SPIKEVAX- covid-19 vaccine, mrna injection, suspension
Moderna US, Inc.

HIGHLIGHTS OF PRESCRIBING INFORMATION
These highlights do not include all the information needed to use SPIKEVAX safely and effectively. See full prescribing information for SPIKEVAX.

SPIKEVAX (COVID-19 Vaccine, mRNA)
Suspension for injection, for intramuscular use
2023-2024 Formula
Initial U.S. Approval: 2022

RECENT MAJOR CHANGES

Dosage and Administration

- Preparation for Administration (2.1) 9/2023
- Dosing and Schedule (2.3) 9/2023

INDICATIONS AND USAGE

SPIKEVAX is a vaccine indicated for active immunization to prevent coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in individuals 12 years of age and older. (1)

DOSAGE AND ADMINISTRATION

- For intramuscular injection only.
- SPIKEVAX is administered as a single 0.5 mL dose. (2.3)
- For individuals previously vaccinated with any COVID-19 vaccine, administer the dose of SPIKEVAX at least 2 months after the last dose of COVID-19 vaccine. (2.3)

DOSAGE FORMS AND STRENGTHS

SPIKEVAX is a suspension for injection.
A single dose is 0.5 mL. (3)

CONTRAINDICATIONS

Severe allergic reaction (e.g., anaphylaxis) to any component of SPIKEVAX. (4)

WARNINGS AND PRECAUTIONS

Postmarketing data with authorized or approved mRNA COVID-19 vaccines demonstrate increased risks of myocarditis and pericarditis, particularly within the first week following vaccination. For SPIKEVAX, the observed risk is highest in males 18 years through 24 years of age. (5.2)

ADVERSE REACTIONS

Most commonly reported adverse reactions following administration of SPIKEVAX or Moderna COVID-19 Vaccine, Bivalent containing the same amount of mRNA as the SPIKEVAX 2023-2024 Formula (≥10%):

- *Participants 12 years through 17 years of age*: pain at the injection site (up to 90.6%), fatigue (up to 58.1%), headache (up to 56.3%), myalgia (up to 40.1%), chills (up to 30.2%), axillary swelling/tenderness (up to 27.8%), arthralgia (up to 23.9%), nausea/vomiting (up to 17.9%), and swelling at the injection site (up to 13.3%). (6)
- *Participants 18 years through 64 years of age*: pain at injection site (up to 86.3%), fatigue (up to 62.0%), headache (up to 58.9%), myalgia (up to 49.6%), arthralgia (up to 41.9%), chills (up to 40.3%), axillary swelling/tenderness (up to 24.8%), and nausea/vomiting (up to 16.7%). (6)
- *Participants 65 years of age and older*: pain at injection site (up to 76.3%), fatigue (up to 58.1%), myalgia (up to 47.4%), headache (up to 42.1%), arthralgia (up to 39.5%), chills (up to 18.4%), and axillary swelling/tenderness (up to 14.3%). (6)

To report SUSPECTED ADVERSE REACTIONS, contact ModernaTX, Inc. at 1-866-663-3762 or VAERS at 1-800-822-7967 or www.vaers.hhs.gov.

See 17 for PATIENT COUNSELING INFORMATION and FDA-approved patient labeling.

Revised: 9/2023

FULL PRESCRIBING INFORMATION: CONTENTS*

* Sections or subsections omitted from the full prescribing information are not listed.

FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

SPIKEVAX is a vaccine indicated for active immunization to prevent coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in individuals 12 years of age and older.

2 DOSAGE AND ADMINISTRATION

For intramuscular injection only.

2.1 Preparation for Administration

- SPIKEVAX multiple-dose vials, single dose vials, and single dose pre-filled syringes contain a frozen suspension that does not contain a preservative and must be thawed prior to administration.
- There are 3 presentations of SPIKEVAX.
- Thaw each vial or pre-filled syringe before use following the instructions below.

	Thaw in Refrigerator	**Thaw at Room Temperature**
Multiple-Dose Vial Containing 5 Doses	Thaw between 2°C to 8°C (36°F to 46°F) for 2 hours. Let each vial stand at room temperature for 15 minutes before administering.	Alternatively, thaw between 15°C to 25°C (59°F to 77°F) for 45 minutes.
0.5 mL Single Dose Vial	Thaw between 2°C to 8°C (36°F to 46°F) for 45 minutes. Let each vial stand at room temperature for 15 minutes before administering.	Alternatively, thaw between 15°C to 25°C (59°F to 77°F) for 15 minutes.
0.5 mL Single Dose Pre-Filled Syringe	Thaw between 2°C to 8°C (36°F to 46°F) for 1 hour. Let each syringe stand at room temperature for 15 minutes before administering.	Alternatively, thaw between 15°C to 25°C (59°F to 77°F) for 45 minutes.

- After thawing, do not refreeze.
- Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit.
- SPIKEVAX is a white to off-white suspension. It may contain white or translucent product-related particulates. Do not administer if vaccine is discolored or contains other particulate matter.
- For multiple-dose vials:
    - Swirl vial gently after thawing and between each withdrawal. **Do not shake.**

Do not dilute the vaccine.
  - Each 2.5 mL multiple-dose vial contains 5 doses of 0.5 mL.
  - If the amount of vaccine remaining in the vial cannot provide a full dose appropriate for the individual being vaccinated, discard the vial and contents. Do not pool excess vaccine from multiple vials.
  - After the first dose has been withdrawn, the vial should be held between 2°C to 25°C (36°F to 77°F). Record the date and time of first use on the SPIKEVAX vial label. Discard multiple-dose vials after 12 hours. Do not refreeze.

- For single dose vials:
  - Swirl vial gently after thawing. **Do not shake.** Do not dilute the vaccine.
  - Each vial is single use only. Discard after single use.

- For single dose pre-filled syringes:
  - **Do not shake.** Do not dilute the vaccine.
  - Use a sterile needle of the appropriate size for intramuscular injection.
  - With tip cap upright, remove tip cap by twisting counterclockwise until tip cap releases. Remove tip cap in a slow, steady motion. Avoid pulling tip cap while twisting.
  - Attach the needle by twisting in a clockwise direction until the needle fits securely on the syringe.
  - Administer the entire dose intramuscularly.
  - Discard syringe after use.

2.2 Administration

Administer SPIKEVAX intramuscularly.

2.3 Dosing and Schedule

SPIKEVAX is administered as a single 0.5 mL dose.

For individuals previously vaccinated with any COVID-19 vaccine, administer the dose of SPIKEVAX at least 2 months after the last dose of COVID-19 vaccine.

3 DOSAGE FORMS AND STRENGTHS

SPIKEVAX is a suspension for injection.

A single dose is 0.5 mL.

4 CONTRAINDICATIONS

Do not administer SPIKEVAX to individuals with a known history of severe allergic reaction (e.g., anaphylaxis) to any component of SPIKEVAX *[see Description (11)]* or to individuals who had a severe allergic reaction (e.g., anaphylaxis) following a previous dose of a Moderna COVID-19 vaccine.

5 WARNINGS AND PRECAUTIONS

5.1 Management of Acute Allergic Reactions

Appropriate medical treatment to manage immediate allergic reactions must be immediately available in the event an acute anaphylactic reaction occurs following administration of SPIKEVAX.

5.2 Myocarditis and Pericarditis

Postmarketing data with authorized or approved mRNA COVID-19 vaccines demonstrate increased risks of myocarditis and pericarditis, particularly within the first week following vaccination. For SPIKEVAX, the observed risk is highest in males 18 years through 24 years of age. Although some cases required intensive care support, available data from short-term follow-up suggest that most individuals have had resolution of symptoms with conservative management. Information is not yet available about potential long-term sequelae.

The Centers for Disease Control and Prevention (CDC) has published considerations related to myocarditis and pericarditis after vaccination, including for vaccination of individuals with a history of myocarditis or pericarditis (https://www.cdc.gov/vaccines/covid-19/clinical-considerations/myocarditis.html).

5.3 Syncope

Syncope (fainting) may occur in association with administration of injectable vaccines. Procedures should be in place to avoid injury from fainting.

5.4 Altered Immunocompetence

Immunocompromised persons, including individuals receiving immunosuppressive therapy, may have a diminished immune response to SPIKEVAX *[see Use in Specific Populations (8.6)]*.

5.5 Limitations of Vaccine Effectiveness

SPIKEVAX may not protect all vaccine recipients.

6 ADVERSE REACTIONS

In clinical studies contributing to the safety assessment of SPIKEVAX, participants received a single dose, a 2-dose series one month apart (referred to as primary series) and subsequent doses referred to as booster doses, as described in Table 1 below.

Table 1: Clinical Studies

Study	Age	Dosing Regimen	Vaccine Recipients
Study 1 (NCT04470427)	18 years of age and older	Primary Series: 2 doses (100 mcg mRNA per dose) of SPIKEVAX[a] 1 month apart	15,184
		First Booster Dose: Single dose (50 mcg mRNA per dose) of SPIKEVAX[a]	19,609[b]
Study 2	18 years of	First Booster Dose: Single dose (50 mcg	171

(NCT04405076)	age and older	mRNA) of SPIKEVAX[a]	171
Study 3 (NCT04649151)	12 years through 17 years of age	Primary Series: 2 doses (100 mcg mRNA per dose) of SPIKEVAX[a] 1 month apart	2,486
		First Booster Dose: Single dose (50 mcg mRNA) of SPIKEVAX[a]	1,405
		Single Dose: 50 mcg mRNA of Moderna COVID-19 Vaccine, Bivalent (Original and Omicron BA.4/BA.5)[c]	379
Study 5 NCT04927065	18 years of age and older	Second Booster Dose: Single dose (50 mcg mRNA) of Moderna COVID-19 Vaccine, Bivalent (Original and Omicron BA.4/BA.5)[c]	511

[a] Vaccine encoding the viral spike (S) glycoprotein of SARS-CoV-2 Wuhan-Hu 1 strain (Original).
[b] Includes 10 participants who received a dose of SPIKEVAX (50 mcg mRNA) without having received a primary series of SPIKEVAX.
[c] Vaccine encoding the viral spike (S) glycoprotein of SARS-CoV-2 Wuhan-Hu 1 strain (Original) and Omicron variant lineages BA.4 and BA.5 (Omicron BA.4/BA.5).

Most commonly (≥10%) reported adverse reactions following administration of SPIKEVAX or Moderna COVID-19 Vaccine, Bivalent (Original and Omicron BA.4/BA.5) (hereafter referred to as Moderna COVID-19 Vaccine, Bivalent and no longer authorized for use in the U.S.) containing the same amount of mRNA as the SPIKEVAX 2023-2024 Formula:

- Participants 12 years through 17 years of age: pain at the injection site (up to 90.6%), fatigue (up to 58.1%), headache (up to 56.3%), myalgia (up to 40.1%), chills (up to 30.2%), axillary swelling/tenderness (up to 27.8%), arthralgia (up to 23.9%), nausea/vomiting (up to 17.9%), and swelling at the injection site (up to 13.3%).
- Participants 18 years through 64 years of age: pain at injection site (up to 86.3%), fatigue (up to 62.0%), headache (up to 58.9%), myalgia (up to 49.6%), arthralgia (up to 41.9%), chills (up to 40.3%), axillary swelling/tenderness (up to 24.8%), and nausea/vomiting (up to 16.7%).
- Participants 65 years of age and older: pain at injection site (up to 76.3%), fatigue (up to 58.1%), myalgia (up to 47.4%), headache (up to 42.1%), arthralgia (up to 39.5%), chills (up to 18.4%), and axillary swelling/tenderness (up to 14.3%).

6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a vaccine cannot be directly compared with rates in the clinical trials of another vaccine and may not reflect the rates observed in practice.

SPIKEVAX Administered as a Two-Dose Primary Series

Participants 18 Years and Older

The safety of SPIKEVAX was evaluated in an ongoing Phase 3 clinical trial with multiple parts. The randomized, placebo-controlled, observer-blind phase of the trial was conducted in the United States involving 30,346 participants 18 years of age and older

who received at least one dose of SPIKEVAX (100 mcg mRNA; n=15,184) or placebo (n=15,162) (Study 1, NCT04470427). Upon issuance of the Emergency Use Authorization (December 18, 2020) for Moderna COVID-19 Vaccine (SPIKEVAX), participants were unblinded in a phased manner over a period of months to offer placebo participants SPIKEVAX. The median duration of follow-up for safety after the second injection during the blinded phase was 4 months. The median duration of follow-up for safety after the second injection including both the blinded phase and the open-label phase was 6 months.

In Study 1, the median age of the population was 52 years (range 18-95); 75.2% participants were 18 years through 64 years of age and 24.8% participants were 65 years of age and older. Overall, 52.6% of the participants were male, 47.4% were female, 20.5% were Hispanic or Latino, 79.2% were White, 10.2% were African American, 4.6% were Asian, 0.8% were American Indian or Alaska Native, 0.2% were Native Hawaiian or Pacific Islander, 2.0% were other races, and 2.1% were Multiracial. Demographic characteristics were similar between participants who received SPIKEVAX and those who received placebo.

Solicited Adverse Reactions

Local and systemic adverse reactions and use of antipyretic medication were solicited in an electronic diary for 7 days following each injection (i.e., day of vaccination and the next 6 days) among participants receiving SPIKEVAX (n=15,179) and participants receiving placebo (n=15,159) with at least 1 documented dose. Events that persisted for more than 7 days were followed until resolution. Solicited adverse reactions were reported more frequently among vaccine participants than placebo participants.

The reported number and percentage of the solicited local and systemic adverse reactions by age group and dose are presented in Table 2 and Table 3, respectively.

Table 2: Number and Percentage of Participants with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After Each Dose in Participants 18 Years Through 64 Years (Solicited Safety Set, Dose 1 and Dose 2)

	SPIKEVAX		**Placebo[a]**	
	Dose 1 (N=11,406) n (%)	**Dose 2 (N=11,000) n (%)**	**Dose 1 (N=11,402) n (%)**	**Dose 2 (N=10,929) n (%)**
Local Adverse Reactions				
Pain	9,908 (86.9)	9,893 (89.9)	2,183 (19.1)	2,048 (18.7)
Pain, Grade 3[b]	366 (3.2)	506 (4.6)	23 (0.2)	22 (0.2)
Axillary swelling/tenderness	1,322 (11.6)	1,777 (16.2)	567 (5.0)	474 (4.3)
Axillary swelling/tenderness, Grade 3[b]	37 (0.3)	47 (0.4)	13 (0.1)	12 (0.1)
Swelling (hardness)	766	1,399	42	46

≥25 mm	(6.7)	(12.7)	(0.4)	(0.4)
Swelling (hardness), Grade 3[c]	62 (0.5)	183 (1.7)	3 (<0.1)	5 (<0.1)
Erythema (redness) ≥25 mm	354 (3.1)	989 (9.0)	54 (0.5)	53 (0.5)
Erythema (redness), Grade 3[c]	34 (0.3)	210 (1.9)	11 (<0.1)	12 (0.1)
Systemic Adverse Reactions				
Fatigue	4,385 (38.5)	7,453 (67.8)	3,281 (28.8)	2,701 (24.7)
Fatigue, Grade 3[d]	121 (1.1)	1,178 (10.7)	83 (0.7)	88 (0.8)
Fatigue, Grade 4[e]	1 (<0.1)	0 (0)	0 (0)	0 (0)
Headache	4,028 (35.3)	6,929 (63.0)	3,303 (29.0)	2,775 (25.4)
Headache, Grade 3[f]	220 (1.9)	559 (5.1)	163 (1.4)	132 (1.2)
Myalgia	2,700 (23.7)	6,789 (61.7)	1,625 (14.3)	1,425 (13.0)
Myalgia, Grade 3[d]	74 (0.6)	1,116 (10.1)	38 (0.3)	42 (0.4)
Arthralgia	1,892 (16.6)	5,010 (45.6)	1,327 (11.6)	1,180 (10.8)
Arthralgia, Grade 3[d]	47 (0.4)	650 (5.9)	30 (0.3)	37 (0.3)
Arthralgia, Grade 4[e]	1 (<0.1)	0 (0)	0 (0)	0 (0)
Chills	1,050 (9.2)	5,357 (48.7)	730 (6.4)	662 (6.1)
Chills, Grade 3[g]	17 (0.1)	164 (1.5)	8 (<0.1)	15 (0.1)
Nausea/vomiting	1,068 (9.4)	2,355 (21.4)	908 (8.0)	807 (7.4)
Nausea/vomiting, Grade 3[h]	6 (<0.1)	11 (0.1)	8 (<0.1)	8 (<0.1)
Fever	102 (0.9)	1,909 (17.4)	37 (0.3)	38 (0.3)
Fever, Grade 3[i]	10 (<0.1)	185 (1.7)	1 (<0.1)	2 (<0.1)
Fever, Grade 4[j]	4 (<0.1)	12 (0.1)	4 (<0.1)	2 (<0.1)
Use of antipyretic or pain medication	2,656 (23.3)	6,307 (57.3)	1,523 (13.4)	1,254 (11.5)

* 7 days included day of vaccination and the subsequent 6 days. Events and use of antipyretic or pain medication were collected in the electronic diary (e-diary).

[a] Placebo was a saline solution.

[a] Placebo was a saline solution.
[b] Grade 3 pain and axillary swelling/tenderness: Defined as any use of prescription pain reliever; prevents daily activity.
[c] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.
[d] Grade 3 fatigue, myalgia, arthralgia: Defined as significant; prevents daily activity.
[e] Grade 4 fatigue, arthralgia: Defined as requires emergency room visit or hospitalization.
[f] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.
[g] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.
[h] Grade 3 nausea/vomiting: Defined as prevents daily activity; requires outpatient intravenous hydration.
[i] Grade 3 fever: Defined as ≥39.0° – ≤40.0°C / ≥102.1° – ≤104.0°F.
[j] Grade 4 fever: Defined as >40.0°C / >104.0°F.

