

NEW ZEALAND DATA SHEET

1. PRODUCT NAME

Comirnaty® Omicron XBB.1.5, 30 micrograms/0.3 mL dose, suspension for injection (light grey and dark grey caps)

Comirnaty® Omicron XBB.1.5, 30 micrograms/0.3 mL dose, suspension for injection in a pre-filled syringe.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

This is a single dose or multidose vial (2.25 mL), or single dose pre-filled syringe. Do not dilute prior to use. One single dose vial (light grey cap) contains 1 dose of 0.3 mL. One multidose vial (dark grey cap) contains 6 doses of 0.3 mL. One pre-filled syringe (glass or plastic) contains 1 dose of 0.3 mL.

One dose (0.3 mL) contains 30 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

Suspension for injection.

THE VACCINE IS A WHITE TO OFF-WHITE SUSPENSION (PH 6.9 - 7.9).

4.1 Therapeutic indications

Active immunisation to prevent coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2, in individuals 12 years of age and older.

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

4.2 Dose and method of administration

Dose

Individuals 12 years of age and older

Comirnaty Omicron XBB.1.5 is administered intramuscularly as a single dose of 0.3 mL for individuals 12 years of age and older, 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.

Severely immunocompromised aged 12 years and older

Additional doses may be administered to individuals who are severely immunocompromised in accordance with official recommendations (see section 4.4 Special warnings and precautions for use).

Paediatric population

There are paediatric formulations available for infants aged 6 months and above, and children below 12 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

No dosage adjustment is required in elderly individuals ≥ 65 years of age.

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 Comirnaty Omicron XBB.1.5 intravascularly, subcutaneously or intradermally.

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

For precautions to be taken before administering Comirnaty Omicron XBB.1.5, see Section 4.4 Special warnings and precautions for use. For instructions regarding thawing, handling and disposal of the vaccine, see section 6.6 Special precautions for disposal and other handling.

Single dose vials

Single dose vials of Comirnaty Omicron XBB.1.5 (light grey 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 grey 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 grey 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.

Pre-filled syringes (glass or plastic)

The glass pre-filled syringes are supplied thawed and must not be shaken. If the glass pre-filled syringe has been frozen, discard. The plastic pre-filled syringes will be received frozen and must be thawed prior to use. Do not shake.

For instructions on handling and thawing the pre-filled syringes prior to use, refer to section 6.6 Special precautions for disposal and other handling.

Each single dose pre-filled syringe contains 1 dose of 0.3 mL of vaccine.

Remove tip cap and attach a sterile needle appropriate for intramuscular injection and administer the entire volume of the syringe.

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, the vaccine 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

The efficacy, safety and immunogenicity of the vaccine has not been assessed in immunocompromised individuals, including those receiving immunosuppressant therapy. The efficacy of Comirnaty may be lower in immunosuppressed individuals.

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 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. No dosage adjustment is required in elderly individuals ≥ 65 years of age.

The data for use in the frail elderly is limited. The potential benefits of vaccination versus the potential risk and clinical impact of even relatively mild systemic adverse events in the frail elderly should be carefully assessed on a case-by-case basis.

The safety of a booster dose of Comirnaty (tozinameran) in individuals 65 years of age and older is based on safety data in 12 booster dose recipients 65 to 85 years of age in Study C4591001, 306 booster dose recipients 18 to 55 years of age in Study C4591001, and 1,175 booster dose recipients 65 years of age and older in Study C4591031. The effectiveness of a booster dose of Comirnaty (tozinameran) in individuals 65 years of age and older is based on effectiveness data in 306 booster dose recipients 18 to 55 years of age in Study C4591001, and an efficacy analysis from participants 16 years of age and older in 9,945 participants in Study C4591031.

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

Comirnaty Omicron XBB.1.5 (30 micrograms/dose only) may be administered concomitantly with seasonal influenza vaccine.

The effectiveness and safety of concomitant Comirnaty (tozinameran) and seasonal influenza vaccination in individuals > 65 years of age is extrapolated from Study C4591030 (see Section 5.1 Pharmacodynamic properties).

Different injectable vaccines should be given at different injection sites.

Do not mix Comirnaty with other vaccines or products in the same syringe

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 is limited experience with use of Comirnaty(tozinameran) in pregnant women. 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 aged 6 months and older in clinical studies (comprised of 22,026 participants 16 years of age and older and 1,131 adolescents 12 to 15 years of age from Study C4591001, and 3,109 children 5 to 11 years of age, 2,368 participants 2 to 4 years of age and 1,458 participants 6 to 23 months of age from Study C4591007) 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.

