



# HUMAN PAPILOMAVIRUS (HPV) FACT SHEET

## Background Information - Human Papillomavirus

- HPV is the name of a group of viruses that include more than 80 different types associated with a variety of epidermal warts and skin lesions, some of which are associated with skin cancer. Low-risk HPV subtypes (eg. Type 6,11) are associated with more benign skin lesions such as warts (papillomas). High-risk subtypes (eg. Type 16,18) can cause neoplasia (abnormal cell growth) or dysplasias and are associated with the development of cervical and anal cancers.<sup>1, 3, 7</sup>
- HPV is one of the most common sexually transmitted diseases (STD) in the world.<sup>1</sup>
- Condoms do not offer complete protection against HPV infection. The papilloma virus lives in the cells of the outer skin as well as inside the body, mainly in the vagina, anus and urethra. When condoms do not cover the entire shaft of the penis or the pubic skin, papilloma-laden skin cells can easily pass from a man's pubic area into the vagina, vulva or anus.<sup>1</sup>
- HPV does not appear on the standard tests for STD infection that many men and women now routinely undergo when they meet new partners. Where there are no visible skin changes, sub-clinical and latent (hidden/inactive) infections can only be detected microscopically within the skin cells via special tests looking for HPV DNA.
- While there is no pharmacologic cure for HPV, the infection can induce an antibody mediated immune response, which is thought to clear the virus from the body. However, HPV can also effectively evade the body's immune system, residing dormant (latent infection) inside certain cells or actively infecting cells resulting in the development of warts and/or dysplasias.<sup>2</sup>
- HPV is the major risk factor for cervical and anal cancer. Cervical and anal intraepithelial neoplasias (CIN, AIN) are common and early manifestations of cervical and anal infections by HPV. It is estimated that there are one million women in the U.S. with HPV-related dysplasia, 55,000 with in-situ carcinomas, and 15,000 with cervical cancer. Approximately 5,000 women die from cervical cancer in the U.S. each year.<sup>3,6</sup>
- The Centers for Disease Control and Prevention (CDC) estimates close to 5.5 million new genital HPV cases occur each year. This represents approximately one-third of all new STD infections. It is estimated that more than 24 million people in the U.S. are infected with HPV at any given time.<sup>1,7</sup>
- Canadian studies estimate that 40 to 80% of women in their early reproductive years have been infected with one of the more than 80 varieties of sexually transmitted HPV. Specifically, in the U.S., nearly three out of four Americans between the ages of 15 and 49 have been infected with genital HPV in their lifetimes.<sup>2,1</sup>
- More than 60% of men without HIV and 90% of men with HIV who have sex with men are infected with HPV in their anal canals.<sup>8</sup>
- A recent study conducted by the Kaiser Family Foundation found that 70% of Americans knew nothing about the existence of HPV as a sexually transmitted disease.<sup>9</sup>



