



Testimony

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Justice,

Drug Policy, and Human Resources

Committee on Government Reform

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## **CDC's Human Papillomavirus (HPV) and Cervical Cancer Prevention Activities**

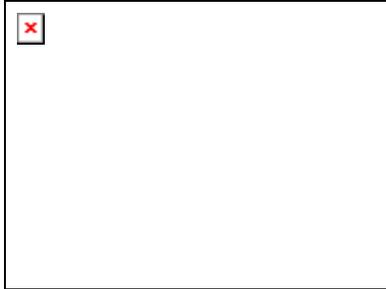
*Statement of*

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Good Morning. I am Dr. Ed Thompson, the Deputy Director for Public Health Services of the Centers for Disease Control and Prevention (CDC) at the Department of Health and Human Services' (HHS). Thank you Mr. Chairman and members of both sides for holding this hearing, for your abiding interest in this subject, and for providing a forum for us to discuss these complex and challenging issues. All of us are troubled by the number of sexually transmitted diseases (STD) cases and infections in America. This problem is most disturbing when it occurs -as it too often does - among our nation's youth. It is absolutely clear, for this population in particular, that abstaining from sexual activity is the first line of defense against STD. We appreciate the commitment that members of this Committee have to protecting the health of the nation's youth and women in particular and welcome this opportunity to present our considerations on the prevention of one specific sexually transmitted infection, genital human papillomavirus (HPV) and its most dramatic complication, cervical cancer.

***I. Cervical Cancer Overview***

Although HPV infection has been found to be associated with a number of diseases, the one that is by far the greatest public health importance is cancer of the uterine cervix. A large body of scientific research over the past 20 years has shown that HPV is one of the causes of developing cervical cancer. Cervical cancer can be largely prevented through screening and early detection and treatment of precancerous abnormalities of the cervix. Decades ago, cervical cancer was one of the most common and deadly cancers in women in the United States. In the past 40 years, widespread cervical cancer screening using the Papanicolaou (Pap) test, and treatment of precancerous cervical abnormalities have resulted in a dramatic decrease in the occurrence of cervical cancer and associated mortality. The purpose of screening with the Pap test is to detect cervical abnormalities that can be treated, thereby preventing progression to invasive cervical cancer, and also to detect invasive cervical cancer at a very early stage. Progression from cervical cancer precursor lesions to invasive cancer is usually a slow process, estimated to take 10 to 15 years. If detected early and managed promptly, survival rates for cervical cancer are over 90%.

In 2004, the American Cancer Society estimates that 10,520 women will be diagnosed with cervical cancer and 3,900 women will die from it. Approximately half of these women will have never been screened, and an additional 10% of these women will not have been screened within the past five years. CDC's Behavioral Risk Factor Surveillance System continues to find that millions of American women still do not receive adequate screening for cervical cancer and its precursors. The most important factors associated with inadequate cervical cancer screening include absence of a usual source of health care, lack of health insurance, and immigration to the United States in the last 10 years. Other factors include older age, low income, low level of education, presence of chronic disabilities, and Asian and American Indian/Alaska Native race/ethnicity. Death rates from cervical cancer in the United States are higher among foreign-born women than women born in the United States. Therefore, the largest gain in reducing the occurrence of cervical cancer and deaths could be achieved by increasing screening rates among women who have never or rarely been screened.

Each year, cervical cancer treatment costs the United States about \$2 billion. However, one of the best prevention methods for cervical cancer, the pap test, is an extremely cost effective measure at \$4,535 per year of life saved.

