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# Fraser Health

## Communicable Disease Report

### 2007

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# Diseases Preventable by Vaccination

Notes:

*Numbers for previous years may slightly differ because of subsequent corrections to the database.  
Rates of rare diseases may be changed considerably by differences of only a few cases*

## Fraser Health Immunization Program

Immunization is the most effective way to protect adults and children from vaccine-preventable diseases. Infants and young children in British Columbia are routinely immunized against many diseases including tetanus, diphtheria, pertussis, polio, Haemophilus influenzae type B (Hib), hepatitis B, pneumococcal disease, meningococcal disease, measles, mumps, rubella and varicella. Given the importance of immunization programs in preventing communicable diseases, tracking immunization data to determine the percentage of children who are up-to-date with recommended vaccines is a key measure of how well the population is protected.

Children residing in Fraser Health have access to publicly-funded vaccines both through local public health units and their family physicians. The primary vehicle for immunization delivery varies throughout Fraser Health, with family physicians in the North and South HSDAs vaccinating nearly half of all children and family physicians in the East vaccinating relatively few. As a result, more children are vaccinated by public health in the East than in the North or South HSDAs.

Immunization data for all children born in 2005 was analyzed to determine the percentage that had completed their primary series and booster immunizations. Vaccines in the primary series are due at 2, 4, 6 and 12 months, and booster doses are due at 18 months. In this analysis, children were assessed at 24 months of age for completion of the primary series and at 36 months of age for completion of the booster doses. The results are shown in Table 1.

Over 80% of children had completed their primary series by the age of 24 months. Completion rates were highest for the diphtheria-tetanus-pertussis-polio-Hib series (88.8%) and measles-mumps-rubella vaccine (88.9%). Rates for pneumococcus, hepatitis B, meningococcus C and varicella were 86.3%, 84.3%, 83.2% and 81.8 % respectively. For the 18-month booster doses, completion rates at 36 months of age were still over 80% for all antigens. The most notable difference in completion rates between the primary series and the 18-month boosters (assessed at 36 months) was that those antigens that are complete with the primary series had higher completion rates than those that required a booster at 18 months. The completion rate for the diphtheria-tetanus-pertussis-polio-Hib series fell to 80.3% with the 18-month booster. The rate for the measles-mumps rubella series fell to 82.0%. Completion rates (at 36 months) for those antigens that are complete with the primary series, including pneumococcus, hepatitis B, meningococcus C and varicella, rose slightly between 24 and 36 months, to 87.0%, 85.3%, 85.5% and 84.2%, respectively. This suggests that delaying the age of assessment, and thereby increasing the time available for the children to receive the vaccines, results in increased rates. It also suggests that the more doses that are required to complete a vaccine series, the lower the completion rates.

Fraser East appeared to have the highest percentage of children up-to-date for both their primary series and 18-month booster doses. More children in Fraser East are immunized exclusively through local public health units rather than their family doctors' offices. Whether the higher completion rates in Fraser East are because children immunized in public health units are more likely to be up-to-date or because of issues of reporting by family physicians cannot be determined from this data.

**Table 1  
Percentage of Children with Completed Primary Series and 18-month Booster Immunizations**

	Primary Series (at 24 months)								18-month Booster (at 36 months)							
	East		South		North		Total		East		South		North		Total	
Children in cohort	3012		7157		5259		15428		3012		7157		5259		15428	
Diphtheria	2770	92.0%	6402	89.5%	4527	86.1%	13699	88.8%	2575	85.5%	5701	79.7%	4112	78.2%	12388	80.3%
Tetanus	2770	92.0%	6402	89.5%	4527	86.1%	13699	88.8%	2575	85.5%	5701	79.7%	4112	78.2%	12388	80.3%
Pertussis	2770	92.0%	6402	89.5%	4527	86.1%	13699	88.8%	2575	85.5%	5701	79.7%	4112	78.2%	12388	80.3%
Polio	2770	92.0%	6402	89.5%	4527	86.1%	13699	88.8%	2575	85.5%	5701	79.7%	4112	78.2%	12388	80.3%
Haemophilus influenzae type b	2770	92.0%	6402	89.5%	4527	86.1%	13699	88.8%	2575	85.5%	5701	79.7%	4112	78.2%	12388	80.3%
Measles	2713	90.1%	6424	89.8%	4581	87.1%	13718	88.9%	2577	85.6%	5833	81.5%	4236	80.5%	12646	82.0%
Mumps	2713	90.1%	6424	89.8%	4581	87.1%	13718	88.9%	2577	85.6%	5833	81.5%	4236	80.5%	12646	82.0%
Rubella	2713	90.1%	6424	89.8%	4581	87.1%	13718	88.9%	2577	85.6%	5833	81.5%	4236	80.5%	12646	82.0%
Hepatitis B	2694	89.4%	6041	84.4%	4275	81.3%	13010	84.3%	2736	90.8%	6109	85.4%	4310	82.0%	13155	85.3%
Varicella	2555	84.8%	5775	80.7%	4283	81.4%	12613	81.8%	2631	87.4%	5974	83.5%	4380	83.3%	12985	84.2%
Pneumococcus	2708	89.9%	6217	86.9%	4390	83.5%	13315	86.3%	2737	90.9%	6265	87.5%	4415	84.0%	13417	87.0%
Meningococcus C	2624	87.1%	5923	82.8%	4289	81.6%	12836	83.2%	2706	89.8%	6103	85.3%	4383	83.3%	13192	85.5%

## Chickenpox (Varicella)

**The varicella zoster virus (VZV) causes chickenpox and shingles.** Most people develop chickenpox in childhood. However, about 5% are infected as adults. Repeat infections are possible although uncommon. After infection with VZV the virus remains in a dormant state in the body in the roots of nerves that control sensation. In about 20% of people the virus reactivates, often many years later, and causes a painful rash known as shingles.

Serious complications from chickenpox are more likely to occur in adults than in children, and include pneumonia, inflammation of the brain, and bacterial infection of the skin. A rare bacterial infection of the skin with invasive Group A streptococcus (necrotizing fasciitis or “flesh-eating disease”) can be life-threatening and is 40-60 times more likely to occur following chickenpox disease. Aspirin should not be given to treat fever in children with chickenpox, because it increases the chances of Reye syndrome, a rare, serious, and sometimes fatal inflammation of the liver and brain.

Chickenpox is not a reportable disease in BC because it is so common and because no vaccine was available until 1998. Publicly-funded varicella vaccine was made available to those most at risk beginning in April 2004. Routine vaccination against chickenpox for 1 year olds, Kindergarten students and Grade 6 students began in BC in 2005. In April 2005, a catch-up program began for children 18-47 months old who were susceptible to chickenpox because they had neither been vaccinated nor had any history of having had chickenpox. In April 2006, this catch-up program was extended to include all susceptible children, adolescents and adults.

A new, more potent varicella zoster vaccine to help protect adults over 60 against shingles was approved in the US in May 2006, but is not yet licensed in Canada.

## *Diphtheria, Polio and Tetanus*

**Diphtheria, polio and tetanus are extremely rare diseases in Canada today because vaccines have been available for many years and immunization rates are high.** Only a few cases are reported nationally every decade, with one case reported in Fraser Health in 2007.

**Diphtheria** is a bacterial disease spread through the air from person to person. Some people carry diphtheria bacteria in their nose and throat without symptoms, whereas others will become ill with severe sore throat and breathing problems. Diphtheria can cause heart failure and paralysis and will kill about one in every 10 people who become ill with it. Babies infected with diphtheria are the most likely to die.

**Tetanus**, also called lockjaw, is a disease caused when tetanus bacteria from the soil get into a cut or other wound and make a toxin that causes the muscles of the body to become stiff and go into spasms. These spasms can be so severe that the infected person cannot breathe and requires mechanical ventilation. About 25% of people with tetanus will die in spite of treatment.

**Polio** is a disease caused by any one of three types of poliovirus, a gastrointestinal virus that is usually spread by ingesting contaminated water or food. Infection may cause no symptoms at all, or may cause serious illness with fever, nausea and vomiting, severe muscle pain and spasms and weakness or paralysis of one or more arms or legs. The weakness and paralysis can be permanent. In 1988 the World Health Organization launched a campaign to eradicate polio from the world. The campaign has made great progress but polio remains in a few countries where it has been very difficult to vaccinate everyone who is susceptible.

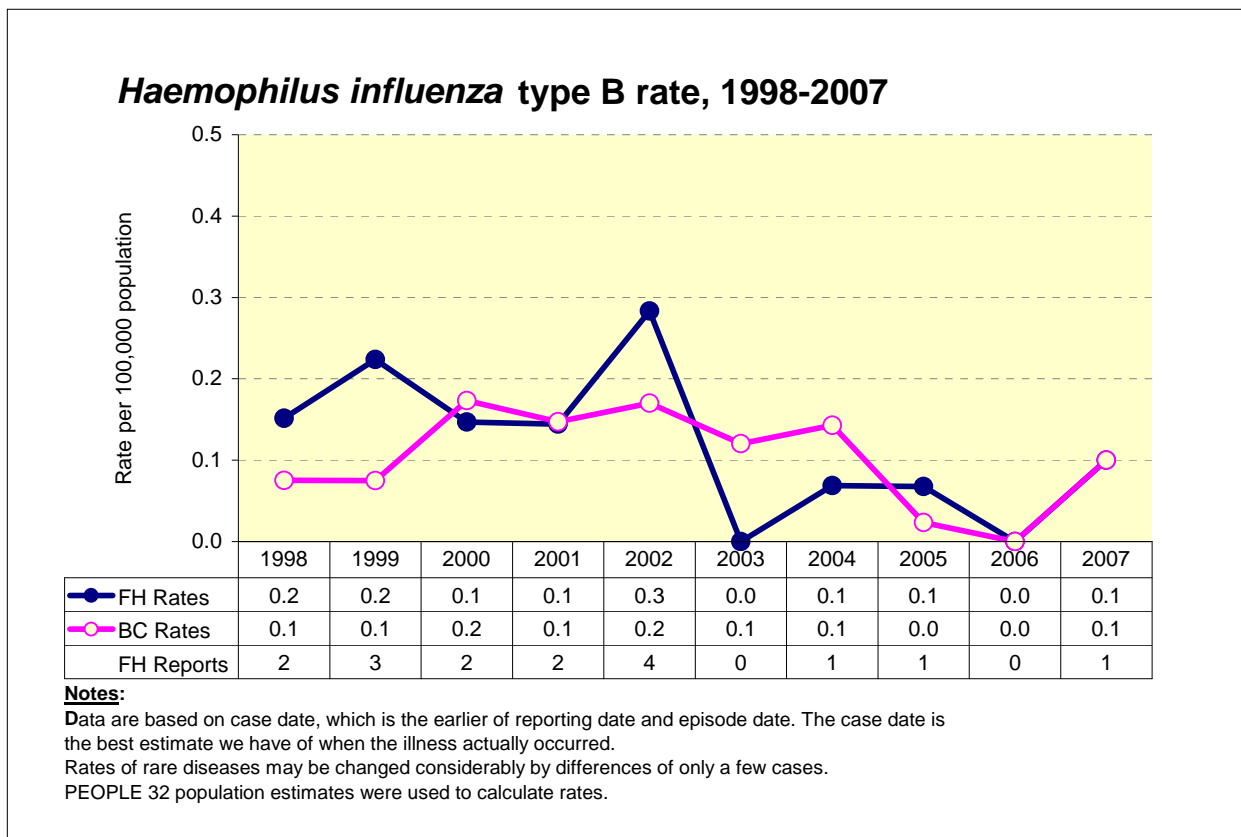
Continued immunization against these three diseases is essential, because exposure to the organisms that cause them can still occur. The bacteria that cause tetanus are found universally in soil, and can contaminate skin wounds. The bacteria that cause diphtheria are carried in the nose of a proportion of BC residents, even if they have been immunized. Polio virus no longer circulates in Canada, but exposure can occur when people travel abroad, or when a visitor to Canada brings in the virus from their home country. This can result in outbreaks among people who are not immunized. A small proportion of Fraser Health residents do not accept immunization for themselves or their children. They are at particular risk in these situations. There was one case of tetanus in Fraser Health in 2007, in a child who had never been immunized.

Infants and children are vaccinated against diphtheria, polio and tetanus as part of the routine childhood immunization program. Adults should receive regular boosters against tetanus and diphtheria every 10 years.

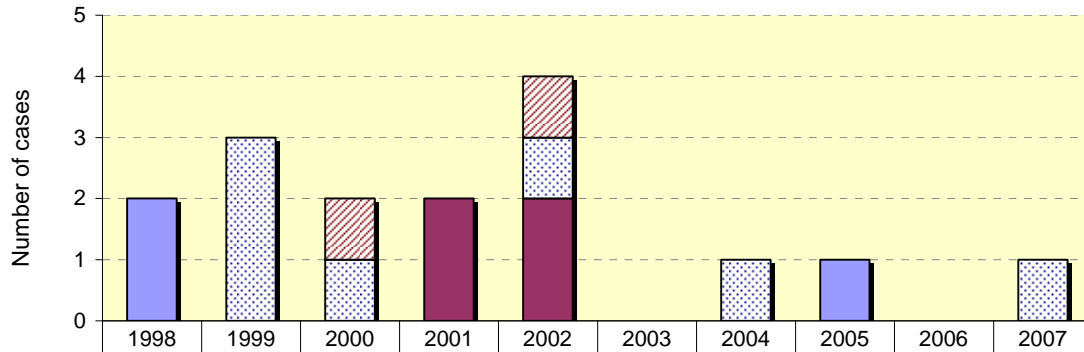
## Haemophilus Influenzae Type B (Hib)

**Haemophilus influenzae type b causes severe or invasive infections in children under the age of five.** These include meningitis, epiglottitis and pneumonia. Prior to 1992, it caused approximately half of bacterial meningitis in children. A Hib vaccine was introduced into the routine infant immunization program in the early 1990s, and invasive Hib disease has now become very rare in children. Occasional invasive infections caused by Hib still occur in unimmunized children and in adults. Fraser Health had one invasive Hib case in 2007, an adult over the age of 19.

Those at higher risk of Hib infection also include people whose spleen has been removed or is not working properly, who have sickle cell disease, who have had a stem cell or organ transplant, a cochlear implant or whose immune system isn't working well because of disease (HIV, lymphoma, etc.) or immunosuppressive treatment (high dose steroids, chemotherapy, etc.) These people should be vaccinated against Hib.



### Distribution of reported *Haemophilus influenzae* type B cases by age Fraser Health, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total	2	3	2	2	4	0	1	1	0	1
60+	0	0	1	0	1	0	0	0	0	0
20-59	0	3	1	0	1	0	1	0	0	1
10-19	0	0	0	0	0	0	0	0	0	0
1-9	2	0	0	0	0	0	0	1	0	0
<1	0	0	0	2	2	0	0	0	0	0

**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

# Influenza

**Influenza is a common viral respiratory illness that causes fever, headache, chills, muscle aches, sore throat and severe cough.** Influenza is important because it spreads easily through droplets in the air and on surfaces, and every winter season it causes many people to become ill. The elderly and those with chronic illnesses who come down with influenza may die and many of those who survive will never fully recover. Infants and pregnant women may also be severely affected. Young, healthy people are more likely to have milder illness or no symptoms at all, yet they will still be infectious to others.

The circulating strains of influenza viruses are constantly changing, and long-term immunity to influenza infection is not possible. A new vaccine has to be created each year to match that year's strains and annual immunization with the current vaccine is the most effective protection against influenza infection. Those who do develop influenza after they have been vaccinated don't get as sick and recover faster.

Influenza vaccination of residents and staff in residential care facilities can prevent 30-70% of influenza illness, 30-50% of hospitalizations and up to 85% of influenza-related deaths among residents. Staff immunization is even more important than resident immunization for protecting residents, in part because the elderly tend to have a weaker response to vaccines. Staff immunization rates of 80% and over are required for good protection of both residents and staff.

## **Influenza Vaccine Uptake in Fraser Health in 2007/08**

British Columbia has set a target of 80% for immunization rates of staff working in residential care facilities. In the 2007/08 season, 73.2% of Fraser Health staff overall working in these facilities were immunized against influenza, increased from 71.9% in 2006/07. This rate has been increasing steadily over the past several years. Rates vary significantly by type of facility as can be seen in the table below; 83% of staff in private pay facilities were immunized, 78% of staff in mental health facilities, 76% in contracted facilities and 60% in Fraser Health owned and operated facilities.

The overall immunization rate of staff working in acute care facilities in Fraser Health was 40% in 2007/08, and this rate has remained steady for the past three years. The provincial target for acute care staff is 60% and substantial improvement will have to occur before this target can be met.

Immunization rates vary not only by type of facility but also by type of staff. Regular staff are more likely to be immunized than casual staff; in Fraser Health in 2007/08 immunization rates of regular staff ranged from 50% in acute care to 88% in private pay facilities. Among casual staff rates ranged from 29% in acute care to 76% in private pay facilities. Part of the reason for the lower rates among casual staff may be that it is more difficult to obtain accurate information on these workers as they generally work at more than one facility.

Ninety three percent of the residents in residential care facilities were immunized against influenza in Fraser Health in 2007/08. This rate has been stable for the past three years. The British Columbia target for resident immunization is 90%, and most Fraser Health facilities met the target this season.

The improvements that have been seen in the immunization rates of residential care staff and the consistently high rates among the residents themselves are attributed to initiatives and partnerships undertaken by FH Medical Health Officers, the FH Communicable Disease Team, Public Health staff, Workplace Health, Communications, various Influenza Working Groups and BCCDC. Rates among acute care staff and casual workers in both acute and residential care remain well below targets and efforts are ongoing to improve them.

**Percent of Staff Immunized against Influenza in  
FH Care Facilities by HSDA, 2007/08**

Facility	Fraser North			Fraser South			Fraser East			Fraser Health		
	Reg.	Cas.	Total	Reg.	Cas.	Total	Reg.	Cas.	Total	Reg.	Cas.	Total
<b>Contracted</b>	83%	64%	76%	84%	66%	79%	74%	54%	68%	<b>82%</b>	<b>63%</b>	<b>76%</b>
<b>Private Pay</b>	94%	92%	93%	83%	63%	76%	100%	100%	100%	<b>88%</b>	<b>76%</b>	<b>83%</b>
<b>Mental Health</b>				81%	67%	78%				<b>81%</b>	<b>67%</b>	<b>78%</b>
<b>Fraser Health Owned</b>	74%	55%	67%	63%	42%	55%	66%	49%	58%	<b>68%</b>	<b>48%</b>	<b>60%</b>
<b>Acute</b>	50%	29%	41%	49%	28%	39%	51%	33%	42%	<b>50%</b>	<b>29%</b>	<b>40%</b>

Note: Reg. = Regular staff; Cas. = Casual staff.

For more information on immunization of Fraser Health staff and residents in 2007/08, the Fraser Health Immunization and Outbreak Report is available from Fraser Health Decision Support.

### **Respiratory Illness Outbreaks in Fraser Health Residential Care Facilities in 2007/08**

Based on the recommendations of the World Health Organization the influenza vaccine for the 2007/08 season contained three influenza virus strains; two A strains (one H1N1 and one H3N2) and a B strain. The match between the H1N1 component and H1N1 viruses circulating during the 2007/08 season was good. However, H3N2 viruses and B viruses circulating during the 2007/08 season drifted away from the strains in the vaccine, resulting in a relative mismatch between those components and circulating strains. The impression of the consulting Fraser Health physicians and nurses was that this was a relatively mild season, suggesting that the closeness of the match between the vaccine and circulating strains is not the only factor that determines disease severity.

Respiratory illness is defined by a new or worse cough, and an outbreak is declared when two or more cases of respiratory illness occur in a unit/area within a seven-day period. For this flu season, respiratory outbreaks were classified into three scenarios; Scenario A was an outbreak of lab-confirmed influenza, Scenario B was an outbreak of non-influenza illness characterized by serious illness and Scenario C was an outbreak of non-influenza illness characterized by mild illness. Surveillance data were collected only for Scenario A and B outbreaks.

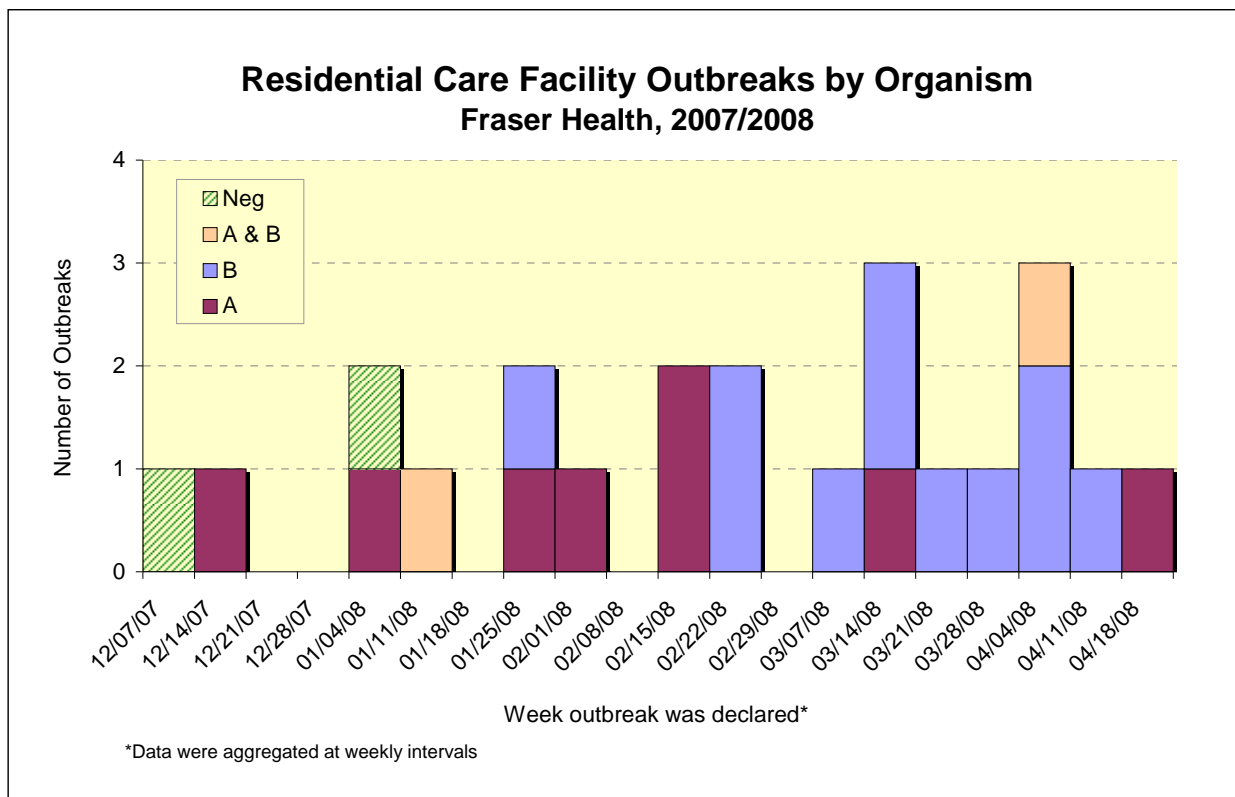
During the winter and spring of 2007/08, 24 respiratory illness outbreaks in 19 facilities were identified in Fraser Health, as compared with 21 outbreaks in 2006/07. Eight of these were due to influenza A, 11 were due to influenza B, and in two outbreaks both influenza A and B were identified. One outbreak was due to metapneumovirus and in two outbreaks no virus was

identified, meaning that they were possibly caused by viruses not included in the respiratory virus testing panel or specimens available for testing were inadequate to detect the virus.

These outbreaks included 365 reported cases, an increase of 90% over the 192 cases reported in 2006/07. The outbreak season also lasted longer than last year; cases were reported as early as November and continued through late April. Fourteen influenza-related hospitalizations and five deaths were reported among facility residents. These numbers are an increase over last year but are still low for a care facility population the size of Fraser Health's, and reflect the work of the Respiratory Outbreak Working Group and all those who use the Guidelines to prevent influenza infections and to reduce severity and spread when they do occur.

This is the first year in which the Luminex panel was routinely available to test for respiratory viruses other than influenza. For those respiratory outbreaks in which influenza virus was not detected, it was used to test for other viruses that can also cause outbreaks. It proved very useful in clarifying and understanding known influenza outbreaks which were behaving atypically, e.g., not responding as expected to the use of antiviral medication. Luminex testing revealed that some outbreaks were characterized by the presence of both influenza and other viruses and allowed for more confidence in using control measures other than antivirals, more judicious use of antiviral medication and confidence that an influenza outbreak could be declared over even when some residents remained symptomatic.

Due to ongoing evidence of resistant viruses, NACI did not recommend using amantadine for treatment and prophylaxis of influenza during the 2007/08 season. Thus oseltamivir was the only antiviral used to control influenza outbreaks this season.





## *Measles (Red Measles)*

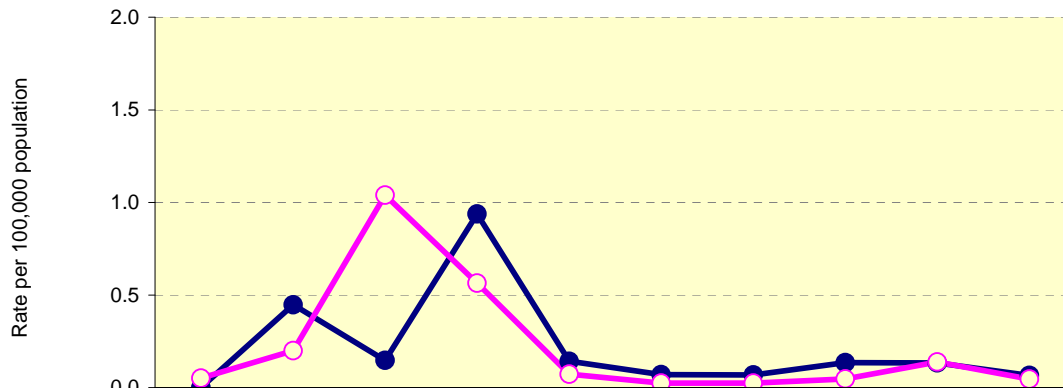
**Measles is a severe, highly-contagious viral illness**, which starts with fever, muscle aches, cough and red, sore eyes. A rash of large red spots then appears first on the face and head, spreading to the chest, arms and legs. Ear infections and pneumonia are common complications. One person in every 1,000 with measles develops encephalitis, or brain inflammation, which can lead to convulsions, deafness, or permanent mental disability. One person in every 1,000 with measles dies of complications.

Measles is now rarely seen in BC because of a very effective immunization program. Before a measles vaccine was developed, measles outbreaks occurred regularly in two or three-year cycles. A one-dose measles immunization program was introduced in 1969 and reduced the number of measles cases and increased the intervals between outbreaks. However, one dose of measles vaccine was not enough to stop the outbreaks altogether, because about 5% to 10% of children and young adults who receive one dose of vaccine do not develop immunity. Therefore, a two-dose measles immunization program was introduced in BC in 1996, with the second dose given at 18 months of age. BC has also offered catch-up programs for older children and youth who did not receive the second dose at 18 months. Ninety-nine percent of people who receive two doses of vaccine are immune to measles infection.

Although a high level of herd immunity in the population will prevent outbreaks, it will not protect someone who is not immune and who is exposed to the virus. Measles virus continues to cause disease in many parts of the developing world and it can easily be imported into the province by a susceptible traveler. Measles outbreaks are also taking place in Europe, the United Kingdom and the United States, in communities where parents have chosen not to immunize their children. There are some communities in Fraser Health where the children have not received any measles-containing vaccine and they are at significant risk. There was one case of measles in Fraser Health in 2007, in a susceptible person who travelled to a country where measles is still in circulation. Ongoing, routine, two-dose measles immunization in Canada will have to continue as long as measles virus continues to circulate in other parts of the world.

Smallpox is the only human pathogen to have ever been “eradicated” (no longer circulating or existing freely in nature to infect humans). The WHO has targeted polio as the next virus for worldwide eradication and the Polio Eradication Campaign was launched in 1988. If the Campaign is successful, measles is the next vaccine-preventable, human-only virus most likely to be targeted for eradication.

### Measles rate, 1998-2007



● FH Rates	0.0	0.4	0.1	0.9	0.1	0.1	0.1	0.1	0.1	0.1
○ BC Rates	0.1	0.2	1.0	0.6	0.1	0.0	0.0	0.0	0.1	0.0
FH Reports	0	6	2	13	2	1	1	2	2	1

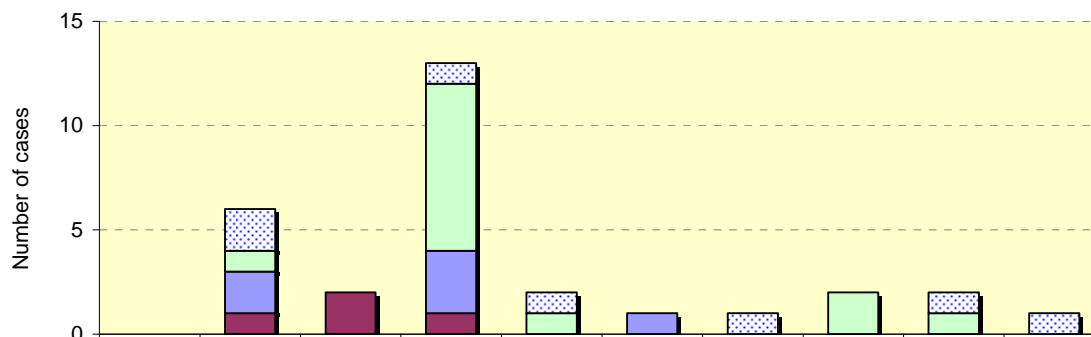
**Notes:**

Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

Rates of rare diseases may be changed considerably by differences of only a few cases.

