

Supplementary Material:

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Supplementary Methods. Determination of symptom status at the time of SARS-CoV-2 testing

The Ontario Laboratories Information System (OLIS) contains open fields (specifically, using the Patient Note Clinical Information field or reporting under the observation code XON13543-4 [Patient symptoms]) that records whether individuals tested for SARS-CoV-2 presented with symptoms at the time of the test. These character-based fields were originally delimited by commas, slashes, semicolons, or ampersands. Character text-strings were parsed and aggregated.

One of the authors, BC, identified symptom classifications available in OLIS as of April 19, 2021 that were likely to be due to COVID-19 and issued a list of symptoms to be adjudicated with JK. Low-frequency terms (appearing <25 times throughout) were excluded. Values listed in the symptoms fields were classified by JK and BC into “symptomatic” and “asymptomatic”. We purposely chose a broadly inclusive definition to capture all potentially relevant COVID-19 symptoms, including atypical symptoms and chronic conditions, based on our scientific and medical understanding of COVID-19-related symptoms as of April 19, 2021.[1]

Terms determined to be indicative of COVID-19 symptoms (classified as ‘symptomatic’) are listed below. In addition to this list, we used SYMPTOMATIC (or partial spellings thereof) or mention of symptom onset.

0 TASTE, 37.8, 37.9, 38.0, 38.1, 38.2, 38.3, 38.4, 38.5, 38.6, 38.7, 38.8, 38.9, 39.0, 39.1, 39.2, 39.3, 39.4, 39.5, 100, 101, 102, 38, 39, ABD, ABD PAIN, ABD. PAIN, ABD.PAIN, ABDO CRAMPS, ABDO PAIN, ABDOMINAL, ABDOMINAL PAIN, ACHE, ACHES, ACHES AND PAINS, ACHES HEADACHE, ACHEY, ACHINESS, ACHY, ALLERGIES, ANOREXIA, AP, APPETITE, ARTHRALGIA, ASTHMA, BACK ACHE, BACK PAIN, BACKACHE, BLOATING, BLOODY STOOLS, BODY ACHE, BODY ACHES, BODY ACHES FATIGUE, BODY ACHES HEADACHE, BODY CHILLS, BODY PAIN, BODY PAINS, BODYACHE, BODYACHES, CHANGE IN TASTE, CHEST, CHEST BURNING, CHEST CONGESTION, CHEST DISCOMFORT, CHEST HEAVINESS, CHEST HEAVY, CHEST PAIN, CHEST PAINS, CHEST PRESSURE, CHEST TIGHT, CHEST TIGHTNESS, CHESTPAIN, CHF, CHI, CHILL, CHILLS, CHILLS BODY ACHES, CHILLS FATIGUE, CHILLS HEADACHE, CHRONIC COUGH, CLEARING THROAT, COLD, COLD LIKE SYMPTOMS, COLD SWEATS, COLD SYMPTOMS, COLD-LIKE SYMPTOMS, CONFUSION, CONG, CONGE, CONGES, CONGEST, CONGESTED, CONGESTED COUGH, CONGESTED HEADACHE, CONGESTED NOSE, CONGESTED RUNNY NOSE, CONGESTI, CONGESTIO, CONGESTION, CONGESTION FATIGUE, CONGESTION HEADACHE, CONGESTION RUNNY NOSE, CONGESTIONS, CONJESTION, CONJUNCTIVITIS, CONSTIPATION, COPD, COUGH, COUGH ONSET 20, COUGHING, CP, CRAMPING, CRAMPS, DECREASE APPETITE, DECREASED APPETITE, DECREASED TASTE, DEHYDRATION, DELIRIUM, DIA, DIAHERRA, DIAHREA, DIAHRREA, DIAR, DIARHEA, DIARRHEA, DIARR, DIARRH, DIARRHE, DIARRHEA, DIARRHEA BLOODY, DIARRHEA FATIGUE, DIARRHEA HEADACHE, DIARRHEA NAUSEA,

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DIARRHEA VOMITING, DIARRHEA WATERY, DIARRHOEA, DIFFICULTY BREATHING, DIFFICULTY SWALLOWING, DIRRHEA, DISCOMFORT, DIZZINESS, DIZZY, DRY COUGH, DRY THROAT, DYSPEPSIA, DYSPNEA, DYSURIA, EAR ACHE, EAR INFECTION, EAR PAIN, EARACHE, EMESIS, ENCEPHALITIS, EPIGASTRIC PAIN, EXHAUSTED, EXHAUSTION, EXTREME FATIGUE, FAT, FATI, FATIG, FATIGU, FATIGUE, FATIGUE AND HEADACHE, FATIGUE BODY ACHES, FATIGUE CHILLS, FATIGUE CONGESTION, FATIGUE DIARRHEA, FATIGUE HEADACHE, FATIGUE RUNNY NOSE, FATIGUE., FATIGUED, FATIQUE, FEBRILE, FEELING UNWELL, FEVER, FEVERISH, FLANK PAIN, FLU, FLU LIKE SYMPTOMS, GASTRITIS, GASTRO, GASTRO SYMPTOMS, GASTROENTERITIS, GEN WEAKNESS, GENERAL MALAISE, GENERAL WEAKNESS, GENERALLY UNWELL, GERD, GI, GI BLEEDING, GI ISSUE, GI ISSUES, GI SYMPTOMS, GI UPSET, HA, HALLUCINATIONS, HEA, HEAD, HEAD ACHE, HEAD ACHES, HEAD COLD, HEAD CONGESTION, HEADA, HEADAC, HEADACH, HEADACHE, HEADACHE (ONLY), HEADACHE AND BODY ACHES, HEADACHE AND CHILLS, HEADACHE AND CONGESTION, HEADACHE AND FATIGUE, HEADACHE AND NAUSEA, HEADACHE AND RUNNY NOSE, HEADACHE BODY ACHE, HEADACHE BODY ACHES, HEADACHE CHILLS, HEADACHE CONGESTED, HEADACHE CONGESTION, HEADACHE DIARRHEA, HEADACHE FATIGUE, HEADACHE NASAL CONGESTION, HEADACHE NAUSEA, HEADACHE RUNNY NOSE, HEADACHE SOB, HEADACHE STOMACH ACHE, HEADACHE STUFFY NOSE, HEADACHE TIRED, HEADACHE UPSET STOMACH, HEADACHE VOMITING, HEADACHE., HEADACHE. FATIGUE, HEADACHE.VSS, HEADACHES, HEADAHCE, HEADCHE, HEART FAILURE, HEARTBURN, HEAVINESS IN CHEST, HEAVY CHEST, HEMATURIA, HIA, HOARSE, HOARSE VOICE, HOT, HOT FLASHES, ITCHY THROAT, JAUNDICE, JOINT PAIN, LACK OF APPETITE, LETHARGIC, LETHARGY, LIGHT HEADED, LIGHTHEADED, LOA, LOOSE BM, LOOSE STOOL, LOOSE STOOLS, LOS, LOSS APPETITE, LOSS OF APPETITE, LOSS OF SMELL, LOSS OF SMELL AND TASTE, LOSS OF TASTE, LOSS OF TASTE AND SMELL, LOSS OF VOICE, LOSS SMELL, LOSS TASTE, LOSS TASTE AND SMELL, LOST OF TASTE, LOST TASTE, LOW APPETITE, LOW ENERGY, LOW GRADE FEVER, LOWER BACK PAIN, MACULOPAPULAR RASH, MALAISE, MENINGITIS, MIGRAINE, MIGRAINES, MILD HEADACHE, MUSCLE, MUSCLE ACHE, MUSCLE ACHES, MUSCLE PAIN, MUSCLE WEAKNESS, MUSCLEACHES, MUSCLES ACHES, MYALGIA, MYALGIAS, N\TV, N+V, NAS.CONG, NASAL, NASAL CONG, NASAL CONG., NASAL CONGEST, NASAL CONGESTED, NASAL CONGESTI, NASAL CONGESTIO, NASAL CONGESTION, NASAL CONGESTION HEADACHE, NASAL DISCHARGE, NASAL DRAINAGE, NASAL DRIP, NASAL SYMPTOMS, NASUEA, NAU, NAUS, NAUSE, NAUSEA, NAUSEA AND HEADACHE, NAUSEA AND VOMITING, NAUSEA DIARRHEA, NAUSEA FATIGUE, NAUSEA HEADACHE, NAUSEA VOMITING, NAUSEA VOMITING DIARRHEA, NAUSEATED, NAUSEOUS, NECK PAIN, NEW SMELL, NIGHT SWEATS, NO APPETITE, NO ENERGY, NO SMELL, NO SMELL OR TASTE, NO TASTE, NO TASTE OR SMELL, NON-SPECIFIC SYMPTOM(S) - SURVEILLANCE, NOSE, NOSE CONGESTION, NSTEMI, PAIN, PAINS, PALPITATIONS, PHLEGM, PINK EYE, PLUGGED EARS, PND, PNEUMONIA, POST NASAL, POST NASAL DRIP, PRODUCTIVE COUGH, R.NOSE, RASH, RASH - NOT

