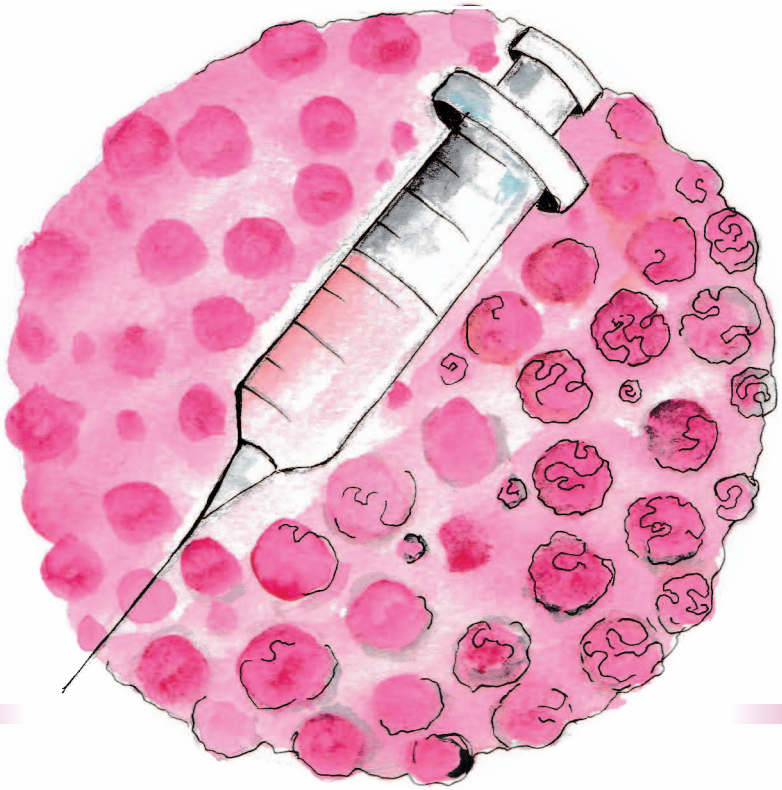
Everything you need to know about the HPV vaccine

Most HPV-associated tumours can be prevented by vaccination!



Many vaccines have been developed around the world to help us survive diseases.

Among these, the HPV vaccine is unique because it is the only vaccine that may help avoid the development of certain cancers.

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Contents

What is HPV?

HPV/human papillomavirus,
is the most common sexually transmitted infection.
More than 200 types have been identified,
and we can divide these into high- or low-risk types.

Condoms are not 100% effective in preventing HPV.

The **low-risk HPV types** are non-oncogenic but can cause some inconvenient symptoms such as warts on the skin, including external genitals.

High-risk HPV types may cause infection in the epithelial cells of the genitals and in the oropharyngeal and anogenital regions, of which cancerous and precancerous status may develop in the process of time. **(1)**

It is very important to note that once you are infected with HPV, you do not gain a permanent immunity like you can for other viruses. Instead, the infection can reactivate again…and again, even several times.

Almost all of us catch the infection at least once in our lifetime without recognising it because in more than 90% of cases our body recovers from the virus.

But in the remaining 10% of cases, HPV can cause persistent infection and may progress to serious illness, like cancer.

HPV is responsible for almost 100% of cervical cancer cases—the fourth most frequent cancer among women—and for 5% of all cancerous diseases worldwide.

This means about 570,000 women and 60,000 men develop HPV-related cancer yearly. **(1)**

These are serious numbers, especially considering that we now can prevent it from happening at all—through vaccines against HPV that are suitable for both women and men.

How does the HPV vaccine work?

A vaccine is a biological preparation that provides active acquired immunity to particular diseases.

Most of the vaccines are **prophylactic**; these are meant to prevent diseases. Most vaccines are prophylactic; these are meant to prevent diseases. You get these before you catch the virus. But it's important to note that HPV vaccines can be administered to a person regardless of the HPV positivity status.

