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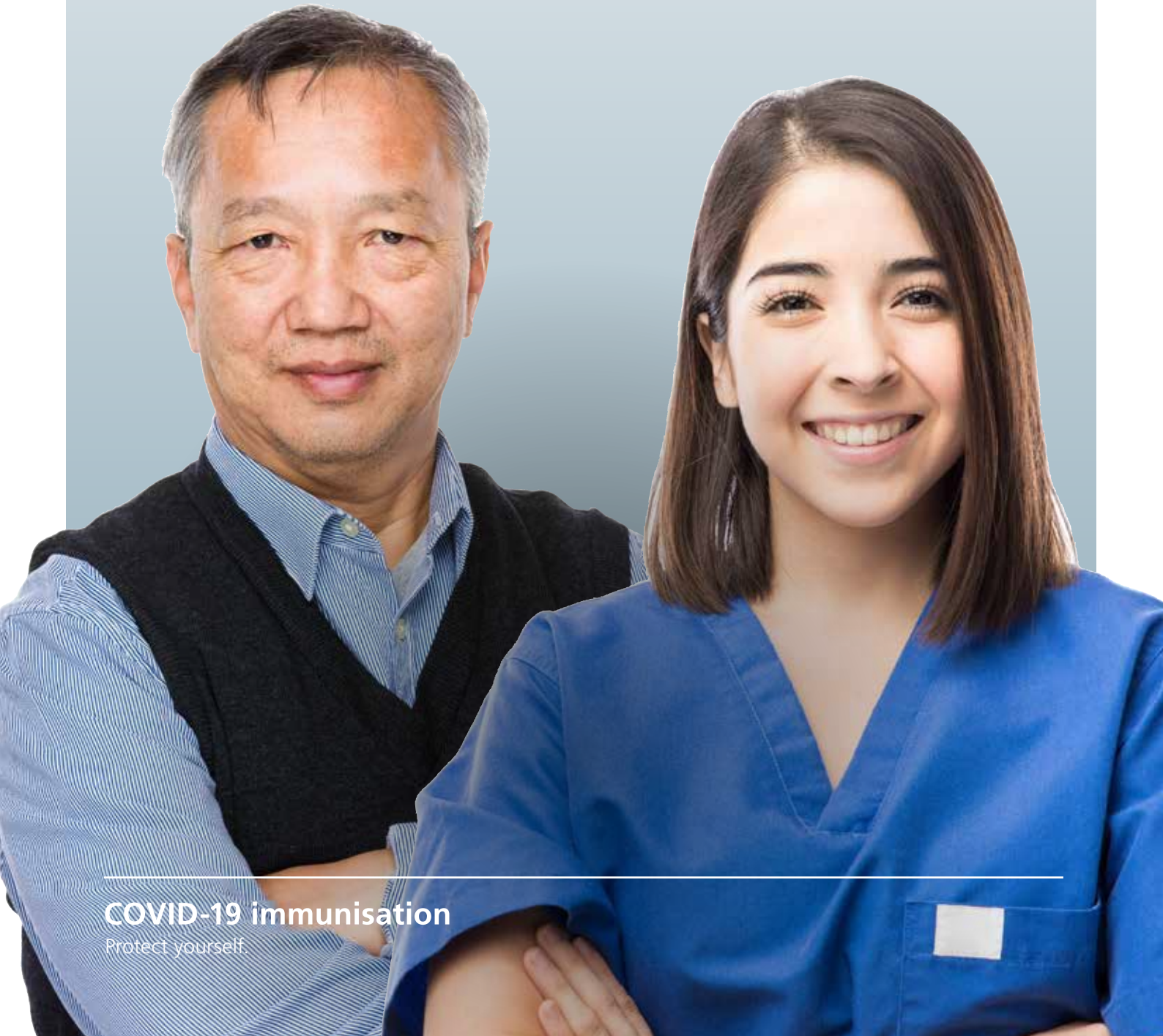
COVID-19 vaccination programme

Information for healthcare practitioners



COVID-19 immunisation
Protect yourself.

Acknowledgement

The information in this document was adapted from a variety of COVID-19 resources produced by UK Health Security Agency (UKHSA). UKHSA granted permission to use their materials in Northern Ireland, this is gratefully acknowledged.

Document information

The information in this document was correct at time of publication. As COVID-19 is an evolving disease, a lot is still being learned about both the disease and the vaccines that have been developed to prevent it, and the knowledge base is still being developed. For this reason, some of the information may change. Updates will be made to this document as new information becomes available. Please use the online version to ensure you are accessing the latest version.

This document includes specific information about the COVID-19 Vaccine Pfizer BioNTech (Comirnaty) 30 micrograms/dose and the COVID-19 Vaccine AstraZeneca (Vaxzevria), following the authorisation for temporary supply by the UK Department of Health and Social Care and the Medicines and Healthcare products Regulatory Agency (MHRA) given on 2 December 2020 and 30 December 2020, respectively.

This document has been updated to provide information about the COVID-19 Vaccine Moderna (Spikevax), given authorisation for temporary supply on 8 January 2021, and the COVID-19 Vaccine Pfizer BioNTech (Comirnaty) 10 micrograms/dose, given authorisation on 22 December 2021.

The guidance will be updated as more information about these vaccines becomes available and will include other vaccines as they become available for use. **As each vaccine is presented, stored and prepared differently, immunisers must ensure they are familiar with the specific details of the vaccine that they are working with.**

COVID–19 disease

On 31 December 2019, the World Health Organization (WHO) was informed of a cluster of cases of pneumonia of unknown cause detected in Wuhan City, China.

On 12 January 2020, it was announced that a novel coronavirus was identified as the cause of the illnesses being detected. This virus is referred to as SARS-CoV-2, and the associated disease as COVID-19.

What are the symptoms of COVID-19?

Whilst many individuals have asymptomatic infection, those who do develop symptoms report a range of symptoms, including fever, a new and continuous cough, anosmia (loss of smell) and ageusia (loss of taste), shortness of breath, fatigue and loss of appetite. Other symptoms include: myalgia, sore throat, headache, nasal congestion, diarrhoea, nausea and vomiting.

Around 40% of people who develop symptoms report mild symptoms and typically present without hypoxia or pneumonia. A further 40% present with moderate symptoms, which may include non-severe pneumonia, and 15% present with severe pneumonia and significant disease. Critical disease can lead to life threatening complications and is reported in around 5% of cases. Patients with critical disease may experience acute respiratory distress syndrome (ARDS), sepsis, septic shock, cardiac disease, thromboembolic events such as pulmonary embolism and multi-organ failure.

Evidence is growing that the longer-term consequences of more severe complications associated with the inflammatory response may be considerable in those who experience critical and life-threatening illness. Rare neurological and psychiatric complications, which can also occur in patients without respiratory symptoms, include stroke, meningo-encephalitis, delirium, encephalopathy, anxiety, depression and sleep disturbances.

In general, children appear to experience mild disease. Further evidence is needed about the association between underlying conditions and risk of COVID-19 disease in children. A rare presentation of multisystem inflammatory syndrome temporarily associated with COVID-19 in children and adolescents has been noted.

How is COVID-19 spread?

SARS-CoV-2 virus is primarily transmitted between people through respiratory droplets expelled from the nose and mouth through coughing, sneezing or speaking or when people touch their eyes, nose or mouth following contact with contaminated objects and surfaces or direct human contact.

Who is affected by COVID-19?

Increasing age and male gender have been shown to be significant risk factors for severe disease and infection fatality ratios are highest in the oldest age groups. Comorbidities such as diabetes and severe asthma are associated with an increased risk of death and obesity and other underlying health conditions can increase the risk for some people. Further information on high risk groups (those who are clinically extremely vulnerable) and moderate risk groups (those who are clinically vulnerable) can be found on the nidirect website at www.nidirect.gov.uk/articles/coronavirus-covid-19-guidance-people-higher-risk-covid-19 Deprivation and being from a black, ethnic and minority group also results in an increased risk of death from COVID-19. Additionally, health and social care workers are at increased risk of acquiring infection in their work setting and they may potentially transmit the virus to their families and to those in their care.

COVID-19 vaccination programme

What is the aim of the vaccination programme?

The aim of the COVID-19 vaccination programme is to protect those who are at most risk from serious illness or death from COVID-19 and to protect the health and social care staff and system.

