Supplementary Online Content

Dickerman BA, Madenci AL, Gerlovin H, et al. Comparative safety of BNT162b2 and mRNA-1273 vaccines in a nationwide cohort of US veterans. *JAMA Intern Med*. Published online June 13, 2022. doi:10.1001/jamainternmed.2022.2109
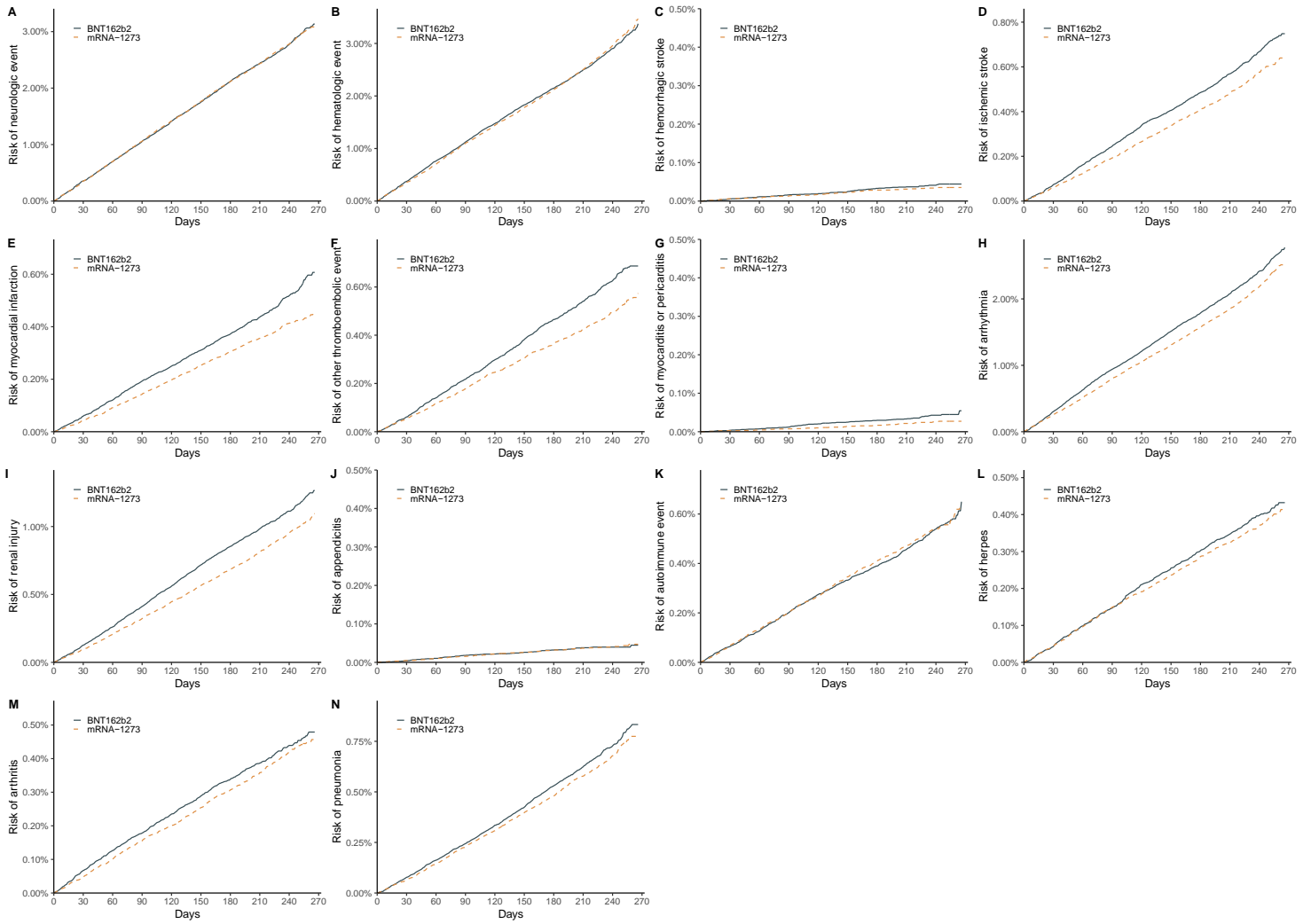
This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods. Handling Incident SARS-CoV-2 Infections

In the primary analysis, we censored individuals if and when they developed a documented SARS-CoV-2 infection and estimated a controlled direct effect of the vaccines on potential adverse events not mediated by infection. That is, these risks reflect potential complications arising only from the vaccines themselves. This estimand refers to a hypothetical population in which SARS-CoV-2 infections do not occur or are independent of the risk of the potential adverse events conditional on the measured variables and may therefore be relevant to decision-making during any future times of less frequent SARS-CoV-2 circulation.

In a secondary analysis, we ignored incident SARS-CoV-2 infections during the follow-up and estimated a total effect of the vaccines on potential adverse events through all causal pathways between the vaccines and outcomes, including those potentially mediated by infection. That is, these risks capture complications arising both from the vaccine themselves and from the incident infections that they are intended to prevent. This estimand may be relevant to decision-making during the acute phase of a pandemic in which the virus is still densely circulating.

eFigure 1. Cumulative Incidence of Potential Adverse Events (January 4–October 5, 2021)

Shaded areas represent pointwise 95% confidence intervals.
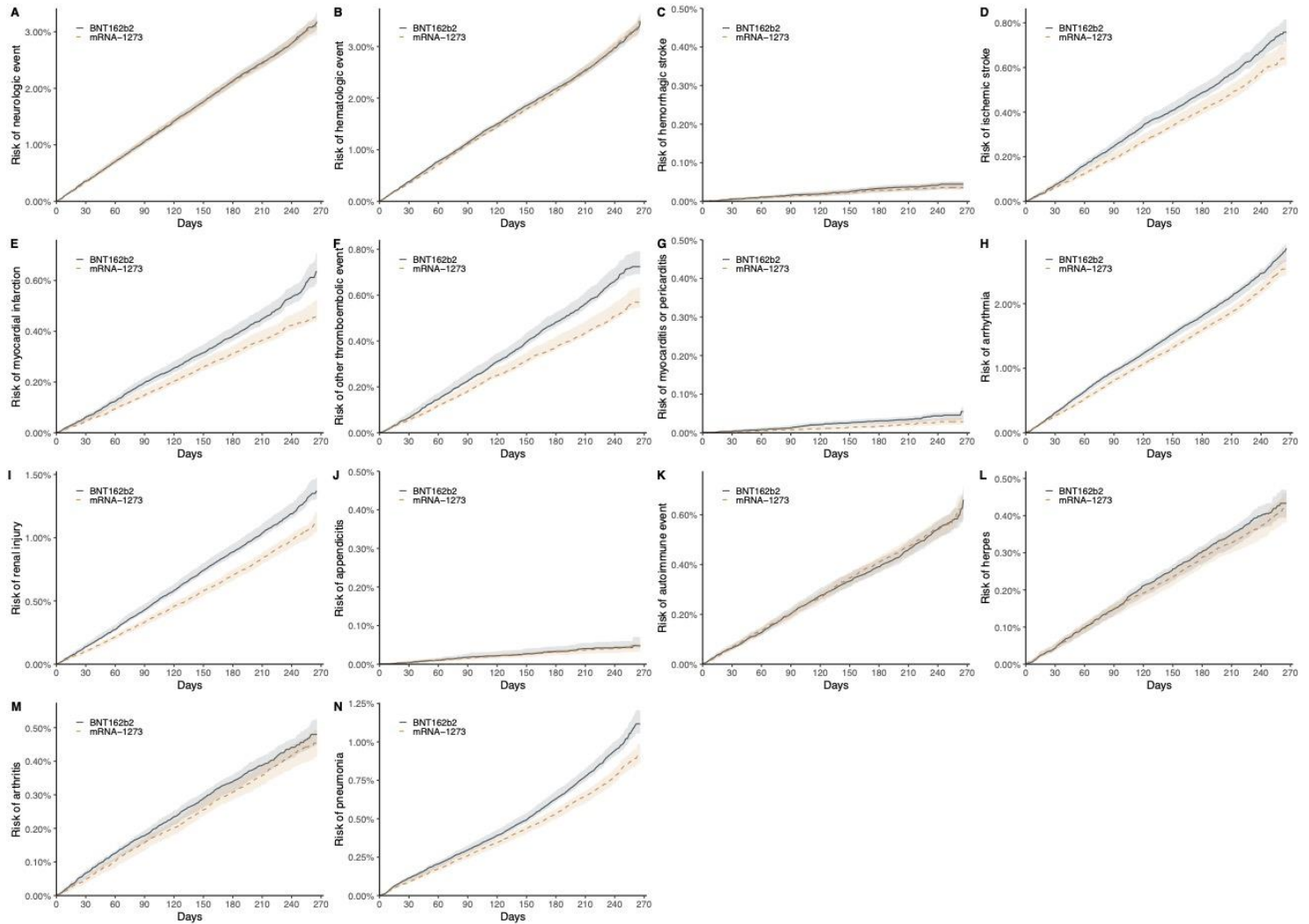
These estimated risks capture complications arising both from the vaccines themselves and from the incident infections that they are intended to prevent. Shaded areas represent pointwise 95% confidence intervals.

eTable 1. Target Trial Specification and Emulation

eTable 1. Specification and Emulation of Target Trials Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines Using Observational Data from Veterans Health Administration Electronic Health Records (January 4–October 5, 2021).

Protocol component	Target trial specification	Target trial emulation

Eligibility criteria	• Aged ≥18 years between January 4, 2021, and September 20, 2021
	• No previously documented Covid-19 vaccination
	• No interactions with the health care system in the past 3 days, which may indicate the start of symptomatic disease and preclude vaccination
	• No contraindication for Covid-19 vaccination:
	   ○ Severe allergic reaction (e.g., anaphylaxis) or immediate reaction of any severity to the vaccine or any of its components
	   ○ Immediate allergic reaction of any severity to polysorbate (due to potential cross-reactive hypersensitivity with the vaccine ingredient PEG)
	• No previously documented positive SARS-CoV-2 PCR test
	• No history of the potential adverse event of interest
	• Known residential address
	• Not in a long-term care facility
	• User of VA health care system (defined as receiving care at a station eligible to administer the vaccines under study and having at least one in-person or telehealth primary care visit in the past year)
	• Known smoking status and body mass index in the past year
		Same as for the target trial, except:
		• We identified previously documented SARS-CoV-2 infections using the VA Covid-19 National Surveillance Tool,[1] which integrates data on PCR laboratory tests with natural language processing of clinical notes to capture diagnoses inside and outside the VA system.
		• Data on the listed allergic reactions are not consistently available for all Veterans, but we assumed that receiving the vaccine indicates there was a determination of no previous allergic reaction.

Treatment strategies	(1) Receive one dose of BNT162b2 vaccine at baseline and an additional dose scheduled 21 days later, or (2) Receive one dose of mRNA-1273 vaccine at baseline and an additional dose scheduled 28 days later. Under each treatment strategy, individuals must not be diagnosed with SARS-CoV-2 infection during the follow-up.	Same as for the target trial. We defined the date of vaccination using records in both the *Immunization* domain and procedures recorded in the *Outpatient* or *Inpatient* domains. There was strict adherence to vaccine deployment protocols in this population.*

Treatment assignment	Individuals are randomly assigned to a strategy at baseline within strata defined by calendar date (5-day bins), age (5-year bins), sex (male, female), race (white, black, other, unknown), urbanicity of residence (urban, not urban), and geographic location coded as 19 categories of Veterans Integrated Services Network. Individuals will be aware of the assigned treatment strategy.	We assumed random assignment after matching individuals who were vaccinated with the BNT162b2 vaccine in a 1:1 ratio to eligible individuals vaccinated with the mRNA-1273 vaccine, using the same factors used for stratified randomization as in the target trial.
Outcomes	• *Neurologic event*: Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, vertigo • *Hematologic event:* anemia, lymphopenia, neutropenia, thrombocytopenia • Hemorrhagic stroke • Ischemic stroke • Myocardial infarction • *Other thromboembolic event:* cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine) • Myocarditis or pericarditis • Arrhythmia • Kidney injury • Appendicitis • *Autoimmune event:* Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, uveitis • *Herpes:* herpes simplex, herpes zoster • Arthritis or arthropathy • Pneumonia	Same as for the target trial. We defined diagnoses using records in *Inpatient, Outpatient,* and *Fee* domains.
Follow-up	For each person, follow-up starts on the day of vaccination (baseline) and ends on the day of the outcome of interest, censoring (due to diagnosis with SARS-CoV-2 infection), 266 days (38 weeks) after baseline, or the end of the study period (October 5, 2021), whichever happens first.	Same as for the target trial.
Causal contrasts	Intention-to-treat effect. Per-protocol effect, i.e., the effect if all individuals had received the vaccination they were assigned to at baseline and the corresponding second dose at the scheduled time.	Observational analogue of the per-protocol effect.

