COVID-19 vaccines – FAQs for Healthcare Workers

Can you give me some information about Covid-19 vaccines?

Yes. There are three COVID-19 vaccines which have already been authorised for use in some countries. So far none have yet received WHO or European Medicines Agency authorisation but we expect an assessment on the Pfizer vaccine by the end of December and for some other candidates soon thereafter.

Once vaccines are demonstrated to be safe and efficacious, they must be approved by national regulators, manufactured to exacting standards, and distributed. WHO is working with partners around the world to help coordinate key steps in this process, including to facilitate equitable access to safe and effective COVID-19 vaccines for the billions of people who will need them.

What are the stages of vaccine development?

The general stages of the development cycle of a vaccine are:

- Exploratory stage
- Pre-clinical stage
- Clinical development
- Regulatory review and approval
- Manufacturing
- Quality control

Clinical development is a three-phase process. During Phase I, small groups of people receive the trial vaccine. In Phase II, the clinical study is expanded and vaccine is given to people who have characteristics (such as age and physical health) similar to those for whom the new vaccine is intended. In Phase III, the vaccine is given to thousands of people and tested for efficacy and safety.

Many vaccines undergo Phase IV- formal, ongoing studies after the vaccine is approved and licensed.

How are new vaccines approved in the European Union?

The regulation of vaccines falls under the scope of medicines regulation, which includes several mutually reinforcing activities all aimed at promoting and protecting public health. In the European Union, once sufficient data is available from research and clinical trials,

companies can apply to the **European Medicines Agency (EMA)** for authorisation to place their vaccine on the EU market.

The EMA then evaluates all the data and carries out a rigorous, independent scientific assessment of the candidate vaccine. Based on result of the EMA's assessment, the European Commission grants a marketing authorisation in the EU. The vaccine can then be used. Each country has its own Medicines Regulatory Authority but countries within the European Community must first wait for direction from the European Medicines Agency before approving a medicine locally.

During a public health emergency, the EMA may grant a **conditional marketing authorisation** for a vaccine. This may happen when the benefit of immediate provision outweighs the risk of having less complete data than would normally be requested for authorisation. A conditional marketing authorisation allows prompt response to a public health threat such as the COVID-19 pandemic. In these cases, the producer commits to providing further data according to an agreed timeline.

In any case, the European Commission will only grant a marketing authorisation once the European Medicines Agency's assessment shows that the vaccine is both safe and effective. Once a new vaccine is placed on the market, EU authorities will carry out continuous monitoring and evaluation of new data on the vaccine, including monthly safety reports from vaccine producers and results of further studies. The **EU safety monitoring plan for COVID-19 vaccines**[1] entails more frequent monitoring than usual as well as monitoring activities specifically tailored to COVID-19 vaccines.

Pfizer/BioNtech and Moderna have submitted applications for conditional marketing authorisation of their COVID-19 vaccines to the EMA. Applications from other companies are expected in the near future. COVID-19 vaccines developed by AstraZeneca and Janssen-Cilag are currently undergoing rolling review by the EMA.

Since the vaccines are being produced at record speed should I worry about safety?

The usual time frame for producing a vaccine is usually 10-15 years. COVID vaccines however are being produced in less than 12 months, so the question regarding safety is a

[1] The plan can be accessed here: https://www.ema.europa.eu/en/news/ema-publishes-safety-monitoring-plan-guidance-risk-management-planning-covid-19-vaccines

pertinent question. There are a number of important factors that explain why the vaccine has been produced in such a short period of time but not at the expense of safety.

These include:

- unprecedented cooperation between stake holders such as governments, private industry and NGOs to come up an effective, safe vaccine
- massive financial commitment of industry and governments to develop the vaccines
- researchers were able to build on work that had already been done. For example, techniques for using mRNA in vaccines had already been developed for cancer therapy, and a large amount of research had been carried out on other Coronaviruses
- The regulatory agencies responsible for vaccine approval have been reviewing the data from the trials on a rolling basis instead of reviewing all the data at the end
- Some companies have taken the risk of producing large amounts of their vaccine before obtaining approval, so the vaccine would be available straight away once approved

These factors have been crucial in shortening the time from the development of COVID-19 vaccines without compromising safety. There are many strict measures in place to help ensure that COVID-19 vaccines will be safe. All COVID-19 vaccines applying for marketing authorization on the EU market need to go through the usual rigorous, independent scientific assessment of the European Medicines Agency (as described in the previous question) before being approved for use.

The Pfizer/BioNTech vaccine has gone through all the usual phases of the vaccine development and evaluation process, including initial laboratory studies and Phase 1, 2 and 3 clinical trials in humans. The phase 3 trial involved over 40,000 participants across 6 countries. The trials included people at high risk for COVID-19, are were specifically designed to identify any common side effects or other safety concerns. Further monitoring and studies are ongoing.

