# Supplementary Material

## Two-dose SARS-CoV-2 vaccine effectiveness (VE) with mixed schedules and extended dosing intervals: test-negative design studies from British Columbia and Quebec, Canada

## Supplementary Material 1. Provincial expert recommendations to defer second doses of SARS-CoV-2 vaccines in British Columbia (BC) and Quebec, Canada, mid-December 2020

Soon after authorization of the first mRNA vaccine (BNT162b2, Pfizer-BioNTech) against SARS-CoV-2 on December 9 (epi-week 50) of 2020 in Canada, experts in the provinces of British Columbia (BC) and Quebec simultaneously (epi-week 51) submitted briefing notes recommending that second doses of SARS-CoV-2 vaccines be deferred at least until optimal single-dose coverage of high-risk priority groups could be assured.

**For excerpt from the BC Centre for Disease Control expert briefing note** (December 13, 2020), see page 3.

**For the full Quebec Immunization Committee expert briefing note**, see:

Original French (December 18, 2020):
https://www.inspq.qc.ca/sites/default/files/publications/3098_vaccination_covid19_2e_dose_contexte_penurie.pdf

English translation (January 15, 2021): https://www.inspq.qc.ca/en/publications/3098-vaccination-second-dose-context-shortage-covid19

Additional information from Quebec (February 18, 2021): https://www.inspq.qc.ca/en/publications/3103

While acknowledging the ongoing importance of second doses, these briefing notes advocated their delayed administration in order to extend substantial single-dose protection to as many priority group members as possible, as fast as possible, while vaccine supplies remained constrained globally. Core ethical and vaccine principles were invoked in support and briefing notes in both provinces also reassuringly addressed the interchangeability of SARS-CoV-2 vaccines if the withholding of homologous doses, as recommended by the manufacturer to complete the series, was not possible under a population strategy of second-dose deferral.

Underpinning the recommendation to defer the second dose was joint provincial re-analysis of the BNT162b2 (Pfizer-BioNTech) randomized controlled trial (RCT) data. Those RCT data became publicly available in the Pfizer-BioNTech Vaccines and Related Biological Products Advisory Committee (VRBAC) Briefing Document when it was web-posted on December 10, 2020.[a] Provincial experts used the data reported in Figure 13 of the Pfizer-BioNTech VRBAC document to show that single-dose BNT162b2 efficacy against symptomatic SARS-CoV-2 infection exceeded 90% when the typical lag period between vaccine receipt and development of the primary antibody response was properly taken into account (14 days for most vaccines), something the original RCT investigators had not presented. Single-dose mRNA-1273 efficacy also exceeding 90% was subsequently reported by Moderna investigators themselves in their VRBAC submission of December 17, 2020 (authorized in Canada on December 23, 2020).[b]

Recognizing the implications for other jurisdictions, lead authors of the BC and Quebec briefing notes disseminated their re-analyses broadly to health authorities nationally and internationally. They drafted a Letter to the Editor[c] of the New England Journal of Medicine in response to the original Pfizer-BioNTech RCT publication[d], providing the re-analyses, rationale and concluding recommendation that other countries (e.g. United States) also consider second-dose deferral as a matter of national security. The Letter to the Editor was submitted on December 24, 2020, and published February 17, 2021.

Thereafter, on March 3, 2021 Canada's National Advisory Committee on Immunization (NACI) endorsed second dose deferral, recommending an even longer interval of 16 weeks between first and second doses.

A timeline of SARS-CoV-2 vaccine developments including provincial (BC and Quebec) and national (NACI) recommendations and program modifications relevant to the current work is shown in **Supplementary Table 1, page 4**.

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[a] Pfizer-BionTech COVID-19 Vaccine (BNT162, PF-07302048) Vaccines and Related Biological Products Advisory Committee (VRBAC) Briefing Document. Available: https://www.fda.gov/media/144246/download

[b] Moderna COVID-19 Vaccine. FDA Briefing Document. Vaccines and Related Biological Products Advisory Committee (VRBAC). December 17, 2020. Available: https://www.fda.gov/media/144434/download

[c] Skowronski DM, De Serres G. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. N Eng J Med. 2021; 384: 10.1056/NEJMc2036242#sa1. Available: https://www.nejm.org/doi/10.1056/NEJMc2036242

[d] Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. N Engl J Med 2020; 383:2603–2615.

**Excerpt, BC Centre for Disease Control briefing note, summary assessment and recommendation to defer second doses**

## Assessment

The current situation in BC is one of elevated COVID-19 epidemic activity and heightened risk, particularly for certain sub-groups. A single dose of COVID-19 vaccine has been shown in recent RCT analysis to be comparably high to that of two doses, both exceeding 90% in short-term prevention of symptomatic illness. Unfortunately, there is current scarcity of vaccine supply globally.

In that context, a strategy to maximize vaccine impact and prevent the greatest number of cases and associated severe outcomes would be to offer a first dose to as many people within the highest priority groups as possible. Holding back doses, as recommended by the manufacturer to ensure a second dose is given 3-4 weeks later, would leave half of the highest priority group members in BC completely unprotected now and through the winter period.

A strategy of second dose deferral to provide single dose protection to as many people as possible in the short term does not preclude subsequent booster dose administration when vaccine supply may be more abundant. The timing of the proposed deferral of the second dose should be guided by field evaluations of the duration of first dose effectiveness. The potential for disease enhancement has been speculated with COVID-19 vaccines; although evidence to date is limited it does not point to such risk to date nor to a greater risk with one versus two doses in the short-term. However, field evaluations of one or two doses should also capture that theoretical risk.

Deferral of the second dose also raises potential issues with respect to the subsequent interchangeability of the Pfizer and Moderna vaccines. Although these products are not identical, they are predicated on the same mRNA mechanisms of action and a schedule of mixed products is likely to induce a booster recall effect. The same may also be anticipated with other COVID-19 vaccine technologies or platforms. If protection is not maintained by a two-dose schedule of mixed products, then a third dose could be offered to ensure each vaccinee receives at least two doses of the same product. Federal allocation of vaccine may take these subsequent considerations into account.

Either way, each of these issues should be addressed in careful field evaluations, requiring a real-time and robust vaccine registry. Finally, potential concerns related to lost follow up in ensuring a second dose, if needed over a longer interval, can be addressed through reminders and other communication supports, also facilitated by a real-time, robust vaccine registry.

## Recommendation

In the context of elevated COVID-19 risk and vaccine shortage, the offering of a first dose of vaccine to as many people in the highest priority groups as possible should be considered. Once these priority group members have had the opportunity to receive a first dose, the second dose may be undertaken if effectiveness evaluations show it is warranted. Conversely, if effectiveness studies show that protection is maintained, the second dose may be further postponed to enable vaccination of additional population sub-groups.

To inform these program adjustments, it is recommended that BC undertake close, real-time and continuous vaccine effectiveness evaluations throughout 2021, requiring a robust vaccine registry and other support. These field studies of vaccine effectiveness may also be supplemented by immunogenicity investigations to establish immune correlates of epidemiological protection.

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**Supplementary Table 1. Timeline of relevant SARS-CoV-2 vaccine program adjustments, adults ≥18 years old**

| Date | Epi-week | Canada (national)[a] | British Columbia (BC)[a] | Quebec[a] |
|---|---|---|---|---|
| Dec 9, 2020 | 50 | **Health Canada authorization:** BNT162b2 (Pfizer-BioNTech), ≥16-year-olds, 2-dose schedule. **V1-V2 interval:** 21 days; **NACI recommendation:** alternate **V1-V2 interval**: 28 days permissible [b] [1] | | |
| Dec 13/18, 2020 | 51 | | **BCCDC and Quebec Immunization Committee expert recommendations submitted to respective provincial vaccine program/policy makers:** defer V2 until optimal V1 coverage of priority groups assured | |
| Dec 14/15, 2020 | 51 | | **Start:** COVID-19 vaccination program (health care workers and long-term care facility residents) | |
| Dec 23, 2020 | 52 | **Health Canada authorization:** mRNA-1273 (Moderna), ≥18-year-olds, 2-dose schedule. **V1-V2 interval:** 28 days [2] | **V1-V2 interval:** extended to 35 days [c] [3] | |
| Dec 31, 2020 | 53 | | | **V1-V2 interval:** extended indefinitely [c] [4, 5] |
| Jan 12, 2021 | 2 | **NACI recommendation:** option to extend **V1-V2 interval**, preferably ≤42 days [c,d] [6] | | |
| Jan 14, 2021 | 2 | | | **V1-V2 interval specified:** 42 to 90 days [c,e] [7] |
| Jan 25, 2021 | 4 | | **V1-V2 interval:** 42 days [c,e] [8] | |
| Feb 26, 2021 | 8 | **Health Canada authorization:** ChAdOx1 (AstraZeneca) for ≥18-year-olds, 2-dose schedule. COVISHIELD by Serum Institute of India considered comparable. **V1-V2 interval:** 4-12 weeks [f,g,h] [9] | | |
| Mar 3, 2021 | 9 | **NACI recommendation: V1-V2 interval:** up to 4 months to maximize vaccine roll-out [c] [10,11] | **V1-V2 interval:** up to 4 months as per NACI [12] | **V1-V2 interval:** up to 4 months as per NACI [13] |
| Mar 29, 2021 | 13 | **NACI recommendation:** ChAdOx1 restricted to ≥ 55-year-olds owing to reports elsewhere of thrombosis with thrombocytopenia syndrome following vaccination [14] | | |
| Apr 23, 2021 | 16 | **NACI recommendation:** discretionary ChAdOx1 use for ≥30-year-olds [15] | | |
| May 27, 2021 | 21 | | **V1-V2 interval:** 8 weeks (owing to improved vaccine supply)[c] [16] | |
| May 28, 2021 | 21 | **NACI recommendation:** with increased vaccine supply, offer second doses as soon as possible [17] | | |
| June 1, 2021 | 22 | **NACI recommendation:** interchangeability of vaccines for series completion [18] | | |
| June 3, 2021 | 22 | | | **V1-V2 interval:** 8 weeks [c] [19] |
| June 17, 2021 | 24 | **NACI recommendation:** ChAdOx1 to initiate vaccine series for authorized age groups only if mRNA vaccines not possible; mRNA vaccines preferred for series completion, including among initial ChAdOx1 recipients [20] | | |
| July 5, 2021 | 27 | | | **V1-V2 interval:** 4 weeks [c] (to maximize number fully-vaccinated before fall) [21] |
| July 27, 2021 | 30 | | **V1-V2 interval:** 7 weeks [c] [22] | |
| Aug 9, 2021 | 32 | | **V1-V2 interval:** 4 weeks [c,i] preferred interval still 6-8 weeks [23, 24] | |
| Sept 1, 2021 | 35 | | | **Vaccine passport** required for ≥13-year-olds to enter social/recreational settings (2 doses) [25, 26] |
| Sept 13, 2021 | 37 | | **Vaccine card** required for ≥12-year-olds to enter social/recreational settings (≥1 dose) [27, 28] | |
| Oct 21, 2021 | 42 | **Vaccine passport** required for travel inter-provincially and internationally [29] | | |
| Oct 22, 2021 | 42 | **NACI recommendation: Optimal V1-V2 interval:** 8 weeks for mRNA; ≥8 weeks for ChAdOx1 [30] | | |
| Oct 24, 2021 | 43 | | **Vaccine card** required for ≥12-year-olds to enter social/recreational settings (2 doses) [27] | |
| Nov 1, 2021 | 44 | | | **Optimal V1-V2 interval:** 8 weeks [31] |
| Dec 7, 2021 | 49 | | **Optimal V1-V2 interval:** 8 weeks [32] | |

Abbreviations: BCCDC, BC Centre for Disease Control; ChAdOx1, Chimpanzee adenoviral vectored vaccine; mRNA, messenger RNA; NACI, National Advisory Committee on Immunization; V1, vaccine dose 1; V2, vaccine dose 2

[a] Consult relevant provincial and national websites for further updated information. A full listing of NACI recommendations can be found here: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci.html

[b] Since authorization, the Canadian NACI recommendation included an alternate schedule of 28 days between dose 1 and dose 2 for BNT162b2 [1,2].

[c] Revised interval applies to all authorized/available vaccines at the time

[d] As also articulated by the World health Organization (WHO) on January 8, 2021 [33]

[e] As also articulated by the United Kingdom Joint Committee on Vaccination and Immunisation (JCVI) on December 30, 2020 (up to 12-week interval) [34]

[f] COVISHIELD (Serum Institute of India) considered comparable by Health Canada regulators [35]

[g] NACI initially recommended against the use of ChAdOx1 in individuals ≥ 65 years old due to limited efficacy data, removing this restriction in its March 16, 2021 statement as effectiveness data from observational studies accrued [35]

[h] On May 3, 2021 (epi-week 18), Health Canada authorized another viral vector vaccine by Janssen for adults ≥ 18 years as a one-dose schedule [36]. This product was not generally available during the study period and is excluded from analyses reported here.

[i] To maximize the number fully-vaccinated by fall and enable healthcare worker vaccination requirements, first announced August 12, 2021 (epi-week 32) and in effect October 12, 2021 (epi-week 41) for long-term care/assisted living workers [37].

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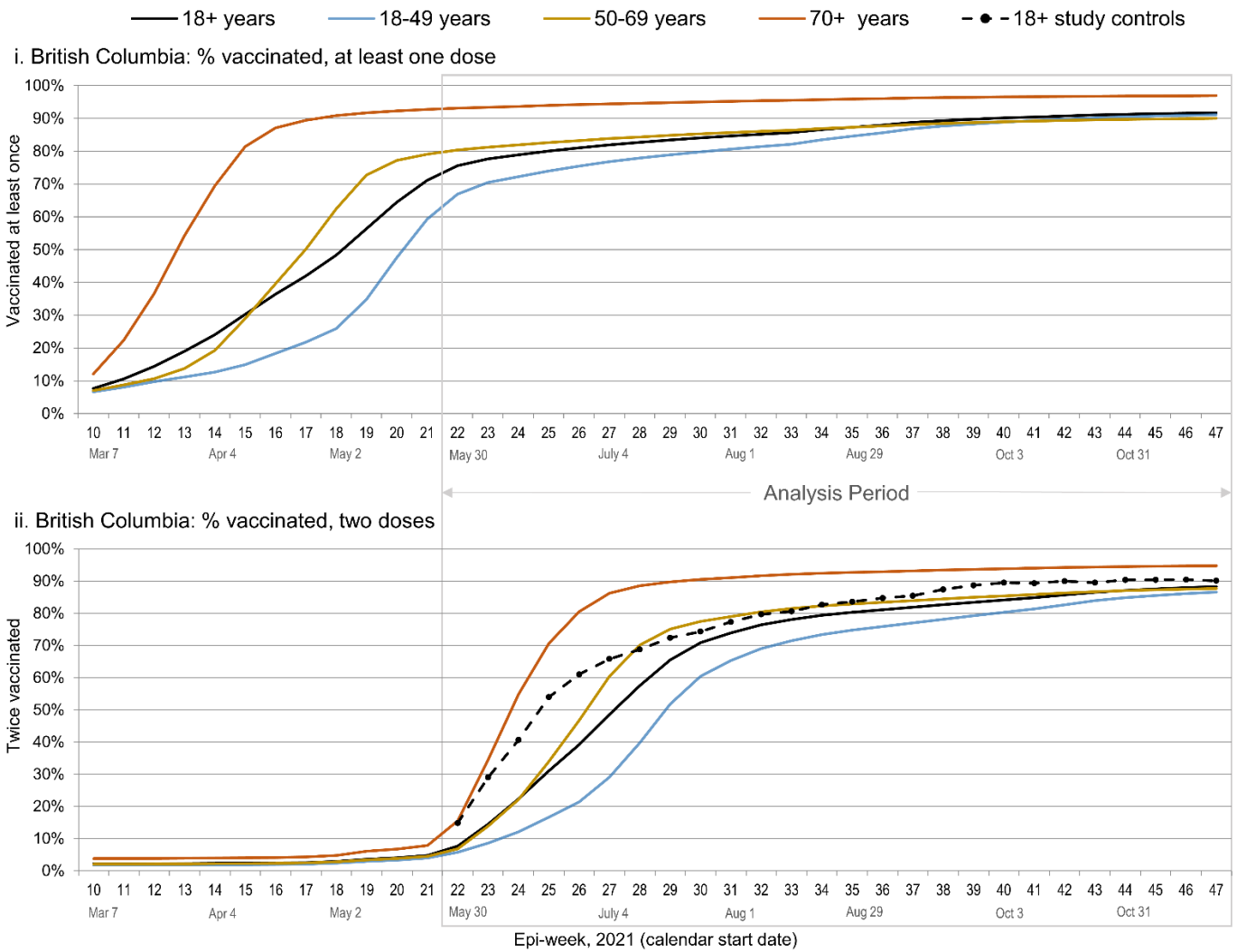
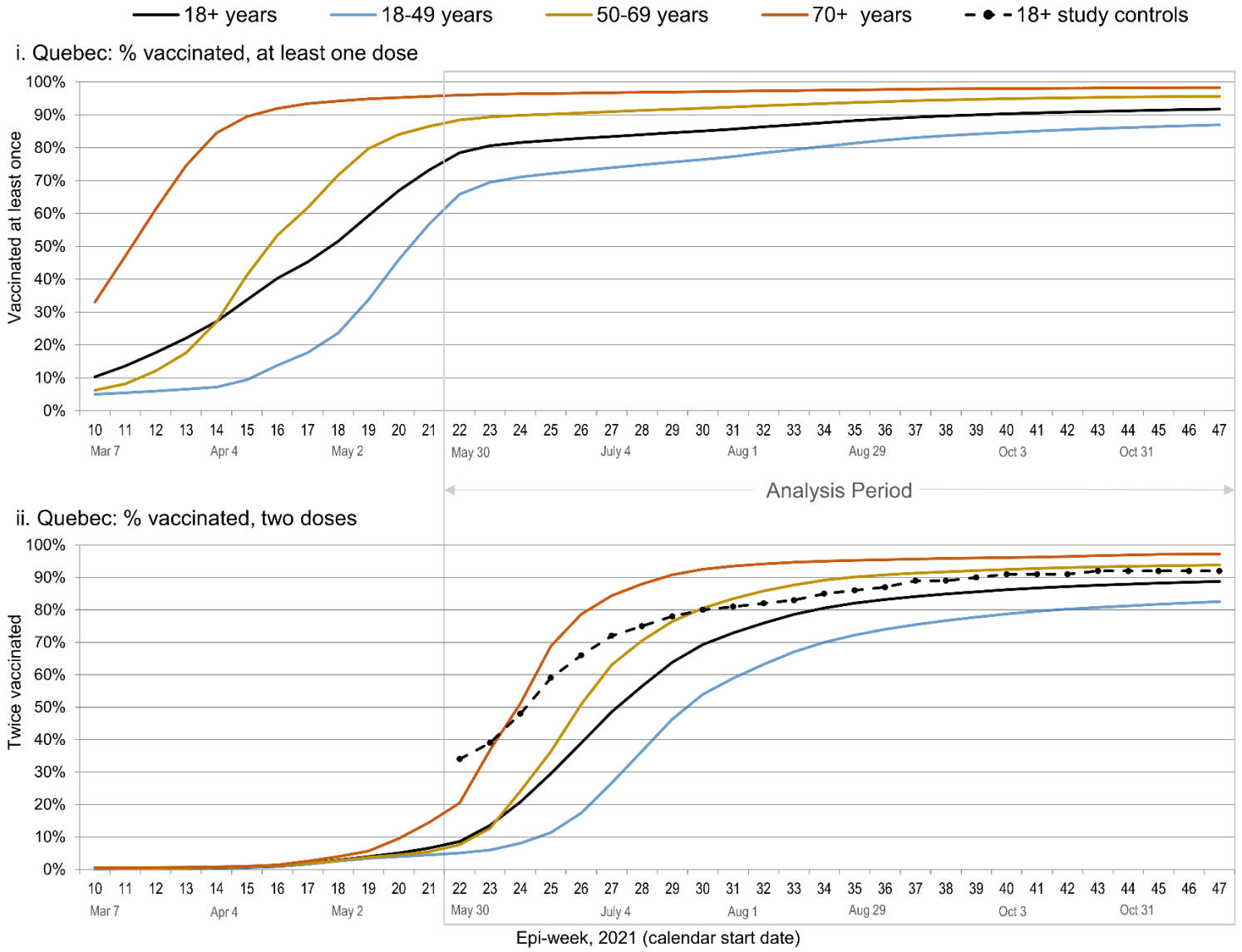
**Supplementary Figure 1. Single-dose and two-dose vaccine coverages by province, adults, ≥18 years old, British Columbia, Canada**




Shown are the weekly percentage of the general population of adults ≥18 years old having received at least one dose (panel i) or two doses (panel ii) of any SARS-CoV-2 vaccine in British Columbia (BC), Canada spanning from epi-week 10 (beginning March 7) to epi-week 47 (ending November 27) of 2021, overall and by age sub-groups. Population vaccine coverage estimates based on vaccine information from the provincial immunization registry with denominators based on estimates of population size by age group.[a] Also displayed for comparison in panel ii are the percentage of test-negative specimens (study controls) collected from twice-vaccinated participants as per profiles displayed in the main manuscript, Table 1 (single randomly-selected control without regard to time since vaccination) spanning epi-week 22 (May 30) to epi-week 47 (study analysis period). Note that with exclusion of more single-dose recipients during the early analysis period, the weekly percentage twice vaccinated among contributing study controls was higher than the general population coverage, but became similar (within 2-5% absolute) from epi-week 30 in BC.

[a]BC STATS. Population projections. Victoria, BC: BC Ministry of Citizens' Services, 2021. [Accessed 8 December 2021]. Available from: https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/population-projections

**Supplementary Figure 1 Cont'd. Single-dose and two-dose vaccine coverage by province, adults, ≥18 years old, Quebec, Canada**




Shown are the weekly percentage of the general population of adults ≥18 years old having received at least one dose (panel i) or two doses (panel ii) of any SARS-CoV-2 vaccine in Quebec, Canada spanning from epi-week 10 (beginning March 7) to epi-week 47 (ending November 27) of 2021, overall and by age sub-groups. . Population vaccine coverage estimates based on vaccine information from the provincial immunization registry with denominators based on the number of persons registered with the Quebec universal medicare system. Also displayed for comparison in panel ii are the percentage of test-negative specimens (study controls) collected from twice-vaccinated participants as per profiles displayed in the main manuscript, Table 1 (single randomly-selected control without regard to time since vaccination) spanning epi-week 22 (May 30) to epi-week 47 (study analysis period). Note that with exclusion of more single-dose recipients during the early analysis period, the weekly percentage twice vaccinated among contributing study controls was higher than the general population coverage, but became similar (within 3-5% absolute) from epi-week 33 in Quebec.

## Supplementary Material 2. Variant of concern (VOC) detection, ≥18-year-old study participants, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)

In variant-specific analyses, cases were categorized as Alpha, Gamma, or Delta variants of concern (VOC)[a,b]. In both provinces, the methods and sampling frame for genetic characterization of viruses evolved in response to changing epidemic patterns, case load and laboratory capacity.

British Columbia (BC)

In BC, genetic characterization of all case viruses was attempted by whole genome sequencing (WGS) from May 30 (epidemiological-week 22) until September 1 (mid-epi-week 35) as previously described,[c,d,e,f] but with WGS applied to a subset only (10% random sample in addition to all hospitalized, vaccinated or outbreak-associated cases) from about September 1. To address the new Omicron VOC, sequencing of all positive samples resumed in BC in December, including retrospective sequencing of specimens collected from about November 15 (epi-week 46).

As shown in **Supplementary Table 2**, 72% of case viruses overall in the current study were genetically characterized in BC. Between epi-weeks 22-34, 90% of all participant case viruses were genetically characterized with Alpha and Gamma variants comprising an approximately equal share (48% and 43%, respectively) between epi-weeks 22-26, but <20% combined between epi-weeks 27-30, and ≤1% between epi-weeks 31-34 or epi-week 35. The Delta VOC represented 81% of characterized viruses in epi-weeks 27-30, 99% in epi- weeks 31-34 and 99% in epi-week 35. Although genetic characterization data were available for a smaller percentage thereafter, Delta comprised virtually all (>99%) of these. In BC, a single Beta (B.1.351, epi-week 22) and a single Omicron (B.1.1.529, epi-week 47) VOC were also detected among participant case viruses during the analysis period (not displayed).

Quebec

In Québec,[g] between epi-weeks 22-35, diagnosis of Alpha was foremost by RT-PCR single-nucleotide polymorphism (SNP) screen for signature mutations, with a subset identified by WGS. After epi-week 35, most Alpha diagnoses were by WGS and Gamma variant detection was also by WGS throughout. Detection of Delta by RT-PCR SNP screen was confirmed by WGS until epi-week 24 and thereafter foremost by RT-PCR screen alone with a subset identified by WGS. Given a high percentage identified as Delta provincially through September and October, 2021, a random sampling only (20% of viruses) was selected for Delta screening from epi-week 42 (beginning around October 17).

As shown in **Supplementary Table 2**, 45% of case viruses overall in the current study were genetically characterized. The Alpha variant predominated over Delta in epi-weeks 22-26 (97%) and 27-30 (73%) but with Delta predominating over Alpha from August to October, including epi-weeks 31-34 (84%), 35 (97%) and 36 (99%). Although genetic characterization data were available for a smaller percentage thereafter in Quebec, virtually all were Delta (≥99%). Quebec did not detect any Gamma, Beta or Omicron VOC among participant case viruses during the study period.