How was the vaccine developed?

Over 300 different COVID-19 vaccines are in various stages of development. Some have been made using existing vaccine technology, whilst others have been made using completely new approaches. While it normally takes several years to develop a vaccine, scientists across the world have worked collaboratively and rapidly to achieve the same amount of work in a few months in order to make a safe and effective vaccine available as soon as possible. Although clinical trials have been carried out more rapidly than they have for other vaccines, this has been achieved by conducting some of the steps in parallel rather than sequentially and vaccine safety has not been compromised. The vaccine trials have been subject to all of the usual strict trial and regulatory requirements.

There is more information about COVID-19 vaccines in development, at https://vac-lshtm.shinyapps.io/ncov_vaccine_landscape/

This document will discuss the first COVID-19 vaccines to be authorised for supply in the UK. The guidance will be updated as more information about these vaccines becomes available and may include other vaccines as they are authorised for use in the UK.

As each vaccine will be presented and prepared differently, immunisers must ensure they are familiar with the specific details of the vaccine that they will be working with.

How long does the vaccine offer protection?

Israel was the first country to demonstrate waning protection from Pfizer BioNTech vaccine showing a decline in protection, even against severe disease, at around six months. In the USA, protection against hospitalisation for Pfizer BioNTech and Moderna vaccines remained high (around 84%) between three and six months.

Updated UK analysis to late August 2021 suggests that protection against symptomatic infection due to the Delta variant appears to decline after the second dose, although remains above 50% overall after five months. Levels of protection from AstraZeneca are lower than that seen after Pfizer BioNTech and remain around 20% lower after five months. In contrast, protection against hospitalisation and death from Delta variant appears to be well sustained, remaining around 85% at six months after primary vaccination with both AstraZeneca and Pfizer BioNTech vaccines. The decline in protection appears to be mainly driven by older people (over 65 years) and those with clinical risk factors (including immunosuppression).

For the Omicron variant, protection from primary vaccination appears to decline to very low levels by six months after all the vaccines used in the UK programme.

COVID-19 vaccination eligibility

Vaccine priority groups

The objectives of the COVID immunisation programme are to protect those who are at highest risk from serious illness or death. The Joint Committee on Vaccination and Immunisation (JCVI) therefore considered the available epidemiological, microbiological and clinical information on the impact of

COVID-19 in the UK and provided the Government and Devolved Administrations with advice to support the development of a vaccine strategy. Key published recommendations in chronological order are:

- Phase 1: JCVI advice on priority groups for COVID-19 vaccination 30 December 2020.
- Phase 2: JCVI final statement on phase 2 of the COVID-19 vaccination programme 13 April 2021.
- Children aged 12 to 17 years: JCVI statement on COVID-19 vaccination of children and young people aged 12 to 17 years 4 August 2021.
- Third dose for immunosuppressed: Joint Committee on Vaccination and Immunisation (JCVI) advice on third primary dose vaccination 1 September 2021.
- Children aged 12 to 15 years: The UK Chief Medical Officers recommendation: Universal vaccination of children and young people aged 12 to 15 years against COVID-19 13 September 2021.
- Booster doses: JCVI statement, September 2021: COVID-19 booster vaccine programme for winter 2021 to 2022 14 September 2021.
- Updated booster dose statement: COVID-19 booster vaccine programme for winter 2021 to 2022: JCVI statement 15 November 2021.
- JCVI advice on the UK vaccine response to the Omicron variant 29 November 2021.
- JCVI statement on COVID-19 vaccination of children and young people aged 5 to 11 years and booster vaccinations in those aged 12 to 17 years 22 December 2021.
- JCVI statement on vaccination of children aged 5 to 11 years old 16 February 2022
- JCVI statement on COVID-19 vaccinations in 2022 21 February 2022

Full details on vaccine eligibility, with detail on the at-risk conditions and the eligibility of health and social care and laboratory staff groups, are included in the Green Book Covid-19 chapter.

Can pregnant women receive the vaccine?

The serious risks posed to women who become infected with the SARS-CoV-2 virus during pregnancy have becoming increasingly clear as the COVID-19 pandemic has progressed and data from recent studies has shown that clinical outcomes following COVID-19 in pregnant women have worsened over the course of the pandemic.

There is an increased risk of hospitalisation, admission to an intensive care unit, invasive ventilation and extracorporeal membrane oxygenation (ECMO) in comparison to non-pregnant women of reproductive age, as well as an increased risk of stillbirth and preterm birth.

Pregnant women are more likely to have severe COVID-19 infection if they are overweight or obese, are of black and Asian minority ethnic background, have co-morbidities such as diabetes, hypertension and asthma, or are 35 years old or older.

In December 2021, the JCVI announced that pregnant women should be considered a clinical risk group within the COVID-19 vaccination programme.

Studies following the use of the COVID-19 vaccines in pregnant women have shown the vaccines to be safe and highly effective in preventing serious complications. Analysis by the UKHSA looked at

women who gave birth up to August 2021 and reassuringly found that there were similar rates of still birth, prematurity and low birth weight in vaccinated and unvaccinated women. It also found that pregnant women who are vaccinated are far more protected against serious COVID-19 than those who are unvaccinated.

There is no known risk associated with giving non-live vaccines during pregnancy. Since these vaccines cannot replicate, they cannot cause infection in either the woman or the unborn child.

There is now extensive post-marketing experience of the use of the Pfizer BioNTech and Moderna vaccines being given to pregnant women in the USA, with no safety signals being raised so far. Over 100,000 pregnant women have been vaccinated in England, Scotland and Wales. Because of more extensive experience with the Pfizer BioNTech and Moderna vaccines in pregnancy, these two vaccines are the preferred vaccines to offer to pregnant women aged 18 years and over. Pregnant women under 18 years of age should be offered the Pfizer BioNTech vaccine as that is the vaccine currently recommended for this age group. Pregnant women who have already received a dose of AstraZeneca vaccine can complete with the same vaccine or with an mRNA vaccine (provided there are no contraindications to either).

Routine questioning about last menstrual period and/or pregnancy testing is not required before offering the vaccine. Women who are planning pregnancy or in the immediate postpartum can be vaccinated with a suitable product for their age and clinical risk group.

If a woman finds out she is pregnant after she has started a course of vaccine, she should complete vaccination during pregnancy at the recommended intervals.

The Royal College of Obstetricians and Gynaecologists (RCOG) and Royal College of Midwives (RCM) have a decision guide and other useful information on COVID-19 vaccines and pregnancy (www.rcog.org.uk/en/guidelines-research-services/coronavirus-covid-19-pregnancy-and-womens-health/covid-19-vaccines-and-pregnancy/covid-19-vaccines-pregnancy-and-breastfeeding/).

See also www.gov.uk/government/news/pregnant-women-urged-to-come-forward-for-covid-19-vaccination

Can breastfeeding women receive the vaccine?

There is no known risk associated with being given a non-live vaccine whilst breastfeeding. JCVI advises that breastfeeding women may be offered any suitable COVID-19 vaccine. Emerging safety data is reassuring: mRNA was not detected in the breastmilk of recently vaccinated women and protective antibodies have been detected in breastmilk.

The developmental and health benefits of breastfeeding are clear and should be discussed with the woman, along with her clinical need for immunisation against COVID-19.

Can children receive the vaccine?

Following careful consideration of the risks and benefits of vaccinating children and young people aged 5 to 17 years, the JCVI has recommended vaccination of the following groups:

Children aged 5 to 11 years in at risk groups

On 22 December 2021, the JCVI recommended that children aged 5 to 11 years in the following two

groups should be offered two 10 microgram doses of the Pfizer BioNTech (Comirnaty) vaccine with an interval of eight weeks between the first and second doses. The groups are:

- children in a recognised clinical risk group who are at higher risk of severe COVID-19 (as defined in Table 4 of the Green Book COVID-19 chapter) – this includes children who are about to commence immunosuppressive treatment.
- children who are a household contact of someone who is immunosuppressed (defined as those who expect to share living accommodation on most days (and therefore for whom continuing close contact is unavoidable) with individuals of any age who are immunosuppressed).

Children aged 5 to 11 years not in at risk groups

On 16 February 2022, the JCVI recommended a one-off, non-urgent programme to offer vaccination to all children aged five to 11 years of age who are not in a clinical risk group. This offer is intended to increase and broaden protection against severe COVID-19 in advance of a potential future wave of COVID-19.