More information about development, evaluation, approval and monitoring of COVID-19 vaccines in the EU is available at:

https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/covid-19-vaccines-development-evaluation-approval-monitoring

What types of Covid-19 vaccines are being developed and how do they work?

Scientists around the world are developing many potential vaccines for COVID-19. These vaccines are all designed to teach the body's immune system to safely recognize and block SARS-CoV-2, the virus that causes COVID-19.

Several different types of potential vaccines for COVID-19 are in development, including:

- ***Inactivated or weakened virus vaccines***, which use a form of the virus that has been inactivated or weakened so it does not cause disease, but still generates an immune response.
- ***Protein-based vaccines***, which use harmless fragments of proteins or protein shells that mimic the COVID-19 virus to safely generate an immune response.
- *Viral vector vaccines*, which use a virus that has been genetically engineered so that it cannot cause disease, but produces coronavirus proteins to safely generate an immune response.
- ***RNA and DNA vaccines***, a cutting-edge approach that uses genetically-engineered RNA or DNA to generate a protein that itself safely prompts an immune response.

The vaccines that are currently being developed all require that they be given in 2 doses.

Can you explain in more detail how mRNA vaccines work? Are they safe?

The COVID-19 vaccines developed by Pfizer/BioNTech and Moderna are mRNA vaccines.

mRNA or messenger ribonucleic acid consists of transcripts of genetic material that are used to guide protein synthesis in the cell. The mRNA in this vaccine codes for a spike protein found on the surface of the SARS-CoV-2 virus. The spike protein is involved in the process of viral attachment and entry into human cells. While the spike protein is harmless on its own, it is very effective at provoking an immune response, allowing the body to recognise the SARS-CoV-2 virus promptly if it comes across it in the future, hence preventing symptomatic COVID-19 infection.

Once the mRNA from the vaccine enters cells, it instructs them to make viral spike protein. The spike protein is recognised by the immune system as a foreign body and triggers an inflammatory reaction from the immune system. The mRNA from the vaccine is broken down by the body within a few days.

The marketing authorisation for the Pfizer/BioNTech COVID-19 vaccine represents the first time an mRNA vaccine has been placed on the market. However, the use of mRNA technology in vaccines, despite being a recent development, is not completely new. They have been studied before for flu, Zika, rabies, and cytomegalovirus (CMV). Also, mRNA technology is being used in cancer therapy to trigger the immune system to target specific cancer cells. Human trials of such cancer therapies have been carried out as early as 2011. Several different mRNA vaccines have now been tested from phase I to IIb clinical studies and have been shown to be safe and reasonably well-tolerated.

Use of mRNA technology also offers some relative advantages over other vaccine formats since it does not involve toxic chemicals or cell cultures that could potentially be contaminated with adventitious viruses. Additionally, mRNA vaccines have a short manufacturing time for mRNA which allows fewer opportunities to introduce contaminants. Theoretical risks of infection or integration of the vector into host cell DNA are not a concern for mRNA. Hence, mRNA vaccines have been considered a relatively safe vaccine format.

Suggested reading for those interested in a detailed review of mRNA vaccines: 'mRNA vaccines — a new era in vaccinology' by Pardi et al.[2]

When will Covid-19 vaccines be ready for distribution?

Within the EU all vaccines must be approved by the European Medicines Agency before they can be distributed. The European Medicines Agency meeting to evaluate the Pfizer/BioNTech vaccine marketing authorisation application has been brought forward to the 21st December. If the EMA recommends that a marketing authorisation is granted, the first doses of the vaccine are expected to be administered across the EU on the 27th, 28th and 29th of December.

Once authorised, the vaccines will be available to EU countries at the same time and under the same conditions. The EU has secured **2 billion doses** of Covid-19 vaccine for its citizens, with each country receiving a supply of vaccines according to its population.

Distribution will be staggered according to the ability of the manufacturing companies to produce the vaccines as fast as possible.

Who will get the vaccine?

As soon as the European Medicines Agency grants marketing approval for a vaccine, the manufacturing company will start distributing the vaccine to the different countries in the EU. Each country will have a priority list of who should get the vaccine first. In Malta the priority list will include:

First Group

- healthcare workers and long-term care facility workers (public and private sector)
- persons living in long-term care facilities – elderly and mental health
- persons aged 85 and over.

[2] Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5906799/pdf/nihms955599.pdf

Second Group

- All other front liners;
- persons 80-85 years of age.