PEOPLE 32 population estimates were used to calculate rates.

### Distribution of reported measles cases by age Fraser Health, 1998-2007



Total	0	6	2	13	2	1	1	2	2	1
■ 60+	0	0	0	0	0	0	0	0	0	0
■ 20-59	0	2	0	1	1	0	1	0	1	1
■ 10-19	0	1	0	8	1	0	0	2	1	0
■ 1-9	0	2	0	3	0	1	0	0	0	0
■ <1	0	1	2	1	0	0	0	0	0	0

**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

## *Meningococcal Disease, invasive*

***Neisseria meningitidis* is a bacterium that is commonly carried in the nose and throat and usually does not cause any symptoms.** Rarely, one of five types of the bacterium (A, B, C, Y and W-135) can cause severe and sometimes fatal invasive disease (such as meningitis, septicemia or pneumonia).

Although a polysaccharide meningococcal vaccine for serogroups A, C, Y and W-135 has been available for a number of years, it is not effective in children under two years of age, does not provide long-term immunity, and does not prevent carriage of the organism in the noses and throats of healthy people. Its use was therefore limited to high risk individuals, including travelers to affected areas, for contacts of known cases and during outbreaks. In 2001, a conjugate vaccine against serogroup C was licensed for use in Canada. In contrast to polysaccharide vaccines, conjugate vaccines protect infants and young children, provide long-term immunity, and prevent carriage of the organism in healthy people.

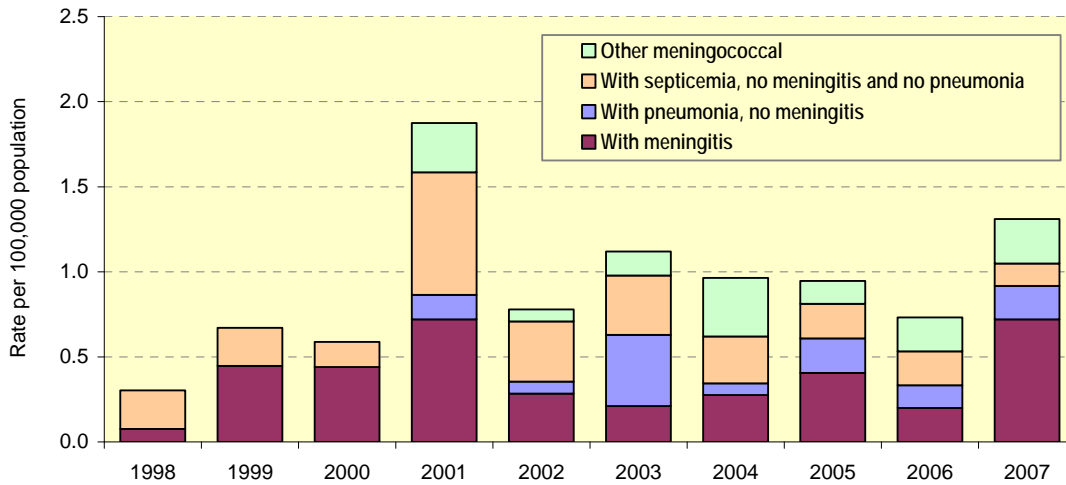
In 2003, a meningococcal C vaccination program using conjugate vaccine was introduced in British Columbia. Starting in 2003, this vaccine was provided to all children at 12 months of age, and to all students in Grade 6. In 2004, Grade 9 students were also included in the vaccination program and in 2005 a 2-month old infant dose was added. The 2005-06 school year was the beginning of a two-year one-time catch-up of unimmunized Grade 12 students.

In 2007 there were 20 cases of invasive meningococcal disease in Fraser Health, an increase over the 11-16 cases we have seen each year over the previous five years. This increase was seen entirely in individuals aged 20 years and older; there was no increase in the younger age groups. Four cases were caused by the vaccine-preventable serogroup C, but all of these cases were aged 20 years and older. There have been no cases of serogroup C disease in children aged 0-19 years since 2004, evidence of the effectiveness of BC's meningococcal C immunization programs.

There have been two recent outbreaks of invasive meningococcal disease in Fraser Health, both due to serogroup C. One was among teens and young adults in Abbotsford in 2000-01. This age group is now covered by BC's routine immunization programs. The second outbreak affected mainly gay men in both the Vancouver Coastal and Fraser Health Authorities in 2004-05, and publicly-funded conjugate C vaccine was made available to all gay men in BC at that time. Although not provided by Public Health to other groups, the vaccine is also available for purchase.

A conjugate vaccine against serogroups A, C, Y, and W135 (Menactra®) was approved for use in Canada in May 2006 in children 2 years of age and older, adolescents and adults. This vaccine is not included in BC's routine immunization programs, but is used to immunize contacts of cases of A, Y, and W135 invasive meningococcal disease. Four people in Fraser Health had invasive meningococcal disease caused by serogroup Y in 2007, and there was one case of W135 disease. Nine cases in 2007 were caused by either nontypable meningococcal disease or serogroup B disease, neither of which is preventable by vaccination.

### Meningococcal disease rate, 1998-2007

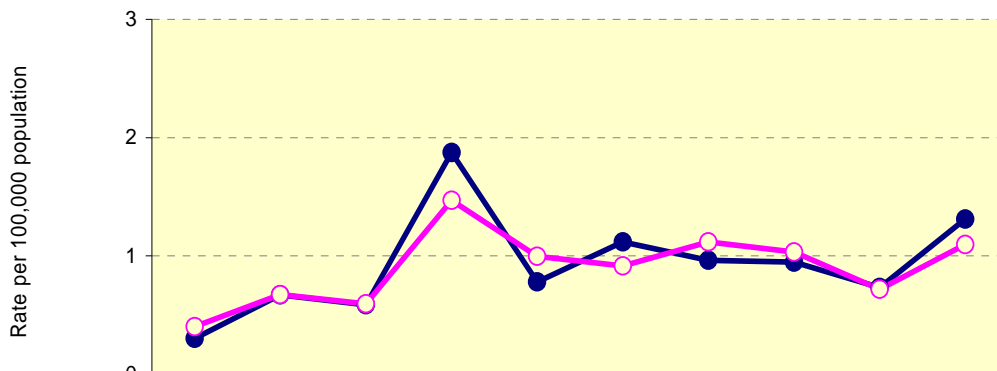


**Notes:** Chart data include all reportable meningococcal cases. "Other meningococcal" includes invasive meningococcal cases without meningitis, septicemia and pneumonia and non-invasive cases with meningococcal conjunctivitis

**Data source:** Enhanced Meningococcal Surveillance, BCCDC, July 17, 2008

Note: Meningococcal conjunctivitis and meningococcal pneumonia became reportable in March 2001 (OIC 409/2001).

### Meningococcal disease rate, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
● FH Rates	0.3	0.7	0.6	1.9	0.8	1.1	1.0	0.9	0.7	1.3
○ BC Rates	0.4	0.7	0.6	1.5	1.0	0.9	1.1	1.0	0.7	1.1
FH Reports	4	9	8	26	11	16	14	14	11	20

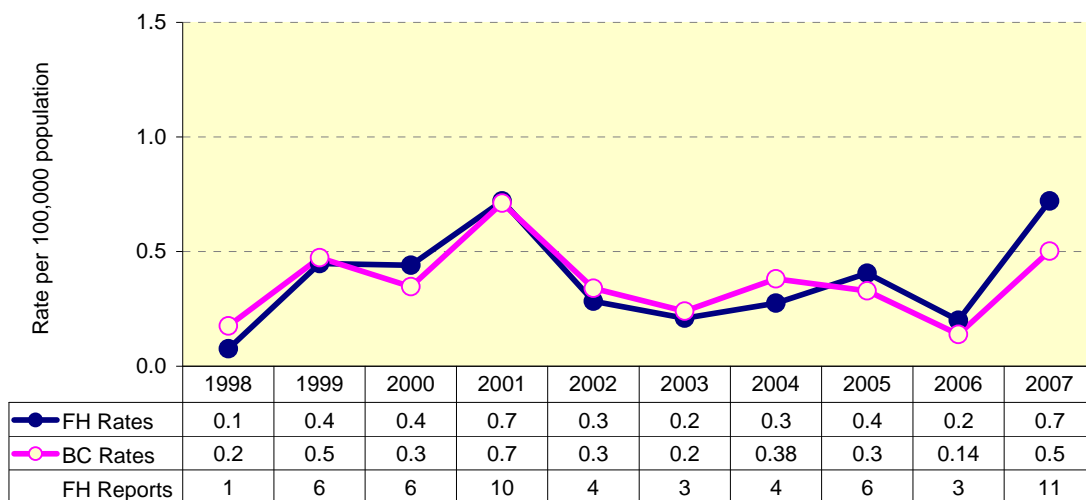
**Notes:** Chart data include all reportable meningococcal cases. PEOPLE 32 population estimates were used to calculate rates.

**Data source:** Enhanced Meningococcal Surveillance, BCCDC, July 17, 2008

Note: The table above is of all reportable Meningococcal Disease, which is comprised of four categories: Meningitis, Septicemia, Pneumonia, Conjunctivitis and other invasive meningococcal diseases. These categories are not mutually exclusive in cases of meningococcal disease. The categories Meningitis, Septicemia, Pneumonia and Other Meningococcal are shown separately in the four graphs following.

2007

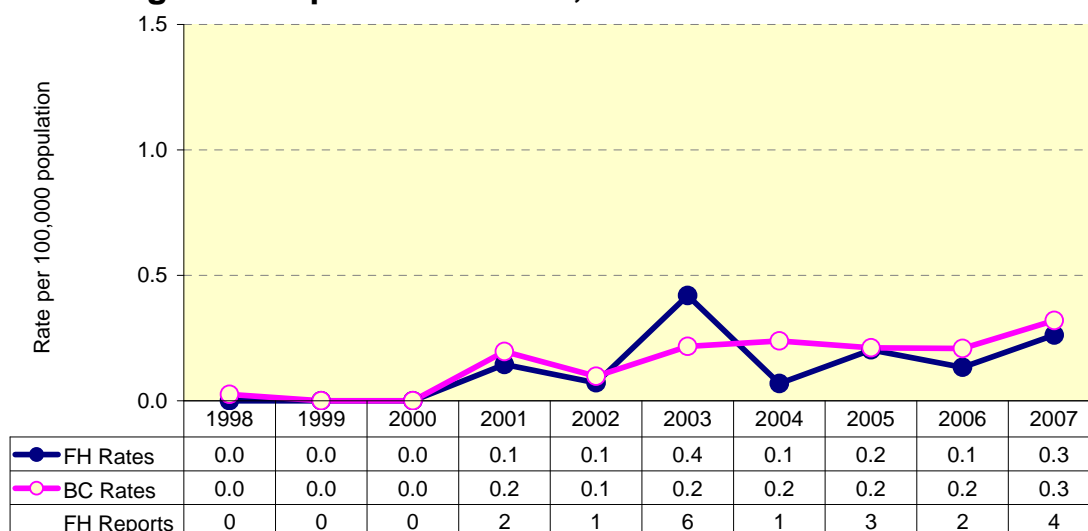
### Meningococcal meningitis rate, 1998-2007



**Notes:** Chart data include cases of meningococcal meningitis with or without other types of meningococcal disease. PEOPLE 32 population estimates were used to calculate rates.

**Data source:** Enhanced Meningococcal Surveillance, BCCDC, July 17, 2008

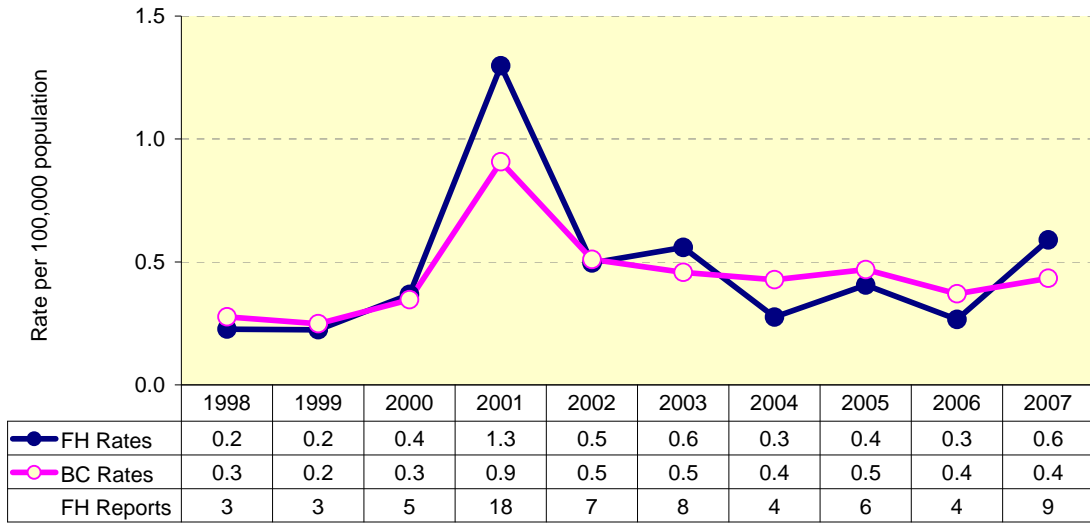
### Meningococcal pneumonia rate, 1998-2007



**Notes:** Chart data include cases of meningococcal pneumonia with or without other types of meningococcal disease. PEOPLE 32 population estimates were used to calculate rates.

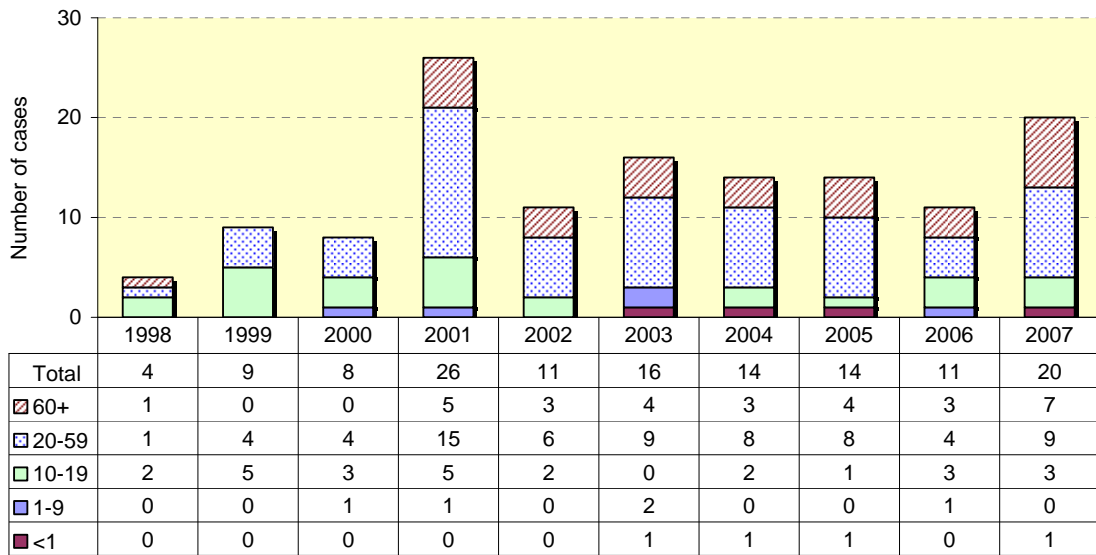
**Data source:** Enhanced Meningococcal Surveillance, BCCDC, July 17, 2008.

### Meningococcal septicemia rate, 1998-2007



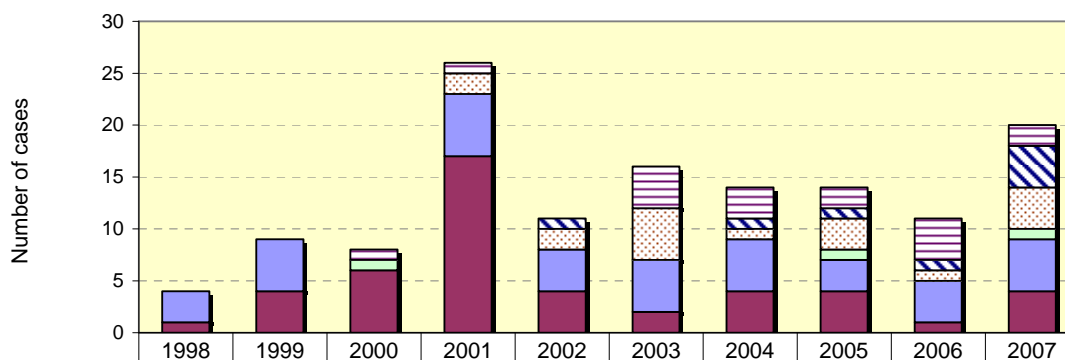
**Notes:** Chart data include cases of meningococcal septicemia with or without other types of meningococcal disease. PEOPLE 32 population estimates were used to calculate rates.  
**Data source:** Enhanced Meningococcal Surveillance, BCCDC, July 17, 2008

### Distribution of meningococcal cases by age Fraser Health, 1998-2007



**Data source:** Enhanced Meningococcal Disease Surveillance data provided by BCCDC, July 17, 2008. Chart data include all reportable meningococcal cases

### Distribution of meningococcal cases by serogroup Fraser Health, 1998-2007

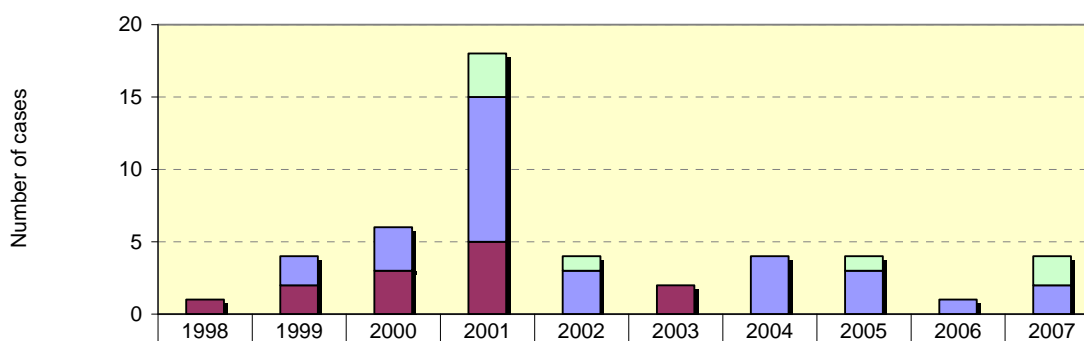


	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total	4	9	8	26	11	16	14	14	11	20
Unknown	0	0	1	1	0	4	3	2	4	2
Non-typable	0	0	0	0	1	0	1	1	1	4
Y	0	0	0	2	2	5	1	3	1	4
W-135	0	0	1	0	0	0	0	1	0	1
B	3	5	0	6	4	5	5	3	4	5
C	1	4	6	17	4	2	4	4	1	4

**Notes:** Serogroup B is not vaccine preventable. Two cases (2003 and 2004) classified as "unknown" serogroup were awaiting test results. Chart data include all reportable meningococcal cases

**Date Source:** Enhanced Meningococcal Surveillance data from BCCDC, July 17, 2008.

### Distribution of serogroup C meningococcal cases by age Fraser Health, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Grand Total	1	4	6	18	4	2	4	4	1	4
60+	0	0	0	3	1	0	0	1	0	2
20-59	0	2	3	10	3	0	4	3	1	2
1-19	1	2	3	5	0	2	0	0	0	0

**Date Source:** Enhanced Meningococcal Surveillance data from BCCDC, July 17, 2008. Chart data include all reportable meningococcal cases of serogroup C

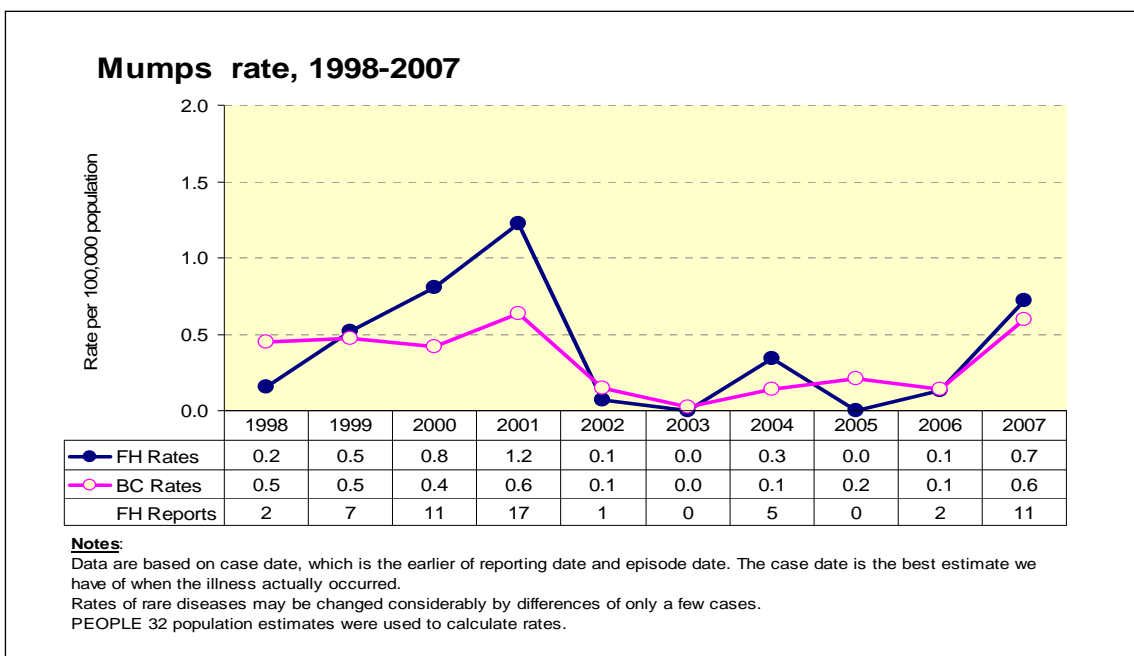
# Mumps

**Mumps is a viral illness that presents with fever followed by painful swelling of the face and neck glands, and sometimes swelling of the testicles, ovaries or pancreas.** Mumps can cause permanent deafness, and, rarely, encephalitis (inflammation of the brain) or meningitis. Mumps is spread by saliva and in respiratory droplets, and the most common method of exposure is from direct (oral) person-to-person contact. Sharing drinks, water bottles or cigarettes are also common routes of transmission.

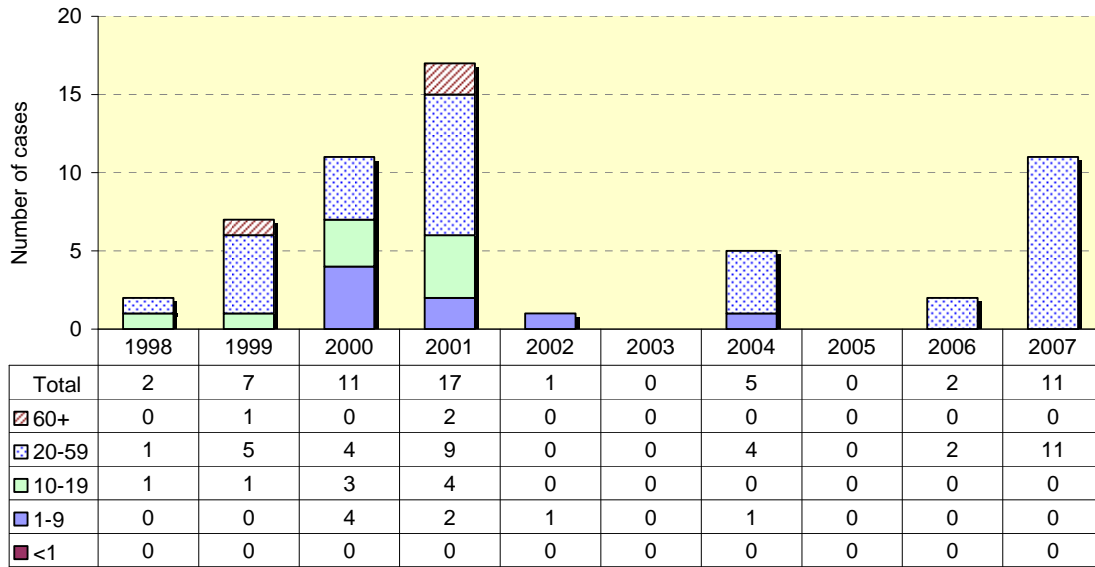
In someone who doesn't have a history of exposure to a case of mumps, most cases of swollen salivary glands are not due to mumps but result from other causes such as salivary duct obstruction or infections with adenovirus, enterovirus or bacteria.

As with measles, the two-dose MMR immunization program that was introduced in 1996 has largely eliminated mumps transmission in BC. Occasional imported cases still occur, however, and the mumps virus can then spread to other people who are not immune. People born before 1970 (before the mumps vaccine was introduced and wild virus stopped circulating) and those who have had mumps are generally considered to be immune. One dose of mumps vaccine has been shown to be around 80% protective against developing clinical mumps and two doses are about 90% effective. In 2007 there were mumps outbreaks in Nova Scotia and Alberta, with the majority of cases in those outbreaks born after 1970 but before the two-dose MMR program was introduced in 1996.

Fraser Health had 11 cases of mumps in 2007, an increase over the last few years, although there were no signs of an outbreak taking place. The numbers were up in other parts of BC as well. Cases ranged in age from 20 to 37 years and there were no cases in children.



### Distribution of reported mumps cases by age Fraser Health, 1998-2007



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

## *Pertussis (Whooping Cough)*

**Pertussis (whooping cough) is a common acute bacterial disease that can cause violent fits of coughing that may continue to occur for many days or weeks.** Pertussis causes particularly severe symptoms in infants under one year of age, and can be fatal in this age group. The name “whooping cough” comes from the characteristic “whoop” sound that follows a bout of coughing. Whooping is more likely in young children than in babies, older children, or adults. Pertussis immunization has greatly reduced infant and childhood illness and death due to this disease. However, pertussis has been more difficult to control than some other vaccine-preventable diseases, in part because pertussis vaccine does not fully protect everyone who receives it. Unfortunately, immunity to pertussis (whether from vaccination or from having had the disease) wears off over time. As a result, the pertussis bacteria remain in circulation and we tend to see increased levels of pertussis in approximately five year cycles.

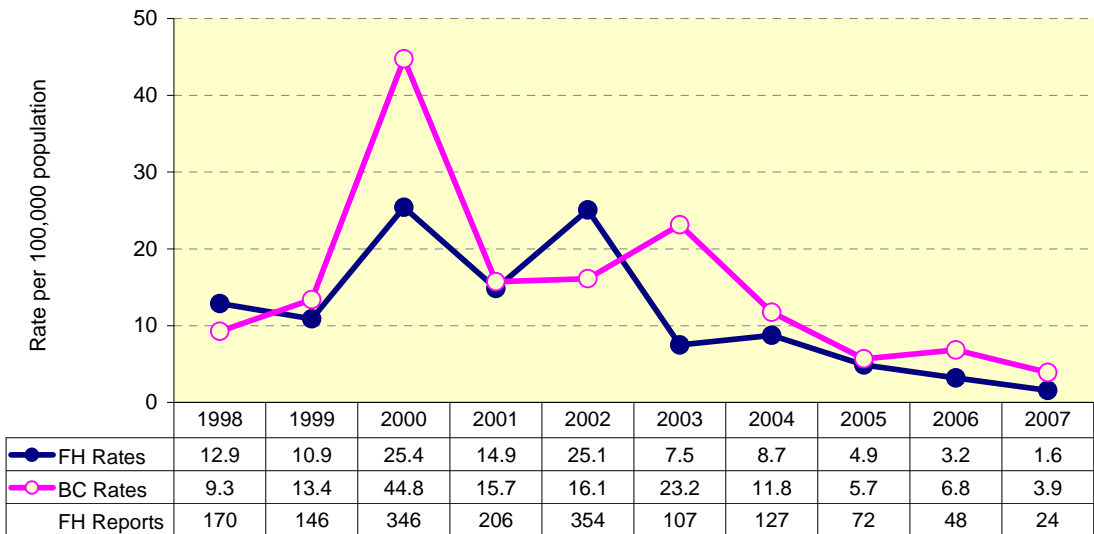
An acellular pertussis vaccine was introduced in 1997 to replace the whole cell vaccine used since 1947. The newer acellular vaccine is more effective in preventing pertussis and has milder, less frequent side effects than the previous vaccine. Unlike the whole cell vaccine, it can be used in adolescents and adults. Since the introduction of the acellular vaccine, most cases of pertussis are now diagnosed in older children and young adults who have only ever received the less effective whole cell pertussis vaccine.

To deal with the shift in pertussis illness to older age groups, in 2004 BC replaced the Grade 9 tetanus-diphtheria (Td)-only vaccine with a new tetanus-diphtheria-acellular pertussis vaccine (Tdap) that provides protection against pertussis as well as against tetanus and diphtheria. Tdap is also safe and effective in adults. Although not publicly-funded for adults in BC, it can be purchased privately. The BC Center for Disease Control recommends that all adults receive one dose of Tdap, which can be given as an alternative to the Td booster that is recommended for adults every 10 years.

Pertussis in adults, although very rarely fatal, can be particularly debilitating. It can cause broken ribs, fractured vertebrae, urinary incontinence, and other complications. In addition, when pertussis continues to circulate amongst adults, infected adults are an ongoing source of exposure for susceptible babies and young children.