Assumed Delta cases

Since virtually all case viruses characterized from epi-week 31 in BC were identified as Delta (≥99%), with the switch from systematic to targeted WGS from September 1 (mid-epi-week 35), we assumed any non-characterized viruses in BC from epi-week 35+ were Delta in variant-specific VE analyses. In Quebec, ≥99% of characterized case viruses were identified as Delta from epi-week 36, and we thus assumed from epi-week 36+ that any non-characterized viruses in Quebec were Delta.

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[a] World Health Organization. Tracking SARS-CoV-2 variants. [Accessed 19 March 2022]. Available: https://www.who.int/en/activities/tracking-SARS-CoV-2-variants/

[b] Government of Canada. SARS-CoV-2 variants: National definitions, classifications and public health actions. [Accessed 19 March 2022]. Available: https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/testing-diagnosing-case-reporting/sars-cov-2-variants-national-definitions-classifications-public-health-actions.html

[c] Skowronski DM, Setayeshgar S, Zou M, et al. Single-dose mRNA vaccine effectiveness against SARS-CoV-2, including Alpha and Gamma variants: a test-negative design in adults 70 years and older in British Columbia, Canada. Clin Infect Dis. 2021 Jul 9:ciab616. Doi: 10.1093/ciab616. Online ahead of print.

[d] Skowronski DM, Setayeshgar S, Zou M, et al. Comparative single-dose mRNA and ChAdOx1 vaccine effectiveness against SARS-CoV-2, including early variants of concern: a test-negative design, British Columbia, Canada. J Infect Dis 2022 Jan 27:jiac023. Doi: 10.1093/infdis/jiac023. Online ahead of print.

[e] Hogan CA, Jassem AN, Sbihi H, et al. Rapid increase in SARS-CoV_2 P.1 lineage leading to codominance with B.1.1.7 lineage, British Columbia, Canada, January-April 2021. Emerg Infect Dis 2021;27:2802-09. Doi: 10.3201/eid2711.211190. Epub Aug 13.

[f] British Columbia Centre for Disease Control (BCCDC). COVID-19 VoC report. [Accessed 19 March 2022]. Available from: http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data#variants

[g] Données sur les variants du SRAS-CoV-2 au Québec. Quebec City: INSPQ. [Accessed 19 March 2022]. Available from: https://www.inspq.qc.ca/covid-19/donnees/variants

**Supplementary Table 2. VOC distribution, study participants, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | Total case viruses (N, column %)[a] | Case viruses genetically characterized (N, row %)[b] | Case viruses not genetically characterized (N, row %)[c] | Among genetically characterized viruses | | | | Delta assumed[d] (n) |
|---|---|---|---|---|---|---|---|---|
| | | | | Non-VOC (n, row %)[e,f] | Alpha (n, row %)[e] | Gamma (n, row %)[e] | Delta confirmed (n, row %)[g] | |
| **British Columbia** | | | | | | | | |
| **Overall** | 44964 | 32354[h] (72) | 12610 (28) | 52 (<1) | 766 (2) | 785 (2) | 30749 (68) | 11394 |
| **By epidemiological week** | | | | | | | | |
| 22-26 (May 30-June 26) | 1603 (4) | 1332 (83) | 271 (17) | 20 (2) | 637 (48) | 569 (43) | 105 (8) | NA |
| 27-30 (July 4-July 31) | 1490 (3) | 1357 (91) | 133 (9) | 9 (1) | 78 (6) | 174 (13) | 1096 (81) | NA |
| 31-34 (Aug 1-Aug 28) | 9515 (21) | 8703 (91) | 812 (9) | 15 (<1) | 42 (<1) | 33 (<1) | 8613 (99) | NA |
| 35 (Aug 29-Sept 4) | 3086 (7) | 2704 (88) | 382 (12) | 2 (<1) | 8 (<1) | 7 (<1) | 2687 (99) | 382 |
| 36 (Sept 5-11) | 3211 (7) | 2128 (66) | 1083 (34) | 0 | 1 (<1) | 1 (<1) | 2126 (>99) | 1083 |
| 37-39 (Sept 12-Oct 2) | 8530 (19) | 3232 (38) | 5298 (62) | 1 (<1) | 0 | 1 (<1) | 3230 (>99) | 5298 |
| 40-43 (Oct 3-Oct 30) | 10227 (23) | 7150 (70) | 3077 (30) | 4 (<1) | 0 | 0 | 7146 (>99) | 3077 |
| 44-47 (Oct 31-Nov 27) | 7302 (16) | 5748 (79) | 1554 (21) | 1 (<1) | 0 | 0 | 5746 (>99) | 1554 |
| **Quebec** | | | | | | | | |
| **Overall** | 31718 | 14399 (45) | 17319 (55) | NA | 1736 (12) | NA | 12663 (88) | 13857 |
| **By epidemiological week** | | | | | | | | |
| 22-26 (May 30-June 26) | 1383 (4) | 911 (66) | 472 (34) | NA | 884 (97) | NA | 27 (3) | NA |
| 27-30 (July 4-July 31) | 966 (3) | 496 (51) | 470 (49) | NA | 362 (73) | NA | 134 (23) | NA |
| 31-34 (Aug 1-Aug 28) | 4513 (14) | 2609 (58) | 1904 (42) | NA | 408 (16) | NA | 2201 (84) | NA |
| 35 (Aug 29-Sept 4) | 2079 (7) | 1463 (70) | 616 (30) | NA | 47 (3) | NA | 1416 (97) | NA |
| 36 (Sept 5-11) | 2487 (8) | 1854 (75) | 633 (25) | NA | 25 (1) | NA | 1829 (99) | 633 |
| 37-39 (Sept 12-Oct 2) | 6047 (19) | 4786 (79) | 1261 (21) | NA | 10 (<1) | NA | 4776 (>99) | 1261 |
| 40-43 (Oct 3-Oct 30) | 5958 (19) | 2279 (38) | 3679 (62) | NA | 0 | NA | 2279 (100) | 3679 |
| 44-47 (Oct 31-Nov 27) | 8285 (26) | 1 (<1) | 8284 (100) | NA | 0 | NA | 1 (100) | 8284 |

NA=Not available

[a] Percentage of cases viruses by epidemiological period (column %)

[b] Percentage of total case viruses for which genetic characterization information available, overall and each epidemiological period (row %).

[c] Percentage of total case viruses for which genetic characterization information not available, overall and each epidemiological period (row %).

[d] As explained in Supplementary Material 1, in BC all case viruses for which genetic characterization was not available were assumed to be Delta from epi-week 35 until the end of the analysis period. In Quebec, all case viruses for which genetic characterization was not available were assumed to be Delta from epi-week 36 until the end of the analysis period.

[e] Percentage of genetically characterized viruses that were the specified variant of concern (VOC) overall and by epidemiological period (row %).

[f] In British Columbia, non-VOC tallies include 22 without the 484K substitution and 30 with 484K substitution, the latter last detected in epi-week 34.

[g] Percentage of genetically characterized viruses that were the specified variant of concern (VOC) overall and by epidemiological period (row %).

[h] Two genetically characterized case viruses in BC were other VOCs, including one Beta (B.1.351) detection in epi-week 22 and one Omicron (B.1.1.529) detection in epi-week 47, not displayed.

**Supplementary Table 3. Profile of participants ≥18 years old, by vaccine type (regardless of time since vaccination), British Columbia, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | Any two mRNA | | | BNT162b2 (Pfizer-BioNTech) | | | mRNA-1273 (Moderna) | | | ChAdOx1 (AstraZeneca) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) |
| **Total N** | 15627 | 498 | 356584 | 11411 | 347 | 256357 | 3007 | 100 | 71406 | 1246 | 33 | 12682 |
| **Age group (years)** | | | | | | | | | | | | |
| 18-49 | 9900 (63) | 73 (15) | 219797 (62) | 7315 (64) | 45 (13) | 160922 (63) | 1985 (66) | 21 (21) | 46170 (65) | 473 (38) | 3 (9) | 4153 (33) |
| 50-69 | 4010 (26) | 156 (31) | 87266 (24) | 2820 (25) | 100 (29) | 59404 (23) | 758 (25) | 37 (37) | 17780 (25) | 758 (61) | 28 (85) | 8378 (66) |
| 70-79 | 1177 (8) | 125 (25) | 32587 (9) | 844 (7) | 89 (26) | 23622 (9) | 198 (7) | 21 (21) | 4930 (7) | 14 (1) | 2 (6) | 128 (1) |
| 80+ | 540 (3) | 144 (29) | 16934 (5) | 432 (4) | 113 (33) | 12409 (5) | 66 (2) | 21 (21) | 2526 (4) | 1 (<1) | 0 (0) | 23 (<1) |
| Median (IQR) | 42 (32-58) | 71 (60-81) | 42 (31-60) | 42 (32-58) | 73 (62-82) | 41 (30-60) | 41 (31-55) | 66.5 (54.5-77) | 40 (30-57) | 55 (43-60) | 60 (55-63) | 57 (45-61) |
| **Sex** | | | | | | | | | | | | |
| Female | 8607 (55) | 205 (41) | 206950 (58) | 6317 (55) | 151 (44) | 150818 (79) | 1631 (54) | 37 (37) | 39767 (56) | 484 (39) | 10 (30) | 5853 (46) |
| Male | 7020 (45) | 293 (59) | 149634 (42) | 5094 (45) | 196 (56) | 105539 (73) | 1376 (46) | 63 (63) | 31639 (44) | 762 (61) | 23 (70) | 6829 (54) |
| **Epidemiological week** | | | | | | | | | | | | |
| 22-26 (May 30-July 3) | 81 (1) | 4 (1) | 9090 (3) | 67 (1) | 5 (1) | 6966 (3) | 9 (0) | 0 (0) | 1346 (2) | 5 (0) | 0 (0) | 541 (4) |
| 27-30 (July 4-July 31) | 297 (2) | 12 (2) | 19338 (5) | 252 (2) | 11 (3) | 13845 (5) | 29 (1) | 0 (0) | 3245 (5) | 26 (2) | 1 (3) | 863 (7) |
| 31-34 (Aug 1-Aug 28) | 2215 (14) | 80 (16) | 54591 (15) | 1689 (15) | 36 (10) | 40094 (16) | 381 (13) | 12 (12) | 10053 (14) | 211 (17) | 7 (21) | 1875 (15) |
| 35-39 (Aug 29-Oct 2) | 5003 (32) | 135 (27) | 105084 (29) | 3625 (32) | 111 (32) | 75522 (29) | 1005 (33) | 30 (30) | 21301 (30) | 415 (33) | 10 (30) | 3544 (28) |
| 40-43 (Oct 3-Oct 30) | 4418 (28) | 147 (30) | 93229 (26) | 3133 (27) | 98 (28) | 66639 (26) | 911 (30) | 34 (34) | 19377 (27) | 352 (28) | 6 (18) | 3224 (25) |
| 44-47 (Oct 31–Nov 27) | 3613 (23) | 120 (24) | 75252 (21) | 2645 (23) | 86 (25) | 53291 (21) | 672 (22) | 24 (24) | 16084 (23) | 237 (19) | 9 (27) | 2635 (21) |
| **Interval between doses** | | | | | | | | | | | | |
| 21-34 days (3-4 weeks) | 649 (4) | 24 (5) | 11605 (3) | 428 (4) | 12 (3) | 7041 (3) | 191 (6) | 10 (10) | 4165 (6) | 7 (1) | 0 (0) | 102 (1) |
| 35-48 days (5-6 weeks) | 1555 (10) | 45 (9) | 24411 (7) | 1004 (9) | 21 (6) | 15544 (6) | 479 (16) | 20 (20) | 7610 (11) | 43 (3) | 1 (3) | 450 (4) |
| 49-62 days (7-8 weeks) | 5602 (36) | 71 (14) | 138979 (39) | 4172 (37) | 46 (13) | 100047 (39) | 911 (30) | 13 (13) | 27509 (39) | 612 (49) | 16 (48) | 6521 (51) |
| 63-83 days (9-11 weeks) | 4788 (31) | 161 (32) | 121321 (34) | 3570 (31) | 123 (35) | 87624 (34) | 803 (27) | 24 (24) | 22695 (32) | 485 (39) | 14 (42) | 4883 (39) |
| 84-111 days (12-15 weeks) | 2565 (16) | 159 (32) | 51457 (14) | 1881 (16) | 113 (33) | 39454 (15) | 537 (18) | 28 (28) | 7831 (11) | 93 (7) | 2 (6) | 673 (5) |
| 112+ days (16+ weeks) | 468 (3) | 38 (8) | 8811 (2) | 356 (3) | 32 (9) | 6647 (3) | 86 (3) | 5 (5) | 1596 (2) | 6 (<1) | 0 (0) | 53 (<1) |
| Median (IQR), days | 63 (54-77) | 77.5 (60-93) | 63 (55-75) | 63 (55-75) | 79 (63-96) | 63 (56-76) | 61 (50-78) | 69.5 (45.5-88) | 61 (53-72) | 62 (56-69) | 62 (58-65) | 62 (56-68) |
| **Time since second dose** | | | | | | | | | | | | |
| 0-13 d (0-1 w) | 1157 (7) | 29 (6) | 18634 (5) | 859 (8) | 19 (5) | 12935 (5) | 263 (9) | 9 (9) | 4414 (6) | 8 (1) | 0 (0) | 443 (3) |
| 14-27 d (2-3 w) | 476 (3) | 13 (3) | 23622 (7) | 369 (3) | 9 (3) | 16891 (7) | 91 (3) | 2 (2) | 5244 (7) | 11 (1) | 0 (0) | 428 (3) |
| 28-55 d (4-7 w) | 1832 (12) | 41 (8) | 59787 (17) | 1410 (12) | 27 (8) | 43026 (17) | 317 (11) | 9 (9) | 12899 (18) | 80 (6) | 3 (9) | 1178 (9) |
| 56-83 d (8-11 w) | 2922 (19) | 87 (17) | 76792 (22) | 2163 (19) | 65 (19) | 55508 (22) | 503 (17) | 13 (13) | 15193 (21) | 255 (20) | 7 (21) | 2281 (18) |
| 84-111 d (12-15 w) | 3451 (22) | 112 (22) | 77978 (22) | 2544 (22) | 78 (22) | 55879 (22) | 590 (20) | 19 (19) | 15003 (21) | 334 (27) | 9 (27) | 3019 (24) |
| 112-139 d (16-19 w) | 3156 (20) | 106 (21) | 59908 (17) | 2249 (20) | 77 (22) | 42731 (17) | 564 (19) | 19 (19) | 11082 (16) | 341 (27) | 7 (21) | 3045 (24) |
| 140-167 d (20-23 w) | 1442 (9) | 79 (16) | 25367 (7) | 1006 (9) | 51 (15) | 18042 (7) | 303 (10) | 19 (19) | 4511 (6) | 194 (16) | 6 (18) | 2110 (17) |
| 168-195 d (24-27 w) | 361 (2) | 11 (2) | 5619 (2) | 255 (2) | 9 (3) | 4266 (2) | 105 (3) | 2 (2) | 1274 (2) | 20 (2) | 1 (3) | 170 (1) |
| 196+ d (28+ w) | 830 (5) | 20 (4) | 8877 (2) | 556 (5) | 12 (3) | 7079 (3) | 271 (9) | 8 (8) | 1786 (3) | 3 (<1) | 0 (0) | 8 (<1) |
| Median, days | 95 | 103 | 83 | 93 | 101 | 83 | 99 | 109.5 | 80 | 106 | 99 | 103 |
| Range, days | 0-303 | 2-303 | 0-589 | 0-302 | 2-277 | 0-589 | 0-303 | 2-303 | 0-577 | 0-506 | 41-192 | 0-206 |
| IQR, days | 61-127 | 70-133 | 50-116 | 59-125 | 68-132 | 50-116 | 60-135 | 71.5-145.5 | 46-113 | 79-131 | 77-137 | 71-131 |

Hosp = Hospitalized cases; IQR = interquartile range

**Supplementary Table 3 Cont'd. Profile of participants ≥18 years old, by vaccine type (regardless of time since vaccination), British Columbia, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | Mixed mRNA | | | Mixed ChAdOX1 plus mRNA | | |
|---|---|---|---|---|---|---|
| | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) |
| **Total N** | 1207 | 50 | 28815 | 962 | 6 | 22094 |
| **Age group (years)** | | | | | | |
| 18-49 | 598 (50) | 6 (12) | 12701 (44) | 611 (64) | 1 (17) | 12154 (55) |
| 50-69 | 432 (36) | 19 (38) | 10080 (35) | 343 (36) | 3 (50) | 9820 (44) |
| 70-79 | 135 (11) | 15 (30) | 4035 (14) | 6 (1) | 1 (17) | 102 (<1) |
| 80+ | 42 (3) | 10 (20) | 1999 (7) | 2 (<1) | 1 (17) | 18 (<1) |
| Median (IQR) | 50 (36-64) | 69 (58-76) | 54 (36-68) | 46 (40-53) | 59 (53-73) | 48 (41-57) |
| **Sex** | | | | | | |
| Female | 659 (55) | 17 (34) | 16363 (57) | 429 (45) | 1 (17) | 11437 (52) |
| Male | 548 (45) | 33 (66) | 12452 (43) | 533 (55) | 5 (83) | 10657 (48) |
| **Epidemiological week** | | | | | | |
| 22-26 (May 30-July 3) | 5 (0) | 0 (0) | 778 (3) | 20 (2) | 0 (0) | 362 (2) |
| 27-30 (July 4-July 31) | 16 (1) | 0 (0) | 2248 (8) | 14 (1) | 0 (0) | 1242 (6) |
| 31-34 (Aug 1-Aug 28) | 145 (12) | 7 (14) | 4442 (15) | 130 (14) | 2 (33) | 3236 (15) |
| 35-39 (Aug 29-Oct 2) | 371 (31) | 18 (36) | 8260 (29) | 284 (30) | 1 (17) | 6613 (30) |
| 40-43 (Oct 3-Oct 30) | 374 (31) | 15 (30) | 7212 (25) | 252 (26) | 0 (0) | 5885 (27) |
| 44-47 (Oct 31–Nov 27) | 296 (25) | 10 (20) | 5875 (20) | 262 (27) | 3 (50) | 4756 (22) |
| **Interval between doses** | | | | | | |
| 21-34 days (3-4 weeks) | 30 (2) | 2 (4) | 397 (1) | 3 (0) | 0 (0) | 31 (<1) |
| 35-48 days (5-6 weeks) | 71 (6) | 4 (8) | 1254 (4) | 13 (1) | 0 (0) | 167 (1) |
| 49-62 days (7-8 weeks) | 518 (43) | 11 (22) | 11422 (40) | 259 (27) | 1 (17) | 5824 (26) |
| 63-83 days (9-11 weeks) | 415 (34) | 14 (28) | 11002 (38) | 514 (53) | 5 (83) | 12263 (56) |
| 84-111 days (12-15 weeks) | 147 (12) | 18 (36) | 4172 (14) | 147 (15) | 0 (0) | 3416 (15) |
| 112+ days (16+ weeks) | 26 (2) | 1 (2) | 568 (2) | 26 (3) | 0 (0) | 393 (2) |
| Median (IQR), days | 62 (55-72) | 72 (60-87) | 64 (56-75) | 68 (62-78) | 72.5 (65-80) | 69 (62-79) |
| **Time since second dose** | | | | | | |
| 0-13 d (0-1 w) | 35 (3) | 1 (2) | 1285 (4) | 41 (4) | 0 (0) | 729 (3) |
| 14-27 d (2-3 w) | 15 (1) | 1 (2) | 1486 (5) | 11 (1) | 1 (17) | 852 (4) |
| 28-55 d (4-7 w) | 104 (9) | 5 (10) | 3862 (13) | 104 (11) | 1 (17) | 2885 (13) |
| 56-83 d (8-11 w) | 256 (21) | 9 (18) | 6089 (21) | 184 (19) | 1 (17) | 4748 (21) |
| 84-111 d (12-15 w) | 317 (26) | 15 (30) | 7095 (25) | 266 (28) | 0 (0) | 6152 (28) |
| 112-139 d (16-19 w) | 343 (28) | 10 (20) | 6095 (21) | 253 (26) | 1 (17) | 4825 (22) |
| 140-167 d (20-23 w) | 133 (11) | 9 (18) | 2813 (10) | 103 (11) | 2 (33) | 1877 (9) |
| 168-195 d (24-27 w) | 1 (<1) | 0 (0) | 79 (<1) | 0 | 0 (0) | 26 (<1) |
| 196+ d (28+ w) | 3 (<1) | 0 (0) | 11 (<1) | 0 | 0 (0) | 0 |
| Median, days | 101 | 102.5 | 90 | 100 | 105.5 | 92 |
| Range, days | 1-246 | 4-160 | 0-271 | 0-166 | 27-158 | 0-189 |
| IQR, days | 72-125 | 74-132 | 58-119 | 70-125 | 42-141 | 62-118 |

Hosp = Hospitalized cases; IQR = interquartile range

**Supplementary Table 4. Profile of participants ≥18 years old, by vaccine type (regardless of time since vaccination), Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | Any two mRNA | | | BNT162b2 (Pfizer-BioNTech) | | | mRNA-1273 (Moderna) | | | ChAdOx1 (AstraZeneca) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) |
| **Total N** | 13854 | 344 | 771821 | 10943 | 275 | 580186 | 2554 | 61 | 170714 | 597 | 30 | 22740 |
| **Age group (years)** | | | | | | | | | | | | |
| 18-49 | 9173 (66) | 65 (19) | 452894 (59) | 7147 (65) | 46 (17) | 333333 (57) | 1755 (69) | 17 (28) | 105979 (62) | 68 (11) | 0 (0) | 1427 (6) |
| 50-69 | 3336 (24) | 83 (24) | 206702 (27) | 2670 (24) | 63 (23) | 156410 (27) | 607 (24) | 18 (30) | 45639 (27) | 369 (62) | 11 (37) | 13119 (58) |
| 70-79 | 871 (6) | 79 (23) | 74741 (10) | 728 (7) | 67 (24) | 60523 (10) | 128 (5) | 11 (18) | 12508 (7) | 145 (24) | 11 (37) | 6531 (29) |
| 80+ | 474 (3) | 117 (34) | 37484 (5) | 398 (4) | 99 (36) | 29920 (5) | 64 (3) | 15 (25) | 6588 (4) | 15 (3) | 8 (27) | 1663 (7) |
| Median (IQR) | 43 (34-46) | 73 (59-82) | 44 (33-63) | 43 (35-57) | 74 (61-82) | 45 (33-64) | 41 (32-55) | 66 (47-79) | 42 (31-60) | 59 (56-70) | 73 (66-86) | 63 (57-74) |
| **Sex** | | | | | | | | | | | | |
| Female | 7724 (56) | 151 (44) | 458489 (59) | 6108 (56) | 123 (45) | 346767 (60) | 1435 (56) | 27 (44) | 99986 (59) | 238 (40) | 9 (30) | 11230 (49) |
| Male | 6130 (44) | 193 (56) | 313332 (41) | 4835 (44) | 152 (55) | 233419 (40) | 1119 (44) | 34 (56) | 70728 (41) | 359 (60) | 21 (70) | 11510 (51) |
| **Epidemiological week** | | | | | | | | | | | | |
| 22-26 (May 30-July 3) | 98 (1) | 6 (2) | 34887 (5) | 87 (1) | 5 (2) | 27541 (5) | 9 (0) | 1 (2) | 6275 (4) | 8 (1) | 2 (7) | 2506 (11) |
| 27-30 (July 4-July 31) | 199 (1) | 6 (2) | 56818 (7) | 168 (2) | 5 (2) | 42599 (7) | 27 (1) | 1 (2) | 12301 (7) | 6 (1) | 0 (0) | 2468 (11) |
| 31-34 (Aug 1-Aug 28) | 1260 (9) | 37 (11) | 91971 (12) | 1013 (9) | 29 (11) | 69176 (12) | 217 (8) | 5 (8) | 20161 (12) | 60 (10) | 3 (10) | 2910 (13) |
| 35-39 (Aug 29-Oct 2) | 4005 (29) | 119 (35) | 205616 (27) | 3199 (29) | 92 (33) | 154876 (27) | 698 (27) | 22 (36) | 45322 (27) | 167 (28) | 10 (33) | 5249 (23) |
| 40-43 (Oct 3-Oct 30) | 3040 (22) | 94 (27) | 186629 (24) | 2411 (22) | 78 (28) | 139565 (24) | 576 (23) | 16 (26) | 42280 (25) | 139 (23) | 7 (23) | 4700 (21) |
| 44-47 (Oct 31–Nov 27) | 5252 (38) | 82 (24) | 195900 (25) | 4065 (37) | 66 (24) | 146429 (25) | 1027 (40) | 16 (26) | 44375 (26) | 217 (36) | 8 (27) | 4907 (22) |
| **Interval between doses** | | | | | | | | | | | | |
| 21-34 days (3-4 weeks) | 1139 (8) | 36 (10) | 39965 (5) | 844 (8) | 22 (8) | 25688 (4) | 266 (10) | 11 (18) | 13171 (8) | 11 (2) | 1 (3) | 245 (1) |
| 35-48 days (5-6 weeks) | 1112 (8) | 14 (4) | 49484 (6) | 717 (7) | 8 (3) | 29305 (5) | 334 (13) | 6 (10) | 16669 (10) | 44 (7) | 0 (0) | 1015 (4) |
| 49-62 days (7-8 weeks) | 3963 (29) | 42 (12) | 205867 (27) | 3099 (28) | 33 (12) | 150499 (26) | 767 (30) | 8 (13) | 48722 (29) | 220 (37) | 10 (33) | 6527 (29) |
| 63-83 days (9-11 weeks) | 4310 (31) | 90 (26) | 254282 (33) | 3449 (32) | 77 (28) | 193294 (33) | 774 (30) | 13 (21) | 55579 (33) | 270 (45) | 15 (50) | 11778 (52) |
| 84-111 days (12-15 weeks) | 2100 (15) | 89 (26) | 143142 (19) | 1752 (16) | 77 (28) | 113002 (19) | 293 (11) | 11 (18) | 27141 (16) | 40 (7) | 4 (13) | 2557 (11) |
| 112+ days (16+ weeks) | 1230 (9) | 73 (21) | 79081 (10) | 1082 (10) | 58 (21) | 68398 (12) | 120 (5) | 12 (20) | 9432 (6) | 12 (2) | 0 (0) | 618 (3) |
| Median (IQR), days | 64 (56-83) | 82 (60-104) | 69 (57-87) | 66 (56-84) | 83 (64-102) | 70 (58-90) | 61 (49-75) | 75 (44-104) | 64 (55-80) | 64 (56-77) | 73 (57-77) | 73 (58-79) |
| **Time since second dose** | | | | | | | | | | | | |
| 0-13 days (0-1 weeks) | 897 (6) | 16 (5) | 47528 (6) | 720 (7) | 14 (5) | 35071 (6) | 159 (6) | 1 (2) | 10925 (6) | 7 (1) | 1 (3) | 1319 (6) |
| 14-27 days (2-3 weeks) | 413 (3) | 20 (6) | 54695 (7) | 325 (3) | 13 (5) | 41190 (7) | 83 (3) | 5 (8) | 12065 (7) | 5 (1) | 1 (3) | 1482 (7) |
| 28-55 days (4-7 weeks) | 1571 (11) | 34 (10) | 128863 (17) | 1257 (11) | 27 (10) | 97604 (17) | 280 (11) | 6 (10) | 27972 (16) | 18 (3) | 0 (0) | 2828 (12) |
| 56-83 days (8-11 weeks) | 2625 (19) | 54 (16) | 156041 (20) | 2050 (19) | 38 (14) | 116946 (20) | 492 (19) | 12 (20) | 34922 (20) | 71 (12) | 3 (10) | 3177 (14) |
| 84-111 days (12-15 weeks) | 3019 (22) | 89 (26) | 161501 (21) | 2418 (22) | 77 (28) | 120889 (21) | 543 (21) | 12 (20) | 36202 (21) | 130 (22) | 5 (17) | 4208 (19) |
| 112-139 days (16-19 weeks) | 3111 (22) | 77 (22) | 134272 (17) | 2458 (22) | 65 (24) | 99670 (17) | 551 (22) | 12 (20) | 30370 (18) | 148 (25) | 7 (23) | 4460 (20) |
| 140-167 days (20-23 weeks) | 1574 (11) | 43 (13) | 63484 (8) | 1252 (11) | 35 (13) | 48873 (8) | 276 (11) | 8 (13) | 13187 (8) | 145 (24) | 10 (33) | 4063 (18) |
| 168-195 days (24-27 weeks) | 382 (3) | 6 (2) | 17272 (2) | 291 (3) | 2 (1) | 13779 (2) | 82 (3) | 4 (7) | 3157 (2) | 72 (12) | 3 (10) | 1190 (5) |
| 196+ days (28+ weeks) | 262 (2) | 5 (1) | 8165 (1) | 172 (2) | 4 (1) | 6164 (1) | 88 (3) | 1 (2) | 1914 (1) | 1 (0) | 0 (0) | 13 (0) |
| Median, days | 97 | 99 | 83 | 97 | 101 | 83 | 97 | 93 | 83 | 125 | 125 | 101 |
| Range, days | 0-290 | 0-284 | 0-325 | 0-289 | 0-284 | 0-325 | 0-290 | 1-210 | 0-298 | 2-236 | 6-176 | 0-233 |
| IQR, days | 62-128 | 68-125 | 48-117 | 62-127 | 72-125 | 48-117 | 62-130 | 66-127 | 48-117 | 93-154 | 104-159 | 56-137 |