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SPECIFIED, RASPY VOICE, RECENT FEVER, RESPIRATORY SYMPTOMS, RHINITIS, RHINNORHEA, RHINO, RHINORHEA, RHINORREA, RHINORRHEA, RUN NOSE, RUNNING NOSE, RUNNING NOSE.VSS, RUNNU NOSE, RUNNY, RUNNY NOSE, RUNNY N, RUNNY NO, RUNNY NOS, RUNNY NOSE, RUNNY NOSE AND CONGESTION, RUNNY NOSE AND HEADACHE, RUNNY NOSE AND SNEEZING, RUNNY NOSE CONGESTED, RUNNY NOSE CONGESTION, RUNNY NOSE DIARRHEA, RUNNY NOSE FATIGUE, RUNNY NOSE HEADACHE, RUNNY NOSE ONSET 20, RUNNY NOSE OR SNEEZING, RUNNY NOSE SNEEZING, RUNNY NOSE., RUNNY NOSR, RUNNYNOSE, RUNY NOSE, SCRATCHY THROAT, SEIZURE, SEPSIS, SHAKES, SHORT OF BREATH, SHORTNESS OF BREATH, SINUS, SINUS CONGESTED, SINUS CONGESTION, SINUS HEADACHE, SINUS INFECTION, SINUS ISSUES, SINUS PAIN, SINUS PRESSURE, SINUSES, SLUGGISH, SMELL, SNEEZ, SNEEZE, SNEEZING, SNEEZING RUNNY NOSE, SNEEZY, SNIFFLES, SOB, SOBOE, SORE, SORE BACK, SORE CHEST, SORE EARS, SORE MUSCLES, SORE NECK, SORE STOMACH, SORE THR, SORE THROAT, SORE THROAT ONSET 20, SORE THT, SORE TUMMY, SORETHROAT, SORETHT, STEMI, STHROAT, STIFF NECK, STOMACH, STOMACH ACHE, STOMACH ACHES, STOMACH CRAMPS, STOMACH PAIN, STOMACH PAINS, STOMACH UPSET, STOMACHACHE, STOMACHE ACHE, STROKE, STUFF NOSE, STUFFED NOSE, STUFFED UP, STUFFING NOSE, STUFFY, STUFFY NOSE, STUFFY NOSE HEADACHE, STUFFYNOSE, SWEAT, SWEATING, SWEATS, SWEATY, SWELLING, SWOLLEN GLANDS, SWOLLEN LYMPH NODES, SWOLLEN TONSILS, SX, SYNCOPE, TACHYCARDIA, TACHYPNEA, TASTE, TASTE DISORDER, TEMPERATURE, TEMPERATURE: 100, TEMPERATURE: 101, TEMPERATURE: 102, TEMPERATURE: 103, TEMPERATURE: 37.8, TEMPERATURE: 37.9, TEMPERATURE: 38, TEMPERATURE: 38.0, TEMPERATURE: 38.1, TEMPERATURE: 38.2, TEMPERATURE: 38.3, TEMPERATURE: 38.4, TEMPERATURE: 38.5, TEMPERATURE: 38.6, TEMPERATURE: 38.7, TEMPERATURE: 38.8, TEMPERATURE: 38.9, TEMPERATURE: 39, TEMPERATURE: 39.0, TEMPERATURE: 39.1, TEMPERATURE: 39.2, TEMPERATURE: 39.3, THROAT, TICKLE IN THROAT, TIGHT CHEST, TIGHTNESS, TIGHTNESS IN CHEST, TIRED, TIREDNESS, TROUBLE BREATHING, TUMMY ACHE, UNEXP FATIGUE, UNEXPLAINED FATIGUE, UNKNOWN COUGH, UNKNOWN FEVER, UNKNOWN PNEUMONIA, UNKNOWN SOB, UNKNOWN SORE THROAT, UNWELL, UPSET STOMACH, UPSET STOMACHE, URINARY TRACT INFECTION, VERTIGO, VESICULAR RASH, VOM, VOMIT, VOMITED, VOMITING, VOMITING AND DIARRHEA, VOMITING DIARRHEA, VOMITTED, VOMITTING, VOMMITING, VOMMITTING, WARM, WATERY EYES, WEAK, WEAKNESS, WEIGHT LOSS, WHEEZE, WHEEZING, WHEEZY, YES COUGH, YES FEVER, YES PNEUMONIA, YES SOB, YES SORE THROAT

Terms determined to be indicative of the absence of COVID-19 symptoms (classified as 'asymptomatic') were as follows: ASYMPTOMATIC (or partial spellings thereof). We also considered other terms that explicitly implied the negative presence of COVID-19 symptoms (e.g., NONE, NO PNEUMONIA, NO COUGH, NO FEVER, NO SORE THROAT, NO SYMPTOMS, N, NO, NO SOB, NIL). If both symptomatic and

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asymptomatic terms were presented in a record, the individual was classified as 'symptomatic'.

Among all eligible individuals tested for SARS-CoV-2 during the study period (n=2,137,686), 39% had a test record that noted whether the individual was symptomatic for COVID-19 or asymptomatic at the time of testing. For the remainder, these fields were blank, contained irrelevant information (e.g., indication of test [e.g., pre-op], targeted patient population [e.g., health care worker, close contact]), or recorded symptoms not consistent with COVID-19 (e.g., anxiety, falls).

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eTable 1: List of covariates used in the analyses.

Variable	Definition
Age	Age was determined from the Registered Persons Database. This variable was included <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk.[2]
Sex	Sex was determined from the Registered Persons Database. This variable was included <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk.[2]
Biweekly period of COVID-19 test	Based on the index date (i.e. specimen collection date, or date of severe outcome if before specimen collection date): 14 Dec 2020 to 27 Dec 2020 28 Dec 2020 to 10 Jan 2021 11 Jan 2021 to 24 Jan 2021 25 Jan 2021 to 7 Feb 2021 8 Feb 2021 to 21 Feb 2021 22 Feb 2021 to 7 Mar 2021 8 Mar 2021 to 21 Mar 2021 22 Mar 2021 to 4 Apr 2021 5 Apr 2021 to 19 Apr 2021
Chronic heart disease	Individuals were defined as having “chronic heart disease” if they had congestive heart failure (CHF), ischemic heart disease, or atrial fibrillation. The definitions for these conditions are as follows: <u>CHF:[3]</u> An ICES-derived CHF database was used to identify patients with CHF, based on 1 NACRS, DAD, SDS, or OHIP claim and a second claim (from either) in 1 year. The CHF database is limited to those aged 40 years or older. This variable was included <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk.[4] OHIP: 428 DAD, SDS: ICD-9: 428, ICD-10: I500, I501, I509 <u>Cardiac ischemic disease:[5]</u> Any comorbidity in the past 5 years (DAD, any diagnosis field) or history of procedure in past 20 years (DAD, SDS), of the following: Comorbidity (DAD, any diagnosis in the past 5 years): Angina: ICD-10: I20 Chronic Ischemic Heart Disease: ICD-10: I25; Myocardial infarction: ICD-10: I21, I22 Procedure (DAD & SDS): Coronary Artery Bypass Grafting: CCI procedure codes: 11J76 CCP procedure codes: 481 Percutaneous Coronary Intervention: CCI procedure codes: 11J50, 11J54, 11J57GQ CCP procedure codes: 4802, 4803

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Variable	Definition
	<p><u>Atrial fibrillation</u>:^[6] Individuals with 1 hospitalization or 4 MD visits within a year in the past 5 years with the following codes: ICD-9: 427.31, 427.32 ICD-10: I48 OHIP dxcode: 427</p>
Chronic respiratory disease	<p><u>Asthma</u>:^[7] An ICES-specific asthma database was used to identify patients with asthma, based on 2 or more ambulatory care visits and/or 1 or more hospitalizations. This variable was included a priori as hypothesized to be directly related to COVID-19 infection risk, as a result of its relationship to severe COVID-19 outcomes.^[4]</p> <p>OHIP OHIP diagnostic code: 493</p> <p>DAD ICD-9 diagnostic code: 493 ICD-10 diagnostic codes: J45, J46</p> <p><u>Chronic obstructive pulmonary disease (COPD)</u>:^[8] An ICES-specific COPD database was used to identify patients with COPD, based on 1 or more ambulatory care visits and/or 1 or more hospitalizations. The algorithm to identify COPD patients was only validated in those aged 35 years or older. This variable was included a priori as hypothesized to be directly related to COVID-19 infection risk.^[4]</p> <p>OHIP OHIP diagnostic codes: 491, 492, 496</p> <p>DAD ICD-9 diagnostic codes: 491, 492, 496 ICD-10 diagnostic codes: J41, J42, J43, J44</p>
Hypertension	<p>An ICES-specific hypertension database was used to identify patients with hypertension, based on 1 or more DAD diagnoses or 2 or more OHIP diagnoses in a two-year period; or 1 OHIP diagnosis followed by an OHIP/DAD diagnosis within two years.^[9] This variable was included a priori as hypothesized to be directly related to COVID-19 infection risk.^[4]</p> <p>DAD, SDS: ICD-9: 401, 402, 403, 404, 405; ICD-10: I10, I11, I12, I13, I15</p> <p>OHIP diagnostic codes: 401, 402, 403, 404, or 405</p>
Diabetes	<p>An ICES-specific diabetes database was used to identify patients with diabetes, based on 2 OHIP diagnostic codes or 1 OHIP service code or 1 DAD admission within 2 years.^[10] This variable was included a priori as hypothesized to be directly related to COVID-19 infection risk.^[4]</p> <p>DAD, SDS: ICD-9: 250; ICD-10: E10, E11, E13, E14 OHIP: 250 OHIP service codes: Q040, K029, K030, K045, K046</p>

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Variable	Definition
<p>Immunocompromised (HIV, transplant, immunosuppressive therapy)</p>	<p>We included immunosuppressive conditions <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk.[4]</p> <p><u>HIV:[11]</u> An ICES-specific HIV database was used to identify patients with HIV, based on 3 physician claims in 3 years with OHIP diagnostic codes: 042, 043 or 044</p> <p><u>Solid organ transplant recipients:</u> CORRLINK is an ICES-specific database which links CORR (Canadian Organ Replacement Register) and DAD data. This database only includes patients that have received an organ transplant and does not include dialysis patients.</p> <ul style="list-style-type: none"> • For transplants before December 31, 2019: individuals are a transplant recipient if they have a treatment code of 171, where the treatment was before the index date • For transplants on/after January 1, 2020: Identify ICD-10 codes, CCI procedure codes, and OHIP feecodes from DAD, NACRS, and OHIP (codes available upon request) <p><u>Allogenic/autologous bone marrow transplant recipients:</u> We identified those who had a history of allogenic bone marrow transplant before the index date using the following combination of diagnostic codes: DAD:</p> <ul style="list-style-type: none"> • CCP procedure codes = 53.0 • CCI procedure codes = 1WY19, 1LZ19HHU7, 1LZ19HHU8 <p>OHIP:</p> <ul style="list-style-type: none"> • Feecode = Z426 <p><u>Other immune disorders:</u> Individuals were identified as having disorders of the immune system based on health care encounters recorded in DAD, SDS, NACRS, and OHIP in the 2-years prior to index using Expanded Diagnostic Clusters from the Johns Hopkins ACG® System Version 10.[12]</p> <p><u>Any hospitalization (any diagnosis field) with the following codes:</u></p> <ul style="list-style-type: none"> • Sickle-cell disease (ICD-10 D57.0 – D57.2; D57.8 OR ICD-9 282.6); • Other immune system disorders (ICD-9 273.2, 279.0, 279.1, 279.2, 279.3, 279.8, 279.9, 289.8; ICD-10 D80, D81, D82, D83, D84, D89; OHIP dxcode 279) • Immunosuppressive therapy (>30 days (total days supplied) of oral corticosteroid in the 6 months before index date; receipt of other immunocompromising drug, including antineoplastics, in the 6 months before index date) <p><u>Active cancer:</u></p> <ul style="list-style-type: none"> • Any of the following treatments in the past 6 months: cancer surgery (codes available upon request), radiation (if the ICD-10 code listed was Z510 in NACRS), chemotherapy (if the ICD-10 code listed was Z511 or Z512 and any evidence of cancer diagnosis in the Ontario Cancer Registry (OCR) prior to the last treatment date)

