

# HPV

(human papillomavirus)



Human  
Papillomavirus:  
the most common  
sexually transmitted  
infection




The Society of  
Obstetricians and  
Gynaecologists of  
Canada



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The public dissemination of health-related information by journalists is of great interest to the SOGC because of the power of the media to help inform patients.

Last year an interesting study\* was conducted among Canadian media by researchers from the University of Toronto. The study pointed out that most cancer patients (70%) look to the media for information, and one-third believes that their decisions are influenced by this information.

The study explained that most reporters usually do not have prior medical/health-related education and that doctors need to simplify their language. Reporters also perceived a lack of proper communication between doctors and themselves as a barrier to getting out their stories.

HPV is an important and complex topic because there are many different types of the virus with multiple health outcomes including genital warts and cervical cancer. We at the SOGC hope to surmount some of the communication barriers identified by Canadian journalists by offering you this background information on HPV.

A handwritten signature in black ink, appearing to read 'André B. Lalonde'.

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\* Chan KK, et al. "Medicine and media: The role of journalism in public health education" *Journal of Clinical Oncology*, Vol 22 No14S, (July 15 Supplement) 2004



## What is HPV?

### Infects the body inside and outside

The human papillomavirus or HPV is one of the most common family of viruses in the world today. HPV is also the world's leading sexually transmitted infection and is transmitted by skin-to-skin (including sexual) contact. HPV infects cells inside and outside of the body. These include surfaces of the skin, lining of the mouth, tongue, throat, tonsils, vagina, penis, cervix, and anus. (see appendix of photos)

Most people who get HPV don't have any signs or symptoms and may unknowingly spread the disease. HPV is not related to HIV (the human immunodeficiency virus, which can cause AIDS). However, people with HIV have weakened immune systems and are therefore likely to be infected with various germs, including one or more types of HPV.

### Different health risks caused by different types

There are many different types of HPV viruses. Over 80 types of HPV have been identified reliably but researchers believe there are over 200. Some types of HPV can cause common skin warts and plantar warts, while other types of HPV (more than 30 types) affect the anogenital tract. Of those HPV types that can cause genital infections:

- Some types such as 16 and 18 can cause pre-cancerous lesions, cervical cancer and other genital cancers and are referred to as carcinogenic or 'high risk HPV types'.
- Other types such as 6 and 11 can lead to genital warts and are referred to as 'low risk HPV types' because they rarely cause cancer.



### **Skin warts**

The most visible types of HPV are skin warts (common, plantar or flat) that develop on areas of the skin such as the hands, arms, legs and bottom of the feet. HPV infections of this type are very common, harmless, non-cancerous, and can be easily treated.

### **Genital warts**

Not to be confused with skin warts, genital warts (also known as *condylomata acuminatum*) are mostly caused by HPV types 6 and 11. In women, genital warts can appear on the vulva, urethra, cervix, anus, or thighs. In men they can appear on the penis, scrotum, anus, or thighs. (see appendix photo bank)

### **Pre-cancerous lesions**

In women, HPV can infect cells on the vagina and cervix where we can't see them. These lesions (medically known as dysplasia, or abnormal cells of the cervix) are considered to be a pre-cancerous condition. HPV is one of the most frequent causes of cervical dysplasia. There are three types of cervical dysplasia: mild, moderate, and severe. Left untreated, dysplasia can progress to cervical cancer. (see appendix photo bank)

### **Cancers**

Carcinogenic types of HPV cause most cervical cancers and 70% are caused by HPV types 16 and 18. These types may also be linked to oral and penile cancers. Research has shown a strong link between anal cancer and HPV 16. (see appendix photo bank)



## Incidence and prevalence of HPV

There are so many types of HPV and since we don't routinely screen for all of them the prevalence of this virus can only be approximated. It is estimated that 75% of Canadians will have at least one HPV infection in their lifetime. The Society of Obstetricians and Gynaecologists of Canada estimates that 10% to 30% of the Canadian adult population is infected with HPV. This is in line with research from the US and Europe which has shown that 10% to 40% of sexually active women are infected by HPV at any one time.

According to the American Social Health Association, approximately 5.5 million new cases of sexually transmitted HPV infections are reported every year. Based on Canadian population statistics an estimated three to nine million Canadians are infected with HPV.

In Canada it is estimated that:

- The highest rates of HPV infection are found in people under the age of 25.
- 2% of sexually active young women have genital warts.
- The prevalence for cancer-causing types of HPV in different groups of females ranges from 11% to 25%.

