

To vaccinate or not to vaccinate against corona: some considerations

The first vaccinations against infection with the SARS-CoV-2 virus have been set. Although there is still a lot of uncertainty about the vaccines, especially the long-term side effects, everyone aged 18 and over will receive an invitation for vaccination at some point. So despite all the questions that are still alive, sooner or later you will have to make a choice. Do you want to get vaccinated or not? Do you want to do it now or perhaps later? Are you doing it for the health of yourself or others? Or because you fear you will have to give up freedoms otherwise? As your general practitioner, I feel called to provide you with additional information on what is and is not yet known about the effectiveness and safety of the corona vaccines available in the Netherlands. I hope this will help you come to an informed decision yourself. After all, control over your health ultimately lies with you.

The government is promoting the vaccination campaign, presenting it as an important means of getting rid of imposed measures and restrictions. It is therefore obvious that possible benefits are mainly emphasised. Naturally, any disadvantages or risks are then discussed less often. Therefore, to complement this coverage, here is an overview of the relevant information currently available.

What is the difference between the various vaccines?

A **classical vaccine** (such as the flu shot) contains the entire (weakened or inactivated) virus or protein particles thereof. These foreign proteins trigger an immediate immune system response, without the body first having to build these proteins itself. The reaction of the immune system most closely resembles that following a natural infection. Examples of these classical vaccines based on inactivated viruses are: *Valneva*, *Sinopharm* and *Sinovac*. These are not yet authorised in the EU, but the WHO has already recommended *Sinopharm*. The United Kingdom has already placed a pre-order for *Valneva*'s vaccine.

A **vector vaccine** makes use of another, harmless virus, which is used as a means of transport and is basically only a tool. The actual active substance is introduced into the human cell through this vector virus. The word vector vaccine says nothing about the technique to induce the intended immune response. Examples of vector vaccines against corona include *AstraZeneca* and *Janssen/Johnson & Johnson*, both of which introduce genetic information (DNA) of the SARS-CoV-2 virus into the human cell by means of a transport virus (a vector).

DNA vaccines (*AstraZeneca*, *Janssen/Johnson & Johnson*)

DNA is the genetic code located in every cell nucleus. Based on the information stored in it, RNA is produced in the cell. As described above, our RNA is responsible for making various proteins necessary for life. The vector vaccines mentioned above are also DNA vaccines. A piece of DNA from the coronavirus is added to the vector (the means of transport) through genetic manipulation. In the human cell, RNA is made from this, which produces a protein particle of the coronavirus. The body recognises it as foreign, producing antibodies.

mRNA vaccines (*Moderna*, *BionTech/Pfizer*)

mRNA is a genetic code from which the cell can read which type of protein it should produce. Provided with a layer of protective fat (so-called nano-lipids), the genetic code of a piece of virus protein is injected into the human muscle cell. This involves the information for the production of the so-called spike protein, which protrudes from the surface of the virus. Once the body cell has

produced this protein, the immune system recognises it as foreign to the body and responds by producing antibodies. This allows the body to defend itself against the coronavirus.

Are the vaccines effective?

According to the manufacturers, the vaccines have effectiveness rates ranging from 70 to 95 per cent. These percentages sound promising. But to understand what this indicates, it must first be clear what is meant by these numbers. Is it the prevention of mild sore throats or colds caused by the coronavirus? Indeed, this is what the manufacturers of these vaccines have measured, scoring them with high *effectiveness* or efficacy.

