5a COVID-19

NOTIFIABLE

In some circumstances, advice in these guidelines may differ from that in the Summary of Product Characteristics (SmPC) of the vaccines. When this occurs, the recommendations in these guidelines, which are based on current expert advice from NIAC, should be followed.

Acronyms used in this chapter

AEFI	Adverse event following immunisation
BMI	Body mass index
BTS/SIGN	British Thoracic Society/Scottish Intercollegiate Guidelines Network
CLS	Capillary Leak Syndrome
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Coronavirus disease 2019
CVST	Cerebral Venous Sinus Thrombosis
EC	European Commission
EMA	European Medicines Agency
GBS	Guillain-Barré Syndrome
HCW	Healthcare worker
HPRA	Health Products Regulatory Authority
HPV	Human Papillomavirus
IM	Intramuscular
MERS	Middle East Respiratory Syndrome
MIS-C	Multisystem Inflammatory Syndrome in Children
mRNA	Messenger RNA
NA	Neutralising antibody
NIAC	National Immunisation Advisory Committee
NIO	National Immunisation Office
PCR	Polymerase Chain Reaction
PEG	Polyethylene glycol
S antigen	Spike glycoprotein
SARS	Severe Acute Respiratory Syndrome
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SmPC	Summary of Product Characteristics
TTS	Thrombosis thrombocytopenia Syndrome
VOC	Variants of concern
WHO	World Health Organization

Click here to return to contents

Contents

Key changes

Transmission

Effects of COVID-19

- Children
- Long COVID

Vaccine safety

- Thrombosis with Thrombocytopenia Syndrome (TTS)
- Cerebrovascular venous and sinus thrombosis without thrombocytopenia
- Capillary leak syndrome
- Myocarditis and pericarditis

Table 5a.1
Priority groups for COVID-19 vaccination

Table 5a.3
Groups for booster COVID-19 vaccination in order of priority

Table 5a.4
Contraindications and precautions to vaccination of those due an mRNA COVID-19 vaccine

Comirnaty 30 micrograms (for those aged 12 and older)

- Pregnancy
- Adverse events
- Booster doses

Comirnaty 10 micrograms (for those aged 5-11 years)

NEW SECTION

Spikevax

- Pregnancy
- Adverse events

Vaxzevria

- Adverse events

5a.1 Introduction

Seven coronaviruses are known to be capable of causing disease in humans. Four of these (229E, NL63, OC43, HKU1) generally cause minor respiratory illnesses. Rarely they cause more serious lower respiratory tract disease in those with an underlying condition such as pulmonary disease or immunocompromise. Three coronaviruses – Middle East Respiratory Syndrome coronavirus, Severe Acute Respiratory Syndrome coronavirus (SARS-CoV), and Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) cause more severe disease. The disease caused by SARS-CoV-2 is termed COVID-19.

5a.2 Epidemiology

Note: Refer to www.hpsc.ie for the most up-to-date information on COVID-19 epidemiology.

In December 2019, an outbreak of severe pneumonia was reported in Wuhan, China. The causative organism was SARS-CoV-2. The disease it causes is called **Co**rona**vi**rus **d**isease 20**19** (COVID-19). On March 11th, 2020, the World Health Organization (WHO) declared the outbreak a pandemic.

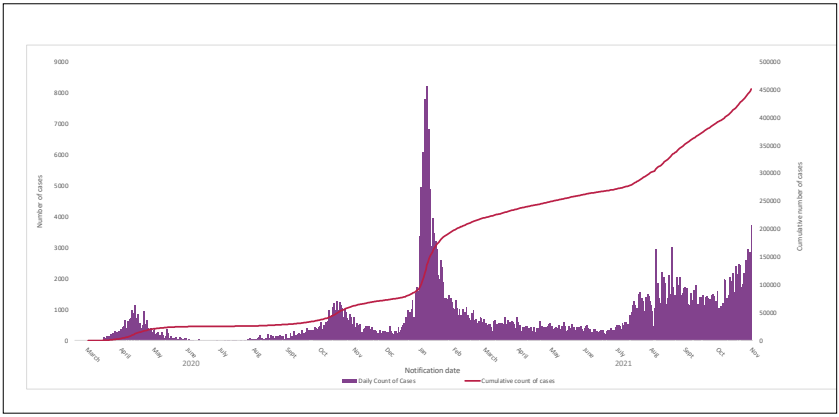
By 3 December 2021, over 250 million cases and over five million deaths have been reported.

On 31 May 2021, the WHO renamed the four variants of concern (VOC): Alpha (B.1.1.7), Beta (B.1.353), Gamma (P.1) and Delta (B.1.617.2). All sub-lineages are included in the variant, e.g., AY.1 is included in Delta. The Delta variant is now the predominant circulating strain in Ireland.

On 26 November 2021, WHO designated the variant B.1.1.529 a variant of concern, named Omicron.

In Ireland, the first laboratory confirmed case of COVID-19 in Ireland was reported on 29 February 2020. Since then there have been four waves, peaking in April and October 2020, January 2021 and the ongoing wave four.

Figure 5a.1 Number and cumulative number of confirmed COVID-19 cases notified in Ireland by notification date to midnight 01/11/21
Source: HPSC



The highest proportion of hospitalisations and deaths have been in those aged 65 and older. An underlying condition was present in 63% of those hospitalised and 89% of those admitted to ICU.

The main underlying conditions associated with increased risk of hospitalisation are chronic respiratory disease, chronic heart disease, hypertension, Type I and Type II diabetes mellitus, chronic neurological disease, cancer, obesity (Body mass index (BMI) ≥40), and chronic kidney disease. Other conditions associated with an increased risk of having a complicated course include immunocompromise due to disease or treatment, inherited metabolic disorders, intellectual disability (including Down syndrome), severe mental illness and sickle cell disease Table 5a.2.

In the first wave in Ireland, 56% of deaths occurred among residents of nursing homes and long-term care facilities. Healthcare workers (HCW) accounted for 30% cases and one third of these occurred in those working in long-stay care facilities (nursing homes,residential institutions, community hospitals). Since the start of the pandemic, HCW have accounted for 10% of cases. This figure continues to decline with increasing HCW vaccine uptake.

Outbreaks have occurred among patients and staff in hospitals, and among people living or working in crowded situations where self-isolation and physical distancing may be difficult to maintain (e.g. meat processing plants, the Irish Traveller community and direct provision centres).

The lowest proportion of hospitalisations and deaths is in those under 15 years of age.

Transmission
Estimates for the basic reproductive number (R_0) of SARS-CoV-2 range from 2–8. The R_0 in confined settings may be at the higher end of this range. The R_0 depends on a range of factors, including circulating strain, setting, vaccination rates and public health and social measures. The transmissibility of the Omicron variant is yet to be characterised.

Transmission occurs mainly indoors through contact within two metres for more than 15 minutes cumulative exposure via respiratory droplets or aerosol. Factors that increase the risk of infection include presence in an enclosed space with inadequate ventilation, increased exhalation of respiratory fluids if an infectious person is e.g. shouting, singing or exercising.

Young children are less likely to transmit infection than adolescents or adults. However, transmission has been reported in all types of school setting.

SARS-CoV-2 virus can survive on surfaces for up to a few days, depending on the surface and environmental conditions.

The **incubation period** is 5 to 6 days (range 1-14 or longer). Around 1% of COVID-19 cases develop symptoms more than 14 days after exposure.

Infectious period Transmission can occur 1-3 days before symptom onset. Peak viral load declines after the first week of symptoms. Those with mild to moderate COVID-19 may shed the virus for up to 10 days following onset of symptoms. Some of those with severe COVID-19 may shed virus for up to 20 days. Asymptomatic persons can transmit the virus, but for shorter periods.

5a.3 Effects of COVID-19

5a.3.1. Symptoms

Overall, 80% of infections are asymptomatic or mild, 15% moderate and 5% severe. Estimates of the proportion of cases which remain asymptomatic range from 15 to 48%. These figures are estimates and vary across different countries, age cohorts and ethnic groups.

The most common symptoms of Delta infection are headache, sore throat, rhinitis, fever and persistent cough. Less common symptoms include myalgia, conjunctivitis, chest pain, dyspnoea, vomiting, diarrhoea, loss of taste or smell, and skin rash.

Symptoms among those aged 65 years and older and those with underlying conditions may be atypical, and fever or respiratory symptoms may be absent. While severe illness and death have been reported at all ages, deaths are more likely in those:

- Age 65 and older
- Age 12-64 years with underlying conditions outlined in Table 5a.2 below.
- From Black, Asian and minority ethnic backgrounds

The majority recover from infection without clinical intervention. However, approximately 20% of identified cases globally have resulted in hospitalisation. In up to 80% of patients symptoms last more than two weeks. Long-term symptoms ("Long COVID") include fatigue, headache, mood changes, chest pain, palpitations, hair loss, and dyspnoea. Long-term symptoms following COVID-19 are more likely with increasing age, BMI and female sex.

5a.3.2 Pregnancy

Pregnant women are at similar risk of COVID-19 infection to non-pregnant women of the same age. The overall risk of severe illness in pregnancy is low. However, pregnant women with COVID-19 infection are more likely to be admitted to ICU or to die than either pregnant women without COVID-19 or similar aged non-pregnant women with COVID-19. Pregnant women from Black, Asian and minority ethnic backgrounds may be more likely to be admitted to hospital with COVID-19 disease than other pregnant women.

COVID-19 in pregnancy may increase the risk of adverse pregnancy outcomes, such as late miscarriage, stillbirth and preterm birth.

The following factors may increase the risks of severe illness in pregnant women:

- Underlying conditions listed in Table 5a.2
- Age over 35 years
- Infection in the third trimester (28 weeks or more)
- BMI of 30 or more

5a.3.3 Children

The overwhelming majority of young adolescents who get SARS-CoV-2 infection experience a mild self-limited illness. However, severe disease, ICU admission and extremely rarely death can occur.

Pooled data from 10 EU/EEA countries shows that between 5 July to 3 October 2021, the weekly notification rates of symptomatic COVID-19 disease in children aged 5-11 years increased eleven-fold from 5.9 to 65 per 100,000 population. The weekly rate of hospitalised cases in children aged 5-11 years increased nine-fold, from 0.025 to 0.24 per 100 000 population and there were two deaths.

The presence of an underlying condition significantly increases the risk of hospitalisation and severe disease as outlined in Table 5a.2. From the analysis

of pooled data reported by 10 EU/EEA countries between 3 August 2020 and 3 October 2021, the presence of an underlying condition among children aged 5-11 years is associated with about 12 times higher odds of hospitalisation and 19 times higher odds or of ICU admission. However, the majority (78%) of hospitalised children of this age had no reported underlying medical condition.