We also know that the prevalence of anal cancer, most of which is believed to be caused by HPV, has doubled in the past 25 years. An estimated 1,400 Canadian women are diagnosed with cervical cancer each year; lower socio-economic, immigrant and Aboriginal women are all under-screened so these numbers could be much higher. In 2002 an estimated 410 women died from cervical cancer. Cervical cancer is the third most frequent cancer in women during their child bearing years — between the ages of 20 to 49. The association between HPV and cervical cancer is stronger than between tobacco and lung cancer.

The prevalence of genital HPV infections increases with increasing numbers of sexual partners; a clinical study of women who had had more than one sexual partner showed that 46% had cervical HPV infection at three years after their first intercourse.



## Transmission and natural history of HPV

HPV is *not* transmitted by blood. The most common means of transmission is by skin-to-skin contact with the penis, scrotum, vagina, vulva, or anus of an infected person. Kissing or touching a partner's genitals with the mouth can also transmit HPV. Using a condom does *not* guarantee protection since the virus can be on an area of skin not covered by the condom.

HPV is usually acquired at a young age at the time of sexual debut (typically measured as the age of 'first intercourse'). Research shows that sexual debut for young Canadians (male and female) can be as young as 15 years of age and it has been reported that oral sex is practised by girls as young as 12 and 13 years old, regardless of their social or economic background.

Genital warts are very contagious and are spread during oral, vaginal, or anal sex with an infected partner:

- Most people (66%) who have sexual contact with a partner infected by genital warts will develop warts themselves usually within three months of contact.
- Genital warts can cause problems during pregnancy:
  - Sometimes they get larger, making it difficult to urinate.

- They can make the vagina less elastic and cause obstruction during delivery.
- In rare cases infants born to women with genital warts develop warts in their throats — a potentially life-threatening condition for the child.

Genital warts may last for years and eventually go away. Even if this happens the HPV virus can remain dormant in the body and the manifestation can return at a later date.

The natural course taken by an HPV infection varies over time and from one person to another:

- Genital warts can develop quickly inside or outside the vagina, usually within three months of contact.
- Within one year of initial HPV infection, low-grade cervical dysplasia (CIN 1) may develop (CIN stands for cervical intraepithelial neoplasia and is a system of classifying cervical lesions: CIN 1 = mild, CIN 2 = moderate, CIN 3 = severe).
- In some women the HPV infection persists and can lead to the beginning stages of cancer (CIN 2-3) — this transformation is generally slow and can take anywhere from five years to a lifetime.



## Symptoms – physical and psychological

### Genital warts

Though usually painless, symptoms for genital warts include:

- Itching, or burning sensation, occasional minor bleeding as a result of anal sex or bowel movement.
- The cauliflower-like growths are unsightly and embarrassing and associated with a high incidence of depression, sexual dysfunction and disruptions to long-term relationships.

Research conducted among people with visible genital warts and who were diagnosed with HPV reported feelings of:

- Depression, shame, guilt;
- Fear of rejection by their partner, loss of sexuality and enjoyment of sex.

### Pre-cancerous lesions

Cervical dysplasia seldom causes any noticeable symptoms. It is usually detected through a Pap test (smear) or colposcopy. HPV infection has social and psychological consequences. Studies of women who have received abnormal Pap test results indicate that they often experience psychological consequences including:

- Anxiety, fears about cancer;
- Sexual difficulties;
- Changes in body image;
- Concerns about loss of reproductive functions.

## Multiple health risks of HPV

Different types of HPV infect different parts of the body, but we don't know why they target different areas. Types 16 and 18 are considered 'high risk' because they can cause cancer and are responsible for:

- 25% of CIN 1 lesions;
- 70% of CIN 2 and 3 lesions, and anogenital cancers.

'Low risk' types 6 and 11 generally do not cause cancer but are associated with:

- 25% of CIN 1 lesions;
- 90% of genital warts.

### MULTIPLE OUTCOMES OF HPV

Disease	High risk (causes cancer)	Low risk (rarely causes cancer)
Plantar warts		1
Common warts		2, 27
Flat warts		3, 10
Oral warts		6, 11 (and others)
Genital warts		6, 11 (and others)
Anal warts		6, 11 (and others)
Lesions		
CIN 1	16, 18 (and others)	6, 11
CIN 2 ou 3	16, 18 (and others)	
Cervical cancer	16, 18 (and others)	
Anal cancer, Vaginal cancer Penile cancer Laryngeal cancer	16, 18 (and others)	
Oral cancer	16	



## Challenges and costs of detection

Tests that can detect the unique DNA signatures of various HPV types are not widely available and are expensive. To date, successful, established disease prevention strategies have been limited to screening for, and treating, the most common malignancy induced by HPV. Cervical cancer is the second most common cause of cancer death in women worldwide and studies have shown that HPV infection is the major risk factor.

