient visits due to ILI reported by sentinel physicians from week 12 (March 20, 2011) through week 17 (April 28, 2012) remained below the historical average of the past 20 years. The 2011/12 season was also distinguished by the absence of an obvious peak and the rate was well below expected from December to March (Figure 3.1).

Influenza illness (ICD-9 code 487) as a proportion of all claims submitted by general practitioners to the BC Medical Services Plan (MSP) showed slight peak in week one, but otherwise a similarly low level of activity during the remainder of the 2011/12 season (Figure 3.2).

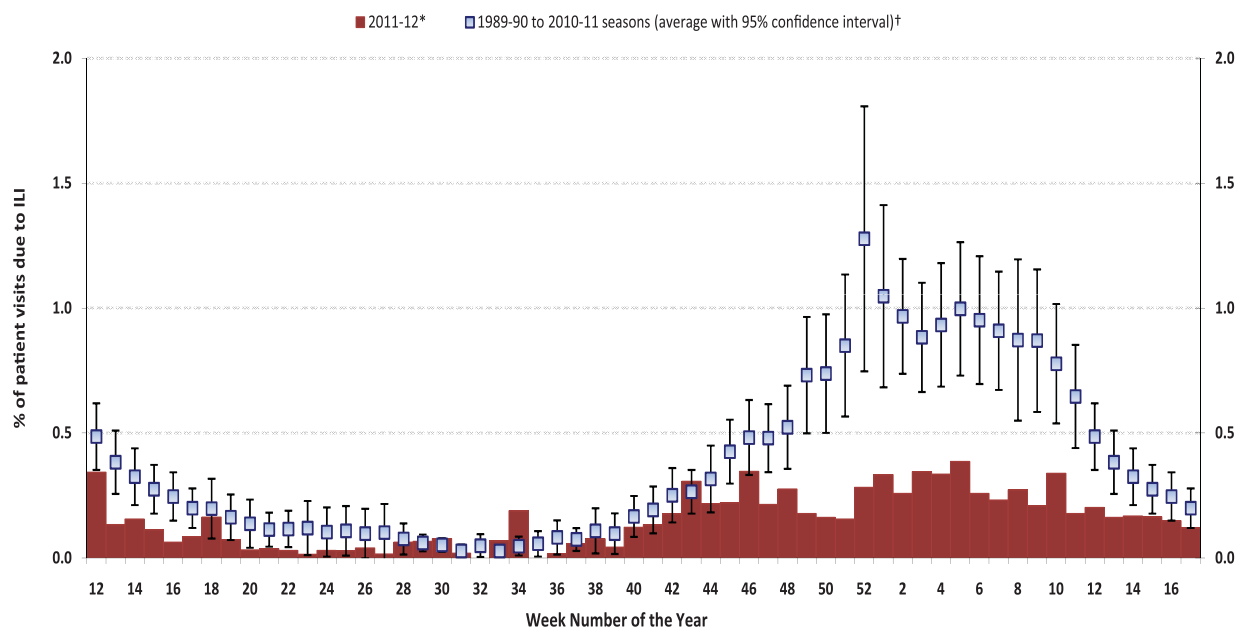
ILI Outbreaks

Between week 12 of the 2010/11 influenza season (March 20, 2011) and week 17 of the 2011/12 influenza season (April 28, 2012), laboratory-confirmed influenza outbreaks were reported from 24 long-term care facilities (LTCF), higher than the 2010-11 season (14); no outbreaks were reported from acute health care facilities (Figure 3.4).

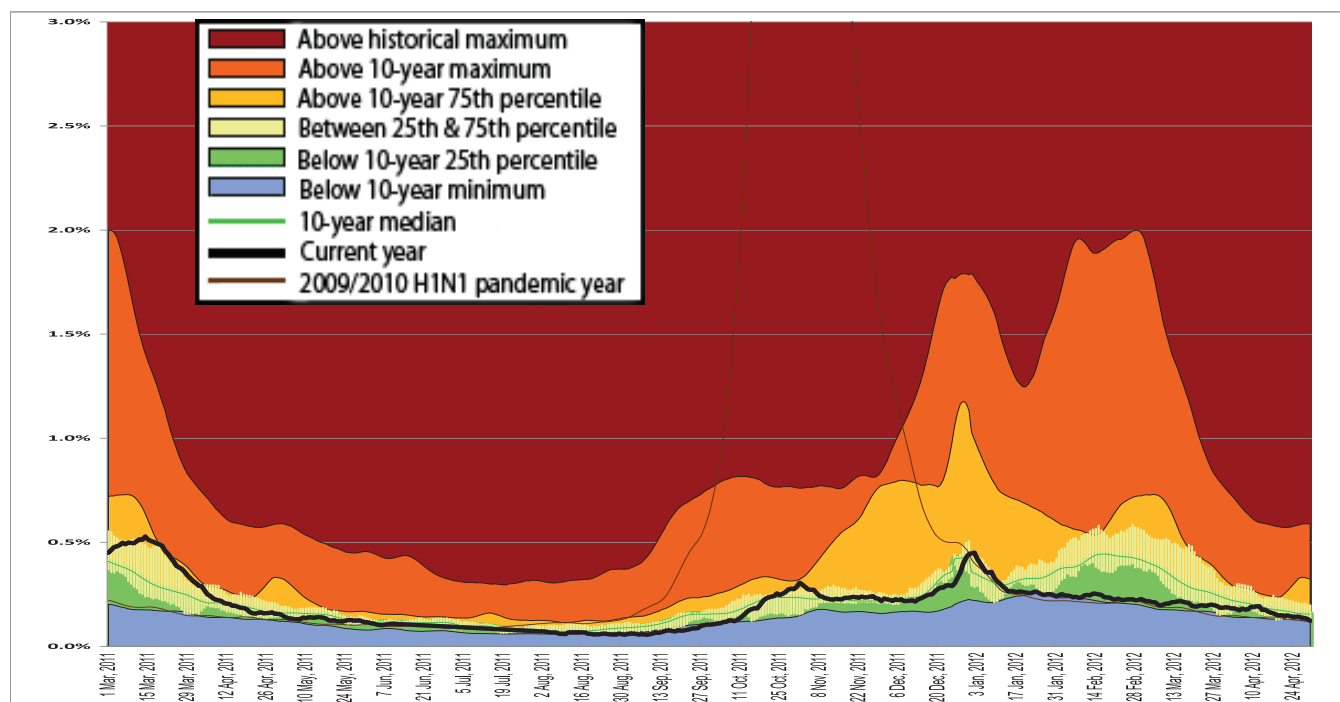
Laboratory Profile of Influenza

The BC Public Health Microbiology & Reference Laboratory tested 5,179 specimens for respiratory viruses between week 12 of 2010/11 (starting on March 20, 2011) to week 17 of 2011/12 (ending on April 28, 2012). Specimens positive for influenza equaled 637 (12%), of which 514 (81%) were influenza A [405 A/H3N2, 109 A(H1N1)pdm09] and 124 (19%) were influenza B. Of the 5,179 specimens tested for other respiratory viruses, 369 (7%) were positive for respiratory syncytial virus (RSV), and 1,695 (33%) positive for at least one virus including enterovirus/rhinovirus, adenovirus, parainfluenza, human metapneumovirus, human bocavirus, and coronavirus (Figures 4a). Overall, the summer period was dominated by enterovirus/rhinoviruses, while after week 50, A/H3N2 constituted the majority of detections along with other influenza and non-influenza respiratory viruses. Unlike provinces in eastern Canada, where influenza B predominated during 2011-12 season, in BC A/H3N2 was the predominant influenza virus detected.

3.1 Percentage of Patient Visits due to Influenza Like Illness (ILI) per Week Compared to Average Percentage of ILI Visits for the Past 20 Seasons Sentinel Physicians, 2011-2012, British Columbia



3.2 Influenza Illness (II) as Percentage of All Daily MSP Claims Received for Selected GP Services (7-day Moving Average), British Columbia

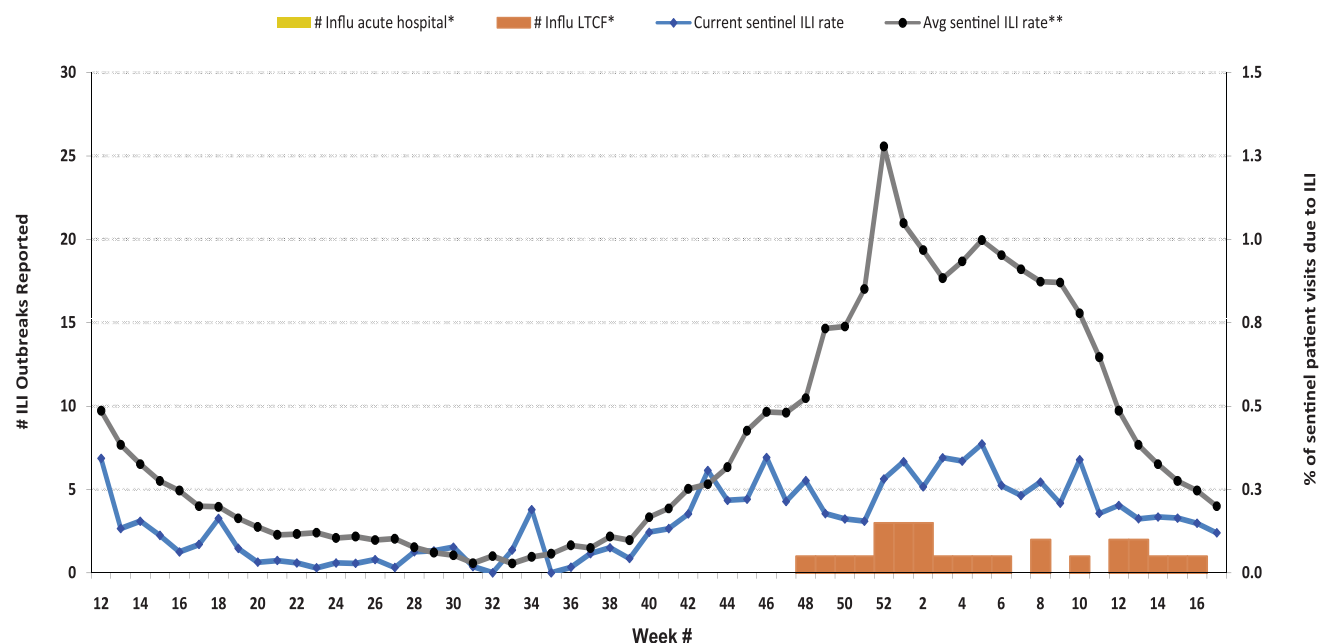


3.3 Number of Reported Influenza/ILI Outbreaks in Long-Term and Acute Care Facilities Between Weeks 40 and 17, British Columbia, 2003-04 to 2010-11 Seasons

	Long-term care facility outbreaks†	Acute care facility outbreak†
2003-04	58	8
2004-05	88	4
2005-06	52	2
2006-07	54	7
2007-08	80	12
2008-09	41	7
2009-10	13	0
2010-11	14	2
2011-12	27	0

† Includes lab-confirmed influenza outbreaks only

3.4 Number of Influenza and Influenza-Like Illness (ILI) Outbreaks Reported, Compared to Current Sentinel ILI Rate and Average Sentinel ILI Rate for past 20 years, per Week, British Columbia, 2011-2012 season

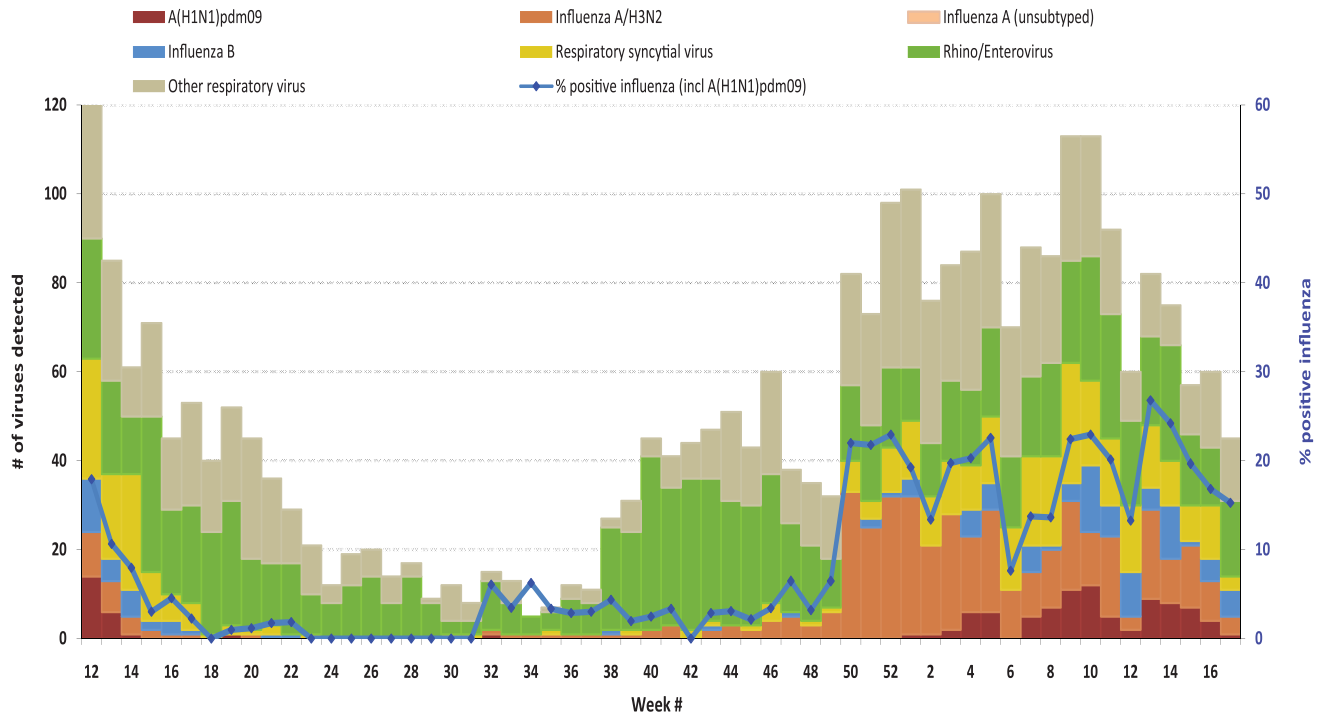


* Facility influenza outbreak defined as 2 or more ILI cases within 7-day period, with at least one case laboratory-confirmed as influenza.

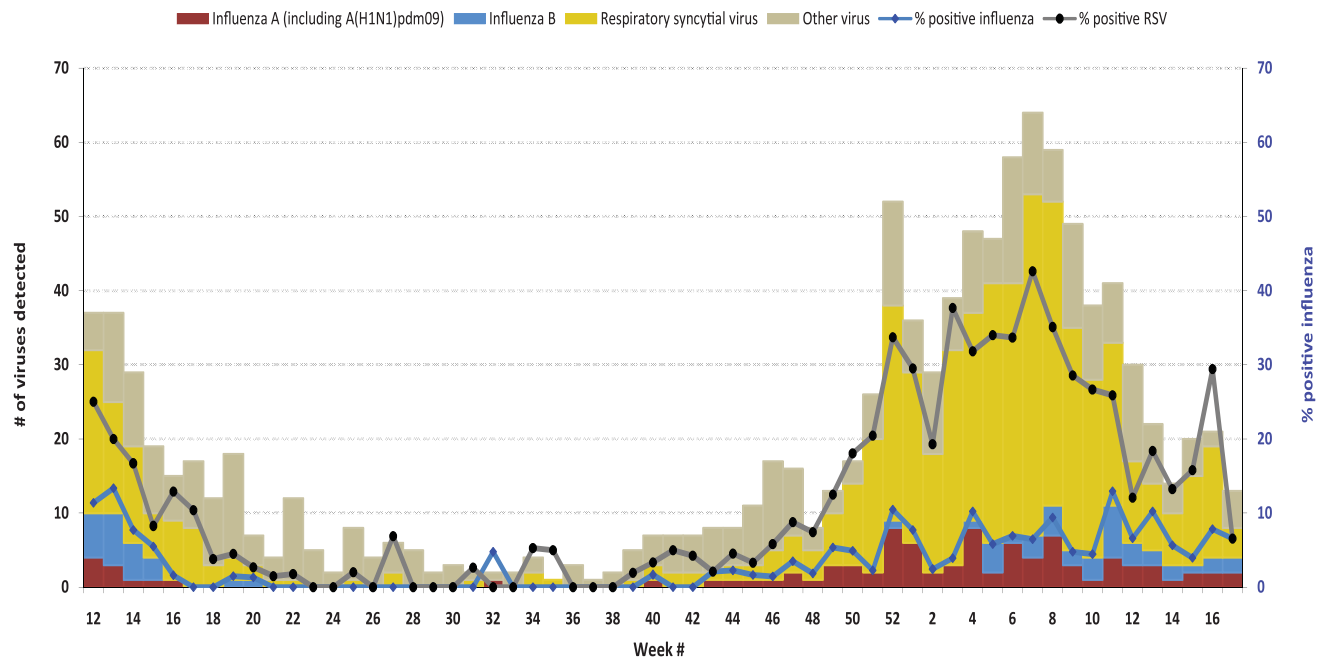
† School ILI outbreak defined as >10% absenteeism on any day, most likely due to ILI.

** Historical values exclude 2008-09 and 2009-10 seasons due to atypical seasonality.

3.5a Influenza and Other Virus Detection Among Respiratory Specimens Submitted to BC Public Health Microbiology & Reference Laboratory PHSA, 2011-2012



3.5b Influenza and Other Virus Detections Among Respiratory Specimens Submitted to BC Children's and Women's Health Centre Laboratory, 2011-2012



Influenza (continued)

From week 12 of 2010/11 (starting on March 20, 2011) to week 17 of 2011/12 (ending on April 28, 2012), BC Children's and Women's Health Centre Laboratory tested 3562 respiratory specimens. Among them, 155 (4%) were positive for influenza viruses of which two-thirds were influenza A(94) and one-third influenza B (61); 565 (16%) were positive for RSV, and 369 (10%) were positive for at least one virus including parainfluenza, adenovirus, human metapneumovirus, enterovirus, and coronavirus (Figures 4b). Overall, RSV was the predominant virus among the detected non-influenza respiratory viruses.

Strain Characterization

BC laboratories routinely send influenza isolates to the National Microbiology Laboratory (NML) for strain characterization. Between September 1, 2011 to April 28, 2012, 135 isolates were sent to NML from BC. Of these, 81 were A/H3N2, all of which were considered A/Perth/16/2009(H3N2)-like; 40 were influenza B including 17 B/Brisbane/60/2008-like (Victoria lineage) and 23 B/Wisconsin/01/2010-like (Yamagata), and 14 A(H1N1)pdm09, all of which were A/California/07/09 (H1N1)-like. For context, the WHO-recommended components of the 2010/11, 2011/12 and 2012/13 Northern

Hemisphere trivalent influenza vaccines are listed below:

2010-11, 2011/2012 and 2012/13 Vaccine Strains

2011/11 and 2011/2012	2012/13
A/California/07/2009 (H1N1) *	A/California/07/2009 (H1N1) *
A/Perth/16/2009 (H3N2)	A/Victoria/361/2011 (H3N2)
B/Brisbane/60/2008 (Victoria lineage)	B/Wisconsin/1/2010 (Yamagata lineage)

* 2009 pandemic H1N1 vaccine strain

Antiviral Resistance

The NML routinely tests for susceptibility of selected isolates to antiviral drugs recommended for treatment of influenza: oseltamivir, zanamivir and amantadine. From across Canada, the NML reported that all 118 A(H1N1)pdm09 isolates, all 345 influenza B isolates, and all 128 influenza A/H3N2 isolates tested were sensitive to oseltamivir. All 117 A(H1N1)pdm09, all 127 A/H3N2, and all 345 influenza B isolates tested were sensitive to zanamivir. All 146 A(H1N1)pdm09 and 99.5% (184/185) A/H3N2 isolates tested were resistant to amantadine.

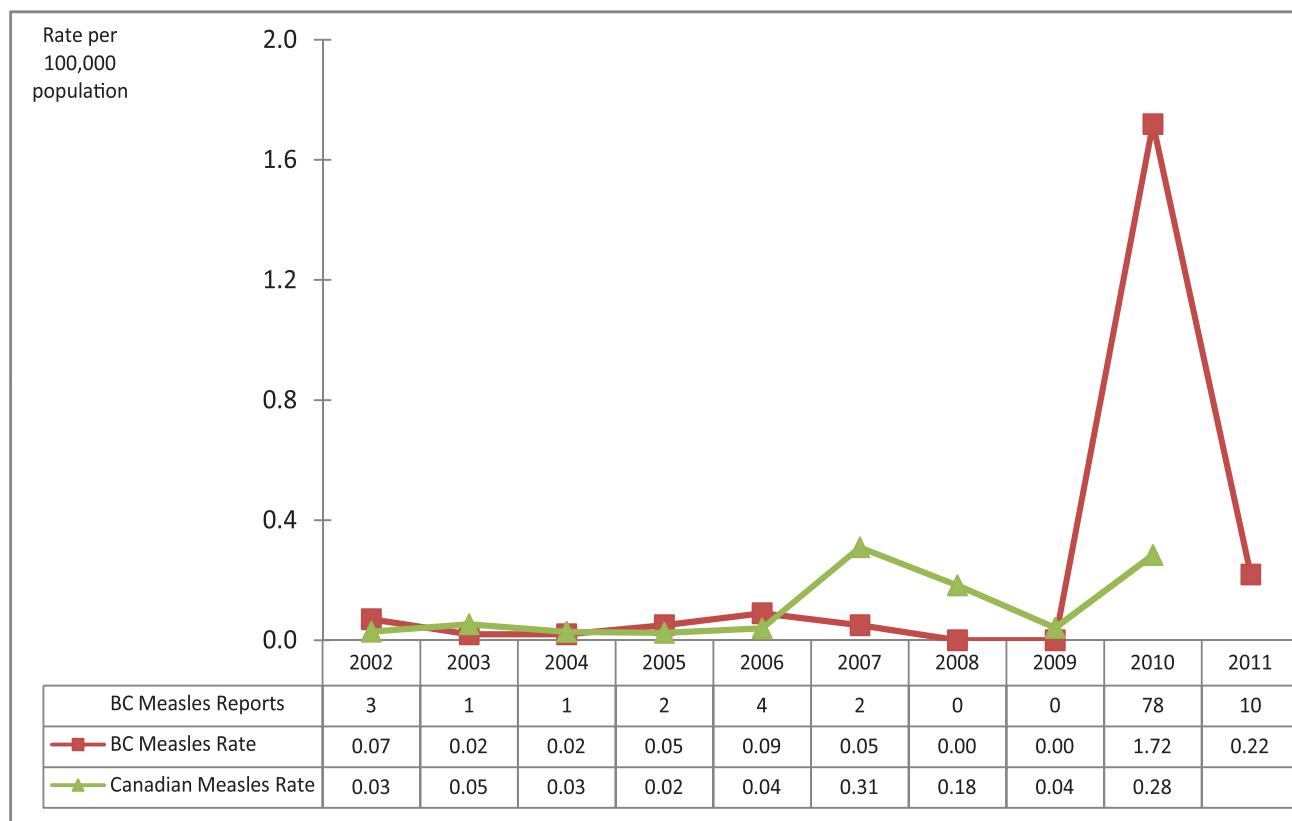
Measles

There were 10 confirmed measles cases among BC residents in 2011 (0.2 per 100,000 population). This was a large decrease from 2010, when there were 78 confirmed cases (1.7 per 100,000 population) in an outbreak associated with the winter Olympics, but slightly higher than the number of cases observed between 2002 and 2009 in BC (zero to four cases per year). Confirmed cases were reported in Thompson Cariboo Shuswap (seven cases, 3.1 per 100,000 population), Fraser South (two cases, 0.3 per 100,000 population), and Vancouver (one case, 0.2 per 100,000 population).

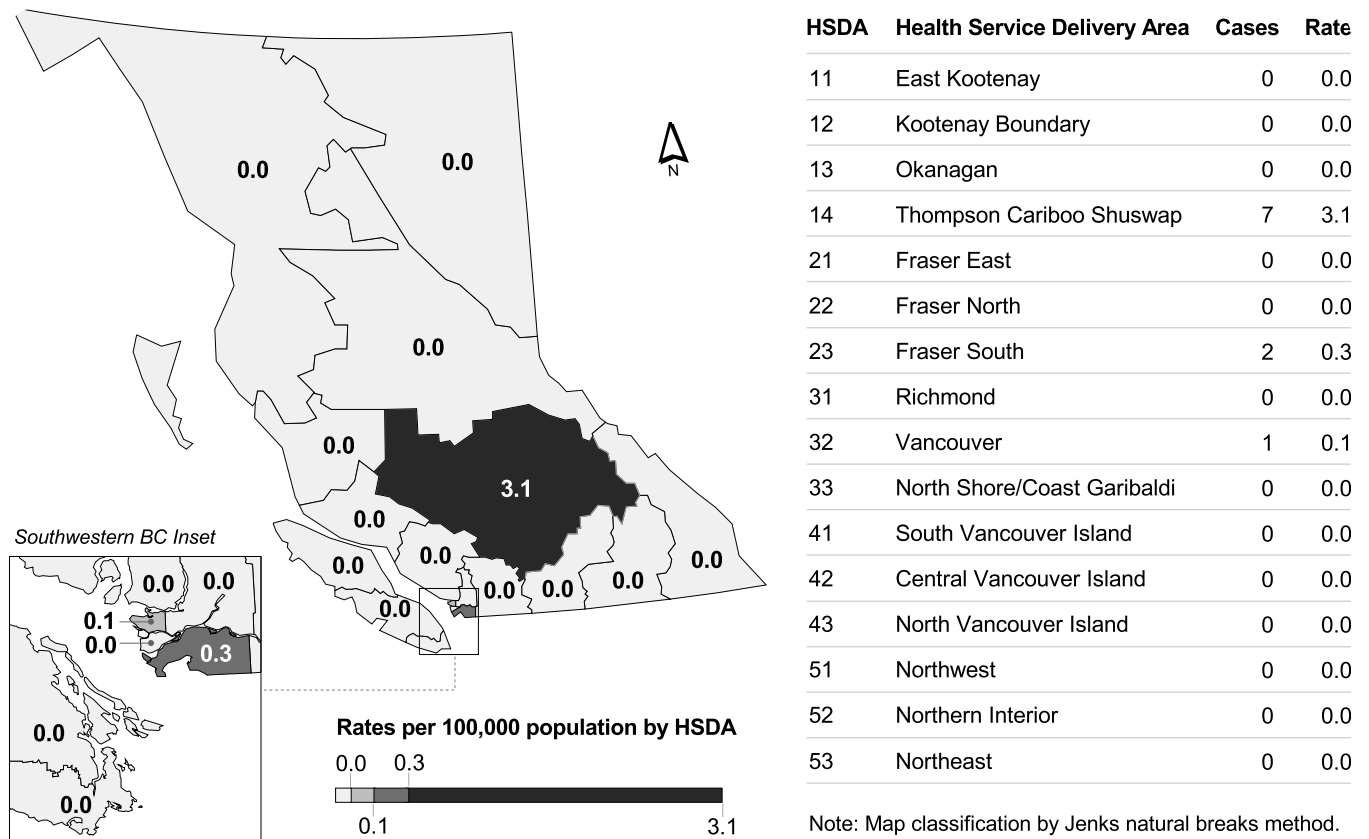
The two cases in Fraser South were in unimmunized twin infants (<one year old) whose infections were compatible with acquisition during travel to India. Measles virus genotype D8 was isolated, which is also consistent with acquisition in India. Neither of these cases resulted in any known transmission of measles in BC

. Each of the other eight cases had a rash onset in February and were associated with a ski resort town located in the Okanagan HSDA. One was a visitor from Vancouver Coastal Health region, and the rest were local residents, five of whom attended the same high school. Three cases had not been previously immunized including one immunized six days prior to rash onset, three had unknown immunization status, and two were fully immunized with two prior doses of measles containing vaccine. The measles virus genotype was determined for five of the eight cases and all were genotype D4. In 2011, the WHO Measles LabNet surveillance system recorded cases of measles genotype D4 in North America, South America, Europe, Russia, Japan, and Australia.

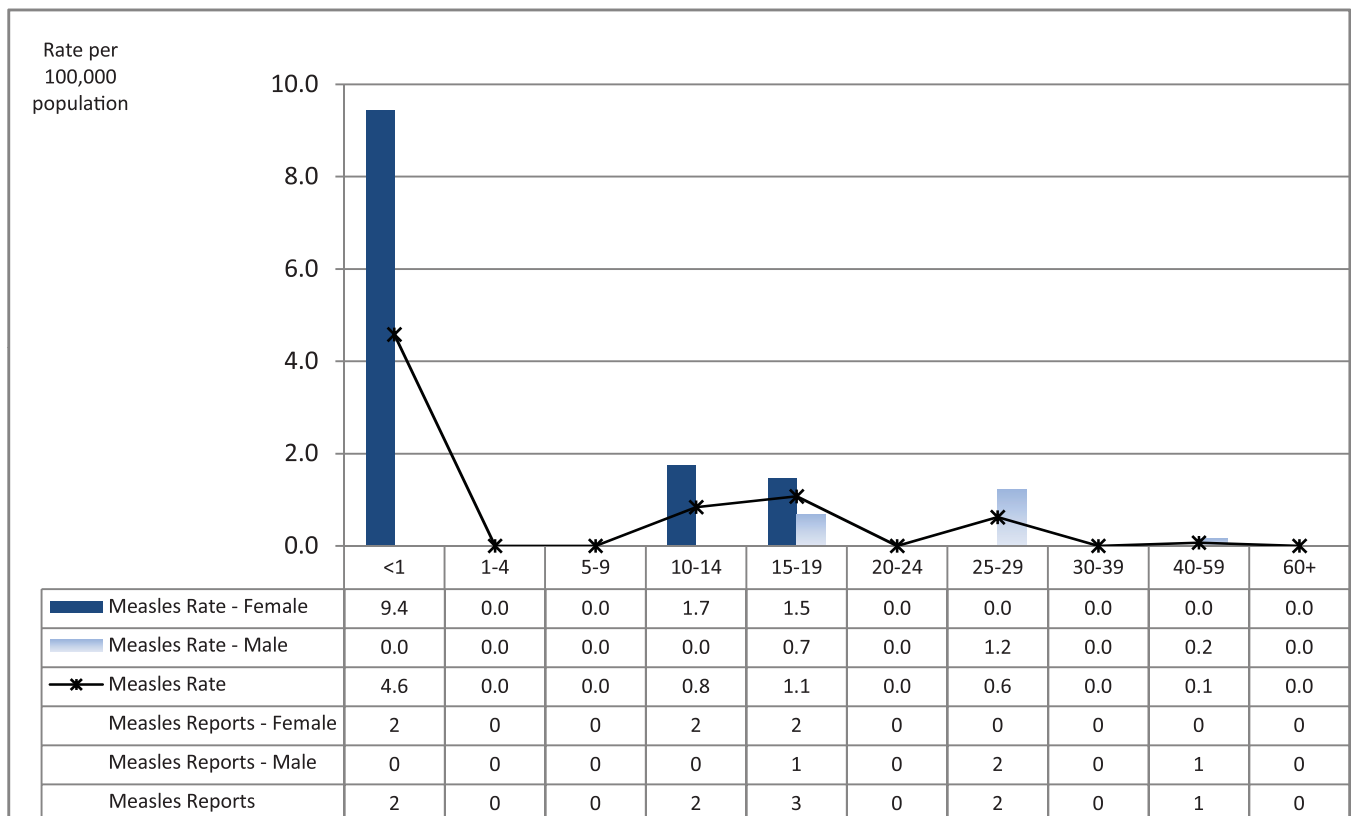
4.1 Measles Rates by Year, 2002-2011



4.2 Measles Rates by HSDA, 2011



4.3 Measles Rates by Age Group and Sex, 2011



Meningococcal Disease (invasive)

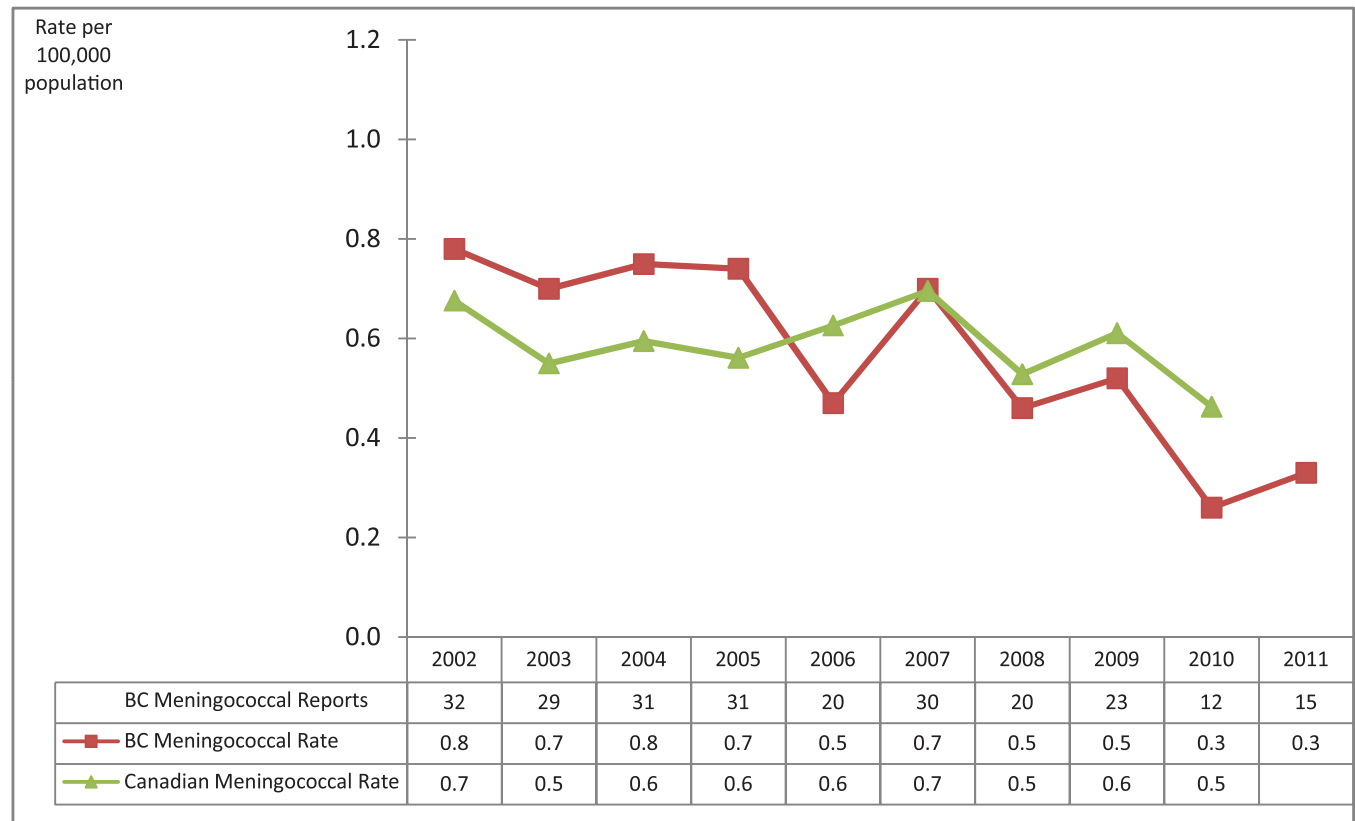
During 2011, 15 invasive meningococcal disease (IMD) cases were reported. The serogroups were: 7 Y, 5 B, 2 29E and 1 W135. Notably, no cases of serogroup C disease were reported. Two cases were fatal; both were serogroup Y. There was no evidence of geographic clustering of cases.

The rate of IMD has decreased from 0.78 cases per 100,000 population in 2002 to 0.33 cases per 100,000 population in 2011. This decline is substantially related to a dramatic downward trend in serogroup C disease as well as in the past 2 years low rates of serogroup B disease. The incidence of serogroup C disease in 2002 was 0.22 per 100,000 population, and in 2011 it was zero. This reflects the impact of the infant and school-age catch-up meningococcal C conjugate immunization program beginning in September 2003. In contrast, while the incidence of serogroup B disease was low in the past two years, this does not reflect a consistent downward trend, with four-fold fluctuations in annual incidence in the last 10 years and rates from 0.09 to 0.41 cases per 100,000 population per year. Serogroup Y incidence is lower and rates fluctuated from 0.02 to 0.24 cases per 100,000 population per year, and the rate of W135 is lower still and ranged from 0.0 to 0.10 cases per 100,000 population per year. Figure 5.4. There have only been two cases of serogroup A disease in the past decade; both occurred in 2006 and were due to importation from the Indian subcontinent.

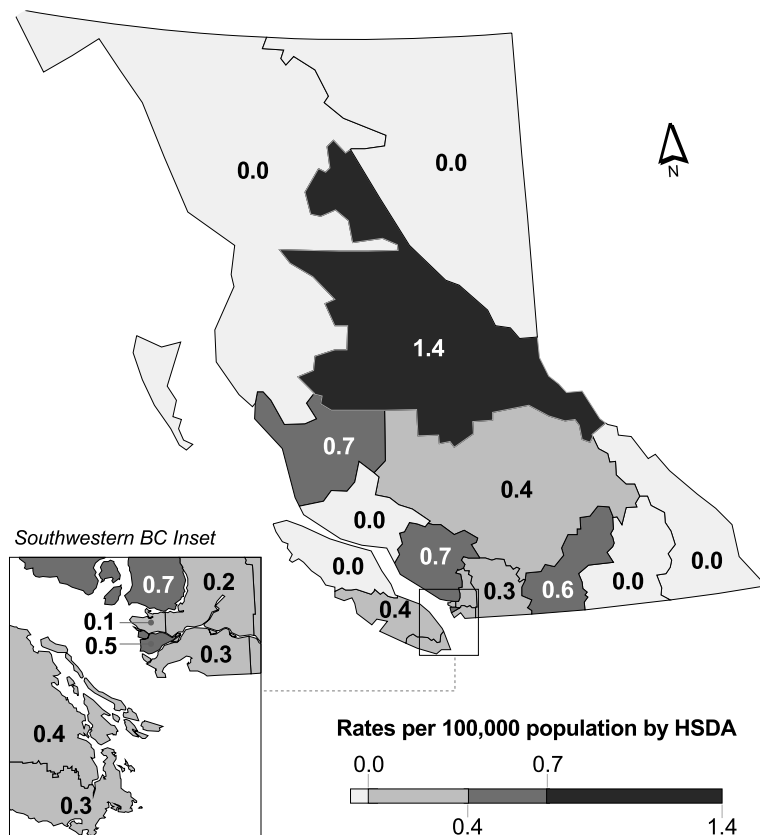
Outbreaks of IMD in the past decade in BC were due to serogroup C: one in the Abbotsford area in 2001 and one among men who have sex with men in 2004 (see Annual Summary of Reportable Diseases for these years for additional detail <http://www.bccdc.ca/util/about/annreport/default.htm>). Since introduction of the serogroup C immunization program, there has not been a recurrence of the historical pattern of periodic outbreaks in school-age children and adolescents.

The annual median age of all IMD ranged from 20 years to 57 years in 2002-2010. In 2011, the median age of IMD cases was 19 years, largely due to four sporadic cases in infants (three serogroup B and 1 serogroup Y).

5.1 Meningococcal Disease (invasive) Rates by Year, 2002-2011



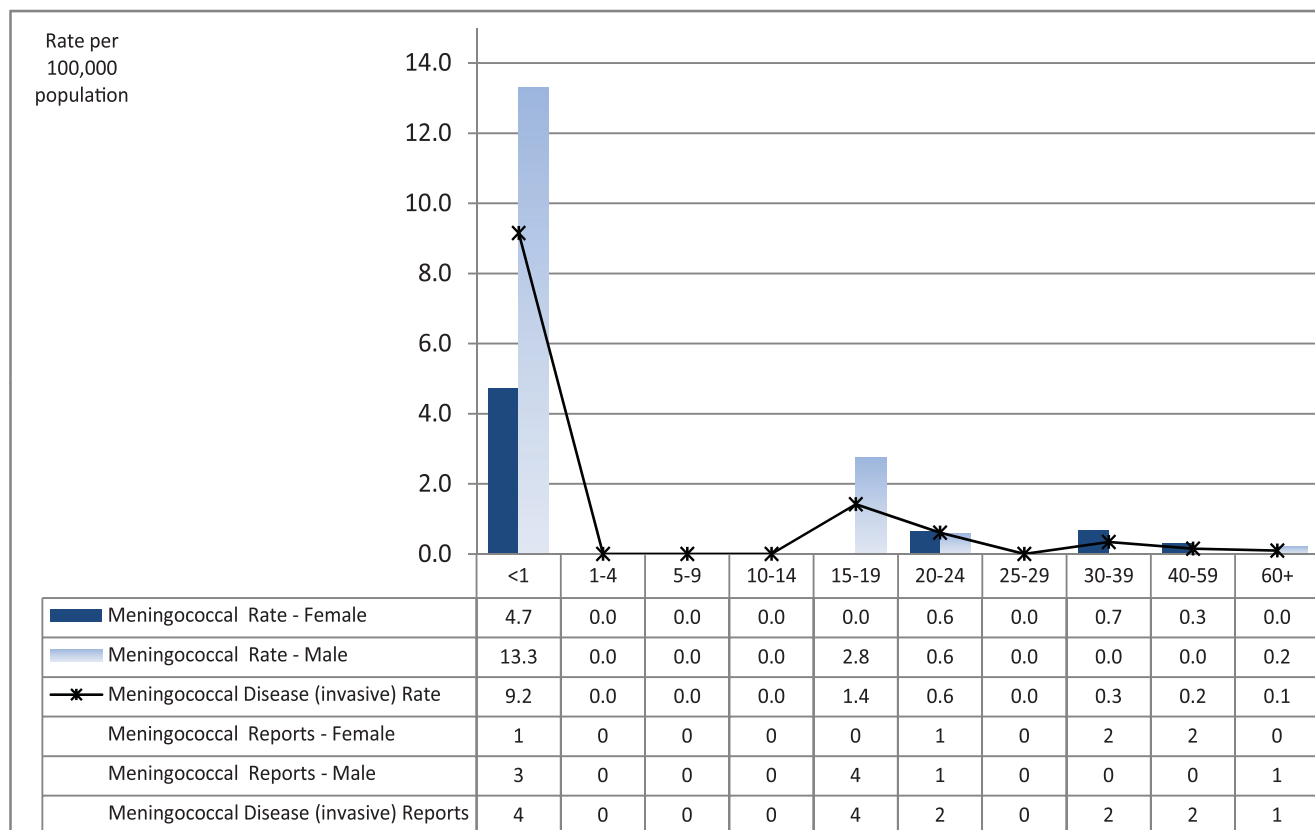
5.2 Meningococcal Disease (invasive) Rates by HSDA, 2011



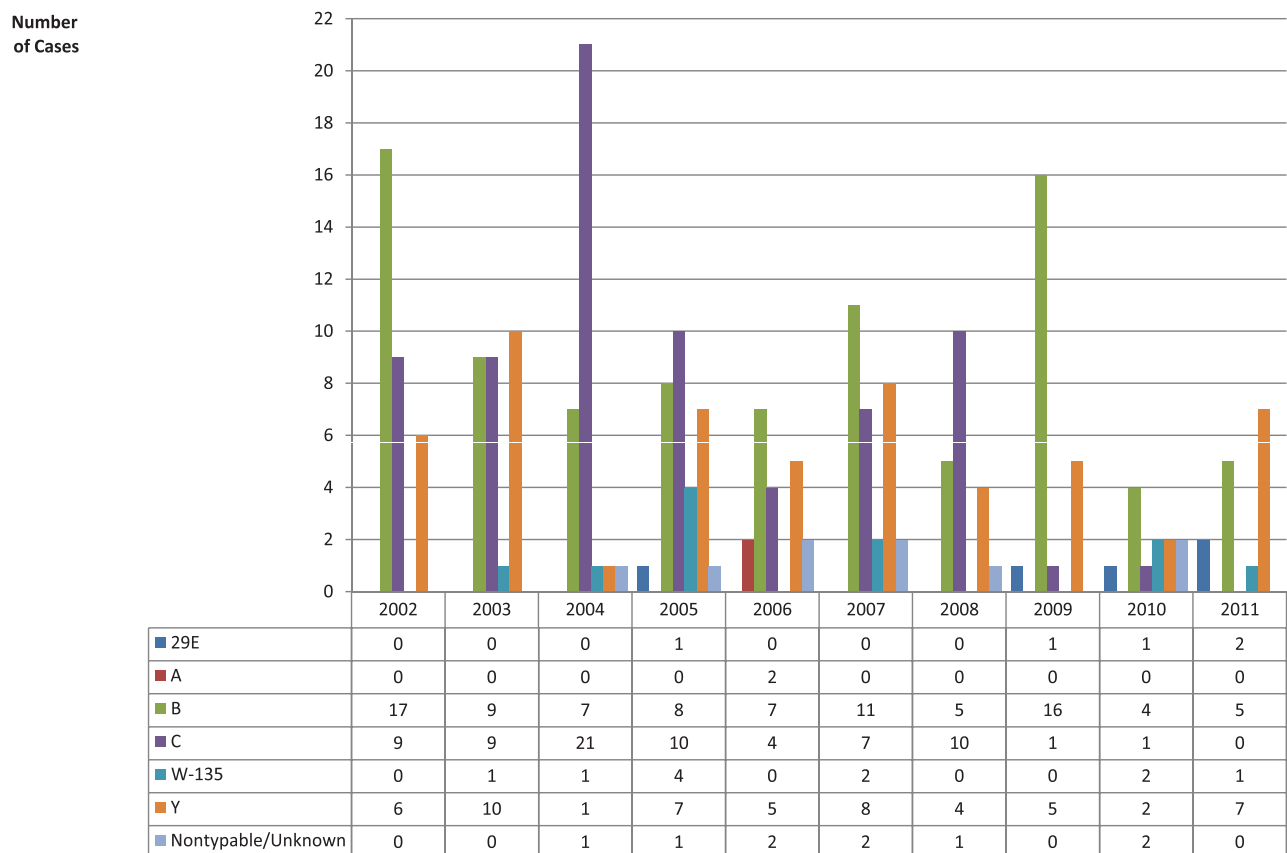
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	0	0.0
13	Okanagan	2	0.6
14	Thompson Cariboo Shuswap	1	0.4
21	Fraser East	1	0.3
22	Fraser North	1	0.2
23	Fraser South	2	0.3
31	Richmond	1	0.5
32	Vancouver	1	0.1
33	North Shore/Coast Garibaldi	2	0.7
41	South Vancouver Island	1	0.3
42	Central Vancouver Island	1	0.4
43	North Vancouver Island	0	0.0
51	Northwest	0	0.0
52	Northern Interior	2	1.4
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

5.3 Meningococcal Disease (invasive) Rates by Age Group and Sex, 2011



5.4 Meningococcal Disease (invasive) Cases by Serotype and Year, 2002-2011



Mumps

Following a mumps outbreak in 2008, with 108 confirmed cases among BC residents, there was reduced mumps activity in the province in 2009 (25 cases) and 2010 (11 cases). Another mumps outbreak occurred in BC in 2011 with 132 confirmed cases among BC residents. The outbreak started in January in the ski resort of Whistler and spread to the Lower Mainland, peaking in the first week of July. The following number of confirmed cases and rates per 100,000 population were reported by regional health authority: Vancouver Coastal (95 cases, 8.2), Fraser (29 cases, 1.8), Interior (seven cases, 1.0), Vancouver Island (one case, 0.1), Northern Health (zero).

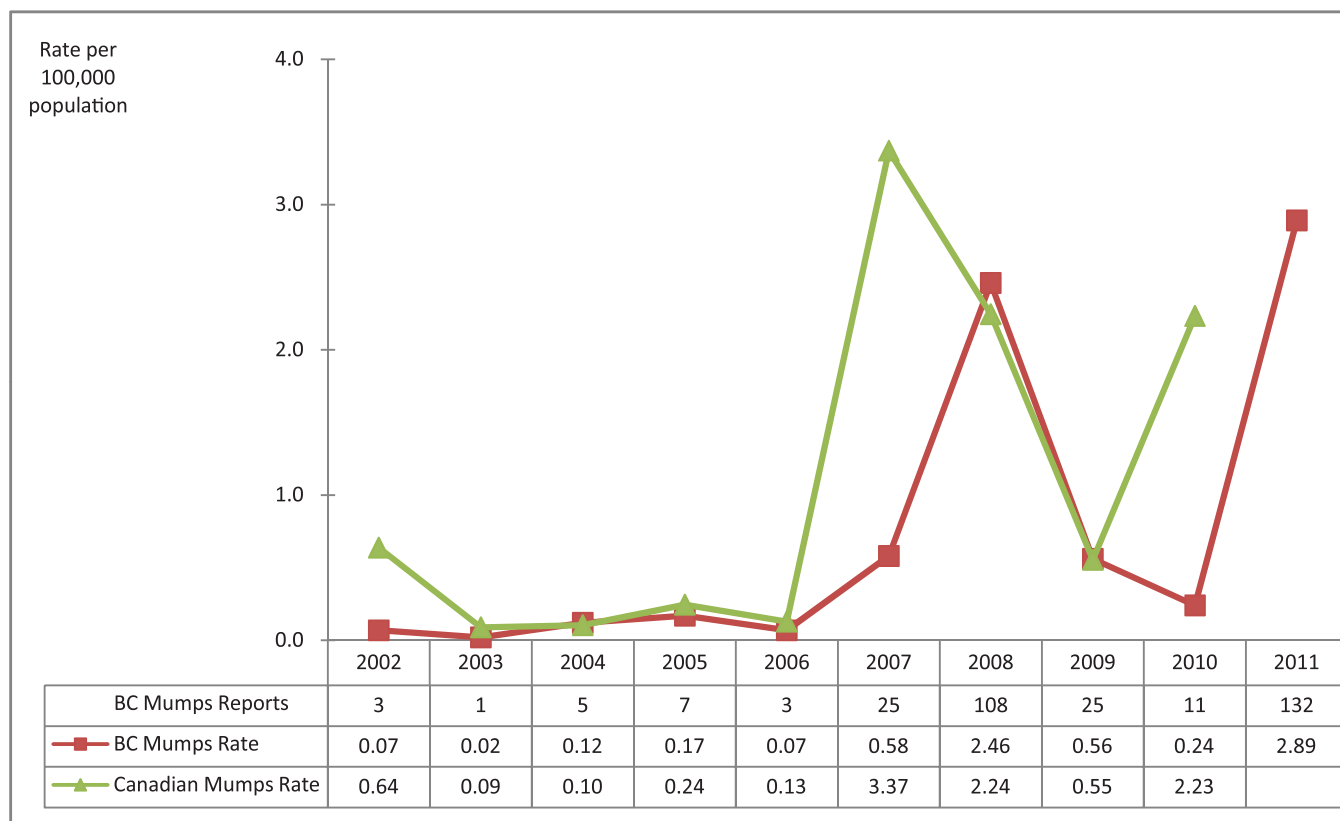
The median age was 27 years, with a range from 10 months to 66 years. More male cases (73, 55%) were reported than females. There were 26 cases (20%) with no record

of mumps immunization; 68 cases (52%) had/ likely had received one dose of mumps vaccine (including 46 cases with a verbal history of receipt of childhood vaccines); seven cases (5%) had received two doses of mumps vaccine; and 31 cases (23%) had an unknown immunization history.

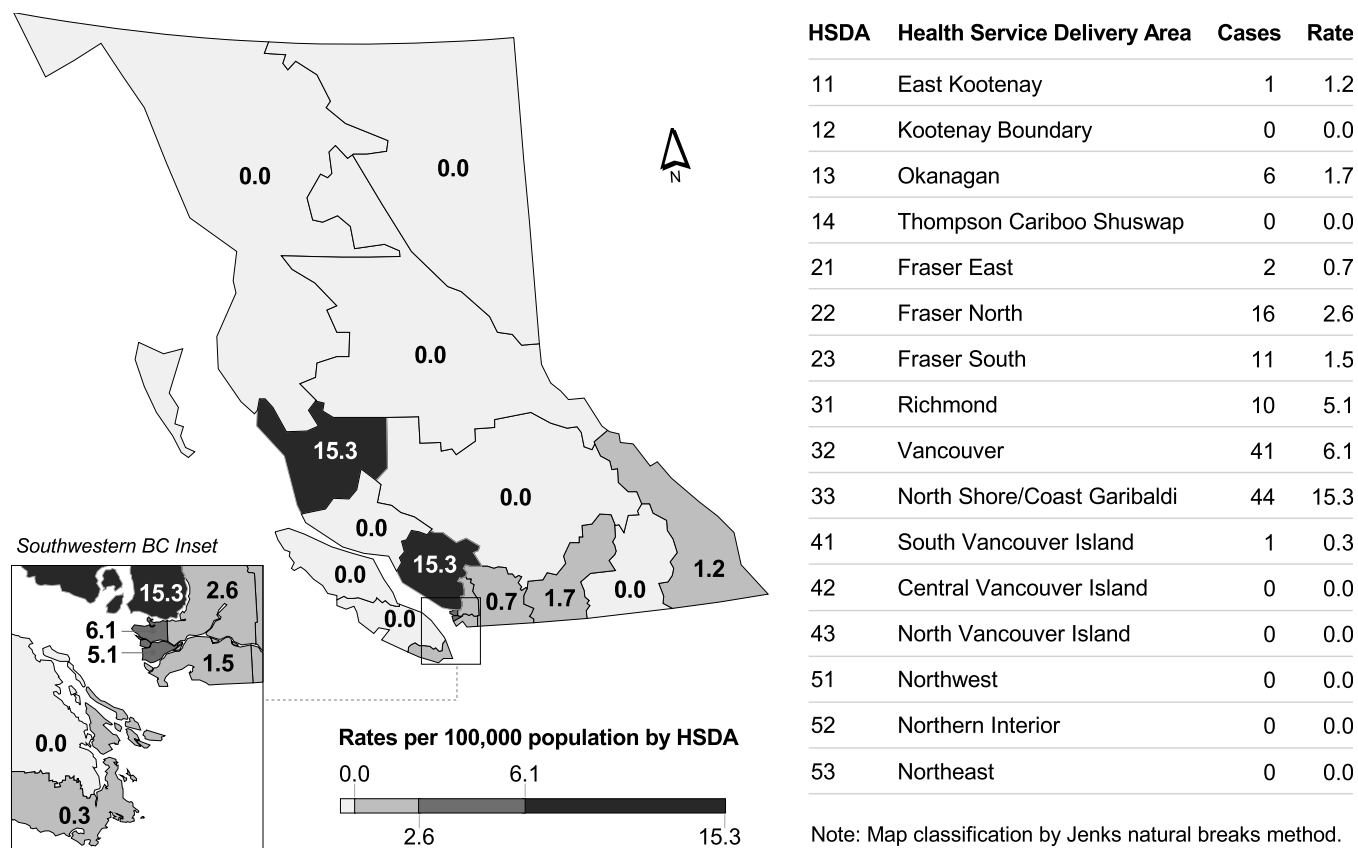
Parotitis was recorded for 91% of cases: unilateral parotitis for 41 cases (31%), bilateral parotitis for 79 cases (60%).

The vast majority of cases visited a physician (111 cases, 84%; data missing for 16 cases), 52 cases (39%) visited an emergency room (unknown for 31 cases), and two cases (2%) were hospitalized for over 24 hours (unknown for 34 cases). There were no deaths associated with the outbreak. Orchitis was the most common complication (16 cases, 22% of males), and there was one case (1%) of mumps meningitis, which was confirmed by CSF testing.