Multisystem Inflammatory Syndrome in Children (MIS-C) is a rare but serious disorder related to prior SARS-CoV-2 infection, in which different organs can become inflamed, including the heart, lungs, kidneys, brain, skin, eyes and gastrointestinal organs.

A large international cohort study on children with COVID-19 estimated MIS-C to affect between 0.5%-3.1% of all diagnosed paediatric COVID-19 patients and between 0.9%-7.6% of hospitalised paediatric COVID-19 patients.

Most children recover with appropriate treatment with 60% requiring ICU admission, with an average length of ICU stay of around 5 days and an average total hospital stay of around 10 days. Myocardial involvement was seen in 93% of 286 children and adolescents with MIS-C from 55 centres across 17 European countries. In Norway, data shows that there is an increased risk of MIS-C in children with underlying conditions; being overweight was seen in one quarter of the cases.

Rarely, adults develop signs and symptoms similar to MIS-C.

5a.3.4 Long COVID

The majority of people who develop COVID-19 feel better in a few days or weeks. For some people, including children and adolescents, symptoms persist for months. This is called "long COVID".

There is wide variation in the reported incidence of long COVID with some suggesting that as many as 42% of patients might be affected. In the UK, a study estimated that 5% have symptoms that persist for at least eight weeks.

Symptoms vary and include fatigue, difficulty breathing, cough, chest pain, muscle pain, headache, memory and concentration or sleep problems, anxiety, and depression. Symptoms may worsen after physical or mental activities. More than one third of patients experience more than one persistent symptom.

Duration of symptoms varies depending on premorbid risk factors and illness severity. Hospitalised patients, in particular seriously ill patients, are more likely to have a more protracted course than those with mild disease. Overall, the incidence of persistent symptoms in children and young adolescents appears to be less than in adults but for some, return to normal baseline health status following infection can take months.

5a.4. Vaccines

5a.4.1 Types of vaccines

mRNA vaccines

Messenger RNA vaccines include genetic material (mRNA) that instructs the recipient's antigen-presenting cells to make a spike protein antigen, thus stimulating an immune response. Rapid degradation of mRNA within cells contributes to the safety profile of these vaccines.

Comirnaty and **Spikevax** are authorised by the European Medicines Agency (EMA).

CVnCoV vaccine (Curevac) is undergoing an EMA rolling review.

Adenoviral vector vaccines

A non-pathogenic virus is genetically modified to encode an antigen which, when expressed by the host cell, provokes an immune response.

Vaxzevria and **COVID-19 Janssen** are authorised by the EMA.
Sputnik V (Gam-COVID-Vac) is undergoing an EMA rolling review.

Protein subunit vaccines

These vaccines are based on injection of key viral antigens stimulating the immune response.

NVX-CoV2373 vaccine (Novavax) is undergoing an EMA rolling review.

Virus Like Particle vaccines

Virus like particles mimic a virus structure, stimulating an immune response. They are not infectious as they contain no genetic material.

Whole virus vaccines

These consist of attenuated or inactivated virus.

5a.4.2 COVID-19 vaccine safety

To date over one billion people have received a COVID-19 vaccine. Following close post-marketing monitoring, the benefit/risk of all EMA authorised vaccines remains positive.

Thrombosis with Thrombocytopenia Syndrome (TTS)

A very rare condition involving serious thromboembolic events accompanied by thrombocytopenia (TTS) has been reported after Vaxzevria and COVID-19 vaccine Janssen. The thrombi occurred in unusual locations including cerebral venous sinus thrombosis (CVST), the splanchnic vein and in arteries. Subsequently, similar reports were received in the US following COVID-19 Vaccine Janssen.

The risk of TTS is higher in younger people. It is not yet known if there is a sex difference.

The current reported rate of TTS in the UK is around 15 cases per million after the first dose, although a higher incidence is seen in younger people.. After the second dose the reported rate is much lower, particularly in younger individuals. It is estimated that 1 in 100,000 people aged 50 and older and 1 in 50,000 people aged 18-49 vaccinated with Vaxzevria may develop TTS. One in 5 of these may die.

Based on data from the United States it is estimated that 1 in 300,000 people vaccinated with COVID-19 Vaccine Janssen may develop TTS. One in 10 of these may die.

The risks of CVST from COVID-19 are much greater than the risk of TTS associated with the vaccine and increase with age. In the US, the incidence of CVST in those admitted to hospital within two weeks following COVID-19 infection is about 4 in 100,000. Approximately 20% of COVID-19 patients admitted to ICU have thrombosis as a complication.
No specific risk factors for TTS have been identified. There is no evidence of an increased risk for those with clotting or platelet disorders e.g., idiopathic or heparin induced thrombocytopenia, autoimmune conditions, history of cerebral venous sinus thrombosis, acquired or hereditary thrombophilia, antiphospholipid syndrome, or pregnancy.

Vaccine recipients should be advised to promptly seek medical attention if they develop symptoms such as shortness of breath, chest pain, leg swelling, persistent abdominal pain within weeks of vaccination, or neurological symptoms including severe or persistent headaches (particularly 3 or more days after vaccination), blurred vision, confusion or seizures, or petechiae/ecchymoses beyond the site of vaccination.

Healthcare professionals should be alert to the signs and symptoms of thromboembolism and/or thrombocytopenia. Early recognition and prompt treatment are important in the management of TTS.

Healthcare professionals should seek early expert advice from the National Coagulation Centre about specialised testing and treatment options for patients presenting with thromboembolic events associated with thrombocytopenia (including DIC or CVST) occurring within weeks following adenoviral vector vaccination.

Cerebrovascular venous and sinus thrombosis without thrombocytopenia
Events of cerebrovascular venous and sinus thrombosis without thrombocytopenia have been observed very rarely following vaccination with Vaxzevria. Some cases had a fatal outcome. The majority of these cases occurred within the first four weeks following vaccination. This information should be considered for individuals at increased risk for cerebrovascular venous and sinus thrombosis.

These events may require different treatment approaches than TTS and healthcare professionals should consult applicable guidance.

Capillary leak syndrome
Capillary leak syndrome (CLS) is a very rare, serious condition, which can be fatal if untreated. It has been reported as an extremely rare event following COVID-19 adenoviral vector vaccines.

It is characterised by acute and severe recurrent attacks of fluid leakage from the capillaries resulting in oedema mainly affecting the limbs, hypotension, haemoconcentration and hypoalbuminaemia.

Healthcare professionals should be aware of the signs and symptoms of CLS and of its risk of recurrence in people previously diagnosed with the condition. Patients with an acute episode of CLS following vaccination require prompt treatment and may require intensive supportive therapy.

Vaccine recipients should be advised to promptly seek medical attention if they develop oedema in the extremities or sudden weight gain in the days after vaccination, which may be associated with feeling faint (due to hypotension).

Myocarditis and pericarditis
There has been an increase of very rare cases of myocarditis and pericarditis following vaccination with both Comirnaty and Spikevax. The cases occurred particularly in males aged under 30 years, and following the second dose of Spikevax.

In the US, reported rates in males were 10 cases per million after first doses, and 67 cases per million after second doses.

During the first 12 months of the pandemic in the US, rates of myocarditis within three months after infection in males aged 12 to 17 was 450 cases per million.

The EMA has evaluated the occurrence of vaccine associated myocarditis as very rare i.e. up to 10 in 100,000 vaccinated people may be affected. The risk is highest in younger males. Studies have shown that after the second dose of Comirnaty there were about 2.6 extra cases of myocarditis per 100,000 males aged 12 - 29 years after seven days and 5.7 extra cases of myocarditis per 100,000 males aged 16 - 24 years after 28 days. The rates for Spikevax were three to five times higher.

The EMA concluded that very rare cases of myocarditis and pericarditis have been reported following vaccination with mRNA vaccines, but the overall benefit risk remains favourable. Available data suggest that the course of myocarditis or pericarditis following vaccination is not different from myocarditis or pericarditis in general.

Data are very limited on those 5 to 11 years of age. However based on preliminary data from US and Israel, the incidence of myocarditis in those aged 12 – 15 years may be less than in those 16 - 24 years. There were no cases of myocarditis or pericarditis observed in the clinical trial but the study size was too small to detect this rare event.

Myocarditis may present with chest pain, shortness of breath, palpitations and fatigue. Most patients respond well to standard treatment, and the prognosis is good. However, it can occasionally progress to dilated cardiomyopathy and chronic heart failure. Acute pericarditis can have a similar presentation to myocarditis.

Healthcare professionals should be aware of the signs and symptoms of myocarditis and pericarditis.

Vaccine recipients should be advised to promptly seek medical attention if they develop (acute and persisting) chest pain, palpitations or shortness of breath in the days after vaccination.

Healthcare professionals should consult applicable guidance and/or consult a cardiologist for advice on management.

Guillain-Barré syndrome (GBS)

In July 2021, the EMA included a warning in the licensed documentation of cases of GBS reported following vaccination with Vaxzevria. The available data neither confirms nor rules out a possible association with the vaccine.

Healthcare professionals should be alert to signs and symptom of GBS, allowing early diagnosis, supportive care and treatment. Vaccine recipients

should be advised to seek immediate medical attention if they develop weakness and paralysis in the extremities that can progress to the chest and face.

Immune thrombocytopenia (ITP)
Cases of ITP, some with platelet levels below 20,000 per microlitre, have been reported very rarely, usually within four weeks after receiving Vaxzevria and COVID-19 Vaccine Janssen. Some of these occurred in individuals with a history of ITP.

If an individual has a history of a thrombocytopenic disorder, such as ITP, the risk of developing low platelet levels should be considered before administering the vaccine and platelet monitoring is recommended after vaccination.

Venous thromboembolism (VTE)
In October 2021, the EMA concluded that there is a reasonable possibility that rare cases of VTE (distinct from TTS) are linked to vaccination with COVID-19 Vaccine Janssen. Most cases observed in the clinical trials occurred in people with at least one risk factor for VTE.

Health care professionals should consider the risk of VTE after COVID-19 Vaccine Janssen in individuals with VTE risk factors.

5a.4.3 Vaccine availability and storage

An up-to-date list of licensed vaccines is available on the Health Products Regulatory Authority (HPRA) website www.hpra.ie

A list of the vaccines currently available from the National Cold Chain Service can be found at https://www.hse.ie/eng/health/immunisation/

Vaccines should be stored at the temperature specified in the Summary of Product Characteristics (SmPC). Those that require reconstitution must be used within a defined number of hours.