Table 3: Number and Percentage of Participants with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After Each Dose in Participants 65 Years and Older (Solicited Safety Set, Dose 1 and Dose 2)

	SPIKEVAX		Placebo[a]	
	Dose 1 (N=3,760) n (%)	Dose 2 (N=3,691) n (%)	Dose 1 (N=3,749) n (%)	Dose 2 (N=3,649) n (%)
Local Adverse Reactions				
Pain	2,780 (73.9)	3,071 (83.2)	482 (12.9)	438 (12.0)
Pain, Grade 3[b]	50 (1.3)	100 (2.7)	32 (0.9)	19 (0.5)
Axillary swelling/tenderness	231 (6.1)	315 (8.5)	155 (4.1)	97 (2.7)
Axillary swelling/tenderness, Grade 3[b]	12 (0.3)	21 (0.6)	14 (0.4)	8 (0.2)
Swelling (hardness) ≥25 mm	169 (4.5)	408 (11.1)	23 (0.6)	14 (0.4)
Swelling (hardness), Grade 3[c]	20 (0.5)	72 (2.0)	3 (<0.1)	7 (0.2)
Erythema (redness) ≥25 mm	91 (2.4)	285 (7.7)	23 (0.6)	15 (0.4)
Erythema (redness), Grade 3[c]	8 (0.2)	77 (2.1)	2 (<0.1)	3 (<0.1)
Systemic Adverse Reactions				
Fatigue	1,251 (33.3)	2,154 (58.4)	852 (22.7)	717 (19.6)
Fatigue, Grade 3[d]	30 (0.8)	255 (6.9)	22 (0.6)	20 (0.5)
Headache	922	1,708	723	652

	(24.5)	(46.3)	(19.3)	(17.9)
Headache, Grade 3[e]	53 (1.4)	107 (2.9)	34 (0.9)	33 (0.9)
Myalgia	742 (19.7)	1,740 (47.2)	444 (11.9)	399 (10.9)
Myalgia, Grade 3[d]	17 (0.5)	205 (5.6)	9 (0.2)	10 (0.3)
Arthralgia	618 (16.4)	1,293 (35.1)	457 (12.2)	399 (10.9)
Arthralgia, Grade 3[d]	13 (0.3)	125 (3.4)	8 (0.2)	7 (0.2)
Chills	201 (5.3)	1,143 (31.0)	148 (4.0)	151 (4.1)
Chills, Grade 3[f]	7 (0.2)	27 (0.7)	6 (0.2)	2 (<0.1)
Nausea/vomiting	194 (5.2)	439 (11.9)	167 (4.5)	134 (3.7)
Nausea/vomiting, Grade 3[g]	4 (0.1)	10 (0.3)	5 (0.1)	3 (<0.1)
Nausea/vomiting, Grade 4[h]	0 (0)	1 (<0.1)	0 (0)	0 (0)
Fever	10 (0.3)	367 (9.9)	7 (0.2)	5 (0.1)
Fever, Grade 3[i]	1 (<0.1)	18 (0.5)	1 (<0.1)	0 (0)
Fever, Grade 4[j]	0 (0)	1 (<0.1)	2 (<0.1)	1 (<0.1)
Use of antipyretic or pain medication	673 (17.9)	1,548 (41.9)	477 (12.7)	331 (9.1)

* 7 days included day of vaccination and the subsequent 6 days. Events and use of antipyretic or pain medication were collected in the electronic diary (e-diary).
[a] Placebo was a saline solution.
[b] Grade 3 pain and axillary swelling/tenderness: Defined as any use of prescription pain reliever; prevents daily activity.
[c] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.
[d] Grade 3 fatigue, myalgia, arthralgia: Defined as significant; prevents daily activity.
[e] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.
[f] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.
[g] Grade 3 nausea/vomiting: Defined as prevents daily activity; requires outpatient intravenous hydration.
[h] Grade 4 nausea/vomiting: Defined as requires emergency room visit or hospitalization for hypotensive shock.
[i] Grade 3 fever: Defined as ≥39.0° – ≤40.0°C / ≥102.1° – ≤104.0°F.
[j] Grade 4 fever: Defined as >40.0°C / >104.0°F.

Solicited local and systemic adverse reactions reported following administration of SPIKEVAX had a median duration of 1 to 3 days.

Grade 3 solicited local adverse reactions were more frequently reported after Dose 2 than after Dose 1. Solicited systemic adverse reactions were more frequently reported by vaccine recipients after Dose 2 than after Dose 1.

In Study 1, 2.3% of participants (vaccine=347, placebo=337) had evidence of prior SARS-CoV-2 infection at baseline (immunologic or virologic evidence of prior SARS-CoV-2 infection [defined as positive RT-PCR test and/or positive Elecsys immunoassay result at Day 1]). Overall, among the 347 vaccine participants, there were no notable differences in reactogenicity compared to the 14,750 vaccine participants who had no evidence of prior SARS-CoV-2 infection at baseline (negative RT-PCR test and negative Elecsys immunoassay result at Day 1).

Unsolicited Adverse Events

Participants were monitored for unsolicited adverse events for 28 days following each dose. Serious adverse events and medically attended adverse events will be recorded for the entire study duration (2 years). Among the 30,346 participants who had received at least 1 dose of vaccine (N=15,184) or placebo (N=15,162), unsolicited adverse events that occurred within 28 days following any vaccination were reported by 31.3% of participants (n=4,752) who received SPIKEVAX and 28.6% of participants (n=4,338) who received placebo.

During the 28-day follow-up period following any dose, lymphadenopathy-related events were reported by 1.7% of vaccine recipients and 0.8% of placebo recipients. These events included lymphadenopathy, lymphadenitis, lymph node pain, vaccination-site lymphadenopathy, injection-site lymphadenopathy, and axillary mass. This imbalance is consistent with the imbalance observed for solicited axillary swelling/tenderness at the injected arm.

During the 7-day follow-up period of any vaccination, hypersensitivity events of injection site rash or injection site urticaria, likely related to vaccination, were reported by 6 participants in the SPIKEVAX group and none in the placebo group. Delayed injection site reactions that began >7 days after vaccination were reported in 1.4% of vaccine recipients and 0.7% of placebo recipients. Delayed injection site reactions included pain, erythema, and swelling and are likely related to vaccination.

In the blinded portion of the study, there were 8 reports of facial paralysis (including Bell’s palsy) in the SPIKEVAX group, and 3 in the placebo group. In the 28-day follow-up period there were two cases of facial paralysis in the SPIKEVAX group, which occurred on 8 and 22 days, respectively, after vaccination, and one in the placebo group, which occurred 17 days after vaccination. Currently available information on facial paralysis is insufficient to determine a causal relationship with the vaccine.

In the blinded portion of the study, there were 50 reports of herpes zoster in the SPIKEVAX group and 23 in the placebo group. In the 28-day period after any vaccination, there were 22 cases of herpes zoster in the SPIKEVAX group and 15 in the placebo group. Currently available information on herpes zoster infection is insufficient to determine a causal relationship with the vaccine.

There were no other notable patterns or numerical imbalances between treatment groups for specific categories of adverse events (including other neurologic, neuro-inflammatory, and thrombotic events) that would suggest a causal relationship to SPIKEVAX.

Serious Adverse Events

During the blinded phase of the study, serious adverse events were reported by 1.8% (n=268) of participants who received SPIKEVAX and 1.9% (n=292) of participants who received placebo.

There were three serious adverse events of angioedema/facial swelling in the vaccine group in recipients with a history of injection of dermatological fillers. The onset of swelling was reported 1-2 days after the second dose and was likely related to vaccination.

There were no other notable patterns or imbalances between treatment groups for specific categories of serious adverse events (including neurologic, neuro-inflammatory, and thrombotic events) that would suggest a causal relationship to SPIKEVAX.

Adolescents 12 Years Through 17 Years of Age

The safety of SPIKEVAX was evaluated in an ongoing Phase 3 clinical trial with multiple parts. The randomized, placebo-controlled, observer-blind clinical trial was conducted in the United States involving 3,726 participants 12 years through 17 years of age who received at least one dose of SPIKEVAX (100 mcg mRNA; n=2,486) or placebo (n=1,240) (Study 3, NCT04649151). Participants started to enter an open-label, observational phase after May 10, 2021. After October 1, 2021, cases of potential myocarditis and/or pericarditis that were identified by the investigator or Applicant were adjudicated by an independent Cardiac Event Adjudication Committee (CEAC) to determine if they met the CDC definition of confirmed or probable myocarditis and/or pericarditis. A safety analysis was conducted in participants who received SPIKEVAX (n=2,486) with a cut-off date of January 31, 2022. In these analyses, the median duration of follow-up including both the blinded and open-label phases was 312 days after Dose 2 and 95.7% of study participants had at least 6 months of follow-up after Dose 2.

Overall, 51.4% were male, 48.6% were female, 11.6% were Hispanic or Latino, 83.8% were White, 3.4% were African American, 6.0% were Asian, 0.5% were American Indian or Alaska Native, <0.1% were Native Hawaiian or Pacific Islander, 1.0% were other races, and 4.5% were Multiracial. Demographic characteristics were similar among participants who received SPIKEVAX and those who received placebo.

Solicited Adverse Reactions

Local and systemic adverse reactions and use of antipyretic medication were solicited in an electronic diary for 7 days following each injection (i.e., day of vaccination and the next 6 days) among participants receiving SPIKEVAX (n=2,485) and participants receiving placebo (n=1,240) with at least 1 documented dose. Events that persisted for more than 7 days were followed until resolution. Solicited adverse reactions were reported more frequently among vaccine participants than placebo participants.

The reported number and percentage of the solicited local and systemic adverse reactions in participants 12 years through 17 years of age by dose are presented in Table 4.

Table 4: Number and Percentage of Participants with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After Each Dose in Participants 12 Years Through 17 Years (Solicited Safety Set, Dose 1 and

Dose 2)[†]

	SPIKEVAX		Placebo[a]	
	Dose 1 N=2,480-2,482 n (%)	**Dose 2 N=2,477-2,478 n (%)**	**Dose 1 N=1,238 n (%)**	**Dose 2 N=1,219-1,220 n (%)**
Local Adverse Reactions				
Pain	2,310 (93.1)	2,290 (92.4)	431 (34.8)	370 (30.3)
Pain, Grade 3[b]	133 (5.4)	126 (5.1)	1 (<0.1)	3 (0.2)
Axillary swelling/tenderness	576 (23.2)	519 (21.0)	101 (8.2)	61 (5.0)
Axillary swelling/tenderness, Grade 3[b]	11 (0.4)	7 (0.3)	0 (0)	0 (0)
Swelling (hardness) ≥25 mm	401 (16.2)	508 (20.5)	12 (1.0)	12 (1.0)
Swelling (hardness), Grade 3[c]	27 (1.1)	56 (2.3)	0 (0)	0 (0)
Erythema (redness) ≥25 mm	329 (13.3)	484 (19.5)	8 (0.6)	11 (0.9)
Erythema (redness), Grade 3[c]	22 (0.9)	72 (2.9)	0 (0)	0 (0)
Systemic Adverse Reactions				
Fatigue	1,188 (47.9)	1,679 (67.8)	453 (36.6)	353 (28.9)
Fatigue, Grade 3[d]	33 (1.3)	188 (7.6)	18 (1.5)	10 (0.8)
Headache	1,106 (44.6)	1,739 (70.2)	477 (38.5)	371 (30.4)
Headache, Grade 3[e]	56 (2.3)	112 (4.5)	17 (1.4)	14 (1.1)
Headache, Grade 4[f]	0 (0)	1 (<0.1)	0 (0)	0 (0)
Myalgia	670 (27.0)	1,155 (46.6)	205 (16.6)	153 (12.5)
Myalgia, Grade 3[d]	24 (1.0)	129 (5.2)	10 (0.8)	3 (0.2)
Arthralgia	371 (15.0)	716 (28.9)	143 (11.6)	113 (9.3)
Arthralgia, Grade 3[d]	15 (0.6)	57 (2.3)	5 (0.4)	2 (0.2)
Chills	456 (18.4)	1,066 (43.0)	138 (11.1)	97 (8.0)

Chills, Grade 3[g]	4 (0.2)	11 (0.4)	1 (<0.1)	0 (0)
Nausea/vomiting	281 (11.3)	591 (23.9)	109 (8.8)	106 (8.7)
Nausea/vomiting, Grade 3[h]	2 (<0.1)	2 (<0.1)	0 (0)	0 (0)
Nausea/vomiting, Grade 4[i]	0 (0)	1 (<0.1)	0 (0)	0 (0)
Fever	57 (2.3)	298 (12.0)	11 (0.9)	12 (1.0)
Fever, Grade 3[j]	9 (0.4)	48 (1.9)	1 (<0.1)	1 (<0.1)
Fever, Grade 4[k]	0 (0)	1 (<0.1)	0 (0)	1 (<0.1)
Use of antipyretic or pain medication[l]	748 (30.1)	1,242 (50.1)	118 (9.5)	108 (8.9)

* 7 days included day of vaccination and the subsequent 6 days. Events and use of antipyretic or pain medication were collected in the electronic diary (e-diary).
† Absence of rows for Grade 4 adverse reactions indicates no events were reported.
N=Number of participants in the Solicited Safety Set who had available data for the solicited adverse reactions.
[a] Placebo was a saline solution.
[b] Grade 3 pain and axillary swelling/tenderness: Defined as any use of prescription pain reliever; prevents daily activity.
[c] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.
[d] Grade 3 fatigue, myalgia, arthralgia: Defined as significant; prevents daily activity.
[e] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.
[f] Grade 4 headache: Defined as requires emergency room visit or hospitalization.
[g] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.
[h] Grade 3 nausea/vomiting: Defined as prevents daily activity, requires outpatient intravenous hydration.
[i] Grade 4 nausea/vomiting: Defined as requires emergency room visit or hospitalization for hypotensive shock.
[j] Grade 3 fever: Defined as ≥39.0° – ≤40.0°C / ≥102.1° – ≤104.0°F.
[k] Grade 4 fever: Defined as >40.0°C / >104.0°F.
[l] Percentage based on participants in the Solicited Safety Set (2,482 post-Dose 1 and 2,478 post-Dose 2 for SPIKEVAX; 1,238 post-Dose 1 and 1,220 post-Dose 2 for placebo).

Solicited local and systemic adverse reactions reported following administration of SPIKEVAX had a median duration of 2 to 3 days.

In ages 12 years through 17 years, 5.8% of participants (vaccine=147, placebo=70) had evidence of prior SARS-CoV-2 infection at baseline (immunologic or virologic evidence of prior SARS-CoV-2 infection [defined as positive RT-PCR test and/or positive Elecsys immunoassay result at Day 1]). An assessment of reactogenicity among participants with evidence of prior SARS-CoV-2 infection compared to those with no

evidence of infection at baseline (negative RT-PCR test and negative Elecsys immunoassay result at Day 1) was conducted. Table 5 presents the number and percentage of the solicited local and systemic adverse reactions in SPIKEVAX participants starting within 7 days after each dose by SARS-CoV-2 status.

Table 5: Number and Percentage of Participants 12 Years Through 17 Years Who Received SPIKEVAX with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After Each Dose by SARS-CoV-2 Status (Solicited Safety Set, Dose 1 and Dose 2)†

	Baseline SARS-CoV-2 Positive		Baseline SARS-CoV-2 Negative	
	Dose 1 N=147 n (%)	Dose 2 N=146 n (%)	Dose 1 N=2,165-2,167 n (%)	Dose 2 N=2,165-2,166 n (%)
Local Adverse Reactions				
Pain	128 (87.1)	124 (84.9)	2,027 (93.5)	2,009 (92.8)
Pain, Grade 3[a]	9 (6.1)	7 (4.8)	113 (5.2)	114 (5.3)
Axillary swelling/tenderness	58 (39.5)	25 (17.1)	485 (22.4)	465 (21.5)
Axillary swelling/tenderness, Grade 3[a]	1 (0.7)	0 (0)	10 (0.5)	7 (0.3)
Swelling (hardness) ≥25 mm	24 (16.3)	22 (15.1)	359 (16.6)	448 (20.7)
Swelling (hardness), Grade 3[b]	4 (2.7)	2 (1.4)	21 (1.0)	50 (2.3)
Erythema (redness) ≥25 mm	20 (13.6)	18 (12.3)	303 (14.0)	432 (19.9)
Erythema (redness), Grade 3[b]	1 (0.7)	3 (2.1)	20 (0.9)	62 (2.9)
Systemic Adverse Reactions				
Fatigue	103 (70.1)	94 (64.4)	1,006 (46.4)	1,471 (67.9)
Fatigue, Grade 3[c]	4 (2.7)	5 (3.4)	27 (1.2)	173 (8.0)
Headache	103 (70.1)	90 (61.6)	941 (43.5)	1,528 (70.5)
Headache, Grade 3[d]	11 (7.5)	7 (4.8)	44 (2.0)	96 (4.4)
Headache, Grade 4[e]	0 (0)	0 (0)	0 (0)	1 (<0.1)
Myalgia	63	63	559	1,019

	(42.9)	(43.2)	(25.8)	(47.1)
Myalgia, Grade 3[c]	3 (2.0)	2 (1.4)	19 (0.9)	117 (5.4)
Arthralgia	36 (24.5)	39 (26.7)	306 (14.1)	634 (29.3)
Arthralgia, Grade 3[c]	2 (1.4)	0 (0)	12 (0.6)	52 (2.4)
Chills	72 (49.0)	63 (43.2)	364 (16.8)	935 (43.2)
Chills, Grade 3[f]	0 (0)	0 (0)	4 (0.2)	10 (0.5)
Nausea/vomiting	30 (20.4)	29 (19.9)	237 (10.9)	523 (24.2)
Nausea/vomiting, Grade 3[g]	0 (0)	0 (0)	2 (<0.1)	2 (<0.1)
Nausea/vomiting, Grade 4[h]	0 (0)	1 (0.7)	0 (0)	0 (0)
Fever	28 (19.0)	20 (13.7)	28 (1.3)	258 (11.9)
Fever, Grade 3[i]	4 (2.7)	2 (1.4)	4 (0.2)	42 (1.9)
Fever, Grade 4[j]	0 (0)	0 (0)	0 (0)	1 (<0.1)

* 7 days included day of vaccination and the subsequent 6 days. Events were collected in the electronic diary (e-diary).