The rest are **therapeutic** vaccines, which are used to treat a disease in the early stages. You get these after you catch a virus.

Prophylactic vaccines are available against HPV. The development of some therapeutic vaccines has also been in progress for years, and, once developed, these will lead to further breakthroughs.

A vaccine teaches our immune systems to react to the virus. A vaccinated person's body can produce antibodies quickly and effectively when it is exposed to the real virus. When our bodies can produce the right immune response, HPV will not gain a foothold in the organism and will not be able to cause lesions.

And, importantly, once our body defeats the virus through vaccination, it means we can't infect others.

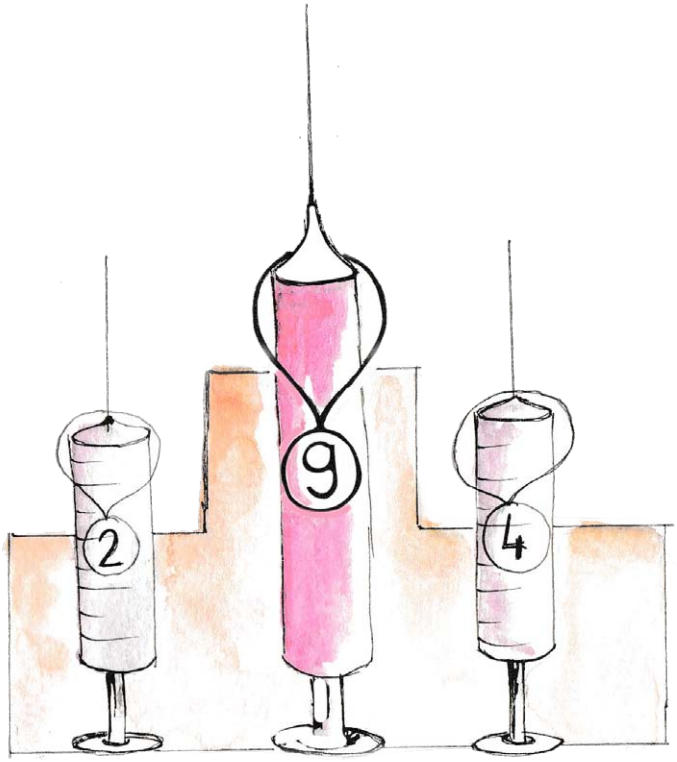
The immune system of a person who is not vaccinated may not be able to defend itself against the virus. Without vaccination, there is a higher risk that HPV will attack and bring long-lasting consequences to your body.

The vaccine does not contain active virus, nor does it have the DNA of the virus. It only contains the major capsid protein of HPV, which is non-infectious and non-oncogenic.

You can think of it like a wardrobe full of clothes. The capsid protein is the wardrobe that contains the clothes. The clothes are the genome, the DNA that causes infection. Because the vaccine contains only the capsid protein, you are getting only the empty wardrobe and not the infectious clothes.

Currently, there are three types of HPV vaccine distributed.

- The 2-valent vaccine protects against HPV 16 and 18, which are responsible for 70% of cervical cancers.
- The 4-valent vaccine grants immunity to HPV 16 and 18 as well as to two low-risk HPV-types, 6 and 11, that are responsible for 90% of all genital warts.
- The 9-valent vaccine gives immunity against 7 high-risk and 2 low-risk types, which are responsible for the development of several genital warts and the majority of HPV-associated cancers.



