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Patient information: Human papillomavirus (HPV) vaccine (Beyond the Basics)

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HPV VACCINE OVERVIEW

Human papillomavirus (HPV) is a virus that causes cervical cancer and genital warts. Persistent infection with certain types of HPV can lead to cancer of the cervix, which affects more than 10,000 American women every year. HPV can also cause cancers of the vulva, vagina, and anus, although these cancers are much less common than cervical cancer. HPV also causes cancers of the head and neck in men and women.

Two vaccines (Gardasil and Cervarix) are available to prevent infection with several types of HPV known to cause cervical cancer. It is hoped that these vaccines will significantly reduce the number of women who develop cervical cancer and pre-cancer.

This article discusses human papillomavirus and the human papillomavirus vaccine. Articles that discuss cervical cancer, cervical cancer screening (Pap smears), and genital warts are also available. (See "[Patient information: Cervical cancer treatment; early stage cancer \(Beyond the Basics\)](#)" and "[Patient information: Cervical cancer screening \(Beyond the Basics\)](#)" and "[Patient information: Genital warts in women \(Beyond the Basics\)](#)".) An article that discusses vaccines recommended for adults is also available. (See "[Patient information: Adult vaccines \(Beyond the Basics\)](#)".)

More detailed information about human papillomavirus vaccines is available by subscription. (See "[Recommendations for the use of human papillomavirus vaccines](#)".)

WHAT IS HPV?

Human papillomavirus (HPV) is a virus that is spread by skin-to-skin contact, including sexual intercourse, oral sex, anal sex, or any other contact involving the genital area (eg, hand to genital contact). Condoms do not provide complete protection from HPV infection because condoms do not cover all exposed genital skin. People do not become infected with HPV by touching an object, such as a toilet seat.

The risk of HPV exposure increases with the number of sexual partners you have and the number of partners your partner has. It has been estimated that 75 to 80 percent of sexually active adults will acquire HPV infection before the age of 50. A majority of women and men become infected with HPV for the first time between ages 15 and 25 years. Most people who are infected with HPV have no signs or symptoms and clear the infection within two years, often without treatment.

In 10 to 20 percent of women, however, the infection persists. In this situation, there is a greater chance of developing cervical pre-cancer and then cancer. However, it usually takes at least 20 years for HPV infection to cause cervical cancer. Thus, regular testing is important in detecting cervical abnormalities early, before cancer develops. (See ["Patient information: Cervical cancer screening \(Beyond the Basics\)".](#))

Over 100 different types of HPV have been identified; more than 40 of these are known to infect the cervix and approximately 15 are known to cause cervical cancer. Researchers have labeled the HPV types as being high or low risk for causing cervical cancer.

- HPV types 6 and 11 can cause about 90 percent of genital warts. These types are low-risk because they do not cause cervical cancer. (See ["Patient information: Genital warts in women \(Beyond the Basics\)".](#))

- Types 16 and 18 are the high-risk types that cause most (about 70 percent) cases of cervical cancer. HPV types 45 and 31 are also high-risk types, causing about 5 to 10 percent of cervical cancers.

There are two HPV vaccines available. Talk to your healthcare provider to determine which vaccine is best for you.

- One HPV vaccine (Gardasil) helps to prevent infection with four HPV types (6, 11, 16, and 18)
- The other vaccine (Cervarix) prevents infection with HPV types 16 and 18, and it may offer some protection against HPV types 45 and 31.

HPV VACCINE TIMING AND DOSE

Gardasil is given by injection and requires three doses; the first injection is followed by a second and third dose two and six months later, respectively.

Cervarix is also given by injection and requires three doses, although the schedule is slightly different than with Gardasil; the first injection is followed by a second and third dose one and six months later, respectively.

It is not clear if the vaccine is effective if fewer than three doses are given. If you miss a dose, talk to your healthcare provider about how many more doses you need.

Who should be vaccinated? — In the United States, HPV vaccination with either vaccine is recommended for all girls and women who are between ages 9 and 26 years. Vaccination with Gardasil is recommended for boys and men who are between ages 9 and 21 years and can be given up to 26 years of age.

With both vaccines, you will have the greatest protection from HPV if you are vaccinated BEFORE becoming sexually active. The vaccine does not help to get rid of HPV infection or any cervical abnormality after it has occurred. However, if you are less than 26 years old and you have been sexually active, had genital warts, a positive HPV test, or an abnormal Pap smear, you may still obtain some (albeit less) benefit from the HPV vaccine.