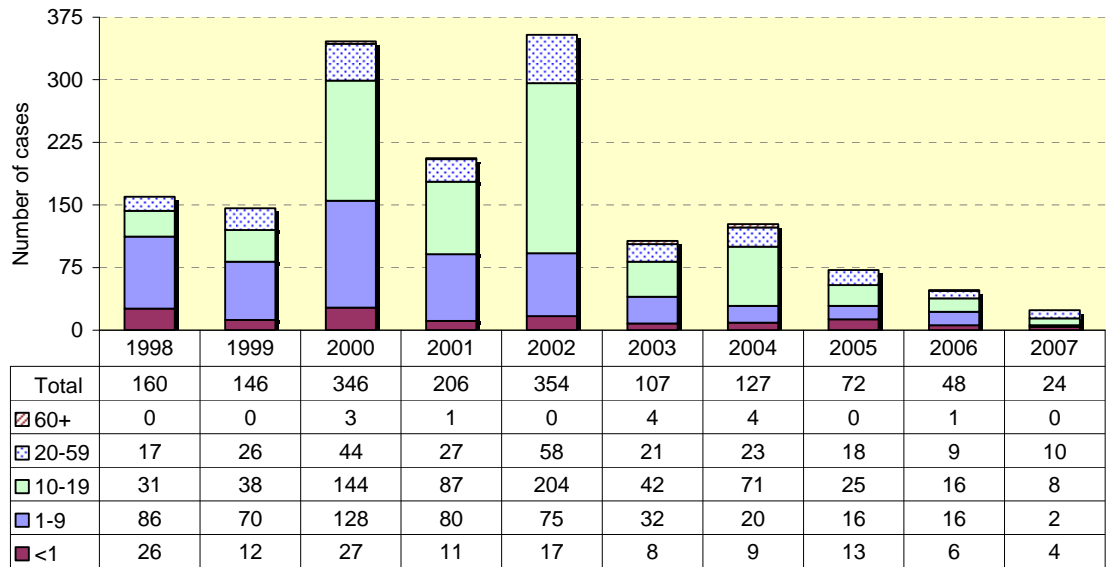
There were 24 cases of pertussis reported in Fraser Health in 2007, the lowest in the last 10 years. The numbers were also low in other parts of BC. Some of the decrease may be due to decreased surveillance and testing by physicians.

### Pertussis rate, 1998-2007



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.  
 PEOPLE 32 population estimates were used to calculate rates.

### Distribution of reported pertussis cases by age Fraser Health, 1998-2007



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

## *Pneumococcal Disease, invasive*

***Streptococcus pneumoniae* (pneumococcus) bacteria commonly cause illnesses such as sinus and middle ear infections and pneumonia and, less frequently, serious invasive infections such as meningitis and septicemia.** Although not reportable, pneumococcal pneumonia is responsible for approximately 3,000 hospitalizations and hundreds of deaths in BC each year, often as a complication of influenza infection. It is the leading cause of death due to infectious disease.

BC has had a pneumococcal vaccination program for all BC seniors and residents of long-term care facilities since 1997-98. This polysaccharide vaccine covers the 23 types of pneumococcus that most commonly cause severe illness in older adults.

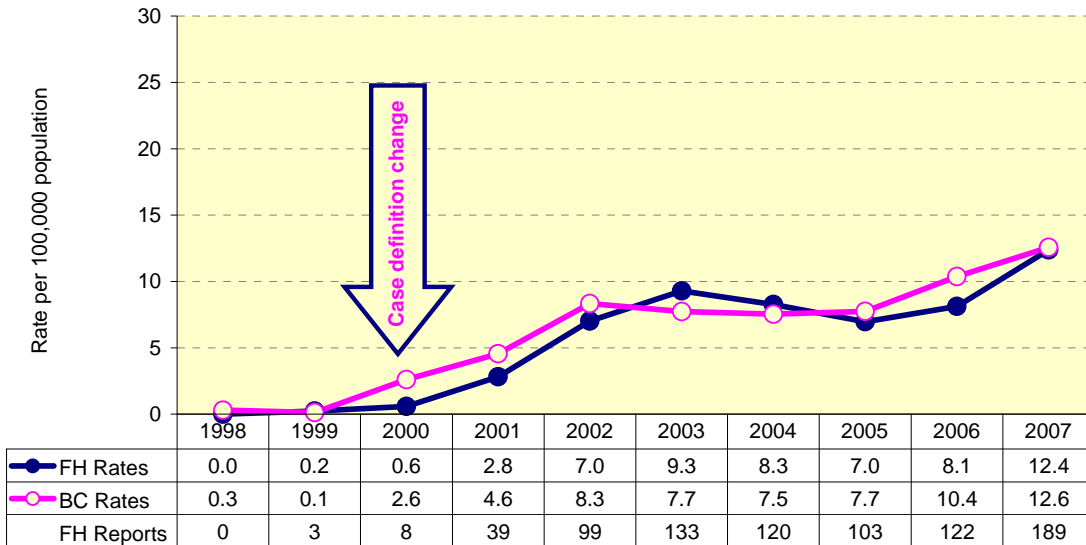
In July 2003, a conjugate pneumococcal vaccine was added to the routine infant immunization program. This vaccine covers the seven types of pneumococcus that most commonly cause severe illness in infants and children. It was anticipated that this vaccine would significantly reduce the incidence of both milder pneumococcal illnesses and more severe invasive disease in young children. The case definition for severe forms of pneumococcal disease was broadened in 2000 in order to track the impact of the new vaccine. The changes in the case definition may account for the increasing number of cases reported from then until 2003.

In 2007, 189 cases of severe pneumococcal disease were reported in Fraser Health residents, up from 122 in 2006 and 103 in 2005. An outbreak of invasive serotype 5 pneumococcal disease affecting mainly adults under the age of 60 who were homeless or using illegal drugs began in the fall of 2006. The outbreak was centred in Vancouver but also affected some Fraser Health residents. Most of the increase in cases of invasive pneumococcal disease in both 2006 and 2007 can be explained by serotype 5 disease in adults between the ages of 20 and 59, who were probably linked to the outbreak. Twenty-nine percent of all cases in 2007 were serotype 5, and it was not until November 2007 that the number of new serotype 5 cases declined. A large outreach to provide vaccination to people at risk started in the downtown eastside of Vancouver and was extended to Fraser Health at the end of November 2006.

In 2007 there were 56 cases of invasive pneumococcal disease in adults aged 65 and older. Forty-four of these, or 79% were caused by serotypes covered by the vaccine that is available for, and should be offered to, all adults in this age group in BC. Work should be done to improve pneumococcal vaccine coverage of BC seniors, as invasive pneumococcal disease is a significant cause of severe illness and death in this group.

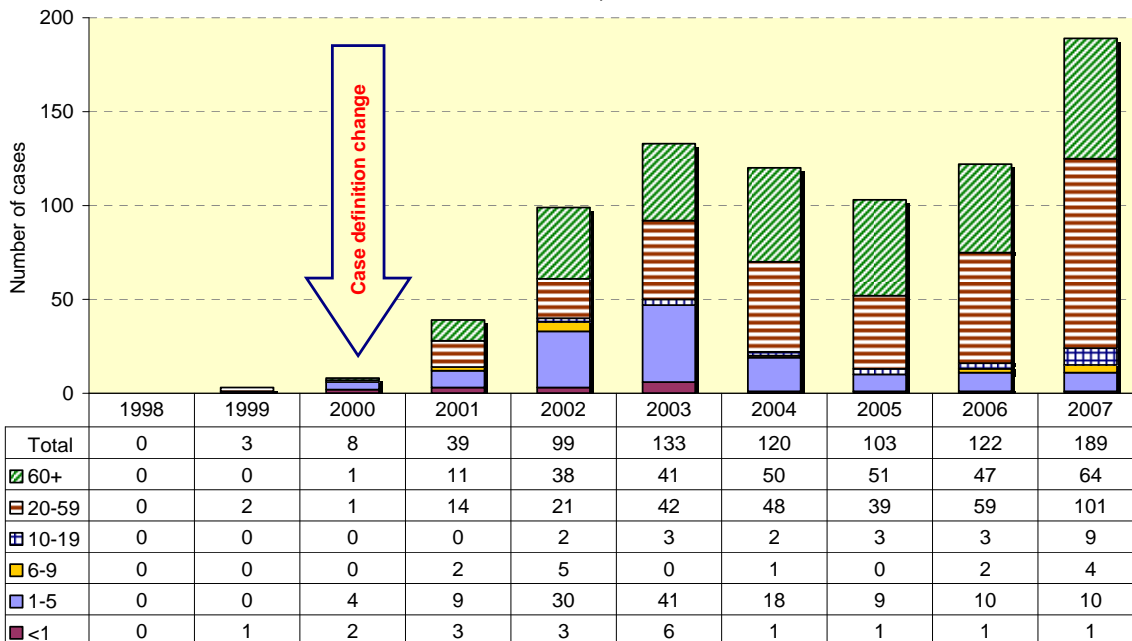
There were only two cases of vaccine-preventable invasive pneumococcal disease in children born after July 2003. One of these was in a child who had been fully immunized, and represents a case of vaccine failure. These are rare, but do happen occasionally. Data on the second case is incomplete, but it appears the child may not have been immunized. The very low number of cases of vaccine-preventable disease in infants and children now eligible for pneumococcal vaccine is evidence of the effectiveness of BC's pneumococcal immunization program.

## Severe pneumococcal disease rate, 1998-2007



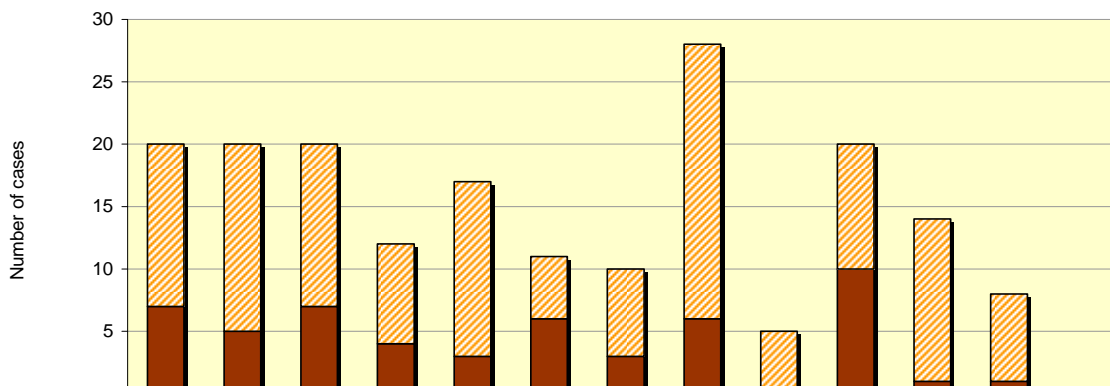
**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred. PEOPLE 32 population estimates were used to calculate rates.

## Distribution of reported severe pneumococcal cases by age Fraser Health, 1998-2007



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

### Monthly cases of serotype 5 invasive pneumococcal disease Fraser Health, 2007

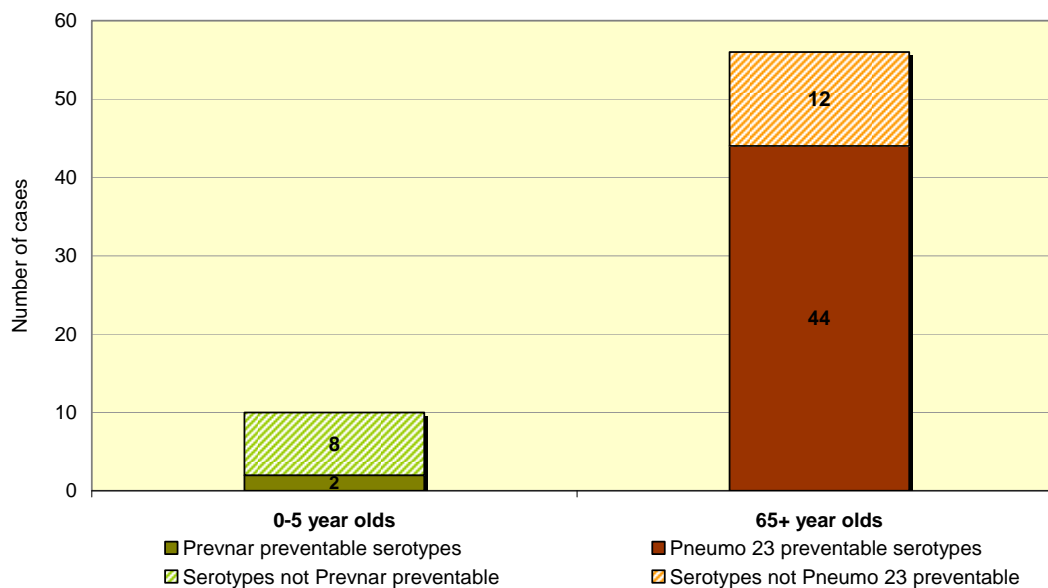


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2007 Overall
<b>Total IPD</b>	20	20	20	12	17	11	10	28	5	20	14	8	185
<b>Other serotypes</b>	13	15	13	8	14	5	7	22	5	10	13	7	132
<b>Serotype 5</b>	7	5	7	4	3	6	3	6	0	10	1	1	53 (29%)

Data Source: BCCDC

Note: Excluded are 3 cases that are untypable and 9 cases with pending test results

### Invasive pneumococcal disease in children and seniors by vaccine preventability Fraser Health, 2007



Data Source: BCCDC

Note: Children 0-5 years include those born on or after July 1, 2003.

Excluded are 3 cases in seniors that are untypable or have pending test results

# Rubella

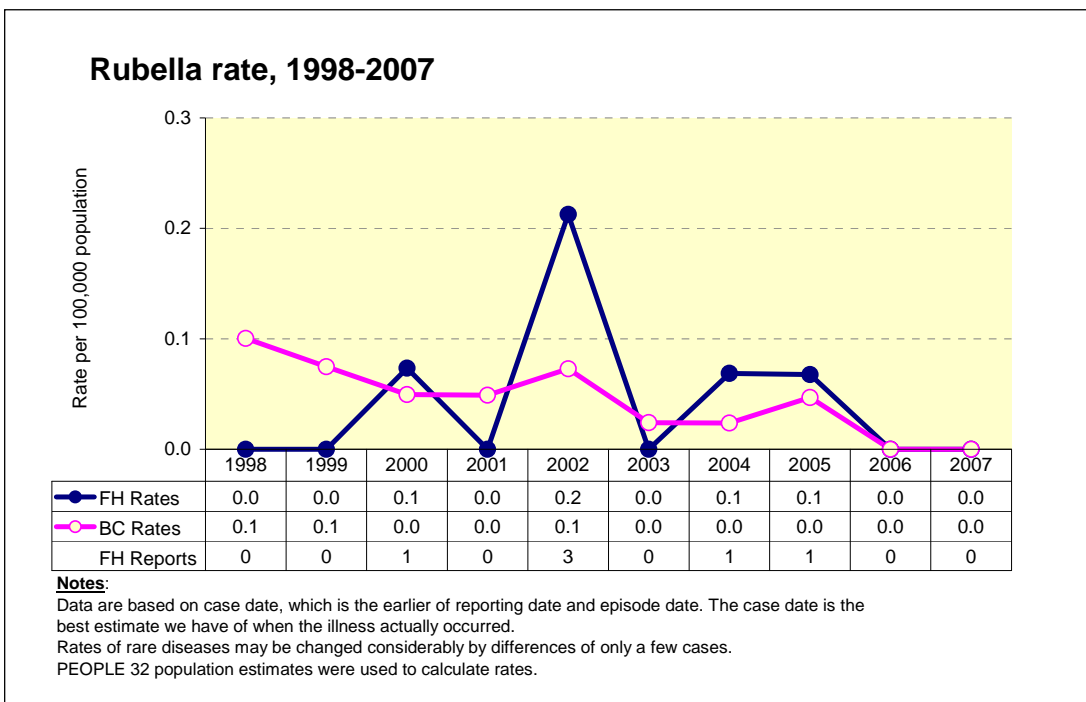
**In the pre-vaccine era, rubella was a common mild illness of childhood that often presented with a measles-like rash.** Routine rubella immunization was introduced in 1970 because infection in pregnant women can cause severe congenital malformations in the baby, including blindness, deafness, brain damage, and heart problems. The two-dose MMR program that was introduced in 1996 has further decreased cases of rubella, as it has for measles and mumps.

Fraser Health had no lab-reported rubella cases in 2007.

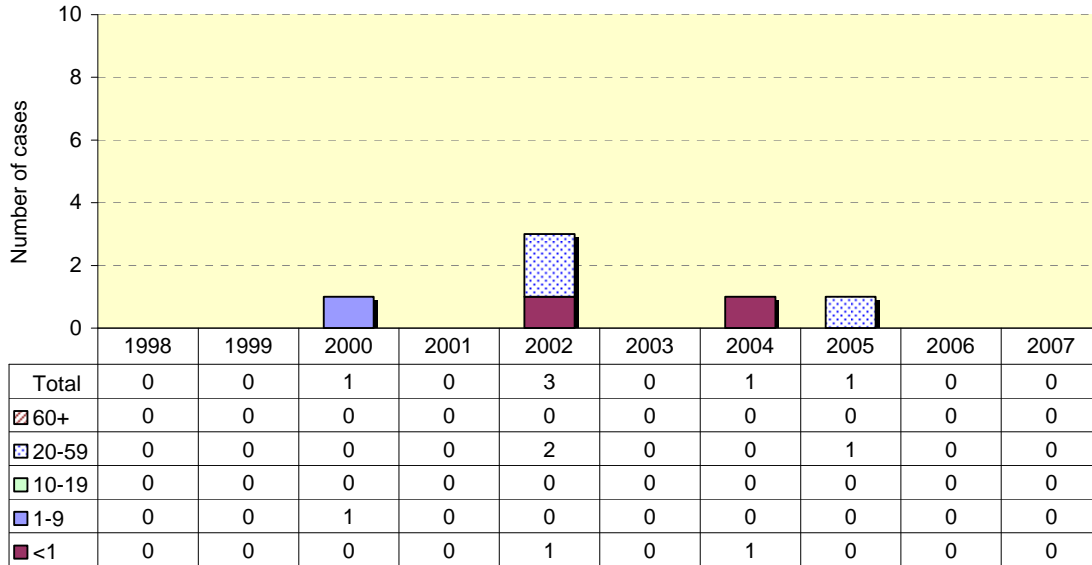
## Congenital Rubella Syndrome

Even though rubella cases are now extremely rare, rubella remains a concern because of possible exposure of non-immune pregnant women leading to congenital rubella syndrome in their babies. We cannot afford to become complacent about immunization, because approximately 6-7% of pregnant women in BC test negative for immunity to rubella. These women will be at risk if they are exposed to a traveler with rubella returning from one of the many countries in the world where this virus continues to cause widespread disease, or if they themselves travel to one of these countries. Immigrant women can also be at risk if they come from an area of the world where rubella vaccination is not routinely given, and should receive vaccination as soon as possible after arrival in Canada.

One case of congenital rubella syndrome was reported in Fraser Health in 2004, the result of a rubella infection acquired in the Indian subcontinent by a pregnant woman who subsequently immigrated to Canada. Travel to India was also the cause of the case of congenital rubella syndrome that occurred in Fraser Health in 2002.



### Distribution of reported rubella cases by age Fraser Health, 1998-2007



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

# Sexually Transmitted and Blood-borne Pathogens

Notes:

*Numbers for previous years may slightly differ because of subsequent corrections to the database.  
Rates of rare diseases may be changed considerably by differences of only a few cases.*

## Introduction

Sexually transmitted and blood-borne pathogens can be spread from person to person through contact with an infected person's blood or body fluids. Pathogens and associated infections that will be discussed in the following sections include hepatitis B, hepatitis C, human immunodeficiency virus (HIV), *Chlamydia trachomatis* (Chlamydia), *Neisseria gonorrhoeae* (Gonorrhea), and *Treponema pallidum* (syphilis). Although each type of infection is different from each other, many of these infections share common routes of transmission, risk factors, and prevention methods.

Although the routes of exposure to these pathogens vary, major routes of exposure include unprotected sexual contact and sharing of personal/hygiene items that are contaminated with infected blood (e.g., needles, razors, equipment for drug use). Other ways to contract infections from sexually transmitted and blood-borne pathogens include tattoos or body piercings, acupuncture, and medical or dental procedures using instruments contaminated with infected blood. Health care workers may be at risk of needle pricks or being splashed in the mouth, eyes, or nose with infected blood while at the workplace. Mothers can also pass an infection to their baby during childbirth.

Infection with a sexually transmitted or blood-borne pathogen often does not cause any symptoms. So many people do not get tested and are not treated. Even without symptoms, an infected person can still spread the infection to others, and may later suffer complications from the infection.

People from all regions of Fraser Health (both rural and urban areas) are affected by sexually transmitted diseases.

### What can you do to protect yourself?

- Abstinence
- Use condoms (see below) when having sex or oral sex.
- Limit the number of sexual partners you have. Remember, not everyone who has sexually transmitted disease knows they have the disease, but they can still transmit it. Also, some people do not disclose their risk behaviors to others, such as having other sexual partners or sharing drug equipment.
- Do not share injection drug equipment, crack pipes, and razors.
- Do not share personal items such as toothbrushes and dental floss, which may be contaminated with blood.
- Avoid tattoos or body piercing, acupuncture, and medical or dental procedures where the operator uses unsterile or homemade equipment, or unsterile techniques.
- Avoid needle pricks and injury from sharp instruments that may be contaminated by blood at the workplace.
- Wear latex gloves and other personal protective equipment when working with blood or body fluids.
- Have regular check ups with a doctor for these infections, for you and your sexual partner(s).

## Important facts about condoms

- A condom acts as a barrier to prevent unwanted pregnancy, the exchange of body fluids, and the transmission of sexually transmitted illnesses (STIs).
- A new condom should be used each time you have sexual intercourse (anal, vaginal, or oral sex).
- Check the expiry date on the condom package.
- Use only water-based lubricants with the male latex condom. Oil-based lubricants, such as petroleum jelly, lotion, or baby oil can weaken and destroy latex.
- Female condoms are made of polyurethane. This material can be used with any type of lubricant, water-based or oil-based.
- Some lubricants contain chemicals called spermicides to help protect against unwanted pregnancy. If they irritate your genital area, do not use them.
- Do not use a male condom together with a female condom as the friction created may cause tearing of either product.
- If a condom breaks during sex, remove it immediately and apply a new condom.

Remember, condoms do not offer 100% protection from STIs or unwanted pregnancy. They will not consistently prevent transmission of STIs passed through skin-to-skin contact - for example, syphilis, human papillomavirus, and herpes. However, if used properly, they are very effective and can reduce the risk of transmission.

If you have risky behaviors, being tested early and regularly can help you to access treatment, and reduce the chance of transmitting the infection to others. Pregnant women should also be tested for STIs in order to detect the disease early and prevent complications or transmission to the baby.

For more information consult the BC health files on the various sexually-transmitted infections: <http://www.healthlinkbc.ca/kbaltindex.asp>.

## What can others do?

### Physicians

Physicians should follow Canadian STI guidelines, recommend risk assessment and adequate testing for sexually-active individuals ([www.phac-aspc.gc.ca/std-mts/sti\\_2006/pdf/02sti2006\\_e.pdf](http://www.phac-aspc.gc.ca/std-mts/sti_2006/pdf/02sti2006_e.pdf)), and follow recommendations from the Canadian Task Force on Preventive Health Care ([www.ctfphc.org](http://www.ctfphc.org)). Please see sections for individual diseases for more detail.

Physicians should offer screening for STIs to all pregnant women. More information on prenatal STI screening can be found at: [www.maternitycalendar.com/MCC/topic\\_reviews.php](http://www.maternitycalendar.com/MCC/topic_reviews.php).

Physicians can also help prevent STIs by obtaining a license to prescribe methadone and offering it to eligible clients in order to reduce injection drug use.

## The Education System

School districts can offer age-appropriate sexual education as part of the curriculum. Teaching techniques to empower students to make healthy choices in relation to sexual activities and safer sex have shown to be effective. The recommendation from the Provincial Health Officer's Report on the Health of the Population can be followed:

“Consideration should be given to introducing a Grade 12 course on Keeping Healthy and Responsible Decision-Making... and include the use of the Canadian Guidelines for Sexual Health Education. Well trained, supportive teachers are needed to deliver such a course, and students will require access both to resources that are youth-friendly and health education professionals that are non-judgmental.” An Ounce of Prevention Revisited, A review of health promotion and selected outcomes for children and youth in BC schools, p. 77, <http://www.hls.gov.bc.ca/pho/pdf/phoannual2006.pdf>

School districts can also offer age-appropriate interventions for prevention of mental health and addiction problems: <http://carbc.ca/Default.aspx?tabid=256>.

High schools, colleges and universities can offer STI education and screening programs as well as condom distribution.

**Parents** can discuss healthy sexuality with their children; many tools are presented in this Canadian web site to help parents address the topic with their children: [http://sexualityandu.ca/parents/index\\_e.aspx](http://sexualityandu.ca/parents/index_e.aspx).

Parents can also help prevent mental health and addiction problems in their children. Here is the link to a toolkit for families from the Centre for Addiction Research of BC: <http://carbc.ca/Default.aspx?tabid=256>, and to the parent series: <http://carbc.net/SILINKLibrary/CARBCPublications/tabid/204/Default.aspx?id=1>.

**Municipalities** can inform themselves and develop evidence-based strategies to address issues of addiction and homelessness. Needle exchanges are effective at decreasing transmission of blood-borne pathogens like HIV or Hepatitis C. Here is the link to the toolkit section for addiction in communities from the Centre for Addiction Research of BC: <http://carbc.ca/Default.aspx?tabid=256>.

This report from the Federation of Canadian Municipalities outlines an action plan to address homelessness, including the role of municipalities: [www.fcm.ca//CMFiles/hstrat1SSA-2242008-4643.pdf](http://www.fcm.ca//CMFiles/hstrat1SSA-2242008-4643.pdf).

## What is Fraser Health doing?

Fraser Health offers education and testing for STIs and blood-borne pathogens through Sexually Transmitted Illness (STI) Clinics and Youth Clinics. They provide support for healthy sexuality as well as diagnosis and treatment of STIs. You can access a directory of these clinics and other resources from the Fraser Health website: [www.fraserhealth.ca/Services/PublicHealth/communicabledisease/STI/Pages/default.aspx](http://www.fraserhealth.ca/Services/PublicHealth/communicabledisease/STI/Pages/default.aspx) . Most walk-in clinics and family physicians also offer these services.

Fraser Health also attempts to decrease the risk factors for STIs by providing outreach and harm reduction initiatives and supplies.

Fraser Health monitors the numbers of cases and rates of infections from sexually-transmitted and blood-borne pathogens to detect outbreaks and clusters of cases in specific populations. Education, support, diagnosis, and treatment services are offered to those in need.

# Hepatitis B

## The Disease

**Hepatitis B is a virus that attacks the liver and can cause serious health concerns including permanent liver damage (cirrhosis) and liver cancer.** Hepatitis B virus is spread through contact with an infected person's blood or body fluids. Possible forms of transmission were previously discussed in the Introduction. Mothers infected with hepatitis B virus can also pass the virus to their newborn babies during delivery. For more information on hepatitis B, please visit <http://www.healthlinkbc.ca/kbase/topic/major/hw40968/descrip.htm>.

Infection with the hepatitis B virus can present in a variety of ways. Most infections are acute infections and in adults, symptoms can include fatigue, nausea and jaundice. Most adults with acute infections recover and develop permanent immunity. In infants and young children, the initial infection may cause few or no symptoms. However, up to 90% of children who are infected at birth will go on to develop chronic hepatitis B infection, which can go undetected until later in life. About 10% of adults also develop chronic infection. Those who develop chronic hepatitis B are long-term carriers of the virus and can spread the virus to others. They are also at increased risk of developing chronic liver disease and liver cancer.

## Epidemiology

In 2007, Fraser Health had 12 reported cases of acute hepatitis B, all in people over 19 years of age. There have been no new hepatitis B cases in infants since 2003, with only one case since 1998, a testimony to the efforts to prevent transmission from infected mothers to newborns.

The rate of acute cases in Fraser Health has stabilized since 2003, similar to the provincial rate. Previous to 2003, there was a downward trend in BC and Fraser Health that can be attributed to the introduction of the Grade 6 hepatitis B immunization program in 1992. The rate of acute infections is higher in Fraser South, possibly related to higher immigration and travel from countries in Asia and South East Asia, where hepatitis B is more common. For example, in a study of rural villagers in the Philippines, the prevalence of chronic Hepatitis B infection ranged from 2.0% to 16.5%, with an average of 12.0%; and in Singapore, the rate in the general population was 9% to 10% in 1980-1981 ([www.phac-aspc.gc.ca/publicat/ccdr-rmtc/01vol27/27s3/27s3k\\_e.html](http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/01vol27/27s3/27s3k_e.html)). Many Asian countries implemented mass immunization programs in the late 1980's to mid 1990's, contributing to the decline of chronic Hepatitis B rates in immigrants and travelers to BC, in turn contributing to reduced transmission in BC.

The rate of newly-identified chronic hepatitis B carriers continues to decline both in Fraser Health and in BC, with the Fraser Health rate staying slightly below the BC rate. The rates reported for acute and chronic hepatitis B are underestimated because of undiagnosed, asymptomatic cases.

The lower mainland has a relatively high number of chronic hepatitis B carriers (data not shown) because this condition is more likely to occur in people who inject illicit drugs and in immigrants from countries where chronic hepatitis B and infant transmission is common.