All vaccines are provided in multi-dose vials. Appropriate infection control precautions should always be taken. Specific guidelines are available on the National Immunisation Office (NIO) website at www.immunisation.ie

5a.5 Recommendations

The objective of the COVID-19 vaccination programme is to ensure equitable access to a safe and effective vaccine with the goals of limiting mortality and morbidity from COVID-19, protecting healthcare capacity and enabling social and economic activity.

Table 5a.1 Priority groups for COVID-19 vaccination

Group	Rationale
Adults aged ≥65 years who are residents of long-term care facilities. Consider offering vaccination to all residents and staff on site	At greatest risk of severe illness and death In Ireland, in the first wave of COVID-19, 56% of deaths occurred in this setting
Frontline HCW* in direct patient contact roles or who risk exposure to bodily fluids or aerosols	At very high or high risk of exposure and/or transmission. In the first wave over 30% of cases were in healthcare workers
Aged 70 and older in the following order: 85 and older 80-84 75-79 70-74	At higher risk of hospitalisation and death
Aged 16-69 with medical conditions that put them at very high risk** of disease	At similar very high risk of hospitalisation and death as those aged 70-74
Aged 65-69. Prioritise those with medical conditions** which put them at high risk of severe disease Other HCWs not in direct patient contact Key workers	At higher risk of hospitalisation and death Provide essential health services, protect patients Providing services essential to the vaccination programme
Aged 18-64 years with medical conditions** which put them at high risk of severe disease	At higher risk of hospitalisation
Aged 16 - 64 years Residents of long-term care facilities Traveller and Roma communities People who are homeless Aged 16 - 64 years in descending order e.g. 10-year cohorts	Based on risk of ICU admission and death
Aged 12-15 years Aged 5-11 years Prioritise those - with underlying conditions - living with a younger child with complex medical needs - living with a person who is immunocompromised	Reducing the rare risk of severe disease Maintain access to educational opportunities Facilitate psychosocial development

* HCW who work in and out of all healthcare settings including vaccinators
**See Table 5a.2

Pregnant women and adolescents from 12 years of age should be offered COVID-19 vaccination at any stage in pregnancy.

Table 5a.2 Underlying conditions associated with very high risk or high risk of severe COVID-19 disease.

May also include others, based on clinical judgement and a needs assessment.

Conditions in the shaded areas may be associated with a suboptimal response to vaccines and patients with these conditions should be given a mRNA vaccine if practicable and timely. However, if preferential selection of a mRNA vaccine will result in delayed vaccination for more than 3 weeks, any benefit of using a higher efficacy vaccine may be lost.

Underlying condition	Very high risk	High risk
Cancer	Receiving or within 6 weeks of receiving systemic cytotoxic chemotherapy, targeted therapy, monoclonal antibodies or immunotherapies Receiving treatment or pending treatment for a haematological cancer Undergoing or within 6 weeks of surgery or radical radiotherapy for lung or head and neck cancer Advanced/ metastatic cancer	Haematological[1] - within 5 years of treatment Non haematological cancer within 1 year following immunomodulating treatment All other cancers being treated (excluding hormonal treatment)
Chronic heart and vascular disease		e.g. heart failure, hypertensive cardiac disease
Chronic kidney disease	On dialysis, or eGFR <15 ml/ min	eGFR <30ml/min
Chronic liver disease		e.g. cirrhosis or fibrosis
Chronic neurological disease or condition	With evolving respiratory failure requiring non-invasive ventilation e.g. motor neurone disease, spinal muscular atrophy	Significantly compromised respiratory function and/or the ability to clear secretions e.g. Parkinson's disease, cerebral palsy
Chronic respiratory disease	Severe e.g. severe cystic fibrosis, severe COPD, severe pulmonary fibrosis	Other conditions e.g. stable cystic fibrosis, severe asthma (continuous or repeated use of systemic corticosteroids), moderate COPD
Diabetes	HbA1c ≥58mmol/mol	All other diabetes (Type 1 and 2)

Immunocompromise due to disease or treatment	Severe e.g. **Transplantation:** - Listed for solid organ or haematopoietic stem cell transplant (HSCT) - Post solid organ transplant at any time - Post HSCT within 12 months **Genetic diseases:** - APECED[2] - Inborn errors in the interferon pathway **Treatment:** - including but not limited to Cyclophosphamide, Rituximab, Alemtuzumab, Cladribine or Ocrelizumab in the last 6 months	Other e.g. High dose systemic steroids[3] HIV, not on treatment or CD4 count <200 $x10^{-6}$L for adults
Inherited metabolic diseases	Disorders of intermediary metabolism/at risk of acute decompensation e.g. Maple Syrup Urine Disease	Disorders of intermediary metabolism not fulfilling criteria for very high risk
Intellectual disability	Down Syndrome	Intellectual disability excluding Down Syndrome
Obesity	BMI >40 Kg/m^2	BMI >35 Kg/m^2
Severe mental illness		e.g. schizophrenia, bipolar disorder, severe depression
Sickle cell disease	Sickle cell disease	

[1] Includes e.g., leukaemia, lymphomas, blood dyscrasias or other malignant neoplasms affecting the bone marrow or lymphatic systems

[2] APECED - autoimmune polyendocrinopathy candidiasis ectodermal dystrophy

[3] The following doses of prednisolone (or equivalent dose of other glucocorticoid) are likely to be immunosuppressive:

- Adults and children ≥10kg: ≥40mg/day for more than 1 week, or ≥20mg/day for 2 weeks or longer
- Children <10 kg: 2mg/kg/day for 2 weeks or longer

Table 5a.3 Groups for booster COVID-19 vaccination in order of priority

Group		Date of recommendation
Residents of long term care facilities aged 65 years and older		7 September 2021
Aged 80 years and older		7 September 2021
Aged 60 to 79 years		18 October 2021
Health care workers including pregnant HCWs (priority to frontline HCWs)		1 November 2021
Aged 16-59 years with underlying medical conditions (Table 5a.2)		16 November 2021
Residents of long term healthcare facilities under 65 years of age		16 November 2021
Aged 50 – 59 years		16 November 2021
Pregnant women aged 16 years and older		25 November 2021
Aged 40 - 49 years who received any COVID-19 vaccine including COVID-19 vaccine Janssen		25 November 2021
Aged 16 - 39 years, who received an mRNA vaccine in descending order by age cohort: 30 - 39 years 20 - 29 years 16 -19 years	Those aged 16 - 29 years who received COVID-19 vaccine Janssen can be offered a booster vaccine in parallel with those aged 30 - 39 years	25 November 2021

EMA authorised COVID-19 vaccines

- **Comirnaty (Pfizer/BioNTech)**
- **Spikevax** (formerly COVID-19 Vaccine Moderna)
- **Vaxzevria** (formerly COVID-19 Vaccine AstraZeneca)
- **COVID-19 Vaccine Janssen**

Comirnaty and Spikevax are the only COVID-19 vaccines authorised for those aged 12-17 years.

Comirnaty is the only COVID-19 vaccine authorised for those aged 5-11 years.

mRNA vaccines

Table 5a.4: Contraindications and precautions to vaccination of those due an mRNA COVID-19 vaccine

	History	Action
Contraindication	• Anaphylaxis after a previous dose of Comirnaty or Spikevax • Anaphylaxis after polyethylene glycol (PEG, e.g., some bowel preparations for endoscopy, certain laxatives such as Movicol®)	Consider vaccination with Vaxzevria or COVID-19 vaccine Janssen in a suitable facility Observe for 30 minutes or Discuss with allergist/ immunologist
	• Anaphylaxis after Trometamol; Spikevax is contraindicated	Vaccinate with alternate vaccine
Special precautions	• Anaphylaxis after multiple, different drug classes, with no identified allergen (may indicate PEG allergy) • Anaphylaxis after a vaccine, or a medicine known to contain PEG • Unexplained anaphylaxis (may indicate PEG allergy)	Clarify if PEG is tolerated (see FAQs) Discuss with allergist/ immunologist Consider vaccination with Vaxzevria or COVID-19 vaccine Janssen Observe for 30 minutes
	All those aged 16-29 years should receive Comirnaty as a second or subsequent dose	
	• Children with a previous history of MIS-C	Defer Comirnaty vaccination until clinical recovery has been achieved or until 90 days or more since diagnosis, whichever is the longer
	• Mastocytosis • Idiopathic anaphylaxis • Anaphylaxis after food, venom or medication	Vaccinate as scheduled Observe for 30 minutes
Not a contraindication or a precaution	• Non-anaphylactic food allergy • Family history of allergy, including anaphylaxis • Previous local reaction to any vaccine • Hereditary angioedema • Contact dermatitis to PEG containing cosmetic product • Underlying asthma • Hay fever • NSAID allergy • Chronic spontaneous urticaria	Vaccinate as scheduled Observe for 15 minutes

[1] including pregnant women

5a.5.1 Comirnaty (Pfizer/BioNTech)

This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions to the HPRA.

5a.5.1.1 Comirnaty 30 micrograms (for those aged 12 years and older)

(See Section 5a.5.1.2 Comirnaty 10 micrograms for those aged 5-11 years)

The vaccine should be stored in a freezer at -90°C to -60°C. Each pack contains 195 vials. Vials should be transferred to +2°C to +8°C to thaw which may take 3 hours. Alternatively, frozen vials may be thawed for 30 minutes at temperatures up to +30°C for immediate use.

After thawing, undiluted vaccine can be stored for up to one month (31 days) at +2°C to +8°C and up to 2 hours at up to +30°C. Once thawed, the vaccine cannot be re-frozen.

Stability data indicate that the unopened vial is stable for up to:
- 24 hours when stored at temperatures from -3°C to +2°C
- a total of 4 hours when stored at temperatures from +8°C to +30°C.

The vaccine requires dilution with 1.8ml of 0.9% sodium chloride. After dilution, the vaccine should be kept at +2°C to +30°C and used within 6 hours.

Licensed indications

Active immunisation to prevent COVID-19 caused by SARS-CoV-2 virus in individuals 12 years of age and older.

Vaccine efficacy

Efficacy is 95-100% after two doses in those aged 12 and older.

Vaccine effectiveness

A large trial in Israel showed two dose effectiveness of 87% against hospitalisation and 92% against severe disease from 7 days after the second dose. This effectiveness may not apply to all variants.

Dose, route and schedule

Primary vaccination

The dose of vaccine is 0.3 ml intramuscularly (IM) into the deltoid muscle. The course consists of 2 doses 21-28 days apart.

If more than six 0.3ml doses can be safely and accurately withdrawn from a diluted vial, they can be used as valid doses. There should be no pooling of the contents of different vials.