Hosp = Hospitalized cases; IQR = interquartile range

**Supplementary Table 4 Cont'd. Profile of participants ≥18 years old, by vaccine type (regardless of time since vaccination), Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | Mixed mRNA | | | Mixed ChAdOX1 plus mRNA | | |
|---|---|---|---|---|---|---|
| | Cases (n, %) | Hosp (n, %) | Controls (n, %) | Cases (n, %) | Hosp (n, %) | Controls (n, %) |
| **Total N** | 357 | 8 | 20921 | 645 | 12 | 42937 |
| **Age group (years)** | | | | | | |
| 18-49 | 271 (76) | 2 (25) | 13582 (65) | 194 (30) | 0 | 9566 (22) |
| 50-69 | 59 (17) | 2 (25) | 4653 (22) | 418 (65) | 5 (42) | 29349 (68) |
| 70-79 | 15 (4) | 1 (13) | 1710 (8) | 25 (4) | 3 (25) | 3472 (8) |
| 80+ | 12 (3) | 3 (38) | 976 (5) | 8 (1) | 4 (33) | 550 (1) |
| Median (IQR) | 40 (32-49) | 68 (50-87) | 41 (30-60) | 55 (49-59) | 77 (61-83) | 56 (51-60) |
| **Sex** | | | | | | |
| Female | 181 (51) | 1 (13) | 11736 (56) | 247 (38) | 9 (75) | 20584 (48) |
| Male | 176 (49) | 7 (88) | 9185 (44) | 398 (62) | 3 (25) | 22353 (52) |
| **Epidemiological week** | | | | | | |
| 22-26 (May 30-July 3) | 2 (1) | 0 (0) | 1071 (5) | 2 (0) | 0 (0) | 1273 (3) |
| 27-30 (July 4-July 31) | 4 (1) | 0 (0) | 1918 (9) | 6 (1) | 0 (0) | 4093 (10) |
| 31-34 (Aug 1-Aug 28) | 30 (8) | 3 (38) | 2634 (13) | 56 (9) | 2 (17) | 5454 (13) |
| 35-39 (Aug 29-Oct 2) | 108 (30) | 5 (63) | 5418 (26) | 196 (30) | 5 (42) | 11338 (26) |
| 40-43 (Oct 3-Oct 30) | 53 (15) | 0 (0) | 4784 (23) | 137 (21) | 1 (8) | 10047 (23) |
| 44-47 (Oct 31-Nov 27) | 160 (45) | 0 (0) | 5096 (24) | 248 (38) | 4 (33) | 10732 (25) |
| **Interval between doses** | | | | | | |
| 21-34 days (3-4 weeks) | 29 (8) | 3 (38) | 1106 (5) | 1 (0) | 1 (8) | 54 (0) |
| 35-48 days (5-6 weeks) | 61 (17) | 0 (0) | 3510 (17) | 2 (0) | 0 (0) | 168 (0) |
| 49-62 days (7-8 weeks) | 97 (27) | 1 (13) | 6646 (32) | 163 (25) | 1 (8) | 8195 (19) |
| 63-83 days (9-11 weeks) | 87 (24) | 0 (0) | 5409 (26) | 346 (54) | 3 (25) | 23092 (54) |
| 84-111 days (12-15 weeks) | 55 (15) | 1 (13) | 2999 (14) | 102 (16) | 6 (50) | 8484 (20) |
| 112+ days (16+ weeks) | 28 (8) | 3 (38) | 1251 (6) | 31 (5) | 1 (8) | 2944 (7) |
| Median (IQR), days | 62 (48-81) | 69 (28-114) | 61 (50-78) | 71 (62-82) | 87 (72-95) | 73 (64-84) |
| **Time since second dose** | | | | | | |
| 0-13 d (0-1 w) | 18 (5) | 1 (13) | 1532 (7) | 13 (2) | 0 | 2530 (6) |
| 14-27 d (2-3 w) | 5 (1) | 2 (25) | 1440 (7) | 7 (1) | 0 | 2557 (6) |
| 28-55 d (4-7 w) | 34 (10) | 1 (13) | 3287 (16) | 51 (8) | 1 (8) | 5642 (13) |
| 56-83 d (8-11 w) | 83 (23) | 4 (50) | 4173 (20) | 125 (19) | 2 (17) | 8259 (19) |
| 84-111 d (12-15 w) | 58 (16) | 0 (0) | 4410 (21) | 151 (23) | 4 (33) | 9903 (23) |
| 112-139 d (16-19 w) | 102 (29) | 0 (0) | 4232 (20) | 169 (26) | 3 (25) | 9637 (22) |
| 140-167 d (20-23 w) | 46 (13) | 0 (0) | 1424 (7) | 128 (20) | 2 (17) | 4350 (10) |
| 168-195 d (24-27 w) | 9 (3) | 0 (0) | 336 (2) | 1 (<1) | 0 | 58 (<1) |
| 196+ d (28+ w) | 2 (1) | 0 (0) | 87 (<1) | 0 | 0 | 1 (<1) |
| Median, days | 102 | 84 | 57 | 106 | 106 | 90 |
| Range, days | 0-206 | 2-83 | 0-265 | 2-181 | 52-144 | 0-197 |
| IQR, days | 68-131 | 20-71 | 47-117 | 77-134 | 83-132 | 56-121 |

Hosp = Hospitalized cases; IQR = interquartile range

**Supplementary Table 5. Two-dose vaccine effectiveness against infection and hospitalization (≥14 days post-second-dose), by vaccine type, adults ≥18 years old, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia | | | | Quebec | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Infection** | | | | | | | | |
| Two any vaccines | 16629 | 371554 | 87 (87, 87) | **89 (88, 89)** | 14179 | 786122 | 84 (84, 84) | **88 (88, 88)** |
| Two any mRNA vaccines | 14470 | 337950 | 88 (87, 88) | **89 (89, 89)** | 12957 | 724293 | 84 (84, 84) | **88 (88, 88)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 10552 | 243422 | 88 (87, 88) | **89 (89, 89)** | 10223 | 545115 | 83 (83, 84) | **88 (87, 88)** |
| Two mRNA-1273 (mRNA) (Moderna) | 2744 | 66992 | 88 (88, 89) | **90 (89, 90)** | 2395 | 159789 | 87 (86, 87) | **89 (89, 90)** |
| Two mixed mRNA doses | 1172 | 27530 | 88 (87, 89) | **90 (89, 90)** | 339 | 19389 | 84 (83, 86) | **88 (86, 89)** |
| Two ChAdOx1 (AstraZeneca) | 1238 | 12239 | 71 (69, 73) | **74 (72, 76)** | 590 | 21421 | 75 (73, 77) | **78 (76, 80)** |
| Two mixed ChAdOx1 + mRNA | 921 | 21365 | 88 (87, 88) | **89 (88, 89)** | 632 | 40407 | 86 (85, 87) | **89 (88, 90)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Hospitalization** | | | | | | | | |
| Two any vaccines | 508 | 371554 | 96 (96, 96) | **97 (97, 98)** | 369 | 786122 | 93 (93, 94) | **97 (97, 97)** |
| Two any mRNA vaccines | 469 | 337950 | 96 (95, 96) | **97 (97, 98)** | 328 | 724293 | 94 (93, 94) | **97 (97, 97)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 328 | 243422 | 96 (95, 96) | **97 (97, 98)** | 261 | 545115 | 93 (92, 94) | **97 (97, 97)** |
| Two mRNA-1273 (mRNA) (Moderna) | 91 | 66992 | 96 (95, 97) | **97 (97, 98)** | 60 | 159789 | 95 (93, 96) | **97 (96, 98)** |
| Two mixed mRNA doses | 49 | 27530 | 95 (93, 96) | **98 (97, 98)** | 7 | 19389 | 95 (89, 98) | **97 (94, 99)** |
| Two ChAdOx1 (AstraZeneca) | 33 | 12239 | 92 (89, 94) | **95 (94, 97)** | 29 | 21421 | 81 (73, 87) | **95 (93, 97)** |
| Two mixed ChAdOx1 + mRNA | 6 | 21365 | 99 (98, 100) | **99 (99, 100)** | 12 | 40407 | 96 (93, 98) | **99 (97, 99)** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |

VE=vaccine effectiveness; 95% CI = 95% confidence interval

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 6. Two-dose vaccine effectiveness against infection (≥14 days post-vaccination), by age group and vaccine type, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia | | | | Quebec | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **18-49 years** | | | | | | | | |
| Two any vaccines | 9998 | 223621 | 87 (87, 87) | **88 (87, 88)** | 8708 | 435760 | 83 (82, 83) | **88 (87, 88)** |
| Two any mRNA vaccines | 8945 | 207812 | 87 (87, 88) | **88 (88, 89)** | 8453 | 425351 | 83 (82, 83) | **88 (87, 88)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 6607 | 152530 | 87 (87, 88) | **88 (88, 88)** | 6578 | 313614 | 82 (81, 82) | **87 (87, 87)** |
| Two mRNA-1273 (mRNA) (Moderna) | 1763 | 43062 | 88 (87, 89) | **89 (88, 89)** | 1617 | 99082 | 86 (85, 87) | **89 (88, 89)** |
| Two mixed mRNA doses | 573 | 12216 | 86 (85, 87) | **88 (87, 89)** | 258 | 12655 | 82 (80, 84) | **87 (85, 88)** |
| Two ChAdOx1 (AstraZeneca) | 470 | 4038 | 66 (62, 69) | **68 (64, 71)** | 67 | 1343 | 57 (44, 66) | **69 (60, 76)** |
| Two mixed ChAdOx1 + mRNA | 583 | 11771 | 85 (84, 87) | **86 (85, 87)** | 188 | 9066 | 82 (79, 84) | **87 (85, 89)** |
| Unvaccinated | 20047 | 58842 | Reference | | 13488 | 117326 | Reference | |
| **50-69 years** | | | | | | | | |
| Two any vaccines | 4940 | 101075 | 88 (87, 88) | **90 (89, 90)** | 3974 | 234417 | 85 (84, 86) | **89 (89, 90)** |
| Two any mRNA vaccines | 3856 | 83532 | 89 (88, 89) | **91 (90, 91)** | 3196 | 194368 | 86 (85, 86) | **90 (89, 90)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 2704 | 56938 | 88 (88, 89) | **90 (89, 91)** | 2551 | 147154 | 85 (84, 86) | **89 (89, 90)** |
| Two mRNA-1273 (mRNA) (Moderna) | 726 | 16919 | 89 (88, 90) | **92 (91, 92)** | 588 | 42917 | 88 (87, 89) | **91 (90, 92)** |
| Two mixed mRNA doses | 426 | 9673 | 89 (88, 90) | **91 (90, 92)** | 59 | 4297 | 88 (84, 91) | **91 (88, 93)** |
| Two ChAdOx1 (AstraZeneca) | 753 | 8059 | 77 (75, 79) | **78 (76, 80)** | 364 | 12379 | 74 (71, 77) | **81 (78, 83)** |
| Two mixed ChAdOx1 + mRNA | 331 | 9484 | 91 (90, 92) | **92 (91, 93)** | 412 | 27670 | 87 (85, 88) | **90 (89, 91)** |
| Unvaccinated | 5706 | 14117 | Reference | | 2679 | 23615 | Reference | |
| **≥70 years[b]** | | | | | | | | |
| Two any vaccines | 1691 | 46858 | 88 (87, 89) | **91 (90, 91)** | 1497 | 115945 | 80 (77, 82) | **86 (84, 87)** |
| Two any mRNA vaccines | 1669 | 46606 | 88 (87, 89) | **91 (90, 91)** | 1306 | 104574 | 80 (78, 82) | **86 (85, 88)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 1241 | 33954 | 88 (87, 89) | **90 (89, 91)** | 1094 | 84347 | 79 (77, 82) | **86 (84, 87)** |
| Two mRNA-1273 (mRNA) (Moderna) | 255 | 7011 | 88 (86, 89) | **91 (90, 93)** | 190 | 17790 | 83 (80, 86) | **88 (86, 90)** |
| Two mixed mRNA doses | 173 | 5641 | 90 (88, 91) | **92 (91, 93)** | 22 | 2437 | 86 (78, 91) | **90 (85, 94)** |
| Two ChAdOx1 (AstraZeneca) | 15 | 142 | 65 (40, 79) | **74 (54, 85)** | 159 | 7699 | 67 (61, 73) | **79 (75, 83)** |
| Two mixed ChAdOx1 + mRNA | 7 | 110 | 79 (54, 90) | **84 (65, 93)** | 32 | 3671 | 86 (80, 90) | **92 (89, 95)** |
| Unvaccinated | 1376 | 4594 | Reference | | 455 | 7202 | Reference | |
| **≥80 years[c]** | | | | | | | | |
| Two any vaccines | 526 | 15833 | 84 (81, 86) | **87 (85, 89)** | 482 | 36925 | 68 (61, 74) | **78 (72, 82)** |
| Two any mRNA vaccines | 523 | 15796 | 84 (82, 86) | **87 (85, 89)** | 459 | 34863 | 68 (61, 74) | **78 (72, 82)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 419 | 11583 | 82 (80, 85) | **86 (83, 88)** | 386 | 27890 | 67 (59, 73) | **76 (71, 81)** |
| Two mRNA-1273 (mRNA) (Moderna) | 63 | 2368 | 87 (83, 90) | **90 (87, 93)** | 64 | 6106 | 75 (66, 81) | **82 (75, 87)** |
| Two mixed mRNA doses | 41 | 1845 | 89 (85, 92) | **91 (88, 94)** | 9 | 867 | 75 (50, 87) | **81 (62, 90)** |
| Two ChAdOx1 (AstraZeneca) | 1 | 22 | NE | **NE** | 15 | 1560 | 77 (60, 86) | **80 (66, 88)** |
| Two mixed ChAdOx1 + mRNA | 2 | 15 | NE | **NE** | 8 | 501 | 61 (21, 81) | **73 (45, 87)** |
| Unvaccinated | 372 | 1803 | Reference | | 125 | 3024 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).
[b] Among those ≥70 years, VE additionally adjusted for 70-79 and ≥80 years.
[c] In Quebec, adjusted VE estimates in ≥80-year-olds were adjusted for calendar time bi-weekly owing to limited sample size.

**Supplementary Table 7. Two-dose vaccine effectiveness against hospitalization (≥14 days post-vaccination), by age group and vaccine type, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia | | | | Quebec | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **18-49 years** | | | | | | | | |
| Two any vaccines | 70 | 223621 | 98 (98, 99) | **98 (98, 99)** | 60 | 435760 | 97 (95, 97) | **97 (97, 98)** |
| Two any mRNA vaccines | 66 | 207812 | 98 (98, 98) | **98 (98, 99)** | 60 | 425351 | 96 (95, 97) | **97 (96, 98)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 40 | 152530 | 98 (98, 99) | **99 (98, 99)** | 42 | 313614 | 97 (95, 98) | **98 (97, 98)** |
| Two mRNA-1273 (mRNA) (Moderna) | 19 | 43062 | 97 (96, 98) | **98 (96, 99)** | 16 | 99082 | 96 (93, 98) | **97 (95, 98)** |
| Two mixed mRNA doses | 6 | 12216 | 97 (93, 99) | **98 (95, 99)** | 2 | 12655 | 96 (84, 99) | **97 (88, 99)** |
| Two ChAdOx1 (AstraZeneca) | 3 | 4038 | 95 (86, 99) | **96 (88, 99)** | 0 | 1343 | NE | **NE** |
| Two mixed ChAdOx1 + mRNA | 1 | 11771 | 99 (96, 100) | **100 (97, 100)** | 0 | 9066 | NE | **NE** |
| Unvaccinated | 966 | 58842 | Reference | | 462 | 117326 | Reference | |
| **50-69 years** | | | | | | | | |
| Two any vaccines | 174 | 101075 | 98 (97, 98) | **98 (98, 98)** | 96 | 234417 | 98 (97, 98) | **98 (98, 99)** |
| Two any mRNA vaccines | 143 | 83532 | 98 (97, 98) | **98 (98, 98)** | 80 | 194368 | 98 (97, 98) | **98 (98, 99)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 92 | 56938 | 98 (97, 98) | **98 (98, 98)** | 60 | 147154 | 98 (97, 98) | **98 (98, 99)** |
| Two mRNA-1273 (mRNA) (Moderna) | 32 | 16919 | 97 (96, 98) | **98 (97, 99)** | 18 | 42917 | 98 (96, 98) | **98 (97, 99)** |
| Two mixed mRNA doses | 19 | 9673 | 97 (96, 98) | **98 (96, 99)** | 2 | 4297 | 97 (89, 99) | **98 (91, 99)** |
| Two ChAdOx1 (AstraZeneca) | 28 | 8059 | 95 (93, 97) | **96 (93, 97)** | 11 | 12379 | 95 (91, 97) | **96 (93, 98)** |
| Two mixed ChAdOx1 + mRNA | 3 | 9484 | 100 (99, 100) | **100 (99, 100)** | 5 | 27670 | 99 (97, 100) | **99 (98, 100)** |
| Unvaccinated | 1041 | 14117 | Reference | | 403 | 23615 | Reference | |
| **≥70 years[b,c]** | | | | | | | | |
| Two any vaccines | 264 | 46858 | 96 (95, 96) | **96 (96, 97)** | 213 | 115945 | 93 (92, 95) | **95 (94, 96)** |
| Two any mRNA vaccines | 260 | 46606 | 96 (95, 96) | **96 (96, 97)** | 188 | 104574 | 94 (92, 95) | **95 (94, 96)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 196 | 33954 | 95 (95, 96) | **96 (96, 97)** | 159 | 84347 | 93 (92, 95) | **95 (94, 96)** |
| Two mRNA-1273 (mRNA) (Moderna) | 40 | 7011 | 96 (94, 97) | **97 (95, 98)** | 26 | 17790 | 95 (92, 97) | **96 (94, 98)** |
| Two mixed mRNA doses | 24 | 5641 | 97 (95, 98) | **97 (96, 98)** | 3 | 2437 | 96 (86, 99) | **97 (90, 99)** |
| Two ChAdOx1 (AstraZeneca) | 2 | 142 | 89 (55, 97) | **91 (64, 98)** | 18 | 7699 | 92 (86, 95) | **94 (90, 96)** |
| Two mixed ChAdOx1 + mRNA | 2 | 110 | 86 (42, 96) | **89 (57, 97)** | 7 | 3671 | 93 (85, 97) | **96 (91, 98)** |
| Unvaccinated | 587 | 4594 | Reference | | 201 | 7202 | Reference | |
| **≥80 years[d]** | | | | | | | | |
| Two any vaccines | 142 | 15833 | 92 (90, 94) | **94 (92, 95)** | 123 | 36925 | 86 (81, 90) | **90 (87, 93)** |
| Two any mRNA vaccines | 141 | 15796 | 92 (90, 94) | **94 (92, 95)** | 111 | 34863 | 87 (82, 90) | **91 (88, 93)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 111 | 11583 | 92 (89, 93) | **93 (91, 95)** | 94 | 27890 | 86 (81, 90) | **90 (87, 93)** |
| Two mRNA-1273 (mRNA) (Moderna) | 20 | 2368 | 93 (88, 95) | **94 (91, 96)** | 15 | 6106 | 90 (82, 94) | **NE** |
| Two mixed mRNA doses | 10 | 1845 | 95 (91, 97) | **96 (93, 98)** | 2 | 867 | 90 (60, 98) | **NE** |
| Two ChAdOx1 (AstraZeneca) | 0 | 22 | NE | **NE** | 8 | 1560 | 78 (55, 90) | **82 (62, 91)** |
| Two mixed ChAdOx1 + mRNA | 1 | 15 | NE | **NE** | 4 | 501 | 66 (8, 88) | **NE** |
| Unvaccinated | 204 | 1803 | Reference | | 72 | 3024 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, all VE estimates adjusted for sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).
[b] Among those ≥70 years, VE additionally adjusted for 70-79 and ≥80 years in both provinces.
[c] In Quebec, adjusted VE estimates against hospitalization in ≥70-year-olds were adjusted for calendar time tri-weekly owing to sample size.
[d] In Quebec, adjusted VE estimates against hospitalization in ≥80-year-olds were adjusted for calendar time tri-weekly owing to sample size.