## Cervical Dysplasia and Cancer - Prevalence and Mortality

- Cervical intraepithelial neoplasia (CIN) is a precancerous condition of the uterine cervix. CIN starts with abnormal cellular development in the cervical epithelium and can be identified as low or high-grade squamous intraepithelial lesions (LSIL or HSIL) by the Pap smear test. Alternatively, CIN is described as CIN I or CIN II (equivalent to LSIL) or CIN III (equivalent to HSIL). High-grade disease refers to increased progression towards cancer. 90% of CIN cases are associated with HPV infection.<sup>10,11</sup>
- Cervical cancer is a global public health problem. It is the most common cancer in women in developing countries and is the second most common cancer in women worldwide. Approximately 500,000 new cases of cervical cancer are identified each year globally. Mortality is very high – nearly 300,000 deaths annually, with 80% of them in developing countries. HPV causes 90 - 95 % of cervical cancers. Thirteen types of HPV have been implicated in precancerous and cancerous lesions of the cervix, the most common of which are HPV 16 and 18. <sup>3,12</sup>
- In Africa and Asia, cervical cancer from HPV is the most common cause of cancer-related deaths in women.<sup>6</sup>
- The American Cancer Society estimates that there are approximately 15,000 new cases of invasive cervical cancer each year in the U.S. Further, the deaths from cervical cancer currently comprise approximately 2% of all cancer deaths in women and 18% of deaths from gynecologic cancers.<sup>3</sup>
- The prevalence of CIN in the U.S. ranges from 20 to 33% percent in women 20 years of age and older.<sup>13</sup>
- Nearly 2.5 million cases of low-grade dysplasia (CIN I) are diagnosed yearly in the U.S. It is estimated that between two thirds of these patients may experience spontaneous regression within a period of nine months.<sup>14,15</sup>
- There are no pharmacologic treatments for this disease. Removal (surgery or freezing) is currently the only mode of treatment for high-grade CIN. The time of progression from CIN to carcinoma in situ (CIS, localized cancer) is estimated to be 10 to 15 years, creating a lengthy lead-time during which the disease may be identified.<sup>15</sup>
- Yearly Pap smears are recommended to detect the abnormal cell growth caused by HPV that may progress to cervical cancer. Each year, 50 million Pap tests are performed in the U.S. to screen women for cervical cancer. But a single Pap smear misses about 40% of cervical disease – one reason why women are told to have yearly Pap smears.<sup>15</sup>
- While HPV 16 and 18 are commonly associated with dysplasia preceding the development of cervical cancers, previous studies have shown that there are at least 11 additional types of high-risk HPV. Together these subtypes cause more than 90 percent of cervical cancers. Testing for HPV high-risk using blood tests is increasingly seen as additional method to screen and prevent cervical cancer.<sup>3</sup>
- Black women have a higher incidence of cervical cancer than white women and are 2.5 times more likely to die of this disease. The death rate from cervical cancer for Hispanic, American Indian and Asian woman also is higher than for white women.<sup>16</sup>



## Anal Dysplasia and Cancer - Prevalence and Mortality

- HPV can also reside in the anus, which has similar epithelial cells to the cervix. Anal HPV infections are one cause of a rising incidence of anal cancer, especially among women and men in the sex trade and men that have sex with men (MSM).
- HPV is involved in the pathogenesis of anal intraepithelial neoplasia (AIN), a precursor to anal cancer. A high proportion of anal cancers have been found to contain the same HPV types present in cervical cancers.<sup>3</sup>
- AIN is under-diagnosed due to a lack of an effective screening program. Unlike CIN where Pap smears are performed regularly, AIN has been almost universally ignored until recently. At present, there is no formalized structure for the diagnosis of anal dysplasia.
- A majority of patients with anal dysplasia are referred to colorectal surgeons for the treatment of either genital warts or hemorrhoids. Among those physicians treating primarily non-homosexual populations, AIN is frequently referred to as Bowen's disease. Bowen's disease is mentioned as an anal skin disorder, which occurs quite rarely and is typified by a chronic atypical epithelial proliferation. Most patients suffering from Bowen's disease are diagnosed in their 60's. Bowen's disease is more prevalent among women than men.<sup>18</sup>
- Studies conducted in the U.S. have shown that 35 out of every 100,000 HIV-negative gay men have anal cancer - the same rate of cervical cancer that was found in women before the widespread adoption of regular Pap tests. In HIV-positive gay men, the rate is estimated to be double – 70 out of 100,000.<sup>6</sup>
- More than 60% of men without HIV and 90 % of men with HIV who have sex with men are infected with HPV in their anal canals.<sup>9</sup>
- Current clinical evidence predicts that anal Pap smear screenings every two to three years would cost about \$16,000 per year of life gained, adjusted for quality of life. By comparison, annual mammography has been reported to cost approximately \$120,000 per year of life gained.<sup>17</sup>
- Recent evidence suggests that the incidence of anal cancer is between five and ten times greater in gay and bisexual men than cervical cancer is in women.<sup>9</sup>



## Genital Warts Prevalence

- In the past 10 years genital wart infections in the U.S. have increased at twice the rate of genital herpes.
- HPV Types 6 and 11 are most commonly linked to genital warts.<sup>3</sup>
- Genital warts (condylomata acuminata or venereal warts) are caused by only a few of the many types of HPV. Other common types of HPV infections, such as those that cause warts on the hands and soles of the feet, do not cause genital warts. Genital warts are spread by sexual contact with an infected partner and are very contagious. Approximately two-thirds of people who have sexual contact with a partner with genital warts will develop warts, usually within three months of contact. The body's immune system often keeps the HPV virus dormant, thus in some cases, warts may never appear.<sup>7</sup>
- Scientists estimate that as many as 1 million new cases of genital warts are diagnosed in the U.S. each year.<sup>7</sup>
- Currently there are a variety of treatments for genital warts. These include: topical treatments (cream/gels); freezing; laser ablation; burning with chemicals and topical immunotherapy, such as alpha-interferon. However, wart recurrence is common after treatment.
- Visible warts are present in only 1% of those infected with HPV.<sup>6</sup>
- The American Social Health Association (ASHA) surveyed people with human papillomavirus (HPV) about their experiences with the disease and its effect on their lives. The psychosocial impact of HPV can be serious ranging from feelings of depression and anger, and feelings of shame. Sexual enjoyment and activity were also negatively affected by HPV.