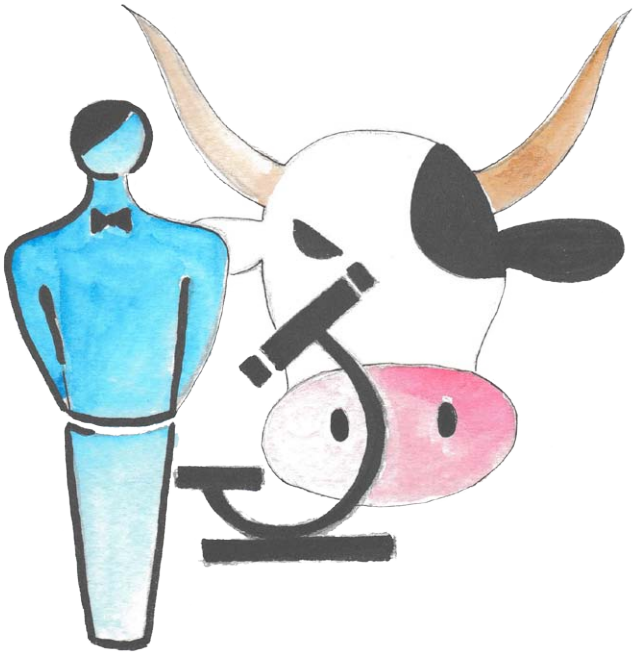
What is the HPV vaccine not able to do?

The vaccine is for prevention. It cannot heal an existing HPV infection or cancer or make them disappear. It cannot protect against sexually transmitted diseases.

If you already have an existing infection, it is still worth getting the vaccine. It won't cure the current infection but can protect you against recurrence in the future and against other HPV types you are not infected with at that moment. Without a vaccine, you can be infected and reinfected with HPV several times.

HPV vaccines are the most effective for persistent HPV infections in people who have never had the virus, if it is administered at an appropriate age. However, it's important to mention that—similar to other vaccines—the HPV vaccine doesn't provide 100% protection against cancer. Even 9-valent vaccines prevent 90% of HPV related cancers.

A little vaccine history



Infectious diseases have been present since the beginning of human history. We had to struggle through a lot of epidemics through the centuries, like the bubonic plague and smallpox.

Since the 18th century, scientists have studied developing our natural immunity with the ability to protect against diseases.

The development of the first vaccine can be linked to an English doctor, Edward Jenner. In the last years of the 18th century, he performed research that proved a human artificially infected with cowpox would not get smallpox.

After some of his colleagues had determined that milkmaids had become immune to smallpox after being infected with cowpox, Dr. Jenner injected the pus of a septic adult into a wound on a healthy child's arm.

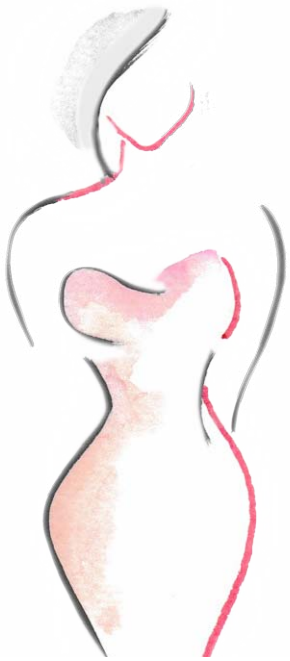
The child recovered from cowpox, and later proved to resist smallpox infection. Dr. Jenner repeated the experiment with several people, including his own son, and then he concluded that this method provides immunity against smallpox without any risk.

The method is called 'vaccination' from the Latin word for cows (vacca). **(2) (3) (4)**

Why is vaccination recommended?

The 9-valent vaccine provides high protection from the development of HPV-related cancers. It provides 85% protection against vaginal cancer and 90% protection against cervical and vulvar cancer and cancers of the anogenital region. In addition, it prevents the development of genital warts with 90% efficiency. **(5)**

Importantly, 99% of cervical cancers are related to HPV. This means that, if at least 80% of women are vaccinated and men are also enrolled in vaccination programmes, we have a chance to eliminate the disease globally.