Though Canada has been a pioneer country in reducing the incidence of cervical cancer using Pap test screening (the Pap test looks for changes in the cervix that might lead to cancer), the disease is still a major problem because detection is both challenging and costly:

- Screening is more accurate with high-grade lesions — early cervical cancer is often present without symptoms so many cases escape detection.
- Resources to detect cervical cancer are expensive for the health care system:
  - In Canada four million Pap tests are done each year at an estimated cost of \$200,000,000.
  - An abnormal Pap test generally means additional testing is required — each year an average of 325,000 Pap tests are abnormal, leading to colposcopy and/or biopsy at an estimated cost of close to \$50,000,000.

The burden associated with not being able to detect cervical cancer is also costly:

- Many women don't get tested - up to 50% of Canadian women with cervical cancer did not get an annual Pap test.
- Canadian studies show that about 60% of cervical cancers occur in women who have not been screened in the previous three years.
- The yearly overall cost of invasive disease and death in Canada from cervical cancer has been estimated at up to \$270,000,000.
- It is estimated that every year cervical cancer causes an estimated 11,000 person-years of life lost.



## Treatments and strategies for prevention

Unlike bacteria, viruses cannot be destroyed with antibiotics, and there is currently no medical cure to eliminate an HPV infection. Treatment depends on the type of HPV infection and in the case of cervical cancer the stage of development.

### Genital warts

Trying to remove the visible warts does not always eliminate HPV and genital warts can reappear. Chemical treatment methods can be painful, embarrassing and may cause scarring. Two powerful chemicals (podophyllin and trichloroacetic acid) are capable of destroying external genital warts with direct application, but this must be repeated several times. A new product, imiquimod cream, is now available and has had some success at stimulating the immune system to fight the virus.


Depending on the size, number of warts and where they are located other methods for removal of external warts include:

- Cryotherapy (damaged cells are killed by freezing them with liquid nitrogen);
- Electrosurgery (passing an electric current through abnormal cells);
- Laser therapy ('super heats' and vaporizes abnormal cells).

### Cervical cancer

Early-stage cervical cancer can usually be treated successfully. Options at this stage can include LEEP (loop electrosurgical excision procedure — the removal of tissue using a hot wire loop), laser therapy, or cryotherapy.

If the cancer has invaded deeper layers of the cervix and has spread to the uterus, more extensive treatment may be involved such as a radical hysterectomy with lymph node removal. Side effects associated with this procedure include: inability to control urination, sexual problems, psychological stress, and swelling in the legs.



Later-stage disease kills by invading nearby tissues, and there are some benefits from chemotherapy and radiation therapy. Disease that has spread beyond the pelvis is generally regarded as incurable since the survival rates are about one in five.

Cervical cancer can be prevented through detection and treatment, but the ideal is to prevent the infection that causes it — HPV. At present, this is problematic because it is almost impossible to break the chain of communicability by stopping unprotected sexual activity. Even when condoms are used, they cover only the penis (or the outer edge of the vagina in the case of the female condom) and other anogenital skin contact can occur. Furthermore, some people are allergic to latex; they use condoms made of sheep intestine instead, but these condoms have pores large enough to let through small bacteria and viruses such as HPV.

Vaccination would be another prevention strategy that would dramatically change the HPV landscape. We know that researchers are currently working on vaccines to prevent HPV infections that can cause cervical cancer and genital warts.



## Role of education

In 2004, a pan-Canadian forum on cervical cancer prevention and control recognized that in Canada and elsewhere, public awareness and knowledge about HPV infection is low especially among young, sexually active women at highest risk for infection:

- 87% of Toronto high school students had not heard of HPV, fewer than half identified it as a prevalent sexually transmitted infection (STI), nearly one-third confused HPV with HIV, and few were aware of its causal role in cervical cancer.
- Findings from other countries and older populations indicate that poor knowledge about the existence, prevention, transmission, symptoms, and consequences of HPV infection is widespread.

Although school sex education classes are a major source of STI information, adolescents have indicated that, compared with other STIs, they were taught the least about HPV. School health educators and health-care providers have identified a need for more information to effectively deliver HPV education.

The American Cancer Society has determined that less than a third of men and women in the general population have ever heard of HPV; of those who have, few are aware of its association with cervical cancer. More than half of American women surveyed at universities who know about HPV do not know how it is transmitted. In addition, women may overestimate the likelihood that HPV can lead to cervical cancer, be confused about how a Pap test can be normal if HPV is present, or have difficulty understanding the distinctions between high-risk and low-risk types of the virus.

Clearly there is need for more education about HPV to enable people to understand this disease and its consequences.