## ***II. Clinical Outcomes of Genital HPV Infection***

Human papillomavirus is a family of more than 100 types of virus that infects skin cells and mucous membranes. The types are selective in what kind of cells they infect. Approximately 70% of HPV types infect the skin in various parts of the body, where the most common problem they cause is warts. The other 30% primarily target genital areas. Genital HPV infection can cause genital warts and cervical cell abnormalities that produce abnormal Pap tests, and is also associated with various types of anogenital cancers, the most important of which is cancer of the cervix. Most genital HPV infections do not cause disease, but instead remain asymptomatic and clear up on their own without treatment, usually within one year. Genital HPV types are designated as high- or low- risk, depending on the health effects that may result from infection. Low- risk types can cause genital warts or benign low-grade abnormalities in cervical cells, but are not associated with cervical cancer. In addition to problems in the genital area, low-risk genital types can sometimes occur in other parts of the body. For example, recurrent respiratory papillomatosis, a very rare disease of the respiratory system, can be caused by transmission of low-risk HPV during birth. High-risk types, primarily types 16, 18, 31, and 45, can cause low-grade cervical cell abnormalities, high-grade cervical cell abnormalities that are precursors to cancer, and invasive cervical cancer itself. HPV infection has also been associated with cancers of the anus, vulva, vagina, and penis, although each of these is much less common than cervical cancer, with the exception of anal cancer in homosexual men. The association of high risk genital type HPV with nongenital cancers has also been studied and current evidence indicates a possible role in a subset of head and neck and esophageal cancers. In addition, while a few studies suggest a possible association of HPV with cancer of the prostate, the findings are not consistent and the most recent studies do not indicate that HPV is associated with these cancers. To reiterate, the vast majority of both high-risk and low-risk types of genital HPV infections usually clear up without treatment and cause no long-term medical consequences, probably as a result of the body's immune response.

## ***III. Prevalence of and Risk Factors for HPV***

Genital HPV infection is the most common sexually transmitted infection for both men and women in the United States. About 20 million Americans at any given point in time are currently infected, and about 5.5 million people become newly infected each year. A recent Duke University estimate suggests that about 80% of sexually active men and women will have acquired genital HPV by age 50. Genital HPV infection is primarily transmitted through sexual intercourse. Most infections are asymptomatic, so the usual source of transmission is an individual who has no idea he or she is infected. The most important predictor of infection

for women is young age, followed by number of sex partners. For men, the leading risk factor is number of partners. For both women and men, the risk of acquiring a genital HPV infection generally increases with increasing numbers of lifetime male sex partners. In addition, another factor that increases a woman's risk of HPV infection is the sexual activity of her partner. Several studies have indicated that for a woman, the greater the number of partners that her partner has had, the greater her risk for acquiring HPV--even if she only has sex with that one individual.

#### ***IV. CDC Activities to Address Genital HPV Infection, HPV Disease, and Cervical Cancer***

##### ***a) CDC HPV Clinical, Epidemiologic, and Prevention Activities***

CDC has been involved in the study of genital HPV infections for more than 20 years. Activities have included a variety of clinical and epidemiological studies of genital HPV infection. These efforts were refocused in 1999 with a report of an External Consultants' Meeting on *Prevention of Genital HPV Infection and Sequelae*, which detailed an extensive list of recommendations for public health prevention activities and research evaluation priorities (Attachment A). The following year, Congress passed Public Law 106-554, which included new provisions for CDC concerning HPV. Since the law's enactment, CDC has implemented the following activities:

- Initiated sentinel surveillance activities in collaboration with six health departments throughout the country to determine the prevalence in various age groups and populations of specific types of HPV infection in the United States.
- Initiated collection of additional HPV prevalence and surveillance information in nationally representative population samples, using CDC's National Health and Nutrition Examination Survey, that will provide specific information on HPV 16, one of the most common high-risk types of HPV associated with cervical cancer.
  
- Initiated several formative research activities to assess knowledge and attitudes of the public and HPV-infected individuals about HPV healthcare-seeking and sexual behaviors and HPV information needs.

- Completed formative research to develop a provider survey that will assess knowledge, attitudes and practices regarding HPV diagnoses and treatment. The provider survey will assess perceptions, practice barriers, and facilitators regarding HPV risk assessment, testing, treatment, counseling, and partner services.

In August 2003, the status of these activities and a timeline of their completion were outlined in a Report to Congress, Human Papillomavirus: Surveillance and Prevention Research (Attachment B).