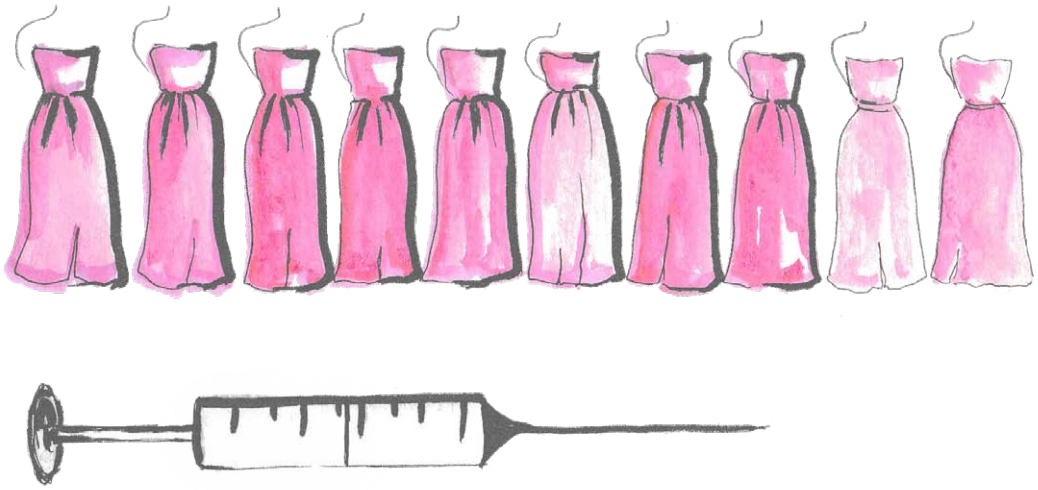


Why is the HPV vaccine recommended for women?

HPV is responsible for nearly all cervical cancers. It frequently causes genital warts and cancer of the genitals and can also rarely cause cancers of the oropharynx. 70% of vulvar cancers and 75% of vaginal cancers can be linked to HPV. **(6)**

The two pillars of prevention against HPV are vaccination and regular gynaecological screening.

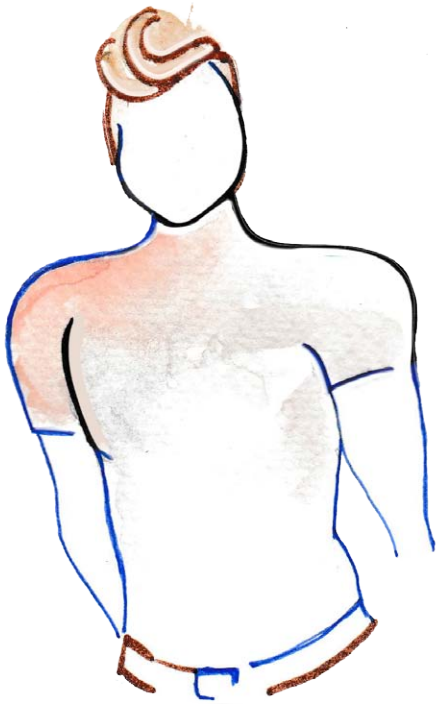
These methods of prevention stop the virus from taking up residence in the body and reduce the chances of developing related malignancies and other diseases.



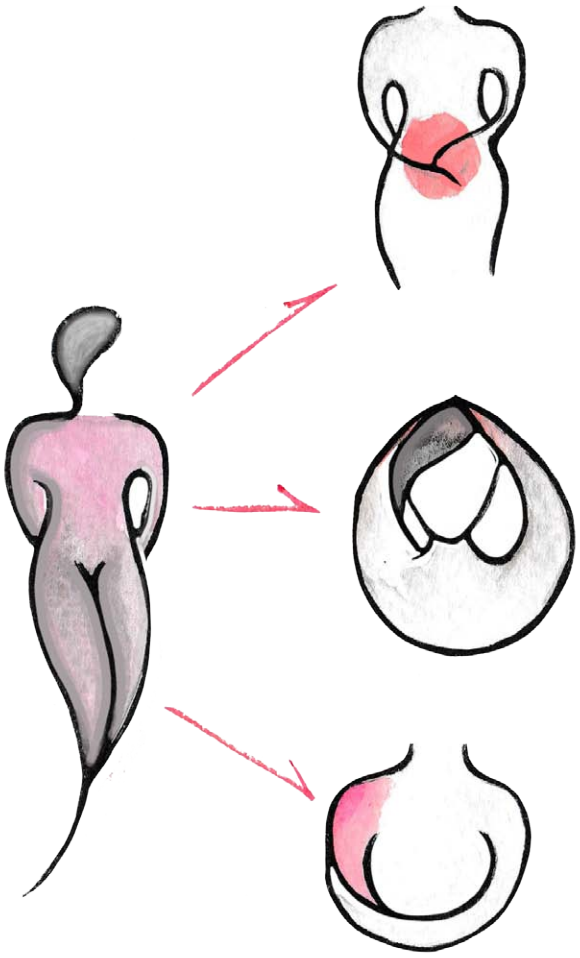
Why is vaccination recommended for men?