**Supplementary Table 8. Two-dose vaccine effectiveness against infection and hospitalization (≥14 days post-vaccination), by sex and vaccine type, adults ≥18 years old, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia | | | | Quebec | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **Female, Infection** | | | | | | | | |
| Two any vaccines | 8973 | 213705 | 87 (87, 87) | **89 (88, 89)** | 7753 | 461877 | 83 (82, 84) | **87 (87, 88)** |
| Two any mRNA vaccines | 8079 | 196975 | 87 (87, 88) | **89 (89, 89)** | 2777 | 431920 | 83 (82, 83) | **87 (87, 88)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 5905 | 143835 | 87 (87, 88) | **89 (88, 89)** | 5757 | 327073 | 82 (82, 83) | **87 (86, 87)** |
| Two mRNA-1273 (mRNA) (Moderna) | 1527 | 37473 | 87 (87, 88) | **89 (89, 90)** | 1345 | 93917 | 85 (85, 86) | **89 (88, 89)** |
| Two mixed mRNA doses | 647 | 15665 | 87 (86, 88) | **89 (88, 90)** | 175 | 10930 | 84 (81, 86) | **87 (85, 89)** |
| Two ChAdOx1 (AstraZeneca) | 481 | 5655 | 74 (71, 76) | **76 (74, 78)** | 234 | 10583 | 78 (74, 80) | **80 (77, 83)** |
| Two mixed ChAdOx1 + mRNA | 413 | 11075 | 88 (87, 90) | **89 (88, 90)** | 242 | 19374 | 87 (86, 89) | **90 (89, 91)** |
| Unvaccinated | 12698 | 39368 | Reference | | 8271 | 83960 | Reference | |
| **Female, Hospitalization** | | | | | | | | |
| Two any vaccines | 206 | 213705 | 97 (96, 97) | **98 (97, 98)** | 161 | 461877 | 94 (93, 95) | **97 (96, 98)** |
| Two any mRNA vaccines | 195 | 196975 | 96 (96, 97) | **98 (97, 98)** | 143 | 431920 | 94 (93, 95) | **97 (96, 98)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 142 | 143835 | 96 (96, 97) | **98 (97, 98)** | 115 | 327073 | 94 (92, 95) | **97 (96, 98)** |
| Two mRNA-1273 (mRNA) (Moderna) | 36 | 37473 | 97 (95, 97) | **98 (97, 98)** | 27 | 93917 | 95 (92, 97) | **97 (96, 98)** |
| Two mixed mRNA doses | 17 | 15665 | 96 (94, 98) | **98 (97, 99)** | 1 | 10930 | 98 (88, 100) | **99 (93, 100)** |
| Two ChAdOx1 (AstraZeneca) | 10 | 5655 | 94 (88, 97) | **96 (93, 98)** | 9 | 10583 | 85 (71, 92) | **96 (91, 98)** |
| Two mixed ChAdOx1 + mRNA | 1 | 11075 | 100 (98, 100) | **100 (98, 100)** | 9 | 19374 | 92 (84, 96) | **97 (94, 98)** |
| Unvaccinated | 1086 | 39368 | Reference | | 470 | 83960 | Reference | |
| **Male, Infection** | | | | | | | | |
| Two any vaccines | 7656 | 157849 | 87 (87, 88) | **89 (88, 89)** | 6426 | 324245 | 85 (84, 85) | **89 (88, 89)** |
| Two any mRNA vaccines | 6391 | 140975 | 88 (88, 88) | **90 (89, 90)** | 5680 | 292373 | 85 (85, 86) | **89 (88, 89)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 4647 | 99587 | 88 (87, 88) | **89 (89, 89)** | 4466 | 218042 | 84 (84, 85) | **88 (88, 89)** |
| Two mRNA-1273 (mRNA) (Moderna) | 1217 | 29519 | 89 (88, 90) | **90 (90, 91)** | 1050 | 65872 | 88 (87, 89) | **90 (89, 91)** |
| Two mixed mRNA doses | 525 | 11865 | 88 (87, 89) | **90 (89, 91)** | 164 | 8459 | 85 (83, 87) | **88 (86, 90)** |
| Two ChAdOx1 (AstraZeneca) | 757 | 6584 | 70 (67, 72) | **72 (70, 75)** | 356 | 10838 | 75 (72, 77) | **77 (74, 79)** |
| Two mixed ChAdOx1 + mRNA | 508 | 10290 | 87 (86, 88) | **88 (87, 89)** | 390 | 21033 | 86 (84, 87) | **89 (87, 90)** |
| Unvaccinated | 14431 | 38185 | Reference | | 8351 | 64183 | Reference | |
| **Male, Hospitalization** | | | | | | | | |
| Two any vaccines | 302 | 157849 | 95 (95, 96) | **97 (97, 98)** | 208 | 324245 | 93 (92, 94) | **97 (97, 98)** |
| Two any mRNA vaccines | 274 | 140975 | 95 (94, 96) | **97 (97, 98)** | 185 | 292373 | 93 (92, 94) | **97 (96, 98)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 186 | 99587 | 95 (94, 96) | **97 (97, 98)** | 146 | 218042 | 93 (91, 94) | **97 (96, 98)** |
| Two mRNA-1273 (mRNA) (Moderna) | 55 | 29519 | 95 (94, 96) | **97 (96, 98)** | 33 | 65872 | 95 (92, 96) | **97 (96, 98)** |
| Two mixed mRNA doses | 32 | 11865 | 93 (90, 95) | **97 (96, 98)** | 6 | 8459 | 92 (83, 97) | **96 (90, 98)** |
| Two ChAdOx1 (AstraZeneca) | 23 | 6584 | 91 (87, 94) | **95 (93, 97)** | 20 | 10838 | 80 (69, 87) | **95 (92, 97)** |
| Two mixed ChAdOx1 + mRNA | 5 | 10290 | 99 (97, 99) | **99 (98, 100)** | 3 | 21033 | 98 (95, 100) | **99 (98, 100)** |
| Unvaccinated | 1508 | 38185 | Reference | | 596 | 64183 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); individual epidemiological week (weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 9. Two-dose vaccine effectiveness against Alpha and Delta variant infection and hospitalization (≥14 days post-vaccination), adults ≥18 years old by vaccine type, British Columbia, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia | | | | Quebec | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Delta Infection** | | | | | | | | |
| Two any vaccines | 16320 | 371554 | 86 (86, 87) | **89 (88, 89)** | 13333 | 786122 | 80 (80, 81) | **87 (87, 88)** |
| Two any mRNA vaccines | 14190 | 337950 | 87 (87, 87) | **89 (89, 89)** | 12192 | 724293 | 80 (80, 81) | **88 (87, 88)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 10333 | 243422 | 87 (86, 87) | **89 (89, 89)** | 9631 | 545115 | 79 (79, 80) | **87 (87, 87)** |
| Two mRNA-1273 (mRNA) (Moderna) | 2708 | 66992 | 87 (87, 88) | **90 (89, 90)** | 2243 | 159789 | 84 (83, 84) | **89 (89, 90)** |
| Two mixed mRNA doses | 1147 | 27530 | 87 (86, 88) | **90 (89, 90)** | 318 | 19389 | 81 (79, 83) | **87 (86, 89)** |
| Two ChAdOx1 (AstraZeneca) | 1221 | 12239 | 69 (67, 71) | **73 (72, 75)** | 548 | 21421 | 70 (67, 73) | **79 (76, 80)** |
| Two mixed ChAdOx1 + mRNA | 909 | 21365 | 87 (86, 88) | **88 (88, 89)** | 593 | 40407 | 83 (81, 84) | **89 (88, 90)** |
| Unvaccinated | 24790 | 77553 | Reference | | 12691 | 148143 | Reference | |
| **Delta Hospitalization[b]** | | | | | | | | |
| Two any vaccines | 494 | 371554 | 96 (95, 96) | **98 (97, 98)** | 331 | 718162 | 95 (95, 96) | **97 (97, 98)** |
| Two any mRNA vaccines | 455 | 337950 | 96 (95, 96) | **98 (97, 98)** | 295 | 663105 | 95 (95, 96) | **97 (97, 98)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 317 | 243422 | 96 (95, 96) | **98 (97, 98)** | 237 | 497583 | 95 (94, 96) | **97 (97, 98)** |
| Two mRNA-1273 (mRNA) (Moderna) | 90 | 66992 | 96 (95, 96) | **97 (97, 98)** | 54 | 147813 | 96 (95, 97) | **97 (96, 98)** |
| Two mixed mRNA doses | 47 | 27530 | 94 (93, 96) | **98 (97, 98)** | 4 | 17709 | 98 (94, 99) | **98 (95, 99)** |
| Two ChAdOx1 (AstraZeneca) | 33 | 12239 | 91 (88, 94) | **95 (93, 97)** | 25 | 17715 | 86 (79, 90) | **95 (93, 97)** |
| Two mixed ChAdOx1 + mRNA | 6 | 21365 | 99 (98, 100) | **99 (99, 100)** | 11 | 37342 | 97 (95, 98) | **99 (97, 99)** |
| Unvaccinated | 2402 | 77553 | Reference | | 869 | 88449 | Reference | |
| **Alpha Infection[c,d]** | | | | | | | | |
| Two any vaccines | 18 | 95791 | 99 (98, 99) | **95 (92, 97)** | 51 | 327507 | 99 (99, 99) | 98 (97, 98) |
| Two any mRNA vaccines | 14 | 86980 | 99 (98, 99) | **96 (93, 98)** | 46 | 299735 | 99 (99, 99) | 98 (97, 98) |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 10 | 63782 | 99 (98, 100) | **96 (92, 98)** | 35 | 227192 | 99 (99, 99) | 98 (97, 99) |
| Two mRNA-1273 (mRNA) (Moderna) | 3 | 15417 | 99 (96, 100) | **95 (84, 98)** | 9 | 64192 | 99 (98, 100) | 98 (96, 99) |
| Two mixed mRNA doses | 1 | 7779 | 99 (95, 100) | **96 (73, 99)** | 2 | 8351 | 98 (94, 100) | 97 (88, 99) |
| Two ChAdOx1 (AstraZeneca) | 4 | 3501 | 93 (82, 97) | **75 (33, 91)** | 3 | 10687 | 98 (94, 99) | 96 (87, 99) |
| Two mixed ChAdOx1 + mRNA | 0 | 5310 | NE | **NE** | 2 | 17084 | 99 (97, 100) | 99 (94, 100) |
| Unvaccinated | 724 | 42307 | Reference | | 1585 | 103857 | Reference | |
| **Alpha Hospitalization[e,f]** | | | | | | | | |
| Two any vaccines | 2 | 95791 | 99 (95, 100) | **97 (89, 99)** | 6 | 327507 | 97 (94, 99) | **97 (93, 99)** |
| Two any mRNA vaccines | 2 | 86980 | 99 (94, 100) | **97 (88, 99)** | 6 | 299735 | 97 (93, 99) | **97 (92, 99)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 2 | 63782 | 98 (92, 100) | **96 (83, 99)** | 2 | 227192 | 99 (95, 100) | **99 (94, 100)** |
| Two mRNA-1273 (mRNA) (Moderna) | 0 | 15417 | NE | **NE** | 3 | 64192 | 94 (79, 98) | **91 (70, 97)** |
| Two mixed mRNA doses | 0 | 7779 | NE | **NE** | 1 | 8351 | NE | **NE** |
| Two ChAdOx1 (AstraZeneca) | 0 | 3501 | NE | **NE** | 0 | 10687 | NE | **NE** |
| Two mixed ChAdOx1 + mRNA | 0 | 5310 | NE | **NE** | 0 | 17084 | NE | **NE** |
| Unvaccinated | 69 | 42307 | Reference | | 75 | 103857 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

[b] In Quebec, VE against hospitalizations due to Delta variant assessed only between epi-weeks 31-47 because no hospitalized Delta variant cases were identified prior to that period.

[c] In BC, adjusted VE against Alpha infections was restricted to a study period spanning from epi-weeks 22-35 owing to sample size considerations and otherwise adjusted as in footnote 1 above.

[d] In Quebec, adjusted VE against Alpha infections was restricted to a study period spanning from epi-weeks 22-38 owing to sample size considerations and otherwise adjusted as in footnote 1 above.

[e] In BC, adjusted VE against Alpha hospitalizations was restricted to a study period spanning from epi-week 22-35 and adjusted as in footnote 1 above except for calendar time undertaken bi-weekly between epi-weeks 22-35 (categorical) owing to sample size considerations.

[f] In Quebec, VE against Alpha hospitalizations assessed only between epi-weeks 22-38, and adjusted for calendar time by four-week periods for epi-weeks 22-33 and five-week periods for epi-weeks 34-38.

**Supplementary Table 10. Two-dose vaccine effectiveness against Gamma variant infection and hospitalization (≥14 days post-vaccination), adults ≥18 years old by vaccine type, British Columbia, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia (BC)[a] | | | |
|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted** |
| **Gamma Infection[b]** | | | | |
| Two any vaccines | 33 | 95791 | 98 (97, 99) | **93 (89, 95)** |
| Two any mRNA vaccines | 30 | 86980 | 98 (97, 99) | **93 (89, 95)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 25 | 63782 | 98 (96, 98) | **92 (88, 95)** |
| Two mRNA-1273 (mRNA) (Moderna) | 3 | 15417 | 99 (96, 100) | **95 (85, 98)** |
| Two mixed mRNA doses | 2 | 7779 | 98 (94, 100) | **94 (76, 99)** |
| Two ChAdOx1 (AstraZeneca) | 2 | 3501 | 97 (86, 99) | **91 (63, 98)** |
| Two mixed ChAdOx1 + mRNA | 1 | 5310 | 99 (92, 100) | **96 (69, 99)** |
| Unvaccinated | 705 | 42307 | Reference | |
| **Gamma Hospitalization[c]** | | | | |
| Two any vaccines | 4 | 95791 | 97 (90, 99) | **95 (86, 98)** |
| Two any mRNA vaccines | 4 | 86980 | 96 (89, 99) | **95 (85, 98)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 3 | 63782 | 96 (87, 99) | **95 (82, 98)** |
| Two mRNA-1273 (mRNA) (Moderna) | 0 | 15417 | NE | **NE** |
| Two mixed mRNA doses | 1 | 7779 | NE | **NE** |
| Two ChAdOx1 (AstraZeneca) | 0 | 3501 | NE | **NE** |
| Two mixed ChAdOx1 + mRNA | 0 | 5310 | NE | **NE** |
| Unvaccinated | 51 | 42307 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Not estimable for the province of Quebec

[b] In BC, VE against Gamma infections was restricted to a study period spanning from epidemiological weeks 22-35 owing to sample size considerations and otherwise adjusted as per usual for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); region of the province (5 categories); and for calendar time as individual epi-week (epi-weeks 22-35, categorical).

[c] In BC, adjusted VE against Gamma hospitalizations was restricted to a study period spanning epi-week 22-35 and adjusted as per usual for age group (18-49, 50-69, 70-79, ≥80 years); and sex (male, female); but with calendar time adjustment bi-weekly and adjustment for region of the province as Vancouver Coastal Health Authority, Fraser Health Authority and Other (Northern Health, Interior Health and Vancouver Island Health Authorities, combined) owing to sample size considerations.

**Supplementary Table 11. Two-dose vaccine effectiveness against infection (≥14 days post-vaccination), by vaccine type, and epi-period, adults ≥18 years old, British Columbia and Quebec, Canada and with restriction to symptomatic outpatient specimens in Quebec**

| Epi-periods (overall and approximately monthly) | Specimens without regard to symptom status | | | | | | | | Specimens collected at designated screening centres intended for symptomatic outpatients only[a] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | British Columbia | | | | Quebec | | | | Quebec | | | |
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[b] | Case N | Control N | Crude | Adjusted[b] | Case N | Control N | Crude | Adjusted[b] |
| **Epi-weeks 22-47 (May 30 to November 27, 2021)** | | | | | | | | | | | | |
| Two any vaccines | 16629 | 371554 | 87 (87, 87) | **89 (88, 89)** | 14179 | 786122 | 84 (84, 84) | **88 (88, 88)** | 7236 | 338691 | 89 (89-89) | **92 (92, 93)** |
| Two any mRNA vaccines | 14470 | 337950 | 88 (87, 88) | **89 (89, 89)** | 12957 | 724293 | 84 (84, 84) | **88 (88, 88)** | 6491 | 310107 | 89 (89-90) | **92 (92, 93)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 10552 | 243422 | 88 (87, 88) | **89 (89, 89)** | 10223 | 545115 | 83 (83, 84) | **88 (87, 88)** | 5157 | 228621 | 88 (88-89) | **92 (92, 92)** |
| Two mRNA-1273 (mRNA) (Moderna) | 2744 | 66992 | 88 (88, 89) | **90 (89, 90)** | 2395 | 159789 | 87 (86, 87) | **89 (89, 90)** | 1163 | 72804 | 92 (91-92) | **94 (93, 94)** |
| Two mixed mRNA doses | 1172 | 27530 | 88 (87, 89) | **90 (89, 90)** | 339 | 19389 | 84 (83, 86) | **88 (86, 89)** | 171 | 8682 | 90 (88-91) | **92 (91, 93)** |
| Two ChAdOx1 (AstraZeneca) | 1238 | 12239 | 71 (69, 73) | **74 (72, 76)** | 590 | 21421 | 75 (73, 77) | **78 (76, 80)** | 367 | 8530 | 78 (75-80) | **86 (85, 88)** |
| Two mixed ChAdOx1 + mRNA | 921 | 21365 | 88 (87, 88) | **89 (88, 89)** | 632 | 40407 | 86 (85, 87) | **89 (88, 90)** | 378 | 20054 | 90 (89-91) | **94 (93, 94)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | | 9601 | 49229 | Reference | |
| **Epi-weeks 22-26 (May 30 to July 3, 2021)** | | | | | | | | | | | | |
| Two any vaccines | 29 | 4415 | 93 (90, 95) | **91 (87, 94)** | 36 | 22202 | 95 (93, 96) | **93 (90, 95)** | 3 | 2974 | 98 (94, 99) | **97 (91, 99)** |
| Two any mRNA vaccines | 28 | 4213 | 93 (90, 95) | **91 (86, 94)** | 34 | 20602 | 95 (93, 96) | **93 (90, 95)** | 3 | 2496 | 98 (92, 99) | **97 (89, 99)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 24 | 3425 | 93 (89, 95) | **90 (85, 93)** | 33 | 16647 | 94 (91, 96) | **92 (88, 94)** | 3 | 1880 | 97 (90, 99) | **96 (86, 99)** |
| Two mRNA-1273 (mRNA) (Moderna) | 4 | 662 | 94 (84, 98) | **92 (78, 97)** | 1 | 3416 | 99 (93, 100) | **98 (88, 100)** | 0 | 543 | NE | **NE** |
| Two mixed mRNA doses | 0 | 126 | NE | **NE** | 0 | 539 | NE | **NE** | 0 | 73 | NE | **NE** |
| Two ChAdOx1 (AstraZeneca) | 1 | 163 | 94 (56, 99) | **91 (34, 99)** | 2 | 1359 | 95 (82, 99) | **91 (63, 98)** | 0 | 406 | NE | **NE** |
| Two mixed ChAdOx1 + mRNA | 0 | 39 | NE | **NE** | 0 | 241 | NE | **NE** | 0 | 72 | NE | **NE** |
| Unvaccinated | 1497 | 14996 | Reference | | 1275 | 39886 | Reference | | 635 | 12762 | Reference | |
| **Epi-weeks 27-30 (July 4 to July 31, 2021)** | | | | | | | | | | | | |
| Two any vaccines | 145 | 15950 | 93 (92, 94) | **90 (88, 92)** | 124 | 45758 | 93 (91, 94) | **90 (88, 92)** | 46 | 13442 | 95 (93, 96) | **95 (92, 96)** |
| Two any mRNA vaccines | 114 | 14220 | 94 (93, 95) | **91 (89, 93)** | 115 | 40586 | 93 (91, 94) | **90 (88, 92)** | 41 | 11575 | 95 (93, 96) | **95 (92, 96)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 90 | 10176 | 93 (92, 95) | **90 (88, 92)** | 96 | 30885 | 92 (90, 93) | **89 (87, 92)** | 35 | 8518 | 94 (91, 96) | **94 (91, 96)** |
| Two mRNA-1273 (mRNA) (Moderna) | 12 | 2272 | 96 (93, 98) | **95 (90, 97)** | 18 | 8560 | 94 (91, 97) | **92 (87, 95)** | 6 | 2695 | 97 (92, 98) | **NE** |
| Two mixed mRNA doses | 12 | 1772 | 95 (91, 97) | **92 (86, 96)** | 1 | 1141 | 98 (84, 100) | **97 (81, 100)** | 0 | 362 | NE | **NE** |
| Two ChAdOx1 (AstraZeneca) | 25 | 819 | 77 (65, 84) | **65 (46, 77)** | 6 | 2347 | 93 (85, 97) | **86 (67, 94)** | 3 | 738 | 94 (81, 98) | **NE** |
| Two mixed ChAdOx1 + mRNA | 6 | 911 | 95 (89, 98) | **94 (87, 97)** | 3 | 2824 | 97 (91, 99) | **96 (88, 99)** | 2 | 1129 | 97 (89, 99) | **NE** |
| Unvaccinated | 1153 | 8793 | Reference | | 755 | 19808 | Reference | | 391 | 5977 | Reference | |
| **Epi-weeks 31-34 (August 1 to 28, 2021)** | | | | | | | | | | | | |
| Two any vaccines | 2097 | 55419 | 92 (92, 93) | **91 (90, 91)** | 1043 | 91863 | 93 (92, 93) | **91 (91, 92)** | 480 | 30238 | 95 (95, 96) | **95 (95, 96)** |
| Two any mRNA vaccines | 1761 | 50348 | 93 (92, 93) | **92 (91, 92)** | 933 | 83719 | 93 (92, 93) | **92 (91, 92)** | 416 | 27311 | 95 (95, 96) | **95 (95, 96)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 1337 | 36967 | 92 (92, 93) | **91 (91, 92)** | 738 | 62814 | 92 (92, 93) | **91 (90, 92)** | 320 | 20267 | 95 (95, 96) | **95 (95, 96)** |
| Two mRNA-1273 (mRNA) (Moderna) | 285 | 8992 | 93 (93, 94) | **92 (91, 93)** | 167 | 18389 | 94 (93, 95) | **93 (91, 94)** | 79 | 6214 | 96 (95, 97) | **96 (95, 97)** |
| Two mixed mRNA doses | 139 | 4387 | 93 (92, 94) | **92 (90, 93)** | 28 | 2516 | 93 (89, 95) | **92 (88, 94)** | 17 | 830 | 94 (90, 96) | **94 (90, 96)** |
| Two ChAdOx1 (AstraZeneca) | 211 | 1866 | 76 (73, 80) | **71 (66, 75)** | 60 | 2866 | 86 (82, 89) | **78 (71, 83)** | 35 | 906 | 88 (84, 92) | **88 (82, 92)** |
| Two mixed ChAdOx1 + mRNA | 125 | 3205 | 92 (90, 93) | **91 (89, 92)** | 50 | 5278 | 94 (92, 95) | **92 (89, 94)** | 29 | 2021 | 96 (94, 97) | **95 (93, 97)** |
| Unvaccinated | 6959 | 14479 | Reference | | 3137 | 20529 | Reference | | 1804 | 5443 | Reference | |

