

NEW ZEALAND DATA SHEET

1. PRODUCT NAME

Comirnaty® Omicron XBB.1.5, 10 micrograms/0.2 mL dose, concentrate for suspension for injection (orange cap), for age 5 to 11 years

Comirnaty® Omicron XBB.1.5, 10 micrograms/0.3 mL dose, suspension for injection (light blue and dark blue caps), for age 5 to 11 years

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

This is a single dose vial (light blue cap) or multidose vial (orange and dark blue caps). The orange cap vials must be diluted before use.

One orange cap multidose vial (1.3 mL) contains 10 doses of 0.2 mL after dilution, see sections 4.2 and 6.6. One dose (0.2 mL) contains 10 micrograms of raxtozinameran, a COVID-19 mRNA Vaccine (embedded in lipid nanoparticles).

One light blue cap single dose vial (0.48 mL) contains 1 dose of 0.3 mL, see sections 4.2 and 6.6. One dose (0.3 mL) contains 10 micrograms of raxtozinameran, a COVID-19 mRNA Vaccine (embedded in lipid nanoparticles).

One dark blue cap multidose vial (2.25 mL) contains 6 doses of 0.3 mL, see sections 4.2 and 6.6. One dose (0.3 mL) contains 10 micrograms of raxtozinameran, a COVID-19 mRNA Vaccine (embedded in lipid nanoparticles).

Raxtozinameran is a single-stranded, 5'-capped messenger RNA (mRNA) produced using a cell-free *in vitro* transcription from the corresponding DNA templates, encoding the viral spike (S) protein of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Omicron XBB.1.5).

For the full list of excipients, see Section 6.1 List of excipients.

3. PHARMACEUTICAL FORM

Comirnaty Omicron XBB.1.5 concentrate for suspension for injection (orange cap) is a white to off-white frozen suspension.

Comirnaty Omicron XBB.1.5 suspension for injection (light blue and dark blue cap) is a clear to slightly opalescent frozen suspension.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Active immunisation to prevent coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2, in children aged 5 to 11 years.

The use of this vaccine should be in accordance with official recommendations.

4.2 Dose and method of administration

Dose

Strength & Age Group	Cap and Label Color	Volume of Each Dose
10 micrograms per dose 5 to 11 years	Orange	0.2 mL (after dilution)
	Light and dark blue	0.3 mL

Children 5 to 11 years of age

Comirnaty Omicron XBB.1.5 10 micrograms/dose is administered intramuscularly as a single dose for individuals 5 to 11 years of age, regardless of prior COVID-19 vaccination status.

For individuals who have previously been vaccinated with a COVID-19 vaccine, Comirnaty Omicron XBB.1.5 should be administered at least 3 months after the most recent dose of a COVID-19 vaccine.

Comirnaty Omicron XBB.1.5 (Orange or Blue cap) should be used only for children 5 to 11 years of age.

Severely immunocompromised aged 5 years and older

Additional doses may be administered to individuals who are severely immunocompromised in accordance with national recommendations (see section 4.4).

Paediatric population

There are paediatric formulations available for infants aged 6 months to 4 years of age. For details, please refer to the data sheets for other formulations. The safety and efficacy of the vaccine in infants aged less than 6 months have not yet been established.

Elderly population

Refer to the Data Sheet for Comirnaty® Omicron XBB.1.5, 30 micrograms/0.3 mL dose, suspension for injection (light grey and dark grey caps) for individuals 12 years of age and older.

Method of administration

Comirnaty Omicron XBB.1.5 should be administered intramuscularly. The preferred site of administration is the deltoid muscle of the upper arm.

Do not inject the vaccine intravascularly, subcutaneously or intradermally.

Comirnaty Omicron XBB.1.5 should not be mixed in the same syringe with any other vaccines or medicinal products.

For precautions to be taken before administering the vaccine, see Section 4.4 Special warnings and precautions for use. For instructions regarding thawing, handling and disposal of the vaccine, see section 6.6.

Comirnaty Omicron XBB.1.5 (Orange cap, Must dilute)

Vials have an orange cap and after **dilution** contain 10 doses of 0.2 mL of vaccine.

In order to extract 10 doses from a single vial, low dead-volume syringes and/or needles should be used. The low dead-volume syringe and needle combination should have a dead volume of no more than 35 microlitres. If standard syringes and needles are used, there may not be sufficient volume to extract a tenth dose from a single vial. Irrespective of the type of syringe and needle:

- Each dose must contain 0.2 mL of vaccine.
- If the amount of vaccine remaining in the vial cannot provide a full dose of 0.2 mL, discard the vial and any excess volume.
- Do not pool excess vaccine from multiple vials.

For instructions on thawing, handling, dilution and dose preparation of Comirnaty (orange cap, must dilute) see Section 6.6 Special precautions for disposal and other handling.

Comirnaty Omicron XBB.1.5 (Blue cap, Do not dilute)

Single dose vials

Single dose vials of Comirnaty Omicron XBB.1.5 (light blue cap) contain 1 dose of 0.3 mL of vaccine and do not require dilution.

- Withdraw a single 0.3 mL dose of Comirnaty Omicron XBB.1.5
- Discard vial and any excess volume.
- Do not pool excess vaccine from multiple vials.

Multidose vials

Multidose vials of Comirnaty Omicron XBB.1.5 (dark blue cap) contain 6 doses of 0.3 mL of vaccine and do not require dilution.

In order to extract 6 doses from a multidose vial (dark blue cap), low dead-volume syringes and/or needles should be used. The low dead-volume syringe and needle combination should have a dead volume of no more than 35 microlitres. If standard syringes and needles are used, there may not be sufficient volume to extract a sixth dose from a single vial. Irrespective of the type of syringe and needle:

- Each dose must contain 0.3 mL of vaccine.
- If the amount of vaccine remaining in the vial cannot provide a full dose of 0.3 mL, discard the vial and any excess volume.

- Do not pool excess vaccine from multiple vials.

For instructions on thawing, handling and dose preparation of Comirnaty Omicron XBB.1.5 suspension for injection, see Section 6.6 Special precautions for disposal and other handling.

4.3 Contraindications

Hypersensitivity to the active substance or to any of the excipients listed in Section 6.1 List of excipients.

4.4 Special warnings and precautions for use

Traceability

In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded.

General recommendations

Hypersensitivity and anaphylaxis

Events of anaphylaxis have been reported. Appropriate medical treatment and supervision should always be readily available in case of an anaphylactic reaction following the administration of Comirnaty.

The individual should be kept under close observation for at least 15 minutes following vaccination. A second dose of Comirnaty should not be given to those who have experienced anaphylaxis to the first dose of Comirnaty.

Myocarditis and pericarditis

Very rare cases of myocarditis and pericarditis have been observed following vaccination with Comirnaty. These cases have primarily occurred within 14 days following vaccination, more often after the second vaccination, and more often, but not exclusively in younger men. There have been reports in females. Based on accumulating data, the reporting rates of myocarditis and pericarditis after primary series in children ages 5 to 11 years are lower than in ages 12 to 17 years. Rates of myocarditis and pericarditis in booster doses do not appear to be higher than after the second dose in the primary series. The cases are generally mild and individuals tend to recover within a short time following standard treatment and rest. Cases of myocarditis and pericarditis following vaccination have rarely been associated with severe outcomes including death.

Healthcare professionals should be alert to the signs and symptoms of myocarditis and pericarditis, including atypical presentations. Vaccinees should be instructed to seek immediate medical attention if they develop symptoms indicative of myocarditis or pericarditis such as (acute and persisting) chest pain, shortness of breath, or palpitations following vaccination. Non-specific symptoms of myocarditis and pericarditis also include fatigue, nausea and vomiting, abdominal pain, dizziness or syncope, oedema and cough. Healthcare professionals should consult guidance and/or specialists to diagnose and treat this condition.

Stress-related responses

Some individuals may have stress-related responses associated with the process of vaccination itself. Stress-related responses are temporary and resolve on their own. They may include dizziness, fainting, palpitations, increases in heart rate, alterations in blood pressure, feeling short of breath, tingling sensations, sweating and/or anxiety. Individuals should be advised to bring symptoms to the attention of the vaccination provider for evaluation and precautions should be in place to avoid injury from fainting.

Concurrent illness

Vaccination should be postponed in individuals suffering from acute severe febrile illness or acute infection. The presence of a minor infection and/or low grade fever should not delay vaccination.

Thrombocytopenia and coagulation disorders

As with other intramuscular injections, Comirnaty Omicron XBB.1.5 should be given with caution in individuals receiving anticoagulant therapy or those with thrombocytopenia or any coagulation disorder (such as haemophilia) because bleeding or bruising may occur following an intramuscular administration in these individuals.

Immunocompromised individuals

Immunocompromised persons, including individuals receiving immunosuppressant therapy, may have a diminished immune response to the vaccine.

Clinical data on safety and immunogenicity after administration of Comirnaty (tozinameran) in immunocompromised participants are available in 37 participants 2 through 4 years old, 65 participants 5 through <12 years old, 15 participants 12 through <18 years old, and 7 participants 18 years of age and older (see Sections 4.8 Undesirable effects and 5.1 Pharmacodynamic properties).

Duration of protection

The duration of protection afforded by Comirnaty is unknown as it is still being determined by ongoing clinical trials.

Limitations of vaccine effectiveness

As with any vaccine, vaccination with Comirnaty may not protect all vaccine recipients. Individuals may not be fully protected until 7 days after their second dose of Comirnaty.

Use in the elderly

Clinical studies of Comirnaty (tozinameran) include participants 65 years of age and older and their data contributes to the overall assessment of safety and efficacy. See Section 5.1 Pharmacodynamic properties, Clinical trials, Efficacy against COVID-19.

Paediatric use

The safety and efficacy of Comirnaty in children aged less than 6 months of age have not yet been established.

Effects on laboratory tests

No data available.

4.5 Interactions with other medicines and other forms of interactions

No interaction studies have been performed.

Concomitant administration of Comirnaty Omicron XBB.1.5 with other vaccines has not been studied.

4.6 Fertility, pregnancy and lactation

Fertility

In a combined fertility and developmental toxicity study, female rats were intramuscularly administered Comirnaty (tozinameran) prior to mating and during gestation (4 full human doses of 30 micrograms each, spanning between pre-mating day 21 and gestation day 20). SARS-CoV-2 neutralising antibodies were present in maternal animals from prior to mating to the end of the study on postnatal day 21 as well as in fetuses and offspring. There were no vaccine related effects on female fertility and pregnancy rate.

Pregnancy

No data are available yet regarding the use of Comirnaty Omicron XBB.1.5 during pregnancy.

There are clinical study data from the use of Comirnaty (tozinameran) in 173 pregnant women and no safety concerns were identified in the mother or their infant that were attributable to maternal vaccination (see Section 4.8 Undesirable effects).

Animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryo/fetal development, parturition or post-natal development (see Section 4.6 Fertility, pregnancy and lactation, Fertility). Administration of Comirnaty Omicron XBB.1.5 in pregnancy should only be considered when the potential benefits outweigh any potential risks for the mother and fetus.

Lactation

No data are available yet regarding the use of Comirnaty Omicron XBB.1.5 during breast-feeding. A combined fertility and developmental toxicity study in rats did not show harmful effects on offspring development before weaning (see Section 4.6 Fertility, pregnancy and lactation, Fertility).

4.7 Effects on ability to drive and use machines

Comirnaty Omicron XBB.1.5 has no, or negligible, influence on the ability to drive and use machines. However, some of the effects mentioned under Section 4.8 Undesirable effects may temporarily affect the ability to drive or use machines.

4.8 Undesirable effects

Summary of safety profile

The safety of Comirnaty (tozinameran) was evaluated in participants 5 years of age and older in 3 clinical studies that included 24,675 participants (comprised of 22,026 participants 16 years of age and older, 1,131 adolescents 12 to 15 years of age and 1,518 children 5 to 11 years of age) that have received at least one dose of Comirnaty (tozinameran).

Additionally, 306 existing Phase 3 participants at 18 to 55 years of age received a booster dose of Comirnaty (tozinameran) approximately 6 months after the second dose in the non-placebo-controlled booster dose portion of Study C4591001. The overall safety profile for the booster dose was similar to that seen after 2 doses.

In Study C4591031, a placebo-controlled booster study, 5,081 participants 16 years of age and older were recruited from Study C4591001 to receive a booster dose of Comirnaty (tozinameran) at least 6 months after the second dose. The overall safety profile for the booster dose was similar to that seen after 2 doses.