If the interval between doses is longer than 28 days, the second dose should be given as soon as possible. The course does not need to be restarted.

If the second dose is given between 17 and 20 days after the first dose, it is a valid dose. If the second dose is given before 17 days, this is not considered a valid dose. A third dose should be given 28 days after the second (invalid) dose.

Booster vaccination
The dose of vaccine is 0.3 ml IM.

Additional (3rd dose) vaccination (see Immunocompromised)
The dose of vaccine is 0.3 ml IM.

Interchangeability
The same vaccine should preferably be used for both doses.

Consideration may be given to non-mRNA vaccination after anaphylaxis to a dose of this vaccine if aged 18 years or older, including pregnant women. The alternate vaccine should be given after an interval of at least 28 days and the person should be considered fully vaccinated.

Contraindications (see Table 5a.4)

- Anaphylaxis (serious systemic allergic reaction requiring medical intervention) following a previous dose of the vaccine or any of its constituents (including polyethylene glycol (PEG)).
- Anaphylaxis following another mRNA vaccine.
- Previous history of myocarditis after a dose of an mRNA vaccine (see Section 5a.4.2).

Those with a contraindication to one mRNA COVID-19 vaccine should not receive another EMA authorised mRNA vaccine. Consideration may be given to non-mRNA vaccination for anyone 18 and older following an individual benefit-risk assessment, including pregnant women. This should be given after an interval of at least 28 days and the person should be considered fully vaccinated.

For those aged 12-17 years of age, discuss with an allergist/immunologist.

Appropriate support should be available in case of anaphylaxis or fainting after vaccine administration.

Precautions should be in place to minimise injury from fainting.

Precautions (see Table 5a.4)

- Acute severe febrile illness; defer until recovery.
- Previous history of pericarditis after a dose of an mRNA vaccine - seek specialist advice (see Section 5a.4.2).
- Consider adenoviral vector vaccination for those aged 18 and older, including pregnant women, with:
    - Anaphylaxis after multiple, different drug classes, with no identified allergen (may indicate PEG allergy)
    - Anaphylaxis after a vaccine, or a medicine which contained PEG
    - Unexplained anaphylaxis (may indicate PEG allergy)

If vaccination is advised for a person with prior anaphylaxis to an unrelated allergen, observe for 30 minutes after vaccination.

Discuss with allergist/immunologist for those aged 12-17 years of age.

If there is a precaution to a booster mRNA vaccine, consideration can be given to boosting with an EMA authorised non-mRNA vaccine following an individual benefit-risk assessment.

For more information see Frequently Asked Questions about COVID-19 vaccines for people with pre-existing allergic conditions.

Patients with planned immunosuppressing therapy should ideally complete vaccination two weeks before treatment. The recommended minimum interval may be used. Specialists should consider the individual's risk and likelihood of disease exposure, and provide advice based on knowledge and understanding of the patient's immune status and likely immune response to vaccination.

Vaccination after COVID-19

Unvacccinated

Vaccination should be deferred until clinical recovery from COVID-19 infection and for at least four weeks after diagnosis or onset of symptoms, or four weeks from the first PCR positive specimen in those who are asymptomatic.

Those with persisting symptoms post COVID-19 may be vaccinated, unless there is evidence of recent clinical deterioration.

Those aged under 65 years and immunocompetent

Vaccination may be deferred for up to nine months after diagnosis, symptom onset, or from the first PCR or antigen positive specimen.

Those who have had previous laboratory confirmed COVID-19 infection within 9 months:

- aged *50 years and older* should receive a full COVID-19 vaccine schedule
- aged *under 50 years and immunocompromised (including pregnant women)* should receive a full COVID-19 vaccine schedule

- aged *under 50 years and immunocompetent*: a single dose of COVID-19 vaccine is sufficient and they should then be considered fully vaccinated.

Partially vaccinated
Those who have had laboratory confirmed COVID-19 infection between their first and second doses of COVID-19 vaccine can receive the second dose after clinical recovery or may defer for up to 6 months.

Additional or booster vaccination
If a person in a group for whom an additional or booster dose is recommended has had laboratory confirmed COVID-19 infection after a completed primary vaccine course i.e., a breakthrough infection), the additional or booster dose should be delayed for at least six months after the COVID-19 infection was diagnosed.

Serological testing prior to giving an additional or booster dose is not recommended.

Post vaccination observation period
- Those with no history of anaphylaxis: 15 minutes
- Those with a history of anaphylaxis from any cause: 30 minutes
- Those with immediate itching, swelling or urticarial reaction at the vaccination site: 30 minutes or longer as clinically indicated

Immunocompromised *(see Chapter 3)*
Immunocompromised individuals due to disease or treatment may be vaccinated if they have no contraindications.

Data indicates that those with severe immunocompromise do not have adequate protection following a primary COVID-19 vaccine course. There is evidence that protection can be enhanced by an additional Comirnaty dose, representing an extension of the primary vaccination series.

An additional Comirnaty dose (full dose 0.3ml) should be given to those aged 12 and older with immunocompromise associated with a suboptimal response to vaccines at the time of vaccination, who have completed their primary course. The Comirnaty dose should be given regardless of whether the primary course was of an mRNA or an adenoviral vector vaccine. This is an extended primary vaccination course. The additional vaccine should be given after a minimum interval of two months following the last dose of an EMA authorised COVID-19 vaccine.

An additional non-mRNA vector vaccine can be considered for those with a contraindication or precaution to an mRNA vaccine.

Serological testing prior to giving an additional dose is not recommended.

See Table 5a.2 for conditions that may be associated with a suboptimal response to vaccines.

Pregnancy
Animal reproductive toxicology studies of the mRNA vaccines did not identify any safety concerns.

There is now a growing body of evidence on the safety and effectiveness of COVID-19 vaccination, in both animal and human studies, clearly indicating that the benefits of vaccination outweigh any know or potential risks of COVID-19 vaccination during pregnancy.

The two doses should be given 21-28 days apart at any stage in pregnancy.

Breastfeeding
There is no known reason for vaccinees to avoid breastfeeding.

Children from 12 years of age
In a study in adolescents aged 12-15 years without evidence of prior infection, the point estimate for efficacy was 100%.

Reactogenicity occurred at a slightly higher frequency compared to the adult population. No new safety concerns were observed.

Vaccination of those with bleeding disorders or on anticoagulants
Individuals with a bleeding disorder or receiving anticoagulant therapy may develop haematomas in IM injection sites. Prior to vaccination, inform the recipient about this risk. For those with thrombocytopenia (platelet count<$50x10^9$/L), consult the supervising consultant. People with mild bleeding disorders or on maintenance dose Emicizumab (Hemlibra) do not require haemostatic cover for vaccination. Details of haemostatic cover for all others can be found in the Patient Information tab at http://www.stjames.ie/services/hope/nationalcoagulationcentre

Those with inherited coagulopathies who require factor replacement therapy should receive it on the day of vaccination, prior to the IM vaccination.

If there is uncertainty about the need for replacement therapy, contact the patient's Comprehensive Care Centre.

Those receiving long-term anticoagulation with either Warfarin or heparin are not considered to be at higher risk of bleeding complications following vaccination. There is no reason to expect that there is a greater risk of bleeding complications with the oral anticoagulants or antiplatelet agents, than with other anticoagulants.

People on Warfarin should follow their usual schedule for international normalised ratio (INR) testing and can be vaccinated if it is less than 4.0.

If the INR is 4.0 or more, follow the advice of the clinic/practice managing Warfarin and wait until the INR is less than 4.0 to be vaccinated.

See Chapter 2, sections 2.4.6 and 2.4.7 for further information, including technique for IM injection, in this patient group.

Adverse reactions

A full list of adverse reactions may be found in the Summary of Product Characteristics (SmPC).

Terms used for frequency of adverse events

Very common:	>1/10
Common:	>1/100 and <1/10
Uncommon:	>1/1,000 and <1/100
Rare:	>1/10,000 and <1/1,000
Very rare:	<1/10,000

Local:	Very common: injection site pain and swelling Common: injection site erythema Uncommon: injection site pruritus
General:	Very common: arthralgia, diarrhoea, fatigue, fever, headache, myalgia Common: nausea, vomiting Uncommon: asthenia, decreased appetite, extremity pain, insomnia, hyperhidrosis, hypersensitivity reactions (e.g. rash, pruritus, angioedema), lethargy, lymphadenopathy in the same arm as vaccination, malaise Rare: acute peripheral facial paralysis Very rare: myocarditis, pericarditis (see Section 5a.4.2) Unknown frequency: erythema multiforme, extensive swelling of the vaccinated limb, facial swelling (in those with a history of dermatological fillers)

The most frequent adverse reactions during clinical trials in those aged 16 years or older were injection site pain (> 80%), fatigue (> 60%), headache (> 50%), myalgia and chills (> 30%), arthralgia (> 20%), pyrexia and injection site swelling (> 10%).

The most frequent adverse reactions in adolescents aged 12-15 years were injection site pain (> 90%), fatigue and headache (> 70%), myalgia and chills (> 40%), arthralgia and pyrexia (> 20%), injection site pain or swelling, fatigue and chills (≥10%).

Symptoms were usually mild or moderate in intensity, and resolved within a few days after vaccination. A lower frequency of adverse events is associated with greater age. A higher rate of pyrexia is seen after the second dose.

Post marketing surveillance has reported an anaphylaxis rate of 2-5/ million in the US and 14/million in the UK (the latter figure includes anaphylactoid reactions). These rates are higher than after non COVID-19 vaccines.

Booster doses of mRNA vaccines have not shown any unexpected short term safety concerns. The risk of myocarditis or other rare adverse reactions following an mRNA booster dose is yet to be characterised and will be closely monitored.

Co-administration
COVID-19 vaccines and other vaccines may be administered at the same time or at any interval.

As it is not known if COVID-19 vaccine reactogenicity is increased with co-administration, vaccines should be given in different arms.

Duration of immunity
There is insufficient information to determine the duration of protection from the vaccine.

Vaccine recipients may not have optimal protection until 7 days after the second dose, and the vaccine may not protect all vaccinees.

Vaccinated persons should continue to follow current public health guidance to protect themselves and others.

Booster doses
A booster dose of Comirnaty should be given to all those in Table 5a.3 aged **16 years and older** who have completed their primary course with any vaccine type.

The booster dose of Comirnaty (0.3ml, the same dose as the primary schedule), should be given six months or longer following the last dose of an EMA authorised two dose COVID-19 vaccine. A minimum interval of five months (150 days) may be used when necessary for operational reasons.

In exceptional circumstances, a minimum interval of two months can be used between the booster dose and the last dose of an EMA authorised two dose COVID-19 vaccine.