Third Group

- persons with chronic illness whose state of health makes them particularly at risk-elevated risk of severe disease or death;
- persons 70-80 years of age;
- staff at schools and child-care centers

Fourth Group

- persons over 55 years of age
- rest of population

The timing of the roll out will depend on the speed of production of the vaccine.

What is the dose and administration schedule for the Pfizer/BioNTech vaccine?

A single vaccine dose is 0.3 ml (30 mcgs), given as an intramuscular injection in the arm or thigh. Two doses of COVID-19 mRNA Vaccine are required with a minimum 21-day interval between doses.

Contraindications to the Pfizer/BioNTech vaccine

Severe allergic reaction (e.g., anaphylaxis) to any component of the Pfizer-BioNTech COVID-19 vaccine is a contraindication to vaccination. While reports of allergic reactions following vaccination outside the clinical trials are further investigated, persons with a history of severe allergic reaction (e.g., anaphylaxis) to any other vaccine or injectable therapy (e.g., intramuscular, intravenous, or subcutaneous) should have a risk assessment to determine the type of reaction and certainty of information.

The Pfizer BioNTech COVID-19 mRNA Vaccine BNT162b2 contains polyethylene glycol (PEG), a known allergen commonly found in medicines and also in household goods and cosmetics. Known allergy to PEG is extremely rare but would contraindicate receipt of this vaccine.

Patients with undiagnosed PEG allergy may have a history of unexplained anaphylaxis or of anaphylaxis to multiple classes of drugs.

A history of mild allergic reaction to a vaccine or injectable therapy, such as urticaria alone without signs or symptoms of anaphylaxis, is not a contraindication or precaution to Pfizer-BioNTech COVID-19 vaccination. In addition, allergic reactions (including severe allergic reactions) not related to vaccines or injectable therapies (e.g., food, pet, venom, environmental, or latex allergies; oral medications [including the oral equivalents of injectable medications]) are not a contraindication or precaution to vaccination with Pfizer-BioNTech COVID-19 vaccine.

Vaccine recipients will be monitored for around 15 minutes after being vaccinated in case of a rare anaphylactic event following the administration of the vaccine. Appropriate medical treatment for anaphylaxis will be available at vaccination centres.

Individuals who have queries regarding the safety of vaccine regarding their medical condition should discuss with their GP or call 145 or send an email to covid-vaccine@gov.mt

Precautions and Information regarding specific sub-populations (Pfizer/BioNTech):Concomitant illness

Minor illnesses without fever or systemic symptoms are not valid reasons to postpone vaccination. If someone 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 to the adverse effects of the vaccine.

- **Previous and ongoing infection with COVID-19**

There is no evidence of any safety concerns from vaccinating individuals that have a past history of COVID-19 infection, or who have detectable levels of COVID-19 antibodies. Based on the current evidence, we do not know how long the immunity from natural infection lasts. Phase 3 trials involving 2 doses of Covid-19 vaccine have shown that

immunity tends to last longer than natural infection. Therefore all those who have been infected are advised to take the vaccine. There is no need to wait for a period of time before taking the vaccine after Covid-19 infection. However, current evidence suggests reinfection is uncommon in the 90 days after initial infection, and thus persons with documented acute infection in the preceding 90 days may defer vaccination until the end of this period, if desired.

Inadvertently vaccinating individuals who are potentially infected/ asymptomatic/ incubating COVID-19 infection is not likely to have a detrimental effect on their illness. Vaccination should be postponed in individuals with confirmed COVID-19, as this avoids confusing the differential diagnosis. 'Vaccination of individuals who may be infected or asymptomatic or incubating COVID-19 infection is unlikely to have a detrimental effect on the illness. Vaccination should be deferred in those with confirmed infection to avoid confusing the differential diagnosis. As clinical deterioration can occur up to two weeks after infection, vaccination should be deferred until clinical recovery and **at least four weeks after onset of symptoms or four weeks from the first PCR positive specimen in those who are asymptomatic.**

Having prolonged COVID-19 symptoms (long COVID) is not a contraindication to receiving the vaccine. However, if a patient is seriously debilitated, still actively being investigated, or has recently deteriorated, postponement of vaccination may be considered to avoid incorrect attribution of changes in the patient's underlying condition to the vaccine.

- **Pregnant and breast-feeding women**

As is usual in initial trials for new vaccinations/medicines, the Pfizer/BioNTech COVID-19 vaccine has not been specifically tested in pregnant and breast-feeding women. As a precaution, current available studies studied safety in adult populations of different characteristics and co-morbidities. Although the available data do not indicate any safety concern or harm to the baby, there is currently insufficient evidence to recommend this since animal reproductive toxicity studies are underway. These studies

are the first step for one to begin to understand in a clinical trial scenario the possible effect on the developing fetus.