## What can you do to protect yourself?

Vaccination against hepatitis B is the most effective method to prevent infection. Hepatitis B vaccine is provided free to infants, Grade 6 students, health care students and workers with potential work-related exposure to blood/body fluids, injection drug users and their sexual partners, men who have sex with men, people with recent sexually-transmitted disease or

multiple sexual partners, people who have been sexually assaulted, people with hepatitis C, liver disease, hemophilia, kidney failure needing dialysis, stem cell or kidney transplant, and those working with children or developmentally-disabled people who are infectious for hepatitis B. For the full list of those eligible, please consult public health in Fraser Health or the BC Centre for Disease Control (BCCDC) guidelines on hepatitis B pre- and post- exposure eligibility in the BCCDC immunization manual and communicable disease control manual (<http://www.bccdc.org/content.php?item=83>). Vaccination is also strongly recommended for travelers to countries where hepatitis B is common.

Pregnant women can get tested before delivery to offer vaccination to eligible newborns as soon as possible. Immigrants from countries where hepatitis B is more common can also seek testing, and if they have chronic hepatitis, their family is offered immunization.

Please refer to the 'What can you do to protect yourself?' section in the Introduction on other ways to protect yourself from hepatitis B infection.

### **What is Fraser Health doing?**

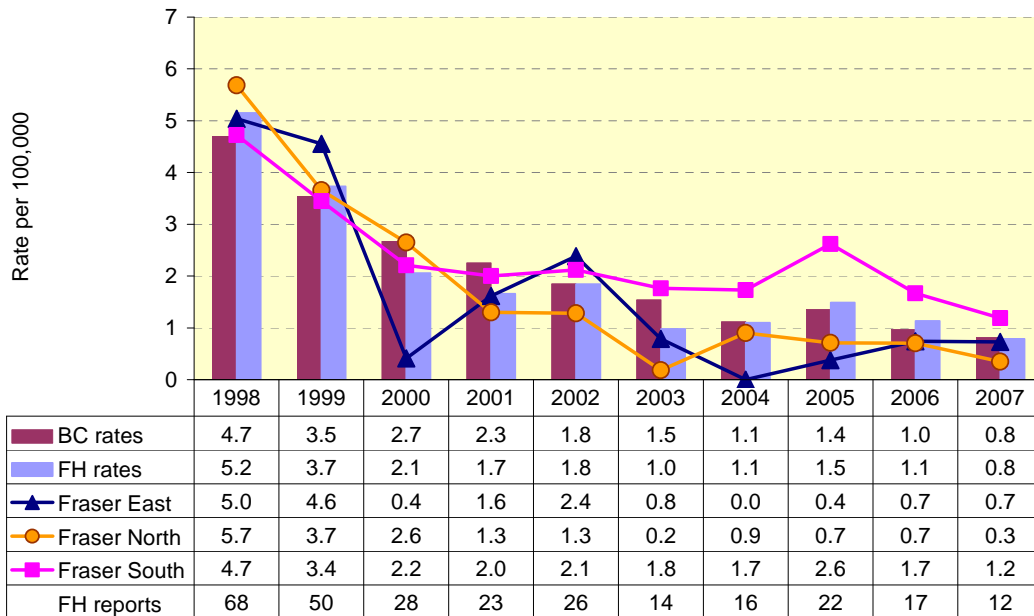
Fraser Health operates the free immunization program to all who are eligible in public health units across the region, delivers the immunization program to grade 6 students in schools, and works closely with immigration organizations to ensure adequate immunization for new immigrants. Fraser Health also distributes the vaccine to family physicians in the community and educates the physicians and the public on hepatitis B immunization and prevention.

Fraser Health public health nurses follow all newborns at risk of hepatitis B very closely and provide immunization and immune globulin if indicated.

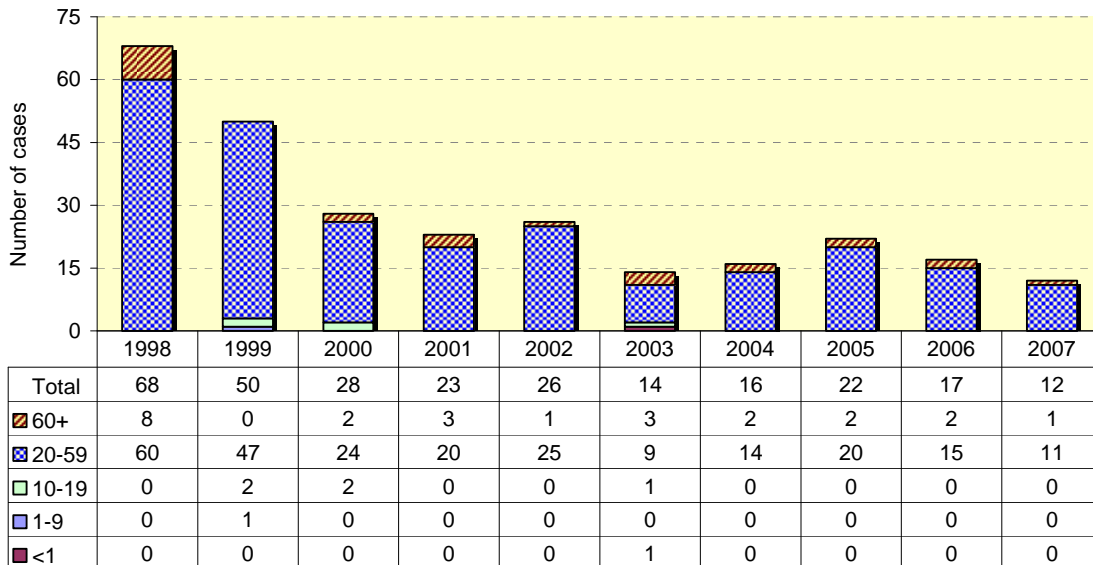
### **What can others do?**

Individuals and organizations (e.g., churches, travel agents, immigration and cultural organizations) that work with people traveling to countries where hepatitis B is more common or with those at increased risk of contracting hepatitis B can promote testing, immunization and sound self-protection practices.

### Acute Hepatitis B Rates by HSDA Fraser Health, 1998-2007



### Distribution of reported acute hepatitis B cases by age Fraser Health, 1998-2007



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

# HIV/AIDS

## The Disease

**Human Immunodeficiency Virus (HIV) is a virus that attacks the immune system.**

Transmission occurs through exposure to blood and body fluids containing the HIV virus. Please refer to the Introduction for a description of ways HIV can be transmitted. In addition, people who also have another sexually transmitted infection are more likely to contract HIV and to transmit HIV to their sex partners.

Once infected with HIV, some people do not notice any symptoms, while others can experience 'seroconversion illness' soon after infection. Seroconversion refers to the time when HIV becomes detectable in the blood, and seroconversion illness will often occur at the same time. Symptoms of seroconversion illness include sore throat, red blotchy rash over the trunk, prolonged fever and achy limbs (4-14 days), ulceration in the mouth or genitals, diarrhea, severe headaches, and aversion to light. These symptoms often occur 2-6 weeks after infection and symptoms vary from a mild flu-like illness to a more severe illness that can result in hospitalization. Approximately 80% of people infected with HIV will experience seroconversion symptoms. However, these symptoms are similar to many common infections such as the flu, glandular fever, tonsillitis, mononucleosis, or a severe herpes outbreak, so people may not associate these symptoms with HIV infection. Testing is the only way to know if you have HIV.

Over years or decades, a HIV infection progresses to Acquired Immune Deficiency Syndrome (AIDS) as it gradually destroys the immune system. With a weakened immune system, individuals may feel unwell and are at risk for opportunistic infections and cancer.

The HIV surveillance system has undergone significant changes over time, changes which affect HIV rates. Because of the changes, caution is needed when interpreting HIV trend rates.

The surveillance system is based on newly diagnosed HIV infections. Data may not reflect all new infections (incidence) accurately because not everyone gets tested. Some newly diagnosed infections are not new infections, but are chronic infections acquired years ago but only detected now. Many individuals with chronic infection are being detected with the increased efforts to test people at risk of HIV. Over time, this will reduce the pool of infected people who are undiagnosed. A decrease in the number of new HIV positive tests over time might reflect the decrease in that pool of undiagnosed individuals rather than a true decrease in the incidence of HIV.

HIV testing in BC began in 1985. The HIV infection rates from 1985 to 2002 were estimated by the BCCDC Sexually Transmitted Disease Control Division from anonymous laboratory test results. In May 2003, HIV became a reportable communicable disease in BC, which affected the rate of newly diagnosed infections in different ways. For example, designated Public Health Nurses specially trained in Partner Counseling and Referral Services (PCRS) have since worked with HIV-infected clients to identify, locate and notify exposed partners. This has helped to identify HIV infected contacts sooner, which may have increased the rate of newly diagnosed HIV infections over time. In contrast, HIV becoming a reportable disease has facilitated the removal of duplicate testing in individuals with known HIV infection, which can decrease in the rate over time. Another improvement to the identification of duplicate testing occurred in 2005, which may have further contributed to lower rates.

Furthermore, since 2004, the BCCDC is better able to track HIV positive individuals identified from immigration medical examinations. The inclusion of individuals who contracted HIV outside of the province in the HIV rates for BC or Fraser Health may obscure the effects of local programs to reduce HIV transmission, which do not have an effect outside of BC. Nevertheless, HIV infected individuals immigrating to BC can put others in BC at risk of acquiring the infection, so prevention services must consider these individuals. These individuals also need treatment for their HIV infection and related co-morbidities, which can have a significant impact on the use of acute care and primary care services in Fraser Health. Therefore, both the infections diagnosed in BC and infections diagnosed from outside BC are reported.

The BCCDC is currently developing better estimates of incidence and prevalence of HIV infection through mathematical modeling and improvement in testing. This might significantly affect HIV incidence and prevalence reporting in the near future.

## **The Epidemiology**

In 2007, some 95 Fraser Health residents were newly diagnosed with HIV, 81 tested in BC and 14 were diagnosed with infections from outside BC. These numbers translate to a rate of 5.3 per 100,000 people in Fraser Health, and 9.0 per 100,000 people in BC. The BC rate is influenced by the high number of cases occurring in Vancouver. For example, in 2006 (latest year of data available from the BCCDC STI-HIV prevention and control report), Vancouver<sup>1</sup> had a rate of 30.6 per 100,000 people or 183 newly-reported cases of HIV. Nonetheless, Fraser Health has the second highest number of individuals newly diagnosed with HIV among BC health authorities.

Since 1996, there seems to be a slight decrease in the rate of newly diagnosed HIV. According to the BCCDC, this decrease is at least in part due to changes in how new cases are reported (as previously discussed).

Most of the newly diagnosed cases in Fraser Health are males. The rate for females is about a third of that for males. There is also an over-representation of HIV cases in the aboriginal population, especially among females.

Most newly diagnosed infections are among adults aged 30 to 59 years. This is not surprising since this age group constitutes the majority of the population. However, in 2006-2007, the rate among those aged 25 to 29 years was higher than the rate for those aged 30 to 39 and those aged 40 to 59. There are very few newly diagnosed infections during infancy or childhood. Mother to child transmission has been greatly reduced with adequate screening for HIV, treatment of HIV positive pregnant women, and prophylaxis of the newborns. However, some women are currently not screened for HIV during pregnancy, despite the recommendation for universal screening.

As discussed in the introduction, major routes of exposure to HIV are through sexual contact and through sharing of contaminated needles while using intravenous (IV) drugs. Many who use IV drugs are also involved in the sex trade or in survival sex.

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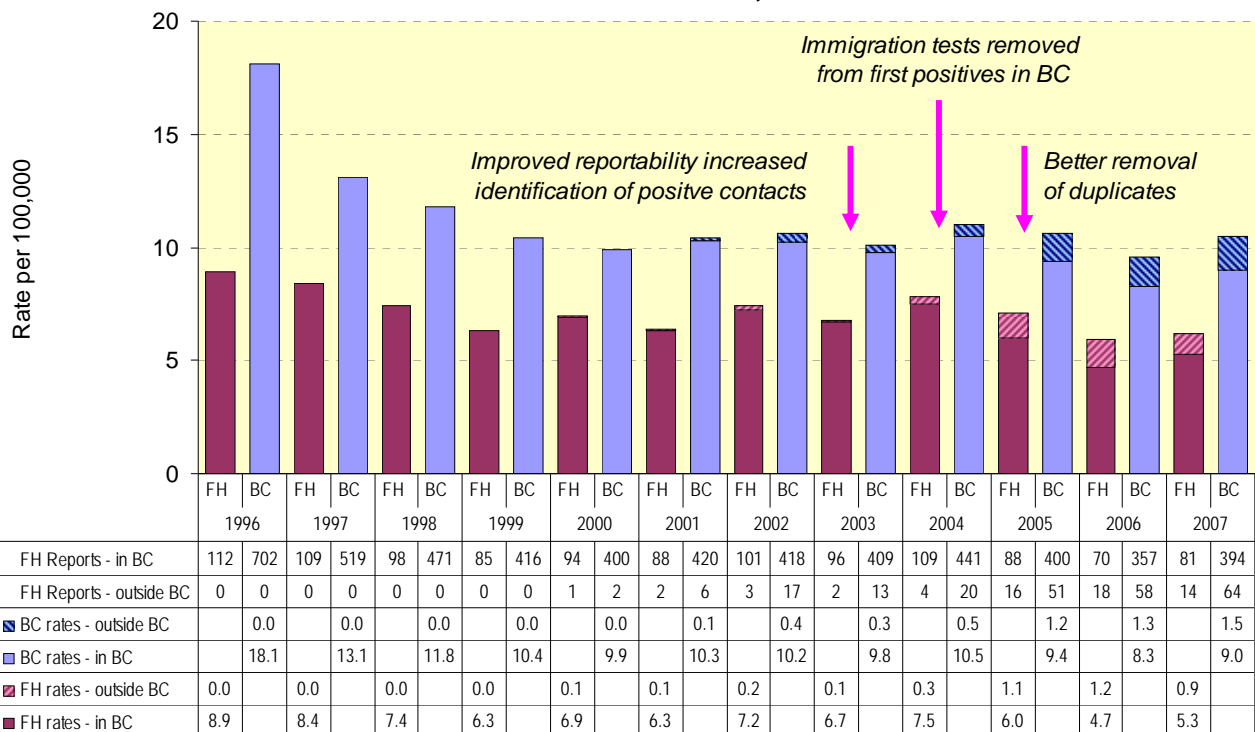
<sup>1</sup> This is for Vancouver health services delivery area not for the whole of Vancouver Coastal Health Authority.

The proportion of newly diagnosed people exposed through sexual contact seems to be increasing for both heterosexual and men who have sex with men (MSM), while the proportion exposed through those the use of IV drugs seems to be decreasing. However, the reductions in exposure of those using IV drugs is more pronounced in men than in women, indicating the need to better reach, support, and protect women.

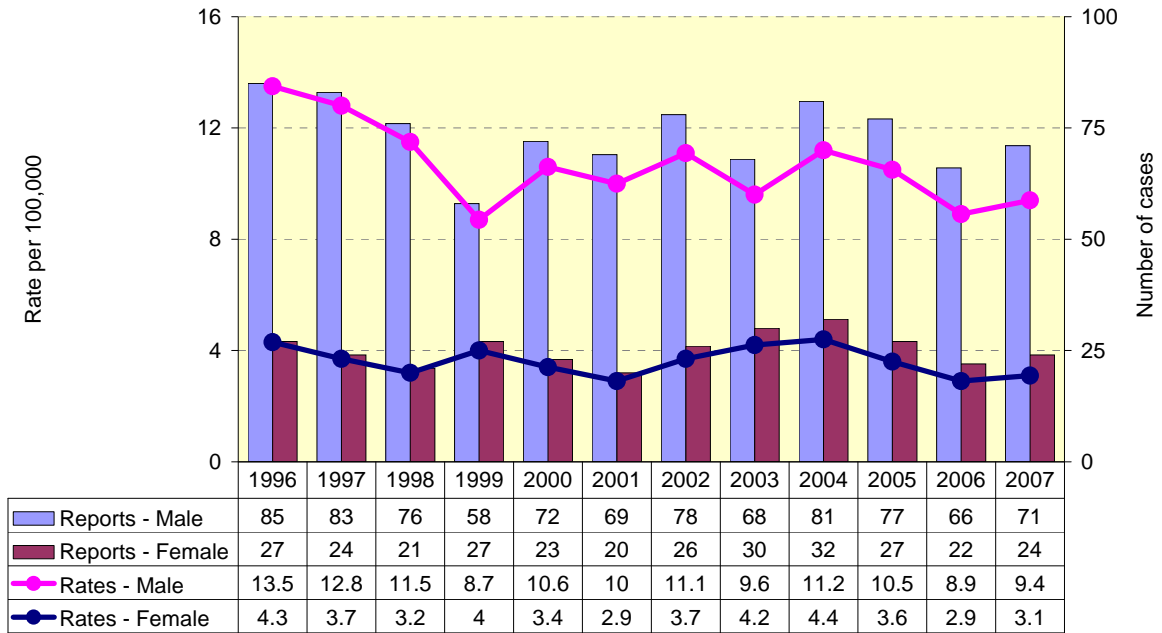
There are limitations in the reporting of routes of exposure. Not all individuals are comfortable reporting their drug use or their types of sexual contacts, which can lead to under-representation of some routes of exposure such as MSM or IV drug use.

AIDS case reports and mortality rates have fallen faster than the rate of people being diagnosed with HIV (Data not shown). This is due to the widespread introduction of triple antiviral drug therapy for HIV/AIDS in 1996, and subsequent improvement in treatment to what is now called Highly Active Antiretroviral Therapy (HAART). Effective treatment slows the damaging effect of the HIV virus on the immune system, delays the development of AIDS or other complications, and reduces infectivity. Antiviral drug therapy for HIV can be difficult to take but when successful, it allows people infected with HIV to live longer. There are limitations in the surveillance system for AIDS. Antiviral therapy can cause individuals previously considered to have AIDS to no longer meet the case definition, making it more complex for physicians to report AIDS cases and thereby affecting the reported rate.

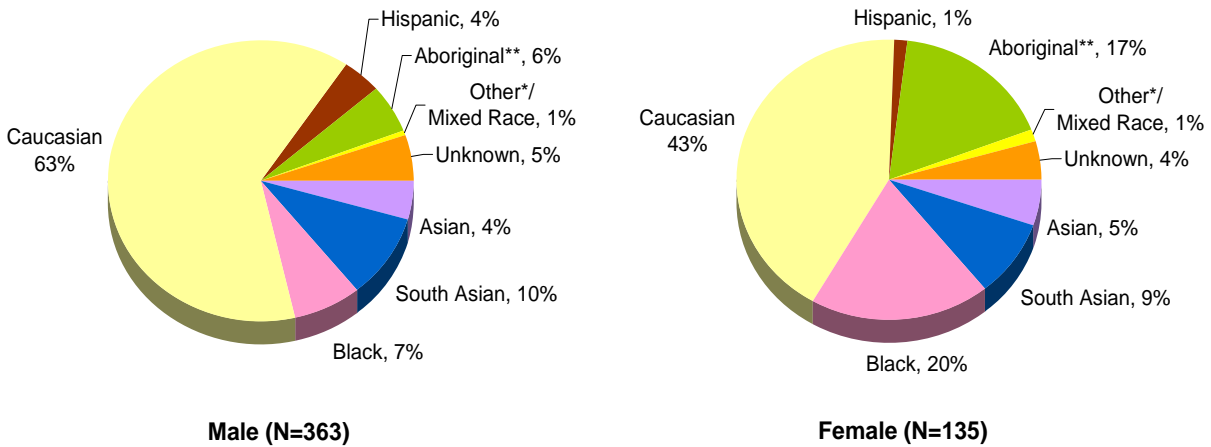
**Rates of Newly Diagnosed HIV Cases  
Fraser Health and BC, 1996-2007**



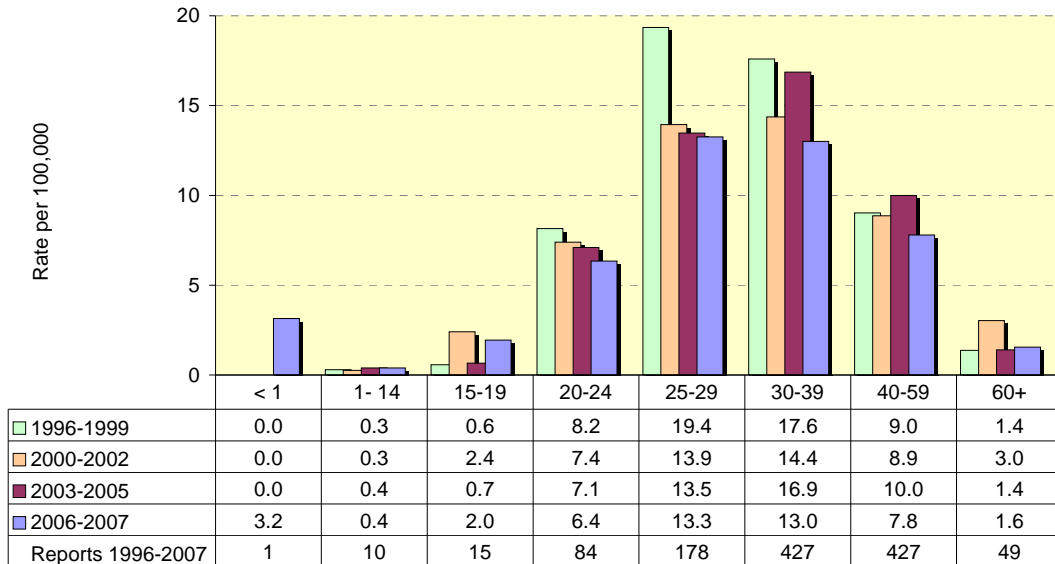
## Newly Diagnosed HIV Cases by Gender Fraser Health, 1996-2007



## Distribution of HIV Cases by Ethnicity and Gender Fraser Health, 2003-2007

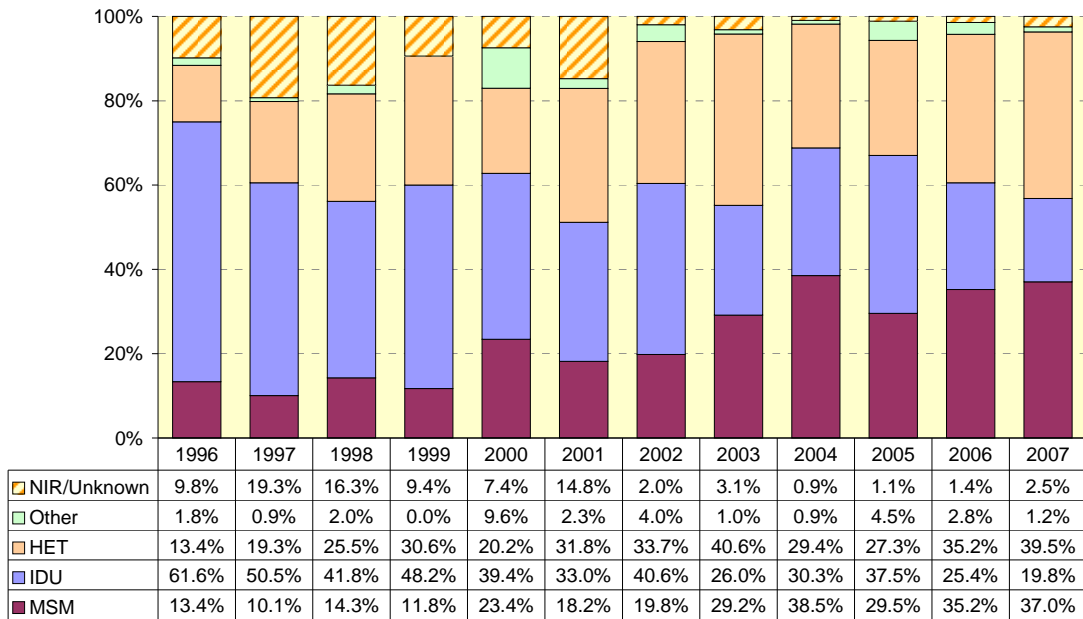


### Rates of Newly Diagnosed HIV Cases by Age Fraser Health, 1996-2007

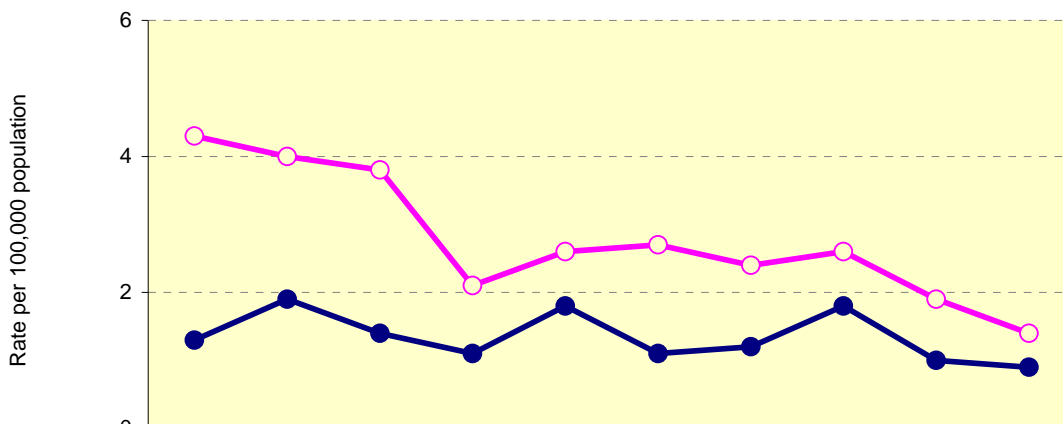


Note: Rates for aggregated periods are calculated as yearly averages

### Percent Distribution of Newly Positive HIV Cases in Fraser Health, by Exposure Route, 1996-2007



### AIDS new diagnosis rate, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
● FH rate	1.3	1.9	1.4	1.1	1.8	1.1	1.2	1.8	1.0	0.9
○ BC rate	4.3	4.0	3.8	2.1	2.6	2.7	2.4	2.6	1.9	1.4
FH counts	17	26	19	15	25	15	18	27	15	13

**Note:** Numbers for previous years may slightly differ because of subsequent corrections to the data base  
 BCCDC STI-HIV-AIDS cubes use PEOPLE 32 population projections to calculate rates.

### What can you do to protect yourself?

Even though existing treatments can slow the progression of HIV, there is no cure. In a developed country with access to highly-active antiretroviral therapy, life expectancy among people with HIV infection is estimated to be about 18.6 years shorter than compared to the general population<sup>2</sup>. Despite continuous improvements, HIV treatments are difficult to follow and cause many secondary effects. Preventing infection with HIV is still the best way that individuals can protect themselves.

Please refer to the section ‘What can you do to protect yourself?’ in the Introduction for ways to protect yourself from HIV infection and other STIs. If you have risky behaviors, being tested early and regularly can help access treatment and prolong life as well as reduce the chance of transmitting HIV to others.

All pregnant women in BC should be tested for HIV in order to detect the disease early and prevent transmission to the baby. Fraser Health recently redeveloped the HIV/AIDS section of its website. You can find more information on a variety of resources at [www.fraserhealth.ca/HIVAIDS](http://www.fraserhealth.ca/HIVAIDS).

<sup>2</sup> Lohse et al., Survival of Persons with and without HIV infection in Denmark, 1995-2005. Ann Intern Med. 2007;146:87-95

## What is Fraser Health doing?

Fraser Health attempts to prevent the transmission of HIV by reducing the prevalence of risky behaviors like having unprotected sex and sharing drug equipment.

Fraser Health has created a team of HIV nurses that ensures HIV post-test counseling, case management and outreach. The HIV nurses help to identify and test those who have been exposed to HIV (contact tracing). The team, in collaboration with support workers and community organizations, also provides support to those living with HIV. This includes supporting a high protein food bank and advocating for adequate housing and support for those who have HIV or AIDS.

Fraser Health promotes HIV testing to diagnose the estimated 700 individuals in Fraser Health who have HIV but do not know (2006 estimates).

Fraser Health is working with physicians and a variety of organizations to improve access to treatment for those who have HIV.

## What can others do?

Please refer to the 'What can others do?' section in the Introduction for further details.

### Physicians

Physicians should offer screening for HIV to all pregnant women. HIV screening is recommended for all pregnant women, regardless of history of risk behaviors.

Physicians should offer screening to all who ask for an HIV test and to all who present with risk factors as per the Canadian Guidelines for STIs, available at:  
[www.phac-aspc.gc.ca/std-mts/sti\\_2006/sti\\_intro2006-eng.php](http://www.phac-aspc.gc.ca/std-mts/sti_2006/sti_intro2006-eng.php).

Physicians can also inform themselves about HIV and follow patients with HIV. Approximately 500 Individuals in Fraser Health are eligible for antiretroviral therapy but are not accessing treatment. About 70% of those who are accessing treatment are accessing it from physicians in another health authority rather than through physicians in Fraser Health. Opportunities to participate in HIV continuing medical education can be found at [www.fraserhealth.ca/HIVAIDS](http://www.fraserhealth.ca/HIVAIDS).

# Chlamydia

## The Disease

**Chlamydia is a common sexually-transmitted infection that is caused by the bacterium *Chlamydia trachomatis*.** It can spread through unprotected sexual contact (vaginal, anal, or oral). Infected mothers can also transmit Chlamydia to their babies during childbirth. Some studies show that about 77% of those infected do not develop symptoms. As discussed in the introduction, these individuals are less likely to get tested, but have a higher chance of developing complications and infecting others. Chlamydia and other STIs also increase the risk of getting HIV and transmitting HIV.