In a subset of C4591007 Phase 2/3 participants, 401 participants 5 to 11 years of age received a booster dose of Comirnaty at least 5 months after completing the primary series. The overall safety profile for the booster dose was similar to that seen after the primary series.

Participants 16 years of age and older – after 2 doses

In Study C4591001, a total of 22,026 participants 16 years of age or older received at least 1 dose of Comirnaty (tozinameran) 30 micrograms and a total of 22,021 participants 16 years of age or older received placebo (including 138 and 145 adolescents 16 and 17 years of age in the Comirnaty (tozinameran) and placebo groups, respectively). A total of 20,519 participants 16 years of age or older received 2 doses of Comirnaty (tozinameran).

At the time of the analysis of Study C4591001 with a data cut-off of 13 March 2021 for the placebo-controlled blinded follow-up period up to the participants' unblinding dates, a total of 25,651 (58.2%) participants (13,031 Comirnaty (tozinameran) and 12,620 placebo) 16 years of age and older were followed up for ≥ 4 months after the second dose. This included a total of 15,111 (7,704 Comirnaty (tozinameran) and 7,407 placebo) participants 16 to 55 years of age and a total of 10,540 (5,327 Comirnaty (tozinameran) and 5,213 placebo) participants 56 years and older.

The most frequent adverse reactions in participants 16 years of age and older that received 2 doses were injection site pain ($>80\%$), fatigue ($>60\%$), headache ($>50\%$), myalgia ($>40\%$), chills ($>30\%$), arthralgia ($>20\%$), pyrexia and injection site swelling ($>10\%$) and were usually mild or moderate in intensity and resolved within a few days after vaccination. A slightly lower frequency of reactogenicity events was associated with greater age.

The safety profile in 545 subjects receiving Comirnaty (tozinameran), that were seropositive for SARS-CoV-2 at baseline, was similar to that seen in the general population.

Study C4591001 also included 200 participants with confirmed stable human immunodeficiency virus (HIV) infection. The safety profile of the participants receiving Comirnaty (tozinameran) (n=100) in the individuals with stable HIV infection was similar to that seen in the general population.

Adolescents 12 to 15 years of age – after 2 doses

In an analysis of long term safety follow-up in Study C4591001, 2,260 adolescents (1,131 Comirnaty (tozinameran) 30 micrograms; 1,129 placebo) were 12 to 15 years of age. Of these, 1,559 adolescents (786 Comirnaty (tozinameran) and 773 placebo) have been followed for ≥ 4 months after the second dose of Comirnaty (tozinameran). The safety evaluation in Study C4591001 is ongoing.

The most frequent adverse reactions in adolescents 12 to 15 years of age that received 2 doses were injection site pain ($>90\%$), fatigue and headache ($>70\%$), myalgia and chills ($>40\%$), arthralgia and pyrexia ($>20\%$).

Children 5 to 11 years of age – after 2 doses

In an analysis of Study C4591007 Phase 2/3, 4,647 children (3,109 Comirnaty (tozinameran) 10 micrograms; 1,538 placebo) were 5 to 11 years of age. Of these, 2,206 (1,481 Comirnaty (tozinameran) 10 micrograms and 725 placebo) children have been followed for >4 months after the second dose in the placebo-controlled blinded follow-up period. The safety evaluation in Study C4591007 is ongoing.

The most frequent adverse reactions in children 5 to 11 years of age that received 2 doses included injection site pain ($>80\%$), fatigue ($>50\%$), headache ($>30\%$), injection site redness and swelling ($\geq 20\%$), myalgia, chills and diarrhoea ($>10\%$).

Participants 16 years of age and older – after booster dose

A subset from Study C4591001 Phase 2/3 participants of 306 adults 18 to 55 years of age who completed the original Comirnaty (tozinameran) 2-dose course, received a booster dose of Comirnaty (tozinameran) approximately 6 months (range of 4.8 to 8.0 months) after receiving Dose 2. Of these, 301 participants have been followed for ≥ 4 months after the booster dose of Comirnaty (tozinameran).

The most frequent adverse reactions in participants 18 to 55 years of age were injection site pain ($>80\%$), fatigue ($>60\%$), headache ($>40\%$), myalgia ($>30\%$), chills and arthralgia ($>20\%$).

In Study C4591031, a placebo-controlled booster study, participants 16 years of age and older recruited from Study C4591001 received a booster dose of Comirnaty (tozinameran) (5,081 participants), or placebo (5,044 participants) at least 6 months after the second dose of Comirnaty (tozinameran). Overall, participants who received a booster dose, had a median follow-up time of 2.8 months (range 0.3 to 7.5 months) after the booster dose in the blinded placebo-controlled follow-up period to the cut-off date (8 February 2022). Of these, 1281 participants (895 Comirnaty (tozinameran) and 386 placebo) have been followed for ≥ 4 months after the booster dose of Comirnaty (tozinameran).

Children 5 to 11 years of age – after booster dose

In a subset from C4591007, a total of 401 children 5 to 11 years of age received a booster dose of Comirnaty (tozinameran) 10 micrograms at least 5 months (range of 5 to 9 months) after completing the primary series. The analysis of the C4591007 Phase 2/3 subset is based on data up to the cut-off date of 22 March 2022 (median follow-up time of 1.3 months).

The most frequent adverse reactions in participants 5 to 11 years of age were injection site pain (>70%), fatigue (>40%), headache (>30%), myalgia, chills, injection site redness, and swelling (>10%).

Tabulated list of adverse reactions from clinical studies and post-authorisation experience

Adverse reactions observed during clinical studies are listed below according to the following frequency categories:

Very common ($\geq 1/10$),

Common ($\geq 1/100$ to $< 1/10$),

Uncommon ($\geq 1/1,000$ to $< 1/100$),

Rare ($\geq 1/10,000$ to $< 1/1,000$),

Very rare ($< 1/10,000$),

Not known (cannot be estimated from the available data).

Table 1: Adverse reactions from Comirnaty (tozinameran) clinical trials: Individuals 12 years of age and older

System Organ Class	Very common ($\geq 1/10$)	Common ($\geq 1/100$ to $< 1/10$)	Uncommon ($\geq 1/1,000$ to $< 1/100$)	Rare ($\geq 1/10,000$ to $< 1/1,000$)	Not known (cannot be estimated from the available data)
Blood and lymphatic system disorders			Lymphadenopathy ^a		
Metabolism and nutrition disorders			Decreased appetite		
Psychiatric disorders			Insomnia		
Nervous system disorders	Headache		Lethargy	Acute peripheral facial paralysis ^b	
Gastrointestinal disorders		Nausea;			
Skin and subcutaneous tissue disorders			Hyperhidrosis; Night sweats		
Musculoskeletal and connective tissue disorders	Arthralgia; Myalgia				

System Organ Class	Very common (≥ 1/10)	Common (≥ 1/100 to < 1/10)	Uncommon (≥ 1/1,000 to < 1/100)	Rare (≥ 1/10,000 to < 1/1,000)	Not known (cannot be estimated from the available data)
General disorders and administration site conditions	Injection site pain; Fatigue; Chills; Pyrexia ^c ; Injection site swelling	Injection site redness	Asthenia; Malaise;		Facial swelling ^d

^a A higher frequency of lymphadenopathy (2.8% vs 0.4%) was observed in participants receiving a booster dose in Study C4591031 compared to participants receiving 2 doses.

^b Through the clinical trial safety follow-up period to 14 November 2020, acute peripheral facial paralysis (or palsy) was reported by four participants in the Comirnaty (tozinameran) group. Onset was Day 37 after Dose 1 (participant did not receive Dose 2) and Days 3, 9, and 48 after Dose 2. No cases of acute peripheral facial paralysis (or palsy) were reported in the placebo group.

^c A higher frequency of pyrexia was observed after the second dose compared to the first dose. The preferred term pyrexia is a cluster term covering also body temperature increased..

^d Facial swelling in vaccine recipients with a history of injection of dermatological fillers

Table 2. Adverse Reactions from Comirnaty (tozinameran) clinical trial: Individuals 5 to 11 Years of Age (22 May 2022 Data Cut-off Date)

System Organ Class	Very Common ≥1/10 (≥10%)	Common ≥1/100 to <1/10 (≥1% to <10%)	Uncommon ≥1/1,000 to <1/100 (≥0.1% to <1%)	Rare ≥1/10,000 to <1/1,000 (≥0.01% to <0.1%)	Very Rare <1/10,000 (<0.01%)	Not known (cannot be estimated from the available data)
Blood and lymphatic system disorders			Lymphadenopathy ^a			
Immune system disorders			Urticaria ^{b,c} ; Pruritus ^{b,c} ; Rash ^{b,c}	Angioedema ^{b,c}		Anaphylaxis ^b
Metabolism and nutrition disorders			Decreased appetite			
Nervous system disorders	Headache					
Gastrointestinal disorders	Diarrhoea ^b	Vomiting ^b	Nausea			
Skin and subcutaneous tissue disorders				Night sweats		
Musculoskeletal and connective tissue disorders	Myalgia	Arthralgia	Pain in extremity (arm) ^b			

Table 2. Adverse Reactions from Comirnaty (tozinameran) clinical trial: Individuals 5 to 11 Years of Age (22 May 2022 Data Cut-off Date)

System Organ Class	Very Common ≥1/10 (≥10%)	Common ≥1/100 to <1/10 (≥1% to <10%)	Uncommon ≥1/1,000 to <1/100 (≥0.1% to <1%)	Rare ≥1/10,000 to <1/1,000 (≥0.01% to <0.1%)	Very Rare <1/10,000 (<0.01%)	Not known (cannot be estimated from the available data)
General disorders and administration site conditions	Injection site pain; Fatigue; Chills; Injection site swelling; Injection site redness	Pyrexia	Malaise			

- A higher frequency of lymphadenopathy was observed in C4591007 (2.5% vs. 0.7%) in participants receiving a booster dose compared to participants receiving 2 doses.
- These adverse reactions were identified in the post-authorisation period. The following events were not reported in participants 5 to 11 Years of Age in Study C4591007 but were reported in individuals ≥16 years of age in Study C4591001: angioedema, lethargy, asthenia, hyperhidrosis, and night sweats.
- The following events are categorised as hypersensitivity reactions: urticaria, pruritus, rash and angioedema

Special populations

Pregnant women and infants born to maternal participants – after 2 doses of Comirnaty (tozinameran)

Study C4591015, a Phase 2/3, placebo-controlled study, evaluated Comirnaty (tozinameran) or placebo administered in 2 doses, approximately 21 days apart, in pregnant women 18 years of age and older, with the first dose given at 24 to 34 weeks gestation. A total of 346 pregnant women received Comirnaty (tozinameran) (n=173) or placebo (n=173).

The most frequent adverse reactions in pregnant women who received any primary series dose with Comirnaty (tozinameran) included injection site pain (>80%), fatigue (>60%), headache (>50%), myalgia (>30%), chills, arthralgia, and injection site swelling (>10%).

The safety profile in pregnant women who received Comirnaty (tozinameran) was similar to that of nonpregnant participants in other clinical studies, with no newly identified adverse reactions.

In Study C4591015, safety in infants born to maternal participants who received Comirnaty (tozinameran) (n=167) or placebo (n=168) was evaluated at birth and up to 6 months after birth. No safety concerns were identified that were attributable to maternal vaccination with Comirnaty (tozinameran).

Immunocompromised participants (adults and children)

In study C4591024, 37 participants 2 through 4 years old, 65 participants 5 through <12 years old, 15 participants 12 through <17 years old, and 7 participants 18 years of age and older from 5 different immunocompromised disease subsets (immunomodulatory therapy, solid organ transplant, stem cell transplant, non-small cell lung cancer (NSCLC)/chronic lymphocytic leukaemia (CLL) and haemodialysis) received at least 1 and up to 4 doses of Comirnaty

(tozinameran) (Doses 1 and 2 were separated by 21 days, Doses 2 and 3 were separated by 28 days and Dose 4 was administered 3 to 6 months after Dose 3).

The safety profile in immunocompromised participants 2 years of age and older who received Comirnaty (tozinameran) was similar to that in non-immunocompromised participants in other clinical studies, with no newly identified adverse reactions.

Post-marketing experience

Although the events listed in Table 3 were not observed in the clinical trials, they are considered adverse drug reactions for Comirnaty as they were reported in the post-marketing experience. As these reactions were derived from spontaneous reports, the frequencies could not be determined and are thus considered as not known.