VE=vaccine effectiveness; 95% CI = 95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Based upon restriction to specimens with the "M7" code indicating collection at community-based assessment centres established for SARS-CoV-2 testing of symptomatic individuals. Such restriction by testing indication was not possible in BC.
[b] All VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 11 Cont'd. Two-dose vaccine effectiveness against infection (≥14 days post-vaccination), by vaccine type, and epi-period, adults ≥18 years old, British Columbia and Quebec, Canada and with restriction to symptomatic outpatient specimens only in Quebec**

| Epi-periods (overall and approximately monthly) | Specimens without regard to symptom status | | | | | | | | Specimens collected at designated screening centres intended for symptomatic outpatients only[a] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | British Columbia | | | | Quebec | | | | Quebec | | | |
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[b]** | Case N | Control N | Crude | **Adjusted[b]** | Case N | Control N | Crude | **Adjusted[b]** |
| **Epi-weeks 35-39 (August 29 to October 2, 2021)** | | | | | | | | | | | | |
| Two any vaccines | 5441 | 113116 | 90 (90, 91) | **89 (89, 90)** | 4071 | 216883 | 91 (91, 92) | **91 (90, 91)** | 2055 | 96628 | 94 (94, 95) | **95 (94, 95)** |
| Two any mRNA vaccines | 4750 | 102992 | 91 (90, 91) | **90 (89, 90)** | 3709 | 200341 | 91 (91, 92) | **91 (90, 91)** | 1825 | 88845 | 95 (94, 95) | **95 (94, 95)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 3465 | 74385 | 91 (90, 91) | **89 (89, 90)** | 2968 | 151176 | 91 (90, 91) | **91 (90, 91)** | 1471 | 65336 | 94 (94, 94) | **94 (94, 95)** |
| Two mRNA-1273 (mRNA) (Moderna) | 922 | 20394 | 91 (90, 91) | **90 (89, 91)** | 638 | 43791 | 93 (93, 94) | **92 (92, 93)** | 310 | 21007 | 96 (96, 97) | **96 (95, 96)** |
| Two mixed mRNA doses | 361 | 8212 | 91 (90, 92) | **91 (90, 92)** | 103 | 5374 | 91 (89, 93) | **90 (88, 92)** | 44 | 2502 | 95 (94, 97) | **95 (93, 96)** |
| Two ChAdOx1 (AstraZeneca) | 413 | 3535 | 76 (74, 79) | **74 (71, 77)** | 167 | 5244 | 85 (83, 87) | **85 (82, 87)** | 107 | 2167 | 87 (84, 89) | **90 (88, 92)** |
| Two mixed ChAdOx1 + mRNA | 278 | 6589 | 91 (90, 92) | **90 (89, 91)** | 195 | 11298 | 92 (91, 93) | **92 (91, 93)** | 123 | 5616 | 94 (93, 95) | **95 (94, 96)** |
| Unvaccinated | 9125 | 18519 | Reference | | 6245 | 29145 | Reference | | 3742 | 10001 | Reference | |
| **Epi-weeks 40-43 (October 3 to 30, 2021)** | | | | | | | | | | | | |
| Two any vaccines | 4889 | 100951 | 89 (88, 89) | **89 (88, 89)** | 3242 | 199169 | 88 (87, 88) | **88 (87, 88)** | 1628 | 98348 | 91 (90, 92) | **92 (91, 92)** |
| Two any mRNA vaccines | 4287 | 91856 | 89 (89, 90) | **89 (89, 90)** | 2968 | 184432 | 88 (87, 88) | **88 (87, 89)** | 1470 | 90600 | 91 (90, 92) | **92 (91, 92)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 3047 | 65770 | 89 (89, 90) | **89 (89, 90)** | 2358 | 138050 | 87 (86, 88) | **87 (86, 88)** | 1174 | 66711 | 90 (90, 91) | **91 (90, 92)** |
| Two mRNA-1273 (mRNA) (Moderna) | 875 | 18902 | 89 (89, 90) | **89 (89, 90)** | 561 | 41640 | 90 (89, 91) | **90 (89, 91)** | 265 | 21458 | 93 (92, 94) | **94 (93, 94)** |
| Two mixed mRNA doses | 365 | 7183 | 88 (87, 90) | **88 (87, 90)** | 49 | 4742 | 92 (90, 94) | **92 (90, 94)** | 31 | 2431 | 93 (90, 95) | **93 (91, 95)** |
| Two ChAdOx1 (AstraZeneca) | 351 | 3222 | 75 (72, 78) | **75 (72, 78)** | 138 | 4698 | 78 (74, 81) | **82 (78, 85)** | 85 | 2183 | 79 (74, 83) | **88 (85, 91)** |
| Two mixed ChAdOx1 + mRNA | 251 | 5873 | 90 (89, 91) | **90 (89, 91)** | 136 | 10039 | 90 (88, 91) | **91 (90, 93)** | 73 | 5565 | 93 (91, 94) | **95 (94, 96)** |
| Unvaccinated | 5205 | 11914 | Reference | | 2642 | 19996 | Reference | | 1538 | 8372 | Reference | |
| **Epi-weeks 44-47 (October 31 to November 27, 2021)** | | | | | | | | | | | | |
| Two any vaccines | 4028 | 81703 | 86 (86, 87) | **85 (84, 85)** | 5663 | 210247 | 80 (79, 81) | **79 (78, 80)** | 3024 | 97061 | 86 (85, 87) | **86 (85, 87)** |
| Two any mRNA vaccines | 3530 | 74321 | 87 (86, 87) | **85 (84, 86)** | 5198 | 194613 | 80 (79, 81) | **80 (78, 81)** | 2736 | 89280 | 86 (85, 87) | **87 (86, 87)** |
| Two BNT162b2 (mRNA) (Pfizer-BioNTech) | 2589 | 52699 | 86 (86, 87) | **85 (84, 85)** | 4030 | 145543 | 80 (79, 81) | **79 (78, 80)** | 2154 | 65909 | 85 (84, 86) | **86 (85, 87)** |
| Two mRNA-1273 (mRNA) (Moderna) | 646 | 15770 | 89 (88, 90) | **88 (87, 89)** | 1010 | 43993 | 83 (82, 84) | **83 (82, 84)** | 503 | 20887 | 89 (88, 90) | **89 (88, 90)** |
| Two mixed mRNA doses | 295 | 5850 | 86 (84, 88) | **86 (84, 88)** | 158 | 5077 | 77 (73, 81) | **76 (72, 80)** | 79 | 2484 | 86 (82, 89) | **86 (82, 89)** |
| Two ChAdOx1 (AstraZeneca) | 237 | 2634 | 75 (71, 78) | **74 (70, 78)** | 217 | 4907 | 68 (63, 72) | **65 (58, 70)** | 137 | 2130 | 71 (65, 76) | **78 (73, 82)** |
| Two mixed ChAdOx1 + mRNA | 261 | 4748 | 85 (83, 87) | **82 (80, 84)** | 248 | 10727 | 83 (81, 85) | **82 (80, 85)** | 151 | 5651 | 88 (86, 90) | **90 (88, 92)** |
| Unvaccinated | 3190 | 8852 | Reference | | 2568 | 18779 | Reference | | 1491 | 6674 | Reference | |

VE=vaccine effectiveness; 95% CI = 95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Based upon restriction to specimens with the "M7" code specification for SARS-CoV-2 testing in Quebec