On this point the two regulators who have issued emergency authorization for use of the Pfizer vaccine to date have diverging positions, one (FDA) permits vaccinations following the informed consent of the woman that there is insufficient trial-based safety data to support use in pregnancy, whilst the other adopted a precautionary approach (MHRA). The latter acknowledges the absence of any safety concerns, indicates a lack of sufficient evidence to recommend routine use in pregnancy.

It must be noted that this precautionary approach is a common position adopted with the licensing of medicines for use in specific populations such as pregnant women, lactating women and also children. In fact these are often termed 'therapeutic orphans' in view of frequent exclusion from studies and consequent absence of clinical trial data in such groups. In fact many older medications are still used off license or off-label since it would not have been deemed commercially viable to extend the product listing.

The current position of the Maltese authorities in relation to COVID-19 vaccination during pregnancy and lactation is that pregnant and breast-feeding women should not receive this vaccine and that women should avoid pregnancy for two months following the administration of the second dose.

- **Children aged under 16 years**

Initially the vaccine will not be licenced for use in children under 16 years of age because safety trials on this group have not yet been carried out. Currently we know that children (<16 years) comprise a small proportion of the total population who contract COVID-19 (<5%). This data tallies both locally and with European data. There are also more likely to have mild illness with uncomplicated recovery. Severe COVID-19 is uncommon and consequently hospitalization too. As a result, vaccination among children is currently not routinely recommended for children and young persons below aged 16. The vaccination of children with underlying conditions will be considered after initial roll-out when more evidence on risk and benefit will be available.

- **Bleeding disorders and anticoagulant therapy**
-
- Precautions for patients with bleeding disorders apply to all vaccines and IM medication. They should be vaccinated using a fine needle and pressure applied to the site of injection for a few minutes

The Green Book[3] offers the following further guidance:

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. Individuals on stable anticoagulation therapy, including individuals on warfarin who are up-to-date with their scheduled INR testing and whose latest INR is below the upper level of the therapeutic range, can receive intramuscular vaccination. 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 2 minutes (ACIP 2019). The individual/parent/ carer should be informed about the risk of haematoma from the injection.

- **Immunocompromised individuals and immunosuppressant therapy**

Immunocompromised persons, including individuals receiving immunosuppressant therapy, may have a diminished immune response to the vaccine. No data are available about concomitant use of immunosuppressants. Individuals with stable HIV infection on treatment were not excluded from the phase 3 trial of the Pfizer/BioNTech vaccine, but data on safety and effectiveness in this group have not been presented.

The COVID-19 chapter of the Green Book[4] advises the following regarding individuals with immunosuppression and/or HIV :

[3] Public Health England's publication on immunisation against infectious diseases
[4] Public Health England's publication on immunisation against infectious diseases

- individuals with immunosuppression and HIV (irrespective of CD4 count) should be administered the Pfizer/BioNTech vaccine in accordance with the other contraindications and precautions described above
- since there is no evidence on response in immunosuppressed individuals there is also no evidence on which to base advice on the optimal timing of vaccination. Specialists may advise their patients based on their knowledge and understanding of their immune status and likely immune response to vaccination, but should also consider the risk from COVID-19 and the patient's likelihood of exposure
- As two doses are required to make a full response in healthy individuals, a decision to defer any possible benefit from vaccination or to suspend therapy should not be taken without due consideration of the risks from COVID and from their underlying condition.
- Until further information becomes available vaccinated patients with immunosuppression should continue to follow advice to minimise potential exposure to COVID-19

No data are available on the use of COVID-19 mRNA Vaccine BNT162b2 in persons that have previously received a full or partial vaccine series with another COVID-19 vaccine.

Will there be different vaccines which are more suited for different medical conditions?

No. All the Covid-19 vaccines which are being developed have the aim of preventing serious disease caused by Covid-19 infection. The vaccine brands in development may have different mechanisms for producing antibodies against Covid-19 but they can all be given to persons suffering from various types of medical conditions.

Can persons who are in preventive quarantine (travel quarantine, contact with a known positive case) still take the vaccine?

Vaccination appointments should be deferred until the quarantine period is over. If testing negative after the quarantine period, then there should be no delay in taking the vaccine.

What are the side-effects of the Pfizer/BioNTech vaccine?

During trials (including a phase 3 trial with around 44,000 participants), the vaccine has been shown to elicit increased local and systemic adverse reactions as compared to placebo, for the most part mild to moderate and usually lasting up to a few days. The most common solicited adverse reactions were:

- injection site reactions (84.1%)
- fatigue (62.9%)
- headache (55.1%)
- muscle pain (38.3%)
- chills (31.9%)
- joint pain (23.6%)
- fever (14.2%).