Two doses of the Pfizer BioNTech (Comirnaty) 10 micrograms/dose vaccine should be offered to children age 5 to 11 years not in a risk group with an interval of at least twelve weeks between doses.

This one-off programme applies to those currently aged 5 to 11 years and children will continue to become eligible as they turn five years of age until the end of August 2022.

Children and young people aged 12 to 17 years not in an at-risk group

Aged 12 to 15 years

On 13 September 2021, the Chief Medical Officers recommended a first dose of Pfizer BioNTech (Comirnaty 30 micrograms/dose) COVID-19 vaccination for children aged 12-15 to reduce the chances of them catching COVID-19, reduce the number of outbreaks in schools, help avoid school absences and disruption to face-to-face education.

On 29 November 2021, the JCVI recommended that all young people in this age group be offered a second dose twelve weeks from the first dose.

Aged 16 to 17 years

On 4 August, the JCVI recommended that all 16 to 17 year olds should be offered a first dose of the Pfizer BioNTech (Comirnaty 30 micrograms/dose) vaccine. This was followed by a further JCVI recommendation on 15 November 2021 that those in this age group who are not in an at-risk group should be offered a second dose after an interval of twelve weeks.

Young people aged 12 to 17 years at higher risk

Young people aged 12 to 17 years with underlying conditions that put them at increased risk of complications from COVID-19 (full details of the conditions included are listed in Table 4 in the Green Book COVID-19 chapter) are recommended to receive 2 doses of Pfizer BioNTech (Comirnaty 30 micrograms/dose) vaccine eight weeks apart, as are young people in this age group who are household contacts of immunosuppressed individuals, or who work in health and social care.

See summary table on page 9.

Can someone with immunosuppression or HIV receive the vaccine?

Individuals who have immunosuppression or HIV infection (regardless of CD4 count) should be given COVID vaccine in accordance with the recommendations and contraindications stated in the PGD and the Green Book COVID-19 chapter. These individuals may not make a full antibody response and should therefore continue to follow advice to avoid exposure unless they are advised otherwise by their doctor.

The small number of patients who are about to receive planned immunosuppressive therapy should be considered for vaccination prior to commencing therapy (ideally at least two weeks before), when their immune system is better able to make a response. Where possible, it would also be preferable for the two-dose schedule to be completed prior to commencing immunosuppression. This would entail offering the second dose at the recommended minimum for that vaccine (three or four weeks from the first dose) to provide maximum benefit that may not be received if the second dose was given during the period of immunosuppression. Any decision to defer immunosuppressive therapy or to delay possible benefit from vaccination until after therapy should not be taken without due consideration of the risks from COVID-19 and from their underlying condition.

On 1 September 2021, the JCVI advised that a third primary dose be offered to individuals aged 12 years and over who were severely immunosuppressed at the time of their first or second primary COVID-19 vaccine doses. If a third primary dose is required, ideally, it should be given at least eight weeks after the second dose with special attention paid to the timing of any planned or current immunosuppressive therapy as vaccines administered during periods of minimum immunosuppression are more likely to generate better immune responses. Where possible, the third dose should be delayed until 2 weeks after the period of immunosuppression, in addition to the time period for clearance of the therapeutic agent. If not possible, consideration should be given to vaccination during a treatment 'holiday' or when the degree of immunosuppression is at a minimum. The general principles for the administration of a third dose and the criteria for a third primary dose are described in the JCVI advice and the Green Book COVID-19 chapter.

Those aged 12 years and above in this group will also require a booster dose to extend protection from their primary course. Further information regarding timing of booster doses can be found in the COVID-19 chapter of the Green Book.

JCVI advises that a third vaccine dose also be offered to individuals aged 5-11 years who had severe immunosuppression in proximity to their first or second COVID-19 doses in the primary schedule.

As this group have only recently become eligible for immunisation, advice on boosters for this group is still under review by JCVI.

Individuals who have received a bone marrow transplant after vaccination should be considered for a re-immunisation programme for all routine vaccinations and for COVID-19.

Can someone with a history of COVID-19 disease receive the vaccine?

People currently unwell and experiencing COVID-19 symptoms should not receive COVID-19 vaccine until they have recovered. This is to avoid wrongly attributing any new symptom or the progression of symptoms to the vaccine. As clinical deterioration can occur up to two weeks after infection, vaccination of adults and high risk children should be deferred until clinical recovery to around four weeks after onset of symptoms or four weeks from the first confirmed positive specimen in those who are asymptomatic. In younger people, protection from natural infection is likely to be high for a period of months, and vaccination in those recently infected may increase the chance of side effects.

*www.gov.uk/government/publications/priority-groups-for-coronavirus-covid-19-vaccination-advice-from-the-jcvi-30-december-2020

Summary table of COVID-19 vaccine recommendations for children and young people aged 5 to 17 years

Age and risk group	Recommendations
Children aged 5 to 11 with specific underlying health conditions that put them at risk of severe COVID-19 or who are household contacts of an immunosuppressed person	• Offer two 10 microgram doses of the Pfizer BioNTech Comirnaty 10 micrograms/dose vaccine with an interval of 8 weeks between doses • Offer a third primary dose to those who had severe immunosuppression at or around the time of their first or second primary COVID-19 vaccine doses at least 8 weeks after second dose
Children aged 12 to 15 with specific underlying health conditions that put them at risk of severe COVID-19	• Offer two 30 microgram doses of the Pfizer BioNTech Comirnaty 30 micrograms/dose vaccine with an interval of 8 weeks between doses • Offer a booster dose at least 3 months after completion of primary course
Children and young people aged 12 years and over who are severely immunosuppressed	• Offer two 30 microgram doses of the Pfizer BioNTech Comirnaty 30 micrograms/dose vaccine with an interval of 8 weeks between doses • Offer a third primary dose at least 8 weeks after second dose to those who had severe immunosuppression at or around the time of their first or second primary COVID-19 vaccine doses • Offer a booster dose at least 3 months after completion of primary course
Children and young people aged 12 and over who are household contacts of an immunosuppressed person	• Offer two 30 microgram doses of the Pfizer BioNTech Comirnaty 30 micrograms/dose vaccine with an interval of 8 weeks between doses • Offer a booster dose at least 3 months after completion of primary course
Young people aged 16 and 17 in a clinical risk group or who work in health and social care	• Offer two 30 microgram doses of the Pfizer BioNTech Comirnaty 30 micrograms/dose vaccine with an interval of 8 weeks between doses • Offer a booster dose at least 3 months after completion of primary course
All other young people aged 12 to 15 not in an at risk group	• Offer two 30 microgram doses of the Pfizer BioNTech Comirnaty 30 micrograms/dose vaccine with an interval of 12 weeks between doses
All other young people aged 16 and 17 not in an at risk group	• Offer two 30 microgram doses of the Pfizer BioNTech Comirnaty 30 micrograms/dose vaccine with an interval of 12 weeks between doses • Offer a booster dose at least 3 months after completion of primary course
All other children aged 5 to 11 not in an at risk group	• Offer two 10 microgram doses of the Pfizer BioNTech Comirnaty 10 micrograms/dose vaccine with an interval of 12 weeks between doses

Therefore vaccination should ideally be deferred until at least twelve weeks from onset (or sample date) in children and young people under 18 years who are not in high risk groups. This includes children and young people who developed PIMS-TS in association with COVID-19 infection and then become eligible for vaccination. Current advice in PIMS-TS cases suggests that an interval of 12 weeks should be observed, although earlier administration can be considered in those at risk of infection and/or who are fully recovered.

There is no evidence from clinical trials of any safety concerns from vaccinating individuals with a past history of COVID-19 infection, or with detectable COVID-19 antibody so people who have had COVID-19 disease (whether confirmed or suspected) can still receive COVID-19 vaccine. This is because it is not known how long antibodies made in response to natural infection persist and whether immunisation could offer more protection. If antibodies have already been made to the disease following natural infection, receiving COVID-19 vaccine would be expected to boost any pre-existing antibodies.

Based on a highly precautionary approach, JCVI are advising a longer interval between COVID infection and vaccination for those aged under 18. This increase is based on the latest reports from the UK and other countries, which suggest that leaving a longer interval between infection and vaccination will further reduce the already very small risk of myocarditis in younger age groups.