Table 3: Adverse reactions from Comirnaty post marketing experience

System Organ Class	Adverse Drug Reaction
Immune system disorders	Anaphylaxis Hypersensitivity reactions (e.g. rash, pruritis, urticaria, angioedema)
Cardiac disorders	Myocarditis Pericarditis
Nervous system disorders	Dizziness
Gastrointestinal disorders	Diarrhoea Vomiting
Musculoskeletal and connective tissue disorders	Pain in extremity (arm) ^a
General disorders and administration site conditions	Extensive swelling of vaccinated limb
Reproductive system and breast disorders	Heavy menstrual bleeding ^b
^a A higher frequency of pain in extremity (1.1% vs. 0.8%) was observed in participants receiving a booster dose in Study C4591031 compared to participants receiving 2 doses.	
^b Most cases appear to be non-serious and temporary in nature.	

Reporting suspected adverse effects

Reporting suspected adverse reactions after authorisation of the medicine is important. It allows continued monitoring of the benefit/risk balance of the medicine. Healthcare professionals are asked to report any suspected adverse reactions at <https://pophealth.my.site.com/carmreportnz/s/>.

4.9 Overdose

In clinical trials, participants who received up to 2 times the recommended dose of Comirnaty did not have an increase in reactogenicity or adverse reactions.

In post-authorisation experience, there have been reports of higher than recommended doses of Comirnaty. In general, adverse events reported with overdoses have been similar to the known adverse reaction profile of Comirnaty.

In the event of overdose, monitoring of vital functions and individualised symptomatic treatment is recommended.

For advice on the management of overdose please contact the National Poisons Centre on 0800 POISON (0800 764766).

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: vaccines, other viral vaccines, ATC code: J07BN01.

Mechanism of action

The nucleoside-modified messenger RNA in Comirnaty is formulated in lipid nanoparticles, which enable delivery of the non-replicating RNA into host cells to direct transient expression of the SARS-CoV-2 spike (S) antigen. The mRNA codes for membrane-anchored, full-length S with two point mutations within the central helix. Mutation of these two amino acids to proline locks S in an antigenically preferred prefusion conformation. Comirnaty elicits both neutralising antibody and cellular immune responses to the antigen, which may contribute to protection against COVID-19.

Clinical efficacy and safety

Efficacy

Study C4591001 is a multicentre, multinational, Phase 1/2/3 randomised, placebo-controlled, observer-blind dose-finding, vaccine candidate selection and efficacy study in participants 12 years of age and older. Randomisation was stratified by age: 12 to 15 years of age, 16 to 55 years of age, or 56 years of age and older, with a minimum of 40% of participants in the ≥ 56 -year stratum. The study excluded participants who were immunocompromised and those who had previous clinical or microbiological diagnosis of COVID-19. Participants with pre-existing stable disease, defined as disease not requiring significant change in therapy or hospitalisation for worsening disease during the 6 weeks before enrolment, were included as were participants with known stable infection with HIV, hepatitis C virus (HCV) or hepatitis B virus (HBV).

Efficacy in participants 16 years of age and older – after 2 doses

In the Phase 2/3 portion of Study C4591001, based on data accrued through 14 November 2020, approximately 44,000 participants were randomised equally and were to receive 2 doses of Comirnaty (tozinameran) or placebo. The efficacy analyses included participants that received their second vaccination within 19 to 42 days after their first vaccination. The majority (93.1%) of vaccine recipients received the second dose 19 days to 23 days after Dose 1. Participants are planned to be followed for up to 24 months after Dose 2, for assessments of safety and efficacy against COVID-19. In the clinical study, participants were required to observe a minimum interval of 14 days before and after administration of an influenza vaccine in order to receive either placebo or Comirnaty (tozinameran). In the clinical study, participants were required to observe a minimum interval of 60 days before or after receipt of blood/plasma products or immunoglobulins through to conclusion of the study in order to receive either placebo or Comirnaty (tozinameran).

The population for the analysis of the primary efficacy endpoint included 36,621 participants 12 years of age and older (18,242 in the Comirnaty (tozinameran) group and 18,379 in the placebo group) who did not have evidence of prior infection with SARS-CoV-2 through 7 days after the second dose. In addition, 134 participants were between the ages of 16 to 17 years of

age (66 in the Comirnaty (tozinameran) group and 68 in the placebo group) and 1616 participants 75 years of age and older (804 in the Comirnaty (tozinameran) group and 812 in the placebo group).

At the time of the primary efficacy analysis, participants had been followed for symptomatic COVID-19 for in total 2,214 person-years for the Comirnaty (tozinameran) group and in total 2,222 person-years for the placebo group.

There were no meaningful clinical differences in overall vaccine efficacy in participants who were at risk of severe COVID-19 including those with 1 or more comorbidities that increase the risk of severe COVID-19 (e.g. asthma, body mass index (BMI) ≥ 30 kg/m², chronic pulmonary disease, diabetes mellitus, hypertension).

Comirnaty (tozinameran) efficacy information is presented in Table 4.

Table 4: Vaccine efficacy – First COVID-19 occurrence from 7 days after Dose 2, by age subgroup – participants without evidence of infection prior to 7 days after Dose 2 – evaluable efficacy (7 days) population

First COVID-19 occurrence from 7 days after Dose 2 in participants without evidence of prior SARS-CoV-2 infection*			
Subgroup	Comirnaty (tozinameran) N^a = 18,198 Cases n1^b Surveillance time^c (n2^d)	Placebo N^a = 18,325 Cases n1^b Surveillance time^c (n2^d)	Vaccine efficacy % (95% CI)^f
All participants ^e	8 2.214 (17,411)	162 2.222 (17,511)	95.0 (90.0, 97.9)
16 to 64 years	7 1.706 (13,549)	143 1.710 (13,618)	95.1 (89.6, 98.1)
65 years and older	1 0.508 (3848)	19 0.511 (3880)	94.7 (66.7, 99.9)
65 to 74 years	1 0.406 (3074)	14 0.406 (3095)	92.9 (53.1, 99.8)
75 years and older	0 0.102 (774)	5 0.106 (785)	100.0 (-13.1, 100.0)

Note: Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 [*Case definition: (at least 1 of) fever, new or increased cough, new or increased shortness of breath, chills, new or increased muscle pain, new loss of taste or smell, sore throat, diarrhoea or vomiting.]

* Participants who had no serological or virological evidence (prior to 7 days after receipt of the last dose) of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and SARS-CoV-2 not detected by nucleic acid amplification tests (NAAT) [nasal swab] at Visits 1 and 2), and had negative NAAT (nasal swab) at any unscheduled visit prior to 7 days after Dose 2 were included in the analysis.

a. N = number of participants in the specified group.

b. n1 = Number of participants meeting the endpoint definition.

c. Total surveillance time in 1000 person-years for the given endpoint across all participants within each group at risk for the endpoint. Time period for COVID-19 case accrual is from 7 days after Dose 2 to the end of the surveillance period.

d. n2 = Number of participants at risk for the endpoint.

e. No confirmed cases were identified in adolescents 12 to 15 years of age.

f. Two-sided confidence interval (CI) for vaccine efficacy (VE) is derived based on the Clopper and Pearson method adjusted to the surveillance time. CI not adjusted for multiplicity.

In the second primary analysis, efficacy of Comirnaty (tozinameran) in preventing first COVID-19 occurrence from 7 days after Dose 2 compared to placebo was 94.6% (95% credible interval of 89.9% to 97.3%) in participants 16 years of age and older with or without evidence of prior infection with SARS-CoV-2.

Additionally, subgroup analyses of the primary efficacy endpoint showed similar efficacy point estimates across genders, ethnic groups, and participants with medical comorbidities associated with high risk of severe COVID-19.

Updated efficacy analyses were performed with additional confirmed COVID-19 cases accrued during blinded placebo-controlled follow-up through 13 March 2021, representing up to 6 months of follow-up after Dose 2 for participants in the efficacy population.

The updated vaccine efficacy information is presented in Table 5.

Table 5: Vaccine efficacy – First COVID-19 occurrence from 7 days after Dose 2, by age subgroup – participants without evidence of infection prior to 7 days after Dose 2 – evaluable efficacy (7 days) population during the placebo-controlled follow-up period

First COVID-19 occurrence from 7 days after Dose 2 in participants without evidence of prior SARS-CoV-2 infection*			
Subgroup	Comirnaty (tozinameran) N^a=20,998 Cases n1^b Surveillance Time^c (n2^d)	Placebo N^a=21,096 Cases n1^b Surveillance Time^c (n2^d)	Vaccine efficacy % (95% CI^e)
All participants ^f	77 6.247 (20,712)	850 6.003 (20,713)	91.3 (89.0, 93.2)
16 to 64 years	70 4.859 (15,519)	710 4.654 (15,515)	90.6 (87.9, 92.7)
65 years and older	7 1.233 (4192)	124 1.202 (4226)	94.5 (88.3, 97.8)
65 to 74 years	6 0.994 (3350)	98 0.966 (3379)	94.1 (86.6, 97.9)
75 years and older	1 0.239 (842)	26 0.237 (847)	96.2 (76.9, 99.9)

Note: Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 (symptoms included: fever; new or increased cough; new or increased shortness of breath; chills; new or increased muscle pain; new loss of taste or smell; sore throat; diarrhoea; vomiting).

* Participants who had no evidence of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and SARS-CoV-2 not detected by NAAT [nasal swab] at Visits 1 and 2), and had negative NAAT (nasal swab) at any unscheduled visit prior to 7 days after Dose 2 were included in the analysis.

a. N = Number of participants in the specified group.

b. n1 = Number of participants meeting the endpoint definition.

c. Total surveillance time in 1000 person-years for the given endpoint across all participants within each group at risk for the endpoint. Time period for COVID-19 case accrual is from 7 days after Dose 2 to the end of the surveillance period.

d. n2 = Number of participants at risk for the endpoint.

e. Two-sided confidence interval (CI) for vaccine efficacy is derived based on the Clopper and Pearson method adjusted to the surveillance time.

f. Included confirmed cases in participants 12 to 15 years of age: 0 in the Comirnaty (tozinameran) group (both without and with or without evidence of prior SARS-CoV-2 infection); 16 and 18 in the placebo group (without and with or without evidence of prior SARS-CoV-2 infection, respectively).

Efficacy against severe COVID-19 in participants 12 years of age or older – after 2 doses

As of 13 March 2021, vaccine efficacy against severe COVID-19 is presented only for participants with or without prior SARS-CoV-2 infection (Table 6) as the COVID-19 case counts in participants without prior SARS-CoV-2 infection were the same as those in participants with or without prior SARS-CoV-2 infection in both the Comirnaty (tozinameran) and placebo groups.

Table 6. Vaccine Efficacy – First Severe COVID-19 Occurrence in Participants With or Without* Prior SARS-CoV-2 Infection Based on Food and Drug Administration (FDA)[†] Definition After Dose 1 or From 7 Days After Dose 2 in the Placebo-Controlled Follow-up

	Comirnaty (tozinameran) Cases n1^a Surveillance Time (n2^b)	Placebo Cases n1^a Surveillance Time (n2^b)	Vaccine Efficacy % (95% CI)^c
After Dose 1 ^d	1 8.439 ^e (22,505)	30 8.288 ^e (22,435)	96.7 (80.3, 99.9)
7 days after Dose 2 ^f	1 6.522 ^g (21,649)	21 6.404 ^g (21,730)	95.3 (70.9, 99.9)

Note: Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 (symptoms included: fever; new or increased cough; new or increased shortness of breath; chills; new or increased muscle pain; new loss of taste or smell; sore throat; diarrhoea; vomiting).

* Participants who had no evidence of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and SARS-CoV-2 not detected by NAAT [nasal swab] at Visits 1 and 2), and had negative NAAT (nasal swab) at any unscheduled visit prior to 7 days after Dose 2 were included in the analysis.