If symptoms of Chlamydia appear, it is usually one to three weeks after exposure to an infected person. For women, symptoms can include:

- A burning feeling when urinating;
- A change in menstrual cycles or more painful menstruation;
- Bleeding or blood spotting from the vagina;
- Pain during sexual intercourse;
- Pain in the lower stomach area;
- Conjunctivitis or pink eye;
- The need to urinate more often;
- A slight fever.

For men, symptoms can include:

- Abnormal fluid from the penis;
- An itching feeling inside the penis;
- Pain while urinating or the need to urinate more often;
- Conjunctivitis or pink eye.

If untreated, Chlamydia can cause infertility in both men and women. It can also cause pelvic inflammatory disease and ectopic pregnancies in women. In men, complications can include infection in the urethra or the testicles or an inflammation of the prostate.

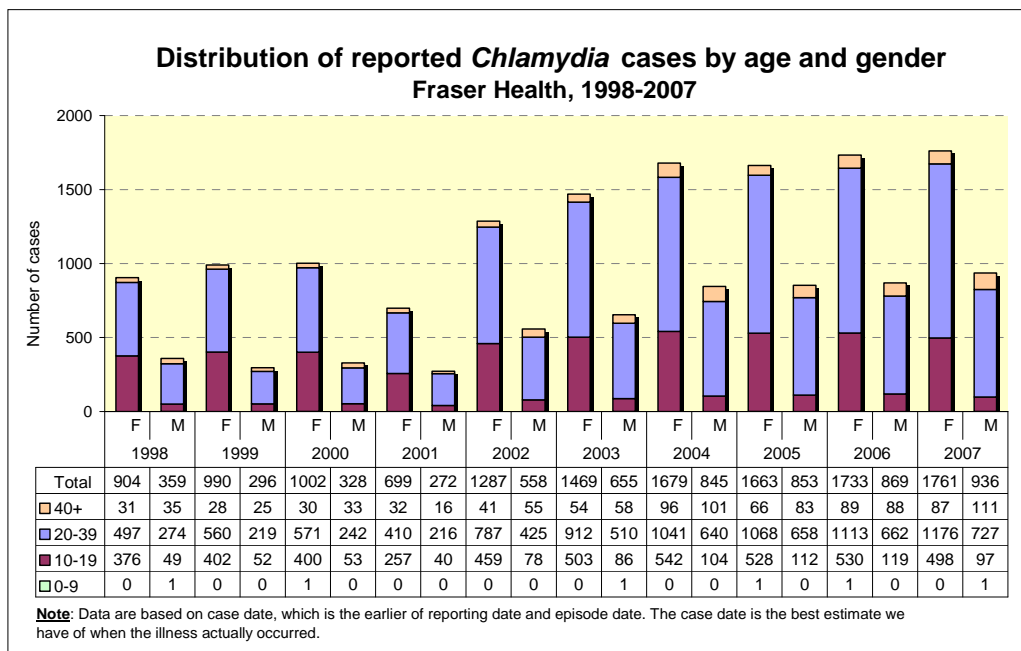
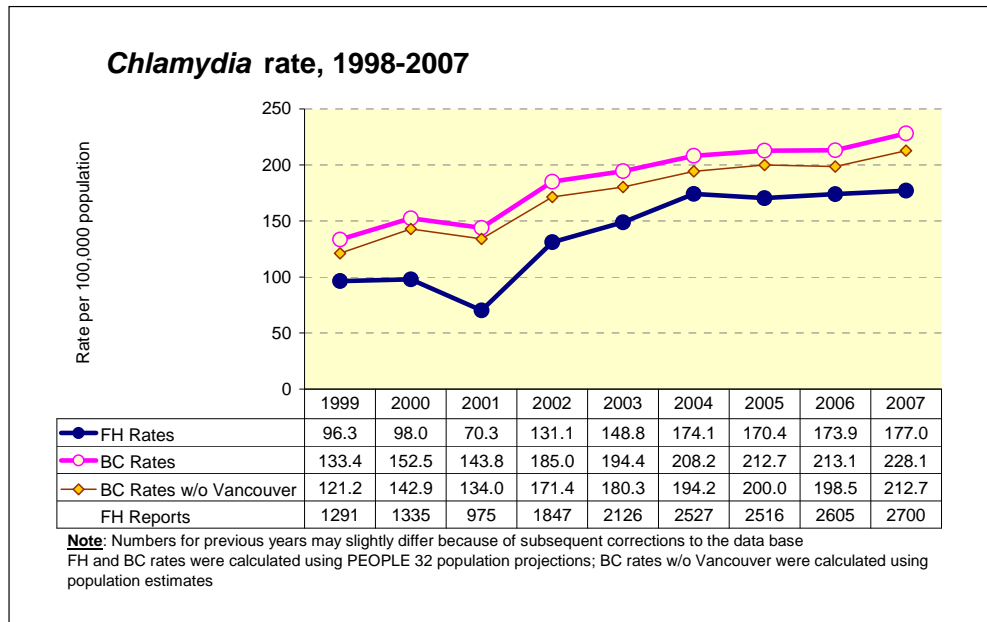
## The Epidemiology

The number of laboratory-reported genital Chlamydia cases in Fraser Health reached a new high in 2007, with 2700 cases. The rate of Chlamydia in Fraser Health has been increasing since 1999, and the long-term trend parallels the provincial rate. However, the current rate underestimates the true number of genital Chlamydia cases because many infected individuals without symptoms do not seek testing.

Over the last decade, the introduction of sensitive and more convenient diagnostic tests may have led to increased testing and detection of the disease. Testing that results in early detection and treatment may help prevent transmission of Chlamydia to others. Early treatment can also help prevent chronic infection and the resulting development of autoimmunity that is linked to increased risk of infertility.

The majority of Chlamydia infections occur in those aged 20 to 39 years. However, 28% of the reported cases in women occur among 10 to 19 year olds. This highlights need for adequate sexual education, prevention and screening programs for youths.

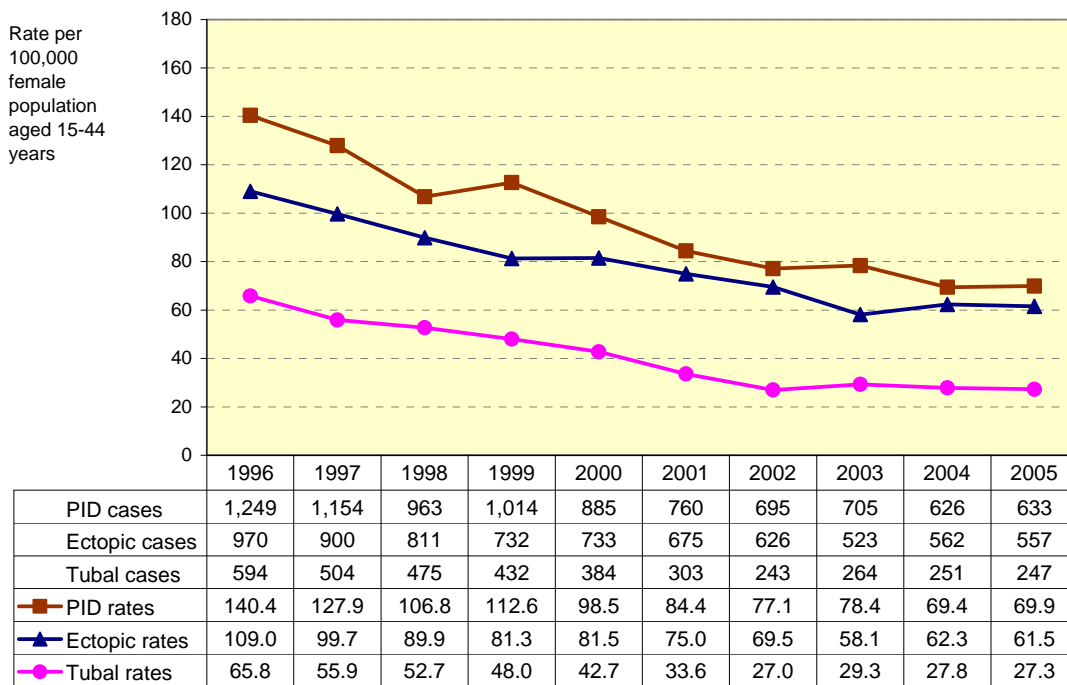
Almost two-thirds of all Chlamydia cases reported in 2007 occurred in females and about one-third in males. Women are more likely to have regular screening, often at the same time as their routine cervical cancer screening. Chlamydia testing in men has increased since March 1997, when urinary polymerase chain reaction (PCR) testing for men was introduced in BC.



\* The total case count in the above age-gender graph does not include cases of unknown age and/or gender (or listed as transgender).

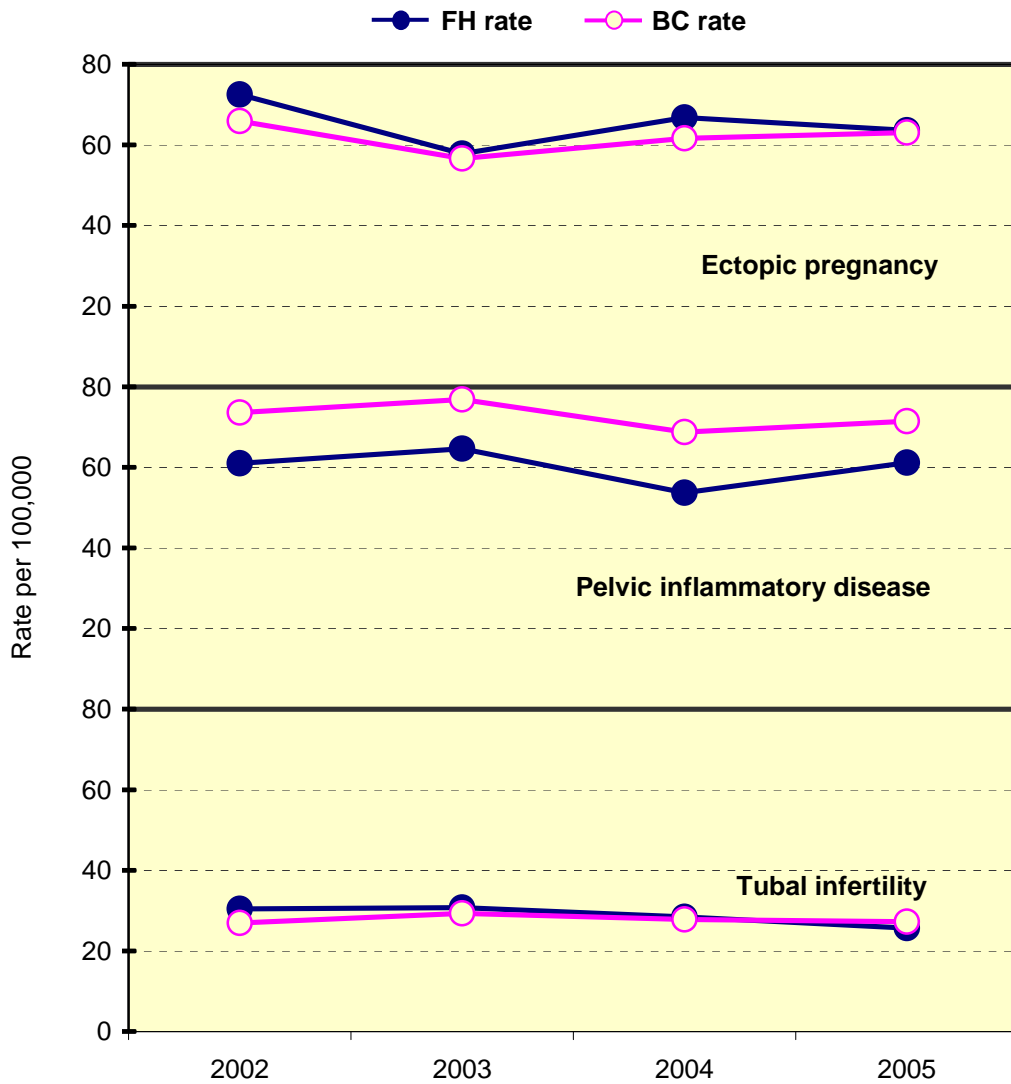
In BC, the rates of hospitalization for tubal infertility, pelvic inflammatory disease, and ectopic pregnancy all have declined since 1996. However, the rates in Fraser Health and BC have stabilized since 2002. The earlier decrease in rates may reflect treatment of Chlamydia and Gonorrhoea (see next section) infections due to increased testing, thereby decreasing the number of complications. But the decreasing trend may also be due to factors unrelated to the screening and treatment of Chlamydia or other STIs. The rates are based on hospitalizations for these conditions. Since 1996, there have been changes in diagnosis and treatment for these conditions, with a shift toward more outpatient management (care outside the hospital setting) and a subsequent reduction in the number of hospitalizations.

### Pelvic inflammatory disease, ectopic pregnancy and tubal infertility case reports and rates in BC, 1996 to 2005



From BC Centre for Disease Control, STI/HIV Prevention and Control, 2006 Annual Report p.42

## Ectopic pregnancy, pelvic inflammatory disease and tubal infertility rates, 2002-2005



**Source:** STI/HIV Prevention and Control , BC Centre for Disease Control

**Note:** Rates are for women, 15-44 years old

### **How can you do to protect yourself?**

Please refer to the section 'What can you do to protect yourself?' in the Introduction for ways to reduce your risk of getting a sexually transmitted infection.

### **What can others do?**

Please refer to the section 'What can others do?' in the Introduction for further details.

**Physicians** should follow Canadian STI guidelines, recommending risk assessment and adequate testing for sexually-active individuals ([www.phac-aspc.gc.ca/std-mts/sti\\_2006/pdf/02sti2006\\_e.pdf](http://www.phac-aspc.gc.ca/std-mts/sti_2006/pdf/02sti2006_e.pdf)) and the recommendations from the Canadian Task Force on Preventive Health Care ([www.ctfphc.org](http://www.ctfphc.org)):

- annual screening of all high risk groups for Chlamydia, including all sexually-active women less than 25 years old and anyone with multiple sexual partners in the past year.

# Gonorrhoea

## The Disease

**Gonorrhoea is a sexually-transmitted disease caused by the bacterium *Neisseria gonorrhoeae*.** It can be spread through unprotected sexual contact (vaginal, anal, or oral). Infected mothers can also transmit Gonorrhoea to their babies during childbirth. Some studies show that 45% of infected people do not have symptoms. They may not know they have the infection or that they are transmitting it. The infection is usually found at the opening of the uterus, or in the tube that carries urine from the bladder. It can also infect the rectum, throat, and pelvic organs. Gonorrhoea infection or any other sexually transmitted infection increases the risk of getting HIV. Like Chlamydia, Gonorrhoea can also cause pelvic inflammatory disease and ectopic pregnancies in women.

## The Epidemiology

The number of Gonorrhoea cases in Fraser Health has been increasing since the late 1990's. The rate in 2007 was comparable to that of 2005. The rate in 2006 was lower than in 2005 or 2007, but this difference may not be statistically significant. Most cases reported occurred in those aged 20 to 39 years. There are about twice the number of cases reported in males than females.

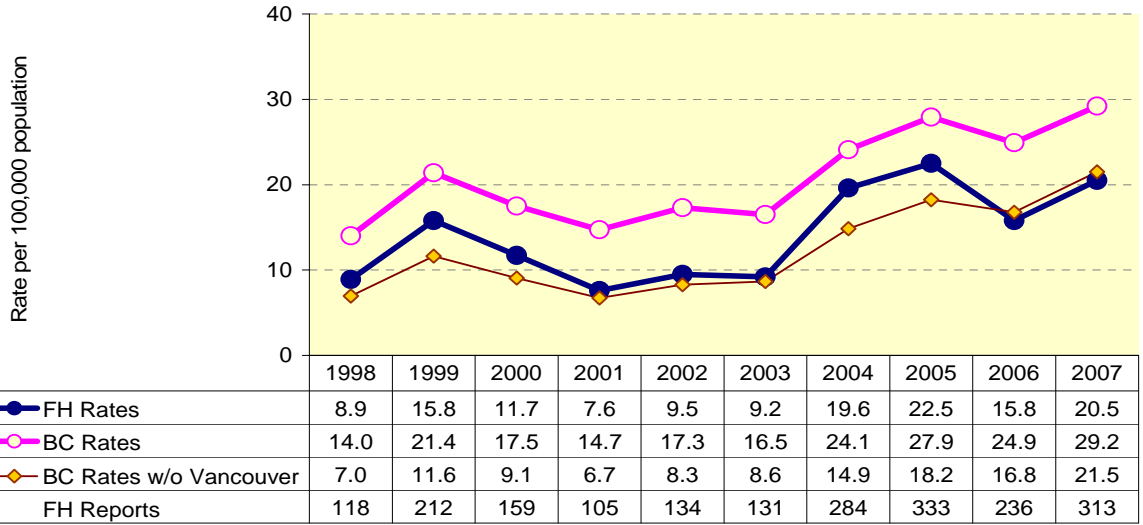
As with Chlamydia, the reported number of cases likely underestimates the true number of cases, as many people are asymptomatic and never seek testing or treatment.

Please refer to the Introduction on how you and others can prevent Gonorrhoea and other sexually transmitted diseases.

**Physicians** should follow Canadian STI guidelines, recommending risk assessment and adequate testing for sexually-active individuals ([www.phac-aspc.gc.ca/std-mts/sti\\_2006/pdf/02sti2006\\_e.pdf](http://www.phac-aspc.gc.ca/std-mts/sti_2006/pdf/02sti2006_e.pdf)) and the recommendations from the Canadian Task Force on Preventive Health Care ([www.ctfphc.org](http://www.ctfphc.org)):

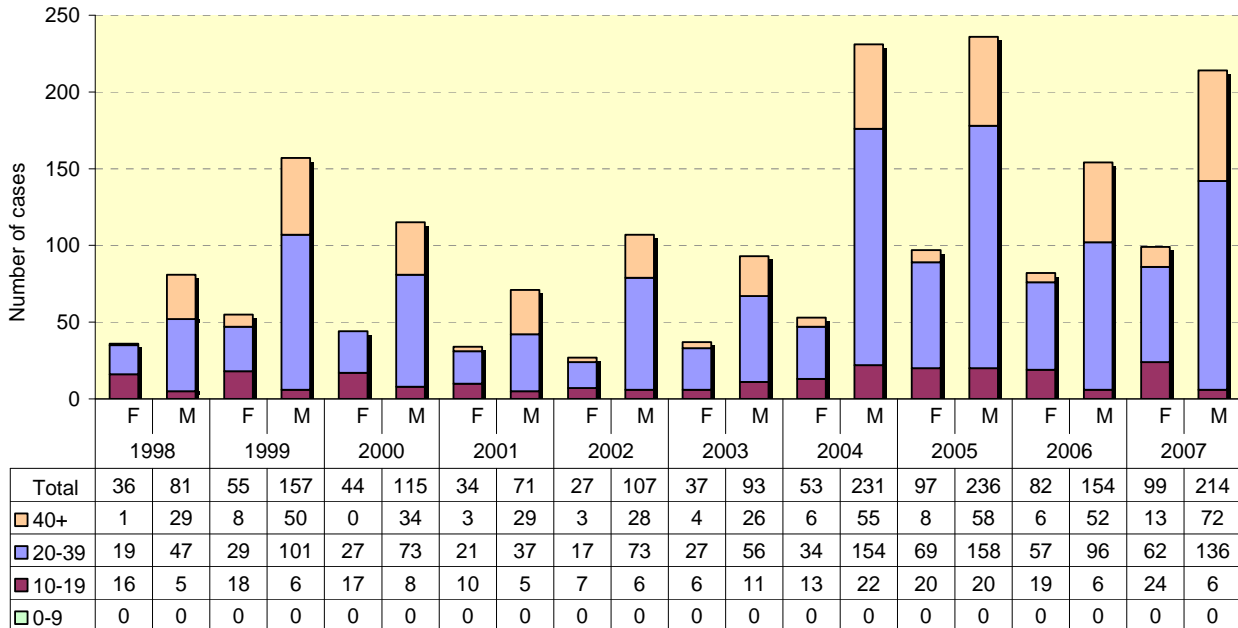
- screening of those at risk for Gonorrhoea, including individuals less than 30 years of age, particularly adolescents, with at least 2 sexual partners in the previous year and those less than 16 years of age at first intercourse.

## Gonorrhoea rate, 1998-2007



**Note:** Numbers for previous years may slightly differ because of subsequent corrections to the data base  
 FH and BC rates were calculated using PEOPLE 32 population projections; BC rates w/o Vancouver were calculated using population estimates

## Distribution of reported *Gonorrhoea* cases by age and gender Fraser Health, 1998-2007



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

# Hepatitis C

**Hepatitis C is a virus that causes chronic liver infection.** About 70% of people who develop hepatitis C infection develop chronic infection, which gradually causes cirrhosis (scarring and damage) to the liver. It can lead to liver failure or liver cancer. After 20 years of infection, about 20% of people will have cirrhosis. Overall, about half of people chronically infected with hepatitis C will develop cirrhosis or cancer of the liver.

Hepatitis C is spread through blood-to-blood contact with infected blood. The risk of transmission from unprotected sex is extremely low, but the risk can increase by engaging in higher-risk sexual behaviors (e.g., unprotected sex with an infected partner that includes contact with blood or exchange of blood, as can happen when the genitals are irritated, with rectal penetration or when there are sores present). Refer to the Introduction for other ways that Hepatitis C and other blood-borne pathogens can be transmitted.

Some people with hepatitis C contracted their infection as a result of blood transfusions prior to the introduction of a blood screening test for hepatitis C in 1992. The risk of infection from receipt of blood products is now extremely low.

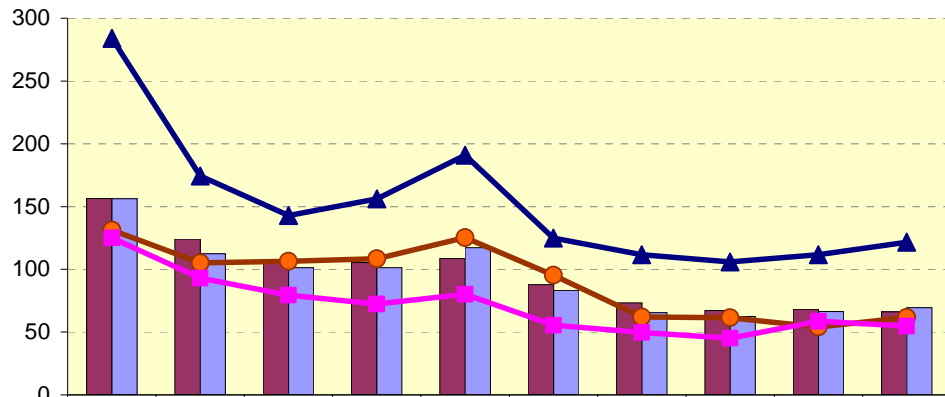
## The Epidemiology

Hepatitis C became reportable in 1992. Most new hepatitis C infections since 1992 have occurred through injection drug use. In Fraser Health, there was a decline in the number of hepatitis C reports from 1998 to 2005. Some of the decrease may be a result of better identification and elimination of duplicate reports (i.e., more than one positive lab test on the same individual). It is believed that the majority of cases reported in 1998 and later represents chronic, pre-existing but unidentified hepatitis C infections, rather than new infections. The BCCDC estimates that about three-quarters of these chronic cases have now been detected. The number of identified cases of hepatitis C in Fraser Health has been relatively stable since 2004. In 2007, there were 1052 newly diagnosed cases of hepatitis C in Fraser Health.

The rate of hepatitis C in Fraser Health closely follows the average BC rate. The BC rate is approximately three times the national average, in part due to a higher proportion of people using injection drugs. The rate in Fraser East seems higher than that in the other Health Service Delivery Areas. This is mostly due to the hepatitis C cases being diagnosed in Federal Correctional Facilities in Fraser East. Testing for hepatitis C is offered to everyone in correctional facilities, so previously undiagnosed cases are identified and increase the rate. Once those are removed, the rate is comparable to the other two Fraser Health regions (data not shown).

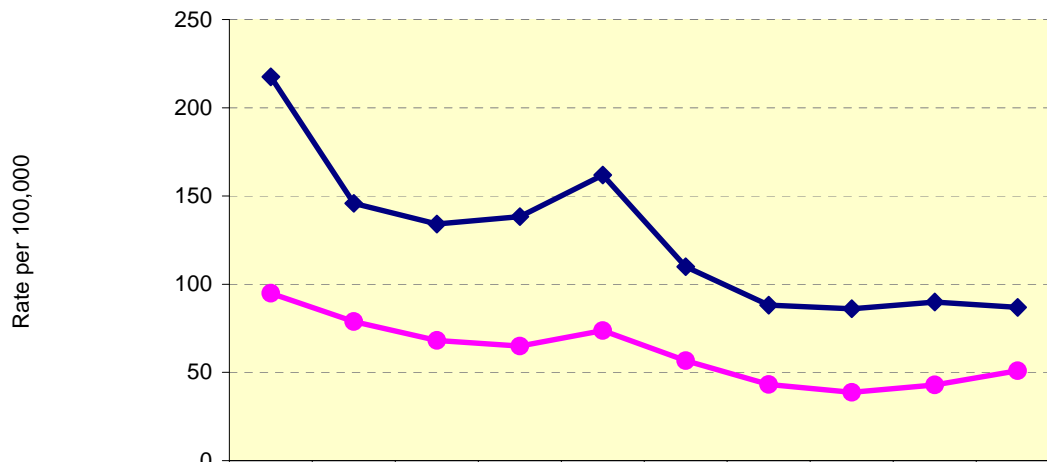
Most hepatitis C infections are diagnosed among men. The decline in the number of newly diagnosed men from 1998 to 2007 (54%) has been greater than that in women (38%).

### Hepatitis C Rates by HSDA Fraser Health, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
BC rates	156.4	124.1	108.0	105.4	108.6	87.7	73.2	67.1	68.2	66.1
FH rates	156.2	112.3	101.3	101.4	117.3	83.3	65.5	62.3	66.4	69.4
Fraser East	284.1	174.4	142.8	156.2	190.9	124.9	111.7	105.9	111.6	121.7
Fraser North	131.2	105.1	106.4	108.5	125.3	95.4	62.0	61.5	54.1	61.7
Fraser South	125.1	92.9	79.5	72.3	80.1	55.5	49.6	45.1	58.6	54.8
FH reports	2,064	1,506	1,377	1,409	1,660	1,189	952	922	996	1,052

### Hepatitis C Rates by Gender Fraser Health, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Male	217.5	145.8	134.2	138.3	161.9	109.9	88.1	86.2	89.9	86.9
Female	94.9	78.8	68.2	64.9	73.8	56.6	43.1	38.8	42.9	51.0
Reports - Male	1,431	974	910	955	1,137	782	637	634	672	660
Reports - Female	628	530	466	452	523	407	315	288	324	391

2007

## **What can individuals do to protect themselves?**

Please refer to the section 'What can you do to protect yourself?' in the Introduction on ways to prevent infection with hepatitis C.

If you engage in risky behaviors, being tested regularly can help you decrease transmission to others and access treatment. See [www.healthlinkbc.ca](http://www.healthlinkbc.ca) for more information about hepatitis C.

## **What can others do?**

Please refer to the section 'What can others do?' in the Introduction for further details.

### **Physicians**

Physicians should offer screening for hepatitis C to those who have risk factors, including mothers from countries where hepatitis C is endemic and to those presenting with potential signs or symptoms. For those who have hepatitis C, physicians can monitor for signs of inflammation or complications and eligibility for treatment:

[www.health.gov.bc.ca/gpac/pdf/hepatitis\\_c.pdf](http://www.health.gov.bc.ca/gpac/pdf/hepatitis_c.pdf)

## **What is Fraser Health doing?**

Fraser Health Hepatitis Services was developed to provide education about hepatitis C and increase the availability of treatment, particularly for those who may not have access to health services elsewhere, such as the homeless. For more information, please call 1-800-308-3318.

## Syphilis, Infectious

**Syphilis is a sexually-transmitted disease caused by the bacterium *Treponema pallidum*.** The first or “primary stage” causes a sore where the bacteria entered the body. Even without treatment, this sore can heal within a month. But if the infection is not treated, the bacteria will continue to spread in the body. About four to six weeks after infection, the “secondary stage” appears as a rash anywhere on the body, most often on the belly, the genitals, palms of the hands, and soles of the feet. After the rash goes away, the hidden or “latent” stage of syphilis begins. The infection continues from weeks to years without symptoms. If treatment still has not occurred, the late or “tertiary stage” of syphilis ensues, resulting in damage to the brain, heart and other organs. Severe cases can result in death. Pregnant women can pass syphilis to an unborn child with severe consequences. Syphilis is known to increase the risk of acquiring and transmitting HIV.

Syphilis can be transmitted from direct contact with infectious exudates from obvious or concealed early lesions of skin and mucous membranes. Transmission occurs most often through oral, anal or vaginal intercourse. Infection of a fetus can occur through the placenta of an infected pregnant woman. Health care workers have contracted the disease after unprotected examination of infectious lesions. Transmission through other means rarely occurs. Transmission after the first year of infection is rare.

### The Epidemiology

An ongoing outbreak of syphilis that began in 1997 is occurring in BC. Unfortunately, the outbreak has been resistant to public health efforts to bring it under control. Prior to 1997, there were fewer than 20 cases per year. Since the summer of 1997, the annual number of cases in BC has steadily increased. There were 2.9 cases per 100,000 population (116 cases) in 1998, increasing in subsequent years to a high of 7.7 per 100,000 (333 cases) in 2006. In 2006 (most recent data available), Vancouver continued to have the vast majority of the province’s cases, at a rate of 35.1 cases per 100,000 people.