In contrast, if you understand *effectiveness to mean* preventing people from being hospitalised or even dying, the effect is much smaller. However, the manufacturers did not investigate whether the vaccines could prevent hospitalisations and deaths.¹² For that, the study population was too small and the duration of the study too short. The vaccine did indeed prevent corona infections, but these were mainly mild cases. In the studies, the concept of *effectiveness* (also called *relative risk reduction*) is based on the number of corona infections confirmed in the laboratory. Here, the risk in the vaccinated group is compared with that of the control group by calculating the ratio between them. The *absolute risk reduction*, on the other hand, does not look at the ratio, but at the difference in risk between the two groups. The numbers are then not divided by each other but subtracted from each other. A typical participant in the vaccination group had roughly 1% less chance of becoming infected with corona. This formula for *absolute risk reduction* is used to calculate how many people need to be vaccinated to prevent one infection (*number needed to vaccinate*).³⁴ Based on these numbers, it appears that to prevent one infection with the virus, 217 people should be vaccinated with the AstraZeneca vaccine, 142 with the Pfizer vaccine and 88 with the Moderna vaccine.⁵ What exactly is the difference between effectiveness (relative risk reduction) and absolute risk reduction? To illustrate: Suppose in a group of 100 people, 2 are sick. In another group, only 1 out of 100 is sick. It is correct to claim that one group has 50% fewer sick people (one person instead of two). However, taken as a whole, the difference in the number of sick between the two groups is only 1%. The first mentioned percentage of 50% relies on the *relative risk reduction* (also called effectiveness), while the percentage of 1% calculated afterwards refers to the *absolute risk reduction*.

Although US Food and Drug Administration (FDA) guidelines state that it is important for good decision-making to include not only the relative risks but also the absolute risks, this was not done in the reporting of the vaccine effect studies.⁶

- It is not yet known how long any protection from the vaccine lasts (the manufacturers guarantee 3 months, probably longer).
- The risk that a vaccinated person can still transmit the virus to others is at least halved, according to new studies.⁷
- It is unclear whether current vaccinations provide protection against all already emerged and future mutations of the virus. BionTech is already working on modifications for a "refresher vaccination".⁸ The EU recently placed an order for 1.8 billion doses, deliveries of which will run until 2023.
- The question is whether vaccination is necessary if you have already had an infection with the coronavirus. After infection, antibodies generally remain present for at least 6 months.⁹ But even if *antibodies are* no longer present in our blood, defence is much more than just the presence of circulating antibodies.¹⁰ Our immune system has a long-term memory function, which can still recognise a (related) virus after more than 15 years.¹¹ This so-called *cellular immunity* triggers the production of antibodies upon renewed contact with a variant virus. In addition, activation of immune cells, which defend the body against a new infection, then also takes place. The response of these cells to a natural infection is more extensive than that

following vaccination. This is because they recognise not only the spike protein, but also other structures of the coronavirus.¹² Researchers also found that in over a third of people who had not yet come into contact with the SARS-CoV-2 virus, a defence response from these cells was already detectable.¹³¹⁴ This relies on contact with related coronaviruses in past colds.

- It is known that older people generally build up less immunity after vaccination than younger people. This means that vaccinating the elderly is less effective than vaccinating young people, even though the elderly can get very sick from the virus. Younger people, in whom the vaccination triggers a stronger immune response, generally have much less to fear from the virus.

Are the vaccines safe?

Official bodies in Europe have *provisionally approved* the vaccines. However, this is not yet a guarantee that the vaccines are also safe. This is because this approval was obtained through an extremely accelerated authorisation process. Normally, there is 8-12 years of research before a new vaccine is registered. With extensive and lengthy experience, all pros and cons have then been clearly identified. Unfortunately, this is not the case for any current corona vaccine. These vaccines are still in a research phase, which will not be completed for several years.

Reliable conclusions about the efficacy and safety of vaccines can only be drawn *after* very large groups of people have been vaccinated and observed for long periods of time. You should therefore realise that anyone who gets vaccinated and registered is more or less automatically part of this research group.

But here's something more important: the current corona vaccines in the Netherlands rely on completely different principles and methods than the vaccines we are familiar with. BionTech/Pfizer and Moderna's vaccines contain messenger RNA encased in nanolipids, AstraZeneca and Janssen's vaccines use a vector virus to transport DNA into the cell. Despite many years of research, these techniques have so far failed to bring a useful vaccine for other infectious diseases to the market. In fact, Moderna and BionTech have never before developed a preventive vaccine. Since it is unclear what the long-term effects will be, *no one* can make reliable statements about the vaccines' safety.