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Variable	Definition
	<ul style="list-style-type: none"> • If not any of the above, individuals still classified as having cancer if they had a cancer diagnosis in OCR in the year before the index date
Autoimmune disease	<p>Individuals considered to have autoimmune disease if they had any of the following:</p> <ul style="list-style-type: none"> • Rheumatoid arthritis (identified in the Ontario Rheumatoid Arthritis Database)[13,14] • Inflammatory bowel disease (identified in the Ontario Crohn’s and Colitis Cohort)[15,16] • Psoriasis/psoriatic arthritis[17] <ul style="list-style-type: none"> ○ Psoriasis: 1 hospitalization or 3 physician billings prior to index date. DAD: ICD-9: 696.1, 696.8; ICD-10: L40.0, L40.1, L40.2, L40.3, L40.4, L40.8, L40.9. OHIP: dxcode = 696 ○ Psoriatic arthritis: 1 hospitalization or: (3 physician billings for psoriatic arthritis + 1 billing for psoriasis [696]). DAD: ICD-9: 696.0; ICD-10: L40.5, M07.0, M07.1, M07.2, M07.3, M09.0. OHIP: dxcode = 721 (at least one of these billings must be billed by a rheumatologist). • Multiple sclerosis[18] <ul style="list-style-type: none"> ○ Individuals with one hospitalization or 5 physician billings over 2 years. DAD: ICD-9: 340; ICD-10: G35. OHIP: dxcode = 340.
Chronic kidney disease (CKD)	<p>This variable was included <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk.[4] We defined this variable as having a CKD diagnosis code in DAD, NACRS, OHIP in the past 5 years, <u>or</u>: at least 1 dialysis code in each of the 3 months prior to index.[19]</p> <p>OHIP: 403, 585</p> <p>ICD-10: E102, E112, E132, E142, I12, I13, N08, N18, N19</p> <p>Patients who were on chronic dialysis in the year before index date, identified as those with at least 2 of any of the following codes in OHIP, DAD, or SDS separated by at least 90 days, but less than 150 days:[20]</p> <p>OHIP service codes: R849, G323, G325, G326, G860, G862, G865 G863, G866, G330, G331, G332, G333, G861, G082, G083, G085, G090, G091, G092, G093, G094, G095, G096, G294, G295, G864, H540, H740</p> <p>DAD, SDS: CCI procedure codes: 5195, 6698 CCP procedure code: 1PZ21</p>
Advanced liver disease (Cirrhosis or Decompensated Cirrhosis)	<p>We included advanced liver disease <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk.[4]</p> <p>Defined using the Cirrhosis Algorithm 9 [from [21]]: Two or more physician visits (diagnosis code 571), or one or more hospital diagnosis of cirrhosis, using the following diagnostic codes: ICD-9 : 456.1, 571.2, 571.5</p>

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Variable	Definition
	<p>ICD-10: I85.9, I98.2, K70.3, K71.7, K74.6</p> <p>Defined using the Decompensated Cirrhosis Algorithm 5 (from [21]): One or more physician visits with diagnosis code 571 and (one or more hospital diagnosis or one or more procedure), using the following diagnostic codes:</p> <p>ICD-9: 456.0, 456.2, 572.2, 572.3, 572.4, 782.4, 789.5; ICD-10: I85.0, I86.4, I98.20, I98.3, K721, K729, K76.6, K76.7, R17, R18</p> <p>CCI: 1.NA.13.BA-FA, 1.NA.13.BA-X7, 1.NA.13.BA-BD, 1.KQ.76GP-NR, 1.OT.52.HA</p> <p>CCP: 1006, 6691</p> <p>OHIP: J057, Z591</p>
Dementia	<p><u>Dementia (ICES cohort) definition:</u> 1 hospitalization for dementia and/or 3 ambulatory visits for dementia, each separated by at least 30 days, within 2 years and/or 1 prescription from ODB.[22] his variable was included <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk,[4] as well as a marker for healthcare access, mobility, and household-level exposures.[23,24]</p> <p>OHIP: 290, 331</p> <p>DAD, SDS: ICD-9: 0461, 290.0, 290.1, 290.2, 290.3, 290.4, 294, 331.0, 331.1, 331.5 ICD-10: F00, F01, F02, F03, G30</p> <p>ODB: 1 prescription for a cholinesterase inhibitor</p>
Frailty	<p><u>Frailty:</u> Individuals were identified as having medical conditions associated with frailty based on health care encounters recorded in DAD, SDS, NACRS, and OHIP in the 2-years prior to index using Special Population Markers from the Johns Hopkins ACG® System Version 10.[12]</p>
History of transient ischemic attack or acute ischemic stroke	<p>This variable was included <i>a priori</i> as hypothesized to be directly related to COVID-19 infection risk.[4]</p> <p><u>Transient Ischemic Attack:</u> DAD and NACRS were used to identify patients with a history of a transient ischemic attack, based on at least 1 hospitalization or ED visit with a diagnosis coded with one of the following codes:</p> <p>ICD-9: 435, 3623 ICD-10: G450, G451, G452, G453, G458, G459, H340</p> <p><u>Acute Ischemic Stroke:</u> DAD was used to identify patients with a history of acute ischemic stroke, based on at least 1 hospitalization with a main diagnosis coded with one of the following codes:</p>

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Variable	Definition
	ICD-9: 434, 436; ICD-10: I63, I64, H34.1
Influenza vaccine received, 2019-2020 season or 2020-2021 season	<p>An OHIP billing with any of the following fee codes from October 1, 2019 to September 30, 2020, or October 1, 2020 up to 14 days before the index date: G590, G591, G592, Q130, Q590, Q690, Q691;</p> <p>or, an ODB billing with any of the following Drug Identification Numbers (DINs)/Product Identification Number (PINs) from October 1, 2019 up to September 30, 2020: 02420643, 02420783, 02432730, 02473283, or October 1, 2020 up to 14 days before the index date: 02420643, 02420783, 02432730, 02445646, 02494248, 09857645, 09857646</p>
Public health unit region	<p>Taken from Public Health Unit (PHU) information using postal code of residence as recorded in the Registered Persons Database and Statistics Canada Postal Code Conversion File Plus (version 7B). Regions were defined as follows:</p> <p><u>Central East</u>: PHU 35 (Haliburton, Kawartha, Pine Ridge District Health Unit), 55 (Peterborough County—City Health Unit), 60 (Simcoe Muskoka District Health Unit)</p> <p><u>Central West</u>: PHU 27 (Brant County Health Unit), 34 (Haldimand-Norfolk Health Unit), 36 (Halton Regional Health Unit), 37 (City of Hamilton Health Unit), 46 (Niagara Regional Area Health Unit), 65 (Waterloo Health Unit), 66 (Wellington-Dufferin-Guelph Health Unit)</p> <p><u>Durham</u>: PHU 30 (Durham Regional Health Unit)</p> <p><u>Eastern</u>: PHU 38 (Hastings and Prince Edward Counties Health Unit), 41 (Kingston, Frontenac and Lennox and Addington Health Unit), 43 (Leeds, Grenville and Lanark District Health Unit), 57 (Renfrew County and District Health Unit), 58 (The Eastern Ontario Health Unit)</p> <p><u>North</u>: PHU 26 (The District of Algoma Health Unit), 47 (North Bay Parry Sound District Health Unit), 49 (Northwestern Health Unit), 56 (Porcupine Health Unit), 61 (Sudbury and District Health Unit), 62 (Thunder Bay District Health Unit), 63 (Timiskaming Health Unit)</p> <p><u>Ottawa</u>: PHU 51 (City of Ottawa Health Unit)</p> <p><u>Peel</u>: PHU 53 (Peel Regional Health Unit)</p> <p><u>South West</u>: PHU 31 (Elgin-St. Thomas), 33 (Grey Bruce Health Unit), 39 (Huron County Health Unit), 40 (Chatham-Kent Health Unit), 42 (Lambton Health Unit), 44 (Middlesex-London Health Unit), 52 (Oxford), 54 (Perth District Health Unit), 68 (Windsor-Essex County Health Unit), 75 (Southwestern Health Unit)</p> <p><u>Toronto</u>: PHU 95 (City of Toronto Health Unit)</p> <p><u>York</u>: PHU 70 (York Regional Health Unit)</p>
Dissemination area (DA)	<p>A dissemination area (DA) is the smallest standard geographic area for which all census data are disseminated. A DA generally comprises approximately 400-700 people, but in densely populated cities may contain several thousand people. DAs cover all the territory of Canada.[25]</p> <p>We assigned subjects to a DA using postal code, as recorded in the Registered Persons Database.</p>
Household income quintile	<p>Calculated at the DA level using 2016 Census data by multiplying the median income (before-tax) by the number of households and dividing by the sum of single-person equivalent to obtain income per single person equivalent.[26] For DAs where median income was unavailable,</p>

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Variable	Definition
	neighbouring DAs were used to estimate income per single person equivalent. DA-based income quintiles were constructed separately for each census metropolitan area or census agglomeration (one or more adjacent municipalities integrated via commuting flows). DAs within each such area were ranked from the lowest average income per single-person equivalent to the highest, and DAs were assigned to five groups, such that each group contained approximately one-fifth the total in-scope population of each area.
Persons per dwelling quintile	Average number of persons in private households, calculated at the DA level using the 2016 Census data.[27] DAs across the province were ranked by average number of persons per household into 5 categories (quintiles), such that each group contained approximately one-fifth of the DAs.
Essential worker quintile	<p>Calculated at the DA level, using 2016 Census data.[28] For each DA, we calculated the number of individuals ≥ 15 years old that were working in one of the following Census-defined work categories: Sales and service occupations; trades, transport and equipment operators and related occupations; natural resources, agriculture and related production occupations; and occupations in manufacturing and utilities.</p> <p>DAs across the province were then ranked by these percentages into quintiles, with the lowest 1/5 of DAs comprising the first quintile, and so on.</p>
Visible minority quintile	<p>Calculated at the DA level, using 2016 Census data.[28] An individual was marked as “self-identify as a visible minority” if they reported being one or more of the following (wording from the 2016 Census): “South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.), Chinese, Black, Filipino, Latin American, Arab, Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.), West Asian (e.g., Iranian, Afghan, etc.), Korean, Japanese, or Other—specify”.</p> <p>DAs across the province were then ranked by these percentages into quintiles, with the lowest 1/5 of DAs comprising the first quintile, and so on.</p>

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eTable 2: Comparison of unadjusted vaccine effectiveness estimates and VE estimates adjusted for a single covariate to evaluate the impact of potential confounders.