Statistical analysis	Cumulative incidence (risk) curves and estimates of 38-week risk, risk differences, and risk ratios comparing the vaccination groups. Subgroup analyses by baseline age and race.	Same as for the target trial.

Abbreviations: Covid-19, coronavirus disease 2019; PCR, polymerase chain reaction; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

* Among persons who received a dose of the BNT162b2 vaccine and had at least 21 days of follow-up, 98% received a second dose of the vaccine (of whom 92% received it before day 24 and 96% received it before day 28). Among persons who received a dose of the mRNA-1273 vaccine and had at least 28 days of follow-up, 98% received a second dose of the vaccine (of whom 92% received it before day 31 and 97% received it before day 35). Therefore, we defined treatment strategies based on the first dose only.

eTable 2. Study Variables

eTable 2. Variables Used in the Analysis when Emulating Target Trials Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines Using Observational Data from Veterans Health Administration Electronic Health Records (January 4–October 5, 2021).				
Variable	**Functional form**	**Values**	**Detail**	**Codes**
Time-fixed (baseline)*				
Age (years)	Linear	N/A	Based on records in the *Patient* domain.	N/A
Sex	Indicator	Male/Female	Based on records in the *Patient* domain.	N/A
Race	4 categories	White Black Other Unknown	In the case of multiple reported races, the most frequently reported race was selected. Based on records in the *Patient* domain.	N/A
Ethnicity	3 categories	Not Hispanic Hispanic Unknown	In the case of multiple reported ethnicities, the most frequently reported ethnicity was selected. Based on records in the *Patient* domain.	N/A
Veterans Integrated Services Network (VISN)	19 categories	19 VISNs representing different geographic regions of the country	Defined as the location of the most recent station utilized prior to baseline. In the case of multiple station visits on the most recent visit date prior to baseline, the station with the most visits on that day was selected. In the case of a tie, the most commonly visited station in the past year was selected among those tied. In the case of another tie, a random station was selected among those tied. Based on records in the *Outpatient* domain.	N/A

eTable 2. Variables Used in the Analysis when Emulating Target Trials Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines Using Observational Data from Veterans Health Administration Electronic Health Records (January 4–October 5, 2021).

Variable	Functional form	Values	Detail	Codes
Received care at a station that offered the BNT162b2 vaccine	Indicator	Yes/No	Defined using the history of stations utilized prior to baseline. Assessed daily. Based on records in the *Patient* domain.	N/A
Received care at a station that offered the mRNA-1273 vaccine	Indicator	Yes/No	Defined using the history of stations utilized prior to baseline. Assessed daily. Based on records in the *Patient* domain.	N/A
Primary care visit in the past year	Indicator	Yes/No	Defined as an in-person or telehealth primary care visit, based on stop codes in any position. Based on records in the *Outpatient* domain.	PCP: 301, 322, 323, 348, 350 Tele-PCP: 338
Interaction with health care system within the past 3 days	Indicator	Yes/No	Defined as a primary care, inpatient, or emergency room visit, based on stop codes in the primary position. Assessed daily. Based on records in the *Inpatient* and *Outpatient* domains.	PCP: 301, 322, 323, 348, 350 ER: 1, 101, 130, 131
In long-term care within the past 2 years	Indicator	Yes/No	Includes admissions and inpatient transfers to or from a community living center (nursing home or domiciliary) or non-VA community nursing home. Based on records in the *Inpatient* and *Fee* domains.	Inpatient sources: AdmitSourceName, PlaceOfAdmit, MedicalService, Specialty, BedSection *Fee* domain: FeePurposeOfVisit or AustinCode in 40-44 or 89
Known residential address in the past year	Indicator	Yes/No	Based on Homeless Services Registry algorithm codes,	Stop codes: 504, 507, 508, 511, 522, 528, 529, 530, 590, 591, 592

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Variable	Functional form	Values	Detail	Codes
			using stop codes, specialty codes, ICD10 diagnosis codes, and adjudicated health factor codes. Based on records in the *Inpatient, Outpatient, Fee*, and *Health Factors* domains.	Specialty codes: 25-29, 37-39, 85, 86, 88, 109-111 ICD10: V60.0, Z59.0
Urban residence	Indicator	Yes/No	Defined as having an address with a GIS zip code considered to be urban. Based on records in the *Patient* domain.	N/A
Number of influenza vaccinations in the past 5 years	4 categories	0 1-2 3-4 ≥5	Based on records in the *Immunization* domain.	CVX codes: 15-17, 69, 88, 111, 123, 125-128, 135, 140, 141, 144, 149-151, 153, 155, 158, 160, 161, 166, 168, 171, 185, 186, 194, 197, 200-202, 205
Number of primary care visits in the past 5 years	4 categories	1-9 10-19 20-29 ≥30	Defined using stop codes, with PCP or Tele-PCP in the primary position, or in the secondary position if the primary position had a Tele-PCP combo stop code. Based on records in the *Outpatient* domain.	PCP: 301, 322, 323, 348, 350 Tele-PCP: 338 Tele-PCP combo: 147, 182, 324, 326, 683
Body mass index (kg/m^2)	Linear	N/A	Calculated using the most recent height and weight measurements. Based on records in the *Vital Signs* domain.	N/A
Obesity (body mass index ≥30 kg/m^2)	Indicator	Yes/No	Based on the most recent body mass index in the past year. Based on records in the *Vital Signs* domain.	N/A

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Variable	Functional form	Values	Detail	Codes
Smoking status	3 categories	Never Current Former	Defined as the most common self-reported smoking status prior to baseline. Based on records in the *Health Factors* domain.	
Chronic lung disease	Indicator	Yes/No	A flag for at least one of the following conditions: asthma, bronchitis, chronic obstructive pulmonary disorder. Each component described below is based on records in the *Inpatient, Outpatient,* and *Fee* domains.	See below
Asthma	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: J45.%
Bronchitis	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: J20.%, J21.%, J40.%, J41.%, J42.%
Chronic obstructive pulmonary disorder	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: J41.0%, J41.1%, J41.8%, J42.%, J43.0%, J43.1%, J43.2%, J43.8%, J43.9%, J44.0%, J44.1%, J44.9%
Cardiovascular disease	Indicator	Yes/No	A flag for at least one of the following conditions: acute myocardial infarction, cardiomyopathy, cerebrovascular accident, coronary heart disease, heart failure, peripheral vascular disease. Each component described below is based on records in the *Inpatient, Outpatient,* and *Fee* domains.	See below

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Variable	Functional form	Values	Detail	Codes
Acute myocardial infarction	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: I21.% (not including I21.A%), I22.%
Cardiomyopathy	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: I42.%, I43.%
Cerebrovascular accident	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: I60.%-I69.%, G45.%, G46.%, H34.0
Coronary heart disease	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: I20.%, I21.%, I24.%, I25.10, I25.110, I25.2, I25.3, I25.41, I25.42, I25.5, I25.700, I25.710, I25.720, I25.730, I25.750, I25.760, I25.790, I25.810, I25.811, I25.812, I25.82, I25.83, I25.84, I25.89, I25.9
Heart failure	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: I11.0, I13.0, I13.2, I50.20, I50.21, I50.22, I50.23, I50.30, I50.31, I50.32, I50.33, I50.40, I50.41, I50.42, I50.43, I50.814, I50.9, I50.1, I50.810, I50.811, I50.812, I50.813, I50.82, I50.83, I50.84, I50.89
Peripheral vascular disease	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years.	ICD10: I70.%, I71.%, I73.9, Z95.8, Z95.9, I73.1, I73.8, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9
Hypertension	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years. Based on records in the *Inpatient, Outpatient,* and *Fee* domains.	ICD10: I10.%-I13.%, I15.%, I16.%
Diabetes	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years. Based on records in the *Inpatient, Outpatient,* and *Fee* domains.	ICD10: E08.%, E10.%, E11.%, E13.%
Chronic kidney disease	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years. Based on records in the *Inpatient, Outpatient,* and *Fee* domains.	ICD10: I12.0, I13.1, N03.2%-N03.7%, N18.%, N19.%, N05.2%-N05.7%, N25.0, Z49.0% - Z49.2%, Z94.0, Z99.2

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Variable	Functional form	Values	Detail	Codes
Liver disease	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 2 years. Based on records in the *Inpatient, Outpatient,* and *Fee* domains.	ICD10: K72.1%, K72.9%, K76.6%, K76.7%, I85.0%, I85.9%, I86.4%, I98.2%, K70.4%, K71.1%, K76.5%
Cancer	Indicator	Yes/No	Defined as ≥2 diagnoses in the past 5 years, except non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior. Based on records in the *Inpatient, Outpatient,* and *Fee* domains.	ICD10: C00.%-C41.%, C43.%, C45.%, C47.%-C86.%, C88.%, C90.%-C96.%, C7A.%, C7B.0
Immunocompromised state	Indicator	Yes/No	Includes ever-diagnosis of human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, or use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, immunosuppressants. Based on ICD codes, procedure codes, and medication records in the *Inpatient, Outpatient,* and *Fee* domains.	Organ transplant ICD9 Dx: 996.8, 996.9, E878.0, V42.0-4, V42.6-9, V43.2; HIV ICD9 Dx: 042.%, 043.%, 044.%, 079.53, 795.71, V08.%; Organ Transplant ICD9 Proc: 00.18, 00.91-93, 07.94, 33.5%, 33.6, 37.5, 41.0%, 41.94, 46.97, 50.5%, 52.80, 52.82-86, 55.53, 55.6%, 63.53, 65.92; Organ Transplant CPT: 0585T-86T, 32851-54, 33935, 33945, 33950, 44135-7, 47135-6, 48160, 48550, 48554, 48556, 50360, 50365-6, 50370, 50380, 51580, 51585, 51597, 54680, 58240, 60510, 60512, 81595, G0341, S2052-4, S2060-1, S2065, S2102-3, S2152, T3829, T5005, T5010, T5015, T5025, T5035, T5079; Immunocompromised state ICD9 Proc: 41.0%, 0.18; Immunocompromised state CPT: 38205-15, 38230-2, 38240-1; ICD10 Dx codes were mapped from ICD9 Dx codes using 2-way GEMS mapping table and ICD10

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Variable	Functional form	Values	Detail	Codes
				proc codes were mapped using 1-way GEMS mapping table; Select meds from the following VA drug classes: HS051, MS190, IM600
Time-varying				
BNT162b2 vaccination	Indicator	Yes/No	Defined using records in both the *Immunization* domain and procedures recorded in the *Outpatient* or *Inpatient* domains.	CPT: 0001A, 0002A, 91300 CVX: 208
mRNA-1273 vaccination	Indicator	Yes/No	Defined using records in both the *Immunization* domain and procedures recorded in the *Outpatient* or *Inpatient* domains.	CPT: 0011A, 0012A, 91301 CVX: 207
Neurologic event	Indicator	Yes/No	A flag for at least one of the following conditions: Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, vertigo. Each component described below is defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	See below
Bell's palsy	Indicator	Yes/No	N/A	ICD9: 351.0 ICD10: G51.0
Non-facial paralysis	Indicator	Yes/No	N/A	ICD9: 344.9, 781.4 ICD10: G83.9, R29.5
Paresthesia	Indicator	Yes/No	N/A	ICD9: 782.0 ICD10: R20.%
Seizure	Indicator	Yes/No	N/A	ICD9: 345.% (not including 345.6%), 780.3, 780.39 ICD10: G40.% (not including G40.42, G40.B%, G40.83%), R56.9