Recipients of COVID-19 vaccine Janssen should receive an mRNA booster dose after an interval of three months.

The booster dose can be given at the same time or at any interval before or after seasonal influenza vaccine.

If there is a contraindication or precaution to an mRNA vaccine, consideration can be given to a booster of an EMA authorised non-mRNA vaccine following an individual benefit-risk assessment.

Serological testing prior to giving a booster dose is not recommended.

5a.5.1.2 Comirnaty 10 micrograms (for children aged 5-11 years)
The vaccine should be stored in a freezer at -90°C to -60°C. Vials should be transferred to +2°C to +8°C to thaw which may take four hours. Alternatively, frozen vials may be thawed for 30 minutes at temperatures up to +30°C for immediate use.

After thawing, undiluted vaccine can be stored for up to ten weeks at +2°C to +8°C and up to 12 hours at up to +30°C. Once thawed, the vaccine cannot be re-frozen.

Stability data indicate that the unopened vial is stable for up to:

- 10 weeks when stored at temperatures from -2°C to +2°C
- a total of 24 hours when stored at temperatures from +8°C to +30°C.

The vaccine requires dilution with 1.3ml of 0.9% sodium chloride. After dilution, the vaccine should be kept at +2°C to +30°C and used within 12 hours.

Licensed indications
Active immunisation to prevent COVID-19 caused by SARS-CoV-2 virus, in children aged 5-11 years.

Vaccine efficacy
A study in children aged 5 to 11 years showed that the immune response to Comirnaty given at a lower dose (10 micrograms) was comparable to that seen with the higher dose (30 micrograms) in those aged 16 to 25 years (as measured by the level of antibodies against SARS-CoV-2).

In another study in children aged 5 – 11 years without evidence of prior infection who were given the lower dose of Comirnaty, there were three COVID-19 cases in 1,305 children who received the vaccine, and 16 cases in 663 who received a placebo The point estimate for efficacy was 90.7% (95% CI 67.7, 98.3). The low dose vaccine demonstrated efficacy against the original and Delta strain.

Approximately 20% enrolled in the trial had an underlying condition associated with severe COVID-19 infection including obesity, but specific risk groups or impact on severe disease was not specifically studied and immunocompromised children were not included.

Dose, route and schedule
Primary vaccination
The dose of vaccine is 0.2 ml intramuscularly (IM) into the deltoid muscle. The course consists of 2 doses 21 days apart.

If more than ten 0.2ml doses can be safely and accurately withdrawn from a diluted vial, they can be used as valid doses. There should be no pooling of the contents of different vials.

The dose of Comirnaty depends on the age at the time of the first vaccine i.e., an 11 year old child who receives the first dose of 10 micrograms Comirnaty and

who is 12 years of age at the time of their second dose, should receive a further dose of 10 micrograms Comirnaty.

If the interval between doses is longer than 21 days, the second dose should be given as soon as possible. The course does not need to be restarted.

If the second dose is given between 19 and 20 days after the first dose, it is a valid dose. If the second dose is given before 19 days, this is not considered a valid dose.

Interchangeability
The same vaccine should be used for both doses.

Contraindications (see Table 5a.4)

- Anaphylaxis (serious systemic allergic reaction requiring medical intervention) following a previous dose of the vaccine or any of its constituents (including polyethylene glycol (PEG)).
- Previous history of myocarditis after a dose of an mRNA vaccine (see Section 5a.4.2).

Appropriate support should be available in case of anaphylaxis or fainting after vaccine administration.
Precautions should be in place to minimise injury from fainting.

Precautions (see Table 5a.4)

- Acute severe febrile illness; defer until recovery.
- Previous history of pericarditis after a dose of an mRNA vaccine - seek specialist advice (see Section 5a.4.2).
- Vaccination should be postponed in children with a previous history of MIS-C, until clinical recovery or until 90 days or more since diagnosis, whichever is the longer.

If vaccination is advised for a child with prior anaphylaxis to an unrelated allergen, observe for 30 minutes after vaccination.

For more information see Frequently Asked Questions about COVID-19 vaccines for people with pre-existing allergic conditions.

Children with planned immunosuppressing therapy should ideally complete vaccination two weeks before treatment. The recommended minimum interval may be used. Specialists should consider the child's risk and likelihood of disease exposure, and provide advice based on knowledge and understanding of their immune status and likely immune response to vaccination.

Vaccination after COVID-19
Vaccination should be deferred until clinical recovery from COVID-19 infection and for at least four weeks after diagnosis or onset of symptoms, or four weeks from the first PCR positive specimen in those who are asymptomatic.

Those with persisting symptoms post COVID-19 may be vaccinated unless there is evidence of recent clinical deterioration.

Serological testing prior to vaccination is not recommended.

Post vaccination observation period

- Those with no history of anaphylaxis: 15 minutes
- Those with a history of anaphylaxis from any cause: 30 minutes
- Those with immediate itching, swelling or urticarial reaction at the vaccination site: 30 minutes or longer as clinically indicated

Immunocompromised *(see Chapter 3)*
Immunocompromised individuals due to disease or treatment may be vaccinated if they have no contraindications.

Data indicates that those with severe immunocompromise do not have adequate protection following a primary COVID-19 vaccine course. There is evidence that protection can be enhanced by an additional mRNA vaccine dose, representing an extension of the primary vaccination series.

An additional Comirnaty dose (10 micrograms 0.2ml) should be given to those aged 5-11 years with immunocompromise associated with a suboptimal response to vaccines at the time of vaccination, who have completed their primary course. This is an extended primary vaccination course.

The additional vaccine should be given after at least 28 days following the second dose.

Serological testing prior to giving an additional dose is not recommended.

See Table 5a.2 for conditions that may be associated with a suboptimal response to vaccines.

Vaccination of those with bleeding disorders or on anticoagulants
Individuals with a bleeding disorder or receiving anticoagulant therapy may develop haematomas in IM injection sites. Prior to vaccination, inform the parent or guardian about this risk. For those with thrombocytopenia (platelet count<50x10^9/L), consult the supervising consultant. People with mild bleeding disorders or on maintenance dose Emicizumab (Hemlibra) do not require haemostatic cover for vaccination.

Those with inherited coagulopathies who require factor replacement therapy should receive it on the day of vaccination, prior to the IM vaccination.

If there is uncertainty about the need for replacement therapy, contact the child's supervising consultant.

Those receiving long-term anticoagulation with either Warfarin or heparin are not considered to be at higher risk of bleeding complications following vaccination.

There is no reason to expect that there is a greater risk of bleeding complications with the oral anticoagulants or antiplatelet agents, than with other anticoagulants.

See Chapter 2, sections 2.4.6 and 2.4.7 for further information, including technique for IM injection, in this patient group.

Adverse reactions
A full list of adverse reactions may be found in the Summary of Product Characteristics (SmPC).

Terms used for frequency of adverse events

Very common:	>1/10
Common:	>1/100 and <1/10 Uncommon:>1/1,000 and <1/100
Rare:	>1/10,000 and <1/1,000
Very rare:	<1/10,000

Local:	Very common: injection site pain, redness and swelling Uncommon: injection site pruritus
General:	Very common: arthralgia, diarrhoea, fatigue, fever, headache, myalgia, pyrexia Common: nausea, vomiting Uncommon: asthenia, decreased appetite, extremity pain, insomnia, hyperhidrosis, hypersensitivity reactions (e.g., rash, pruritus, angioedema), lethargy, lymphadenopathy in the same arm as vaccination, malaise, night sweats, pain in extremity Rare: acute peripheral facial paralysis Unknown frequency: anaphylaxis, erythema multiforme, extensive swelling of the vaccinated limb, myocarditis, pericarditis (see Section 5a.4.2)

The most frequent adverse reactions in children 5 to 11 years of age were injection site pain (>80%), fatigue (>50%), headache (>30%), injection site redness and swelling (>20%), myalgia and chills (>10%).

These were usually mild or moderate in intensity and resolved within a few days after vaccination. A higher rate of pyrexia is seen after the second dose.

The safety profile in the clinical trials of children aged 5-11 years was similar to that seen in older trial participants. No cases of myocarditis were noted. No new safety concerns were observed. However, the study size did not allow for detection of rare or very rare adverse events or to evaluate whether

the characteristics of identified, but rarer risks such as myocarditis differ compared with the adolescent and adult populations.

More than four million first doses and approximately 450,000 second doses have been given to children in this age group in the US. No immediate safety issues have been notified but follow up time has been short.

Co-administration
It is prudent to separate COVID-19 vaccine administration in children aged 5-11 years from any other vaccine for a period of 14 days until there is more evidence regarding co-administration.

Duration of immunity
There is insufficient information to determine the duration of protection from the vaccine.

Vaccine recipients may not have optimal protection until seven days after the second dose, and the vaccine may not protect all vaccinees.

Vaccinated children should continue to follow current public health guidance to protect themselves and others.

5a.5.2 **Spikevax** (formerly COVID-19 Vaccine Moderna)

This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions to the HPRA.

The vaccine should be stored in a freezer at -25°C to -15°C. Each pack contains 10 vials. Vials should be transferred to +2°C to +8°C to thaw which may take 2 and a half hours, and must sit at room temperature for 15 minutes before administering. Alternatively, frozen vials may be thawed for 1 hour at room temperature between +15°C to +25°C for immediate use.

After thawing, the vaccine can be stored for up to 30 days at +2°C to +8°C and up to 24 hours at +8°C up to +25°C. Once thawed, the vaccine cannot be re-frozen.

The vaccine does not require dilution. Once the multidose vial is punctured the vaccine should be kept at +2°C to +25°C and used as soon as possible and within 19 hours.

Licensed indications
Active immunisation to prevent COVID-19 caused by SARS-CoV-2 virus, in individuals 12 years of age and older.

Vaccine efficacy
Clinical trial data demonstrated a two-dose vaccine efficacy of 94.1% in those aged 18 and above. This efficacy may not apply to all variants.

Dose, route and schedule
Primary vaccination
The dose of vaccine is 0.5 ml IM, preferably into the deltoid muscle. The course consists of two doses, 28 days apart.

If more than ten 0.5ml doses can be safely and accurately withdrawn from a vial, they can be used as valid vaccines doses. There should be no pooling of the contents of different vaccine vials.

If the interval between doses is longer than 28 days, the second dose should be given as soon as possible. The course does not need to be restarted.

If the second dose was given between 21 and 27 days after the first dose, it is a valid dose. If the second dose is given before 21 days, this is not considered a valid dose. A third dose should be given 28 days after the second (invalid) dose.

Booster vaccination
The dose of vaccine is 0.25 ml IM (**half the dose of the primary schedule**).