† Absence of rows for Grade 4 adverse reactions indicates no events were reported.

N=Number of participants in the Solicited Safety Set who had available data for the solicited adverse reactions.

[a] Grade 3 pain and axillary swelling/tenderness: Defined as any use of prescription pain reliever; prevents daily activity.

[b] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.

[c] Grade 3 fatigue, myalgia, arthralgia: Defined as significant; prevents daily activity.

[d] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.

[e] Grade 4 headache: Defined as requires emergency room visit or hospitalization.

[f] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.

[g] Grade 3 nausea/vomiting: Defined as prevents daily activity, requires outpatient intravenous hydration.

[h] Grade 4 nausea/vomiting: Defined as requires emergency room visit or hospitalization for hypotensive shock.

[i] Grade 3 fever: Defined as ≥39.0° – ≤40.0°C / ≥102.1° – ≤104.0°F.

[j] Grade 4 fever: Defined as >40.0°C / >104.0°F.

Unsolicited Adverse Events

Participants were monitored for unsolicited adverse events for 28 days following each dose. Serious adverse events and medically attended adverse events were recorded for the entire study duration. Among the 3,726 participants who had received at least 1

dose of vaccine (n=2,486) or placebo (n=1,240), unsolicited adverse events that occurred within 28 days following any vaccination were reported by 23.4% of participants (n=582) who received SPIKEVAX and 19.1% of participants (n=237) who received placebo.

In the open-label portion of the study, a 14-year-old male experienced probable myocarditis with onset of symptoms 1 day after Dose 2 of SPIKEVAX. Symptoms resolved after 8 days and no sequelae were observed at 5 months. This event was considered related to SPIKEVAX and was subsequently adjudicated by the CEAC as probable myocarditis. There were no cases of myocarditis among placebo recipients.

During the 28-day follow-up period following any dose, lymphadenopathy-related events were reported by 6.0% of vaccine recipients and 0.6% of placebo recipients. These events included lymphadenopathy, vaccination-site lymphadenopathy, and injection-site lymphadenopathy which were plausibly related to vaccination. This imbalance is consistent with the imbalance observed for solicited axillary swelling/tenderness in the injected arm.

During the 28-day follow-up period following any dose, hypersensitivity events of injection site rash or injection site urticaria, likely related to vaccination, were reported by 0.3% of participants in the SPIKEVAX group and <0.1% in the placebo group. Delayed injection site reactions that began >7 days after vaccination were reported in 1.5% of vaccine recipients and in <0.1% of placebo recipients. Delayed injection site reactions included pain, erythema, and swelling and are likely related to vaccination.

There were no other notable patterns or numerical imbalances between treatment groups for specific categories of adverse events (including other neurologic, neuro-inflammatory, and thrombotic events) that would suggest a causal relationship to SPIKEVAX.

Serious Adverse Events

During the blinded portion of the study, serious adverse events were reported by 0.4% (n=9) of participants who received SPIKEVAX and 0.2% (n=3) of participants who received placebo. In the open-label phase, an additional 12 SPIKEVAX recipients reported serious adverse events. There were no serious adverse events considered causally related to the vaccine.

There were no notable patterns or imbalances between treatment groups for specific categories of serious adverse events (including neurologic, neuro-inflammatory, and thrombotic events) that would suggest a causal relationship to SPIKEVAX.

SPIKEVAX Administered as a First Booster Dose Following a Primary Series of SPIKEVAX

Participants 18 Years and Older

Safety data for SPIKEVAX administered as a first booster dose following a primary series of SPIKEVAX in participants 18 years of age and older were evaluated in two clinical studies.

Study 2

Study 2 was a Phase 2, randomized, observer-blind, placebo-controlled, dose-confirmation study to evaluate the safety, reactogenicity, and immunogenicity of SPIKEVAX in participants 18 years of age and older (NCT04405076). In this study, 198 participants received two doses 1 month apart of SPIKEVAX primary series (100 mcg

mRNA per dose). In an open-label phase of the study, 171 of those participants received a single booster dose (50 mcg mRNA) at least 6 months (range of 5.8 to 8.5 months) after receiving the second dose of the primary series.

Among the 171 booster dose recipients, the median age was 55 years (range 18-87); 77.8% of participants were 18 years through 64 years of age, 22.2% were 65 years of age and older, 39.2% were male, 60.8% were female, 5.8% were Hispanic or Latino, 95.9% were White, 2.9% were African American, 0.6% were Asian, and 0.6% were American Indian or Alaska Native.

Solicited Adverse Reactions

Solicited local and systemic adverse reactions in participants 18 years through 64 years of age starting within 7 days after administration of a booster dose included pain at the injection site (86.0%), fatigue (62.0%), headache (58.9%), myalgia (49.6%), arthralgia (41.9%), chills (40.3%), axillary swelling/tenderness (24.8%), nausea/vomiting (12.4%), fever (7.0%), swelling at the injection site (6.2%), erythema at the injection site (5.4%), and rash (2.3%).

Solicited local and systemic adverse reactions in participants 65 years of age and older starting within 7 days after administration of a booster dose included pain at the injection site (76.3%), fatigue (47.4%), myalgia (47.4%), headache (42.1%), arthralgia (39.5%), chills (18.4%), nausea/vomiting (7.9%), fever (5.4%), axillary swelling/tenderness (5.3%), erythema at the injection site (2.6%), and swelling at the injection site (2.6%).

No Grade 4 adverse reactions were reported. The median duration of solicited local and systemic adverse reactions was 2 to 3 days.

Unsolicited Adverse Events

Overall, the 171 participants who received a booster dose had a median follow-up time of 176 days after the booster dose to the database lock date (November 23, 2021). Through 28 days after the booster dose, unsolicited adverse events were reported by 14.6% of participants (n=25) after the booster dose. There were no unsolicited adverse events not already captured by solicited local and systemic reactions that were considered causally related to SPIKEVAX.

Serious Adverse Events

There were no serious adverse events reported from the booster dose through 28 days after the booster dose. Through the database lock date (November 23, 2021), there were no serious adverse events following the booster dose considered causally related to SPIKEVAX.

Study 1

Study 1 is an ongoing Phase 3 with multiple parts to evaluate the safety, reactogenicity, and immunogenicity of SPIKEVAX in participants 18 years of age and older (NCT04470427). In the open-label booster dose phase of this study, 19,609 participants received a single booster dose of SPIKEVAX (50 mcg mRNA). Of these participants, 19,599 had previously received a primary series of SPIKEVAX and received a single booster dose at least 6 months (range of 5 to 19 months) after receiving the second dose of the primary series.

Among the 19,609 booster dose recipients, the median age was 55 years (range 19-96);

69.6% of participants were 18 years through 64 years of age, 30.4% were 65 years of age and older, 52.4% were male, 47.6% were female, 20.2% were Hispanic or Latino, 78.9% were White, 10.6% were African American, 4.1% were Asian, 0.8% were American Indian or Alaska Native, 0.2% were Native Hawaiian or Pacific Islander, 2.0% were other races, and 2.2% were Multiracial. After October 1, 2021, cases of potential myocarditis and/or pericarditis that were identified by the investigator or Applicant were adjudicated by an independent CEAC to determine if they met the CDC definition of confirmed or probable myocarditis and/or pericarditis. In these analyses, the median follow-up time after the booster dose through the cutoff date (April 5, 2022) was 161 days and 3,361 study participants who received the booster dose (17.1%) had at least 6 months of follow-up.

Unsolicited Adverse Events

Participants were monitored for unsolicited adverse events for up to 28 days following the booster dose. As of the cut-off date (April 5, 2022), among the 19,609 participants who had received a booster dose, unsolicited adverse events that occurred within 28 days after the booster were reported by 31.7% of participants (n=6,209). The safety profile for the booster dose of SPIKEVAX was similar to the safety profile of the SPIKEVAX primary series in this population.

Serious Adverse Events

Serious adverse events through 28 days following the booster dose of SPIKEVAX were reported by 0.5% of participants (n=94). Through the cut-off date (April 5, 2022), 2.3% of participants (n=442) reported serious adverse events following the booster dose.

A 42-year-old male experienced probable myocarditis (per CEAC adjudication) with onset of symptoms the same day following receipt of the booster dose of SPIKEVAX. Myocarditis was reported as resolved without sequelae on Day 72. This event was considered related to SPIKEVAX.

There was one serious adverse event of erythema nodosum 8 days after the booster dose in a 73-year-old female. This event was considered causally related to SPIKEVAX and was reported as resolved without treatment on Day 30.

Adolescents 12 Years Through 17 Years of Age

Safety data for a booster dose of SPIKEVAX in adolescents were collected in an ongoing Phase 3 clinical trial with multiple parts. The open-label booster portion of the study included 1,405 participants who were 12 years through 17 years of age at the time of first dose of the primary series and who received a booster dose of SPIKEVAX (50 mcg mRNA) at least 5 months (range 2.1 to 16.9 months) after the second dose of the primary series (Study 3, NCT04649151). Overall, 51.5% were male, 48.5% were female, 13.4% were Hispanic or Latino, 84.9% were White, 3.1% were African American, 4.9% were Asian, 0.5% were American Indian or Alaska Native, <0.1% were Native Hawaiian or Pacific Islander, 0.7% were other races, and 5.2% were Multiracial. The median duration of follow-up for safety after the booster dose was 204 days.

Solicited Adverse Reactions

Local and systemic adverse reactions and use of antipyretic medication were solicited in an electronic diary for 7 days following the injection (i.e., day of vaccination and the next 6 days) among participants receiving SPIKEVAX as a booster dose. Events that persisted for more than 7 days were followed until resolution.

Table 6 presents the frequency and severity of reported solicited local and systemic adverse reactions among SPIKEVAX booster dose recipients 12 years through 17 years of age within 7 days of a booster vaccination.

Table 6: Number and Percentage of Adolescents 12 Years Through 17 Years of Age with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After the SPIKEVAX Booster Dose (Solicited Safety Set)†

	SPIKEVAX Booster Dose N=1,335-1,351 n (%)
Local Adverse Reactions	
Pain	1,224 (90.6)
Pain, Grade 3[a]	44 (3.3)
Axillary swelling/tenderness	375 (27.8)
Axillary swelling/tenderness, Grade 3[a]	5 (0.4)
Swelling (hardness) ≥25 mm	180 (13.3)
Swelling (hardness), Grade 3[b]	10 (0.7)
Erythema (redness) ≥25 mm	121 (9.0)
Erythema (redness), Grade 3[b]	10 (0.7)
Systemic Adverse Reactions	
Fatigue	784 (58.1)
Fatigue, Grade 3[c]	54 (4.0)
Headache	760 (56.3)
Headache, Grade 3[d]	29 (2.1)
Myalgia	542 (40.1)
Myalgia, Grade 3[c]	49 (3.6)
Arthralgia	322 (23.9)
Arthralgia, Grade 3[c]	18 (1.3)
Chills	408 (30.2)
Chills, Grade 3[e]	7 (0.5)
Nausea/vomiting	241 (17.9)
Nausea/vomiting, Grade 3[f]	2 (0.1)
Fever	81 (6.1)
Fever, Grade 3[g]	8 (0.6)
Use of antipyretic or pain medication[h]	526 (38.9)

* 7 days included day of vaccination and the subsequent 6 days. Events and use of antipyretic or pain medication were collected in the electronic diary (e-diary).
† Absence of rows for Grade 4 adverse reactions indicates no events were reported.
N=Number of participants in the Solicited Safety Set who had available data for the solicited adverse reactions.
[a] Grade 3 pain and axillary swelling/tenderness: Defined as any use of prescription pain reliever; prevents daily activity.
[b] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.
[c] Grade 3 fatigue, myalgia, arthralgia: Defined as significant; prevents daily activity.

[d] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.
[e] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.
[f] Grade 3 nausea/vomiting: Defined as prevents daily activity; requires outpatient intravenous hydration.
[g] Grade 3 fever: Defined as ≥39.0° – ≤40.0°C / ≥102.1° – ≤104.0°F.
[h] Percentage based on participants in the Solicited Safety Set (N=1,351).

In participants who received a booster dose, the median duration of solicited local and systemic adverse reactions was 2 to 3 days.

Unsolicited Adverse Events

Participants were monitored for unsolicited adverse events for up to 28 days following the booster dose. Serious adverse events and medically attended adverse events were recorded for the entire study duration. As of August 15, 2022, among the 1,405 participants who had received a booster dose of SPIKEVAX, unsolicited adverse events that occurred within 28 days following vaccination were reported by 14.9% of participants (n=209). In these analyses, 85.7% of study participants had at least 6 months of follow-up after the booster dose. Overall, there were no notable differences in the safety profiles observed between participants who had received a booster dose of SPIKEVAX and those who had received a primary series.

Serious Adverse Events

Through the cut-off date of August 15, 2022, with a median follow-up duration of 204 days after the booster dose, there were no serious adverse events considered causally related to the vaccine.

Moderna COVID-19 Vaccine, Bivalent Administered as a Second Booster Dose in Participants 18 Years and Older

Study 5 (NCT04927065), a Phase 2/3 open-label study with multiple parts conducted in the United States, evaluated the immunogenicity, safety, and reactogenicity of a second booster dose of Moderna COVID-19 Vaccine, Bivalent (50 mcg mRNA) compared to a second booster dose of SPIKEVAX (50 mcg mRNA) when administered to participants 18 years of age and older who had previously received a primary series and a first booster dose with SPIKEVAX at least 3 months prior. The safety analysis set included 511 participants in the Moderna COVID-19 Vaccine, Bivalent booster dose group and 376 participants in the SPIKEVAX booster dose group.

For the Moderna COVID-19 Vaccine, Bivalent group, the median age of the population was 50 years (range 19-89); 79.5% of participants were 18 years through 64 years of age and 20.5% were 65 years of age and older. Overall, 38.2% were male, 61.8% were female, 11.4% were Hispanic or Latino, 83.4% were White, 11.0% were African American, 2.2% were Asian, 0.2% were American Indian or Alaska Native, 1.2% were other races, and 1.6% were Multiracial. For the SPIKEVAX group, the median age of the population was 61 years (range 20-96); 60.1% of participants were 18 years through 64 years of age and 39.9% were 65 years of age and older. Overall, 49.5% were male, 50.5% were female, 9.8% were Hispanic or Latino, 85.6% were White, 7.4% were African American, 4.3% were Asian, 0.3% were American Indian or Alaska Native, 0.3% were Native Hawaiian or Pacific Islander, 0.5% were other races, and 0.5% were

Multiracial.

In these analyses, the median follow-up time after the booster dose through the cutoff date (September 23, 2022) for the Moderna COVID-19 Vaccine, Bivalent recipients was 37 days. The median follow-up time after the booster dose through the cutoff date (July 6, 2022) for the SPIKEVAX recipients was 127 days.

Solicited Adverse Reactions

Local and systemic adverse reactions and use of antipyretic medication were solicited in an electronic diary for 7 days following each injection (i.e., day of vaccination and the next 6 days) among participants receiving Moderna COVID-19 Vaccine, Bivalent and participants receiving SPIKEVAX. Events that persisted for more than 7 days were followed until resolution.

Table 7 and Table 8 present the frequency and severity of reported solicited local and systemic adverse reactions within 7 days following a second booster dose with Moderna COVID-19 Vaccine, Bivalent compared to SPIKEVAX in participants 18 years through 64 years of age and 65 years of age and older.

Table 7: Number and Percentage of Participants 18 Years Through 64 Years of Age with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After a Second Booster Dose with Moderna COVID-19 Vaccine, Bivalent Compared to a Second Booster Dose with SPIKEVAX (Solicited Safety Set)†

	Moderna COVID-19 Vaccine, Bivalent Booster Dose N=402-403 n (%)	**SPIKEVAX Booster Dose N=210 n (%)**
Local Adverse Reactions		
Pain	347 (86.3)	174 (82.9)
Pain, Grade 3[a]	19 (4.7)	4 (1.9)
Axillary swelling/tenderness	91 (22.6)	38 (18.1)
Axillary swelling/tenderness, Grade 3[a]	1 (0.2)	4 (1.9)
Swelling (hardness) ≥25 mm	32 (8.0)	14 (6.7)
Swelling (hardness), Grade 3[b]	2 (0.5)	2 (1.0)
Erythema (redness) ≥25 mm	17 (4.2)	10 (4.8)
Erythema (redness), Grade 3[b]	3 (0.7)	1 (0.5)
Systemic Adverse Reactions		
Fatigue	243 (60.3)	114 (54.3)
Fatigue, Grade 3[c]	14 (3.5)	7 (3.3)
Headache	210 (52.2)	99 (47.1)
Headache, Grade 3[d]	11 (2.7)	1 (0.5)
Myalgia	197 (49.0)	89 (42.4)
Myalgia, Grade 3[c]	17 (4.2)	8 (3.8)
Arthralgia	145 (36.1)	68 (32.4)
Arthralgia, Grade 3[c]	9 (2.2)	2 (1.0)

Chills	96 (23.9)	54 (25.7)
Chills, Grade 3[e]	3 (0.7)	0 (0)
Nausea/vomiting	67 (16.7)	27 (12.9)
Nausea/vomiting, Grade 3[f]	1 (0.2)	0 (0)
Fever	16 (4.0)	9 (4.3)
Fever, Grade 3[g]	1 (0.2)	0 (0)
Use of antipyretic or pain medication[h]	159 (39.5)	67 (31.9)

* 7 days included day of vaccination and the subsequent 6 days. Events and use of antipyretic or pain medication were collected in the electronic diary (e-diary). Solicited Safety Set consisted of participants who received a booster dose and contributed solicited adverse reaction data.