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Variable	Functional form	Values	Detail	Codes
Syncope	Indicator	Yes/No	N/A	ICD9: 780.2, 992.1 ICD10: R55
Vertigo	Indicator	Yes/No	N/A	ICD9: 780.4 ICD10: R42
Hematologic event	Indicator	Yes/No	A flag for at least one of the following conditions: anemia, lymphopenia, neutropenia, thrombocytopenia. Each component described below is defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	See below
Anemia	Indicator	Yes/No	N/A	ICD9: 280.%, 281.%, 283.%, 284.%, 285.% (not including 285.3) ICD10: D50.%, D51.%, D52.%, D53.%, D59.%, D60.%, D61.% (not including D61.810), D62, D64.% (not including D64.4, D64.81)
Lymphocytopenia or neutropenia	Indicator	Yes/No	N/A	ICD9: 288.0% (not including 288.01), 288.5% (not including 288.59), 289.53 ICD10: D70.%, D72.81% (not including D72.818), D73.81
Thrombocytopenia	Indicator	Yes/No	N/A	ICD9: 287.3[0,1,9], 287.5 ICD10: D69.3, D69.49, D69.6
Non-traumatic intracranial hemorrhage	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 431 ICD10: I61.%
Ischemic or unspecified cerebrovascular accident	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 362.3[1,2,3], 433.[0,1,2,3,8,9]1, 434.%, 436 ICD10: H34.1%, H34.2%, I63.%, I66.%
Myocardial infarction	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 410.% ICD10: I21.%, I22.%

Variable	Functional form	Values	Detail	Codes
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Other thromboembolic event	Indicator	Yes/No	A flag for at least one of the following conditions: cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine). Each component described below is defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	See below
Cerebral venous sinus thrombosis	Indicator	Yes/No	N/A	ICD9: 437.6 ICD10: I67.6
Deep venous thrombosis or thrombophlebitis	Indicator	Yes/No	N/A	ICD9: 451.11, 451.19, 451.81, 451.83, 452, 453.[0,2,3], 453.4%, 453.8[2,4,5,6,7], 671.[3,4]% ICD10: I80.1%, I80.2% I81, I82.0, I82.1, I82.210, I82.220, I82.290, I82.3, I82.4%, I82.60%, I82.62%, I82.A1%, I82.B1%, I82.C1%, O22.3%, O87.1
Pulmonary embolism	Indicator	Yes/No	N/A	ICD9: 415.1%, 673.2%, 673.8% ICD10: I26.%, O88.2%
Other thrombosis	Indicator	Yes/No	A composite of arterial embolism and thrombosis, vascular insufficiency of the intestine.	ICD9: 444.%, 557.0, 557.9 ICD10: I74.%, K55.0%, K55.3%
Myocarditis or pericarditis	Indicator	Yes/No	A flag for at least one of the following conditions: myocarditis, pericarditis. Each component described below is defined as ≥1 diagnosis in the	See below

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Variable	Functional form	Values	Detail	Codes
			Inpatient, Outpatient, or *Fee* domain.	
Myocarditis	Indicator	Yes/No	N/A	ICD9: 391.2, 398.0, 422.%, 429.0 ICD10: I01.2, I09.0, I40.%, I41, I51.4
Pericarditis	Indicator	Yes/No	N/A	ICD9: 420.%, 423.9 ICD10: I30.%, I32, M32.12
Arrhythmia	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 426.%, 427.% ICD10: I44.%, I45.%, I46.%, I47.%, I48.% (not including I48.11, I48.2%), I49.%
Kidney injury	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 584.% ICD10: N17.%
Appendicitis	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 540.%, 541, 542 ICD10: K35.%, K36, K37
Autoimmune event	Indicator	Yes/No	A flag for at least one of the following conditions: Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, uveitis. Each component described below is defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	See below
Guillain-Barré syndrome	Indicator	Yes/No	N/A	ICD9: 357.0 ICD10: G61.0
Inflammatory bowel disease	Indicator	Yes/No	N/A	ICD9: 555.%, 556.%, 695.2 ICD10: K50.%, K51.%, K59.31, L52
Multiple sclerosis	Indicator	Yes/No	N/A	ICD9: 340 ICD10: G35
Psoriasis	Indicator	Yes/No	N/A	ICD9: 696.0, 696.1, 696.8

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Variable	Functional form	Values	Detail	Codes
				ICD10: L40.%, L44.8, L45
Rheumatoid arthritis	Indicator	Yes/No	N/A	ICD9: 714.0, 714.1, 714.2, 714.81 ICD10: M05.%, M06.%
Systemic lupus erythematosus	Indicator	Yes/No	N/A	ICD9: 373.34, 695.4, 710.0 ICD10: H01.12%, L93.%, M32.%
Uveitis	Indicator	Yes/No	N/A	ICD9: 091.5%, 098.41, 115.92, 360.12, 362.18, 363.0%, 363.1% (not including 363.14), 363.2%, 364.0%, 364.1%, 364.2%, 364.3 ICD10: A18.53, A18.54, A51.43, A54.32, H20.%, H30.%, H32, H35.06%, H44.11%
Herpes	Indicator	Yes/No	A flag for at least one of the following conditions: herpes simplex, herpes zoster. Each component described below is defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	See below
Herpes simplex	Indicator	Yes/No	N/A	ICD9: 054.% ICD10: A60.%, B00.%
Herpes zoster	Indicator	Yes/No	N/A	ICD9: 053.% ICD10: B02.%
Arthritis or arthropathy	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 713.%, 719.[0,1]%, ICD10: E08.610, E09.610, E10.610, E11.610, E13.610, M02.2%, M07.6%, M12.8%, M25.0%, M25.4%, M36.1, M36.2, M36.3, M36.4
Pneumonia	Indicator	Yes/No	Defined as ≥1 diagnosis in the *Inpatient, Outpatient,* or *Fee* domain.	ICD9: 480.%, 481, 482.%-484.%,485, 486 487.0, 488.01, 488.11, 488.81 ICD10: A37.01, A37.11, A37.81, A37.91, A48.1, B25.0, B44.0, B77.81, J09.X1, J10.00, J10.01, J10.08, J11.00, J11.08, J12.%, J13, J14, J15.%, J16.0, J16.8, J17, J18.% (not including J18.2)

eTable 2. Variables Used in the Analysis when Emulating Target Trials Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines Using Observational Data from Veterans Health Administration Electronic Health Records (January 4–October 5, 2021).

Variable	Functional form	Values	Detail	Codes
Documented infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	Indicator	Yes/No	Defined as a nasopharyngeal swab, nasal swab, or saliva sample (or respiratory sample, if hospitalized) positive for SARS-CoV-2. Identified using the VA Covid-19 National Surveillance Tool, which integrates data on laboratory tests conducted at VA clinics with natural language processing of clinical notes to capture diagnoses inside and outside the VA health care system. The algorithm to identify persons with SARS-CoV-2 infection is continually updated to ensure new annotations of Covid-19 are captured from clinical notes, with chart reviews performed periodically to validate the algorithm.[1] Based on records in the COVID-19 Shared Data Resource. The event date is the specimen collection date.	N/A
Death	Indicator	Yes/No	Based on records in the *Patient* domain.	N/A
* Baseline variables were assessed on January 4, 2021, unless otherwise noted.				

eTable 3. Baseline Characteristics of Eligible vs. Matched Vaccinated Persons

eTable 3. Baseline Characteristics of Eligible vs. Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration.*		
Characteristic	**Eligible (N=770,107)**	**Matched (N=433,672)**
Median age (IQR) – yr	69.0 [59.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	41,892 (5)	18,670 (4)
40 to 49 years	49,626 (6)	24,788 (6)
50 to 59 years	107,345 (14)	60,764 (14)
60 to 69 years	196,749 (26)	115,498 (27)
70 to 79 years	286,799 (37)	168,754 (39)
≥80 years	87,696 (11)	45,198 (10)
Sex – no. (%)		
Male	700,392 (91)	401,816 (93)
Female	69,715 (9)	31,856 (7)
Race – no. (%)		
Black	160,758 (21)	86,904 (20)
Other	21,367 (3)	8,404 (2)
Unknown	29,971 (4)	13,158 (3)
White	558,011 (72)	325,206 (75)
Ethnicity – no. (%)		
Hispanic	59,541 (8)	35,216 (8)
Not Hispanic	686,841 (89)	386,116 (89)
Unknown	23,725 (3)	12,340 (3)
Urban residence – no. (%)	541,298 (70)	315,910 (73)
Smoking status – no. (%)		
Current	261,951 (34)	148,065 (34)
Former	240,913 (31)	135,841 (31)
Never	267,243 (35)	149,766 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	131,533 (17)	74,506 (17)
Cardiovascular disease‡	206,137 (27)	118,419 (27)
Hypertension	487,115 (63)	278,039 (64)
Diabetes	266,447 (35)	152,233 (35)
Chronic kidney disease	75,703 (10)	42,582 (10)
Liver disease	2,686 (<1)	1,588 (<1)
Cancer§	101,418 (13)	59,178 (14)
Immunocompromised state¶	59,969 (8)	34,134 (8)
Obesity‖	358,574 (47)	202,092 (47)

eTable 3. Baseline Characteristics of Eligible vs. Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration.*		
No. of primary care visits in the past 5 years – no. (%)		
1-9	102,997 (13)	56,145 (13)
10-19	255,676 (33)	142,969 (33)
20-29	188,628 (24)	107,494 (25)
≥30	222,806 (29)	127,064 (29)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	107,985 (14)	59,621 (14)
1 or 2	139,821 (18)	77,312 (18)
3 or 4	241,533 (31)	136,230 (31)
≥5	280,768 (36)	160,509 (37)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

eTable 4. Baseline Characteristics of Matched Vaccinated Persons for Each Outcome-Specific Analysis

eTable 4A. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Neurologic Events, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=116,985)**	**mRNA-1273 recipients (N=116,985)**
Median age (IQR) – yr	69.0 [59.0, 74.0]	69.0 [59.0, 74.0]
Age group, no. (%)		
18 to 39 years	6,193 (5)	6,193 (5)
40 to 49 years	7,153 (6)	7,153 (6)
50 to 59 years	16,651 (14)	16,651 (14)
60 to 69 years	30,108 (26)	30,108 (26)
70 to 79 years	44,884 (38)	44,884 (38)
≥80 years	11,996 (10)	11,996 (10)
Sex – no. (%)		
Male	109,967 (94)	109,967 (94)
Female	7,018 (6)	7,018 (6)
Race – no. (%)		
Black	22,170 (19)	22,170 (19)
Other	2,154 (2)	2,154 (2)
Unknown	3,784 (3)	3,784 (3)
White	88,877 (76)	88,877 (76)
Ethnicity – no. (%)		
Hispanic	7,691 (7)	10,597 (9)
Not Hispanic	105,999 (91)	103,016 (88)
Unknown	3,295 (3)	3,372 (3)
Urban residence – no. (%)	85,615 (73)	85,615 (73)
Smoking status – no. (%)		
Current	36,581 (31)	39,647 (34)
Former	38,470 (33)	36,015 (31)
Never	41,934 (36)	41,323 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	16,375 (14)	17,852 (15)
Cardiovascular disease‡	26,316 (22)	26,609 (23)
Hypertension	70,301 (60)	72,085 (62)
Diabetes	36,545 (31)	39,982 (34)
Chronic kidney disease	9,649 (8)	10,282 (9)
Liver disease	356 (<1)	331 (<1)
Cancer§	14,616 (12)	13,948 (12)
Immunocompromised state¶	7,642 (7)	7,474 (6)
Obesity‖	54,378 (46)	54,657 (47)