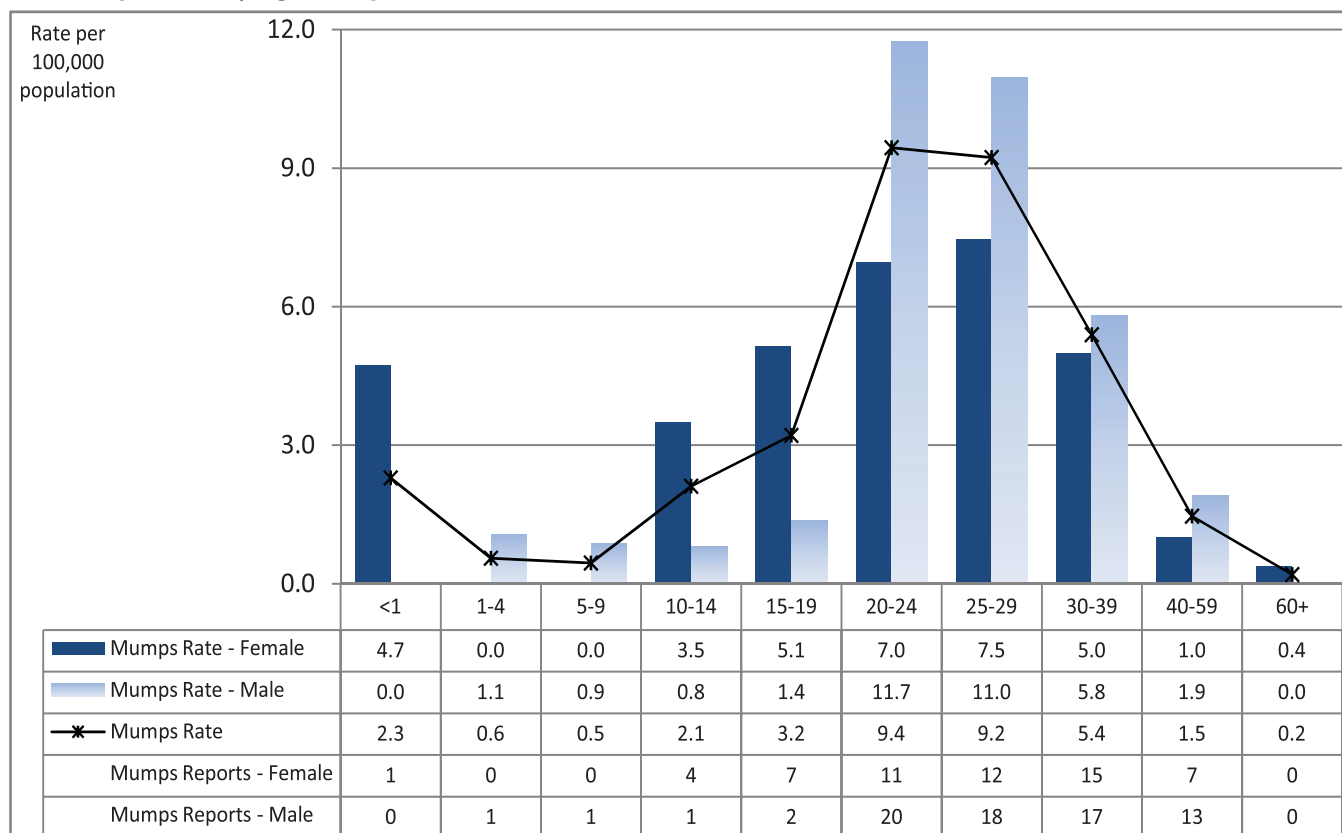
6.1 Mumps Rates by Year, 2002-2011



6.2 Mumps Rates by HSDA, 2011



6.3 Mumps Rates by Age Group and Sex, 2011



Pertussis

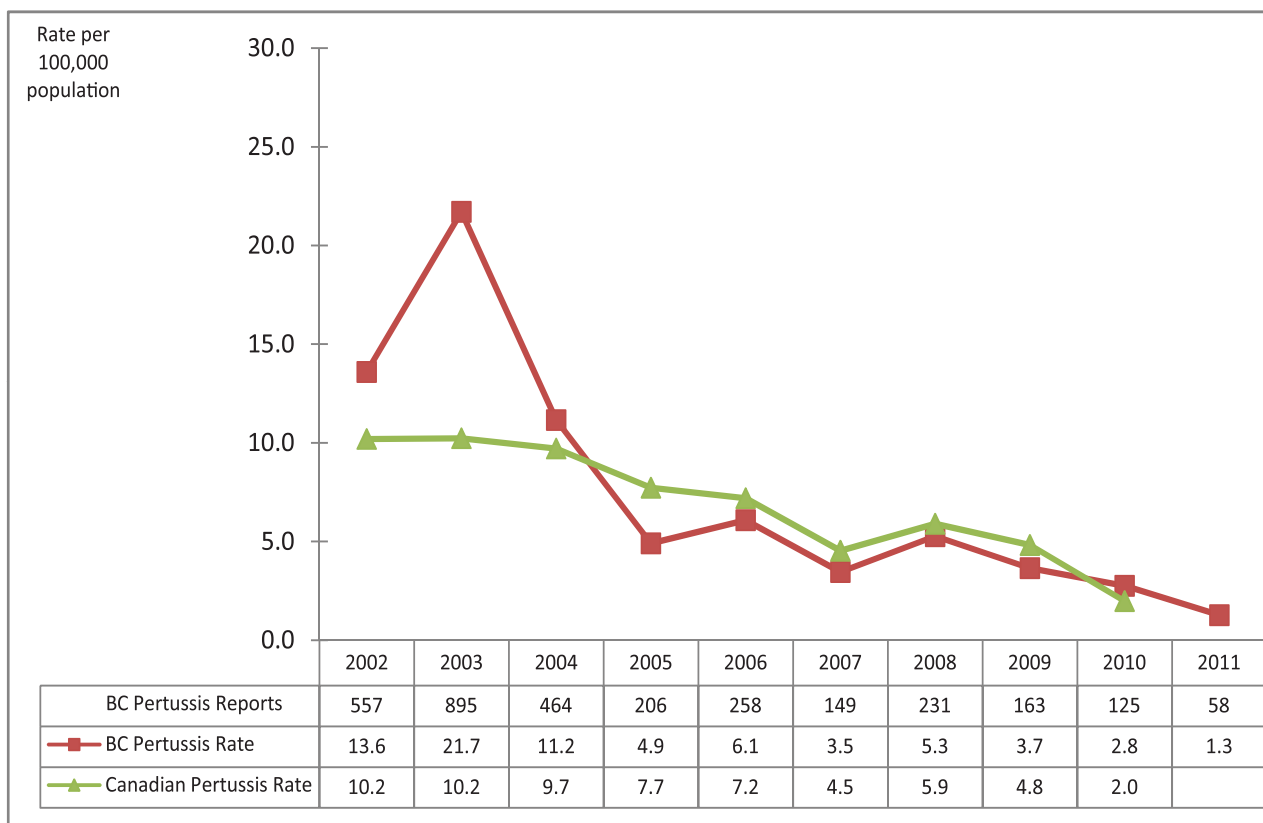
Pertussis generally demonstrates cyclical peaks every three to five years in BC. Following the detection of dramatic epidemics in 1996, 2000 and 2003, BC has not experienced a significant provincial peak since 2003 (21.5 per 100,000), following which rates have dropped to their lowest levels in ~20 years (<10 per 100,000 from 2005) despite ongoing surveillance and testing through sensitive PCR. The cumulative incidence rate in 2011 was 1.3 per 100,000, which is the lowest recorded since 1990. Localized increase in pertussis activity at the tail-end of 2011 in the Fraser Health Authority is not substantially evident in provincial tallies but reflected in subsequent 2012 activity.

The peaks of 2000 and 2003 were driven primarily by a preteen/teen reservoir reflecting a moving (aging) birth cohort effect among children previously given the less efficacious whole cell pertussis vaccine. Infants were also substantially affected during these peaks. In British Columbia, acellular pertussis vaccine replaced whole cell vaccine for routine childhood immunization in 1997 and was introduced

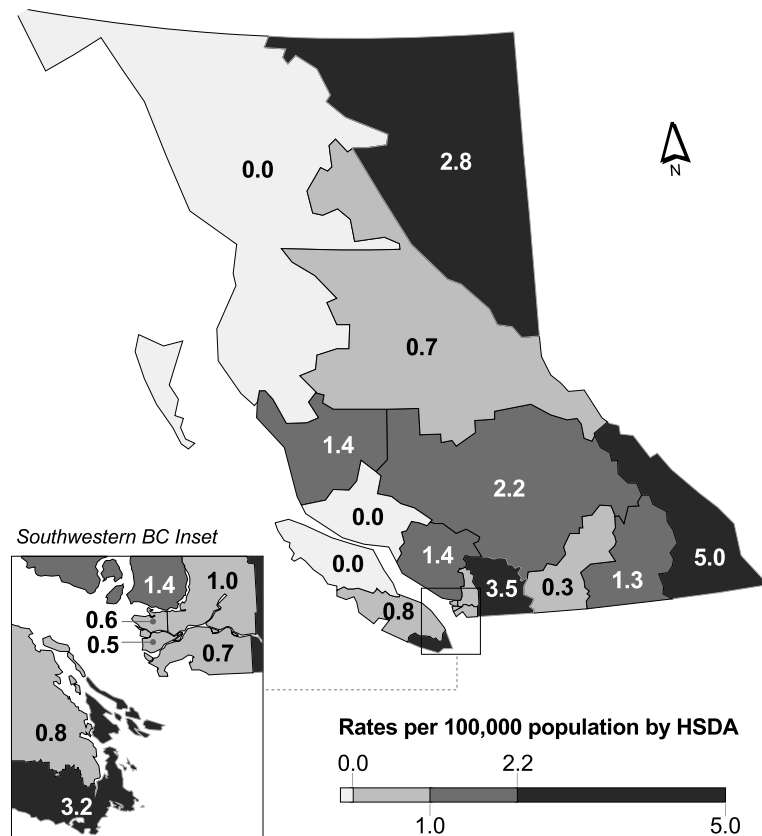
for routine immunization of adolescents 14-15 years of age (Grade 9) in January 2004. More recent change to the routine infant immunization program (2, 4, and 6 month doses) in February 2009 included replacement of the pentavalent vaccine (with five acellular pertussis [aP] antigens in addition to tetanus [T], diphtheria [D], polio [P], and Haemophilus influenzae b [Hib]) with a hexavalent combination including hepatitis B plus D,T,P,aP,Hib but with fewer (three) pertussis antigens.

Previous outbreaks and immunization program expansions may have contributed to population immunity and recent decrease in provincial pertussis rates. In recent years, pertussis rates in preteens/teens have diminished, with no apparent remaining birth cohort effects and some shift in predominance back toward infants and pre-school children. Continued monitoring is required to assess further changes in pertussis activity and to inform modifications to the pertussis immunization program.

7.1 Pertussis Rates by Year, 2002-2011



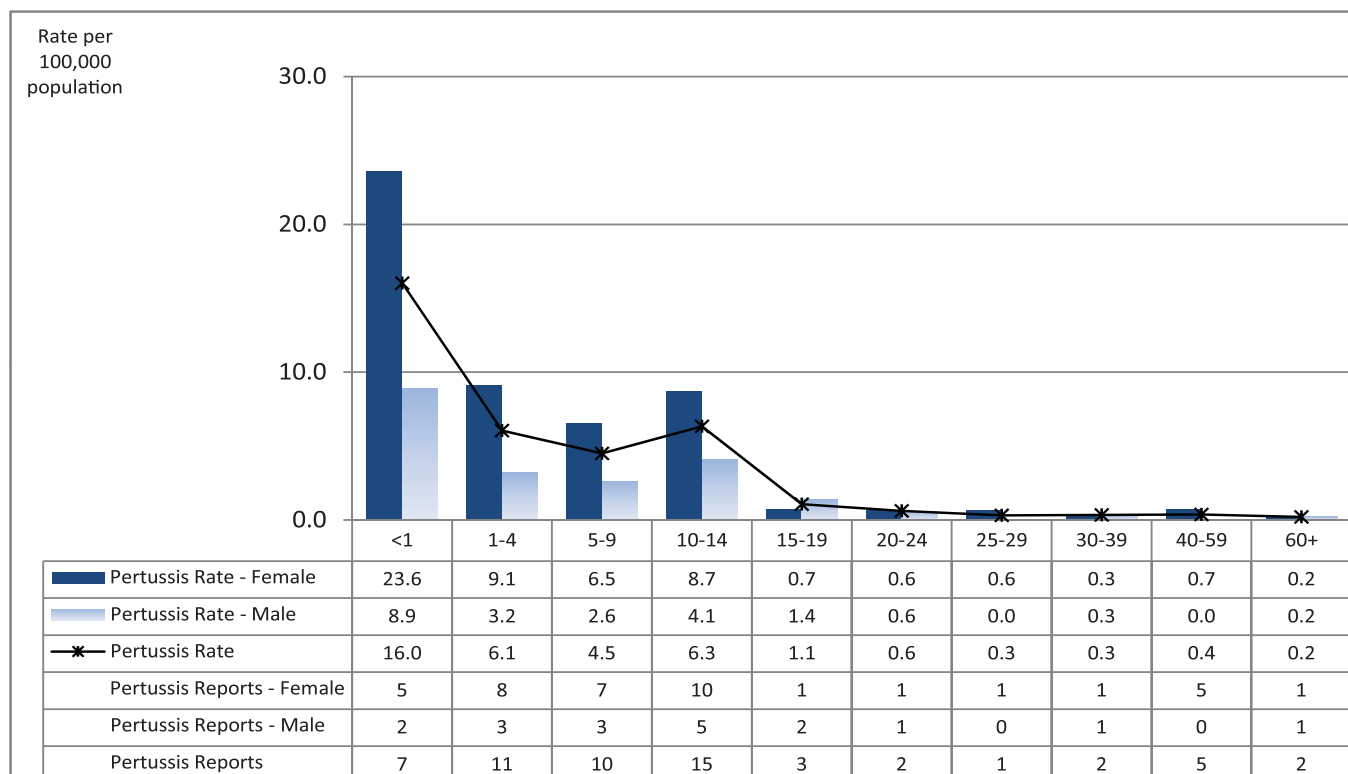
7.2 Pertussis Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	4	5.0
12	Kootenay Boundary	1	1.3
13	Okanagan	1	0.3
14	Thompson Cariboo Shuswap	5	2.2
21	Fraser East	10	3.5
22	Fraser North	6	1.0
23	Fraser South	5	0.7
31	Richmond	1	0.5
32	Vancouver	4	0.6
33	North Shore/Coast Garibaldi	4	1.4
41	South Vancouver Island	12	3.2
42	Central Vancouver Island	2	0.8
43	North Vancouver Island	0	0.0
51	Northwest	0	0.0
52	Northern Interior	1	0.7
53	Northeast	2	2.8

Note: Map classification by Jenks natural breaks method.

7.3 Pertussis Rates by Age Group and Sex, 2011



Pneumococcal Disease (invasive)

The rate of invasive pneumococcal disease (IPD) remained relatively stable from 2010 to 2011 with 5.8 and 7.2 reports per 100,000 population respectively.

There were seven more cases reported among children < five years old in 2011 compared to 2010, however the rate was not statistically different with 10.7 cases per 100,000 population in 2010 (24 cases) and 13.7 per 100,000 population in 2011 (31 cases).

Serotyping results were available for 90% (296/329) of cases in 2011. Among cases aged less than five years where serotyping results were available, 11% (3/28) were due to serotypes covered by the pneumococcal conjugate 7-valent vaccine (PCV-7) and 50% (14/28) were due to the six additional serotypes covered by the pneumococcal conjugate 13-valent vaccine (PCV-13), nine of which were serotype 19A.

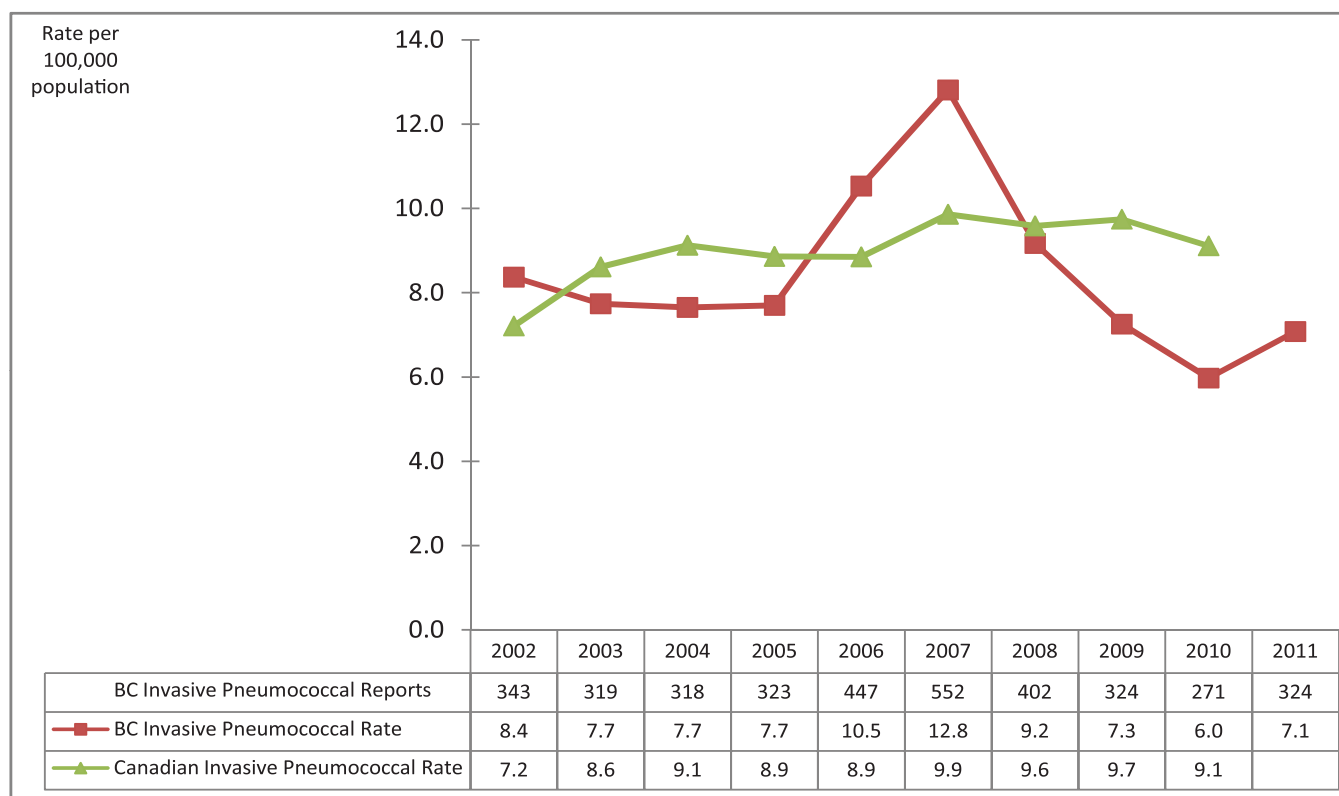
Of the three cases with serotypes preventable by PCV-7 one child was unvaccinated, one was old enough to have received only one dose of vaccine (PCV-13), and one had received three

doses of PCV-7 and was a vaccine failure. Both vaccinated children had serotype 19F disease.

Of those children with disease due to one of the six additional serotypes covered by PCV-13, nine had received three doses of PCV-7 and no PCV-13, one case was a vaccine failure and had received three doses of PCV-13; one was old enough to have received only one dose of PCV-13; one was too young to have been vaccinated, one was unvaccinated and one had unknown vaccination status. Among cases over 65 years of age where serotyping results were available, 63% (61/96) of cases were due to serotypes covered by the PPV-23 vaccine.

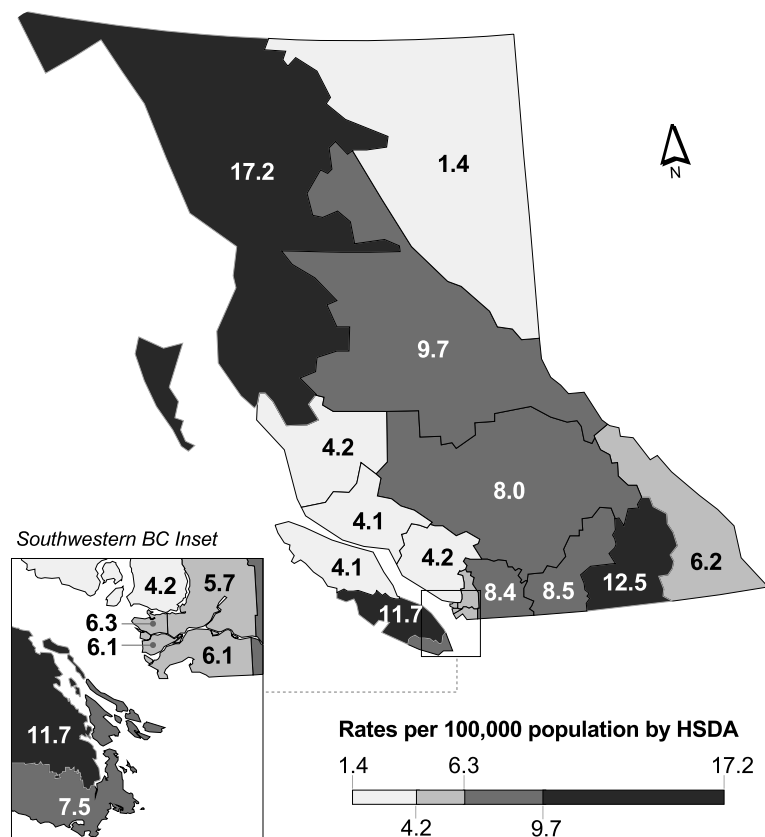
NOTE: This summary is based on data in the enhanced surveillance database for IPD, whereas the data in the table, figure and map are based on iPHIS reports. Both sources of data are based on reports from BC health authorities. As of June 1st 2012 there were five cases in the enhanced surveillance database for the year 2011 that were not also reported through iPHIS.

8.1 Pneumococcal Disease (invasive) Rates by Year, 2002-2011



Note: Reporting of pneumococcal meningitis under regulations under the Health Act was replaced with Invasive Pneumococcal Disease in Jan 2000.

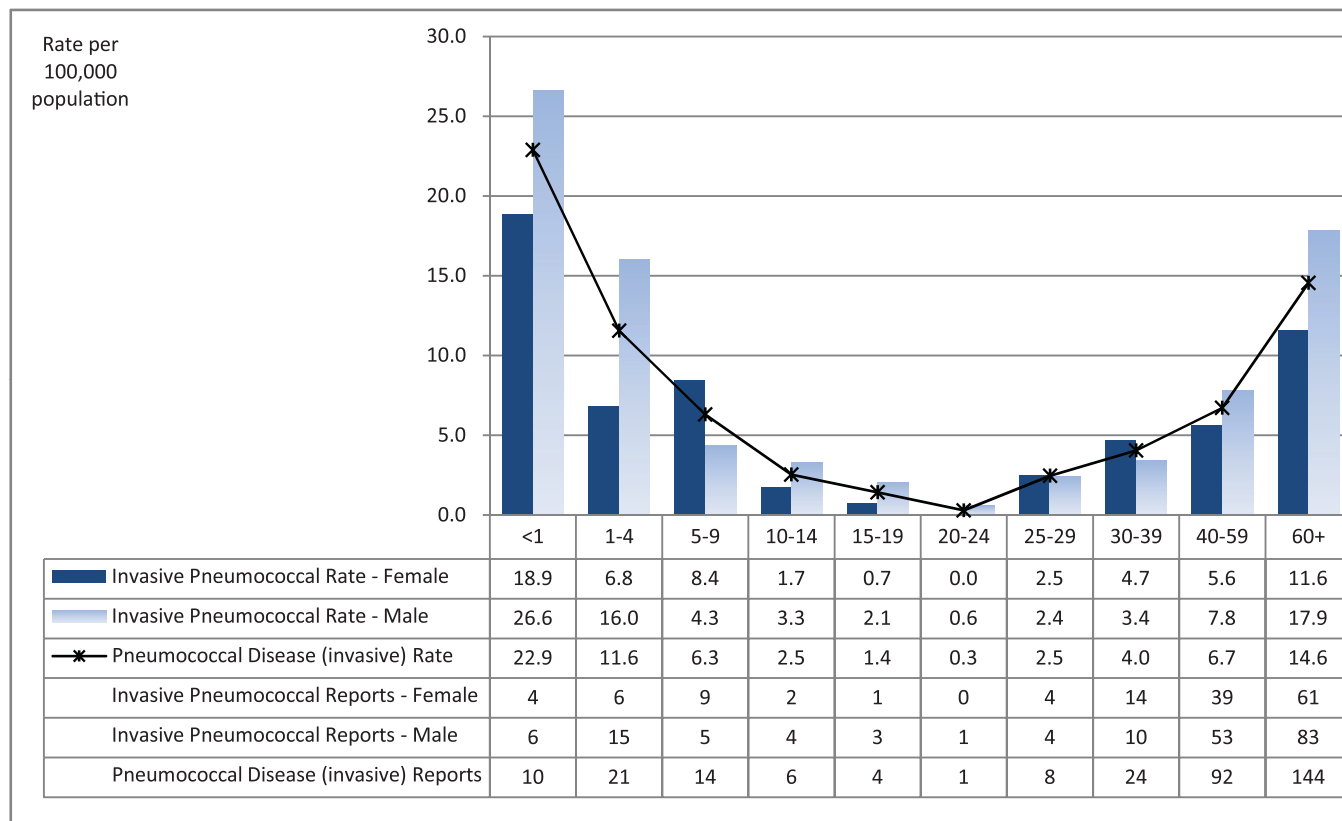
8.2 Pneumococcal Disease (invasive) Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	5	6.2
12	Kootenay Boundary	10	12.5
13	Okanagan	30	8.5
14	Thompson Cariboo Shuswap	18	8.0
21	Fraser East	24	8.4
22	Fraser North	35	5.7
23	Fraser South	44	6.1
31	Richmond	12	6.1
32	Vancouver	42	6.3
33	North Shore/Coast Garibaldi	12	4.2
41	South Vancouver Island	28	7.5
42	Central Vancouver Island	31	11.7
43	North Vancouver Island	5	4.1
51	Northwest	13	17.2
52	Northern Interior	14	9.7
53	Northeast	1	1.4

Note: Map classification by Jenks natural breaks method.

8.3 Pneumococcal Disease (invasive) Rates by Age Group and Sex, 2011



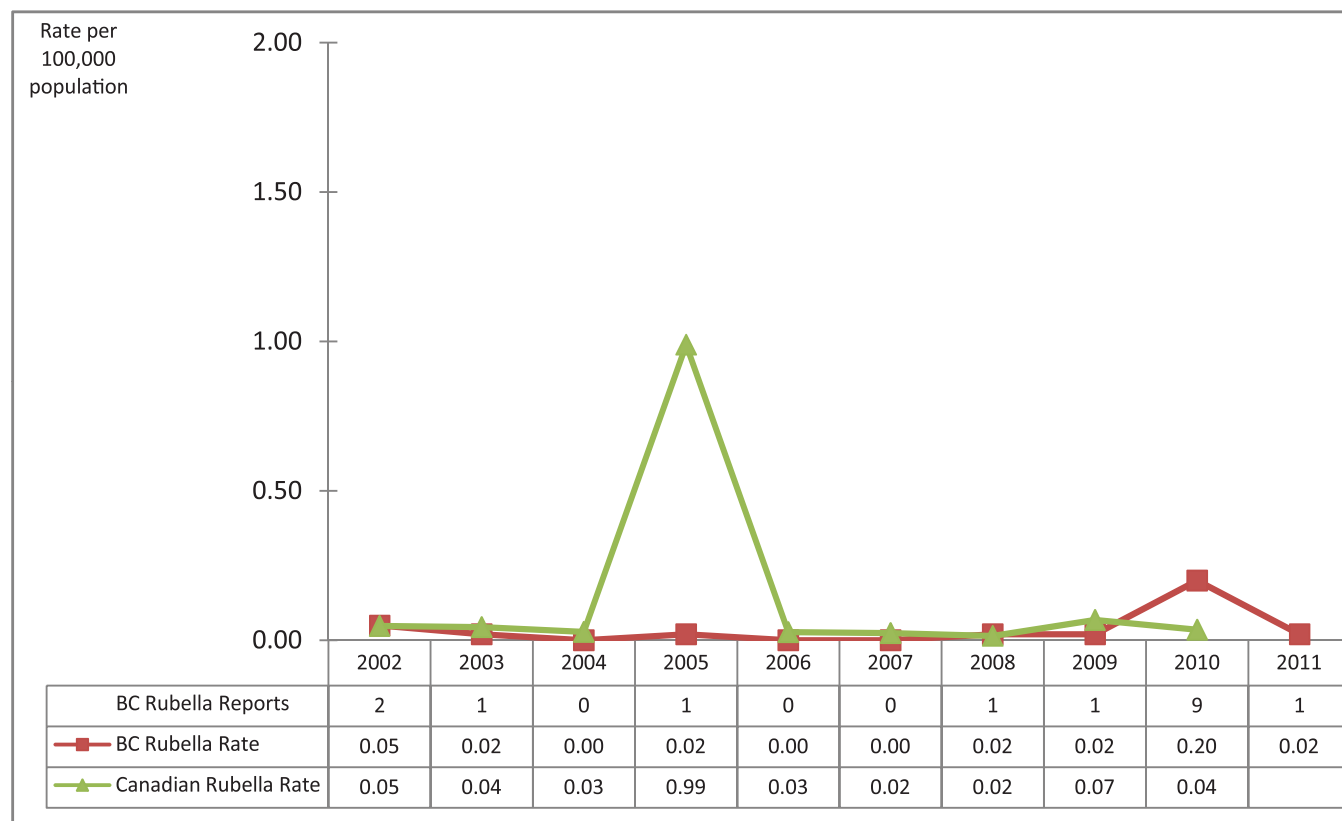
Rubella and Congenital Rubella Syndrome

There was one rubella case reported in BC in 2011. The case was a female in her late 30s whose infection was compatible with acquisition during travel to the Philippines. The woman was not pregnant at the time of infection and her vaccination status was unknown.

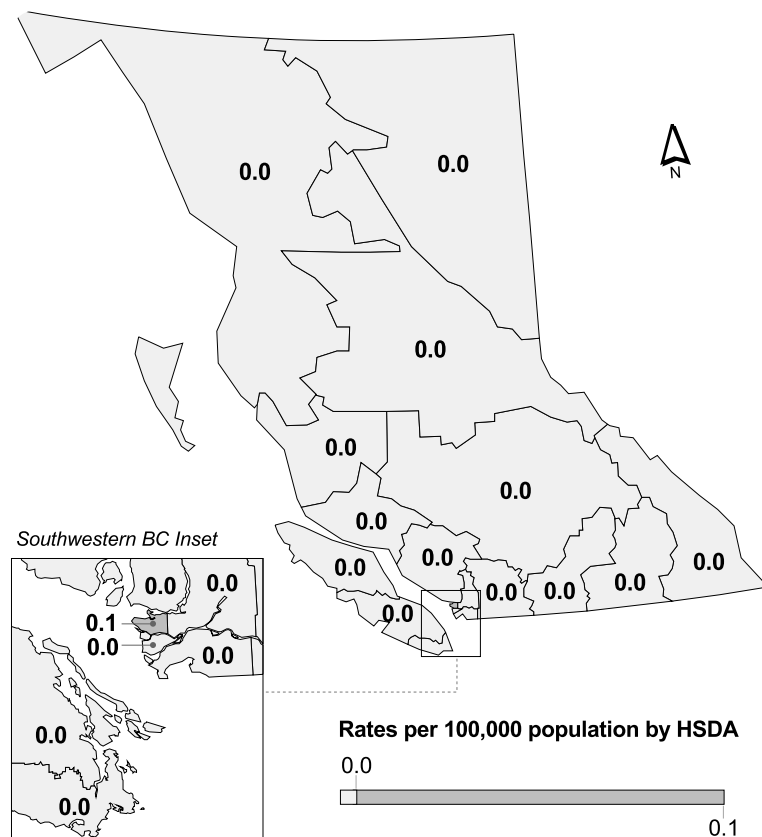
No cases of congenital rubella syndrome were reported in BC in 2011. There have been no reported cases of congenital rubella syndrome in BC since a single case was reported in each of 2002 and 2004.

There were nine rubella cases in BC in 2010 and all were associated with an outbreak at a workplace in the Lower Mainland with an index case whose infection was also compatible with acquisition during travel to the Philippines. From 2002 to 2009 there were between zero to three rubella cases reported in BC annually.

9.1 Rubella Rates by Year, 2002-2011



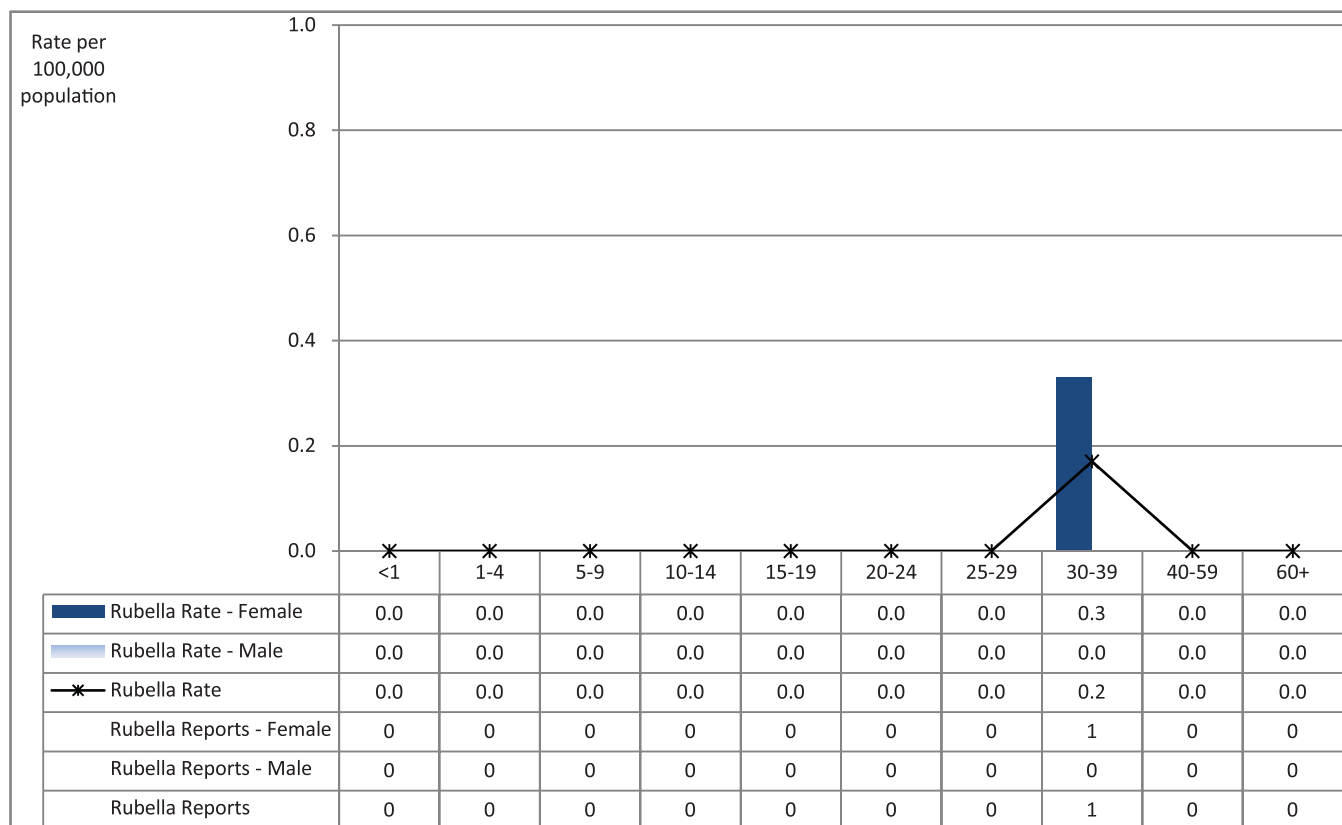
9.2 Rubella Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	0	0.0
13	Okanagan	0	0.0
14	Thompson Cariboo Shuswap	0	0.0
21	Fraser East	0	0.0
22	Fraser North	0	0.0
23	Fraser South	0	0.0
31	Richmond	0	0.0
32	Vancouver	1	0.1
33	North Shore/Coast Garibaldi	0	0.0
41	South Vancouver Island	0	0.0
42	Central Vancouver Island	0	0.0
43	North Vancouver Island	0	0.0
51	Northwest	0	0.0
52	Northern Interior	0	0.0
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

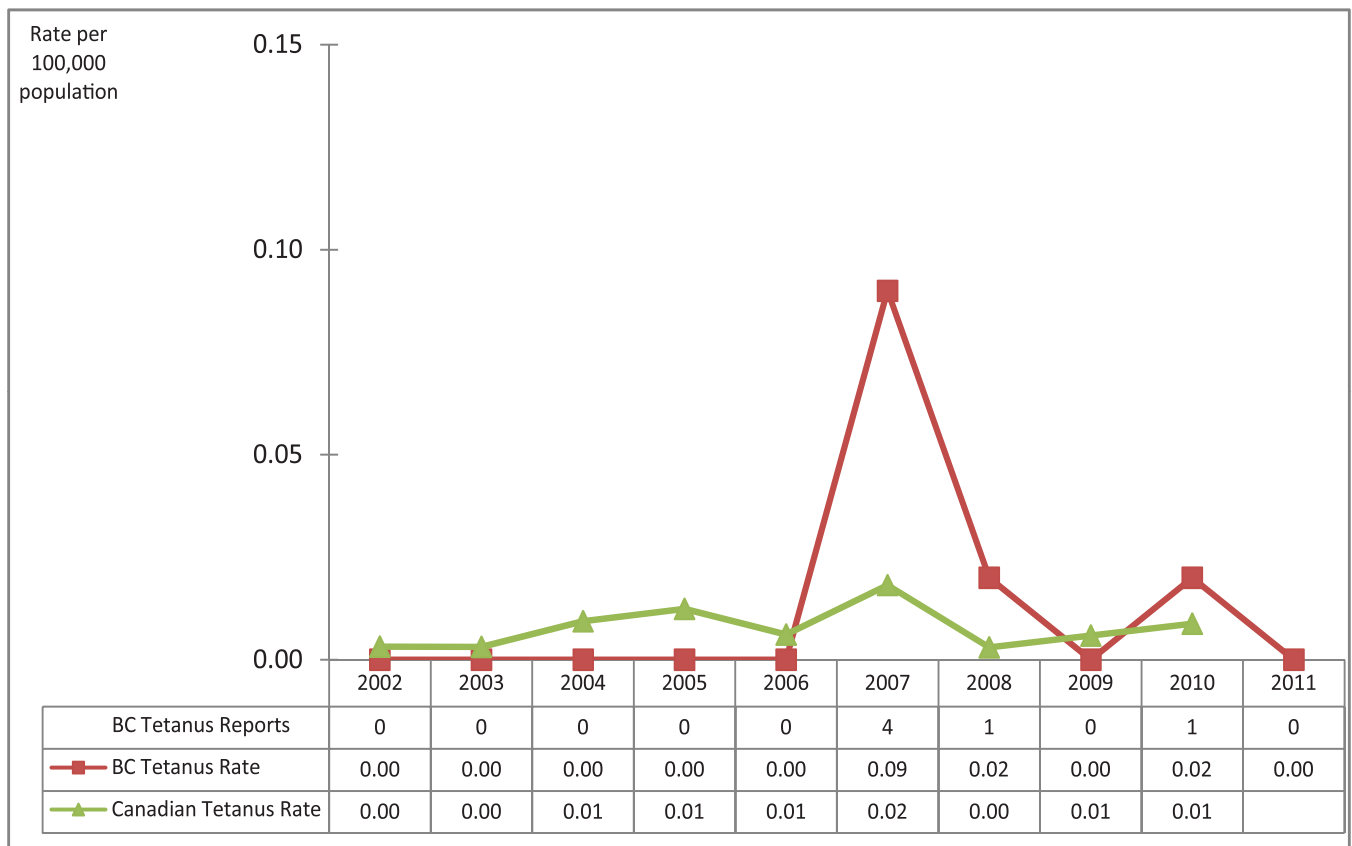
9.3 Rubella Rates by Age Group and Sex, 2011



Tetanus

There were no cases of tetanus reported in BC in 2011.

10.1 Tetanus Rates by Year, 2002-2011





SEXUALLY TRANSMITTED AND BLOODBORNE PATHOGENS

HIV

AIDS

Hepatitis B

Genital Chlamydia

Genital Gonorrhea

Hepatitis C

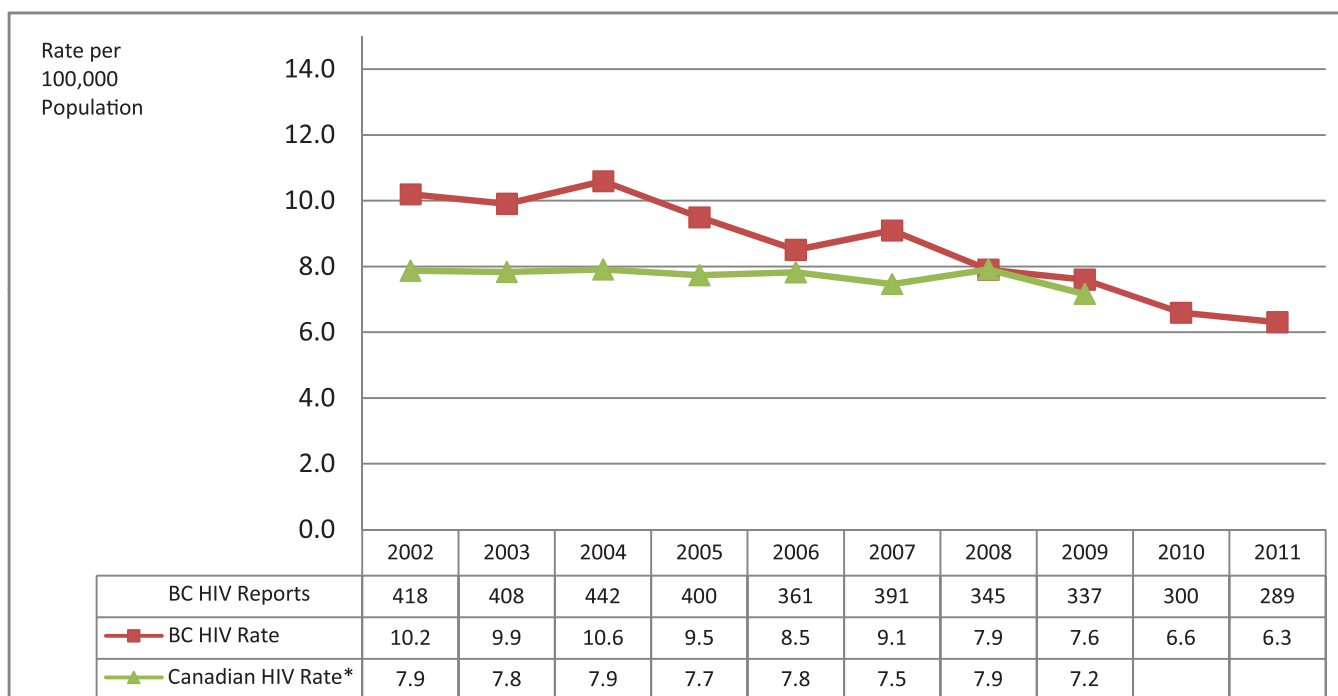
Infectious Syphilis

HIV

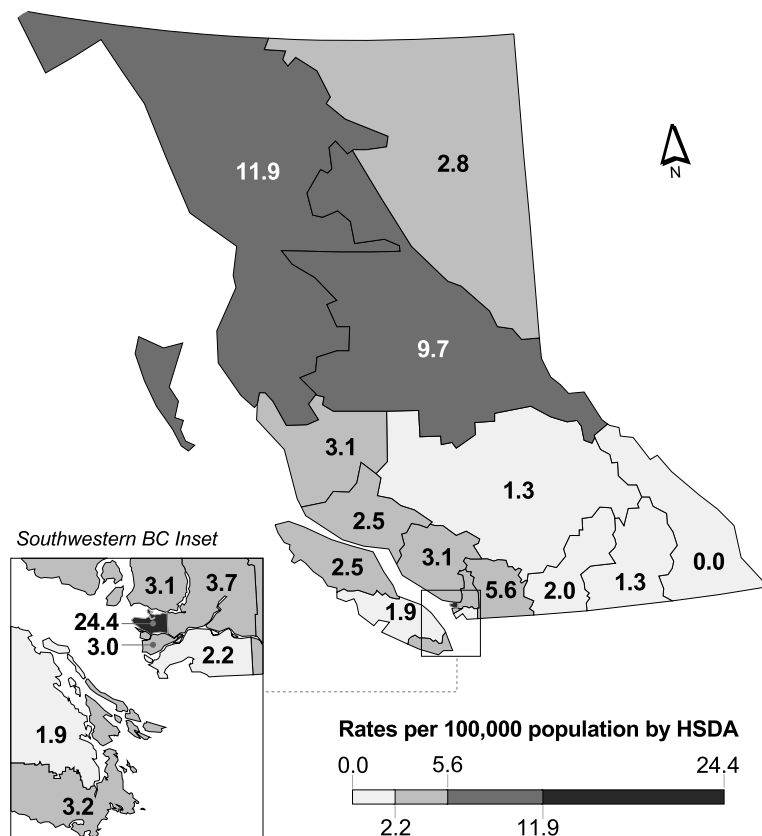
The rate of new positive HIV tests decreased slightly in 2011 to 6.3 (289 cases) from 6.6 per 100,000 (300 cases) in 2010. The majority of new positive HIV tests were identified in males, with the highest rate among males aged 30-39 years (27.7 per 100,000, 81 cases). The highest rate of new positive HIV tests was in Vancouver HSDA (24.4 per 100,000; 163 cases), followed by Northwest HSDA (11.9 per 100,000; 9 cases) and Northern Interior (9.7 per 100,000; 14 cases). The

increase of cases in Vancouver and Northern Interior HSDAs, despite the overall decrease of BC cases may be in part due to the increased testing efforts as part of the Seek and Treat for optimum Prevention (STOP) pilot project.

11.1 HIV Rates by Year, 2002-2011



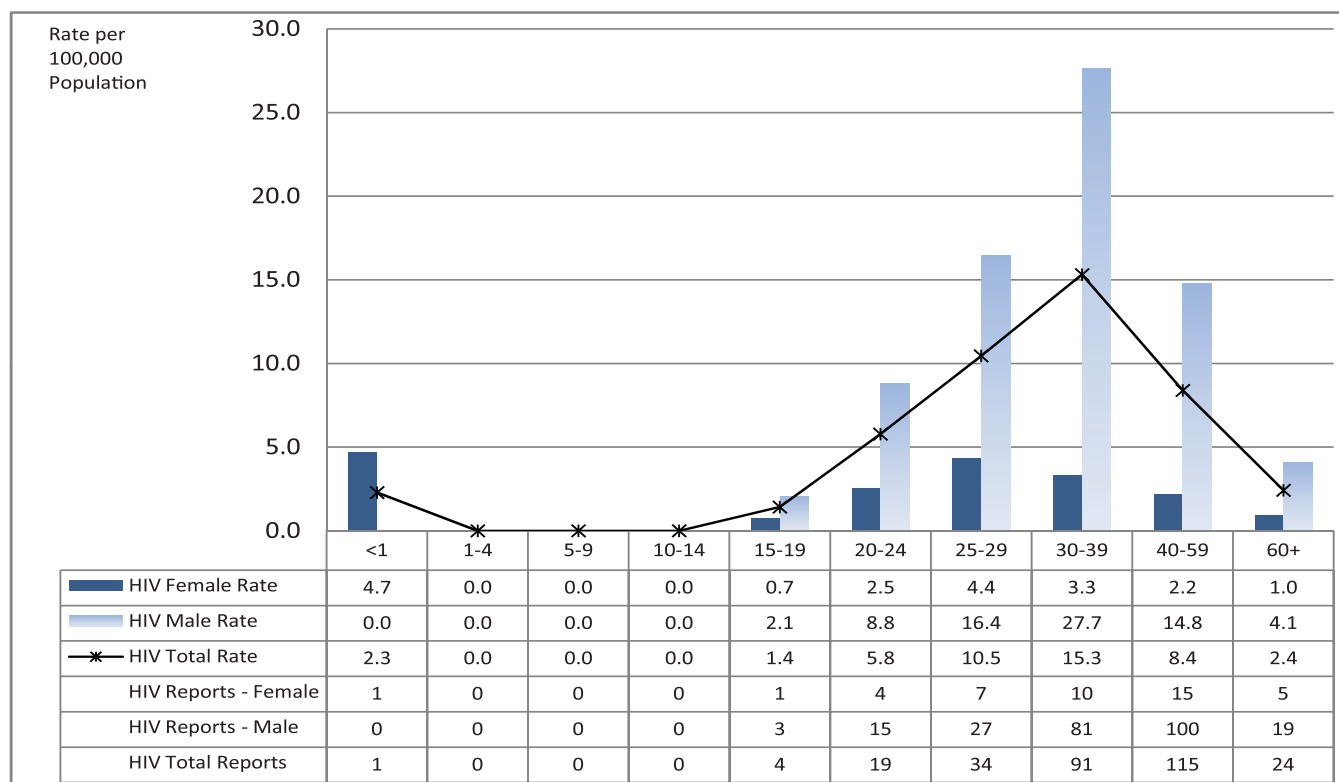
11.2 HIV Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	1	1.3
13	Okanagan	7	2.0
14	Thompson Cariboo Shuswap	3	1.3
21	Fraser East	16	5.6
22	Fraser North	23	3.7
23	Fraser South	16	2.2
31	Richmond	6	3.0
32	Vancouver	163	24.4
33	North Shore/Coast Garibaldi	9	3.1
41	South Vancouver Island	12	3.2
42	Central Vancouver Island	5	1.9
43	North Vancouver Island	3	2.5
51	Northwest	9	11.9
52	Northern Interior	14	9.7
53	Northeast	2	2.8

Note: Map classification by Jenks natural breaks method.

11.3 HIV Rates by Age Group and Sex, 2011

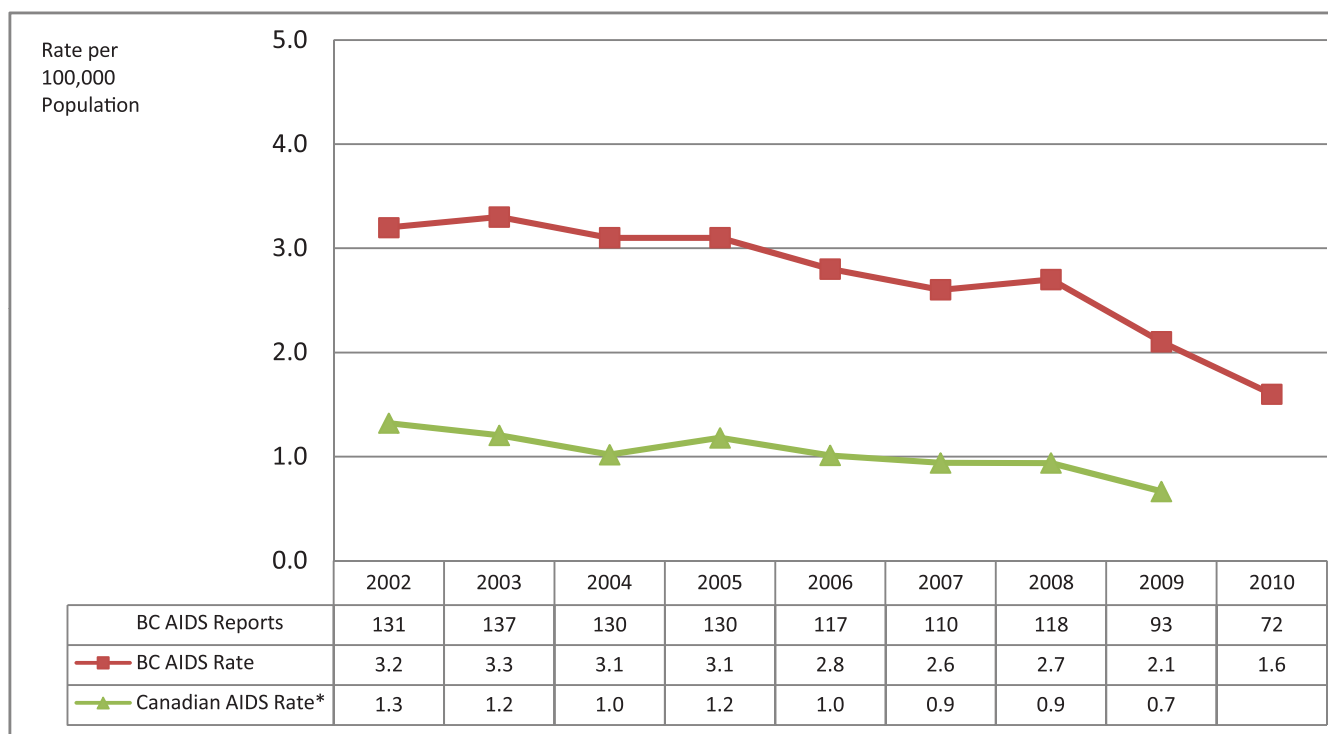


AIDS

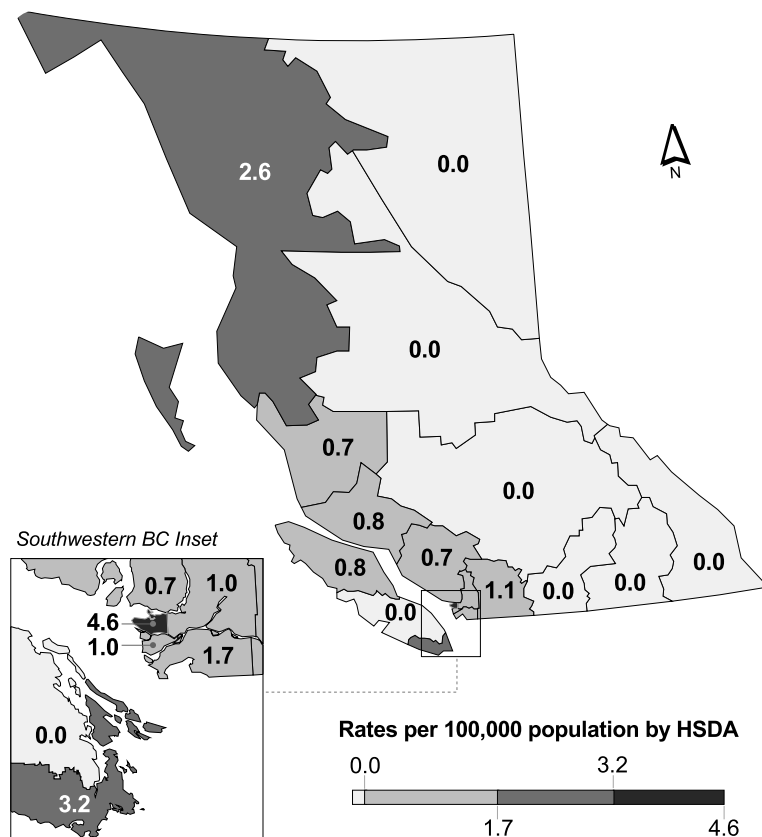
Due to the expected delays associated with AIDS reporting, this report includes data on AIDS through 2010 only. In 2010, the AIDS rate in BC decreased to 1.6 per 100,000 (72 cases) from 2.1 per 100,000 (93 cases) in 2009. The majority of AIDS cases occurred in males, with the greatest concentration in males aged 40-59 years (5.0 per 100,000, 34 cases). The

highest rate was recorded in Vancouver HSDA (4.6 per 100,000; 30 cases) followed by South Vancouver Island HSDA (3.2 per 100,000; 12 cases).

12.1 AIDS Rates by Year, 2002-2010



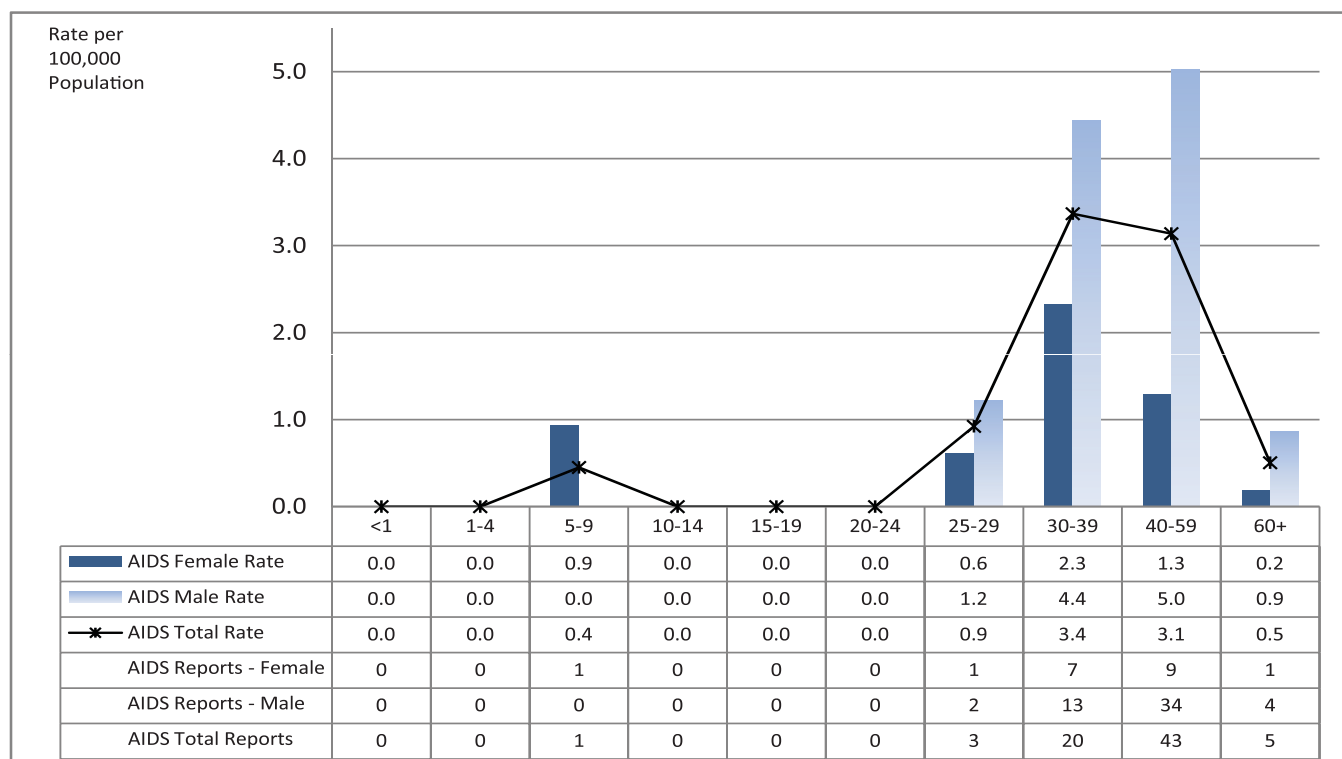
12.2 AIDS Rates by HSDA, 2010



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	0	0.0
13	Okanagan	0	0.0
14	Thompson Cariboo Shuswap	0	0.0
21	Fraser East	3	1.1
22	Fraser North	6	1.0
23	Fraser South	12	1.7
31	Richmond	2	1.0
32	Vancouver	30	4.6
33	North Shore/Coast Garibaldi	2	0.7
41	South Vancouver Island	12	3.2
42	Central Vancouver Island	0	0.0
43	North Vancouver Island	1	0.8
51	Northwest	2	2.6
52	Northern Interior	0	0.0
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

12.3 AIDS Rates by Age Group and Sex, 2009



Chlamydia (genital)

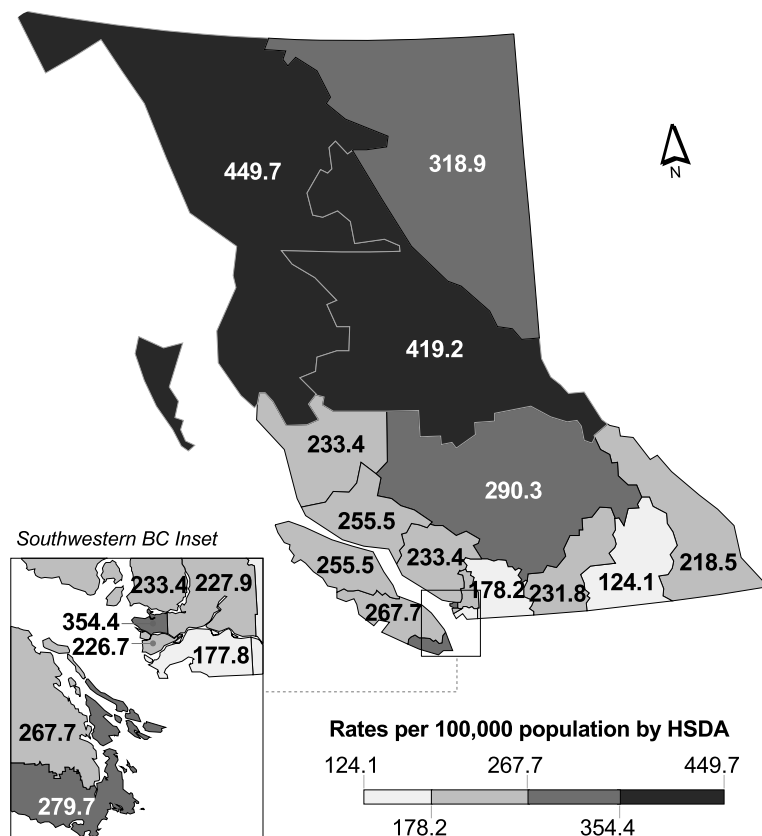
Chlamydia rates in BC decreased slightly, to 256.5 per 100,000 (11,730 cases) in 2011. The overall trend in Chlamydia infection rates has been increasing since 1999. By age, women aged 15-19 and 20-24 continue to have the highest chlamydia rates at 1470.0 and 1768.9 per 100,000

respectively. The greatest rates of infection are observed in Northwest HSDA (449.7 per 100,000; 340 cases), Northern Interior HSDA (419.2 per 100,000; 606 cases), and Vancouver HSDA (354.4 per 100,000; 2370 cases).