Can someone experiencing prolonged COVID-19 symptoms ('Long COVID') receive the vaccine?

Having prolonged COVID-19 symptoms is not a contraindication to receiving COVID-19 vaccine but if there is evidence of current deterioration, deferral of vaccination may be considered to avoid incorrect attribution of any change in the person's underlying condition to the vaccine.

Is there a time interval between treatments for COVID-19 disease (for example dexamethasone, monoclonal antibody or antiviral medicines) and vaccine administration?

Dexamethasone is a steroid treatment given to patients experiencing severe COVID-19 symptoms to suppress the immune response and reduce inflammation.

As the currently authorised COVID-19 vaccines are non-live vaccines, the response to these vaccines should not be affected by short-term steroid treatment. In addition, by the time a person who has received steroid treatment for COVID-19 infection is well enough to receive a COVID-19 vaccination, the suppressant effect of the steroid treatment should be gone.

Monoclonal antibody preparations containing specific man-made antibodies which bind to the surface of the SARS-CoV-2 virus and stop it from attaching to the body's cells and replicating further have recently been licensed for the treatment and prophylaxis of COVID-19 infection. Primate data suggests that administration of the AstraZeneca combination monoclonal antibody product did not interfere with the subsequent response to active vaccination. Based on this limited evidence, therefore, no specific interval is required between receipt of these products and COVID-19 vaccination, or vice versa. As the use of these products is likely to be prioritised to those who are less able to respond to vaccination, for example immunosuppressed individuals, additional doses of vaccine may be required.

Antivirals prevent the further replication of viruses. As neither of the above mentioned COVID-19 vaccines contain live virus, response to the vaccine will not be affected by prior or recent receipt of anti-viral medication.

Can individuals with a bleeding disorder receive the COVID-19 vaccine?

Individuals with bleeding disorders may be vaccinated intramuscularly if, in the opinion of a doctor familiar with the individual's bleeding risk, vaccines or similar small volume intramuscular injections can be administered with reasonable safety by this route. If the individual receives medication/treatment to reduce bleeding, for example treatment for haemophilia, intramuscular vaccination can be scheduled shortly after such medication/treatment is administered. A fine needle (23 or 25 gauge) should be used for the vaccination, followed by firm pressure applied to the site (without rubbing) for at least two minutes*. The individual/carer should be informed about the risk of haematoma from the injection.

Can individuals taking anticoagulants receive the COVID-19 vaccine?

Individuals on stable anticoagulation therapy, including individuals on warfarin who are up-to-date with their scheduled INR testing and whose latest INR was below the upper threshold of their therapeutic range, can receive intramuscular vaccination. If in any doubt, consult with the clinician responsible for prescribing or monitoring the individual's anticoagulant therapy.

The separate needles and syringes and the fixed-needle dose-sparing syringes being supplied for administration of the COVID-19 vaccines are suitable for use for vaccination of people with bleeding disorders or anticoagulation therapies.

COVID-19 vaccines

In the UK, four COVID-19 vaccines have been approved by MHRA for use within the UK national vaccination programme. These are the COVID-19 Pfizer BioNTech (Comirnaty) 30 microgram dose, COVID-19 Vaccine Moderna (Spikevax), COVID-19 vaccine AstraZeneca (Vaxzevria) and Pfizer BioNTech (Comirnaty) 10 microgram dose (for children aged 5-11). Information about other COVID-19 vaccines which are given regulatory approval will be added when this occurs.

The COVID-19 Pfizer BioNTech vaccines and COVID-19 Vaccine Moderna use an mRNA platform and the COVID-19 vaccine AstraZeneca is an adenovirus vector vaccine.

All the currently authorised vaccines are presented in multi-dose vials and require completion of a two-dose primary course. Using multi-dose vials can improve the efficiency of vaccine manufacture and distribution, enabling vaccine availability for those eligible at the earliest opportunity.

Pfizer BioNTech (Comirnaty) and Moderna (Spikevax) COVID-19 vaccines

The Pfizer BioNTech and Moderna COVID-19 vaccines are mRNA (messenger ribonucleic acid) vaccines. They contain the genetic sequence (mRNA) for the spike protein which is found on the surface of the SARS-CoV-2 virus, wrapped in a lipid envelope (referred to as a nanoparticle) to enable it to be transported into the cells in the body.

When injected, the mRNA is taken up by the host's cells which translate the genetic information and produce the spike proteins. These are then displayed on the surface of the cell. This stimulates the immune system to produce antibodies and activate T-cells which prepare the immune system to respond to any future exposure to the SARS-CoV-2 virus by binding to and disabling any virus encountered.

As there is no whole or live virus involved, the vaccine cannot cause disease. The mRNA naturally degrades after a few days.

How do we know the COVID-19 Pfizer BioNTech vaccine is safe?

During clinical trials, local reactions at the injection site were found to be fairly common after vaccination with the Pfizer BioNTech COVID-19 vaccines. Over 80% of trial participants reported pain at the injection site. This occurred within seven days after the injection and resolved after a few days.

The safety of Pfizer BioNTech COVID-19 vaccine was evaluated in participants 16 years of age and older in two clinical studies conducted in the United States, Europe, Turkey, South Africa, and South America. The most frequent adverse reactions in participants 16 years of age and older were pain at the injection site (> 80%), fatigue (> 60%), headache (> 50%), myalgia (> 30%), chills (> 30%), arthralgia (> 20%) and pyrexia (> 10%) and were usually mild or moderate in intensity and resolved within a few days after vaccination. If required, symptomatic treatment with analgesic and/or anti-pyretic medicinal products (eg paracetamol-containing products) may be used.

Following a study in over 2,000 children aged 12-15 years, which generated additional safety and efficacy data, the approval of a 30 microgram dose was extended to those in this age group in June 2021.

Trials have now been concluded in children aged 5-11 years, using a 10 microgram dose of the vaccine formulated for children.

Compared to adults and older children, children aged 5 to 11 years reported more injection-site redness (15-19% vs 5-7%) and local swelling (10-15% vs 5-8%), but less fever (3-7% vs 1-20%) and chills (5-10% vs 6-42%).

How do we know the COVID-19 Pfizer BioNTech vaccine is effective?

The immunogenicity of the Pfizer BioNTech COVID-19 vaccine has been evaluated in clinical trials in six countries: US, Germany, Brazil, Argentina, South Africa and Turkey.

Over 44,000 individuals aged 12 years and above have taken part in clinical trials of this vaccine. Half of the participants received the COVID-19 vaccine and the other half received a placebo vaccine.

Results from the phase three clinical trials suggested the vaccine can prevent 95% of vaccinated adults from getting COVID-19 disease and that the vaccine works equally well in people of all ages, races and ethnicities. The observed efficacy in adults over 65 years of age was over 94%.

The trials among 5-11 year olds, using a 10 microgram dose, have shown equivalent antibody response and slightly lower reactogenicity than the full adult/adolescent dose (30 micrograms) in those aged 16-25 years.

Safety data reported from other countries after routine use of the paediatric dose of Pfizer BioNTech vaccine confirms the finding of lower rates of all reactions when compared to a full dose in older children and young people.

How do we know the COVID-19 Vaccine Moderna is safe?

The safety of COVID-19 Vaccine Moderna was evaluated in ongoing phase 3 clinical trials in the United States involving 30,351 participants 18 years of age and older.

The most frequently reported adverse reactions were injection site pain (92%), fatigue (70%), headache (65%), myalgia (62%), arthralgia (46%), chills (46%), nausea/vomiting (23%), auxillary swelling/tenderness (19.8%), fever (15.5%), injection site swelling (14.7%) and redness (10%). Adverse reactions were usually mild or moderate in intensity and resolved within a few days after vaccination.

There were two serious adverse events of facial swelling in vaccine recipients with a history of injection of dermatological fillers.

How do we know the COVID-19 Vaccine Moderna is effective?

The immunogenicity of the COVID-19 Vaccine Moderna has been evaluated in clinical trials in the United States with over 30,000 participants. In phase 1 testing of the Moderna mRNA-1273 vaccine, all patients seroconverted to IgG after the first dose of vaccine. Phase 3 placebo controlled testing in participants, showed a vaccine efficacy of 94.1%. Efficacy was similar in those over 65 years. Vaccine efficacy against severe COVID-19 was 100%. The cumulative case numbers in the phase 3 study showed a clear divergence between the vaccine and placebo groups from about 14 days days after the first dose.