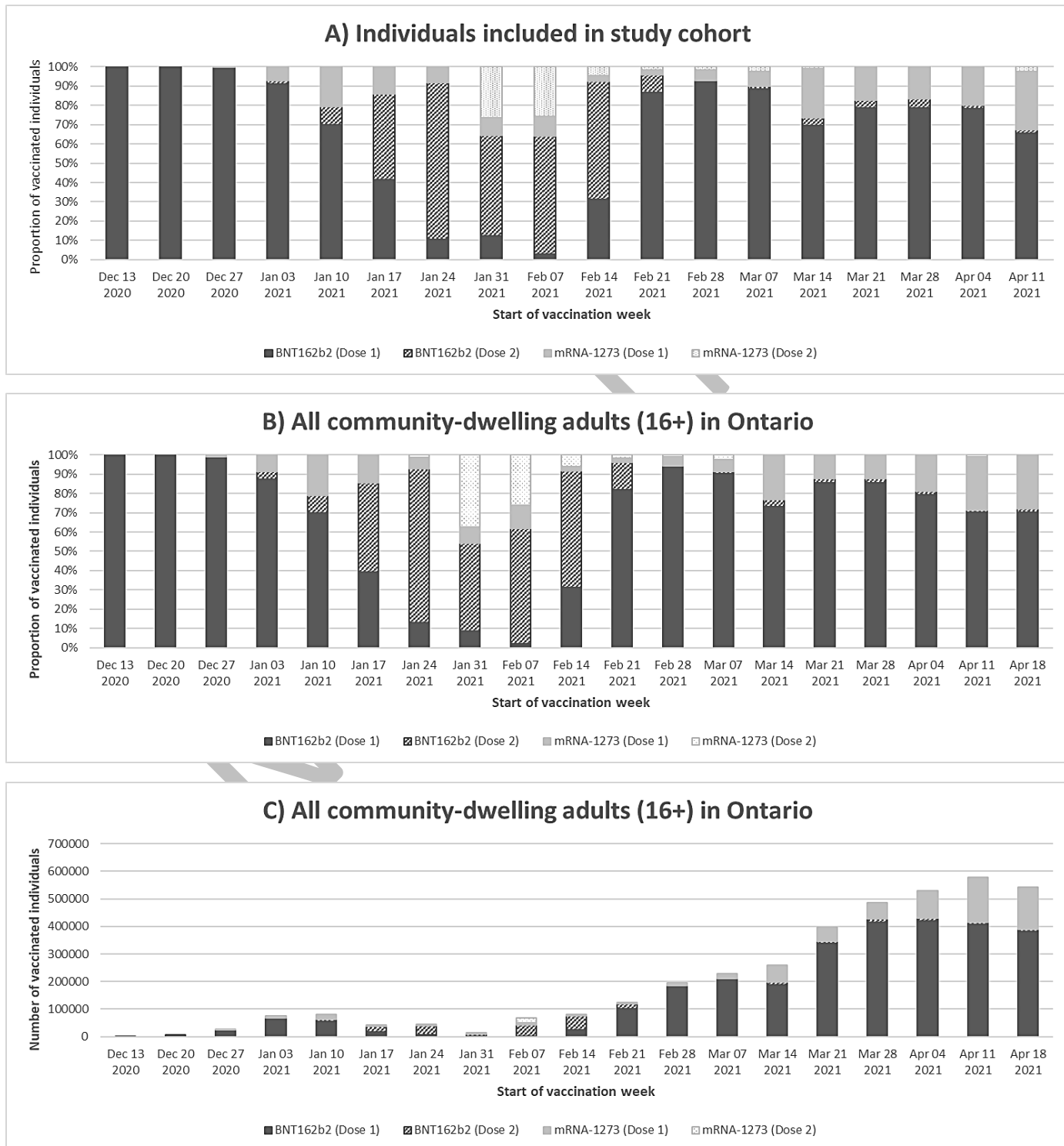
	Symptomatic infection				Severe outcomes			
	≥14 days after Dose 1 ^a		≥7 days after Dose 2		≥14 days after Dose 1 ^a		≥7 days after Dose 2	
	VE (95% CI)	% change in OR ^b	VE (95% CI)	% change in OR ^b	VE (95% CI)	% change in OR ^b	VE (95% CI)	% change in OR ^b
Unadjusted	60 (57 to 63)	-	93 (91 to 94)	-	25 (3 to 43)	-	97 (80 to 100)	-
Adjusted for:								
Age group	58 (55 to 61)	5.0	92 (90 to 94)	3.9	60 (48 to 70)	-47	98 (88 to 100)	-39
Sex	59 (55 to 62)	4.2	92 (90 to 94)	5.9	18 (-7 to 37)	9.9	97 (77 to 100)	14
Public Health Unit Region	58 (54 to 61)	6.7	93 (91 to 95)	-4.9	23 (0 to 41)	3.5	97 (81 to 100)	-4.3
Biweekly period of test	72 (69 to 74)	-29	94 (92 to 95)	-12	33 (12 to 48)	-9.6	97 (79 to 100)	2.3
Number of tests in previous 3 months	56 (53 to 59)	10	90 (87 to 93)	32	19 (-5 to 38)	7.8	97 (76 to 100)	21
Any comorbidity	60 (56 to 63)	1.7	93 (90 to 94)	0.9	34 (15 to 50)	-12	97 (81 to 100)	-7.3
Receipt of 2019-2020 and/or 2020-2021 influenza vaccination	58 (55 to 61)	5.4	93 (90 to 94)	1.6	31 (10 to 47)	-7.1	97 (80 to 100)	-2.3
Household income quintile	60 (57 to 63)	0.3	93 (91 to 94)	0.1	24 (2 to 42)	0.7	97 (80 to 100)	0.4
Essential workers quintile	60 (57 to 63)	-0.6	93 (90 to 94)	1.4	26 (4 to 43)	-1.1	97 (79 to 100)	1.8
Persons per dwelling quintile	58 (54 to 61)	6.2	93 (90 to 94)	0.5	24 (1 to 41)	2.4	97 (80 to 100)	0.0
Self-identified visible minorities quintile	55 (52 to 59)	12	93 (91 to 95)	-2.1	18 (-7 to 37)	10	97 (80 to 100)	-2.0
Adjusted for all covariates	60 (57 to 64)	-0.6	91 (89 to 93)	20	70 (60 to 77)	-59	98 (88 to 100)	-43

^aAmong individuals who received only one dose by the index date

^b% Change in OR = (adjusted OR/crude OR - 1)*100

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eFigure 1: Distribution of mRNA vaccine product (BNT162b2, mRNA-1273) among vaccinated individuals included in the study cohort (Panel A) and all adults aged ≥16 years in Ontario, Canada (Panels B, C) between 14 December 2020 and 19 April 2021.



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eTable 3: Characteristics of individuals with symptoms consistent with COVID-19 recorded in the Ontario Laboratories Information System (OLIS) at the time of testing for SARS-CoV-2, individuals recorded in OLIS as asymptomatic, and individuals who did not have symptoms consistent with COVID-19 or had no symptom information recorded in OLIS between 14 December 2020 and 19 April 2021 in Ontario, Canada.

Characteristic	(A) COVID-19 symptoms, n (%) ^a (N=324,033)	(B) Asymptomatic, n (%) ^a (N=519,885)	(C) COVID-19 symptoms and asymptomatic combined, n (%) ^a (N=843,918)	(D) Recorded symptoms not consistent with COVID-19 or no symptom information recorded, n (%) ^a (N=1,293,768)	Standardized difference ^b (C vs. D)
Received ≥1 dose of COVID-19 vaccine	21,272 (6.6)	83,890 (16.1)	105,162 (12.5)	93,639 (7.2)	0.18
Tested positive for SARS-CoV-2	53,270 (16.4)	22,740 (4.4)	76,010 (9.0)	136,653 (10.6)	0.05
Age (years), mean (standard deviation)	43.0 (17.7)	47.0 (18.9)	45.5 (18.5)	45.8 (18.6)	0.01
Age group (years)					
16–29	87,413 (27.0)	113,375 (21.8)	200,788 (23.8)	303,837 (23.5)	0.01
30–39	69,350 (21.4)	87,079 (16.7)	156,429 (18.5)	247,433 (19.1)	0.02
40–49	55,867 (17.2)	88,466 (17.0)	144,333 (17.1)	211,122 (16.3)	0.02
50–59	50,334 (15.5)	97,557 (18.8)	147,891 (17.5)	215,614 (16.7)	0.02
60–69	32,621 (10.1)	69,504 (13.4)	102,125 (12.1)	159,036 (12.3)	0.01
70–79	17,314 (5.3)	32,322 (6.2)	49,636 (5.9)	94,374 (7.3)	0.06
≥80	11,134 (3.4)	31,582 (6.1)	42,716 (5.1)	62,352 (4.8)	0.01
Male sex	138,494 (42.7)	208,819 (40.2)	347,313 (41.2)	585,559 (45.3)	0.08
Public health unit region ^c					
Central East	31,818 (9.8)	47,792 (9.2)	79,610 (9.4)	63,357 (4.9)	0.18
Central West	56,741 (17.5)	86,609 (16.7)	143,350 (17.0)	271,921 (21.0)	0.10
Durham	10,016 (3.1)	19,991 (3.8)	30,007 (3.6)	70,212 (5.4)	0.09
Eastern	15,836 (4.9)	24,630 (4.7)	40,466 (4.8)	90,671 (7.0)	0.09
North	33,074 (10.2)	46,562 (9.0)	79,636 (9.4)	48,150 (3.7)	0.23
Ottawa	3,561 (1.1)	15,029 (2.9)	18,590 (2.2)	112,651 (8.7)	0.29
Peel	46,496 (14.3)	61,058 (11.7)	107,554 (12.7)	107,572 (8.3)	0.14
South West	46,878 (14.5)	73,947 (14.2)	120,825 (14.3)	126,449 (9.8)	0.14
Toronto	57,998 (17.9)	98,517 (18.9)	156,515 (18.5)	282,852 (21.9)	0.08
York	20,273 (6.3)	43,618 (8.4)	63,891 (7.6)	115,422 (8.9)	0.05
Biweekly period of test					
14 Dec 2020 to 27 Dec 2020	31,623 (9.8)	51,533 (9.9)	83,156 (9.9)	172,097 (13.3)	0.11
28 Dec 2020 to 10 Jan 2021	33,825 (10.4)	50,050 (9.6)	83,875 (9.9)	164,818 (12.7)	0.09