## Glossary of terms

### **biopsy**

small specimen of tissue taken for examination

### **cervix**

opening of the uterus (womb) that leads into the vagina

### **chemotherapy**

treatment of infections, cancer, and other diseases with chemical agents

### **CIN**

cervical intraepithelial neoplasia, a system of classifying cervical lesions: CIN 1 (mild), CIN 2 (moderate), CIN 3 (severe)

### **colposcope**

microscope used to examine the surfaces of the vagina and cervix

### **colposcopy**

examination using a microscope that provides a magnified image of the vagina and cervix

### **condylomata acuminatum**

genital warts

### **cryotherapy**

freezing with liquid nitrogen

### **electrosurgery**

killing cells by passing an electric current through them

### **epithelial cells**

specialized skin cells; they cover our bodies and line the digestive and reproductive tracts

### **genitals (a.k.a. genitalia)**

sex organs of females and males; external genitals include the clitoris and vulva in females, scrotum and penis in males

### **HIV**

human immunodeficiency virus; causes AIDS

### **HPV**

human papillomavirus; causes genital warts, cervical and other cancers

### **laser surgery**

killing cells by superheating and vaporizing them

### **LEEP (loop electrosurgical excision procedure)**

removal of tissue using a hot wire loop

### **lesion**

any physical abnormality or injury

### **Pap (Papanicolaou) test**

process in which a sample of cells is gently scraped from the surface of the cervix, is smeared on a slide, and is then examined for cellular abnormalities

### **papilloma**

a variety of wart consisting of a small growth of skin and mucous membranes on a fibrous stalk

### **radiation therapy**

treatment of cancer with x-rays and gamma rays

## Appendix: Photo bank



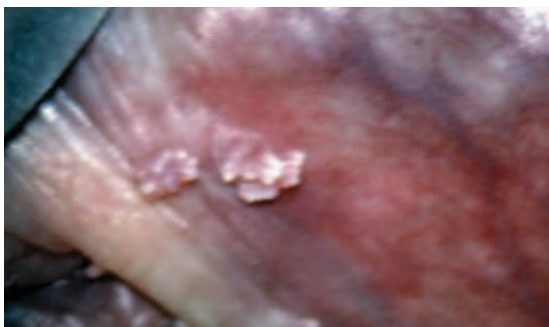
Anal warts

Reproduced by permission from Dr. Marc Steben,  
Institut national de santé publique du Québec



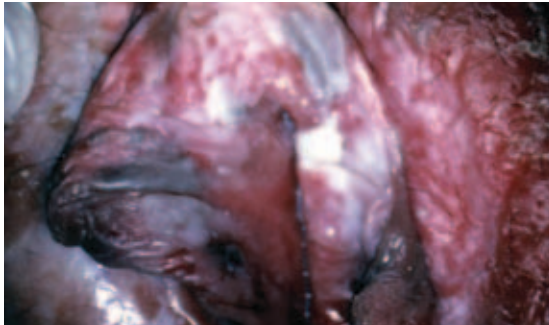
Cancer of the perineum with the entrance  
of the vagina up and the entrance of the  
rectum down

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Genital warts on the penis

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High grade pre-cancer lesion on the vulva

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Genital warts on the perineum with the  
entrance of the vagina up and the entrance  
to the rectum down

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Genital warts on the vulva

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## Appendix: Suggested web sites

### **Web MD**

[http://my.webmd.com/hw/health\\_guide\\_atoz/hw103503.asp](http://my.webmd.com/hw/health_guide_atoz/hw103503.asp)

### **Health Canada**

[http://www.hc-sc.gc.ca/english/iyh/diseases/hpv-vph\\_e.html](http://www.hc-sc.gc.ca/english/iyh/diseases/hpv-vph_e.html)

### **Public Health Agency of Canada**

[http://www.phac-aspc.gc.ca/publicat/std-mts/sti\\_l.html](http://www.phac-aspc.gc.ca/publicat/std-mts/sti_l.html)

### **Stanford University**

<http://www.stanford.edu/group/virus/papova/HPV.html>

### **Institut national de santé publique du Québec**

<http://ftp.msss.gouv.qc.ca/publications/acrobat/f/documentation/2002/02-308-01a.pdf>

### **Health Canada - *What You Need to Know About Human Papillomavirus (HPV)***

<http://www.phac-aspc.gc.ca/std-mts/pdf/hpv-e.pdf>

### **US National Institute of Allergy and Infectious Diseases**

<http://www.niaid.nih.gov/factsheets/stdhpv.htm>

### **Cancer Care Ontario**

<http://www.oma.org/pcomm/OMR/dec/04cervicalscreening.htm>

### **Web site administered by The Society of Obstetricians and Gynaecologists of Canada**

<http://www.sexualityandu.ca/eng/>