

*The* ROYAL MARSDEN

# COVID-19 Vaccination

**Pfizer BioNTech  
(Comirnaty) vaccine**



**Date: 20 September 2021**

We appreciate that it has been a very difficult and stressful year for everyone. We also anticipate that whilst the prospect of a vaccine is an exciting development to help us move forwards and return to a normal life, for some this may be creating new anxieties. We have prepared this document in the hope that it will answer many of your questions.

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# Executive summary

A COVID-19 vaccine is essential to protect ourselves, our families and friends, and our patients and so we can return to a normal life and recover from the pandemic.

While the vaccines have been produced quickly, there should be no concerns over their safety. The speed of development has come from enormous scientific and governmental collaboration. The rigorous safety testing by the MHRA that any new drug or vaccine must go through to be approved for use has absolutely been adhered to.

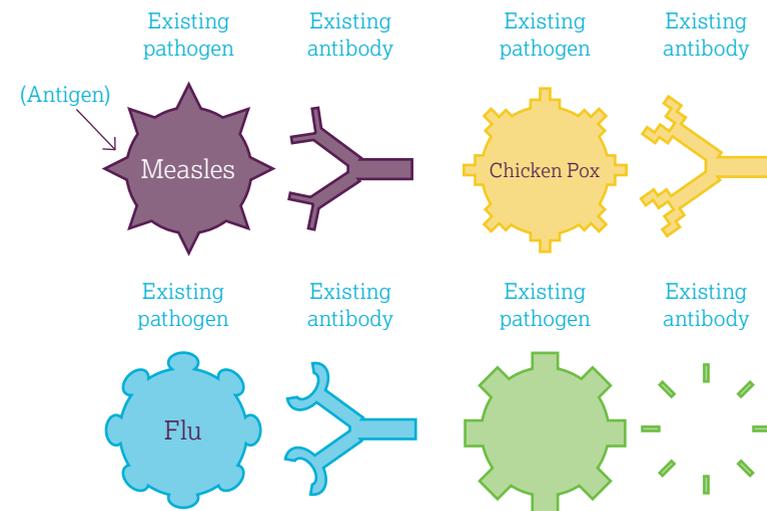
The Pfizer vaccine is not a live vaccine and so it cannot give you the COVID-19 illness. It is delivered initially as two vaccine doses, with the addition of a third vaccine for certain people, and the addition of “booster” doses a minimum of six months after the primary doses, to achieve the full immune response. After the injections, as with any vaccine, it is normal to have mild symptoms such as muscle aches and a low grade fever. This is a sign that your immune system is responding as it should.

The vaccine is safe for everyone to receive except people who have had a previous allergic reaction (including anaphylaxis) to a previous dose of the same COVID-19 vaccine, or any component of the COVID-19 vaccine.

It is recommended that anyone pregnant should be vaccinated against COVID-19 due to the increased risk from the illness in later stages of pregnancy. Vaccines are also safe to have whilst breastfeeding. The Pfizer vaccine has been tested in children aged 12-16 years, and it is now recommended in this age group to those who have underlying health conditions, or live with family members who are vulnerable, and is now also being offered to all children aged 12-16 years.

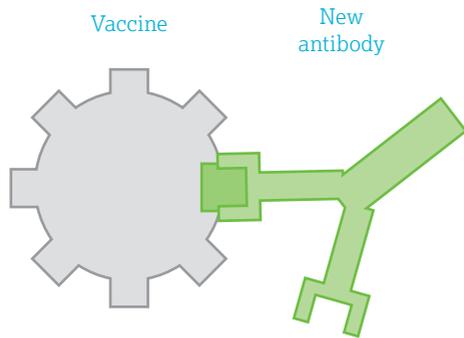
# How do vaccines work?