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Characteristic	(A) COVID-19 symptoms, n (%) ^a (N=324,033)	(B) Asymptomatic, n (%) ^a (N=519,885)	(C) COVID-19 symptoms and asymptomatic combined, n (%) ^a (N=843,918)	(D) Recorded symptoms not consistent with COVID-19 or no symptom information recorded, n (%) ^a (N=1,293,768)	Standardized difference ^b (C vs. D)
11 Jan 2021 to 24 Jan 2021	31,600 (9.8)	48,456 (9.3)	80,056 (9.5)	147,371 (11.4)	0.06
25 Jan 2021 to 7 Feb 2021	27,852 (8.6)	46,513 (8.9)	74,365 (8.8)	118,455 (9.2)	0.01
8 Feb 2021 to 21 Feb 2021	28,302 (8.7)	54,532 (10.5)	82,834 (9.8)	103,879 (8.0)	0.06
22 Feb 2021 to 7 Mar 2021	34,367 (10.6)	61,588 (11.8)	95,955 (11.4)	114,039 (8.8)	0.08
8 Mar 2021 to 21 Mar 2021	37,969 (11.7)	61,008 (11.7)	98,977 (11.7)	124,445 (9.6)	0.07
22 Mar 2021 to 4 Apr 2021	44,218 (13.6)	67,522 (13.0)	111,740 (13.2)	146,394 (11.3)	0.06
5 Apr 2021 to 19 Apr 2021	54,277 (16.8)	78,683 (15.1)	132,960 (15.8)	202,270 (15.6)	0.00
Number of tests in previous 3 months					
0	233,499 (72.1)	312,611 (60.1)	546,110 (64.7)	969,250 (74.9)	0.22
1	61,978 (19.1)	77,354 (14.9)	139,332 (16.5)	222,312 (17.2)	0.02
≥2	28,556 (8.8)	129,920 (25.0)	158,476 (18.8)	102,206 (7.9)	0.32
Any comorbidity ^d	151,186 (46.7)	250,466 (48.2)	401,652 (47.6)	619,430 (47.9)	0.01
Receipt of 2019-2020 and/or 2020-2021 influenza vaccination	103,146 (31.8)	174,271 (33.5)	277,417 (32.9)	437,059 (33.8)	0.02
Household income quintile ^{c, e}					
1 (lowest)	59,822 (18.5)	103,771 (20.0)	163,593 (19.4)	251,573 (19.4)	0.00
2	62,624 (19.3)	102,050 (19.6)	164,674 (19.5)	250,720 (19.4)	0.00
3	64,105 (19.8)	103,053 (19.8)	167,158 (19.8)	261,983 (20.2)	0.01
4	66,822 (20.6)	104,840 (20.2)	171,662 (20.3)	261,363 (20.2)	0.00
5 (highest)	69,133 (21.3)	103,711 (19.9)	172,844 (20.5)	263,195 (20.3)	0.00
Essential workers quintile ^{c, f}					
1 (0%–32.5%)	57,104 (17.6)	86,085 (16.6)	143,189 (17.0)	294,015 (22.7)	0.14
2 (32.5%–42.3%)	71,265 (22.0)	114,051 (21.9)	185,316 (22.0)	290,191 (22.4)	0.01
3 (42.3%–49.8%)	67,214 (20.7)	109,473 (21.1)	176,687 (20.9)	253,246 (19.6)	0.03
4 (50.0%–57.5%)	64,425 (19.9)	106,133 (20.4)	170,558 (20.2)	240,766 (18.6)	0.04
5 (57.5%–100%)	61,586 (19.0)	99,835 (19.2)	161,421 (19.1)	209,013 (16.2)	0.08
Persons per dwelling quintile ^{c, g}					
1 (0–2.1)	57,633 (17.8)	89,760 (17.3)	147,393 (17.5)	246,369 (19.0)	0.04
2 (2.2–2.4)	58,967 (18.2)	92,229 (17.7)	151,196 (17.9)	217,568 (16.8)	0.03
3 (2.5–2.6)	42,862 (13.2)	69,632 (13.4)	112,494 (13.3)	180,832 (14.0)	0.02
4 (2.7–3.0)	76,741 (23.7)	125,991 (24.2)	202,732 (24.0)	307,590 (23.8)	0.01

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Characteristic	(A) COVID-19 symptoms, n (%) ^a (N=324,033)	(B) Asymptomatic, n (%) ^a (N=519,885)	(C) COVID-19 symptoms and asymptomatic combined, n (%) ^a (N=843,918)	(D) Recorded symptoms not consistent with COVID-19 or no symptom information recorded, n (%) ^a (N=1,293,768)	Standardized difference ^b (C vs. D)
5 (3.1–5.7)	85,292 (26.3)	137,732 (26.5)	223,024 (26.4)	334,154 (25.8)	0.01
Self-identified visible minority quintile ^{c, h}					
1 (0.0%–2.2%)	56,356 (17.4)	92,897 (17.9)	149,253 (17.7)	180,221 (13.9)	0.10
2 (2.2%–7.5%)	60,876 (18.8)	92,318 (17.8)	153,194 (18.2)	210,399 (16.3)	0.05
3 (7.5%–18.7%)	58,345 (18.0)	91,061 (17.5)	149,406 (17.7)	244,332 (18.9)	0.03
4 (18.7%–43.5%)	64,409 (19.9)	102,903 (19.8)	167,312 (19.8)	304,299 (23.5)	0.09
5 (43.5%–100%)	81,612 (25.2)	136,413 (26.2)	218,025 (25.8)	348,009 (26.9)	0.02

^aProportion reported, unless stated otherwise.

^bStandardized differences of >0.10 are considered clinically relevant.

^cThe sum of counts does not equal the column total because of individuals with missing information (<1.0%) for this characteristic.

^dComorbidities include chronic respiratory diseases, chronic heart diseases, hypertension, diabetes, immunocompromising conditions due to underlying diseases or therapy, autoimmune diseases, chronic kidney disease, advanced liver disease, dementia/frailty and history of stroke or transient ischemic attack.

^eHousehold income quintile has variable cut-off values in each city/Census area to account for cost of living. A dissemination area (DA) being in quintile 1 means it is among the lowest 20% of DAs in its city by income.

^fPercentage of people in the area working in the following occupations: sales and service occupations; trades, transport and equipment operators and related occupations; natural resources, agriculture, and related production occupations; and occupations in manufacturing and utilities. Census counts for people are randomly rounded up or down to the nearest number divisible by 5, which causes some minor imprecision.

^gRange of persons per dwelling.

^hPercentage of people in the area who self-identified as a visible minority. Census counts for people are randomly rounded up or down to the nearest number divisible by 5, which causes some minor imprecision.

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eTable 4: Characteristics of symptomatic individuals tested for SARS-CoV-2 according to vaccine product and vaccination status between 14 December 2020 and 19 April 2021 in Ontario, Canada.

Characteristic	BNT162b2		mRNA-1273	
	Received only 1 dose, n (%) ^a (N= 14,156)	Received 2 doses, n (%) ^a (N= 4,176)	Received only 1 dose, n (%) ^a (N= 2,222)	Received 2 doses, n (%) ^a (N= 718)
Interval between receipt of only dose 1 and index date, or interval between dose 2 and index date (days), median (IQR)	16 (8–27)	30 (10–51)	12 (6–21)	26 (7–44)
Interval between 2 doses (days), median (IQR)	-	25 (21–35)	-	28 (28–28)
Age (years), mean (standard deviation)	51.8 (20.4)	45.6 (18.6)	57.7 (21.6)	68.4 (23.1)
Age group (years)				
16–29	2,292 (16.2)	854 (20.5)	253 (11.4)	58 (8.1)
30–39	2,592 (18.3)	1,035 (24.8)	328 (14.8)	56 (7.8)
40–49	2,131 (15.1)	799 (19.1)	293 (13.2)	64 (8.9)
50–59	2,010 (14.2)	719 (17.2)	314 (14.1)	69 (9.6)
60–69	1,653 (11.7)	304 (7.3)	242 (10.9)	62 (8.6)
70–79	1,774 (12.5)	99 (2.4)	318 (14.3)	81 (11.3)
≥80	1,704 (12.0)	366 (8.8)	474 (21.3)	328 (45.7)
Male sex	4,152 (29.3)	882 (21.1)	774 (34.8)	205 (28.6)
Public health unit region ^b				
Central East	1,381 (9.8)	519 (12.4)	53 (2.4)	16 (2.2)
Central West	2,495 (17.6)	1,044 (25.0)	220 (9.9)	94 (13.1)
Durham	369 (2.6)	112 (2.7)	33 (1.5)	8 (1.1)
Eastern	834 (5.9)	142 (3.4)	72 (3.2)	39 (5.4)
North	1,366 (9.6)	112 (2.7)	735 (33.1)	38 (5.3)
Ottawa	258 (1.8)	147 (3.5)	22 (1.0)	19 (2.6)
Peel	1,499 (10.6)	500 (12.0)	272 (12.2)	124 (17.3)
South West	2,840 (20.1)	599 (14.3)	302 (13.6)	144 (20.1)
Toronto	2,170 (15.3)	756 (18.1)	357 (16.1)	179 (24.9)
York	892 (6.3)	231 (5.5)	151 (6.8)	49 (6.8)
Biweekly period of test				
14 Dec 2020 to 27 Dec 2020	13 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)
28 Dec 2020 to 10 Jan 2021	320 (2.3)	8 (0.2)	7 (0.3)	0 (0.0)
11 Jan 2021 to 24 Jan 2021	782 (5.5)	151 (3.6)	135 (6.1)	0 (0.0)
25 Jan 2021 to 7 Feb 2021	657 (4.6)	394 (9.4)	137 (6.2)	16 (2.2)
8 Feb 2021 to 21 Feb 2021	313 (2.2)	523 (12.5)	77 (3.5)	118 (16.4)
22 Feb 2021 to 7 Mar 2021	597 (4.2)	681 (16.3)	86 (3.9)	127 (17.7)