[b] All VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 12. Two-dose vaccine effectiveness against infection and hospitalization, by time since second dose, adults ≥18 years old, mRNA and ChAdOx1 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Any two mRNA vaccines, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 1157 | 18634 | 82 (81, 83) | **75 (74, 77)** | 897 | 47528 | 83 (82, 84) | **76 (74, 78)** |
| 14-27 days (2-3 weeks) | 476 | 23622 | 94 (94, 95) | **94 (93, 94)** | 413 | 54695 | 93 (93, 94) | **93 (92, 94)** |
| 28-55 days (4-7 weeks, 2nd month) | 1832 | 59787 | 91 (91, 92) | **92 (92, 93)** | 1571 | 128863 | 89 (89, 90) | **92 (91, 92)** |
| 56-83 days (8-11 weeks, 3rd month) | 2922 | 76792 | 89 (89, 90) | **91 (91, 91)** | 2625 | 156041 | 85 (84, 86) | **90 (89, 90)** |
| 84-111 days (12-15 weeks, 4th month) | 3451 | 77978 | 87 (87, 88) | **89 (88, 89)** | 3019 | 161501 | 83 (83, 84) | **87 (86, 87)** |
| 112-139 days (16-19 weeks, 5th month) | 3156 | 59908 | 85 (84, 86) | **85 (85, 86)** | 3111 | 134272 | 79 (79, 80) | **83 (82, 84)** |
| 140-167 days (20-23 weeks, 6th month) | 1442 | 25367 | 84 (83, 85) | **83 (82, 84)** | 1574 | 63484 | 78 (77, 79) | **82 (81, 83)** |
| 168-195 days (24-27 weeks, 7th month) | 361 | 5619 | 82 (80, 84) | **82 (80, 84)** | 382 | 17272 | 80 (78, 82) | **81 (79, 83)** |
| 196-223 days (28-31 weeks, 8th month) | 321 | 3166 | 71 (67, 74) | **75 (72, 78)** | 222 | 7025 | 72 (68, 75) | **75 (71, 78)** |
| 224-251 days (32-35 weeks, 9th month) | 311 | 3340 | 73 (70, 76) | **77 (74, 79)** | 29 | 831 | 69 (55, 78) | **69 (55, 79)** |
| 252-279 days (36-39 weeks, 10th month) | 183 | 2065 | 75 (70, 78) | **75 (71, 79)** | 7 | 250 | 75 (47, 88) | **76 (48, 89)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Any two mRNA vaccines, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 29 | 18634 | 95 (93, 97) | **93 (89, 95)** | 16 | 47528 | 95 (92, 97) | **94 (89, 96)** |
| 14-27 days (2-3 weeks) | 13 | 23622 | 98 (97, 99) | **98 (96, 99)** | 20 | 54695 | 95 (92, 97) | **95 (92, 97)** |
| 28-55 days (4-7 weeks, 2nd month) | 41 | 59787 | 98 (97, 98) | **98 (97, 99)** | 34 | 128863 | 96 (95, 97) | **98 (97, 98)** |
| 56-83 days (8-11 weeks, 3rd month) | 87 | 76792 | 97 (96, 97) | **98 (97, 98)** | 54 | 156041 | 95 (94, 96) | **98 (97, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 112 | 77978 | 96 (95, 96) | **98 (97, 98)** | 89 | 161501 | 92 (90, 94) | **97 (96, 98)** |
| 112-139 days (16-19 weeks, 5th month) | 106 | 59908 | 95 (94, 96) | **97 (97, 98)** | 77 | 134272 | 92 (90, 94) | **96 (95, 97)** |
| 140-167 days (20-23 weeks, 6th month) | 79 | 25367 | 91 (88, 93) | **96 (95, 97)** | 43 | 63484 | 91 (87, 93) | **96 (94, 97)** |
| 168-195 days (24-27 weeks, 7th month) | 11 | 5619 | 94 (89, 97) | **96 (93, 98)** | 6 | 17272 | 95 (89, 98) | **96 (92, 98)** |
| 196-223 days (28-31 weeks, 8th month) | 8 | 3166 | 92 (85, 96) | **95 (89, 97)** | 4 | 7025 | 92 (79, 97) | **94 (83, 98)** |
| 224-251 days (32-35 weeks, 9th month) | 7 | 3340 | 94 (87, 97) | **96 (91, 98)** | 0 | 831 | NE | **NE** |
| 252-279 days (36-39 weeks, 10th month) | 4 | 2065 | 94 (85, 98) | **96 (88, 98)** | 0 | 250 | NE | **NE** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |
| **Two ChAdOx1 vaccines, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 8 | 443 | 95 (90, 97) | **82 (63, 91)** | 7 | 1319 | 95 (90, 98) | **83 (65, 92)** |
| 14-27 days (2-3 weeks) | 11 | 428 | 93 (87, 96) | **77 (57, 87)** | 5 | 1482 | 97 (93, 99) | **90 (76, 96)** |
| 28-55 days (4-7 weeks, 2nd month) | 80 | 1178 | 81 (76, 85) | **77 (71, 82)** | 18 | 2828 | 94 (91, 96) | **90 (84, 94)** |
| 56-83 days (8-11 weeks, 3rd month) | 255 | 2281 | 68 (64, 72) | **76 (73, 79)** | 71 | 3177 | 80 (75, 84) | **85 (81, 88)** |
| 84-111 days (12-15 weeks, 4th month) | 334 | 3019 | 68 (65, 72) | **74 (71, 77)** | 130 | 4208 | 72 (67, 77) | **83 (80, 86)** |
| 112-139 days (16-19 weeks, 5th month) | 341 | 3045 | 68 (64, 71) | **73 (69, 76)** | 148 | 4460 | 70 (65, 75) | **74 (70, 78)** |
| 140-167 days (20-23 weeks, 6th month) | 194 | 2110 | 74 (69, 77) | **74 (70, 78)** | 145 | 4063 | 68 (62, 73) | **70 (64, 75)** |
| 168-195 days (24-27 weeks, 7th month) | 20 | 170 | 66 (47, 79) | **67 (48, 80)** | 72 | 1190 | 46 (32, 58) | **56 (43, 65)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two ChAdOx1 vaccines, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 0 | 443 | NE | **NE** | 1 | 1319 | 89 (25, 99) | **NE** |
| 14-27 days (2-3 weeks) | 0 | 428 | NE | **NE** | 1 | 1482 | 91 (33, 99) | **87 (8, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 3 | 1178 | 92 (76, 98) | **91 (71, 97)** | 0 | 2828 | NE | **NE** |
| 56-83 days (8-11 weeks, 3rd month) | 7 | 2281 | 91 (81, 96) | **95 (88, 97)** | 3 | 3177 | 87 (59, 96) | **97 (89, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 9 | 3019 | 91 (83, 95) | **95 (91, 98)** | 5 | 4208 | 83 (60, 93) | **97 (94, 99)** |
| 112-139 days (16-19 weeks, 5th month) | 7 | 3045 | 93 (86, 97) | **97 (93, 98)** | 7 | 4460 | 78 (54, 90) | **95 (90, 98)** |
| 140-167 days (20-23 weeks, 6th month) | 6 | 2110 | 91 (81, 96) | **96 (90, 98)** | 10 | 4063 | 66 (36, 82) | **89 (80, 94)** |
| 168-195 days (24-27 weeks, 7th month) | 1 | 170 | 82 (-26, 98) | **91 (35, 99)** | 3 | 1190 | 65 (-9, 89) | **89 (64, 96)** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 12 Contin'd. Two-dose vaccine effectiveness against infection and hospitalization, by time since second dose, adults ≥18 years old, BNT162b2 and mRNA-1273 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Two BNT162b2 (Pfizer-BioNTech), Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 859 | 12935 | 81 (80, 82) | **73 (71, 75)** | 720 | 35071 | 82 (80, 83) | **74 (72, 76)** |
| 14-27 days (2-3 weeks) | 369 | 16891 | 94 (93, 94) | **93 (92, 94)** | 325 | 41190 | 93 (92, 94) | **93 (92, 93)** |
| 28-55 days (4-7 weeks, 2nd month) | 1410 | 43026 | 91 (90, 91) | **92 (91, 92)** | 1257 | 97604 | 89 (88, 89) | **91 (91, 92)** |
| 56-83 days (8-11 weeks, 3rd month) | 2163 | 55508 | 89 (88, 89) | **91 (90, 91)** | 2050 | 116946 | 84 (84, 85) | **89 (89, 90)** |
| 84-111 days (12-15 weeks, 4th month) | 2544 | 55879 | 87 (86, 88) | **88 (88, 89)** | 2418 | 120889 | 82 (81, 83) | **86 (85, 87)** |
| 112-139 days (16-19 weeks, 5th month) | 2249 | 42731 | 85 (84, 86) | **85 (84, 86)** | 2458 | 99670 | 78 (77, 79) | **82 (81, 83)** |
| 140-167 days (20-23 weeks, 6th month) | 1006 | 18042 | 84 (83, 85) | **83 (82, 84)** | 1252 | 48873 | 77 (76, 78) | **81 (80, 83)** |
| 168-195 days (24-27 weeks, 7th month) | 255 | 4266 | 83 (81, 85) | **83 (80, 85)** | 291 | 13779 | 81 (79, 83) | **83 (81, 85)** |
| 196-223 days (28-31 weeks, 8th month) | 214 | 2451 | 75 (71, 78) | **78 (74, 81)** | 147 | 5444 | 76 (72, 80) | **80 (76, 83)** |
| 224-251 days (32-35 weeks, 9th month) | 211 | 2628 | 77 (74, 80) | **79 (76, 82)** | 16 | 507 | 72 (54, 83) | **75 (58, 85)** |
| 252-279 days (36-39 weeks, 10th month) | 120 | 1723 | 80 (76, 83) | **80 (75, 83)** | 6 | 168 | 68 (28, 86) | **71 (35, 87)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two BNT162b2 (Pfizer-BioNTech), Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 19 | 12935 | 96 (93, 97) | **93 (88, 95)** | 14 | 35071 | 94 (91, 97) | **93 (87, 96)** |
| 14-27 days (2-3 weeks) | 9 | 16891 | 98 (97, 99) | **98 (96, 99)** | 13 | 41190 | 96 (92, 97) | **96 (92, 97)** |
| 28-55 days (4-7 weeks, 2nd month) | 27 | 43026 | 98 (97, 99) | **98 (97, 99)** | 27 | 97604 | 96 (94, 97) | **98 (96, 98)** |
| 56-83 days (8-11 weeks, 3rd month) | 65 | 55508 | 96 (96, 97) | **98 (97, 98)** | 38 | 116946 | 95 (94, 97) | **98 (98, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 78 | 55879 | 96 (95, 97) | **98 (97, 98)** | 77 | 120889 | 91 (89, 93) | **97 (96, 97)** |
| 112-139 days (16-19 weeks, 5th month) | 77 | 42731 | 95 (93, 96) | **97 (97, 98)** | 65 | 99670 | 91 (88, 93) | **96 (94, 97)** |
| 140-167 days (20-23 weeks, 6th month) | 51 | 18042 | 92 (89, 94) | **96 (95, 97)** | 35 | 48873 | 90 (86, 93) | **96 (94, 97)** |
| 168-195 days (24-27 weeks, 7th month) | 9 | 4266 | 94 (88, 97) | **95 (91, 98)** | 2 | 13779 | 98 (92, 99) | **98 (94, 100)** |
| 196-223 days (28-31 weeks, 8th month) | 6 | 2451 | 93 (84, 97) | **94 (87, 97)** | 3 | 5444 | 92 (76, 98) | **94 (81, 98)** |
| 224-251 days (32-35 weeks, 9th month) | 3 | 2628 | 97 (89, 99) | **98 (93, 99)** | 0 | 507 | NE | **NE** |
| 252-279 days (36-39 weeks, 10th month) | 3 | 1723 | 95 (84, 98) | **96 (86, 99)** | 0 | 168 | NE | **NE** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |
| **Two mRNA-1273 (Moderna), Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 263 | 4414 | 83 (81, 85) | **81 (78, 83)** | 159 | 10925 | 87 (85, 89) | **82 (79, 85)** |
| 14-27 days (2-3 weeks) | 91 | 5244 | 95 (94, 96) | **95 (94, 96)** | 83 | 12065 | 94 (92, 95) | **94 (92, 95)** |
| 28-55 days (4-7 weeks, 2nd month) | 317 | 12899 | 93 (92, 94) | **94 (93, 94)** | 280 | 27972 | 91 (90, 92) | **93 (92, 94)** |
| 56-83 days (8-11 weeks, 3rd month) | 503 | 15193 | 91 (90, 91) | **92 (91, 93)** | 492 | 34922 | 87 (86, 89) | **91 (91, 92)** |
| 84-111 days (12-15 weeks, 4th month) | 590 | 15003 | 89 (88, 90) | **90 (89, 91)** | 543 | 36202 | 87 (85, 88) | **89 (88, 90)** |
| 112-139 days (16-19 weeks, 5th month) | 564 | 11082 | 85 (84, 87) | **87 (85, 88)** | 551 | 30370 | 84 (82, 85) | **85 (84, 87)** |
| 140-167 days (20-23 weeks, 6th month) | 303 | 4511 | 81 (78, 83) | **82 (80, 84)** | 276 | 13187 | 81 (79, 83) | **83 (81, 85)** |
| 168-195 days (24-27 weeks, 7th month) | 105 | 1274 | 76 (71, 81) | **81 (76, 84)** | 82 | 3157 | 77 (71, 81) | **74 (67, 79)** |
| 196-223 days (28-31 weeks, 8th month) | 106 | 710 | 57 (48, 65) | **67 (59, 73)** | 73 | 1497 | 57 (45, 66) | **48 (34, 60)** |
| 224-251 days (32-35 weeks, 9th month) | 98 | 707 | 60 (51, 68) | **69 (62, 75)** | 13 | 322 | 64 (37, 79) | **59 (27, 76)** |
| 252-279 days (36-39 weeks, 10th month) | 63 | 340 | 47 (30, 59) | **55 (40, 66)** | 1 | 81 | 89 (21, 99) | **87 (8, 98)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two mRNA-1273 (Moderna), Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 9 | 4414 | 94 (88, 97) | **92 (85, 96)** | 1 | 10925 | 99 (91, 100) | **98 (88, 100)** |
| 14-27 days (2-3 weeks) | 2 | 5244 | 99 (95, 100) | **99 (95, 100)** | 5 | 12065 | 94 (86, 98) | **94 (85, 97)** |
| 28-55 days (4-7 weeks, 2nd month) | 9 | 12899 | 98 (96, 99) | **98 (96, 99)** | 6 | 27972 | 97 (93, 99) | **98 (96, 99)** |
| 56-83 days (8-11 weeks, 3rd month) | 13 | 15193 | 97 (96, 99) | **98 (97, 99)** | 12 | 34922 | 95 (92, 97) | **98 (96, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 19 | 15003 | 96 (94, 98) | **98 (97, 99)** | 12 | 36202 | 95 (92, 97) | **98 (96, 99)** |
| 112-139 days (16-19 weeks, 5th month) | 19 | 11082 | 95 (92, 97) | **97 (96, 98)** | 12 | 30370 | 95 (90, 97) | **97 (94, 98)** |
| 140-167 days (20-23 weeks, 6th month) | 19 | 4511 | 87 (80, 92) | **94 (91, 96)** | 8 | 13187 | 92 (83, 96) | **95 (90, 98)** |
| 168-195 days (24-27 weeks, 7th month) | 2 | 1274 | 95 (81, 99) | **97 (90, 99)** | 4 | 3157 | 82 (53, 93) | **87 (63, 95)** |
| 196-223 days (28-31 weeks, 8th month) | 2 | 710 | 92 (66, 98) | **95 (80, 99)** | 1 | 1497 | 91 (34, 99) | **93 (50, 99)** |
| 224-251 days (32-35 weeks, 9th month) | 4 | 707 | 83 (55, 94) | **91 (77, 97)** | 0 | 322 | NE | **NE** |
| 252-279 days (36-39 weeks, 10th month) | 1 | 340 | 91 (37, 99) | **95 (65, 99)** | 0 | 81 | NE | **NE** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 12 Contin'd. Two-dose vaccine effectiveness against infection and hospitalization, by time since second dose, adults ≥18 years old, mixed mRNA and mRNA/ChAdOx1 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **Two mixed mRNA, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 35 | 1285 | 92 (89, 94) | **78 (69, 84)** | 18 | 1532 | 90 (83, 93) | **75 (60, 84)** |
| 14-27 days (2-3 weeks) | 15 | 1486 | 97 (95, 98) | **95 (91, 97)** | 5 | 1440 | 97 (93, 99) | **96 (89, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 104 | 3862 | 92 (91, 94) | **93 (92, 95)** | 34 | 3287 | 91 (87, 93) | **93 (90, 95)** |
| 56-83 days (8-11 weeks, 3rd month) | 256 | 6089 | 88 (86, 89) | **91 (90, 92)** | 83 | 4173 | 82 (78, 86) | **89 (86, 91)** |
| 84-111 days (12-15 weeks, 4th month) | 317 | 7095 | 87 (86, 89) | **89 (88, 91)** | 58 | 4410 | 88 (85, 91) | **90 (88, 93)** |
| 112-139 days (16-19 weeks, 5th month) | 343 | 6095 | 84 (82, 86) | **86 (84, 88)** | 102 | 4232 | 79 (74, 82) | **82 (77, 85)** |
| 140-167 days (20-23 weeks, 6th month) | 133 | 2813 | 86 (84, 89) | **85 (82, 88)** | 46 | 1424 | 71 (61, 79) | **75 (66, 81)** |
| 168-195 days (24-27 weeks, 7th month) | 1 | 79 | 96 (74, 99) | **96 (73, 99)** | 9 | 336 | 76 (54, 88) | **76 (53, 88)** |
| 196-223 days (28-31 weeks, 8th month) | 1 | 5 | NE | **NE** | 2 | 84 | 78 (13, 95) | **82 (25, 96)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two mixed mRNA, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 1 | 1285 | 98 (83, 100) | **96 (69, 99)** | 1 | 1532 | 91 (36, 99) | **NE** |
| 14-27 days (2-3 weeks) | 1 | 1486 | 98 (86, 100) | **96 (75, 100)** | 2 | 1440 | 81 (23, 95) | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 5 | 3862 | 96 (91, 98) | **97 (93, 99)** | 1 | 3287 | 96 (70, 99) | **97 (79, 100)** |
| 56-83 days (8-11 weeks, 3rd month) | 9 | 6089 | 96 (91, 98) | **98 (96, 99)** | 4 | 4173 | 87 (64, 95) | **94 (84, 98)** |
| 84-111 days (12-15 weeks, 4th month) | 15 | 7095 | 94 (89, 96) | **97 (96, 98)** | 0 | 4410 | NE | **NE** |
| 112-139 days (16-19 weeks, 5th month) | 10 | 6095 | 95 (91, 97) | **98 (97, 99)** | 0 | 4232 | NE | **NE** |
| 140-167 days (20-23 weeks, 6th month) | 9 | 2813 | 90 (82, 95) | **96 (92, 98)** | 0 | 1424 | NE | **NE** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |
| **Two mixed ChadOx1 + mRNA, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 41 | 729 | 84 (78, 88) | **49 (30, 63)** | 13 | 2530 | 95 (92, 97) | **86 (76, 92)** |
| 14-27 days (2-3 weeks) | 11 | 852 | 96 (93, 98) | **94 (89, 97)** | 7 | 2557 | 98 (95, 99) | **95 (90, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 104 | 2885 | 90 (87, 92) | **91 (89, 93)** | 51 | 5642 | 92 (89, 94) | **93 (91, 95)** |
| 56-83 days (8-11 weeks, 3rd month) | 184 | 4748 | 89 (87, 90) | **91 (90, 92)** | 125 | 8259 | 86 (84, 89) | **93 (91, 94)** |
| 84-111 days (12-15 weeks, 4th month) | 266 | 6152 | 88 (86, 89) | **89 (87, 90)** | 151 | 9903 | 86 (84, 88) | **90 (88, 91)** |
| 112-139 days (16-19 weeks, 5th month) | 253 | 4825 | 85 (83, 87) | **86 (84, 88)** | 169 | 9637 | 84 (82, 87) | **86 (83, 88)** |
| 140-167 days (20-23 weeks, 6th month) | 103 | 1877 | 84 (81, 87) | **82 (78, 85)** | 128 | 4350 | 74 (69, 78) | **79 (75, 83)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two mixed ChadOx1 + mRNA, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 0 | 729 | NE | **NE** | 0 | 2530 | NE | **NE** |
| 14-27 days (2-3 weeks) | 1 | 852 | 96 (75, 100) | **93 (48, 99)** | 0 | 2557 | NE | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 1 | 2885 | 99 (93, 100) | **99 (93, 100)** | 1 | 5642 | 98 (82, 100) | **99 (93, 100)** |
| 56-83 days (8-11 weeks, 3rd month) | 1 | 4748 | 99 (96, 100) | **100 (97, 100)** | 2 | 8259 | 97 (87, 99) | **99 (97, 100)** |
| 84-111 days (12-15 weeks, 4th month) | 0 | 6152 | NE | **NE** | 4 | 9903 | 94 (85, 98) | **98 (96, 99)** |
| 112-139 days (16-19 weeks, 5th month) | 1 | 4825 | 99 (96, 100) | **100 (97, 100)** | 3 | 9637 | 96 (87, 99) | **98 (94, 99)** |
| 140-167 days (20-23 weeks, 6th month) | 2 | 1877 | 97 (87, 99) | **98 (91, 99)** | 2 | 4350 | 94 (74, 98) | **97 (87, 99)** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, all VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 13. Two-dose vaccine effectiveness against infection and hospitalization, by time since second dose and age group, adults 18-49 years old, mRNA and ChAdOx1 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Any two mRNA vaccines, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 955 | 11985 | 77 (75, 78) | **74 (72, 76)** | 720 | 27543 | 77 (75, 79) | **75 (73, 77)** |
| 14-27 days (2-3 weeks) | 389 | 15972 | 93 (92, 94) | **93 (93, 94)** | 318 | 32348 | 91 (90, 92) | **93 (92, 94)** |
| 28-55 days (4-7 weeks, 2nd month) | 1389 | 40234 | 90 (89, 90) | **91 (91, 92)** | 1207 | 80929 | 87 (86, 88) | **91 (91, 92)** |
| 56-83 days (8-11 weeks, 3rd month) | 1913 | 50146 | 89 (88, 89) | **90 (89, 90)** | 1805 | 100040 | 84 (84, 85) | **89 (88, 90)** |
| 84-111 days (12-15 weeks, 4th month) | 2069 | 47861 | 87 (87, 88) | **87 (87, 88)** | 1965 | 96873 | 82 (81, 83) | **85 (84, 86)** |
| 112-139 days (16-19 weeks, 5th month) | 1710 | 32926 | 85 (84, 86) | **83 (82, 84)** | 1959 | 72935 | 77 (75, 78) | **82 (81, 83)** |
| 140-167 days (20-23 weeks, 6th month) | 705 | 11492 | 82 (81, 83) | **79 (78, 81)** | 807 | 26478 | 73 (72, 75) | **79 (77, 81)** |
| 168-195 days (24-27 weeks, 7th month) | 236 | 3372 | 79 (77, 82) | **79 (76, 82)** | 239 | 10787 | 81 (78, 83) | **81 (78, 83)** |
| 196-223 days (28-31 weeks, 8th month) | 211 | 2064 | 70 (65, 74) | **72 (68, 76)** | 141 | 4535 | 73 (68, 77) | **74 (70, 79)** |
| 224-251 days (32-35 weeks, 9th month) | 187 | 2215 | 75 (71, 79) | **76 (72, 79)** | 10 | 330 | 73 (50, 86) | **73 (49, 86)** |
| 252-279 days (36-39 weeks, 10th month) | 126 | 1330 | 72 (67, 77) | **69 (63, 74)** | 2 | 76 | 77 (6, 94) | **82 (25, 96)** |
| 280-307 days (40-43 weeks, 11th month) | 10 | 189 | 84 (71, 92) | **79 (61, 89)** | 0 | 18 | NE | **NE** |
| Unvaccinated | 20047 | 58842 | Reference | | 13488 | 117326 | Reference | |
| **Any two mRNA vaccines, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 7 | 11985 | 96 (93, 98) | **96 (91, 98)** | 5 | 27543 | 95 (89, 98) | 95 (87, 98) |
| 14-27 days (2-3 weeks) | 5 | 15972 | 98 (95, 99) | **98 (95, 99)** | 11 | 32348 | 91 (84, 95) | 93 (87, 96) |
| 28-55 days (4-7 weeks, 2nd month) | 16 | 40234 | 98 (96, 99) | **98 (96, 99)** | 10 | 80929 | 97 (94, 98) | 98 (96, 99) |
| 56-83 days (8-11 weeks, 3rd month) | 9 | 50146 | 99 (98, 99) | **99 (98, 100)** | 9 | 100040 | 98 (96, 99) | 99 (97, 99) |
| 84-111 days (12-15 weeks, 4th month) | 12 | 47861 | 98 (97, 99) | **99 (98, 99)** | 18 | 96873 | 95 (92, 97) | 96 (94, 98) |
| 112-139 days (16-19 weeks, 5th month) | 10 | 32926 | 98 (97, 99) | **98 (97, 99)** | 4 | 72935 | 99 (96, 99) | 99 (97, 100) |
| 140-167 days (20-23 weeks, 6th month) | 7 | 11492 | 96 (92, 98) | **97 (93, 98)** | 5 | 26478 | 95 (88, 98) | 96 (89, 98) |
| 168-195 days (24-27 weeks, 7th month) | 1 | 3372 | 98 (87, 100) | **98 (87, 100)** | 2 | 10787 | 95 (81, 99) | 95 (81, 99) |
| 196-223 days (28-31 weeks, 8th month) | 3 | 2064 | 91 (72, 97) | **92 (76, 98)** | 1 | 4535 | 94 (60, 99) | 94 (54, 99) |
| 224-251 days (32-35 weeks, 9th month) | 2 | 2215 | 94 (78, 99) | **96 (83, 99)** | 0 | 330 | NE | **NE** |
| 252-279 days (36-39 weeks, 10th month) | 1 | 1330 | 95 (67, 99) | **96 (71, 99)** | 0 | 76 | NE | **NE** |
| 280-307 days (40-43 weeks, 11th month) | 0 | 189 | NE | **NE** | 0 | 18 | NE | **NE** |
| Unvaccinated | 966 | 58842 | Reference | | 462 | 117326 | Reference | |
| **Two ChAdOx1 vaccines, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 3 | 115 | 92 (76, 98) | **80 (36, 94)** | 1 | 84 | 90 (26, 99) | **NE** |
| 14-27 days (2-3 weeks) | 3 | 126 | 93 (78, 98) | **86 (54, 95)** | 2 | 89 | 80 (21, 95) | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 39 | 407 | 72 (61, 80) | **72 (61, 80)** | 7 | 192 | 68 (32, 85) | 75 (46, 88) |
| 56-83 days (8-11 weeks, 3rd month) | 97 | 766 | 63 (54, 70) | **72 (65, 77)** | 16 | 214 | 35 (-8, 61) | 64 (40, 78) |
| 84-111 days (12-15 weeks, 4th month) | 128 | 1111 | 66 (59, 72) | **68 (62, 74)** | 11 | 304 | 68 (42, 83) | 81 (65, 90) |
| 112-139 days (16-19 weeks, 5th month) | 117 | 1003 | 66 (58, 72) | **67 (60, 73)** | 8 | 279 | 75 (49, 88) | 80 (60, 90) |
| 140-167 days (20-23 weeks, 6th month) | 76 | 585 | 62 (52, 70) | **58 (46, 67)** | 20 | 205 | 15 (-34, 46) | 33 (-7, 58) |
| 168-195 days (24-27 weeks, 7th month) | 8 | 39 | 40 (-29, 72) | **48 (-12, 76)** | 3 | 58 | 55 (-44, 86) | 67 (-5, 90) |
| Unvaccinated | 20047 | 58842 | Reference | | 13488 | 117326 | Reference | |
| **Two ChAdOx1 vaccines, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 0 | 115 | NE | **NE** | 0 | 84 | NE | **NE** |
| 14-27 days (2-3 weeks) | 0 | 126 | NE | **NE** | 0 | 89 | NE | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 0 | 407 | NE | **NE** | 0 | 192 | NE | **NE** |
| 56-83 days (8-11 weeks, 3rd month) | 1 | 766 | 92 (43, 99) | **93 (49, 99)** | 0 | 214 | NE | **NE** |
| 84-111 days (12-15 weeks, 4th month) | 0 | 1111 | NE | **NE** | 0 | 304 | NE | **NE** |
| 112-139 days (16-19 weeks, 5th month) | 1 | 1003 | 94 (57, 99) | **95 (68, 99)** | 0 | 279 | NE | **NE** |
| 140-167 days (20-23 weeks, 6th month) | 1 | 585 | 90 (26, 99) | **91 (36, 99)** | 0 | 205 | NE | **NE** |
| 168-195 days (24-27 weeks, 7th month) | 0 | 39 | NE | **NE** | 0 | 58 | NE | **NE** |
| Unvaccinated | 966 | 58842 | Reference | | 462 | 117326 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 13 Cont'd. Two-dose vaccine effectiveness (VE) against infection and hospitalization, by time since second dose and age group, adults 50-69 years old, mRNA and ChAdOx1 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Any two mRNA vaccines, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 154 | 3734 | 90 (88, 91) | **79 (75, 82)** | 138 | 12334 | 90 (88, 92) | **78 (74, 82)** |
| 14-27 days (2-3 weeks) | 83 | 4684 | 96 (95, 96) | **93 (91, 94)** | 74 | 13780 | 95 (94, 96) | **92 (90, 94)** |
| 28-55 days (4-7 weeks, 2nd month) | 360 | 12889 | 93 (92, 94) | **93 (92, 94)** | 284 | 31128 | 92 (91, 93) | **92 (91, 93)** |
| 56-83 days (8-11 weeks, 3rd month) | 728 | 17654 | 90 (89, 91) | **92 (91, 93)** | 639 | 37932 | 85 (84, 86) | **91 (90, 92)** |
| 84-111 days (12-15 weeks, 4th month) | 949 | 19684 | 88 (87, 89) | **91 (90, 92)** | 706 | 43078 | 86 (84, 87) | **91 (90, 92)** |
| 112-139 days (16-19 weeks, 5th month) | 933 | 16607 | 86 (85, 87) | **89 (88, 90)** | 815 | 39618 | 82 (80, 83) | **87 (86, 88)** |
| 140-167 days (20-23 weeks, 6th month) | 460 | 7484 | 85 (83, 86) | **86 (84, 87)** | 494 | 21747 | 80 (78, 82) | **87 (85, 88)** |
| 168-195 days (24-27 weeks, 7th month) | 91 | 1744 | 87 (84, 90) | **88 (85, 91)** | 108 | 4619 | 79 (75, 83) | **84 (80, 87)** |
| 196-223 days (28-31 weeks, 8th month) | 93 | 975 | 76 (71, 81) | **81 (76, 85)** | 64 | 2066 | 73 (65, 79) | **79 (72, 84)** |
| 224-251 days (32-35 weeks, 9th month) | 103 | 1012 | 75 (69, 79) | **81 (77, 85)** | 11 | 303 | 68 (41, 82) | **75 (53, 86)** |
| 252-279 days (36-39 weeks, 10th month) | 51 | 697 | 82 (76, 86) | **84 (79, 88)** | 1 | 77 | 89 (18, 98) | **91 (36, 99)** |
| 280-307 days (40-43 weeks, 11th month) | 5 | 99 | 87 (69, 95) | **88 (70, 95)** | 2 | 18 | NE | **NE** |
| Unvaccinated | 5706 | 14117 | Reference | | 2679 | 23615 | Reference | |
| **Any two mRNA vaccines, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 13 | 3734 | 95 (92, 97) | **90 (83, 94)** | 3 | 12334 | 99 (96, 100) | **97 (91, 99)** |
| 14-27 days (2-3 weeks) | 7 | 4684 | 98 (96, 99) | **96 (93, 98)** | 5 | 13780 | 98 (95, 99) | **97 (92, 99)** |
| 28-55 days (4-7 weeks, 2nd month) | 11 | 12889 | 99 (98, 99) | **99 (98, 99)** | 10 | 31128 | 98 (96, 99) | **98 (97, 99)** |
| 56-83 days (8-11 weeks, 3rd month) | 31 | 17654 | 98 (97, 98) | **98 (97, 99)** | 13 | 37932 | 98 (97, 99) | **99 (98, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 29 | 19684 | 98 (97, 99) | **99 (98, 99)** | 17 | 43078 | 98 (96, 99) | **99 (98, 99)** |
| 112-139 days (16-19 weeks, 5th month) | 34 | 16607 | 97 (96, 98) | **98 (97, 99)** | 23 | 39618 | 97 (95, 98) | **97 (95, 98)** |
| 140-167 days (20-23 weeks, 6th month) | 22 | 7484 | 96 (94, 97) | **96 (95, 98)** | 9 | 21747 | 98 (95, 99) | **97 (95, 99)** |
| 168-195 days (24-27 weeks, 7th month) | 3 | 1744 | 98 (93, 99) | **98 (93, 99)** | 1 | 4619 | 99 (91, 100) | **98 (89, 100)** |
| 196-223 days (28-31 weeks, 8th month) | 3 | 975 | 96 (87, 99) | **96 (88, 99)** | 2 | 2066 | 94 (77, 99) | **92 (68, 98)** |
| 224-251 days (32-35 weeks, 9th month) | 2 | 1012 | 97 (89, 99) | **98 (92, 99)** | 0 | 303 | NE | **NE** |
| 252-279 days (36-39 weeks, 10th month) | 0 | 697 | NE | **NE** | 0 | 77 | NE | **NE** |
| 280-307 days (40-43 weeks, 11th month) | 1 | 99 | 86 (2, 98) | **86 (1, 98)** | 0 | 18 | NE | **NE** |
| Unvaccinated | 1041 | 14117 | Reference | | 403 | 23615 | Reference | |
| **Two ChAdOx1 vaccines, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 5 | 319 | 96 (91, 98) | **81 (54, 92)** | 5 | 740 | 94 (86, 98) | **78 (46, 91)** |
| 14-27 days (2-3 weeks) | 8 | 289 | 93 (86, 97) | **59 (14, 80)** | 2 | 769 | 98 (91, 99) | **93 (70, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 40 | 747 | 87 (82, 90) | **71 (59, 79)** | 11 | 1559 | 94 (89, 97) | **88 (79, 94)** |
| 56-83 days (8-11 weeks, 3rd month) | 156 | 1494 | 74 (69, 78) | **76 (71, 80)** | 44 | 1896 | 80 (72, 85) | **84 (78, 88)** |
| 84-111 days (12-15 weeks, 4th month) | 199 | 1876 | 74 (70, 77) | **79 (75, 82)** | 88 | 2569 | 70 (63, 76) | **85 (81, 88)** |
| 112-139 days (16-19 weeks, 5th month) | 220 | 2022 | 73 (69, 77) | **78 (75, 81)** | 89 | 2665 | 71 (64, 76) | **80 (76, 84)** |
| 140-167 days (20-23 weeks, 6th month) | 117 | 1499 | 81 (77, 84) | **81 (77, 85)** | 96 | 2367 | 64 (56, 71) | **73 (66, 78)** |
| 168-195 days (24-27 weeks, 7th month) | 12 | 128 | 77 (58, 87) | **75 (54, 86)** | 33 | 548 | 47 (24, 63) | **64 (47, 75)** |
| Unvaccinated | 5706 | 14117 | Reference | | 2679 | 23615 | Reference | |
| **Two ChAdOx1 vaccines, Hospitalization** | | | | | | | | |
| 0-13 days (0-1 week) | 0 | 319 | NE | **NE** | 0 | 740 | NE | **NE** |
| 14-27 days (2-3 weeks) | 0 | 289 | NE | **NE** | 0 | 769 | NE | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 3 | 747 | 95 (83, 98) | **87 (57, 96)** | 0 | 1559 | NE | **NE** |
| 56-83 days (8-11 weeks, 3rd month) | 6 | 1494 | 95 (88, 98) | **94 (87, 97)** | 2 | 1896 | 94 (75, 98) | **96 (84, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 7 | 1876 | 95 (89, 98) | **96 (91, 98)** | 1 | 2569 | 98 (84, 100) | **99 (93, 100)** |
| 112-139 days (16-19 weeks, 5th month) | 6 | 2022 | 96 (91, 98) | **97 (93, 99)** | 3 | 2665 | 93 (79, 98) | **96 (86, 99)** |
| 140-167 days (20-23 weeks, 6th month) | 5 | 1499 | 95 (89, 98) | **96 (90, 98)** | 4 | 2367 | 90 (73, 96) | **88 (67, 96)** |
| 168-195 days (24-27 weeks, 7th month) | 1 | 128 | 89 (24, 99) | **90 (30, 99)** | 1 | 548 | 89 (24, 99) | **83 (-25, 98)** |
| Unvaccinated | 1041 | 14117 | Reference | | 403 | 23615 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 13 Cont'd. Two-dose vaccine effectiveness against infection and hospitalization, by time since second dose and age group, adults ≥70 years old, mRNA vaccines and BNT162b2, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia (BC), Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **Two any mRNA, Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 48 | 2915 | 95 (93, 96) | **78 (70, 84)** | 39 | 7651 | 92 (89, 94) | **64 (46, 76)** |
| 14-27 days (2-3 weeks) | 4 | 2966 | 100 (99, 100) | **98 (95, 99)** | 21 | 8567 | 96 (94, 98) | **86 (77, 91)** |
| 28-55 days (4-7 weeks, 2nd month) | 83 | 6664 | 96 (95, 97) | **92 (90, 94)** | 80 | 16806 | 92 (90, 94) | **88 (84, 91)** |
| 56-83 days (8-11 weeks, 3rd month) | 281 | 8992 | 90 (88, 91) | **92 (91, 94)** | 181 | 18069 | 84 (81, 87) | **90 (88, 92)** |
| 84-111 days (12-15 weeks, 4th month) | 433 | 10433 | 86 (84, 88) | **91 (90, 92)** | 348 | 21550 | 74 (71, 78) | **88 (86, 90)** |
| 112-139 days (16-19 weeks, 5th month) | 513 | 10375 | 83 (82, 85) | **89 (88, 91)** | 337 | 21719 | 75 (72, 79) | **86 (83, 88)** |
| 140-167 days (20-23 weeks, 6th month) | 277 | 6391 | 86 (83, 87) | **89 (87, 91)** | 273 | 15259 | 72 (67, 76) | **81 (76, 85)** |
| 168-195 days (24-27 weeks, 7th month) | 34 | 503 | 77 (68, 84) | **81 (73, 87)** | 35 | 1866 | 70 (58, 79) | **77 (66, 84)** |
| 196-223 days (28-31 weeks, 8th month) | 17 | 127 | 55 (26, 73) | **75 (59, 85)** | 17 | 424 | 37 (-4, 61) | **63 (38, 78)** |
| Unvaccinated | 1376 | 4594 | Reference | | 455 | 7202 | Reference | |
| **Two any mRNA, Hospitalizations[b]** | | | | | | | | |
| 0-13 days (0-1 week) | 9 | 2915 | 98 (95, 99) | **90 (79, 95)** | 8 | 7651 | 96 (92, 98) | **78 (53, 90)** |
| 14-27 days (2-3 weeks) | 1 | 2966 | 100 (98, 100) | **99 (93, 100)** | 4 | 8567 | 98 (96, 99) | **94 (82, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 14 | 6664 | 98 (97, 99) | **97 (95, 98)** | 14 | 16806 | 97 (95, 98) | **95 (90, 97)** |
| 56-83 days (8-11 weeks, 3rd month) | 47 | 8992 | 96 (94, 97) | **97 (96, 98)** | 32 | 18069 | 94 (91, 96) | **96 (94, 97)** |
| 84-111 days (12-15 weeks, 4th month) | 71 | 10433 | 95 (93, 96) | **96 (95, 97)** | 54 | 21550 | 91 (88, 93) | **96 (94, 97)** |
| 112-139 days (16-19 weeks, 5th month) | 62 | 10375 | 95 (94, 96) | **97 (96, 98)** | 50 | 21719 | 92 (89, 94) | **95 (93, 96)** |
| 140-167 days (20-23 weeks, 6th month) | 50 | 6391 | 94 (92, 95) | **96 (94, 97)** | 29 | 15259 | 93 (90, 95) | **95 (91, 97)** |
| 168-195 days (24-27 weeks, 7th month) | 7 | 503 | 89 (77, 95) | **91 (81, 96)** | 3 | 1866 | 94 (82, 98) | **95 (85, 99)** |
| 196-223 days (28-31 weeks, 8th month) | 2 | 127 | 88 (50, 97) | **92 (67, 98)** | 1 | 424 | 92 (40, 99) | **95 (62, 99)** |
| Unvaccinated | 587 | 4594 | Reference | | 201 | 7202 | Reference | |
| **Two BNT162b2 (Pfizer-BioNTech), Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 35 | 2077 | 94 (92, 96) | **76 (65, 84)** | 32 | 6096 | 92 (88, 94) | **62 (42, 76)** |
| 14-27 days (2-3 weeks) | 2 | 2126 | 100 (99, 100) | **99 (95, 100)** | 18 | 6934 | 96 (93, 97) | **84 (73, 90)** |
| 28-55 days (4-7 weeks, 2nd month) | 61 | 4876 | 96 (95, 97) | **92 (89, 94)** | 67 | 13500 | 92 (90, 94) | **87 (82, 90)** |
| 56-83 days (8-11 weeks, 3rd month) | 220 | 6503 | 89 (87, 90) | **92 (90, 93)** | 144 | 14436 | 84 (81, 87) | **90 (88, 92)** |
| 84-111 days (12-15 weeks, 4th month) | 325 | 7587 | 86 (84, 87) | **91 (89, 92)** | 300 | 17352 | 73 (68, 76) | **87 (85, 89)** |
| 112-139 days (16-19 weeks, 5th month) | 376 | 7612 | 84 (81, 85) | **89 (88, 91)** | 284 | 17595 | 74 (70, 78) | **85 (83, 88)** |
| 140-167 days (20-23 weeks, 6th month) | 215 | 4715 | 85 (82, 87) | **88 (86, 90)** | 238 | 12707 | 70 (65, 75) | **80 (75, 84)** |
| 168-195 days (24-27 weeks, 7th month) | 24 | 351 | 77 (65, 85) | **79 (68, 86)** | 25 | 1394 | 72 (57, 81) | **78 (66, 86)** |
| 196-223 days (28-31 weeks, 8th month) | 8 | 87 | 69 (36, 85) | **81 (60, 91)** | 9 | 226 | NE | **68 (37, 84)** |
| Unvaccinated | 1376 | 4594 | Reference | | 455 | 7202 | Reference | |
| **Two BNT162b2 (Pfizer-BioNTech), Hospitalization[b]** | | | | | | | | |
| 0-13 days (0-1 week) | 6 | 2077 | 98 (95, 99) | **90 (77, 96)** | 7 | 6096 | 96 (91, 98) | **75 (42, 89)** |
| 14-27 days (2-3 weeks) | 1 | 2126 | 100 (97, 100) | **99 (89, 100)** | 3 | 6934 | 98 (95, 100) | **93 (79, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 11 | 4876 | 98 (97, 99) | **96 (93, 98)** | 11 | 13500 | 97 (95, 98) | **95 (90, 97)** |
| 56-83 days (8-11 weeks, 3rd month) | 37 | 6503 | 96 (94, 97) | **97 (95, 98)** | 23 | 14436 | 94 (91, 96) | **96 (94, 98)** |
| 84-111 days (12-15 weeks, 4th month) | 49 | 7587 | 95 (93, 96) | **97 (95, 97)** | 51 | 17352 | 89 (86, 92) | **95 (94, 97)** |
| 112-139 days (16-19 weeks, 5th month) | 47 | 7612 | 95 (93, 96) | **97 (96, 98)** | 44 | 17595 | 91 (88, 94) | **95 (92, 96)** |
| 140-167 days (20-23 weeks, 6th month) | 40 | 4715 | 93 (91, 95) | **95 (93, 97)** | 24 | 12707 | 93 (90, 96) | **95 (91, 97)** |
| 168-195 days (24-27 weeks, 7th month) | 5 | 351 | 89 (73, 95) | **90 (76, 96)** | 2 | 1394 | 95 (79, 99) | **96 (84, 99)** |
| 196-223 days (28-31 weeks, 8th month) | 2 | 87 | 82 (27, 96) | **87 (47, 97)** | 0 | 226 | NE | **NE** |
| Unvaccinated | 587 | 4594 | Reference | | 201 | 7202 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, all VE estimates adjusted for age group (70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

[b] In Quebec, adjusted VE estimates against hospitalization in ≥70-year-olds were adjusted for calendar time tri-weekly owing to sample size.

**Supplementary Table 13 Contin'd. Two-dose vaccine effectiveness against infection and hospitalization, by time since second dose and age group, adults ≥70 years old, mRNA-1273 vaccine, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia (BC), Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **Two mRNA-1273 (Moderna), Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 9 | 445 | 93 (87, 97) | **84 (69, 92)** | 2 | 1306 | 98 (90, 99) | **90 (61, 98)** |
| 14-27 days (2-3 weeks) | 1 | 453 | 99 (95, 100) | **98 (88, 100)** | 3 | 1397 | 97 (89, 99) | **90 (68, 97)** |
| 28-55 days (4-7 weeks, 2nd month) | 11 | 1029 | 96 (94, 98) | **95 (91, 97)** | 11 | 2892 | 94 (89, 97) | **91 (84, 95)** |
| 56-83 days (8-11 weeks, 3rd month) | 33 | 1342 | 92 (88, 94) | **94 (92, 96)** | 31 | 3206 | 85 (78, 89) | **91 (87, 94)** |
| 84-111 days (12-15 weeks, 4th month) | 60 | 1601 | 87 (84, 90) | **93 (90, 94)** | 46 | 3687 | 80 (73, 85) | **91 (87, 93)** |
| 112-139 days (16-19 weeks, 5th month) | 77 | 1450 | 82 (78, 86) | **89 (86, 92)** | 49 | 3621 | 79 (71, 84) | **87 (82, 90)** |
| 140-167 days (20-23 weeks, 6th month) | 37 | 895 | 86 (81, 90) | **90 (86, 93)** | 29 | 2263 | 80 (70, 86) | **85 (77, 90)** |
| 168-195 days (24-27 weeks, 7th month) | 10 | 143 | 77 (56, 88) | **85 (70, 92)** | 8 | 420 | 70 (39, 85) | **75 (48, 88)** |
| 196-223 days (28-31 weeks, 8th month) | 9 | 40 | 25 (-55, 64) | **66 (28, 84)** | 8 | 194 | 35 (-33, 68) | **52 (-3, 78)** |
| Unvaccinated | 1376 | 4594 | Reference | | 455 | 7202 | Reference | |
| **Two mRNA-1273 (Moderna), Hospitalization[b]** | | | | | | | | |
| 0-13 days (0-1 week) | 2 | 445 | 96 (86, 99) | **91 (63, 98)** | 0 | 1306 | NE | **NE** |
| 14-27 days (2-3 weeks) | 0 | 453 | NE | **NE** | 1 | 1397 | 97 (82, 100) | **92 (45, 99)** |
| 28-55 days (4-7 weeks, 2nd month) | 1 | 1029 | 99 (95, 100) | **99 (93, 100)** | 2 | 2892 | 98 (90, 99) | **96 (85, 99)** |
| 56-83 days (8-11 weeks, 3rd month) | 6 | 1342 | 97 (92, 98) | **98 (94, 99)** | 7 | 3206 | 92 (83, 96) | **95 (90, 98)** |
| 84-111 days (12-15 weeks, 4th month) | 11 | 1601 | 95 (90, 97) | **97 (94, 98)** | 3 | 3687 | 97 (91, 99) | **99 (96, 100)** |
| 112-139 days (16-19 weeks, 5th month) | 11 | 1450 | 94 (89, 97) | **96 (93, 98)** | 6 | 3621 | 94 (87, 97) | **96 (91, 98)** |
| 140-167 days (20-23 weeks, 6th month) | 7 | 895 | 94 (87, 97) | **96 (91, 98)** | 5 | 2263 | 92 (81,97) | **93 (83,97)** |
| 168-195 days (24-27 weeks, 7th month) | 2 | 143 | 89 (56, 97) | **93 (71, 98)** | 1 | 420 | 91 (39,99) | **92 (40,99)** |
| 196-223 days (28-31 weeks, 8th month) | 0 | 40 | NE | **NE** | 1 | 194 | 82 (-32, 97) | **NE** |
| Unvaccinated | 587 | 4594 | Reference | | 201 | 7202 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, all VE estimates adjusted for age group (70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47), categorical; and region (5 categories in each province).