HPV can cause genital warts for men too. Unfortunately, the virus doesn't stop there. **(7)** It can trigger penile, anal, and oropharyngeal cancers.

Having no HPV screening method for men makes the situation harder (in the future, some male screening programmes such as yearly dental screening and proctological check-ups may be implemented but are not currently recommended). Therefore, the best we can do to prevent HPV-associated cancers (and genital warts, depending on the vaccine type) is to vaccinate.



What are the possible side effects of the vaccine?



Both clinical trials and real-life data from different countries show that HPV vaccines are well-tolerated. This means that people who get the vaccine are unlikely to get any serious side effects. The WHO's latest report underscores that HPV vaccines are extremely safe.

Mild inconveniences like a swelling in the arm where the shot was given, itching, muscle or joint pain, redness, fever, headache, tiredness, dizziness, nausea, or fainting (especially among adolescents) can occur.

Serious side effects happen only very rarely. **(8) (9) (10)**

More than 390 million people have been inoculated worldwide with the HPV vaccine.

Who should not get the HPV vaccine?

- People who have experienced an allergic reaction to any component of the HPV vaccine cannot take it.
- Taking further doses of the vaccine cannot be continued if a person experiences oversensitivity to the previous dose.
- Vaccination should be delayed if the person has a fever or any other infection, for example, a respiratory tract infection.

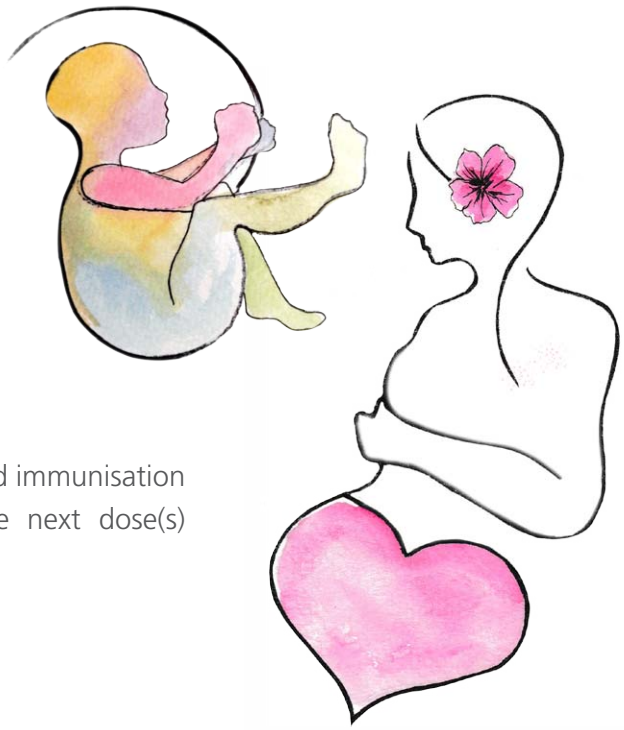
Vaccination schedule

Children who are older than 9 can get the vaccine; the best time for it is at about 11–12, but there is no upper age limit. It is recommended at such young ages so it can prepare the immune system to defend against HPV before a person is exposed to HPV. The earlier the vaccine is administered, the stronger the immune response.