13.1 Genital Chlamydia Rates by Year, 2002-2011



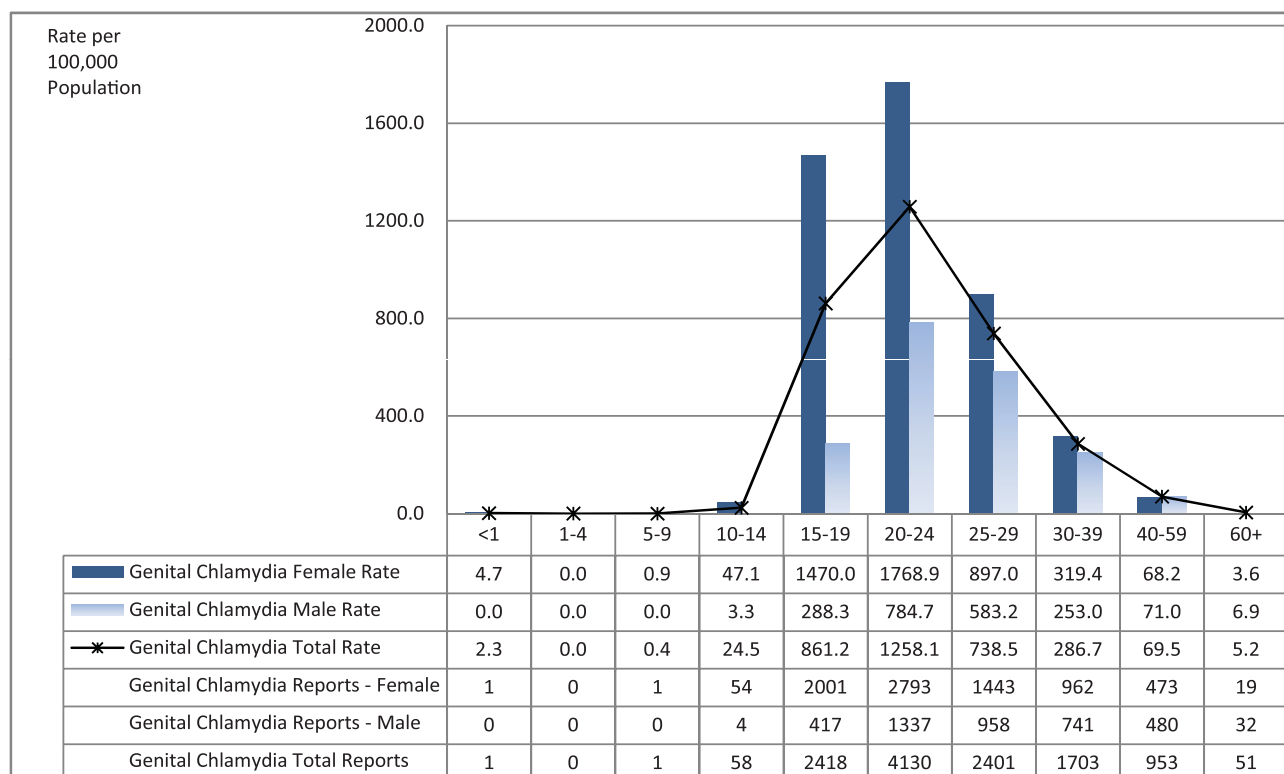
13.2 Genital Chlamydia Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	176	218.5
12	Kootenay Boundary	99	124.1
13	Okanagan	818	231.8
14	Thompson Cariboo Shuswap	651	290.3
21	Fraser East	511	178.2
22	Fraser North	1405	227.9
23	Fraser South	1292	177.8
31	Richmond	448	226.7
32	Vancouver	2370	354.4
33	North Shore/Coast Garibaldi	671	233.4
41	South Vancouver Island	1048	279.7
42	Central Vancouver Island	712	267.7
43	North Vancouver Island	310	255.5
51	Northwest	340	449.7
52	Northern Interior	606	419.2
53	Northeast	224	318.9

Note: Map classification by Jenks natural breaks method.

13.3 Genital Chlamydia Rates by Age Group and Sex, 2011

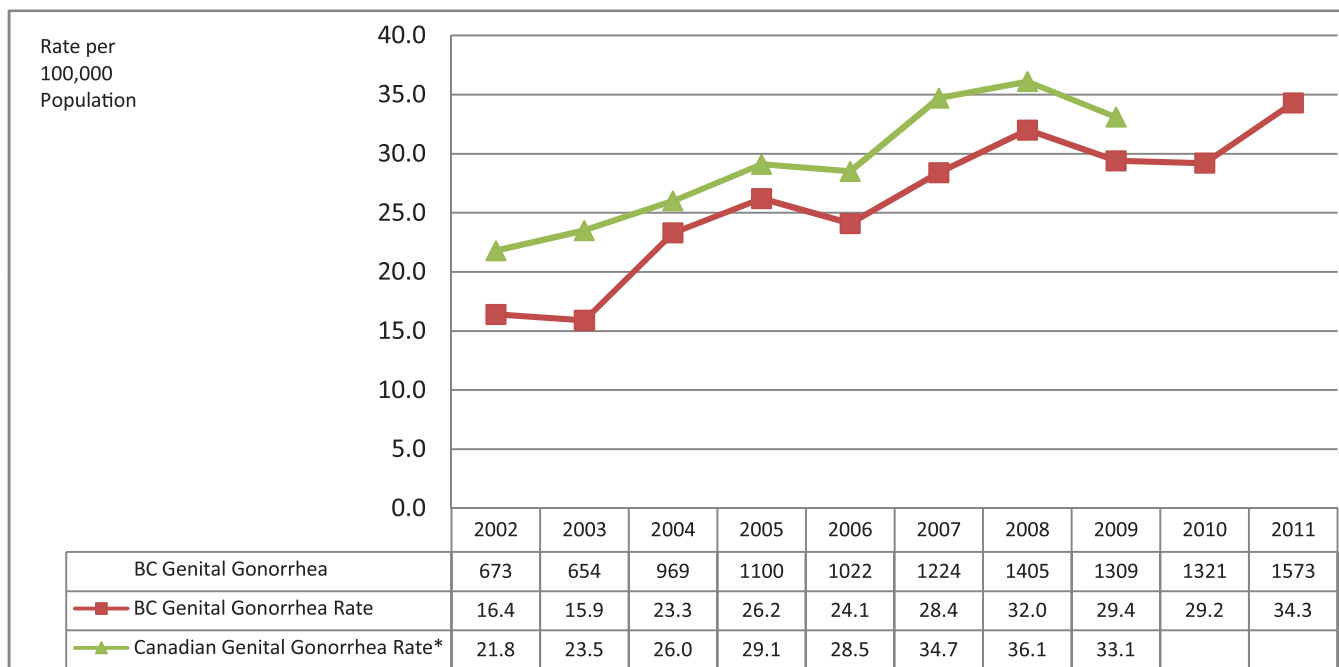


Gonorrhea (genital)

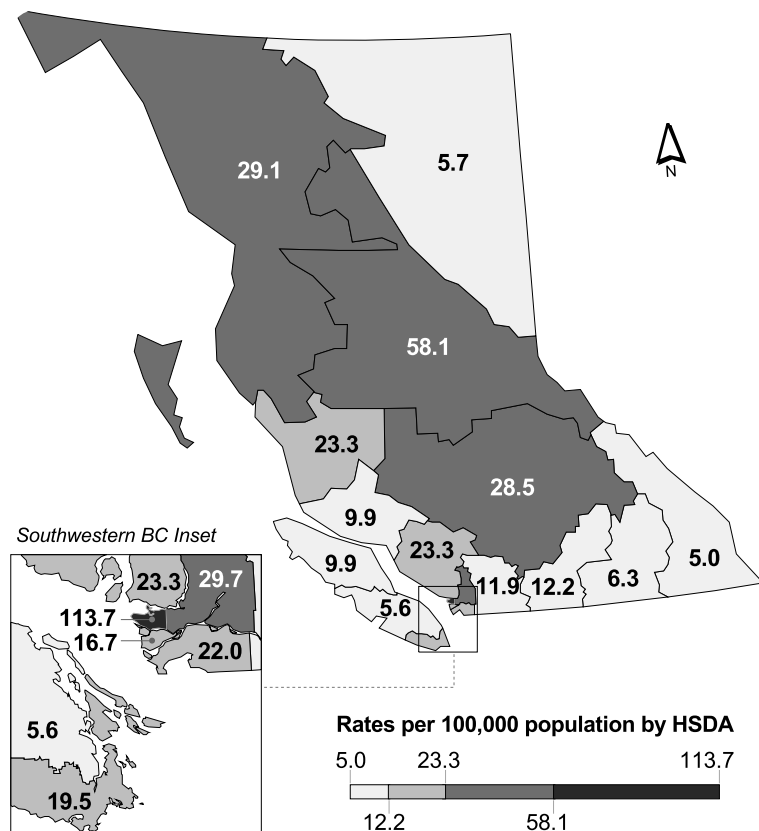
There has been an overall increasing trend in gonorrhea rates in BC, with a rate of 34.4 per 100,000 (1573 cases) in 2011. Similar to previous years, the highest rates of gonorrhea were for females between the ages of 15-24 years, and for males between 20-29 years. The highest rate

was observed in Vancouver HSDA (113.7 per 100,000; 760 cases) followed by Northern Interior HSDA (58.1 per 100,000; 84 cases).

14.1 Genital Gonorrhea Rates by Year, 2002-2011



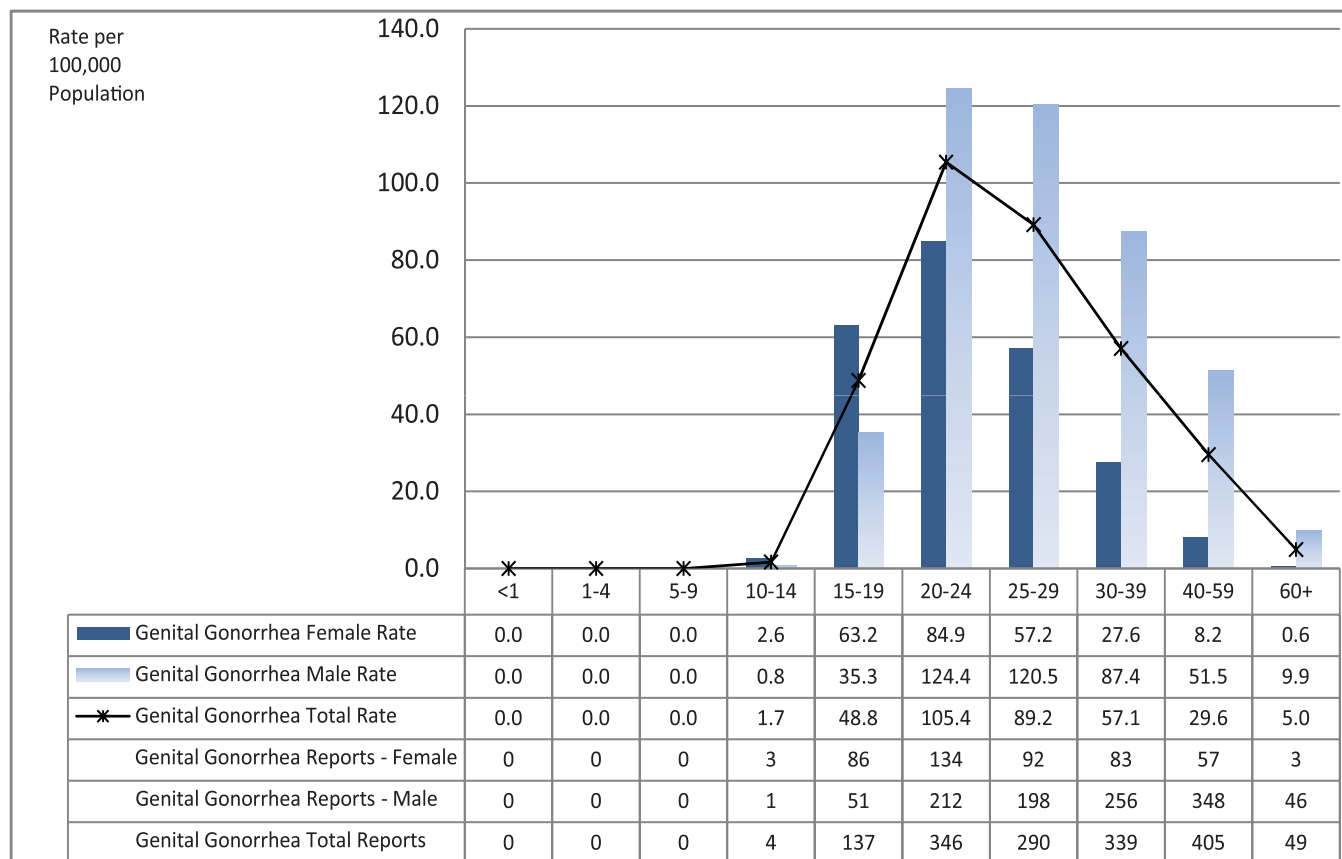
14.2 Genital Gonorrhea Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	4	5.0
12	Kootenay Boundary	5	6.3
13	Okanagan	43	12.2
14	Thompson Cariboo Shuswap	64	28.5
21	Fraser East	34	11.9
22	Fraser North	183	29.7
23	Fraser South	160	22.0
31	Richmond	33	16.7
32	Vancouver	760	113.7
33	North Shore/Coast Garibaldi	67	23.3
41	South Vancouver Island	73	19.5
42	Central Vancouver Island	15	5.6
43	North Vancouver Island	12	9.9
51	Northwest	22	29.1
52	Northern Interior	84	58.1
53	Northeast	4	5.7

Note: Map classification by Jenks natural breaks method.

14.3 Genital Gonorrhea Rates by Age Group and Sex, 2011



Hepatitis B

Most hepatitis B cases reported each year in BC are reported as chronic infections. The majority of these are persons who have emigrated from a country where hepatitis B infection is endemic. Persons infected at birth have a high likelihood of developing chronic hepatitis B infection. People with chronic hepatitis B may be asymptomatic and the virus detected through prenatal testing, testing due to symptoms of chronic infection such as cirrhosis or testing for routine insurance purposes. Acute hepatitis B is suspected when a person is symptomatic (e.g. jaundice) and is confirmed by hepatitis B surface antigen and anti-hepatitis B core IgM. Infants and young children are more likely to be asymptomatic than older children and adults. As the number of acute cases is very small, to interpret hepatitis B trends meaningfully it is important to determine which cases are acute and which are chronic. Some cases are reported as unknown/undetermined, but as these are usually asymptomatic they are considered likely chronically infected.

Hepatitis B - Chronic and Unknown

Continuing a decade long trend, the rates of chronic and unknown Hepatitis B has declined from 29.3 cases per 100,000 in 2010 to 25.2 in 2011. Inconsistencies in national surveillance of hepatitis B make comparison to national trends impossible.

Demographic data show the majority of reported cases are aged between 20-59 years, with a mode in the 30-39 age group. Chronic Hepatitis B cases were distributed fairly evenly between sex, with rates of 30.7 and 26.7 cases per 100,000 for males and females, respectively. The higher incidence of females 15-29 years old is likely due to a selection bias associated with routine prenatal screening and thus, incidental identification of chronic hepatitis B in this group. Despite administering timely post exposure prophylaxis to infants of affected mothers (hepatitis B

immunoglobulin at birth and hepatitis B vaccine at birth, 2, 4, and 6 months), there is still a small risk of hepatitis B transmission, necessitating testing post-immunization. This may account for the slightly increased rate in the <1 year group.

As with previous years, Richmond, Vancouver and Fraser North, regions of high immigration, demonstrate rates far above all other areas (103.2, 66.9, 37.5 per 100,000 respectively) and above the overall rate of 25.2.

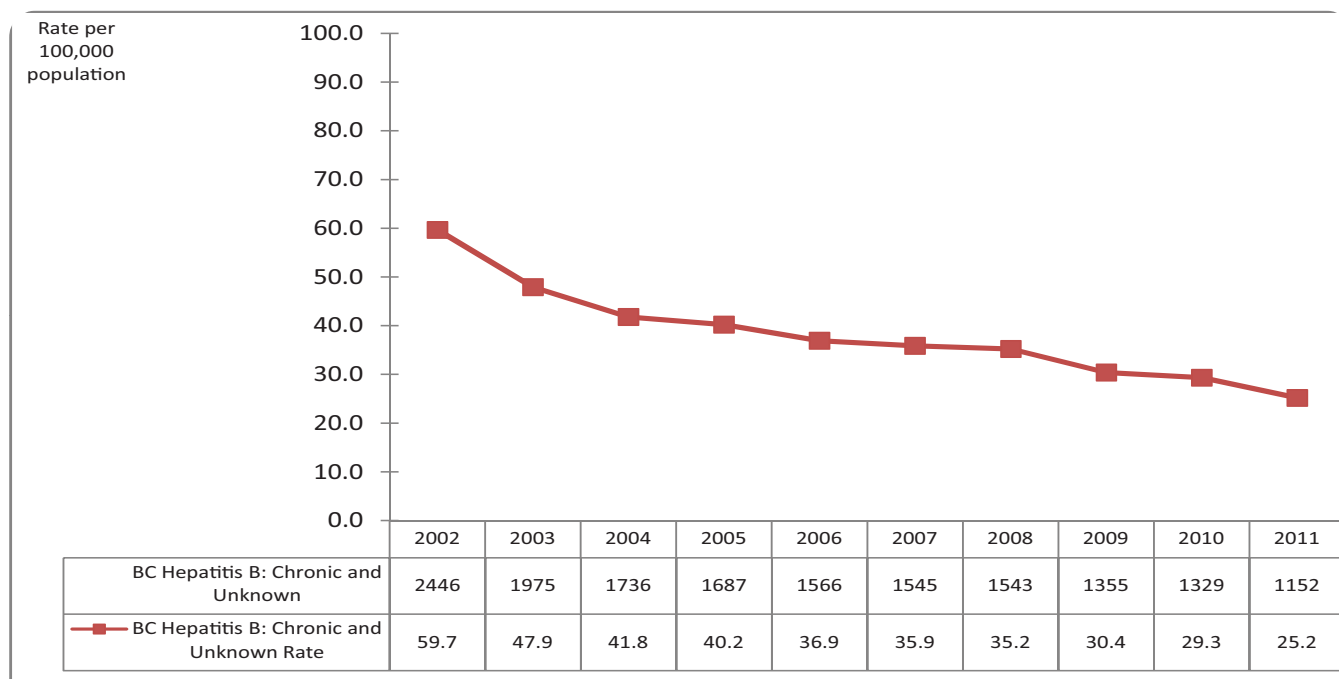
Hepatitis B - Acute

The number of acute Hepatitis B cases reported in 2011 was 15, translating into a rate of 0.33 per 100,000. Although this is a slight increase compared to 2010 (11 cases), it is nearly half that of 2009 (27), fitting with a general trend of decline over the past decade. This number, however, is provisional and may change with follow-up testing at 6 months. In British Columbia, publicly funded hepatitis B vaccination programs have been implemented in grade 6 since 1992, and in infancy since 2001, as well as for any high-risk individuals.

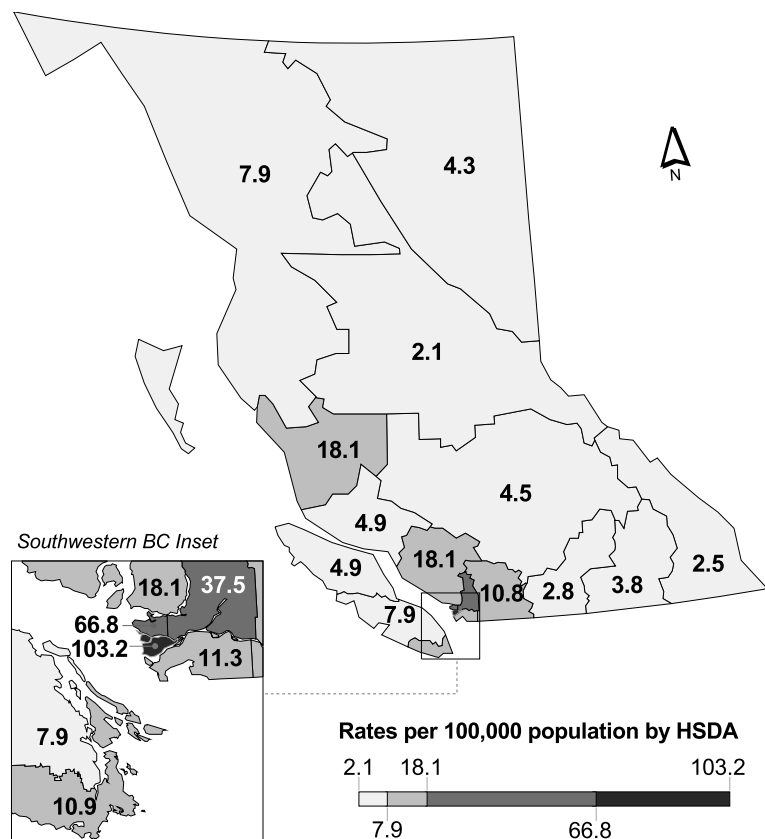
Rates between HSDAs are fairly uniform, the range spanning Vancouver Coastal Health with 0.6 per 100,000, none in Northern. The highest proportion of rates, as in previous years, is in Vancouver, at 1.1 per 100,000. However, due to the relatively small numbers of cases, these rates are quite unstable and may not represent a significant trend.

There are 2 distinct peaks in age and gender, comprised of females 25-29 (1.2 per 100,000), and males 40-59 (1.2 per 100,000). Overall, males encompass 60% of total reports.

2.1 Chronic and Unknown Hepatitis B Rates by Year, 2002-2011



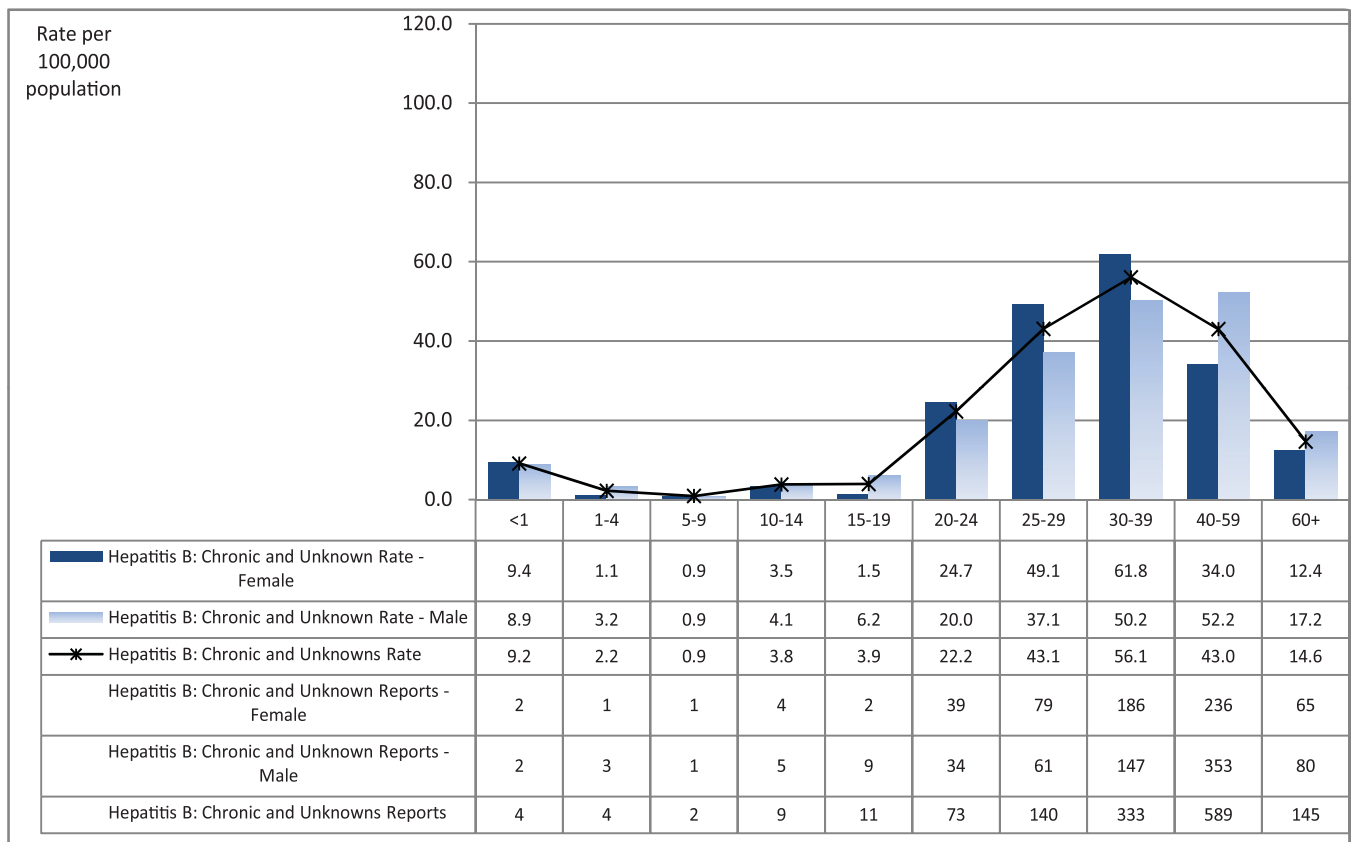
2.2 Chronic and Unknown Hepatitis B Rates by HSDA, 2011



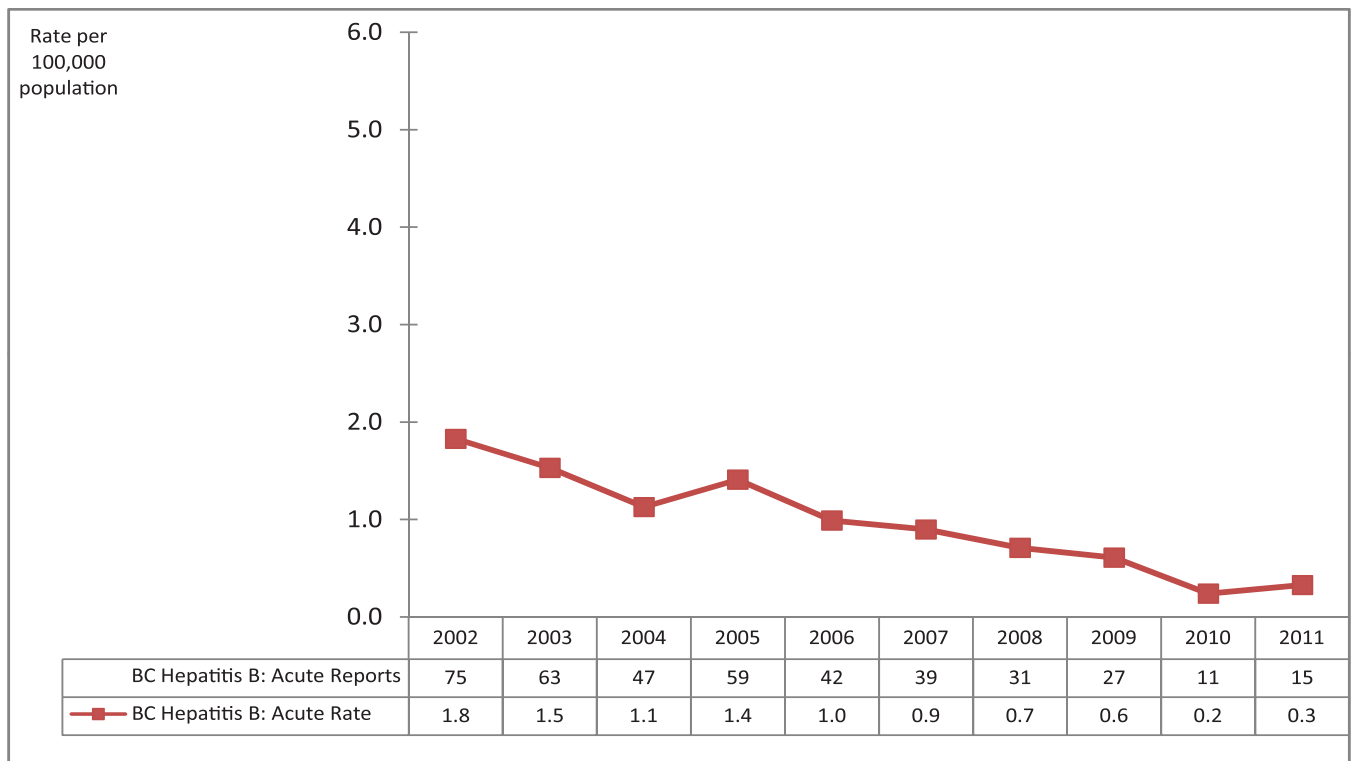
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	2	2.5
12	Kootenay Boundary	3	3.8
13	Okanagan	10	2.8
14	Thompson Cariboo Shuswap	10	4.5
21	Fraser East	31	10.8
22	Fraser North	231	37.5
23	Fraser South	82	11.3
31	Richmond	204	103.2
32	Vancouver	447	66.8
33	North Shore/Coast Garibaldi	52	18.1
41	South Vancouver Island	41	10.9
42	Central Vancouver Island	21	7.9
43	North Vancouver Island	6	4.9
51	Northwest	6	7.9
52	Northern Interior	3	2.1
53	Northeast	3	4.3

Note: Map classification by Jenks natural breaks method.

2.3 Chronic and Unknown Hepatitis B Rates by Age Group and Sex, 2011

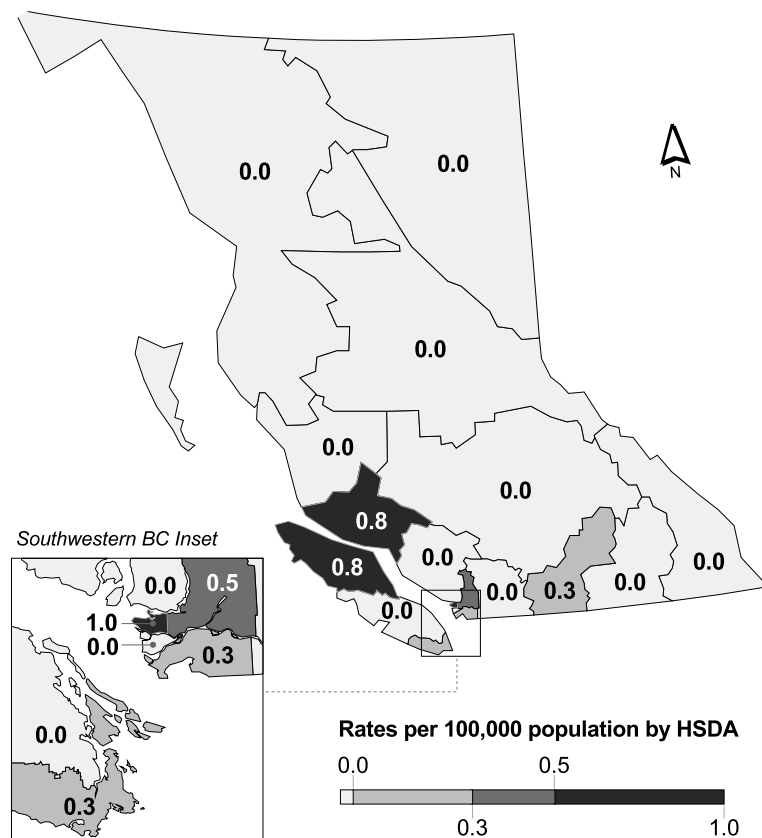


2.4 Acute Hepatitis B Rates by Year, 2002-2011



* Hepatitis B Acute national rate has not been provided due to difficulty in determining denominator as not all provinces report.

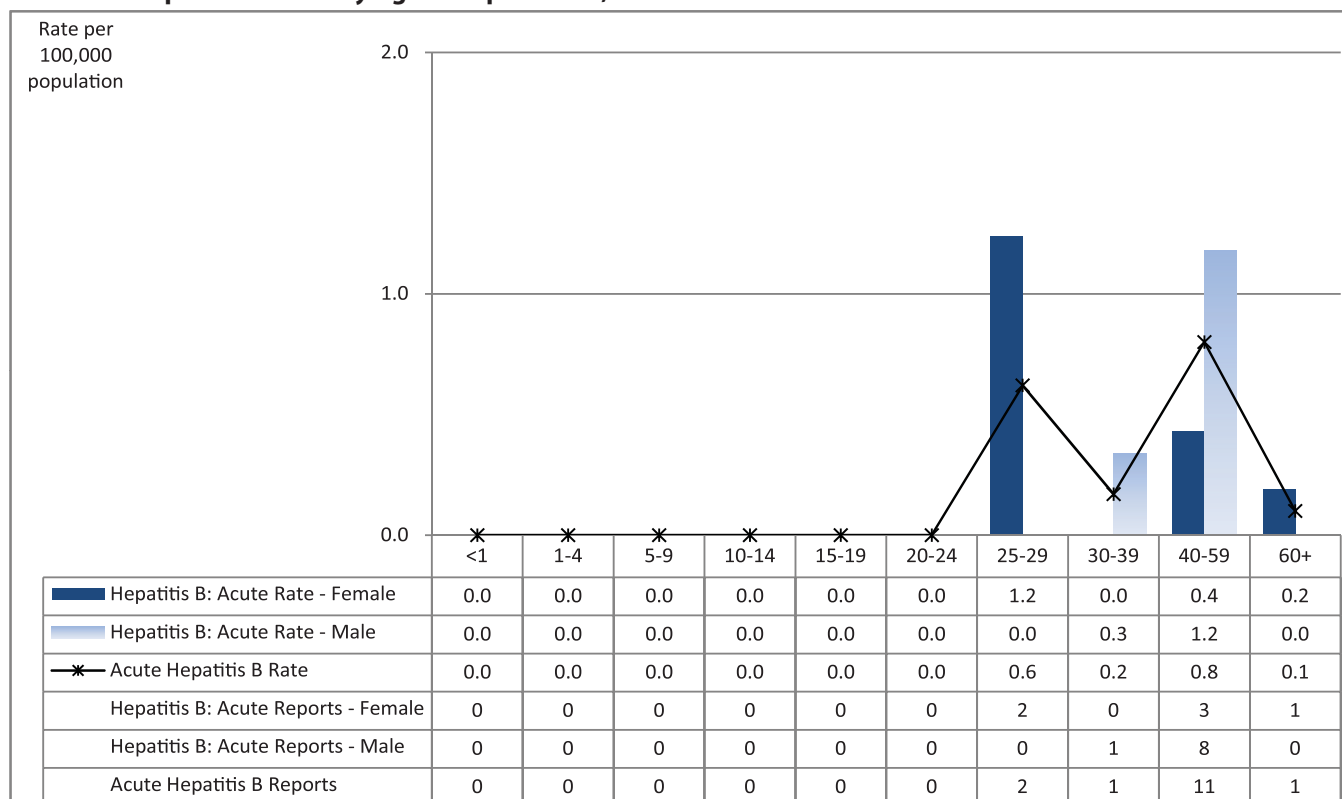
2.5 Acute Hepatitis B Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	0	0.0
13	Okanagan	1	0.3
14	Thompson Cariboo Shuswap	0	0.0
21	Fraser East	0	0.0
22	Fraser North	3	0.5
23	Fraser South	2	0.3
31	Richmond	0	0.0
32	Vancouver	7	1.0
33	North Shore/Coast Garibaldi	0	0.0
41	South Vancouver Island	1	0.3
42	Central Vancouver Island	0	0.0
43	North Vancouver Island	1	0.8
51	Northwest	0	0.0
52	Northern Interior	0	0.0
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

2.6 Acute Hepatitis B Rates by Age Group and Sex, 2011



Hepatitis C

Hepatitis C case reports continue to decline in BC. Cases which are newly identified may represent either new or remote infection. Moreover, rates of acute cases, or those which newly seroconverted from negative to positive, also declined in 2011. Individuals are tested for many reasons, including current or past risk factors, symptoms of liver disease or for routine insurance purposes. Overall, the rate of hepatitis C testing has increased. In 2011, 1970 cases were reported, for a rate of 43.1 per 100,000. This is less than 2010's provincial rate of 49.2 per 100,000, but still above the 2010 national rate of 29.6 per 100,000; the 2011 National rate is not currently available.

Overall, males are overrepresented, with a rate of 58.5 per 100,000, compared to 27.8 per 100,000 in females, a trend which holds true in all age categories in contrast to previous

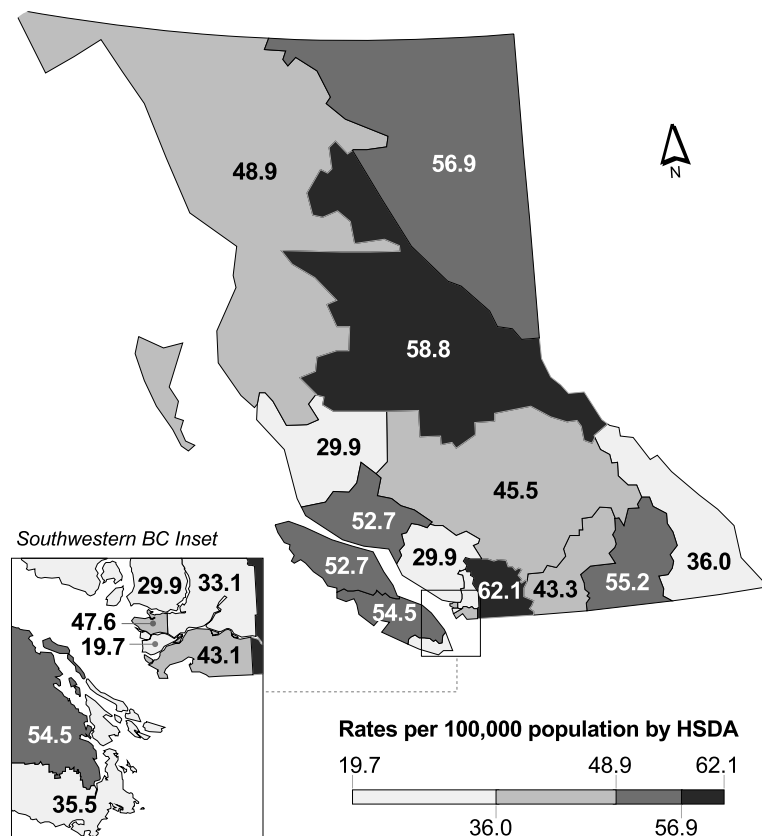
years. Additionally, cases increased with increasing age from 20-60 years old, with a slight decline in the greater than 60 year old population and a peak from 40-59 years old. While incidence in childhood and adolescence was quite low, there were 3 cases less than 1 year of age, likely representing vertical transmission. When compared to 6 cases in 2010, and 16 in 2009, this is also consistent with a declining burden of disease.

With respect to Health Service Delivery Areas (HSDA), the highest rates were found in Fraser East (62.1 per 100,000), Northern Interior (58.8 per 100,000) and Northeast (56.9 per 100,000). Northern Health Authority represented the largest overall rate of all Health Authorities, with 55.8 cases per 100,000, although Fraser East maintained its previous status as the HSDA with highest rates.

15.1 Hepatitis C Rates by Year, 2002-2011



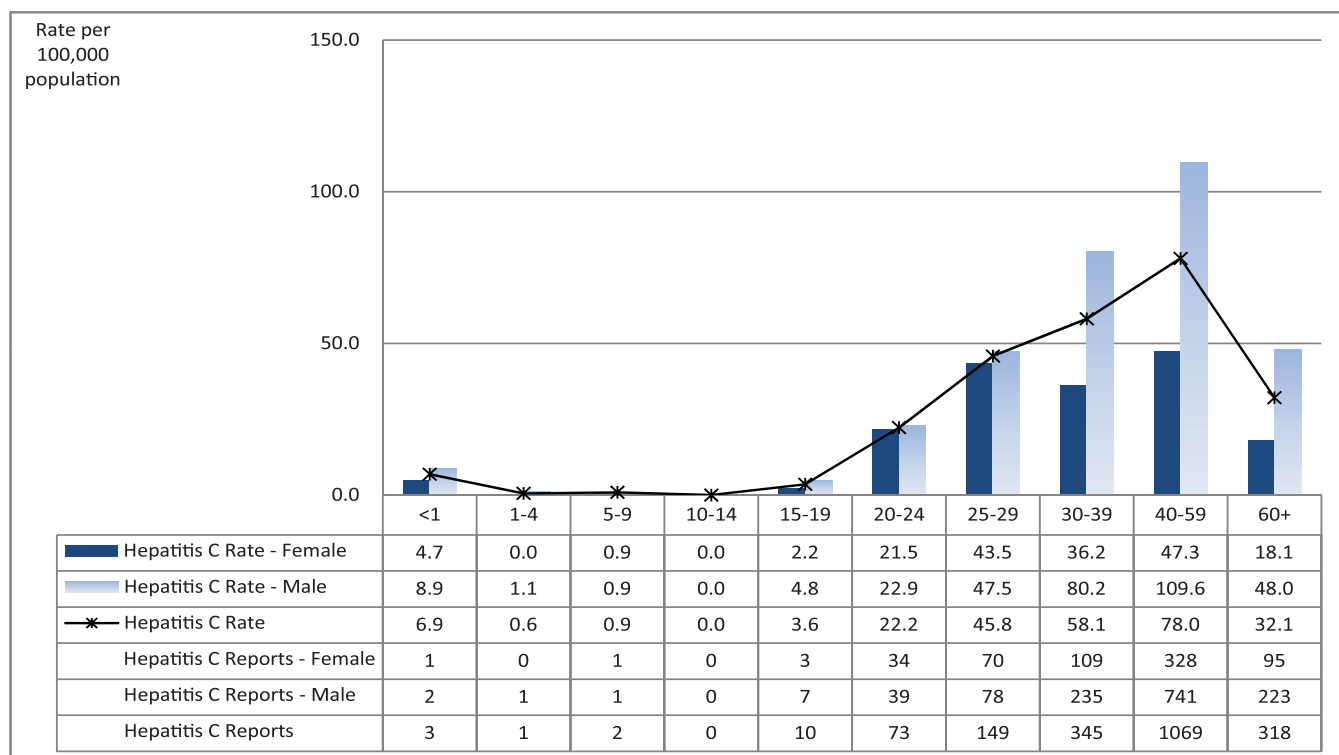
15.2 Hepatitis C Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	29	36.0
12	Kootenay Boundary	44	55.2
13	Okanagan	153	43.3
14	Thompson Cariboo Shuswap	102	45.5
21	Fraser East	178	62.1
22	Fraser North	204	33.1
23	Fraser South	313	43.1
31	Richmond	39	19.7
32	Vancouver	318	47.6
33	North Shore/Coast Garibaldi	86	29.9
41	South Vancouver Island	133	35.5
42	Central Vancouver Island	145	54.5
43	North Vancouver Island	64	52.7
51	Northwest	37	48.9
52	Northern Interior	85	58.8
53	Northeast	40	56.9

Note: Map classification by Jenks natural breaks method.

15.3 Hepatitis C Rates by Age Group and Sex, 2011

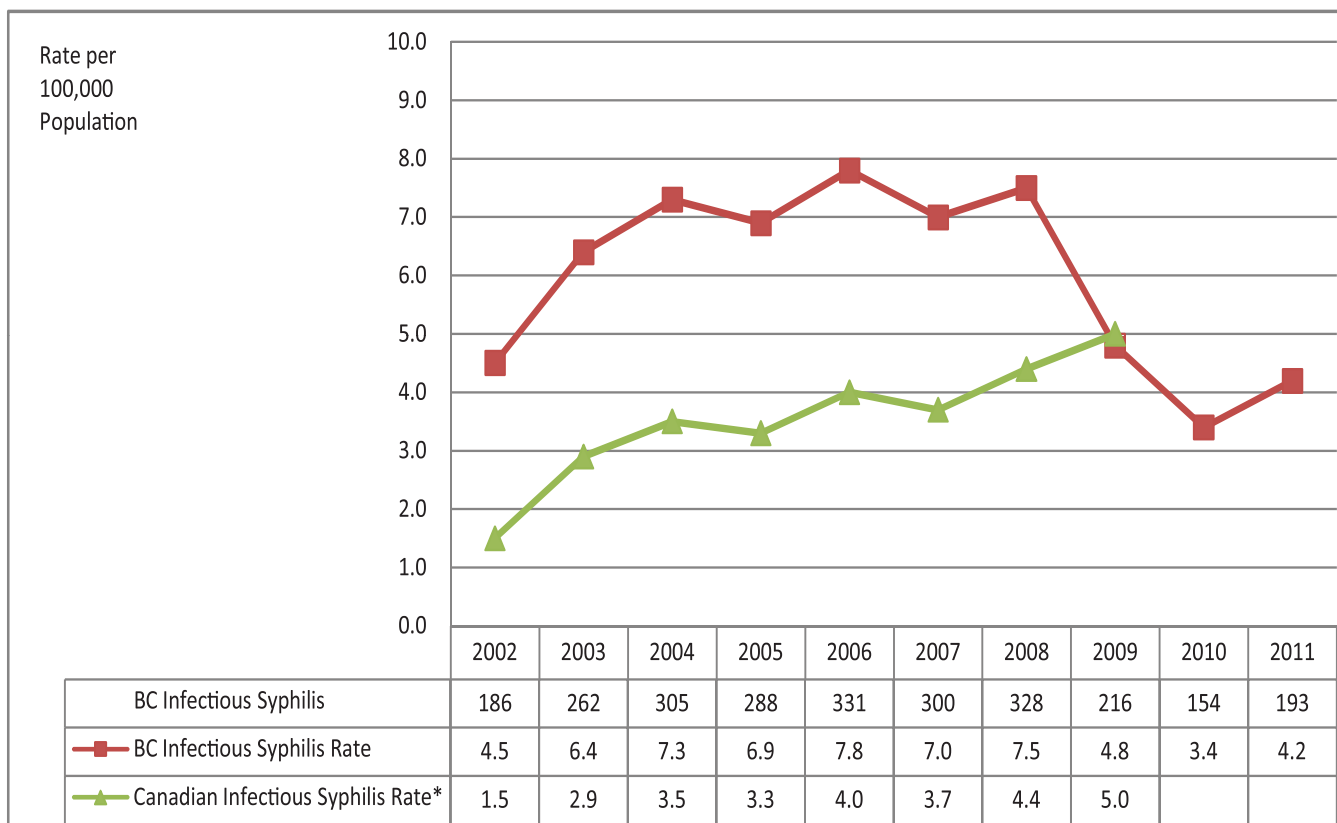


Infectious Syphilis

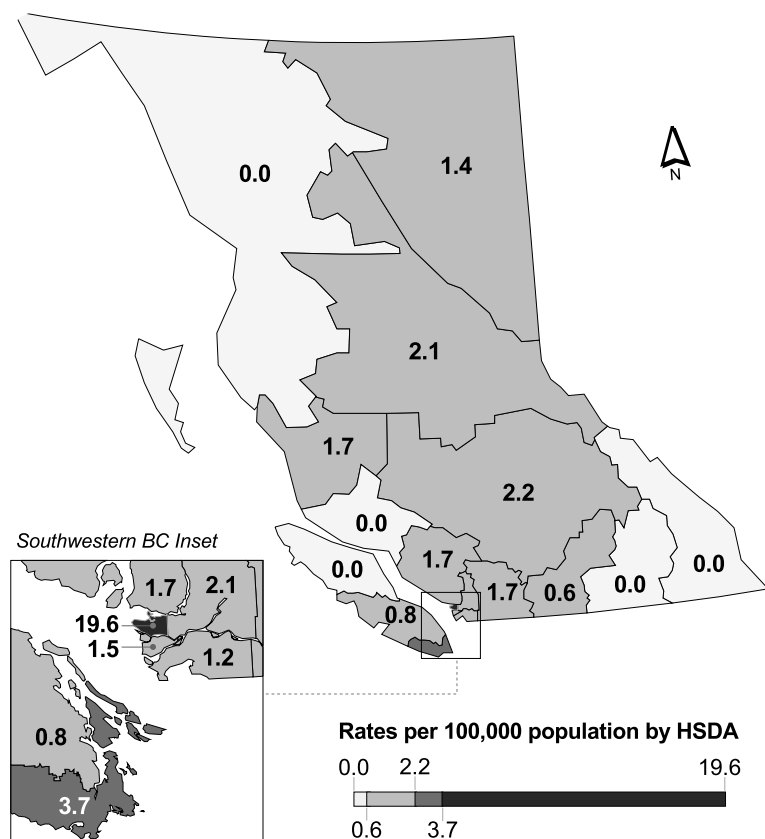
The rate of infectious syphilis increased from 3.4 in 2010 to 4.2 per 100,000 in 2011 reflecting an increase from 154 to 193 cases. The majority of cases occurred among men, with the

greatest rates among men aged 25-59 years. The highest rate was observed in Vancouver HSDA (19.6 per 100,000; 131 cases).

16.1 Infectious Syphilis Rates by Year, 2002-2011



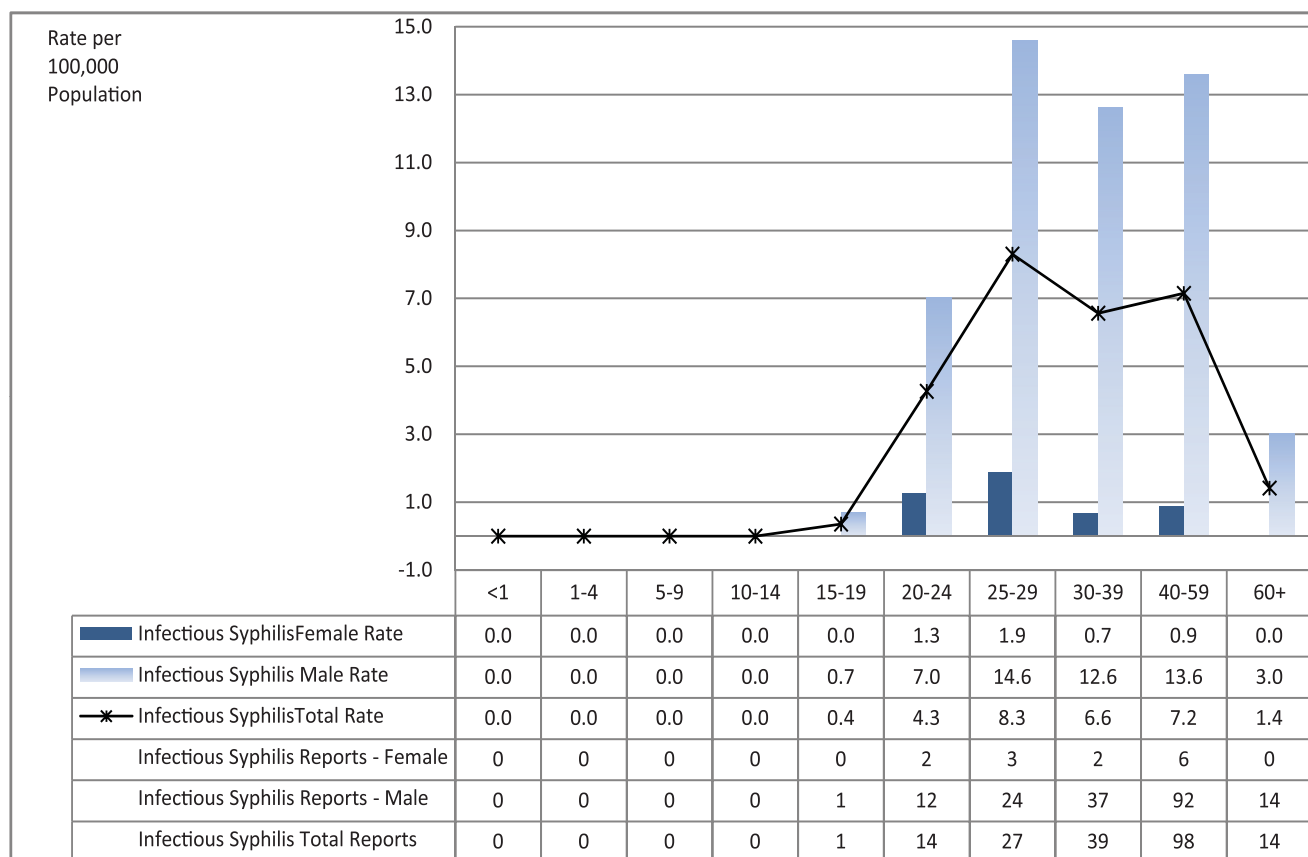
16.2 Infectious Syphilis Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	0	0.0
13	Okanagan	2	0.6
14	Thompson Cariboo Shuswap	5	2.2
21	Fraser East	5	1.7
22	Fraser North	13	2.1
23	Fraser South	9	1.2
31	Richmond	3	1.5
32	Vancouver	131	19.6
33	North Shore/Coast Garibaldi	5	1.7
41	South Vancouver Island	14	3.7
42	Central Vancouver Island	2	0.8
43	North Vancouver Island	0	0.0
51	Northwest	0	0.0
52	Northern Interior	3	2.1
53	Northeast	1	1.4

Note: Map classification by Jenks natural breaks method.

16.3 Infectious Syphilis Rates by Age Group and Sex, 2011





DISEASES TRANSMITTED BY DIRECT CONTACT AND RESPIRATORY ROUTES

Streptococcal Disease, invasive, Group A

Tuberculosis

Streptococcal Disease (invasive) Group A

The rate of reported confirmed cases of invasive Group A Streptococcal disease (iGAS) was 4 per 100,000 in 2011. This is similar to the reported iGAS rates prior to the peak rates in 2007-2008.

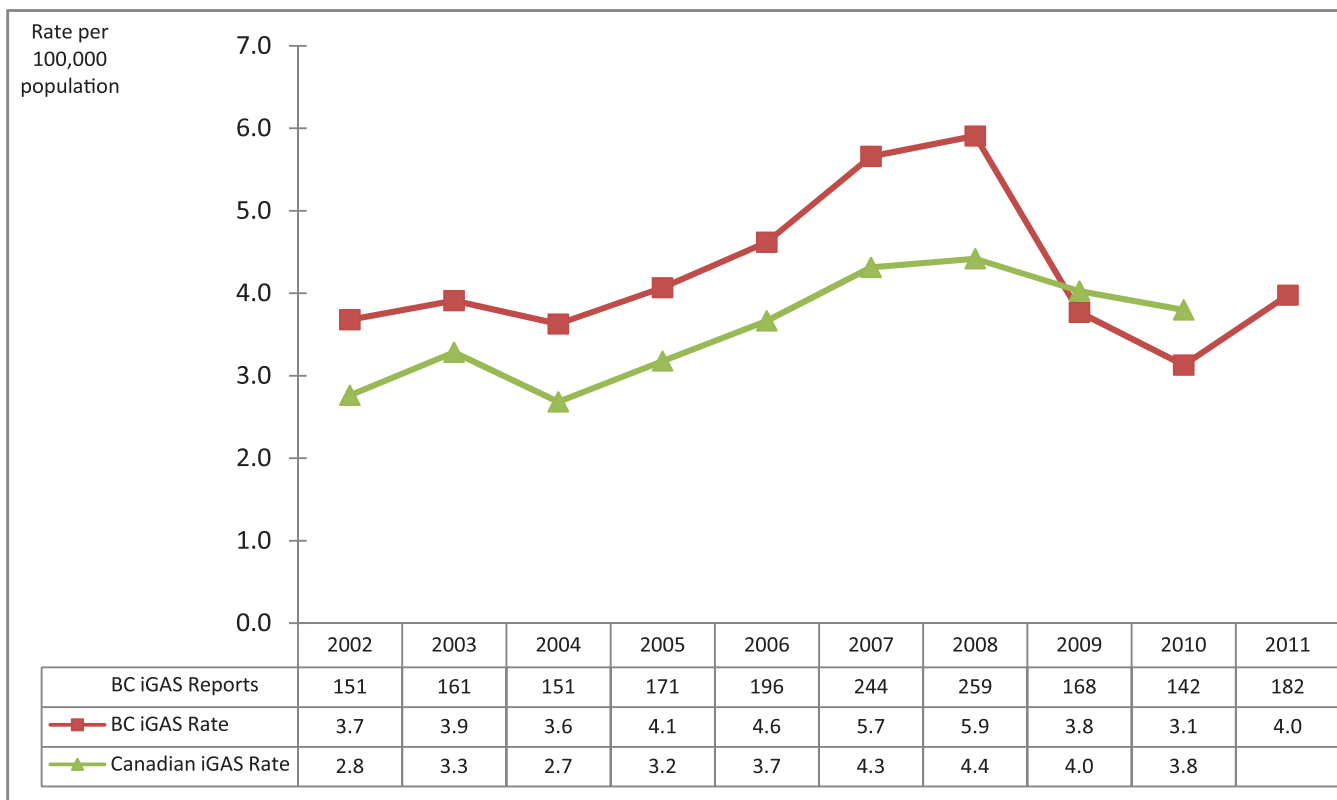
The highest incidence was in females aged ≥ 60 years with a rate of 7.6 cases per 100,000 population.

Of the 182 confirmed cases in 2011, three (1.6%) had toxic shock syndrome, eleven (6.0%) had necrotizing fasciitis and an additional three (1.6%) had both toxic shock syndrome and necrotizing fasciitis.