eTable 4A. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Neurologic Events, Veterans Health Administration.*		
No. of primary care visits in the past 5 years – no. (%)		
1-9	23,798 (20)	19,970 (17)
10-19	45,851 (39)	44,824 (38)
20-29	25,997 (22)	27,872 (24)
≥30	21,339 (18)	24,319 (21)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	17,073 (15)	16,699 (14)
1 or 2	24,214 (21)	23,687 (20)
3 or 4	37,901 (32)	38,203 (33)
≥5	37,797 (32)	38,396 (33)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

eTable 4B. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Hematologic Events, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=139,507)**	**mRNA-1273 recipients (N=139,507)**
Median age (IQR) – yr	68.0 [58.0, 74.0]	68.0 [58.0, 74.0]
Age group, no. (%)		
18 to 39 years	7,933 (6)	7,933 (6)
40 to 49 years	9,790 (7)	9,790 (7)
50 to 59 years	21,979 (16)	21,979 (16)
60 to 69 years	37,416 (27)	37,416 (27)
70 to 79 years	50,884 (36)	50,884 (36)
≥80 years	11,505 (8)	11,505 (8)
Sex – no. (%)		
Male	130,415 (93)	130,415 (93)
Female	9,092 (7)	9,092 (7)
Race – no. (%)		
Black	24,258 (17)	24,258 (17)
Other	2,784 (2)	2,784 (2)
Unknown	4,352 (3)	4,352 (3)
White	108,113 (77)	108,113 (77)
Ethnicity – no. (%)		
Hispanic	9,821 (7)	13,296 (10)
Not Hispanic	125,740 (90)	122,305 (88)
Unknown	3,946 (3)	3,906 (3)
Urban residence – no. (%)	100,658 (72)	100,658 (72)
Smoking status – no. (%)		
Current	46,344 (33)	50,323 (36)
Former	44,330 (32)	41,226 (30)
Never	48,833 (35)	47,958 (34)
Coexisting conditions – no. (%)		
Chronic lung disease†	20,002 (14)	22,226 (16)
Cardiovascular disease‡	31,127 (22)	31,537 (23)
Hypertension	81,727 (59)	84,721 (61)
Diabetes	41,647 (30)	46,276 (33)
Chronic kidney disease	7,899 (6)	8,565 (6)
Liver disease	149 (<1)	118 (<1)
Cancer§	15,180 (11)	14,275 (10)
Immunocompromised state¶	8,007 (6)	7,819 (6)
Obesity‖	67,125 (48)	67,840 (49)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4B. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Hematologic Events, Veterans Health Administration.*		
1-9	25,381 (18)	20,638 (15)
10-19	52,283 (37)	50,669 (36)
20-29	32,811 (24)	34,808 (25)
≥30	29,032 (21)	33,392 (24)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	20,651 (15)	20,525 (15)
1 or 2	28,485 (20)	27,542 (20)
3 or 4	44,990 (32)	44,881 (32)
≥5	45,381 (33)	46,559 (33)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

	BNT162b2 recipients (N=215,754)	mRNA-1273 recipients (N=215,754)
eTable 4C. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Hemorrhagic Stroke, Veterans Health Administration.*		
Characteristic		
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	9,319 (4)	9,319 (4)
40 to 49 years	12,370 (6)	12,370 (6)
50 to 59 years	30,251 (14)	30,251 (14)
60 to 69 years	57,426 (27)	57,426 (27)
70 to 79 years	83,914 (39)	83,914 (39)
≥80 years	22,474 (10)	22,474 (10)
Sex – no. (%)		
Male	199,899 (93)	199,899 (93)
Female	15,855 (7)	15,855 (7)
Race – no. (%)		
Black	43,178 (20)	43,178 (20)
Other	4,173 (2)	4,173 (2)
Unknown	6,551 (3)	6,551 (3)
White	161,852 (75)	161,852 (75)
Ethnicity – no. (%)		
Hispanic	14,769 (7)	20,335 (9)
Not Hispanic	194,797 (90)	189,276 (88)
Unknown	6,188 (3)	6,143 (3)
Urban residence – no. (%)	157,116 (73)	157,116 (73)
Smoking status – no. (%)		
Current	70,739 (33)	76,282 (35)
Former	69,633 (32)	65,595 (30)
Never	75,382 (35)	73,877 (34)
Coexisting conditions – no. (%)		
Chronic lung disease†	35,461 (16)	38,652 (18)
Cardiovascular disease‡	58,371 (27)	58,414 (27)
Hypertension	136,366 (63)	139,744 (65)
Diabetes	72,427 (34)	78,573 (36)
Chronic kidney disease	20,647 (10)	21,655 (10)
Liver disease	805 (<1)	762 (<1)
Cancer§	30,091 (14)	28,491 (13)
Immunocompromised state¶	17,205 (8)	16,771 (8)
Obesity‖	100,228 (46)	100,892 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4C. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Hemorrhagic Stroke, Veterans Health Administration.*		
1-9	30,901 (14)	25,338 (12)
10-19	72,273 (33)	70,139 (33)
20-29	52,378 (24)	54,574 (25)
≥30	60,202 (28)	65,703 (30)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	29,678 (14)	29,454 (14)
1 or 2	38,947 (18)	37,925 (18)
3 or 4	67,893 (31)	68,029 (32)
≥5	79,236 (37)	80,346 (37)

Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.

* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.

† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.

‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.

§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.

¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.

|| Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.

eTable 4D. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Ischemic Stroke, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=196,131)**	**mRNA-1273 recipients (N=196,131)**
Median age (IQR) – yr	69.0 [59.0, 74.0]	69.0 [59.0, 74.0]
Age group, no. (%)		
18 to 39 years	9,229 (5)	9,229 (5)
40 to 49 years	12,082 (6)	12,082 (6)
50 to 59 years	28,780 (15)	28,780 (15)
60 to 69 years	52,214 (27)	52,214 (27)
70 to 79 years	74,479 (38)	74,479 (38)
≥80 years	19,347 (10)	19,347 (10)
Sex – no. (%)		
Male	181,185 (92)	181,185 (92)
Female	14,946 (8)	14,946 (8)
Race – no. (%)		
Black	39,030 (20)	39,030 (20)
Other	3,802 (2)	3,802 (2)
Unknown	6,018 (3)	6,018 (3)
White	147,281 (75)	147,281 (75)
Ethnicity – no. (%)		
Hispanic	13,566 (7)	18,696 (10)
Not Hispanic	177,029 (90)	171,830 (88)
Unknown	5,536 (3)	5,605 (3)
Urban residence – no. (%)	142,988 (73)	142,988 (73)
Smoking status – no. (%)		
Current	63,303 (32)	68,597 (35)
Former	63,145 (32)	59,266 (30)
Never	69,683 (36)	68,268 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	30,863 (16)	33,819 (17)
Cardiovascular disease‡	45,944 (23)	46,552 (24)
Hypertension	120,565 (61)	124,140 (63)
Diabetes	63,476 (32)	69,154 (35)
Chronic kidney disease	17,279 (9)	18,147 (9)
Liver disease	714 (<1)	678 (<1)
Cancer§	26,637 (14)	25,245 (13)
Immunocompromised state¶	15,039 (8)	14,615 (7)
Obesity‖	92,080 (47)	92,509 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4D. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Ischemic Stroke, Veterans Health Administration.*		
1-9	29,708 (15)	24,335 (12)
10-19	67,939 (35)	65,812 (34)
20-29	47,416 (24)	49,683 (25)
≥30	51,068 (26)	56,301 (29)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	27,501 (14)	27,412 (14)
1 or 2	36,445 (19)	35,408 (18)
3 or 4	61,796 (32)	61,853 (32)
≥5	70,389 (36)	71,458 (36)

Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.

* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.

† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.

‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.

§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.

¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.

|| Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.

eTable 4E. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Myocardial Infarction, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=203,068)**	**mRNA-1273 recipients (N=203,068)**
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	9,293 (5)	9,293 (5)
40 to 49 years	12,218 (6)	12,218 (6)
50 to 59 years	29,236 (14)	29,236 (14)
60 to 69 years	53,819 (27)	53,819 (27)
70 to 79 years	77,569 (38)	77,569 (38)
≥80 years	20,933 (10)	20,933 (10)
Sex – no. (%)		
Male	187,532 (92)	187,532 (92)
Female	15,536 (8)	15,536 (8)
Race – no. (%)		
Black	41,122 (20)	41,122 (20)
Other	3,956 (2)	3,956 (2)
Unknown	6,214 (3)	6,214 (3)
White	151,776 (75)	151,776 (75)
Ethnicity – no. (%)		
Hispanic	13,963 (7)	19,321 (10)
Not Hispanic	183,325 (90)	177,961 (88)
Unknown	5,780 (3)	5,786 (3)
Urban residence – no. (%)	148,444 (73)	148,444 (73)
Smoking status – no. (%)		
Current	65,475 (32)	70,749 (35)
Former	65,365 (32)	61,619 (30)
Never	72,228 (36)	70,700 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	31,934 (16)	34,996 (17)
Cardiovascular disease‡	48,002 (24)	48,302 (24)
Hypertension	125,887 (62)	129,183 (64)
Diabetes	66,256 (33)	72,389 (36)
Chronic kidney disease	17,912 (9)	19,154 (9)
Liver disease	757 (<1)	712 (<1)
Cancer§	27,846 (14)	26,376 (13)
Immunocompromised state¶	15,698 (8)	14,901 (7)
Obesity‖	94,761 (47)	95,331 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4E. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Myocardial Infarction, Veterans Health Administration.*		
1-9	30,419 (15)	24,840 (12)
10-19	69,735 (34)	67,366 (33)
20-29	49,159 (24)	51,562 (25)
≥30	53,755 (26)	59,300 (29)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	28,213 (14)	27,982 (14)
1 or 2	37,340 (18)	36,404 (18)
3 or 4	64,389 (32)	64,278 (32)
≥5	73,126 (36)	74,404 (37)

Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.

eTable 4F. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Other Thromboembolic Events, Veterans Health Administration.*	BNT162b2 recipients (N=201,063)	mRNA-1273 recipients (N=201,063)
Characteristic		
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	9,156 (5)	9,156 (5)
40 to 49 years	11,966 (6)	11,966 (6)
50 to 59 years	28,782 (14)	28,782 (14)
60 to 69 years	53,330 (27)	53,330 (27)
70 to 79 years	77,176 (38)	77,176 (38)
≥80 years	20,653 (10)	20,653 (10)
Sex – no. (%)		
Male	186,003 (93)	186,003 (93)
Female	15,060 (7)	15,060 (7)
Race – no. (%)		
Black	40,293 (20)	40,293 (20)
Other	3,958 (2)	3,958 (2)
Unknown	6,156 (3)	6,156 (3)
White	150,656 (75)	150,656 (75)
Ethnicity – no. (%)		
Hispanic	14,007 (7)	19,261 (10)
Not Hispanic	181,411 (90)	176,076 (88)
Unknown	5,645 (3)	5,726 (3)
Urban residence – no. (%)	146,617 (73)	146,617 (73)
Smoking status – no. (%)		
Current	65,054 (32)	70,421 (35)
Former	64,794 (32)	61,002 (30)
Never	71,215 (35)	69,640 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	31,590 (16)	34,576 (17)
Cardiovascular disease‡	51,723 (26)	51,601 (26)
Hypertension	125,897 (63)	128,995 (64)
Diabetes	66,571 (33)	72,151 (36)
Chronic kidney disease	18,121 (9)	19,010 (9)
Liver disease	642 (<1)	597 (<1)
Cancer§	26,891 (13)	25,453 (13)
Immunocompromised state¶	15,236 (8)	14,583 (7)
Obesity‖	93,261 (46)	93,818 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4F. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Other Thromboembolic Events, Veterans Health Administration.*

1-9	30,032 (15)	24,763 (12)
10-19	69,641 (35)	67,103 (33)
20-29	48,859 (24)	51,075 (25)
≥30	52,531 (26)	58,122 (29)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	28,029 (14)	27,807 (14)
1 or 2	37,120 (18)	35,985 (18)
3 or 4	63,612 (32)	63,741 (32)
≥5	72,302 (36)	73,530 (37)

Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.

* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.

† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.

‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.

§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.

¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.

|| Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.

eTable 4G. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Myocarditis or Pericarditis, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=214,782)**	**mRNA-1273 recipients (N=214,782)**
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	9,287 (4)	9,287 (4)
40 to 49 years	12,294 (6)	12,294 (6)
50 to 59 years	30,155 (14)	30,155 (14)
60 to 69 years	57,173 (27)	57,173 (27)
70 to 79 years	83,527 (39)	83,527 (39)
≥80 years	22,346 (10)	22,346 (10)
Sex – no. (%)		
Male	199,005 (93)	199,005 (93)
Female	15,777 (7)	15,777 (7)
Race – no. (%)		
Black	43,017 (20)	43,017 (20)
Other	4,165 (2)	4,165 (2)
Unknown	6,532 (3)	6,532 (3)
White	161,068 (75)	161,068 (75)
Ethnicity – no. (%)		
Hispanic	14,704 (7)	20,355 (9)
Not Hispanic	194,034 (90)	188,336 (88)
Unknown	6,044 (3)	6,091 (3)
Urban residence – no. (%)	156,455 (73)	156,455 (73)
Smoking status – no. (%)		
Current	70,434 (33)	76,175 (35)
Former	69,351 (32)	65,217 (30)
Never	74,997 (35)	73,390 (34)
Coexisting conditions – no. (%)		
Chronic lung disease†	35,077 (16)	38,380 (18)
Cardiovascular disease‡	58,290 (27)	58,112 (27)
Hypertension	135,717 (63)	139,201 (65)
Diabetes	71,960 (34)	78,422 (37)
Chronic kidney disease	20,385 (9)	21,451 (10)
Liver disease	810 (<1)	758 (<1)
Cancer§	30,003 (14)	28,219 (13)
Immunocompromised state¶	17,019 (8)	16,405 (8)
Obesity‖	99,768 (46)	100,288 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4G. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Myocarditis or Pericarditis, Veterans Health Administration.*		
1-9	30,721 (14)	25,303 (12)
10-19	72,263 (34)	69,929 (33)
20-29	52,100 (24)	54,235 (25)
≥30	59,698 (28)	65,315 (30)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	29,640 (14)	29,553 (14)
1 or 2	38,900 (18)	37,973 (18)
3 or 4	67,713 (32)	67,642 (31)
≥5	78,529 (37)	79,614 (37)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

eTable 4H. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Arrhythmia, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=138,719)**	**mRNA-1273 recipients (N=138,719)**
Median age (IQR) – yr	67.0 [57.0, 73.0]	67.0 [57.0, 73.0]
Age group, no. (%)		
18 to 39 years	8,286 (6)	8,286 (6)
40 to 49 years	10,345 (7)	10,345 (7)
50 to 59 years	23,383 (17)	23,383 (17)
60 to 69 years	38,820 (28)	38,820 (28)
70 to 79 years	47,884 (35)	47,884 (35)
≥80 years	10,001 (7)	10,001 (7)
Sex – no. (%)		
Male	126,989 (92)	126,989 (92)
Female	11,730 (8)	11,730 (8)
Race – no. (%)		
Black	29,883 (22)	29,883 (22)
Other	2,847 (2)	2,847 (2)
Unknown	4,428 (3)	4,428 (3)
White	101,561 (73)	101,561 (73)
Ethnicity – no. (%)		
Hispanic	10,661 (8)	14,657 (11)
Not Hispanic	124,177 (90)	120,141 (87)
Unknown	3,881 (3)	3,921 (3)
Urban residence – no. (%)	102,002 (74)	102,002 (74)
Smoking status – no. (%)		
Current	46,838 (34)	50,558 (36)
Former	42,039 (30)	39,198 (28)
Never	49,842 (36)	48,963 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	18,775 (14)	20,669 (15)
Cardiovascular disease‡	25,090 (18)	25,085 (18)
Hypertension	79,915 (58)	82,157 (59)
Diabetes	42,172 (30)	46,304 (33)
Chronic kidney disease	9,600 (7)	10,358 (7)
Liver disease	441 (<1)	378 (<1)
Cancer§	16,539 (12)	15,732 (11)
Immunocompromised state¶	8,985 (6)	8,651 (6)
Obesity‖	64,515 (47)	64,879 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4H. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Arrhythmia, Veterans Health Administration.*		
1-9	24,877 (18)	20,433 (15)
10-19	52,198 (38)	50,371 (36)
20-29	32,428 (23)	34,622 (25)
≥30	29,216 (21)	33,293 (24)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	21,276 (15)	21,044 (15)
1 or 2	28,515 (21)	27,884 (20)
3 or 4	44,429 (32)	44,449 (32)
≥5	44,499 (32)	45,342 (33)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

eTable 4l. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Kidney Injury, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=178,804)**	**mRNA-1273 recipients (N=178,804)**
Median age (IQR) – yr	68.0 [59.0, 74.0]	68.0 [59.0, 74.0]
Age group, no. (%)		
18 to 39 years	9,014 (5)	9,014 (5)
40 to 49 years	11,658 (7)	11,658 (7)
50 to 59 years	27,194 (15)	27,194 (15)
60 to 69 years	47,983 (27)	47,983 (27)
70 to 79 years	65,907 (37)	65,907 (37)
≥80 years	16,248 (9)	16,248 (9)
Sex – no. (%)		
Male	163,475 (92)	163,475 (92)
Female	14,529 (8)	14,529 (8)
Race – no. (%)		
Black	34,091 (19)	34,091 (19)
Other	3,469 (2)	3,469 (2)
Unknown	5,551 (3)	5,551 (3)
White	134,893 (76)	134,893 (76)
Ethnicity – no. (%)		
Hispanic	12,526 (7)	17,218 (10)
Not Hispanic	160,388 (90)	155,673 (87)
Unknown	5,090 (3)	5,113 (3)
Urban residence – no. (%)	129,373 (73)	129,373 (73)
Smoking status – no. (%)		
Current	58,440 (33)	63,195 (36)
Former	56,438 (32)	52,937 (30)
Never	63,126 (35)	61,872 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	26,574 (15)	29,553 (17)
Cardiovascular disease‡	40,499 (23)	40,948 (23)
Hypertension	104,411 (59)	107,678 (60)
Diabetes	52,373 (29)	58,083 (33)
Chronic kidney disease	0 (0)	0 (0)
Liver disease	497 (<1)	478 (<1)
Cancer§	21,985 (12)	21,072 (12)
Immunocompromised state¶	11,442 (6)	11,338 (6)
Obesity‖	82,307 (46)	82,883 (47)
No. of primary care visits in the past 5 years – no. (%)		
1-9	29,107 (16)	23,678 (13)

eTable 4l. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Kidney Injury, Veterans Health Administration.*		
10-19	64,728 (36)	62,325 (35)
20-29	42,874 (24)	45,236 (25)
≥30	41,295 (23)	46,765 (26)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	25,835 (15)	25,505 (14)
1 or 2	34,298 (19)	33,270 (19)
3 or 4	56,812 (32)	56,670 (32)
≥5	61,059 (34)	62,559 (35)

Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.

eTable 4J. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Appendicitis, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=214,428)**	**mRNA-1273 recipients (N=214,428)**
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	9,167 (4)	9,167 (4)
40 to 49 years	12,200 (6)	12,200 (6)
50 to 59 years	30,019 (14)	30,019 (14)
60 to 69 years	57,101 (27)	57,101 (27)
70 to 79 years	83,519 (39)	83,519 (39)
≥80 years	22,422 (10)	22,422 (10)
Sex – no. (%)		
Male	198,712 (93)	198,712 (93)
Female	15,716 (7)	15,716 (7)
Race – no. (%)		
Black	43,117 (20)	43,117 (20)
Other	4,152 (2)	4,152 (2)
Unknown	6,523 (3)	6,523 (3)
White	160,636 (75)	160,636 (75)
Ethnicity – no. (%)		
Hispanic	14,597 (7)	20,070 (9)
Not Hispanic	193,777 (90)	188,252 (88)
Unknown	6,054 (3)	6,106 (3)
Urban residence – no. (%)	156,212 (73)	156,212 (73)
Smoking status – no. (%)		
Current	70,037 (33)	75,809 (35)
Former	69,317 (32)	65,251 (30)
Never	75,074 (35)	73,368 (34)
Coexisting conditions – no. (%)		
Chronic lung disease†	35,291 (16)	38,470 (18)
Cardiovascular disease‡	58,552 (27)	58,601 (27)
Hypertension	135,873 (63)	139,180 (65)
Diabetes	72,268 (34)	78,565 (37)
Chronic kidney disease	20,519 (10)	21,602 (10)
Liver disease	805 (<1)	749 (<1)
Cancer§	29,985 (14)	28,156 (13)
Immunocompromised state¶	17,098 (8)	16,510 (8)
Obesity‖	99,547 (46)	100,051 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4J. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Appendicitis, Veterans Health Administration.*		
1-9	30,733 (14)	25,273 (12)
10-19	71,955 (34)	69,324 (32)
20-29	51,889 (24)	54,374 (25)
≥30	59,851 (28)	65,457 (31)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	29,431 (14)	29,348 (14)
1 or 2	38,664 (18)	37,828 (18)
3 or 4	67,514 (31)	67,464 (31)
≥5	78,819 (37)	79,788 (37)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

Characteristic	BNT162b2 recipients (N=188,044)	mRNA-1273 recipients (N=188,044)
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	8,557 (5)	8,557 (5)
40 to 49 years	10,972 (6)	10,972 (6)
50 to 59 years	26,517 (14)	26,517 (14)
60 to 69 years	49,766 (26)	49,766 (26)
70 to 79 years	72,530 (39)	72,530 (39)
≥80 years	19,702 (10)	19,702 (10)
Sex – no. (%)		
Male	175,187 (93)	175,187 (93)
Female	12,857 (7)	12,857 (7)
Race – no. (%)		
Black	37,946 (20)	37,946 (20)
Other	3,599 (2)	3,599 (2)
Unknown	5,747 (3)	5,747 (3)
White	140,752 (75)	140,752 (75)
Ethnicity – no. (%)		
Hispanic	12,778 (7)	17,746 (9)
Not Hispanic	169,973 (90)	164,917 (88)
Unknown	5,293 (3)	5,381 (3)
Urban residence – no. (%)	137,003 (73)	137,003 (73)
Smoking status – no. (%)		
Current	61,368 (33)	66,212 (35)
Former	60,159 (32)	56,635 (30)
Never	66,517 (35)	65,197 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	29,877 (16)	32,366 (17)
Cardiovascular disease‡	50,446 (27)	50,494 (27)
Hypertension	118,116 (63)	121,434 (65)
Diabetes	62,862 (33)	68,374 (36)
Chronic kidney disease	17,409 (9)	18,305 (10)
Liver disease	671 (<1)	589 (<1)
Cancer§	25,857 (14)	24,305 (13)
Immunocompromised state¶	11,806 (6)	11,436 (6)
Obesity‖	87,325 (46)	88,033 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4K. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Autoimmune Events, Veterans Health Administration.*

eTable 4K. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Autoimmune Events, Veterans Health Administration.*		
1-9	28,348 (15)	23,453 (12)
10-19	64,666 (34)	62,604 (33)
20-29	45,317 (24)	47,517 (25)
≥30	49,713 (26)	54,470 (29)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	26,221 (14)	26,092 (14)
1 or 2	34,936 (19)	34,085 (18)
3 or 4	59,655 (32)	59,752 (32)
≥5	67,232 (36)	68,115 (36)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