When a pathogen (an organism that causes a disease, such as a virus) enters the body our immune system is activated to develop ways to attack and destroy that pathogen. Each pathogen is made up of specific parts unique to that disease. The body develops antibodies to a small part of that pathogen, known as the antigen. Each antibody is specific to a unique antigen. We therefore have thousands of different antibodies in our bodies that we develop over our lifetime. Antibodies take some time to develop, and so when a new pathogen enters the body for the first time there is a period when that person becomes ill whilst the antibodies are developing. Once these are produced, they work in conjunction with other immune mechanisms to destroy the pathogen and end the disease. When the immune system produces antibodies it also produces antibody-producing memory cells which remain even after the pathogen has been defeated. These enable a faster and more effective response if the body is exposed to the pathogen again in the future, protecting the individual against the disease.



When a new pathogen or disease enters our body, it introduces a new antigen. For every new antigen, our body needs to build a specific antibody that can grab onto the antigen and the pathogen.

Vaccines work by delivering weakened or inactive antigens to the body which triggers an immune response and development of antibodies, without causing the disease itself in the person receiving the vaccine. Some vaccines require multiple doses to enable production of a stronger immune response and development of memory cells.



A vaccine is a tiny weakened non-dangerous fragment of the organism and includes parts of the antigen. It's enough that our body can learn to build the specific antibody. Then if the body encounters the real antigen later, as part of the real organism, it already knows how to defeat it.

## Why do we need a COVID-19 vaccine?

Many of us have first-hand experience of the devastating effect of COVID-19. Whilst it is true that the majority of people have a relatively mild, or even asymptomatic infection, it is clear that for some it is a very dangerous illness leading to death or with long-term consequences. At The Royal Marsden, our patient population is particularly vulnerable as research shows that patients with cancer are at higher risk of morbidity and mortality from COVID-19.

When someone is vaccinated, they are likely to be protected against the disease – in this case COVID-19. This should then prevent the person that has received the vaccine from catching the illness and passing it on to others. If the vaccine doesn't prevent an individual catching the illness it is likely to mean they have a much milder version of the illness. When many people in a community are vaccinated it becomes hard for the illness to pass from one person to the next and this then protects everyone, including those unable to receive the vaccine for various reasons. This is called herd immunity. No vaccine provides 100% protection but developing herd immunity gives substantial protection particularly to vulnerable people, such as our patient population. It is essential for global recovery from the pandemic that we achieve herd immunity so we can resume a normal life.



A vaccine protects an individual

When a community is vaccinated, everyone is protected, even those who can't be vaccinated due to underlying health conditions.

## How have the COVID-19 Vaccines been produced so quickly?

The global effort to find a vaccine for COVID-19 has been astonishingly quick. Historically, vaccines have taken many years to develop from the start. However, the difference in this situation partly relates to modern techniques and knowledge, but also the urgency with which governments around the world appreciated the need for a vaccine to end the catastrophic impact the COVID-19 virus is having on economies, in addition to the physical and psychological health of the world. Under normal circumstances, much of the time is spent applying for grants to fund the research and wading through regulations and paperwork. However, the remarkable collaboration between companies and researchers around the world, seemingly limitless funding from governments, and cooperation with regulating agencies who have facilitated ongoing “fast-track” data analysis with easy submission of the data has eliminated these blocks.

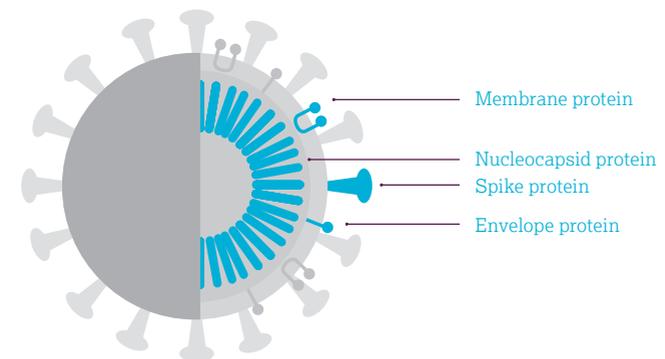
Normally trials also struggle to recruit participants. However, in this case, people have been volunteering in large numbers to help in the effort to validate a vaccine. It has been likened to the difference between driving through central London in rush hour traffic, compared with driving through central London in the middle of the night with all the traffic lights switched to green and a police escort to help.