Two doses of HPV vaccine are needed, ideally both before or at the age of 15. The second dose of the vaccine should be given 6 to 12 months after the first dose.

For people older than 15, three doses should be taken. The second dose comes 2 months after the first and the third 6 months after that. All doses should take place within one year. In special circumstances (like during the COVID-19 pandemic) the second and third doses can be delayed, according to a doctor's recommendation.

Vaccination during pregnancy



We can be infected with human papillomavirus at any point in our lives, including during pregnancy.

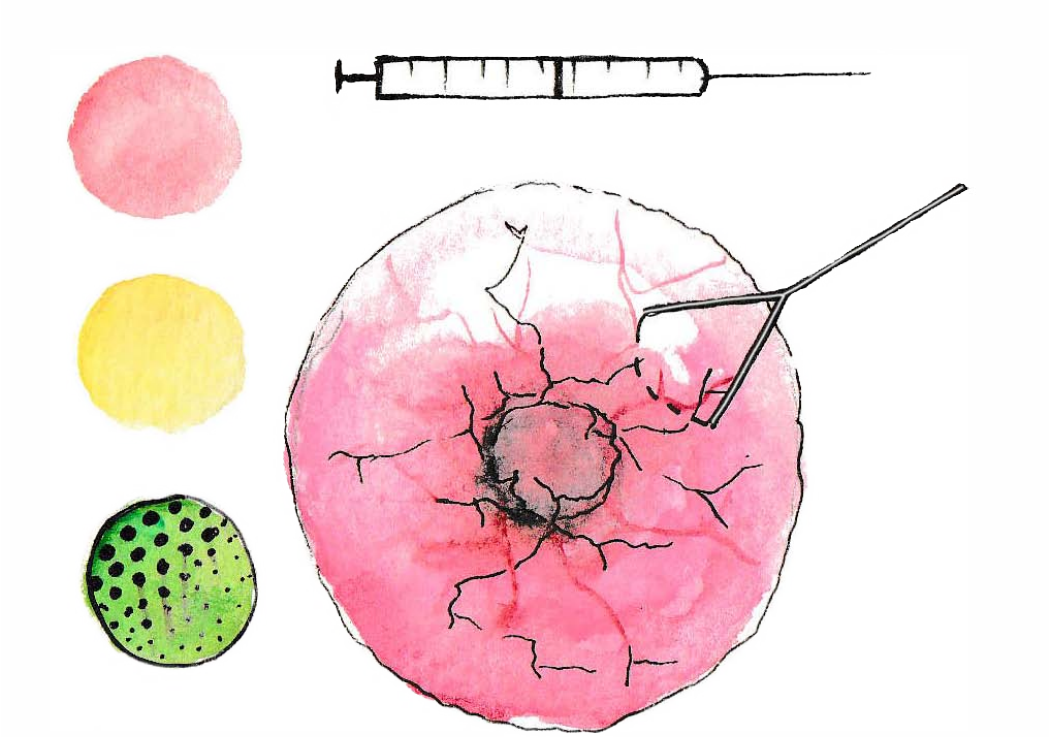
HPV infection developed during pregnancy doesn't pose a threat to the embryo, and so a termination is not necessary.

The HPV vaccine is recommended before pregnancy, but it is not a cause for termination if a woman becomes pregnant between vaccine doses. The vaccine has not been linked to embryo lesions or evolutionary disorders, nor does it increase the risk of miscarriage.

At the same time, it is expedient and recommended to avoid immunisation during pregnancy. If vaccination doses have begun, the next dose(s) should be delayed until the end of the pregnancy.

HPV vaccine and conisation

The vaccine can be taken before or after conisation. It won't have any effect on the existing infection, but it might provide protection against future recurrent infections, new infections from a different HPV type or CIN lesions. Discuss these opportunities and your vaccine schedule with your doctor.