How long am I protected? — Scientists do not know exactly how long the vaccine protects against HPV infection. Clinical trials show that it provides protection for at least five years.

Do I still need a Pap smear? — You do not need to have a pelvic exam or test for cervical cancer (eg, Pap smear) before you have the HPV vaccine. Cervical cancer screening (Pap smear) is recommended to start at age 21 [\[1\]](#).

However, getting the HPV vaccine does not mean that you can skip cervical cancer screening in the future, since the vaccine does not treat pre-existing infections. Other types of high-risk HPV, which are not prevented by the vaccine, can also cause cervical cancer. (See "[Patient information: Cervical cancer screening \(Beyond the Basics\)](#)".)

HPV VACCINE SIDE EFFECTS AND PRECAUTIONS

The HPV vaccine may cause mild redness, tenderness, or swelling near the injection site. There is no thimerosal (a mercury derivative used as a preservative) in the HPV vaccine. There may be an increased risk of passing out or developing blood clots after an injection of Gardasil. However, there are no known long-term side effects of the HPV vaccine.

The vaccine is not currently recommended during pregnancy, although there are no known risks to a fetus if the vaccine is given.

Despite recent concerns about the safety of the vaccine, most experts continue to believe that the benefits of the vaccine outweigh its risks [\[2\]](#).

DOES THE VACCINE REALLY WORK?

Results from vaccine studies show that the HPV vaccine in women is very effective in preventing HPV infections and cervical pre-cancers caused by HPV types targeted by the vaccine [\[3-6\]](#). HPV vaccination of women has been shown to reduce the risk of genital warts in their male sexual partners [\[7\]](#). Studies also show that the HPV vaccine in men reduces the risk of developing genital warts and persistent HPV infection, which may decrease the spread of HPV to sexual partners.

OTHER SEXUALLY TRANSMITTED INFECTIONS

The HPV vaccine is not perfectly protective, meaning that some women will acquire an HPV infection despite having being vaccinated. In addition, the vaccine does not prevent other sexually transmitted infections (STIs), including human immunodeficiency virus (HIV), herpes, chlamydia, and gonorrhea.

It is important to practice safer sex to reduce the risk of all STIs. This includes using a male or female condom with every sexual act. (See ["Patient information: Barrier methods of birth control \(Beyond the Basics\)"](#).)

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient information: Human papillomavirus \(HPV\) vaccine \(The Basics\)](#)

[Patient information: Vaccines \(The Basics\)](#)

[Patient information: Cervical cancer \(The Basics\)](#)

[Patient information: Vaccines for adults \(The Basics\)](#)

[Patient information: Screening for sexually transmitted infections \(The Basics\)](#)

[Patient information: Urethritis \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient information: Cervical cancer treatment; early stage cancer \(Beyond the Basics\)](#)

[Patient information: Cervical cancer screening \(Beyond the Basics\)](#)

[Patient information: Genital warts in women \(Beyond the Basics\)](#)

[Patient information: Adult vaccines \(Beyond the Basics\)](#)

[Patient information: Barrier methods of birth control \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Anal squamous intraepithelial lesions: Diagnosis, screening, prevention, and treatment](#)
[Carcinoma of the penis: Epidemiology, risk factors, staging, and prognosis](#)
[Cervical intraepithelial neoplasia: Terminology, incidence, pathogenesis, and prevention](#)
[Cervical intraepithelial neoplasia: Management of low-grade and high-grade lesions](#)
[Clinical trials of human papillomavirus vaccines](#)
[Condylomata acuminata \(anogenital warts\)](#)
[Epidemiology of human papillomavirus infections](#)
[Invasive cervical cancer: Epidemiology, risk factors, clinical manifestations, and diagnosis](#)
[Recommendations for the use of human papillomavirus vaccines](#)
[Treatment of vulvar and vaginal warts](#)
[Virology of human papillomavirus infections and the link to cancer](#)

The following organizations also provide reliable health information.

- National Cancer Institute

(www.nci.nih.gov/cancertopics/factsheet/prevention/HPV-vaccine)

- National HPV and Cervical Cancer Public Education Campaign

Telephone: 1-866-280-6605

(www.cervicalcancercampaign.org)

- Center for Disease Control and Prevention

(www.cdc.gov/std/hpv/STDFact-HPV-vaccine-young-women.htm)

- American Social Health Association

(www.ashastd.org/)

[[2-6,8](#)]

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