British Columbia Report

Adverse Events Following Immunization with COVID-19 Vaccines

December 13, 2020 to November 19, 2022

This report summarizes COVID-19 vaccine adverse events following immunization (AEFI) reported to the BC Centre for Disease Control up to and including November 19, 2022. Refer to the BCCDC website for reporting guidelines.[1] Events can be reported even when there is no certainty of a causal association. Refer to the Data Notes section at the end of this report for additional information on the source data.

Summary

The COVID-19 vaccines demonstrated safety in clinical trials prior to authorization for worldwide use.[2-4] During post-marketing surveillance, larger numbers of individuals are vaccinated, and this allows for detection of rare events undetected in clinical trials.

Among reports in BC, anaphylaxis and allergic events are the most frequently reported events following all of the COVID-19 vaccines. About half of the cases managed as anaphylaxis had lower level of diagnostic certainty and may reflect events such as anxiety or pre-syncopal (fainting) events managed as anaphylaxis out of an abundance of caution.

In association with the mRNA vaccines, myocarditis and pericarditis were first recognized in Israel and the USA in young adults and adolescents, and have now also been seen in other countries including Canada and in BC reports.[5-9]

There have been six reports of thrombosis with thrombocytopenia syndrome (TTS) reported in BC to date, of which 5 were associated with the adenovirus vector vaccines. This syndrome was identified in March 2021 in Europe in association with the AstraZeneca vaccine and also in the US with the Janssen vaccine, with a small number of cases accumulating in Canada associated with use of the adenovirus vector vaccines. The rate of occurrence has been estimated at about 1 in 67,000 recipients following the first dose and 1 in 500,000 following the second dose.[8,10,11]

Background

AEFIs are reportable by health care providers to the local medical health officer under the regulations of the Public Health Act. Detailed reporting guidelines are available in the BC Immunization Manual.[12] When an AEFI report is received at a local public health unit, it is further reviewed and investigated, and then reported in the public health information system aligned with the immunization registry which contains the information about the vaccine(s) administered on a specific date. Recommendations for further assessment and future doses are made by the medical health officer or designated public health professional. Expected side effects such as pain, redness, and swelling at the injection site which are commonly observed with many vaccines are not reportable as AEFI unless these meet specific severity thresholds.

AEFI reports are further investigated provincially with particular focus on serious AEFI and detection of potential safety signals (e.g., clusters of events, event rates occurring at a higher than expected frequency compared to background rates, or rare events with previously unknown association with vaccination). Additionally, BC submits AEFI reports to the Canadian Adverse Event Following Immunization Surveillance System where additional review and analysis for potential safety signals is performed at the national level.[13] The Public Health Agency of Canada also produces a weekly COVID-19 AEFI report.[14]

Definitions

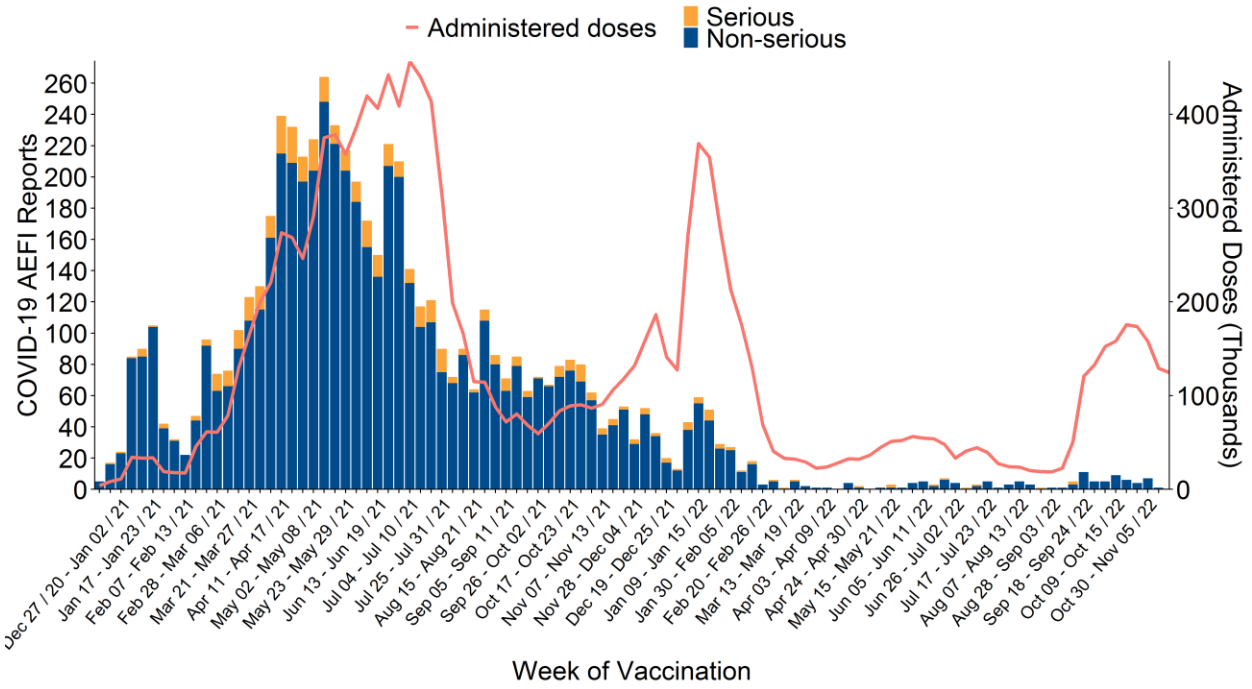
1. **Adverse event following immunization (AEFI)** - Any untoward medical event following immunization that is temporally (i.e., occurs within a biologically plausible timeframe after receipt of vaccine) but not necessarily causally associated.[15]
2. **Serious AEFI** - For the purpose of this report, a serious AEFI is one that resulted in hospitalization or a prolongation of hospitalization, permanent disability/incapacity, or death.