[†] Severe illness from COVID-19 as defined by FDA is confirmed COVID-19 and presence of at least 1 of the following:

- Clinical signs at rest indicative of severe systemic illness (respiratory rate ≥ 30 breaths per minute, heart rate ≥ 125 beats per minute, saturation of oxygen $\leq 93\%$ on room air at sea level, or ratio of arterial oxygen partial pressure to fractional inspired oxygen < 300 mm Hg);
- Respiratory failure [defined as needing high-flow oxygen, noninvasive ventilation, mechanical ventilation or extracorporeal membrane oxygenation (ECMO)];
- Evidence of shock (systolic blood pressure < 90 mm Hg, diastolic blood pressure < 60 mm Hg, or requiring vasopressors);
- Significant acute renal, hepatic, or neurologic dysfunction;
- Admission to an Intensive Care Unit;
- Death.

a. n1 = Number of participants meeting the endpoint definition.

b. n2 = Number of participants at risk for the endpoint.

c. Two-side confidence interval (CI) for vaccine efficacy is derived based on the Clopper and Pearson method adjusted to the surveillance time.

d. Efficacy assessed based on the Dose 1 all available efficacy (modified intention-to-treat) population that included all randomised participants who received at least 1 dose of study intervention.

e. Total surveillance time in 1000 person-years for the given endpoint across all participants within each group at risk for the endpoint. Time period for COVID-19 case accrual is from Dose 1 to the end of the surveillance period.

f. Efficacy assessed based on the evaluable efficacy (7 Days) population that included all eligible randomised participants who receive all dose(s) of study intervention as randomised within the predefined window, have no other important protocol deviations as determined by the clinician

g. Total surveillance time in 1000 person-years for the given endpoint across all participants within each group at risk for the endpoint. Time period for COVID-19 case accrual is from 7 days after Dose 2 to the end of the surveillance period.

Efficacy and immunogenicity in adolescents 12 to 15 years of age – after 2 doses

An analysis of Study C4591001 has been performed in adolescents 12 to 15 years of age up to a data cutoff date of 13 March 2021.

The vaccine efficacy information in adolescents 12 to 15 years of age is presented in Table 7.

Table 7: Vaccine efficacy – First COVID-19 occurrence from 7 days after Dose 2 – participants without evidence of infection and with or without evidence of infection prior to 7 days after Dose 2 – adolescents 12 to 15 years of age evaluable efficacy (7 days) population

First COVID-19 occurrence from 7 days after Dose 2 in adolescents 12 to 15 years of age without evidence of prior SARS-CoV-2 infection*			
	Comirnaty (tozinameran) N^a = 1005 Cases n^{1b} Surveillance time^c (n^{2d})	Placebo N^a = 978 Cases n^{1b} Surveillance time^c (n^{2d})	Vaccine efficacy % (95% CI^e)
Adolescents 12 to 15 years	0 0.154 (1001)	16 0.147 (972)	100.0 (75.3, 100.0)
First COVID-19 occurrence from 7 days after Dose 2 in adolescents 12 to 15 years of age with or without* evidence of prior SARS-CoV-2 infection			
	Comirnaty (tozinameran) N^a = 1119 Cases n^{1b} Surveillance time^c (n^{2d})	Placebo N^a = 1110 Cases n^{1b} Surveillance time^c (n^{2d})	Vaccine efficacy % (95% CI^e)
Adolescents 12 to 15 years	0 0.170 (1109)	18 0.163 (1094)	100.0 (78.1, 100.0)

Note: Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 [*Case definition: (at least 1 of) fever, new or increased cough, new or increased shortness of breath, chills, new or increased muscle pain, new loss of taste or smell, sore throat, diarrhoea or vomiting).

* Participants who had no serological or virological evidence (prior to 7 days after receipt of the last dose) of past SARS-CoV-2 infection (i.e, N-binding antibody [serum] negative at Visit 1 and SARS-CoV-2 not detected by nucleic acid amplification tests (NAAT) [nasal swab] at Visits 1 and 2), and had negative NAAT (nasal swab) at any unscheduled visit prior to 7 days after Dose 2 were included in the analysis.

- a. N = number of participants in the specified group.
- b. n1 = Number of participants meeting the endpoint definition.
- c. Total surveillance time in 1000 person-years for the given endpoint across all subjects within each group at risk for the endpoint. Time period for COVID-19 case accrual is from 7 days after Dose 2 to the end of the surveillance period.
- d. n2 = Number of subjects at risk for the endpoint.
- e. Confidence interval (CI) for vaccine efficacy is derived based on the Clopper and Pearson method adjusted for surveillance time. CI not adjusted for multiplicity.

In Study C4591001 an analysis of SARS-CoV-2 neutralising titres in a randomly selected subset of participants was performed to demonstrate non-inferior immune responses (within 1.5-fold) comparing adolescents 12 to 15 years of age to participants 16 to 25 years of age who had no serological or virological evidence of past SARS-CoV-2 infection. The immune response to Comirnaty (tozinameran) in adolescents 12 to 15 years of age (n = 190) was non-inferior to the immune response in participants 16 to 25 years of age (n = 170), based on results for SARS-CoV-2 neutralising titres at 1 month after Dose 2. The geometric mean titres (GMT) ratio of the adolescents 12 to 15 years of age group to the participants 16 to 25 years of age group was 1.76, with a 2-sided 95% CI of 1.47 to 2.10, meeting the 1.5-fold non-inferiority criterion (the lower bound of the 2-sided 95% CI for the geometric mean ratio [GMR] >0.67), which indicates a statistically greater response in the adolescents 12 to 15 years of age than that of participants 16 to 25 years of age.

An updated efficacy analysis of Study C4591001 has been performed in approximately 2,260 adolescents 12 to 15 years of age evaluating confirmed COVID-19 cases accrued up to a data cut-off date of 2 September 2021, representing up to 6 months of follow-up after Dose 2 for participants in the efficacy population.

The updated vaccine efficacy information in adolescents 12 to 15 years of age is presented in Table 8.

Table 8: Vaccine Efficacy – First COVID-19 Occurrence From 7 Days After Dose 2: Without Evidence of Infection and With or Without Evidence of Infection Prior to 7 Days After Dose 2 – Blinded Placebo-Controlled Follow-up Period, Adolescents 12 To 15 Years of Age Evaluable Efficacy (7 Days) Population

First COVID-19 occurrence from 7 days after Dose 2 in adolescents 12 to 15 years of age without evidence of prior SARS-CoV-2 infection*			
	Comirnaty (tozinameran) N^a=1057 Cases n¹^b Surveillance Time^c (n²^d)	Placebo N^a=1030 Cases n¹^b Surveillance Time^c (n²^d)	Vaccine Efficacy % (95% CI^e)
Adolescents 12 to 15 years of age	0 0.343 (1043)	28 0.322 (1019)	100.0 (86.8, 100.0)
First COVID-19 occurrence from 7 days after Dose 2 in adolescents 12 to 15 years of age with or without evidence of prior SARS-CoV-2 infection			
	Comirnaty (tozinameran) N^a=1119 Cases n¹^b Surveillance Time^c (n²^d)	Placebo N^a=1109 Cases n¹^b Surveillance Time^c (n²^d)	Vaccine Efficacy % (95% CI^e)
Adolescents 12 to 15 years of age	0 0.362 (1098)	30 0.345 (1088)	100.0 (87.5, 100.0)

Note: Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 (symptoms included: fever; new or increased cough; new or increased shortness of breath; chills; new or increased muscle pain; new loss of taste or smell; sore throat; diarrhoea; vomiting).

* Participants who had no evidence of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and SARS-CoV-2 not detected by NAAT [nasal swab] at Visits 1 and 2), and had negative NAAT (nasal swab) at any unscheduled visit prior to 7 days after Dose 2 were included in the analysis.

- a. N = Number of participants in the specified group.
- b. n¹ = Number of participants meeting the endpoint definition.
- c. Total surveillance time in 1000 person-years for the given endpoint across all participants within each group at risk for the endpoint. Time period for COVID-19 case accrual is from 7 days after Dose 2 to the end of the surveillance period.
- d. n² = Number of participants at risk for the endpoint.
- e. Two-sided confidence interval (CI) for vaccine efficacy is derived based on the Clopper and Pearson method adjusted for surveillance time.

Efficacy in children 5 to 11 years of age – after 2 doses

An initial descriptive efficacy analysis of Study C4591007 has been performed in 1,968 children 5 to 11 years of age without evidence of infection prior to 7 days after Dose 2. This analysis evaluated confirmed symptomatic COVID-19 cases accrued up to a data cut-off date of 8 October 2021.

The initial descriptive vaccine efficacy results in children 5 to 11 years of age without evidence of prior SARS-CoV-2 infection are presented in Table 9. None of the cases accrued met criteria for severe COVID-19 or multisystem inflammatory syndrome in children (MIS-C). No cases of COVID-19 were observed in either the vaccine group or the placebo group in participants with evidence of prior SARS-CoV-2 infection.

Table 9: Vaccine Efficacy – First COVID-19 Occurrence From 7 Days After Dose 2: Without Evidence of Infection Prior to 7 Days After Dose 2 – Phase 2/3 – Children 5 To 11 Years of Age Evaluable Efficacy Population

First COVID-19 occurrence from 7 days after Dose 2 in children 5 to 11 years of age without evidence of prior SARS-CoV-2 infection*			
	Comirnaty[±] (tozinameran) 10 micrograms/dose N^a=1305 Cases n^{1b} Surveillance Time^c (n^{2d})	Placebo N^a=663 Cases n^{1b} Surveillance Time^c (n^{2d})	Vaccine Efficacy % (95% CI)
Children 5 to 11 years of age	3 0.322 (1273)	16 0.159 (637)	90.7 (67.7, 98.3)

Note: Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 (symptoms included: fever; new or increased cough; new or increased shortness of breath; chills; new or increased muscle pain; new loss of taste or smell; sore throat; diarrhoea; vomiting).

* Participants who had no evidence of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and SARS-CoV-2 not detected by NAAT [nasal swab] at Visits 1 and 2), and had negative NAAT (nasal swab) at any unscheduled visit prior to 7 days after Dose 2 were included in the analysis.

± Pfizer-BioNTech COVID-19 Vaccine (10 micrograms modRNA).

a. N = Number of participants in the specified group.

b. n1 = Number of participants meeting the endpoint definition.

c. Total surveillance time in 1000 person-years for the given endpoint across all participants within each group at risk for the endpoint. Time period for COVID-19 case accrual is from 7 days after Dose 2 to the end of the surveillance period.

d. n2 = Number of participants at risk for the endpoint.

Prespecified hypothesis-driven efficacy analysis was performed with additional confirmed COVID-19 cases accrued during blinded placebo-controlled follow-up, representing up to 6 months after Dose 2 in the efficacy population.

In the efficacy analysis of Study C4591007 in children 5 to 11 years of age without evidence of prior infection, there were 10 cases out of 2,703 participants who received the vaccine and 42 cases out of 1,348 participants who received placebo. The point estimate for efficacy is 88.2% (95% CI: 76.2, 94.7). In participants with or without evidence of prior infection there were 12 cases in the 3,018 who received vaccine and 42 cases in 1,511 participants who received placebo. The point estimate for efficacy is 85.7% (95% CI: 72.4, 93.2).

Immunogenicity in children 5 to 11 years of age – after 2 doses

Study C4591007 is a Phase 1/2/3 study comprised of an open-label vaccine dose-finding portion (Phase 1) and a multicentre, multinational, randomised, saline placebo-controlled, observer-blind efficacy portion (Phase 2/3) that has enrolled participants 5 to 11 years of age.

In C4591007, an analysis of SARS-CoV-2 50% neutralising titres (NT50) 1 month after Dose 2 in a randomly selected subset of participants demonstrated effectiveness by immunobridging of immune responses comparing children 5 to 11 years of age in the Phase 2/3 part of Study C4591007 to participants 16 to 25 years of age in the Phase 2/3 part of Study C4591001 who had no serological or virological evidence of past SARS-CoV-2 infection up to 1 month after Dose 2, meeting the prespecified immunobridging criteria for both the geometric mean ratio (GMR) and the seroresponse difference with seroresponse defined as achieving at least 4-fold rise in SARS-CoV-2 NT50 from baseline (before Dose 1).

The ratio of the SARS-CoV-2 NT50 in children 5 to 11 years of age to that of young adults 16 to 25 years of age was 1.04 (2-sided 95% CI: 0.93, 1.18), as presented in Table 10.

Table 10: Summary of geometric mean ratio for 50% neutralising titre – Comparison of children 5 to 11 years of age (Study C4591007) to participants 16 to 25 years of age (Study C4591001) – participants without* evidence of infection up to 1 month after Dose 2 – evaluable immunogenicity population

		Comirnaty (tozinameran)		5 to 11 years/ 16 to 25 years	
		10 microgram/dose 5 to 11 years n ^a =264	30 microgram/dose 16 to 25 years n ^a =253		
Assay	Time point ^b	GMT ^c (95% CI ^c)	GMT ^c (95% CI ^c)	GMR ^d (95% CI ^d)	Met immunobridging objective ^e (Y/N)
SARS-CoV-2 neutralisation assay - NT50 (titre) ^f	1 month after Dose 2	1197.6 (1106.1, 1296.6)	1146.5 (1045.5, 1257.2)	1.04 (0.93, 1.18)	Y

Abbreviations: CI = confidence interval; GMR = geometric mean ratio; GMT = geometric mean titre; LLOQ = lower limit of quantitation; NAAT = nucleic acid amplification test; NT50 = 50% neutralising titre; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

*Participants who had no serological or virological evidence (up to 1 month post-Dose 2 blood sample collection) of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and 1 month after Dose 2, SARS-CoV-2 not detected by NAAT [nasal swab] at Visits 1 and 2, and negative NAAT (nasal swab) at any unscheduled visit up to 1 month after Dose 2 blood collection) and had no medical history of COVID-19 were included in the analysis.