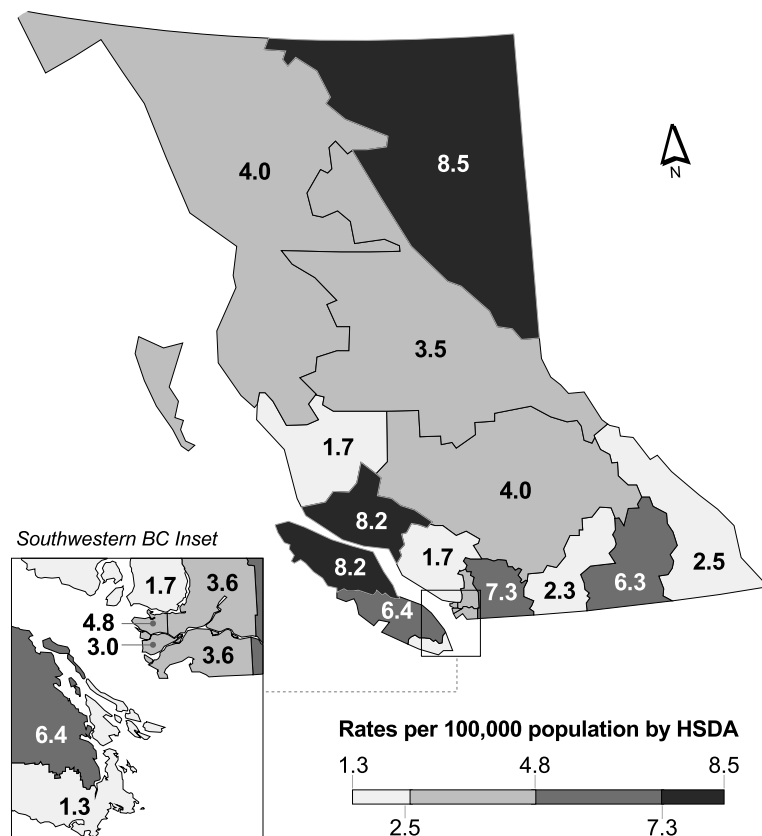
The case fatality rate was 13.2%, the highest since and same as that observed in 2002. Between 2003 and 2011, annual case fatality rates ranged from 3.7% to 9.9%.

Of the 24 deaths in 2011, five were in children aged 1-12 years. Of these, two had underlying medical conditions; none had contact with other iGAS cases. The emm types were types 1 (two cases), 87, 12 and unknown for one case. The other 19 deaths were in adults aged 38-95 years. Isolates from 132 (73%) confirmed cases were typed by the National Microbiology Laboratory. Of these, the most common emm types were 1 (30%), 12 (8%), 89 (7%) and 28 (6%). In 2002 through 2010 the most common emm types among cases with typing results were types 1 (20%), 59 (14%), 12 (5%) and 91 (5%).

17.1 Streptococcal Disease (invasive) Group A Rates by Year, 2002-2011



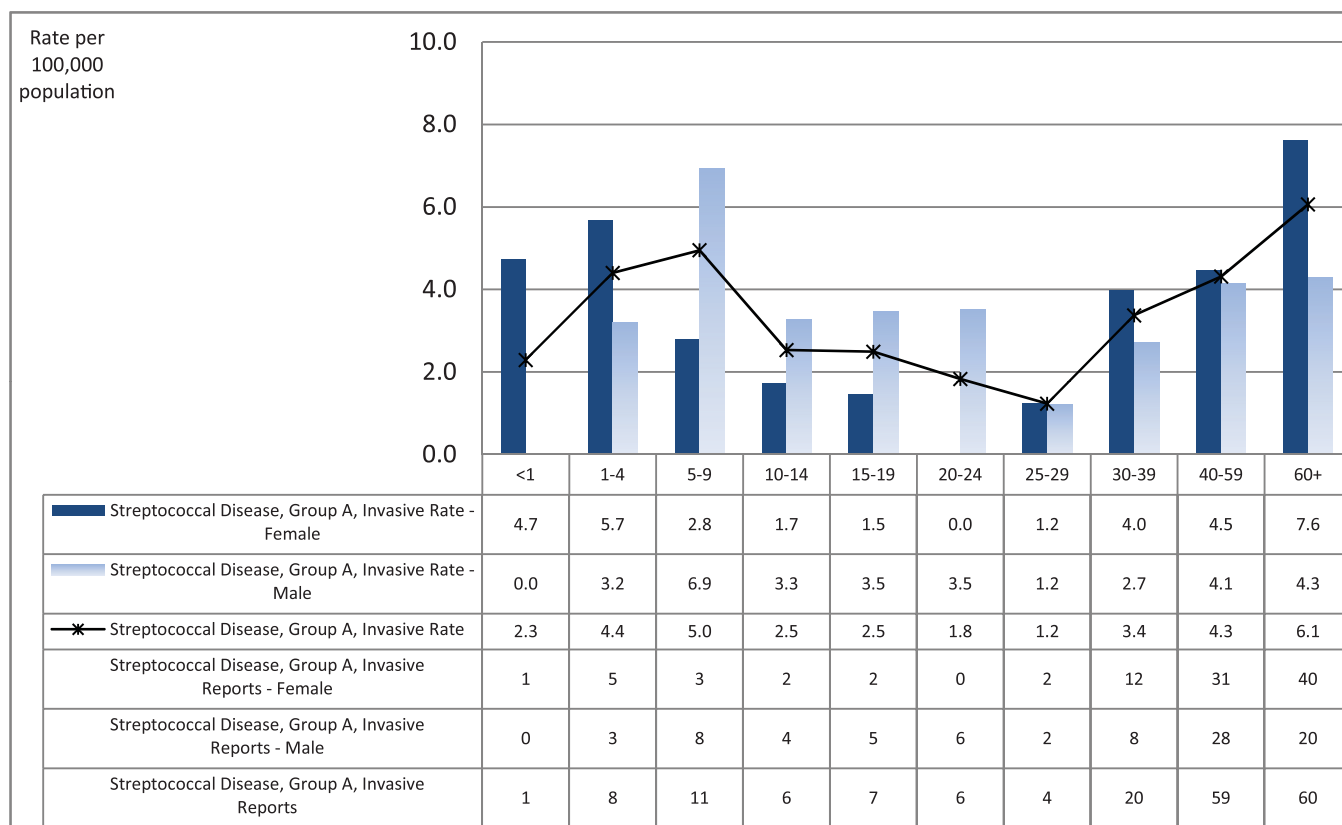
17.2 Streptococcal Disease (invasive) Group A Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	2	2.5
12	Kootenay Boundary	5	6.3
13	Okanagan	8	2.3
14	Thompson Cariboo Shuswap	9	4.0
21	Fraser East	21	7.3
22	Fraser North	22	3.6
23	Fraser South	26	3.6
31	Richmond	6	3.0
32	Vancouver	32	4.8
33	North Shore/Coast Garibaldi	5	1.7
41	South Vancouver Island	5	1.3
42	Central Vancouver Island	17	6.4
43	North Vancouver Island	10	8.2
51	Northwest	3	4.0
52	Northern Interior	5	3.5
53	Northeast	6	8.5

Note: Map classification by Jenks natural breaks method.

17.3 Streptococcal Disease (invasive) Group A Rates by Age Group and Sex, 2011



Tuberculosis

There were 268 cases of tuberculosis reported in British Columbia in 2011, for a rate of 5.9 per 100,000 population. This represents a 7% increase in both the number and rate of reported cases compared to 2010.

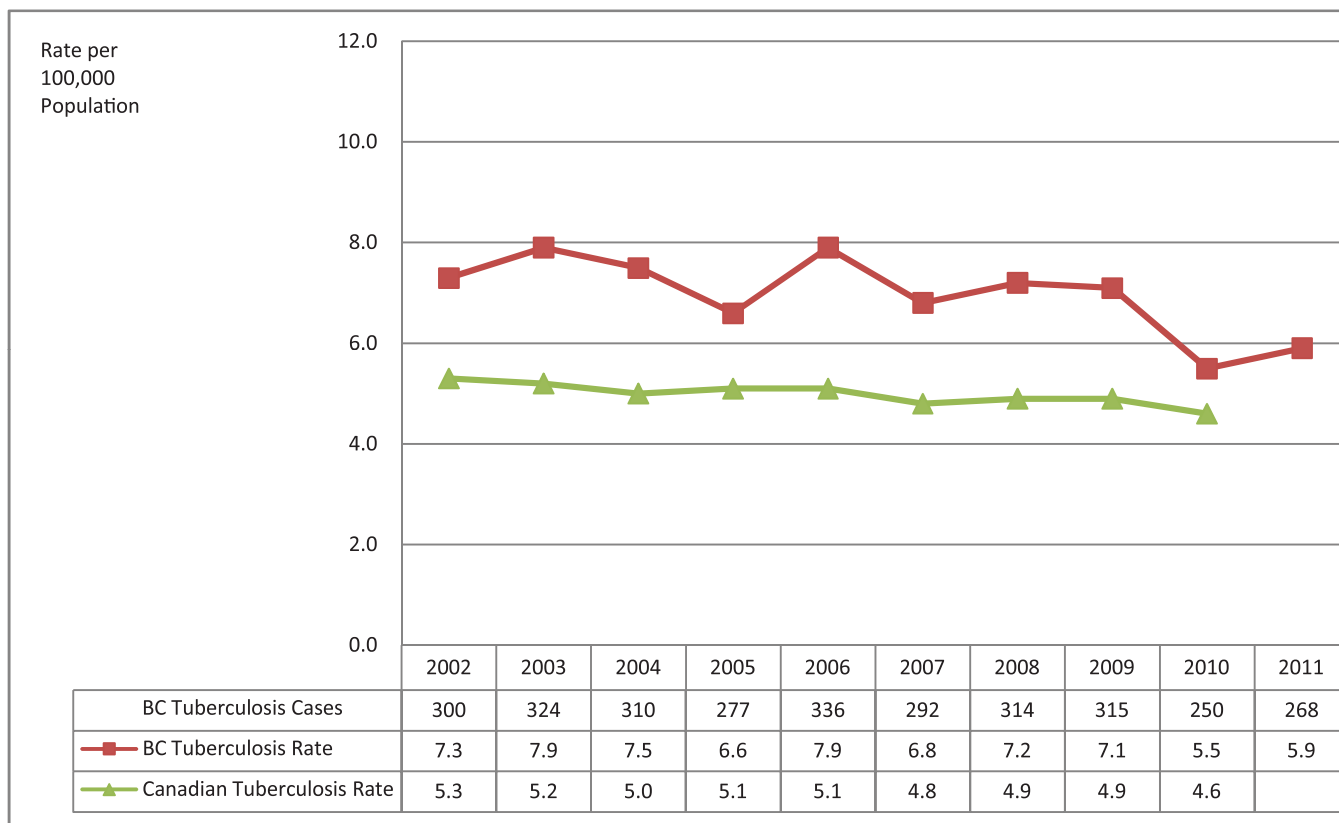
Rates for Health Regions vary across the province. The Vancouver, Fraser South, Northern Interior and Richmond health service delivery areas (HSDA) have rates exceeding the provincial rate. The highest incidence was reported from Vancouver and Fraser South HSDA (11.8 and 10.3 per 100,000 population respectively) while the lowest incidence was in Kootenay Boundary, North Vancouver Island and East Kootenay HSDA (0.0, 0.8 and 1.2 per 100,000 population respectively).

The rate of tuberculosis in 2011 increased from 2010 rates in Northwest, Richmond, Okanagan, Central Vancouver Island,

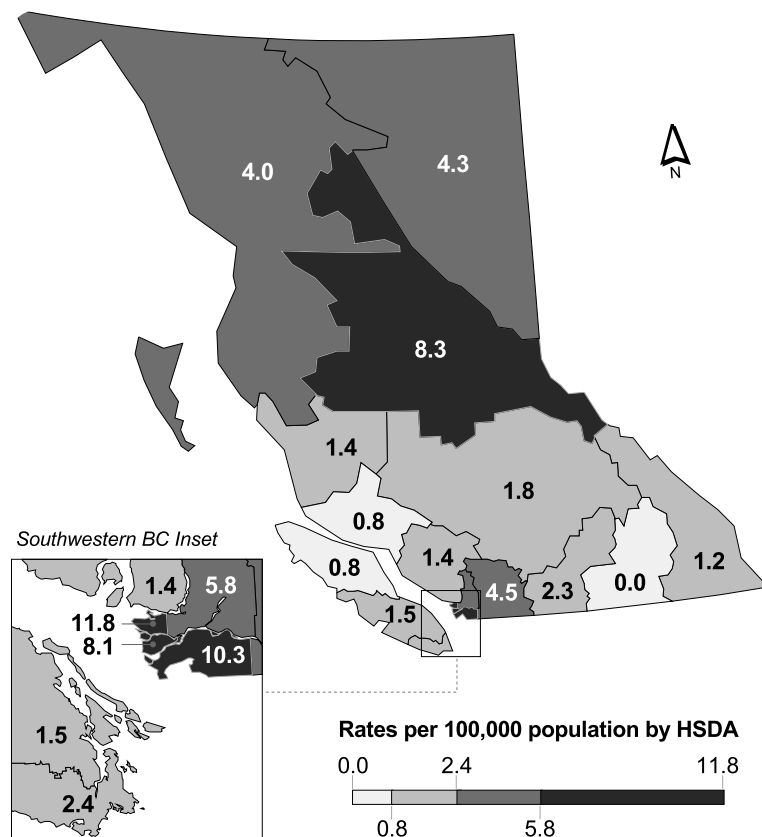
East Kootenay, Thompson Cariboo Shuswap and North Shore/Coast Garibaldi HSDA with Northwest showing the largest increase from 4 to 6.7 per 100,000 population. As in 2010, no cases of tuberculosis were observed in Kootenay Boundary HSDA in 2011. In all other health regions the rate of tuberculosis decreased, with Northeast and Northern Interior HSDA showing the largest decrease from 4.3 to 1.5 and from 8.3 to 4.9/ 100,000 population respectively.

Age specific TB rates are shown in figure 18.3. Overall, the tuberculosis rate was higher in males than in females (7.1 vs 4.7 per 100,000). However, for those 5-14 years of age the rate of tuberculosis was higher in females than in males (1.4 vs 0.4 per 100,000). In those ≥ 60 years old, the rate of tuberculosis in males was higher than in females (15.1 vs 6.9 per 100,000).

18.1 Tuberculosis Rates by Year, 2002-2011



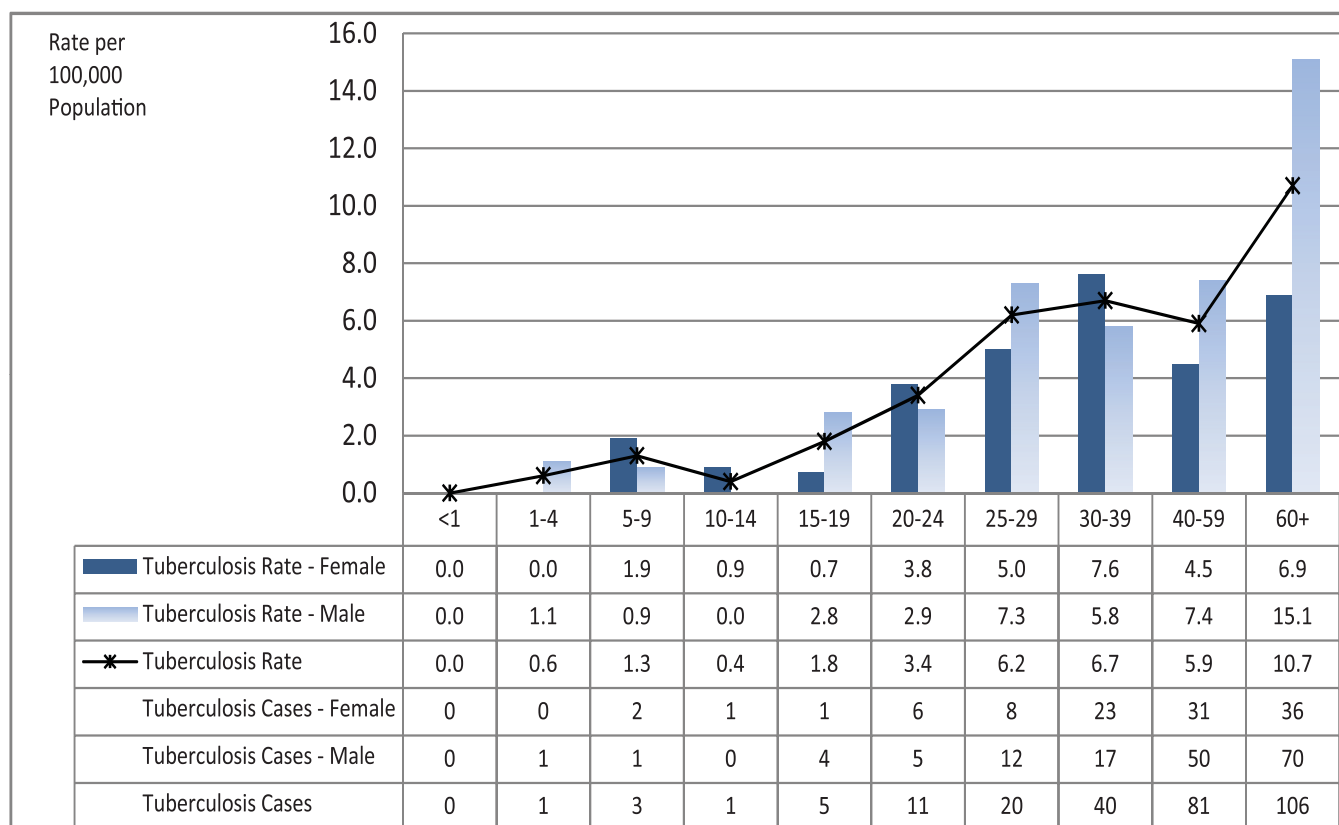
18.2 Tuberculosis Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	1	1.2
12	Kootenay Boundary	0	0.0
13	Okanagan	8	2.3
14	Thompson Cariboo Shuswap	4	1.8
21	Fraser East	13	4.5
22	Fraser North	36	5.8
23	Fraser South	75	10.3
31	Richmond	16	8.1
32	Vancouver	79	11.8
33	North Shore/Coast Garibaldi	4	1.4
41	South Vancouver Island	9	2.4
42	Central Vancouver Island	4	1.5
43	North Vancouver Island	1	0.8
51	Northwest	3	4.0
52	Northern Interior	12	8.3
53	Northeast	3	4.3

Note: Map classification by Jenks natural breaks method.

18.3 Tuberculosis Rates by Age Group and Sex, 2011



Antimicrobial Resistant Organism Surveillance in BC

An update on antimicrobial resistance within British Columbia is compiled in a separate report entitled "Antimicrobial Resistance Trends in the Province of British Columbia." Data are obtained through collaborations with provincial and national partners who provide de-identified or aggregate data. These data primarily represent isolates collected in the community. The trends reported here are therefore not necessarily representative of those found in institutions. Indeed, in some cases we know that institutional trends are substantially different for a number of reasons. However, the focus of this surveillance, as of the Do Bugs Need Drugs? program, is primarily on the community. This report also includes a section on antimicrobial consumption rates and trends, and how these correlate with growing resistance. The most recent update of this report (2011) has been published online at www.bccdc.ca. The highlights are summarized here.

- According to British Columbia Association of Medical Microbiologists (BCAMM), which represents both hospital and community isolates, the percent of *Staphylococcus aureus* isolates that are methicillin-resistant (MRSA) decreased between 2006 to 2010 (23% to 17.1%). BC Biomedical Laboratories, which represents community isolates in the Lower Mainland, reports a variable increase between 2008 and 2011 (16.1% to 24.9%), but an overall decrease from 30.5% in 2007. The overall decrease in non-susceptibility rate for clindamycin, erythromycin and trimethoprim-sulfamethoxazole (TMP-SMX) reflects an increase in community-associated (CA) MRSA strains.
- *Streptococcus pneumoniae* isolates have demonstrated a stable rate of resistance to erythromycin since 2007, with 31.4% of all tested isolates demonstrating resistance

against erythromycin in 2011. Approximately one sixth to one fourth of *Streptococcus pneumoniae* isolates have also demonstrated non-susceptibility against clindamycin (14.9%), penicillin (18.0%) and trimethoprim-sulfamethoxazole (TMP-SMX) (23.8%).

- From 2007 to 2010, resistance rates to erythromycin and clindamycin decreased in *Streptococcus pyogenes* isolates, but then increased in 2011. All isolates remain highly susceptible to penicillin and vancomycin (>99%).
- *Enterococcus spp.* isolates remain highly susceptible to vancomycin, ampicillin and nitrofurantoin (>97%). Approximately one fourth of all isolates tested are resistant to ciprofloxacin (24.7%), largely due to the high amount of resistance in those greater than 70 years of age. The percent of *Enterococcus spp.* isolates demonstrating resistance against vancomycin (VRE) has remained below or near 1% for all years.
- Data from BC Biomedical Laboratories indicated the percent of *H. influenzae* isolates resistant to ampicillin decreased from 18.4% in 2008 to 14.3% in 2011. Data from Canadian Bacterial Surveillance Network (CBSN) indicated the percent of β -lactamase-producing *Haemophilus influenzae* isolates showed a significant increase in 2008, with approximately 40% of isolates testing positive. This discrepancy may be due to the different nature of data sources.
- *Escherichia coli* resistance to ciprofloxacin sits at 26.8% as it continues to increase. Much of this resistance comes from those greater than 70 years of age.
- Urinary tract pathogens such as *Escherichia coli* and *Klebsiella pneumoniae* have shown increasing resistance to ciprofloxacin, although the increase is much less prevalent and consistent in *K. pneumoniae*, while *Proteus mirabilis*

Antimicrobial Resistant Organism Surveillance in BC (continued)

isolates have shown varying resistance to ciprofloxacin after a peak in 2008. *E. coli* and *P. mirabilis* isolates demonstrate high levels of resistance to trimethoprim-sulfamethoxazole (TMP-SMX) for all years available, including 26.0% in 2011 for *E. coli* and 30.5% for *P. mirabilis*, while a relatively lower resistance rate was found for *K. pneumoniae* (8.5%). Nitrofurantoin remains highly effective for *E. coli* isolates with over 96% of isolates showing susceptibility. This is reassuring as 85% to 90% of all uncomplicated UTI infections are caused by *E. coli*.

- According to data from the BCAMM 2010 report, the percent of *Enterobacteriaceae* spp. producing extended spectrum β -lactamases (ESBL) remained low for BC communities, including *Escherichia coli* (0.7% – 2.5%) and *Klebsiella pneumoniae* (0.5%).
- *Salmonella* enteritidis resistance to ampicillin, tetracycline, and chloramphenicol remains low (<3%).
- Resistance rates for *Pseudomonas aeruginosa* isolates to ciprofloxacin continue to decline, reaching 10.1% in 2011. *P. aeruginosa* isolates continue to be highly susceptible (>95%) to tobramycin, piperacillin, ceftazidime and gentamicin.
- *Mycobacterium tuberculosis* isolates that demonstrate multiple-drug resistance (MDR; resistance to both isoniazid and rifampin) were found in 10 cases over 6 years, representing 0.7% of cases. Mono-resistance occurred in 8.6% of cases while poly-resistance was noted in 2.2% of cases over all years. There are no cases of extensively drug resistant TB (XDR) cases in BC from 2005 to 2010.
- The overall antibiotic utilization rate has decreased after 2005, due to drops in 2006 and 2009, arresting an upward trend seen between 2002 and 2005.
- Penicillins constitute the majority of antimicrobial prescriptions with a rate of 5.3 defined daily doses

(DDD)/1000 inhabitant-days in 2010. Penicillins are followed by macrolides, tetracyclines, quinolones, cephalosporins, other antibacterials and finally sulfonamides and trimethoprim.

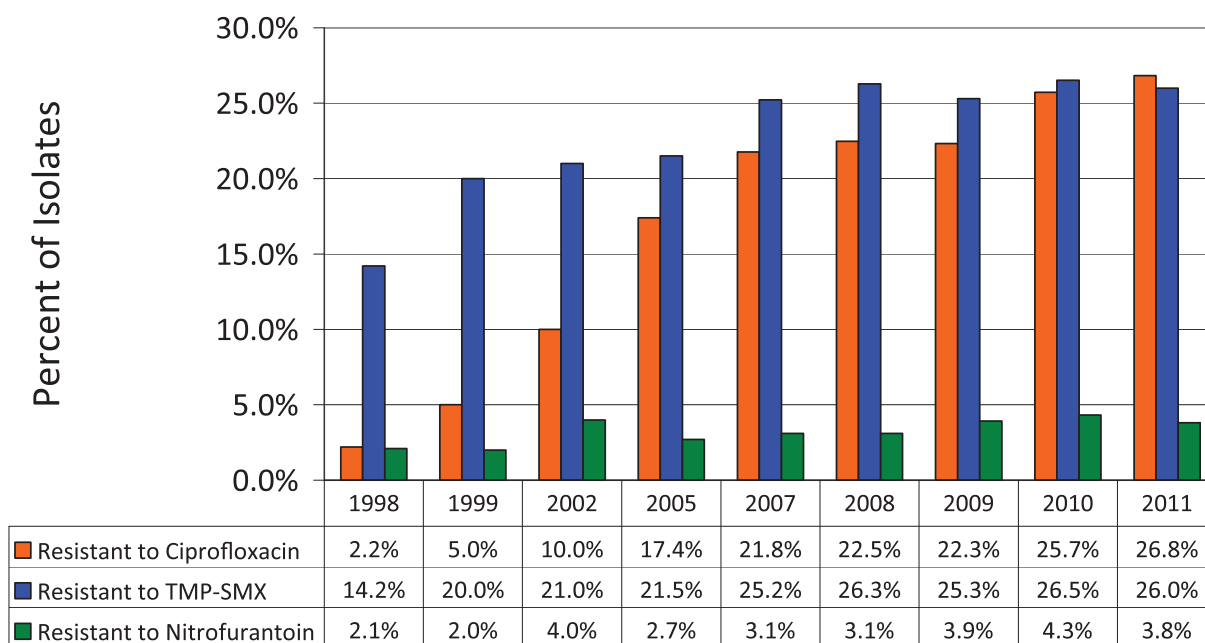
- Within the β -lactam class, there had been a significant increase in the use of penicillins with β -lactamase inhibitors until the rate plummeted in 2010. β -lactamase resistant penicillins decreased from 1996 to 2009, but saw a small increase in 2010. β -lactamase sensitive penicillins have continued the decreasing trend with a large drop in 2010. Cephalosporin utilization rate remains high, although the rate has been decreasing since 2007. Although first and second generation cephalosporins have decreased since 2007, third generation cephalosporins had a large percentage increase in 2010; however, the rate remains low.
- Macrolide utilization of clarithromycin continues to increase while erythromycin utilization has significantly decreased since 1996. Utilization of azithromycin has decreased since 2007, reversing the increasing trend seen since 1996. Lincosamide utilization of clindamycin has increased consistently since 1996, despite stabilization from 2007 to 2009.
- The fluoroquinolones subclass continues to be the major contributor to the increase in quinolone utilization. Ciprofloxacin remains the most common within the fluoroquinolones subclass. The utilization rate for fluoroquinolones has decreased since 2007; however, even though all other fluoroquinolones have decreased in utilization since 2007 (disregarding ciprofloxacin the use of fluoroquinolones has been decreasing since 2004), moxifloxacin has consistently increased since introduction in 2000, and has had the second highest quinolone utilization since 2003.

Antimicrobial Resistant Organism Surveillance in BC (continued)

Conclusion

Stabilization of resistance among most Gram positive organisms has been evident in recent years. The most worrisome trends continue to be among the extended spectra of resistance among Gram negatives.

Percent of *E. coli* Isolates Resistant to Ciprofloxacin, TMP-SMX, and Nitrofurantoin



ENTERIC, FOOD AND WATERBORNE DISEASES



Amebiasis

Botulism

Campylobacteriosis

Cryptosporidiosis

Cyclosporiasis

Shigatoxigenic *E. coli* (STEC) Infection

Giardiasis

Hepatitis A

Legionellosis

Listeriosis

Salmonellosis

- **Typhoid Fever**
- **Paratyphoid Fever**

Shigellosis

Vibrio parahaemolyticus

Yersiniosis

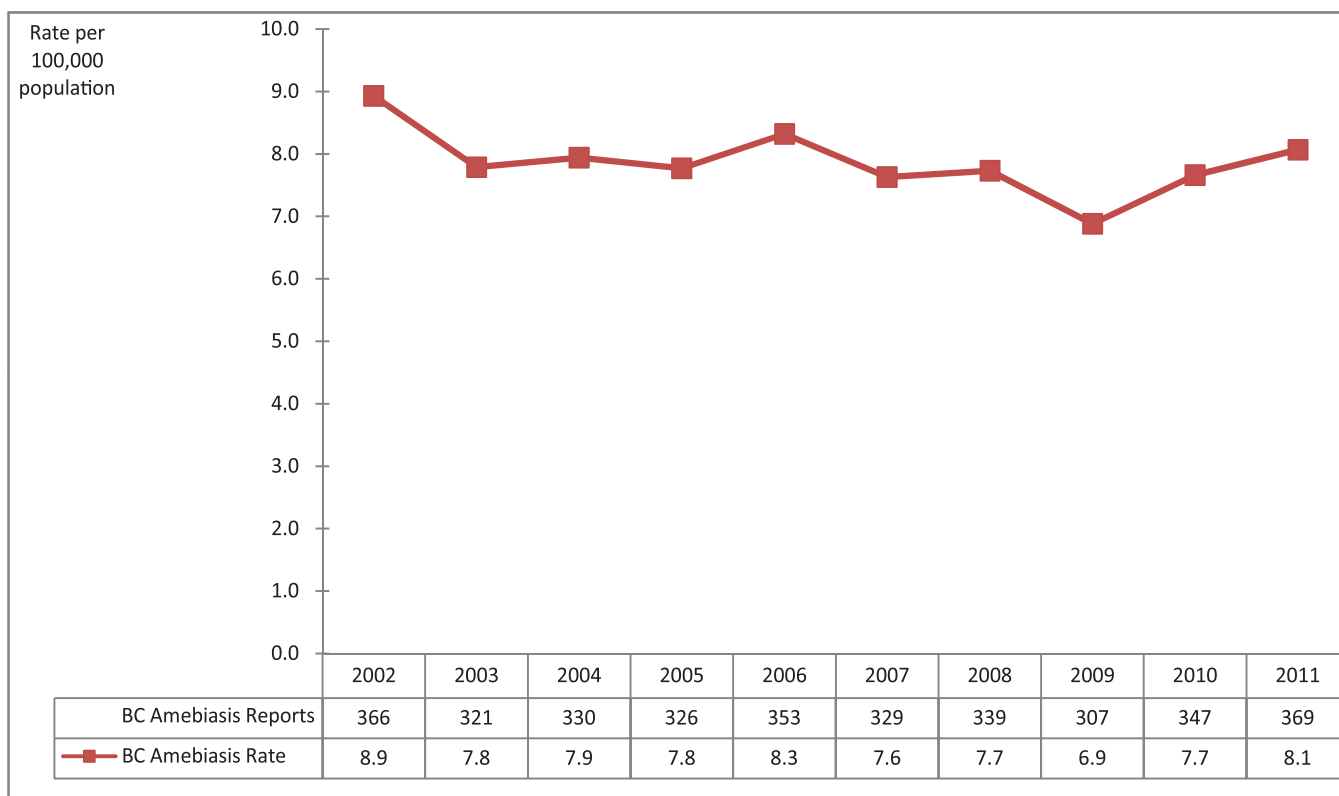
Outbreaks of Gastroenteritis

Amebiasis

Throughout the last ten years, the rate of amebiasis in BC has remained fairly constant. The overall provincial rate for 2011 was 8.1 cases per 100,000. In 2011, no outbreaks were identified and no seasonal pattern was evident. As in previous years, the reporting rate was highest in males in the 25-59 year old group. The highest rate of illness (23.5 cases

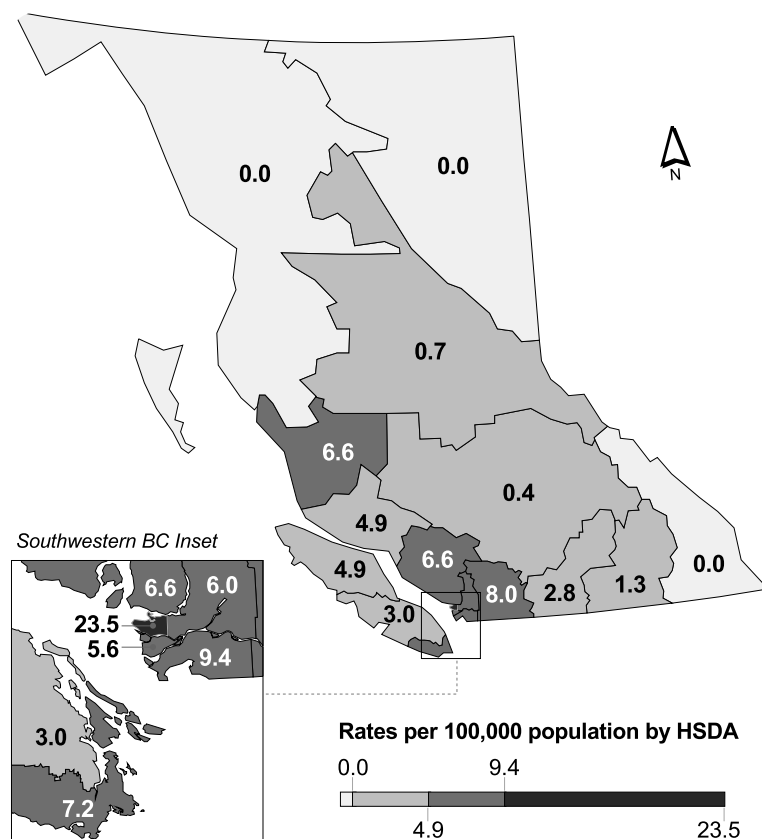
per 100,000) was reported from Vancouver. Men who have sex with men (MSM) may be at increased risk of infection as amebiasis is known to be transmitted sexually through oral-anal contact. Screening programs for refugees in Vancouver and risk in MSM may partially account for the increases seen in 2011.

19.1 Amebiasis Rates by Year, 2002-2011



Note: Amebiasis was removed from national surveillance in January 2000

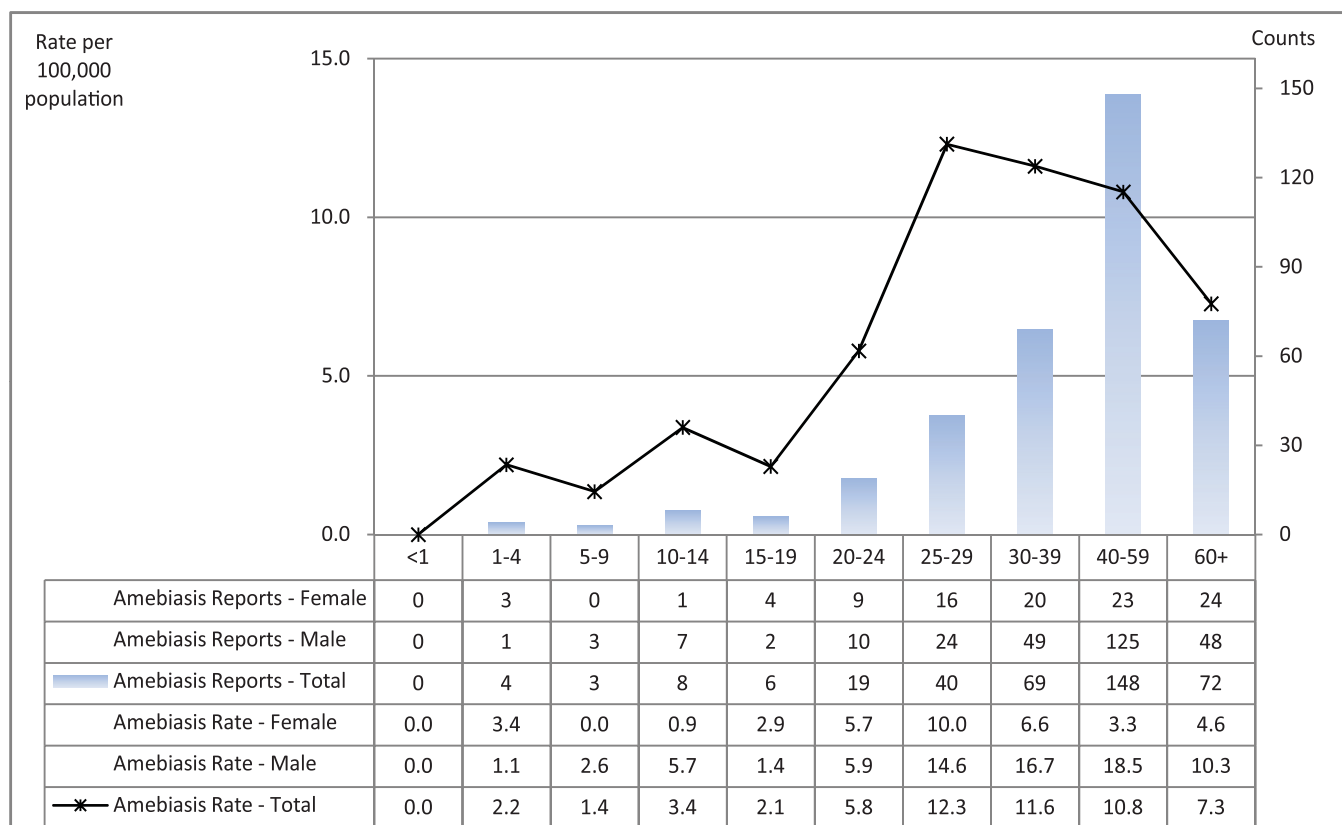
19.2 Amebiasis Rates by HSDA, 2011



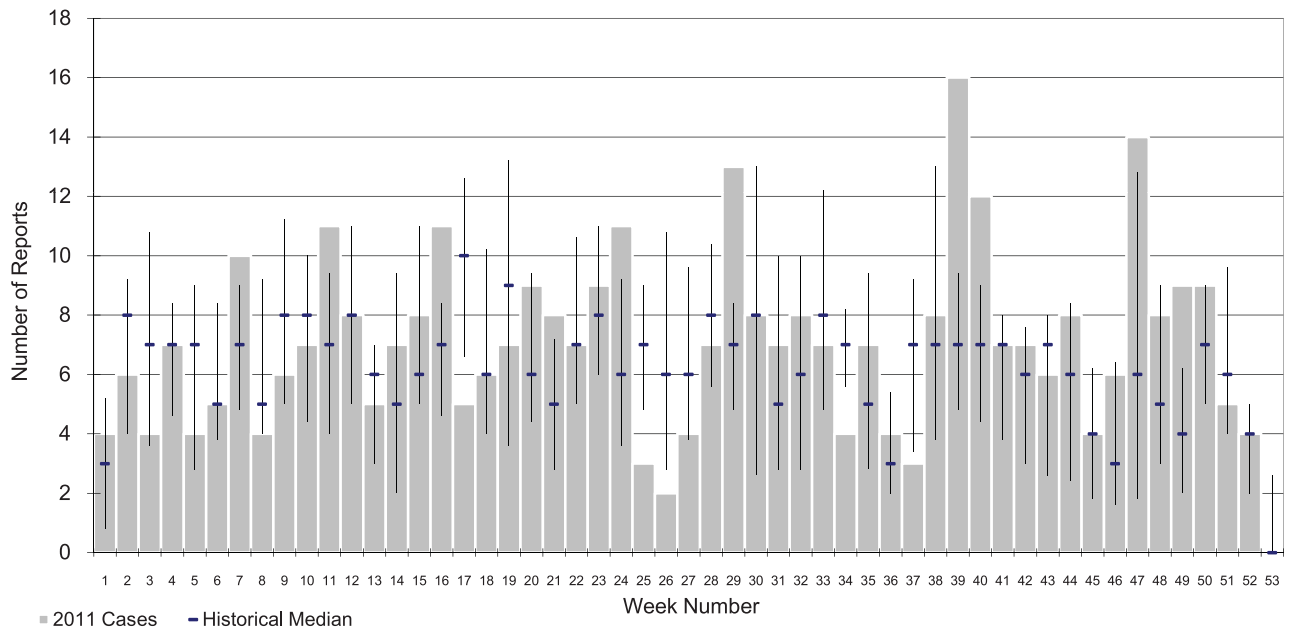
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	1	1.3
13	Okanagan	10	2.8
14	Thompson Cariboo Shuswap	1	0.4
21	Fraser East	23	8.0
22	Fraser North	37	6.0
23	Fraser South	68	9.4
31	Richmond	11	5.6
32	Vancouver	157	23.5
33	North Shore/Coast Garibaldi	19	6.6
41	South Vancouver Island	27	7.2
42	Central Vancouver Island	8	3.0
43	North Vancouver Island	6	4.9
51	Northwest	0	0.0
52	Northern Interior	1	0.7
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

19.3 Amebiasis Rates by Age Group and Sex, 2011



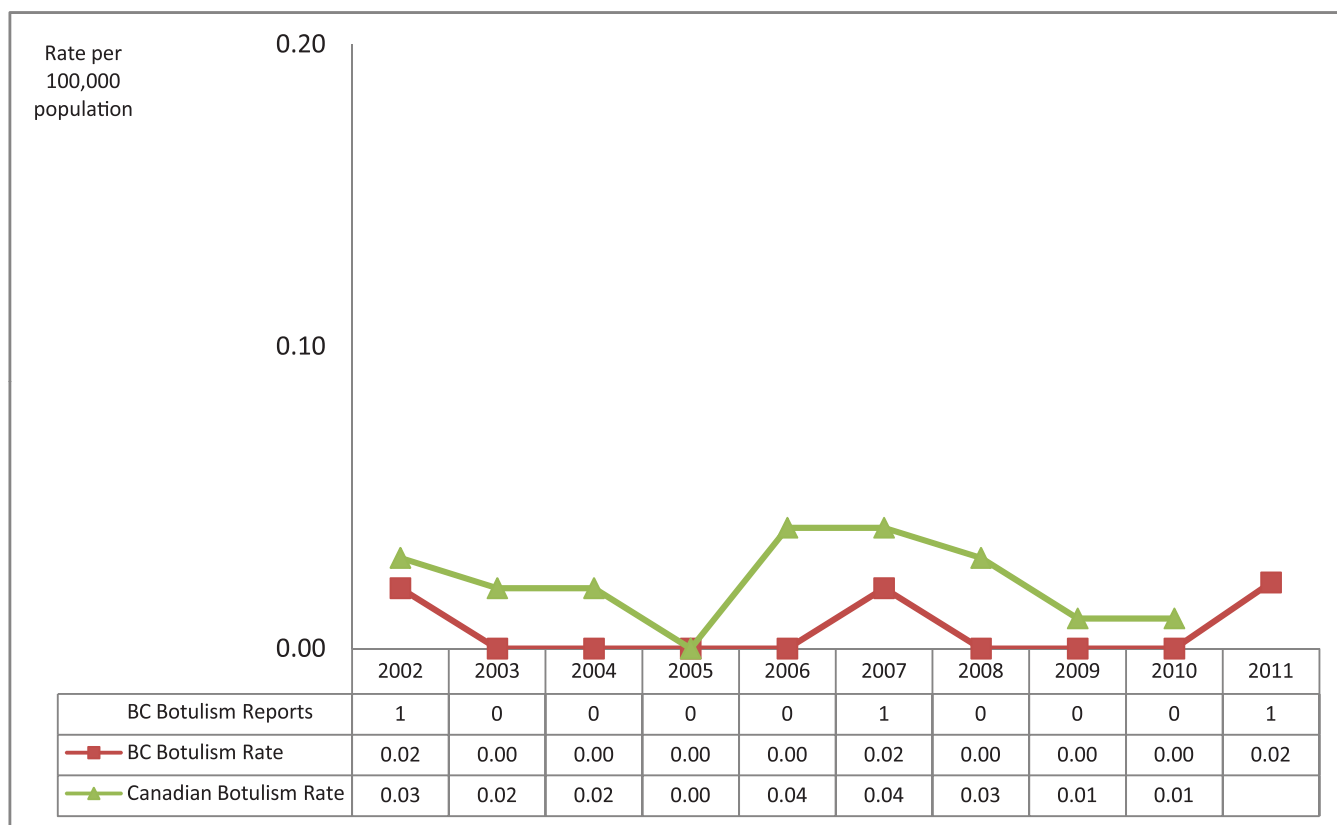
19.4 2011 Amebiasis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)



Botulism

One case of botulism was reported in 2011. This case was associated with home prepared watermelon jelly distributed throughout the province. As a consequence public notification and warning went out to discard the affected products.

20.0 Botulism Rates by Year, 2002-2011

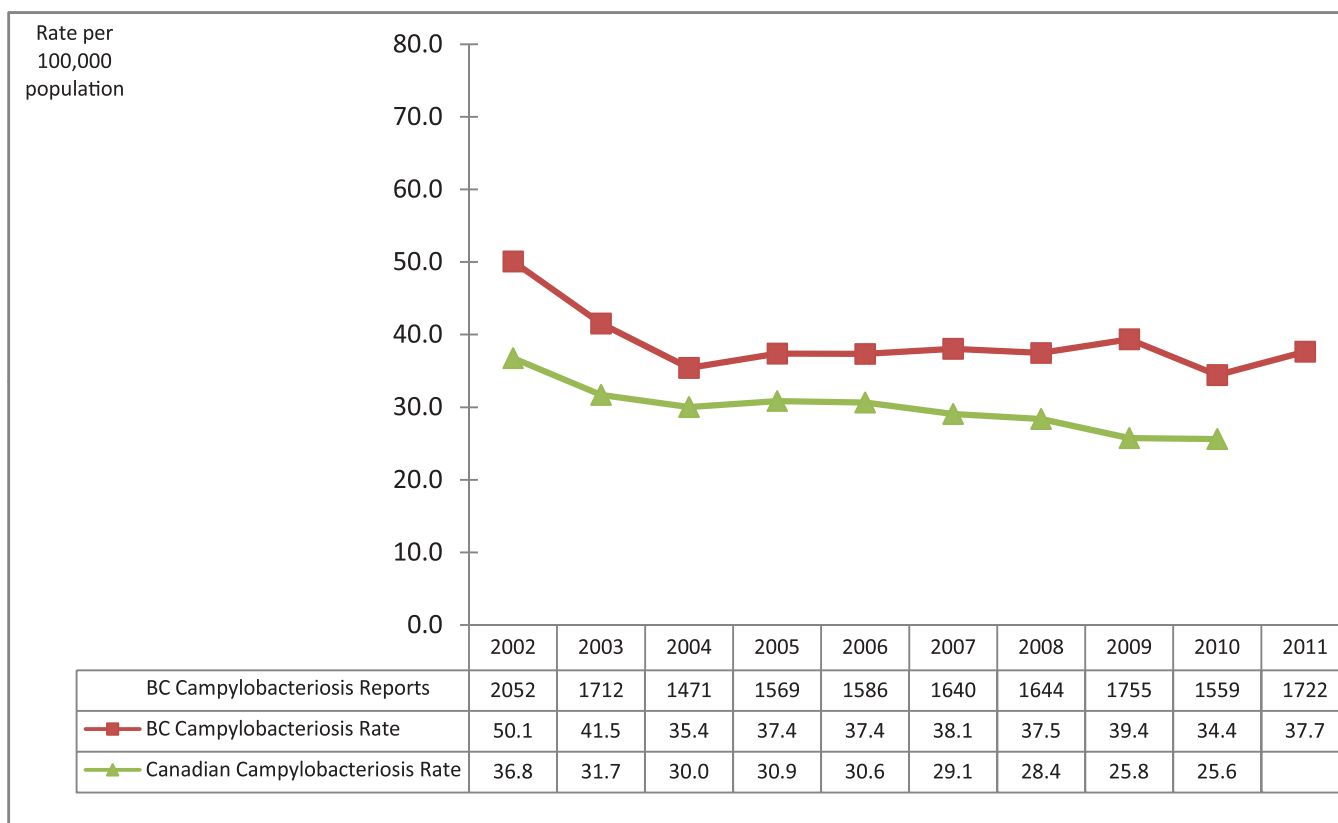


Campylobacteriosis

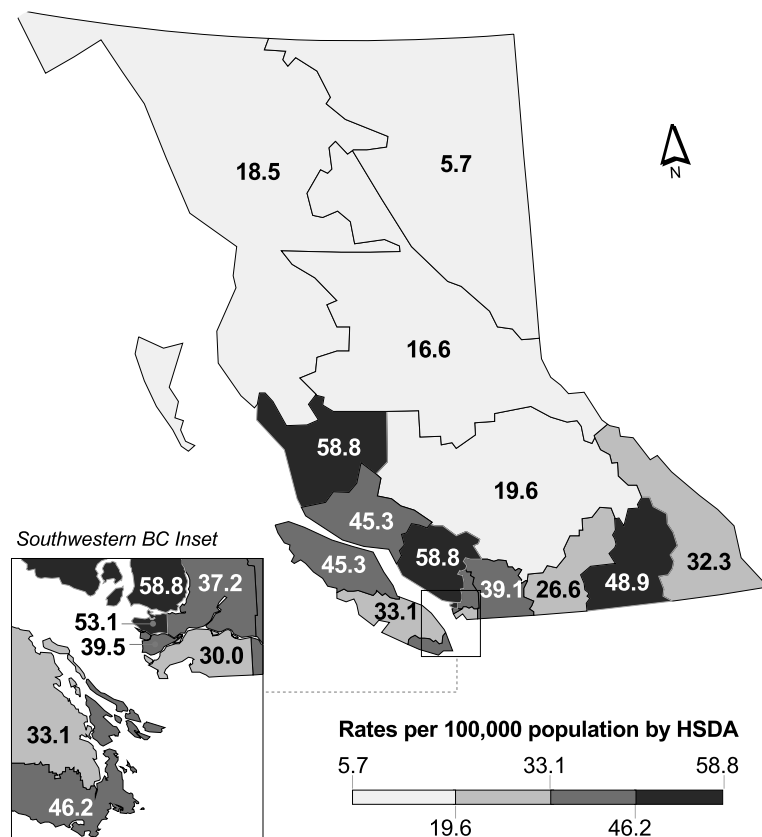
Campylobacteriosis continues to be the most commonly reported enteric disease with a total of 1722 cases reported in 2011. The rate in 2011 increased slightly but overall the incidence has been fairly stable since 2004. Similar to past years, rates were highest among children aged 1 to 4 and adults 25-29 years. Rates are highest for males in all age categories. The highest rate was once again reported from North Shore/Coast Garibaldi (58.85 per 100,000). This was

followed by Vancouver, Kootenay Boundary and North Vancouver Island. The geographic distribution is similar to that seen in previous years. The number of cases reported was slightly higher during the summer and early fall months, between weeks 26 and 39. A small cluster of cases reported in May was investigated in Northern Interior HSDA, no source was identified.

20.1 Campylobacteriosis Rates by Year, 2002-2011



20.2 Campylobacteriosis Rates by HSDA, 2011

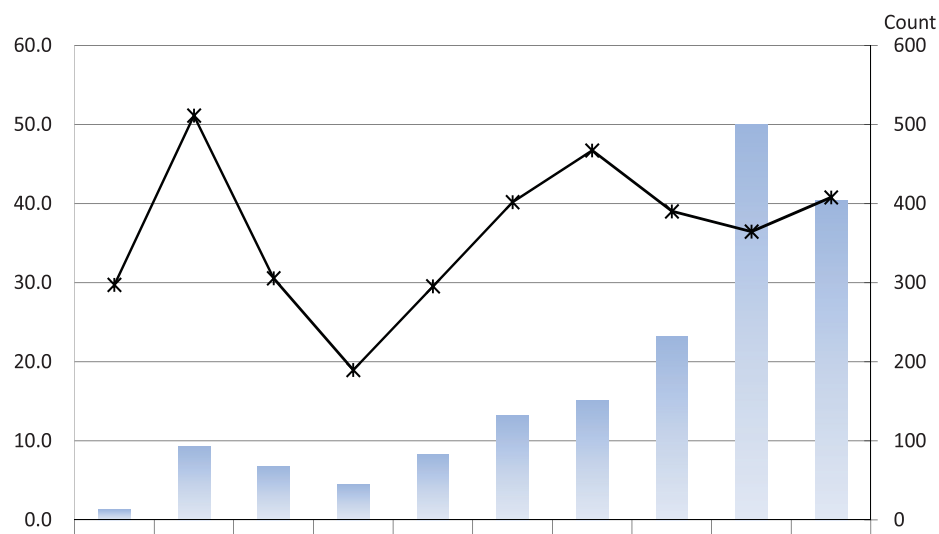


HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	26	32.3
12	Kootenay Boundary	39	48.9
13	Okanagan	94	26.6
14	Thompson Cariboo Shuswap	44	19.6
21	Fraser East	112	39.1
22	Fraser North	229	37.2
23	Fraser South	218	30.0
31	Richmond	78	39.5
32	Vancouver	355	53.1
33	North Shore/Coast Garibaldi	169	58.8
41	South Vancouver Island	173	46.2
42	Central Vancouver Island	88	33.1
43	North Vancouver Island	55	45.3
51	Northwest	14	18.5
52	Northern Interior	24	16.6
53	Northeast	4	5.7

Note: Map classification by Jenks natural breaks method.

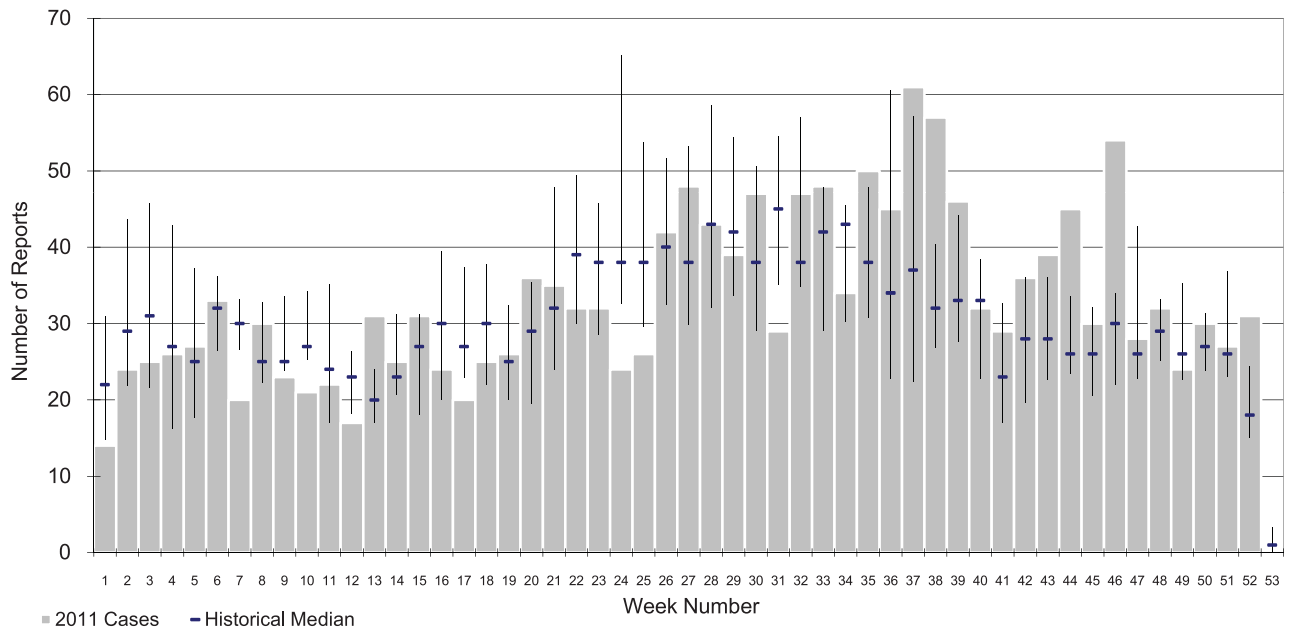
20.3 Campylobacteriosis Rates by Age Group and Sex, 2011

Rate per
100,000
population



Campylobacteriosis Reports - Female	6	42	25	15	29	60	65	117	224	209
Campylobacteriosis Reports - Male	7	51	43	30	54	72	87	114	276	195
Campylobacteriosis Reports - Total	13	93	68	45	83	132	152	232	500	404
Campylobacteriosis Rate - Female	28.3	47.7	23.4	13.1	21.3	38.0	40.4	38.9	32.3	39.8
Campylobacteriosis Rate - Male	31.1	54.4	37.3	24.5	37.3	42.3	53.0	38.9	40.8	42.0
Campylobacteriosis Rate - Total	29.7	51.2	30.6	19.0	29.6	40.2	46.8	39.1	36.5	40.8

20.4 2011 Campylobacteriosis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)

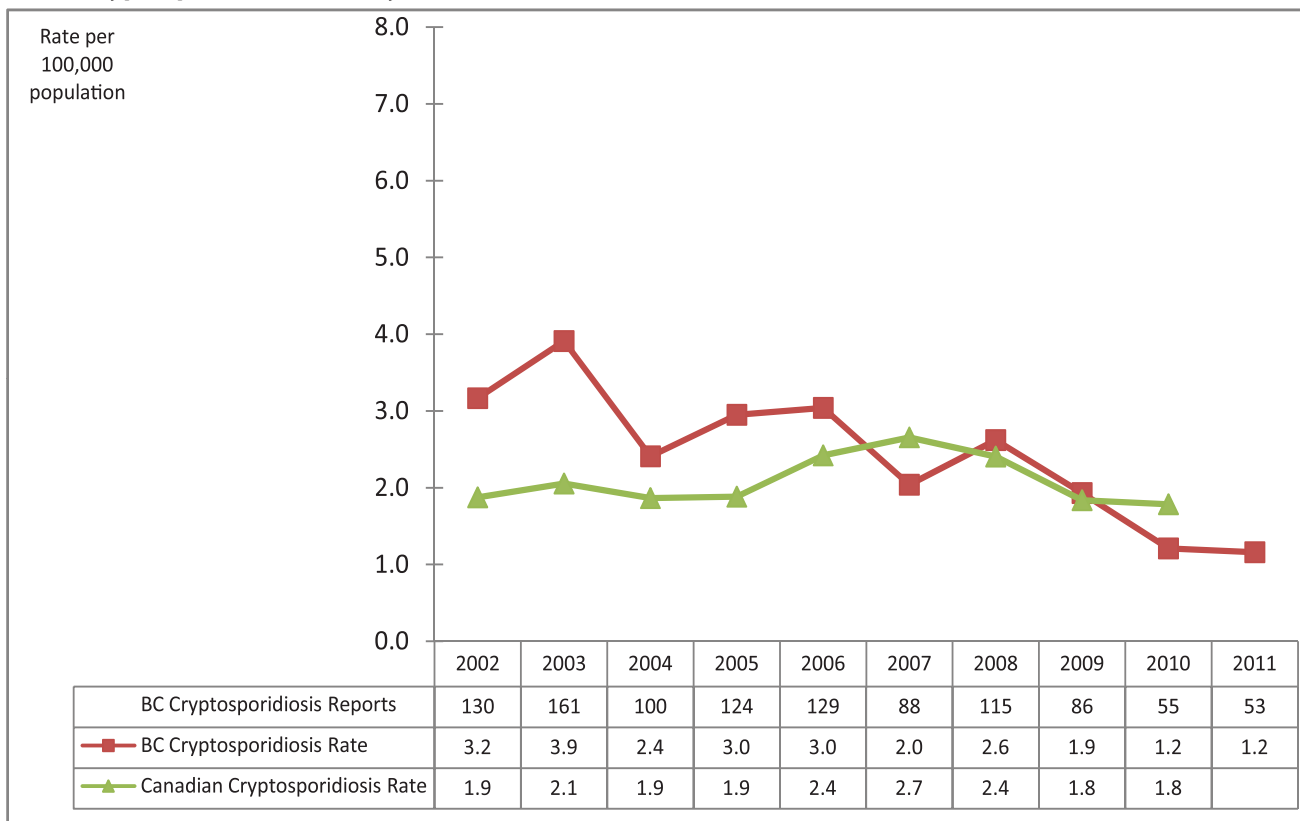


Cryptosporidiosis

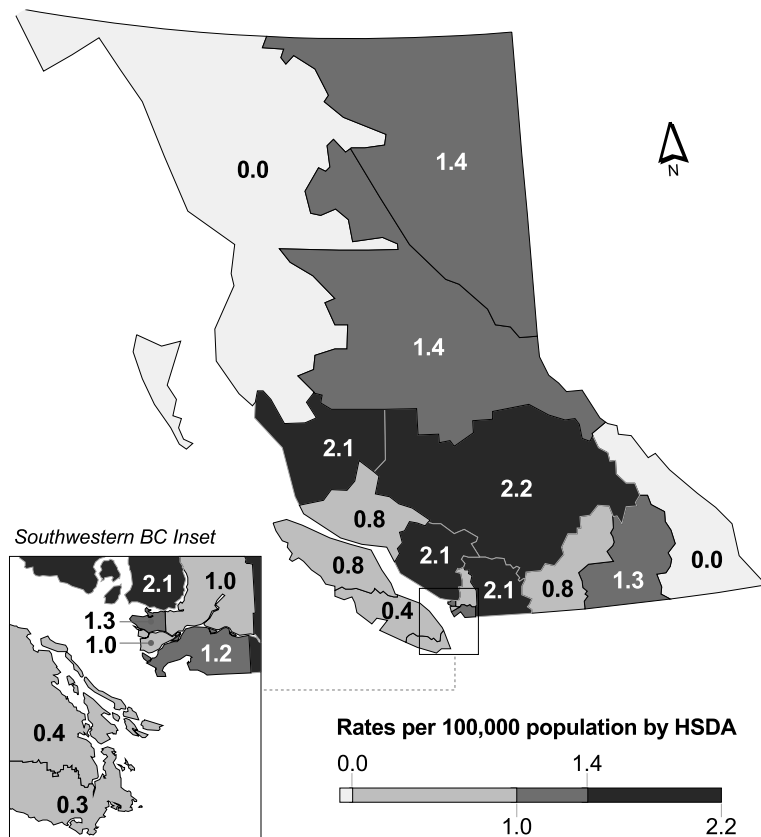
In 2011, 53 cases of cryptosporidiosis were reported, 29.7% were associated with international travel. Rates have continued to decrease in BC over the past decade. The highest rate was reported from Thompson Cariboo Shuswap (5 cases), followed by Fraser East and North Shore/Coast Garibaldi. Incidence of infection was highest in children

aged 1-4 years (3.3 per 100,000) followed by 2.4-2.5 per 100,000 in young adults aged 15-24 years. Rates in those aged 15-24 are increased slightly compared to 2010. No seasonal pattern was seen and no outbreaks were reported.