Characteristic	**BNT162b2 recipients (N=193,528)**	**mRNA-1273 recipients (N=193,528)**
eTable 4L. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Herpes Zoster or Simplex, Veterans Health Administration.*		
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	8,388 (4)	8,388 (4)
40 to 49 years	10,944 (6)	10,944 (6)
50 to 59 years	27,281 (14)	27,281 (14)
60 to 69 years	51,838 (27)	51,838 (27)
70 to 79 years	75,180 (39)	75,180 (39)
≥80 years	19,897 (10)	19,897 (10)
Sex – no. (%)		
Male	180,688 (93)	180,688 (93)
Female	12,840 (7)	12,840 (7)
Race – no. (%)		
Black	38,955 (20)	38,955 (20)
Other	3,701 (2)	3,701 (2)
Unknown	5,910 (3)	5,910 (3)
White	144,962 (75)	144,962 (75)
Ethnicity – no. (%)		
Hispanic	13,093 (7)	18,282 (9)
Not Hispanic	174,931 (90)	169,806 (88)
Unknown	5,504 (3)	5,440 (3)
Urban residence – no. (%)	140,711 (73)	140,711 (73)
Smoking status – no. (%)		
Current	63,975 (33)	68,933 (36)
Former	62,436 (32)	58,747 (30)
Never	67,117 (35)	65,848 (34)
Coexisting conditions – no. (%)		
Chronic lung disease†	31,315 (16)	34,081 (18)
Cardiovascular disease‡	52,577 (27)	52,296 (27)
Hypertension	122,788 (63)	125,721 (65)
Diabetes	65,180 (34)	70,955 (37)
Chronic kidney disease	18,221 (9)	19,169 (10)
Liver disease	729 (<1)	679 (<1)
Cancer§	26,703 (14)	25,115 (13)
Immunocompromised state¶	14,511 (7)	13,958 (7)
Obesity‖	90,640 (47)	91,200 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4L. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Herpes Zoster or Simplex, Veterans Health Administration.*		
1-9	29,077 (15)	24,069 (12)
10-19	66,368 (34)	64,092 (33)
20-29	46,491 (24)	48,710 (25)
≥30	51,592 (27)	56,657 (29)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	26,961 (14)	26,925 (14)
1 or 2	35,665 (18)	34,794 (18)
3 or 4	61,279 (32)	61,341 (32)
≥5	69,623 (36)	70,468 (36)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

eTable 4M. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Arthritis, Veterans Health Administration.*

Characteristic	BNT162b2 recipients (N=198,866)	mRNA-1273 recipients (N=198,866)
Median age (IQR) – yr	69.0 [60.0, 74.0]	69.0 [60.0, 74.0]
Age group, no. (%)		
18 to 39 years	8,970 (5)	8,970 (5)
40 to 49 years	11,483 (6)	11,483 (6)
50 to 59 years	27,441 (14)	27,441 (14)
60 to 69 years	52,343 (26)	52,343 (26)
70 to 79 years	77,577 (39)	77,577 (39)
≥80 years	21,052 (11)	21,052 (11)
Sex – no. (%)		
Male	184,522 (93)	184,522 (93)
Female	14,344 (7)	14,344 (7)
Race – no. (%)		
Black	38,745 (19)	38,745 (19)
Other	3,848 (2)	3,848 (2)
Unknown	6,115 (3)	6,115 (3)
White	150,158 (76)	150,158 (76)
Ethnicity – no. (%)		
Hispanic	13,552 (7)	18,561 (9)
Not Hispanic	179,664 (90)	174,555 (88)
Unknown	5,650 (3)	5,750 (3)
Urban residence – no. (%)	144,781 (73)	144,781 (73)
Smoking status – no. (%)		
Current	65,612 (33)	70,823 (36)
Former	64,092 (32)	60,401 (30)
Never	69,162 (35)	67,642 (34)
Coexisting conditions – no. (%)		
Chronic lung disease†	32,336 (16)	35,271 (18)
Cardiovascular disease‡	53,713 (27)	53,960 (27)
Hypertension	124,527 (63)	127,802 (64)
Diabetes	65,637 (33)	71,332 (36)
Chronic kidney disease	18,525 (9)	19,390 (10)
Liver disease	711 (<1)	659 (<1)
Cancer§	27,739 (14)	26,217 (13)
Immunocompromised state¶	15,138 (8)	14,683 (7)
Obesity‖	91,121 (46)	91,439 (46)
No. of primary care visits in the past 5 years – no. (%)		
1-9	29,710 (15)	24,600 (12)

eTable 4M. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Arthritis, Veterans Health Administration.*		
10-19	68,249 (34)	66,058 (33)
20-29	47,784 (24)	50,199 (25)
≥30	53,123 (27)	58,009 (29)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	27,794 (14)	27,532 (14)
1 or 2	36,602 (18)	35,650 (18)
3 or 4	62,655 (32)	62,759 (32)
≥5	71,815 (36)	72,925 (37)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

eTable 4N. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Pneumonia, Veterans Health Administration.*		
Characteristic	**BNT162b2 recipients (N=189,989)**	**mRNA-1273 recipients (N=189,989)**
Median age (IQR) – yr	69.0 [59.0, 74.0]	69.0 [59.0, 74.0]
Age group, no. (%)		
18 to 39 years	8,909 (5)	8,909 (5)
40 to 49 years	11,571 (6)	11,571 (6)
50 to 59 years	27,646 (15)	27,646 (15)
60 to 69 years	50,073 (26)	50,073 (26)
70 to 79 years	72,573 (38)	72,573 (38)
≥80 years	19,217 (10)	19,217 (10)
Sex – no. (%)		
Male	175,968 (93)	175,968 (93)
Female	14,021 (7)	14,021 (7)
Race – no. (%)		
Black	38,476 (20)	38,476 (20)
Other	3,708 (2)	3,708 (2)
Unknown	5,941 (3)	5,941 (3)
White	141,864 (75)	141,864 (75)
Ethnicity – no. (%)		
Hispanic	13,228 (7)	18,280 (10)
Not Hispanic	171,353 (90)	166,317 (88)
Unknown	5,408 (3)	5,392 (3)
Urban residence – no. (%)	138,725 (73)	138,725 (73)
Smoking status – no. (%)		
Current	59,947 (32)	64,833 (34)
Former	61,583 (32)	57,797 (30)
Never	68,459 (36)	67,359 (35)
Coexisting conditions – no. (%)		
Chronic lung disease†	25,815 (14)	28,004 (15)
Cardiovascular disease‡	47,796 (25)	47,772 (25)
Hypertension	117,959 (62)	120,969 (64)
Diabetes	61,785 (33)	67,443 (35)
Chronic kidney disease	16,434 (9)	17,354 (9)
Liver disease	639 (<1)	605 (<1)
Cancer§	24,871 (13)	23,221 (12)
Immunocompromised state¶	12,980 (7)	12,336 (6)
Obesity‖	88,483 (47)	89,013 (47)
No. of primary care visits in the past 5 years – no. (%)		

eTable 4N. Baseline Characteristics of Matched Persons in the Target Trial Emulation Evaluating the Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines for Pneumonia, Veterans Health Administration.*		
1-9	29,636 (16)	24,464 (13)
10-19	67,345 (35)	65,253 (34)
20-29	46,084 (24)	48,388 (25)
≥30	46,924 (25)	51,884 (27)
No. of influenza vaccinations in the past 5 years – no. (%)		
0	27,176 (14)	26,957 (14)
1 or 2	35,537 (19)	34,774 (18)
3 or 4	60,409 (32)	60,473 (32)
≥5	66,867 (35)	67,785 (36)
Abbreviation: IQR, interquartile range. Percentages may not total to 100% because of rounding.		
* Persons included in this target trial emulation received a first dose of BNT162b2 or mRNA-1273 between January 4 and September 20, 2021.		
† Chronic lung disease included asthma, bronchitis, and chronic obstructive pulmonary disease.		
‡ Cardiovascular disease included acute myocardial infarction, cardiomyopathy, cerebrovascular disease, coronary heart disease, heart failure, and peripheral vascular disease.		
§ Not included here are non-melanoma skin cancer, benign neoplasms, cancers in situ, and neoplasms of uncertain behavior.		
¶ Immunocompromised state included human immunodeficiency virus infection, organ or tissue transplant, bone marrow biopsy, and use of any of the following medications (prescribed ≥2 times over the past year): systemic glucocorticoids, anti-inflammatory or anti-rheumatic agents in combination with glucocorticoids, and immunosuppressants.		
‖ Obesity was defined as a body-mass index (the weight in kilograms divided by the square of the height in meters) of 30 or greater.		

eTable 5. Secondary Analysis Without Censoring Incident SARS-CoV-2 Infections During the Follow-up: Estimated Risks of Potential Adverse Events

eTable S5. Secondary Analysis Without Censoring Incident SARS-CoV-2 Infections During the Follow-up: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

	No. of persons	No. of events		38-week risk no. of events/10,000 persons (95% CI)		Risk difference no. of events/ 10,000 persons (95% CI)	Risk ratio (95% CI)
Event		**BNT162b2**	**mRNA-1273**	**BNT162b2**	**mRNA-1273**		
Neurologic†	233,970	3,027	3,014	317.7 (305.1, 336.5)	309.6 (293.3, 321.4)	8.1 (-6.9, 33.1)	1.03 (0.98, 1.11)
Hematologic‡	279,014	3,756	3,755	347.5 (333.1, 368.8)	350.1 (331.8, 364.5)	-2.6 (-23.0, 25.4)	0.99 (0.94, 1.08)
Hemorrhagic stroke	431,508	84	70	4.5 (3.2, 5.1)	3.6 (3.0, 5.1)	0.9 (-1.3, 1.5)	1.24 (0.72, 1.44)
Ischemic stroke	392,262	1,201	1,017	75.8 (71.3, 81.5)	64.0 (60.8, 72.5)	11.8 (1.7, 17.3)	1.18 (1.02, 1.28)
Myocardial infarction	406,136	987	779	63.5 (59.0, 71.1)	46.7 (44.2, 52.4)	16.7 (9.8, 24.2)	1.36 (1.20, 1.53)
Other thromboembolic§	402,126	1,207	934	72.4 (69.1, 79.1)	58.6 (55.2, 65.2)	13.8 (6.8, 21.7)	1.24 (1.10, 1.38)
Myocarditis or pericarditis	429,564	83	51	5.5 (3.4, 6.6)	2.9 (2.1, 3.8)	2.6 (0.0, 3.7)	1.92 (1.00, 2.50)
Arrhythmia	277,438	3,087	2,752	285.8 (265.5, 294.1)	253.8 (244.4, 267.9)	32.0 (5.1, 43.4)	1.13 (1.02, 1.17)
Kidney injury	356,008	1,944	1,577	136.6 (130.7, 147.6)	112.7 (104.2, 120.3)	23.9 (15.9, 38.0)	1.21 (1.13, 1.35)
Appendicitis	428,856	86	82	4.8 (4.2, 7.0)	4.7 (3.2, 5.3)	0.1 (-0.4, 3.2)	1.02 (0.92, 1.91)
Autoimmune¶	376,088	927	943	66.0 (58.6, 72.5)	63.6 (57.9, 68.7)	2.5 (-6.9, 10.9)	1.04 (0.90, 1.17)
Herpes zoster or simplex	387,056	710	669	43.3 (39.5, 47.0)	41.8 (38.1, 46.0)	1.5 (-4.7, 6.1)	1.04 (0.90, 1.15)
Arthritis or arthropathy	397,732	809	755	48.0 (44.8, 52.4)	45.4 (41.2, 49.3)	2.6 (-2.1, 9.3)	1.06 (0.96, 1.23)
Pneumonia	379,978	1,608	1,336	111.7 (105.5, 120.6)	90.8 (86.1, 98.9)	20.9 (11.4, 29.5)	1.23 (1.12, 1.34)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

eTable 6. Secondary Analysis: Evaluating 14-Day Risk

eTable 6. Secondary Analysis: Evaluating 14-day Risk: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