Key Findings

- As of November 19, 2022, there have been 13,688,078 COVID-19 vaccine doses administered in BC and 6,035 COVID-19 AEFI reports (44.1 reports per 100,000 doses administered)
- 473 reports (7.8%) met the serious definition, for a rate of 3.5 per 100,000 doses administered
- The most frequently reported events were other allergic event, anaesthesia/paraesthesia, and injection site pain/swelling/redness
- Other events have been less frequently reported and are detailed below

Summary of AEFI Reports

Figure 1: Adverse event reports following receipt of a COVID-19 vaccine by week of vaccination, BC, Dec. 13, 2020 - Nov. 19, 2022 **(N=6,035)**



COVID-19 vaccinations of British Columbians began the week of December 13, 2020, and up to and including November 19, 2022, a total of 13,688,078 doses have been administered. During this period, there have been 6,035 AEFI reports following a COVID-19 vaccine, for a reporting rate of 44.1 reports per 100,000 doses administered (Table 1). Reports are delayed beyond the week of vaccination because of time to onset that varies by event and associated time to receive, investigate and process a report for submission. Weekly report counts, especially for recent weeks, are expected to increase over time as these are submitted, but Figure 1 shows that reports have declined as the immunization campaign has progressed, even as the doses administered have continued to increase. This is because the AEFI reporting rates associated with second, third, and fourth doses of COVID-19 vaccines administered have been substantially lower than the rate associated with the first dose.

Table 1: Description of adverse event reports following receipt of a COVID-19 vaccine, BC, Dec. 13, 2020 - Nov. 19, 2022 **(N=6,035)**

	COVID-19 Vaccine*							
	All COVID-19 Vaccines	**Moderna Spikevax**	**Moderna Spikevax Pediatric**	**Moderna Spikevax Bivalent**	**Pfizer-BioNTech Comirnaty**	**Pfizer-BioNTech Comirnaty Pediatric (6mo - 4yrs)**	**Pfizer-BioNTech Comirnaty Pediatric (5 - 11yrs)**	**Pfizer-BioNTech Comirnaty Bivalent**
Total reports	**6035**	**2145**	**15**	**37**	**3405**	**0**	**52**	**5**
Non-serious reports	5562	1989	14	36	3139	0	47	5
Serious reports	473	156	1	1	266	0	3	0
Proportion serious	7.8%	7.3%	6.7%	2.7%	7.8%	0.0%	5.8%	0%
Dose 1 reports	4109	1314	12	0	2409	0	34	0
Dose 2 reports	1466	557	1	0	860	0	14	0
Dose 3 reports	368	245	0	2	117	0	2	1
Dose 4 reports	62	23	0	26	11	0	0	2
Total doses administered	**13,688,078**	**3,926,882**	**44,689**	**864,966**	**7,563,384**	**2**	**434,984**	**399,407**
Recorded as Dose 1	4,552,254	932,876	30,975	13	3,057,983	1	211,995	22
Recorded as Dose 2	4,384,633	1,188,604	13,540	67	2,883,790	1	166,737	44
Recorded as Dose 3	2,928,010	1,476,901	90	26,560	1,344,714	0	56,113	21,500
Recorded as Dose 4	1,523,954	328,192	66	666,136	274,681	0	139	253,470
Total reporting rate	**44.1**	**54.6**	**33.6**	**4.3**	**45.0**	**0.0**	**12.0**	**1.3**
Serious rate	3.5	4.0	2.2	0.1	3.5	0.0	0.7	0.0
Dose 1 rate	90.3	140.9	38.7	0.0	78.8	0.0	16.0	0.0
Dose 2 rate	33.4	46.9	7.4	0.0	29.8	0.0	8.4	0.0
Dose 3 rate	12.6	16.6	0.0	7.5	8.7	--	3.6	4.7
Dose 4 rate	4.1	7.0	0.0	3.9	4.0	--	0.0	0.8

Note: Rates calculated per 100,000 doses administered. Doses administered are those recorded in the immunization registry and include vaccine receipt out of province. Doses recorded as 2 and higher may have been administered with a product different from that received for earlier doses.