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 ($>20\%$).

Participants 12 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) were followed for ≥ 4 months after the booster dose of Comirnaty (tozinameran). The overall safety profile for the booster dose was similar to that seen after 2 doses.

In another subset from Study C4591001, 825 adolescents 12 to 15 years of age who completed the Comirnaty (tozinameran) 2-dose course, received a booster dose of Comirnaty (tozinameran) approximately 11.2 months (range of 6.3 to 20.1 months) after receiving Dose 2. Overall, participants who received a booster dose, had a median follow-up time of 9.5 months (range 1.5 to 10.7 months) based on data up to the cut-off date (3 November 2022). No new adverse reactions of Comirnaty (tozinameran) were identified.

Participants 18 years of age and older – after subsequent booster doses

In a subset from study C4591031 (Phase 3), 325 adults 18 to ≤ 55 years of age who had completed 3 doses of Comirnaty (tozinameran), received a booster (fourth dose) of Comirnaty (tozinameran 30 micrograms) 90 to 180 days after receiving Dose 3. Participants who received a booster (fourth dose) of Comirnaty (tozinameran 30 micrograms) had a median follow-up time of 1.4 months. The most frequent adverse reactions in these participants were injection site pain ($>70\%$), fatigue ($>60\%$), headache ($>40\%$), myalgia and chills ($>20\%$) and arthralgia ($>10\%$).

In a subset from Study C4591031 (Phase 3), 305 adults greater than 55 years of age who had completed 3 doses of Comirnaty (tozinameran), received a booster (fourth dose) of Comirnaty (tozinameran 30 micrograms) 5.3 to 13.1 months after receiving Dose 3. Participants who received a booster (fourth dose) of Comirnaty (tozinameran 30 micrograms) had a median follow-up time of at least 1.7 months up to a data cutoff date of 16 May 2022. The most frequent adverse reactions in participants greater than 55 years of age were injection site pain (60%), fatigue ($>40\%$), headache ($>20\%$), myalgia and chills ($>10\%$). 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 (≥ 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)
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				
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

Post-marketing experience

Although the events listed in Table 2 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 2: 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.

Safety with concomitant vaccine administration

In Study C4591030, a Phase 3 study, participants 18 to 64 years of age who received Comirnaty (tozinameran) coadministered with seasonal inactivated influenza vaccine (SIIV), quadrivalent followed 1 month later by placebo (n=564), were compared to participants who received an inactivated influenza vaccine with placebo followed 1 month later by Comirnaty (tozinameran) alone (n=564). Reactogenicity events were reported more frequently by participants who received Comirnaty (tozinameran) coadministered with SIIV, quadrivalent, compared to participants who received Comirnaty (tozinameran) alone, but overall the reactogenicity events were mostly mild to moderate in severity. The most common adverse reactions reported in the coadministration group and after Comirnaty (tozinameran) alone were injection site pain (86.2% and 84.4%, respectively), fatigue (64.0% and 50.8%, respectively) and headache (47.2% and 37.8%, respectively).

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

Overdose data is available from 52 study participants included in the clinical trial that due to an error in dilution received 58 micrograms of Comirnaty. The Comirnaty recipients did not report an increase in reactogenicity or adverse reactions.

In the event of overdose, monitoring of vital functions and possible 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, Covid-19 RNA-based 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 3.

Table 3: 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.

- 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 Dose 2 to the end of the surveillance period.
- n2 = Number of participants at risk for the endpoint.
- No confirmed cases were identified in adolescents 12 to 15 years of age.
- 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 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 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.

- 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 Dose 2 to the end of the surveillance period.
- n2 = Number of participants at risk for the endpoint.
- Two-sided confidence interval (CI) for vaccine efficacy is derived based on the Clopper and Pearson method adjusted to the surveillance time.
- 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 5) 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 5. 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 6.

Table 6: 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 n¹^b Surveillance time^c (n²^d)	Placebo N^a = 978 Cases n¹^b Surveillance time^c (n²^d)	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 n¹^b Surveillance time^c (n²^d)	Placebo N^a = 1110 Cases n¹^b Surveillance time^c (n²^d)	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.

- 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 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.
- n2 = Number of subjects at risk for the endpoint.
- 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 7.

Table 7: 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 n^{1b} Surveillance Time^c (n^{2d})	Placebo N^a=1030 Cases n^{1b} Surveillance Time^c (n^{2d})	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 n^{1b} Surveillance Time^c (n^{2d})	Placebo N^a=1109 Cases n^{1b} Surveillance Time^c (n^{2d})	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.