The above adverse reactions reflect reactogenicity (inflammatory response to the vaccine) which commonly occurs after most vaccinations. These side-effects were generally mild to moderate, resolving without complication or injury. Vaccine recipients can be advised to use anti-pyretics and/or analgesics to control these symptoms as appropriate.

The number of trial participants reporting hypersensitivity-related adverse events (allergic reactions) was numerically higher in the vaccine group compared with the placebo group (137 [0.63%] vs. 111 [0.51%]). (Contraindication and precautions related to allergic reactions are discussed separately below.)

Lymphadenopathy is an adverse reaction that occurred significantly more frequently in the vaccine group than in the placebo group and was considered plausibly related to vaccination. This adverse event occurred uncommonly (>=1/1000 to <1/100).

Serious adverse events (SAEs) were uncommon (<1.0%) and represented medical events that occur in the general population at a similar frequency as that observed in the trial. In its review, the FDA (Food and Drug Administration in the U.S.) considered two SAEs to be plausibly related to the vaccine: lymphadenopathy (as discussed above) and a case of shoulder injury thought to be related to vaccine administration or the vaccine itself.

Otherwise, SAEs observed during the trial were not considered to be related to the vaccine when investigated.

Subgroup analyses by age, race, ethnicity, medical comorbidities, or prior SARS-CoV-2 infection did not reveal any specific safety concerns for these sub-groups. Side effects were less common in those aged over 55 than those aged 16 to 55 years.

Reporting of suspected adverse reactions

Adverse events should be reported to Medicines Authority on their online Adverse Reaction Reporting Form
http://www.medicinesauthority.gov.mt/reportingadversereactions?l=1

Does the vaccine interact with other medications?

No interaction studies have yet been performed. The Pfizer/BioNTech vaccine should not be mixed with other vaccines/products in the same syringe.

What does the vaccine contain?

Vaccine ingredient	
BNT162b2 RNA	This is the mRNA that codes for the COVID-19 virus spike protein. This is the active ingredient.
ALC-0315	These are lipids that surround the mRNA in the form of lipid nanoparticles. This protects the mRNA and helps it enter cells through microporation.
ALC-0159 (contains polyethylene glycol/macrogol (PEG))	
1,2-Distearoyl-sn-glycero-3-phosphocholine	
Cholesterol	
potassium chloride	These are the constituents of phosphate-buffered saline which helps control the pH of the vaccine
potassium dihydrogen phosphate	
sodium chloride	
disodium hydrogen phosphate dihydrate	
sucrose	Acts as a cryoprotectant to protect the lipid nanoparticles and prevent them from sticking together
water for injection	Before being injected, the vaccine is mixed with 0.9% sodium chloride solution

The vaccine is **egg-free** so may be used by those with an egg allergy.

There are **no animal products or preservatives** in the vaccine.

The vaccine is administered from vial with a synthetic rubber (bromobutyl) stopper that **does not contain latex** so is safe in those with latex allergies.

With what efficacy will COVID-19 vaccines reduce the risk of COVID-19 and its complications?

The WHO had originally set as an expectation that a COVID-19 vaccine would prevent disease or decrease its severity in at least 50% of people who are vaccinated. However, clinical trials have shown that some vaccines are registering a vaccine efficacy of 90% to 95%. This means that the vaccine will prevent serious disease and complications from Covid-19 in at least 90- 95% of cases.

<u>Efficacy of Pfizer/BioNTech vaccine:</u>

Part of the Phase 3 trial of this vaccine involved 36,621 individuals at high risk of being infected with COVID-19. They were randomly split into two equal groups to receive either the vaccine or a placebo.

Of all the participants who were still negative for COVID-19 7 days after the second dose, 162 individuals from the placebo group got COVID-19, while only 8 individuals from the vaccine group got COVID-19.

This makes the vaccine 95% efficacious at preventing symptomatic COVID-19 from 7 days after the 2nd dose in participants without evidence of SARS-CoV-2 infection before and during vaccination regimen. (The 95% credible interval for the vaccine efficacy was 90.3% to 97.6%, which means that the true efficacy is at least 90.3% with a 97.5% probability, meeting the pre-specified success criterion for the trial).

For participants with and without evidence of SARS-CoV-2 infection before and during vaccination regimen, efficacy against confirmed COVID-19 occurring at least 7 days after Dose 2 was 94.6%, with 9 and 169 cases in the vaccine and placebo groups respectively. The 95% credible interval for the vaccine efficacy was 89.9% to 97.3%,

indicating that the true vaccine efficacy is at least 89.9% with a 97.5% probability. It was similarly effective across different age groups, genders, racial/ethnic groups and in people with medical conditions that put them at greater risk of severe COVID-19.