The speed with which the vaccines have been produced should not be a cause of anxiety. The regulatory bodies (FDA in the USA, and MHRA in the UK) will not approve any treatments without the certainty that they have been rigorously and scientifically developed and are safe to use.

## How do the COVID-19 vaccines work?

There are two main COVID-19 vaccines that we have received. As a trust, we have no control over which vaccine we receive as this is organised centrally by NHS England. The likely vaccines work in slightly different ways to achieve the same result. Many of the vaccines in development have focussed on the “spike” protein, which the disease uses to enter human cells, as a target antigen for vaccines. The Pfizer BioNTech COVID-19 is an mRNA vaccine, and works by introducing a messenger RNA (mRNA) sequence from the virus into the body. The mRNA contains the genetic instructions for the individual’s own cells to produce the antigen protein which the body then uses to generate an immune response. The Oxford AstraZeneca vaccine (ChAdOx1) is an “adenovirus vector vaccine”.

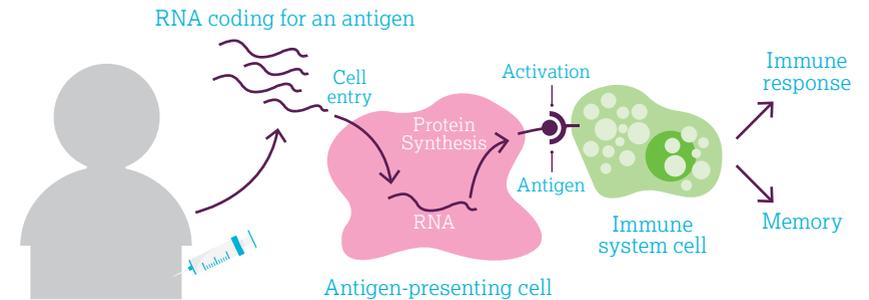
We will receive the Pfizer BioNTech COVID-19 vaccine for the next phase of the vaccine programme, and so this document will focus primarily on that vaccine.



# Pfizer BioNTech COVID-19 vaccine (Comirnaty)

This vaccine is an mRNA vaccine. This is a relatively new technology for vaccines, as traditional vaccines use weakened forms of the virus itself. The mRNA vaccine works by introducing a messenger RNA (mRNA) sequence from the virus into the body. The mRNA contains the genetic instructions for the individual's own cells to produce the antigen protein which the body then uses to generate an immune response. When the vaccine is injected into the upper arm, the muscle cells translate them to make the viral antigen protein (the spike protein). While this synthetic mRNA is genetic material, it is not transmitted into the recipient DNA. After the injection, the mRNA guides the antigen production inside the muscle cells for a few days, before being destroyed. For technical reasons, mRNA vaccines are potentially faster to develop than traditional vaccines. They are also thought to be safer than traditional vaccines as they are not produced using any infectious elements.

Whilst they are thought of as relatively new technology, which is causing some to be anxious, research into mRNA vaccines and applications started long before the COVID-19 pandemic. The technique was described in 1990, but it wasn't until 2005 that scientists discovered how to stabilise the mRNA to enable it to be delivered as a vaccine. It is thought they could be used for treatment of cancer, allergies, in addition to infectious diseases, and there are many in clinical trials including immunotherapy treatments for melanoma, glioblastoma, and prostate cancer ongoing. One advantage of mRNA vaccines is that they are produced in a laboratory from a DNA template and so are produced without the need of other products – such as chicken eggs or mammalian cells – that some vaccine production requires.