- 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 Dose 2 to the end of the surveillance period.
- n2 = Number of participants at risk for the endpoint.
- Two-sided confidence interval (CI) for vaccine efficacy is derived based on the Clopper and Pearson method adjusted for surveillance time.

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 8.

Table 8. 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 9.

Table 9: 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.
- Relative vaccine efficacy of the Comirnaty (tozinameran) booster group relative to the placebo group (non-booster).
- Two-sided confidence interval (CI) for relative vaccine efficacy is derived based on the Clopper and Pearson method adjusted for surveillance time.

Concomitant vaccine administration with influenza vaccine

In Study C4591030, a Phase 3 multicentre, randomised, observer-blind study, 1,134 participants 18 to 64 years of age who had received 3 doses of Comirnaty (tozinameran) at least 3 months prior were randomised in a 1:1 ratio to receive either Comirnaty (tozinameran) coadministered with a SIIV, quadrivalent (Afluria Quad) followed 1 month later by placebo (Group 1, n=568) or an inactivated influenza vaccine with placebo followed 1 month later with Comirnaty (tozinameran) (Group 2, n=566).

The immune responses to Comirnaty (tozinameran) and SIIV were similar after Comirnaty (tozinameran) administered concomitantly with SIIV compared with those elicited by either vaccine administered alone. The non-inferiority criterion was achieved for both full-length S-binding immunoglobulin G (IgG) and all 4 influenza strain-specific hemagglutination inhibition (HAI) titres.

The immunogenicity results are presented in Table 10 and Table 11.

Table 10. Geometric Mean Ratio for Full-Length S-Binding IgG Levels (U/mL) at 1 Month After Comirnaty (tozinameran) Vaccination – Evaluable Immunogenicity Population

Assay	Vaccine Group (as Randomised)				Coadministration Group/Separate Administration Group
	Coadministration Group		Separate-Administration Group		
	n ^a	GMC ^b (95% CI ^b)	n ^a	GMC ^b (95% CI ^b)	GMR ^c (95% CI ^c)
Full-length S-binding IgG (U/mL)	499	13806.5 (12838.9, 14847.0)	413	16254.6 (15035.5, 17572.5)	0.83 (0.77, 0.89)

Abbreviations: CI = confidence interval; GMC = geometric mean concentration; GMR = geometric mean ratio; IgG = immunoglobulin G; LLOQ = lower limit of quantitation; LS Means = least squares means; S = spike protein. Note: The baseline was defined as Visit 1 for the coadministration group and Visit 2 for the separate-administration group.

- n = Number of participants with valid and determinate assay results for the specified assay at the given sampling time point.
- GMC and the 2-sided 95% CI were calculated by exponentiating the concentrations and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to 0.5 × LLOQ.
- GMR and the corresponding 2-sided 95% CI were calculated by exponentiating the difference in LS Means and the corresponding CIs based on analysis of logarithmically transformed assay results using a linear regression

model with terms of vaccine group, age group, and the corresponding baseline assay results (log scale). Noninferiority is declared if the lower bound of the 2-sided 95% CI for the GMR is greater than 0.67.

Table 11. Geometric Mean Ratio for Strain-Specific HAI Titres at 1 Month After SIIV Vaccination – Evaluable SIIV Immunogenicity Population

Strain	Vaccine Group (as Randomised)				Coadministration Group/Separate Administration Group GMR ^c (95% CI ^c)
	Coadministration Group		Separate Administration Group		
	n ^a	GMT ^b (95% CI ^b)	n ^a	GMT ^b (95% CI ^b)	
B/Austria	514	72.4 (64.2, 81.7)	491	78.3 (69.3, 88.5)	0.89 (0.77, 1.04)
B/Phuket	520	87.4 (79.7, 95.7)	496	86.3 (78.4, 94.9)	1.00 (0.89, 1.13)
H1N1 A/Victoria	516	344.3 (312.4, 379.3)	492	362.3 (326.3, 401.6)	0.95 (0.83, 1.09)
H3N2 A/Darwin	519	230.6 (209.5, 253.8)	491	242.2 (221.2, 265.2)	0.96 (0.85, 1.09)

Abbreviations: CI = confidence interval; GMR = geometric mean ratio; GMT = geometric mean titre; HAI = hemagglutination inhibition; LLOQ = lower limit of quantitation; LS Means = least squares means; SIIV = seasonal inactivated influenza vaccine; ULOQ = upper limit of quantitation.