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Characteristic	BNT162b2		mRNA-1273	
	Received only 1 dose, n (%) ^a (N= 14,156)	Received 2 doses, n (%) ^a (N= 4,176)	Received only 1 dose, n (%) ^a (N= 2,222)	Received 2 doses, n (%) ^a (N= 718)
8 Mar 2021 to 21 Mar 2021	1,820 (12.9)	665 (15.9)	179 (8.1)	126 (17.5)
22 Mar 2021 to 4 Apr 2021	3,388 (23.9)	776 (18.6)	513 (23.1)	137 (19.1)
5 Apr 2021 to 19 Apr 2021	6,266 (44.3)	978 (23.4)	1,088 (49.0)	194 (27.0)
Number of tests in previous 3 months				
0	8,546 (60.4)	1,489 (35.7)	1,331 (59.9)	222 (30.9)
1	2,859 (20.2)	902 (21.6)	435 (19.6)	142 (19.8)
≥2	2,751 (19.4)	1,785 (42.7)	456 (20.5)	354 (49.3)
Any comorbidity ^c	8,159 (57.6)	2,002 (47.9)	1,496 (67.3)	561 (78.1)
Receipt of 2019-2020 and/or 2020-2021 influenza vaccination	6,878 (48.6)	1,361 (32.6)	978 (44.0)	370 (51.5)
Household income quintile ^{b, d}				
1 (lowest)	2,416 (17.1)	667 (16.0)	532 (23.9)	135 (18.8)
2	2,690 (19.0)	819 (19.6)	459 (20.7)	178 (24.8)
3	2,842 (20.1)	816 (19.5)	443 (19.9)	132 (18.4)
4	3,037 (21.5)	928 (22.2)	401 (18.0)	147 (20.5)
5 (highest)	3,112 (22.0)	930 (22.3)	380 (17.1)	118 (16.4)
Essential workers quintile ^{b, e}				
1 (0%–32.5%)	2,527 (17.9)	924 (22.1)	308 (13.9)	158 (22.0)
2 (32.5%–42.3%)	3,074 (21.7)	912 (21.8)	520 (23.4)	158 (22.0)
3 (42.3%–49.8%)	3,001 (21.2)	868 (20.8)	451 (20.3)	148 (20.6)
4 (50.0%–57.5%)	2,845 (20.1)	786 (18.8)	463 (20.8)	117 (16.3)
5 (57.5%–100%)	2,612 (18.5)	658 (15.8)	462 (20.8)	127 (17.7)
Persons per dwelling quintile ^{b, f}				
1 (0–2.1)	2,796 (19.8)	757 (18.1)	536 (24.1)	188 (26.2)
2 (2.2–2.4)	2,834 (20.0)	697 (16.7)	557 (25.1)	131 (18.2)
3 (2.5–2.6)	2,058 (14.5)	577 (13.8)	290 (13.1)	95 (13.2)
4 (2.7–3.0)	3,255 (23.0)	1,084 (26.0)	378 (17.0)	157 (21.9)
5 (3.1–5.7)	3,108 (22.0)	1,023 (24.5)	440 (19.8)	138 (19.2)
Self-identified visible minority quintile ^{b, g}				
1 (0.0%–2.2%)	2,768 (19.6)	594 (14.2)	670 (30.2)	101 (14.1)
2 (2.2%–7.5%)	3,245 (22.9)	794 (19.0)	444 (20.0)	109 (15.2)
3 (7.5%–18.7%)	2,684 (19.0)	844 (20.2)	303 (13.6)	151 (21.0)
4 (18.7%–43.5%)	2,507 (17.7)	950 (22.7)	344 (15.5)	173 (24.1)
5 (43.5%–100%)	2,855 (20.2)	966 (23.1)	443 (19.9)	174 (24.2)

^aProportion reported, unless stated otherwise.

^bThe sum of counts does not equal the column total because of individuals with missing information (<1.0%) for this characteristic.

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^cComorbidities include chronic respiratory diseases, chronic heart diseases, hypertension, diabetes, immunocompromising conditions due to underlying diseases or therapy, autoimmune diseases, chronic kidney disease, advanced liver disease, dementia/frailty and history of stroke or transient ischemic attack.

^dHousehold income quintile has variable cut-off values in each city/Census area to account for cost of living. A dissemination area (DA) being in quintile 1 means it is among the lowest 20% of DAs in its city by income.

^ePercentage of people in the area working in the following occupations: sales and service occupations; trades, transport and equipment operators and related occupations; natural resources, agriculture, and related production occupations; and occupations in manufacturing and utilities. Census counts for people are randomly rounded up or down to the nearest number divisible by 5, which causes some minor imprecision.

^fRange of persons per dwelling.

^gPercentage of people in the area who self-identified as a visible minority. Census counts for people are randomly rounded up or down to the nearest number divisible by 5, which causes some minor imprecision.

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eTable 5: Unadjusted and adjusted vaccine effectiveness estimates of COVID-19 mRNA vaccines against symptomatic SARS-CoV-2 infection and severe outcomes (hospitalization or death) by various intervals, between 14 December 2020 and 19 April 2021 in Ontario, Canada.

	Test-positive cases, No. Vaccinated/Total ^a	Test-negative controls, No. Vaccinated/Total ^a	Unadjusted VE% (95% CI)	Adjusted ^b VE% (95% CI)	Adjusted ^c VE% (95% CI)
Symptomatic SARS-CoV-2 infection					
Received one dose, time since Dose 1					
0–6 days	520 / 51,740	2,674 / 254,215	5 (-5 to 13)	3 (-8 to 12)	Reference
7–13 days	772 / 51,992	3,282 / 254,823	-16 (-25 to -7)	-16 (-26 to -6)	
14–20 days	283 / 51,503	2,794 / 254,335	50 (44 to 56)	48 (41 to 54)	50 (43 to 57)
21–27 days	161 / 51,381	2,130 / 253,671	63 (56 to 68)	60 (53 to 66)	58 (49 to 65)
28–34 days	108 / 51,328	1,647 / 253,188	68 (61 to 74)	68 (60 to 73)	62 (52 to 69)
35–41 days	72 / 51,292	1,063 / 252,604	67 (58 to 74)	71 (63 to 78)	67 (57 to 74)
42–48 days	42 / 51,262	594 / 252,135	65 (53 to 75)	70 (58 to 78)	66 (52 to 75)
≥49 days	19 / 51,239	217 / 251,758	57 (31 to 73)	64 (42 to 78)	60 (35 to 76)
Received two doses, time since Dose 2					
0–6 days	16 / 51,236	1,004 / 252,545	92 (87 to 95)	88 (81 to 93)	88 (80 to 93)
≥7 days	57 / 51,277	3,817 / 255,358	93 (91 to 94)	91 (89 to 93)	91 (88 to 93)
≥14 days	Suppressed ^d	Suppressed ^d	92 (90 to 94)	91 (88 to 93)	91 (87 to 93)
COVID-19 hospitalization or death					
Received one dose, time since Dose 1					
0–6 days	Suppressed ^d	2,674 / 254,215	-79 (-142 to -32)	20 (-10 to 41)	Reference
7–13 days	Suppressed ^d	3,282 / 254,823	-99 (-158 to -54)	26 (2 to 43)	
14–20 days	Suppressed ^d	2,794 / 254,335	-5 (-54 to 28)	62 (44 to 75)	53 (26 to 70)
21–27 days	Suppressed ^d	2,130 / 253,671	-2 (-59 to 34)	60 (37 to 75)	48 (13 to 69)
28–34 days	Suppressed ^d	1,647 / 253,188	47 (-6 to 74)	76 (52 to 88)	68 (31 to 85)
≥35 days	Suppressed ^d	1,874 / 253,415	83 (46 to 94)	91 (73 to 97)	88 (60 to 96)
Received two doses, time since Dose 2					
0–6 days	Suppressed ^d	1,004 / 252,545	78 (13 to 95)	83 (32 to 96)	78 (-2 to 95)
≥7 days	Suppressed ^d	3,817 / 255,358	97 (80 to 100)	98 (88 to 100)	98 (83 to 100)

^aThe denominator represents the total number of test-positive cases or test-negative controls (vaccinated and unvaccinated), whereas the numerator represents only the number of test-positive cases or test-negative controls that are vaccinated.

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^bModels were adjusted for age, sex, public health unit region, biweekly period of test, number of SARS-CoV-2 tests in the 3 months prior to 14 December 2020, presence of any comorbidity that increase the risk of severe COVID-19, receipt of influenza vaccination in current or prior influenza season, and neighbourhood-level household income, persons per dwelling, proportion of persons employed as non-health essential workers, and self-identified visible minority quintiles.

^cAnalyses restricted to only individuals who were vaccinated, where individuals vaccinated 0-13 days before index date were considered 'unvaccinated' and served as the reference group.

^dCounts of vaccinated test-positive cases for each interval are suppressed because they are either small cell counts (≤ 5 , which cannot be disclosed because of privacy and data obligations) or they could be derived using other estimates in this table. Overall, 165/2,479 (6.6%) of test-positive cases were vaccinated.

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eTable 6: Unadjusted and adjusted vaccine effectiveness estimates against symptomatic COVID-19 infection after Dose 1 (for individuals who received only 1 dose) and Dose 2, by various factors, including vaccine product, patient characteristics, epidemic wave, and SARS-CoV-2 lineage between 14 December 2020 and 19 April 2021 in Ontario, Canada.