COVID-19 Vaccine AstraZeneca (Vaxzevria)

COVID-19 Vaccine AstraZeneca is a viral vector vaccine that uses a weakened adenovirus as a carrier to deliver the SARS-CoV-2 antigen. The adenovirus has been modified so that it cannot replicate (grow and multiply by making copies of itself) in human cells and therefore cause any disease.

The genes that encode for the spike protein on the SARS-CoV-2 virus have been inserted into the adenovirus's genetic code to make the vaccine. When the vaccine is injected, it enters the host's cells, which then manufacture the spike protein. This then stimulates the immune system, which reacts by producing antibodies and memory cells to the SARS-CoV-2 virus without causing disease.

How do we know the COVID-19 Vaccine AstraZeneca is safe?

The overall safety of COVID-19 Vaccine AstraZeneca is based on an interim analysis of pooled data from four clinical trials conducted in the United Kingdom, Brazil, and South Africa. At the time of analysis, 12,021 participants received at least one dose of COVID-19 Vaccine AstraZeneca.

Reactions reported were similar to those seen following other vaccines and there were no serious adverse reactions to the vaccines seen in the trial participants who received them. The most frequently reported adverse reactions were injection site tenderness (>60%), injection site pain, headache, fatigue (>50%), myalgia, malaise (>40%), pyrexia, chills (>30%), and arthralgia, nausea (>20%). These symptoms were usually mild or moderate in intensity and resolved within a few days after vaccination.

A very rare condition involving serious thromboembolic events accompanied by thrombocytopaenia has been reported after AstraZeneca vaccination (see Thrombosis and thrombocytopaenia occurring after COVID-19 AstraZeneca vaccination on page 20).

For more information, see https://www.publichealth.hscni.net/publications/blood-clotting-following-covid-19-vaccination-information-health-professionals

How do we know the COVID-19 Vaccine AstraZeneca is effective?

Prior to approval by the MHRA, manufacturers of the COVID-19 vaccines need to show evidence that they will be effective. They can do this by showing a reduction in virus levels in animal studies where the vaccines were used and that people in the trials have made an antibody response to the vaccine. COVID-19 Vaccine AstraZeneca elicited increased neutralisation antibodies in Rhesus macaques as well as a reduction in detectable virus in the lower respiratory tract following challenge with SARS-CoV-2.

Final data in human trials showed that IgG spike antibody responses and neutralising antibody 28 days after the booster dose were similar across the three age cohorts (18–55 years, 56–69 years and ≥70

years). More than 99% (208/209) of the participants had neutralising antibody responses two weeks after the booster dose. In analysis of over 11,000 patients in the phase 3 clinical trials, overall vaccine efficacy against symptomatic disease was 70·4%. High protection against hospitalisation was seen from 21 days after the first dose until two weeks after the second dose, suggesting that a single dose will provide high short-term protection against severe disease.

Vaccines for children and young people

Currently, the Pfizer BioNTech vaccines are the only vaccines recommended to be given to children and young people less than 18 years of age. Although the Moderna vaccine is also approved in children from 12 years, the Pfizer BioNTech vaccines are currently preferred due to a lower reported rate of myocarditis (see page 22). The Pfizer BioNTech (Comirnaty) 30 micrograms/dose vaccine should be given to eligible children and young people from 12 years. The Pfizer BioNTech Comirnaty 10 micrograms/dose vaccine should be given to eligible children aged 5 to 11 years.

It is not recommended that the Comirnaty 30 micrograms/dose vaccine licensed for adults and adolescents from 12 years of age is used for children under 12 years other than in exceptional circumstances – for example, where the Comirnaty 10 micrograms/dose vaccine is not available when protection is required rapidly. In this situation, 10 micrograms (0.1ml) of the Comirnaty 30 micrograms/dose vaccine may be used as an alternative. However, the use of a fractional dose of the Comirnaty 30 micrograms/dose vaccine would be off-label and healthcare providers need to have the necessary skills to deliver such fractional doses, with appropriate guidance, training and systems in place to support vaccine delivery.

Children aged 5 to 11 years who are given a fractional dose of the 30 micrograms/dose vaccine may complete their primary course with the 10 micrograms/dose vaccine formulation or vice versa.

Children aged 5 to 11 years who commence immunisation with the 10 microgram dose of the Pfizer BioNTech (Comirnaty) vaccine and then turn 12 years of age should complete vaccination with the 10 microgram dose. The 30 microgram adult or adolescent dose is an acceptable alternative if this is the only vaccine available.

Young people aged 16 and 17 years who have already received a first dose of AstraZeneca vaccine can complete with the same vaccine or with an mRNA vaccine (provided there are no contraindications to either).

Can a different vaccine be used for the 2nd dose?

Evidence from trials suggest that those who receive mixed schedules, including mRNA and adenovirus vectored vaccines, make a good immune response, although rates of side effects with a heterologous second dose are higher. Accumulating evidence now supports the use of heterologous schedules for primary immunisation, and these are now recognised by the European Medicines Agency (EMA).

Individuals who do receive a different vaccine for their second dose should be informed that they may experience more reactions to the second dose.

For individuals who started the schedule and who attend for vaccination at a site where the same vaccine is not available, for example, if the individual received their first dose abroad, or where the first product received is unknown, one dose of the locally available product should be given to complete the primary course if suitable for age and not contraindicated.

For information relating to individuals who received their COVID-19 vaccination overseas, please

refer to UKHSA COVID-19 vaccination of individuals vaccinated overseas: https://www.gov.uk/government/publications/covid-19-vaccinations-received-overseas

Can the vaccine be administered with other inactivated or live vaccines?

Although no data for co-administration of COVID-19 vaccine with other vaccines exists, in the absence of such data, first principles would suggest that interference between inactivated vaccines with different antigenic content is likely to be limited. Based on experience with other vaccines, any potential interference is most likely to result in a slightly attenuated (weaker) immune response to one of the vaccines. There is no evidence of any safety concerns, although it may make the attribution of any adverse events more difficult.

As the Pfizer-BioNTech, AstraZeneca and Moderna COVID-19 vaccines are considered inactivated, where individuals in an eligible cohort present having recently received another inactivated or live vaccine, COVID-19 vaccination should still be given. The same applies for most other live and inactivated vaccines where COVID-19 vaccination has been received first or where a patient presents requiring 2 vaccines. It is generally better for vaccination to proceed to avoid any further delay in protection and to avoid the risk of the patient not returning for a later appointment. **An exception to this is shingles vaccination, where a 7 day interval should ideally be observed given the potential for an inflammatory response to COVID-19 vaccine to reduce the response to the live virus.**

A UK study of co-administration of AstraZeneca and Pfizer BioNTech COVID-19 vaccines with inactivated influenza vaccines confirmed acceptable immunogenicity and reactogenicity. Where co-administration does occur, patients should be informed about the likely timing of potential adverse events relating to each vaccine. If the vaccines are not given together, they can be administered at any interval, although separating the vaccines by a day or two will avoid confusion over systemic side effects.

Booster programme

To maintain high levels of protection against severe COVID-19 disease and specifically, hospitalisation and death through the winter 2021, the JCVI initially advised that booster vaccines be offered to those most at risk from serious disease, and who were vaccinated during Phase 1 of the vaccine programme. However, after extending the booster dose offer to all aged 40 to 49 years, on 29 November 2021, in response to the emergence of the Omicron variant, the JCVI advised accelerating the booster programme and offering a booster dose to all adults aged from 18 years.

On 22 December 2021, the JCVI recommended booster doses for all those aged 16 and 17 years, children and young people aged 12 to 15 years who are at higher risk from COVID-19 (as set out in the Green Book COVID-19 chapter), and those aged 12 to 15 years who are household contacts of immunosuppressed individuals of any age. Booster vaccination should be given at least three months after completion of the primary course.

Boosters in children and young people aged 12 to 15 years who are not at high risk and in those aged 5 to 11 years will be reviewed in due course.