Note that (as for all vaccines) since efficacy is not 100%, vaccination cannot provide a guarantee that an individual is protected from COVID-19.

With respect to secondary efficacy endpoints of the trial, when it comes to severe COVID-19 disease, ten participants had severe COVID-19 disease after Dose 1 (one subject who received the vaccine and nine participants who received placebo). The vaccine recipient who met criteria for severe disease did so because of oxygen saturations of 93% on room air but did not require hospitalisation or further medical care. Of the placebo recipients who met criteria for severe COVID-19 disease, 2 did not require hospitalisation. The rest required hospital treatment including one participant who required non-invasive positive pressure ventilation for bilateral pneumonia and 3 who required admission to intensive care. While the number of severe cases is too small to draw more definitive conclusions, this case split does suggest protection from severe COVID-19 disease.

Will the vaccine stop the pandemic? Can vaccinated people still transmit COVID-19?

While a vaccine will help protect individual patients and those around them, a large proportion of the population must be immunised and protected before transmission is substantially reduced. Vaccinating whole populations will take several months. Thus far we know that the vaccine is highly effective at preventing symptomatic cases of COVID-19. We do not yet have data to indicate whether the vaccine prevents asymptomatic COVID-19. It may be the case that vaccinated people can still get asymptomatic COVID-19 and pass it to others.

Hence it is crucial that the public health measures currently in place to reduce COVID-19 transmission continue to be adhered to even after the vaccine becomes available, as COVID-19 will remain a continuing concern. Effective public health

measures, such as social distancing, limiting the size of gatherings, and wearing masks, will still be needed for at least several more months, and potentially longer before these measures can start to be eased gradually. Also, in view of the fact that asymptomatic transmission from vaccinated persons has not been excluded, vaccinated persons are NOT exempt from quarantine e.g if they have close contact with a positive case.

What level of population coverage is required to achieve herd immunity?

Herd immunity is a term used to describe when sufficient people have protection—either from previous infection or vaccination—to make it unlikely for a pathogen to continue spreading within a community. As a result, herd immunity protects a community even if some people do not have individual protection themselves. The percentage of people that need to be immune to obtain herd immunity in the case of COVID-19 is still unknown. Mathematical modelling has shown it to be around 75% For other diseases the percentage of people who need to be immune to a disease to achieve herd immunity varies from 80 to 95% depending on the disease.

Does immunity from getting Covid-19 last longer than from vaccination?

The protection natural immunity gained from having been infected with COVID-19 varies from person to person. We do not yet know how long natural immunity lasts and some cases of re-infection with COVID-19 have been documented. The vaccines being developed, however, are showing a very strong immune response which may provide better and longer protection than natural immunity. More studies and more time are required before these questions may be answered. Thus far the follow-up data available has confirmed sustained vaccine efficacy for a 2-month period with no waning of protection for the Pfizer/BioNTech vaccine. monitoring will be ongoing to provide further data regarding duration of protection down the line.

Will a coronavirus vaccine need to be given annually?

When a vaccine is licensed, only information about the length of immunity for that particular period of time included in the trial is available (as mentioned above in relation to the Pfizer/BioNTech vaccine). For example, if the first people in the study were vaccinated in July 2020 and the vaccine is licensed in December 2020, we will only have information about the immune response up to 5 months after vaccination. The vaccine manufacturer will continue to monitor vaccine recipients for several months or more, so that over time, we will continue to get a better picture of the duration of immunity. With this information, we will be better able to understand whether vaccines against COVID-19 will require annual dosing like influenza.

How long before a coronavirus vaccine takes effect?

It usually takes a week or two for immunity to develop following vaccination, but the specific timeline for any coronavirus vaccine will depend to some extent on the specific type of vaccines that are licensed.

In the case of the Pfizer/BioNTech vaccine, while there is evidence of some protective effect some days after the first dose, the vaccine achieves 95% efficacy at preventing symptomatic COVID-19 from 7 days after the 2nd dose.

How will people know when to attend for vaccination?

A letter with an appointment for the vaccine will be sent to groups of people at a time so that they can take the vaccine. It is important to wait for this letter, as the vaccine will not be given to anyone without an appointment. This is done to make sure that those people who are most at risk are protected from the complications of COVID-19 infection.

Those who have received an appointment but need to reschedule it for any reason are kindly requested to inform the covid19 vaccine helpline on Tel. 145. Any healthcare professional who counsels a patient to defer or refrain from vaccination is kindly asked to remind patients to inform the **145 covid19 vaccine helpline** that they will not be attending for their vaccination. This will help to avoid wastage of vaccines. This is particularly relevant

for the Pfzer/BioNTech vaccines in view of the complex logistics related to thawing and preparation of this vaccine.