Table 1 (continued): Description of adverse event reports following receipt of a COVID-19 vaccine, BC, Dec. 13, 2020 - Nov. 19, 2022 **(N=6,035)**

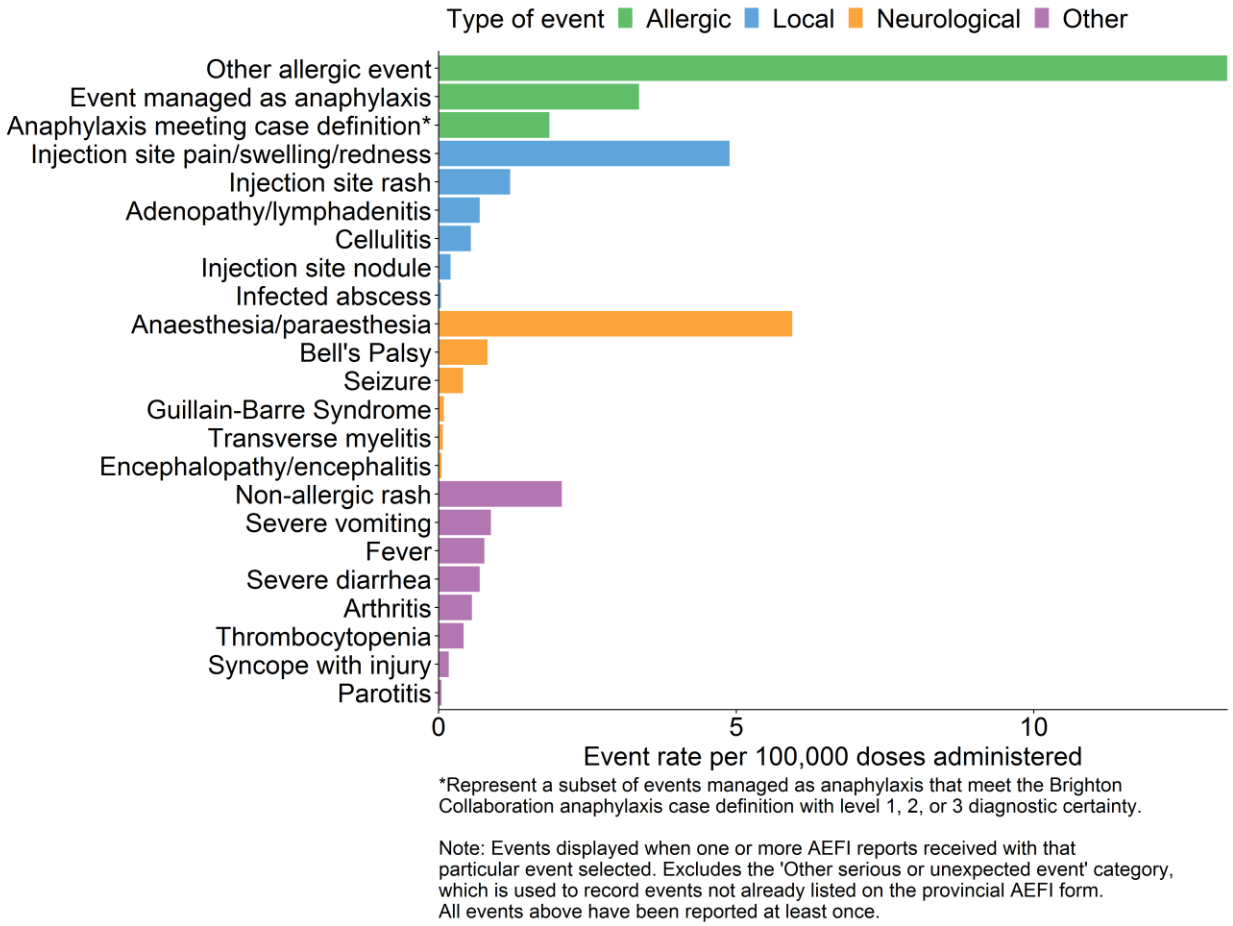
	COVID-19 Vaccine*				
	All COVID-19 Vaccines	**Verity COVISHIELD**	**AstraZeneca Vaxzevria**	**J&J Janssen**	**Novavax NUVAXOVID**
Total reports	**6035**	**72**	**287**	**15**	**2**
Non-serious reports	5562	66	251	13	2
Serious reports	473	6	36	2	0
Proportion serious	7.8%	8.3%	12.5%	13.3%	0%
Dose 1 reports	4109	70	256	12	2
Dose 2 reports	1466	2	30	2	0
Dose 3 reports	368	0	0	1	0
Dose 4 reports	62	0	0	0	0
Total doses administered	**13,688,078**	**89,988**	**344,476**	**12,898**	**6,402**
Recorded as Dose 1	4,552,254	70,886	233,166	12,130	2,207
Recorded as Dose 2	4,384,633	18,844	110,319	547	2,140
Recorded as Dose 3	2,928,010	252	959	192	729
Recorded as Dose 4	1,523,954	5	31	29	1,205
Total reporting rate	**44.1**	**80.0**	**83.3**	**116.3**	**31.2**
Serious rate	3.5	6.7	10.5	15.5	0.0
Dose 1 rate	90.3	98.8	109.8	98.9	90.6
Dose 2 rate	33.4	10.6	27.2	365.6	0.0
Dose 3 rate	12.6	0.0	0.0	520.8	0.0
Dose 4 rate	4.1	0.0	0.0	0.0	0.0

Note: Rates calculated per 100,000 doses administered. Doses administered are those recorded in the immunization registry and include vaccine receipt out of province. Doses recorded as 2 and higher may have been administered with a product different from that received for earlier doses.