21.1 Cryptosporidiosis Rates by Year, 2002-2011



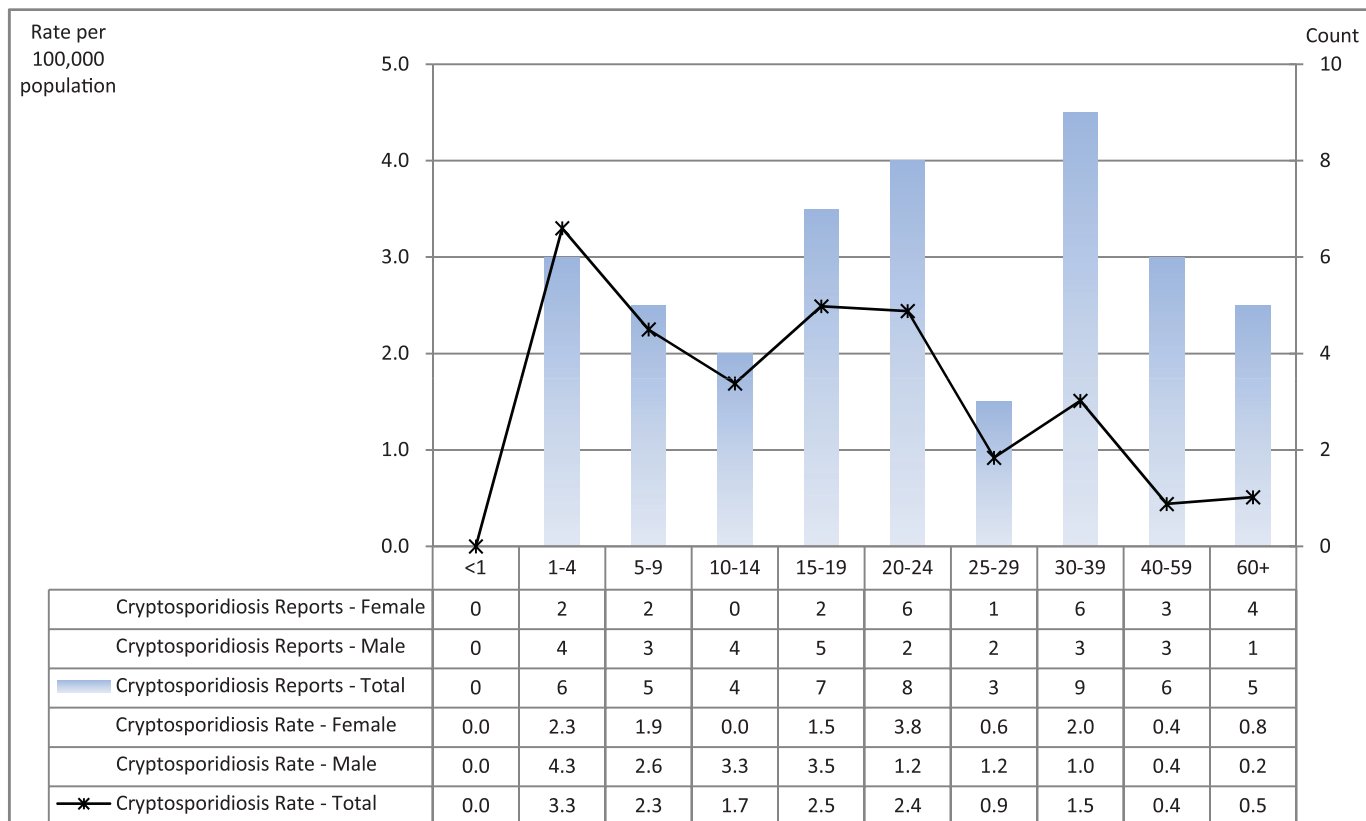
21.2 Cryptosporidiosis Rates by HSDA, 2011



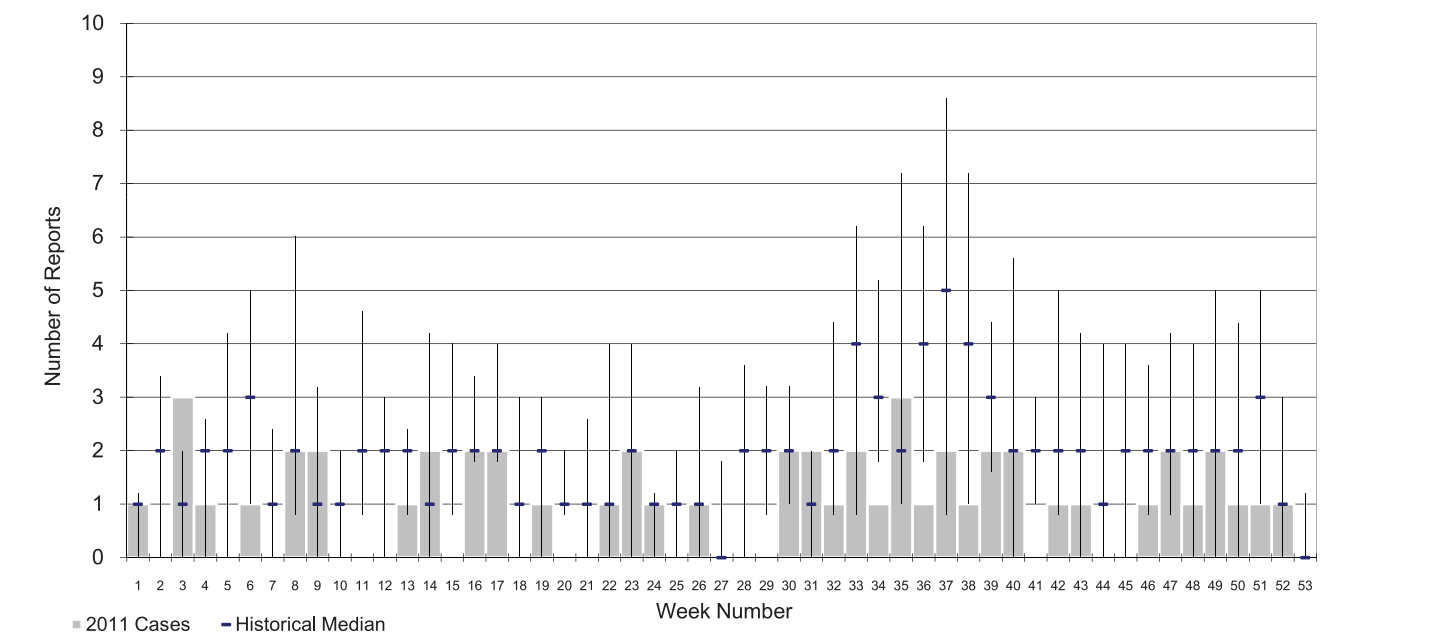
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	1	1.3
13	Okanagan	3	0.8
14	Thompson Cariboo Shuswap	5	2.2
21	Fraser East	6	2.1
22	Fraser North	6	1.0
23	Fraser South	9	1.2
31	Richmond	2	1.0
32	Vancouver	9	1.3
33	North Shore/Coast Garibaldi	6	2.1
41	South Vancouver Island	1	0.3
42	Central Vancouver Island	1	0.4
43	North Vancouver Island	1	0.8
51	Northwest	0	0.0
52	Northern Interior	2	1.4
53	Northeast	1	1.4

Note: Map classification by Jenks natural breaks method.

21.3 Cryptosporidiosis Rates by Age Group and Sex, 2011



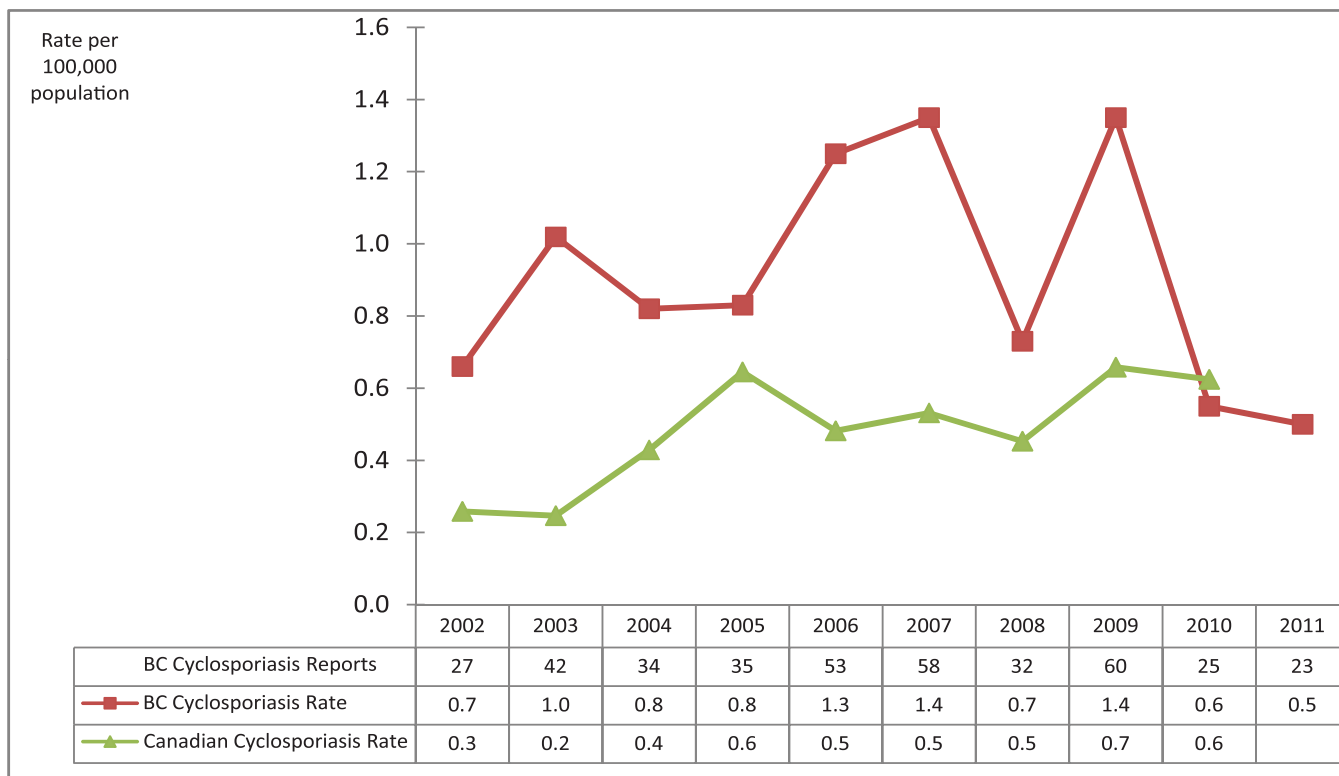
21.4 2011 Cryptosporidiosis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)



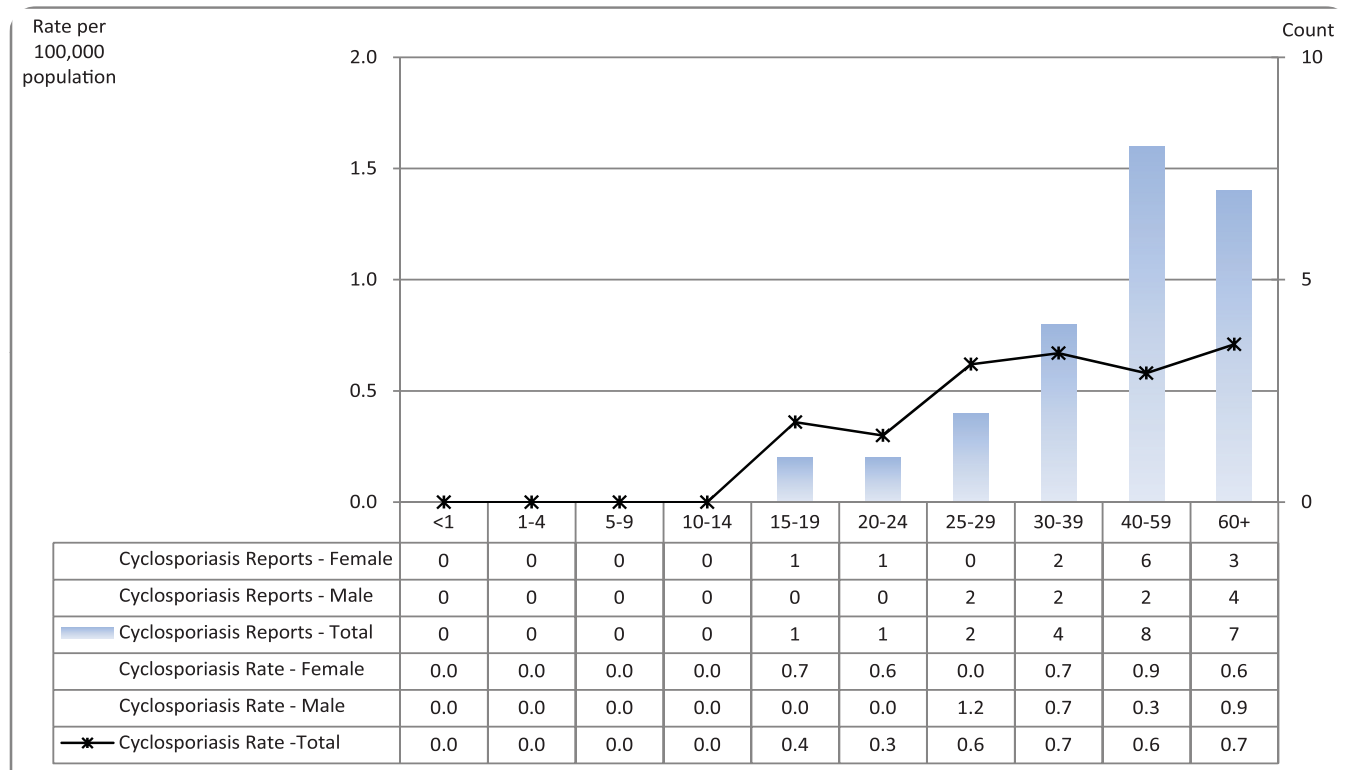
Cyclosporiasis

The number of cyclosporiasis infections reported decreased in 2011 to 23 cases (0.5 per 100,000), the lowest rate since 2002. Previous peaks have been associated with locally-acquired outbreaks associated with fresh produce (2006, 2007) or travel to endemic areas (2009). The majority of the infections in 2011 were also a result of travel to endemic areas such as South and Central America (60.0%).

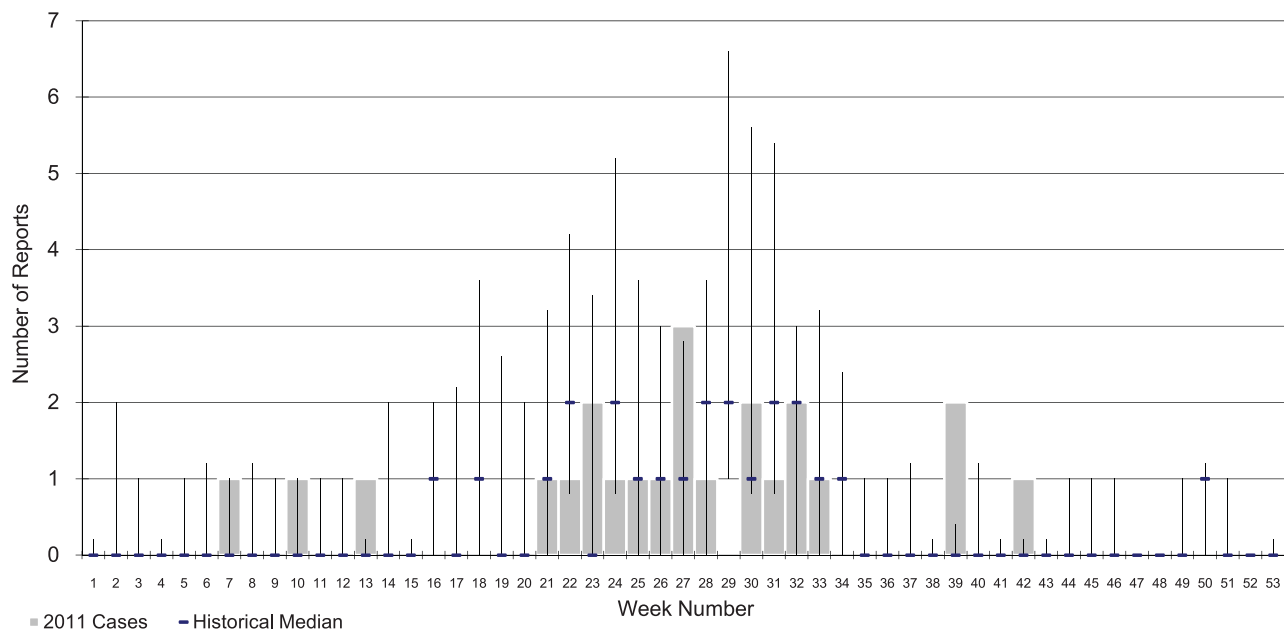
22.1 Cyclosporiasis Rates by Year, 2002-2011



22.2 Cyclosporiasis Rates by Age Group and Sex, 2011



22.3 2011 Cyclosporiasis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)

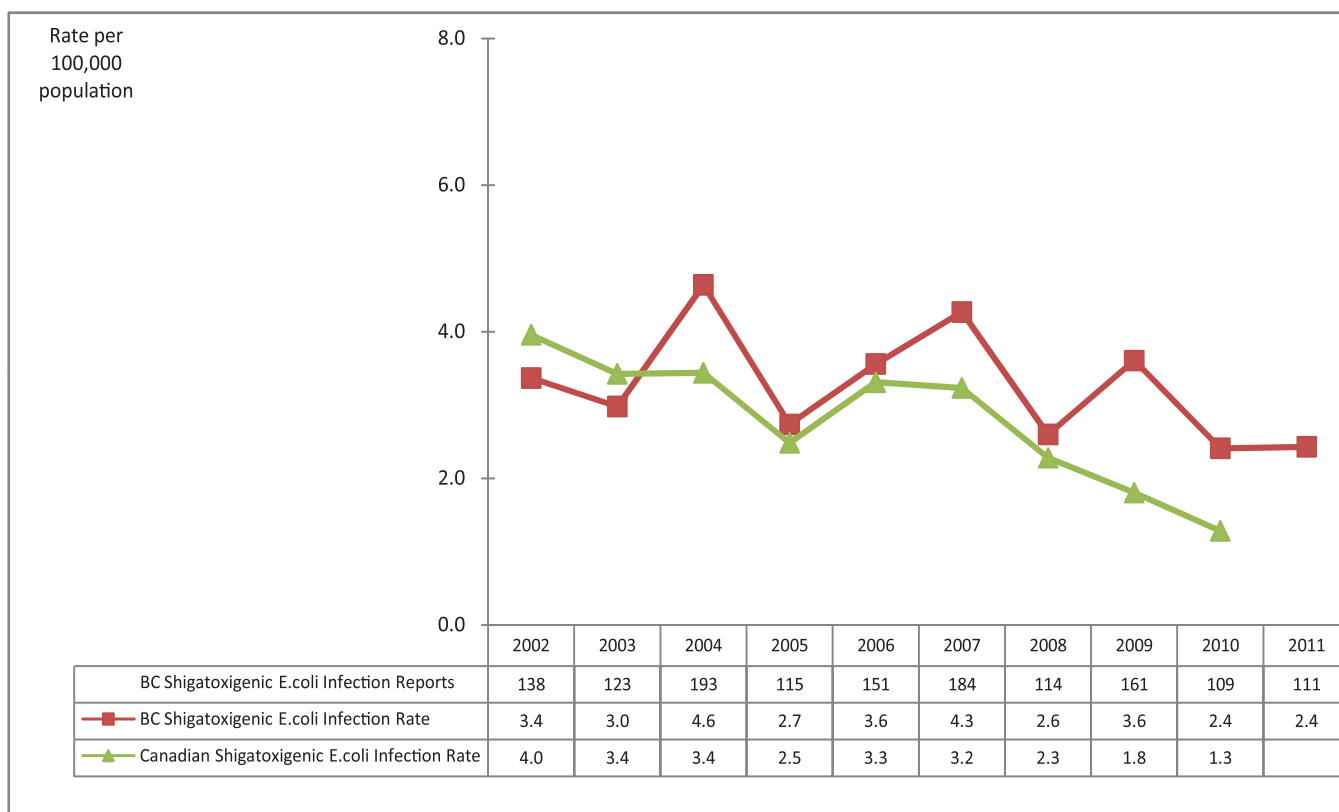


Shigatoxigenic *E. coli*

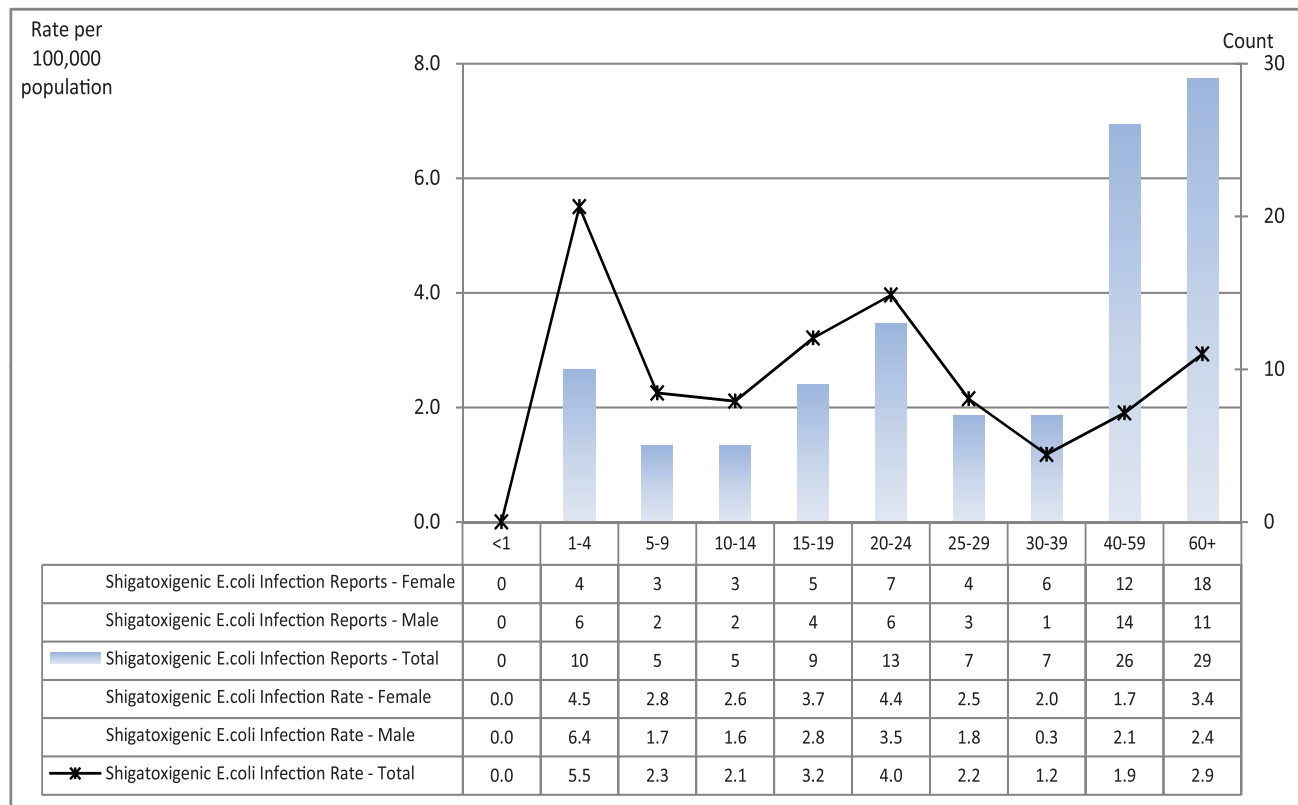
There were 111 cases of shigatoxigenic *E. coli* infection reported in BC in 2011, 16.7% of which were associated with international travel. The incidence remains stable and lower than previous years earlier in the decade. The highest rates of infection were observed in Kootenay Boundary, Fraser East and Central Vancouver Island. Incidence was highest in children aged 1-4 years and 20-24 years. The number of reported cases showed a typical increase in the summer months and a peak in week 47. The peak in week 47 and clustering of cases seen between weeks 38-50 was associated with a cluster of cases that were investigated in coordination with other provincial and federal colleagues where no source of illness was identified and a second investigation associated with a facility in Fraser South. In addition, an investigation of illnesses in Quebec and BC led to the recall of veal product in July.

O157 isolates made up the majority of isolates reported in BC. The number and proportion of non-O157 isolates may be under represented due to current testing practices. In recent years there have been an increasing number of outbreaks caused by non-O157 strains and increasing interest in improving surveillance and investigations associated with them.

23.1 Shigatoxigenic *E. coli* Rates by Year, 2002-2011



23.2 Shigatoxigenic *E. coli* Rates by Age Group and Sex, 2011

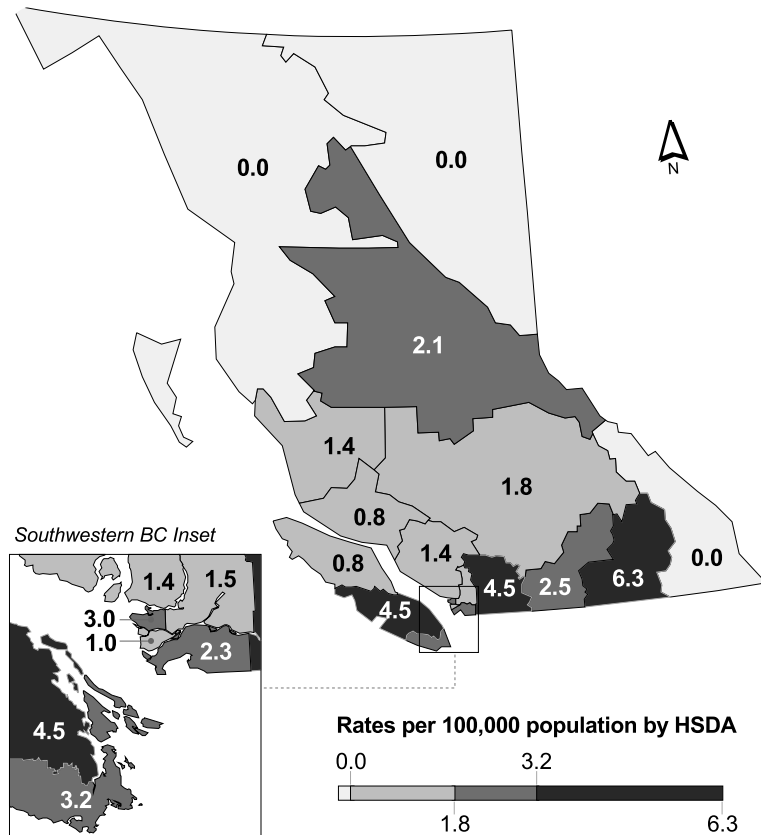


23.3 Shigatoxigenic *E. coli* distribution, 2011

Rank	Species	Number of Cases	Proportion
1	O157	49	63.6%
2	O26	4	5.2%
3	O121	3	3.9%
4	O103	2	2.6%
5	O111	2	2.6%
	Unknown/Unspecified	18	23.4%
	Total	77	100.0%

Note: Serogroup distribution is based on the BCCDC Public Health and Microbiology Reference Laboratory (PHMRL) data. Numbers may vary from those reported in iPHIS as not all isolates are serotyped.

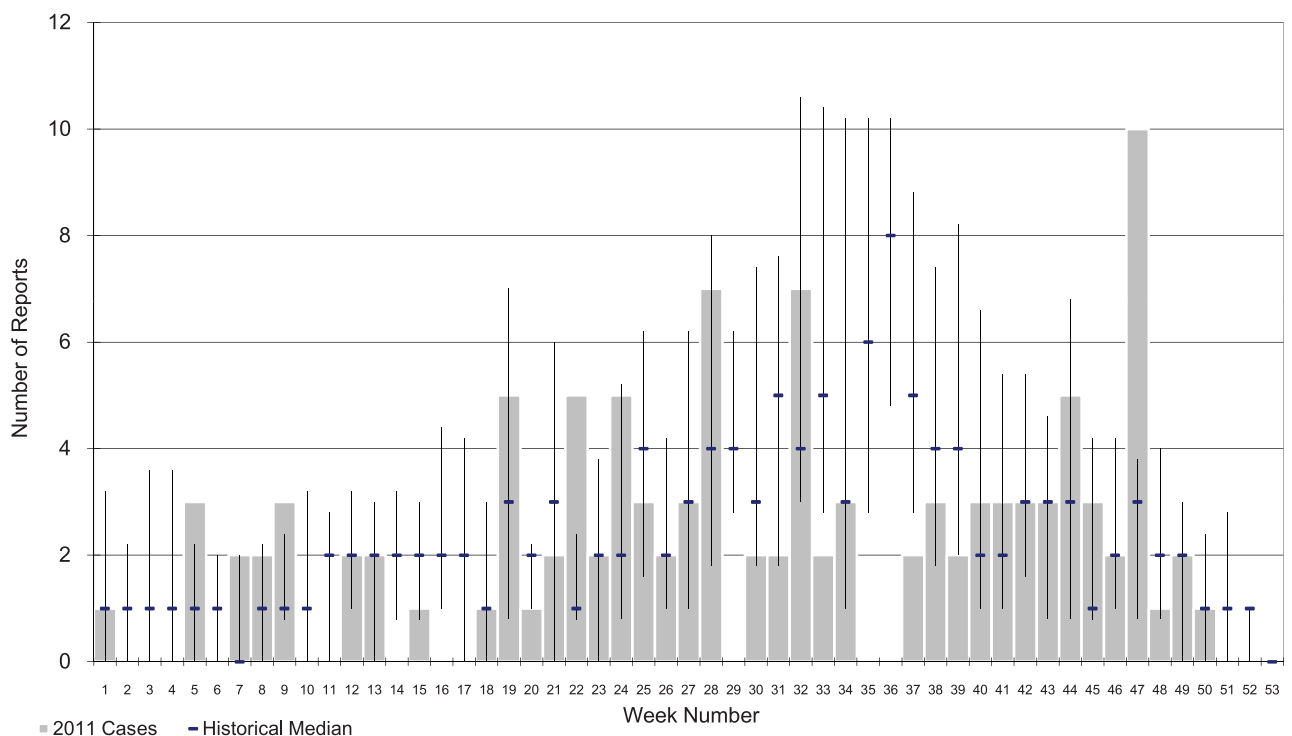
23.4 Shigatoxigenic *E. coli* Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	5	6.3
13	Okanagan	9	2.5
14	Thompson Cariboo Shuswap	4	1.8
21	Fraser East	13	4.5
22	Fraser North	9	1.5
23	Fraser South	17	2.3
31	Richmond	2	1.0
32	Vancouver	20	3.0
33	North Shore/Coast Garibaldi	4	1.4
41	South Vancouver Island	12	3.2
42	Central Vancouver Island	12	4.5
43	North Vancouver Island	1	0.8
51	Northwest	0	0.0
52	Northern Interior	3	2.1
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

23.5 2011 Shigatoxigenic *E. Coli* Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)

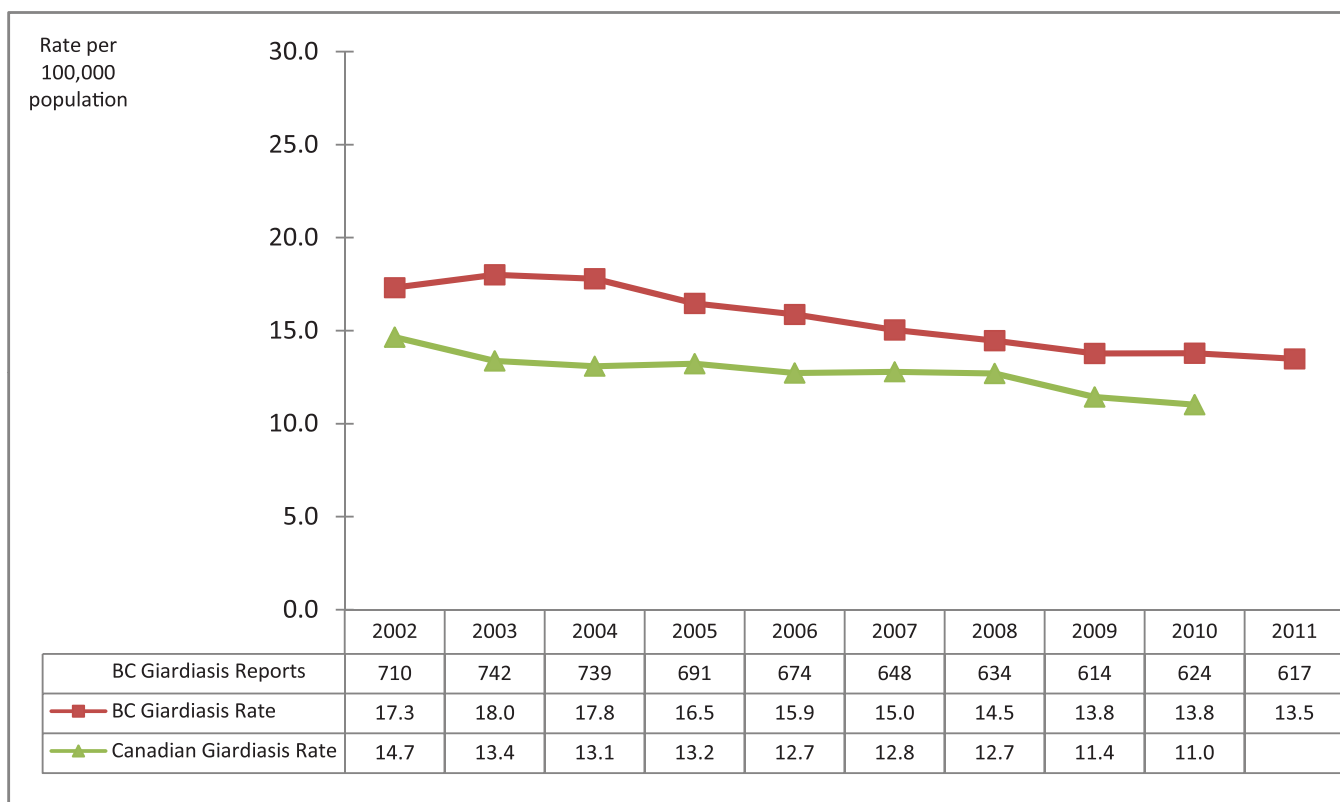


Giardiasis

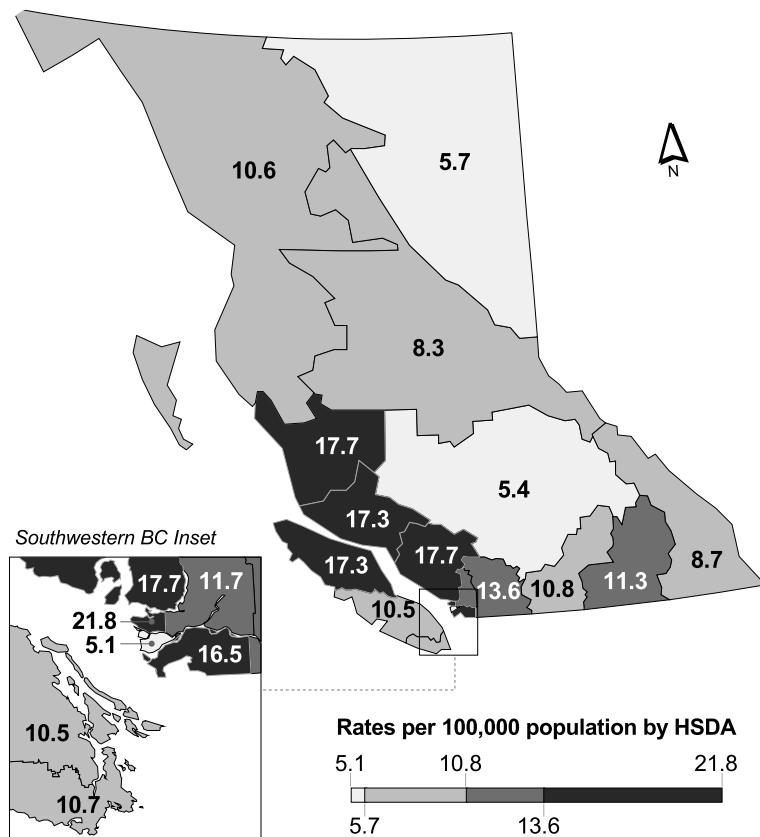
Annual rates of giardiasis in BC remained constant in 2011 (13.5 per 100,000). Rates were highest in Vancouver North Shore/Coast Garibaldi and North Vancouver Island. Rates have increased in North Vancouver Island and decreased in Northwest, Northeast and Okanagan HSDA compared

to 2010. Rates were highest in children 1-9 years and adult males 20-59 years. Rates in males aged 20-29 and females between the ages of 15-24 have increased compared to 2010. There was no seasonal pattern and no outbreaks detected in 2011.

24.1 Giardiasis Rates by Year, 2002-2011



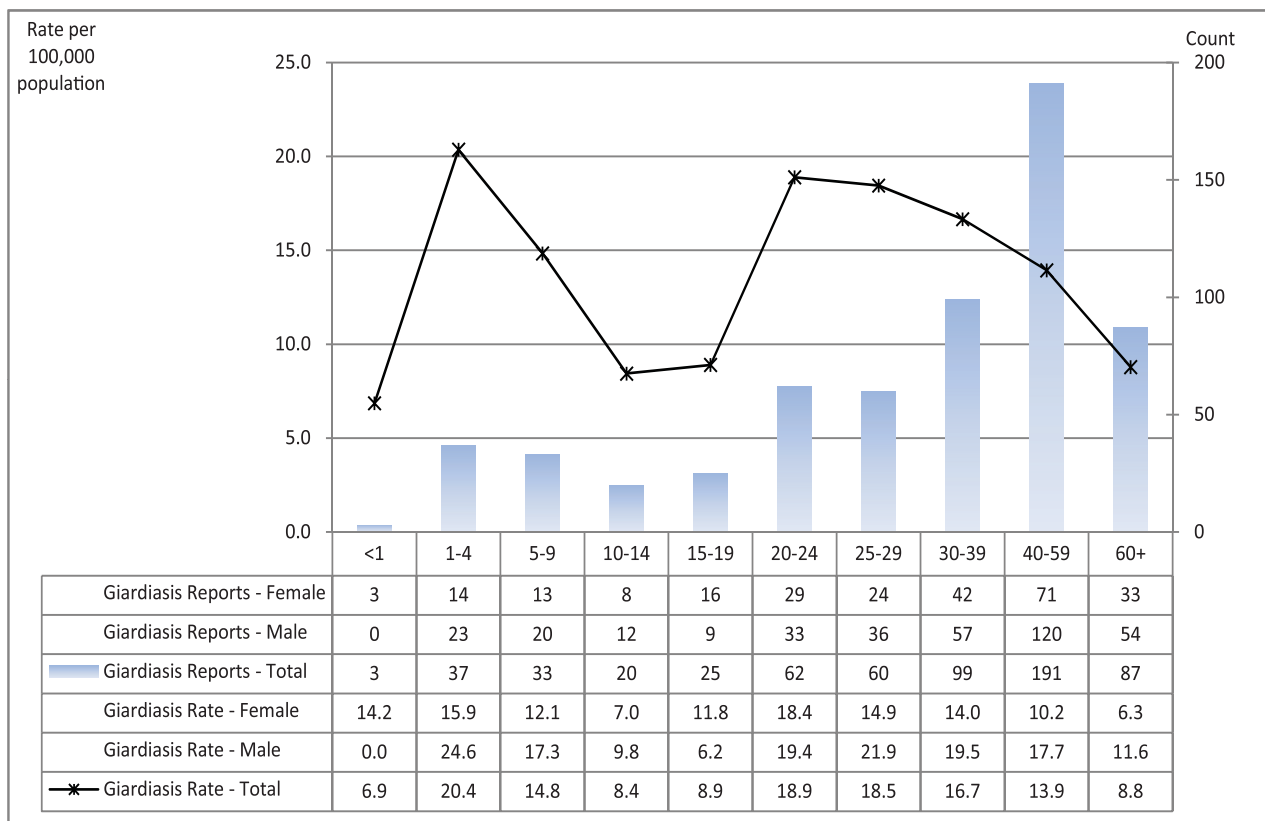
24.2 Giardiasis Rates by HSDA, 2011



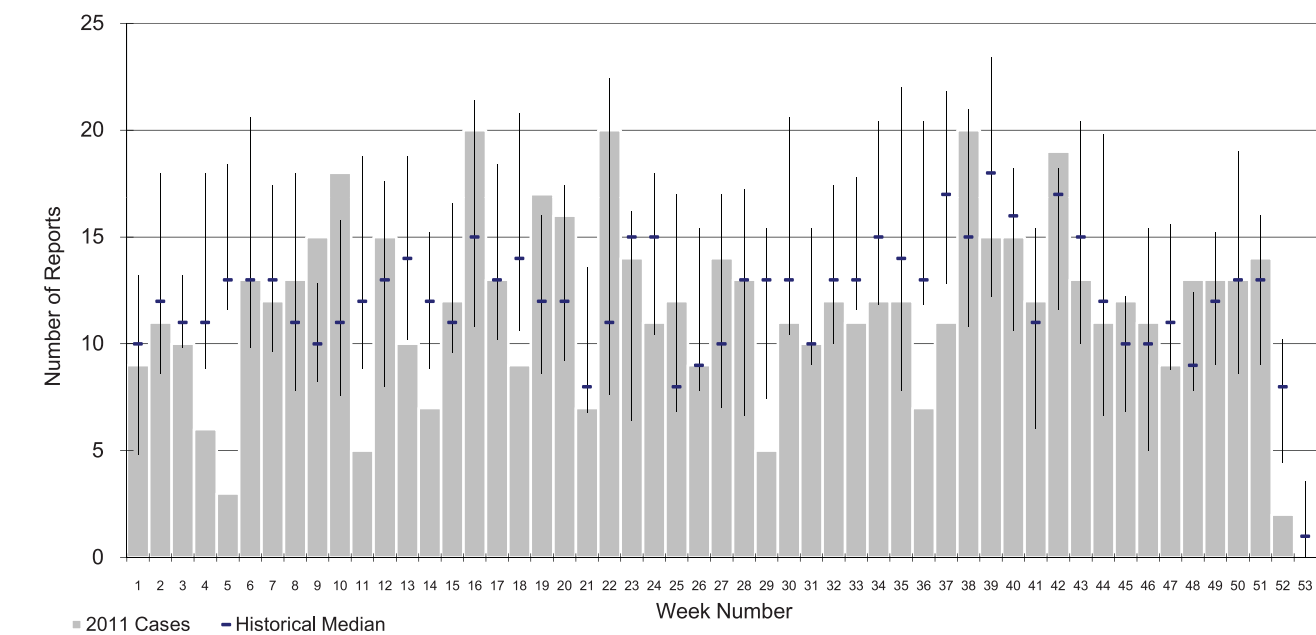
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	7	8.7
12	Kootenay Boundary	9	11.3
13	Okanagan	38	10.8
14	Thompson Cariboo Shuswap	12	5.4
21	Fraser East	39	13.6
22	Fraser North	72	11.7
23	Fraser South	120	16.5
31	Richmond	10	5.1
32	Vancouver	146	21.8
33	North Shore/Coast Garibaldi	51	17.7
41	South Vancouver Island	40	10.7
42	Central Vancouver Island	28	10.5
43	North Vancouver Island	21	17.3
51	Northwest	8	10.6
52	Northern Interior	12	8.3
53	Northeast	4	5.7

Note: Map classification by Jenks natural breaks method.

24.3 Giardiasis Rates by Age Group and Sex, 2011



24.4 2011 Giardiasis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)



Hepatitis A

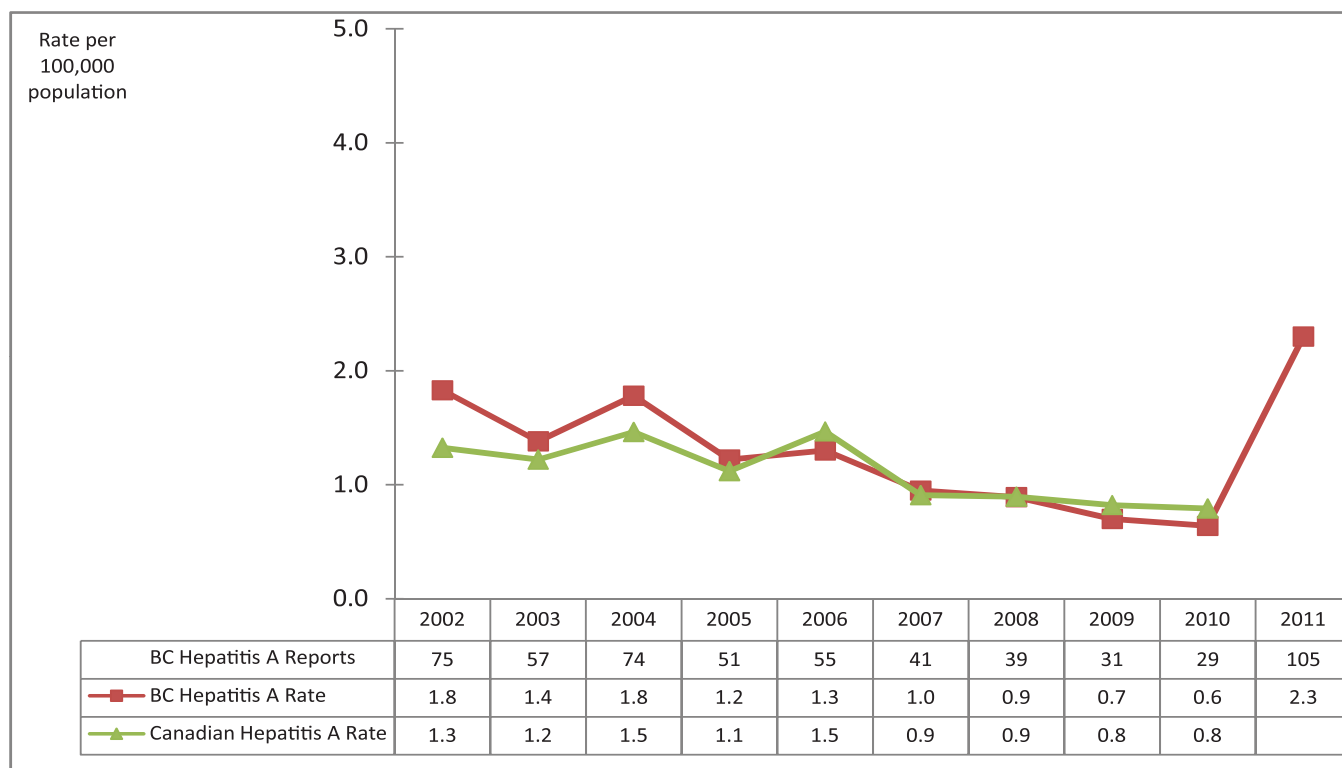
In 2011, there were a total of 105 reported cases of Hepatitis A in British Columbia. This yields a rate of 2.3 per 100,000, a dramatic increase from a previously declining provincial trend, and contrary to the continued declining national trend.

This observed increase is largely due to an outbreak which began in October 2010 and continued throughout the first 12 weeks of 2011 in Central Vancouver Island. In 2011 there were a total of 28 non-outbreak related cases of hepatitis A reported in BC; these cases tended to affect older children and adolescents, whereas outbreak cases were seen predominantly in children under 10 years old. In 2012, hepatitis A vaccine became available for all Aboriginal persons six months to 18 years of age living on or off reserve in BC.

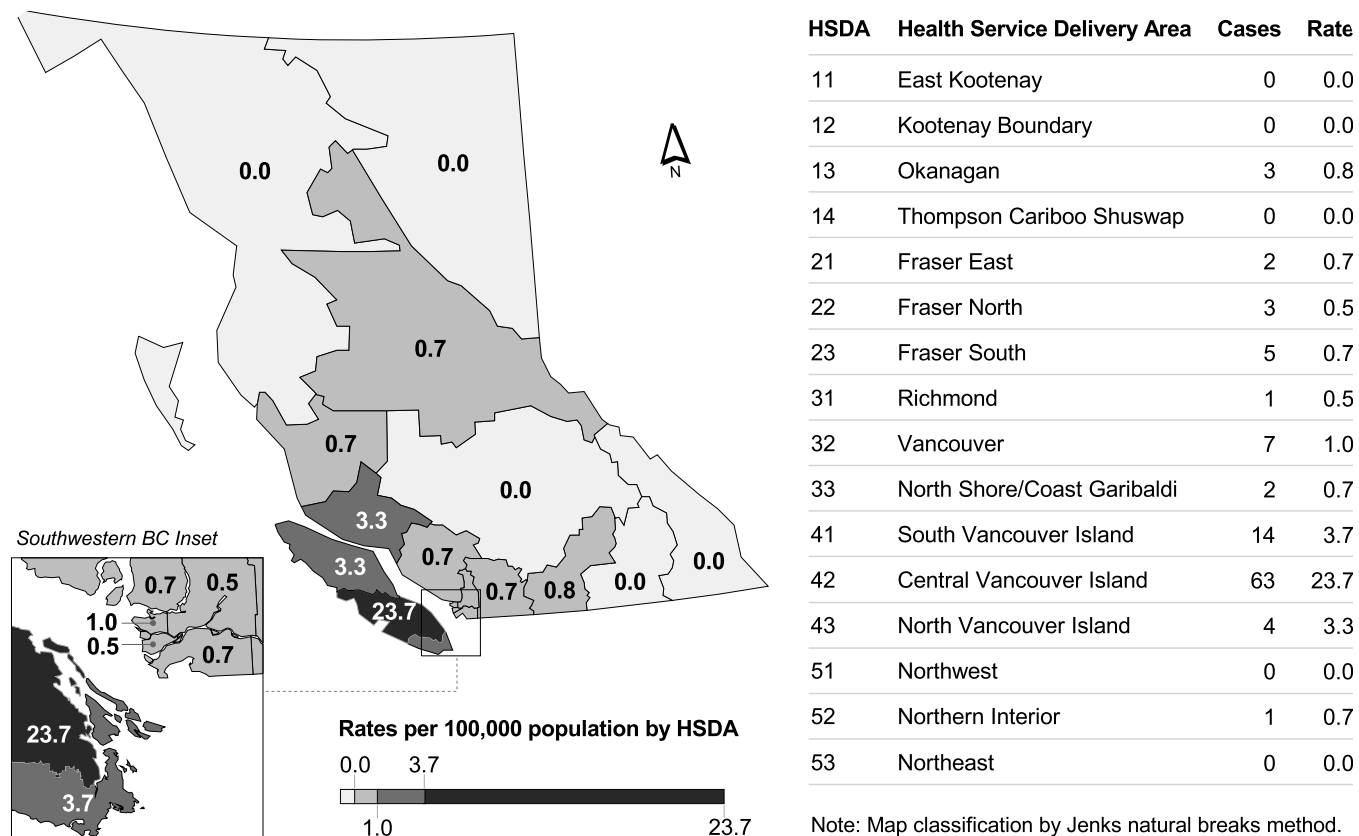
Of the non-outbreak cases in 2011, 10 came from the Fraser Health Authority, 10 from Vancouver Coastal, three from Interior, and one from Northern Health. While this represents little change for Fraser, Interior and Northern, it represented a doubling of the rate in Vancouver Coastal Health compared to 2010. However the numbers are small and therefore the rates are unstable. The increase in the rate in Vancouver Coastal Health may be partially attributed to its proximity to the outbreak region of Vancouver Island and an increase in awareness. Moreover, of the cases not epidemiologically linked to the outbreak, the majority were associated with travel to, or visitors from endemic regions outside Canada, such as Mexico and India¹.