No research has been done into what effect the vaccines have in the very elderly, in people who are taking anti-rejection drugs or have an immune system disorder. Nor has the effect of vaccinating people who have already had a corona infection been investigated (these were excluded from the study). Virtually nothing is known about any harmful effects on unborn children. There is no experience with this in humans and trials in animals have not been done or have not been completed.

In experiments on laboratory animals vaccinated against the related SARS-CoV-1 virus, an overreaction of the immune system occurred when the virus was (re)infected, resulting in organ damage.¹⁵

Common direct side effects

- Biontech/Pfizer (Comirnaty): pain at injection site (75%), headache (39%), fatigue (37%), muscle pain (25%), fever (8%)
- Moderna: pain at injection site (92%), fatigue (70%), headache (65%), muscle pain (62%), aching joints (46%), chills (45%), nausea and vomiting (23%) and swollen glands (20%)
- AstraZeneca (Vaxzevria): pain at the puncture site (54%), headache (53%), fatigue (53%), muscle aches and feeling sick (44%), fever (34%), chills (32%), aching joints (26%), nausea

(22%). Meanwhile, this vaccine is also known for cases of thrombosis (vessel occlusion due to blood clots) and thrombocytopenia (too few platelets, which are necessary for proper blood clotting). This side effect occurred particularly in women under 60 years of age. The combination of thrombosis and thrombocytopenia occurred "very rarely" (<0.01%), the frequency of thrombocytopenia "frequently" (1-10%).¹⁶

Most of the listed side effects usually pass after a few days. However, it is also possible that serious side effects may not occur until later, which are rarer and therefore less likely to be noticed. You only find this out when very many people have been vaccinated and enough time has passed. Severe and life-threatening allergic reactions can occur in some people. Experience shows that in very frail elderly people with underlying suffering or a short life expectancy, common side effects can also be much more severe.

Are the vaccines necessary?

The higher your age and the number of chronic conditions you have, the more likely you are to develop severe disease when infected with the virus. Those who are older are therefore significantly more likely to die from corona. Those who are young are generally at low risk. However, the chance of dying from corona turns out to be much lower than initially thought and approaches the mortality rate from flu. According to WHO figures, 1 in 500 infected people do not survive corona infection (*infection fatality rate* 0.20%).¹⁷ By comparison, in a normal flu season, this figure is about 0.10%; during the severe flu wave in the 2017/2018 season, the mortality rate was 0.15%. The RIVM reports that after infection with coronavirus, about 98% of people are "little sick to virtually no symptoms".¹⁸ Between 1 and 1.5% of infected people require hospitalisation. About 0.25% of cases require admission to the ICU.

Even previously healthy individuals with mild symptoms of corona may maintain unpleasant symptoms for an extended period. Overall, this affects about 10% of patients over a period of several weeks to months. A study in the UK found that most patients recovered within 12 days. About 15% of patients kept symptoms for at least 4 weeks, around 5% had symptoms for at least 8 weeks, while around 2% reported discomfort even after 12 weeks. The most commonly mentioned symptoms were rapid fatigue, shortness of breath on exertion, increased body temperature, palpitations, chest pain, cough, headache, gastrointestinal disturbances, reduction in mental performance and muscle aches.¹⁹

The cause of these persistent symptoms has not yet been definitively determined. An inflammatory reaction caused by the virus or an immune response to the infection is suspected. The University of Bristol reports that 75% of patients who had been treated in hospital still had symptoms after three months. However, there was usually significant improvement and no damage to the lungs was later found.²⁰

All these symptoms are also known from other viral infections, especially after the flu. Such symptoms are summarised under the so-called *postviral syndrome*. So the symptoms that now appear as symptoms after corona infection are not unusual and were to be expected. For the vast majority of the population, however, corona represents a relatively mild and short-term infectious disease.