## Are mRNA vaccines safe and effective?

- mRNA vaccines are not made with pathogen particles or inactivated pathogen and so they are not infectious.
- The mRNA does not bind itself into the human genetic material. Once the antigen protein is made in the host cell, the mRNA strand from the vaccine is destroyed within a few days.
- Clinical trials of many of these new vaccines suggest that they generate a reliable and strong immune response with few side effects.

## Are there any problems with mRNA vaccines?

- Delivering the mRNA into cells can be challenging as free mRNA is broken down very quickly in the body. Therefore, the mRNA strand is “packaged” in a larger molecule or into “liposomes” to deliver it safely where it is needed.
- mRNA vaccines often need to be frozen or refrigerated when stored. This makes them less suitable for countries with limited refrigeration facilities, and so work is ongoing to develop an mRNA vaccine that doesn't need to be stored in a cold environment.

## Results from the Pfizer BioNTech studies to date:

- Primary efficacy analysis demonstrates the vaccine to be 95% effective against COVID-19 beginning 28 days after the first dose (based on second dose being administered on day 21).
- Efficacy was consistent across age, gender, race, and ethnicity demographics
- Efficacy in adults over 65 was over 94%
- Safety data demonstrates the vaccine was well tolerated across all populations
- 43,661 participants were enrolled in the study when results were reported on 13 November 2020, of which half (nearly 22,000) have received the trial vaccine candidate.
- No serious safety concerns have been reported to date

Side effects may occur with following frequencies:

### **Very common: may affect more than 1 in 10 people**

- pain at injection site
- tiredness
- headache
- muscle pain
- chills
- joint pain
- fever

### **Common: may affect up to 1 in 10 people**

- injection site swelling
- redness at injection site
- nausea

### **Uncommon: may affect up to 1 in 100 people**

- enlarged lymph nodes
- feeling unwell

UK Data from ongoing surveillance of vaccine recipients has shown that a single dose of the Pfizer vaccine gives approximately 60% protection against symptomatic disease. Higher levels of protection are seen after a second dose with greater than 90% protection against severe disease requiring hospitalisation from COVID-19 including the newer delta variant.

# Frequently Asked Questions (FAQs)

## Who will receive the vaccine and do I have to have it?

### Who will get the vaccine?

The aim of the COVID immunisation programme is to protect those who are at highest risk from serious illness or death. Healthcare workers have been identified as a group at risk of acquiring the COVID-19 infection and so are being prioritised by Public Health England (PHE). Our aim is to vaccinate as close to 100% of our workforce as possible.

### Do I have to receive the vaccine?

No, you do not have to have the vaccine. It is your choice. However, in the same way that we aim to achieve high vaccination rates for seasonal flu, vaccinating a large proportion of our workforce and patients is the only way to make The Royal Marsden a COVID safe environment for our staff and patients. It also contributes to the country's immunisation as a whole, as without high levels of vaccination we will not be able to move out of the pandemic and return to a "normal" life for a long time. We would encourage you to consider having the vaccine to help us protect everyone, including your own families.

## How can I be sure the vaccine is safe and effective?

### I'm worried that the vaccine isn't 100% effective

The results from all the vaccine trials have been very impressive and very encouraging. No vaccine can be 100% effective at preventing you from catching the illness it is designed against. The results from the real-world data show that in most people, 2 doses of the Pfizer vaccine will lead to over 90% protection against severe disease requiring hospitalisation. Even if the vaccines don't prevent you from getting COVID-19 they are likely to reduce the severity of your illness. It is worth knowing that the effectiveness of the flu vaccine (its ability to prevent the flu illness) ranges from only 40-60%.

### How do I know that the vaccine is safe?

The results from the trials and from real-world safety reporting are constantly examined by the Medicines Health and Regulatory Agency (MHRA) who only approve vaccines shown to be safe to use, and issue advice about changing usage as soon as any safety concerns arise. When we deliver the vaccination programme, we will make sure it is safely delivered by having experienced staff in a carefully controlled environment so that we can make sure everyone is protected and safe.