Summary of Reported Events

A single AEFI report may contain one or more adverse events. Reported events are temporally associated with vaccination (i.e., occur after vaccination within a biologically plausible timeframe) but not necessarily causally associated. The 6,035 AEFI reports received up to November 19, 2022 contained a total of 7,686 adverse events for a ratio of 1.3 events per COVID-19 AEFI report. The most frequently reported events were other allergic events (e.g., allergic rash, hives, pruritus, and gastrointestinal symptoms), anaesthesia/paraesthesia, and events managed as anaphylaxis (Figure 2).

Figure 2: Adverse events following receipt of a COVID-19 vaccine, British Columbia, Dec. 13, 2020 - Nov. 19, 2022 **(N=7,686)**



Event Descriptions

Four hundred sixty-one reports were received for events managed as anaphylaxis (i.e., the client received epinephrine for a suspected anaphylactic reaction). Of these, 254 (55%) met the Brighton Collaboration definition for anaphylaxis with diagnostic certainty levels of 1, 2, or 3.[16] Many events managed as anaphylaxis have features more compatible with anxiety or vasovagal syncope/pre-syncopal (fainting) events.

Seventy-four reports of cellulitis were received. Although most of these reports specified that antibiotics were provided, many appeared to represent a delayed onset local inflammatory reaction rather than cellulitis.[17] None of these reports were confirmed by microbial testing, therefore none meet criteria for level 1 of the Brighton case definition.

Four hundred seventy-three reports (7.8%), including some of the events described above, were considered **serious** (refer to serious AEFI definition above). Of these, 444 individuals were admitted to hospital, including 2.8% of cases reported as anaphylaxis.

Two hundred and one reports contained a diagnosed neurological event. One hundred and twelve individuals experienced Bell's palsy within 30 days following COVID-19 vaccination. Six individuals were admitted to hospital and diagnosed with transverse myelitis, including one with a history of multiple sclerosis. An additional four individuals were reported as having transverse myelitis, however, one was unconfirmed by diagnostic imaging, one had a workup inconsistent with transverse myelitis, and another was referred to a specialist for further investigation. Fifty-six individuals were reported with seizures (19.6% of whom were hospitalized). Four individuals were admitted to hospital for an intracerebral hemorrhage, including one with encephalopathy. Six additional individuals developed encephalitis or encephalopathy: one encephalitis was presumed to be viral in nature; one encephalopathy was attributed to a workplace toxin exposure; one individual with multiple chronic neurologic conditions developed encephalopathy presumed to be unrelated to the vaccine; two individuals with several comorbidities and encephalopathy made a spontaneous and full recovery within days, without a specific cause identified; one encephalitis was attributed to a new onset autoimmune condition diagnosed after receipt of vaccine. One individual was hospitalized for aseptic meningitis. There were twelve reports for individuals hospitalized with Guillain-Barre Syndrome (GBS), now all discharged. Five of these reports followed AstraZeneca vaccine, five followed Pfizer-BioNTech Comirnaty, and two followed Moderna Spikevax. A possible infectious cause of GBS was not identified in five of the cases but in two cases followed an illness compatible with recent infection. GBS cases following COVID-19 vaccines have been identified in Canada and internationally, but rarely.[14,18,19]

Death is reportable as an adverse event when it occurs within 30 days of vaccination and no other clear cause of death has been established.[12] Readers will note that some of the reported deaths described below appear to have a clear cause of death unrelated to the vaccine. Death may also be recorded as the outcome of a specific reportable event. Twenty serious AEFI reports were received for individuals (median age: 76.5 years) who died within 30 days of receiving a COVID-19 vaccine.

- For five of the deaths, vaccination was not considered to be a contributing factor by the health care provider who attended and investigated the death and considered the individuals' medical history.
- One death occurred in a long term care resident following deterioration with reduction in oral intake, without a clear underlying cause of death identified.
- In six individuals, death was the outcome of cardiac arrest. Seven of these were elderly individuals and many with multiple underlying medical conditions; one had cardiac risk factors and was hospitalized for a myocardial infarction, and one had severe coronary artery disease that predated vaccine administration.
- Two deaths occurred in elderly individuals following a stroke and hospital admission. Both had previous history of stroke along with other medical conditions.
- One death occurred in an individual with metastatic cancer who had been hospitalized for complications of thrombocytopenia and hemolytic anemia.

- One death occurred in an elderly individual who suffered from multiple serious comorbidities. Investigation revealed the death was due to natural causes unrelated to the vaccine, but occurring in temporal association with vaccine receipt.
- One death occurred in an elderly individual with multiple comorbidities, whose health was declining before vaccine administration.
- One death occurred in an individual due to septic shock unrelated to the vaccine.
- Two deaths occurred in elderly individuals due to underlying cardiac compromise unrelated to the vaccine.

