

## Measles in 2014 in British Columbia, Canada

Measles is a highly contagious, acute viral illness preventable by measles vaccine. With adoption of the measles elimination goal for the Pan American Health Organization region, BC introduced a two dose measles vaccination program for children in 1996. Canada has been free of endemic measles (defined as an identifiable chain of transmission lasting over 12 months) since 1998 and measles was declared eliminated in the Americas in 2002. However, measles cases and outbreaks continue to occur in Canada due to periodic importation.

### Measles trends in BC since 1987

BC experienced a large outbreak of measles in the first year following adoption of measles elimination goal, with 255 confirmed measles cases reported in 1997 associated with an outbreak at Simon Fraser University (see Appendix, Figure 1). Since 1998, BC has experienced 2 substantial outbreaks. The first and smaller outbreak which resulted in province-wide transmission occurred in 2010 and was associated with two separate importations during the Winter Olympic Games held in Vancouver. The second and substantially larger outbreak occurred in 2014, during which year 343 confirmed measles cases were reported and most of these were associated with an outbreak in a religious community that objects to vaccination.

### Measles in BC in 2014

Three hundred and forty three cases of confirmed measles were reported in BC in 2014.

#### Fraser East outbreak

A large outbreak consisting of 325 confirmed and 108 clinical cases occurred in Fraser East, with onset of rash ranging from late February to mid-June. All but 5 cases were among members of the Netherlands Reformed community which has low rates of vaccine acceptance. The true number of cases was likely higher due to under-reporting. The community was linked by travel to the Netherlands, where a large outbreak had begun in May 2013 and continued until March 2014, with over 2600 cases reported.

The epicenter of the outbreak was a school of about 360 students from kindergarten to grade 12, accounting for 248 (57%) of all cases including 13 lab confirmed cases.

Only 33 (8%) cases were laboratory confirmed, 292 (67%) were epidemiologically-linked ('confirmed') and 108 (25%) were clinical. Fifty-one percent of cases were male. Two percent of cases were among infants, 16% were 1 to 4 years old, 68% were 5 to 19, and 14% were 20 to 44 years old. Three cases were hospitalized, including one with encephalitis. None had a fatal outcome.

Genotype was determined to be D8 for 28 cases; of these, 27 were identical to the MVs/Taunton.GBR/27.12 sequence-variant, the same as the strain associated with the Netherlands outbreak, and 1 was 99.8% identical.

### Other measles activity in BC in 2014

There were 18 confirmed measles cases reported in 2014 that were not associated with the Fraser East outbreak.

Of these, 15 cases were confirmed by PCR (83%), 1 by IgM serology, and 2 were epidemiologically linked to a confirmed case (see Appendix, Table 1). These cases were reported from three regional Health Authorities: 14 (78%) in Vancouver Coastal, 3 (17%) in Fraser Health and 1 (6%) in Island Health. There were no measles cases reported in Interior or Northern Health in 2014. There were three infant cases (17%), one case (6%) was 1 to 4 years old, four cases (22%) were 5 to 19 years old, and ten cases (56%) were 20 years or older. Fifteen (83%) of the eighteen cases were male. Nine cases (50%) were unvaccinated against measles, 4 cases (22%) provided a verbal history of prior measles vaccination but no immunization record documenting the history, and 5 cases (28%) had unknown immunization history. Five cases were hospitalized: two infants and three adults. There were no fatal outcomes.

The genotype was determined for all 15 PCR confirmed cases; 14 cases were genotype B3 and 1 case was genotype D8.

Two cases were imported, and the remainder were deemed import-associated. All 14 genotype B3 cases were the MVi/Harare.ZWE/38.09 strain, which has been associated with travel to the Philippines. The one IgM confirmed case had travel history consistent with infection in the Philippines and was also likely B3. Both epidemiologically linked confirmed case were household contacts of PCR confirmed B3 cases. Only one PCR confirmed B3 case had travel history consistent with acquisition in the Philippines. Another PCR confirmed B3 case travelled to Alberta during their exposure period, while there was ongoing B3 measles activity in Alberta. Of the 12 PCR confirmed B3 cases without travel during their exposure period, only one had a known exposure, which was at a medical clinic.

The one Island Health case was PCR confirmed genotype D8. The genotype was identical to the MVs/Taunton.GBR/27.12 strain detected in the Fraser East outbreak. This case had rash onset in April (epidemiologic-week 14), which was during the Fraser East outbreak. However, the case had no known exposure to any of the outbreak cases. The case travelled to the United States during the exposure period although measles was not reported in locations visited during travel.