### How can I be confident that I will be safe when I have the vaccine?

We appreciate that some people receiving this vaccine may feel anxious for all the reasons already discussed. For that reason, we are ensuring you will be as safe as possible with equipment readily available for an unexpected emergency. To date nearly 22 million first doses and over 18 million second doses of the Pfizer BioNTech vaccine have been given in the UK which gives us very robust safety data. This has demonstrated that severe allergic reactions to the vaccine are very rare. Of the 40,000,000 doses given, only 476 cases of severe allergic reaction have been confirmed which is approximately a 1:80,000 risk of anaphylaxis.

## How will the vaccination programme run?

### **When will I be vaccinated?**

The vaccination programme for “3rd dose” vaccines for immunosuppressed people and “booster dose” vaccines for healthcare workers will begin towards the end of September 2021. During this period we will always facilitate 1st or 2nd dose vaccines for those that to date have chosen not to be vaccinated.

### **Where will I be vaccinated?**

The vaccines are being administered in the Cripps Lecture Theatre in Sutton, and in the Markus Centre in Chelsea.

### **Does the second vaccine dose have to be exactly 21 days after the first?**

The second dose of the Pfizer-BioNTech vaccine should not be given less than 21 days after the first dose. Analysis from UK data has shown that a longer gap between vaccines leads to an improved immune response. For this reason the optimum is to have a gap of more than 8 weeks between doses unless there are healthcare reasons for giving the vaccine sooner.

### **Do I have to have the second dose or further booster doses?**

It is important that you have the second dose of the vaccine as all the evidence from studies shows that this second dose significantly boosts the immune response and leads to the high levels of efficacy that have been demonstrated in the trials. If you are unexpectedly unable to receive the second dose (eg unwell) you should be rescheduled at the earliest opportunity when you are well, and do not need to start the course again. If you completely miss the second dose, you will have some protection to COVID-19, but it will not be as effective, and is likely to be for a shorter duration, although accurate information is limited at present. We do not recommend missing the second vaccine dose.

To date the JCVI recommendations relating to vaccines have been very well-judged based on current available evidence. The recommendation to have a booster vaccine comes from evidence of waning immunity in those that were vaccinated over six

months ago at a time where the levels of infections are rising. The recommendation has been made to help protect the country and minimise the need for further disruption to society.

### **Will I be given anything to prove I have been vaccinated?**

Your vaccination will be documented on the National Reporting System which links to your GP and with the NHS app which you can use for proof of vaccination.

### **Is it OK for me to have a Pfizer vaccine booster if my first two doses were AstraZeneca?**

After reviewing the data on responses to booster doses from different combinations of COVID-19 vaccines, the JCVI has recommended a preference for the Pfizer BioNTech vaccine to be offered to everyone irrespective of which vaccine they were given for their primary course. There is evidence that this vaccine is tolerated well and leads to a good immune response. If you are unable to have a Pfizer vaccine for medical reasons (e.g. allergy), then an alternative vaccine (AstraZeneca) can be considered.

### **Am I able to have the flu vaccine and the COVID-19 vaccine on the same day?**

Data from a study called the “ComFluCOV trial” has shown that it is safe to receive the flu vaccine and the COVID-19 vaccine together on the same day. Receiving them at the same time does not reduce the intended immune response generated by either vaccine and has been approved by the JCVI. For practical reasons we have decided to run the flu vaccine and COVID-19 vaccine campaigns separately. We would advise that you might like to consider having the vaccines on separate days to minimise the risk of staff sickness from the anticipated normal side effects that we expect to see with any vaccine.

## Will the COVID-19 vaccination make me unwell?

### **Will I get the COVID-19 infection from the vaccine?**

You will NOT get COVID-19 from the vaccine. The vaccine only delivers a small amount of mRNA to build the antigen “spike” protein and the mRNA is then normally degraded within a few days. This cannot give you the infection. However, it is common for any vaccination to give you “flu-like” symptoms to varying degrees which reflects your immune system responding as it should. You may, therefore, experience mild symptoms such as muscle aches (especially in the region of the injection), a headache, or a low-grade fever.