Will the vaccine be available in private practice?

The vaccine will be given free of charge and will be available from government entities only. The vaccine will not be available on the private market. Beware of any individuals or websites selling the vaccine. Vaccines being sold online or by unauthorised persons may be fraudulent and there is no way of knowing if they were kept under the required standards.

COVID-19 vaccine myths and misinformation

The volume of misinformation and disinformation that has accompanied the COVID-19 pandemic has been unprecedented, thanks in part to the new technologies and social media platforms that are available. This includes a large amount of false information being circulated by members of the anti-vaccine community in response to the development of COVID-19 vaccines. Healthcare professionals have an important role to play in managing this infodemic, as they are often looked up to by their community as a source of reliable information. We are including below some of the myths that have been circulating about the vaccine below along with the information that debunks them. For more information about infodemic management and guidance on risk communication with the public, visit:

https://www.who.int/teams/risk-communication

Vaccine myth: The m-RNA Covid-19 vaccine will alter the body's genetic make-up

No. The vaccine is made up of lipid mRNA nanoparticles. These do not enter the host's cell nucleus and so will not change the host's genetic makeup. These nanoparticles are destroyed once a level of immunity is produced.

Vaccine myth: Covid-19 vaccines are made from foetal cells

The vaccines that have reached Phase 3 trials were not created with and do not require the use of foetal cell cultures in the production process.

Vaccine myth: More people will die as a result of a negative side effect to the COVID-19 vaccine than would die from the virus.

Fact: A claim circulating on social media is that the COVID-19 mortality rate is 1%–2% and that people should not be vaccinated against a virus with a high survival rate. However, a 1% mortality rate is 10 times more lethal than the seasonal flu. In addition, the mortality rate can vary widely based on age, sex and underlying health conditions.

In contrast, clinical trials of COVID-19 vaccines have shown only short-term mild or moderate vaccine reactions that resolve without complication or injury.

While some people who receive the vaccine may develop symptoms as their immune system responds, this is common when receiving any vaccine, and these symptoms are not considered serious or life-threatening. And you cannot become infected with COVID-19 from COVID-19 vaccines. These are inactivated vaccines, not live-virus vaccines.

It's important to recognize that getting vaccinated for COVID-19 is not just about survival from COVID-19. It's about preventing spread of the virus to others and preventing infection that can lead to long-term negative health effects.

While no vaccine is 100% effective, getting vaccinated is far better than not getting vaccinated. The benefits outweigh the risks in healthy people.

Vaccine Myth: COVID-19 vaccines were developed to control the population through microchip tracking or "nanotransducers" in the human brain.

There is no vaccine microchip, and the vaccine will not track people or gather personal information into a database.

This myth started after comments made by Bill Gates from the Bill & Melinda Gates Foundation about a digital certificate of vaccine records. The technology he was referencing is not a microchip, has not been implemented in any manner and is not tied to the development, testing or distribution of COVID-19 vaccines.

Vaccine Myth: COVID-19 vaccines cause infertility or miscarriage.

No, COVID-19 vaccines have not been linked to infertility or miscarriage.

A sophisticated disinformation campaign has been circulating online, claiming that antibodies to the spike protein of COVID-19 produced from these vaccines will bind to placental proteins and prevent pregnancy. This disinformation is thought to originate from internet postings by a former scientist known to hold anti-vaccine views.

These postings are not scientifically plausible, as COVID-19 infection has not been linked to infertility. Also, no other viral infection or vaccination-inducing immunity by similar mechanisms has been shown to cause infertility. Antibodies to the spike protein have not been linked to infertility after COVID-19 infection. There is no scientific reason to believe this will change after vaccination for COVID-19. While there are no formal studies, the best evidence comes from women who got sick with COVID-19 while pregnant. While data clearly indicate pregnant women are at higher risk of hospitalization due to COVID-19 infection, there is no evidence of increased miscarriage rates.

During natural infection, the immune system generates the same antibodies to the spike protein that COVID-19 vaccines would. Thus, if COVID-19 affected fertility, there already would be an increase in miscarriage rates in women infected with COVID-19. This has not happened.

Vaccine Myth: COVID-19 vaccines must be stored at extremely low temperatures because of preservatives in the vaccines**.**

Pfizer/BioNTech and Moderna have reported that their vaccines contain no preservatives.

Different vaccines have different storage requirements. For instance, the Pfizer/BioNTech vaccine must be stored at minus 94 degrees Fahrenheit (minus 70 degrees Celsius), while Moderna has said that its vaccine needs to be stored at minus 4 degrees Fahrenheit (minus 20 degrees Celsius). Both of these vaccines are mRNA vaccines. mRNA is fragile and can

break down easily. Storing mRNA vaccines, like these COVID-19 vaccines, in an ultracold environment keeps them stable and safe.