† Absence of rows for Grade 4 adverse reactions indicates no events were reported.

N=Number of participants in the Solicited Safety Set who had available data for the solicited adverse reactions.

[a] Grade 3 pain and axillary swelling/tenderness: Defined as any use of prescription pain reliever; prevents daily activity.

[b] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.

[c] Grade 3 fatigue, myalgia, arthralgia: Defined as significant; prevents daily activity.

[d] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.

[e] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.

[f] Grade 3 nausea/vomiting: Defined as prevents daily activity; requires outpatient intravenous hydration.

[g] Grade 3 fever: Defined as ≥39.0° – ≤40.0°C / ≥102.1° – ≤104.0°F.

[h] Percentage based on participants in the Solicited Safety Set (N=403) for Moderna COVID-19 Vaccine, Bivalent and N=210 for SPIKEVAX.

Table 8: Number and Percentage of Participants 65 Years of Age and Older with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After a Second Booster Dose with Moderna COVID-19 Vaccine, Bivalent Compared to a Second Booster Dose with SPIKEVAX (Solicited Safety Set)†

	Moderna COVID-19 Vaccine, Bivalent Booster Dose N=105 n (%)	**SPIKEVAX Booster Dose N=139-140 n (%)**
Local Adverse Reactions		
Pain	71 (67.6)	94 (67.1)
Pain, Grade 3[a]	1 (1.0)	0 (0)
Axillary swelling/tenderness	15 (14.3)	15 (10.7)
Swelling (hardness) ≥25 mm	8 (7.6)	8 (5.7)
Swelling (hardness), Grade 3[b]	3 (2.9)	3 (2.1)
Erythema (redness) ≥25 mm	6 (5.7)	3 (2.1)
Erythema (redness), Grade 3[b]	2 (1.9)	1 (0.7)
Systemic Adverse Reactions		

Fatigue	61 (58.1)	65 (46.8)
Fatigue, Grade 3[c]	3 (2.9)	4 (2.9)
Headache	39 (37.1)	44 (31.7)
Headache, Grade 3[d]	1 (1.0)	1 (0.7)
Myalgia	38 (36.2)	45 (32.4)
Myalgia, Grade 3[c]	3 (2.9)	5 (3.6)
Arthralgia	32 (30.5)	42 (30.2)
Arthralgia, Grade 3[c]	0 (0)	1 (0.7)
Chills	16 (15.2)	20 (14.4)
Chills, Grade 3[e]	1 (1.0)	1 (0.7)
Nausea/vomiting	4 (3.8)	8 (5.8)
Fever	4 (3.8)	2 (1.4)
Use of antipyretic or pain medication[f]	38 (36.2)	40 (28.6)

* 7 days included day of vaccination and the subsequent 6 days. Events and use of antipyretic or pain medication were collected in the electronic diary (e-diary). Solicited Safety Set consisted of participants who received a booster dose and contributed solicited adverse reaction data.

† Absence of rows for Grade 3 or Grade 4 adverse reactions indicates no events were reported.

N=Number of participants in the Solicited Safety Set who had available data for the solicited adverse reactions.

[a] Grade 3 pain: Defined as any use of prescription pain reliever; prevents daily activity.

[b] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.

[c] Grade 3 fatigue, myalgia, arthralgia: Defined as significant; prevents daily activity.

[d] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.

[e] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.

[f] Percentage based on participants in the Solicited Safety Set (N=105) for Moderna COVID-19 Vaccine, Bivalent and N=140 for SPIKEVAX.

The median duration of solicited local and systemic adverse reactions was 3 days in participants who received either vaccine booster dose.

Unsolicited Adverse Events

Participants were monitored for unsolicited adverse events for up to 28 days following the booster dose. Serious adverse events and medically attended adverse events will be recorded for the entire study duration. As of September 23, 2022, among participants who had received a booster dose of Moderna COVID-19 Vaccine, Bivalent (n=511), unsolicited adverse events that occurred within 28 days following vaccination were reported by 22.7% of participants (n=116). As of July 6, 2022, among participants who had received a booster dose of SPIKEVAX (n=376), unsolicited adverse events that occurred within 28 days following vaccination were reported by 21.3% of participants (n=80). In these analyses, 99.6% of study participants in the Moderna COVID-19 Vaccine, Bivalent group had at least 28 days of follow-up after the booster dose to the cut-off date (September 23, 2022) and 100.0% of participants in the SPIKEVAX group had at least 28 days of follow-up after the booster dose to the cutoff date (July 6, 2022). There were no notable differences in specific categories of adverse events that were

reported between the vaccine groups.

Serious Adverse Events

As of the cutoff date (September 23, 2022), the median duration of follow-up was 37 days among Moderna COVID-19 Vaccine, Bivalent booster dose recipients. Serious adverse events were reported by 0.6% of participants (n=3) who received Moderna COVID-19 Vaccine, Bivalent. As of the cutoff date (July 6, 2022), the median duration of follow-up was 127 days among the SPIKEVAX booster dose recipients. Serious adverse events were reported by 2.7% of participants (n=10) who received SPIKEVAX. None of the events in either vaccine group were considered to be related to vaccine.

Moderna COVID-19 Vaccine, Bivalent Administered as a Single Dose in Participants 12 Years Through 17 Years of Age

Safety data for a single dose of Moderna COVID-19 Vaccine, Bivalent in adolescents were collected in an ongoing Phase 3 clinical trial with multiple parts. The open-label single dose portion of the study conducted in the United States and the Dominican Republic included 379 participants 12 years through 17 years of age who were COVID-19 vaccine-naïve and received a single 50 mcg dose of Moderna COVID-19 Vaccine, Bivalent (Study 3, NCT04649151). Overall, 52.8% were male, 47.2% were female, 94.5% were Hispanic or Latino, 10.3% were White, 32.2% were African American or Black, 56.7% were other races, and 0.8% were Multiracial. Of the 379 participants, 99.7% had evidence of prior SARS-CoV-2 infection at baseline (immunologic or virologic evidence of prior SARS-CoV-2 infection [defined as positive RT-PCR test and/or positive Elecsys immunoassay result at Day 1]). The median duration of follow-up for safety after vaccination was 35 days.

Solicited Adverse Reactions

Local and systemic adverse reactions and use of antipyretic medication were solicited in an electronic diary for 7 days following the injection (i.e., day of vaccination and the next 6 days) among participants receiving a single dose of Moderna COVID-19 Vaccine, Bivalent. Events that persisted for more than 7 days were followed until resolution.

Table 9 presents the frequency and severity of reported solicited local and systemic adverse reactions among Moderna COVID-19 Vaccine, Bivalent single dose recipients 12 years through 17 years of age within 7 days of vaccination.

Table 9: Number and Percentage of Adolescents 12 Years Through 17 Years of Age with Solicited Local and Systemic Adverse Reactions Starting Within 7 Days* After a Single Dose of Moderna COVID-19 Vaccine, Bivalent (Solicited Safety Set)†

	Moderna COVID-19 Vaccine, Bivalent Single Dose N=377-378 n (%)
Local Adverse Reactions	
Pain	161 (42.6)
Pain, Grade 3[a]	4 (1.1)
Axillary swelling/tenderness	43 (11.4)

Axillary swelling/tenderness, Grade 3[a]	1 (0.3)
Swelling (hardness) ≥25 mm	10 (2.6)
Swelling (hardness), Grade 3[b]	3 (0.8)
Erythema (redness) ≥25 mm	11 (2.9)
Erythema (redness), Grade 3[b]	6 (1.6)
Systemic Adverse Reactions	
Fatigue	46 (12.2)
Headache	104 (27.6)
Headache, Grade 3[c]	5 (1.3)
Myalgia	59 (15.6)
Myalgia, Grade 3[d]	1 (0.3)
Arthralgia	37 (9.8)
Arthralgia, Grade 3[d]	1 (0.3)
Chills	20 (5.3)
Chills, Grade 3[e]	1 (0.3)
Nausea/vomiting	18 (4.8)
Fever	30 (7.9)
Fever, Grade 3[f]	10 (2.6)
Fever, Grade 4[g]	1 (0.3)
Use of antipyretic or pain medication[h]	76 (20.1)

* 7 days included day of vaccination and the subsequent 6 days. Events and use of antipyretic or pain medication were collected in the electronic diary (e-diary).
† Absence of rows for Grade 3 or Grade 4 adverse reactions indicates no events were reported.
N=Number of participants in the Solicited Safety Set who had available data for the solicited adverse reactions.
[a] Grade 3 pain and axillary swelling/tenderness: Defined as any use of prescription pain reliever; prevents daily activity.
[b] Grade 3 swelling and erythema: Defined as >100 mm / >10 cm.
[c] Grade 3 headache: Defined as significant; any use of prescription pain reliever or prevents daily activity.
[d] Grade 3 myalgia and arthralgia: Defined as significant; prevents daily activity.
[e] Grade 3 chills: Defined as prevents daily activity and requires medical intervention.
[f] Grade 3 fever: Defined as ≥39.0° – ≤40.0°C / ≥102.1° – ≤104.0°F.
[g] Grade 4 fever: Defined as >40.0°C / >104.0°F.
[h] Percentage based on participants in the Solicited Safety Set (N=378).

The median duration of solicited local and systemic adverse reactions was 2 days.

Unsolicited Adverse Events

Participants were monitored for unsolicited adverse events for up to 28 days vaccination. Serious adverse events and medically attended adverse events will be recorded for the entire study duration. As of June 5, 2023, among the 379 participants who had received a single dose of Moderna COVID-19 Vaccine, Bivalent, unsolicited adverse events that occurred within 28 days following vaccination were reported by 12.9% of participants (n=49). In these analyses, 68.9% of study participants had at

least 28 days of follow-up after vaccination. There were no unsolicited adverse events not already captured by solicited local and systemic reactions that were considered causally related to SPIKEVAX.

Serious Adverse Events

Through the cut-off date of June 5, 2023, with a median follow-up duration of 35 days after vaccination, serious adverse events were reported by 0.8% of participants (n=3). None of these events were considered to be related to vaccine.

6.2 Postmarketing Experience

The following adverse reactions have been identified during postmarketing use of SPIKEVAX or Moderna COVID-19 Vaccine, Bivalent. Because these reactions are reported voluntarily, it is not always possible to reliably estimate their frequency or establish a causal relationship to vaccine exposure.

Cardiac Disorders: myocarditis, pericarditis
Immune System Disorders: anaphylaxis, urticaria
Nervous System Disorders: syncope

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Exposure Registry

There is a pregnancy exposure registry that monitors pregnancy outcomes in women exposed to SPIKEVAX during pregnancy. Women who are vaccinated with SPIKEVAX during pregnancy are encouraged to enroll in the registry by calling 1-866-MODERNA (1-866-663-3762).

Risk Summary

All pregnancies have a risk of birth defect, loss, or other adverse outcomes. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2% to 4% and 15% to 20%, respectively. Available data on SPIKEVAX administered to pregnant women are insufficient to inform vaccine-associated risks in pregnancy.

A developmental toxicity study was performed in female rats administered the equivalent of a single primary series dose of SPIKEVAX twice prior to mating and twice during gestation. The study revealed no evidence of harm to the fetus due to the vaccine (*see Animal Data*).

Data

Animal Data

In a developmental toxicity study, 0.2 mL of a vaccine formulation containing the same quantity of nucleoside-modified messenger ribonucleic acid (mRNA) (100 mcg) and other ingredients included in a single primary series dose of SPIKEVAX for individuals 12 years of age and older was administered to female rats by the intramuscular route on four occasions: 28 and 14 days prior to mating, and on gestation days 1 and 13. No vaccine-related fetal malformations or variations and no adverse effect on postnatal

development were observed in the study.

Clinical Considerations

Disease-Associated Maternal and/or Embryo/Fetal Risk

Pregnant individuals infected with SARS-CoV-2 are at increased risk of severe COVID-19 compared with non-pregnant individuals.

8.2 Lactation

Risk Summary

It is not known whether SPIKEVAX is excreted in human milk. Data are not available to assess the effects of SPIKEVAX on the breastfed infant or on milk production/excretion. The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for SPIKEVAX and any potential adverse effects on the breastfed infant from SPIKEVAX or from the underlying maternal condition. For preventive vaccines, the underlying maternal condition is susceptibility to disease prevented by the vaccine.

8.4 Pediatric Use

Safety and effectiveness of SPIKEVAX have not been established in individuals less than 12 years of age. Evidence from clinical studies in individuals 6 months through 23 months of age strongly suggest that a single dose of SPIKEVAX would be ineffective in individuals younger than 2 years of age.

8.5 Geriatric Use

Clinical studies of SPIKEVAX and Moderna COVID-19 Vaccine, Bivalent included approximately 7,800 participants 65 years of age and older and 1,400 participants 75 years of age and older *[see Adverse Reactions (6.1) and Clinical Studies (14)]*.

Some local and systemic adverse reactions were reported in a lower proportion of participants 65 years of age and older compared to participants 18 years through 64 years of age *[see Adverse Reactions (6.1)]*.

Vaccine effectiveness was similar between participants 65 years of age and older and participants 18 years through 64 years *[see Clinical Studies (14.1 and 14.5)]*.

8.6 Immunocompromised Individuals

The Centers for Disease Control and Prevention has published considerations related to COVID-19 vaccination for individuals who are moderately to severely immunocompromised (https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html).

11 DESCRIPTION

SPIKEVAX (COVID-19 Vaccine, mRNA) is a sterile white to off-white suspension for intramuscular injection.

Each 0.5 mL dose of SPIKEVAX (2023-2024 Formula) contains 50 mcg nucleoside-modified messenger RNA (mRNA) encoding the pre-fusion stabilized Spike glycoprotein

(S) of the SARS-CoV-2 Omicron variant lineage XBB.1.5. Each dose also contains the following ingredients: a total lipid content of 1.01 mg (SM-102, polyethylene glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]), 0.25 mg tromethamine, 1.2 mg tromethamine hydrochloride, 0.021 mg acetic acid, 0.10 mg sodium acetate trihydrate, and 43.5 mg sucrose.

SPIKEVAX does not contain a preservative.

The vial stoppers and rubber tip cap and plunger used for the single dose syringes are not made with natural rubber latex.

12 CLINICAL PHARMACOLOGY

12.1 Mechanism of Action

The nucleoside-modified mRNA in SPIKEVAX is formulated in lipid particles, which enable delivery of the nucleoside-modified mRNA into host cells to allow expression of the SARS-CoV-2 S antigen. The vaccine elicits an immune response to the S antigen, which protects against COVID-19.

13 NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

SPIKEVAX has not been evaluated for carcinogenic, mutagenic potential, or impairment of male fertility in animals. A developmental toxicity study was conducted in female rats that received a vaccine formulation containing nucleoside-modified messenger ribonucleic acid (mRNA) (100 mcg) and other ingredients included in a single human dose of SPIKEVAX. No impact on female fertility was reported *(see Use in Specific Populations [8.1])*.

14 CLINICAL STUDIES

14.1 Efficacy of SPIKEVAX Two-Dose Primary Series in Participants 18 Years of Age and Older

Study 1 is an ongoing Phase 3 clinical trial with multiple parts. The randomized, placebo-controlled, observer-blind phase evaluated the efficacy, safety, and immunogenicity of SPIKEVAX in participants 18 years of age and older in the United States. Randomization was stratified by age and health risk: 18 to <65 years of age without comorbidities (not at risk for progression to severe COVID-19), 18 to <65 years of age with comorbidities (at risk for progression to severe COVID-19), and 65 years of age and older with or without comorbidities. Participants who were immunocompromised and those with a known history of SARS-CoV-2 infection were excluded from the study. Participants with no known history of SARS-CoV-2 infection but with positive laboratory results indicative of infection at study entry were included. The study allowed for the inclusion of participants with stable pre-existing medical conditions, defined as disease not requiring significant change in therapy or hospitalization for worsening disease during the 3 months before enrollment, as well as participants with stable human immunodeficiency virus (HIV) infection. A total of 30,415 participants were randomized equally to receive 2

doses of SPIKEVAX or saline placebo 1 month apart. Participants will be followed for efficacy and safety until 2 years after the second dose.

The primary efficacy analysis population (referred to as the Per-Protocol Set) included 28,451 participants who received two doses (at 0 and 1 month) of either SPIKEVAX (100 mcg mRNA per dose; n=14,287) or placebo (n=14,164), and had a negative baseline SARS-CoV-2 status. In the Per-Protocol Set, 47.5% of participants were female, 19.7% were Hispanic or Latino; 79.7% were White, 9.7% were African American, 4.7% were Asian, and 2.0% other races. The median age of participants was 53 years (range 18-95) and 25.4% of participants were 65 years of age and older. Of the study participants in the Per-Protocol Set, 22.8% were at increased risk of severe COVID-19 due to at least one pre-existing medical condition (chronic lung disease, significant cardiac disease, severe obesity, diabetes, liver disease, or HIV infection) regardless of age. There were no notable differences in demographics or pre-existing medical conditions between participants who received SPIKEVAX and those who received placebo.

The population for the vaccine efficacy analysis included participants 18 years of age and older who were enrolled from July 27, 2020, and followed for the development of COVID-19 through the data cutoff of March 26, 2021, or the Participant Decision Visit for treatment unblinding, whichever was earlier. The median length of follow-up for participants in the blinded placebo-controlled phase of the study was 4 months following Dose 2.

Efficacy Against COVID-19

COVID-19 was defined based on the following criteria: The participant must have experienced at least two of the following systemic symptoms: fever (≥38ºC / ≥100.4ºF), chills, myalgia, headache, sore throat, new olfactory and taste disorder(s); or the participant must have experienced at least one of the following respiratory signs/symptoms: cough, shortness of breath or difficulty breathing, or clinical or radiographical evidence of pneumonia; and the participant must have at least one NP swab, nasal swab, or saliva sample (or respiratory sample, if hospitalized) positive for SARS-CoV-2 by RT-PCR. COVID-19 cases were adjudicated by a Clinical Adjudication Committee.