### **Will the vaccine make me feel unwell?**

It is normal for any vaccination to cause some discomfort at the vaccination site – and the Pfizer COVID-19 vaccine is no different. The main reported reaction from the studies and from our surveillance data is pain at the injection site, and that is normally without any redness or swelling. In the final analysis of safety data any effects of the vaccine were generally reported as being “mild and short lived”. In younger trial participants, the most common side effects classified as “severe (interfering with daily activity)” were fatigue (4%), and headache (2%). Older recipients, classed as those aged 65-85, tended to have fewer adverse events (fever, fatigue, headache, muscle pain, or joint pains) than younger recipients.

We know that the side effects from the second dose of the Pfizer vaccine were marginally more pronounced in general than after the first Pfizer vaccine. What is less clear is what the side effect profile will be with a third Pfizer vaccine after a 6 month period. We do know from a study into mixing vaccines that receiving a different vaccine type can lead to higher rates of the common side effects.

COVID-19 vaccines may cause a mild fever which usually resolves within 48 hours. This is a common, expected reaction that can be treated with paracetamol if necessary.

There have also been lots of queries relating to the effect of the vaccine on the menstrual cycle. There is currently no proven link between the vaccine and changes to the menstrual cycle, although there is a call for this to be looked into as there have been reports of changes to the cycle following the vaccine. It is important to note that the vaccine is safe and will not affect fertility.

### **Are there any severe side effects?**

Surveillance reporting data has shown that the reported rate of anaphylaxis to the Pfizer vaccine is approximately 1:80,000 cases. The vaccine should not be given to anyone that has had a reaction to a previous dose of the same COVID-19 vaccine, or any component of the COVID-19 vaccine. The only known allergen in the BioNTech COVID-19 vaccine is polyethylene glycol (PEG) which is from a group of known allergens commonly found in medicines and household goods and cosmetics. People with a history of unexplained anaphylaxis to multiple classes of drugs may have an undiagnosed PEG allergy and so should not receive the Pfizer BioNTech vaccine. The AstraZeneca vaccine does not contain PEG and would be a suitable alternative.

Recently some very rare (approximately 6:1,000,000) cases of myocarditis (inflammation of the heart) and pericarditis (inflammation of the tissue surrounding the heart) have been reported. Most have been mild and have resolved without any longstanding issues. The cases are reported more frequently in men under the age of 25 years after the second dose. The MHRA has advised that the benefit of vaccination still outweighs the risk of this rare event.

### **What should I do if I feel unwell after my vaccine?**

If you feel unwell after the vaccine it is most likely that these symptoms are due to the vaccine itself but it is important to remember that you are still at risk of a coincidental infection of COVID-19 in the first few days after your vaccine.

After your vaccine:

- 1 If you develop a fever greater than 37.8°C that lasts for less than

24 hours AND there are no other COVID-19 symptoms (cough or anosmia) then it is most likely that these symptoms are just related to the vaccine. If you have any concerns then contact your GP in the first instance for advice.

- 2 If you develop a fever (greater than 37.8°C) that lasts for more than 24 hours OR if it is accompanied by a cough or anosmia you must arrange a COVID-19 PCR test through NHS 119.

**If you develop a fever greater than 37.8°C and have had anticancer therapy within the last 6 weeks please ring The Royal Marsden Macmillan Hotline on 020 8915 6899 for advice immediately.** If you have not recently had anticancer therapy please contact your GP or NHS111 for further advice.