On 21 February 2022, recognising the small decline in observed vaccine effectiveness against hospitalisation for COVID-19 after the booster dose, the JCVI recommended a Spring booster campaign for individuals at higher risk of severe COVID-19. In order to sustain protection, the JCVI

recommended that a booster dose should be given around six months after the last vaccine dose to:

- adults aged 75 years and over
- residents in a care home for older adults, and
- individuals aged 12 years and over who are immunosuppressed

The vast majority of people aged over 75 will reach an interval of around six months from their previous dose between March and June 2022. Although vaccination should ideally be offered around six months from any previous dose, operational flexibility may be used. For example, individuals in care homes or housebound patients may be offered the booster alongside other residents providing there is at least three months from the previous dose. Immunosuppressed individuals who have received an additional primary dose may have received the booster (fourth) dose more recently. These latter individuals and other eligible people who received their last vaccine more recently should also be offered the booster during the spring campaign providing there is at least three months from the previous dose. This will ensure they have additional protection against a potential summer wave and will align with their peers to facilitate an autumn programme.

A further booster programme is expected in autumn 2022.

Further information about the booster programmes is available in the JCVI statements and also in the COVID-19 chapter of the Green Book.

Vaccine to be used for booster doses

The JCVI have advised that a full dose (30 micrograms) of Pfizer BioNTech vaccine or a half dose (50 micrograms) of the Moderna vaccine should be offered as a booster dose. These two vaccines should be used with equal preference in the COVID-19 booster programme as both vaccines have been shown to substantially increase antibody levels when offered as a booster dose.

A half dose of Moderna is advised for the booster dose as it is expected to have a lower rate of side effects (including myocarditis) than a full dose.

Where both the Pfizer and Moderna vaccines are clinically contraindicated, vaccination with the AstraZeneca vaccine may be considered for those who have received at least one dose of this vaccine previously. In exceptional circumstances, individuals aged 40 years or over who received a mRNA COVID-19 vaccine previously may be offered boosting with AstraZeneca vaccine following a decision by a health professional on a case-by-case basis. Where individuals have inadvertently received a third dose or booster of AstraZeneca vaccine, JCVI does not advise re-vaccination.

The Pfizer BioNTech vaccine is the only suitable product for boosting those aged between 12 to 17 years.

Inadvertent vaccine administration errors

Does the vaccine dose need to be repeated if only the diluent is administered?

The diluent for the Pfizer BioNTech COVID-19 vaccine is sodium chloride, which is purified water with a very small amount of salt in it. This diluent is commonly used to dilute other medicines and no adverse reactions would be expected if it was inadvertently administered alone. However, the diluent alone will not evoke an immune response so the person should be given a dose of properly reconstituted Pfizer BioNTech COVID-19 vaccine as soon as the error is realised.

What should you do if you inadvertently administer the whole multi-dose vial of vaccine instead of the recommended dose?

In a Phase I/II study of COVID-19 mRNA vaccines in adults, different strength doses of Pfizer BioNTech COVID-19 vaccine were given. The trial showed that a stronger dose (100 micrograms instead of the recommended 30 microgram dose) was not harmful but the recipients experienced more local reactions with very painful arms being reported. Participants who received 58 micrograms of COVID-19 mRNA vaccine in clinical trials did not report an increase in reactogenicity or adverse events. The Moderna vaccine has also been given at higher dose levels in clinical trials than the dose recommended in the UK vaccination programme.

If a person is given more than the recommended dose, they should be reassured that this is not harmful but that they may be more likely to experience pain in their injected arm. Any subsequent doses due should still be given as per the recommended schedule.

What should you do if you inadvertently administer an incomplete dose of vaccine or a dose that may have been affected by a storage or preparation error?

If less than the full dose of COVID-19 vaccine is inadvertently given, for example, if some vaccine leaks out as it is being administered or if the vaccine has been over-diluted, a risk assessment should be carried out to determine whether it is necessary to repeat the dose. Trial data for the Pfizer BioNTech and Moderna vaccines showed a good immune response was made to a lower dose of the vaccine than the recommended authorised dose, particularly in younger age groups and as a booster.

Where the risk of under-dosing is considered substantial, it is recommended that a full additional recommended dose should be given immediately. If the error is only realised after the individual leaves the vaccination clinic, it is recommended that the repeat dose should be offered from 48 hours after the possible partial dose was given. The 48 hour wait period is to allow for any reactions experienced following the incomplete dose to resolve before the repeat dose is given. It is recommended that the repeat dose should be given within 7 days of the incomplete dose to minimise the time the individual may be left susceptible to infection. If more than 7 days have elapsed, a further risk assessment will be required to decide on the optimal timing for a repeat dose, considering the individual risk and epidemiological context.

If the dose is repeated, the recipient should be advised of possible side effects and if this was the first primary dose, the 'second' dose of the 2 dose primary schedule (which will actually be the third dose in this case) should still be given at the recommended interval from the additional dose. If this was the second primary dose, the booster dose should still be given at the recommended interval (at least 3 months) from the additional dose.

If a dose of COVID-19 vaccine is given following an incident in which the potency may have been affected, for example by a storage or preparation error, seek expert advice from the local health protection team (Duty Room 0300 555 0119) and if recommended repeat the dose of vaccine. This should either be given on the same day as the potentially affected dose was given, or from 48 hours after the potentially affected dose was given.

What should you do if the second dose is given at less than the minimum recommended interval?

If the second dose of the Pfizer BioNTech vaccine is given less than 19 days after the first dose, the dose should be discounted and another dose (a third dose) should be given at least 21 days after the dose given too early. The 19 day interval is the minimum interval that was used in the clinical trials.

If the second dose of the AstraZeneca or Moderna COVID-19 vaccine is given at less than the recommended 28 day interval, but at least 21 days after the first dose, it does not need to be repeated. If the second dose is given less than 21 days after the first, it should be discounted and another dose (a third dose) should be given at least 28 days after the dose given too early.

What should you do if longer than recommended interval is left between doses?

If an interval longer than the recommended interval is left between doses, the second dose should still be given (preferably using the same vaccine as was given for the first dose if possible). The course does not need to be restarted.

What if a different COVID-19 vaccine is given inadvertently for second dose than was given for first dose?

Evidence from trials suggest that those who receive mixed schedules, including mRNA and adenovirus vectored vaccines, make a good immune response, although rates of side effects at the second dose are higher. Reactogenicity and safety data from the Com-COV clinical trial showed that mixed schedule recipients were more likely to experience feverishness, chills, fatigue, headache, joint pain, malaise, and muscle ache. Therefore, if an individual is inadvertently given a different vaccine for their second dose than for their first dose, they should be informed that they may experience more side effects than they did following their first dose, but that a further dose is not required.

What if a different COVID-19 vaccine is inadvertently given at a short interval after the first dose?

If a dose of a different COVID-19 vaccine is inadvertently given a few days after the first dose was given, the person should be offered a third dose of vaccine at the currently recommended interval for second doses (8 weeks from when the second dose was given).

If different COVID-19 vaccines are given a minimum of 21 days apart, these doses should be counted as a completed course and no further doses are needed.

Inadvertent administration of 10 microgram dose of Pfizer BioNTech vaccine instead of the recommended 30 microgram dose to those 12 years and over

If a young person aged 12 to 15 years is inadvertently given a 10 microgram dose of the Pfizer BioNTech vaccine instead of the recommended 30 microgram dose, this dose can still be counted as a valid dose and does not need to be repeated.

If this was the first dose, children aged 12 years should complete their primary vaccination course with the 10 microgram dose (although the 30 microgram dose is an acceptable alternative if this is the only vaccine available). Those aged 13 to 15 years should be given the 30 microgram dose for their second dose.

Moderna vaccine given in error to child or young person under 18 years

Although the Moderna (Spikevax) vaccine has been approved for use in children from 12 years of age, the Pfizer BioNTech (Comirnaty) vaccine is currently preferred due to a lower reported rate of myocarditis (see page 22).

If a child or young person under 18 years of age receives a dose of Moderna vaccine in error, they should complete the course with the Pfizer BioNTech vaccine.

Half dose of Moderna vaccine given as third dose to an immunosuppressed individual in error

It is recommended that individuals who were immunosuppressed at or around the time they received their first or second primary dose should be offered a third primary dose of vaccine at least 8 weeks after their second dose and that, preferably, the Pfizer BioNTech vaccine or a full dose of the Moderna vaccine should be given for this third dose.

However, if a half dose of Moderna vaccine is inadvertently given to an immunosuppressed individual in error, the dose does not need to be repeated as it is expected that a half dose will still produce a good immune response and is expected to be equivalent to that of a full dose of Pfizer BioNTech.