[b] In Quebec, adjusted VE estimates against hospitalization in ≥70-year-olds were adjusted for calendar time tri-weekly owing to sample size.

**Supplementary Table 14. Two-dose vaccine effectiveness against Delta VOC infection and hospitalization, by time since second dose, adults ≥18 years old, mRNA and ChAdOx1 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **Any two mRNA vaccines, Delta infection** | | | | | | | | |
| 0-13 days (0-1 week) | 1015 | 18634 | 83 (82, 84) | **74 (73, 76)** | 526 | 47528 | 87 (86, 88) | **76 (73, 78)** |
| 14-27 days (2-3 weeks) | 420 | 23622 | 94 (94, 95) | **94 (93, 94)** | 275 | 54695 | 94 (93, 95) | **93 (92, 93)** |
| 28-55 days (4-7 weeks, 2nd month) | 1715 | 59787 | 91 (91, 91) | **92 (92, 93)** | 1218 | 128863 | 89 (88, 90) | **91 (91, 92)** |
| 56-83 days (8-11 weeks, 3rd month) | 2865 | 76792 | 88 (88, 89) | **91 (91, 91)** | 2436 | 156041 | 82 (81, 83) | **90 (89, 90)** |
| 84-111 days (12-15 weeks, 4th month) | 3437 | 77978 | 86 (86, 87) | **89 (88, 89)** | 2958 | 161501 | 79 (78, 79) | **87 (86, 87)** |
| 112-139 days (16-19 weeks, 5th month) | 3144 | 59908 | 84 (83, 84) | **85 (85, 86)** | 3090 | 134272 | 73 (72, 74) | **83 (82, 84)** |
| 140-167 days (20-23 weeks, 6th month) | 1433 | 25367 | 82 (81, 83) | **83 (82, 84)** | 1571 | 63484 | 71 (70, 73) | **82 (81, 83)** |
| 168-195 days (24-27 weeks, 7th month) | 348 | 5619 | 81 (78, 83) | **83 (81, 84)** | 382 | 17272 | 74 (71, 77) | **82 (80, 84)** |
| 196-223 days (28-31 weeks, 8th month) | 319 | 3166 | 68 (65, 72) | **75 (72, 78)** | 222 | 7025 | 63 (58, 68) | **75 (71, 78)** |
| 224-251 days (32-35 weeks, 9th month) | 311 | 3340 | 71 (67, 74) | **77 (74, 79)** | 29 | 831 | 59 (41, 72) | **71 (58, 80)** |
| 252-279 days (36-39 weeks, 10th month) | 183 | 2065 | 72 (68, 76) | **75 (70, 78)** | 7 | 250 | 67 (31, 85) | **77 (52, 89)** |
| Unvaccinated | 24790 | 77553 | Reference | | 12691 | 148143 | Reference | |
| **Any two mRNA vaccines, Delta Hospitalization[b]** | | | | | | | | |
| 0-13 days (0-1 week) | 27 | 18634 | 95 (93, 97) | **90 (86, 93)** | 11 | 17011 | 93 (88, 96) | **92 (85, 95)** |
| 14-27 days (2-3 weeks) | 10 | 23622 | 99 (97, 99) | **98 (96, 99)** | 11 | 29345 | 96 (93, 98) | **95 (91, 97)** |
| 28-55 days (4-7 weeks, 2nd month) | 38 | 59787 | 98 (97, 99) | **98 (97, 99)** | 25 | 102353 | 98 (96, 98) | **98 (97, 98)** |
| 56-83 days (8-11 weeks, 3rd month) | 82 | 76792 | 97 (96, 97) | **98 (97, 98)** | 46 | 149008 | 97 (96, 98) | **98 (98, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 111 | 77978 | 95 (94, 96) | **98 (97, 98)** | 83 | 159700 | 95 (93, 96) | **97 (96, 98)** |
| 112-139 days (16-19 weeks, 5th month) | 105 | 59908 | 94 (93, 95) | **98 (97, 98)** | 77 | 133931 | 94 (93, 95) | **96 (95, 97)** |
| 140-167 days (20-23 weeks, 6th month) | 78 | 25367 | 90 (88, 92) | **96 (95, 97)** | 42 | 63346 | 93 (91, 95) | **96 (94, 97)** |
| 168-195 days (24-27 weeks, 7th month) | 11 | 5619 | 94 (89, 97) | **96 (93, 98)** | 6 | 17258 | 96 (92, 98) | **96 (92, 98)** |
| 196-223 days (28-31 weeks, 8th month) | 8 | 3166 | 92 (84, 96) | **95 (89, 97)** | 4 | 7024 | 94 (85, 98) | **94 (83, 98)** |
| Unvaccinated | 2402 | 77553 | Reference | | 869 | 88449 | Reference | |
| **Two ChAdOx1 vaccines, Delta infection** | | | | | | | | |
| 0-13 days (0-1 week) | 3 | 443 | 98 (93, 99) | **78 (29, 93)** | 1 | 1319 | 99 (94, 100) | **NE** |
| 14-27 days (2-3 weeks) | 8 | 428 | 94 (88, 97) | **70 (39, 86)** | 2 | 1482 | 98 (94, 100) | **85 (38, 96)** |
| 28-55 days (4-7 weeks, 2nd month) | 77 | 1178 | 80 (74, 84) | **75 (68, 80)** | 11 | 2828 | 95 (92, 97) | **88 (78, 93)** |
| 56-83 days (8-11 weeks, 3rd month) | 245 | 2281 | 66 (62, 71) | **76 (72, 79)** | 49 | 3177 | 82 (76, 86) | **85 (80, 89)** |
| 84-111 days (12-15 weeks, 4th month) | 334 | 3019 | 65 (61, 69) | **74 (70, 77)** | 121 | 4208 | 66 (60, 72) | **85 (82, 87)** |
| 112-139 days (16-19 weeks, 5th month) | 341 | 3045 | 65 (61, 69) | **72 (69, 75)** | 148 | 4460 | 61 (54, 67) | **76 (72, 80)** |
| 140-167 days (20-23 weeks, 6th month) | 193 | 2110 | 71 (67, 75) | **74 (70, 78)** | 144 | 4063 | 59 (51, 65) | **72 (67, 77)** |
| 168-195 days (24-27 weeks, 7th month) | 20 | 170 | 63 (41, 77) | **67 (48, 80)** | 72 | 1190 | 29 (10, 44) | **60 (48, 69)** |
| Unvaccinated | 24790 | 77553 | Reference | | 12691 | 148143 | Reference | |
| **Two ChAdOx1 vaccines, Delta Hospitalization[2]** | | | | | | | | |
| 0-13 days (0-1 week) | 0 | 443 | NE | **NE** | 0 | 51 | NE | **NE** |
| 14-27 days (2-3 weeks) | 0 | 428 | NE | **NE** | 0 | 95 | NE | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 3 | 1178 | 92 (74, 97) | **89 (67, 97)** | 0 | 752 | NE | **NE** |
| 56-83 days (8-11 weeks, 3rd month) | 7 | 2281 | 90 (79, 95) | **94 (88, 97)** | 1 | 2937 | 97 (75, 100) | **98 (88, 100)** |
| 84-111 days (12-15 weeks, 4th month) | 9 | 3019 | 90 (81, 95) | **95 (91, 98)** | 5 | 4207 | 88 (71, 95) | **97 (94, 99)** |
| 112-139 days (16-19 weeks, 5th month) | 7 | 3045 | 93 (84, 96) | **97 (93, 98)** | 7 | 4458 | 84 (66, 92) | **96 (90, 98)** |
| 140-167 days (20-23 weeks, 6th month) | 6 | 2110 | 91 (80, 96) | **96 (90, 98)** | 9 | 4063 | 77 (56, 88) | **91 (82, 95)** |
| 168-195 days (24-27 weeks, 7th month) | 1 | 170 | 81 (-36, 97) | **91 (34, 99)** | 3 | 1190 | 74 (20, 92) | **89 (66, 97)** |
| Unvaccinated | 2402 | 77553 | Reference | | 869 | 88449 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, all VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

[b] In Quebec, VE against hospitalizations due to Delta variant assessed only between epi-weeks 31-47 because no hospitalized Delta variant cases identified prior to that period.

**Supplementary Table 14 Contin'd. Two-dose vaccine effectiveness (VE) against Delta VOC infection and hospitalization, by time since second dose, adults ≥18 years old, BNT162b2 and mRNA-1273 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Two BNT162b2 (Pfizer-BioNTech), Delta Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 745 | 12935 | 82 (81, 83) | **72 (69, 74)** | 409 | 35071 | 86 (85, 88) | **74 (71, 77)** |
| 14-27 days (2-3 weeks) | 320 | 16891 | 94 (93, 95) | **93 (93, 94)** | 220 | 41190 | 94 (93, 95) | **92 (91, 93)** |
| 28-55 days (4-7 weeks, 2nd month) | 1318 | 43026 | 90 (90, 91) | **92 (91, 92)** | 981 | 97604 | 88 (87, 89) | **91 (90, 92)** |
| 56-83 days (8-11 weeks, 3rd month) | 2127 | 55508 | 88 (87, 89) | **91 (90, 91)** | 1907 | 116946 | 81 (80, 82) | **89 (89, 90)** |
| 84-111 days (12-15 weeks, 4th month) | 2533 | 55879 | 86 (85, 86) | **88 (88, 89)** | 2370 | 120889 | 77 (76, 78) | **86 (85, 87)** |
| 112-139 days (16-19 weeks, 5th month) | 2238 | 42731 | 84 (83, 84) | **85 (84, 86)** | 2440 | 99670 | 71 (70, 73) | **82 (81, 83)** |
| 140-167 days (20-23 weeks, 6th month) | 1000 | 18042 | 83 (81, 84) | **83 (82, 84)** | 1250 | 48873 | 70 (68, 72) | **82 (81, 83)** |
| 168-195 days (24-27 weeks, 7th month) | 243 | 4266 | 82 (80, 84) | **83 (81, 85)** | 291 | 13779 | 75 (72, 78) | **83 (81, 85)** |
| 196-223 days (28-31 weeks, 8th month) | 212 | 2451 | 73 (69, 76) | **78 (74, 81)** | 147 | 5444 | 68 (63, 73) | **80 (76, 83)** |
| 224-251 days (32-35 weeks, 9th month) | 211 | 2628 | 75 (71, 78) | **79 (76, 82)** | 16 | 507 | 63 (39, 78) | **76 (60, 85)** |
| 252-279 days (36-39 weeks, 10th month) | 120 | 1723 | 78 (74, 82) | **79 (75, 83)** | 6 | 168 | 58 (6, 82) | **73 (38, 88)** |
| Unvaccinated | 24790 | 77553 | Reference | | 12691 | 148143 | Reference | |
| **Two BNT162b2, Delta Hospitalization[b]** | | | | | | | | |
| 0-13 days (0-1 week) | 17 | 12935 | 96 (93, 97) | **90 (84, 94)** | 9 | 12463 | 93 (86, 96) | **91 (82, 95)** |
| 14-27 days (2-3 weeks) | 7 | 16891 | 99 (97, 99) | **98 (95, 99)** | 8 | 21975 | 96 (93, 98) | **95 (91, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 25 | 43026 | 98 (97, 99) | **98 (97, 99)** | 19 | 76242 | 97 (96, 98) | **98 (96, 99)** |
| 56-83 days (8-11 weeks, 3rd month) | 61 | 55508 | 96 (95, 97) | **98 (97, 98)** | 32 | 111537 | 97 (96, 98) | **98 (98, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 77 | 55879 | 96 (94, 96) | **98 (97, 98)** | 72 | 119653 | 94 (92, 95) | **97 (96, 98)** |
| 112-139 days (16-19 weeks, 5th month) | 76 | 42731 | 94 (93, 95) | **97 (97, 98)** | 65 | 99466 | 93 (91, 95) | **96 (95, 97)** |
| 140-167 days (20-23 weeks, 6th month) | 50 | 18042 | 91 (88, 93) | **96 (95, 97)** | 35 | 48781 | 93 (90, 95) | **96 (94, 97)** |
| 168-195 days (24-27 weeks, 7th month) | 9 | 4266 | 93 (87, 96) | **95 (91, 97)** | 2 | 13766 | 99 (94, 100) | **98 (94, 100)** |
| 196-223 days (28-31 weeks, 8th month) | 6 | 2451 | 92 (82, 96) | **94 (87, 97)** | 3 | 5443 | 94 (83, 98) | **94 (80, 98)** |
| Unvaccinated | 2402 | 77553 | Reference | | 869 | 88449 | Reference | |
| **Two mRNA-1273 (Moderna), Delta Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 241 | 4414 | 83 (81, 85) | **80 (78, 83)** | 104 | 10925 | 89 (87, 91) | **82 (78, 85)** |
| 14-27 days (2-3 weeks) | 86 | 5244 | 95 (94, 96) | **95 (94, 96)** | 52 | 12065 | 95 (93, 96) | **94 (92, 95)** |
| 28-55 days (4-7 weeks, 2nd month) | 304 | 12899 | 93 (92, 93) | **94 (93, 94)** | 213 | 27972 | 91 (90, 92) | **93 (92, 94)** |
| 56-83 days (8-11 weeks, 3rd month) | 493 | 15193 | 90 (89, 91) | **92 (91, 93)** | 455 | 34922 | 85 (83, 86) | **92 (91, 92)** |
| 84-111 days (12-15 weeks, 4th month) | 587 | 15003 | 88 (87, 89) | **90 (89, 91)** | 530 | 36202 | 83 (81, 84) | **89 (88, 90)** |
| 112-139 days (16-19 weeks, 5th month) | 563 | 11082 | 84 (83, 85) | **87 (85, 88)** | 548 | 30370 | 79 (77, 81) | **85 (84, 87)** |
| 140-167 days (20-23 weeks, 6th month) | 300 | 4511 | 79 (77, 82) | **82 (80, 84)** | 275 | 13187 | 76 (73, 78) | **84 (81, 86)** |
| 168-195 days (24-27 weeks, 7th month) | 104 | 1274 | 74 (69, 79) | **80 (80, 84)** | 82 | 3157 | 70 (62, 76) | **75 (69, 80)** |
| 196-223 days (28-31 weeks, 8th month) | 106 | 710 | 53 (43, 62) | **67 (60, 73)** | 73 | 1497 | 43 (28, 55) | **52 (39, 63)** |
| 224-251 days (32-35 weeks, 9th month) | 98 | 707 | 57 (46, 65) | **69 (62, 75)** | 13 | 322 | 53 (18, 73) | **62 (34, 79)** |
| 252-279 days (36-39 weeks, 10th month) | 63 | 340 | 42 (24, 56) | **55 (41, 66)** | 1 | 81 | 86 (-4, 98) | **88 (16, 98)** |
| Unvaccinated | 24790 | 77553 | Reference | | 12691 | 148143 | Reference | |
| **Two mRNA-1273, Delta Hospitalization[2]** | | | | | | | | |
| 0-13 days (0-1 week) | 9 | 4414 | 93 (87, 97) | **91 (82, 95)** | 1 | 4325 | 98 (83, 100) | **97 (80, 100)** |
| 14-27 days (2-3 weeks) | 2 | 5244 | 99 (95, 100) | **98 (94, 100)** | 2 | 6787 | 97 (88, 99) | **96 (86, 99)** |
| 28-55 days (4-7 weeks, 2nd month) | 9 | 12899 | 98 (96, 99) | **98 (96, 99)** | 5 | 23470 | 98 (95, 99) | **98 (95, 99)** |
| 56-83 days (8-11 weeks, 3rd month) | 12 | 15193 | 97 (96, 99) | **98 (97, 99)** | 12 | 33458 | 96 (94, 98) | **98 (96, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 19 | 15003 | 96 (94, 97) | **98 (97, 99)** | 11 | 35654 | 97 (94, 98) | **98 (96, 99)** |
| 112-139 days (16-19 weeks, 5th month) | 19 | 11082 | 94 (91, 96) | **97 (96, 98)** | 12 | 30233 | 96 (93, 98) | **97 (94, 98)** |
| 140-167 days (20-23 weeks, 6th month) | 19 | 4511 | 86 (79, 91) | **94 (91, 96)** | 7 | 13141 | 95 (89, 97) | **96 (91, 98)** |
| 168-195 days (24-27 weeks, 7th month) | 2 | 1274 | 95 (80, 99) | **98 (90, 99)** | 4 | 3156 | 87 (66, 95) | **87 (66, 95)** |
| 196-223 days (28-31 weeks, 8th month) | 2 | 710 | 91 (64, 98) | **95 (80, 99)** | 1 | 1497 | 93 (52, 99) | **94 (55, 99)** |
| Unvaccinated | 2402 | 77553 | Reference | | 869 | 88449 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, all VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (weeks 22-47, categorical); and region (5 categories in each province).

[b] In Quebec, VE against hospitalizations due to Delta variant assessed only between epi-weeks 31-47 because no hospitalized Delta variant cases identified prior to that period.

**Supplementary Table 14 Contin'd. Two-dose vaccine effectiveness (VE) against Delta VOC infection and hospitalization, by time since second dose, adults ≥18 years old, mixed mRNA and mRNA/ChAdOx1 vaccines, British Columbia, and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Two mixed mRNA, Delta Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 29 | 1285 | 93 (90, 95) | **70 (56, 80)** | 13 | 1532 | 90 (83, 94) | **51 (15, 72)** |
| 14-27 days (2-3 weeks) | 13 | 1486 | 97 (95, 98) | **94 (90, 97)** | 3 | 1440 | 98 (92, 99) | **94 (82, 98)** |
| 28-55 days (4-7 weeks, 2nd month) | 92 | 3862 | 93 (91, 94) | **94 (92, 95)** | 24 | 3287 | 91 (87, 94) | **93 (89, 95)** |
| 56-83 days (8-11 weeks, 3rd month) | 245 | 6089 | 87 (86, 89) | **92 (91, 93)** | 74 | 4173 | 79 (74, 84) | **89 (87, 92)** |
| 84-111 days (12-15 weeks, 4th month) | 317 | 7095 | 86 (84, 88) | **89 (88, 91)** | 58 | 4410 | 85 (80, 88) | **90 (88, 93)** |
| 112-139 days (16-19 weeks, 5th month) | 343 | 6095 | 82 (80, 84) | **86 (84, 88)** | 102 | 4232 | 72 (66, 77) | **82 (78, 85)** |
| 140-167 days (20-23 weeks, 6th month) | 133 | 2813 | 85 (82, 88) | **85 (82, 88)** | 46 | 1424 | 62 (49, 72) | **76 (68, 82)** |
| 168-195 days (24-27 weeks, 7th month) | 1 | 79 | 96 (72, 99) | **96 (73, 99)** | 9 | 336 | 69 (39, 84) | **77 (55, 88)** |
| 196-223 days (28-31 weeks, 8th month) | 1 | 5 | NE | **NE** | 2 | 84 | 72 (-13, 93) | **82 (27, 96)** |
| Unvaccinated | 24790 | 77553 | Reference | | 12691 | 148143 | Reference | |
| **Two mixed mRNA, Delta Hospitalization [b]** | | | | | | | | |
| 0-13 days (0-1 week) | 1 | 1285 | 97 (82, 100) | **87 (4, 98)** | 1 | 223 | NE | **NE** |
| 14-27 days (2-3 weeks) | 0 | 1486 | NE | **NE** | 1 | 583 | NE | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 4 | 3862 | 97 (91, 99) | **97 (93, 99)** | 1 | 2641 | 96 (73, 99) | **96 (70, 99)** |
| 56-83 days (8-11 weeks, 3rd month) | 9 | 6089 | 95 (91, 98) | **98 (96, 99)** | 2 | 4013 | 95 (80, 99) | **97 (87, 99)** |
| 84-111 days (12-15 weeks, 4th month) | 15 | 7095 | 93 (89, 96) | **97 (96, 98)** | 0 | 4393 | NE | **NE** |
| 112-139 days (16-19 weeks, 5th month) | 10 | 6095 | 95 (90, 97) | **98 (97, 99)** | 0 | 4232 | NE | **NE** |
| 140-167 days (20-23 weeks, 6th month) | 9 | 2813 | 90 (80, 95) | **96 (92, 98)** | 0 | 1424 | NE | **NE** |
| Unvaccinated | 2402 | 77553 | Reference | | 869 | 88449 | Reference | |
| **Two mixed ChadOx1 + mRNA, Delta Infection** | | | | | | | | |
| 0-13 days (0-1 week) | 15 | 729 | 94 (89, 96) | **67 (45, 81)** | 4 | 2530 | 98 (95, 99) | **84 (58, 94)** |
| 14-27 days (2-3 weeks) | 9 | 852 | 97 (94, 98) | **94 (88, 97)** | 4 | 2557 | 98 (95, 99) | **93 (81, 97)** |
| 28-55 days (4-7 weeks, 2nd month) | 97 | 2885 | 89 (87, 91) | **91 (89, 93)** | 32 | 5642 | 93 (91, 95) | **93 (91, 95)** |
| 56-83 days (8-11 weeks, 3rd month) | 181 | 4748 | 88 (86, 90) | **91 (90, 92)** | 110 | 8259 | 84 (81, 87) | **93 (91, 94)** |
| 84-111 days (12-15 weeks, 4th month) | 266 | 6152 | 86 (85, 88) | **88 (87, 90)** | 149 | 9903 | 82 (79, 85) | **90 (89, 92)** |
| 112-139 days (16-19 weeks, 5th month) | 253 | 4825 | 84 (81, 86) | **86 (84, 87)** | 169 | 9637 | 80 (76, 82) | **87 (84, 89)** |
| 140-167 days (20-23 weeks, 6th month) | 103 | 1877 | 83 (79, 86) | **82 (77, 85)** | 128 | 4350 | 66 (59, 71) | **80 (76, 84)** |
| 168+ days (24+ weeks, 7th+ month) | 0 | 26 | NE | **NE** | 1 | 59 | 80 (-43, 97) | **88 (15, 98)** |
| Unvaccinated | 24790 | 77553 | Reference | | 12691 | 148143 | Reference | |
| **Two mixed ChadOx1 + mRNA, Delta Hospitalization [2]** | | | | | | | | |
| 0-13 days (0-1 week) | 0 | 729 | NE | **NE** | 0 | 229 | NE | **NE** |
| 14-27 days (2-3 weeks) | 1 | 852 | 96 (73, 99) | **91 (33, 99)** | 0 | 558 | NE | **NE** |
| 28-55 days (4-7 weeks, 2nd month) | 1 | 2885 | 99 (92, 100) | **99 (92, 100)** | 1 | 4592 | 98 (84, 100) | **98 (89, 100)** |
| 56-83 days (8-11 weeks, 3rd month) | 1 | 4748 | 99 (95, 100) | **100 (97, 100)** | 1 | 8244 | 99 (91, 100) | **100 (97, 100)** |
| 84-111 days (12-15 weeks, 4th month) | 0 | 6152 | NE | **NE** | 4 | 9902 | 96 (89, 98) | **98 (96, 99)** |
| 112-139 days (16-19 weeks, 5th month) | 1 | 4825 | 99 (95, 100) | **100 (97, 100)** | 3 | 9637 | 97 (90, 99) | **98 (94, 99)** |
| 140-167 days (20-23 weeks, 6th month) | 2 | 1877 | 97 (86, 99) | **98 (91, 99)** | 2 | 4350 | 95 (81, 99) | **97 (87, 99)** |
| 168+ days (24+ weeks, 7th+ month) | 0 | 26 | NE | **NE** | 0 | 59 | NE | **NE** |
| Unvaccinated | 2402 | 77553 | Reference | | 869 | 88449 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] Unless otherwise specified, all VE estimates adjusted for age group (18-49, 50-69, 70-79, ≥80 years); sex (male, female); individual epidemiological week (weeks 22-47, categorical); and region (5 categories in each province).