## How quickly does the vaccine work and how long does it protect me for?

### **How quickly does the vaccine work?**

Your immune system will start to work on developing antibodies and memory cell immunity very quickly after the vaccination. However, it takes some time before this reaches its maximum effectiveness. The trial data results are quoted as having a vaccine efficacy of 95% measured seven days after the second dose. “Efficacy” is the ability of something to produce its intended result – in this case how well the vaccine has prevented recipients from contracting the COVID-19 infection. However, even before this time you will have developed some immunity which is likely to reduce the severity of a COVID-19 infection if you were to contract the illness before you have managed to develop full immunity. It has been suggested from data analysis that short term protection from dose one is very high from day 10 after vaccination with estimated efficacy against symptomatic COVID-19 of 89%.

### **How long does the vaccine protect me from COVID-19 for?**

The answer to this is not clear as we need time to assess the effectiveness of the vaccine. The studies will continue to follow participants for a longer period of time to assess levels of immunity.

## What should I do if I have already had the COVID-19 infection?

### **Should I have the vaccine if I have been infected with COVID-19 some time ago?**

Yes, it is still recommended that you have the vaccine even if you have been infected with COVID-19. Receiving a vaccine will help your body to “boost” its immune response, and in particular should help to generate more of the “memory” immunity to prevent further infection. The vaccine study protocol included people that had not been infected with COVID-19, but also those that had been infected previously demonstrating that this is safe. See the link to the study protocol if you are interested in further information.

If you have prolonged COVID-19 symptoms, you should only postpone the vaccine if there are signs of worsening symptoms to prevent incorrectly attributing these changes to being a reaction to the vaccine.

### **Should I have the vaccine if I have very recently been infected with COVID-19?**

Vaccinating people who may be asymptomatic or “incubating” COVID-19 infection is unlikely to have any detrimental effect on the illness. However, if you have a confirmed asymptomatic case of COVID-19 your vaccine should be postponed, to avoid confusing symptoms of the illness with potential adverse effects of the vaccine.

Anyone that has recently had COVID-19 should delay a vaccine until they have completely recovered, and at least four weeks have passed from the onset of symptoms or from the first positive PCR result.

### **Should I have the vaccine if I am feeling unwell?**

If you are feeling acutely unwell (eg fever) you should postpone your immunisation until you are better. This is to avoid any confusing symptoms of your illness and wrongly attributing them as adverse effects from your vaccine. A minor illness without a fever or systemic symptoms is not a reason to postpone the vaccination.

## What should I do if I am pregnant, have healthcare issues, or have allergies?

### **Is the vaccine safe to have if I am pregnant?**

There is no known risk associated with giving inactivated, recombinant viral or bacterial vaccines or toxoids during pregnancy or whilst breast-feeding. Since inactivated vaccines cannot replicate they cannot cause infection in either the mother or the baby. Trials have now been performed in pregnant women showing no safety concerns relating to the mother or the baby. Given there is an increased risk of being very unwell from COVID-19 in later stages of pregnancy, pregnant women are strongly recommended to be vaccinated. The JCVI are recommending a preference for pregnant women to be given the Pfizer vaccine because of more experience and trial data of its use in pregnancy.

NHS England is continuing to ask recipients whether they are pregnant purely to aid with vaccine surveillance and not because of any safety concerns.

### **Is the vaccine safe for me to have if I am breastfeeding?**

There is no known risk associated with giving a non-live vaccine whilst breastfeeding. PHE therefore recommend that breastfeeding women may be offered either of the COVID-19 vaccines, although they should be aware of the lack of formal safety data to date in this area.

### **Should I receive the vaccine if I am immunosuppressed?**

Public Health England (PHE) are recommending that those who are immunosuppressed from any cause (disease or treatment related) should receive the COVID-19 vaccine. These individuals, however, may not make a full antibody response because of their condition and so should continue to take precautions to avoid unnecessary exposure. PHE recommends consideration to vaccinating the adult household contacts of immunocompromised individuals.