¹Kuo, Margot. Hepatitis A in British Columbia, 2010-2011. <http://www.bccdc.ca/NR/rdonlyres/BAFDED8C-77EA-4493-A3A9-6AD7483A65D6/0/HepatitisAUpdateBC20102011.pdf>

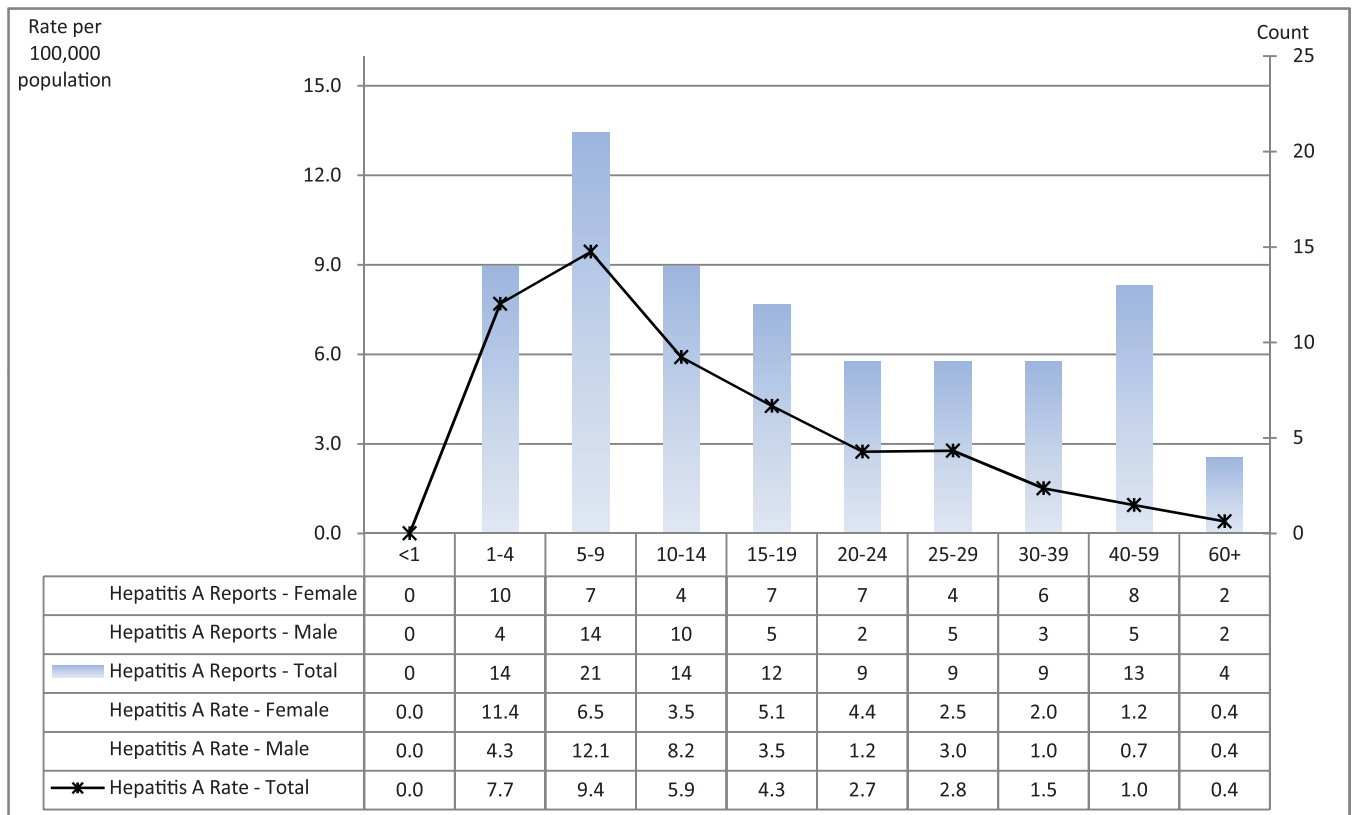
25.1 Hepatitis A Rates by Year, 2002-2011



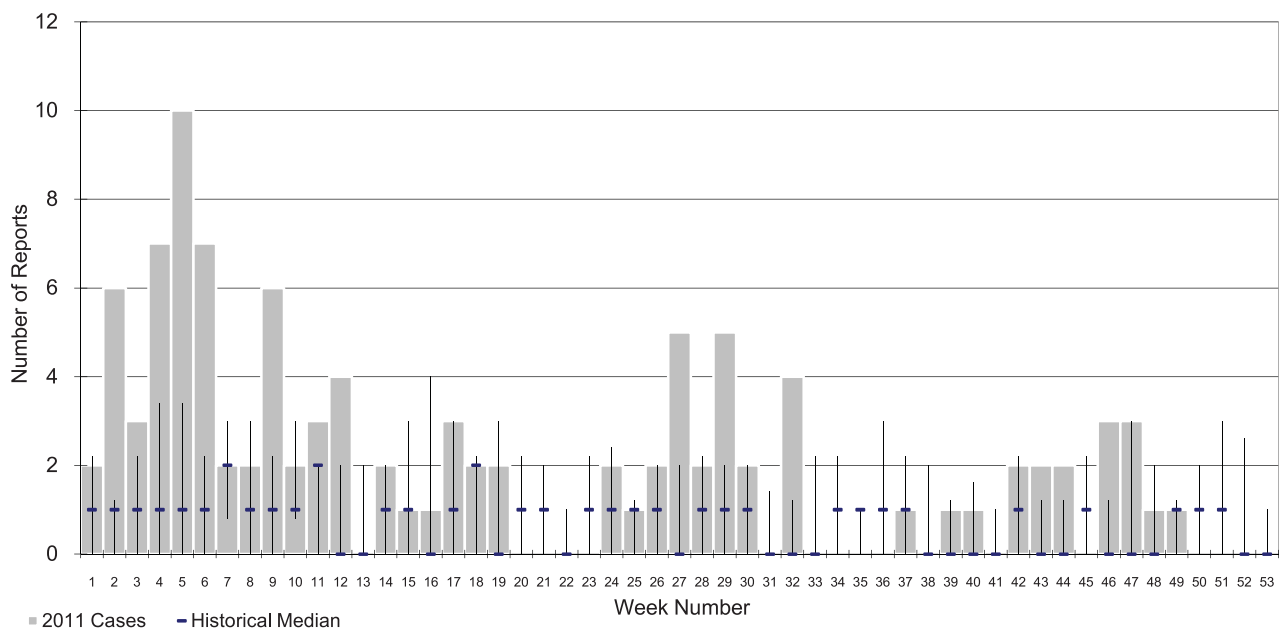
25.2 Hepatitis A Rates by HSDA, 2011



25.3 Hepatitis A Rates by Age Group and Sex, 2011



25.4 2011 Hepatitis A Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)

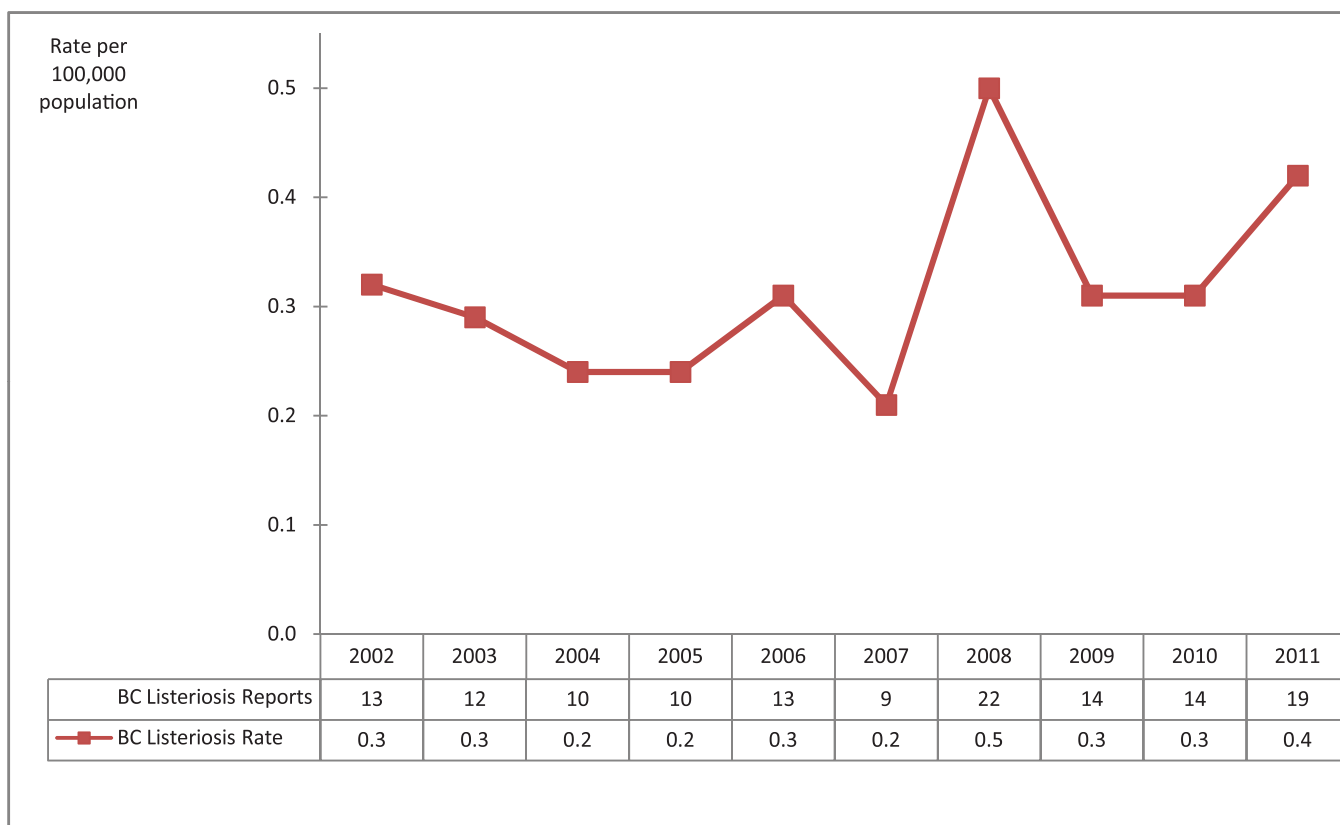


Listeriosis

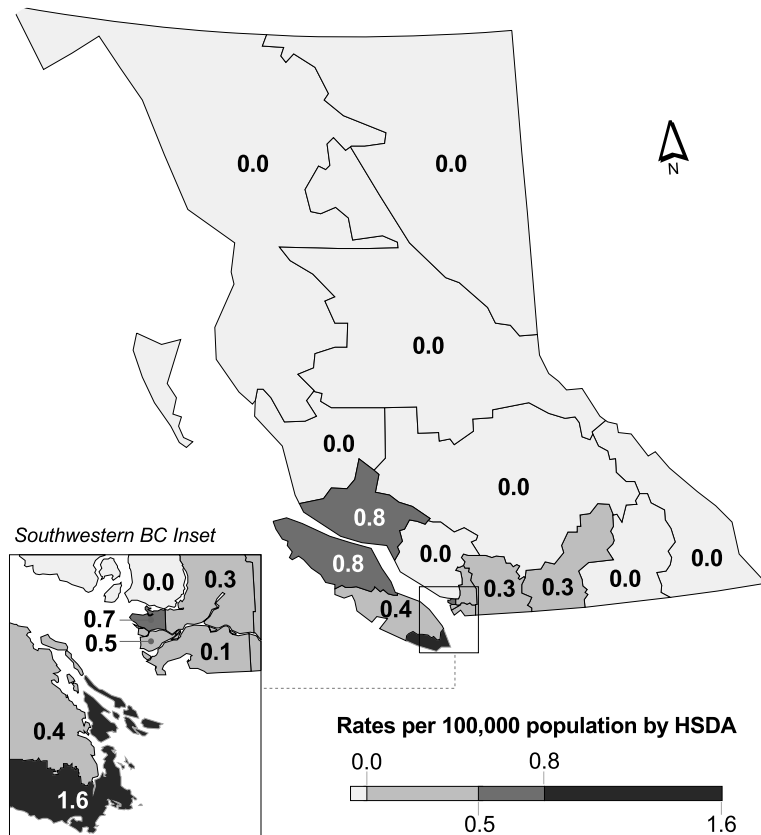
Nineteen cases of invasive listeriosis were reported in 2011, none were associated with international travel. The incidence in 2011 increased slightly. Rates were highest among adults over the age of sixty and one neonatal case was reported. There was no regional clustering and cases occurred throughout the year. No outbreaks were reported.

New resources for pregnant women related to food safety and listeriosis have been developed and are available at: www.bccdc.ca/foodsafetyinpregnancy

26.1 Listeriosis Rates by Year, 2002-2011



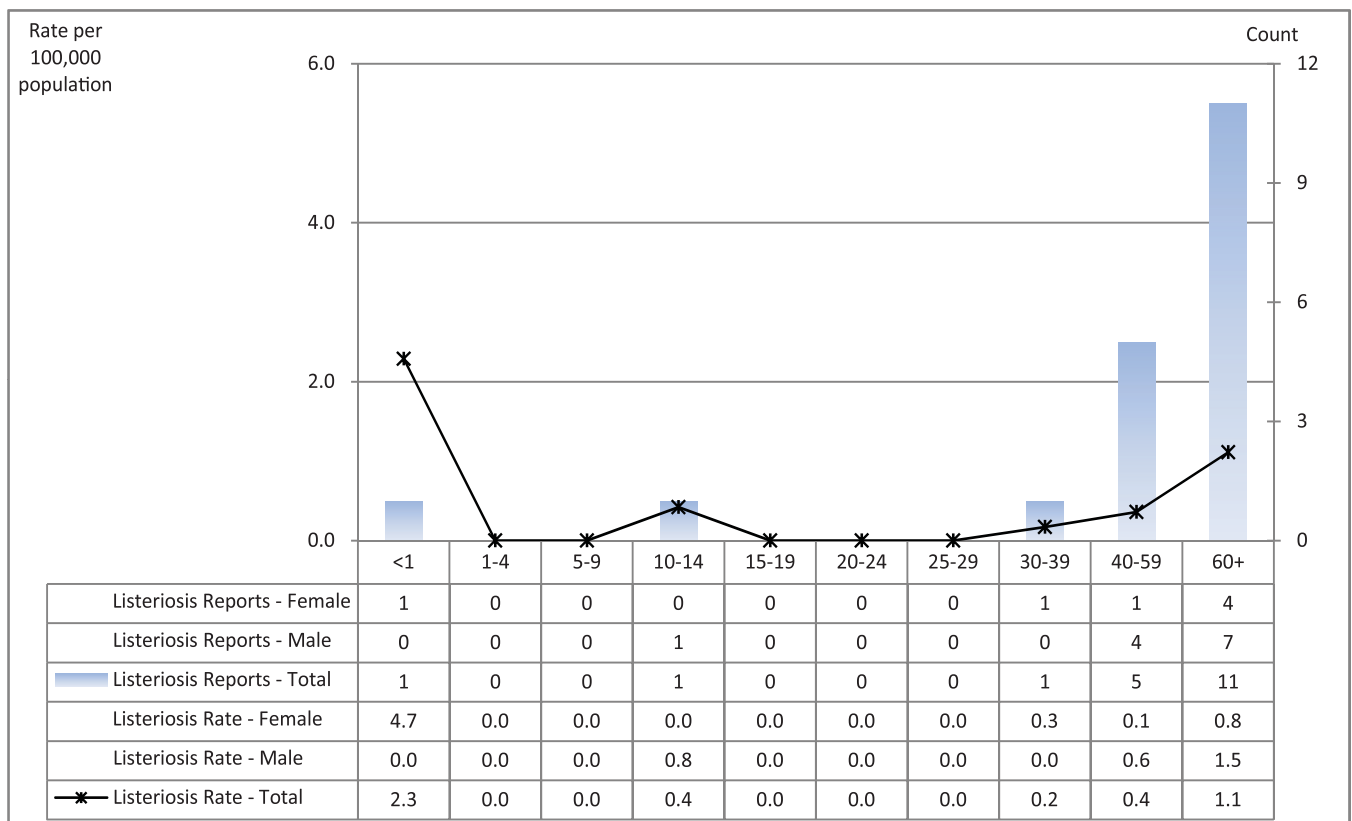
26.2 Listeriosis Rates by HSDA, 2011



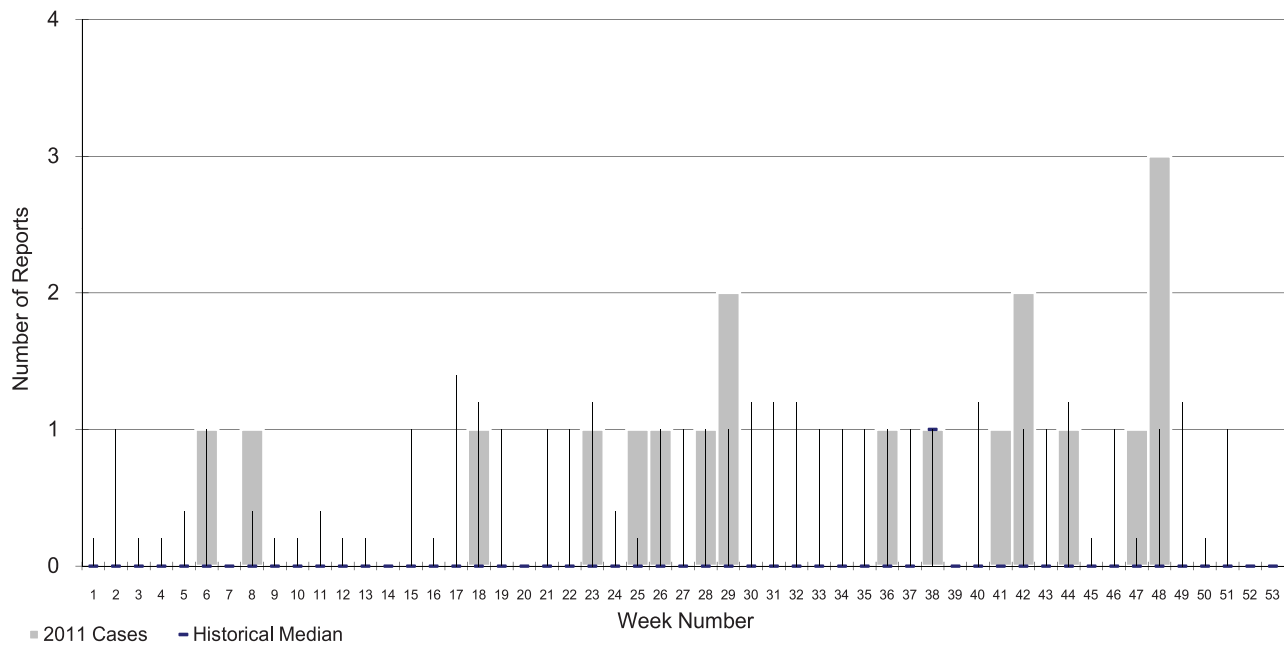
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	0	0.0
13	Okanagan	1	0.3
14	Thompson Cariboo Shuswap	0	0.0
21	Fraser East	1	0.3
22	Fraser North	2	0.3
23	Fraser South	1	0.1
31	Richmond	1	0.5
32	Vancouver	5	0.7
33	North Shore/Coast Garibaldi	0	0.0
41	South Vancouver Island	6	1.6
42	Central Vancouver Island	1	0.4
43	North Vancouver Island	1	0.8
51	Northwest	0	0.0
52	Northern Interior	0	0.0
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

26.3 Listeriosis Rates by Age Group and Sex, 2011



26.4 2011 Listeriosis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)



Salmonellosis, Typhoid Fever and Paratyphoid Fever*

In 2011, 1103 cases of salmonellosis were reported for a rate of 24.1 per 100,000. *Salmonella* infection continues to be the second most commonly reported enteric disease in BC. Overall, 26.6% of *Salmonella* infections were associated with international travel. The rate in 2011 remained stable compared to 2010 but was still increased compared to years prior to 2007. Rates remain highest in children under five years of age. Three peaks were seen in 2011; early spring (week 15), summer (weeks 24-28) and winter (week 47). The spring peak was associated with an investigation of cases in the lower mainland, no source was identified. The summer peak was associated with clusters of cases associated with common food establishments and events and the winter peak was associated with a large outbreak associated with an event in Vancouver associated with a dessert made with eggs. Rates were highest among residents of North Shore/Coast Garibaldi, Fraser South and Fraser East.

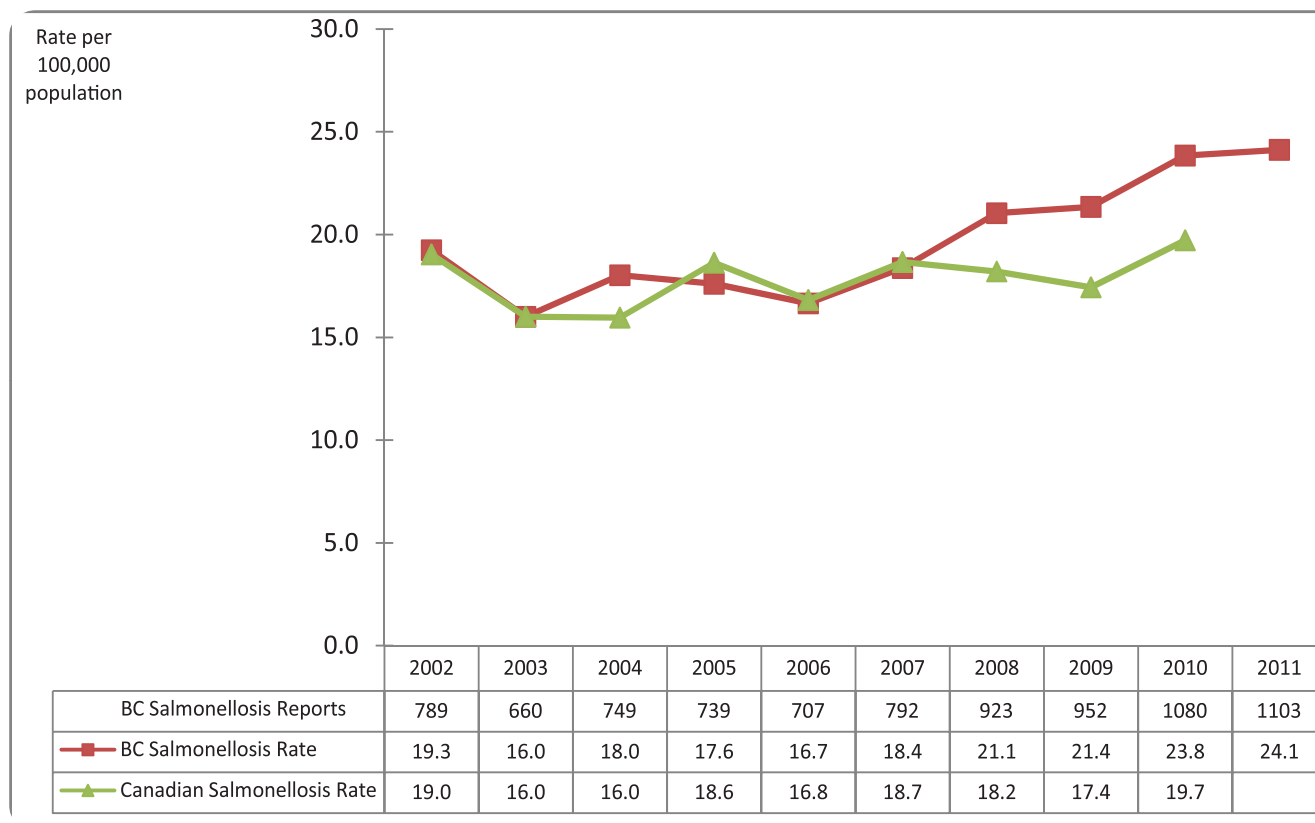
Ongoing investigation of *S. Enteritidis* continued in 2011. Over 200 cases were investigated in 2011 and over 800 cases have been investigated since May 2008. The majority of cases resided in the lower mainland which likely explains the higher rates in these geographic areas. The largest number of cases was reported in summer months reflected by the summer peak.

Typhoid and paratyphoid fever rates in British Columbia remained stable in 2011 (0.7 and 0.6 per 100,000 respectively). 75.0% and 80.0% percent were associated with international travel respectively. Cases of Typhoid and Paratyphoid Fever are acquired during travel to endemic countries and the majority of cases clustered in the first quarter of the year, a temporal reflection of the travel patterns of BC residents. Most cases were reported from Fraser Health Authority and were associated with travel to India.

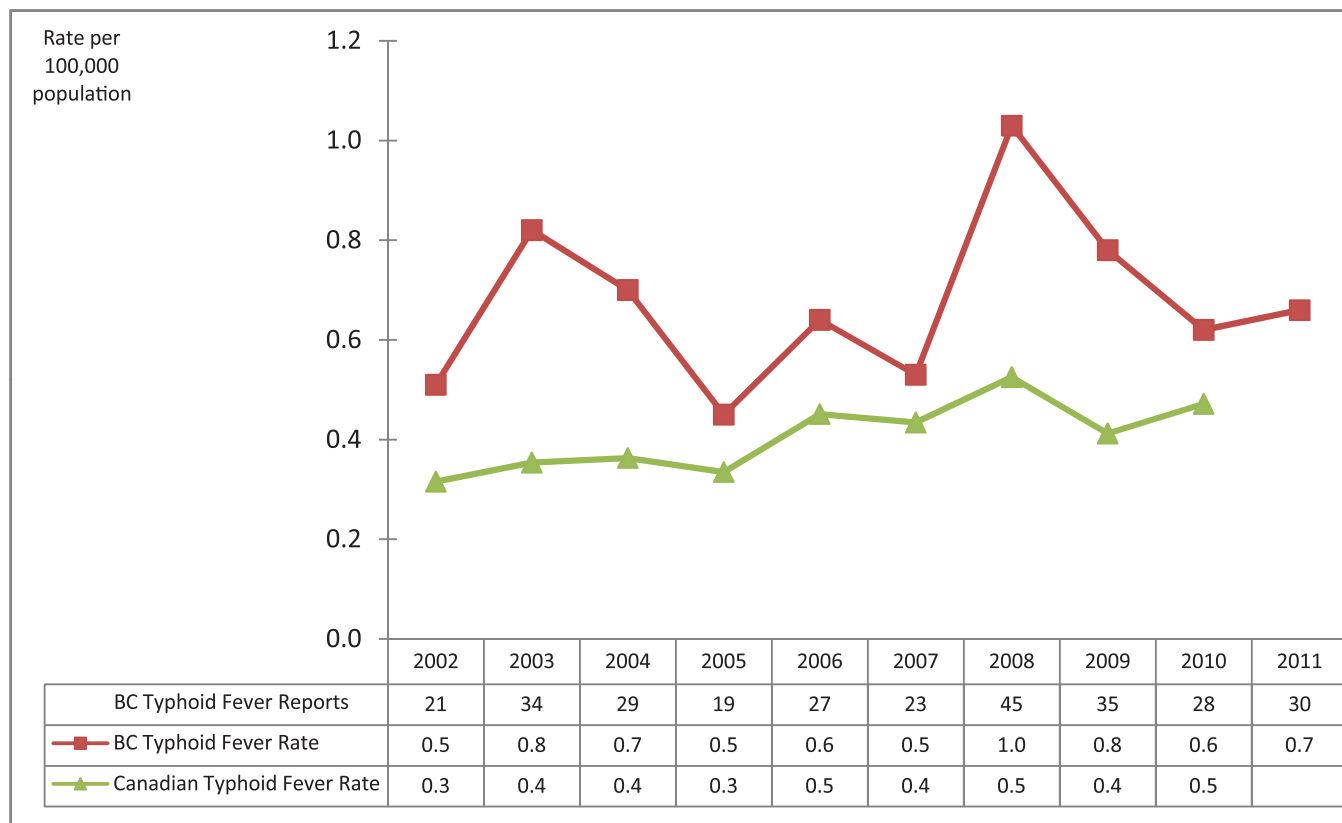
Enteritidis, Typhimurium and Heidelberg remained the top three serotypes isolated in 2011. As in previous years, the proportion of Enteritidis continues to increase whereas the proportion of Typhimurium continues to decrease. Typhi, Paratyphi A, *Salmonella* ssp I 4,5,12:i, Stanley and Newport remain in the top 10. *S. Infantis* is reported in the top 10 due to an outbreak in November and December associated with a single restaurant.

**All cases of Salmonella infection reported through iPHIS, including S. Typhi and S. Paratyphi, have been included in the overall numbers and rates by year, the rates by age and sex, the geographical distribution of cases and the cases reported by week. S. Typhi (Typhoid fever) and S. Paratyphi (Paratyphoid fever) cases and rates by year have also been presented separately.*

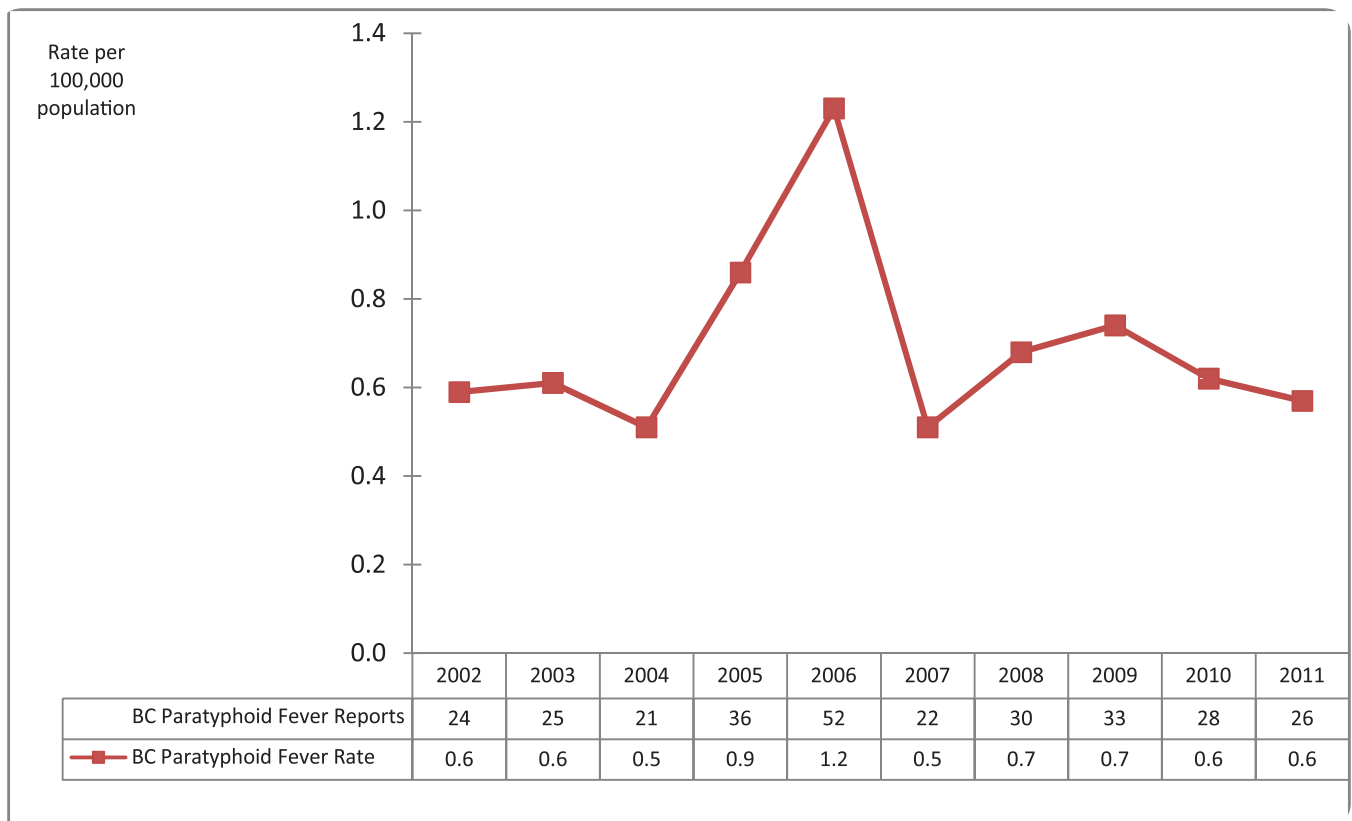
27.1 Salmonellosis Rates by Year, 2002-2011



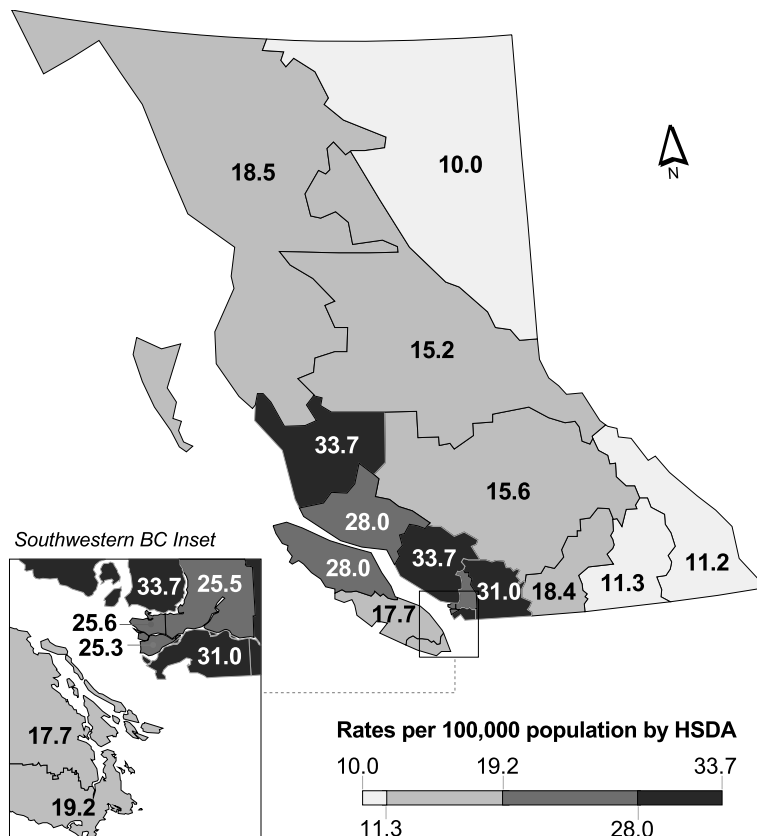
27.2 Typhoid Rates by Year, 2002-2011



27.3 Paratyphoid Fever Rates by Year, 2002-2011



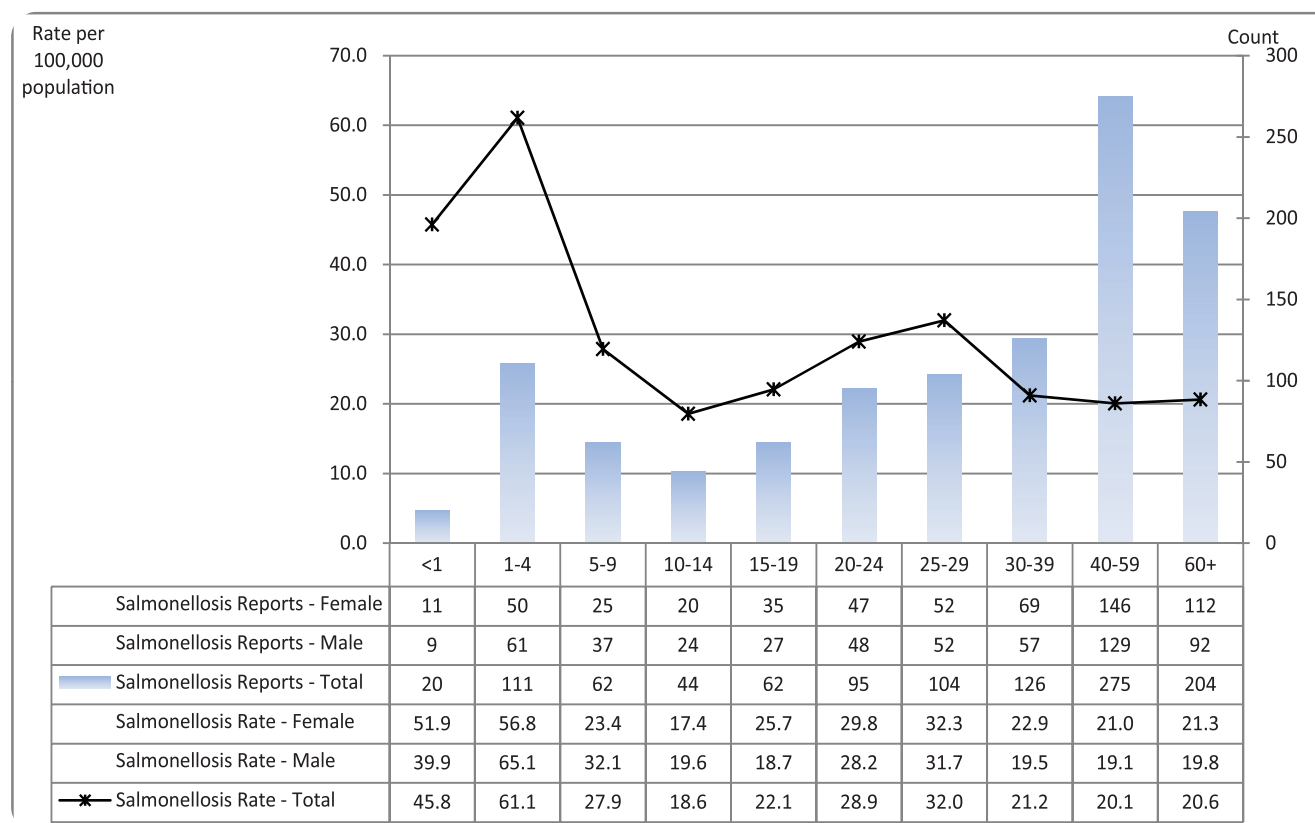
27.4 Salmonellosis Rates by HSDA, 2011



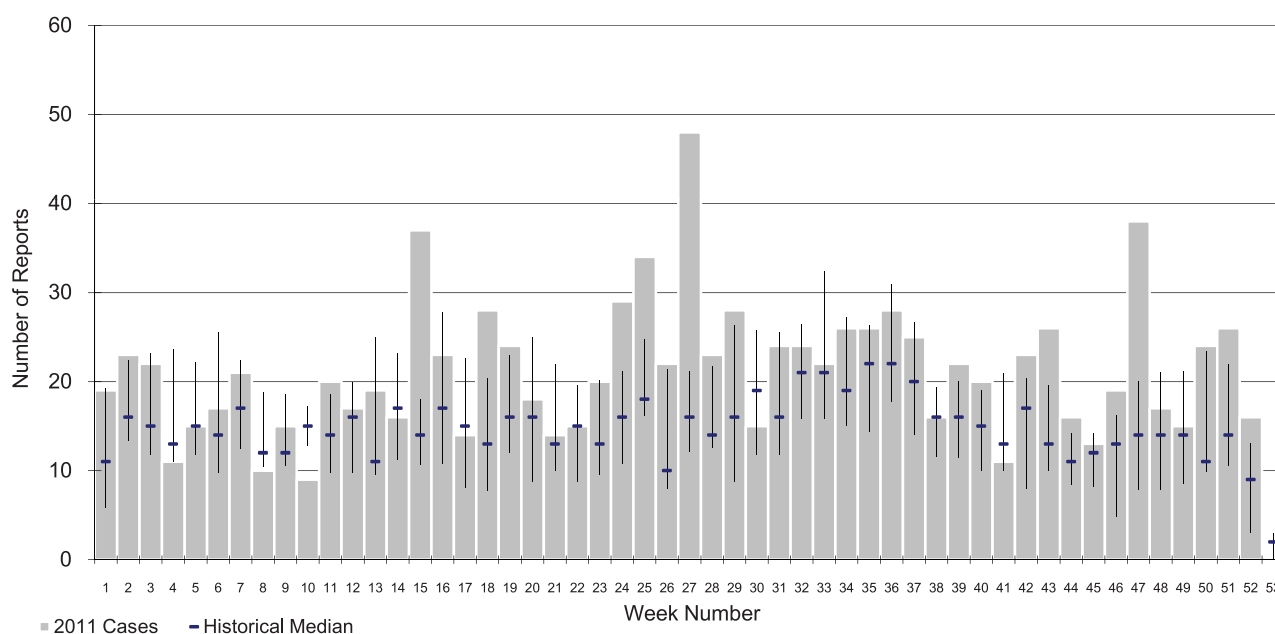
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	9	11.2
12	Kootenay Boundary	9	11.3
13	Okanagan	65	18.4
14	Thompson Cariboo Shuswap	35	15.6
21	Fraser East	89	31.0
22	Fraser North	157	25.5
23	Fraser South	225	31.0
31	Richmond	50	25.3
32	Vancouver	171	25.6
33	North Shore/Coast Garibaldi	97	33.7
41	South Vancouver Island	72	19.2
42	Central Vancouver Island	47	17.7
43	North Vancouver Island	34	28.0
51	Northwest	14	18.5
52	Northern Interior	22	15.2
53	Northeast	7	10.0

Note: Map classification by Jenks natural breaks method.

27.5 Salmonellosis Rates by Age Group and Sex, 2011



27.6 2011 Salmonellosis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002-2009)



27.7 *Salmonella* serotype distribution, 2011

Rank	Species	Number of Cases	Proportion
1	Enteritidis	588	50.8%
2	Typhimurium	79	6.8%
3	Heidelberg	51	4.4%
4	<i>Typhi</i>	40	3.5%
5	Infantis	33	2.8%
6	Paratyphi A	30	2.6%
7	<i>Salmonella</i> ssp I 4,5,12:i-	27	2.3%
8	Paratyphi B var. Java	17	1.5%
9	Agona	16	1.5%
10	Newport	16	1.5%
11	Stanley	16	1.5%
	Others	245	21.2%
	Total	1158	100.0%

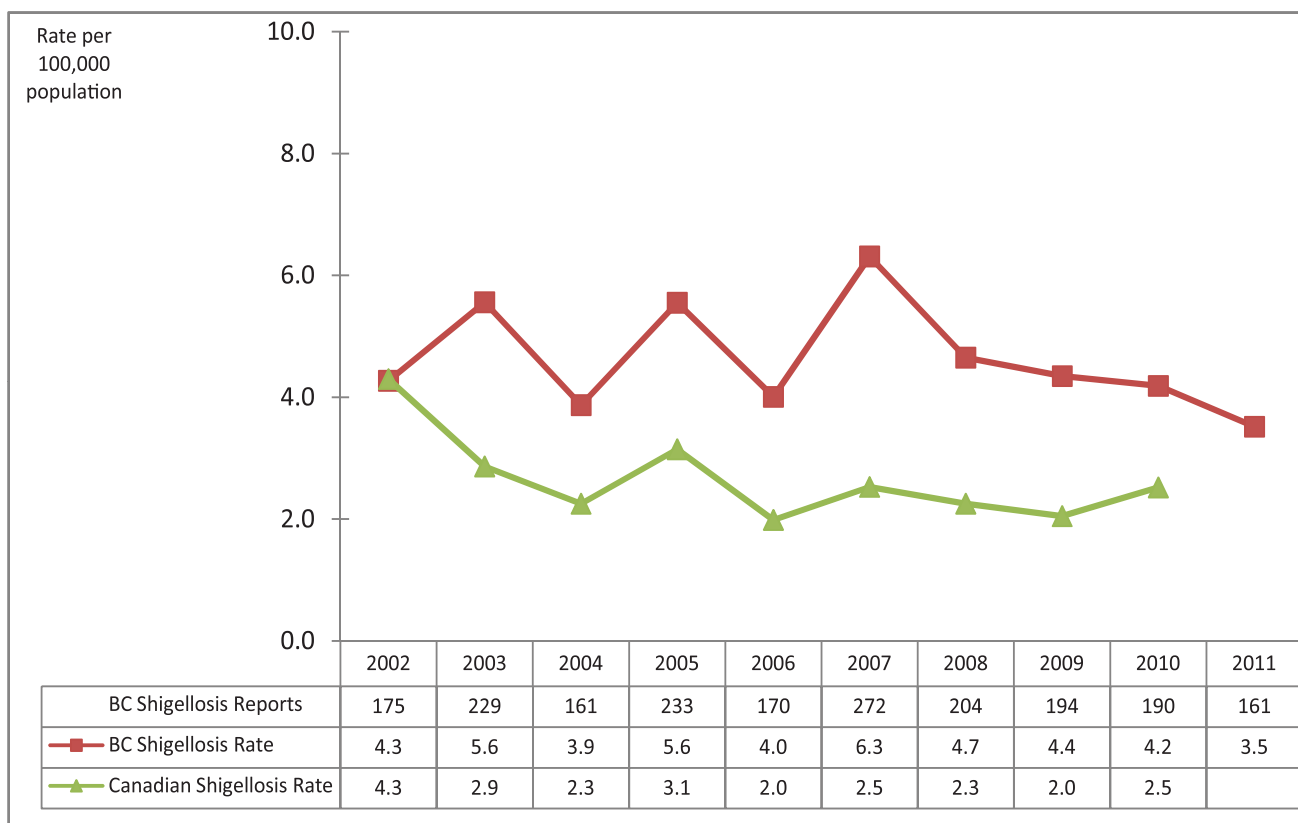
Note: Species distribution is based on the BCCDC Public Health and Microbiology Reference Laboratory data. Numbers may vary from those reported in iPHIS.

Shigellosis

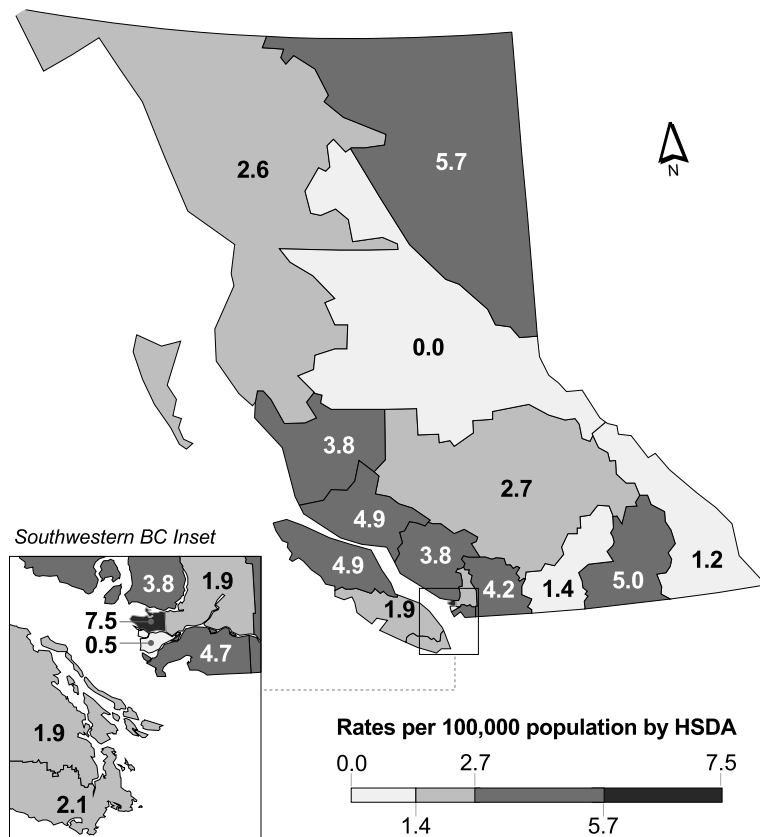
In 2011, the annual incidence decreased slightly (3.5 per 100,000). International travel accounted for 66.4% of cases. Rates continue to be highest in Vancouver. Increased incidence was seen from Kootenay Boundary and Northeast HSDA in 2011 compared to 2010. Incidence rates were highest children aged 1-4 years and adults aged 25-29 years. There was no seasonal pattern and no outbreaks were reported.

S. flexneri was the most common species reported in 2011 for the third year in a row. This is a change from previous years when *S. sonnei* accounted for the majority of isolates reported; however in 2011 the proportion between the two types was almost equal compared to previous years when *flexneri* made up over 50%. These changes may in part be due to transmission among MSM and/or acquisition during travel.

28.1 Shigellosis Rates by Year, 2002-2011



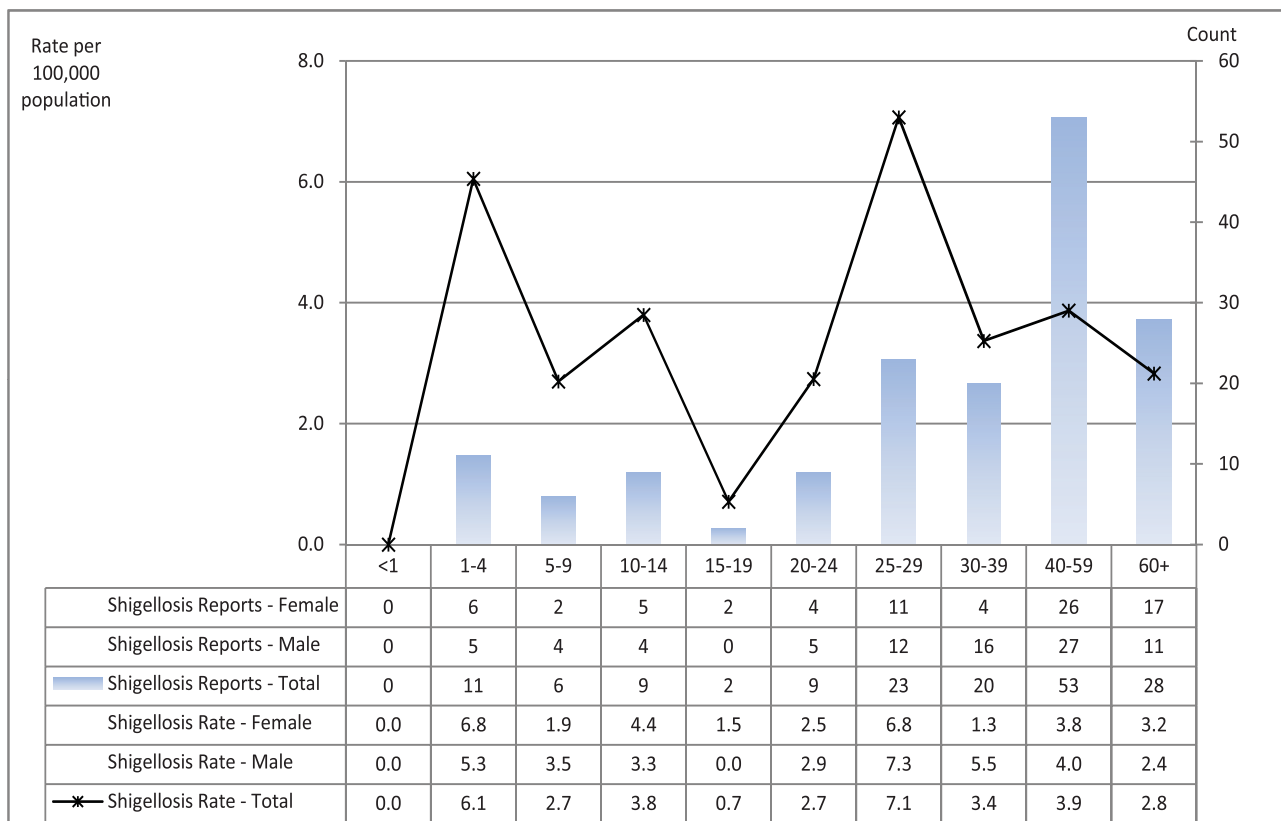
28.2 Shigellosis Rates by HSDA, 2011



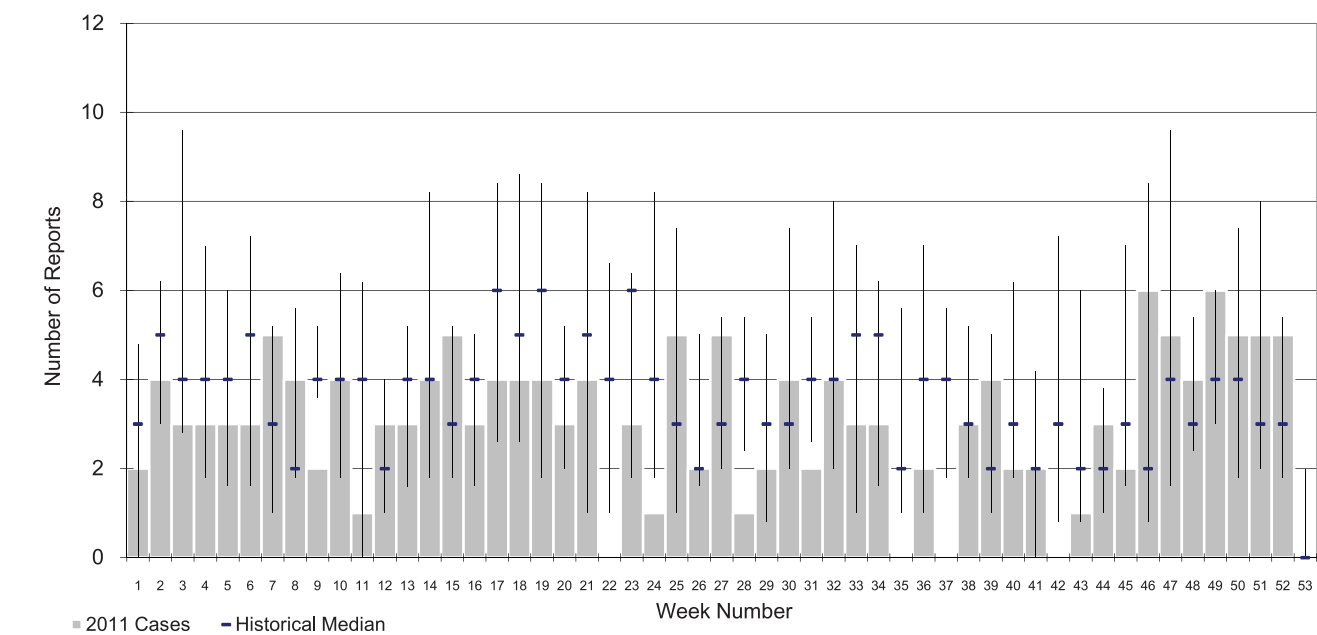
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	1	1.2
12	Kootenay Boundary	4	5.0
13	Okanagan	5	1.4
14	Thompson Cariboo Shuswap	6	2.7
21	Fraser East	12	4.2
22	Fraser North	12	1.9
23	Fraser South	34	4.7
31	Richmond	1	0.5
32	Vancouver	50	7.5
33	North Shore/Coast Garibaldi	11	3.8
41	South Vancouver Island	8	2.1
42	Central Vancouver Island	5	1.9
43	North Vancouver Island	6	4.9
51	Northwest	2	2.6
52	Northern Interior	0	0.0
53	Northeast	4	5.7

Note: Map classification by Jenks natural breaks method.

28.3 Shigellosis Rates by Age Group and Sex, 2011



28.4 2011 Shigellosis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)



28.5 *Shigella* species distribution, 2011

Rank	Species	Number of Cases	Proportion
1	<i>flexneri</i>	77	48.4%
2	<i>sonnei</i>	71	44.6%
3	<i>boydii</i>	5	3.1%
4	<i>dysenteriae</i>	6	3.8%
	Total	159	100.0%

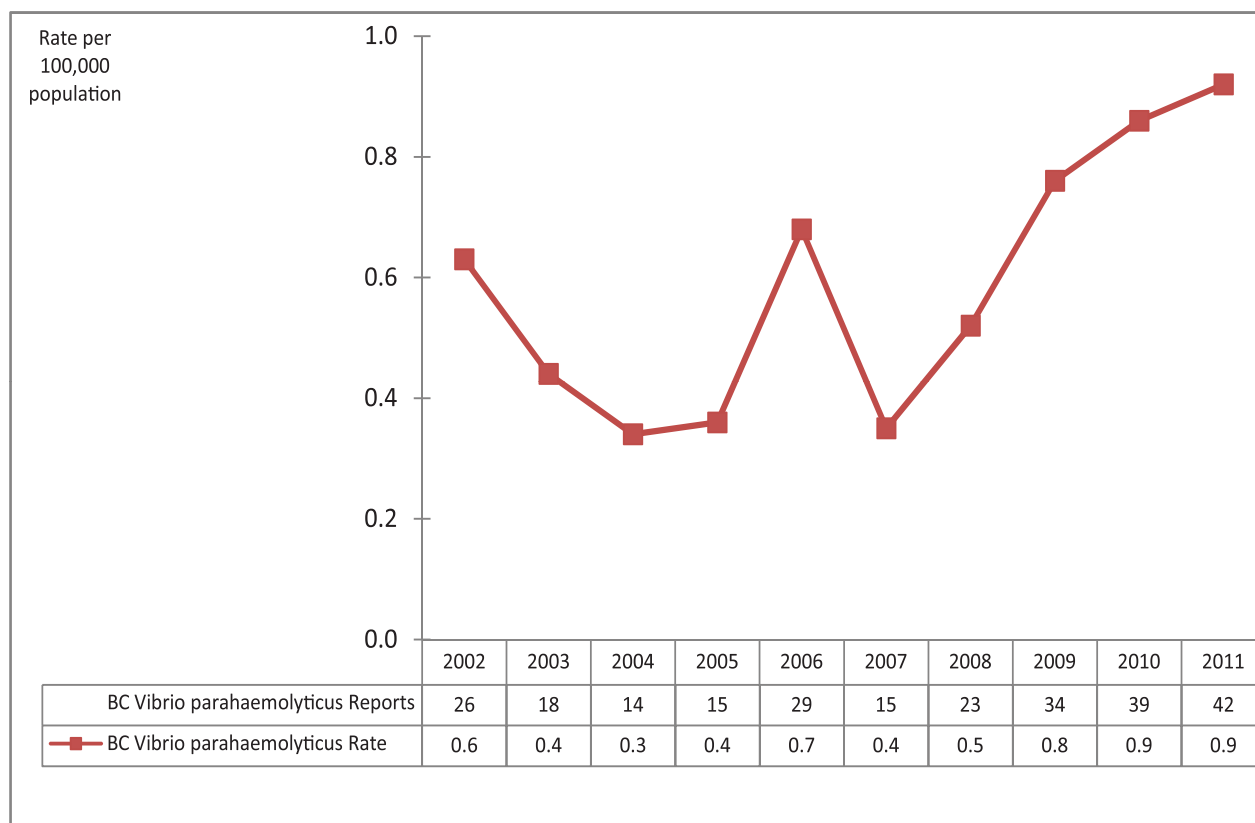
Note: Species distribution is based on the BCCDC Public Health and Microbiology Reference Laboratory (PHMRL) data. Numbers may vary from those reported in iPHIS.

Vibrio parahaemolyticus

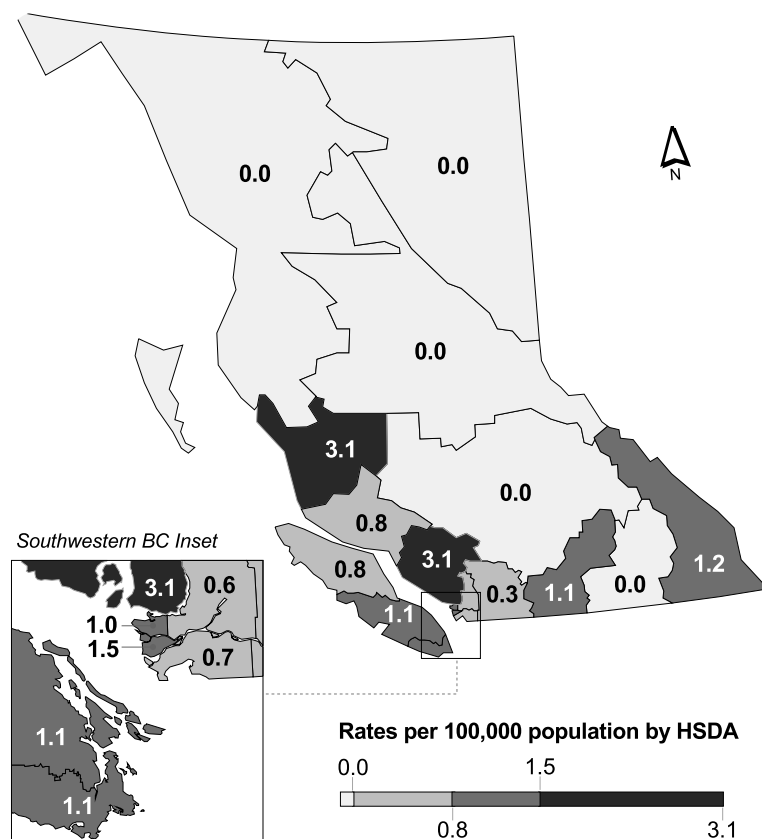
Forty-two cases were reported in 2011, 15.6% were associated with international travel. The incidence of *Vibrio parahaemolyticus* infections has continued to increase since 2007 in BC and the highest rate in the last 10 years was reported in 2010 and 2011 (0.9 per 100,000). Incidence was highest in adult males, particularly aged 25-29 years (3.7 per 100,000). Typically cases are reported mostly from coastal regions; in 2011 the highest incidence rates were reported from North Shore/Coast Garibaldi, Richmond and

East Kootenay. All cases were reported in the summer and early fall months (weeks 25-43) which is consistent with the annual summer peak. *V. parahaemolyticus* infections in BC are mostly associated with consumption of raw or undercooked shellfish. We continue collaborative monitoring and response to illness reports with our food safety colleagues and have developed materials directed to self harvesters to alert them to the risks of consuming raw or undercooked shellfish.