Administration of a booster dose less than 3 months after the second dose

The JCVI recommend that booster vaccination should not be given within three months of completion of the primary course.

Where the booster dose is inadvertently given earlier than 3 months (12 weeks) from the final primary dose, it should not be counted as a valid booster dose and a further booster dose should be scheduled around 3 months from the dose inadvertently given early.

COVID-19 vaccine contraindications

COVID-19 vaccine should not be given to those who have had a previous systemic allergic reaction (including immediate-onset anaphylaxis) to:

- a previous dose of the same COVID-19 vaccine
- any components of the vaccine.

The COVID-19 chapter of the Green Book also provides full details about the contraindications to COVID-19 vaccine. Where there is any doubt as to whether the vaccine can be given, appropriate advice should be sought from the relevant specialist in the first instance.

A very small number of individuals have experienced anaphylaxis when vaccinated with the Pfizer-BioNTech vaccine and anaphylaxis events have also been reported after the Moderna vaccine. Following close national surveillance, the MHRA is no longer advising that individuals with a history of anaphylaxis to any vaccine, medicine or food do not get the vaccine. Anyone with a previous history of allergic reactions to the ingredients of the vaccine should not receive it, but those with any other allergies (such as a food allergy) can now have the vaccine. Please refer to the Green Book COVID-19 vaccine chapter for management of individuals with a history of allergy.

Information for Healthcare Professionals on Pfizer/BioNTech COVID-19 Vaccine for full list of excipients) https://www.ema.europa.eu/en/medicines/human/EPAR/comirnaty#product-information-section

Further information on COVID-19 Vaccine AstraZeneca is in Information for Healthcare Professionals on Covid-19 Vaccine AstraZeneca at https://www.ema.europa.eu/en/documents/product-information/vaxzevria-previously-covid-19-vaccine-astrazeneca-epar-product-information_en.pdf

Product information for the COVID-19 Vaccine Moderna at https://www.ema.europa.eu/en/medicines/human/EPAR/spikevax

Polyethylene glycol (PEG)

The Pfizer-BioNTech and Moderna mRNA vaccines contain polyethylene glycol (PEG). PEGs (also known as macrogols) are a group of known allergens commonly found in medicines, many household products and cosmetics. Medicines containing PEG include some tablets, laxatives, depot steroid injections, and some bowel preparations used for colonoscopy. Known allergy to PEG is rare but would contraindicate receipt of the Pfizer-BioNTech and Moderna vaccines. It is unclear whether PEG is the only cause of allergic reactions in patients with systemic allergic symptoms after the first dose of these vaccines.

Polysorbate 80

The AstraZeneca vaccine does not contain PEG but does contain a related compound called polysorbate 80. Some people with PEG allergy may also be allergic to polysorbate 80.

However, polysorbate 80 is widely used in medicines and foods, and is present in many medicines including monoclonal antibody preparations. Some injected influenza vaccines (including the main vaccine used in over 65 year olds) contain polysorbate 80. Individuals who have tolerated injections that contain polysorbate 80 (such as certain influenza vaccines) are likely to tolerate the AstraZeneca vaccine. Please see table 5 in the Green Book COVID-19 vaccine chapter.

Thrombosis and thrombocytopaenia occurring after COVID-19 AstraZeneca vaccination

Following widespread use of the AstraZeneca COVID-19 vaccine, a rare condition involving serious thromboembolic events accompanied by thrombocytopenia, has been reported after receipt of this vaccine.

The condition presents with unusual venous thrombosis, including cerebral venous sinus thrombosis, portal vein thrombosis, and sometimes arterial thrombosis, with low platelet count and high D-dimer measurements. The condition has similarities to heparin-induced thrombocytopenia and thrombosis (HITT or HIT type 2) and patients usually have positive antibody to platelet factor 4. The majority of the events have occurred between 5 and 16 days following vaccination.

The condition is very rare, although a higher incidence is seen in younger individuals. After the second dose the reported rate is much lower, particularly in younger individuals.

Caution should be used when vaccinating individuals who have a history of a previous episode of heparin induced thrombocytopenia and thrombosis (HITT or HIT type 2). The Information for Healthcare Professionals on COVID-19 Vaccine AstraZeneca advises that, as a precautionary measure, administration of the AstraZeneca vaccine in patients with a history of HITT or HIT type 2 should only be considered when the benefit outweighs any potential risks.

Individuals who experience a clotting episode with concomitant thrombocytopaenia following the first dose of AstraZeneca vaccine should be properly assessed. If they are considered to have the reported condition, further vaccination should be deferred until their clotting has completely stabilised. Current evidence supports a decision to complete the primary course or boost patients with a history of Thrombosis and thrombocytopenia syndrome (TTS) with an mRNA vaccine, provided at least 12 weeks has elapsed from the implicated dose.

Individuals who have received the first dose of AstraZeneca vaccine without developing this rare condition are advised to receive the second dose of the same vaccine at the currently recommended

interval. To date, there is no signal of an increased risk of this condition after the second dose and the rate of other reactions is lower at the second dose than after the first dose of this vaccine. Using an alternative product for the second dose is more likely to lead to common side effects.

Based on current evidence JCVI is advising a preference for an alternative vaccine for healthy people under 40 years of age, including health and social care workers, unpaid carers and household contacts of immunosuppressed individuals.

Individuals with past clotting episodes and those diagnosed with thrombophilia, whether or not they are on long-term anti-coagulation, remain at risk of COVID-19 disease. There is no evidence that those with a prior history of thrombosis or known risk factors for thrombosis are more at risk of developing this immune-mediated condition of thrombosis in combination with thrombocytopaenia after the AstraZeneca vaccine.

For most of these individuals, the risk of recurrent thrombosis due to COVID-19 infection, remains far greater than the risk of this syndrome. Therefore individuals with such a history should be vaccinated with any of the available vaccines (provided they are not otherwise contra-indicated). The same consideration applies to those who experience common clotting episodes after the first dose of AstraZeneca vaccine but without concomitant thrombocytopaenia.

The contraindications and precautions to the AstraZeneca vaccine, including the age group recommendations for this vaccine, are detailed in the COVID-19 chapter of the Green Book.

For further information, see https://www.publichealth.hscni.net/publications/blood-clotting-following-covid-19-vaccination-information-health-professionals

A JCVI statement on the use of the AstraZeneca COVID-19 vaccine has also been published: https://www.gov.uk/government/publications/use-of-the-astrazeneca-covid-19-vaccine-jcvi-statement-7-may-2021

Capillary Leak Syndrome

A small number of cases of capillary leak syndrome have been reported following vaccination with the AstraZeneca vaccine.

Capillary leak syndrome causes fluid and proteins to leak out of the capillaries into surrounding tissues. This may lead to very low blood pressure, low blood albumin levels and thickened blood due to a decrease in plasma volume. Initial symptoms may include tiredness, nausea, abdominal pain, extreme thirst and sudden increase in body weight. Complications can include general swelling, compartment syndrome, kidney failure and stroke.

Individuals with a history of capillary leak syndrome should be carefully counselled about the risks and benefits of vaccination and may be offered an alternative COVID-19 vaccine (that is an mRNA vaccine instead of AstraZeneca).

Precautions to COVID-19 vaccines

Other precautions

It is recommended that individuals are observed for a minimum of 15 minutes following administration

of the Pfizer-BioNTech and Moderna vaccines. However, in recognition of the need to accelerate delivery of the programme in response to the emergence of the Omicron variant, the UK Chief Medical Officers have recommended suspension of this requirement. This temporary suspension in individuals without a history of allergy, and in those over the age of 17, has also been agreed by the Commission on Human Medicines.

https://www.health-ni.gov.uk/sites/default/files/publications/health/doh-hss-md-82-2021.pdf

There is no requirement for 15 minutes observation following the AstraZeneca vaccine. However, as fainting can occur following vaccination, all those vaccinated with any of the COVID-19 vaccines should either be driven by someone else or should not drive for 15 minutes after vaccination.

Following COVID-19 vaccine administration, vaccinated individuals should be observed for any immediate reactions whilst they are receiving any verbal post vaccination information. Vaccinated individuals should be informed about how to access immediate healthcare advice if they require it following vaccination.