Additional (3rd dose) vaccination (see Immunocompromised)
The dose of vaccine is 0.5ml IM

Interchangeability
The same vaccine should preferably be used for both doses.

Consideration may be given to non-mRNA vaccination after anaphylaxis to a dose of this vaccine if aged 18 years or older, including pregnant women. The alternate vaccine should be given after an interval of at least 28 days and the person should be considered fully vaccinated.

Contraindications (see Table 5a.4)
- Anaphylaxis (serious systemic allergic reaction requiring medical intervention) following a previous dose of the vaccine or any of its constituents (including polyethylene glycol (PEG)).
- Anaphylaxis following another mRNA vaccine.
- Previous history of myocarditis after a dose of an mRNA vaccine (see Section 5a.4.2).

Those with a contraindication to one mRNA COVID-19 vaccine should not receive another authorised mRNA vaccine. Consideration may be given to non-mRNA vaccination for anyone 18 and older following an individual

benefit-risk assessment, including pregnant women. This should be given after an interval of at least 28 days and the person should be considered fully vaccinated.

For those aged 12-17 years of age, discuss with an allergist/immunologist.

Appropriate support should be available in case of anaphylaxis or fainting after vaccine administration.

Precautions should be in place to minimise injury from fainting.

Precautions (see Table 5a.4)

- Acute severe febrile illness; defer until recovery.
- **All those aged 12-29 years should receive Comirnaty as a second or subsequent dose.**
- Previous history of pericarditis after a dose of an mRNA vaccine - seek specialist advice (see Section 5a.4.2).
- Consider non-mRNA vaccination for those aged 18 years or older, including pregnant women, with:
  - Anaphylaxis after multiple, different drug classes, with no identified allergen (may indicate PEG allergy)
  - Anaphylaxis after a vaccine, or a medicine which contained PEG
  - Unexplained anaphylaxis (may indicate PEG allergy)

If vaccination is advised for a person with prior anaphylaxis to an unrelated allergen observe for 30 minutes after vaccination.

For those aged 12-17 years, discuss with an allergist/immunologist.

If there is a precaution to a booster mRNA vaccine, consideration can be given to boosting with an EMA authorised non-mRNA vaccine following an individual benefit-risk assessment.

For more information see Frequently Asked Questions about COVID-19 vaccines for people with pre-existing allergic conditions.

Patients with planned immunosuppressing therapy should ideally complete vaccination two weeks before treatment. The recommended minimum interval may be used. Specialists should consider the individual's risk and likelihood of disease exposure, and provide advice based on knowledge and understanding of the patient's immune status and likely immune response to vaccination.

Vaccination after COVID-19

Unvacccinated

Vaccination should be deferred until clinical recovery from COVID-19 infection and for at least four weeks after diagnosis or onset of symptoms, or four weeks from the first PCR positive specimen in those who are asymptomatic.

Those with persisting symptoms post COVID-19 may be vaccinated, unless there is evidence of recent clinical deterioration.

Those aged under 65 years and immunocompetent:
Vaccination may be deferred for up to nine months after diagnosis, symptom onset, or from the first PCR or antigen positive specimen.

Those who have had previous laboratory confirmed COVID-19 infection within 9 months:

- aged *50 years and older* should receive a full COVID-19 vaccine schedule
- aged *under 50 years and immunocompromised (including pregnant women)* should receive a full COVID-19 vaccine schedule
- aged *under 50 years and immunocompetent*: a single dose of COVID-19 vaccine is sufficient and they should then be considered fully vaccinated.

Partially vaccinated
Those who have had laboratory confirmed COVID-19 infection between their first and second doses of COVID-19 vaccine can receive the second dose after clinical recovery or may defer for up to 6 months.

Additional or booster vaccination
If a person in a group for whom an additional or booster dose is recommended has had laboratory confirmed COVID-19 infection after a completed primary vaccine course (i.e. a breakthrough infection), the additional or booster dose should be delayed for at least six months after the COVID-19 infection was diagnosed.

Serological testing prior to giving an additional or booster dose is not recommended.

Post vaccination observation period

- Those with no history of anaphylaxis: 15 minutes
- Those with a history of anaphylaxis from any cause: 30 minutes
- Those with immediate itching, swelling or urticarial reaction at the vaccination site: 30 minutes or longer as clinically indicated

Immunocompromised *(see Chapter 3)*
Immunocompromised individuals due to disease or treatment may be vaccinated if they have no contraindications.

Data indicates that those with severe immunocompromise do not have adequate protection following a primary COVID-19 vaccine course. There is evidence that protection can be enhanced by an additional Spikevax dose, representing an extension of the primary vaccination series.

An additional Spikevax dose (full dose 0.5ml) should be given to those aged 30 and older with immunocompromise associated with a suboptimal response to vaccines at the time of vaccination, who have completed their primary course. The Spikevax dose should be given regardless of whether the primary course was with an mRNA or an adenoviral vector vaccine. This is an extended primary vaccination course. The additional vaccine should be given after a minimum interval of two months following the last dose of an EMA authorised COVID-19 vaccine.

An additional non-mRNA vaccine can be considered for those with a contraindication or precaution to an mRNA vaccine.

Serological testing prior to giving an additional dose is not recommended.

See Table 5a.2 for conditions that may be associated with a suboptimal response to vaccines.

Pregnancy
Animal reproductive toxicology studies of the mRNA vaccines did not identify any safety concerns.

There is now a growing body of evidence on the safety and effectiveness of COVID-19 vaccination, in both animal and human studies, clearly indicating that the benefits of vaccination outweigh any know or potential risks of COVID-19 vaccination during pregnancy.

The two doses should be given 28 days apart at any stage in pregnancy.

Breastfeeding
There is no known reason for vaccinees to avoid breastfeeding.

Children from 12 years of age
In a study in adolescents without evidence of prior infection aged 12 to 17 years, there were no symptomatic COVID-19 cases in 2,163 participants who received the vaccine and 4 cases out of 1,073 who received a placebo.

No new safety concerns were observed.

Vaccination of those with bleeding disorders or on anticoagulants
Individuals with a bleeding disorder or receiving anticoagulant therapy may develop haematomas in IM injection sites. Prior to vaccination, inform the recipient about this risk. For those with thrombocytopenia (platelet count<$50x10^9$/L), consult the supervising consultant. People with mild bleeding disorders or on maintenance dose Emicizumab (Hemlibra) do not require haemostatic cover for vaccination. Details of haemostatic cover for all others can be found in the Patient Information tab at http://www.stjames.ie/services/hope/nationalcoagulationcentre

Those with inherited coagulopathies who require factor replacement therapy should receive it on the day of vaccination, prior to the IM vaccination.

If there is uncertainty about the need for replacement therapy, contact the patient's Comprehensive Care Centre.

Those receiving long-term anticoagulation with either Warfarin or heparin are not considered to be at higher risk of bleeding complications following vaccination. There is no reason to expect that there is a greater risk of bleeding complications with the newer oral anticoagulants or antiplatelet agents, than with other anticoagulants.

People on Warfarin should follow their usual schedule for international normalised ratio (INR) testing and can be vaccinated if it is less than 4.0. If the INR is 4.0 or more, follow the advice of the clinic/practice managing Warfarin and wait until the INR is less than 4.0 to be vaccinated.

See Chapter 2, sections 2.4.6 and 2.4.7 for further information, including technique for IM injection, in this patient group.

Adverse reactions
A full list of adverse reactions may be found in the Summary of Product characteristics (SmPC).

Terms used for frequency of adverse events

Very common:	>1/10
Common:	>1/100 and <1/10
Uncommon:	>1/1,000 and <1/100
Rare:	>1/10,000 and <1/1,000
Very rare:	<1/10,000

Local:	Very common: injection site pain and swelling Common: injection site erythema, rash and urticaria Uncommon: injection site pruritis
General:	Very common: arthralgia, axillary lymphadenopathy on the side of injection, chills, fatigue, fever, headache, myalgia, nausea, vomiting Rare: acute peripheral facial paralysis, facial swelling (in those with a history of dermatological fillers) Very rare: myocarditis, pericarditis (see Section 5a.4.2) Unknown frequency: erythema multiforme

The most frequent adverse reactions during clinical trials in those aged ≥18 years were injection site pain (>90%), fatigue (70%), headache (>60%), myalgia (>60%), arthralgia (> 40%), chills (>40%), nausea and vomiting (>20%), axillary swelling/ tenderness, pyrexia and injection site swelling (>15%), which were similar in those aged 12-17 years.

These were usually mild or moderate in intensity and resolved within a few days after vaccination. A slightly lower frequency of adverse events was associated with greater age.

A lower frequency of adverse events is associated with greater age. A higher rate of local and systemic adverse events are seen after the second dose.

Post marketing surveillance has reported an anaphylaxis rate of 2-5/ million in the US and 21/million in the UK (the latter figure includes anaphylactoid reactions). These rates are higher than after non COVID-19 vaccines.

Booster doses of mRNA vaccines have not shown any unexpected short term safety concerns. The risk of myocarditis or other rare adverse reactions following an mRNA booster dose is yet to be characterised and will be closely monitored.

Co-administration
COVID-19 vaccines and other vaccines may be administered at the same time or at any interval.

As it is not known if COVID-19 vaccine reactogenicity is increased with co-administration, vaccines should be given in different arms.

Duration of immunity
There is insufficient information to determine the duration of protection from the vaccine.

Vaccine recipients may not have optimal protection until 14 days after the second dose, and the vaccine may not protect all vaccinees.

Vaccinated persons should continue to follow current public health guidance to protect themselves and others.

Booster doses
A booster dose of Spikevax should be given to all those in in Table 5a.3 **aged 30 years and older** who have completed their primary course with any vaccine type.

The booster dose of Spikevax (0.25ml, **half the dose of the primary schedule**) should be given six months or longer following the last dose of an EMA authorised two dose COVID-19 vaccine. A minimum interval of five months (150 days) may be used when necessary for operational reasons.

In exceptional circumstances, a minimum interval of two months can be used between the booster dose and the last dose of an EMA authorised two dose COVID-19 vaccine.

Recipients of COVID-19 vaccine Janssen should receive an mRNA booster dose after an interval of three months.

The booster dose can be given at the same time or at any interval before or after seasonal influenza vaccine.

If there is a contraindication or precaution to an mRNA vaccine, consideration can be given to a booster of an EMA authorised non-mRNA vaccine following an individual benefit-risk assessment.

Serological testing prior to giving a booster dose is not recommended.