[b] In Quebec, VE against hospitalizations due to Delta variant assessed only between epi-weeks 31-47 because no hospitalized Delta variant cases identified prior to that period.

**Supplementary Table 15. Two-dose vaccine effectiveness against infection and hospitalization (≥14 days post-vaccination), by interval between doses, adults ≥18 years old, mRNA and ChAdOx1 vaccines, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Any two mRNA vaccines, Infection** | | | | | | | | |
| 21-34 days (3-4 weeks) | 527 | 9944 | 85 (83, 86) | **86 (85, 87)** | 950 | 33895 | 75 (73, 77) | **81 (80, 82)** |
| 35-48 days (5-6 weeks) | 1398 | 22684 | 82 (81, 83) | **84 (83, 85)** | 1047 | 45686 | 80 (78, 81) | **85 (84, 86)** |
| 49-62 days (7-8 weeks) | 5239 | 132735 | 89 (88, 89) | **90 (90, 90)** | 3830 | 194898 | 82 (82, 83) | **88 (87, 88)** |
| 63-83 days (9-11 weeks) | 4512 | 115577 | 89 (88, 89) | **90 (90, 90)** | 4076 | 240253 | 85 (84, 85) | **88 (88, 89)** |
| 84-111 days (12-15 weeks) | 2422 | 48988 | 86 (85, 86) | **86 (86, 87)** | 1922 | 134684 | 87 (87, 88) | **89 (88, 89)** |
| 112+ days (16+ weeks) | 372 | 8022 | 87 (85, 88) | **88 (86, 89)** | 1132 | 74877 | 87 (86, 87) | **88 (88, 89)** |
| 49+ days (7+ weeks) | 12545 | 305322 | 88 (88, 89) | **90 (89, 90)** | 10960 | 644712 | 85 (84, 85) | **89 (88, 89)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Any two mRNA vaccines, Hospitalization** | | | | | | | | |
| 21-34 days (3-4 weeks) | 17 | 9944 | 95 (92, 97) | **96 (93, 97)** | 30 | 33895 | 88 (82, 91) | **92 (88, 94)** |
| 35-48 days (5-6 weeks) | 42 | 22684 | 94 (92, 96) | **95 (94, 97)** | 13 | 45686 | 96 (93, 98) | **97 (94, 98)** |
| 49-62 days (7-8 weeks) | 66 | 132735 | 99 (98, 99) | **99 (98, 99)** | 41 | 194898 | 97 (96, 98) | **98 (97, 99)** |
| 63-83 days (9-11 weeks) | 157 | 115577 | 96 (95, 97) | **98 (98, 98)** | 87 | 240253 | 95 (94, 96) | **98 (97, 98)** |
| 84-111 days (12-15 weeks) | 156 | 48988 | 90 (89, 92) | **95 (94, 96)** | 87 | 134684 | 91 (89, 93) | **97 (96, 98)** |
| 112+ days (16+ weeks) | 31 | 8022 | 88 (84, 92) | **93 (89, 95)** | 70 | 74877 | 87 (83, 90) | **95 (94, 96)** |
| 49+ days (7+ weeks) | 410 | 305322 | 96 (96, 96) | **98 (97, 98)** | 285 | 644712 | 94 (93, 95) | **97 (97, 98)** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |
| **Two ChAdOx1 vaccines, Infection** | | | | | | | | |
| 21-34 days (3-4 weeks) | 7 | 97 | 79 (55, 90) | **81 (58, 91)** | 11 | 233 | 58 (23, 77) | **64 (34, 81)** |
| 35-48 days (5-6 weeks) | 43 | 443 | 72 (62, 80) | **76 (67, 82)** | 44 | 970 | 60 (45, 70) | **69 (58, 77)** |
| 49-62 days (7-8 weeks) | 610 | 6298 | 72 (70, 75) | **75 (73, 77)** | 218 | 6163 | 68 (64, 72) | **76 (72, 79)** |
| 63-83 days (9-11 weeks) | 481 | 4704 | 71 (68, 73) | **74 (71, 77)** | 265 | 11102 | 79 (76, 81) | **79 (76, 82)** |
| 84-111 days (12-15 weeks) | 92 | 651 | 60 (50, 68) | **62 (53, 70)** | 40 | 2379 | 85 (79, 89) | **85 (79, 89)** |
| 112+ days (16+ weeks) | 5 | 46 | 69 (22, 88) | **73 (33, 89)** | 12 | 574 | 81 (67, 89) | **86 (76, 92)** |
| 49+ days (7+ weeks) | 1188 | 11699 | 71 (69, 73) | **74 (72, 76)** | 535 | 20218 | 76 (74, 78) | **79 (77, 81)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two ChAdOx1 vaccines, Hospitalization** | | | | | | | | |
| 21-34 days (3-4 weeks) | 0 | 97 | NE | **NE** | 1 | 233 | NE | **NE** |
| 35-48 days (5-6 weeks) | 1 | 443 | 93 (52, 99) | **94 (59, 99)** | 0 | 970 | NE | **NE** |
| 49-62 days (7-8 weeks) | 16 | 6298 | 92 (88, 95) | **96 (93, 97)** | 10 | 6163 | 77 (58, 88) | **93 (87, 96)** |
| 63-83 days (9-11 weeks) | 14 | 4704 | 91 (85, 95) | **96 (93, 97)** | 14 | 11102 | 82 (70, 90) | **96 (93, 98)** |
| 84-111 days (12-15 weeks) | 2 | 651 | 91 (63, 98) | **93 (72, 98)** | 4 | 2379 | 77 (38, 91) | **94 (84, 98)** |
| 112+ days (16+ weeks) | 0 | 46 | NE | **NE** | 0 | 574 | NE | **NE** |
| 49+ days (7+ weeks) | 32 | 11699 | 92 (88, 94) | **95 (94, 97)** | 28 | 20218 | 81 (72, 87) | **95 (93, 97)** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, 80+ years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 15 Contin'd. Two-dose vaccine effectiveness against infection and hospitalization (≥14 days post-vaccination), by interval between doses, adults ≥18 years old, BNT162b2 and mRNA-1273 vaccines, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | **Adjusted[a]** | Case N | Control N | Crude | **Adjusted[a]** |
| **Two BNT162b2 (Pfizer-BioNTech) vaccines, Infection** | | | | | | | | |
| 21-34 days (3-4 weeks) | 344 | 6052 | 84 (82, 85) | **84 (83, 86)** | 691 | 21551 | 71 (69, 74) | **79 (77, 80)** |
| 35-48 days (5-6 weeks) | 913 | 14630 | 82 (81, 83) | **83 (82, 84)** | 680 | 27038 | 78 (76, 79) | **84 (83, 85)** |
| 49-62 days (7-8 weeks) | 3885 | 95565 | 88 (88, 89) | **90 (89, 90)** | 2984 | 142518 | 81 (81, 82) | **87 (87, 88)** |
| 63-83 days (9-11 weeks) | 3358 | 83463 | 89 (88, 89) | **89 (89, 90)** | 3257 | 182455 | 84 (83, 85) | **88 (87, 88)** |
| 84-111 days (12-15 weeks) | 1771 | 37627 | 87 (86, 87) | **87 (86, 87)** | 1606 | 106419 | 87 (86, 87) | **88 (88, 89)** |
| 112+ days (16+ weeks) | 281 | 6085 | 87 (85, 88) | **87 (86, 89)** | 1005 | 65134 | 86 (85, 87) | **88 (88, 89)** |
| 49+ days (7+ weeks) | 9295 | 222740 | 88 (88, 88) | **89 (89, 90)** | 8852 | 496526 | 84 (84, 85) | **88 (88, 88)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two BNT162b2 (Pfizer-BioNTech) vaccines, Hospitalization** | | | | | | | | |
| 21-34 days (3-4 weeks) | 8 | 6052 | 96 (92, 98) | **97 (93, 98)** | 16 | 21551 | 90 (83, 94) | **93 (89, 96)** |
| 35-48 days (5-6 weeks) | 20 | 14630 | 96 (94, 97) | **96 (95, 98)** | 7 | 27038 | 96 (92, 98) | **97 (94, 99)** |
| 49-62 days (7-8 weeks) | 43 | 95565 | 99 (98, 99) | **99 (98, 99)** | 33 | 142518 | 97 (95, 98) | **98 (97, 99)** |
| 63-83 days (9-11 weeks) | 120 | 83463 | 96 (95, 96) | **98 (97, 98)** | 74 | 182455 | 94 (93, 96) | **97 (97, 98)** |
| 84-111 days (12-15 weeks) | 111 | 37627 | 91 (89, 93) | **95 (94, 96)** | 75 | 106419 | 90 (88, 92) | **97 (96, 98)** |
| 112+ days (16+ weeks) | 26 | 6085 | 87 (81, 91) | **91 (87, 94)** | 56 | 65134 | 88 (84, 91) | **95 (94, 97)** |
| 49+ days (7+ weeks) | 300 | 222740 | 96 (95, 96) | **98 (97, 98)** | 238 | 496526 | 93 (92, 94) | **97 (97, 98)** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |
| **Two mRNA-1273 (Moderna) vaccines, Infection** | | | | | | | | |
| 21-34 days (3-4 weeks) | 155 | 3537 | 87 (85, 89) | **89 (87, 91)** | 231 | 11381 | 82 (79, 84) | **86 (84, 88)** |
| 35-48 days (5-6 weeks) | 416 | 6875 | 83 (81, 84) | **85 (83, 86)** | 307 | 15441 | 82 (80, 84) | **87 (85, 88)** |
| 49-62 days (7-8 weeks) | 845 | 26160 | 91 (90, 91) | **91 (91, 92)** | 750 | 46144 | 86 (84, 87) | **89 (88, 90)** |
| 63-83 days (9-11 weeks) | 743 | 21578 | 90 (89, 91) | **91 (91, 92)** | 735 | 52766 | 88 (87, 88) | **90 (89, 91)** |
| 84-111 days (12-15 weeks) | 513 | 7428 | 80 (78, 82) | **84 (83, 86)** | 267 | 25472 | 91 (89, 92) | **91 (90, 92)** |
| 112+ days (16+ weeks) | 72 | 1414 | 85 (82, 89) | **88 (84, 90)** | 105 | 8585 | 89 (87, 91) | **89 (86, 91)** |
| 49+ days (7+ weeks) | 2173 | 56580 | 89 (89, 90) | **90 (90, 91)** | 1857 | 132967 | 88 (87, 88) | **90 (89, 90)** |
| Unvaccinated | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |
| **Two mRNA-1273 (Moderna) vaccines, Hospitalization** | | | | | | | | |
| 21-34 days (3-4 weeks) | 7 | 3537 | 94 (88, 97) | **96 (91, 98)** | 11 | 11381 | 87 (76, 93) | **91 (83, 95)** |
| 35-48 days (5-6 weeks) | 18 | 6875 | 92 (88, 95) | **94 (90, 96)** | 6 | 15441 | 95 (88, 98) | **96 (90, 98)** |
| 49-62 days (7-8 weeks) | 11 | 26160 | 99 (98, 99) | **99 (98, 99)** | 7 | 46144 | 98 (96, 99) | **98 (97, 99)** |
| 63-83 days (9-11 weeks) | 23 | 21578 | 97 (95, 98) | **98 (98, 99)** | 13 | 52766 | 97 (94, 98) | **98 (97, 99)** |
| 84-111 days (12-15 weeks) | 28 | 7428 | 89 (84, 92) | **95 (93, 97)** | 11 | 25472 | 94 (89, 97) | **98 (96, 99)** |
| 112+ days (16+ weeks) | 4 | 1414 | 92 (77, 97) | **95 (88, 98)** | 12 | 8585 | 81 (66, 89) | **94 (89, 97)** |
| 49+ days (7+ weeks) | 66 | 56580 | 97 (96, 97) | **98 (97, 98)** | 43 | 132967 | 96 (94, 97) | **98 (97, 98)** |
| Unvaccinated | 2594 | 77553 | Reference | | 1066 | 148143 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, 80+ years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 16. Two-dose vaccine effectiveness against infection, by interval between doses and time since second dose, adults ≥18 years old, any mRNA and BNT162b2 vaccines, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Any two mRNA** | | | | | | | | |
| **14-27 days (2-3 weeks) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 67 | 1609 | 88 (85, 91) | **89 (87, 92)** | 99 | 5704 | 85 (81, 87) | **88 (85, 90)** |
| 35-48 day (5-6 week) interval between doses | 56 | 1782 | 91 (88, 93) | **92 (89, 94)** | 37 | 3801 | 91 (88, 94) | **91 (87, 93)** |
| 49-62 day (7+ week) interval between doses | 353 | 20231 | 95 (94, 96) | **94 (94, 95)** | 277 | 45190 | 95 (94, 95) | **94 (93, 95)** |
| **28-55 days (4-7 weeks; 2nd month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 94 | 2569 | 90 (87, 91) | **90 (88, 92)** | 234 | 9849 | 79 (76, 81) | **84 (81, 86)** |
| 35-48 day (5-6 week) interval between doses | 126 | 3308 | 89 (87, 91) | **90 (88, 92)** | 153 | 8310 | 84 (81, 86) | **89 (87, 90)** |
| 49-62 day (7+ week) interval between doses | 1612 | 53910 | 91 (91, 92) | **93 (92, 93)** | 1184 | 110704 | 90 (90, 91) | **93 (92, 93)** |
| **56-83 days (8-11 weeks; 3rd month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 82 | 1737 | 87 (83, 89) | **87 (84, 90)** | 227 | 7157 | 72 (68, 75) | **79 (76, 82)** |
| 35-48 day (5-6 week) interval between doses | 125 | 2771 | 87 (85, 89) | **89 (87, 91)** | 244 | 10483 | 79 (76, 82) | **87 (86, 89)** |
| 49-62 day (7+ week) interval between doses | 2715 | 72284 | 89 (89, 90) | **91 (91, 91)** | 2154 | 138401 | 86 (85, 87) | **91 (90, 91)** |
| **84-111 days (12-15 weeks; 4th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 65 | 1138 | 84 (79, 87) | **84 (80, 88)** | 169 | 4373 | 66 (60, 70) | **76 (71, 79)** |
| 35-48 day (5-6 week) interval between doses | 127 | 2397 | 85 (82, 87) | **85 (82, 87)** | 220 | 10381 | 81 (78, 83) | **86 (83, 87)** |
| 49-62 day (7+ week) interval between doses | 3259 | 74443 | 87 (87, 88) | **89 (88, 89)** | 2630 | 146747 | 84 (83, 85) | **87 (87, 88)** |
| **112-139 days (16-19 weeks; 5th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 51 | 857 | 83 (77, 87) | **84 (78, 88)** | 81 | 2934 | 75 (69, 80) | **81 (77, 85)** |
| 35-48 day (5-6 week) interval between doses | 92 | 1832 | 86 (82, 88) | **82 (78, 86)** | 263 | 9282 | 75 (71, 78) | **80 (77, 83)** |
| 49-62 day (7+ week) interval between doses | 3013 | 57219 | 85 (84, 86) | **86 (85, 86)** | 2767 | 122056 | 80 (79, 81) | **83 (82, 84)** |
| **140-167 days (20-23 weeks; 6th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 54 | 724 | 79 (72, 84) | **79 (72, 84)** | 55 | 1829 | 73 (65, 80) | **79 (72, 84)** |
| 35-48 day (5-6 week) interval between doses | 60 | 1345 | 87 (83, 90) | **84 (79, 88)** | 98 | 2618 | 67 (59, 73) | **74 (68, 79)** |
| 49-62 day (7+ week) interval between doses | 1328 | 23298 | 84 (83, 85) | **83 (82, 84)** | 1421 | 59037 | 79 (77, 80) | **82 (81, 83)** |
| **168-195 days (24-27 weeks; 7th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 22 | 447 | 86 (78, 91) | **87 (80, 91)** | 37 | 983 | 66 (53, 76) | **74 (63, 81)** |
| 35-48 day (5-6 week) interval between doses | 116 | 1681 | 80 (76, 84) | **84 (81, 87)** | 19 | 602 | 72 (55, 82) | **76 (63, 85)** |
| 49-62 day (7+ week) interval between doses | 223 | 3491 | 82 (79, 84) | **81 (78, 83)** | 326 | 15687 | 81 (79, 83) | **82 (80, 84)** |
| **Two BNT162b2 (Pfizer-BioNTech)** | | | | | | | | |
| **14-27 days (2-3 weeks) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 41 | 919 | 87 (83, 91) | **88 (84, 91)** | 78 | 3908 | 82 (78, 86) | **86 (82, 89)** |
| 35-48 day (5-6 week) interval between doses | 36 | 939 | 89 (85, 92) | **90 (86, 93)** | 23 | 2312 | 91 (87, 94) | **90 (86, 94)** |
| 49-62 day (7+ week) interval between doses | 292 | 15033 | 94 (94, 95) | **94 (93, 94)** | 224 | 34970 | 94 (93, 95) | **94 (93, 95)** |
| **28-55 days (4-7 weeks; 2nd month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 67 | 1491 | 87 (84, 90) | **88 (84, 90)** | 179 | 6454 | 75 (71, 79) | **81 (78, 84)** |
| 35-48 day (5-6 week) interval between doses | 74 | 1560 | 86 (83, 89) | **88 (85, 90)** | 107 | 4947 | 81 (77, 84) | **87 (84, 89)** |
| 49-62 day (7+ week) interval between doses | 1269 | 39975 | 91 (90, 91) | **92 (92, 93)** | 971 | 86203 | 90 (89, 91) | **92 (92, 93)** |
| **56-83 days (8-11 weeks; 3rd month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 54 | 989 | 84 (79, 88) | **85 (80, 89)** | 164 | 4530 | 68 (62, 72) | **77 (73, 80)** |
| 35-48 day (5-6 week) interval between doses | 63 | 1247 | 86 (81, 89) | **88 (85, 91)** | 150 | 6316 | 79 (75, 82) | **87 (85, 89)** |
| 49-62 day (7+ week) interval between doses | 2046 | 53272 | 89 (88, 90) | **91 (90, 91)** | 1736 | 106100 | 85 (85, 86) | **90 (90, 91)** |
| **84-111 days (12-15 weeks; 4th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 44 | 688 | 82 (75, 87) | **83 (77, 87)** | 115 | 2537 | 60 (51, 67) | **72 (67, 77)** |
| 35-48 day (5-6 week) interval between doses | 70 | 1282 | 84 (80, 88) | **84 (80, 88)** | 143 | 6311 | 80 (76, 83) | **84 (82, 87)** |
| 49-62 day (7+ week) interval between doses | 2430 | 53909 | 87 (87, 88) | **89 (88, 89)** | 2160 | 112041 | 83 (82, 84) | **86 (86, 87)** |
| **112-139 days (16-19 weeks; 5th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 32 | 579 | 84 (77, 89) | **84 (78, 89)** | 57 | 1812 | 72 (63, 78) | **79 (73, 84)** |
| 35-48 day (5-6 week) interval between doses | 55 | 1237 | 87 (83, 90) | **82 (76, 86)** | 188 | 5519 | 70 (65, 74) | **77 (73, 80)** |
| 49-62 day (7+ week) interval between doses | 2162 | 40915 | 85 (84, 86) | **85 (84, 86)** | 2213 | 92339 | 79 (78, 80) | **83 (82, 83)** |
| **140-167 days (20-23 weeks; 6th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 38 | 471 | 77 (68, 83) | **76 (67, 83)** | 39 | 1062 | 67 (55, 76) | **75 (65, 82)** |
| 35-48 day (5-6 week) interval between doses | 42 | 934 | 87 (82, 91) | **82 (75, 87)** | 52 | 1314 | 65 (53, 73) | **75 (66, 81)** |
| 49-62 day (7+ week) interval between doses | 926 | 16637 | 84 (83, 85) | **84 (82, 85)** | 1161 | 46497 | 78 (76, 79) | **82 (81, 83)** |
| **168-195 days (24-27 weeks; 7th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 18 | 293 | 82 (72, 89) | **83 (72, 89)** | 26 | 543 | 57 (37, 71) | **67 (52, 78)** |
| 35-48 day (5-6 week) interval between doses | 89 | 1314 | 81 (76, 84) | **84 (80, 87)** | 10 | 235 | 62 (29, 80) | **70 (43, 84)** |
| 49-62 day (7+ week) interval between doses | 148 | 2659 | 84 (81, 87) | **82 (79, 85)** | 255 | 13001 | 83 (80, 85) | **84 (82, 86)** |
| **Unvaccinated** | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, 80+ years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).

**Supplementary Table 16 Contin'd. Two-dose vaccine effectiveness against infection, by interval between doses and time since second dose, adults ≥18 years old, mRNA-1273 vaccines, British Columbia and Quebec, Canada, May 30 to November 27, 2021 (epi-weeks 22-47)**

| | British Columbia, Canada | | | | Quebec, Canada | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample sizes | | VE (95% CI) | | Sample sizes | | VE (95% CI) | |
| | Case N | Control N | Crude | Adjusted[a] | Case N | Control N | Crude | Adjusted[a] |
| **Two mRNA-1273 (Moderna)** | | | | | | | | |
| **14-27 days (2-3 weeks) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 24 | 642 | 89 (84, 93) | **91 (87, 94)** | 19 | 1692 | 90 (84, 94) | **92 (88, 95)** |
| 35-48 day (5-6 week) interval between doses | 18 | 759 | 93 (89, 96) | **94 (91, 96)** | 14 | 1237 | 90 (83, 94) | **89 (82, 94)** |
| 49-62 day (7+ week) interval between doses | 49 | 3843 | 96 (95, 97) | **96 (95, 97)** | 50 | 9136 | 95 (94, 96) | **95 (93, 96)** |
| **28-55 days (4-7 weeks; 2nd month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 25 | 1015 | 93 (90, 95) | **94 (91, 96)** | 51 | 3198 | 86 (81, 89) | **89 (85, 92)** |
| 35-48 day (5-6 week) interval between doses | 41 | 1547 | 92 (90, 94) | **93 (91, 95)** | 38 | 2841 | 88 (84, 91) | **91 (88, 94)** |
| 49-62 day (7+ week) interval between doses | 251 | 10337 | 93 (92, 94) | **94 (93, 95)** | 191 | 21933 | 92 (91, 93) | **94 (93, 95)** |
| **56-83 days (8-11 weeks; 3rd month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 21 | 676 | 91 (86, 94) | **91 (87, 94)** | 56 | 2426 | 79 (73, 84) | **83 (78, 87)** |
| 35-48 day (5-6 week) interval between doses | 44 | 1237 | 90 (86, 92) | **91 (88, 93)** | 73 | 3443 | 81 (76, 85) | **88 (85, 91)** |
| 49-62 day (7+ week) interval between doses | 438 | 13280 | 91 (90, 91) | **92 (91, 93)** | 363 | 29053 | 89 (88, 90) | **92 (92, 93)** |
| **84-111 days (12-15 weeks; 4th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 13 | 379 | 90 (83, 94) | **90 (83, 94)** | 46 | 1654 | 75 (67, 82) | **81 (75, 86)** |
| 35-48 day (5-6 week) interval between doses | 42 | 830 | 86 (80, 89) | **84 (78, 88)** | 73 | 3364 | 81 (76, 85) | **85 (82, 88)** |
| 49-62 day (7+ week) interval between doses | 535 | 13794 | 89 (88, 90) | **90 (90, 91)** | 424 | 31184 | 88 (87, 89) | **90 (89, 91)** |
| **112-139 days (16-19 weeks; 5th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 14 | 223 | 82 (69, 90) | **83 (70, 90)** | 20 | 951 | 81 (71, 88) | **85 (77, 90)** |
| 35-48 day (5-6 week) interval between doses | 20 | 375 | 85 (76, 90) | **83 (73, 89)** | 55 | 2968 | 83 (78, 87) | **86 (82, 90)** |
| 49-62 day (7+ week) interval between doses | 530 | 10484 | 86 (84, 87) | **87 (86, 88)** | 476 | 26451 | 84 (82, 85) | **85 (84, 86)** |
| **140-167 days (20-23 weeks; 6th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 12 | 210 | 84 (71, 91) | **85 (73, 92)** | 14 | 681 | 82 (69, 89) | **84 (73, 91)** |
| 35-48 day (5-6 week) interval between doses | 14 | 321 | 88 (79, 93) | **87 (78, 92)** | 40 | 1129 | 68 (57, 77) | **72 (62, 80)** |
| 49-62 day (7+ week) interval between doses | 277 | 3980 | 80 (78, 82) | **81 (79, 84)** | 222 | 11377 | 83 (80, 85) | **84 (82, 86)** |
| **168-195 days (24-27 weeks; 7th month) since second dose** | | | | | | | | |
| 21-34 day (3-4 week) interval between doses | 4 | 151 | 92 (79, 97) | **93 (82, 98)** | 10 | 422 | 79 (60, 89) | **83 (68, 91)** |
| 35-48 day (5-6 week) interval between doses | 27 | 365 | 79 (69, 86) | **85 (77, 90)** | 8 | 338 | 79 (57, 90) | **81 (63, 91)** |
| 49-62 day (7+ week) interval between doses | 74 | 758 | 72 (65, 78) | **75 (69, 81)** | 64 | 2397 | 76 (69, 81) | **70 (61, 76)** |
| **Unvaccinated** | 27129 | 77553 | Reference | | 16622 | 148143 | Reference | |

VE=vaccine effectiveness; 95%CI=95% confidence interval; NE = not estimable or total span of CI is ≥100%

[a] All VE estimates adjusted for age group (18-49, 50-69, 70-79, 80+ years); sex (male, female); individual epidemiological week (epi-weeks 22-47, categorical); and region (5 categories in each province).