Patients with undiagnosed PEG allergy often have a history of immediate onset-unexplained anaphylaxis or anaphylaxis to multiple classes of drugs or an unexplained anaphylaxis. Such individuals should not be vaccinated with the Pfizer-BioNTech or Moderna vaccine, except on the expert advice of an allergy specialist. The AstraZeneca vaccine can be used as an alternative (unless otherwise contraindicated), particularly if they previously tolerated an injected influenza vaccine. The vaccine should be administered in a setting with full resuscitation facilities (e.g. a hospital), and a 30 minute observation period is recommended.

The British Society for Allergy and Clinical Immunology (BSACI) has advised that individuals who have a reaction to the first dose of a COVID-19 vaccine may be able to receive a 2nd dose of vaccine. Please see the flowchart for managing patients who have allergic reactions to the first dose of COVID-19 vaccine in the Green Book COVID-19 vaccine chapter for further information.

Individuals with non-allergic reactions (vasovagal episodes, non-urticarial skin reaction or non-specific symptoms) to the first dose of a COVID-19 vaccine can receive the second dose of vaccine in any vaccination setting.

Further information can be found on the RCUK publishes, including hypersensitivity to the active substance or to any of the excipients, anaphylaxis guidance for vaccination settings | Resuscitation Council UK

Myocarditis and pericarditis

Cases of myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the pericardium) have been reported in people who have received COVID-19 vaccine. The reported rate appears to be highest in those under 25 years of age and in males, and after the second dose. Onset is within a few days of vaccination and most cases are mild, recovering within a short time following standard treatment and rest without any sequalae.

Vaccinated individuals should be advised to seek immediate medical attention should they experience new onset of chest pain, shortness of breath, palpitations or arrhythmias. Those who develop myocarditis or pericarditis following the first COVID-19 vaccination should be assessed by an appropriate clinician to determine whether it is likely to be vaccine related. Subsequent doses should be deferred until further information becomes available.

Further detailed information for healthcare professionals on myocarditis and pericarditis following COVID-19 vaccination is also available: https://www.gov.uk/government/publications/covid-19-vaccination-myocarditis-and-pericarditis-information-for-healthcare-professionals/information-for-healthcare-professionals-on-myocarditis-and-pericarditis-following-covid-19-vaccination

Guillain-Barré syndrome (GBS)

Very rare reports have been received of Guillain-Barré syndrome (GBS) following COVID-19 vaccination, so healthcare professionals should be alert to the signs and symptoms of GBS to ensure correct diagnosis, in order to initiate adequate supportive care and treatment and to rule out other causes.

Guillain-Barré syndrome is a very rare and serious condition that affects the nerves. It mainly affects the feet, hands and limbs, causing problems such as numbness, weakness and pain. In severe cases, GBS can cause difficulty moving, walking, breathing and or swallowing.

Individuals who have a history of GBS should be vaccinated as recommended for their age and underlying risk status.

In those who are diagnosed with GBS after the first dose of vaccine, the balance of risk benefit is in favour of completing a full COVID-19 vaccination schedule. On a precautionary basis, however, where GBS occurs within 6 weeks of an AstraZeneca vaccine, the Pfizer BioNTech or Moderna mRNA COVID-19 vaccines are preferred for any future doses. Where GBS occurs following either of the mRNA vaccines (Pfizer BioNTech or Moderna), further vaccination can proceed as normal, once recovered. Further information can be found in the COVID-19 chapter of the Green Book.

Immune thrombocytopenia (ITP)

Immune thrombocytopenia (ITP) is a condition where the immune system does not function correctly and attacks and destroys platelets in the blood. Platelets help the blood to clot so this can lead to bruising and bleeding.

There is now emerging evidence of a small risk of ITP or ITP relapse following COVID-19 vaccination. To date, this has been reported extremely rarely and the MHRA Yellow card summary states that this is usually short-lived and of minor severity.

Previous ITP is not a contraindication for vaccination but guidance produced by the UK ITP Forum Working Party advises discussing the potential for a fall in platelet count in patients with a history of ITP receiving any COVID-19 vaccine and recommends a platelet count check 2 to 5 days after vaccination (British Society for Haematology COVID-19 updates: https://b-s-h.org.uk/about-us/news/COVID-19-updates/

Additional advice for recipients

Vaccine recipients should also be advised that it may take a few weeks for protection from their COVID-19 vaccination to develop and that they should continue to follow advice current at the time regarding practicing social distancing, wearing a face mask and washing their hands thoroughly and frequently.

Vaccine recipients should also be advised to follow the current advice on testing and self-isolation if they develop any coronavirus symptoms or undergo regular testing as a health or social care worker. Vaccination will not affect testing. The lateral flow device (LFD) test detects a different protein of the virus than the one encoded in the vaccine, and the polymerase chain reaction (PCR) test detects different genes of the virus than the one included in the vaccine.

As no vaccine is completely effective, some people may still become infected with coronavirus despite having been vaccinated (although this should be less severe). The vaccine cannot cause COVID-19 infection.

Postponing immunisation

Minor illnesses without fever or systemic upset are not valid reasons to postpone immunisation. If an individual is acutely unwell, immunisation may be postponed until they have fully recovered. This is to avoid confusing the differential diagnosis of any acute illness (including COVID-19) by wrongly attributing any signs or symptoms of the illness as being possible reactions to the vaccine.

Useful links

Northern Ireland COVID-19 Vaccination Programme:
https://www.publichealth.hscni.net/covid-19-coronavirus/northern-ireland-covid-19-vaccination-programme

Northern Ireland COVID-19 - Daily Dashboard Updates:
www.health-ni.gov.uk/articles/covid-19-daily-dashboard-updates

Green Book COVID-19 chapter:
www.gov.uk/government/publications/covid-19-the-green-book-chapter-14a

UK Health Security Agency Coronavirus resources: https://www.gov.uk/government/collections/covid-19-vaccination-programme

GOV.UK Coronavirus (COVID-19) in the UK: https://coronavirus.data.gov.uk/

WHO COVID-19 Worldwide Dashboard:
https://covid19.who.int/?gclid=EAIaIQobChMInr6P36Dc7AIVBWHmCh3IswIXEAAYASAAEgIPT_D_BwE

LSHTM COVID-19 vaccine tracker: https://vac-lshtm.shinyapps.io/ncov_vaccine_landscape/

Royal College of Nursing - COVID-19 vaccination page:
www.rcn.org.uk/clinical-topics/public-health/immunisation/covid-19-vaccination

Product information for the COVID-19 Vaccine Pfizer BioNTech (Comirnaty):
https://www.ema.europa.eu/en/documents/product-information/comirnaty-epar-product-information_en.pdf

Liu, X, Shaw, RH, Stuart, ASV and others. Safety and Immunogenicity Report from the Com-COV Study – a Single-Blind Randomised Non-Inferiority Trial Comparing Heterologous And Homologous Prime-Boost Schedules with An Adenoviral Vectored and mRNA COVID-19 Vaccine. Available at SSRN: https://ssrn.com/abstract=3874014 or http://dx.doi.org/10.2139/ssrn.3874014

Shaw, RH and others. Heterologous prime-boost COVID-19 vaccination: initial reactogenicity data. Lancet 2021 May 12, https://doi.org/10.1016/S0140-6736(21)01115-6

Product information for the COVID-19 Vaccine AstraZeneca (Vaxzevria): https://www.ema.europa.eu/en/documents/product-information/vaxzevria-previously-covid-19-vaccine-astrazeneca-epar-product-information_en.pdf

Product information for the COVID-19 Vaccine Moderna (Spikevax): https://www.ema.europa.eu/en/documents/product-information/spikevax-previously-covid-19-vaccine-moderna-epar-product-information_en.pdf

British Society of Immunology, A guide for COVID-19 vaccinations: https://www.immunology.org/public-information/guide-vaccinations-for-covid-19

MHRA weekly summary of Yellow Card reports: https://www.gov.uk/government/publications/coronavirus-covid-19-vaccine-adverse-reactions

Vaccination, helping to protect those most vulnerable.

If you need more information on the COVID-19 vaccination please visit: www.nidirect.gov.uk/covid-vaccine

HSC Public Health Agency

Public Health Agency
12-22 Linenhall Street, Belfast BT2 8BS.
Tel: 0300 555 0114 (local rate).
www.publichealth.hscni.net

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