'Other serious or unexpected' events:
Some events may be reported as an "other serious or unexpected" event when these do not have their own discrete event on the provincial AEFI report form. These are outlined in this section; some of these events have been described above in the **serious events** section. Amongst these events, 190 were for various thrombotic/ thromboembolic conditions. These included 40 strokes (90% hospitalized) two cerebral venous sinus thromboses, 28 myocardial infarctions (92.9% hospitalized), 51 pulmonary emboli (58.9% hospitalized), 60 deep vein thromboses, and nine superficial vein thromboses. None of these events met the TTS criteria as none were associated with new onset thrombocytopenia.[10,11]

One "other serious" report was received for an individual with capillary leak syndrome with onset five weeks after AstraZeneca vaccine. Capillary leak syndrome is a very rare condition now recognized as potentially associated with the AstraZeneca vaccine. By June 2021 only six cases had been identified in Europe following over 78 million doses of AstraZeneca vaccine administered.[20] Health Canada issued an advisory for this condition and its association with AstraZeneca/COVISHIELD vaccines.[21]

There have been six non-fatal confirmed cases of TTS reported in BC to date, four of whom were adults aged 30-49 and two were aged 60-69 years. The first had onset four days after receipt of the AstraZeneca vaccine with a low platelet count found upon presentation for care, and a diagnosis of pulmonary embolism. The second case had abdominal symptoms that progressed the week after receiving the AstraZeneca vaccine, with a diagnosis of abdominal venous thrombus and thrombocytopenia. The third case also had symptoms develop in the week after AstraZeneca vaccine. Upon presentation to care, thrombocytopenia was detected. The individual was assessed for possible TTS, and identification of an abdominal venous thrombus was made in hospital. All three of these individuals followed the first dose of AstraZeneca and had a positive anti-platelet factor 4 antibody test. The fourth individual suffered a stroke a week after the second dose of the AstraZeneca vaccine. Thrombocytopenia was identified in hospital; the anti-platelet factor 4 antibody test was negative. The fifth individual met the Brighton Collaboration criteria for TTS level 1-H because they had received heparin; this case also tested negative for the anti-platelet factor 4 antibody test. The sixth individual had onset 10 days after receipt of Janssen vaccine with a diagnosis of portal vein thrombosis; TTS was confirmed with anti-platelet factor 4 antibody testing.

Four serious AEFI reports in the 5-11 year age group have been reported. The first was for a new onset type 1 diabetes mellitus in a child with a strong familial history of this condition. Diabetes mellitus has not been shown to be associated with COVID-19 vaccines. People with diabetes are encouraged to get vaccinated because they are at higher risk of developing more severe COVID-19.[22] The second was for hospitalization due to immune thrombocytopenia purpura in a child recovering from an illness compatible with a viral respiratory infection before vaccination. Their platelet counts recovered and they were discharged from hospital. The third was for hospitalization following myo/pericarditis; this child was discharged with full resolution of symptoms. The fourth was for hospitalization following febrile seizures with onset several days later than expected for a plausible causal association to vaccine; this child was discharged home after full resolution and further investigations are in progress to identify an infectious cause.

There have been 228 reports of myocarditis/pericarditis. Sixty-seven individuals were diagnosed with myocarditis, 104 with pericarditis, and 57 with myopericarditis. Ages ranged from 10 to 95 with a median of 35 years, and 150 (66%) were male. Ninety-five had received Moderna Spikevax, 125 received Pfizer-BioNTech Comirnaty, one received Pfizer-BioNTech Comirnaty Pediatric, and seven received AstraZeneca Vaxzevria/Verity COVISHIELD. One hundred and four of these events occurred after a second dose (47 Moderna Spikevax, 55 Pfizer-BioNTech Comirnaty, 1 Pfizer-BioNTech Comirnaty Pediatric, and 1 AstraZeneca Vaxzevria/Verity COVISHIELD). Twenty occurred after a third dose (15 Moderna Spikevax and 5 Pfizer-BioNTech Comirnaty), and one occurred after a fourth dose of Moderna. Some may have alternate explanations including rheumatic diseases, a genetic syndrome associated with cardiac disorders, or viral infection. Fifty-nine (out of 67) of the myocarditis cases met the diagnostic criteria for level 1, 2, or 3 of the Brighton Collaboration case definition. Forty-eight (out of 104) pericarditis cases met the diagnostic criteria for level 1, 2, or 3 of the Brighton Collaboration case definition. Twenty-five (out of 57) myopericarditis cases met the diagnostic criteria for level 1, 2, or 3 of the Brighton Collaboration case definition for both myocarditis and pericarditis.[23] These conditions have been seen in association with the mRNA vaccines in several countries including the US and UK as well as in Canada, especially in adolescent and young adult males and with the 2nd dose.[5-7,14,24]

Table 2: Number of Myo/Pericarditis reports following receipt of an mRNA COVID-19 vaccine, British Columbia, Dec. 13, 2020 - Nov. 19, 2022 **(N=221)**