Adenoviral vector vaccines

Table 5a.5: Contraindications and precautions to vaccination of those due a adenoviral vector COVID--19 vaccine

	History	Action
Contraindication	• Anaphylaxis after a previous dose of Vaxzevria • Anaphylaxis after polysorbate 80	Consider vaccination with Comirnaty or Spikevax in a suitable facility Observe for 30 minutes or Discuss with allergist/ immunologist
Special precautions	• Anaphylaxis after a vaccine, injected antibody preparation, or a medicine known to contain polysorbate 80 • Unexplained anaphylaxis (may indicate polysorbate 80 allergy)	Clarify if polysorbate 80 is tolerated (see FAQs) Discuss with allergist/ immunologist Consider vaccination with Comirnaty or Spikevax Observe for 30 minutes
	• Mastocytosis • Idiopathic anaphylaxis • Anaphylaxis after food, venom or medication	Vaccinate as scheduled Observe for 30 minutes
Not a contraindication or a precaution	• Non-anaphylactic food allergy • Family history of allergy, including anaphylaxis • Previous local reaction to any vaccine • Hereditary angioedema • Contact dermatitis to polysorbate 80 containing cosmetic product • Underlying asthma • Hay fever • NSAID allergy • Chronic spontaneous urticaria	Vaccinate as scheduled Observe for 15 minutes

5a.5.3 **Vaxzevria** (formerly COVID-19 Vaccine AstraZeneca)

This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions to the HPRA.

The vaccine should be stored at +2°C to +8°C. Each pack contains 10 vials.

The vaccine does not require dilution. Once the multidose vial is punctured, the vaccine should be used immediately. If not used, it may be kept for a single period for up to 30°C and used within 6 hours or an opened vial may be stored in a refrigerator (+2°C to + 8°C) for a maximum of 48 hours if it is immediately returned to the refrigerator following each puncture.

Licensed indications
Active immunisation to prevent COVID-19 caused by SARS-CoV-2 virus, in individuals 18 years of age and older.

Vaccine efficacy
Clinical trial data demonstrated a two-dose vaccine efficacy of 59.5% in those aged 18 and above. There was insufficient clinical data to allow reliable calculation of efficacy in those aged 55 and older. However, as a similar immune response was shown in all age groups, including those aged 65 and older, the EMA authorised the vaccine for all adults.

The World Health Organization (WHO) Strategic Advisory Group of Experts (SAGE), subsequently reported the overall vaccine efficacy at 63.1%. There were no cases of COVID-19 hospitalisation, severe disease, or death in those aged 65 and older who received the vaccine.

Clinical trial data published in October 2021 estimated overall vaccine efficacy in adults of 74%. Estimated vaccine efficacy was 83.5% in those aged 65 or older. There were no severe or critical symptomatic COVID-19 cases in the fully vaccinated cohort.

Vaccine effectiveness
A prospective population study of 5.4 million people from Scotland found that the first dose of vaccine showed effectiveness of 94% for COVID-19 related hospitalisation at 28-34 days post-vaccination. This effectiveness may not apply to all variants.

Dose, route and schedule
The dose of vaccine is 0.5 ml IM, into the deltoid muscle. The vaccine is authorised as a two dose course 4-12 weeks apart.

If more than ten 0.5ml doses can be safely and accurately withdrawn from a vial, they can be used as valid vaccines. There should be no pooling of the contents of different vials.

It is recommended the two doses are given 8-12 weeks apart because of greater efficacy after a longer interval between doses.

If the interval between doses is longer than 12 weeks, the second dose should be given as soon as possible. The course does not need to be restarted.

The minimum interval is 3 weeks (21 days). If the second dose is given before 21 days, this is not a valid vaccine. A third dose should be given 28 days after the second (invalid) vaccine.

Interchangeability
The same vaccine should preferably be used for both doses.

For those who have already had a first dose of Vaxzevria and who did not complete the vaccination schedule as recommended, an mRNA vaccine should be offered.

If an mRNA vaccine is used as a second dose, it should be given after an interval of at least 28 days and the person should be considered fully vaccinated.

Those who receive a heterologous schedule should be considered fully vaccinated after their second vaccine (7 days after Comirnaty, 14 days after Spikevax).

Contraindications (see Table 5a.5)

- Anaphylaxis (serious systemic allergic reaction requiring medical intervention) following a previous dose of the vaccine or any of its constituents (including polysorbate 80).
- Thrombosis with Thrombocytopenia Syndrome after the first dose. of Vaxzevria or COVID-19 Vaccine Janssen (see Section 5a.4.2).
- Previous history of capillary leak syndrome (see Section 5a.4.2).

Those with a contraindication to one adenoviral vector vaccine should not receive another adenoviral vector vaccine. They should be offered an mRNA vaccine, given at least 28 days later and the person considered fully vaccinated.

Appropriate support should be available in case of anaphylaxis or fainting after vaccine administration.

Precautions should be in place to minimise injury from fainting.

Precautions (see Table 5a.5)

- Acute severe febrile illness; defer until recovery.
- Consider mRNA vaccination for those with:
  - Anaphylaxis after a vaccine, injected antibody preparation, or a medicine known to contain polysorbate 80
  - Unexplained anaphylaxis (may indicate polysorbate 80 allergy).

If vaccination is advised, in a patient with prior anaphylaxis to an unrelated allergen, the patient should be observed for 30 minutes after vaccination.

For more information see Frequently Asked Questions about COVID-19 vaccines for people with pre-existing allergic conditions.

Those aged **under 50 years,** including those with conditions with very high or high risk of severe COVID-19 disease, should be given an mRNA vaccine, unless they have received one dose of Vaxzevria; in that case they should receive their second dose as scheduled.

Patients with planned immunosuppressing therapy should ideally complete vaccination two weeks before treatment. The recommended minimum interval may be used. Specialists should consider the individual's risk and likelihood of disease exposure, and provide advice based on knowledge and understanding of the patient's immune status and likely immune response to vaccination.

Vaccination after COVID-19

Unvacccinated

Vaccination should be deferred until clinical recovery from COVID-19 infection and for at least four weeks after diagnosis or onset of symptoms, or four weeks from the first PCR positive specimen in those who are asymptomatic.

Those with persisting symptoms post COVID-19 may be vaccinated, unless there is evidence of recent clinical deterioration.

Those aged under 65 years and immunocompetent

Vaccination may be deferred for up to nine months after diagnosis, symptom onset, or from the first PCR or antigen positive specimen.

Those who have had previous laboratory confirmed COVID-19 infection within 9 months:

- aged *50 years and older* should receive a full COVID-19 vaccine schedule
- aged *under 50 years and immunocompromised* should receive a full COVID-19 vaccine schedule
- aged *under 50 years and immunocompetent*: a single dose of COVID-19 vaccine is sufficient and they should then be considered fully vaccinated.

Partially vaccinated
Those who have had laboratory confirmed COVID-19 infection between their first and second doses of COVID-19 vaccine can receive the second dose after clinical recovery or may defer for up to 6 months.

Post vaccination observation period
- Those with no history of anaphylaxis: 15 minutes
- Those with a history of anaphylaxis from any cause: 30 minutes
- Those with immediate itching, swelling or urticarial reaction at the vaccination site: 30 minutes or longer as clinically indicated

Immunocompromised
Data are not currently available to establish vaccine safety or efficacy in these groups. Individuals with immunocompromise due to disease or treatment may be vaccinated if they have no contraindications.

See immunocompromised sections of mRNA vaccines re extension of primary vaccination series.

Pregnancy
This vaccine is not recommended for those aged under 50 years, including those with conditions with very high or high risk of severe COVID-19 disease.

See Precautions section for those who have received a first dose.

The vaccine may be considered for those with a contraindication or precaution to an mRNA vaccine (see Table 5a.4 and contraindications sections of mRNA vaccines).

Breastfeeding
There is no known reason for vaccinees to avoid breastfeeding.

Children and adolescents under 18 years of age
There are no data available on vaccine safety and efficacy in children.

Vaccination of those with bleeding disorders or on anticoagulants
Individuals with a bleeding disorder or receiving anticoagulant therapy may develop haematomas in IM injection sites. Prior to vaccination, inform the recipient about this risk. For those with thrombocytopenia (platelet count<$50x10^9$/L), consult the supervising consultant. People with mild bleeding disorders or on maintenance dose Emicizumab (Hemlibra) do not require haemostatic cover for vaccination. Details of haemostatic cover for all others can be found in the Patient Information tab at http://www.stjames.ie/services/hope/nationalcoagulationcentre

Those with inherited coagulopathies who require factor replacement therapy should receive it on the day of vaccination, prior to the IM vaccination.

If there is uncertainty about the need for replacement therapy, contact the patient's Comprehensive Care Centre.

Those receiving long-term anticoagulation with either Warfarin or heparin are not considered to be at higher risk of bleeding complications following vaccination. There is no reason to expect that there is a greater risk of bleeding complications with the newer direct oral anticoagulants or antiplatelet agents, than with other anticoagulants.

People on Warfarin should follow their usual schedule for international normalised ratio (INR) testing and can be vaccinated if it is less than 4.0. If the INR is 4.0 or more, follow the advice of the clinic/practice managing Warfarin and wait until the INR is less than 4.0 to be vaccinated.

See Chapter 2, sections 2.4.6 and 2.4.7 for further information, including technique for IM injection, in this patient group.

Adverse reactions

A full list of adverse reactions may be found in the Summary of Product Characteristics (SmPC).

Terms used for frequency of adverse events

Very common:	>1/10
Common:	>1/100 and <1/10
Uncommon:	>1/1,000 and <1/100
Rare:	>1/10,000 and <1/1,000
Very rare:	<1/10,000

Local:	Very common: injection site bruising, pain, pruritus, tenderness, warmth
	Common: injection site erythema, swelling
	Uncommon: injection site haematoma
General:	Very common: arthralgia, chills, fatigue, feverishness, headache, malaise, myalgia, nausea
	Common: asthenia, diarrhoea, fever >38°C, influenza-like illness, pain in extremity, thrombocytopenia (mild and transient decrease on blood tests), vomiting
	Uncommon: abdominal pain, decreased appetite, dizziness, hyperhidrosis, lethargy, lymphadenopathy, muscle spasms, pruritus, somnolence, rash, urticaria
	Very rare: facial paralysis, Guillain-Barré syndrome, thrombosis with thrombocytopenia syndrome (see Section 5a.4.2)
	Unknown frequency: angioedema, capillary leak syndrome, cerebrovascular venous and sinus thrombosis without thrombocytopenia and distinct from TTS, immune thrombocytopenia (see Section 5a.4.2)

Those who developed Guillain-Barré syndrome following Vaxzevria should seek specialist advice regarding a second COVID-19 vaccine.