There were 55 COVID-19 cases in the SPIKEVAX group and 744 cases in the placebo group, with a vaccine efficacy of 93.2% (95% confidence interval of 91.0% to 94.8%) (Table 10).

SARS-CoV-2 identified in the majority of COVID-19 cases in this study were sequenced to be the B.1.2 variant. Additional SARS-CoV-2 variants identified in this study included B.1.427/B.1.429 (Epsilon), P.1 (Gamma), and P.2 (Zeta). Representation of identified variants among cases in the vaccine versus placebo recipients did not suggest decreased vaccine effectiveness against these variants.

Table 10: Vaccine Efficacy Against COVID-19* in Participants 18 Years of Age and Older Starting 14 Days After Dose 2 per Adjudication Committee Assessments – Per-Protocol Set

	SPIKEVAX[a]			**Placebo[b]**			
			Incidence Rate of COVID-			**Incidence Rate of COVID-**	

Age Subgroup (Years)	Participants (N)	COVID-19 Cases (n)	19 per 1,000 Person-Years	Participants (N)	COVID-19 Cases (n)	19 per 1,000 Person-Years	% Vaccine Efficacy (95% CI)[c]
All participants	14,287	55	9.6	14,164	744	136.6	93.2 (91.0, 94.8)
18 to <65	10,661	46	10.7	10,569	644	159.0	93.4 (91.1, 95.1)
≥65	3,626	9	6.2	3,595	100	71.7	91.5 (83.2, 95.7)

* COVID-19: symptomatic COVID-19 requiring positive RT-PCR result and at least two systemic symptoms (fever [≥38ºC / ≥100.4ºF], chills, myalgia, headache, sore throat, new olfactory and taste disorder[s]) or one respiratory symptom (cough, shortness of breath or difficulty breathing, or clinical or radiographical evidence of pneumonia). Cases starting 14 days after Dose 2.
[a] SPIKEVAX dosing was a two-dose series (100 mcg mRNA per dose) 1 month apart.
[b] Placebo dosing was a two-dose series (saline solution) 1 month apart.
[c] VE and 95% CI from the stratified Cox proportional hazard model.

Severe COVID-19 was defined based on confirmed COVID-19 as per the primary efficacy endpoint case definition, plus any of the following: Clinical signs indicative of severe systemic illness, respiratory rate ≥30 per minute, heart rate ≥125 beats per minute, SpO2 ≤93% on room air at sea level or PaO2/FIO2 <300 mm Hg; or respiratory failure or ARDS (defined as needing high-flow oxygen, non-invasive or mechanical ventilation, or ECMO), evidence of shock (systolic blood pressure <90 mmHg, diastolic BP <60 mmHg or requiring vasopressors); or significant acute renal, hepatic, or neurologic dysfunction; or admission to an intensive care unit or death.

Among all participants in the Per-Protocol Set analysis, which included COVID-19 cases confirmed by an adjudication committee, 2 cases of severe COVID-19 were reported in the SPIKEVAX group compared with 106 cases reported in the placebo group, with a vaccine efficacy of 98.2% (95% confidence interval of 92.8% to 99.6%) (Table 11).

Table 11: Vaccine Efficacy Against Severe COVID-19* in Participants 18 Years of Age and Older Starting 14 Days After Dose 2 per Adjudication Committee Assessments – Per-Protocol Set

SPIKEVAX[a]			Placebo[b]			
Participants (N)	**Severe COVID-19 Cases (n)**	**Incidence Rate of COVID-19 per 1,000 Person-Years**	**Participants (N)**	**Severe COVID-19 Cases (n)**	**Incidence Rate of COVID-19 per 1,000 Person-Years**	**% Vaccine Efficacy (95% CI)[c]**
14,287	2	0.3	14,164	106	19.1	98.2 (92.8, 99.6)

* Severe COVID-19: symptomatic COVID-19 requiring positive RT-PCR result and at least two systemic symptoms or one respiratory symptom, plus any of the following: Clinical signs indicative of severe systemic illness, respiratory rate ≥30 per minute, heart rate ≥125 beats per minute, SpO2 ≤93% on room air at sea level or PaO2/FIO2 <300 mm Hg; or respiratory failure or ARDS (defined as needing high-flow oxygen, non-invasive or mechanical ventilation, or ECMO), evidence of shock (systolic blood pressure <90 mmHg, diastolic BP <60 mmHg or requiring vasopressors); or significant acute renal, hepatic, or neurologic dysfunction; or admission to an intensive care unit or death. Cases starting 14 days after Dose 2.
[a] SPIKEVAX dosing was a two-dose series (100 mcg mRNA per dose) 1 month apart.
[b] Placebo dosing was a two-dose series (saline solution) 1 month apart.
[c] VE and 95% CI from the stratified Cox proportional hazard model.

In an exploratory analysis, occurrence of asymptomatic SARS-CoV-2 infection was assessed among participants in the Per-Protocol Set (enrolled from July 27, 2020, and followed maximally through March 26, 2021). Asymptomatic SARS-CoV-2 infection was defined as having a positive scheduled serology test based on binding antibody against SARS-CoV-2 nucleocapsid protein as measured by the Roche Elecsys immunoassay (N-serology) and/or a positive RT-PCR test for SARS-CoV-2, in the absence of any reported COVID-19 symptoms included as part of the primary efficacy endpoint case definition (described above) or symptoms included in the secondary COVID-19 endpoint case definition (fever ≥38°C / ≥100.4°F, chills, cough, shortness of breath or difficulty breathing, fatigue, muscle aches, body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea, vomiting, or diarrhea) at any time during the study. To assess for asymptomatic infection starting 14 days after Dose 2, all participants had scheduled blood draws for N-serology collected at the 1-month post-Dose 2 visit and the 6-month post-Dose 2 visit (if still blinded to treatment arm), and scheduled N-serology and nasopharyngeal swab for RT-PCR collection at the Participant Decision Visit for treatment unblinding.

In the Per-Protocol Set, 14,287 participants in the SPIKEVAX group and 14,164 participants in the placebo group had N-serology and/or RT-PCR results available from one or more of the pre-specified timepoints listed above. Among these participants, there were 180 cases of asymptomatic SARS-CoV-2 infection in the SPIKEVAX group compared with 399 cases in the placebo group. Limitations of this analysis include the infrequently scheduled assessments for serology and PCR testing, which may not have captured all cases of asymptomatic infections which occurred during the study.

14.2 Effectiveness of SPIKEVAX Two-Dose Primary Series in Participants 12 Years Through 17 Years of Age

Study 3 is an ongoing Phase 3 clinical trial with multiple parts. The randomized, placebo-controlled, observer-blind phase evaluated the safety, reactogenicity, and effectiveness of SPIKEVAX in participants ages 12 years through 17 years in the United States. Participants with a known history of SARS-CoV-2 infection were excluded from the study. A total of 3,733 participants were randomized 2:1 to receive 2 doses of SPIKEVAX (100 mcg mRNA per dose) or saline placebo 1 month apart. Among participants assessed for immunogenicity, 52.4% of participants were male, 47.6% were female, 7.6% were Hispanic or Latino; 83.5% were White, 1.2% were African American, 4.4% were Asian, 0.3% were Native Hawaiian or Pacific Islander, 2.1% were other races, and 5.6% were Multiracial.

Effectiveness in individuals 12 years through 17 years of age is based on a comparison of immune responses in this age group to adults 18 years through 25 years of age.

In Study 3, an analysis was conducted of SARS-CoV-2 50% neutralizing titers and seroresponse rates 28 days after Dose 2 in a subset of participants 12 years through 17 years of age in Study 3 and participants 18 years through 25 years of age in Study 1 who had no immunologic or virologic evidence of prior SARS-CoV-2 at baseline. Noninferior immune responses as assessed by geometric mean 50% neutralizing titers and seroresponse rates were demonstrated in a comparison of participants 12 years through 17 years of age to participants 18 years through 25 years of age (Table 12).

Table 12: Comparison of Geometric Mean Titer Ratio and Seroresponse Rate Against a Pseudovirus Expressing the Original SARS-CoV-2 Spike Protein (D614G) at 28 Days After Completion of the Primary Series of SPIKEVAX,* Participants 12 Years Through 17 Years of Age vs Participants 18 Years Through 25 Years of Age – Per-Protocol Immunogenicity Subset

12 Years Through 17 Years N=340	18 Years Through 25 Years N=295	12 Years Through 17 Years/ 18 Years Through 25 Years	
GMT (95% CI)[a]	**GMT (95% CI)[a]**	**GMT Ratio (95% CI)[b]**	**Met Success Criteria[c]**
1401.7 (1276.2, 1539.5)	1299.9 (1175.4, 1437.5)	1.1 (0.9, 1.2)	Yes
Seroresponse %[d] (95% CI)[e]	**Seroresponse %[d] (95% CI)[e]**	**Difference in Seroresponse Rate % (95% CI)[f]**	**Met Success Criteria[c]**
98.8 (97.0, 99.7)	99.0 (97.1, 99.8)	-0.2 (-2.1, 1.9)	Yes

N=Number of subjects with non-missing data at the corresponding timepoint.
GMT=Geometric mean titers

* SPIKEVAX dosing was a two-dose series (100 mcg mRNA per dose) 1 month apart.

[a] Antibody values reported as below the lower limit of quantification (LLOQ) are replaced by 0.5 x LLOQ. Values greater than the upper limit of quantification (ULOQ) are replaced by the ULOQ if actual values are not available.

[b] The log-transformed antibody levels are analyzed using an analysis of covariance (ANCOVA) model with the group variable (adolescents in Study 3 and young adults in Study 1) as fixed effect. The resulted LS means, difference of LS means, and 95% CI are back transformed to the original scale for presentation.

[c] Noninferiority is declared if the lower bound of the 2-sided 95% CI for the GMT Ratio is greater than 0.67, with a point estimate of >0.8 and the lower bound of the 2-sided 95% CI for difference in seroresponse rate is greater than -10%, with a point estimate of >-5%.

[d] Proportion of participants who met seroresponse definition.

[e] Seroresponse due to vaccination specific to pseudovirus neutralizing antibody ID50 titer at a subject level is defined as at least 4-fold rise from baseline, where baseline

titers <LLOQ are set to LLOQ for the analysis. 95% CI is calculated using the Clopper-Pearson method.
[f] Difference in seroresponse rate 95% CI is calculated using the Miettinen-Nurminen (score) confidence limits.
Note: SARS-CoV-2 50% inhibitory dose (ID50) neutralization titers were determined using a SARS-CoV-2 Spike-Pseudotyped Virus Neutralization Assay. Quantification of SARS-CoV-2 neutralizing antibodies utilizes lentivirus particles expressing SARS-CoV-2 Spike protein on their surface and contains a firefly luciferase (Luc) reporter gene for quantitative measurements of infection by relative luminescence units (RLU). Neutralization is measured as the serum dilution at which RLU is reduced by 50% (ID50) relative to mean RLU in virus control wells but after subtraction of mean RLU in cell control wells.

A descriptive efficacy analysis evaluating confirmed COVID-19 cases accrued up to the blinded data cutoff date of May 31, 2021, was performed in 3,186 participants who received two doses (at 0 and 1 month) of either SPIKEVAX (n=2,142) or placebo (n=1,044) and had a negative baseline SARS-CoV-2 status (referred to as the Per-Protocol Set for Efficacy). In the Per-Protocol Set for Efficacy, 51.5% were male, 48.5% were female, 11.0% were Hispanic or Latino; 84.0% were White, 2.7% were African American, 6.2% were Asian, 0.5% were American Indian or Alaska Native, <0.1% were Native Hawaiian or Pacific Islander, 0.9% were other races, and 4.8% were Multiracial. There were no notable differences in demographics between participants who received SPIKEVAX and those who received placebo.

The population for the vaccine efficacy analysis included participants 12 years through 17 years of age who were enrolled from December 9, 2020, and followed for the development of COVID-19 through the data cutoff of May 31, 2021. The median length of follow-up for participants in the blinded, placebo-controlled phase of the study was 112 days following Dose 2.

The efficacy information in participants 12 years through 17 years of age is presented in Table 13.

Table 13: Efficacy Analyses: COVID-19 in Participants 12 Years Through 17 Years of Age Starting 14 Days After Dose 2 – Per-Protocol Set for Efficacy

	SPIKEVAX[a] N=2,142		**Placebo[b]** N=1,044		
	COVID-19 Cases (n)	**Incidence Rate of COVID-19 per 1,000 Person-Years**	**COVID-19 Cases (n)**	**Incidence Rate of COVID-19 per 1,000 Person-Years**	**% Vaccine Efficacy (95% CI)[c]**
COVID-19 Case Definition 1[d]	0	0	6	21.5	100.0 (61.2, NE)
COVID-19 Case Definition 2[e]	2	3.3	9	32.4	89.9 (51.0, 98.9)

NE=Not estimable

[a] SPIKEVAX dosing was a two-dose series (100 mcg mRNA per dose) 1 month apart.
[b] Placebo dosing was a two-dose series (saline solution) 1 month apart.
[c] Vaccine efficacy defined as 1 - ratio of incidence rate (SPIKEVAX vs. placebo). The 95% CI of the ratio is calculated using the exact method conditional upon the total number of cases, adjusting for person-years.
[d] COVID-19 Case Definition 1: Participant must have experienced at least two of the following systemic symptoms: fever (≥38°C / ≥100.4°F), chills, myalgia, headache, sore throat, new olfactory and taste disorder(s); or the participant must have experienced at least one of the following respiratory signs/symptoms: cough, shortness of breath or difficulty breathing, or clinical or radiographical evidence of pneumonia; and the participant must have at least one NP swab, nasal swab, or saliva sample (or respiratory sample, if hospitalized) positive for SARS- CoV-2 by RT-PCR.
[e] COVID-19 Case Definition 2: Presence of at least one symptom from a list of COVID-19 symptoms and a positive NP swab or saliva sample for SARS-CoV-2 by RT-PCR. Listed symptoms were fever (temperature >38°C / ≥100.4°F), or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle aches, or body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea, or vomiting or diarrhea.

14.3 Immunogenicity of a Single Dose of Moderna COVID-19 Vaccine, Bivalent in COVID-19 Vaccine-Naïve Individuals with Evidence of Prior SARS-CoV-2 Infection

In an open-label phase of Study 3 conducted in the United States and the Dominican Republic, participants 12 years through 17 years of age who were COVID-19 vaccine-naïve received a single dose (50 mcg mRNA) of Moderna COVID-19 Vaccine, Bivalent. Of the 246 participants in the immunogenicity subset, 99.6% had evidence of prior SARS-CoV-2 infection at baseline (immunologic or virologic evidence of prior SARS-CoV-2 infection [defined as positive RT-PCR test and/or positive Elecsys immunoassay result at Day 1]). The primary immunogenicity analysis population included 245 participants who were baseline SARS-COV-2 positive in Study 3 and a subset of 296 participants 18 years through 25 years of age from Study 1 who had no evidence of prior SARS-CoV-2 infection at baseline and received two doses (100 mcg mRNA per dose) of SPIKEVAX 1 month apart. Among participants 12 years through 17 years of age assessed for immunogenicity, 53.5% were male, 46.5% were female, 94.3% were Hispanic or Latino, 14.3% were White, 33.9% were African American or Black, 51.0% were other races, and 0.8% were Multiracial.

A comparison of neutralizing antibody concentrations against a pseudovirus expressing Omicron BA.4/BA.5 and the original SARS-CoV-2 Spike protein (D614G) was conducted. The primary immunogenicity analyses of the GMC ratio following the single dose in Study 3 compared to after the primary series in Study 1 met the pre-defined success criteria for superiority against Omicron BA.4/BA.5 and noninferiority against the Original strain. Secondary analyses included the difference in seroresponse rates, where seroresponse for a participant was defined as achieving a ≥4-fold rise of neutralizing antibody concentration from baseline (before the first dose of the primary series in Study 1 and the single dose in Study 3). These analyses are summarized in Table 14.

Table 14: Comparison of Geometric Mean Concentration and Seroresponse Rate 28 Days After a Single Dose of Moderna COVID-19 Vaccine, Bivalent in

Study 3 (Participants 12 Years Through 17 Years of Age) vs 28 Days After Completion of the Primary Series of SPIKEVAX in Study 1 (Participants 18 Years Through 25 Years of Age) – Per-Protocol Immunogenicity Subsets

Assay	Moderna COVID-19 Vaccine, Bivalent[a] Single Dose[b] GMC (95% CI)[c]	SPIKEVAX[d] Primary Series[e] GMC (95% CI)[c]	GMC Ratio (Moderna COVID-19 Vaccine, Bivalent/ SPIKEVAX) (95% CI)[c,f]
Omicron BA.4/BA.5	2771.0 (2570.0, 2987.6) N=245	56.6 (52.8, 60.6) N=294	49.0 (44.2, 54.2)
Original SARS-CoV-2 (D614G)	7187.1 (6480.5, 7970.8) N=243	1692.3 (1540.6, 1858.9) N=295	4.2 (3.7, 4.9)
	Moderna COVID-19 Vaccine, Bivalent Single Dose[b] Seroresponse[g] % (95% CI)[h]	**SPIKEVAX Primary Series[d] Seroresponse[g] % (95% CI)[h]**	**Difference in Seroresponse Rate (Moderna COVID-19 Vaccine, Bivalent-SPIKEVAX) % (95% CI)[i]**
Omicron BA.4/BA.5	94.7 (91.1, 97.1) N=245	0 (0, 1.2) N=294	94.7 (91.1, 96.9)
Original SARS-CoV-2 (D614G)	94.6 (91.0, 97.1) N=241	99.3 (97.6, 99.9) N=295	-4.7 (-8.4, -2.1)

N=Number of participants with non-missing data at the corresponding timepoint(s).