Event	No. of persons	No. of events			14-day risk no. of events/10,000 persons (95% CI)			Risk difference no. of events/ 10,000 persons (95% CI)		Risk ratio (95% CI)
		BNT162b2	mRNA-1273		BNT162b2	mRNA-1273				
Neurologic†	233,970	188	185		16.1 (14.7, 19.4)	15.8 (14.0, 18.8)		0.3 (-2.5, 4.2)		1.02 (0.86, 1.29)
Hematologic‡	279,014	247	244		17.7 (15.5, 20.3)	17.5 (15.0, 19.4)		0.2 (-2.7, 3.9)		1.01 (0.86, 1.24)
Hemorrhagic stroke	431,508	3	4		0.1 (0.0, 0.3)	0.2 (0.0, 0.4)		0.0 (-0.3, 0.2)		0.75 (0.00, 4.00)
Ischemic stroke	392,262	59	57		3.0 (2.1, 3.8)	2.9 (2.4, 4.1)		0.1 (-1.3, 0.9)		1.03 (0.65, 1.35)
Myocardial infarction	406,136	54	40		2.7 (2.0, 3.5)	2.0 (1.6, 2.8)		0.7 (-0.4, 1.6)		1.35 (0.86, 1.94)
Other thromboembolic§	402,126	54	56		2.7 (2.2, 3.7)	2.8 (2.0, 3.5)		-0.1 (-0.9, 1.3)		0.96 (0.73, 1.57)
Myocarditis or pericarditis	429,564	3	3		0.1 (0.0, 0.3)	0.1 (0.0, 0.3)		0.0 (-0.2, 0.2)		1.00 (0.00, Inf)
Arrhythmia	277,438	171	172		12.3 (10.3, 14.2)	12.4 (10.1, 14.0)		-0.1 (-2.4, 3.0)		0.99 (0.82, 1.29)
Kidney injury	356,008	100	82		5.6 (4.8, 7.2)	4.6 (3.4, 5.5)		1.0 (-0.1, 3.1)		1.22 (0.97, 1.80)
Appendicitis	428,856	3	5		0.1 (0.0, 0.4)	0.2 (0.0, 0.4)		-0.1 (-0.2, 0.3)		0.60 (0.00, 7.55)
Autoimmune¶	376,088	65	51		3.5 (2.8, 4.5)	2.7 (1.9, 3.4)		0.7 (-0.1, 2.1)		1.27 (0.97, 1.99)
Herpes zoster or simplex	387,056	42	43		2.2 (1.7, 3.2)	2.2 (1.7, 3.1)		-0.1 (-1.0, 1.1)		0.98 (0.68, 1.56)
Arthritis or arthropathy	397,732	60	44		3.0 (2.3, 3.8)	2.2 (1.4, 2.8)		0.8 (-0.1, 2.0)		1.36 (0.95, 2.33)
Pneumonia	379,978	65	60		3.4 (2.5, 4.2)	3.2 (2.8, 4.5)		0.3 (-1.4, 0.9)		1.08 (0.66, 1.33)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network. Follow-up of a matched pair ended when either member developed a documented SARS-CoV-2 infection.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

eTable 7: Secondary Analysis: Evaluating 42-Day Risk

eTable 7. Secondary Analysis: Evaluating 42-day Risk: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

Event	No. of persons	No. of events			42-day risk no. of events/10,000 persons (95% CI)			Risk difference no. of events/ 10,000 persons (95% CI)		Risk ratio (95% CI)
		BNT162b2	mRNA-1273		BNT162b2	mRNA-1273				
Neurologic†	233,970	565	567		48.5 (47.0, 54.3)	48.7 (44.5, 52.3)		-0.2 (-3.4, 8.2)		1.00 (0.93, 1.18)
Hematologic‡	279,014	731	681		52.6 (47.6, 55.7)	49.0 (45.7, 53.1)		3.6 (-2.9, 7.7)		1.07 (0.94, 1.17)
Hemorrhagic stroke	431,508	15	15		0.7 (0.3, 1.1)	0.7 (0.3, 1.0)		0.0 (-0.4, 0.6)		1.00 (0.50, 2.38)
Ischemic stroke	392,262	205	168		10.5 (9.3, 11.9)	8.6 (7.7, 10.3)		1.9 (-0.3, 3.4)		1.22 (0.97, 1.42)
Myocardial infarction	406,136	167	120		8.3 (6.9, 9.3)	5.9 (5.5, 7.7)		2.3 (-0.1, 3.2)		1.39 (0.99, 1.56)
Other thromboembolic§	402,126	189	154		9.5 (8.9, 11.6)	7.7 (6.8, 9.4)		1.8 (0.2, 4.2)		1.23 (1.02, 1.59)
Myocarditis or pericarditis	429,564	12	7		0.6 (0.3, 1.0)	0.3 (0.1, 0.6)		0.2 (-0.1, 0.7)		1.72 (0.78, 5.78)
Arrhythmia	277,438	596	492		43.2 (39.0, 46.2)	35.6 (32.9, 39.8)		7.5 (1.9, 11.5)		1.21 (1.05, 1.34)
Kidney injury	356,008	315	247		17.8 (16.6, 21.0)	13.9 (12.0, 15.6)		3.8 (2.1, 8.0)		1.28 (1.14, 1.63)
Appendicitis	428,856	16	13		0.8 (0.4, 1.2)	0.6 (0.3, 1.0)		0.1 (-0.3, 0.6)		1.23 (0.62, 2.56)
Autoimmune¶	376,088	169	179		9.0 (8.3, 10.9)	9.6 (7.9, 10.6)		-0.5 (-1.5, 2.2)		0.94 (0.85, 1.27)
Herpes zoster or simplex	387,056	133	124		6.9 (5.6, 8.0)	6.4 (5.4, 7.7)		0.5 (-1.4, 1.9)		1.07 (0.80, 1.31)
Arthritis or arthropathy	397,732	182	145		9.2 (7.4, 10.1)	7.3 (5.9, 8.3)		1.9 (-0.2, 3.6)		1.25 (0.98, 1.61)
Pneumonia	379,978	206	183		10.9 (9.2, 12.3)	9.7 (8.7, 11.5)		1.2 (-1.7, 2.7)		1.13 (0.85, 1.30)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network. Follow-up of a matched pair ended when either member developed a documented SARS-CoV-2 infection.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

eTable 8. Subgroup Analysis: Among Persons <40 Years of Age

eTable 8. Subgroup Analysis Among Persons <40 Years of Age: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

	No. of persons	No. of events		38-week risk no. of events/10,000 persons (95% CI)			Risk difference no. of events/ 10,000 persons (95% CI)	Risk ratio (95% CI)
Event		**BNT162b2**	**mRNA-1273**	**BNT162b2**	**mRNA-1273**			
Neurologic†	12,386	110	120	211.2 (180.5, 286.6)	357.6 (183.4, 554.8)		-146.4 (-337.2, 66.6)	0.59 (0.39, 1.34)
Hematologic‡	15,866	72	78	160.1 (85.9, 256.9)	245.7 (85.9, 418.1)		-85.7 (-261.0, 138.1)	0.65 (0.30, 2.44)
Hemorrhagic stroke	18,638	0	0	--	--		--	--
Ischemic stroke	18,458	5	2	5.7 (1.3, 12.3)	2.3 (0.0, 6.7)		3.4 (-3.8, 10.4)	2.49 (0.34, Inf)
Myocardial infarction	18,586	5	3	5.6 (1.2, 10.1)	3.7 (0.0, 8.0)		1.9 (-4.3, 7.5)	1.50 (0.18, Inf)
Other thromboembolic§	18,312	11	11	81.3 (6.8, 232.7)	17.7 (4.4, 25.3)		63.6 (-12.5, 218.4)	4.59 (0.42, 28.33)
Myocarditis or pericarditis	18,574	5	2	6.4 (1.3, 12.1)	2.4 (0.0, 5.4)		4.0 (-1.8, 10.8)	2.66 (0.48, Inf)
Arrhythmia	16,572	40	39	60.2 (36.2, 84.9)	86.7 (35.0, 141.8)		-26.5 (-87.0, 31.8)	0.69 (0.34, 1.81)
Kidney injury	18,028	11	6	12.9 (7.9, 27.3)	7.3 (1.3, 12.8)		5.7 (-0.7, 21.5)	1.78 (0.94, 10.91)
Appendicitis	18,334	11	8	13.1 (4.1, 24.3)	9.2 (3.9, 17.3)		4.0 (-7.8, 15.9)	1.43 (0.38, 4.57)
Autoimmune¶	17,114	38	33	72.2 (27.9, 133.7)	127.3 (30.4, 310.7)		-55.1 (-265.9, 73.6)	0.57 (0.14, 2.71)
Herpes zoster or simplex	16,776	32	38	61.7 (33.9, 92.6)	50.9 (32.3, 69.6)		10.7 (-22.5, 47.5)	1.21 (0.61, 2.19)
Arthritis or arthropathy	17,940	26	12	34.7 (17.4, 129.8)	87.3 (8.1, 255.0)		-52.5 (-208.3, 102.7)	0.40 (0.12, 9.75)
Pneumonia	17,818	6	6	7.0 (4.1, 18.8)	7.0 (1.3, 10.8)		0.0 (-2.7, 14.9)	1.00 (0.67, 9.46)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network. Follow-up of a matched pair ended when either member developed a documented SARS-CoV-2 infection. The sum of events across subgroups may not equal the sum of events in the overall population because the entire analysis (including matching) was repeated after stratification of the population according to baseline characteristics.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

eTable 9. Subgroup Analysis: Among Persons 40-69 Years of Age

eTable 9. Subgroup Analysis Among Persons 40-69 Years of Age: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

Event	No. of persons	No. of events			38-week risk no. of events/10,000 persons (95% CI)			Risk difference no. of events/ 10,000 persons (95% CI)		Risk ratio (95% CI)
		BNT162b2	mRNA-1273		BNT162b2	mRNA-1273				
Neurologic†	107,824	1,346	1,322		327.5 (288.7, 355.8)	322.6 (288.2, 344.8)		4.9 (-40.0, 49.3)		1.02 (0.88, 1.17)
Hematologic‡	138,370	1,381	1,396		266.3 (249.7, 330.6)	279.3 (244.4, 317.5)		-13.0 (-49.5, 62.3)		0.95 (0.84, 1.25)
Hemorrhagic stroke	200,094	24	22		2.7 (1.9, 4.3)	2.4 (1.5, 3.6)		0.3 (-1.0, 2.1)		1.14 (0.70, 2.28)
Ischemic stroke	186,152	377	335		53.4 (48.5, 64.5)	47.7 (40.6, 54.2)		5.7 (-1.2, 19.3)		1.12 (0.98, 1.44)
Myocardial infarction	190,546	329	264		46.7 (38.2, 52.7)	33.7 (29.0, 39.2)		13.1 (2.2, 20.5)		1.39 (1.06, 1.68)
Other thromboembolic§	188,156	432	352		62.3 (53.8, 71.7)	48.9 (43.1, 57.8)		13.4 (1.6, 23.1)		1.27 (1.03, 1.51)
Myocarditis or pericarditis	199,244	30	22		11.5 (2.8, 19.5)	2.6 (1.5, 4.2)		8.8 (-0.3, 16.3)		4.36 (0.92, 7.69)
Arrhythmia	145,096	1,075	985		216.4 (183.4, 253.3)	181.0 (166.8, 208.2)		35.4 (-11.0, 69.2)		1.20 (0.94, 1.39)
Kidney injury	173,670	634	569		90.0 (87.6, 113.0)	87.6 (71.9, 103.5)		2.4 (-8.8, 34.2)		1.03 (0.91, 1.45)
Appendicitis	198,640	42	37		7.5 (3.4, 15.0)	4.4 (2.9, 5.9)		3.1 (-1.4, 11.2)		1.70 (0.73, 3.94)
Autoimmune¶	174,510	382	416		62.0 (52.3, 77.2)	71.7 (55.4, 94.0)		-9.7 (-30.3, 12.4)		0.86 (0.66, 1.20)
Herpes zoster or simplex	180,126	317	290		50.0 (40.9, 64.7)	42.2 (34.8, 50.3)		7.8 (-5.0, 23.5)		1.18 (0.89, 1.63)
Arthritis or arthropathy	182,534	417	362		61.1 (50.4, 74.1)	57.1 (44.8, 73.2)		4.0 (-15.6, 20.7)		1.07 (0.77, 1.43)
Pneumonia	178,580	434	422		73.0 (59.1, 88.9)	67.3 (55.4, 76.0)		5.7 (-10.5, 27.2)		1.09 (0.85, 1.45)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network. Follow-up of a matched pair ended when either member developed a documented SARS-CoV-2 infection. The sum of events across subgroups may not equal the sum of events in the overall population because the entire analysis (including matching) was repeated after stratification of the population according to baseline characteristics.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

eTable 10. Subgroup Analysis: Among Persons ≥70 Years of Age

eTable 10. Subgroup Analysis Among Persons ≥70 Years of Age: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