Note: The baseline for the SIIV assay was defined at Visit 1.

- n = Number of participants with valid and determinate assay results for the specified assay at the given sampling time point.
- GMTs and the 2-sided 95% CIs were calculated by exponentiating the titres and the corresponding CIs (based on the Student t distribution). Assay results below the LLOQ were set to $0.5 \times \text{LLOQ}$, and results above the ULOQ were set to $\text{ULOQ} + 1$.
- GMRs and the corresponding 2-sided 95% CI were calculated by exponentiating the difference in LS Means and the corresponding CIs based on analysis of logarithmically transformed assay results using a linear regression model with terms of vaccine group, age group, and the corresponding baseline assay results (log scale). Noninferiority is declared if the lower bound of the 2-sided 95% CI for the GMR is greater than 0.67.

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)azanediy1)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 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 6 hours 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.

Opened vial

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.

Pre-filled syringes

Confirm the storage conditions listed for the different types of pre-filled syringes.

Plastic pre-filled syringes

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.

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

Within the 12-month shelf life the thawed (previously frozen) pre-filled syringes may be stored at 2 °C to 8 °C for up to 10 weeks.

Thawing procedure for plastic pre-filled syringes

Frozen 10-pack of pre-filled syringes should be thawed in the original carton at 2 °C to 8 °C for 2 hours or at room temperature (up to 30 °C) for 60 minutes.

Thawed (previously frozen) plastic pre-filled syringes

10 weeks storage and transport at 2 °C to 8 °C within the 12-month shelf life.

- Upon moving the vaccine 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.
- If the vaccine is received at 2 °C to 8 °C it should be stored at 2 °C to 8 °C. The expiry date on the outer carton should have been updated to reflect the refrigerated expiry date and the original expiry date should have been crossed out.

Prior to use, thawed pre-filled syringes can be stored for up to 12 hours at temperatures between 8 °C and 30 °C and can be handled in room light conditions.

Once thawed, the vaccine should not be re-frozen.

Glass pre-filled syringes

The vaccine will be received and stored at 2 °C to 8 °C (refrigerated only).

8 months when stored at 2 °C to 8 °C.

Prior to use, pre-filled syringes can be stored for up to 12 hours at temperatures between 8 °C and 30 °C and can be handled in room light conditions.

6.4 Special precautions for storage

Vials and plastic pre-filled syringes

Store single dose vials, multidose vials and frozen plastic pre-filled syringes in a freezer at -90 °C to -60 °C.

Glass pre-filled syringes

Store glass pre-filled syringes at 2 °C to 8 °C. DO NOT FREEZE.

Vials and pre-filled syringes

Store the vaccine in the original package in order to protect from light. During storage, minimise exposure to room light, and avoid exposure to direct sunlight and ultraviolet light. For storage conditions after thawing and first opening, 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 (Light Grey cap) 0.48 mL fill volume, 2 mL clear vial (Type I glass) with a stopper (synthetic bromobutyl rubber) and a Light Grey 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, 195 vials

Comirnaty Omicron XBB.1.5 (Dark Grey cap) 2.25 mL fill volume, 2 mL clear multidose vial (Type I glass) with a stopper (synthetic bromobutyl rubber) and a Dark Grey 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, 195 vials

Comirnaty Omicron XBB.1.5 Prefilled Glass Syringe: 1 mL clear glass syringe (Type I glass) with polypropylene rigid cap with a 1 mL plunger stopper (bromobutyl elastomer). Each prefilled glass syringe contains 1 dose.

Pack size: 10 Prefilled glass syringes

Comirnaty Omicron XBB.1.5 Prefilled Plastic Syringe: 1 mL transparent plastic (cyclic-olefin-copolymer plastic) syringe with polycarbonate rigid cap with a 1 mL plunger stopper (bromobutyl elastomer). Each prefilled plastic syringe contains 1 dose.