[a] Per-Protocol Immunogenicity Subset – Baseline SARS-CoV-2 Positive for Study 3 included all subjects who had serologic or virologic evidence of prior SARS-CoV-2 infection pre-dose 1, did not have a major protocol deviation that impacted immune response, and had both pre-dose 1 and post-dose 1 immunogenicity assessment at timepoint of primary interest (28 days post-Dose 1).

[b] Moderna COVID-19 Vaccine, Bivalent dosing was a single dose (50 mcg mRNA).

[c] The log-transformed antibody levels are analyzed using an analysis of covariance (ANCOVA) model with the group variable (Study 3 and Study 1) as fixed effect. The resulted LS means, difference of LS means, and 95% CI are back transformed to the original scale for presentation.

[d] Per-Protocol Immunogenicity Subset for Study 1 included all subjects who had both baseline (pre-vaccination) and post-vaccination immunogenicity samples, did not have SARS-CoV-2 infection at baseline, did not have a major protocol deviation that impacted immune response, and had post-injection immunogenicity assessment at timepoint of primary interest (28 days post-Dose 2).

[e] SPIKEVAX dosing was a two-dose series (100 mcg mRNA per dose) 1 month apart.

[f] The superiority of GMC against Omicron BA.4/BA.5 is demonstrated if the lower limit of the 2-sided 95% CI for the GMC Ratio is >1. The noninferiority of GMC against Original SARS-CoV-2 (D614G) is demonstrated if the lower limit of the 2-sided 95% CI for the GMC Ratio is >0.667.

[g] Seroresponse rate at Day 29 (in Study 3) and at Day 57 (in Study 1) from baseline (pre-Dose 1) is defined as the percentage of participants with at least a 4-fold rise if baseline is equal to or above LLOQ, or a change from a baseline below the LLOQ to equal or above 4 x LLOQ.
[h] 95% CI is calculated using the Clopper-Pearson method.
[i] 95% CI is calculated using the Miettinen-Nurminen (score) confidence limits.
Note: Antibody values < the lower limit of quantitation (LLOQ) are replaced by 0.5 × LLOQ. Values > the upper limit of quantitation (ULOQ) are replaced by the ULOQ if actual values are not available.

14.4 Immunogenicity of SPIKEVAX Administered as a First Booster Dose Following a SPIKEVAX Primary Series in Participants 18 Years of Age and Older

Effectiveness of a booster dose of SPIKEVAX was based on assessment of neutralizing antibody geometric mean concentration (GMC) against a pseudovirus expressing the original SARS-CoV-2 Spike protein (D614G). Immunogenicity analyses compared the GMC following the booster dose to the GMC following the primary series.

In the open-label booster dose phase of Study 1, the primary immunogenicity analysis population included 682 participants 18 years of age and older who received a single booster dose of SPIKEVAX (50 mcg mRNA) at least 6 months after completion of the primary series of SPIKEVAX (two doses of 100 mcg mRNA 1 month apart). Participants had no serologic or virologic evidence of SARS-CoV-2 infection prior to the first primary series dose and prior to the booster dose. Among participants assessed for immunogenicity, the median age at the time of booster dose was 59 years (range 19-87); 61.3% of participants were 18 years through 64 years of age, 38.7% were 65 years of age and older, 52.9% were male, 47.1% were female, 30.4% were Hispanic or Latino; 70.8% were White, 19.6% were African American, 2.5% were Asian, 1.3% were American Indian or Alaska Native, 0.4% were Native Hawaiian or Pacific Islander, 3.1% were other races, and 1.3% were Multiracial.

The primary immunogenicity analyses of the GMC ratio and difference in seroresponse rates following the booster dose compared to after the primary series met the pre-defined success criteria. Seroresponse for a participant was defined as achieving a ≥4-fold rise of neutralizing antibody concentration from baseline (before the first dose of the primary series). These analyses are summarized in Table 15.

Table 15: Comparison of Geometric Mean Concentration and Seroresponse Rate Against a Pseudovirus Expressing the Original SARS-CoV-2 Spike Protein (D614G) at 28 Days After a Booster Dose of SPIKEVAX vs 28 Days After Completion of the Primary Series of SPIKEVAX, Participants 18 Years of Age and Older, Per-Protocol Immunogenicity Set – Pre-booster SARS-CoV-2 Negative*

Booster Dose[a] N=636 GMC (95% CI)[b]	Primary Series[c] N=680 GMC (95% CI)[b]	GMC Ratio (Study 1 Booster Dose/ Study 1 Primary Series)[d]	Met Success Criteria
7750.3	1111.3	7.0	

7759.3 (7258.7, 8294.4)	1111.3 (1041.7, 1185.5)	7.0 (6.5, 7.5)	Yes[e]
Booster Dose[a] Seroresponse[d] N1=634 % (95% CI)[f]	**Primary Series[d] Seroresponse[d] N1=680 % (95% CI)[f]**	**Difference in Seroresponse Rate (Study 1 Booster Dose- Study 1 Primary Series) % (95% CI)[g]**	**Met Success Criterion**
100 (99.4, 100.0)	98.8 (97.7, 99.5)	0.9 (0.1, 1.8)	Yes[h]

N=Number of subjects with non-missing data at the corresponding timepoint.
N1=Number of participants with non-missing data at pre-vaccination baseline and 28 days post-Booster Dose in the booster dose group or 28 days post-Dose 2 in the primary series group.
* Per-Protocol Immunogenicity Set – Pre-booster SARS-CoV-2 Negative included all subjects who had both baseline (or Booster Dose Day 1) and post-vaccination immunogenicity samples, did not have evidence of prior SARS-CoV-2 infection at baseline and Booster Dose Day 1, did not have a major protocol deviation that impacted immune response, and had post-injection immunogenicity assessment at timepoint of primary interest (Booster Dose Day 29 for booster dose and Day 57 for primary series).
[a] SPIKEVAX dosing was a single booster dose (50 mcg mRNA).
[b] 95% CI is calculated based on the t-distribution of the log-transformed values for GMC, then back transformed to the original scale for presentation.
[c] SPIKEVAX dosing was a two-dose series (100 mcg mRNA per dose) 1 month apart.
[d] The log-transformed antibody levels are analyzed using paired t-test method with the group variable and 95% CI is calculated based on the t-distribution of the mean of paired difference in the log-transformed values, then back transformed to the original scale for presentation.
[e] Success criteria are met if the lower limit of the 2-sided 95% CI for the GMC ratio is ≥0.67 and the point estimate of the GMC ratio is >1.0.
[f] Seroresponse at a subject level is defined as a change from below the lowest limit of quantification (LLOQ) to equal or above 4 x LLOQ, or at least a 4-fold rise if baseline (Pre-vaccination [Dose 1]) is equal to or above the LLOQ. 95% CI is calculated using the Clopper-Pearson method.
[g] Difference in seroresponse rate and 95% CI are calculated using adjusted Wald method for the paired binary data. The number of subjects included in the comparison could be different from N1.
[h] Success criterion is met if the lower limit of the 2-sided 95% CI for the percentage difference is > -10%.
Note: Geometric mean concentration (GMC) was determined using a SARS-CoV-2 Spike-Pseudotyped Virus Neutralization Assay. Quantification of SARS-CoV-2 neutralizing antibodies utilizes a SARS-CoV-2 Reporter Virus Particles which express GFP for quantitative measurement of infection by counting the number of green fluorescent cells (assay readout [count] is Foci Forming Units [FFUs]). The serum antibody concentration (Ab[C]) of the neutralizing antibodies was determined by interpolating the mean of the replicate FFU values off the fitted reference standard curve (AU/mL).

A descriptive analysis evaluated seroresponse rates using pre-booster neutralizing antibody concentration. The booster dose seroresponse rate, with seroresponse defined as at least a 4-fold rise relative to the pre-booster concentration, was 98.4%. The difference in seroresponse rates in this post-hoc analysis was -0.8% (95% CI -2.1, 0.5).

14.5 Immunogenicity of SPIKEVAX Booster Dose Following SPIKEVAX Primary Series in Participants 12 Years Through 17 Years of Age

Effectiveness of a booster dose of SPIKEVAX in participants 12 years through 17 years of age was based on a comparison of immune responses, as assessed by neutralizing antibody concentration against a pseudovirus expressing the original SARS-CoV-2 Spike protein (D614G), following the booster dose in this age group to that following the primary series in adults 18 years through 25 years of age.

In an open-label booster phase of Study 3, participants who were 12 years through 17 years of age at the time of first dose of a primary series received a single booster dose of SPIKEVAX (50 mcg mRNA) at least 5 months (range 2.1 to 16.9) after completion of the primary series (two doses 1 month apart). The primary immunogenicity analysis population included 264 booster dose participants in Study 3 and a random subset of 295 participants 18 years through 25 years of age from Study 1 who received two doses of SPIKEVAX 1 month apart. Study 1 and Study 3 participants included in the analysis population had no serologic or virologic evidence of SARS-CoV-2 infection prior to the first primary series dose and prior to the booster dose, respectively. Among participants 12 years through 17 years of age assessed for immunogenicity, 50.8% were male, 49.2% were female, 12.5% were Hispanic or Latino; 87.9% were White, 1.5% were African American, 3.4% were Asian, 1.1% were other races, and 5.7% were Multiracial.

The primary immunogenicity analyses of the GMC ratio and difference in seroresponse rates following the booster dose in Study 3 compared to after the primary series in Study 1 met the pre-defined success criteria. Seroresponse for a participant was defined as achieving a ≥4-fold rise of neutralizing antibody concentration from baseline (before the first dose of the primary series in Study 1 and Study 3). These analyses are summarized in Table 16.

Table 16: Comparison of Geometric Mean Concentration and Seroresponse Rate Against a Pseudovirus Expressing the Original SARS-CoV-2 Spike Protein (D614G) at 28 Days After a Booster Dose of SPIKEVAX in Study 3 (Participants 13 Years Through 19 Years of Age) vs 28 Days After Completion of the Primary Series with SPIKEVAX in Study 1 (Participants 18 Years Through 25 Years of Age) – Per-Protocol Immunogenicity Subsets

Study 3[a] Booster Dose[b] N=264 GMC (95% CI)[c]	Study 1[d] Primary Series[e] N=294 GMC (95% CI)[c]	GMC Ratio (Study 2/Study 1) (95% CI)[f]	Met Success Criteria
7102.0 (6553.2, 7696.8)	1400.4 (1272.7, 1541.0)	5.1 (4.5, 5.7)	Yes[g]

Study 3 Booster Dose[b] Seroresponse[h] N1=264 % (95% CI)[i]	Study 1 Primary Series[e] Seroresponse[h] N1=294 % (95% CI)[i]	Difference in Seroresponse Rate (Study 2-Study 1) % (95% CI)[j]	Met Success Criterion
100 (98.6, 100.0)	99.3 (97.6, 99.9)	0.7 (-0.8, 2.4)	Yes[k]

N=Number of subjects with non-missing data at the corresponding timepoint.
N1=Number of participants with non-missing data at pre-vaccination baseline and 28 days post-Booster Dose for Study 3 or 28 days post-Dose 2 for Study 1.
[a] Per-Protocol Immunogenicity Subset – Pre-Booster SARS-CoV-2 Negative for Study 3 included all subjects who had both pre-booster and post-booster immunogenicity samples, did not have SARS-CoV-2 infection at pre-booster, did not have a major protocol deviation that impacted immune response, and had post-booster immunogenicity assessment at timepoint of primary interest (28 days post-Booster Dose).
[b] SPIKEVAX dosing was a single booster (50 mcg mRNA).
[c] 95% CI is calculated based on the t-distribution of the log-transformed values for GMC, then back transformed to the original scale for presentation.
[d] Per-Protocol Immunogenicity Subset for Study 1 included all subjects who had both baseline (pre-vaccination) and post-vaccination immunogenicity samples, did not have SARS-CoV-2 infection at baseline, did not have a major protocol deviation that impacted immune response, and had post-injection immunogenicity assessment at timepoint of primary interest (28 days post-Dose 2).
[e] SPIKEVAX dosing was a two-dose series (100 mcg mRNA per dose) 1 month apart.
[f] The log-transformed antibody levels were analyzed using t-test method with the group variable (Study 3 and Study 1) and 95% CI was calculated based on the t-distribution of the difference in the log-transformed values for GMC. The resulted means and 95% CI were back transformed to the original scale for presentation.
[g] Success criteria were met if the lower limit of the 2-sided 95% CI for the GMC Ratio is >0.667 and the point estimate of the GMC Ratio is ≥0.8.
[h] Seroresponse is defined as ≥4-fold rise of pseudovirus neutralizing antibody concentration from baseline (pre-Dose 1 of primary series in Study 3 and Study 1), where baseline concentration < LLOQ is set to LLOQ for the analysis.
[i] 95% CI is calculated using the Clopper-Pearson method.
[j] 95% CI is calculated using the Miettinen-Nurminen (score) confidence limits.
[k] Success criterion is met if the lower limit of the 2-sided 95% CI for the percentage difference is ≥ -10%.
Note: Antibody values < the lower limit of quantitation (LLOQ) are replaced by 0.5 × LLOQ. Values > the upper limit of quantitation (ULOQ) are replaced by the ULOQ if actual values are not available.

A descriptive analysis evaluated seroresponse rates using pre-booster neutralizing antibody concentration. The booster dose seroresponse rate, with seroresponse defined as at least a 4-fold rise relative to the pre-booster concentration, was 96.6%. The difference in seroresponse rates in this post-hoc analysis was -2.7% (95% CI -5.8, -

0.5).

14.6 Immunogenicity of Moderna COVID-19 Vaccine, Bivalent Administered as a Second Booster Dose

Study 5 is a Phase 2/3 open-label study with multiple parts which evaluated the immunogenicity of a second booster dose of Moderna COVID-19 Vaccine, Bivalent (50 mcg mRNA) compared to a second booster dose of SPIKEVAX (50 mcg mRNA) when administered to participants 18 years of age and older who had previously received a primary series and a first booster dose with SPIKEVAX at least 3 months prior. The primary immunogenicity analysis population included 209 participants who received a booster dose of Moderna COVID-19 Vaccine, Bivalent and 259 participants who received a booster dose of SPIKEVAX. Participants included in the analysis population had no serologic or virologic evidence of SARS-CoV-2 infection prior to the second booster dose.

Among participants assessed for immunogenicity for the Moderna COVID-19 Vaccine, Bivalent group, the median age was 51 years (range 21-84); 74.6% of participants were 18 years through 64 years of age, 25.4% were 65 years of age and older, 35.4% were male, 64.6% were female, 9.6% were Hispanic or Latino, 89.0% were White, 5.3% were African American, 3.3% were Asian, 0.5% were American Indian or Alaska Native, 0.5% were other races, and 1.0% were Multiracial. Among participants assessed for immunogenicity for the SPIKEVAX group, the median age was 63 years (range 21-96); 53.7% of participants were 18 years through 64 years of age, 46.3% were 65 years of age and older, 48.3% of participants were male, 51.7% were female, 8.5% were Hispanic or Latino, 90.0% were White, 4.2% were African American, 4.2% were Asian, and 0.4% were other races. The median time between the first booster dose and the second booster dose was 288 days in the Moderna COVID-19 Vaccine, Bivalent group and 133 days in the SPIKEVAX group.

In Study 5, the neutralizing antibody titers (50% inhibitory dose [ID50]) against a pseudovirus expressing the original SARS-CoV-2 Spike protein (D614G) and a pseudovirus expressing the Omicron BA.4/BA.5 Spike protein were evaluated. Primary immunogenicity analyses compared the ID50 GMTs and seroresponse rates 28 days following a second booster dose with Moderna COVID-19 Vaccine, Bivalent to those following a second booster dose with SPIKEVAX. Analyses of GMTs met predefined success criteria for superiority against Omicron BA.4/BA.5 and noninferiority against the Original strain. The analysis of seroresponse against Omicron BA.4/BA.5 met the criterion for noninferiority: Lower limit of the 2-sided 95% CI for the percentage difference in seroresponse rate (Moderna COVID-19 Vaccine, Bivalent minus SPIKEVAX) >-10%. Table 17 presents the analyses of ID50 GMTs. Table 18 presents the analyses of differences in seroresponse rates (the proportion achieving a ≥4-fold rise in ID50 from pre-second booster) against both the Original strain and Omicron BA.4/BA.5.

Table 17: Neutralizing Antibody Titers (ID50) at 28 Days After a Second Booster Dose with Moderna COVID-19 Vaccine, Bivalent or SPIKEVAX in Participants 18 Years and Older – Per-Protocol Immunogenicity SARS-CoV-2 Negative Set*

	Moderna COVID-19 Vaccine, Bivalent[a]	SPIKEVAX[c]	GMT Ratio[b] (Moderna COVID-19	

Assay	N=209 GMT[b] (95% CI)	N=259 GMT[b] (95% CI)	Vaccine, Bivalent / SPIKEVAX) (95% CI)[b]	Met Success Criteria
Omicron BA.4/BA.5	2747.3 (2399.2, 3145.9)	436.7 (389.1, 490.0)	6.3 (5.3, 7.5)	Yes[d]
Original SARS-CoV-2 (D614G)	9555.8 (8593.6, 10625.7)	4882.2 (4457.7, 5347.1)	2.0 (1.7, 2.3)	Yes[e]

* Per-Protocol Immunogenicity SARS-CoV-2 Negative Set included all subjects who received the planned dose of study vaccine per schedule, had pre-booster and Day 29 neutralizing antibody data, had no major protocol deviations that impact key or critical data, had no history of HIV infection, and had no serologic or virologic evidence of SARS-CoV-2 infection prior to the second booster dose.

[a] Moderna COVID-19 Vaccine, Bivalent dosing was a single booster (50 mcg mRNA).