The rate of syphilis in Fraser Health has increased as well, from 0.9 cases per 100,000 in 1997 to 2.0 per 100,000 (26 cases) in 1998 to 5.7 per 100,000 (87 cases) in 2006, at the peak of the outbreak. In 2006, the outbreak affected Fraser North and Fraser East, and in particular Chilliwack in Fraser East.

Fraser Health Public Health responded to the outbreak in a number of ways:

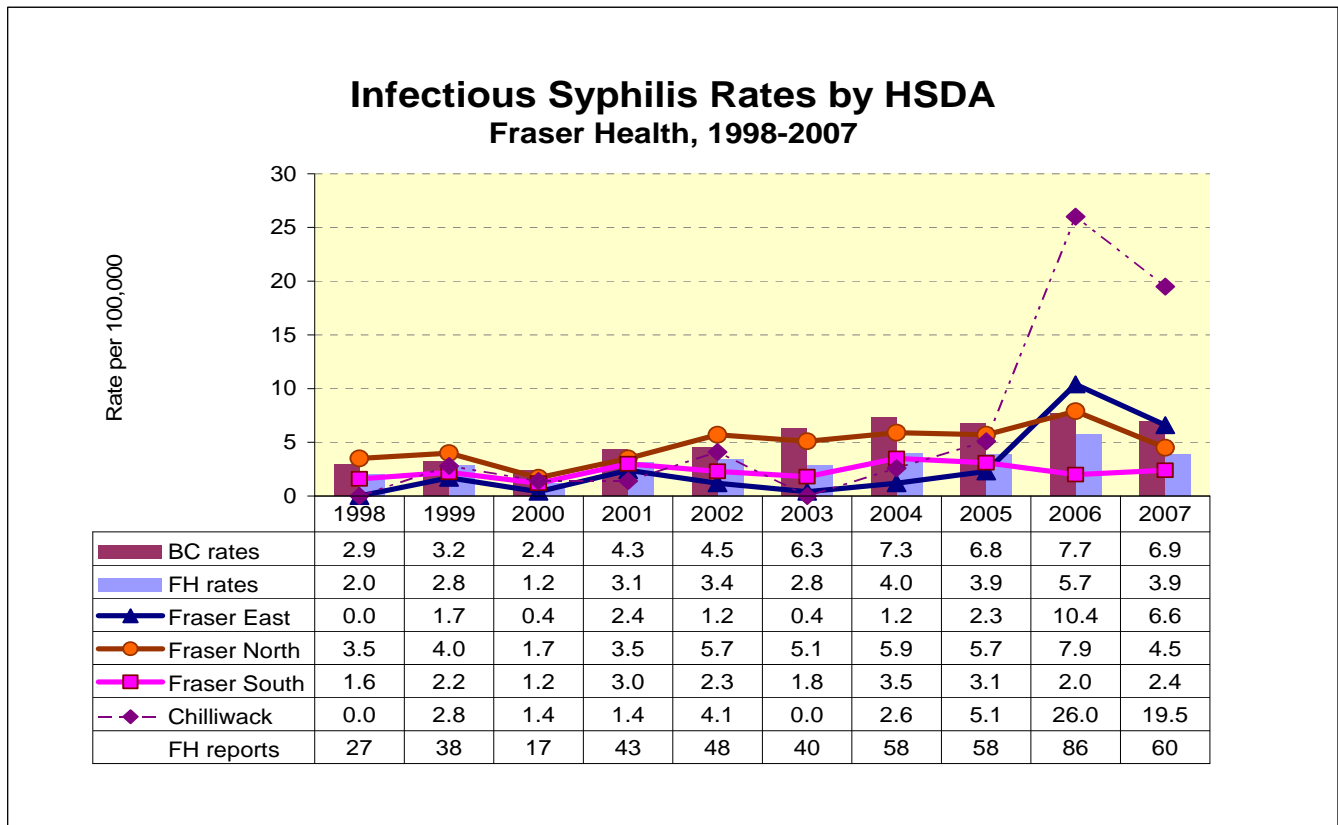
- by establishing community partnerships;
- distributing health alerts to at-risk populations;
- issuing a letter from the local Medical Health Officer (MHO) to physicians in Fraser East;
- increasing testing, treatment and immunization clinics at a variety of sites within the community;
- having a Public Health Nurse act in an "outreach" role for case follow-up and contact tracing;
- and to establish connections with the population.

Efforts to halt transmission in 2006 and 2007 appear to have led to a decrease in the rate in Fraser East, especially in Chilliwack, and in Fraser North. However, there were still 60 people

newly identified with syphilis in 2007 in Fraser Health, and people from all ethnicities were affected.

People from all age groups (from youth aged 15 to 19 years to those over 60 years old) were affected in 2007, and there was one case of congenital syphilis (data not shown). Over the last 5 years there have been both congenital and prenatal cases of syphilis.

About 30% of those affected by syphilis in 2007 reported only heterosexual contacts, another 40% were either street involved, sex trade workers or patrons of sex trade workers, and another 20% reported being men who have sex with men. Six percent reported acquiring the infection outside of Canada (either during travel outside Canada or diagnosed at immigration into Canada). These percentages are comparable to the proportion of each of the risk factors documented since 1997 (data not shown).



### What can be done?

Please see the section ‘What can you do to protect yourself?’ in the Introduction on how you and others can prevent syphilis.

Due to the cases of syphilis in pregnant women and congenital syphilis being documented since 1997, it is recommended that all pregnant women screen for syphilis and other sexually transmitted diseases as part of prenatal screening, with repeat testing if there is ongoing risk.

# Diseases Transmitted by Direct Contact and Respiratory Routes

Notes:

*Numbers for previous years may slightly differ because of subsequent corrections to the database.  
Rates of rare diseases may be changed considerably by differences of only a few cases.*

# Community-Acquired Methicillin-Resistant *Staphylococcus Aureus*

***Staphylococcus aureus* (*S. aureus*) is a bacterium that normally lives on the skin of healthy people and does no harm.** Sometimes, the bacteria can infect cuts or breaks in the skin, causing wound infections, impetigo or boils. Rarely, *S. aureus* can also invade the body and cause septicemia or other serious infections.

Some *Staphylococcus* have become resistant to methicillin or cloxacillin, a class of antibiotic to which they have been normally susceptible. Being resistant does not pose a problem for bacteria that do not cause infections. However, infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA) are more difficult to treat and require treatment with other antibiotics.

In addition, in recent years a new type of MRSA has emerged, primarily in the community setting. Because of this, it is called community-associated MRSA, or CA-MRSA. Many strains of CA-MRSA produce a toxin that causes local tissue necrosis (breakdown). Early symptoms may be described as “spider bite-like” lesions, which then may progress to boils, impetigo, wound infections or more invasive infections. Fatal infections observed have included sepsis, toxic shock syndrome, necrotizing pneumonia, purpura fulminans, pyomyositis, and necrotizing fasciitis, even in previously-healthy patients.

CA-MRSA was considered rare, but it is becoming more prevalent in North America, including BC. In BC, CA-MRSA has been increasing from approximately 2004 onwards and is becoming a more common cause of skin and soft-tissue infections.

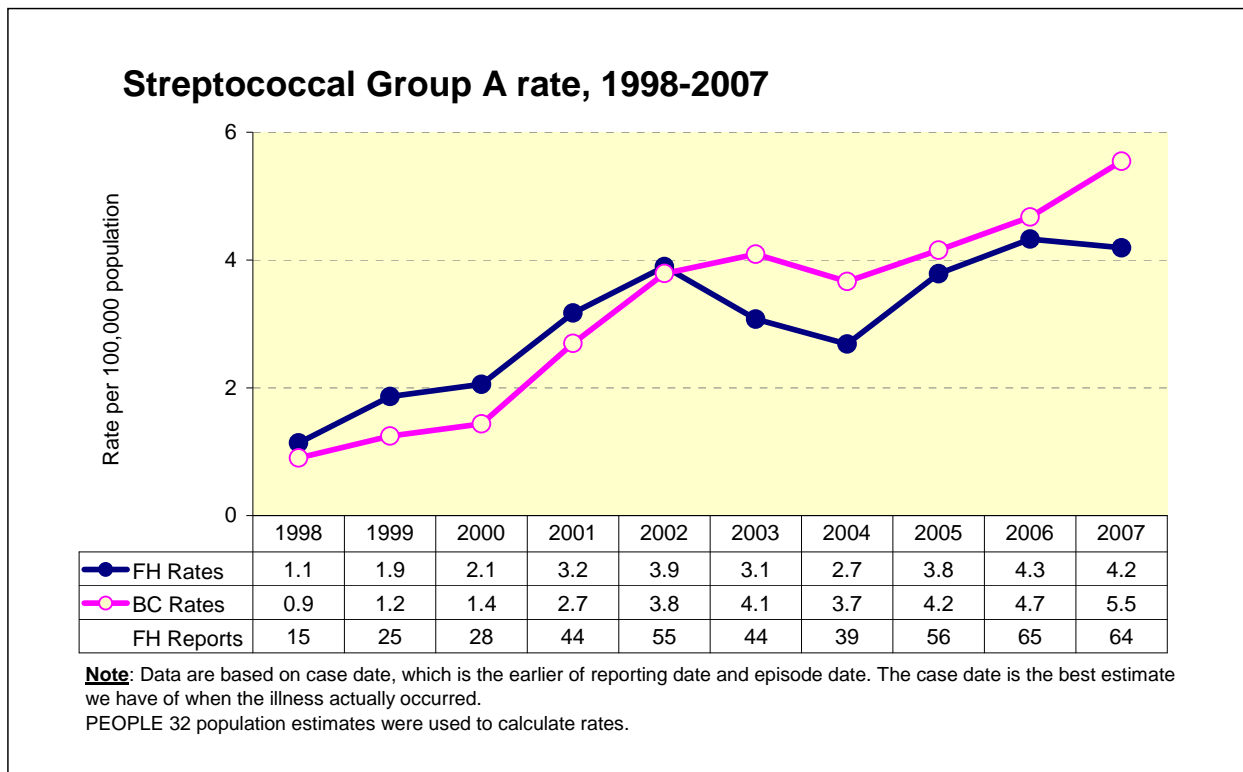
CA-MRSA spreads more easily when there is frequent skin-to-skin contact, crowding, sharing of personal items and less than ideal hygiene. CA-MRSA tends to affect groups with specific risk factors such as: athletes (particularly those involved in sporting teams), intravenous drug users, men who have sex with men, military personnel, inmates in correctional facilities, Aboriginal people and people with chronic skin disorders. Adherence to good personal hygiene and frequent hand washing are effective ways to help reduce infections and the transmission of the organism. CA-MRSA has tended to affect younger age groups than does hospital-associated MRSA. Recurrent or recent antibiotic use can also be a risk factor for CA-MRSA. In very rare circumstances, animals such as family pets, horses, and pigs can be sources of the organism.

Occurrence of MRSA in hospitals is monitored in Fraser Health, but because CA-MRSA is not yet reportable in British Columbia, population-based figures are not available.

# Invasive Group A Streptococcal Disease

Group A *Streptococcus* (GAS) is a type of bacteria that usually lives in the throat and on the skin of healthy people, where it does no harm. Severe, sometimes life-threatening, Group A streptococcal disease may occur when bacteria get into parts of the body where bacteria are not usually found, such as the blood, muscle or the lungs. These infections are termed “invasive Group A streptococcal disease” (iGAS). Examples of iGAS disease include necrotizing fasciitis (“flesh-eating disease”), septicemia and streptococcal toxic shock syndrome. Close contacts of cases are advised to take antibiotics as a prophylactic measure to reduce the risk of subsequent episodes of severe disease in household or other close contacts. Such prophylaxis may also contribute to reducing transmission of GAS to others. There is no vaccine currently available to protect against Group A streptococcal disease.

There were 64 cases of iGAS disease in Fraser Health in 2007, very close to the number of cases in 2006. Invasive Group A streptococcal disease has been gradually increasing in both Fraser Health and BC, particularly among marginalized and homeless populations.



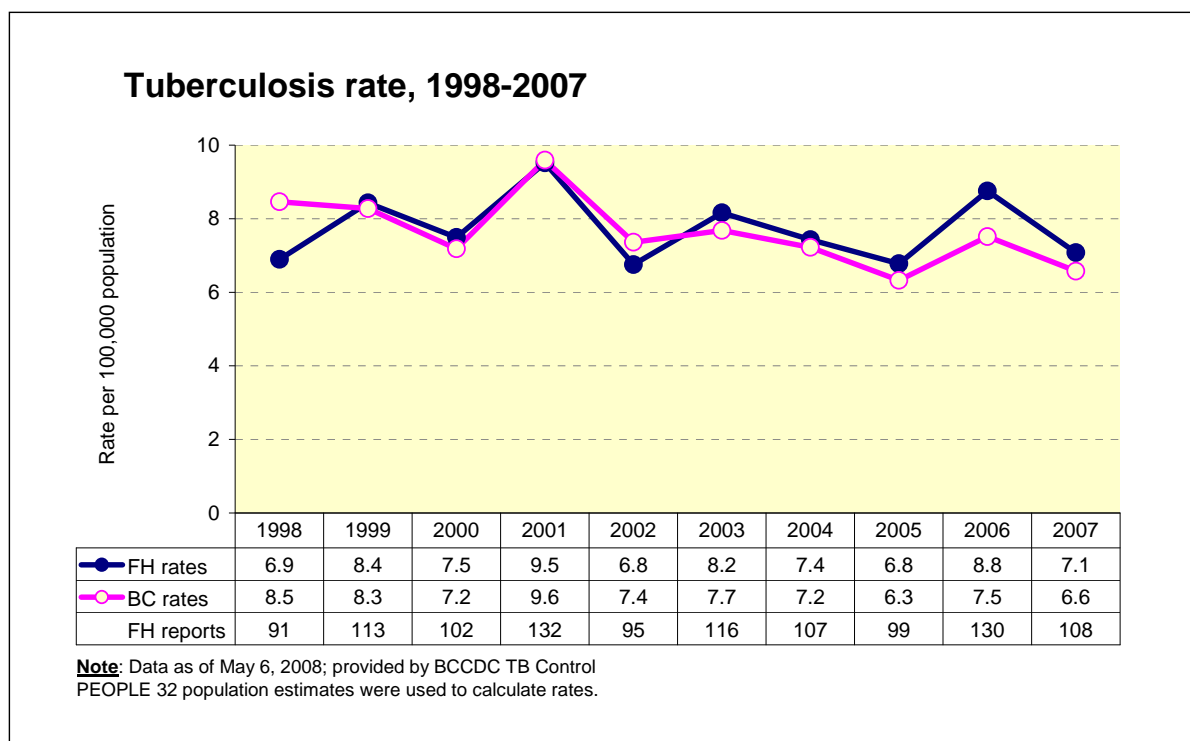
## Tuberculosis (TB)

**Tuberculosis (TB) is a disease caused by bacteria called *Mycobacterium tuberculosis*.** The bacteria usually attack the lungs but can attack any part of the body. If untreated, TB can be fatal. TB is especially dangerous for people who are infected with HIV.

TB is usually spread when a person with TB of the lungs coughs or sneezes and tiny droplets containing the bacteria are dispersed into the air, where they can be inhaled by people nearby. Most people who are infected initially develop latent TB, a condition in which the bacteria are dormant in their bodies but do not cause symptoms or disease. People with latent TB cannot spread TB to others. TB disease occurs when the bacteria begin to grow and become active in the lungs. The person develops symptoms and becomes infectious to others. The vast majority of active TB cases detected each year in BC are re-activations of old latent infections in immigrants to Canada who have come from countries where TB is more common. TB is also relatively common among Canada's Aboriginal peoples.

A key component of TB control is case identification and treatment. This can be difficult, because treatment involves six to twelve months of taking multiple drugs. Continued compliance with drug therapy is a significant challenge. In recent years, extremely drug-resistant strains of TB have developed in other areas of the world, often found in clients who did not complete their full course of treatment, although they have not yet become common in North America. Another important component of TB control is to identify people with latent TB and offer them prophylaxis, to prevent progression to active disease.

In 2007, 108 people in Fraser Health were diagnosed with active (infectious) TB. There has been some fluctuation of the rate in Fraser Health from year to year, but overall the rate has been quite stable for the last 10 years.



# Enteric, Food and Water-borne Diseases

Notes:

*Numbers for previous years may slightly differ because of subsequent corrections to the database.  
Rates of rare diseases may be changed considerably by differences of only a few cases.*

## Notable Enteric and Zoonotic Communicable Disease Events

*While the vast majority of the communicable disease issues that comprise the bulk of the day-to-day workload in enteric and zoonotic disease surveillance, prevention, and control are not listed in this section, these notable events are included either because they represented an exceptionally rare occurrence or because they required a disproportionate amount of staff time in the assessment and closure of the case investigation.*

**March – Ciguatera poisoning.** 3 members of a family presented to their physician with symptoms compatible with ciguatera poisoning. All 3 persons had recently consumed locally purchased fish, but there was no known consumption of imported predatory fish. Investigation could not confirm the source of the fish from the distributor and no toxin was detected in the submitted fish samples. No further cases were reported.

**May – BSE.** A single dairy cow from within the Fraser health area tested positive for Bovine Spongiform Encephalopathy. No parts of the cow entered the food chain, and no human risk was identified.

**May – Cholera.** 2 cases of Cholera were identified in Fraser Health, with no history of travel. It is exceptionally rare to identify cases without a link to travel. Neither case had any ill contacts who had recently returned from Cholera-endemic areas. Exposure to imported contaminated seafood/shellfish was suspected, but trace back of seafood products did not reveal a definitive link. No further cases were reported.

**May – Hepatitis A.** Hepatitis A was identified in a food handler from a family style restaurant in Langley. The case worked during the infectious period (although not symptomatic), resulting in a media release and mass immunizations of co-workers and patrons who had been at the restaurant during the case's infectious period. Approximately 1400 staff and patrons received vaccine or Immune Globulin products through special clinics set up by Fraser Health Health Promotion and Prevention staff. This incident highlighted the collaborative approach needed between all Public Health programs to provide the appropriate and timely response.

**May to July – Salmonella Enteritidis phage type 13.** There was a national outbreak in 2007 of a new strain of Salmonella Enteritidis (phage type 13). BC had 145 cases of this strain, of which approximately 1/3 were within Fraser Health. No sources were conclusively determined for this outbreak, but hypotheses have been formed as to the potential food items involved and will be tested this year across Canada should there be another outbreak.

**May to August – Cyclospora.** A national outbreak was detected in two distinct waves, in May, then from mid-June to late July with the majority of cases occurring in BC. Exhaustive investigation and trace back linked the outbreak to organic basil imported from Mexico through a local herb producer/ importer in Surrey. Excellent cooperation with the local producer resulted in improved practices for record keeping of herb sources and distribution. Both the Canadian Food Inspection Agency and the BCCDC worked with Fraser Health in this outbreak.

**June – Rabies.** On May 30, an outdoor cat from an acreage in Maple Ridge became ill with neurologic symptoms. After being examined in two veterinary clinics, the cat was sent for rabies testing. The result was positive for bat-variant rabies virus, and represents the first rabid non-bat in Fraser Health in over 15 years. 21 people received rabies immune globulin and/or vaccine as a result of significant contact with the cat.

**June to October – West Nile Virus.** 9 residents of Fraser Health were diagnosed with acute West Nile Virus infection. Half of these cases were classified as the serious Neurologic Syndrome based on symptom history. All infections were travel acquired from the Prairie provinces, with only one case having had concurrent travel to the US during the potential exposure period.

**July – Vibrio vulnificus.** Normally associated with warm brackish waters of the Southern US states; two cases of severe *V. vulnificus* wound infection were reported in FH residents who had no travel history. Investigation revealed both cases had been wading in different beaches within Vancouver Coastal Health Authority prior to onset of symptoms. Environmental water sampling was conducted and *V. vulnificus* was confirmed at the sites. Literature review shows that while vibrio wound infections are not a major concern on the BC coast, *V. vulnificus* has been identified here before.

**August – Norovirus/South Surrey Campground.** A total of 17 of 123 persons attending a gathering at a campground within the Fraser Health area were transported to hospital for assessment after becoming ill with gastrointestinal symptoms. The Hospital Emergency Department set up a separate clinical assessment unit to receive those ill. The Medical Health Officer and Health Protection staff attended at the camp to review food/clinical histories, inspect camp facilities, and provide appropriate public health guidance. None of the patients sent to hospital required admission, and the cause of the outbreak was confirmed to be Norovirus.

**October – Infant Botulism.** A single case of infant botulism in a resident of the Fraser Health area was diagnosed at BC Children’s Hospital in early October. No further cases were reported, although another case had been identified in eastern Canada just prior to our case. Environmental sampling and food testing did not identify a source of *Clostridium* or its toxin.

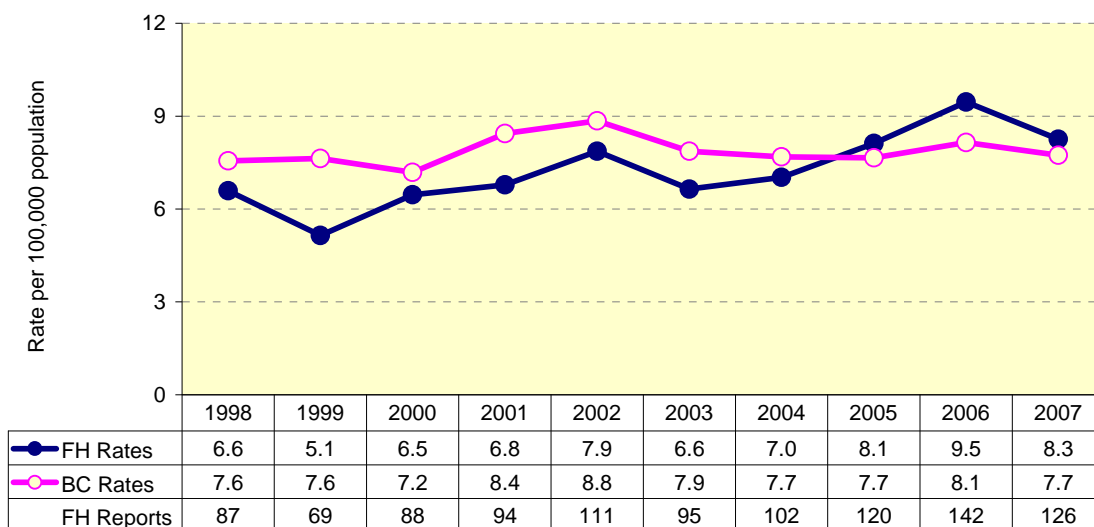
**October to January – Shigella Sonnei 0172.** In late October, an outbreak of *Shigella sonnei* type 0172 was noted mainly among transient and homeless people who use soup kitchens and shelters in East Vancouver and North Surrey. Fraser Health and Vancouver Coastal Health Communicable Disease Environmental Health Officers and Medical Health Officers worked closely together in education campaigns and had excellent cooperation with an area walk-in clinic and hospitals that provided empirical treatment to symptomatic clients.

**December – Hepatitis A.** Hepatitis A was identified in a food handler working at a large restaurant in Port Moody. The case worked at the restaurant while symptomatic and infectious, resulting in a media release and mass immunizations of co-workers and patrons. Approximately 500 case contacts (restaurant staff and patrons who ate at the restaurant while the case worked) received either vaccine or immune globulin through clinics set up on site at the restaurant and at the nearby health unit by staff in Fraser Health Health Promotion and Prevention program.

# Amebiasis

**Amebiasis is diarrheal illness caused by Entamoeba protozoa, which are tiny one-celled parasites found in contaminated food or water.** The number of lab-reported cases of amebiasis in Fraser Health dropped to 126 cases in 2007, slightly above the provincial average. Most of the cases detected provincially occur in the lower mainland and southern Vancouver Island. Prominent risk factors include overseas exposure to contaminated water sources and fecal-oral sexual practices. New immigrant screening accounts for some of the reporting variation across the province. An important consideration is that routine lab tests do not distinguish between the non-pathogenic *E. dispar*, which does not usually cause disease, and the pathogenic *E. histolytica* which does. Most people immigrating from endemic areas will be colonized by the non-pathogenic *dispar* species.

**Amoebiasis rate, 1998-2007**



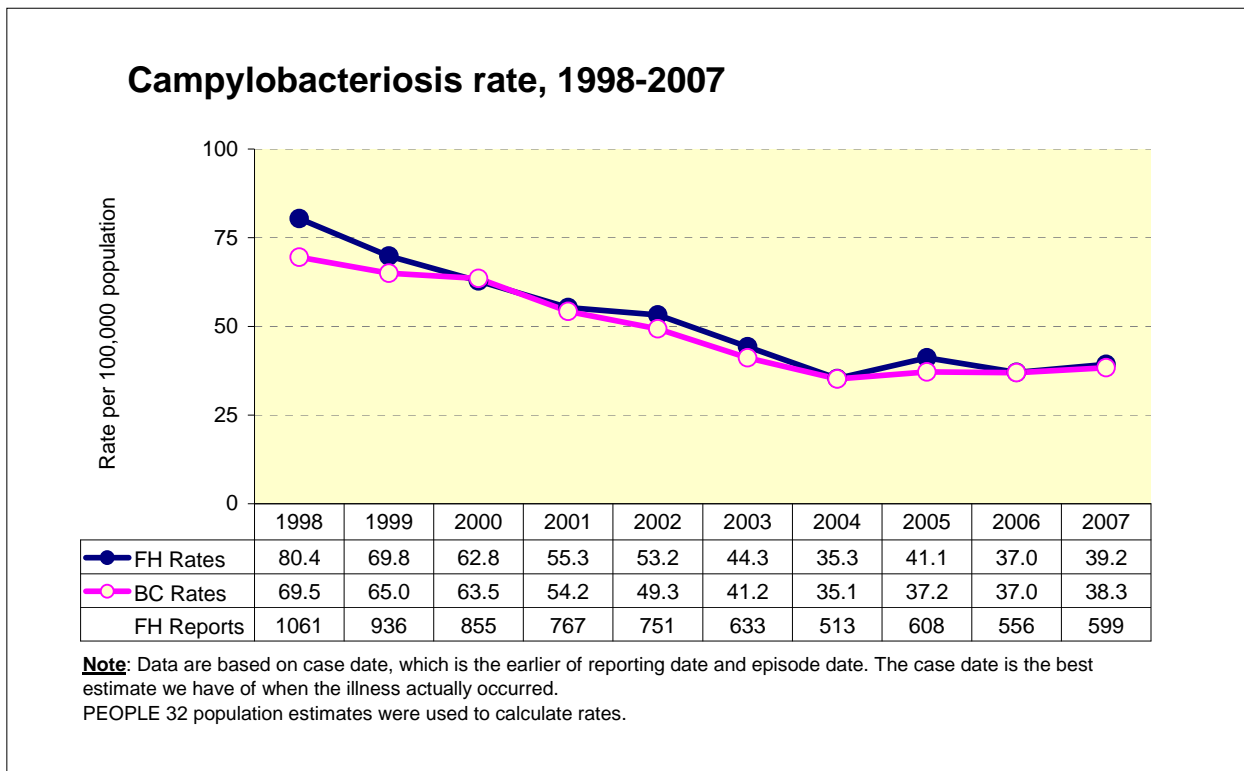
**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.  
 PEOPLE 32 population estimates were used to calculate rates.

# Campylobacteriosis

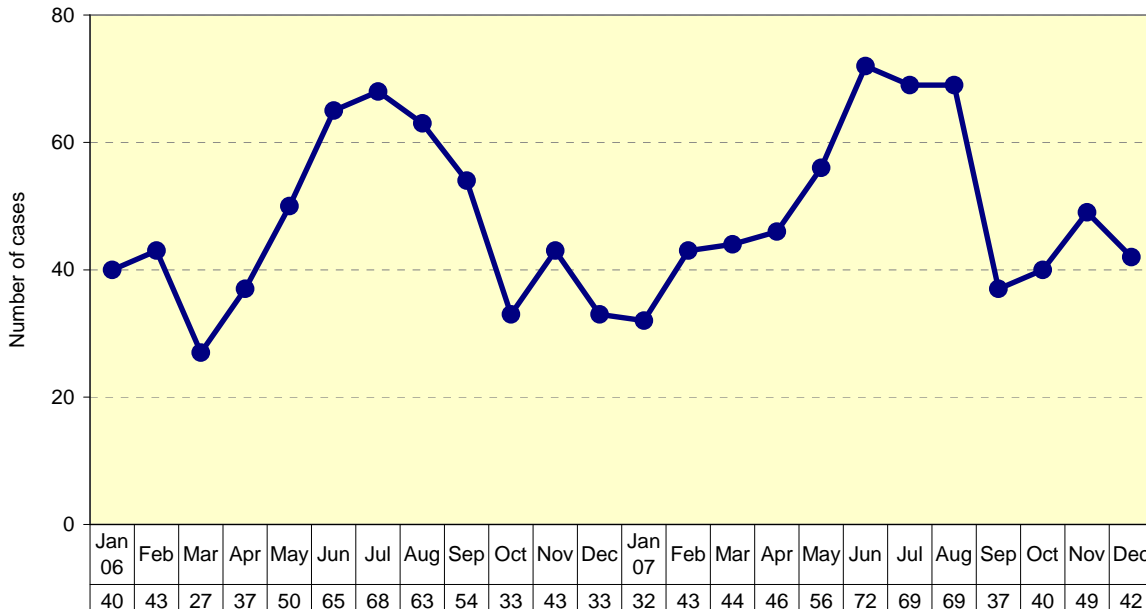
**Campylobacter** is a bacterial disease causing diarrhea of variable severity, frequently with bloody stools, usually lasting for less than one week. Prolonged illness and/or relapses may occur in adults. Post-infectious complications of *Campylobacter* may include reactive arthritis, febrile convulsions, or Guillain-Barré syndrome. Cases may mimic acute appendicitis or inflammatory bowel disease. Symptoms are usually self-limited and many cases are asymptomatic. *Campylobacter* is most often transmitted by contaminated food or water. Both outbreak-related and sporadic cases of campylobacteriosis occur, with most sporadic cases occurring during the warmer summer months.