HIV-positive people and the HPV vaccine

The human immunodeficiency virus (HIV) attacks the human immune system, causing a gradual degradation and, eventually, the loss of the ability to defend the body against other viruses. **(11)**

An immune system already attacked by HIV faces a higher risk of HPV infection because the body cannot defend itself properly. In addition, having HIV as well as HPV means that HPV stays in the body longer and heightens the risk of developing HPV-related cancer. **(12)**

The HPV vaccine helps the body prepare to meet and defend against the virus. But HIV-positive people may not be able to generate an adequate immune response even with vaccination.

Vaccination and screening

Even people who get the HPV vaccine should attend regular screenings in the future.

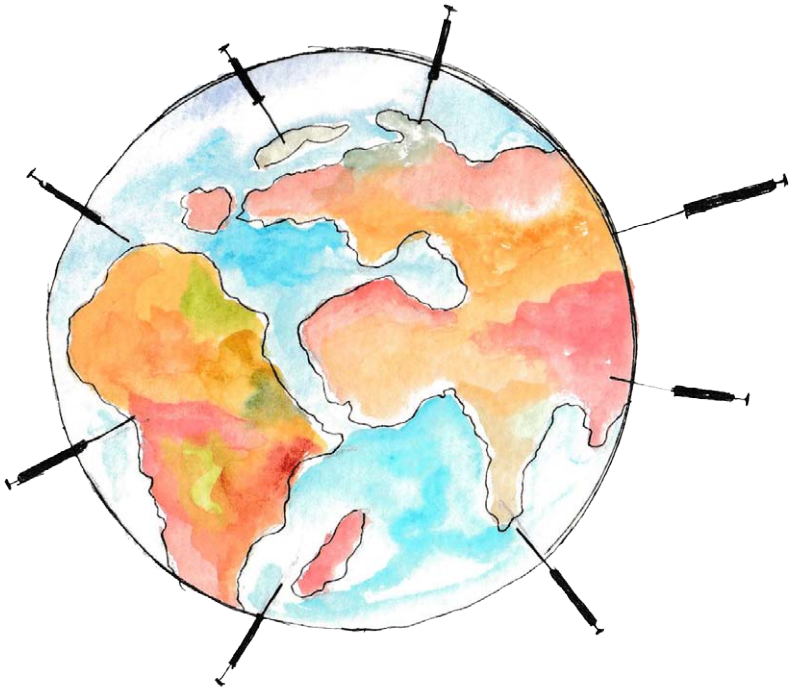
Primary prevention in terms of infection is the vaccine itself, but secondary prevention is regular screenings (cytology and HPV screening). This will detect precancerous cases and other lesions, inflammations, and infections.

HPV vaccine defends against:

- The 9-valent: 7 high-risk HPV types that cause most of the cervical cancers and two low-risk types that cause genital warts.
- The 4-valent: 2 high-risk and 2 low-risk. **This vaccine substantially protects against gential warts compared to the 2-valent one.**
- The 2-valent: 2 high-risk.

Even though the vaccine prevents common types of HPV, unfortunately, there are several other types that are also dangerous, though they pose a lower risk. Screenings are essential to detect these types in time to treat the infection and stop spreading it to others.

Note that none of the vaccines are 100% efficient, and they only work for a few of the most common high- and low-risk strains. The HPV vaccine cannot defend you against the types of the virus that it doesn't target, or against any existing HPV infection that you may already carry. For this reason, regular cervical screening is very important and must be performed according to the standard practices in your area.



HPV vaccination in Europe and worldwide

Vaccination schemes vary greatly across European states as you can see in the following table **(13)**

Human Papillomavirus Infection: Recommended vaccinations

GENERAL RECOMMENDATION
CATCH-UP
Vaccination not funded by the National Health system
Mandatory vaccination