Pack size: 10 Prefilled plastic syringes

Not all pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

Comirnaty Omicron XBB.1.5 Suspension for Injection

Handling Instructions

Handling prior to use

Frozen vials must be completely thawed prior to use. Frozen vials should be transferred to 2 °C to 8 °C to thaw. Thaw times for 10-vial packs are noted in table below:

Vial Cap Color	Time That May Be Required For a 10-vial Pack to Thaw (at 2 °C to 8 °C)
Light Grey	2 hours
Dark Grey	6 hours

- Upon moving frozen vaccine to 2 °C to 8 °C storage, update the expiry date on the carton. The updated expiry date should reflect 10 weeks from the date of transfer to refrigerated conditions (2 °C to 8 °C) and not exceeding the original printed expiry date (EXP).
- Alternatively, individual frozen vials may be thawed for 30 minutes at temperatures up to 30 °C for immediate use.
- If the vaccine is received at 2 °C to 8 °C it should continue to be stored at 2 °C to 8 °C. Check that the carton has been previously updated to reflect the 10-week refrigerated expiry date.
- Unopened vials can be stored for up to 12 hours at temperatures up to 30 °C. Total storage time between 8 °C to 30 °C, inclusive of storage before and after puncture, should not exceed 24 hours.

Comirnaty Omicron XBB.1.5 - Suspension for Injection

Preparation for administration

Comirnaty Omicron XBB.1.5 Suspension for Injection should be prepared by a healthcare professional using aseptic technique to ensure the sterility of the prepared suspension.

Vials of Comirnaty Omicron XBB.1.5 Suspension for Injection have a grey cap, contain either 1 or 6 doses of 0.3 mL of vaccine and **do not require dilution**.

- Light Grey cap: single dose vial
- Dark Grey cap: 6 dose multidose vial

Vial verification

Prior to administration, check the name and strength of the vaccine on the vial label and the colour of the vial cap and vial label border to ensure it is the intended presentation. Check whether the vial is a single dose vial or a multidose vial and check if the vial requires dilution.

- Check appearance of vaccine prior to mixing and administration.
 - Grey cap vials: Prior to mixing, the vaccine is a white to off-white dispersion and may contain white to off-white opaque amorphous particles.
- Gently invert the vial 10 times. **Do not shake**.
- Do not use the vaccine if particulates or discoloration are present after mixing.

Preparation of individual doses

- Using aseptic technique, cleanse the vial stopper with a single-use antiseptic swab.
- Withdraw a 0.3 mL single dose.
- *For Dark Grey multidose vials (6 doses per vial):*
 - After first puncture, record appropriate date and time on the vial and store at 2 °C to 30 °C for up to 12 hours. Do not re-freeze.
 - Each dose must contain 0.3 mL of vaccine. Low dead-volume syringes and/or needles should be used in order to extract all doses from a single vial. The low dead-volume syringe and needle combination should have a dead volume of no more than 35 microlitres.
 - If the amount of vaccine remaining in the vial cannot provide a full dose, discard the vial and any excess volume.

Instructions applicable to pre-filled syringes

Plastic pre-filled syringes

- Frozen pre-filled syringes must be completely thawed prior to use.
 - A 10 pre-filled syringe pack can be thawed at 2 °C to 8 °C. It may take 2 hours to thaw.
 - Alternatively, a carton of 10 frozen pre-filled syringes may be thawed for 60 minutes at room temperature (up to 30 °C).
- If an individual pre-filled syringe is thawed outside the carton at room temperature (up to 30 °C), this must be used immediately.
- Upon moving the pre-filled syringes to 2 °C to 8 °C storage, update the expiry date on the carton. If received at 2 °C to 8 °C, check that the expiry date has been updated.
- Thawed (previously frozen) pre-filled syringes can be stored for up to 10 weeks at 2 °C to 8 °C; not exceeding the printed expiry date (EXP). Once thawed, the vaccine cannot be re-frozen.
- Prior to use, the thawed pre-filled syringes can be stored for up to 12 hours at temperatures between 8 °C to 30 °C and can be handled in room light conditions.
- Remove tip cap by slowly turning the cap counterclockwise. Do not shake. Attach a needle appropriate for intramuscular injection and administer the entire volume.

Glass pre-filled syringes

- Prior to use, pre-filled syringes can be stored for up to 12 hours at temperatures between 8 °C to 30 °C and can be handled in room light conditions.
 - Remove tip cap by slowly turning the cap counterclockwise. Do not shake. Attach a needle appropriate for intramuscular injection and administer the entire volume.

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:

20 December 2023

10. DATE OF REVISION OF THE TEXT

7 November 2024

Comirnaty® is a registered trademark of BioNTech SE. Used under license.

Summary of Updates

Section	Update
3	Addition of information relating to Prefilled plastic and Prefilled glass syringe
4.2	Inclusion of instructions of use for Prefilled syringe
6.3	Inclusion of shelf-life of Prefilled syringe
6.4	Additional precautions added relating to Prefilled syringe
6.5	Inclusion of information relating to Prefilled syringe
6.6	Inclusion of information relating to Prefilled syringe