- n = Number of participants with valid and determinate assay results for the specified assay at the given dose/sampling time point.
- Protocol-specified timing for blood sample collection.
- GMTs and 2-sided 95% CIs were calculated by exponentiating the mean logarithm of the titres and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to $0.5 \times \text{LLOQ}$.
- GMRs and 2-sided 95% CIs were calculated by exponentiating the mean difference of the logarithms of the titres (Group 1 [5 to 11 years of age] - Group 2 [16 to 25 years of age]) and the corresponding CI (based on the Student t distribution).
- Immunobridging is declared if the lower bound of the 2-sided 95% CI for the GMR is greater than 0.67 and the point estimate of the GMR is ≥ 0.8 .
- SARS-CoV-2 NT50 were determined using the SARS-CoV-2 mNeonGreen Virus Microneutralisation Assay. The assay uses a fluorescent reporter virus derived from the USA_WA1/2020 strain and virus neutralisation is read on Vero cell monolayers. The sample NT50 is defined as the reciprocal serum dilution at which 50% of the virus is neutralised.

Among participants without prior evidence of SARS-CoV-2 infection up to 1 month after Dose 2, 99.2% of children 5 to 11 years of age and 99.2% of participants 16 to 25 years of age had a seroresponse from before vaccination to 1 month after Dose 2. The difference in

proportions of participants who had seroresponse between the 2 age groups (children – young adult) was 0.0% (2-sided 95% CI: -2.0%, 2.2%) as presented in Table 11.

Table 11: Difference in percentages of participants with seroresponse – participants without evidence of infection up to 1 month after Dose 2 – immunobridging subset – Phase 2/3 – comparison of 5 to 11 years of age to Study C4591001 Phase 2/3 16 to 25 years of age – evaluable immunogenicity population

		Comirnaty (tozinameran)		5 to 11 years/ 16 to 25 years	
		10 microgram/dose 5 to 11 years N ^a =264	30 microgram/dose 16 to 25 years N ^a =253		
Assay	Time point ^b	n ^c (%) (95% CI ^d)	n ^c (%) (95% CI ^d)	Difference % ^e (95% CI ^f)	Met immunobridging objective ^g (Y/N)
SARS-CoV-2 neutralisation assay – NT50 (titre) ^h	1 month after Dose 2	262 (99.2) (97.3, 99.9)	251 (99.2) (97.2, 99.9)	0.0 (-2.0, 2.2)	Y

Abbreviations: LLOQ = lower limit of quantitation; NAAT = nucleic acid amplification test; N-binding = SARS-CoV-2 nucleoprotein-binding; NT50 = 50% neutralising titre 50; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

Note: Seroresponse is defined as achieving a ≥ 4 -fold rise from baseline (before Dose 1). If the baseline measurement is below the LLOQ, a postvaccination assay result $\geq 4 \times$ LLOQ is considered a seroresponse.

Note: Participants who had no serological or virological evidence (up to 1 month post-Dose 2 blood sample collection) of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and 1 month after Dose 2, SARS-CoV-2 not detected by NAAT [nasal swab] at Visits 1 and 2, and negative NAAT (nasal swab) at any unscheduled visit up to 1 month after Dose 2 blood collection) and had no medical history of COVID-19 were included in the analysis.

- N = number of participants with valid and determinate assay results both before vaccination and at 1 month after Dose 2. These values are the denominators for the percentage calculations.
- Protocol-specified timing for blood sample collection.
- n = Number of participants with seroresponse for the given assay at the given dose/sampling time point.
- Exact 2-sided CI based on the Clopper and Pearson method.
- Difference in proportions, expressed as a percentage (Group 1 [5 to 11 years of age] – Group 2 [16 to 25 years of age]).
- 2-Sided CI, based on the Miettinen and Nurminen method for the difference in proportions, expressed as a percentage.
- Immunobridging is declared if the lower bound of the 2-sided 95% CI for the difference in proportions is greater than -10.0%.
- SARS-CoV-2 NT50 were determined using the SARS-CoV-2 mNeonGreen Virus Microneutralisation Assay. The assay uses a fluorescent reporter virus derived from the USA_WA1/2020 strain and virus neutralisation is read on Vero cell monolayers. The sample NT50 is defined as the reciprocal serum dilution at which 50% of the virus is neutralised.

Immunogenicity in participants 18 years of age and older – after booster dose

Effectiveness of a booster dose of Comirnaty (tozinameran) was based on an assessment of 50% neutralising titres (NT50) against SARS-CoV-2 (USA_WA1/2020). In Study C4591001, analyses of NT50 1 month after the booster dose compared to 1 month after the primary series in individuals 18 to 55 years of age who had no serological or virological evidence of past SARS-CoV-2 infection up to 1 month after the booster vaccination demonstrated noninferiority for both GMR and difference in seroresponse rates. Seroresponse for a

participant was defined as achieving a ≥ 4 -fold rise in NT50 from baseline (before Dose 1). These analyses are summarised in Table 12.

Table 12. SARS-CoV-2 neutralisation assay - NT50 (titre)[†] (SARS-CoV-2 USA_WA1/2020) – GMT and seroresponse rate comparison of 1 month after booster dose to 1 month after primary series – participants 18 to 55 years of age without evidence of infection up to 1 month after booster dose* – booster dose evaluable immunogenicity population[±]

	n	1 month after booster dose (95% CI)	1 month after primary series (95% CI)	1 month after booster dose/- 1 month after primary series (97.5% CI)	Met noninferiority objective (Y/N)
Geometric mean 50% neutralising titre (GMT^b)	212 ^a	2466.0 ^b (2202.6, 2760.8)	755.7 ^b (663.1, 861.2)	3.26 ^c (2.76, 3.86)	Y ^d
Seroresponse rate (%) for 50% neutralising titre[†]	200 ^e	199 ^f 99.5% (97.2%, 100.0%)	190 ^f 95.0% (91.0%, 97.6%)	4.5% ^g (1.0%, 7.9% ^h)	Y ⁱ

Abbreviations: CI = confidence interval; GMR = geometric mean ratio; GMT = geometric mean titre; LLOQ = lower limit of quantitation; N-binding = SARS-CoV-2 nucleoprotein-binding; NAAT = nucleic acid amplification test; NT50 = 50% neutralising titre; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2; Y/N = yes/no.

[†] SARS-CoV-2 NT50 were determined using the SARS-CoV-2 mNeonGreen Virus Microneutralisation Assay. The assay uses a fluorescent reporter virus derived from the USA_WA1/2020 strain and virus neutralisation is read on Vero cell monolayers. The sample NT50 is defined as the reciprocal serum dilution at which 50% of the virus is neutralised.

* Participants who had no serological or virological evidence (up to 1 month after receipt of a booster dose of Comirnaty) of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative and SARS-CoV-2 not detected by NAAT [nasal swab]) and had a negative NAAT (nasal swab) at any unscheduled visit up to 1 month after the booster dose were included in the analysis.

[±] All eligible participants who had received 2 doses of Comirnaty (tozinameran) as initially randomised, with Dose 2 received within the predefined window (within 19 to 42 days after Dose 1), received a booster dose of Comirnaty (tozinameran), had at least 1 valid and determinate immunogenicity result after booster dose from a blood collection within an appropriate window (within 28 to 42 days after the booster dose), and had no other important protocol deviations as determined by the clinician.

a. n = Number of participants with valid and determinate assay results at both sampling time points within specified window.

b. GMTs and 2-sided 95% CIs were calculated by exponentiating the mean logarithm of the titres and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to $0.5 \times \text{LLOQ}$.

c. GMRs and 2-sided 97.5% CIs were calculated by exponentiating the mean differences in the logarithms of the assay and the corresponding CIs (based on the Student t distribution).

d. Noninferiority is declared if the lower bound of the 2-sided 97.5% CI for the GMR is > 0.67 and the point estimate of the GMR is ≥ 0.80 .

e. n = Number of participants with valid and determinate assay results for the specified assay at baseline, 1 month after Dose 2 and 1 month after the booster dose within specified window. These values are the denominators for the percentage calculations.

f. Number of participants with seroresponse for the given assay at the given dose/sampling time point. Exact 2-sided CI based on the Clopper and Pearson method.

g. Difference in proportions, expressed as a percentage (1 month after booster dose – 1 month after Dose 2).

h. Adjusted Wald 2-sided CI for the difference in proportions, expressed as a percentage.

i. Noninferiority is declared if the lower bound of the 2-sided 97.5% CI for the percentage difference is $> -10\%$.

Relative vaccine efficacy in participants 16 years of age and older – after booster dose

An interim efficacy analysis of Study C4591031, a placebo-controlled booster study, was performed in approximately 10,000 participants 16 years of age and older who were recruited from Study C4591001, evaluated confirmed COVID-19 cases accrued from at least 7 days after booster vaccination up to a data cut-off date of 8 February 2022 (a period when Delta and then Omicron was the predominant variant), which represents a median of 2.8 months (range 0.3 to 7.5 months) post-booster follow-up. Vaccine efficacy of the Comirnaty (tozinameran) booster dose after the primary series relative to the placebo booster group who only received the primary series dose was assessed. The relative vaccine efficacy information for participants 16 years of age and older is presented in Table 13.

Table 13: Vaccine Efficacy – First COVID-19 Occurrence From 7 Days After Booster Vaccination – Participants 16 Years of Age and Older Without Evidence of Infection and Participants With or Without Evidence of Infection Prior to 7 Days After Booster Vaccination – Evaluable Efficacy Population

First COVID-19 occurrence from 7 days after booster dose in participants without evidence of prior SARS-CoV-2 infection*			
	Comirnaty (tozinameran) N^a=4689 Cases n¹^b Surveillance Time^c (n²^d)	Placebo N^a=4664 Cases n¹^b Surveillance Time^c (n²^d)	Relative Vaccine Efficacy^e % (95% CI^f)
First COVID-19 occurrence from 7 days after booster vaccination	63 1.098 (4639)	148 0.932 (4601)	63.9 (51.1, 73.5)
First COVID-19 occurrence from 7 days after booster dose in participants with or without evidence of prior SARS-CoV-2 infection			
	Comirnaty (tozinameran) N^a=4977 Cases n¹^b Surveillance Time^c (n²^d)	Placebo N^a=4942 Cases n¹^b Surveillance Time^c (n²^d)	Relative Vaccine Efficacy^e % (95% CI^f)
First COVID-19 occurrence from 7 days after booster vaccination	67 1.173 (4903)	150 0.989 (4846)	62.4 (49.5, 72.2)

Note: Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 (symptoms included: fever; new or increased cough; new or increased shortness of breath; chills; new or increased muscle pain; new loss of taste or smell; sore throat; diarrhoea; vomiting).

* Participants who had no serological or virological evidence (prior to 7 days after receipt of the booster vaccination) of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Visit 1 and SARS-CoV-2 not detected by NAAT [nasal swab] at Visit 1, and had a negative NAAT [nasal swab] at any unscheduled visit prior to 7 days after booster vaccination) were included in the analysis.

- N = Number of participants in the specified group.
- n1 = Number of participants meeting the endpoint definition.
- Total surveillance time in 1000 person-years for the given endpoint across all participants within each group at risk for the endpoint. Time period for COVID-19 case accrual is from 7 days after the booster vaccination to the end of the surveillance period.
- n2 = Number of participants at risk for the endpoint.

- e. Relative vaccine efficacy of the Comirnaty (tozinameran) booster group relative to the placebo group (non-booster).
- f. Two-sided confidence interval (CI) for relative vaccine efficacy is derived based on the Clopper and Pearson method adjusted for surveillance time.