Newer evidence from ongoing trials has supported the decision to offer certain groups a «third» vaccine dose in the initial course of vaccines to help boost immunity further. This relates to those people that were on immunosuppressant treatment at the time of their initial two doses. Please consult your specialist for advice if you think you may be eligible for a “third” dose.

### **Is there anyone that should not receive the vaccine?**

There are very few people that should not receive a COVID-19 vaccine. People with long-term illnesses such as chronic respiratory disease, chronic heart disease, kidney disease, liver disease, diabetes, obesity and those lacking a functioning spleen are being actively encouraged to receive the vaccine as they are at higher risk of serious consequences of COVID-19 infection. If there is any uncertainty because of an underlying health condition, then specific advice from a specialist should be sought.

Based on MHRA advice, the only people that should definitely not receive the vaccine are those that have had a confirmed anaphylactic reaction to a previous COVID-19 vaccine, or are known to have severe allergic reactions to components of the vaccine.

### **Is the vaccine safe if I am unable to use animal products for dietary or religious reasons?**

Unlike some traditional vaccines, the Pfizer BioNTech vaccine is all completely manufactured without the use of materials, such as chicken eggs to cultivate an inactivated virus. Therefore, this vaccine is safe for you to receive if you are unable to use products linked to animals for dietary, or religious reasons.

### **I have just had a flu or another type of vaccine, when can I receive the COVID-19 vaccine?**

When the COVID-19 vaccines were originally approved in December 2020 it was recommended that if another vaccine had been given recently a minimum of seven days should be scheduled between doses. This recommendation was based on experience with other vaccines suggesting a slightly reduced immune response might be seen to one of the vaccines if given at the same time. It is now recommended that if you have recently had another vaccine it is safe to also have a COVID-19 vaccine. The only exception is a recommendation to wait for seven days after a shingles vaccine to prevent interference between the two vaccines. It is now considered safe to have flu and COVID-19 vaccines on the same day. If they are given separately it is recommended to separate by a few days to avoid confusion over which vaccine has caused any side effects.

### **Will I still have to use personal protective equipment (PPE) after I have the vaccine?**

Yes, currently the guidance remains that PPE use is maintained in the hospital.

## Further reading

If you are interested in learning more about vaccines, and the COVID-19 vaccines in particular, we recommend these useful resources:

<https://www.washingtonpost.com/health/2020/11/17/covid-vaccines-what-you-need-to-know/>

<http://sitn.hms.harvard.edu/flash/2015/rna-vaccines-a-novel-technology-to-prevent-and-treat-disease/>

<https://theconversation.com/how-mrna-vaccines-from-pfizer-and-moderna-work-why-theyre-a-breakthrough-and-why-they-need-to-be-kept-so-cold-150238>

<https://www.phgfoundation.org/briefing/rna-vaccines>

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines/how-do-vaccines-work>

<https://www.pfizer.co.uk/our-progress-developing-potential-covid-19-vaccine>

<https://www.lji.org/news-events/news/post/first-detailed-analysis-of-immune-response-to-sars-cov-2-bodes-well-for-covid-19-vaccine-development/>

[https://pfe-pfizercom-d8-prod.s3.amazonaws.com/2020-11/C4591001\\_Clinical\\_Protocol\\_Nov2020.pdf](https://pfe-pfizercom-d8-prod.s3.amazonaws.com/2020-11/C4591001_Clinical_Protocol_Nov2020.pdf)

<https://www.gov.uk/government/publications/jcvi-statement-september-2021-covid-19-booster-vaccine-programme-for-winter-2021-to-2022/jcvi-statement-regarding-a-covid-19-booster-vaccine-programme-for-winter-2021-to-2022>

<https://www.rcm.org.uk/vaccine-facts/>

<https://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/>

<https://www.gov.uk/government/publications/covid-19-vaccine-surveillance-report>

<https://www.gov.uk/government/publications/coronavirus-covid-19-vaccine-adverse-reactions/coronavirus-vaccine-summary-of-yellow-card-reporting>