29.1 *Vibrio parahaemolyticus* Rates by Year, 2002-2011



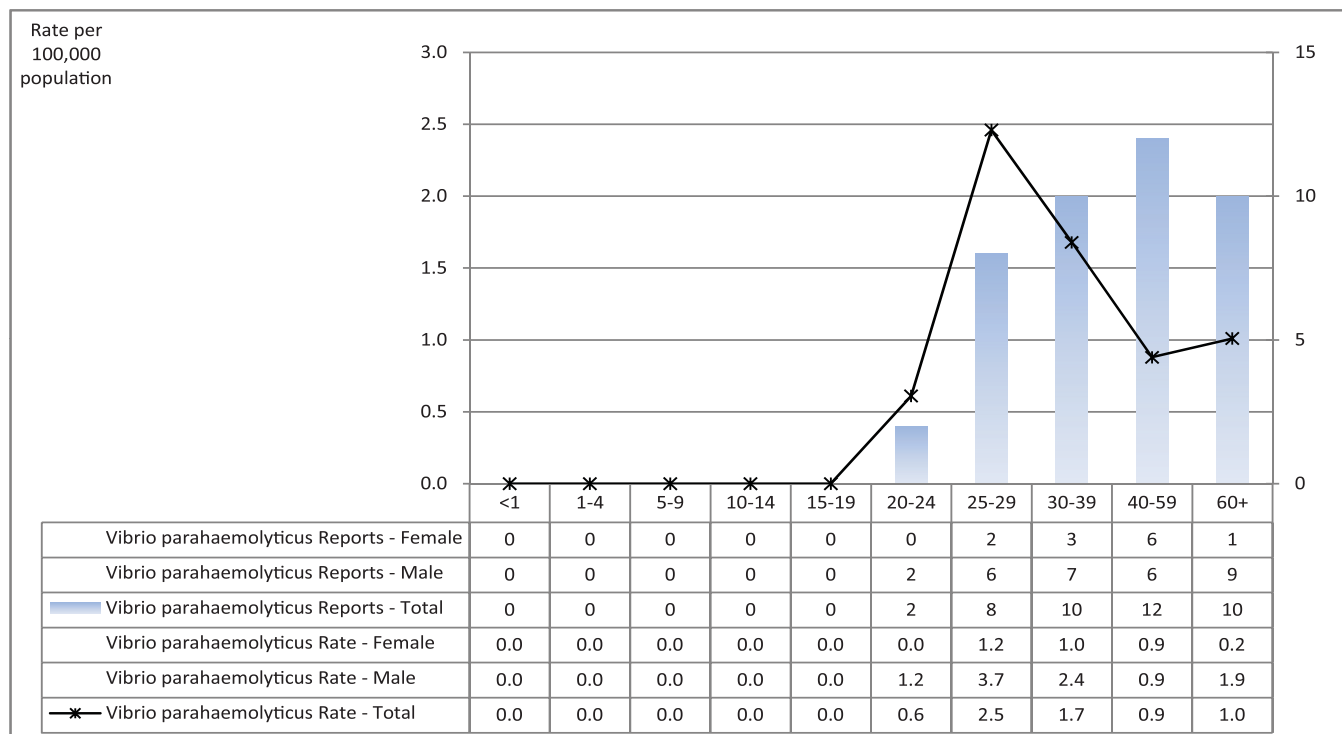
29.2 *Vibrio parahaemolyticus* Rates by HSDA, 2011



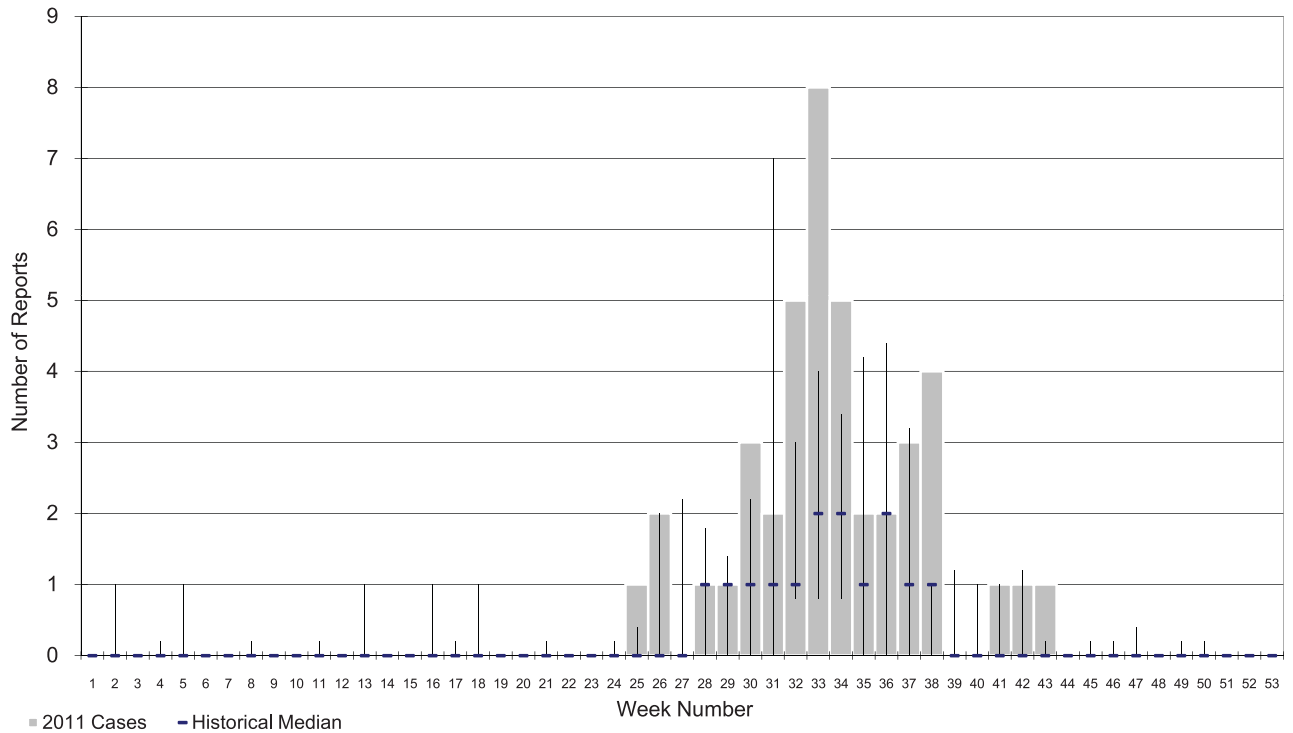
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	1	1.2
12	Kootenay Boundary	0	0.0
13	Okanagan	4	1.1
14	Thompson Cariboo Shuswap	0	0.0
21	Fraser East	1	0.3
22	Fraser North	4	0.6
23	Fraser South	5	0.7
31	Richmond	3	1.5
32	Vancouver	7	1.0
33	North Shore/Coast Garibaldi	9	3.1
41	South Vancouver Island	4	1.1
42	Central Vancouver Island	3	1.1
43	North Vancouver Island	1	0.8
51	Northwest	0	0.0
52	Northern Interior	0	0.0
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

29.3 *Vibrio parahaemolyticus* Rates by Age Group and Sex, 2011



29.4 2011 *Vibrio parahaemolyticus* Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)

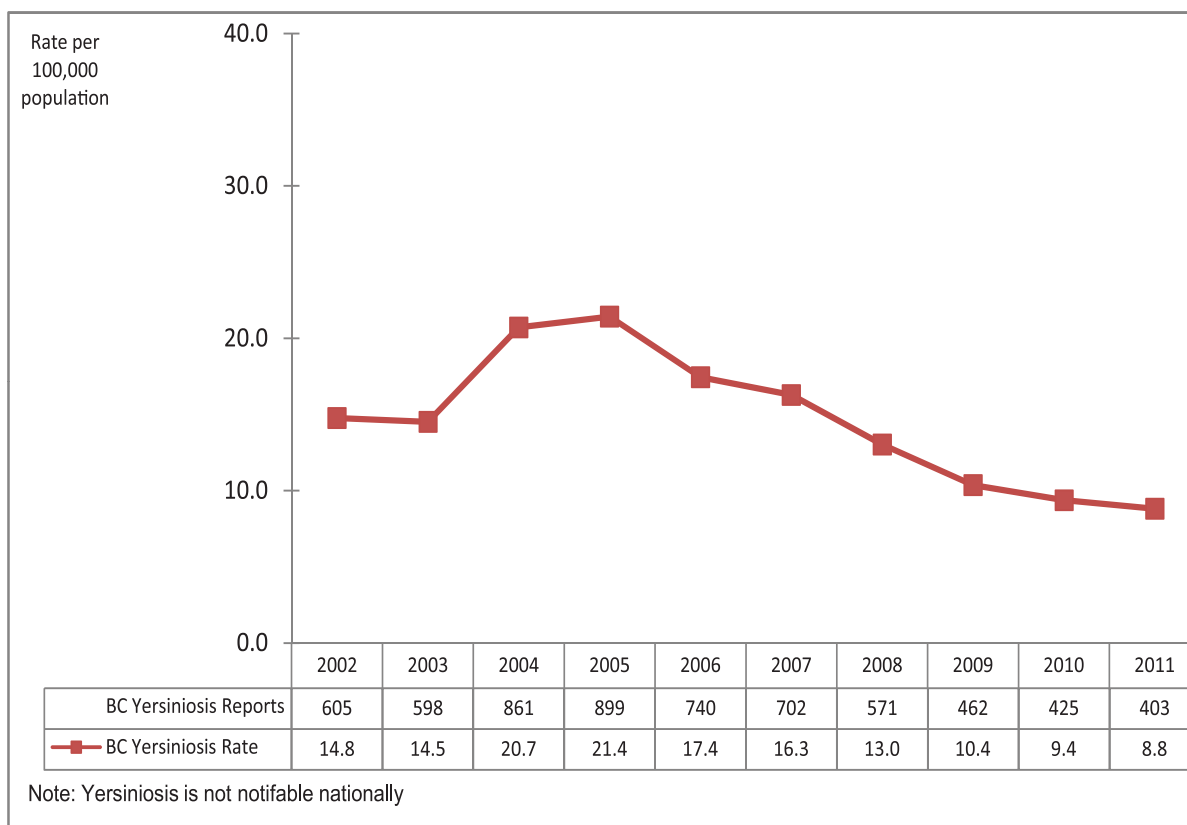


Yersiniosis

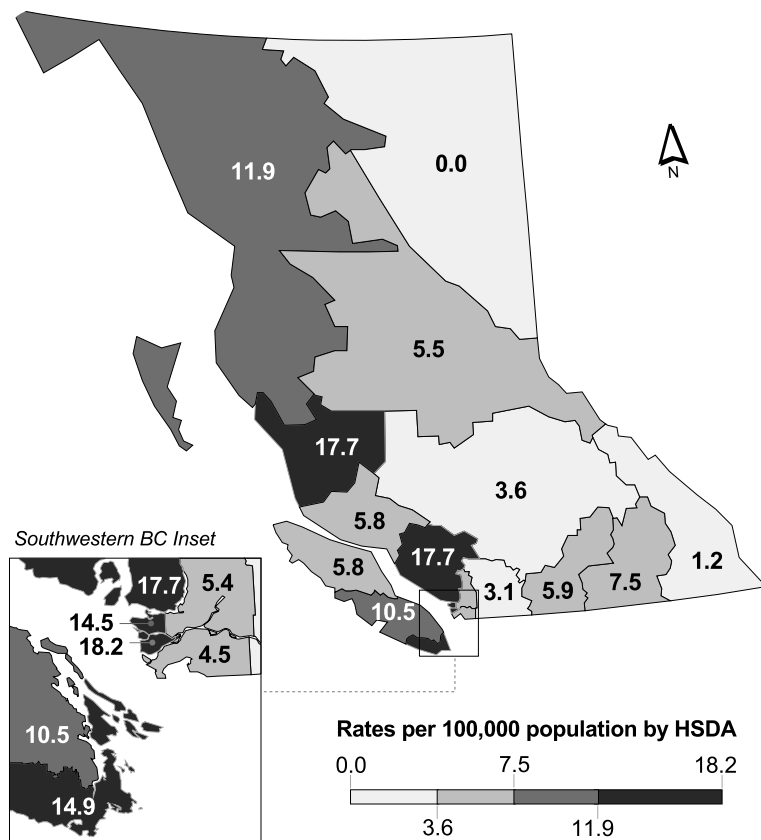
In 2011, 403 cases of yersiniosis were reported which is slightly lower compared to 2010 (425 cases). There has been a decreasing trend in incidence over the past six years. Incidence was the highest in adults over 60 years followed by children less than five years. A slight increase was identified in the summer months (week 27 to 35). No

outbreaks were reported. Like previous years, there was significant geographic variation with the highest number of cases reported from Vancouver Coastal Health Authority (184) followed by VIHA (91), Fraser HA (75) and NHA (17 cases).

30.1 Yersiniosis Rates by Year, 2002-2011



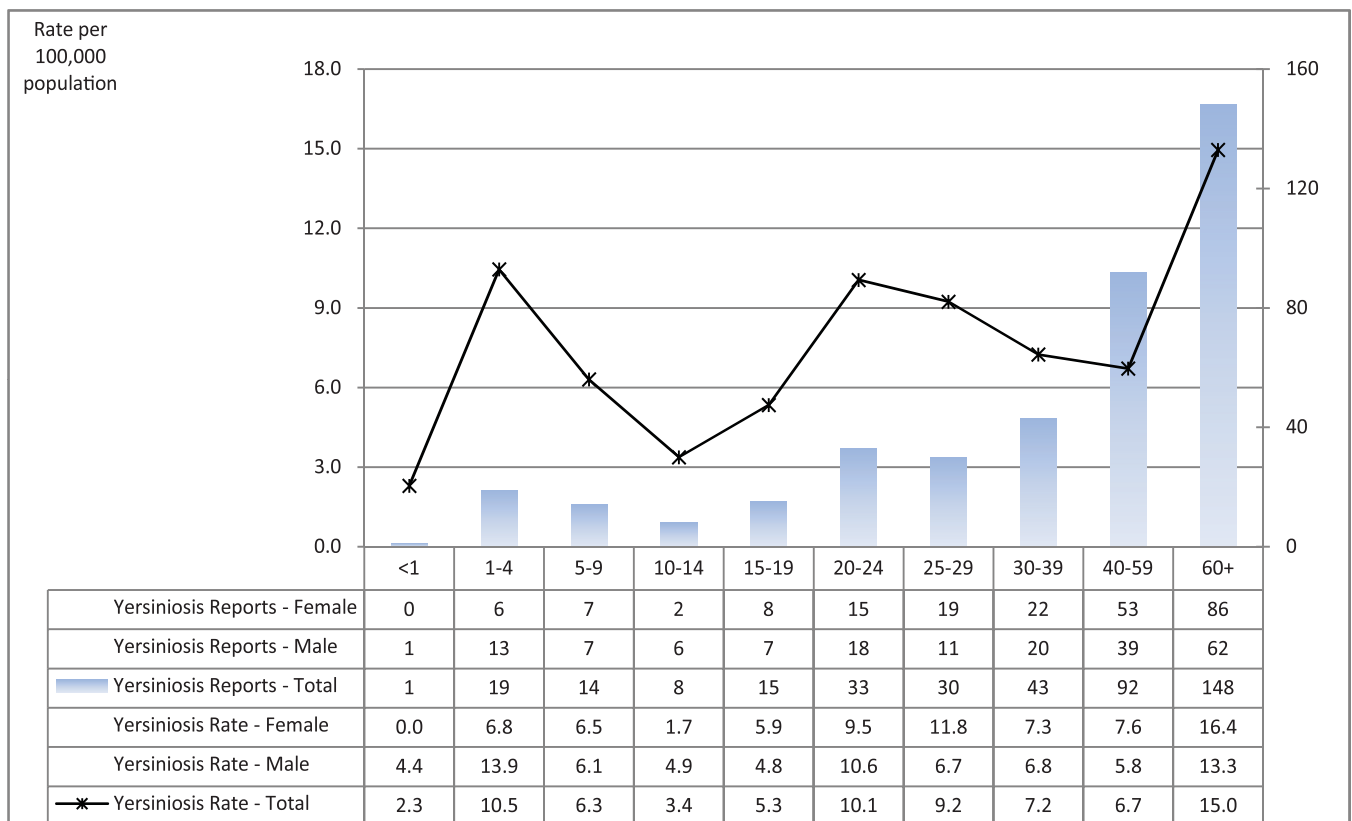
30.2 Yersiniosis Rates by HSDA, 2011



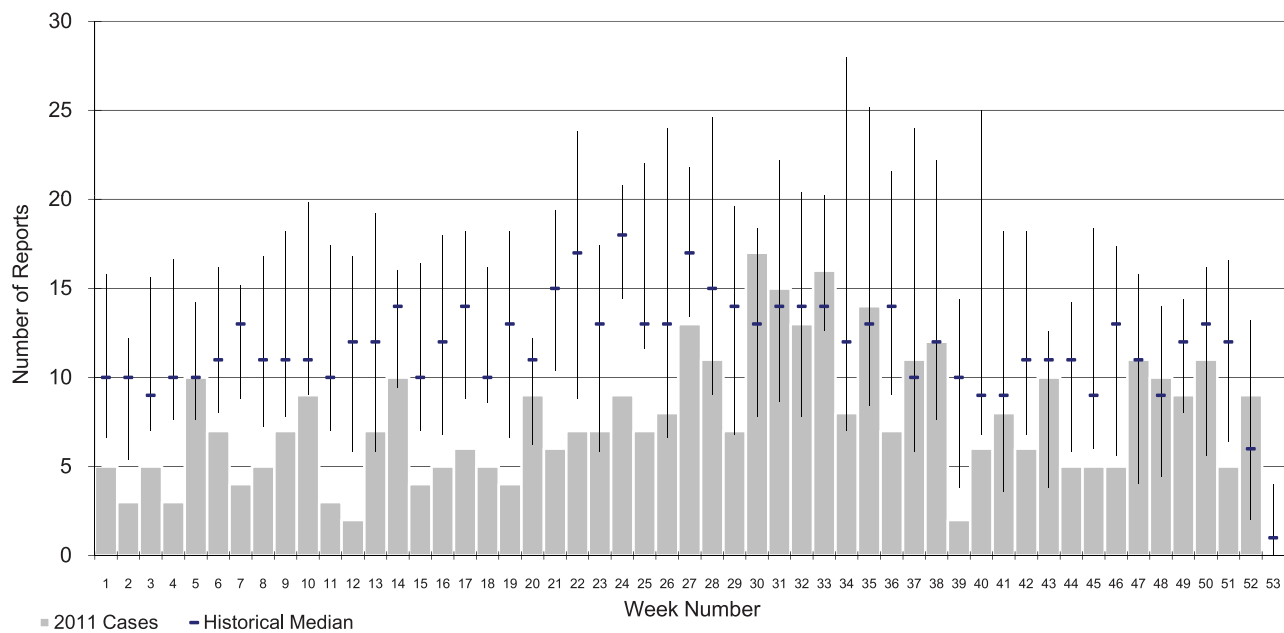
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	1	1.2
12	Kootenay Boundary	6	7.5
13	Okanagan	21	5.9
14	Thompson Cariboo Shuswap	8	3.6
21	Fraser East	9	3.1
22	Fraser North	33	5.4
23	Fraser South	33	4.5
31	Richmond	36	18.2
32	Vancouver	97	14.5
33	North Shore/Coast Garibaldi	51	17.7
41	South Vancouver Island	56	14.9
42	Central Vancouver Island	28	10.5
43	North Vancouver Island	7	5.8
51	Northwest	9	11.9
52	Northern Interior	8	5.5
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

30.3 Yersiniosis Rates by Age Group and Sex, 2011



30.4 2011 Yersiniosis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)



Outbreaks of Gastroenteritis

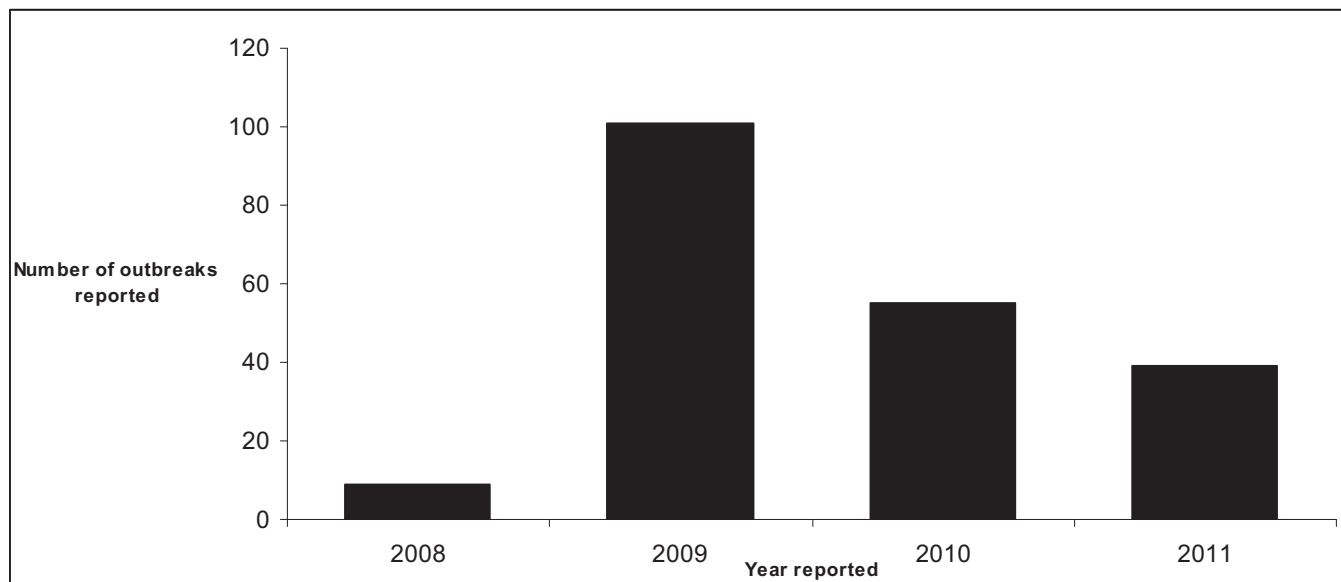
In August 2008 a national web-enabled outbreak reporting tool was launched in BC. The objective of surveillance of enteric outbreaks in BC is to describe and understand trends in outbreaks (e.g. organism, setting, route of transmission, source), and to evaluate effectiveness of outbreak control measures. Since this system launched in 2008 a total of 218 enteric outbreaks have been reported in BC. In 2011, changes to reporting occurred which saw most health authorities discontinue reporting of viral enteric outbreaks in facilities.

Between January 1 and December 31, 2011, 39 enteric outbreaks were reported. Thirteen were reported from IHA, 11 from VIHA, 6 from FHA, 6 from NHA and 3 from VCH.

Twenty-nine (74%) were caused by a viral pathogen.

Twenty-eight (71%) occurred in residential institutional facilities, four in food service establishments and three were

associated with private functions. Twenty-nine (71%) were associated with person to person contact, seven through food (one egg, one meat, one seafood, one vegetables, one mixed food and two unknown).





VECTORBORNE AND ZOOBOTIC DISEASES

Leptospirosis

Lyme Disease

Malaria

Rabies, exposures

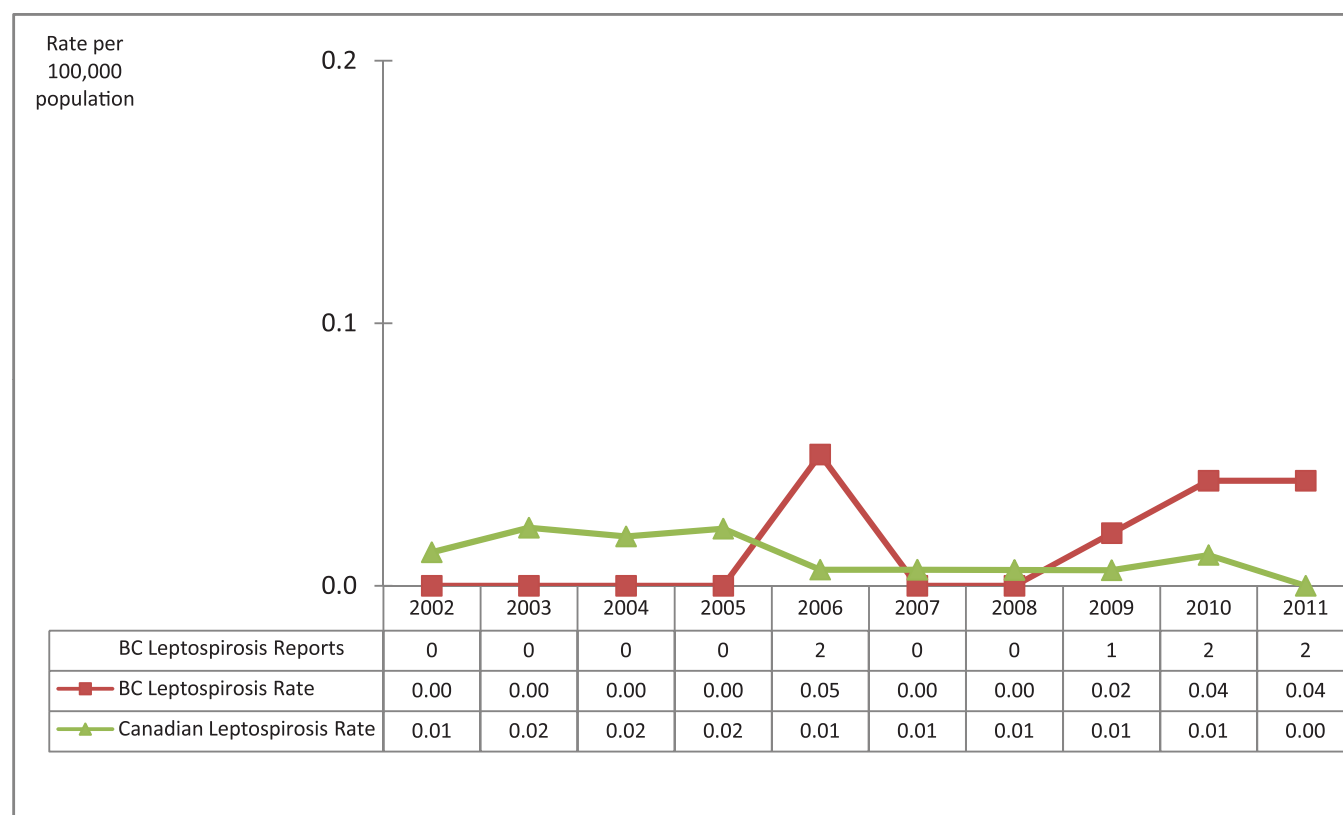
Tularemia

West Nile Virus

Leptospirosis

There were two leptospirosis reports in 2011 similar to previous years. Incidence remains very low.

31.1 Leptospirosis Disease Rates by Year, 2002-2011

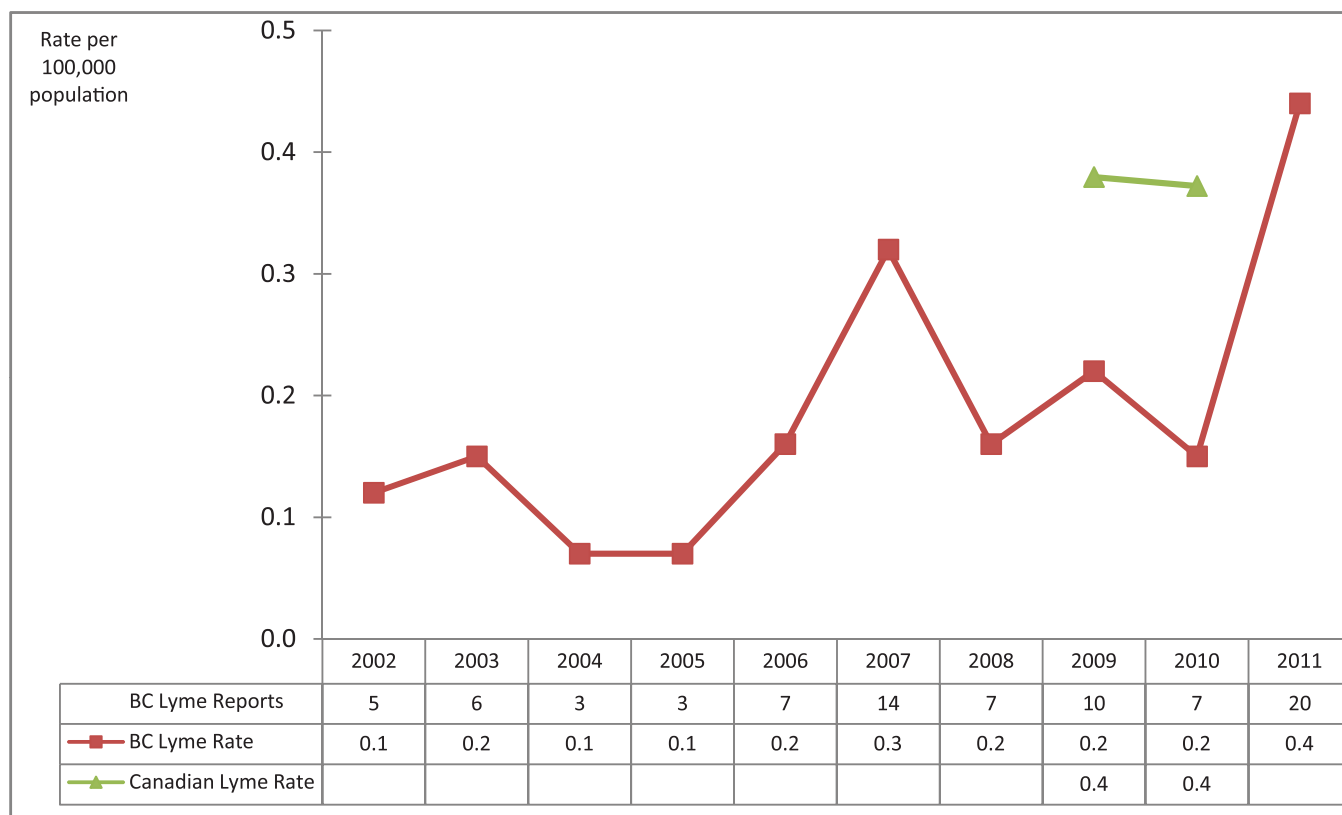


Lyme Disease

BC continues to have a low endemic risk of Lyme Disease (LD). There were 20 cases of clinical or laboratory confirmed LD reported in BC in 2011. This is an increase compared to previous years. This increase is likely related to ongoing communication with health care providers and increased awareness of the disease and reporting. Ten (50%) of cases reported travel and likely acquired their infection outside of BC. Incidence is highest in

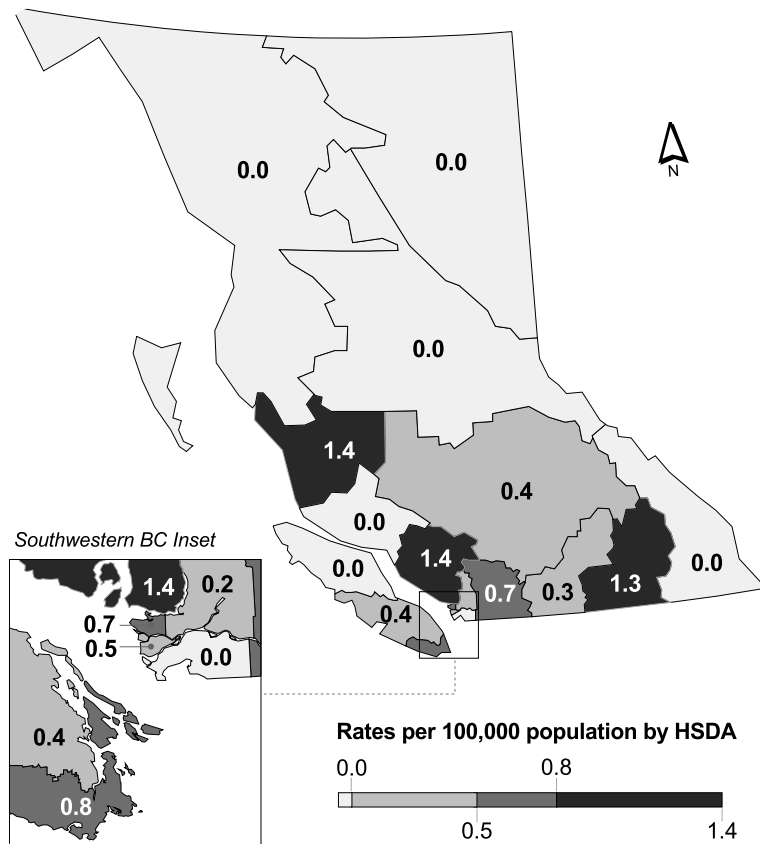
males between the ages of 40-59 years (1.2 per 100,000) although cases are reported throughout a variety of age groups. Highest incidence was reported in North Shore/Coast Garibaldi and Kootenay Boundary.

33.1 Lyme Disease Rates by Year, 2002-2011



Note: Lyme disease became nationally notifiable in 2009.

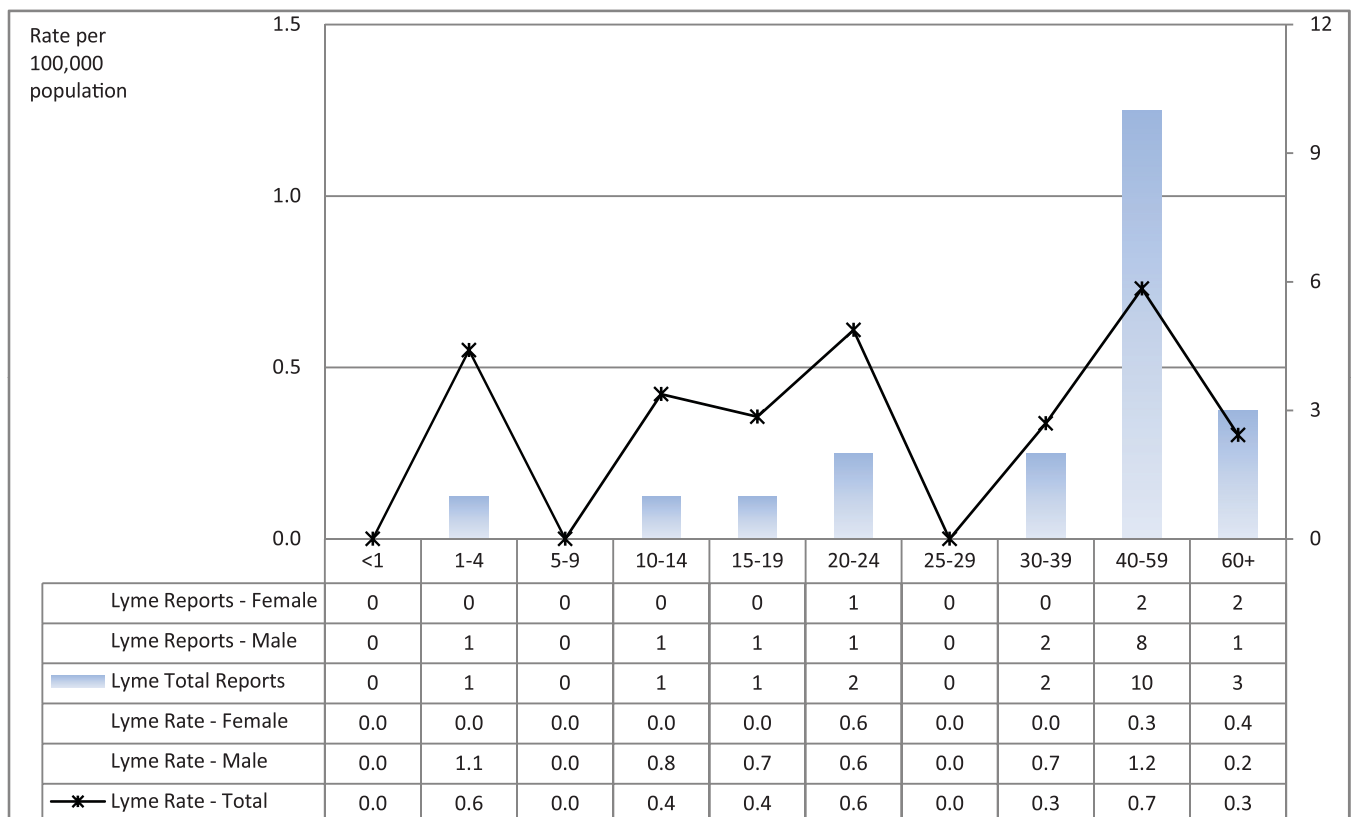
33.2 Lyme Disease Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	1	1.3
13	Okanagan	1	0.3
14	Thompson Cariboo Shuswap	1	0.4
21	Fraser East	2	0.7
22	Fraser North	1	0.2
23	Fraser South	0	0.0
31	Richmond	1	0.5
32	Vancouver	5	0.7
33	North Shore/Coast Garibaldi	4	1.4
41	South Vancouver Island	3	0.8
42	Central Vancouver Island	1	0.4
43	North Vancouver Island	0	0.0
51	Northwest	0	0.0
52	Northern Interior	0	0.0
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

33.3 Lyme Disease Rates by Age Group and Sex, 2011

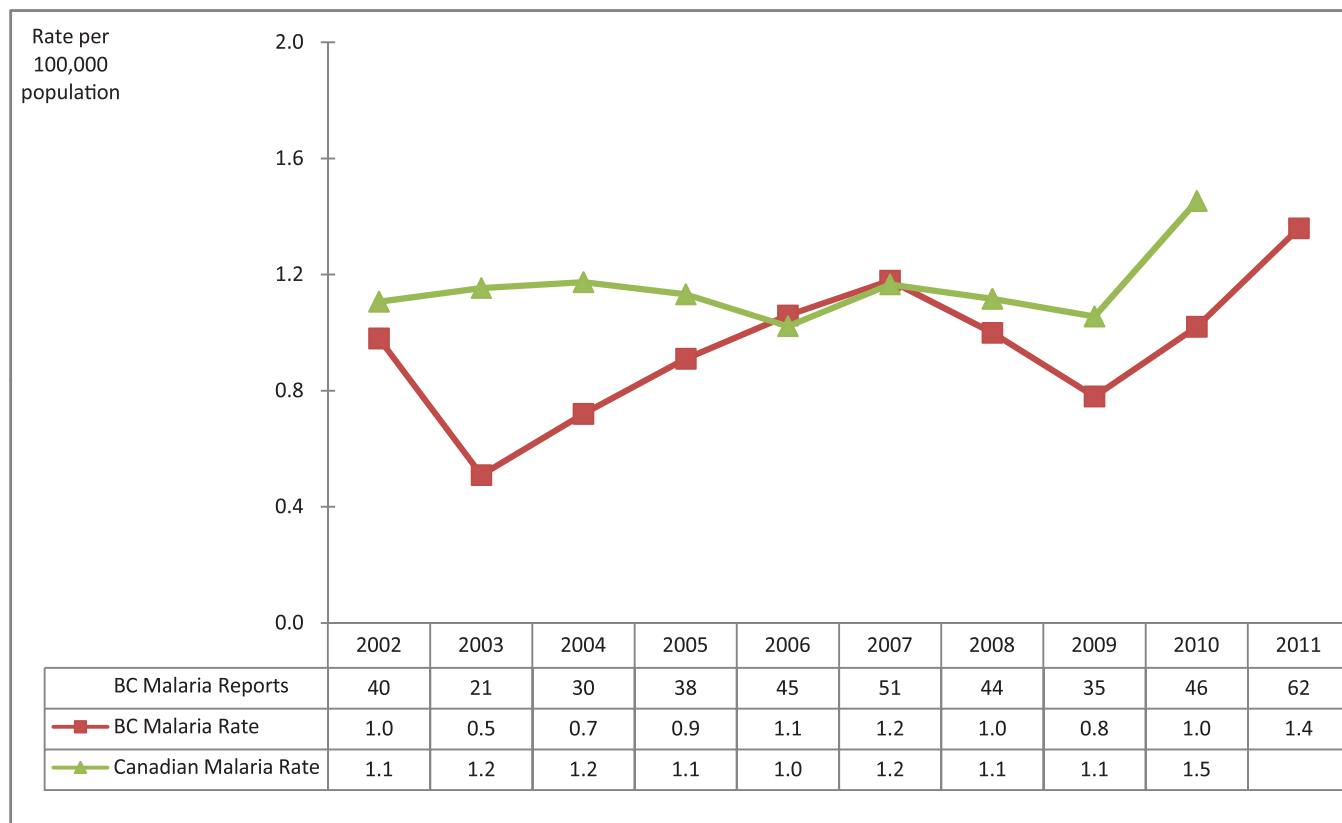


Malaria

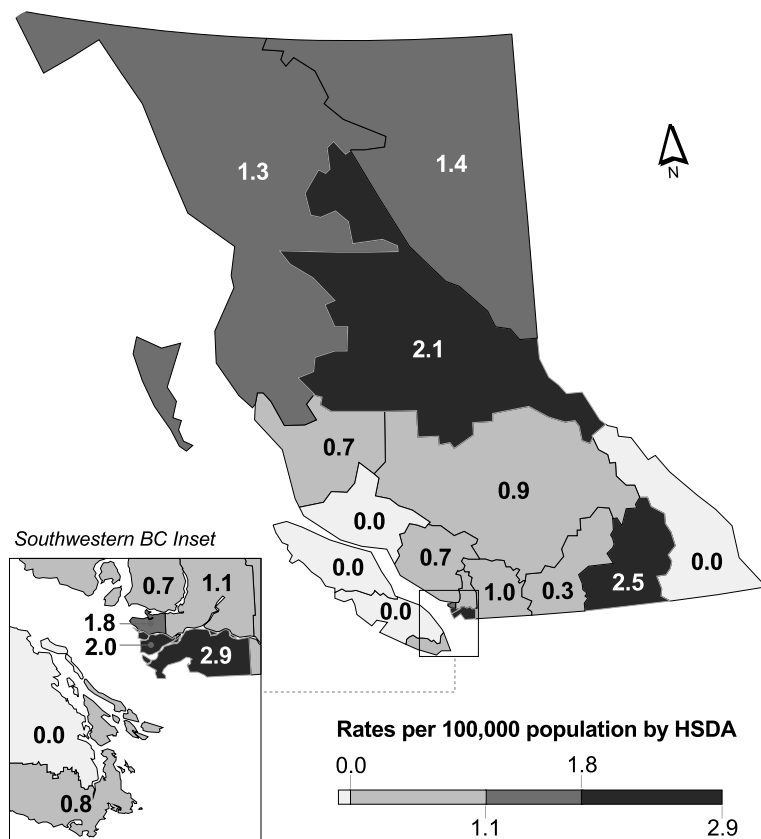
Malaria is not endemic in BC as we do not have the mosquito species that can carry malaria in the province. There were 62 cases of malaria reported in BC in 2011 for a rate of 1.4 per 100,000 population; this is slightly higher than numbers we have seen in the past few years and may reflect an increasing

burden of malaria worldwide. The largest proportion of cases continues to be from the Fraser South HSDA which reflects frequent travel to malaria endemic countries by residents of Fraser South.

34.1 Malaria Rates by Year, 2002-2011



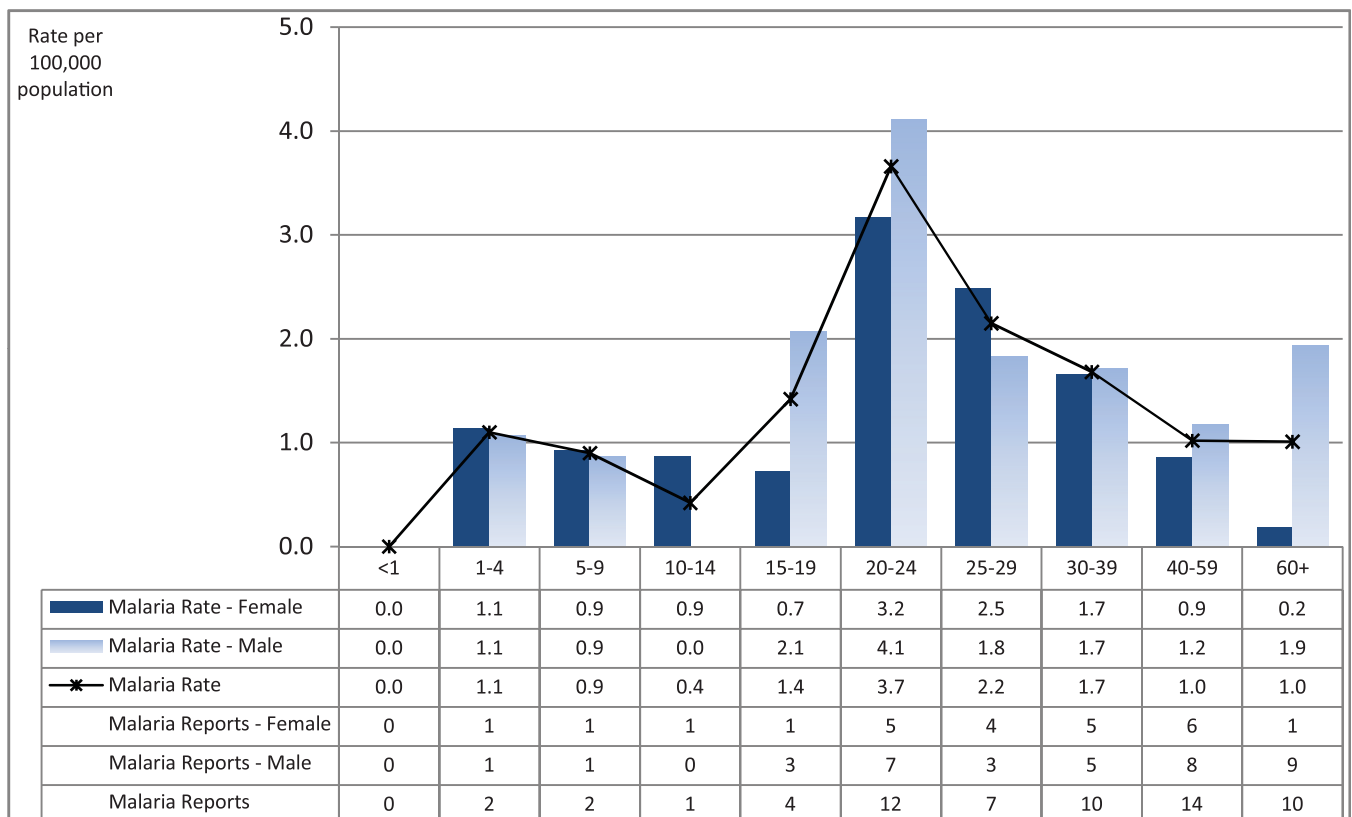
34.2 Malaria Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	2	2.5
13	Okanagan	1	0.3
14	Thompson Cariboo Shuswap	2	0.9
21	Fraser East	3	1.0
22	Fraser North	7	1.1
23	Fraser South	21	2.9
31	Richmond	4	2.0
32	Vancouver	12	1.8
33	North Shore/Coast Garibaldi	2	0.7
41	South Vancouver Island	3	0.8
42	Central Vancouver Island	0	0.0
43	North Vancouver Island	0	0.0
51	Northwest	1	1.3
52	Northern Interior	3	2.1
53	Northeast	1	1.4

Note: Map classification by Jenks natural breaks method.

34.3 Malaria Rates by Age Group and Sex, 2011



Rabies Exposures

The term “exposure” denotes a report of an animal exposure which presents a risk of rabies infection. One report represents an individual incident that was reported to a BC Health Authority . From 2009 to 2011, the rate of reported rabies exposures decreased from 3.7 to 2.8 per 100.000. There were total of 129 exposures to potentially rabid animals reported in 2011. The 2011 rate of exposures (2.7per 100.000) is similar to the 2010 exposure rate. The incidence of reported exposures was greatest in 15-19 year olds followed by 25-29 year olds (5.0 per 100.000 and 4.3 per 100.00 respectively). The number of exposures by sex did not vary greatly; the F:M ratio was 69:62 cases which translates into an incidence of 3.04 and 2.68 per 100.00 for females and males respectively.

The greatest number of exposures was reported from VCH, followed by FH, IH and VIHA. The least number of exposure reports came from NH (four in total).

The majority of the exposures were animal bites (90%), followed by scratches (18%) and handling of animals (10%). The largest number of exposures were to dogs (41%) followed by exposure to bats (28%) and cats (10%). The

proportion of bat exposures has decreased from 60% in 2008 to 28% in 2011.

A total of 116 people who had reported exposures in 2011 required rabies post-exposure prophylaxis (RPEP). Out of the 116 exposures requiring RPEP: 31 were after bat exposures in BC; one after a dog exposure in BC; seven to other animals in BC; and 77 exposures to animals outside of BC or Canada.

The breakdown for exposures outside of British Columbia by animal type is as follows:

Number of dog exposures outside of BC: 46

Number of bat exposures outside of BC: two

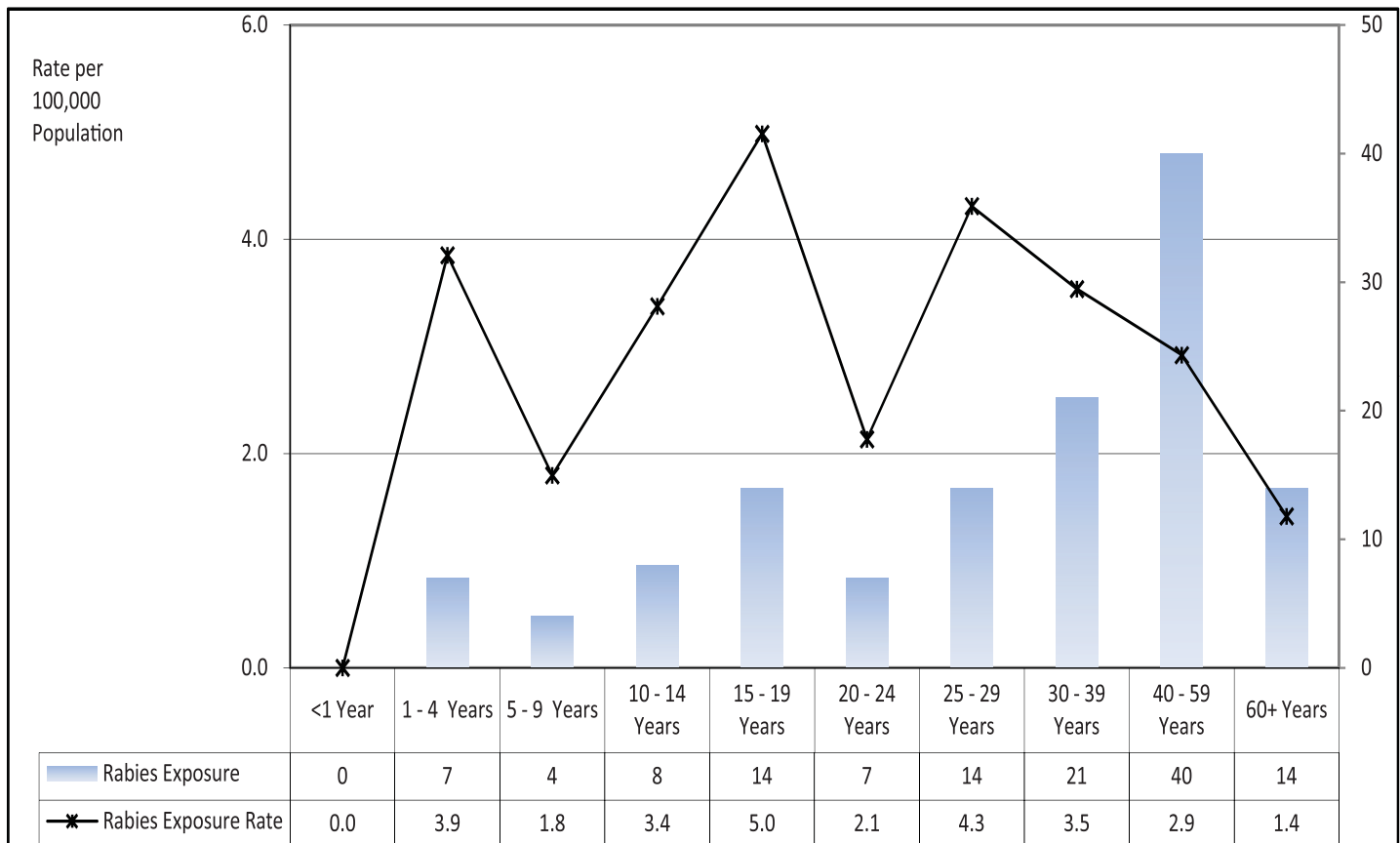
Number of other exposures outside of BC: 29

Among all bat exposures, RPEP was given due to bat bites most frequently (15), followed by bat handling (10), bat scratches (four) and exposure to saliva of a bat (one).

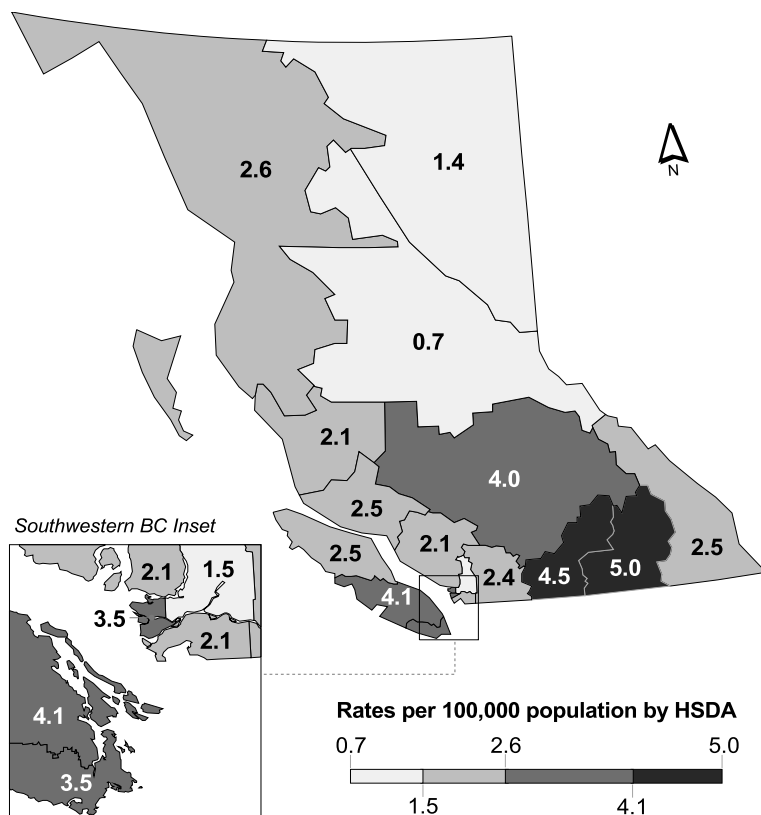
35.1 Rabies Exposure Incidents Reported to BC Health Authorities, 2008-2011

Year	# Exposures	Rate per 100,000
2008	240	5.5
2009	164	3.7
2010	121	2.7
2011	129	2.8
TOTAL	654	3.6

35.2 Rabies Exposure Rates by Age Group, 2011



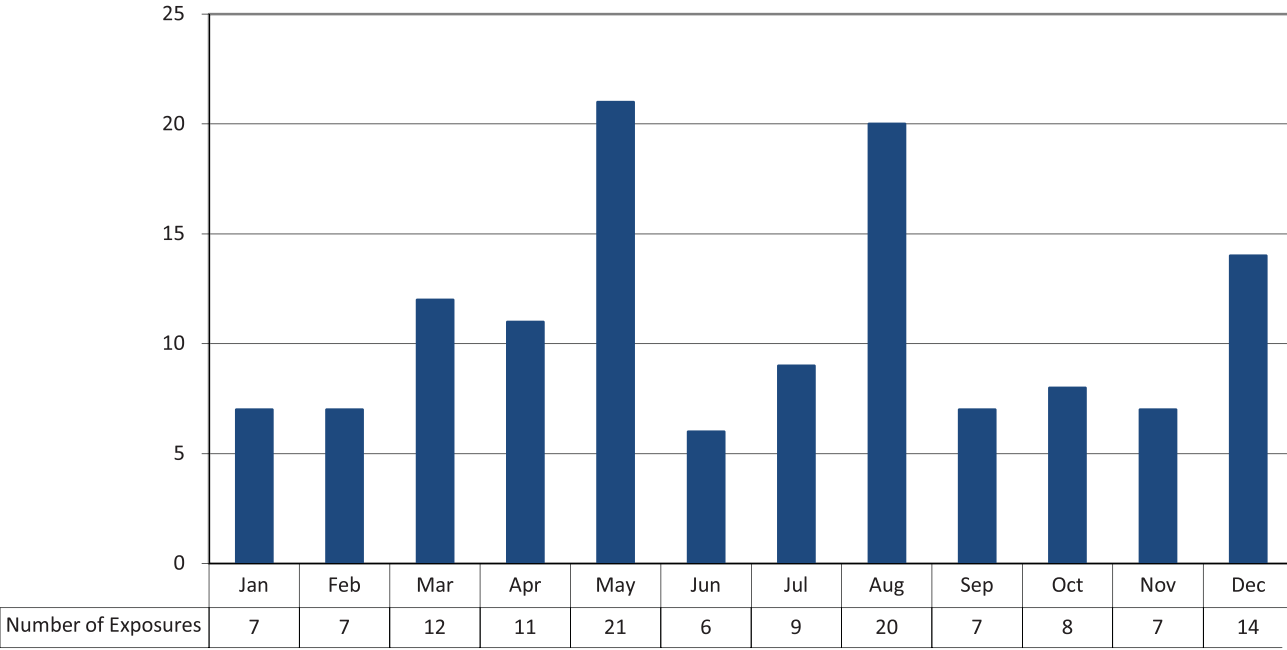
35.3 Rabies Exposure Rates by HSDA, 2011



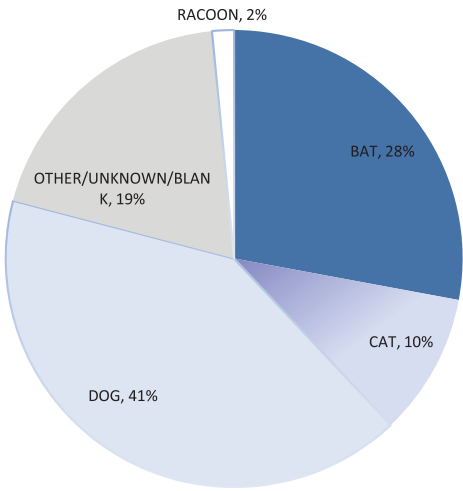
HSDA	Health Service Delivery Area	Exps.	Rate
11	East Kootenay	2	2.5
12	Kootenay Boundary	4	5.0
13	Okanagan	16	4.5
14	Thompson Cariboo Shuswap	9	4.0
21	Fraser East	7	2.4
22	Fraser North	9	1.5
23	Fraser South	15	2.1
31/32	Richmond/Vancouver	30	3.5
33	North Shore/Coast Garibaldi	6	2.1
41	South Vancouver Island	13	3.5
42	Central Vancouver Island	11	4.1
43	North Vancouver Island	3	2.5
51	Northwest	2	2.6
52	Northern Interior	1	0.7
53	Northeast	1	1.4

Note: Map classification by Jenks natural breaks method.