[b] The log-transformed antibody levels are analyzed using an analysis of covariance (ANCOVA) model with the treatment variable as fixed effect, adjusting for age group (<65, ≥65 years) and pre-booster antibody titer level (in log 10 scale). The treatment variable corresponds to each individual study arm dose. The resulted least square (LS) means, difference of LS means, and confidence intervals are back transformed to the original scale for presentation.

[c] SPIKEVAX dosing was a single booster dose (50 mcg mRNA).

[d] Superiority is declared if the lower limit of the 2-sided 95% CI for the GMT ratio is >1.

[e] Non-inferiority is declared if the lower limit of the 2-sided 95% CI for the GMT ratio is >0.667.

Note: Antibody values < the lower limit of quantitation (LLOQ) are replaced by 0.5 × LLOQ. Values > the upper limit of quantitation (ULOQ) are replaced by the ULOQ if actual values are not available.

Table 18: Analyses of Seroresponse Rates at 28 Days After a Second Booster Dose with Moderna COVID-19 Vaccine, Bivalent or SPIKEVAX in Participants 18 Years and Older – Per-Protocol Immunogenicity SARS-CoV-2 Negative Set*

Assay	Moderna COVID-19 Vaccine, Bivalent[a] Seroresponse[b] N=209 %[c] (95% CI)[d]	SPIKEVAX[e] Seroresponse[b] N=259 %[c] (95% CI)[d]	Difference in Seroresponse Rate (Moderna COVID-19 Vaccine, Bivalent-SPIKEVAX) % (95% CI)[f]
Omicron BA.4/BA.5	90.9 (86.2, 94.4)	37.8 (31.9, 44.0)	53.9 (46.7, 61.2)
Original SARS-CoV-2 (D614G)	80.4 (74.3, 85.5)	42.9 (36.7, 49.1)	37.3 (29.0, 45.6)

N=number of participants with non-missing data at corresponding timepoint.

* Per-Protocol Immunogenicity SARS-CoV-2 Negative Set included all subjects who received the planned dose of study vaccine per schedule, had pre-booster and Day 29 neutralizing antibody data, had no major protocol deviations that impact key or critical data, had no history of HIV infection, and had no serologic or virologic evidence of

SARS-CoV-2 infection prior to the second booster dose.
[a] Moderna COVID-19 Vaccine, Bivalent dosing was a single booster dose (50 mcg mRNA).
[b] For assessment of seroresponse rates, baseline was pre-second booster dose; seroresponse was defined as a change from below the LLOQ to equal or above 4 x LLOQ if participant pre-second booster dose baseline was below the LLOQ, or at least a 4-fold rise if baseline is equal to or above the LLOQ.
[c] Proportion of participants who met seroresponse definition.
[d] 95% CI is calculated using the Clopper-Pearson method.
[e] SPIKEVAX dosing was a single booster dose (50 mcg mRNA).
[f] Common risk difference and 95% CI is calculated using the stratified Miettinen-Nurminen method to adjust for age group (<65, ≥65 years).

In subgroup analyses, neutralizing antibodies against a pseudovirus expressing the original SARS-CoV-2 Spike protein (D614G) and a pseudovirus expressing the Omicron BA.4/BA.5 Spike protein were similar in participants 65 years of age and older compared to participants 18 years through 64 years of age. The seroresponse rate observed at Day 29 was similar between age groups.

16 HOW SUPPLIED/STORAGE AND HANDLING

SPIKEVAX (2023-2024 Formula) is supplied as follows:

NDC 80777-102-97 Carton of 10 multiple-dose vials, each vial containing 5 doses (each dose is 0.5 mL)
NDC 80777-102-95 Carton of 10 single dose vials, each vial containing 0.5 mL
NDC 80777-102-96 Carton of 10 single dose pre-filled syringes, each syringe containing 0.5 mL
NDC 80777-102-93 Carton of 10 single dose, blister-sealed pre-filled syringes, each syringe containing 0.5 mL

During storage, minimize exposure to room light, and avoid exposure to direct sunlight and ultraviolet light.

Frozen Storage

Store frozen between -50°C to -15°C (-58°F to 5°F).

Storage of Multiple-Dose Vials after Thawing

- Storage at 2°C to 8°C (36°F to 46°F):
    - Vials may be stored refrigerated between 2°C to 8°C (36°F to 46°F) for up to 30 days prior to first use.
    - Vials should be discarded 12 hours after the first puncture.
- Storage at 8°C to 25°C (46°F to 77°F):
    - Vials may be stored between 8°C to 25°C (46°F to 77°F) for a total of 24 hours.
    - Vials should be discarded 12 hours after the first puncture.
    - Total storage at 8°C to 25°C (46°F to 77°F) must not exceed 24 hours.

Storage of Single Dose Vials after Thawing

- Storage at 2°C to 8°C (36°F to 46°F):
    - Vials may be stored refrigerated between 2°C to 8°C (36°F to 46°F) for up to 30 days prior to use.
    - Vials should be discarded after single use.
- Storage at 8°C to 25°C (46°F to 77°F):
    - Vials may be stored between 8°C to 25°C (46°F to 77°F) for a total of 24 hours.
    - Vials should be discarded after single use.
    - Total storage at 8°C to 25°C (46°F to 77°F) must not exceed 24 hours.

Storage of Single Dose Pre-Filled Syringes after Thawing

- Storage at 2°C to 8°C (36°F to 46°F):
    - Syringes may be stored refrigerated between 2°C to 8°C (36°F to 46°F) for up to 30 days.
- Storage at 8°C to 25°C (46°F to 77°F):
    - Syringes may be stored between 8°C to 25°C (46°F to 77°F) for up to 24 hours.

Do not refreeze once thawed.

Thawed vials and syringes can be handled in room light conditions.

Transportation of Thawed Vials at 2°C to 8°C (36°F to 46°F)

If transport at -50°C to -15°C (-58°F to 5°F) is not feasible, available data support transportation of one or more thawed vials for up to 12 hours at 2°C to 8°C (36°F to 46°F) when shipped using shipping containers which have been qualified to maintain 2°C to 8°C (36°F to 46°F) and under routine road and air transport conditions with shaking and vibration minimized. Once thawed and transported at 2°C to 8°C (36°C to 46°F), vials should not be refrozen and should be stored at 2°C to 8°C (36°F to 46°F) until use.

17 PATIENT COUNSELING INFORMATION

Advise the vaccine recipient or caregiver to read the FDA-approved patient labeling.

Inform the vaccine recipient or caregiver of the potential benefits and risks of vaccination with SPIKEVAX.

Instruct the vaccine recipient or caregiver to report any adverse events to their healthcare provider or to the Vaccine Adverse Event Reporting System at 1-800-822-7967 and www.vaers.hhs.gov.

There is a pregnancy exposure registry for SPIKEVAX. Encourage individuals who receive SPIKEVAX around the time of conception or while pregnant to enroll in the

pregnancy exposure registry. Pregnant individuals can enroll in the pregnancy exposure registry by calling 1-866-MODERNA (1-866-663-3762).

Manufactured for:
Moderna US, Inc.
Princeton, NJ 08540

Patent(s): www.modernatx.com/patents

US Govt. License No. 2256

Revised: 9/2023

Information for Recipients and Caregivers
SPIKEVAX (pronounced SPĪK-văx)
(COVID-19 Vaccine, mRNA)
(2023-2024 Formula)

Please read this information sheet before getting SPIKEVAX. This summary is not intended to take the place of talking with your healthcare provider. If you have questions or would like more information, please talk with your healthcare provider.

What is SPIKEVAX?

SPIKEVAX is a vaccine to protect you against COVID-19. SPIKEVAX is for people 12 years of age and older. Vaccination with SPIKEVAX may not protect all people who receive the vaccine.

SPIKEVAX does not contain SARS-CoV-2, the virus that causes COVID-19. SPIKEVAX cannot give you COVID-19.

Who should not get SPIKEVAX?

You should not get SPIKEVAX if you had:

- a severe allergic reaction after a previous dose of SPIKEVAX, Moderna COVID-19 Vaccine (Original monovalent), or Moderna COVID-19 Vaccine, Bivalent[1]
- a severe allergic reaction to any ingredient of this vaccine (see **What are the ingredients in SPIKEVAX?**)

What should I tell my healthcare provider?

Tell your healthcare provider about all of your medical conditions, including if you:

- have any allergies
- had a severe allergic reaction after receiving a previous dose of any COVID-19 vaccine
- have had myocarditis (inflammation of the heart muscle) or pericarditis (inflammation of the lining outside the heart)
- have a fever

- have a bleeding disorder or are on a blood thinner
- are immunocompromised or are on a medicine that affects your immune system
- are pregnant or plan to become pregnant
- are breastfeeding
- have received any other COVID-19 vaccine
- have ever fainted in association with an injection

How is SPIKEVAX given?

SPIKEVAX is given as an injection into the muscle.

What are the risks of SPIKEVAX?

Severe allergic reactions have occurred in some people who have received SPIKEVAX, Moderna COVID-19 Vaccine (Original monovalent), and Moderna COVID-19 Vaccine, Bivalent. There is a very small chance that SPIKEVAX could cause a severe allergic reaction. A severe allergic reaction would usually occur within a few minutes to 1 hour after getting a dose of SPIKEVAX. For this reason, your healthcare provider may ask you to stay for a short time at the place where you received your vaccine. Signs of a severe allergic reaction can include:

- Trouble breathing
- Swelling of your face and throat
- A fast heartbeat
- A rash all over your body
- Dizziness and weakness

Myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the lining outside the heart) have occurred in some people who have received mRNA COVID-19 vaccines, including SPIKEVAX, Moderna COVID-19 Vaccine (Original monovalent), and Moderna COVID-19 Vaccine, Bivalent. Myocarditis and pericarditis following Moderna COVID-19 vaccines have occurred, most commonly in males 18 years through 24 years of age. In most of these individuals, symptoms began within a few days following vaccination. The chance of having this occur is very low. You should seek medical attention right away if you or your child has any of the following symptoms after receiving the vaccine, particularly during the 2 weeks after receiving a dose of the vaccine:

- Chest pain
- Shortness of breath
- Feelings of having a fast-beating, fluttering, or pounding heart

Side effects that have been reported in clinical trials with SPIKEVAX, Moderna COVID-19 Vaccine (Original monovalent), and Moderna COVID-19 Vaccine, Bivalent include:

- Injection site reactions: pain, tenderness and swelling of the lymph nodes in the same arm of the injection, swelling (hardness), and redness
- General side effects: fatigue, headache, muscle pain, joint pain, chills, nausea and vomiting, fever, and rash

Other side effects that have been reported include:

- Severe allergic reactions

- Urticaria (itchy rash/hives)
- Myocarditis (inflammation of the heart muscle)
- Pericarditis (inflammation of the lining outside the heart)
- Fainting in association with injection of the vaccine

These may not be all of the possible side effects of SPIKEVAX. Ask your healthcare provider about any side effects that concern you. You may report side effects to the Vaccine Adverse Event Reporting System (VAERS) at 1-800-822-7967 or https://vaers.hhs.gov.

What if I am pregnant or breastfeeding?

If you are pregnant or breastfeeding, discuss your options with your healthcare provider.

A pregnancy exposure registry is available. You are encouraged to contact the registry as soon as you become aware of your pregnancy by calling 1-866-MODERNA (1-866-663-3762) or ask your healthcare provider to contact the registry for you.

What are the ingredients in SPIKEVAX?

SPIKEVAX contains the following ingredients:

- messenger ribonucleic acid (mRNA)
- lipids (SM-102, polyethylene glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC])
- tromethamine
- tromethamine hydrochloride
- acetic acid
- sodium acetate trihydrate
- sucrose

SPIKEVAX does not contain preservatives.

If you would like more information, talk to your healthcare provider or visit www.spikevax.com or call 1-866-MODERNA (1-866-663-3762).

Manufactured for:
Moderna US, Inc.
Princeton, NJ 08540

SPIKEVAX is a trademark of ModernaTX, Inc.
Patent(s): www.modernatx.com/patents
Revised: September 2023

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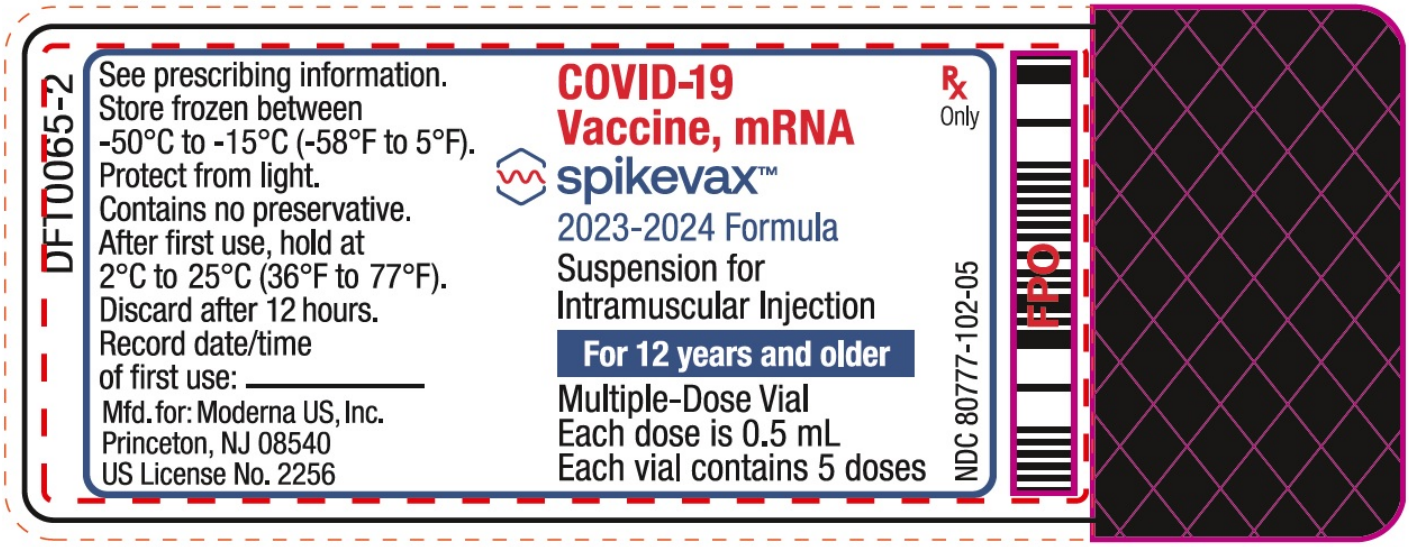
1 SPIKEVAX is made the same way as the Moderna COVID-19 Vaccine (Original monovalent) and Moderna COVID-19 Vaccine, Bivalent, but it encodes the spike protein of SARS-CoV-2 Omicron variant lineage XBB.1.5 (Omicron XBB.1.5).

Package/Label Display Panel



Rx Only

COVID-19 Vaccine, mRNA

Spikevax

2023-2024 Formula

Suspension for Intramuscular Injection

For 12 years and older

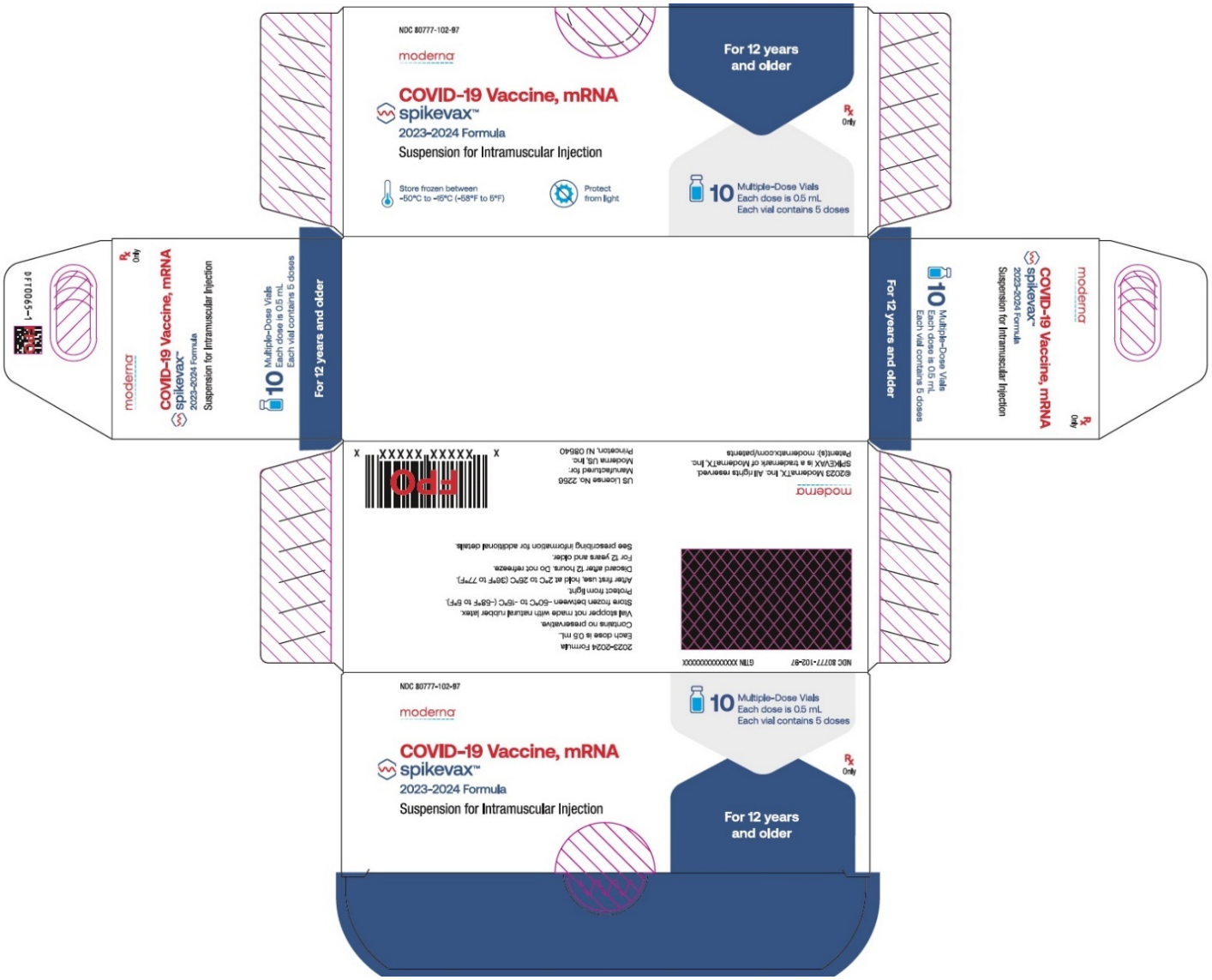
Multiple-Dose Vial

Each dose is 0.5 mL

Each vial contains 5 doses

NDC 80777-102-05

Package/Label Display Panel



NDC 80777-102-97

Moderna

COVID-19 Vaccine, mRNA

Spikevax

2023-2024 Formula

Suspension for Intramuscular Injection

For 12 years and older

Rx Only

Store frozen between -50°C to -15°C (-58°F to 5°F)