Immunogenicity in children 5 to 11 years of age – after booster dose

Effectiveness of a booster dose of Comirnaty (tozinameran) was based on an assessment of NT50 against the reference strain of SARS-CoV-2 (USA_WA1/2020). Analyses of NT50 1 month after the booster dose compared to before the booster dose demonstrated a substantial increase in GMTs in individuals 5 to 11 years of age who had no serological or virological evidence of past SARS-CoV-2 infection up to 1 month after the booster dose. This analysis is summarised in Table 14.

Table 14: Summary of Geometric Mean Titres – NT50 – Participants Without Evidence of Infection – Phase 2/3 – Immunogenicity Set – 5 to 11 Years of Age – Evaluable Immunogenicity Population

		Comirnaty (tozinameran) 10 micrograms /Dose					
		3-Dose Set		2-Dose Set		Total	
Assay	Dose/ Sampling Time Point ^a	n ^b	GMT ^c (95% CI ^c)	n ^b	GMT ^c (95% CI ^c)	n ^b	GMT ^c (95% CI ^c)
SARS-CoV-2 neutralisation assay - NT50 (titre)	1 month Prevax	79	20.5 (20.5, 20.5)	67	20.5 (20.5, 20.5)	146	20.5 (20.5, 20.5)
	1 month after Dose 2	29	1659.4 (1385.1, 1988.0)	67	1110.7 (965.3, 1278.1)	96	1253.9 (1116.0, 1408.9)
	3 months Prevax	67	271.0 (229.1, 320.6)	-	-	67	271.0 (229.1, 320.6)
	1 month after Dose 3	67	2720.9 (2280.1, 3247.0)	-	-	67	2720.9 (2280.1, 3247.0)

Abbreviations: CI = confidence interval; GMT = geometric mean titre; LLOQ = lower limit of quantitation; NAAT = nucleic acid amplification test; N-binding = SARS-CoV-2 nucleoprotein-binding; NT50 = 50% neutralising titre; Prevax = before vaccination; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

Note: Three-dose immunogenicity set included the first 130 participants who received Dose 3 and completed 1-month post-Dose 3 visit prior to March 15, 2022. Among those, 30 had blood sample collection at 1-month post-Dose 2. Two-dose immunogenicity set included an extra 67 participants randomly selected from previous Dose-2 evaluable immunogenicity population and without evidence of infection up to 1-month post-Dose 2 subset used for 2-dose immunobridging analysis.

Note: Participants included in this analysis had no serological or virological evidence of past SARS-CoV-2 infection up to the 1-month post-Dose 2 (for 1-month post-Dose 2 time point) or 1-month post-Dose 3 (for pre-Dose 3 and 1-month post-Dose 3 time point) study blood sample collection. Having no evidence of past SARS-CoV-2 infection up to 1-month post-Dose 2 was defined as having a negative N-binding antibody (serum) result at the Dose 1 and 1-month post-Dose 2 study visits; a negative NAAT (nasal swab) result at the Dose 1 and Dose 2 study visits and any unscheduled visit prior to the 1-month post-Dose 2 blood sample collection; and no medical history of COVID-19. Having no evidence of past SARS-CoV-2 infection up to 1-month post-Dose 3 was defined as having a negative N-binding antibody (serum) result at the Dose 1, 1-month post-Dose 2 (if available), Dose 3, and 1-month post-Dose 3 study visits; a negative NAAT (nasal swab) result at the Dose 1, Dose 2, and Dose 3 study visits and any unscheduled visit prior to the 1-month post-Dose 3 blood sample collection; and no medical history of COVID-19.

a. Protocol-specified timing for blood sample collection.

b. n = Number of participants with valid and determinate assay results for the specified assay at the given dose/sampling time point.

- c. GMTs and 2-sided 95% CIs were calculated by exponentiating the mean logarithm of the titres and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to $0.5 \times$ LLOQ.

Immunogenicity in children 5 to 11 years of age on the Omicron variant (B1.1.529) – after booster dose

The neutralising GMTs against both the Omicron variant (B1.1.529) and reference strain were substantially increased after booster vaccination compared with after the 2-dose primary series. At 1-month post-Dose 2, the observed neutralising GMTs for the Omicron variant (B1.1.529) and reference strain were 27.6 and 323.8, respectively. At 1-month post-Dose 3, the observed neutralising GMTs for the Omicron variant (B1.1.529) and reference strain were 614.4 and 1702.8, respectively (see Table 15).

For the Omicron variant (B1.1.529), neutralising titres after booster vaccination (1-month post-Dose 3) increased 22-fold over those after the 2-dose primary series (1-month post-Dose 2). For the reference strain, the increase after the booster relative to the primary series was 5.3-fold.

Table 15: Summary of Geometric Mean Titres – Omicron-Neutralisation Subset – Participants Without Evidence of Infection – Phase 2/3 – Immunogenicity Set – 5 to 11 Years of Age – Evaluable Immunogenicity Population

		Comirnaty (tozinameran) 10 micrograms /Dose	
		Vaccine Group (as Randomised)	
Assay	Time Point^b	n^b	GMT^c (95% CI^c)
SARS-COV-2 FFRNT-B.1.1.529 strain (Omicron) - NT50 (titre)	1 month after Dose 2	29	27.6 (22.1, 34.5)
	1 month after Dose 3	17	614.4 (410.7, 919.2)
SARS-CoV-2 FFRNT-reference strain - NT50 (titre)	1 month after Dose 2	29	323.8 (267.5, 392.1)
	1 month after Dose 3	17	1702.8 (1282.6, 2260.7)

Abbreviations: CI = confidence interval; FFRNT = fluorescence focus reduction neutralisation test; GMT = geometric mean titre; LLOQ = lower limit of quantitation; NAAT = nucleic acid amplification test; N-binding = SARS-CoV-2 nucleoprotein-binding; NT50 = 50% neutralising titre; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

Note: Participants included in this analysis had no serological or virological evidence of past SARS-CoV-2 infection up to the 1-month post-Dose 2 (for 1-month post-Dose 2 time point) or 1-month post-Dose 3 (for 1-month post-Dose 3 time point) study blood sample collection. Having no evidence of past SARS-CoV-2 infection up to 1-month post-Dose 2 was defined as having a negative N-binding antibody (serum) result at the Dose 1 and 1-month post-Dose 2 study visits; a negative NAAT (nasal swab) result at the Dose 1 and Dose 2 study visits and any unscheduled visit prior to the 1-month post-Dose 2 blood sample collection; and no medical history of COVID-19. Having no evidence of past SARS-CoV-2 infection up to 1-month post-Dose 3 was defined as having a negative N-binding antibody (serum) result at the Dose 1, 1-month post-Dose 2 (if available), Dose 3, and 1-month post-Dose 3 study visits; a negative NAAT (nasal swab) result at the Dose 1, Dose 2, and Dose 3 study visits and any unscheduled visit prior to the 1-month post-Dose 3 blood sample collection; and no medical history of COVID-19.

a. Protocol-specified timing for blood sample collection.

b. n = Number of participants with valid and determinate assay results for the specified assays at the given dose/sampling time point.

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- c. GMTs and 2-sided 95% CIs were calculated by exponentiating the mean logarithm of the titres and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to $0.5 \times \text{LLOQ}$.

Immunogenicity in pregnant women and infants born to maternal participants – after 2 doses with COMIRNATY (tozinameran)

Study C4591015 was a Phase 2/3 multinational, placebo-controlled, observer-blind study that enrolled pregnant women 18 years of age and older to receive 2 doses of COMIRNATY (tozinameran) (n=173) or placebo (n=173). Pregnant women received Dose 1 of COMIRNATY (tozinameran) at 24 to 34 weeks gestation and the majority (90.2%) received the second dose 19 to 23 days after Dose 1.

Descriptive immunogenicity analysis was performed in pregnant women receiving COMIRNATY (tozinameran) in Study C4591015 compared to a comparator subset of nonpregnant women from Study C4591001 evaluating the ratio of the neutralising GMT (GMR) 1 month after Dose 2.

The evaluable immunogenicity population who received COMIRNATY (tozinameran) in the maternal participants group in Study C4591015 (n=111) and in nonpregnant participants in Study C4591001 (n=114) comprised of 69.4% vs. 82.5% White, 27.0% vs. 5.3% Black or African American, 1.8% vs. 6.1% Asian, 0 vs 4.4% multiracial participants, 37.8% vs 34.2% Hispanic/Latino, 37.8% vs 3.5% had a positive baseline SARS-CoV-2 status, and 38.7% vs 27.2% were obese [BMI ≥ 30 kg/m² (pre-pregnancy weight in participants in Study C4591015)], respectively. In maternal participants group in Study C4591015 and in nonpregnant participants in Study C4591001 who received COMIRNATY (tozinameran), the median age was 30 years (range 18 through 44 years of age) in both groups.

The immunogenicity results after 2 doses of COMIRNATY (tozinameran) in pregnant women 18 years of age and older are presented in Table 16.

Table 16. Geometric Mean Ratios – Participants Without* or With or Without Evidence of Infection up to 1 Month After Dose 2 – Maternal Participants (Study C4591015) and Nonpregnant Female Participants (Study C4591001) – Evaluable Immunogenicity Population

Participants Without Evidence of Infection*						
		COMIRNATY (tozinameran)				
		Study C4591015 Pregnant Women		Study C4591001 Nonpregnant Women		Pregnant/ Nonpregnant
Assay	Dose/ Sampling Time Point ^b	n ^c	GMT ^d (95% CI ^d)	n ^c	GMT ^d (95% CI ^d)	GMR ^e (95% CI) ^e
SARS-CoV-2 neutralisation assay - NT50 (titre) ^a	2/1 month	58	1109.2 (849.2, 1448.9)	107	1663.7 (1411.5, 1960.8)	0.67 (0.50, 0.90)
Participants With or Without Evidence of Infection						
		COMIRNATY (tozinameran)				
		Study C4591015 Pregnant Women		Study C4591001 Nonpregnant Women		Pregnant/ Nonpregnant
Assay	Dose/ Sampling Time Point ^b	nf	GMT ^g (95% CI ^g)	n ^f	GMT ^g (95% CI ^g)	GMR ^h (95% CI) ^h
SARS-CoV-2 neutralisation assay - NT50 (titre) ^a	2/1 month	99	1900.0 (1518.2, 2377.7)	113	2005.7 (1627.0, 2472.6)	0.95 (0.69, 1.30)

Abbreviations: CI = confidence interval; GMR = geometric mean ratio; GMT = geometric mean titre; LLOQ = lower limit of quantitation; LS = least square; N-binding = SARS-CoV-2 nucleoprotein-binding; NAAT = nucleic acid amplification test; NT50 = 50% neutralising titre; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

Note: Participants from Study 2 are a selected subset of age matched nonpregnant female Phase 3 participants.

* Participants who had no serological or virological evidence (prior to the 1 month after Dose 2 blood sample collection) of past SARS-CoV-2 infection (i.e., N-binding antibody [serum] negative at Dose 1 and 1 month after Dose 2 and no positive result between visits, negative NAAT [nasal swab] at Dose 1, Dose 2, and any unscheduled visit prior to the 1 month after Dose 2 blood sample collection) were included in the analysis.

- SARS-CoV-2 NT50 were determined using a validated 384-well assay platform (original strain [USA-WA1/2020, isolated in January 2020]).
- Protocol-specified timing for blood sample collection.
- n = Number of participants with valid and determinate assay results for the specified assay at the given dose/sampling time point.
- GMTs and 2-sided 95% CIs were calculated by exponentiating the mean logarithm of the titres and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to $0.5 \times \text{LLOQ}$.
- GMR and 2-sided 95% CIs were calculated by exponentiating the mean difference of the logarithms of the assay and the corresponding CIs (based on the Student t distribution).
- n = Number of participants with valid and determinate assay results for the specified assay at both baseline and the given dose/sampling time point.
- GMTs and 2-sided CIs were calculated by exponentiating the LS means and the corresponding CIs based on analysis of log-transformed NT50 titres using a regression model with group, age at Dose 1 in years (continuous), and baseline log-transformed NT50 titres.
- GMR (ratio of GMTs of pregnant women to nonpregnant women) and 2-sided CIs were calculated by exponentiating the difference of LS means and the corresponding CIs based on the same regression model as above.

Among participants without prior evidence of SARS-CoV-2 infection up to 1 month after Dose 2 (evaluable immunogenicity population), the ratio of the neutralising GMTs (GMR) in Study C4591015 maternal participants in the BNT162b2 (30 µg) group to that of Study C4591001 nonpregnant females who received BNT162b2 30 µg was 0.67 (95% CI: 0.50, 0.90).

