

Measles Epidemiological Summary, British Columbia 2019 year to date – July 26th

Measles is a highly contagious, acute viral illness preventable by measles vaccine. 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. Notable recent outbreaks in British Columbia (BC) occurred in 2010 during the Winter Olympic Games held in Vancouver and associated with multiple importations including by visitors, and four years later in 2014 when 343 cases were reported, the majority in members of a religious community in the Fraser Valley that objects to vaccination. In 2018, nine cases of measles were reported; three of these cases were out of country residents visiting BC.

Measles in BC in 2019

As of July 26th, 31 confirmed cases of measles have been reported in 2019 amongst BC residents (Figure 1). None were linked to the measles outbreak in Washington State, with the epicentre in Clark County, which began January 1, 2019 and in which the date of the last confirmed case was March 18th.¹

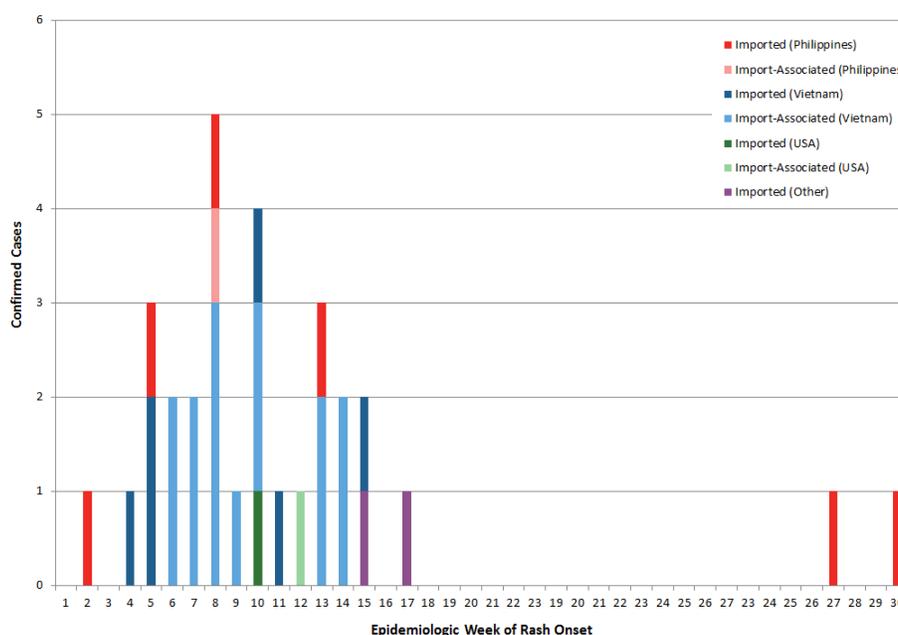


Figure 1: Confirmed cases of measles by epidemiological week, British Columbia, 2019 to July 26

The summary of 2019 BC measles cases below is in chronological order of occurrence.

Two cases with rash onset in January and one case in February were adults who acquired measles during travel to the Philippines, where a large measles outbreak is ongoing.² A separate case with no out-of-country travel occurred in February.³ While this case had no clear epidemiologic links to earlier BC cases, the measles virus genotype of all of these cases was B3.⁴

¹ For information on the measles outbreak in Clark County, Washington State: <https://www.clark.wa.gov/public-health/measles-investigation>

² For information on the measles outbreak in the Philippines: <https://travel.gc.ca/travelling/health-safety/travel-health-notice/195>

³ For exposure information from Vancouver Coastal Health: <http://www.vch.ca/about-us/news/news-releases>

⁴ Source: National Microbiology Laboratory, Public Health Agency of Canada

In a separate series of events beginning in late January, three school-age children who acquired measles infection while traveling in Vietnam returned to Vancouver. They developed symptoms immediately prior to travel or upon return, and resulted in transmission to 4 other students. An additional 6 cases were identified among those exposed in medical settings or households. The measles virus genotype associated with this outbreak was D8.⁴ As of April 3rd, a full maximal incubation period had elapsed since the date of onset rash in the last case in this outbreak, without additional cases being recognized; this is indicative of termination of transmission in this chain of events.

In an event unrelated to the above outbreak, a Canadian traveler returned from the Philippines to the Northwest Territories and transited through Vancouver International Airport, overnighing in Richmond from February 11th through 12th. This event is not counted as a BC case, but the event resulted in public notification about potential exposures; no recognized transmission occurred within BC.

In March, one measles case was reported in a resident of Interior Health Authority region, with travel history compatible with acquisition in the United States. A secondary case later occurred in a household contact. Genotype D8 was identified in the primary case, with a strain different from that identified in the Vancouver outbreak cluster. Separately in March, a measles case was confirmed in a resident of Fraser Health Authority with history compatible with acquisition in the Philippines.⁵ Genotype B3 was identified.