	Test-positive cases, No. Vaccinated/Total ^a	Test-negative controls, No. Vaccinated/Total ^a	Unadjusted VE% (95% CI)	Adjusted ^b VE% (95% CI)
Vaccine product				
BNT162b2				
≥14 days after Dose 1	636 / 51,856	7,483 / 259,024	58 (55 to 62)	59 (55 to 62)
≥7 days after Dose 2	51 / 51,271	3,275 / 254,816	92 (90 to 94)	91 (88 to 93)
<i>By age group</i>				
≥70 years				
≥14 days after Dose 1	Suppressed ^c	Suppressed ^c	-5 (-20 to 9)	40 (29 to 50)
≥7 days after Dose 2	Suppressed ^c	Suppressed ^c	93 (81 to 97)	93 (82 to 98)
40–69 years				
≥14 days after Dose 1	Suppressed ^c	Suppressed ^c	66 (61 to 71)	64 (58 to 69)
≥7 days after Dose 2	Suppressed ^c	Suppressed ^c	90 (86 to 93)	88 (83 to 92)
16–39 years				
≥14 days after Dose 1	Suppressed ^c	Suppressed ^c	72 (67 to 76)	69 (64 to 74)
≥7 days after Dose 2	Suppressed ^c	Suppressed ^c	94 (91 to 96)	93 (88 to 96)
mRNA-1273				
≥14 days after Dose 1	49 / 51,269	962 / 252,503	75 (67 to 81)	72 (63 to 80)
≥7 days after Dose 2	6 / 51,226	542 / 252,083	95 (88 to 98)	94 (86 to 97)
<i>By age group</i>				
≥70 years				
≥14 days after Dose 1	Suppressed ^c	Suppressed ^c	41 (15 to 59)	54 (31 to 69)
≥7 days after Dose 2	Suppressed ^c	Suppressed ^c	94 (80 to 98)	95 (83 to 98)
40–69 years				
≥14 days after Dose 1	Suppressed ^c	Suppressed ^c	83 (70 to 90)	82 (68 to 90)
≥7 days after Dose 2	Suppressed ^c	Suppressed ^c	97 (77 to 100)	97 (75 to 100)
16–39 years				
≥14 days after Dose 1	Suppressed ^c	Suppressed ^c	90 (77 to 96)	89 (73 to 95)
≥7 days after Dose 2	Suppressed ^c	Suppressed ^c	88 (49 to 97)	86 (44 to 97)
Age group				
≥70 years				
≥14 days after Dose 1	Suppressed ^c	1,977 / 22,258	3 (-10 to 15)	40 (29 to 49)
≥7 days after Dose 2	Suppressed ^c	690 / 20,971	93 (86 to 97)	94 (87 to 97)
40–69 years				
≥14 days after Dose 1	237 / 23,697	3,381 / 110,083	68 (64 to 72)	66 (61 to 70)
≥7 days after Dose 2	31 / 23,491	1,574 / 108,276	91 (87 to 94)	89 (85 to 93)

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	Test-positive cases, No. Vaccinated/Total ^a	Test-negative controls, No. Vaccinated/Total ^a	Unadjusted VE% (95% CI)	Adjusted ^b VE% (95% CI)
16–39 years				
≥14 days after Dose 1	Suppressed ^c	3,087 / 127,645	73 (69 to 77)	71 (66 to 75)
≥7 days after Dose 2	Suppressed ^c	1,553 / 126,111	94 (90 to 96)	93 (88 to 95)
Sex				
Male				
≥14 days after Dose 1	247 / 25,453	2,317 / 109,592	55 (48 to 60)	56 (49 to 62)
≥7 days after Dose 2	9 / 25,215	840 / 108,115	95 (91 to 98)	94 (89 to 97)
Female				
≥14 days after Dose 1	438 / 26,452	6,128 / 150,394	60 (56 to 64)	62 (58 to 66)
≥7 days after Dose 2	48 / 26,062	2,977 / 147,243	91 (88 to 93)	90 (87 to 93)
Presence of any comorbidity				
Yes				
≥14 days after Dose 1	457 / 22,349	4,788 / 121,864	49 (44 to 54)	54 (49 to 59)
≥7 days after Dose 2	26 / 21,918	2,005 / 119,081	93 (90 to 95)	92 (88 to 95)
No				
≥14 days after Dose 1	228 / 29,556	3,657 / 138,122	71 (67 to 75)	69 (64 to 73)
≥7 days after Dose 2	31 / 29,359	1,812 / 136,277	92 (89 to 95)	91 (86 to 93)
Epidemic wave				
14 Dec 2020–7 Feb 2021				
≥14 days after Dose 1	Suppressed ^c	817 / 103,936	73 (63 to 80)	62 (48 to 73)
≥7 days after Dose 2	Suppressed ^c	141 / 103,260	96 (73 to 100)	94 (60 to 99)
8 Feb 2021–21 Mar 2021				
≥14 days after Dose 1	Suppressed ^c	1,124 / 84,426	72 (63 to 79)	61 (46 to 71)
≥7 days after Dose 2	Suppressed ^c	1,721 / 85,023	94 (90 to 96)	92 (86 to 95)
22 Mar 2021–19 Apr 2021				
≥14 days after Dose 1	599 / 20,684	6,504 / 71,624	70 (68 to 73)	59 (55 to 62)
≥7 days after Dose 2	41 / 20,126	1,955 / 67,075	93 (91 to 95)	90 (86 to 93)
SARS-CoV-2 lineage				
Earlier variant				
≥14 days after Dose 1	132 / 27,642	8,445 / 259,986	86 (83 to 88)	61 (53 to 67)
≥7 days after Dose 2	13 / 27,523	3,817 / 255,358	97 (95 to 98)	93 (87 to 96)
Alpha (B.1.1.7)				
≥14 days after Dose 1	300 / 12,582	8,445 / 259,986	27 (18 to 35)	61 (56 to 66)
≥7 days after Dose 2	23 / 12,305	3,817 / 255,358	88 (81 to 92)	90 (85 to 94)
Beta (B.1.351) or Gamma (P.1)				
≥14 days after Dose 1	Suppressed ^c	8,445 / 259,986	1 (-35 to 27)	43 (22 to 59)
≥7 days after Dose 2	Suppressed ^c	3,817 / 255,358	85 (52 to 95)	88 (61 to 96)

^aThe denominator represents the total number of test-positive cases or test-negative controls (vaccinated and unvaccinated), whereas the numerator represents only the number of test-positive cases or test-negative controls that are vaccinated.

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^bModels were adjusted for age, sex, public health unit region, biweekly period of test, number of SARS-CoV-2 tests in the 3 months prior to 14 December 2020, presence of any comorbidity that increase the risk of severe COVID-19, receipt of influenza vaccination in current or prior influenza season, and neighbourhood-level household income, persons per dwelling, proportion of persons employed as non-health essential workers, and self-identified visible minority quintiles.

^cCounts of vaccinated test-positive cases for each interval are suppressed because they are either small cell counts (≤ 5 , which cannot be disclosed because of privacy and data obligations) or they could be derived using other estimates in this table.

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eTable 7: Unadjusted and adjusted vaccine effectiveness estimates after Dose 1 (for individuals who received only 1 dose) and Dose 2, by various factors, including vaccine product, patient characteristics, epidemic wave, and SARS-CoV-2 lineage against severe outcomes (hospitalization or death) of symptomatic SARS-CoV-2 infection between 14 December 2020 and 19 April 2021 in Ontario, Canada.

	Test-positive cases, No. Vaccinated/Total ^a	Test-negative controls, No. Vaccinated/Total ^a	Unadjusted VE% (95% CI)	Adjusted ^b VE% (95% CI)
Vaccine product				
BNT162b2				
≥14 days after Dose 1	Suppressed ^c	7,483 / 259,024	26 (2 to 44)	69 (59 to 77)
After Dose 2 ^d	Suppressed ^c	4,112 / 255,653	95 (79 to 99)	96 (82 to 99)
<i>By age group</i>				
≥70 years				
≥14 days after Dose 1	Suppressed ^c	1623 / 21904	37 (15 to 54)	68 (54 to 77)
After Dose 2 ^d	Suppressed ^c	458 / 20739	95 (66 to 99)	97 (77 to 100)
40–69 years				
≥14 days after Dose 1	Suppressed ^c	3035 / 109737	85 (64 to 94)	84 (60 to 93)
After Dose 2 ^d	Suppressed ^c	1786 / 108488	95 (64 to 99)	93 (48 to 99)
16–39 years				
≥14 days after Dose 1	0 / 214	2825 / 127383	100	100
After Dose 2 ^d	0 / 214	1868 / 126426	100	100
mRNA-1273				
≥14 days after Dose 1	Suppressed ^c	962 / 252,503	21 (-67 to 62)	73 (42 to 87)
After Dose 2	Suppressed ^c	709 / 252,250	85 (-9 to 98)	96 (74 to 100)
<i>By age group</i>				
≥70 years				
≥14 days after Dose 1	Suppressed ^c	354 / 20635	56 (7 to 79)	69 (33 to 86)
After Dose 2 ^d	Suppressed ^c	404 / 20685	95 (61 to 99)	96 (73 to 99)
40–69 years				
≥14 days after Dose 1	Suppressed ^c	346 / 107048	100	100
After Dose 2 ^d	Suppressed ^c	194 / 106896	100	100
16–39 years				
≥14 days after Dose 1	0 / 214	262 / 124820	100	100
After Dose 2 ^d	0 / 214	111 / 124669	100	100
Age group				
≥70 years				
≥14 days after Dose 1	Suppressed ^c	1,977 / 22,258	41 (22 to 55)	67 (54 to 76)
After Dose 2 ^d	Suppressed ^c	862 / 21,143	95 (79 to 99)	97 (86 to 99)