The most frequent adverse reactions during clinical trials in those aged ≥18 years were injection site tenderness (>60%), fatigue, headache, injection site pain (50%), malaise, myalgia (>40%), chills, feverishness, pyrexia (>30%) and arthralgia and nausea (>20%).

A lower frequency of adverse events is associated with older age. The rate and severity of local and systemic adverse reactions is lower after the second dose.

Post marketing surveillance in the UK has reported an anaphylaxis rate of 17/ million (the figure includes anaphylactoid reactions). This rate is higher than after non COVID-19 vaccines.

Co-administration
COVID-19 vaccines and other vaccines may be administered at the same time or at any interval.

As it is not known if COVID-19 vaccine reactogenicity is increased with co-administration, vaccines should preferably be given in different limbs.

Duration of immunity
There is insufficient information to determine the duration of protection from the vaccine.

Protection starts from approximately three weeks after first dose of vaccine with 76% protection overall against symptomatic COVID-19 disease for up to 90 days (12 weeks). There is no evidence of significant waning of protection for up to 16 weeks after vaccination. Higher efficacy of 82% was reported when the second dose was given after 12 weeks.

Vaccine recipients may not have optimal protection until 15 days after the second dose, and the vaccine may not protect all vaccinees.

Vaccinated persons should continue to follow current public health guidance to protect themselves and others.

Booster doses
Those outlined in Table 5a.3 who have received a primary course of Vaxzevria should receive a booster dose of an mRNA vaccine (see sections on booster mRNA vaccines).

5a.5.4 COVID-19 Vaccine Janssen

This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions to the HPRA.

The vaccine should be stored at +2°C to +8°C. Each pack contains 10 vials.

The vaccine does not require dilution.
After the first dose has been withdrawn, the vaccine should be used immediately. If not used, the vial can be maintained between 2° to 8°C for up to 6 hours or at room temperature (up to 25°C) for up to 3 hours. Discard the vial if vaccine is not used within these times.

Licensed indications
Active immunisation to prevent COVID-19 caused by SARS-CoV-2 virus, in individuals 18 years of age and older.

Vaccine efficacy
Clinical trial data demonstrated a vaccine efficacy against severe COVID-19 disease of 76.7% (95% confidence interval 54.6% to 89.1%) 14 days after vaccination, increasing to 85.4% (95% confidence interval 54.2% to 96.9%) 28 days in those aged 18 and above. High efficacy was observed across age and sex, and among persons with underlying medical conditions. This efficacy may not apply to all variants.

Dose and route of administration
The dose of vaccine is 0.5 ml IM, into the deltoid muscle.

The course consists of one 0.5 ml dose.

If more than five 0.5ml doses can be safely and accurately withdrawn from a vial, they can be used as valid vaccines.

Interchangeability
The vaccine may be used as the second dose for a person who had anaphylaxis to an mRNA vaccine and the person should be considered fully vaccinated.

Contraindications (see Table 5a.5)
- Anaphylaxis (serious systemic allergic reaction requiring medical intervention) following a previous dose of the vaccine or any of its constituents (including polysorbate 80).
- Anaphylaxis following another adenoviral vector vaccine.
- Thrombosis with Thrombocytopenia Syndrome (TTS) after the first dose of another adenoviral vector COVID-19 vaccine (see Section 5a.4.2).
- Previous history of capillary leak syndrome (see Section 5a.4.2).

Appropriate support should be available in case of anaphylaxis or fainting after vaccine administration.

Precautions should be in place to minimise injury from fainting.

Precautions

- Acute severe febrile illness; defer until recovery.

- Consider mRNA vaccination for those with:
  - Anaphylaxis after a vaccine, injected antibody preparation, or a medicine known to contain polysorbate 80
  - Unexplained anaphylaxis (may indicate polysorbate 80 allergy).

If vaccination is advised for a patient with prior anaphylaxis to an unrelated allergen, the patient should be observed for 30 minutes after vaccination.

mRNA vaccines are recommended for those aged **under 50 years** including those with conditions with very high or high risk of severe COVID-19 disease.

Advice from a relevant specialist should be sought for a person with a history of an immediate severe allergic reaction to multiple drug classes with no identified allergen, any other vaccine injected antibody preparation or medicine likely to contain polysorbate 80 or idiopathic anaphylaxis and the risks should be weighed against the benefits of vaccination.

Patients with planned immunosuppressing therapy should ideally receive vaccination two weeks before treatment. Specialists should consider the individual's risk and likelihood of disease exposure, and provide advice based on knowledge and understanding of the patient's immune status and likely immune response to vaccination.

Vaccination after COVID-19

Vaccination should be deferred until clinical recovery from COVID-19 infection and for at least four weeks after diagnosis or onset of symptoms, or four weeks from
the first PCR positive specimen in those who are asymptomatic.

Those with persisting symptoms post COVID-19 may be vaccinated, unless there is evidence of recent clinical deterioration.

Those aged under 65 years and immunocompetent

Vaccination may be deferred for up to nine months after diagnosis, symptom onset, or from the first PCR or antigen positive specimen.

Post vaccination observation period

- Those with no history of anaphylaxis: 15 minutes
- Those with a history of anaphylaxis from any cause: 30 minutes
- Those with immediate itching, swelling or urticarial reaction at the vaccination site: 30 minutes or longer as clinically indicated

Immunocompromised

Data are not currently available to establish vaccine safety and efficacy in these groups. Individuals with immunosuppression due to disease or treatment may be vaccinated if they have no contraindications.

See immunocompromised sections of mRNA vaccines re extension of primary vaccination series.

Pregnancy

This vaccine is not recommended for pregnant women including those with medical conditions with very high or high risk of severe COVID-19 disease.

The vaccine may be considered for those with a contraindication or precaution to an mRNA vaccine (see Table 5a.4 and contraindications sections of mRNA vaccines).

Breastfeeding

There is no known reason for vaccinees to avoid breastfeeding. Breastfeeding mothers should be vaccinated according to their risk grouping.

Children and adolescents under 18 years of age

There is no data available on vaccine safety and efficacy in children.

Vaccination of those with bleeding disorders or on anticoagulants

Individuals with a bleeding disorder or receiving anticoagulant therapy may develop haematomas in IM injection sites. Prior to vaccination, inform the recipient about this risk. For those with thrombocytopenia (platelet count<$50x10^9$/L), consult the supervising consultant. People with mild bleeding disorders or on maintenance dose Emicizumab (Hemlibra) do not require haemostatic cover for vaccination. Details of haemostatic cover for all others can be found in the Patient Information tab at http://www.stjames.ie/services/hope/nationalcoagulationcentre

Those with inherited coagulopathies who require factor replacement therapy should receive it on the day of vaccination, prior to the IM vaccination. If there is uncertainty about the need for replacement therapy, contact the patient's Comprehensive Care Centre.

Those receiving long-term anticoagulation with either Warfarin or heparin are not considered to be at higher risk of bleeding complications following vaccination. There is no reason to expect that there is a greater risk of bleeding complications with the newer oral anticoagulants or antiplatelet agents, than with other anticoagulants.

Those on Warfarin should follow their usual schedule for international normalised ratio (INR) testing and can be vaccinated if it is less than 4.0. If the INR is 4.0 or more, follow the advice of the clinic/practice managing Warfarin and wait until the INR is less than 4.0 to be vaccinated.

See Chapter 2, sections 2.4.6 and 2.4.7 for further information, including technique for IM injection, in this patient group.

Adverse reactions
A full list of adverse reactions may be found in the Summary of Product Characteristics (SmPC).

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Common:	>1/100 and <1/10
Uncommon:	>1/1,000 and <1/100
Rare:	>1/10,000 and <1/1,000
Very rare:	<1/10,000

Local:	Very common: injection site pain Common: injection site erythema, swelling
General:	Very common: fatigue, headache, myalgia, nausea Common: arthralgia, chills, cough, pyrexia Uncommon: asthenia, back pain, diarrhoea, hyperhidrosis, malaise, muscular weakness, oropharyngeal pain, pain in extremity, paraesthesia, rash, sneezing, tremor Rare: hypersensitivity, hypoesthesia, lymphadenopathy, tinnitus, urticaria, venous thromboembolism, vomiting Very rare: thrombosis with thrombocytopenia, Guillain-Barré syndrome (see Section 5a.4.2). Unknown frequency: capillary leak syndrome, immune thrombocytopenia (see Section 5a.4.2)

The most frequent adverse reactions during clinical trials in those aged ≥18 years were injection site pain (> 40%), fatigue, headache, myalgia (> 30%), nausea (>10%) and fever (9%). A lower frequency and severity of adverse events was associated with greater age.

Co-administration
COVID-19 vaccines and other vaccines may be administered at the same time or at any interval.

As it is not known if COVID-19 vaccine reactogenicity is increased with co-administration, vaccines should preferably be given in different limbs.

Duration of immunity
There is insufficient information to determine the duration of protection from the vaccine.

Vaccinated persons should continue to follow all current public health guidance to protect themselves and others.

Clinical trial follow-up is ongoing to determine the duration of protection from the vaccine.

Booster doses
Those outlined in Table 5a.3 who have received COVID-19 vaccine Janssen should receive a booster dose of an mRNA vaccine after an interval of three months (see sections on booster mRNA vaccines).

5a.6 COVID-19 vaccination outside Ireland

Those who have documentary evidence of a complete COVID-19 vaccination course with a COVID-19 vaccine authorised by the FDA, MHRA or recommended by WHO should be considered fully vaccinated.

Those who have partially completed a COVID-19 vaccine course with a vaccine authorised by the FDA, MHRA or recommended by WHO should be offered an EMA authorised COVID-19 vaccine to complete the series, and then should be considered fully vaccinated. The minimum interval between the last vaccine dose and an EMA authorised COVID-19 vaccine is 28 days.

Those who have received a partial or complete course of COVID-19 vaccine not authorised by the FDA, MHRA or recommended by WHO should be offered a complete course of an EMA authorised COVID-19 vaccine. The minimum interval between the last dose and an EMA authorised COVID-19 vaccine is 28 days.

5a.7 Post-marketing surveillance (Pharmacovigilance)

The HPRA is responsible for managing the national pharmacovigilance system. The HPRA reports nationally occurring adverse reactions to the EMA. Adverse reaction reporting is an important part of the EMA intensive monitoring plan for COVID-19 vaccines, so that any changes in benefit risk balance can be promptly detected and acted upon. This enables the EMA to continue to safeguard public health safety.

Healthcare professionals and members of the public are encouraged to report suspected adverse reactions to the HPRA following the instructions available on the HPRA website www.hpra.ie

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