Is the vaccination mandatory?

This is an important question. The government has always said that vaccination will not be made compulsory. Remember that Article 11 of the Dutch constitution guarantees the inviolability of your body. Everyone has the right to decide for themselves what happens to their bodies. Yet many people experience pressure on them to get vaccinated. With plans for a digital European vaccination passport, it looks like unvaccinated people will indeed face restrictions. As an employee, you may also come under pressure from your employer or colleagues. If there are negative consequences for you if you do not want to be vaccinated, there is no longer true voluntarism. We will never vaccinate you against your will and will support you in your free choice.

What decision to make?

Deciding what is best for you cannot be easy. For an informed decision, not only does the available information around corona and available vaccines play a role, but also your personal situation. In the media, vaccination is often presented as the solution to the epidemic. However, you should not lose sight of the fact that your natural defences play a decisive role in whether or not you get sick. Promoting a healthy lifestyle can have a big impact on your risk of getting sick from corona. Think about sufficient exercise (preferably outdoors in nature), healthy diet and preventing or addressing obesity. You would also do well to ensure adequate intake of the minerals zinc, selenium and vitamins C and D3.

In summary, you could factor into your consideration:

Those who are older and/or have more risk factors are more likely to become seriously ill from corona and die from it. Those who are young are at very little risk. Long-term side effects may not weigh as heavily on an older person as on a younger one.

There are some people who want to get the vaccine as soon as possible and take the uncertainties about the effect and safety for granted, while others refrain from vaccination for the time being for this reason. Of course, you can ask your GP to think with you. Our team believes it is important that you can make an independent choice and that it is respected, regardless of how your decision turns out. Ultimately, you must decide for yourself about your body and your health.

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This information is based on the current information known to us and is intended to support you in making an autonomous choice.

¹ <https://www.bmj.com/content/371/bmj.m4037>

² <https://blogs.bmj.com/bmj/2021/01/04/peter-doshi-pfizer-and-modernas-95-effective-vaccines-we-need-more-details-and-the-raw-data/>

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- ³ <https://www.bmj.com/content/371/bmj.m4471/rr-0>
- ⁴ <https://www.bmj.com/content/371/bmj.m4347/rr-4>
- ⁵ [https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247\(21\)00069-0/fulltext](https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(21)00069-0/fulltext)
- ⁶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7996517/>
- ⁷ <https://www.gov.uk/government/news/one-dose-of-covid-19-vaccine-can-cut-household-transmission-by-up-to-half>
- ⁸ <https://www.aerzteblatt.de/nachrichten/123033/Pfizer-Chef-Wahrscheinlich-dritte-und-jaehrliche-Impfdosis-notwendig>
- ⁹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7832116/>
- ¹⁰ <https://immunology.sciencemag.org/content/5/54/eabf8891>
- ¹¹ <https://www.nature.com/articles/s41586-020-2550-z>
- ¹² <https://www.sciencedirect.com/science/article/abs/pii/S0092867420306103>
- ¹³ <https://www.nature.com/articles/s41586-020-2598-9>
- ¹⁴ <https://science.sciencemag.org/content/370/6512/89>
- ¹⁵ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0035421>
- ¹⁶ Important risk information: VAXZEVRIA (formerly COVID-19 Vaccine AstraZeneca): Relationship between the vaccine and the occurrence of thrombosis combined with thrombocytopenia
- ¹⁷ <https://www.who.int/bulletin/volumes/99/1/20-265892/en/>
- ¹⁸ <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdslijn/documenten/vergaderstukken/2021/03/21/catshuisstukken-21-maart-2021>
- ¹⁹ <https://www.nature.com/articles/s41591-021-01292-y>
- ²⁰ <https://www.miragenews.com/three-quarters-of-patients-report-long-term-effects-of-coronavirus/>