### ***b) HPV Laboratory Studies***

CDC has conducted laboratory research on clinical outcomes of HPV disease, prevalence and risk factors for HPV, biological markers of cervical cancer and HPV, and development of sensitive HPV diagnostic tools. Examples of this research include development of:

- A national registry to describe the course of recurring respiratory papillomatosis (an infection involving the vocal cords of children and adults);
- Novel methods of HPV detection and evaluation by analysis of HPV 16 genetic changes, gene expression, and host/immune response;
- Novel biomarkers to improve early detection of cervical neoplasia with funding from the National Cancer Institute (CDC will also be initiating a study of cervical cancer in Appalachian women in Southern Ohio that will examine HPV factors in the context of socio-biologic background.); and

- Standardized methods for HPV detection, typing and serology to facilitate vaccine development, use, and evaluation, and novel noninvasive methods to monitor HPV immunity by testing saliva.

### ***c) CDC Activities to Prevent Cervical Cancer***

The Breast and Cervical Cancer Prevention Mortality Act of 1990 authorized CDC to establish the first national program to increase access to and use of breast and cervical cancer screening services. Now in its 13<sup>th</sup> year, CDC's National Breast and Cervical Cancer Early Detection Program provides cancer screening for uninsured and underserved women, particularly low-income women, older women, and women of racial/ethnic minorities. Specifically, the program provides pelvic examinations and Pap tests, along with clinical breast examinations and mammograms. It also funds post-screening diagnostic services such as surgical consultation and biopsy and colposcopy. Through this program, CDC currently funds all 50 U.S. states, the District of Columbia, four U.S. territories, and 13 American Indian/Alaska Native organizations to support activities at the state, tribal, territorial and national levels in the following areas: screening; tracking, follow-up and case management; quality assurance; public and professional education; evaluation and surveillance; and partnership development.

The program provides health care services to women who are at or below 250% of the federal poverty level, uninsured or underinsured, and ages 18 to 64 for Pap testing and 40 to 64 for mammograms. To date, almost 1.75 million women have been screened. The program has provided women with more than four million screening examinations, through which approximately 14,446 women with breast cancers, 55,210 women with precancerous cervical lesions, and 1,020 women with cervical cancers have been diagnosed. Fifty percent of the women screened are from racial/ethnic minority populations.

CDC also collects data through the Behavioral Risk Factor Surveillance System (BRFSS) to monitor the frequency of Pap tests. BRFSS is a telephone survey conducted by all state health departments, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam with assistance from CDC. The primary focus of these surveys has been on behaviors linked with chronic diseases that are the leading causes of death. This information is essential for planning and

conducting public health programs at national, state, and local levels and evaluating these programs to ensure they are effective.

Finally, in 2002, NCI and CDC collaborated on the publication of the *U.S. Cancer Statistics 2000 Incidence* report for the first time in history. Produced in cooperation with the North American Association of Central Cancer Registries, this report provides state-specific data and regional level data for cancer cases diagnosed in 1999 including cervical cancer. The same report was produced in 2003 highlighting cancer cases diagnosed in 2000. In 2004, for the first time, this report will include mortality data as well as incidence (occurrence of new cancer cases) data. With availability of broad-based cancer incidence data, we can better identify, understand and address variations in the occurrence of new cancer cases and work to reduce health disparities among different population groups.

## ***V. Prevention Strategies for HPV & HPV disease:***

### **a) Prevention Strategies for Genital HPV Infection**

Prevention of genital HPV infection is important for reducing the prevalence of genital warts and abnormal Pap tests as well as cervical cancer. The traditional public health strategy for preventing STD in a community has four components: shorten the duration of infectiousness of those who are infected, reduce the efficiency or likelihood of transmission of infection, limit the number of persons who are exposed to the person while they are infected, and locate and intervene with exposed persons before they become infectious. This is essentially the same approach used in limiting the spread of other infectious diseases (such as TB) unless there is a vaccine or other measure to reduce overall susceptibility in the population. The following is a discussion of how these strategies can be applied to genital HPV infection.

***Reducing Duration of Infectiousness*** - The most common approach to reducing the infectiousness of many STD is treatment with an antibiotic that cures the infection. In contrast to many STD, there is no effective cure for genital HPV. Treatment for HPV is limited because it is not directed to the HPV itself. Instead, treatment includes removing lesions (genital warts or abnormal cells) through cryotherapy, electrocautery, laser therapy, surgical excision, or topical

pharmacologic agents. The limited data that are available indicate that such therapies can reduce but probably do not eliminate infectiousness.