Three confirmed cases were reported among visitors to BC whose measles infection was diagnosed in BC and were infectious while in the province. No recognized transmissions occurred from these cases in BC. These were reported to their jurisdiction of residence and are not counted among the 18 cases described above.

### **Acknowledgements**

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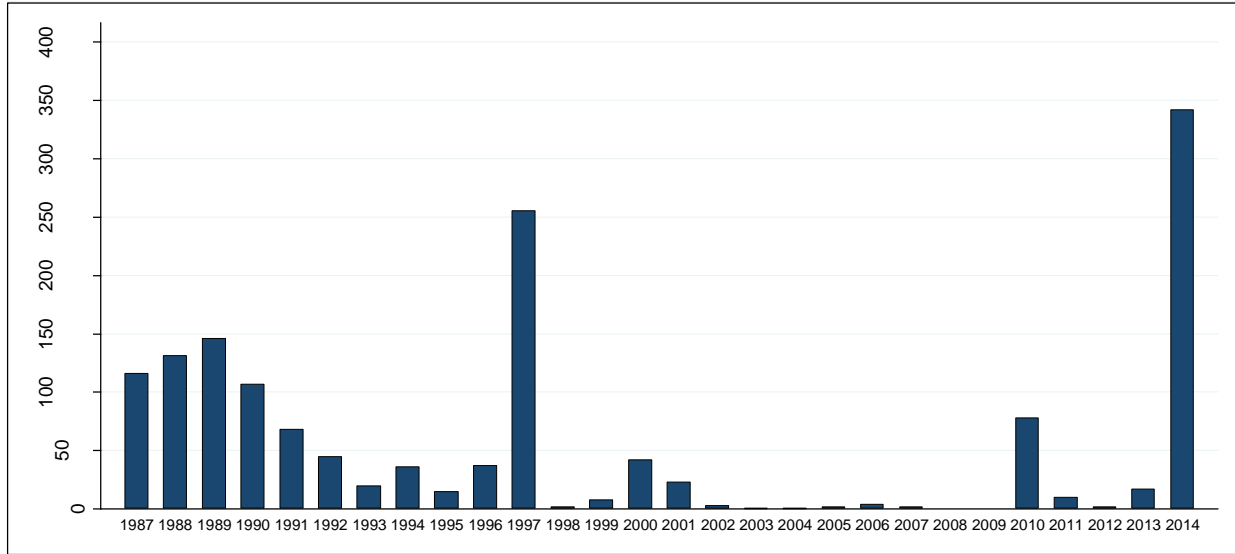
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**Note**

This report was originally issued on April 10, 2015. The report has been updated to include one additional epidemiologically confirmed case, which was not part of the Fraser East outbreak. The numbers and percentages in the 'Other measles activity in BC in 2014' section and in Table 1 have been updated to include the additional case.

**Appendix**



**Figure 1: Number of confirmed measles cases among residents of British Columbia, 1987 to 2014**

## Appendix (cont'd)

**Table 1: Characteristics of measles cases unassociated with the Fraser East outbreak, British Columbia, 2014**

Characteristic	Confirmed cases, N=18	
	n	(genotype) %
<b>Case status</b>		
PCR confirmed	15	83
IgM confirmed	1	6
Epidemiologically-linked confirmed	2	11
<b>Health Authority</b>		
Fraser Health	3	17
Vancouver Coastal	14	78
Island Health	1	6
<b>Age group (years)</b>		
<1	3	17
1 to 4	1	6
5 to 9	3	17
10 to 19	1	6
20 to 44	9	50
45+	1	6
<b>Sex</b>		
Male	15	83
Female	3	17
<b>Source of infection/ importation</b>		
Imported and infectious in BC	1	Philippines (B3) 6
Epidemiologically linked to an imported case	0	-
Returning traveler with measles infection acquired and resolved outside of Canada	1	Philippines (Unknown) 6
Unknown source	13	Total 72
	12	(B3)
	1	(D8)
Epidemiologically linked to unknown source case	3	17
<b>Objects to vaccination</b>		
No	10	56
Yes	4	22
Unknown	4	22
<b>Immunization history</b>		
Vaccinated (1 or 2 doses documented)	0	-
0 doses	9	50
Verbal history of vaccination (1 dose or 'childhood' vaccinations undocumented)	4	22
Unknown	5	28