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	Test-positive cases, No. Vaccinated/Total ^a	Test-negative controls, No. Vaccinated/Total ^a	Unadjusted VE% (95% CI)	Adjusted ^b VE% (95% CI)
40–69 years				
≥14 days after Dose 1	Suppressed ^c	3,381 / 110,083	87 (68 to 94)	86 (66 to 94)
After Dose 2 ^d	Suppressed ^c	1,980 / 108,682	95 (68 to 99)	94 (56 to 99)
16–39 years				
≥14 days after Dose 1	0 / 214	3,087 / 127,645	100	100
After Dose 2 ^d	0 / 214	1,979 / 126,537	100	100
Sex				
Male				
≥14 days after Dose 1	Suppressed ^c	2,317 / 109,592	9 (-35 to 38)	72 (57 to 81)
After Dose 2 ^d	Suppressed ^c	1,071 / 108,346	77 (29 to 93)	89 (65 to 97)
Female				
≥14 days after Dose 1	32 / 1,025	6,128 / 150,394	24 (-8 to 47)	67 (52 to 77)
After Dose 2 ^d	0 / 993	3,750 / 148,016	100	100
Presence of any comorbidity				
Yes				
≥14 days after Dose 1	Suppressed ^c	4,788 / 121,864	26 (3 to 43)	68 (57 to 76)
After Dose 2 ^d	Suppressed ^c	2,527 / 119,603	93 (77 to 98)	96 (86 to 99)
No				
≥14 days after Dose 1	Suppressed ^c	3,657 / 138,122	84 (37 to 96)	89 (54 to 97)
After Dose 2 ^d	Suppressed ^c	2,294 / 136,759	100	100
Epidemic wave				
14 Dec 2020–7 Feb 2021				
≥14 days after Dose 1	Suppressed ^c	817 / 103,936	75 (-1 to 94)	71 (-20 to 93)
After Dose 2 ^d	Suppressed ^c	563 / 103,682	100	100
8 Feb 2020–21 Mar 2021				
≥14 days after Dose 1	Suppressed ^c	1,124 / 84,426	63 (-15 to 88)	69 (4 to 90)
After Dose 2 ^d	Suppressed ^c	2,218 / 85,520	88 (50 to 97)	90 (59 to 98)
22 Mar 2021–19 Apr 2021				
≥14 days after Dose 1	Suppressed ^c	6,504 / 71,624	25 (0 to 43)	64 (50 to 73)
After Dose 2 ^d	Suppressed ^c	2,040 / 67,160	95 (68 to 99)	97 (80 to 100)
SARS-CoV-2 lineage				
Earlier variant				
≥14 days after Dose 1	Suppressed ^c	8,445 / 259,986	87 (70 to 94)	76 (46 to 90)
After Dose 2 ^d	Suppressed ^c	4,821 / 256,362	92 (69 to 98)	90 (61 to 98)
Alpha (B.1.1.7)				
≥14 days after Dose 1	Suppressed ^c	8,445 / 259,986	-77 (-158 to -22)	59 (39 to 73)
After Dose 2 ^d	Suppressed ^c	4,821 / 256,362	89 (24 to 99)	94 (59 to 99)

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	Test-positive cases, No. Vaccinated/Total^a	Test-negative controls, No. Vaccinated/Total^a	Unadjusted VE% (95% CI)	Adjusted^b VE% (95% CI)
Beta (B.1.351) or Gamma (P.1)				
≥14 days after Dose 1	6 / 92	8,445 / 259,986	-108 (-376 to 9)	56 (-9 to 82)
After Dose 2 ^d	0 / 86	4,821 / 256,362	100	100

^aThe denominator represents the total number of test-positive cases or test-negative controls (vaccinated and unvaccinated), whereas the numerator represents only the number of test-positive cases or test-negative controls that are vaccinated.

^bModels were adjusted for age, sex, public health unit region, biweekly period of test, number of SARS-CoV-2 tests in the 3 months prior to 14 December 2020, presence of any comorbidity that increase the risk of severe COVID-19, receipt of influenza vaccination in current or prior influenza season, and neighbourhood-level household income, persons per dwelling, proportion of persons employed as non-health essential workers, and self-identified visible minority quintiles.

^cCounts of vaccinated test-positive cases for each interval are suppressed because they are either small cell counts (≤ 5 , which cannot be disclosed because of privacy and data obligations) or they could be derived using other estimates in this table. Overall, 61/2,479 (2.5%) of test-positive cases with a severe outcome were vaccinated.

^dDue to the small number of severe outcomes after Dose 2, we evaluated VE for the entire period (i.e., ≥ 0 days) after receipt of the second dose.

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eTable 8: Unadjusted and adjusted vaccine effectiveness estimates against symptomatic SARS-CoV-2 infection and severe outcomes (hospitalization or death), stratified by age group, between 14 December 2020 and 19 April 2021 in Ontario, Canada.

	Test-positive cases, No. Vaccinated/Total ^a	Test-negative controls, No. Vaccinated/Total ^a	Unadjusted VE% (95% CI)	Adjusted ^b VE% (95% CI)
Symptomatic SARS-CoV-2 infection				
≥70 years				
Received one dose, time since Dose 1				
0–13 days	Suppressed ^c	1,638 / 21,919	-52 (-71 to -35)	-9 (-26 to 6)
14–20 days	Suppressed ^c	851 / 21,132	-25 (-49 to -5)	24 (7 to 38)
21–27 days	Suppressed ^c	557 / 20,838	9 (-17 to 28)	40 (21 to 54)
28–34 days	Suppressed ^c	322 / 20,603	42 (14 to 60)	64 (46 to 76)
35–41 days	Suppressed ^c	177 / 20,458	28 (-16 to 55)	64 (41 to 78)
42–48 days	Suppressed ^c	51 / 20,332	74 (-8 to 94)	85 (38 to 97)
≥49 days	Suppressed ^c	19 / 20,300	65 (-164 to 95)	81 (-48 to 98)
Received two doses, time since Dose 2				
≥7 days	Suppressed ^c	690 / 20,971	93 (86 to 97)	94 (87 to 97)
40–69 years				
Received one dose, time since Dose 1				
0–13 days	647 / 24,107	2,378 / 109,080	-24 (-35 to -13)	-16 (-27 to -5)
14–20 days	93 / 23,553	1,059 / 107,761	60 (51 to 68)	54 (42 to 63)
21–27 days	52 / 23,512	801 / 107,503	71 (61 to 78)	66 (54 to 74)
28–34 days	33 / 23,493	685 / 107,387	78 (69 to 85)	76 (65 to 83)
35–41 days	31 / 23,491	444 / 107,146	68 (54 to 78)	71 (58 to 80)
42–48 days	19 / 23,479	306 / 107,008	72 (55 to 82)	75 (60 to 85)
≥49 days	9 / 23,469	86 / 106,788	52 (5 to 76)	59 (17 to 80)
Received two doses, time since Dose 2				
≥7 days	31 / 23,491	1,574 / 108,276	91 (87 to 94)	89 (85 to 93)
16–39 years				
Received one dose, time since Dose 1				
0–13 days	Suppressed ^c	1,940 / 126,498	29 (19 to 37)	10 (-4 to 21)
14–20 days	Suppressed ^c	884 / 125,442	82 (75 to 88)	78 (68 to 85)

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	Test-positive cases, No. Vaccinated/Total ^a	Test-negative controls, No. Vaccinated/Total ^a	Unadjusted VE% (95% CI)	Adjusted ^b VE% (95% CI)
21–27 days	Suppressed ^c	772 / 125,330	79 (70 to 85)	75 (64 to 82)
28–34 days	Suppressed ^c	640 / 125,198	63 (50 to 73)	61 (47 to 71)
35–41 days	Suppressed ^c	442 / 125,000	75 (62 to 84)	76 (63 to 85)
42–48 days	Suppressed ^c	237 / 124,795	55 (30 to 72)	56 (31 to 72)
≥49 days	Suppressed ^c	112 / 124,670	60 (20 to 80)	65 (30 to 82)
Received two doses, time since Dose 2				
≥7 days	Suppressed ^c	1,553 / 126,111	94 (90 to 96)	93 (88 to 95)
COVID-19 hospitalization or death				
≥70 years				
Received one dose, time since Dose 1				
0–13 days	Suppressed ^c	1,638 / 21,919	-8 (-37 to 15)	18 (-7 to 37)
14–20 days	Suppressed ^c	851 / 21,132	32 (0 to 55)	58 (35 to 72)
21–27 days	Suppressed ^c	557 / 20,838	33 (-10 to 59)	61 (34 to 77)
28–34 days	Suppressed ^c	322 / 20,603	45 (-11 to 73)	72 (42 to 87)
≥35 days	Suppressed ^c	247 / 20,528	82 (28 to 96)	93 (71 to 98)
Received two doses				
After Dose 2 ^d	Suppressed ^c	862 / 21,143	95 (79 to 99)	97 (86 to 99)
40–69 years				
Received one dose, time since Dose 1				
0–13 days	Suppressed ^c	2,378 / 109,080	20 (-23 to 48)	40 (6 to 62)
14–20 days	Suppressed ^c	1,059 / 107,761	92 (39 to 99)	92 (41 to 99)
21–27 days	Suppressed ^c	801 / 107,503	66 (-5 to 89)	64 (-13 to 89)
28–34 days	Suppressed ^c	685 / 107,387	100	100
≥35 days	Suppressed ^c	836 / 107,538	89 (23 to 99)	88 (13 to 98)
Received two doses				
After Dose 2 ^d	Suppressed ^c	1,980 / 108,682	95 (68 to 99)	94 (56 to 99)
16–39 years				
Received one dose, time since Dose 1				
0–13 days	Suppressed ^c	1,940 / 126,498	Suppressed [†]	-6 (-236 to 66)
≥14 days	0 / 214	3,087 / 127,645	100	100
Received two doses				

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	Test-positive cases, No. Vaccinated/Total^a	Test-negative controls, No. Vaccinated/Total^a	Unadjusted VE% (95% CI)	Adjusted^b VE% (95% CI)
After Dose 2 ^d	0 / 214	1,979 / 126,537	100	100

^aThe denominator represents the total number of test-positive cases or test-negative controls (vaccinated and unvaccinated), whereas the numerator represents only the number of test-positive cases or test-negative controls that are vaccinated.

^bModels were adjusted for age, sex, public health unit region, biweekly period of test, number of SARS-CoV-2 tests in the 3 months prior to 14 December 2020, presence of any comorbidity that increase the risk of severe COVID-19, receipt of influenza vaccination in current or prior influenza season, and neighbourhood-level household income, persons per dwelling, proportion of persons employed as non-health essential workers, and self-identified visible minority quintiles.

^cCounts of vaccinated test-positive cases for each interval or unadjusted VE estimates are suppressed because they are either small cell counts (≤ 5 , which cannot be disclosed because of privacy and data obligations) or they could be derived using other estimates in this table.

^dDue to the small number of severe outcomes after Dose 2, we evaluated VE for the entire period (i.e., ≥ 0 days) after receipt of the second dose.

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