Vaccine/Age Groups	*Dose 1*	*Dose 2*	*Dose 3*	*Dose 4*	*All Doses*
Moderna Spikevax					
Under 5	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
5-11	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
12-17	0 (0%)	0 (0%)	1 (0.5%)	0 (0%)	1 (0.5%)
18-24	5 (2.3%)	14 (6.3%)	1 (0.5%)	0 (0%)	20 (9%)
25-29	10 (4.5%)	9 (4.1%)	3 (1.4%)	0 (0%)	22 (10%)
30-39	7 (3.2%)	10 (4.5%)	1 (0.5%)	0 (0%)	18 (8.1%)
40+	10 (4.5%)	14 (6.3%)	9 (4.1%)	1 (0.5%)	34 (15.4%)
All ages	32 (14.5%)	47 (21.3%)	15 (6.8%)	1 (0.5%)	95 (43%)
Pfizer-BioNTech Comirnaty					
Under 5	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
5-11	0 (0%)	1 (0.5%)	0 (0%)	0 (0%)	1 (0.5%)
12-17	7 (3.2%)	10 (4.5%)	1 (0.5%)	0 (0%)	18 (8.1%)
18-24	7 (3.2%)	15 (6.8%)	2 (0.9%)	0 (0%)	24 (10.9%)
25-29	4 (1.8%)	4 (1.8%)	0 (0%)	0 (0%)	8 (3.6%)
30-39	19 (8.6%)	6 (2.7%)	0 (0%)	0 (0%)	25 (11.3%)
40+	28 (12.7%)	20 (9%)	2 (0.9%)	0 (0%)	50 (22.6%)
All ages	65 (29.4%)	56 (25.3%)	5 (2.3%)	0 (0%)	126 (57%)
mRNA Vaccines					
Under 5	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
5-11	0 (0%)	1 (0.5%)	0 (0%)	0 (0%)	1 (0.5%)
12-17	7 (3.2%)	10 (4.5%)	2 (0.9%)	0 (0%)	19 (8.6%)
18-24	12 (5.4%)	29 (13.1%)	3 (1.4%)	0 (0%)	44 (19.9%)
25-29	14 (6.3%)	13 (5.9%)	3 (1.4%)	0 (0%)	30 (13.6%)
30-39	26 (11.8%)	16 (7.2%)	1 (0.5%)	0 (0%)	43 (19.5%)
40+	38 (17.2%)	34 (15.4%)	11 (5%)	1 (0.5%)	84 (38%)
All ages	97 (43.9%)	103 (46.6%)	20 (9%)	1 (0.5%)	221 (100%)

Total = 221 reports of myocarditis/pericarditis following an mRNA COVID-19 Vaccine (7 reports following AstraZeneca Vaxzevria/Verity COVISHIELD vaccine were omitted from this table). Based on data reported to BCCDC (Panorama) up to and including November 19, 2022.

Table 3: Rates of Myo/Pericarditis reports following receipt of an mRNA COVID-19 vaccine, British Columbia, Dec. 13, 2020 - Nov. 19, 2022. Stratified by sex, age group, vaccine trade name, and dose **(N=221)**

Vaccine / Age Group	Reporting Rate* (95% CI)									
	Males					Females				
Moderna Spikevax	Dose 1	Dose 2	Dose 3	Dose 4	All doses	Dose 1	Dose 2	Dose 3	Dose 4	All doses
Under 5	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
5-11	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
12-17	0 (0-0)	0 (0-0)	**934.6 (226.4-3447.6)**	0 (0-0)	217.9 (52.8-803.7)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
18-24	85.4 (34.7-187.2)	**278.3 (163.9-448.8)**	88.2 (21.4-325.3)	0 (0-0)	**171.2 (108.8-259)**	23.8 (5.8-87.6)	22.7 (5.5-83.8)	0 (0-0)	0 (0-0)	19.4 (6-53.9)
25-29	**161 (82.8-290.2)**	**157.1 (80.8-283.2)**	201.8 (73.3-486)	0 (0-0)	**164 (105.5-245.6)**	47.4 (14.7-132.2)	22.1 (5.3-81.4)	0 (0-0)	0 (0-0)	27.3 (9.9-65.8)
30-39	40.6 (16.5-89)	45.5 (20-93.3)	10.6 (2.6-39)	0 (0-0)	32.8 (18-56)	34.4 (12.5-82.9)	50.3 (22.1-103)	0 (0-0)	0 (0-0)	26.9 (13.8-48.4)
40+	24.9 (12.3-46.5)	17.8 (8.8-33.2)	7 (2.9-15.4)	6.9 (1.7-25.3)	13.7 (8.8-20.5)	10.6 (3.9-25.6)	17.7 (8.7-33)	7.8 (3.5-16.1)	0 (0-0)	10.1 (6.1-15.8)
All ages	46.6 (31.2-67.5)	**54.2 (38.6-74.1)**	14.5 (7.9-24.7)	6.7 (1.6-24.9)	**34.5 (27.2-43.2)**	19.1 (10.2-33.5)	23.6 (14.2-37.5)	6.4 (2.8-13)	0 (0-0)	13.8 (9.6-19.4)