***Reducing the Likelihood of Transmission*** - The second approach to halt spread of disease is to reduce the ability of the infection to be transmitted from an infected person to another person who is not yet infected. For STD, the most common approach to reduce transmission likelihood has been physical barriers such as condoms. Many studies have evaluated the effectiveness of condoms in preventing genital HPV infection; however, all have significant methodologic limitations which make their interpretation difficult. Presently, the effect of condoms in prevention of HPV infection is unknown. While some published studies of HPV infection have found evidence of reduced risk associated with condom use, most published studies on genital HPV infection and condom use have not shown a protective effect of condoms. However, available studies suggest that condoms reduce the risk of the clinically important outcomes of genital warts and cervical cancer (see January 2004 CDC HPV Report to Congress). One possible explanation for the protective effect of condoms against warts and cancer is that condom use could reduce the quantity of HPV transmitted or decrease the likelihood of re-exposure, thereby decreasing the chance of developing clinical disease. An alternative explanation is that condom use may reduce exposure to a co-factor for cervical cancer, such as chlamydia or genital herpes, thereby reducing the chance of developing cervical cancer. The available scientific evidence is not sufficient to recommend condoms as a primary prevention strategy for the prevention of genital HPV infection. There is evidence that indicates that the use of condoms may reduce the risk of cervical cancer.

***Reduction of Sexual Behavior Risk*** - The third approach to preventing transmission of infectious disease is to limit the number of persons exposed to an individual while they are infected. Because genital HPV infection is most common in men and women who have had multiple sex partners, abstaining from sexual activity (i.e., refraining from any genital contact with another individual) is the surest way to prevent infection. For those who choose to be sexually active, a monogamous relationship with an uninfected partner is the strategy most likely to prevent future genital HPV infections. For those who choose to be sexually active but who are not in a monogamous relationship, reducing the number of sexual partners and choosing a partner less likely to be infected may reduce the risk of genital HPV infection.

***Intervene with Exposed Persons Before They Become Infectious*** - "Contact tracing," or partner notification is an important element in controlling some other STD such as syphilis and HIV. However, genital HPV infection is so prevalent that most partners of persons found to have HPV infection are infected already, so notification will not necessarily identify uninfected exposed persons in whom infection can be prevented. In addition, as mentioned previously, no curative therapy is available for HPV infection. Finally, in the vast majority of people, genital HPV infection is cleared by the body's immune system. For all these reasons, partner notification is not thought to be a useful strategy for preventing transmission of genital HPV infection.

***Vaccines*** - In contrast to other prevention approaches, vaccines are effective in preventing the spread of an infectious disease by reducing overall susceptibility in uninfected partners. A variety of HPV vaccines may provide immunity to a combination of high-risk and low-risk HPV types are under investigation. The goal of a HPV vaccine is to prevent genital warts, cell abnormalities and cervical cancer. So far, results from studies are encouraging. In one trial, an HPV-16 vaccine given to adolescent girls who were negative for HPV-16 DNA at the beginning of the study demonstrated 91% efficacy in preventing HPV-16 infection and essentially complete protection (100% efficacy) in preventing persistent HPV-16 infection and cervical cancer precursors. Trials of other HPV-16 vaccines and vaccines with multiple HPV types are underway and are likely to provide an important new approach for prevention of genital HPV infection within the next several years. Other types of research are also important for laying the groundwork for vaccine programs. Evaluations of economic feasibility, patient acceptability, and predictions about the number of cervical cancer deaths that could be averted have been promising. CDC is working with partners such as the Advisory Committee on Immunization Practices to identify information needed for public health recommendations concerning vaccinations, and with the World Health Organization to identify markers for HPV DNA to monitor population immunity. CDC and its partners are also evaluating non-invasive methods of detecting HPV infection such as in saliva. Clearly, the combination of an effective vaccine with currently used or recommended methods of prevention would provide optimal protection against HPV infection and consequences.