Reassure anyone that voices concerns about these temperatures that vaccines are thawed before injection.

For further information or queries:

A Covid 19 vaccine helpline 145 has been set up as well as an email address covid-vaccine@gov.mt

This document will be regularly updated as new evidence emerges.

Acknowledgement

The input from members of the Advisory Committee on Immunization Policy is gratefully acknowledged

Bibliography

CDC - Centers for Disease Control and Prevention. (2014). Vaccine Development and Approval Process. Retrieved from https://www.cdc.gov/vaccines/basics/test-approve.html

CDC - Centers for Disease Control and Prevention. (2020). Understanding mRNA COVID vaccines. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/mrna.html

Cohn, A., & Mbaeyi, S. (2020). *What Clinicians Need to Know About the Pfizer-BioNTech COVID-19 Vaccine*.

European Commission. (2020a). How are vaccines developed, authorised and put on the market? Retrieved December 17, 2020, from https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/safe-covid-19-vaccines-europeans/how-are-vaccines-developed-authorised-and-put-market_en

European Commission. (2020b). Social Media Toolkit for Healthcare Professionals. https://doi.org/10.2875/893280

European Medicines Agency. (2020a). COVID-19: Latest Updates. Retrieved from https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/covid-19-latest-updates

European Medicines Agency. (2020b). COVID-19 vaccines: development, evaluation, approval and monitoring. Retrieved from https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/covid-19-vaccines-development-evaluation-approval-monitoring

European Medicines Agency. (2020c). EMA receives application for conditional marketing authorisation of COVID-19 mRNA vaccine BNT162b2.

European Medicines Agency. (2020d). Update on assessment of the BioNTech and Pfizer BNT162b2 vaccine marketing authorisation application. Retrieved from https://www.ema.europa.eu/en/news/update-assessment-biontech-pfizer-bnt162b2-vaccine-marketing-authorisation-application

Hervé, C., Laupèze, B., Giudice, G. Del, Didierlaurent, A. M., & Silva, F. T. Da. (2019). The how ' s and what ' s of vaccine reactogenicity. *Npj Vaccines*, (February). https://doi.org/10.1038/s41541-019-0132-6

May, L. (2020). Administration of COVID-19 vaccine in the UK. Retrieved from https://www.chemistanddruggist.co.uk/cpd-article/administration-covid-19-vaccine-uk

Mayo Clinic Health System. (2020). COVID-19 Vaccine Myths Debunked. Retrieved from https://www.mayoclinichealthsystem.org/hometown-health/featured-topic/covid-19-vaccine-myths-debunked?fbclid=IwAR3FJw8HRRLqEAIsrJAd1hibXJKl7h09VDSMq5Y3ccajQ1O9Alu47-hfWkc

Medicines & Healthcare products Regulatory Agency. (2020a). COVID-19 mRNA Vaccine BNT162b2 Information for UK healthcare professionals.

Medicines & Healthcare products Regulatory Agency. (2020b). COVID-19 mRNA Vaccine BNT162b2 Information for UK recipients.

Pardi, N., Hogan, M. J., Porter, F. W., Weissman, D., & Carolina, N. (2018). mRNA vaccines — a new era in vaccinology. *Nat Rev Drug Discov*, *17*(4), 261–279. https://doi.org/10.1038/nrd.2017.243.mRNA

Pfizer/BioNTech. (2020). *Vaccines and Related Biological Products Advisory Committee Meeting FDA Briefing Document Pfizer-BioNTech COVID-19 Vaccine*.

Public Health England. (2020a). Chapter 14a - COVID-19 - SARS-CoV-2. In *Immunisation against infectious diseases (The Green Book)*.

Public Health England. (2020b). COVID-19 vaccination programme - Information for healthcare practitioners, (December), 1–32.

Regalado, A. (2020). What are the ingredients of Pfizer's covid-19 vaccine?

https://www.statnews.com/2020/12/17/calculating-our-way-to-herd-immunity/

U.S. Food and Drug Administration. (2020). Pfizer-BioNTech COVID-19 Vaccine EUA Fact Sheet for Healthcare Providers, 1–29.

Whiting, A. (2020). Five things you need to know about: mRNA vaccine safety.

World Health Organization. (2003). *Effective medicines regulation : ensuring safety , efficacy and quality*.

World Health Organization. (2020). Coronavirus disease (COVID-19): Herd immunity, lockdowns and COVID-19. Retrieved from https://www.who.int/news-room/q-a-detail/herd-immunity-lockdowns-and-covid-19