Pfizer-BioNTech Comirnaty	Dose 1	Dose 2	Dose 3	Dose 4	All doses	Dose 1	Dose 2	Dose 3	Dose 4	All doses
Under 5	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
5-11	0 (0-0)	13.4 (3.2-49.4)	0 (0-0)	0 (0-0)	5.1 (1.2-18.8)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
12-17	45.7 (21.4-88.9)	55.9 (27.6-104.3)	**19 (4.6-69.9)**	0 (0-0)	45 (27-71.5)	7.9 (1.9-29.3)	24.9 (9-59.8)	0 (0-0)	0 (0-0)	13.2 (5.4-29)
18-24	34 (15-69.6)	**63.7 (34-111.6)**	31.9 (9.9-89)	0 (0-0)	**45.4 (28.1-70.3)**	13.3 (4.1-37.2)	41.7 (19.6-81.1)	0 (0-0)	0 (0-0)	21.5 (11-38.7)
25-29	**25 (9.1-60.2)**	**17.5 (5.4-48.8)**	0 (0-0)	0 (0-0)	**17.2 (7.6-35.2)**	8.1 (2-29.9)	17 (5.3-47.4)	0 (0-0)	0 (0-0)	9.7 (3.5-23.4)
30-39	68.4 (42.3-105.7)	18 (7.3-39.4)	0 (0-0)	0 (0-0)	37.1 (24.1-55.1)	12.1 (4.4-29.1)	8.4 (2.6-23.5)	0 (0-0)	0 (0-0)	8.6 (3.8-17.6)
40+	14.3 (8.3-23.5)	14.2 (8-23.7)	2.7 (0.7-9.9)	0 (0-0)	11.4 (7.7-16.4)	16.5 (10.2-25.5)	10 (5.3-17.4)	2.3 (0.6-8.5)	0 (0-0)	10.6 (7.3-15.1)
All ages	26.9 (19.9-35.6)	**23.4 (16.8-31.9)**	6.1 (2.5-13.5)	0 (0-0)	**21.1 (17-26)**	13.5 (9-19.5)	13.8 (9.1-20.1)	1.3 (0.3-4.9)	0 (0-0)	10.9 (8.2-14.3)

mRNA Vaccines	Dose 1	Dose 2	Dose 3	Dose 4	All doses	Dose 1	Dose 2	Dose 3	Dose 4	All doses
Under 5	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
5-11	0 (0-0)	13.4 (3.2-49.4)	0 (0-0)	0 (0-0)	5.2 (1.3-19.2)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
12-17	45.1 (21.2-87.7)	54.9 (27.1-102.4)	36.5 (11.3-101.6)	0 (0-0)	46.7 (28.5-73.2)	7.8 (1.9-28.7)	24.4 (8.9-58.7)	0 (0-0)	0 (0-0)	12.8 (5.2-28)
18-24	46.4 (24.7-81.3)	116.8 (77.4-170.4)	40 (14.5-96.4)	0 (0-0)	73.1 (52.4-99.6)	15.6 (5.7-37.5)	37.2 (18.3-69.4)	0 (0-0)	0 (0-0)	20.5 (11.3-35)
25-29	64.8 (36.5-108.3)	60.6 (33.2-103.5)	42 (15.3-101.2)	0 (0-0)	57.5 (38.8-82.7)	18.1 (6.6-43.7)	18.4 (6.7-44.3)	0 (0-0)	0 (0-0)	13.8 (6.5-26.9)
30-39	60.2 (39.1-89.2)	27.1 (14.4-47.5)	5.7 (1.4-21)	0 (0-0)	34.2 (24-47.5)	17.9 (8.4-34.8)	20.8 (10.3-38.8)	0 (0-0)	0 (0-0)	14.1 (8.3-22.7)
40+	17 (10.9-25.5)	14.6 (9.1-22.3)	5.3 (2.3-10.8)	2 (0.5-7.4)	10.9 (8-14.4)	15.2 (9.8-22.8)	12.3 (7.6-19.1)	4.6 (2-9.5)	0 (0-0)	9.4 (6.9-12.5)
All ages	31.6 (24.8-39.7)	32.1 (25.2-40.2)	10.4 (6.2-16.5)	1.8 (0.4-6.6)	23.9 (20.3-28)	14.7 (10.5-20.3)	16.5 (11.9-22.3)	3.2 (1.4-6.6)	0 (0-0)	11 (8.8-13.7)

* Rates calculated per 1 million doses administered. Based on data reported to BCCDC (Panorama) up to and including November 19, 2022. These rates were calculated from all reports of myocarditis/pericarditis submitted the BCCDC, without assessment against the Brighton Collaboration case definition (7 reports following AstraZeneca Vaxzevria/Verity COVISHIELD vaccine were omitted from the calculation of rates in this table). Rates shown in bold represent a significant difference between products (Moderna Spikevax vs Pfizer-BioNTech Comirnaty) within the same sex and age group.