## GLOSSARY OF TERMS & USEFUL WEBSITES

**Anal Intraepithelial Neoplasia**—A general term for the growth of abnormal cells on the surface of the anus or anal canal. Also called AIN.

**Cervical Dysplasia**—An abnormal tissue growth on the cervix that may progress to cancer if not treated in time. Cervical dysplasia is detected through a pap smear.

**Cervical Intraepithelial Neoplasia**—An alternative term for cervical dysplasia. Also called CIN.

**Dysplasia**—Abnormal changes or growth of cells and tissues

**Intraepithelial**—Within the layer of cells that forms the surface or lining of an organ

**Latency**—The phenomenon by which viruses (such as HPV) can remain dormant within tissues in the body. Such inactive virus reservoirs can be reactivated to cause viral shedding or disease

**Neoplasia**—Abnormal new growth of cells

**American Cancer Society:** <http://www3.cancer.org>

**American Social Health Association:** <http://www.ashastd.org>

**Canadian Cancer Association:** <http://www.cancer.ca>

**Center for Disease Control:** <http://www.cdc.gov>

**Gay Health:** <http://www.gayhealth.com>

**National Cancer Institute:** <http://www.nci.nih.gov>

**World Health Organization:** <http://www.who.int>



## REFERENCES

1. American Social Health Association.
2. Stressgen Biotechnologies Corp. Data on File, 2000.
3. American Cancer Society.
4. Group Health Cooperative <http://www.ghc.org>
5. National Cancer Institute of Canada <http://www.ncic.ca>
6. King, E.; The Silent Majority Epidemic; Sun Herald; February 27, 2000; Page 14.
7. Fact Sheet: Human Papillomavirus and Genital Warts, National Institute of Allergy and Infectious Diseases, National Institutes of Health.
8. Ven-Pedersen, K.; U. Iowa: U. Iowa tests new STD vaccine; U-Wire, June 13, 2000.
9. Gay Health <http://www.gayhealth.com>
10. Walboomers JMM, Jacobs MV, Manos MM, et al.; Human papillomavirus is a necessary cause of invasive cervical cancer worldwide; J Pathol.; 1999;189:12-19.
11. Schiffman, M., Herrero, R., Hildesheim, A. et al.; HPV DNA Testing in Cervical Cancer Screening: Results From Women in a High-Risk Province of Costa Rica; J. American Medical Association; 2000;283: 87-93.
12. World Health Organisation Press Release 47; Cervical Cancer: experts confirmed virus a major cause, new detection technologies available; July 3, 1996.
13. Stressgen Biotechnologies Corp. Data on File, 2000.
14. Nel, J.T., De Lange, L., Meiring P.J., De Wet, J.I.; Cervical intra-epithelial neoplasia and invasive cervical cancer in black and white patient; S Afr Med J.; 1994;84:18-19.
15. Stressgen Biotechnologies Corp. Data on File, 2000.
16. American Cancer Society Breast and Cervical Cancer Forum, St. Petersburg, Florida, June 17, 2000.
17. Goldie, S.J, Kuntz, K.M., Weinstein, M.C. et al.; The Clinical Effectiveness and Cost-effectiveness of Screening for Anal Squamous Intraepithelial Lesions in Homosexual and Bisexual HIV-Positive Men; Journal of American Medical Association; 1999; 281:1822-29.18. Stressgen Biotechnologies Corp. Data on File, 2000.

For further information, please contact:

Jennifer Matterson  
Communications Coordinator  
Stressgen Biotechnologies  
350-4243 Glanford Ave.  
Victoria, BC  
V8Z 4B9  
tel: 250-744-2811 x222  
fax: 250-744-3331  
[jmatterson@stressgen.com](mailto:jmatterson@stressgen.com)