Spanning March and April, two related measles cases were confirmed in residents of Vancouver Island Health Authority (VIHA) whose travel history was compatible with acquisition in Vietnam. Genotype D8 of the same strain as identified in the earlier Vancouver school-related outbreak which had also originated through importation from Vietnam was confirmed from one of these cases, although no links to the Vancouver outbreak were identified. Four subsequent cases were confirmed in VIHA. None reported recent travel. Both timing of onset and identification of the same D8 genotype in all four cases were compatible with either acquisition from one of the earlier March VIHA cases despite lack of identified common settings of exposure, or from an unrecognized source.⁶

In April, three separate cases were confirmed with acquisition of measles occurring abroad. The first occurred in a Fraser Health Authority resident with acquisition in Vietnam and onset prior to departure from that country. This case was considered infectious during travel back to Canada and a public notification about potential in-flight and airport exposure was released.⁷ Genotype D8 was identified. The second case was a Vancouver Island resident with recent travel to several countries in Southeast Asia with genotype B3 identified. The third and most recently reported case was also a Vancouver Island resident with travel history consistent with measles acquisition in Japan. Genotype D8 was identified in this case.

In July, two separate imported cases were reported. The first was identified in a Vancouver Coastal Health resident at the beginning of July following recent travel to the Philippines. Potential acquisition could have occurred while visiting that country or from transmission from an ill passenger who was diagnosed with measles following their arrival in Manitoba. The BC case had been on board the same flight from Manila to Vancouver. Genotype B3 was identified. The second case reported at the end of July was a Fraser Health resident who had travel history consistent with acquisition in the Philippines. This case was considered

⁴ Source: National Microbiology Laboratory, Public Health Agency of Canada

⁵ For exposure information from Fraser Health Authority: <https://www.fraserhealth.ca/news/2019/Apr/new-confirmed-case-of-measles-in-lower-mainland#.XKUCJ8IKiUm>

⁶ For exposure information from Vancouver Island Health Authority: <https://www.islandhealth.ca/news/news-releases>

⁷ For flight exposure information from BCCDC: <http://www.bccdc.ca/measles-alert-japan-airlines-flight-from-tokyo-to-vancouver>

infectious while on a return flight to Vancouver, and a notification was released regarding this potential public exposure.⁸ Genotype information is pending.

A breakdown of the confirmed cases by demographic characteristics and vaccination history is provided in Table 1. [Geographic attribution](#) in epidemiologic reports is by place of residence, not by the location of the setting where measles infection was acquired. For vaccination history, undocumented doses are those for which a verbal history is provided without substantiating records. For information about measles vaccination recommendations in BC and interpretive information for Table 1, see Appendix.

Table 1: Characteristics of confirmed measles cases, British Columbia, 2019 to July 26

Characteristic	Confirmed Cases	
	n	(%)*
Age Group (years)		
<1	2	(6)
1 to 9	2	(6)
10 to 19	11	(35)
20 to 29	8	(26)
30 to 39	2	(6)
40 +	6	(19)
Sex		
Male	19	(61)
Female	12	(39)
Regional Health Authority		
Fraser Health	10	(32)
Interior Health	2	(6)
Northern Health	0	-
Vancouver Coastal Health	11	(35)
Vancouver Island Health	8	(26)
Vaccination History		
0 doses	11	(35)
1 dose undocumented	3	(10)
2 doses undocumented	5	(16)
1 dose documented	3	(10)
2 doses documented	9	(29)

*Percentages may not add up to 100% due to rounding

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⁸ For flight exposure information from BCCDC: <http://www.bccdc.ca/bccdc-issues-alert-about-passenger-with-measles-on-flight-from-manila-that-landed-at-yvr-on-july-23-2019>

APPENDIX.

Two doses of the measles, mumps and rubella (MMR) vaccine are recommended for individuals born after 1970 and healthcare workers born after 1957 to provide protection against measles. The routine childhood schedule for BC children is: 1st dose at 12 months of age, and 2nd dose at school entry (4-6 years of age). Adults born prior to 1970 are assumed to have been previously infected with measles and are generally considered immune. More details are available in the MMR pages of [Part 4, Biological Products, Chapter 2, Immunization, Communicable Disease Manual](#).

To help understand why a high proportion of cases will occur among vaccinated individuals when a vaccine is highly effective and most of the population are vaccinated, see pages 1056-7 on Screening, and Figure 1 on page 1057, in the following source: Orenstein WA, Bernier RH, Dondero TJ et al. Field Evaluation of Vaccine Efficacy. Bulletin of the World Health Organization. Available at:

<https://apps.who.int/iris/bitstream/handle/10665/265195/PMC2536484.pdf?sequence=1&isAllowed=y>

A lay explanation of this 'vaccine paradox' is available either in the example provided below or separately on the World Health Organization web page titled "The majority of people who get disease have been vaccinated" as one of the Six common misconceptions about immunization, available at the following link: https://www.who.int/vaccine_safety/initiative/detection/immunization_misconceptions/en/index2.html

Example:

A class has 100 students, and 95 are vaccinated with MMR. The 5 unvaccinated students are susceptible to measles. Because the vaccine is 95% effective, 90 of the vaccinated students are immune to measles, but 5 vaccinated students remain susceptible.

If the students are all exposed to measles, we could expect all 10 susceptible individuals to become infected. Of those infected, 5 (50%) would have received vaccination. If you look within the vaccinated students only, however, just 5 out of 95 became infected (5.3%). Amongst unvaccinated students 5 out of 5 became infected (100%).