Protect from light

10 Multiple-Dose Vials

Each dose is 0.5 mL

Each vial contains 5 doses

Package/Label Display Panel

COVID-19 Vaccine, mRNA

Spikevax

2023-2024 Formula

For Intramuscular Use

For 12y and older

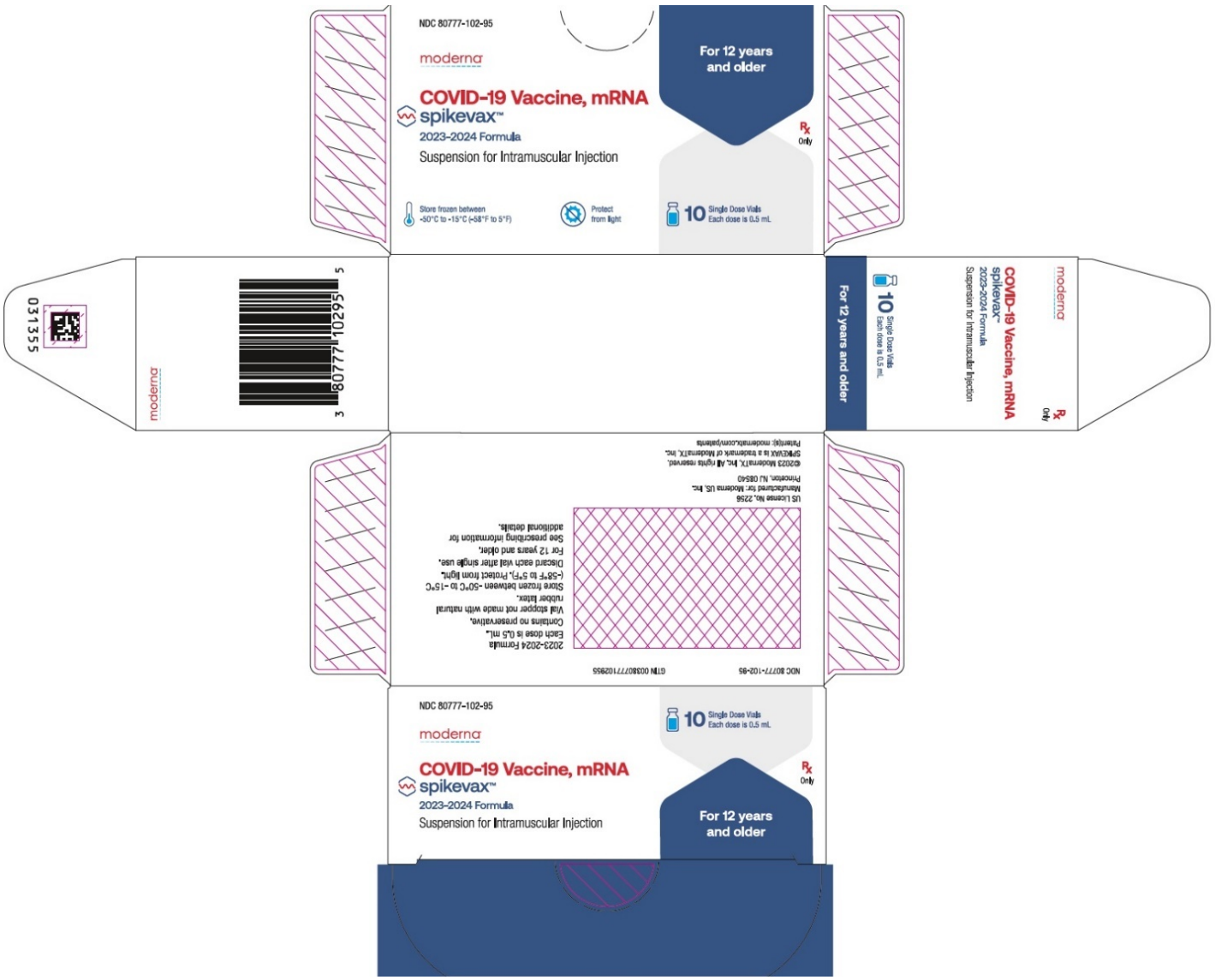
0.5 mL Single Dose Vial

Mfd. for: Moderna US, Inc.

NDC 80777-102-04

Rx Only

Package/Label Display Panel



NDC 80777-102-95

Moderna

COVID-19 Vaccine, mRNA

Spikevax

2023-2024 Formula

Suspension for Intramuscular Injection

For 12 years and older

Rx Only

Store frozen between -50°C to -15°C (-58°F to 5°F)

Protect from light

10 Single Dose Vials

Each dose is 0.5 mL

Package/Label Display Panel

COVID-19 Vaccine, mRNA

Spikevax

2023-2024 Formula

For 12 years and older

NDC 80777-102-01

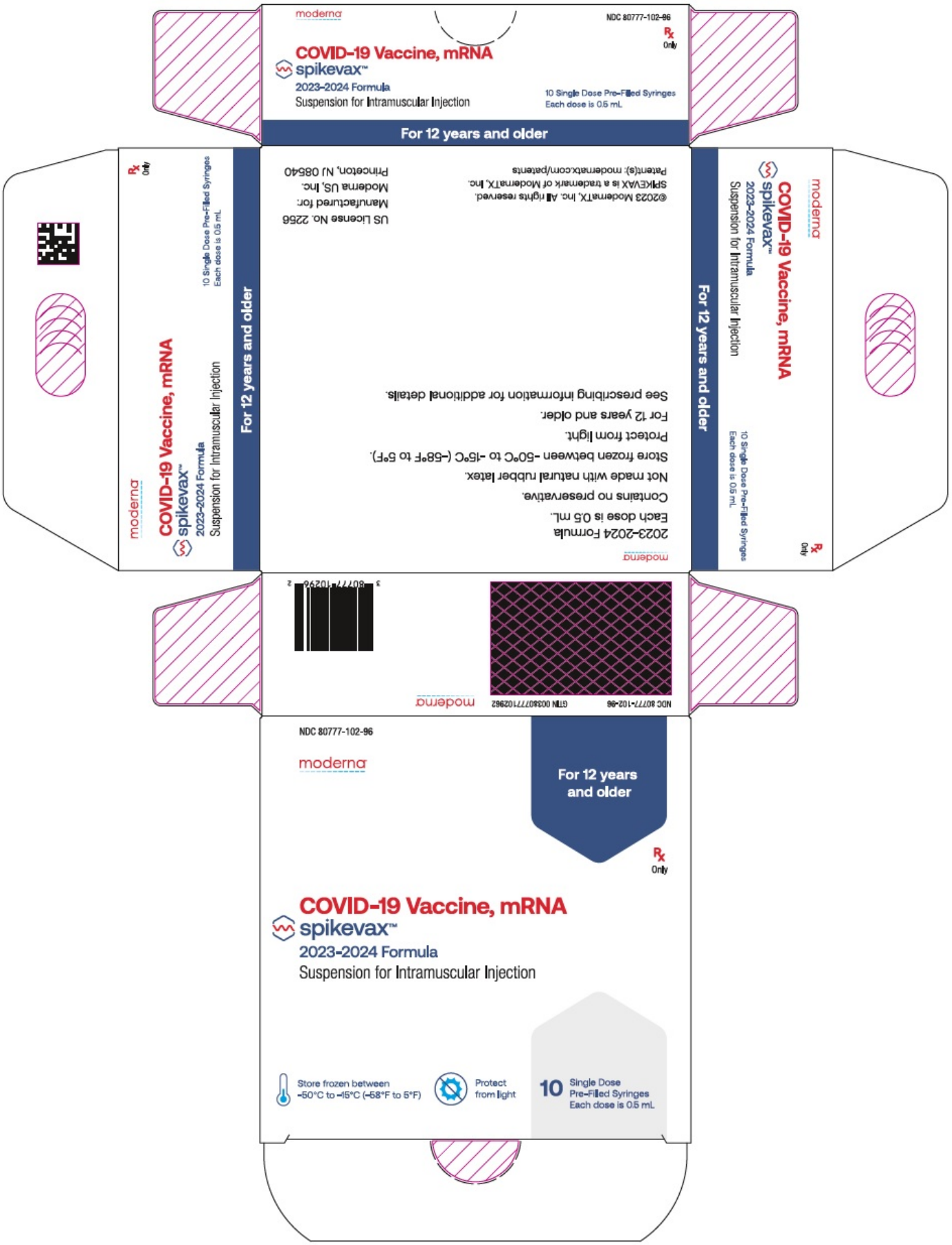
0.5 mL Single Dose

Rx Only

For IM Use

Mfd. for: Moderna US, Inc.

Package/Label Display Panel



NDC 80777-102-96

Moderna

For 12 years and older

Rx Only

COVID-19 Vaccine, mRNA

Spikevax

2023-2024 Formula

Suspension for Intramuscular Injection

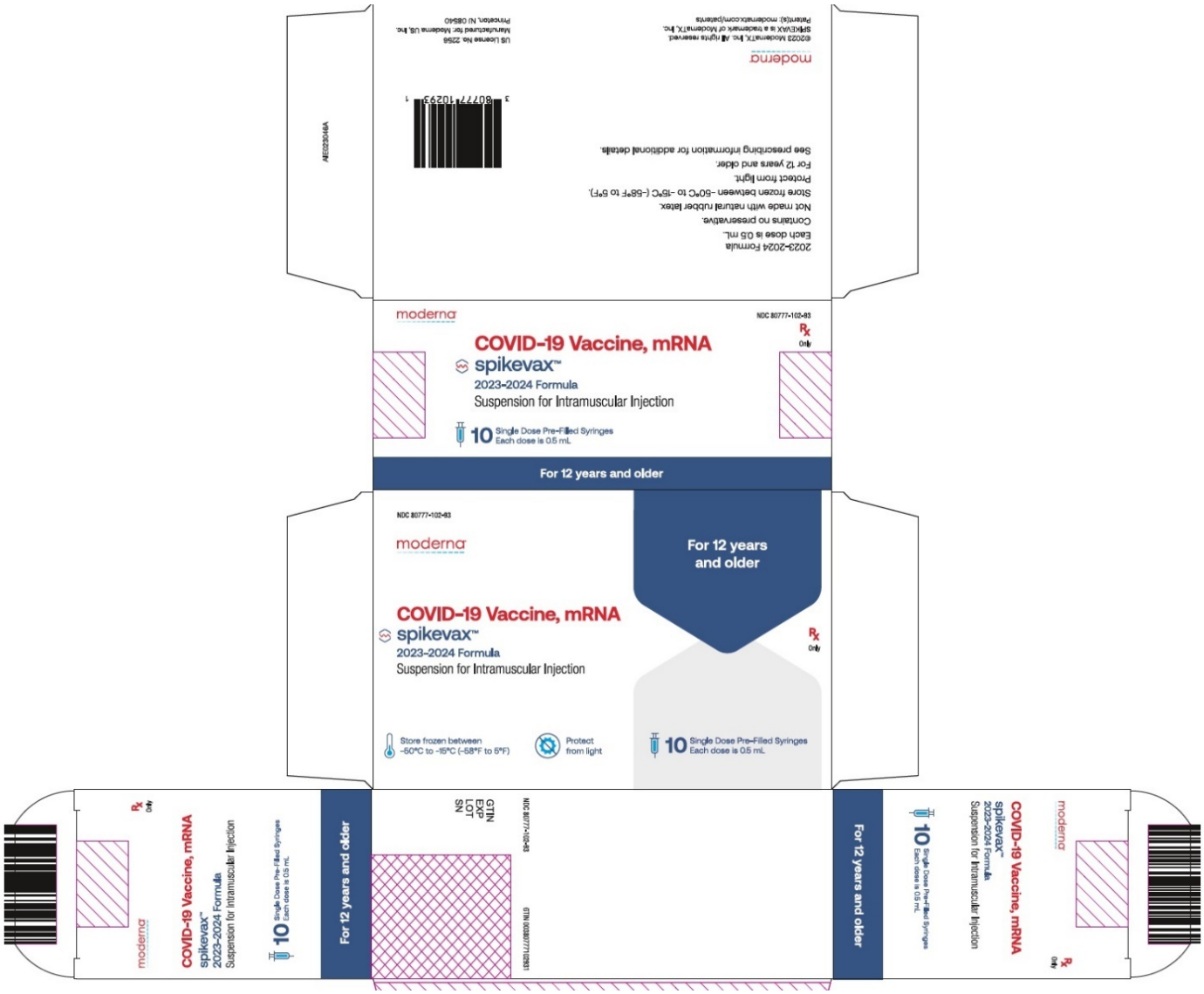
Store frozen between -50°C to -15°C (-58°F to 5°F)

Protect from light

10 Single Dose Pre-Filled Syringes

Each dose is 0.5 mL

Package/Label Display Panel



NDC 80777-102-93

Moderna

COVID-19 Vaccine, mRNA

Spikevax

2023-2024 Formula

Suspension for Intramuscular Injection

For 12 years and older

Rx Only

Store frozen between -50°C to -15°C (-58°F to 5°F)

Protect from light

10 Single Dose Pre-Filled Syringes

Each dose is 0.5 mL

SPIKEVAX

covid-19 vaccine, mrna injection, suspension

Product Information			
Product Type	VACCINE	**Item Code (Source)**	NDC:80777-102
Route of Administration	INTRAMUSCULAR		

Active Ingredient/Active Moiety		
Ingredient Name	**Basis of Strength**	**Strength**
CX-038839 OMICRON (XBB.1.5) (UNII: 4F9QRS7ZV2) (CX-038839 OMICRON (XBB.1.5) - UNII:4F9QRS7ZV2)	CX-038839 OMICRON (XBB.1.5)	50 ug in 0.5 mL

Inactive Ingredients	
Ingredient Name	**Strength**
SM-102 (UNII: T7OBQ65G2I)	
CHOLESTEROL (UNII: 97C5T2UQ7J)	
1,2-DISTEAROYL-SN-GLYCERO-3-PHOSPHOCHOLINE (UNII: 043IPI2M0K)	
1,2-DIMYRISTOYL-RAC-GLYCERO-3-METHOXYPOLYETHYLENE GLYCOL 2000 (UNII: 9X2596CIE0)	
TROMETHAMINE (UNII: 023C2WHX2V)	
TROMETHAMINE HYDROCHLORIDE (UNII: 383V75M34E)	
ACETIC ACID (UNII: Q40Q9N063P)	
SODIUM ACETATE (UNII: 4550K0SC9B)	
SUCROSE (UNII: C151H8M554)	
WATER (UNII: 059QF0KO0R)	

Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:80777-102-97	10 in 1 CARTON		
1	NDC:80777-102-05	2.5 mL in 1 VIAL, MULTI-DOSE; Type 0: Not a Combination Product		
2	NDC:80777-102-95	10 in 1 CARTON		
2	NDC:80777-102-04	0.5 mL in 1 VIAL, SINGLE-DOSE; Type 0: Not a Combination Product		
3	NDC:80777-102-96	10 in 1 CARTON		
3	NDC:80777-102-01	0.5 mL in 1 SYRINGE, PLASTIC; Type 3: Prefilled Biologic Delivery Device/System (syringe, patch, etc.)		
4	NDC:80777-102-93	10 in 1 CARTON		
4	NDC:80777-102-01	0.5 mL in 1 SYRINGE, PLASTIC; Type 3: Prefilled Biologic Delivery Device/System (syringe, patch, etc.)		

Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
BLA	BLA125752	09/11/2023	

Labeler - Moderna US, Inc. (117626450)

Establishment

Name	Address	ID/FEI	Business Operations
ModernaTX, Inc.		116912313	ANALYSIS(80777-102) , API MANUFACTURE(80777-102)

Establishment

Name	Address	ID/FEI	Business Operations
Catalent Indiana, LLC		172209277	MANUFACTURE(80777-102) , ANALYSIS(80777-102) , LABEL(80777-102) , PACK(80777-102)

Establishment

Name	Address	ID/FEI	Business Operations
Rovi Pharma Industrial Services S.A.		463584525	MANUFACTURE(80777-102) , ANALYSIS(80777-102)

Establishment

Name	Address	ID/FEI	Business Operations
Rovi Pharma Industrial Services S.A.		462117953	ANALYSIS(80777-102) , LABEL(80777-102) , PACK(80777-102)

Establishment

Name	Address	ID/FEI	Business Operations
Catalent Anagni		440438700	MANUFACTURE(80777-102) , ANALYSIS(80777-102) , LABEL(80777-102) ,

S.R.L.		440438790	PACK(80777-102)

Establishment

Name	Address	ID/FEI	Business Operations
Patheon Manufacturing Services, LLC		079415560	MANUFACTURE(80777-102) , ANALYSIS(80777-102) , LABEL(80777-102) , PACK(80777-102)

Establishment

Name	Address	ID/FEI	Business Operations
Rovi Pharma Industrial Services S.A.		469527153	MANUFACTURE(80777-102)