For participants with or without prior evidence of SARS-CoV-2 infection up to 1 month after Dose 2 (evaluable immunogenicity population), the model-adjusted ratio of the neutralising GMTs (adjusted GMR) in Study C4591015 maternal participants in the BNT162b2 (30 µg) group to that of Study C4591001 nonpregnant females who received BNT162b2 30 µg was 0.95 (95% CI: 0.69, 1.30). The model-adjusted GMT and GMR were calculated based on a regression model adjusting for age and baseline neutralising titres.

In an additional descriptive immunogenicity analysis, infants born to maternal participants who received COMIRNATY (tozinameran) had higher geometric mean concentrations (GMCs) of full length S-binding immunoglobulin G (IgG) concentrations at birth and at 6 months after delivery [5576.4 (95% CI: 4246.2, 7323.2); n=91 and 311.1 (95% CI: 235.8, 410.5); n=83], respectively, compared to infants born to maternal participants from the placebo group [19.4 (95% CI: 10.2, 37.0); n=92 and 22.0 (95% CI: 11.4, 42.7); n=69].

Immunogenicity in immunocompromised participants (adults and children)

Study C4591024 is a Phase 2b, open-label study (n=124) that enrolled immunocompromised participants 2 through <18 years of age receiving immunomodulator therapy or who have undergone solid organ transplant (within the previous 3 months) and are on immunosuppression or who have undergone bone marrow or stem cell transplant at least 6 months prior to enrollment. Study C4591024 also enrolled immunocompromised participants 18 years of age and older treated for NSCLC or CLL, receiving hemodialysis for secondary to end-stage renal disease, or receiving immunomodulator therapy for an autoimmune inflammatory disorder. Study participants did not have a past clinical or microbiological diagnosis of COVID-19. Participants received 4 age-appropriate doses of Comirnaty (tozinameran) (3 micrograms, 10 micrograms, or 30 micrograms); the first 2 doses separated by 21 days, with the third dose occurring 28 days after the second dose, followed by a fourth dose, 3 to 6 months after Dose 3.

Participants 2 through 4 years of age who received 3 micrograms Comirnaty (tozinameran) (n=37) comprised of 86.5% White and 83.8% non-Hispanic/non-Latino. The median age at vaccination was 3.0 years.

Participants 5 through <12 years of age who received 10 micrograms Comirnaty (tozinameran) (n=65) comprised of 87.7% White and 83.1% non-Hispanic/non-Latino. The median age at vaccination was 9.0 years.

Participants 12 through <18 years of age who received 30 micrograms Comirnaty (tozinameran) (n=15) comprised of 93.3% White and 73.3% non-Hispanic/non-Latino. The median age at vaccination was 12.0 years.

Participants 18 years of age and older who received 30 micrograms Comirnaty (tozinameran) (n=7) comprised of 28.6% Black or African American and 57.1% Hispanic. The median age at vaccination was 40.0 years.

The immunogenicity results pre-vaccination and after 3 and 4 doses of Comirnaty (tozinameran) in immunocompromised participants 2 years of age and older are presented in Table 17.

Table 17. Summary of Geometric Mean Titres – Participants With or Without Evidence of Infection by Age Group – All-Available Immunogenicity Population

		COMIRNATY (tozinameran)							
		3 micrograms Age Group: 2 to <5 Years		10 micrograms Age Group: 5 to <12 Years		30 micrograms Age Group: 12 to <18 Years		30 micrograms Age Group: ≥18 Years	
Assay	Dose/ Sampling Time Point ^b	n ^c	GMT ^c (95% CI ^d)	n ^c	GMT ^c (95% CI ^d)	n ^c	GMT ^c (95% CI ^d)	n ^c	GMT ^c (95% CI ^d)
SARS-CoV-2 neutralisation assay – reference strain – NT50 (titre) ^a	1/Prevax	32	44.8 (42.2, 47.7)	62	44.5 (42.5, 46.5)	14	54.2 (33.7, 87.0)	6	82.2 (16.0, 422.5)
	3/1 Month	32	942.3 (537.1, 1653.4)	60	1566.5 (1019.9, 2405.9)	14	2940.6 (1175.5, 7356.0)	6	787.1 (66.5, 9321.5)
	4/Pre-Dose 4	29	487.8 (269.0, 884.9)	57	922.2 (586.7, 1449.3)	11	3284.5 (1609.8, 6701.3)	3	606.2 (5.3, 68756.0)
	4/1 Month	26	3447.0 (1851.0, 6419.2)	50	6463.4 (4319.7, 9670.9)	9	13457.1 (5270.1, 34362.4)	4	1031.3 (56.9, 18681.7)
	4/6 Months	25	1296.7 (674.2, 2494.0)	49	2382.3 (1554.3, 3651.2)	8	5776.1 (2801.4, 11909.2)	3	1605.6 (28.5, 90614.9)

Abbreviations: CI = confidence interval; GMT = geometric mean titre; LLOQ = lower limit of quantitation; NT50 = 50% neutralising titre; Prevax = before vaccination; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

- SARS-CoV-2 NT50 were determined using a validated 384-well assay platform (original strain [USA-WA1/2020, isolated in January 2020]).
- Protocol-specified timing for blood sample collection.
- n = Number of participants with valid and determinate assay results for the specified assay at the given dose/sampling time point.
- GMTs and 2-sided 95% CIs were calculated by exponentiating the mean logarithm of the titres and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to $0.5 \times \text{LLOQ}$.

Analysis of immunogenicity data at 1 month after Dose 3 (32 participants 2 to < 5 years of age, 60 participants 5 to < 12 years of age, 14 participants 12 to < 18 years of age, and 6 participants ≥ 18 years of age) and 1 month after Dose 4 (26 participants 2 to < 5 years of age, 50 participants 5 to < 12 years of age, 9 participants 12 to < 18 years of age, and 4 participants ≥ 18 years of age) in the all available immunogenicity population with or without evidence of prior infection demonstrated a vaccine-elicited immune response.

GMTs were observed to be substantially higher at 1 month after Dose 3 and further increased at 1 month after Dose 4 and remained high at 6 months after Dose 4 compared to levels observed before study vaccination across age groups and disease subsets.

5.2 Pharmacokinetic properties

Not applicable.

5.3 Preclinical safety data

Genotoxicity/Carcinogenicity

Neither genotoxicity nor carcinogenicity studies were performed. The components of Comirnaty (lipids and mRNA) are not expected to have genotoxic potential.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate) (ALC-0315)

2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide (ALC-0159)

1,2-Distearoyl-sn-glycero-3-phosphocholine (DSPC)

Cholesterol

Trometamol

Trometamol hydrochloride

Sucrose

Water for injections

6.2 Incompatibilities

This medicinal product must not be mixed with other medicinal products except those mentioned in Section 6.6 Special precautions for disposal and other handling.

6.3 Shelf life

Unopened vial

Frozen vial

18 months when stored at -90°C to -60°C.

The vaccine will be received frozen at -90°C to -60°C. Frozen vaccine can be stored either at -90°C to -60°C or 2°C to 8°C upon receipt.

Single dose vials

When stored frozen at -90 °C to -60 °C, 10-vial packs of single dose vials (light blue cap) of the vaccine can be thawed at 2 °C to 8 °C for 2 hours or individual vials can be thawed at room temperature (up to 30 °C) for 30 minutes.

Multidose vials

When stored frozen at -90 °C to -60 °C, 10-vial packs of multidose vials of the vaccine can be thawed at 2 °C to 8 °C for 4 hours (orange cap) or 6 hours (dark blue cap) or individual vials can be thawed at room temperature (up to 30 °C) for 30 minutes.

Thawed vial

If the vaccine is received at 2°C to 8°C it should be stored at 2°C to 8°C. Once removed from frozen storage, the unopened vial may be stored refrigerated at 2°C to 8°C for a single period of up to 10 weeks within the 18 month shelf life.

Upon moving the product to 2°C to 8°C storage, the updated expiry date must be written on the outer carton and the vaccine should be used or discarded by the updated expiry date. The original expiry date should be crossed out.

Check that the expiry date on the outer carton has been updated to reflect the refrigerated expiry date and that the original expiry date has been crossed out.

Prior to use, the unopened vials can be stored for up to 12 hours at temperatures between 8°C to 30°C.

Thawed vials can be handled in room light conditions.

Once thawed the vaccine should not be re-frozen.

Diluted medicinal product (Orange cap)

Chemical and physical in-use stability has been demonstrated for 12 hours at 2°C to 30°C, after dilution with sodium chloride 9 mg/mL (0.9%) solution for injection. From a microbiological point of view, unless the method of dilution precludes the risk of microbial contamination, the product should be used immediately. If not used immediately, in-use storage times and conditions are the responsibility of the user.

Opened vial (Blue caps)

Chemical and physical in-use stability has been demonstrated for 12 hours at 2°C to 30°C. From a microbiological point of view, unless the method of opening precludes the risks of microbial contamination, the product should be used immediately after the first puncture. If not used immediately, in-use storage times and conditions are the responsibility of the user.

6.4 Special precautions for storage

Check that the expiry date has been updated to reflect the refrigerated EXP date and that the original expiry date has been crossed out.

Store in the original package to protect from light. During storage, minimise exposure to room light, and avoid exposure to direct sunlight and ultraviolet light.

For detailed instructions see Section 6.6 Special precautions for disposal and other handling.

Once thawed, the vaccine cannot be re-frozen.

Thawed vials can be handled in room light conditions.

For storage conditions after thawing and dilution of the medicinal product, see Section 6.3 Shelf life.

For additional advice on storing Comirnaty Omicron XBB.1.5, contact Pfizer New Zealand on 0800 736 363.

6.5 Nature and contents of container

Comirnaty Omicron XBB.1.5 (Orange cap, must dilute) 1.3 mL fill volume in 2 mL clear multidose vial (Type I glass) with a stopper (synthetic bromobutyl rubber) and an Orange flip-off plastic cap with aluminium seal. Each vial contains 10 doses of 0.2 mL after dilution, see Section 6.6 Special precautions for disposal and other handling.

Pack size: 10 vials

Comirnaty Omicron XBB.1.5 (Light blue cap) 0.48 mL fill volume, 2 mL clear vial (Type I glass) with a stopper (synthetic bromobutyl rubber) and a Light Blue flip-off plastic cap with aluminium seal. Each vial contains 1 dose of 0.3 mL, see Section 6.6 Special precautions for disposal and other handling.

Pack size: 10 vials

Comirnaty Omicron XBB.1.5 (Dark blue cap) 2.25 mL fill volume, 2 mL clear multidose vial (Type I glass) with a stopper (synthetic bromobutyl rubber) and a Dark Blue flip-off plastic cap with aluminium seal. Each vial contains 6 doses of 0.3 mL, see Section 6.6 Special precautions for disposal and other handling.

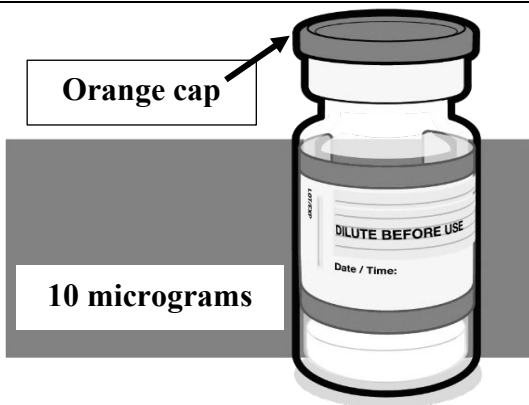
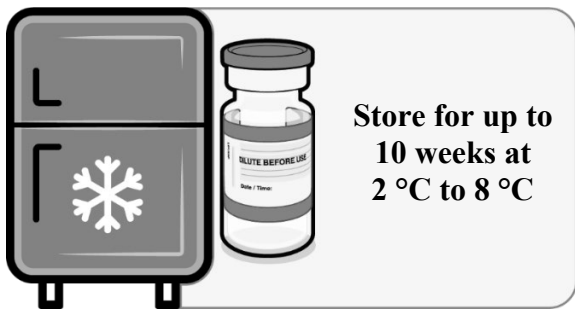
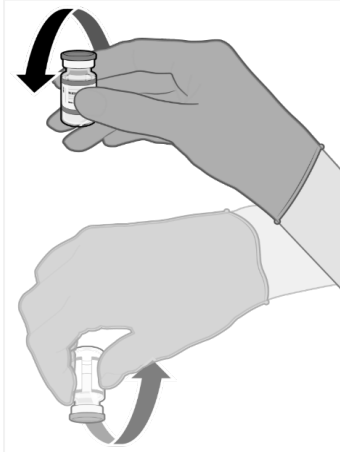
Pack size: 10 vials

Not all pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

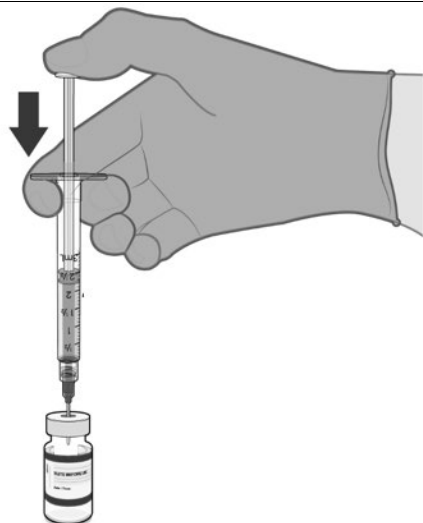
Comirnaty Omicron XBB.1.5 Concentrate for suspension for injection (Orange cap)

The vaccine should be prepared by a healthcare professional using aseptic technique to ensure the sterility of the prepared diluted suspension.