	YEARS													
	9	10	11	12	13	14	15	16	17	18	19	26	30	49
Austria		HPV (F/M)			HPV (F/M)			HPV (F/M)						
Belgium				HPV (F/M)										
Bulgaria				HPV (F)										
Croatia						HPV (F/M)								
Cyprus				HPV (F)										
Czech Rep.					HPV (F/M)					HPV (F/M)				
Denmark				HPV (F/M)	HPV (F)									
Estonia				HPV (F)										
Finland			HPV (F)											
France			HPV (F)				HPV (F)							
Germany	HPV (F/M)						HPV (F)							
Greece			HPV (F)		HPV (F)									
Hungary				HPV (F)										
Iceland				HPV (F)										
Ireland				HPV (F/M)										
Italy				HPV (F/M)										
Latvia				HPV (F)										
Lichtenstein			HPV (F/M)				HPV (F/M)							
Lithuania			HPV (F)											
Luxembourg	HPV (F/M)					HPV (F/M)								
Malta				HPV (F)										
Netherlands				HPV (F)										
Norway				HPV (F/M)										
Poland			HPV (F)											
Portugal		HPV (F)												
Romania			HPV (F)											
Slovakia				HPV (F/M)										
Slovenia			HPV (F)											
Spain				HPV (F)	HPV (F)									
Sweden		HPV (F/M)												

For more information please visit the ECDC website on: https://vaccine-schedule.ecdc.europa.eu

If at least 80% of the 7th-grade girls and boys applied for the vaccine every year, a high degree of protection would develop in just a few decades stopping the spread of the virus.

Australia is an excellent supporting example of the ability to stop the spread. Thanks to the Australian screening and vaccination programme, the frequency of the main HPV types has decreased by 92% over the past ten years, and cervical cancer and precancerous cases have occurred 50% less in the past 7 years. This means cervical cancer can be eliminated in Australia in the next 10 years. **(14) (15)**

In 2020, WHO launched its global programme "90-70-90" to eliminate cervical cancer worldwide.

The purpose of this is to achieve the following statistics:

- 90% of girls fully vaccinated with the HPV vaccine by age 15
- 70% of women screened using a high-performance test by age 35 and again by age 45
- 90% of women identified with cervical disease are treated (both precancer and invasive cancer) **(16)**

Practical information

- The vaccine is most effective if it is taken before beginning sexual activities. The efficiency of the vaccine is best if given between the ages of 9-15.
- In some countries the HPV vaccine must be prescribed by a pediatrist, gynaecologist, or practitioner.
- The price of the vaccines can be different in pharmacies.
- Governments or public organisations may offer financial support to the "catch up" age group (the age group older than 13 years of age but most concerned).
- The vaccine is inoculated into the muscle of the upper arm.

HPV information

Do you have further questions about HPV and related topics?

Please don't hesitate to contact us:

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facebook.com/engage.esgo
https://engage.esgo.org/

And of course, consult with your doctor, your gynaecologist, or nurse!

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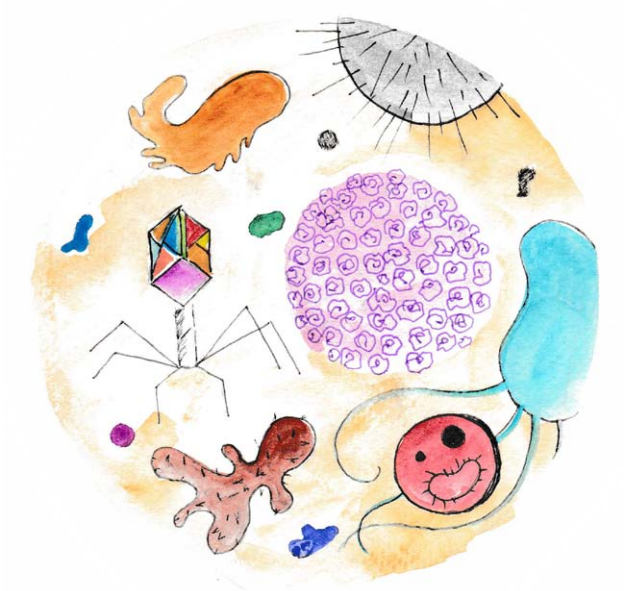
ENGAGe recommends contacting your local patient association!



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