Table 3 interpretation:
The rates for myo/pericarditis following Moderna Spikevax in BC are higher than rates following Pfizer-BioNTech Comirnaty vaccine for the following sex, dose, and age groups:

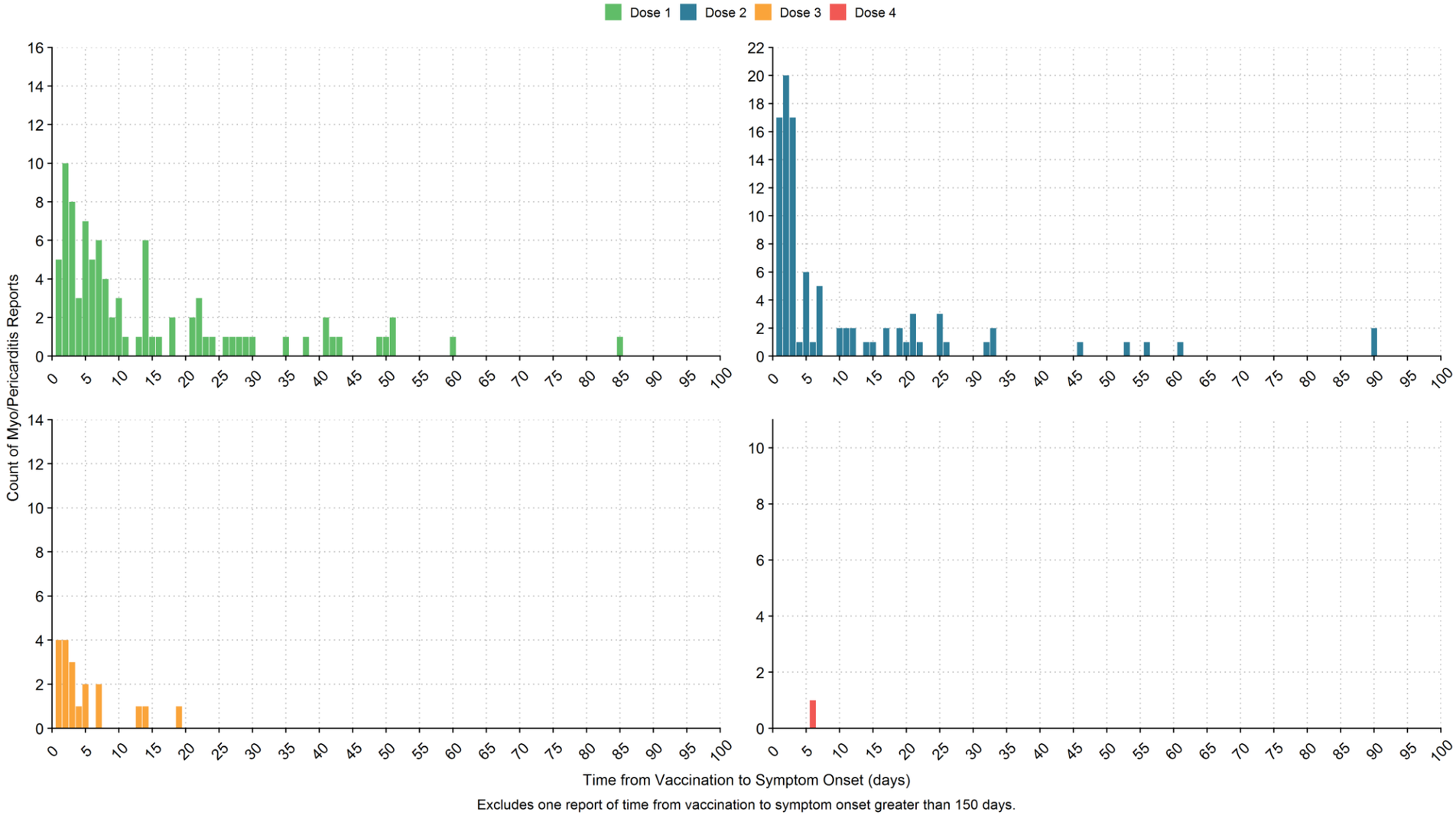
Males:

- 12-17 year olds: Dose 3 - However this is based on a single report in relation to only 1088 doses administered. This rate should be interpreted with caution.
- 18-24 years old: Dose 2 and all doses combined
- 25-29 years old: Doses 1, 2, and all doses combined
- All ages combined: Dose 2 and all doses combined

Females:

- None showed a statistically significant difference between products.

Figure 3: Time from Vaccination to Symptom Onset of Myo/Pericarditis Reports, British Columbia, Dec. 13, 2020 - Nov. 19, 2022 **(N=221)**



Excludes one report of time from vaccination to symptom onset greater than 150 days.

Data Notes

Data on COVID-19 AEFI reports and doses administered were extracted from Panorama, the provincial public health information system, on November 23, 2022. Only AEFIs reported and doses administered up to November 19, 2022 were included in this report. Any AEFI report with a status of “Does not meet reporting criteria” or “Disregard - Entered in error” was excluded.

Delays exist between the time an AEFI occurs, is reported to public health, and is entered into Panorama. As AEFI investigations progress, there may be changes to the data, or reports may be removed from analysis if events upon review are deemed not reportable (e.g., expected local reaction). This may lead to some fluctuations in AEFI counts and rates in subsequent reporting periods.

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