<p align="center">Comirnaty Omicron XBB.1.5 Concentrate for suspension for injection (Orange cap, Must dilute)</p>	
Dose Verification	
	<ul style="list-style-type: none"> • Verify that the product name is Comirnaty Omicron XBB.1.5, and that the indicated age range on the label is children age 5 to 11 years. • Verify that the vial has an orange plastic cap. • If the vial cap has any other colour refer to the handling instructions for that formulation.
Handling Prior To Use	
	<ul style="list-style-type: none"> • If the multidose vial is stored frozen it must be thawed prior to use. Frozen vials should be transferred to an environment of 2°C to 8°C to thaw; a 10 vial pack may take 4 hours to thaw. Ensure vials are completely thawed prior to use. • Unopened vials can be stored for up to 10 weeks at 2°C to 8°C within the 18 month shelf life. • Alternatively, individual frozen vials may be thawed for 30 minutes at temperatures up to 30°C for immediate use.
Mixing Prior To Dilution	
 <p align="center">Gently × 10</p>	<ul style="list-style-type: none"> • Allow the thawed vial to come to room temperature and gently invert it 10 times prior to dilution. Do not shake. • Prior to dilution, the thawed suspension may contain white to off-white opaque amorphous particles.

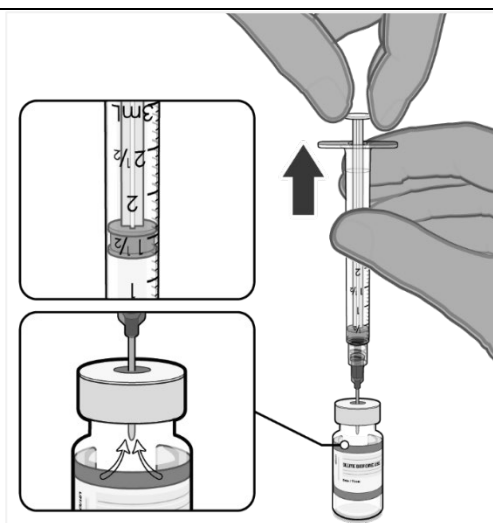
Comirnaty Omicron XBB.1.5 Concentrate for suspension for injection
(Orange cap, Must dilute)

Dilution



1.3 mL of 0.9% sodium chloride

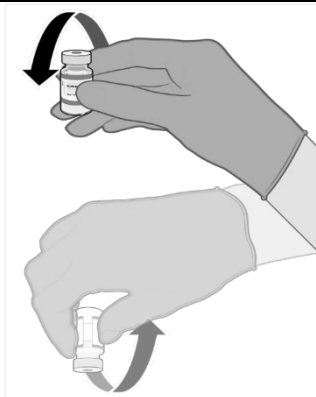
- The thawed vaccine must be diluted in its original vial with 1.3 mL sodium chloride 9 mg/mL (0.9%) solution for injection, using a 21 gauge or narrower needle and aseptic techniques.



Pull back plunger to 1.3 mL to remove air from vial.

- Equalise vial pressure before removing the needle from the vial stopper by withdrawing 1.3 mL air into the empty diluent syringe.

Comirnaty Omicron XBB.1.5 Concentrate for suspension for injection
(Orange cap, Must dilute)



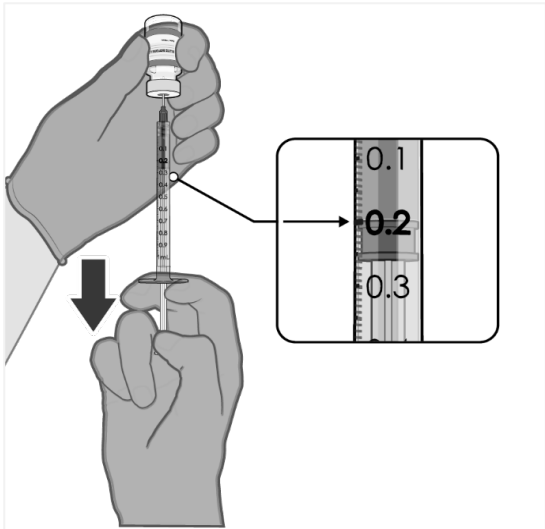
Gently × 10

- Gently invert the diluted suspension 10 times. Do not shake.
- The diluted vaccine should present as a white to off-white suspension with no particulates visible. Do not use the diluted vaccine if particulates or discoloration are present.



Record appropriate date and time.
Use within 12 hours after dilution.

- The diluted vials should be marked with the appropriate date and time.
- After dilution, store at 2°C to 30°C and use within 12 hours.
- Do not freeze or shake the diluted dispersion. If refrigerated, allow the diluted suspension to come to room temperature prior to use.

Comirnaty Omicron XBB.1.5 Concentrate for suspension for injection (Orange cap, must dilute)	
Preparation of Individual 0.2 mL Doses	
 <p>0.2 mL diluted vaccine</p>	<ul style="list-style-type: none"> • Using aseptic technique, cleanse the vial stopper with a single-use antiseptic swab. • Withdraw 0.2 mL of diluted vaccine <p>Low dead-volume syringes and/or needles should be used in order to extract 10 doses from a single vial. The low dead-volume syringe and needle combination should have a dead volume of no more than 35 microlitres.</p> <p>If standard syringes and needles are used, there may not be sufficient volume to extract ten doses from a single vial.</p> <ul style="list-style-type: none"> • Each dose must contain 0.2 mL of vaccine. • Discard syringe and needle after administration to a single patient. • Use a new, sterile needle and syringe to draw up each new dose. • If the amount of vaccine remaining in the vial cannot provide a full dose of 0.2 mL, discard the vial and any excess volume. • Discard any unused vaccine within 12 hours after dilution.

Comirnaty Omicron XBB.1.5 Suspension for Injection (Blue caps)

The vaccine should be prepared by a healthcare professional using aseptic technique to ensure the sterility of the prepared suspension.

Comirnaty Omicron XBB.1.5 Suspension for Injection (Light blue or Dark blue cap)

Dose Verification

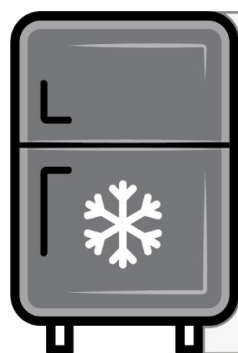


**Light or Dark
Blue cap**

10 micrograms

- Verify that the product name is Comirnaty Omicron XBB.1.5, and that the indicated age range on the label is children age 5 to 11 years
- Verify that the vial has a light or a dark blue plastic cap.
- If the vial cap has any other colour refer to the handling instructions for that formulation.

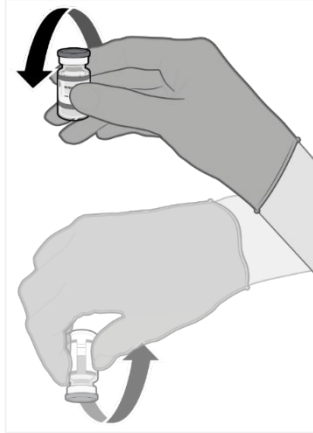
Handling Prior To Use



**Store for up to
10 weeks at
2 °C to 8 °C**

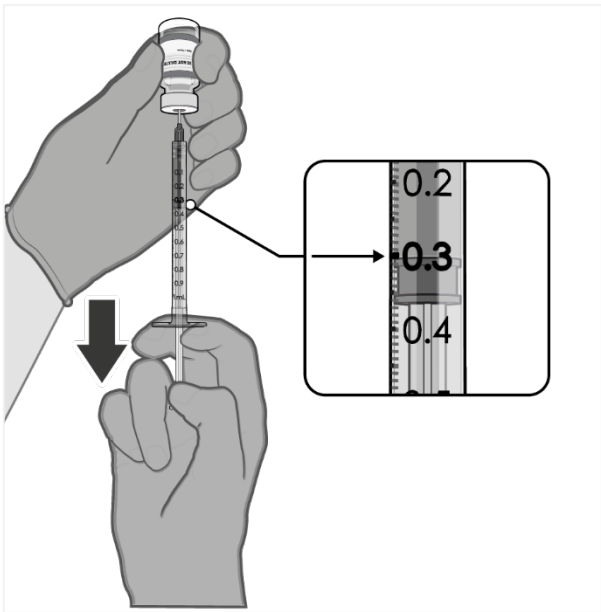
- If the single or multidose vial is stored frozen it must be thawed prior to use. Frozen vials should be transferred to an environment of 2 °C to 8 °C to thaw. Ensure vials are completely thawed prior to use.
 - Single dose vials: A 10-vial pack of single dose vials may take 2 hours to thaw.
 - Multidose vials: A 10-vial pack of multidose vials may take 6 hours to thaw.
- Upon moving vials to 2 °C to 8 °C storage, update the expiry date on the carton.
- Unopened vials can be stored for up to 10 weeks at 2°C to 8°C within the 18 month shelf life.
- Alternatively, individual frozen vials may be thawed for 30 minutes at temperatures up to 30°C for immediate use.

Comirnaty Omicron XBB.1.5 Suspension for Injection
(Light blue or Dark blue cap)



Gently × 10

- Gently mix by inverting vial 10 times prior to use. Do not shake.
- Prior to mixing, the thawed suspension may contain white to off-white opaque amorphous particles.
- After mixing, the vaccine should present as a white to off-white suspension with no particulates visible. Do not use the vaccine if particulates or discoloration are present.

Comirnaty Omicron XBB.1.5 Suspension for Injection (Light Blue or Dark Blue cap)	
Preparation of Individual 0.3 mL Doses	
 <p style="text-align: center;">0.3 mL vaccine</p>	<p><u>Single dose vials</u></p> <ul style="list-style-type: none"> • Withdraw a single 0.3 mL dose of vaccine. • Discard vial and any excess volume. <p><u>Multidose vials</u></p> <ul style="list-style-type: none"> • Multidose vials contain 6 doses of 0.3 mL each • Using aseptic technique, cleanse the vial stopper with a single-use antiseptic swab. • Withdraw 0.3 mL of the vaccine. <p>Low dead-volume syringes and/or needles should be used in order to extract 6 doses from a single vial. The low dead-volume syringe and needle combination should have a dead volume of no more than 35 microlitres.</p> <p>If standard syringes and needles are used, there may not be sufficient volume to extract a sixth dose from a single vial.</p> <ul style="list-style-type: none"> • Each dose must contain 0.3 mL of vaccine. • Use a new, sterile needle and syringe to draw up each new dose. • If the amount of vaccine remaining in the vial cannot provide a full dose of 0.3 mL, discard the vial and any excess volume. • Record the appropriate date/time on the vial. Discard any unused vaccine 12 hours after first puncture.

Any unused medicine or waste material should be disposed of in accordance with local requirements.

7. MEDICINE SCHEDULE

Prescription Medicine.

8. SPONSOR

Pfizer New Zealand Limited
P O Box 3998
Auckland, New Zealand

Toll Free Number: 0800 736 363

9. DATE OF FIRST APPROVAL

Date of publication in the New Zealand Gazette of consent to distribute this medicine:

12 April 2024

10. DATE OF REVISION OF THE TEXT

24 January 2025

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Summary of Updates

Section	Update
4.4	Addition of Study C4591024 data (immunocompromised)
4.6	Addition of Study C4591015 data (maternal study)
4.8	Addition of AE data from Study C4591024 & Study C4591015
4.9	Inclusion of post-authorisation experience