CDC has prepared a Report to Congress on Prevention of Genital HPV Infection. (Attachment C). This report summarizes available science and makes a series of

recommendations about the strategies most likely to be effective in preventing future infections of genital HPV infection and cervical cancer. I would like to summarize the recommendations from that report. First addressing strategies for individuals and secondly addressing strategies for public health agencies.

### ***Individual Strategies***

1) The surest way to eliminate the risk for future genital HPV infections is to refrain from any genital contact with another individual.

2) For those who choose to be sexually active, a long-term, mutually monogamous relationship with an uninfected partner is the strategy most likely to prevent future genital HPV infections. However, it is difficult to determine whether a partner who has been sexually active in the past is currently infected. Partners less likely to be infected include those who have had no or few prior sex partners.

3) For those choosing to be sexually active and who are not in long-term mutually monogamous relationships, reducing the number of sexual partners and choosing a partner less likely to be infected may reduce the risk of genital HPV infection. Partners less likely to be infected include those who have had no or few prior sex partners.

4) While available scientific evidence suggests that the effect of condoms in preventing HPV infection is unknown, condom use has been associated with lower rates of the HPV-associated diseases of genital warts and cervical cancer. The available scientific evidence is not sufficient to recommend condoms as a primary prevention strategy for the prevention of genital HPV infection. There is evidence that indicates the use of condoms may reduce the risk of cervical cancer.

5) Regular cervical cancer screening for all sexually active women and treatment of precancerous lesions remains the key strategy to prevent cervical cancer.

6) In the future, receiving a safe and effective HPV vaccine to help prevent genital HPV infection as well as the HPV-associated diseases of genital warts and cervical cancer would be an important prevention measure. However, an effective HPV vaccine would not replace other prevention strategies.

### ***Public Health Strategies***

1) Promote increased cervical cancer screening among never and rarely-screened women and appropriate follow-up of those with abnormal Pap tests.

2) Work with public and private partners to increase awareness about prevention of genital HPV infection and cervical cancer among health care providers and in the general public.

3) Collaborate with private industry to promote and accelerate the development of a safe and effective HPV vaccine;

4) Continue epidemiologic, laboratory, and behavioral research on genital HPV infection including studies of the prevalence of HPV in the United States, research on the attitudes and concerns of women diagnosed with HPV infection (e.g., concerns about cancer or about transmission), and surveys of provider knowledge and practices regarding HPV.

### ***b) CDC Strategies to Address Cervical Cancer***

CDC's strategies to address the cervical cancer burden include providing services to underserved women, providing outreach to women who have not been screened with the last three years, and developing educational materials to assist states with their public awareness/education and outreach efforts. Public education and outreach involve the design and delivery of clear and consistent messages about cervical cancer and the benefits of early detection using a variety of methods and strategies to reach priority populations. States receive funds to create and disseminate educational resources to women, especially those who are rarely or never screened.

CDC recently developed a cervical cancer fact sheet entitled *Basic Facts on Screening and the Pap Test*. This fact sheet is written at the sixth grade reading level and addresses the basics of cervical cancer and testing. The purpose of the fact sheet is to encourage women to be screened, as early detection is the key to reducing morbidity and mortality related to cervical cancer. It is available in print and on the Internet at [http://www.cdc.gov/cancer/nbcccep/bccpdfs/cc\\_basic.pdf](http://www.cdc.gov/cancer/nbcccep/bccpdfs/cc_basic.pdf).

Lastly, while CDC does not provide funding for treatment services, Congress passed the Breast and Cervical Cancer Prevention and Treatment Act of 2000 to address this issue. The Act provides Medicaid services for women screened through the National Breast and Cervical Cancer Early Detection Program if they are U.S. citizens or qualified aliens in States that elect to participate. According to the Centers for Medicare and Medicaid Services, 49 states and the District of Columbia have received approved Medicaid amendments to participate in this program.

## ***VI. Conclusion***

In closing, I would like to thank the Subcommittee again for this opportunity to describe CDC's critical activities and its strategies to prevent future genital HPV infection and cervical cancer.

I am prepared to answer any questions that members may have.