Proper food-handling practices in the home are key to preventing *Campylobacter* infections. Regulatory food safety activities also contribute to prevention of campylobacteriosis.

The number of lab-reported cases of campylobacteriosis was 599 in 2007, slightly up from 556 in 2006 and close to the number in 2005. This suggests that a declining trend that had been observed since 1998 is leveling off. Although the decline is considered to reflect an overall reduction in illness due to *Campylobacter* infection, some of the decline is also thought to be due to provincial laboratory testing guidelines introduced in 1998 that recommended against stool testing in people with mild to moderate diarrhea lasting less than seven days. These guidelines are scheduled for an update in 2008.



***Campylobacter* cases by month  
Fraser Health, 2006-2007**

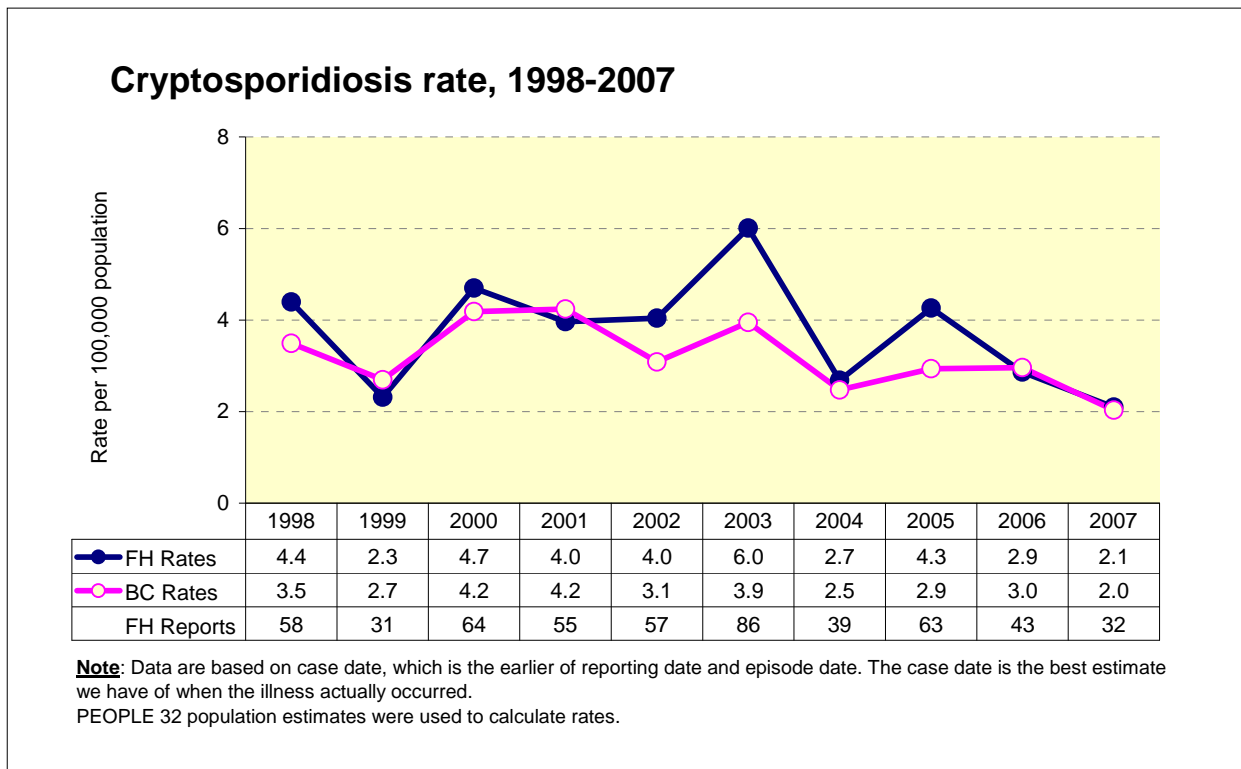


# Cryptosporidiosis

***Cryptosporidium* is an intestinal parasite that causes diarrhea. Infections can be severe and even life-threatening in people who are immune-compromised. *Cryptosporidium* is usually transmitted by food or water that contains *Cryptosporidium* cysts. People who are immune-compromised should always use water that has been boiled or treated using special filters designed to remove parasitic cysts.**

Cryptosporidiosis reports dropped to 32 in 2007, down from 43 cases in 2006 and 63 in 2005. The 2003 peak in Fraser Health was due to two swimming pool outbreaks. The annual number of cryptosporidiosis cases across the province is quite stable year-to-year, except in 1996 when large outbreaks caused by contaminated municipal drinking water systems occurred in Cranbrook and Kelowna. A smaller outbreak affected Chilliwack in 1998. Since then, ground water is used exclusively in Chilliwack (and Chilliwack water has been rated amongst the best in Canada). The Fraser Health ten-year rate is just slightly over the BC rate.

*Cryptosporidium* can be transmitted through eating contaminated food, or by swallowing water while swimming or drinking surface or other contaminated water. *Cryptosporidium* cysts are not killed by chlorination that is used to treat drinking water, unless the chlorination is combined with another type of water treatment. Water contaminated with *Cryptosporidium* cysts can be treated by ozone and chlorine combined, filtration followed by chlorination, filtration that removes all particles one micron or greater, ultraviolet radiation or boiling for at least one minute.

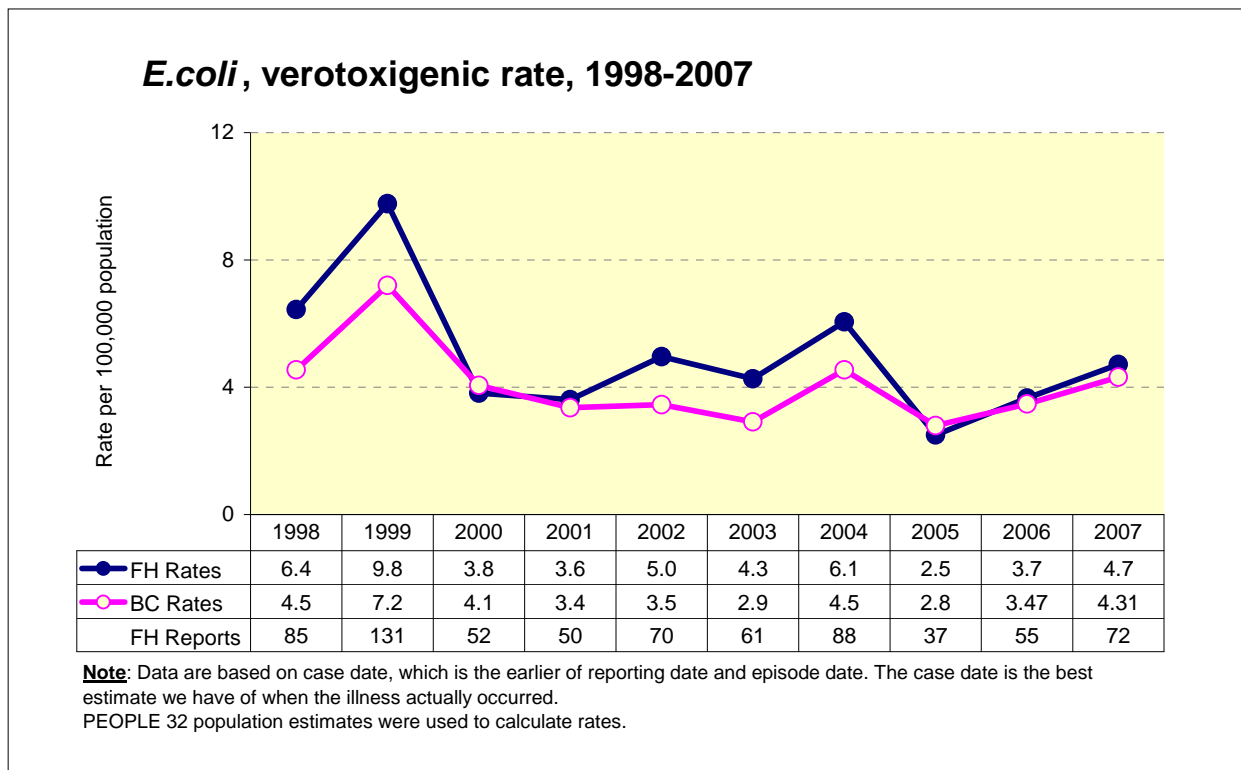


## E. coli Infection, verotoxigenic

**Verotoxigenic *E. coli* bacteria (mostly the 0157:H7 strain) can cause a bloody diarrheal illness. This is sometimes referred to as “hamburger disease”.** Especially in young children, this can lead to haemolytic-uremic syndrome (HUS) which, when severe, can result in kidney and/or brain damage and even death. Sporadic (single, isolated) cases occur due to fecal-oral spread, either through direct exposure such as in daycare settings, or by consuming contaminated food or water. Contact with livestock (e.g., farm animals, petting zoos) is also a significant factor in verotoxigenic *E. coli* infection. A greater proportion of cases occur during the summer months.

Undercooked hamburger and cross-contamination in the kitchen between raw hamburger or raw meat juices and other non-cooked food items are common exposures. Foods like lettuce, sprouts, raw milk, and unpasteurized juices can also be contaminated by manure used as fertilizer. Such contaminated foods, as well as contaminated water sources, have caused large, widespread outbreaks of verotoxigenic *E. coli* disease.

The number of cases and rates of verotoxigenic *E. coli* infections in Fraser Health and across BC increased slightly in 2007 compared to 2005 and 2006. The Fraser Health rates drive the provincial rates and are consistently higher than the BC and Canadian averages. The urban/rural mix in Fraser Health may account for some of this difference.



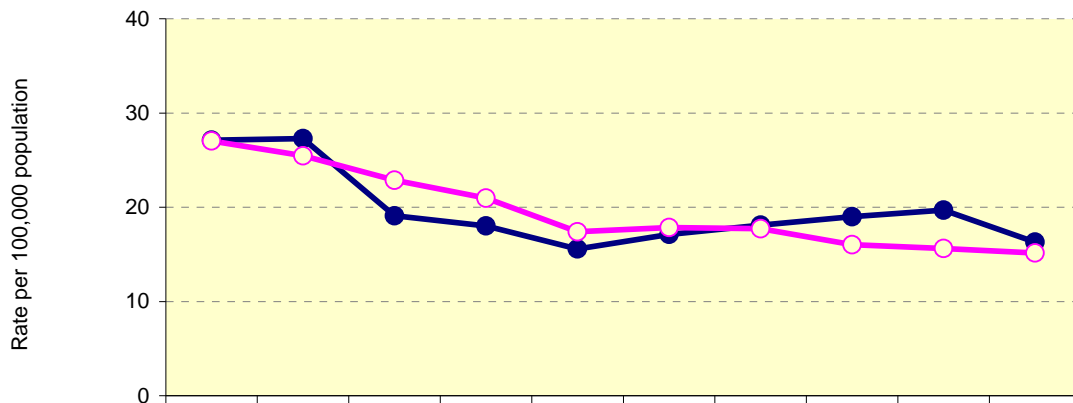
## Giardiasis

**Giardiasis is caused by a parasite called *Giardia lamblia*. Humans are the most likely to be infected, but *Giardia* can also infect dogs, cats, beavers, cattle and other animals.** Infection with *Giardia* may cause no symptoms at all or may cause off-and-on bouts of watery diarrhea with abdominal pain. Infection usually clears in a few weeks, but some people need treatment to prevent relapses or development of a carrier state. Giardiasis can also cause chronic diarrhea with cramping, bloating, and loose pale greasy stools, with fat malabsorption, weight loss, fatigue and sometimes reactive arthritis. People with HIV infection and others who are immune-compromised may have more severe and prolonged giardiasis. Diagnosis is usually made by identifying cysts or trophozoites in diarrheal stool, although, because *Giardia* is shed intermittently, three negative samples taken on alternate days are needed to rule out *Giardia* infection. On the other hand, because not everyone with *Giardia* has symptoms, a positive test for *Giardia* does not necessarily mean that the *Giardia* is causing a person's symptoms.

Giardiasis is commonly acquired by direct contact. This can be from infected animal to person, as in petting zoos, or from an infected person to another person, as in daycare settings or through fecal-oral sex. *Giardia* can also be acquired through eating contaminated food, by swallowing water while swimming or by drinking surface or other contaminated water. *Giardia* cysts are not killed by chlorination used to treat drinking water unless it is combined with another type of water treatment. Water contaminated with *Giardia* cysts can be treated by ozone and chlorine combined, filtration followed by chlorination, filtration that removes all particles of one micron or greater, ultraviolet radiation or boiling for at least one minute.

Giardiasis is common and often not diagnosed, in part because it does not always cause symptoms. In 2007, 249 people in Fraser Health were diagnosed with giardiasis, down somewhat from 296 in 2006. Since giardiasis is not routinely followed up in Fraser Health, there is no information on how these particular people may have acquired their infections. Of note, a substantial proportion of Fraser Health reports for *Giardia* infection are from a Vancouver clinic specializing in health screening of recent immigrants to Canada.

## Giardiasis rate, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
● FH Rates	27.1	27.3	19.1	18.0	15.6	17.1	18.1	19.0	19.7	16.3
○ BC Rates	27.0	25.5	22.9	21.0	17.4	17.9	17.7	16.0	15.6	15.2
FH Reports	358	366	260	250	220	245	263	281	296	249

**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.

PEOPLE 32 population estimates were used to calculate rates.

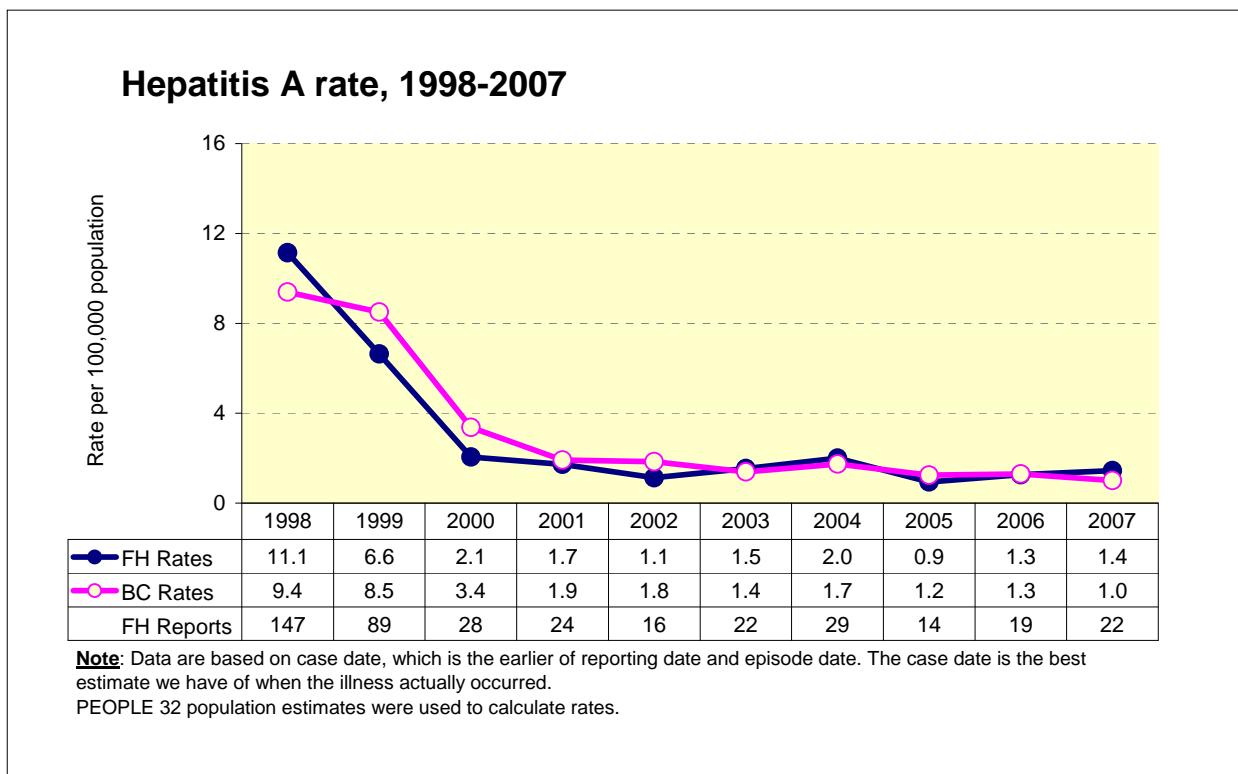
# Hepatitis A

**Hepatitis A is an acute self-limited viral infection of the liver transmitted via contaminated food or water.** The disease usually begins suddenly and lasts a few weeks with nausea, vomiting and jaundice. Although chronic infection does not occur, the acute illness can be serious and even fatal, especially for people with pre-existing liver disease such as those with chronic hepatitis C.

The BC provincial hepatitis A rate was consistently higher than the national rate until more targeted and widespread hepatitis A immunization occurred in 1998-99. The BC hepatitis A rate now approximates the national rate.

The number of hepatitis A cases in Fraser Health was 22 in 2007, consistent with the overall downward trend that started after 1998. Most hepatitis A in Fraser Health occurs in travelers to areas outside of Canada who did not get vaccinated against hepatitis A prior to travel.

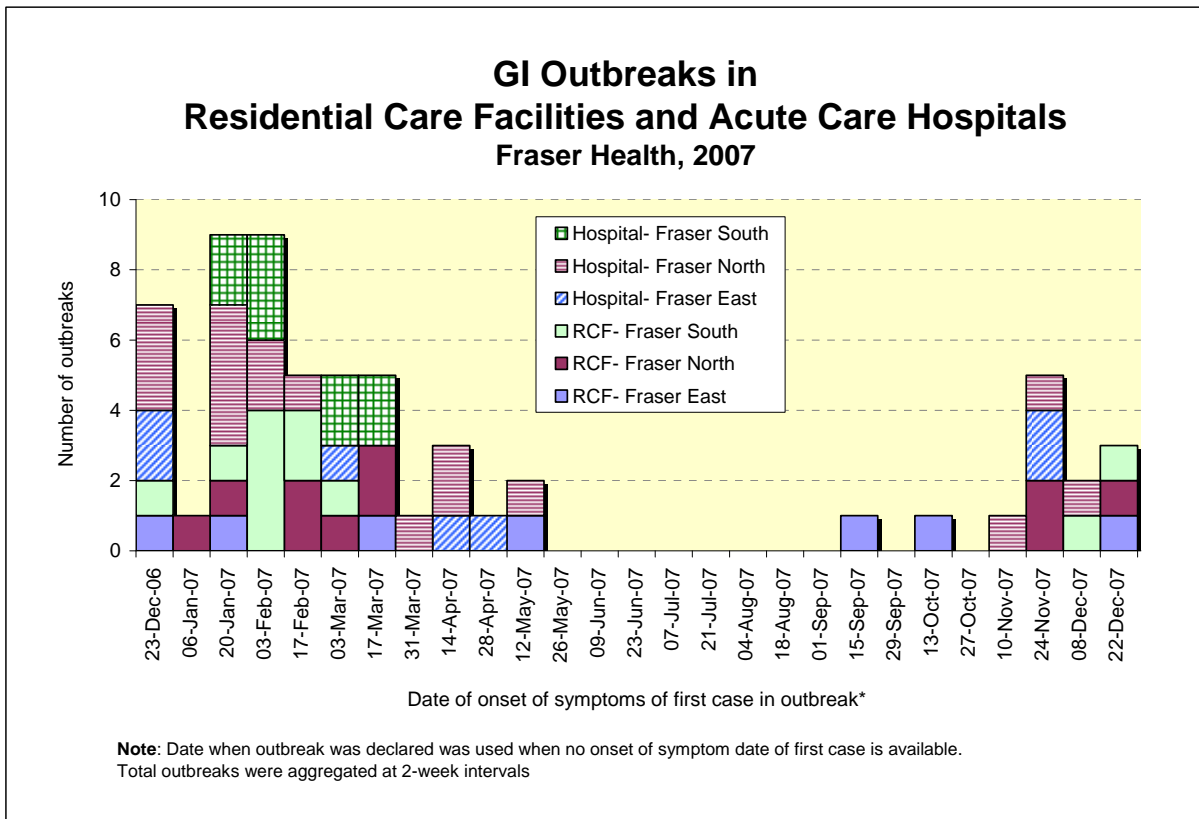
In 2007, two cases of hepatitis A in food handlers at newly-opened restaurants resulted in large follow-up efforts to provide hepatitis A vaccine (or immunoglobulin when indicated to patrons who may have been exposed). No related cases were detected. The food handlers did not acquire their illness locally. Good food-handling practices and cooperation response on the part of the restaurants contributed to the prevention of transmission of illness to patrons or other staff members.



# Norovirus

**Norovirus (Norwalk virus, Norwalk-like virus, small round particle virus) is a highly-infectious, very hardy virus that causes repeated episodes of diarrhea and projectile vomiting (“winter vomiting disease”).** Norovirus is transmitted by direct contact, through contaminated food, water, and frequently-touched surfaces, and by droplets from vomiting, diarrhea and toilet flushing. As few as 1 to 10 virus particles (or virions) can cause infection and illness. It takes between 10 to 50 hours from exposure until symptoms develop. Illness can last up to 10 days, but averages 1 to 3 days. Immunity to norovirus is strain-specific and lasts only a few months, although reinfections within a month or two are milder. Hand-washing and sanitizing of surfaces with household bleach freshly mixed 1:50 with water or using accelerated hydrogen peroxide are essential in stopping the transmission of norovirus.

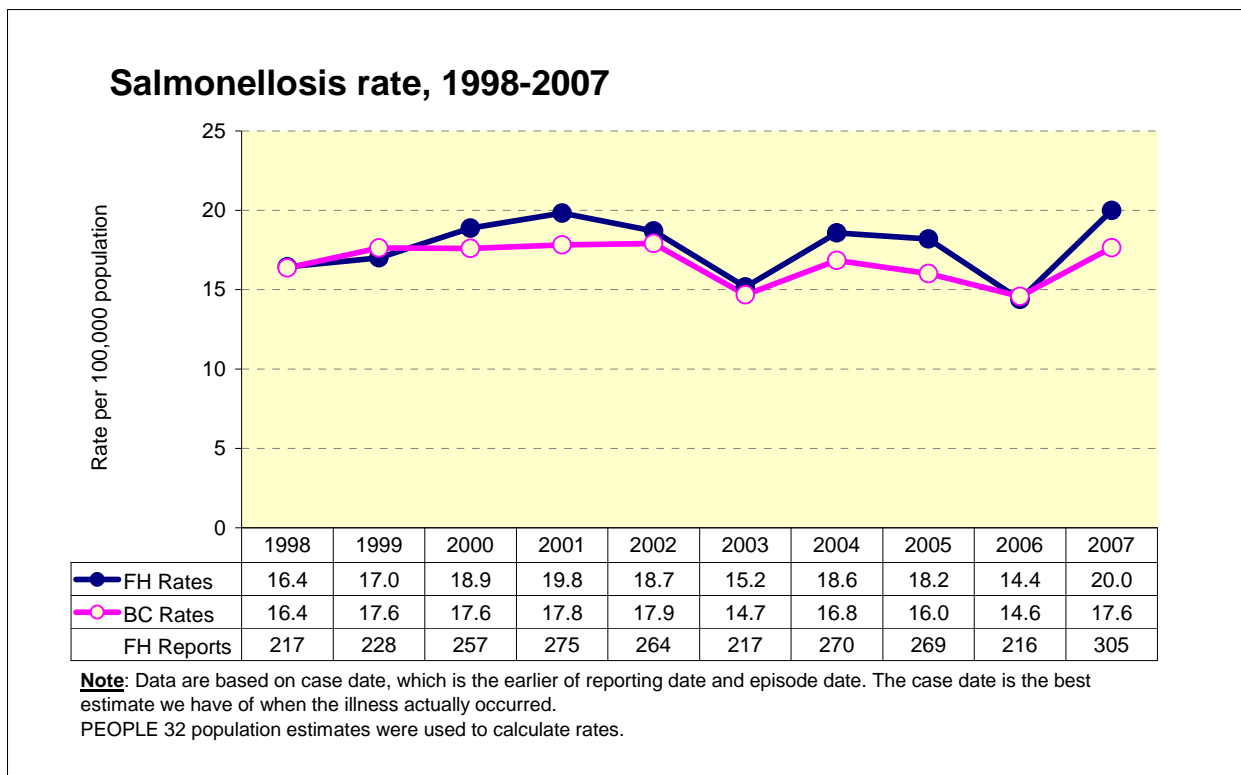
Norovirus activity was greatest from late 2006 through mid-March 2007. Between 23 December 2006 and 22 December 2007, Fraser Health dealt with 28 gastrointestinal outbreaks in community residential care facilities and 32 in Fraser Health operated hospitals (14 in residential care and 18 in acute care) and consulted in one at Riverview Hospital). Norovirus was suspected or identified as the causative agent for almost all of the outbreaks. Rotavirus and Norovirus were identified in one outbreak. There were also 18 reported gastrointestinal outbreaks in schools, preschools and daycares, 6 in independent or assisted living residences and 1 in a corrections facility.



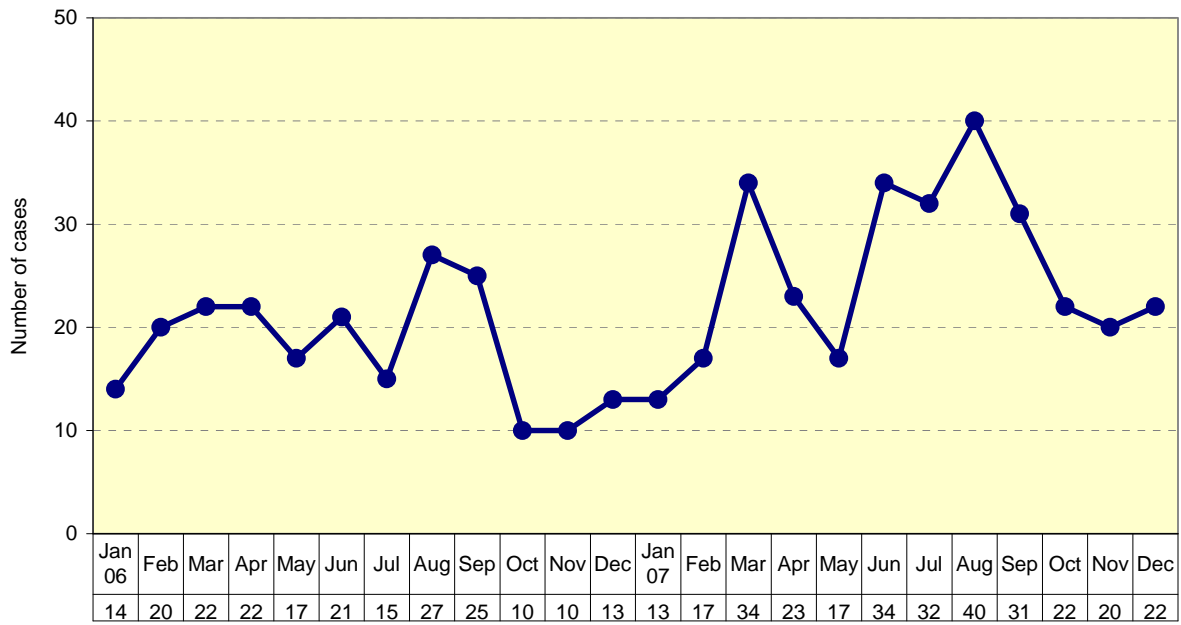
# Salmonellosis

**Salmonellosis is a bacterial infection that causes diarrhea.** Salmonella is commonly found in chickens (including raw poultry), amphibians and reptiles. It is sometimes found in raw eggs, raw milk and dried natural pet dog treats such as pigs' ears and jerky. Most cases of salmonella are sporadic, but occasional larger clusters or outbreaks occur, often related to contaminated ready-to-eat, commercially-sold food products.

The long-term rates of salmonellosis in Fraser Health are fairly stable at a level slightly above the BC average. There were 305 infections in Fraser Health residents in 2007. In 2007, an increase in a specific type of salmonella infection that had been observed in central Canada appeared in BC, peaking in the summer months. The increase was over and above the background rate of reported salmonella infection and explains the increase from 216 cases in 2006 to 305 in 2007, the most reported cases in 10 years. Enhanced case report forms will be used in 2008 to help identify the source or sources.