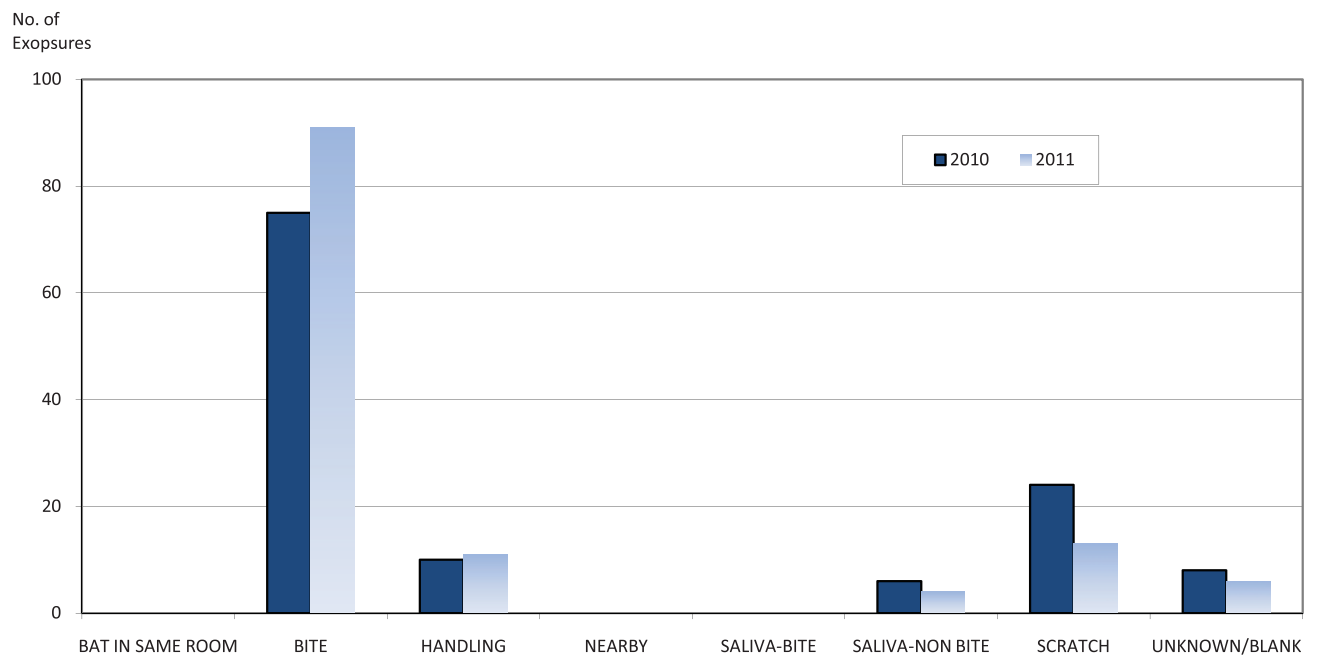
35.4 Rabies Exposure Incident by Month, 2011



35.5 Rabies Exposure Incidents by Percentage of Animal Species Involved, 2011



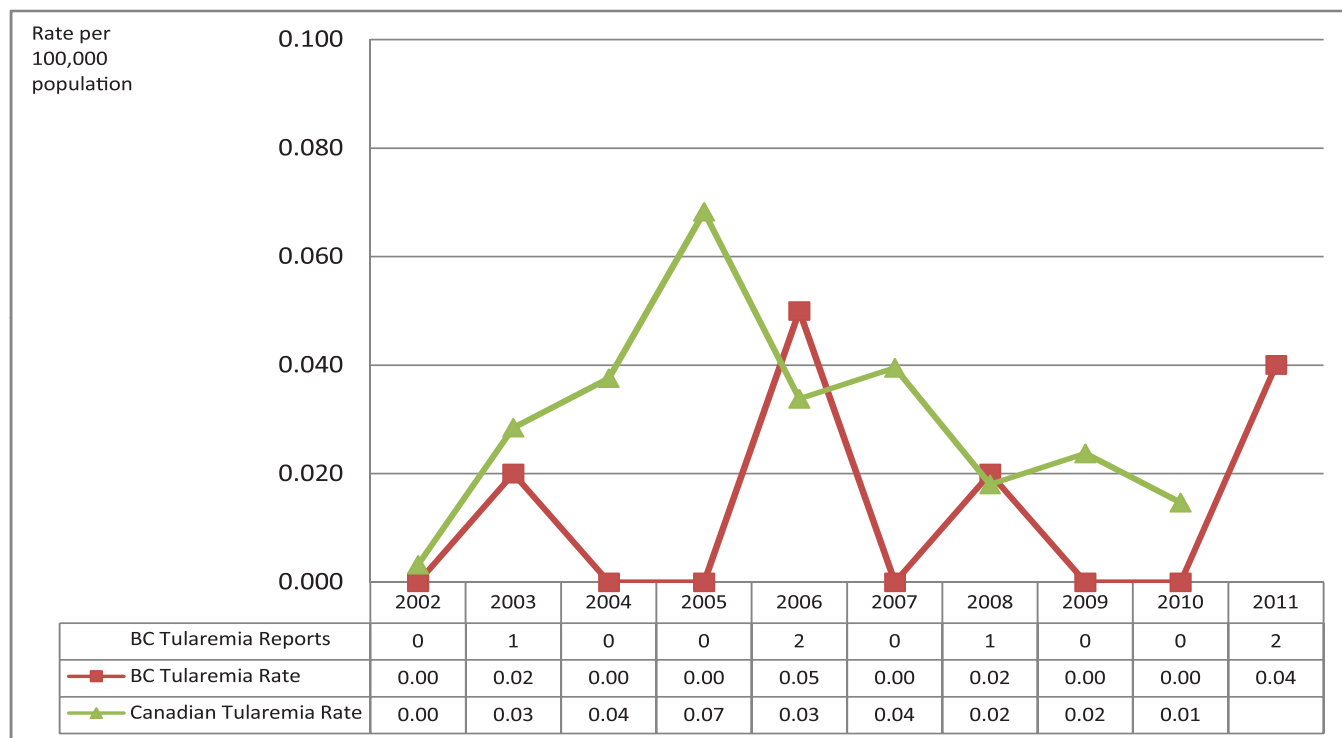
35.6 Rabies Exposure by Type of Exposure and Year, 2010-2011



Tularemia

There were two cases of tularemia in 2011. Incidence remains low and infections appear sporadically in BC.

36.1 Tularemia Rates by Year, 2002-2011



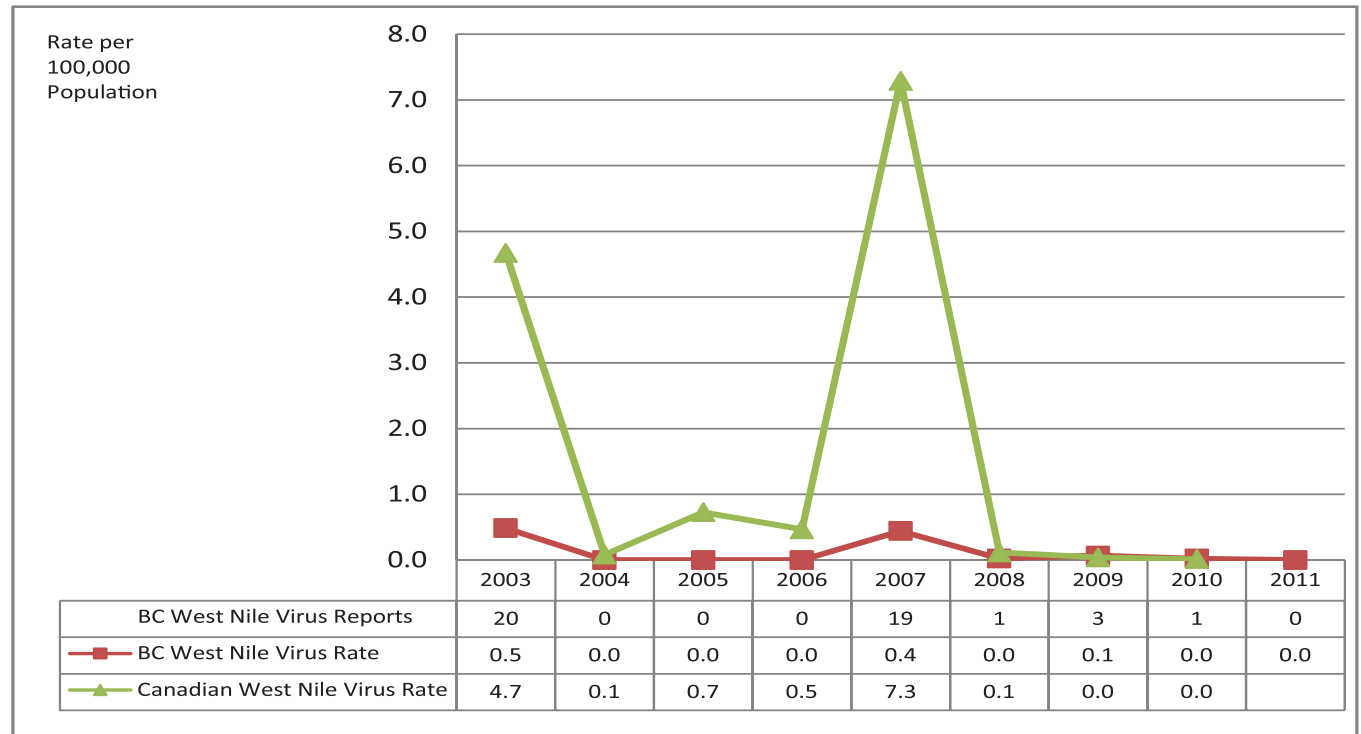
West Nile Virus

No positive human cases, birds or mosquito samples were reported in 2011. One horse from the central Okanagan was reported as positive. Positive indicators have been identified from the Central Okanagan in previous years.

The 2011 BC West Nile Virus Surveillance Program Report is available at http://www.bccdc.ca/dis-cond/a-z/_w/WestNileVirus/Surveillance/WNV2011Surveillance.htm

In 2011, 101 human cases were reported in Canada (37 in Quebec and 64 in Ontario) and 627 cases were reported in the US (none from Washington State).

37.1 West Nile Virus Infection Rates by Year, 2003-2011





ENVIRONMENTAL PATHOGENS

Cryptococcus gattii

Legionellosis

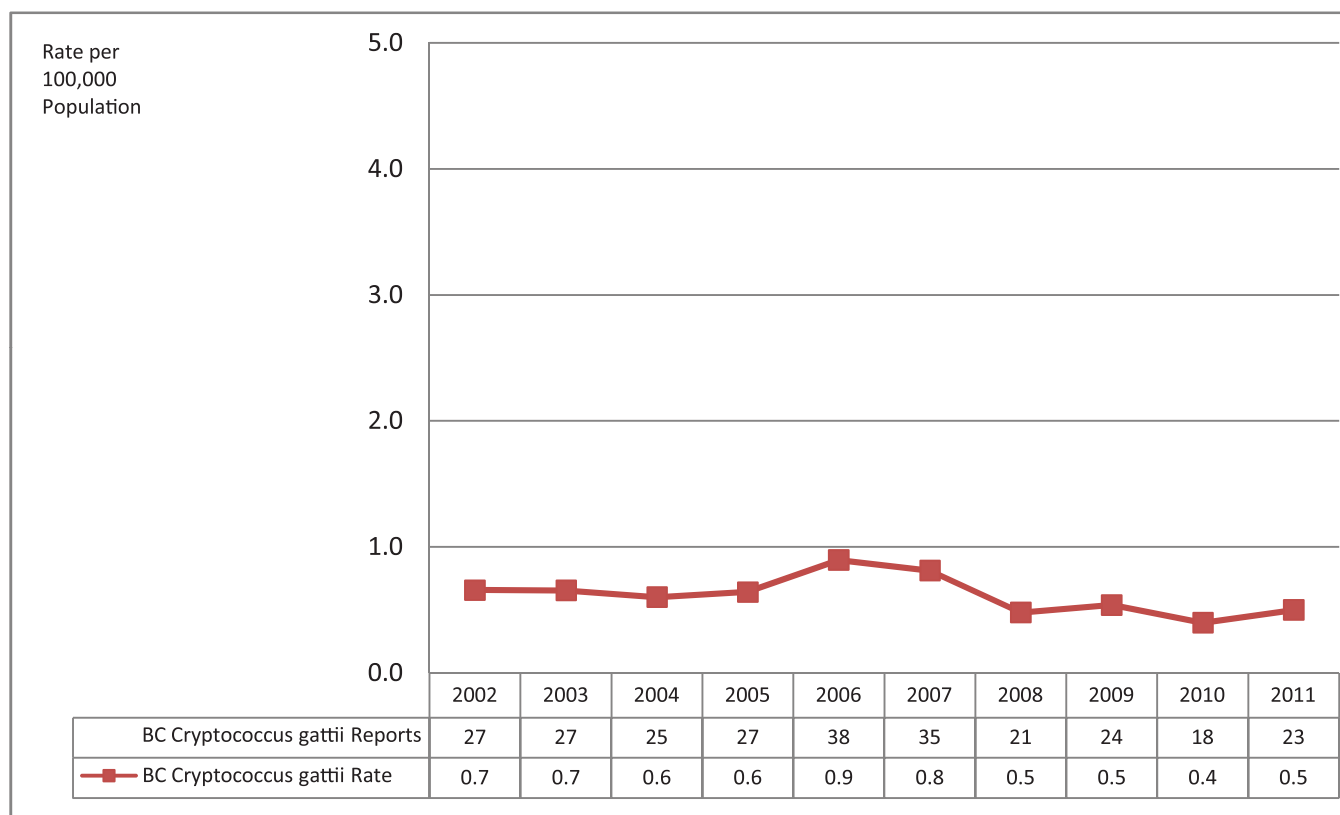
Cryptococcus gattii

The numbers presented in this section are based on information generated through enhanced surveillance for *C. gattii* infection.

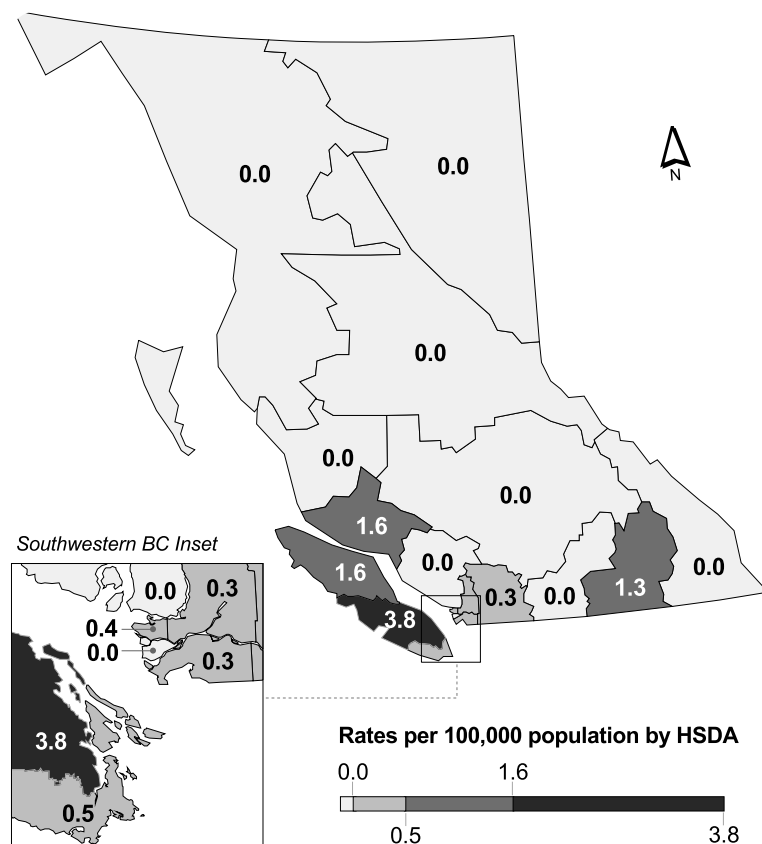
In 2011, 23 cases (0.5 per 100,000) of *C. gattii* infection were reported. The number of reports is increased slightly

compared to 2010 but the incidence rate has remained steady since 2008. As seen in previous years, all cases occurred in adults and the majority of 2011 cases were in females. The highest rates were reported from Central and North Vancouver Island and nine cases were reported from mainland BC.

37.1 *Cryptococcus gattii* Infection Rates by Year, 2002-2011



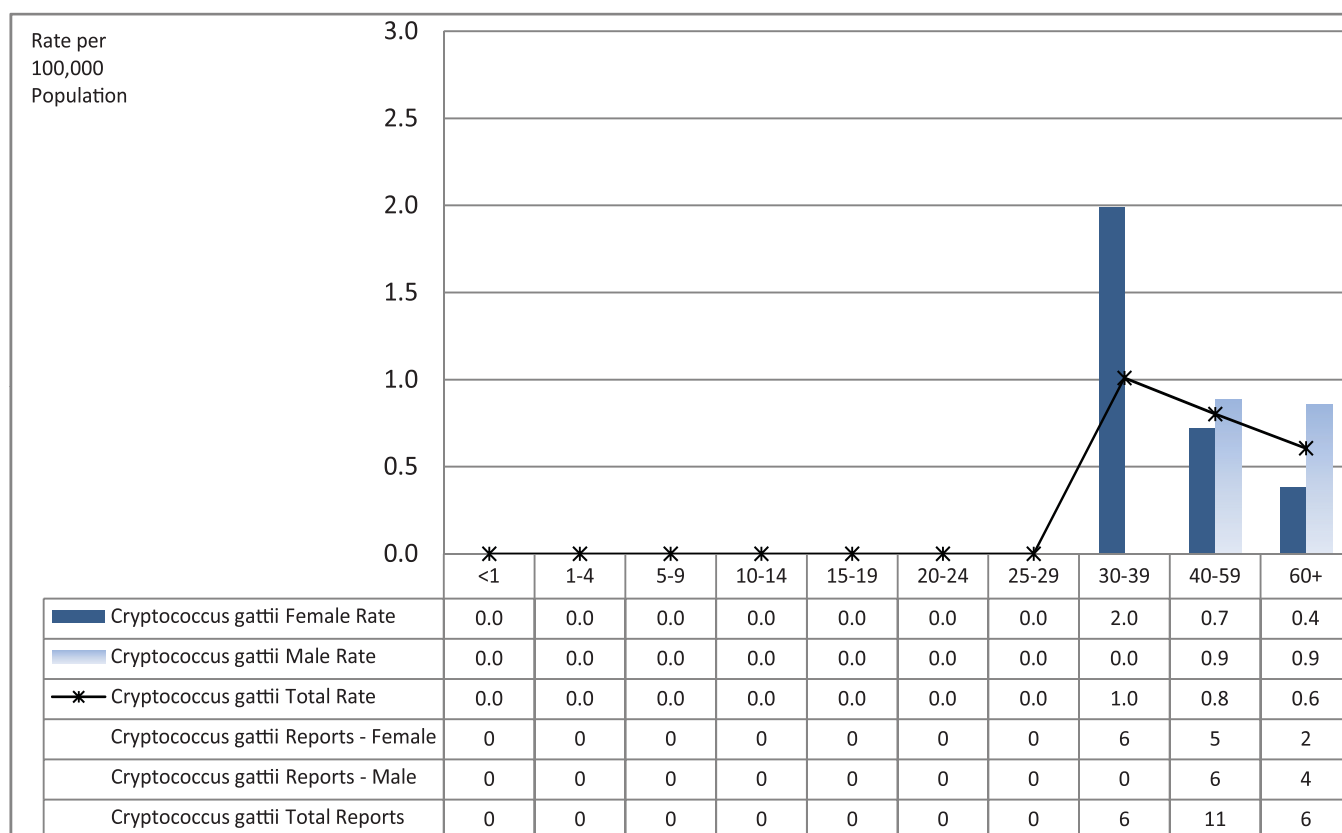
37.2 *Cryptococcus gattii* Infection Rates by HSDA, 2011



HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	1	1.3
13	Okanagan	0	0.0
14	Thompson Cariboo Shuswap	0	0.0
21	Fraser East	1	0.3
22	Fraser North	2	0.3
23	Fraser South	2	0.3
31	Richmond	0	0.0
32	Vancouver	3	0.4
33	North Shore/Coast Garibaldi	0	0.0
41	South Vancouver Island	2	0.5
42	Central Vancouver Island	10	3.8
43	North Vancouver Island	2	1.6
51	Northwest	0	0.0
52	Northern Interior	0	0.0
53	Northeast	0	0.0

Note: Map classification by Jenks natural breaks method.

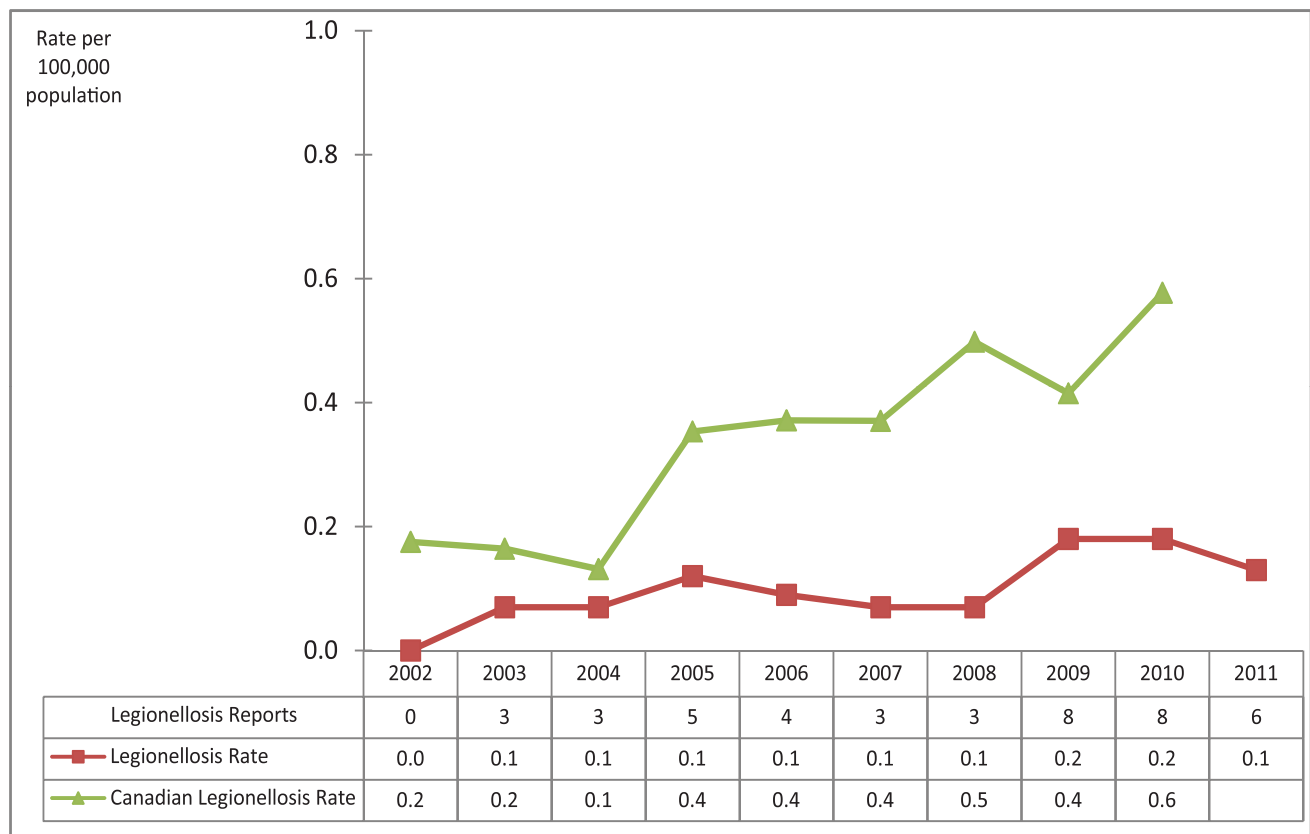
37.3 *Cryptococcus gattii* Infection Rates by Age Group and Sex, 2011



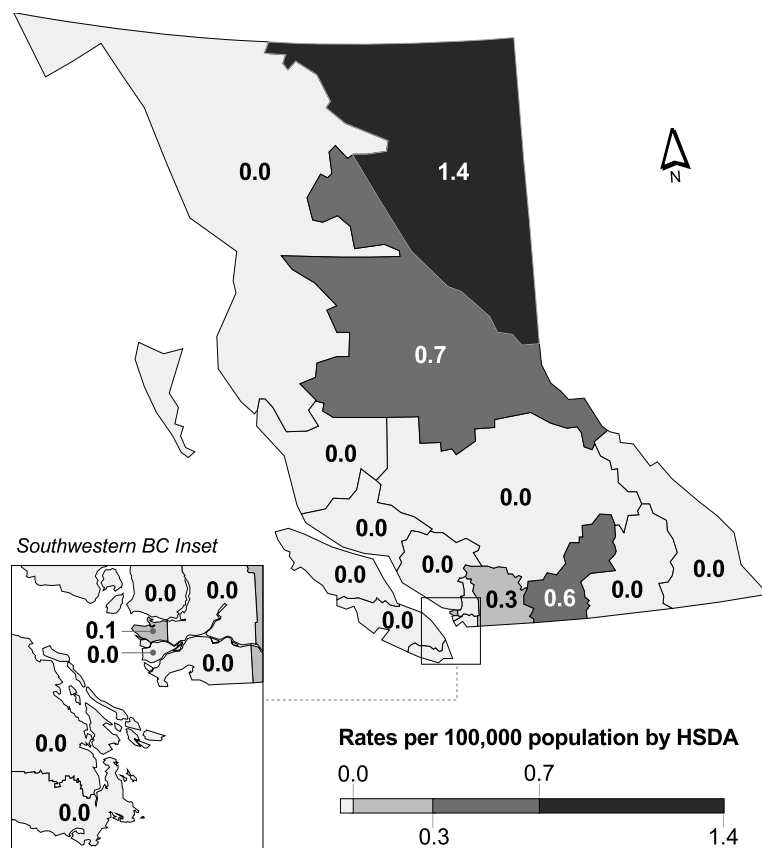
Legionellosis

In 2011, six cases of legionellosis were reported for an overall rate of 0.1 per 100,000. The incidence rate of 0.1 per 100,000 is comparable to previous years (2002-2010). Two cases occurred in adult females and four cases are in adult males. All cases were spread out geographically in various health authorities. Cases occurred throughout the year. There was no common exposure identified between cases.

38.1 Legionellosis Rates by Year, 2002-2011



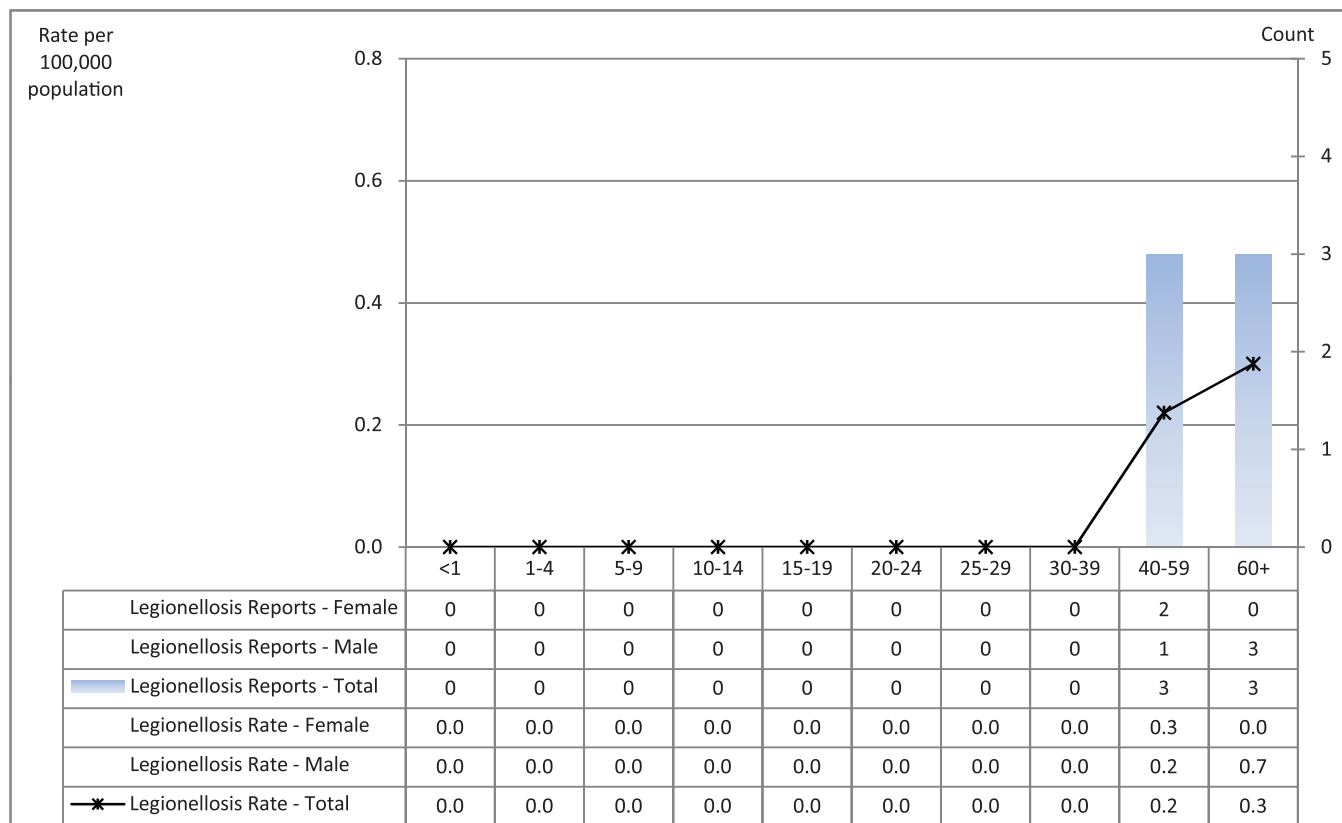
38.2 Legionellosis Rates by HSDA, 2011



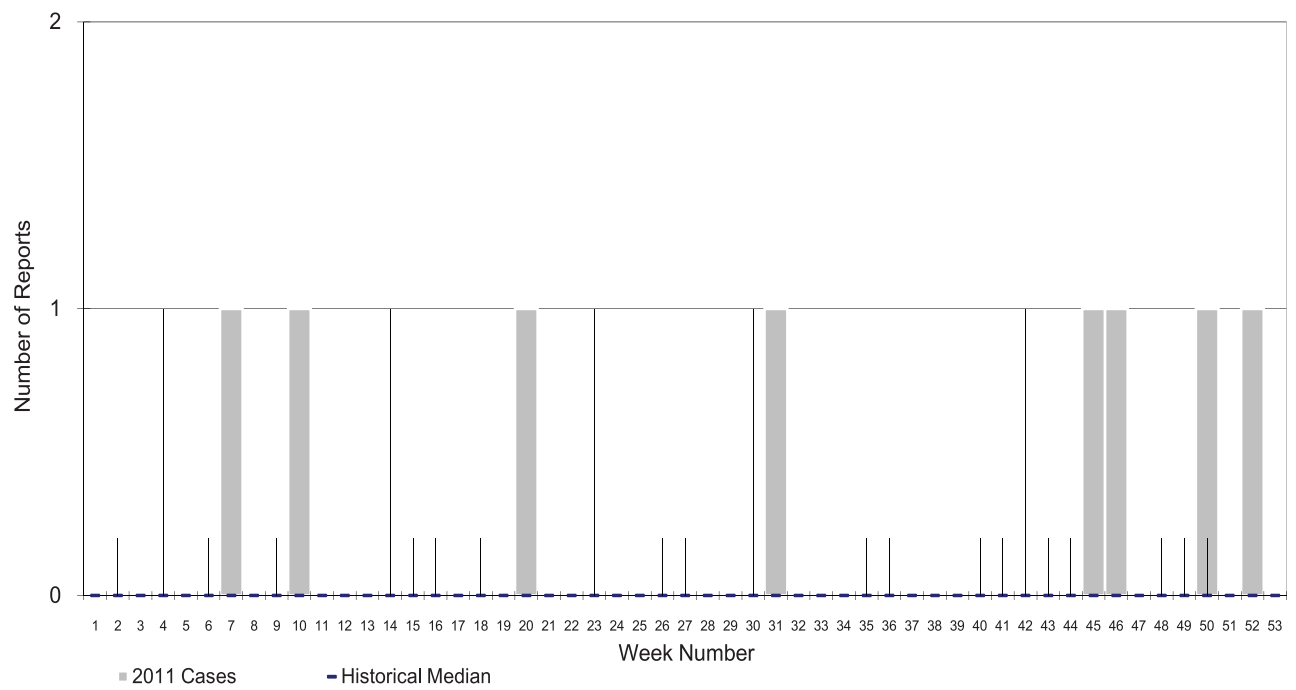
HSDA	Health Service Delivery Area	Cases	Rate
11	East Kootenay	0	0.0
12	Kootenay Boundary	0	0.0
13	Okanagan	2	0.6
14	Thompson Cariboo Shuswap	0	0.0
21	Fraser East	1	0.3
22	Fraser North	0	0.0
23	Fraser South	0	0.0
31	Richmond	0	0.0
32	Vancouver	1	0.1
33	North Shore/Coast Garibaldi	0	0.0
41	South Vancouver Island	0	0.0
42	Central Vancouver Island	0	0.0
43	North Vancouver Island	0	0.0
51	Northwest	0	0.0
52	Northern Interior	1	0.7
53	Northeast	1	1.4

Note: Map classification by Jenks natural breaks method.

38.3 Legionellosis Rates by Age Group and Sex, 2011



27.4 2011 Legionellosis Reports Compared to Historical Median and the 10th and 90th Percentiles Around the Median (2002 to 2009)



Reportable Communicable Diseases in BC, December 2011

Schedule A: Reportable by all sources, including Laboratories

Acquired Immune Deficiency Syndrome	Human Immunodeficiency Virus Infection
Anthrax	Leprosy
Botulism	Lyme Disease
Brucellosis	Measles
Chancroid	Meningitis: All causes
Cholera	(i) Bacterial:
Congenital Infections:	Haemophilus
Toxoplasmosis	Pneumococcal
Rubella	Other
Cytomegalovirus	(ii) Viral
Herpes Simplex	Meningococcal Disease, All Invasive
Varicella-Zoster	including "Primary Meningococcal Pneumonia" and
Hepatitis B Virus	"Primary Meningococcal Conjunctivitis"
Listeriosis and any other congenital infection	Mumps
Creutzfeldt-Jacob Disease	Neonatal Group B Streptococcal Infection
Cryptococcal infection	Paralytic Shellfish Poisoning (PSP)
Cryptosporidiosis	Pertussis (Whooping Cough)
<i>Cyclospora</i> infection	Plague
Diffuse Lamellar Keratitis	Poliomyelitis
Diphtheria:	Rabies
Cases	Reye Syndrome
Carriers	Rubella
Encephalitis:	Severe Acute Respiratory Syndrome (SARS)
Post-infectious	Smallpox
Subacute sclerosing panencephalitis	<i>Streptococcus pneumoniae</i> Infection, Invasive
Vaccine-related	Syphilis
Viral	Tetanus
Foodborne illness:	Transfusion Transmitted Infection
All causes	Tuberculosis
Gastroenteritis epidemic:	Tularemia
Bacterial	Typhoid Fever and Paratyphoid Fever
Parasitic	Venereal Disease:
Viral	Chancroid
Genital Chlamydia Infection	Gonorrhea - all sites
Giardiasis	Syphilis
Gonorrhea - all sites	Waterborne Illness
Group A Streptococcal Disease, Invasive	All causes
H5 and H7 strains of the Influenza virus	West Nile Virus Infection
<i>Haemophilus influenzae</i> Disease,	Yellow Fever
All Invasive, by Type	
Hantavirus Pulmonary Syndrome	
Hemolytic Uremic Syndrome (HUS)	
Hemorrhagic Viral Fevers	
Hepatitis Viral:	
Hepatitis A	
Hepatitis B	
Hepatitis C	
Hepatitis E	
Other Viral Hepatitis	

Schedule B: Reportable by Laboratories only

All specific bacterial and viral stool pathogens:

(i) Bacterial:

Campylobacter
Salmonella
Shigella
Yersinia

(ii) Viral

Amoebiasis

Borrelia burgdorferi infection

Cerebrospinal Fluid Micro-organisms

Chlamydial Diseases, including Psittacosis

Creutzfeldt-Jacob Disease

Cryptococcal Infection

Herpes Genitalis

Human Immunodeficiency Virus Infection

Influenza virus, including the H5 and H7 strains

Legionellosis

Leptospirosis

Listeriosis

Malaria

Q Fever

Rickettsial Diseases

Severe Acute Respiratory Syndrome (SARS)

Smallpox

Tularemia

West Nile Virus Infection

2011 BC SELECTED REPORTABLE DISEASE CASE REPORTS BY HEALTH SERVICE DELIVERY AREA

	BC TOTAL	INTERIOR					FRASER			
	Provincial Total	East Kootenay	Kootenay Boundary	Okanagan	Thompson Cariboo	Interior Total	Fraser East	Fraser North	Fraser South	Fraser Total
2011 Population Estimate	4573321	80536	79754	352948	224230	737468	286758	616412	726525	1629695
AIDS (2010)*	70	0	0	0	0	0	3	6	12	21
Amebiasis	369	0	1	10	1	12	23	37	68	128
Campylobacteriosis	1722	26	39	94	44	203	112	229	218	559
Chlamydia^	11681	176	99	818	651	1744	511	1405	1292	3208
<i>Cryptococcus gattii</i>	23	0	1	0	0	1	1	2	2	5
Cryptosporidiosis	53	0	1	3	5	9	6	6	9	21
Cyclosporiasis	23	0	0	2	1	3	3	2	2	7
<i>E. coli</i> , Shigatoxigenic	111	0	5	9	4	18	13	9	17	39
Giardiasis	617	7	9	38	12	66	39	72	120	231
Gonorrhea^	1563	4	5	43	64	116	34	183	160	377
Hepatitis A	105	0	0	3	0	3	2	3	5	10
Hepatitis B Acute	15	0	0	1	0	1	0	3	2	5
Hepatitis B Chronic and Unknown	1152	2	3	10	10	25	31	231	82	344
Hepatitis C	1970	29	44	153	102	328	178	204	313	695
<i>Haemophilus influenzae b</i> , invasive	5	0	0	0	0	0	0	2	0	2
HIV^	289	0	1	7	3	11	16	23	16	55
Listeriosis	19	0	0	1	0	1	1	2	1	4
Lyme	20	0	1	1	1	3	2	1	0	3
Malaria	62	0	2	1	2	5	3	7	21	31
Measles	10	0	0	0	7	7	0	0	2	2
Meningococcal Disease, invasive	15	0	0	2	1	3	1	1	2	4
Mumps	132	1	0	6	0	7	2	16	11	29
Paratyphoid Fever	26	0	0	0	0	0	6	2	13	21
Pertussis	58	4	1	1	5	11	10	6	5	21
Pneumococcal Disease, invasive	324	5	10	30	18	63	24	35	44	103
Rubella	1	0	0	0	0	0	0	0	0	0
Salmonellosis	1103	9	9	65	35	118	89	157	225	471
Shigellosis	161	1	4	5	6	16	12	12	34	58
Streptococcus Group A invasive	182	2	5	8	9	24	21	22	26	69
Syphilis (infectious)^	193	0	0	2	5	7	5	13	9	27
Tuberculosis	268	1	0	8	4	13	13	36	75	124
Typhoid Fever	30	3	0	1	0	4	5	1	12	18
<i>Vibrio Parahaemolyticus</i>	42	1	0	4	0	5	1	4	5	10
West Nile	0	0	0	0	0	0	0	0	0	0
Yersiniosis	403	1	6	21	8	36	9	33	33	75
LESS COMMON DISEASES										
Brucellosis	1	0	0	0	0	0	0	1	0	1
Cholera: Serogroup non-O1/O139	1	0	0	1	0	1	0	0	0	0
Cholera: Serogroup O1/O139	1	0	0	0	0	0	0	0	1	1
Creutzfeldt-Jacob Disease	1	0	0	0	0	0	0	0	0	0
Legionellosis	6	0	0	2	0	2	1	0	0	1
Leptospirosis	2	0	0	0	0	0	0	0	0	0
Leprosy	1	0	0	0	0	0	0	0	1	1
Neonatal Group B Streptococcal Infection	10	0	0	2	2	4	0	0	0	0
Tularemia	2	0	1	0	1	2	0	0	0	0
Yellow Fever	1	0	0	0	0	0	0	0	0	0

*AIDS case reports are for 2010. The 2011 AIDS statistics will be available in our next report due to a delay associated with AIDS data collection.

^BC total includes cases of non-BC residents and cases of unspecified residency and thus may exceed the sum of cases of the five health authorities.

Note: In 2011, there were no reported cases of Anthrax, Congenital Rubella Syndrome, Diphtheria, Hantavirus, Viral Hemorrhagic Fevers, Plague, Poliomyelitis, Rabies, Severe Acute Respiratory Syndrome, Tetanus or Trichinosis. One case of Botulism was reported.

VANCOUVER COASTAL				VANCOUVER ISLAND				NORTHERN			
Richmond	Vancouver	North Shore Coast Garibaldi	Vancouver Coastal Total	South Vancouver Island	Central Vancouver Island	North Vancouver Island	Vancouver Island Total	Northwest	Northern Interior	Northeast	Northern Total
197631	668690	287432	1153753	374674	265979	121337	761990	75606	144558	70251	290415
2	30	2	34	12	0	1	13	2	0	0	2
11	157	19	187	27	8	6	41	0	1	0	1
78	355	169	602	173	88	55	316	14	24	4	42
448	2370	671	3489	1048	712	310	2070	340	606	224	1170
0	3	0	3	2	10	2	14	0	0	0	0
2	9	6	17	1	1	1	3	0	2	1	3
0	2	7	9	0	2	1	3	1	0	0	1
2	20	4	26	12	12	1	25	0	3	0	3
10	146	51	207	40	28	21	89	8	12	4	24
33	760	67	860	73	15	12	100	22	84	4	110
1	7	2	10	14	63	4	81	0	1	0	1
0	7	0	7	1	0	1	2	0	0	0	0
204	447	52	703	41	21	6	68	6	3	3	12
39	318	86	443	133	145	64	342	37	85	40	162
0	3	0	3	0	0	0	0	0	0	0	0
6	163	9	178	12	5	3	20	9	14	2	25
1	5	0	6	6	1	1	8	0	0	0	0
1	5	4	10	3	1	0	4	0	0	0	0
4	12	2	18	3	0	0	3	1	3	1	5
0	1	0	1	0	0	0	0	0	0	0	0
1	1	2	4	1	1	0	2	0	2	0	2
10	41	44	95	1	0	0	1	0	0	0	0
2	2	1	5	0	0	0	0	0	0	0	0
1	4	4	9	12	2	0	14	0	1	2	3
12	42	12	66	28	31	5	64	13	14	1	28
0	1	0	1	0	0	0	0	0	0	0	0
50	171	97	318	72	47	34	153	14	22	7	43
1	50	11	62	8	5	6	19	2	0	4	6
6	32	5	43	5	17	10	32	3	5	6	14
3	131	5	139	14	2	0	16	0	3	1	4
16	79	4	99	9	4	1	14	3	12	3	18
1	4	3	8	0	0	0	0	0	0	0	0
3	7	9	19	4	3	1	8	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
36	97	51	184	56	28	7	91	9	8	0	17
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	1	0	0	0	0
0	1	0	1	0	0	0	0	0	1	1	2
1	0	1	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	1	3	1	0	4	0	0	1	1
0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	1	0	0	0	0	0	0	0	0

2011 BC SELECTED REPORTABLE DISEASE CASE RATES BY HEALTH SERVICE DELIVERY AREA

	BC TOTAL	INTERIOR					FRASER			
	Provincial Total	East Kootenay	Kootenay Boundary	Okanagan	Thompson Cariboo	Interior Total	Fraser East	Fraser North	Fraser South	Fraser Total
2011 Population Estimate	4573321	80536	79754	352948	224230	737468	286758	616412	726525	1629695
AIDS (2010)*	1.5	0.0	0.0	0.0	0.0	0.0	1.1	1.0	1.7	1.3
Amebiasis	8.1	0.0	1.3	0.5	2.8	1.6	8.0	6.0	9.4	7.9
Campylobacteriosis	37.7	32.3	48.9	19.6	26.6	27.5	39.1	37.2	30.0	34.3
Chlamydia ^	255.4	214.1	124.3	226.2	287.8	236.5	175.6	225.8	177.4	196.8
<i>Cryptococcus gattii</i>	0.5	0.0	1.3	0.0	0.0	0.1	0.3	0.3	0.3	0.3
Cryptosporidiosis	1.2	0.0	1.3	2.2	0.9	1.2	2.1	1.0	1.2	1.3
Cyclosporiasis	0.5	0.0	0.0	0.5	0.6	0.4	1.1	0.3	0.3	0.4
<i>E. coli</i> , Shigatoxigenic	2.4	0.0	6.3	1.8	2.6	2.4	4.5	1.5	2.3	2.4
Giardiasis	13.5	8.7	11.3	5.4	10.8	9.0	13.6	11.7	16.5	14.2
Gonorrhea ^	34.2	4.9	6.3	11.9	28.3	15.7	11.7	29.4	22.0	23.1
Hepatitis A	2.3	0.0	0.0	0.0	0.9	0.4	0.7	0.5	0.7	0.6
Hepatitis B Acute	0.3	0.0	0.0	0.0	0.3	0.1	0.0	0.5	0.3	0.3
Hepatitis B Chronic and Unknown	25.2	2.5	3.8	4.5	2.8	3.4	10.8	37.5	11.3	21.1
Hepatitis C	43.1	36.0	55.2	45.5	43.4	44.5	62.1	33.1	43.1	42.7
<i>Haemophilus influenzae b</i> , invasive	0.11	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1
HIV ^	6.3	0.0	1.3	1.9	1.3	1.5	5.5	3.7	2.2	3.4
Listeriosis	0.4	0.0	0.0	0.0	0.3	0.1	0.4	0.3	0.1	0.3
Lyme	0.4	0.0	1.3	0.3	0.4	0.4	0.7	0.2	0.0	0.2
Malaria	1.4	0.0	2.5	0.9	0.3	0.7	1.1	1.1	2.9	1.9
Measles	0.2	0.0	0.0	3.1	0.0	1.0	0.0	0.0	0.3	0.1
Meningococcal Disease, invasive	0.3	0.0	0.0	0.5	0.6	0.4	0.4	0.2	0.3	0.3
Mumps	2.9	1.2	0.0	0.0	1.7	1.0	0.7	2.6	1.5	1.8
Paratyphoid Fever	0.6	0.0	0.0	0.0	0.0	0.0	2.1	0.3	1.8	1.3
Pertussis	1.3	5.0	1.3	2.2	0.3	1.5	3.5	1.0	0.7	1.3
Pneumococcal Disease, invasive	7.1	6.2	12.5	8.0	8.5	8.5	8.4	5.7	6.1	6.3
Rubella	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmonellosis	24.1	11.2	11.3	15.6	18.4	16.0	31.0	25.5	31.0	28.9
Shigellosis	3.5	1.2	5.0	2.7	1.4	2.2	4.2	2.0	4.7	3.6
Streptococcus Group A invasive	4.0	2.5	6.3	4.0	2.3	3.3	7.3	3.6	3.6	4.2
Syphilis (infectious) ^	4.2	0.0	0.0	0.6	2.2	0.9	1.7	2.1	1.2	1.7
Tuberculosis	5.9	1.2	0.0	2.3	1.8	1.8	4.5	5.8	10.3	7.6
Typhoid Fever	0.7	3.7	0.0	0.0	0.3	0.5	1.7	0.2	1.7	1.1
<i>Vibrio Parahaemolyticus</i>	0.9	1.2	0.0	0.0	1.1	0.7	0.4	0.7	0.7	0.6
West Nile	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yersiniosis	8.8	1.2	7.5	3.6	6.0	4.9	3.1	5.4	4.5	4.6
LESS COMMON DISEASES										
Brucellosis	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1
Cholera: Serogroup non-O1/O139	0.02	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0
Cholera: Serogroup O1/O139	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Creutzfeldt-Jacob Disease	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Legionellosis	0.1	0.0	0.0	0.0	0.6	0.3	0.4	0.0	0.0	0.1
Leptospirosis	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leprosy	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Neonatal Group B Streptococcal Infection	0.2	0.0	0.0	0.9	0.6	0.5	0.0	0.0	0.0	0.0
Tularemia	0.04	0.0	1.3	0.5	0.0	0.3	0.0	0.0	0.0	0.0
Yellow Fever	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*AIDS case reports are for 2010. The 2011 AIDS statistics will be available in our next report due to a delay associated with AIDS data collection.

^BC total includes cases of non-BC residents and cases of unspecified residency and thus may exceed the sum of cases of the five health authorities.

Note: In 2011, there were no reported cases of Anthrax, Congenital Rubella Syndrome, Diphtheria, Hantavirus, Viral Hemorrhagic Fevers, Plague, Poliomyelitis, Rabies, Severe Acute Respiratory Syndrome, Tetanus or Trichinosis. One case of Botulism was reported.

VANCOUVER COASTAL				VANCOUVER ISLAND				NORTHERN			
Richmond	Vancouver	North Shore Coast Garibaldi	Vancouver Coastal Total	South Vancouver Island	Central Vancouver Island	North Vancouver Island	Vancouver Island Total	Northwest	Northern Interior	Northeast	Northern Total
197631	668690	287432	1153753	374674	265979	121337	761990	75606	144558	70251	290415
1.0	4.6	0.7	2.9	3.2	0.0	0.8	1.7	2.7	0.0	0.0	0.7
5.6	23.5	6.6	16.2	7.2	3.0	4.9	5.4	0.0	0.7	0.0	0.3
39.5	53.1	58.8	52.2	46.2	33.1	45.3	41.5	18.5	16.6	5.7	14.5
224.9	359.9	235.8	302.4	278.8	264.3	251.4	271.7	451.3	423.2	321.7	402.9
0.0	0.4	0.0	0.3	0.5	3.8	1.6	1.8	0.0	0.0	0.0	0.0
1.0	1.4	2.1	1.5	0.3	0.4	0.8	0.4	0.0	1.4	1.4	1.0
0.0	0.3	2.4	0.8	0.0	0.8	0.8	0.4	1.3	0.0	0.0	0.3
1.0	3.0	1.4	2.3	3.2	4.5	0.8	3.3	0.0	2.1	0.0	1.0
5.1	21.8	17.7	17.9	10.7	10.5	17.3	11.7	10.6	8.3	5.7	8.3
16.6	115.4	23.5	74.5	19.4	5.6	9.7	13.1	29.2	58.7	5.7	37.9
0.5	1.1	0.7	0.9	3.7	23.7	3.3	10.6	0.0	0.7	0.0	0.3
0.0	1.1	0.0	0.6	0.3	0.0	0.8	0.3	0.0	0.0	0.0	0.0
103.2	66.9	18.1	60.9	10.9	7.9	4.9	8.9	7.9	2.1	4.3	4.1
19.7	47.6	29.9	38.4	35.5	54.5	52.8	44.9	48.9	58.8	56.9	55.8
0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	24.8	3.2	15.4	3.2	1.9	2.4	2.6	11.9	9.8	2.9	8.6
0.5	0.8	0.0	0.5	1.6	0.4	0.8	1.1	0.0	0.0	0.0	0.0
0.5	0.7	1.4	0.9	0.8	0.4	0.0	0.5	0.0	0.0	0.0	0.0
2.0	1.8	0.7	1.6	0.8	0.0	0.0	0.4	1.3	2.1	1.4	1.7
0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.2	0.7	0.4	0.3	0.4	0.0	0.3	0.0	1.4	0.0	0.7
5.1	6.1	15.3	8.2	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0
1.0	0.3	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.6	1.4	0.8	3.2	0.8	0.0	1.8	0.0	0.7	2.9	1.0
6.1	6.3	4.2	5.7	7.5	11.7	4.1	8.4	17.2	9.7	1.4	9.6
0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.3	25.6	33.8	27.6	19.2	17.7	28.0	20.1	18.5	15.2	10.0	14.8
0.5	7.5	3.8	5.4	2.1	1.9	4.9	2.5	2.7	0.0	5.7	2.1
3.0	4.8	1.7	3.7	1.3	6.4	8.2	4.2	4.0	3.5	8.5	4.8
1.5	19.9	1.8	12.0	3.7	0.7	0.0	2.1	0.0	2.1	1.4	1.4
8.1	11.8	1.4	8.6	2.4	1.5	0.8	1.8	4.0	8.3	4.3	6.2
0.5	0.6	1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	1.1	3.1	1.7	1.1	1.1	0.8	1.1	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.2	14.5	17.7	16.0	15.0	10.5	5.8	11.9	11.9	5.5	0.0	5.9
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0
0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7	1.4	0.7
0.5	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.2	0.0	0.1	0.8	0.4	0.0	0.5	0.0	0.0	1.4	0.3
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Sources and Explanatory Remarks

1. Clinical and confirmed case reports are collected from the health regions in British Columbia through the integrated Public Health Information System (iPHIS). Starting in 2005, only confirmed cases are described in the main report, in keeping with BC reporting to the Public Health Agency of Canada. For the breakdown of cases by their confirmed or clinical case status for 2005 and previous years, see the 2005 BC Annual Summary of Reportable Diseases posted on www.bccdc.ca. The exceptions are *Cryptococcus gattii*, Lyme Disease, and Tetanus for which clinical cases are included in reporting.
2. Numbers in this report were generated in April 2011 and are subject to change due to possible late reporting and/or data clean up in the regions. This may also explain changes in the number of reported cases in previous years for some diseases.
3. Summary reports contained herein for some diseases are based on enhanced surveillance data bases maintained at BCCDC which are sourced from reporting by BC Health Authorities using forms specifically designed for that disease, and reconciliation of laboratory data. These may not always correspond to iPHIS reports, including by case classification (i.e., confirmed and clinical status).
4. Data for influenza, invasive meningococcal and pneumococcal disease and invasive group A streptococcal disease, measles, mumps, and rubella, *Cryptococcus gattii* infection, MRSA and VRE are collected through enhanced surveillance systems. Invasive meningococcal disease, invasive group A streptococcal disease, and *Cryptococcus gattii* infection are reported using episode date. Episode date is the onset date if reported. Other diseases are classified by the reported date which is the date reported to the health authority.
5. Data for HIV and AIDS are collected through HAISYS, the HIV/AIDS Information System. Data for other sexually transmitted infections (STIs) are collected through the STI Information System. AIDS case reports are for 2009. The 2010 AIDS statistics will be available in our next report due to a delay associated with AIDS data collection. The BC total numbers for AIDS, chlamydia (genital), gonorrhea (genital), HIV and syphilis (infectious) include cases of non-BC residents and cases of unknown residency and thus may exceed the sum of cases in the five health authorities.
6. Statistics on tuberculosis are based on the analysis of the data extracted in March 2011. For more updated statistics on tuberculosis, please contact the Division of Tuberculosis Control.
7. For information on Antimicrobial Resistant Organism (ARO) Surveillance in BC, please refer to: *Antimicrobial Resistance Trends in the Province of British Columbia - 2009. Epidemiology Services, British Columbia Centre for Disease Control*. Available at www.bccdc.ca/prevention/AntibioticResistance

8. Amebiasis, cryptosporidiosis and listeriosis were removed from national surveillance in January 2000. Lyme disease became nationally notifiable in 2009; methicillin resistant *Staphylococcus aureus*, vancomycin resistant *enterococci*, *Vibrio parahaemolyticus* and yersiniosis have not been nationally notifiable diseases in the period 2002 through 2011.
9. Salmonellosis reports include Paratyphoid (*S. Paratyphi*) and Typhoid Fever (*S. Typhi*).
10. The Jenks Natural Breaks Classification method was used for defining different classifications of disease rates in the maps. This classification method identifies gaps or depressions within the data distribution and creates the categories based on the best fit of the data (i.e., groups based on similarities).
11. Health Service Delivery Area boundaries are taken from BC STATS; BC STATS is the central statistical agency of the Province of British Columbia.
12. National rates are provided by the Public Health Agency of Canada -Division of Surveillance and Risk Assessment. The 2009 and 2010 national rates are preliminary. 2010 data do not include data from Manitoba and Nunavut. The resulting national rates are therefore based only on the data and populations for the remaining participating jurisdictions, and the national rates may change once reporting is complete. 2011 national rates are unavailable currently until data updates are finalized.
13. Population estimates are taken from BC Stats, Ministry of Labour, Citizens' Services and Open Government July 1. Please note for the 2010 BC Annual Summary of Reportable Diseases and previous years reports, population estimates were taken from P.E.O.P.L.E. Projection (Population Extrapolation for Organizational Planning with Less Error) .
14. While we endeavour to include data on the majority of reportable diseases in this publication, data on some are not included. For information on the incidence of these diseases in 2011 in British Columbia, please contact epidserv@bccdc.ca.

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