Event	No. of persons	No. of events			38-week risk no. of events/10,000 persons (95% CI)			Risk difference no. of events/ 10,000 persons (95% CI)		Risk ratio (95% CI)
		BNT162b2	mRNA-1273		BNT162b2	mRNA-1273				
Neurologic†	113,760	1,561	1,514		318.4 (300.3, 339.8)	300.4 (287.3, 319.8)		18.0 (-9.5, 40.8)		1.06 (0.97, 1.14)
Hematologic‡	124,778	2,201	2,234		412.3 (387.6, 428.6)	410.9 (399.2, 442.5)		1.4 (-41.4, 17.4)		1.00 (0.91, 1.04)
Hemorrhagic stroke	212,776	47	45		4.8 (3.5, 6.4)	4.5 (3.8, 6.8)		0.3 (-2.4, 1.8)		1.06 (0.63, 1.44)
Ischemic stroke	187,652	811	655		97.8 (88.1, 103.1)	82.3 (75.1, 90.5)		15.5 (3.2, 23.2)		1.19 (1.04, 1.30)
Myocardial infarction	197,004	619	513		73.8 (69.1, 84.0)	60.7 (53.4, 64.5)		13.0 (7.6, 27.4)		1.21 (1.12, 1.50)
Other thromboembolic§	195,658	720	580		81.8 (75.5, 87.8)	68.9 (60.9, 73.7)		12.9 (5.3, 24.6)		1.19 (1.07, 1.39)
Myocarditis or pericarditis	211,746	43	24		4.2 (2.9, 5.6)	2.6 (1.6, 3.8)		1.7 (0.0, 3.3)		1.65 (1.01, 2.86)
Arrhythmia	115,770	1,790	1,664		353.0 (335.4, 371.3)	329.9 (316.5, 353.8)		23.2 (-5.4, 43.3)		1.07 (0.98, 1.14)
Kidney injury	164,310	1,151	928		156.6 (150.6, 170.7)	132.2 (122.5, 143.2)		24.4 (11.7, 42.6)		1.18 (1.08, 1.33)
Appendicitis	211,882	38	23		3.9 (3.1, 5.5)	2.4 (2.0, 4.7)		1.5 (-0.9, 2.7)		1.61 (0.78, 2.23)
Autoimmune¶	184,464	494	475		69.2 (58.2, 75.0)	61.4 (54.6, 67.2)		7.8 (-5.7, 15.9)		1.13 (0.92, 1.29)
Herpes zoster or simplex	190,154	327	337		38.6 (35.0, 44.1)	40.4 (35.8, 45.5)		-1.8 (-8.7, 5.9)		0.96 (0.80, 1.16)
Arthritis or arthropathy	197,258	362	371		42.8 (36.7, 46.6)	42.3 (36.0, 45.3)		0.6 (-6.4, 7.5)		1.01 (0.85, 1.20)
Pneumonia	183,580	831	726		103.3 (94.0, 109.2)	93.1 (85.9, 102.0)		10.2 (-3.5, 18.6)		1.11 (0.97, 1.21)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network. Follow-up of a matched pair ended when either member developed a documented SARS-CoV-2 infection. The sum of events across subgroups may not equal the sum of events in the overall population because the entire analysis (including matching) was repeated after stratification of the population according to baseline characteristics.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

eTable 11. Subgroup Analysis: Among Persons of Black Race

eTable 11. Subgroup Analysis Among Persons of Black Race: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

Event	No. of persons	No. of events		38-week risk no. of events/10,000 persons (95% CI)		Risk difference no. of events/ 10,000 persons (95% CI)	Risk ratio (95% CI)
		BNT162b2	mRNA-1273	BNT162b2	mRNA-1273		
Neurologic†	44,340	560	524	324.7 (296.6, 371.5)	294.1 (275.3, 344.1)	30.6 (-25.4, 77.9)	1.10 (0.93, 1.27)
Hematologic‡	48,516	735	701	395.0 (344.0, 440.6)	405.6 (347.7, 456.0)	-10.6 (-84.2, 68.4)	0.97 (0.81, 1.18)
Hemorrhagic stroke	86,356	16	12	4.6 (2.3, 7.1)	3.3 (2.1, 7.2)	1.3 (-3.4, 3.5)	1.41 (0.45, 2.43)
Ischemic stroke	78,060	222	221	75.8 (62.2, 84.3)	77.0 (63.6, 88.3)	-1.2 (-20.5, 13.2)	0.98 (0.76, 1.20)
Myocardial infarction	82,244	174	119	52.9 (46.2, 71.2)	32.8 (28.6, 41.6)	20.1 (9.6, 38.6)	1.61 (1.25, 2.26)
Other thromboembolic§	80,586	295	189	95.8 (80.2, 105.8)	57.1 (51.1, 71.0)	38.7 (15.8, 49.0)	1.68 (1.23, 1.91)
Myocarditis or pericarditis	86,034	14	9	3.4 (1.3, 5.0)	3.4 (1.5, 6.6)	0.0 (-3.8, 2.4)	1.00 (0.32, 2.23)
Arrhythmia	59,766	537	473	272.7 (218.6, 318.5)	212.5 (194.4, 248.0)	60.2 (-5.8, 104.6)	1.28 (0.98, 1.48)
Kidney injury	68,182	372	295	141.9 (130.0, 168.9)	118.1 (109.1, 170.6)	23.8 (-28.0, 44.2)	1.20 (0.83, 1.37)
Appendicitis	86,234	15	19	4.0 (2.4, 6.7)	4.9 (2.1, 6.2)	-1.0 (-2.6, 3.5)	0.80 (0.50, 2.37)
Autoimmune¶	75,892	169	199	58.7 (51.7, 80.0)	71.4 (54.7, 85.3)	-12.7 (-24.4, 15.7)	0.82 (0.70, 1.28)
Herpes zoster or simplex	77,910	139	124	47.9 (37.1, 57.5)	42.8 (33.7, 53.4)	5.0 (-10.9, 17.1)	1.12 (0.78, 1.47)
Arthritis or arthropathy	77,490	210	184	76.1 (63.4, 100.7)	65.5 (49.7, 82.4)	10.6 (-9.2, 42.1)	1.16 (0.89, 1.79)
Pneumonia	76,952	222	161	75.8 (63.7, 91.0)	58.6 (47.1, 71.2)	17.2 (-1.1, 37.7)	1.29 (0.98, 1.77)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network. Follow-up of a matched pair ended when either member developed a documented SARS-CoV-2 infection.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

eTable 12. Subgroup Analysis: Among Persons of White Race

eTable 12. Subgroup Analysis Among Persons of White Race: Estimated Comparative Safety of the BNT162b2 and mRNA-1273 Vaccines, Veterans Health Administration (January 4–October 5, 2021).*

Event	No. of persons	No. of events			38-week risk no. of events/10,000 persons (95% CI)			Risk difference no. of events/ 10,000 persons (95% CI)		Risk ratio (95% CI)
		BNT162b2	mRNA-1273		BNT162b2	mRNA-1273				
Neurologic†	177,754	2,327	2,281		319.3 (298.8, 333.6)	307.1 (293.8, 322.2)		12.2 (-14.7, 30.9)		1.04 (0.95, 1.10)
Hematologic‡	216,226	2,789	2,916		329.3 (315.8, 353.5)	349.8 (322.7, 358.2)		-20.5 (-30.9, 19.0)		0.94 (0.91, 1.06)
Hemorrhagic stroke	323,704	61	50		4.3 (3.0, 5.1)	3.5 (2.7, 5.0)		0.8 (-1.4, 1.6)		1.23 (0.68, 1.57)
Ischemic stroke	294,562	937	751		77.8 (71.4, 83.2)	67.3 (59.4, 72.2)		10.5 (2.4, 20.4)		1.16 (1.03, 1.33)
Myocardial infarction	303,552	766	616		66.0 (57.8, 71.0)	49.1 (45.6, 55.9)		16.9 (5.1, 22.6)		1.34 (1.09, 1.48)
Other thromboembolic§	301,312	849	694		66.4 (61.6, 71.0)	56.4 (53.9, 65.6)		10.0 (-0.7, 13.9)		1.18 (0.99, 1.25)
Myocarditis or pericarditis	322,136	59	38		4.3 (3.3, 5.8)	2.9 (1.9, 3.7)		1.4 (0.3, 3.3)		1.49 (1.11, 2.58)
Arrhythmia	203,122	2,254	2,082		275.9 (266.0, 292.6)	269.8 (252.9, 280.2)		6.1 (-7.1, 30.5)		1.02 (0.97, 1.12)
Kidney injury	269,786	1,405	1,143		129.2 (118.6, 136.2)	105.8 (98.1, 113.8)		23.4 (8.3, 33.9)		1.22 (1.08, 1.34)
Appendicitis	321,272	73	52		5.6 (3.9, 7.3)	4.0 (2.8, 5.1)		1.6 (-0.4, 3.8)		1.41 (0.91, 2.26)
Autoimmune¶	281,504	696	666		65.1 (58.2, 74.2)	62.0 (55.3, 67.8)		3.1 (-5.8, 14.1)		1.05 (0.91, 1.24)
Herpes zoster or simplex	289,924	526	497		43.2 (38.3, 47.1)	41.4 (37.5, 47.2)		1.8 (-6.0, 7.0)		1.04 (0.87, 1.18)
Arthritis or arthropathy	300,316	575	531		44.7 (38.8, 47.4)	42.5 (38.5, 46.4)		2.2 (-5.3, 6.0)		1.05 (0.88, 1.15)
Pneumonia	283,728	995	945		88.2 (80.1, 93.2)	82.9 (78.3, 92.3)		5.3 (-8.3, 11.5)		1.06 (0.91, 1.15)

Abbreviation: CI, confidence interval.

* Persons newly vaccinated with the BNT162b2 vaccine were matched in a 1:1 ratio to persons newly vaccinated with the mRNA-1273 vaccine according to the following variables: calendar date, age, sex, race, urbanicity of residence, and geographic location coded as categories of Veterans Integrated Services Network. Follow-up of a matched pair ended when either member developed a documented SARS-CoV-2 infection.

† Neurologic events included Bell's palsy, non-facial paralysis, paresthesia, seizure, syncope, and vertigo.

‡ Hematologic events included anemia, lymphopenia, neutropenia, and thrombocytopenia.

§ Other thromboembolic events included cerebral venous sinus thrombosis, deep venous thrombosis or thrombophlebitis, pulmonary embolism, and other thrombosis (arterial embolism and thrombosis, vascular insufficiency of the intestine).

¶ Autoimmune events included Guillain-Barré syndrome, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, systemic lupus erythematosus, and uveitis.

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