**Salmonella cases by month  
Fraser Health, 2006-2007**

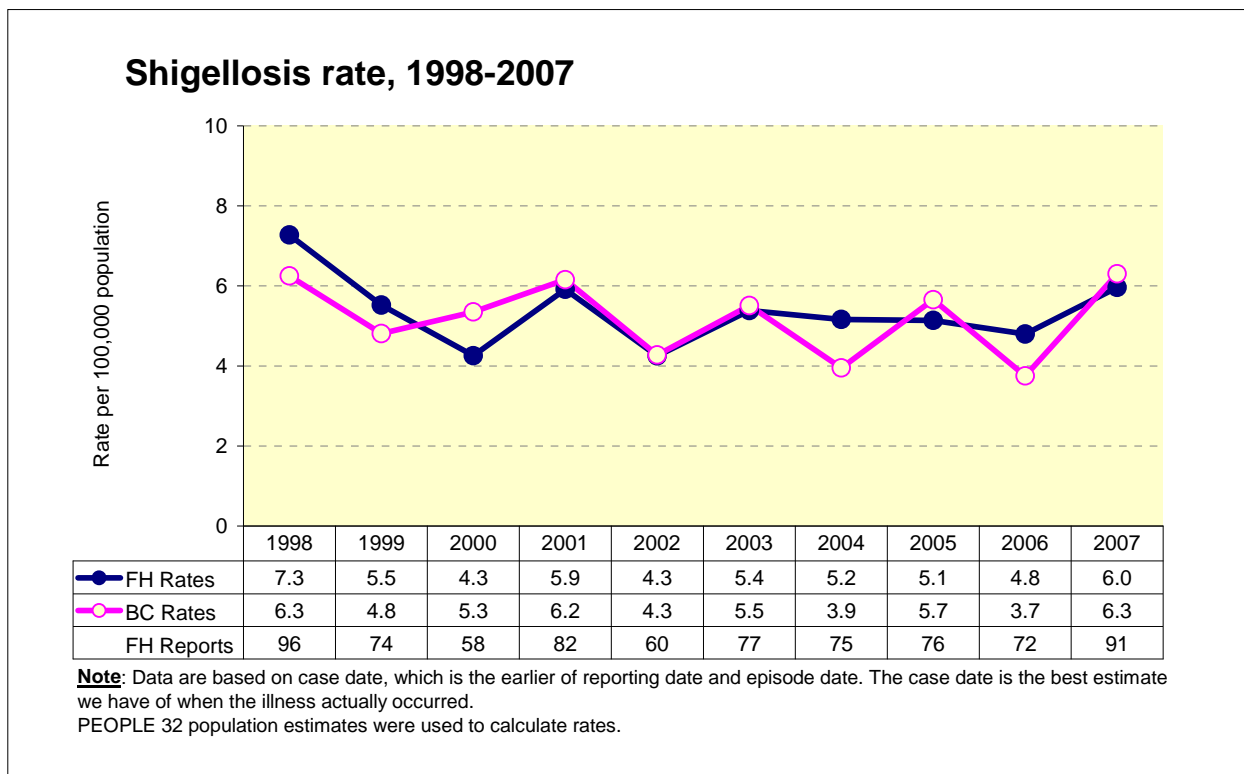


# Shigellosis

**Shigellosis, formerly known as “bacillary dysentery,” is an uncommon bacterial disease that causes bloody diarrhea. The disease affects only humans.** Spread is fecal-oral, either through contaminated food, contaminated water, contaminated objects or sexual practices.

The number of Fraser Health cases in 2006 was 72, similar to the 75 cases seen in 2004 and 2005. The long-term BC and Canadian trend-lines are downwards, with year-to-year variation.

The major control measures are follow-up of cases to ensure good hygiene in order to minimize risk to close household contacts, and having affected food handlers and people working in other sensitive occupations stay away from work until their illness has passed.

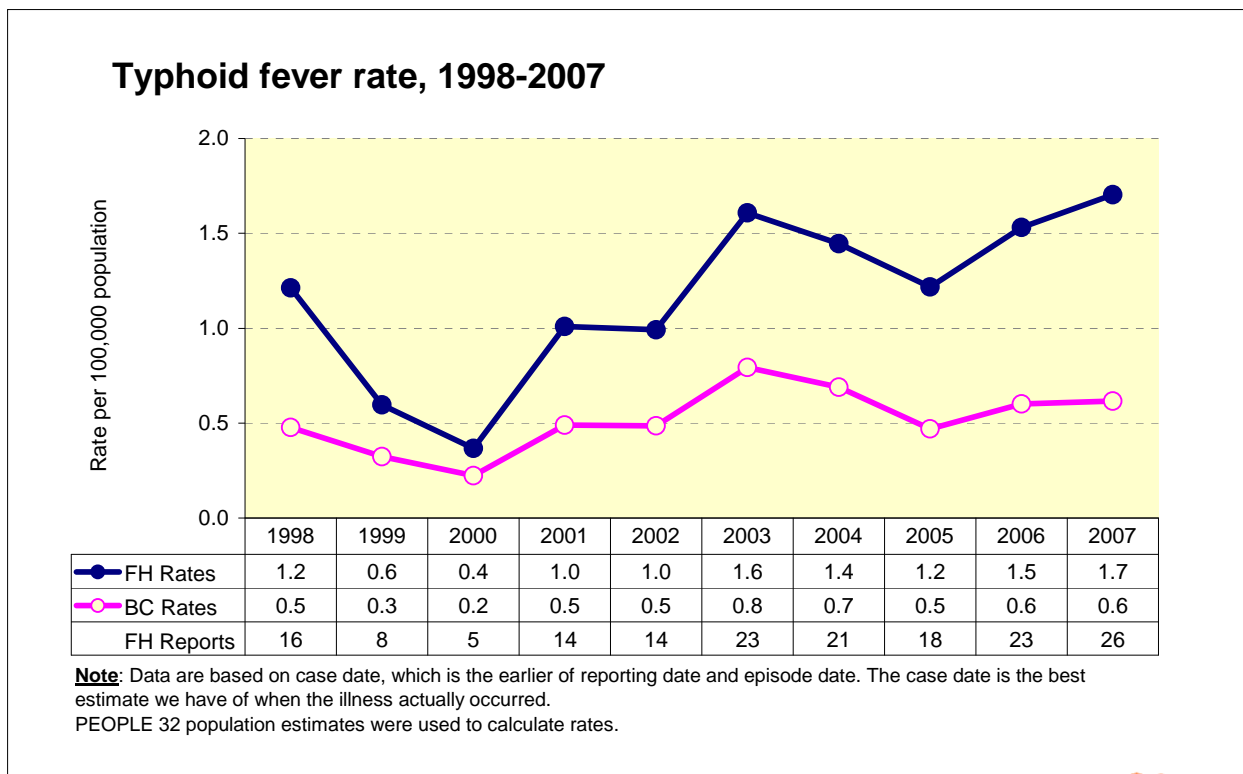


# Typhoid Fever

**Typhoid fever is a serious disease affecting only humans. It is caused by the bacteria *Salmonella Typhi*.** Symptoms include constipation, which is more common than diarrhea, high fever, headache, tiredness, loss of appetite, dizziness and a rash. The disease can cause bleeding in the bowel. Early treatment with antibiotics reduces the risk of serious illness or death.

Typhoid is spread by food or drink that has become contaminated with *Salmonella Typhi* usually through contact with hands that were not washed properly after using the bathroom. The bacteria are carried in the bowel movements and urine. Some people may continue to carry the bacteria in their bowel movements and urine even after they recover and can then pass on the bacteria to others. *Salmonella Typhi* is more common in developing countries. Hand washing and avoiding contaminated food and drink when traveling abroad is very important. There are also vaccines that help further reduce the chance of coming down with typhoid fever.

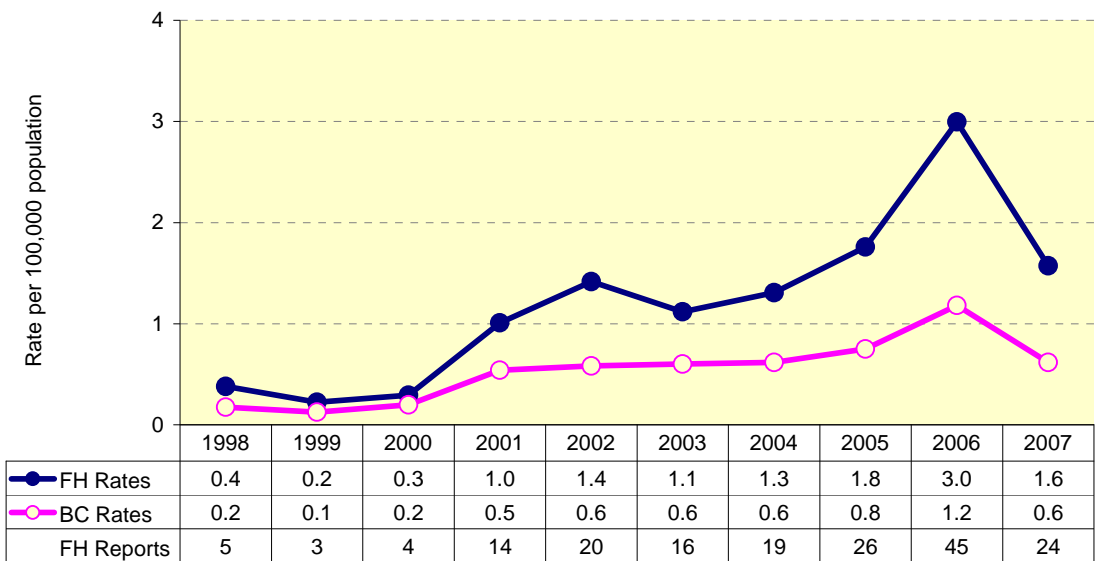
The rate of typhoid fever in Fraser Health is considerably higher than the BC rate, and has been increasing since 2000. Fraser Health has a large Indo-Canadian population, members of which frequently travel to India each year between the months of October and March. The majority of our typhoid cases are reported in the early spring each year. Most cases of typhoid reported in Fraser Health and in Canada are among travellers returning from developing countries. There were 26 cases of typhoid fever in Fraser Health in 2007. In Fraser Health, travel-related cases are seen mainly in Fraser East and Fraser South, as a result of travel to India. Person-to-person spread or any form of sustained transmission has been successfully averted. Follow-up of reported cases, exclusion of cases and close contacts from commercial food-handling and other sensitive occupations until stools are clear of the bacteria contribute to the prevention of secondary cases.



# Paratyphoid Fever

**Paratyphoid fever is also a serious disease mainly affecting humans. It is caused by the bacteria *Salmonella Paratyphi* and is spread in ways similar to typhoid.** Generally, paratyphoid fever is reported as somewhat less likely than typhoid fever to cause severe illness, though there are exceptions. In 2007, there were 24 reported cases of paratyphoid fever in Fraser Health. Similar exposures in travel explain the higher than BC average rate of typhoid fever and paratyphoid fever in Fraser Health. There is no specific vaccine available and recommended to protect against paratyphoid fever. Studies have documented a level of crossover protection from oral typhoid vaccine, but not as good as for typhoid fever.

**Paratyphoid fever rate, 1998-2007**



**Note:** Data are based on case date, which is the earlier of reporting date and episode date. The case date is the best estimate we have of when the illness actually occurred.  
 PEOPLE 32 population estimates were used to calculate rates.

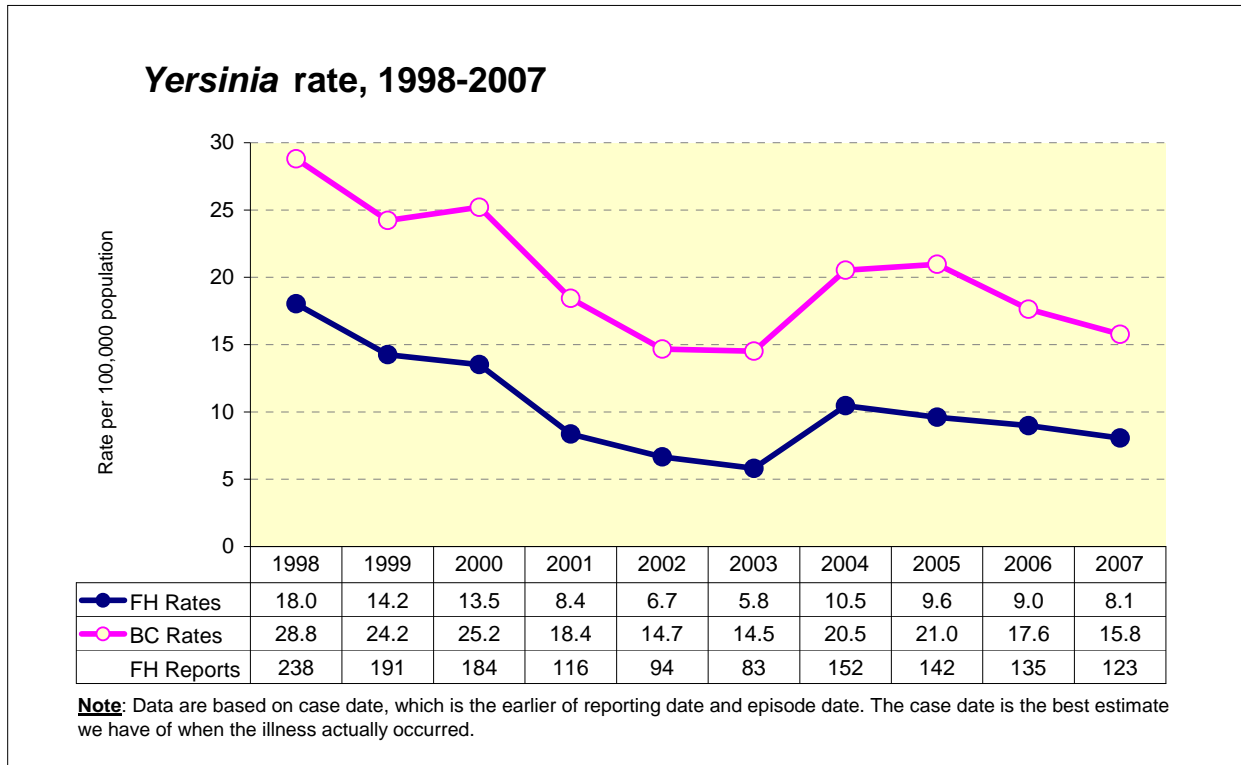
# Yersinia

Infections with the bacteria *Yersinia pseudotuberculosis* and *Yersinia enterocolitica* cause diarrhea that is often bloody. Symptoms also include fever and swollen glands in the abdomen that can sometimes mimic appendicitis. The most common post-infectious complications of *Yersinia* infection are erythema nodosum, which is patchy inflammation of subcutaneous fat tissue and reactive arthritis. Diagnosis of *Yersinia* infection is usually made through stool culture.

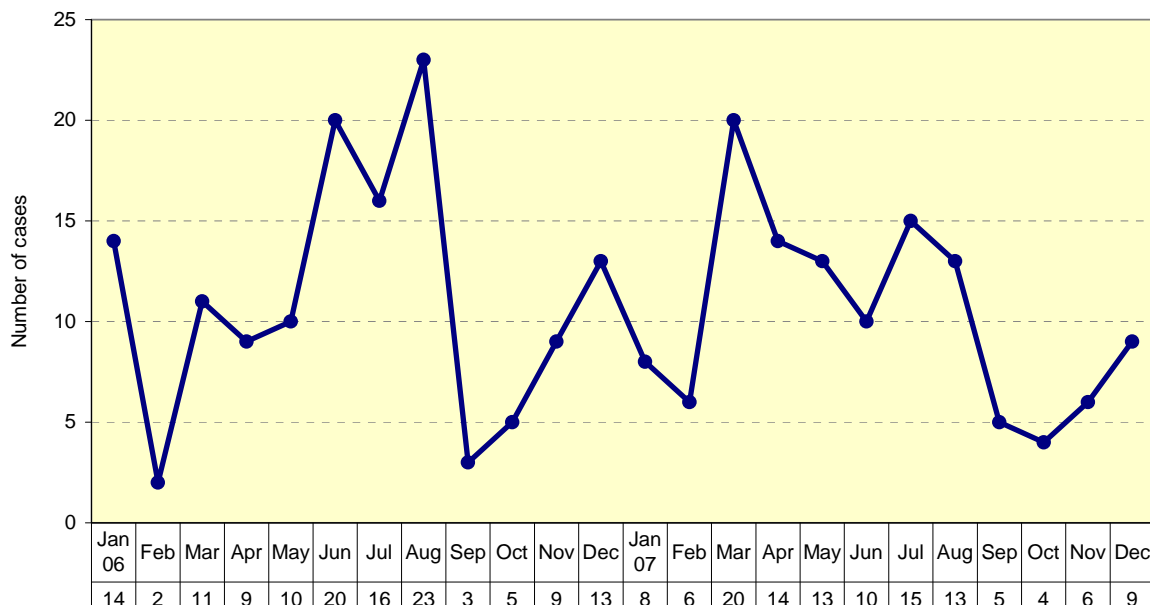
Yersiniosis is transmitted through contaminated food and water, as well as by direct contact, and is often linked to having eaten raw or undercooked pork or having consumed unpasteurized or contaminated milk.

In British Columbia, the stool culture technique for *Yersinia* varies between local laboratories, with almost all positive *Yersinia* cultures being reported by the laboratory that does a special 10-day cold enrichment of the culture plates.

In 2007, 123 Fraser Health residents were diagnosed with yersiniosis, down from 2004-2006 and lower than the 10 year average. Because *Yersinia* infection is not routinely followed up in Fraser Health, there is no information indicating how these people may have acquired their infections.



### Yersinia cases by month Fraser Health, 2006-2007



# Vector-borne and other Zoonotic Diseases

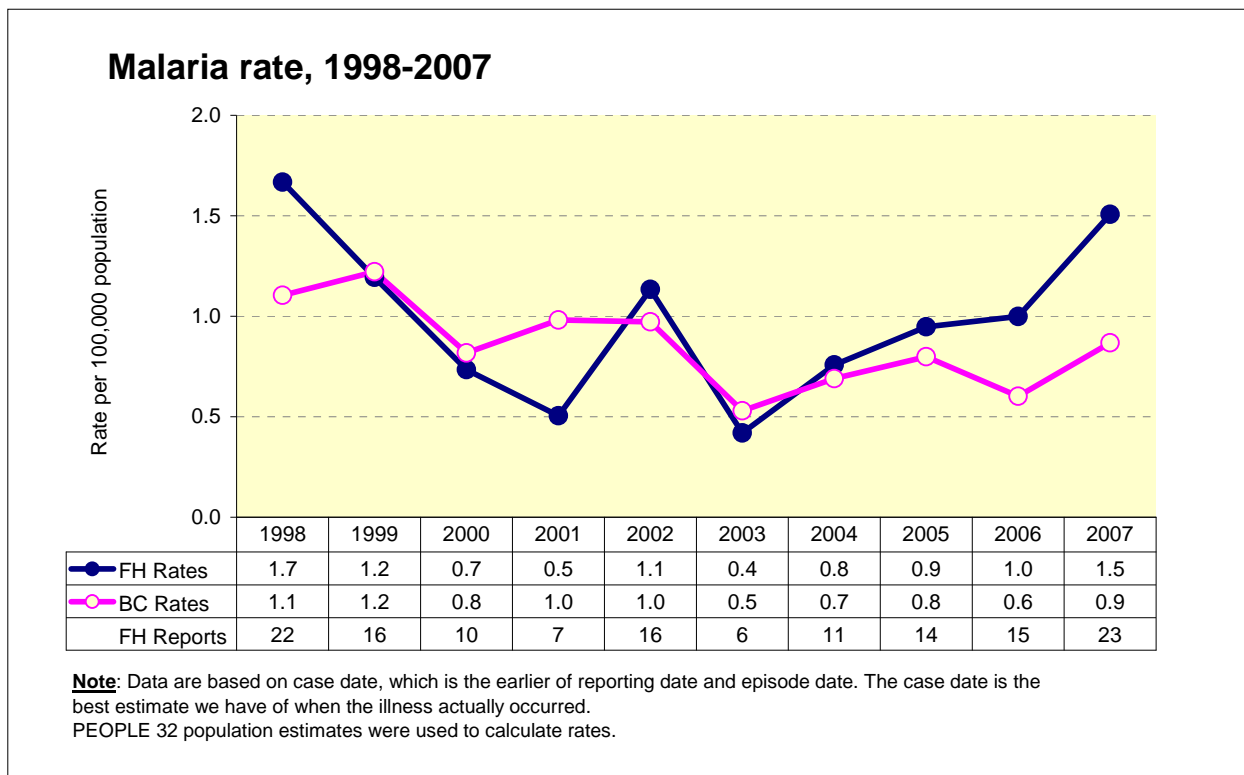
Notes:

*Numbers for previous years may slightly differ because of subsequent corrections to the database.  
Rates of rare diseases may be changed considerably by differences of only a few cases.*

# Malaria

**Malaria is a mosquito-borne illness acquired outside of Canada. It is seen in Canadians who have travelled abroad and as recurrences in new immigrants. Adequate numbers of the mosquito vector for malaria are not present in Canada to be a factor in spread. All travelers to places in the world where malaria is present are at risk of malaria infection and should take appropriate steps, including prophylactic anti-malarial medication, to avoid becoming infected with this mosquito-borne parasite.**

Travel to India accounts for the largest proportion of reported malaria cases in BC. There were 23 cases of malaria in Fraser Health in 2007, up from 15 cases in 2006. A peak incidence of cases occurred in BC 1995-97, due largely to increased malarial transmission in India. Some of the subsequent decline since then may be due to better pre-travel health counseling and malarial prophylaxis, but a larger portion is likely due to better malaria control in India.



# Rabies

**Rabies virus causes infections in humans that target the nerves and brain.** Such infections are fatal, with the notable exception of one young Wisconsin woman in 2004, who was aggressively treated with induced coma, a neuroprotective agent (ketamine), two antivirals, and bioppterin (a B vitamin that appears to be depleted in rabies infection). She recovered with normal cognitive function, continues to get excellent grades in high school and is hoping to become a veterinarian. Subsequent attempts to repeat her treatment have been unsuccessful, although some of the attempts did not use all the drugs involved or otherwise varied the regime.

Rabies virus is transmitted to humans through contact with an infected animal. While the rabies virus can infect any mammal, bats are the only animal species in BC in which rabies is consistently present. Over the past 10 years, 10-15% of the bats submitted for testing in BC because they have had interactions with humans have been positive for the virus. In 2006, 4% of 23 bats submitted for testing were positive for rabies compared to 19% of submitted bats in 2005. Overall, it is estimated that about 1% of all bats, and 10% of bats that are incautious enough to interact with people or pets, are positive for rabies.

Because of evidence that bat scratches and bites may go unnoticed, any human contact with a bat, including finding a bat in any building where humans live or work, should be assessed to see if there could have been any possible exposure to the rabies virus.

Bats that have been in contact with humans should be captured and submitted for rabies testing, because people who have been exposed to a bat can avoid rabies post-exposure prophylaxis (RPEP) if it can be determined that the bat to which they were exposed did not have rabies.

In eastern Canada and the US, skunks and raccoons can have rabies. Dogs in India, Mexico and many developing countries can also carry rabies. Domestic animals can also be infected if they are in contact with rabid wild animals. Any bite or other exposure to a domestic animal displaying abnormal behaviour, a wild animal, or any animal (domestic or wild) in a developing country should be assessed for risk of rabies, preferably by the local public health service who will have the best information on rabies in that location. Highly effective rabies post-exposure prophylaxis (RPEP), a series of six or more injections with rabies immune globulin and rabies vaccine is given over five visits to those people assessed to be at risk of exposure to the virus.

In Fraser Health in 2007, 338 reports of animal exposures were received, resulting in RPEP recommendation for 158 people. Of the 338 animal exposures in 2007, 173 involved a bat, 72 a dog, 53 a cat, 6 a monkey, 10 a raccoon or skunk and 24 involved other animals. Of the animals sent for testing, one cat and 5 bats tested positive for rabies. In 2006, there were 252 reports of animal exposures resulting in 88 people receiving RPEP and in 2005, 269 animal exposures resulting in 87 people receiving RPEP. Of the 252 animal exposures in 2006, bats were involved in 99 and dogs in 88. Of the 52 animals sent for testing, only one, a bat, proved to be positive for rabies. In 2005, of the 269 reports, bats were involved in 124 and dogs in 87; 68 animals were sent for testing and twelve, all bats, proved to be positive for rabies.

Rabies in any animal other than a bat is extremely rare in BC, especially in a domestic animal. 2007 was unusual in that a cat in Maple Ridge was confirmed as having bat-variant rabies

virus. Twenty-one individuals received RPEP because of significant contact with the cat. This was the first animal other than a bat to test positive for rabies in the Fraser Health area in over 15 years.

There were no human cases of rabies reported in 2007 in BC.

## West Nile Virus

**West Nile virus (WNV) is a mosquito-borne virus that was first identified in Uganda in 1937 and historically has been found in parts of Southern Europe, the Middle East, Africa and Asia. The virus was introduced to North America in New York in 1999 and has since spread to all but one (Alaska) of the 49 continental US states and to most of the Canadian provinces. It has not yet arrived in BC.**

West Nile virus is transmitted when an infected mosquito bites humans and other animals. Most people who become infected will experience no symptoms at all. For those who do become ill, the incubation period (time between being bitten by a WNV-infected mosquito and starting to show any signs or symptoms of WNV illness) ranges from 2 to 15 days.

About 20% of those infected will develop West Nile non-Neurological Syndrome (WN non-NS) which typically involves mild flu-like symptoms such as fever, headache and body aches lasting one week or less. Some people with WN non-NS may have a more severe illness and a prolonged recovery period. In about one in 150 cases, infection can cause West Nile Neurological Syndrome (WNNS), resulting in serious health effects such as meningitis (inflammation of the lining of the brain) or encephalitis (inflammation of the brain) and flaccid paralysis. A small percentage of cases will die from their infection. The very young and the elderly are most likely to develop illness when infected with WNV.

Fraser Health participates in a comprehensive program of preparedness for the arrival of WNV in BC. Mosquitoes are sampled for species identification and for WNV testing. Dead corvids (crows, jays, ravens and magpies), which are often an early warning of the arrival of the virus are collected and tested. A Fraser Health-wide telephone information line (1-888-WNV- LINE) allows the public to receive information about WNV and to report the sighting of dead corvids that can be used for testing. Provincial funding is available to enable local governments to monitor mosquito habitats and carry out mosquito larval control activities where needed. Fraser Health has a full-time WNV Coordinator and summer staff are employed to assist in surveillance activities.

WNV did not arrive in BC in 2007, and was not detected in any of the 394,047 tested mosquitoes or 746 tested corvids. Two hundred seven human blood donors in BC were also tested and no WNV was found. There were 19 cases of WNV in humans in BC in 2007, nine of whom were Fraser Health residents, but all of the cases acquired their infections outside of the province (during travel to one of the Prairie provinces). Ten cases had WN non-NS, eight had WNNS, and one was unclassified. British Columbia, the Yukon and Alaska remain the only areas of continental western North America still without evidence of WNV infection in birds, mosquitoes, humans or other mammals. There is still no reason to think WNV will not arrive in BC, and Fraser Health remains prepared.

2007 was the worst year yet for WNV in Canada. There were 2401 reported human infections and two deaths, a substantial increase from the 127 cases reported in 2006. The majority occurred in the Prairie provinces, in Saskatchewan in particular. WNV activity was also present in the three states bordering BC; Washington, Idaho and Montana. Washington State reported WNV activity in the environment, but no human cases. Idaho reported 132 human cases with one associated death. The United States reported a total of 3404 human cases in 2007.

### Reported Human Cases of West Nile Virus Infection

	2003	2004	2005	2006	2007
Fraser Health	3	0	0	0	9
BC	20	0	0	0	19
Canada	1,495 (14 <sup>1</sup> )	26 (1 <sup>1</sup> )	239 (13 <sup>1</sup> )	154 (3 <sup>1</sup> )	2,401 (186 <sup>1</sup> )

<sup>1</sup>: Number of asymptomatic infections (included in the total)

# Reportable Communicable Diseases in BC

April 2008

## SCHEDULE A: Reportable by all sources, including Laboratories

Acquired Immune Deficiency Syndrome

Anthrax

Botulism

Brucellosis

Cholera

Congenital Infections:

Toxoplasmosis

Rubella

Cytomegalovirus

Herpes Simplex

Varicella-Zoster

Hepatitis B Virus

Listeriosis and any other congenital infection

Creutzfeldt-Jacob Disease

Cryptococcus neoformans

Cryptosporidiosis

Cyclospora infection

Diffuse Lamellar Keratitis

Diphtheria:

Cases

Carriers

Encephalitis:

Post-infectious

Subacute sclerosing panencephalitis

Vaccine-related

Viral

Food-borne illness: all causes

Gastroenteritis epidemic:

Bacterial

Parasitic

Viral

Genital Chlamydia Infection

Giardiasis

H5 and H7 strain of the influenza virus

*Haemophilus influenzae* Disease:

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

Human Immunodeficiency Virus Infection

Invasive Group A Streptococcal Disease

Invasive *Streptococcus pneumoniae* Infection

Leprosy

Lyme Disease

Measles

Meningitis: All causes

(i) Bacterial:

Haemophilus

Pneumococcal

Other

(ii) Viral

Meningococcal Disease:

All Invasive

Including Primary Meningococcal Pneumonia and  
Primary Meningococcal Conjunctivitis

Mumps

Neonatal Group B Streptococcus Infection

Paralytic Shellfish Poisoning (PSP)

Pertussis (Whooping Cough)

Plague

Poliomyelitis

Rabies

R-eye Syndrome

Rubella

Congenital rubella syndrome

Severe Acute Respiratory Syndrome (SARS)

Smallpox

Tetanus

Transfusion Transmitted Infection

Tuberculosis

Tularemia

Typhoid Fever and Paratyphoid Fever

Venereal Disease:

Chancroid

Gonorrhea – all sites

Syphilis

Water-borne Illness - All causes

West Nile Virus Infection

Yellow Fever

## 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

Cryptococcus neoformans

Herpes Genitalis

Human Immunodeficiency Virus

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

2007