Human Papillomavirus (HPV) and Cervical Cancer: *An Update on Prevention Strategies* Script
August 9, 2005

[1]DANIELS
Hello and welcome to "Human Papillomavirus (HPV) and Cervical Cancer: *An Update on Prevention Strategies."*

I'm Kysa Daniels, your moderator for this program, which is originating from the Centers for Disease Control and Prevention in Atlanta, Georgia.

In this Webcast, we'll be discussing genital human papillomavirus (HPV) infection, a sexually transmitted disease. This is an extremely common infection of growing concern to both the public and to health care providers.

Our focus today is
- an update on the natural history of HPV infection,
- the association of different HPV types with various clinical manifestations,
- HPV transmission, and...
- methods for HPV and cervical cancer prevention.

Before we introduce our panelists, let's hear from CDC Director, Dr. Julie Gerberding.

DR. JULIE GERBERDING:
Hello! I am Dr. Julie Gerberding, Director of the Centers for Disease Control and Prevention. Thanks for joining us for this very important webcast on Human Papilloma Virus.

Genital infection with HPV is the most common sexually transmitted infection in the United States. About 20 million Americans are currently infected with the virus, and about 6.2 million people become newly infected each year.

Most infections cause no clinical problems and go away on their own without treatment. But some infections lead to genital warts in men and women, and cervical cancer in women.

Although a vaccine against HPV is in development, there is no curative treatment for genital HPV infection. Treatments are available for the abnormalities caused by HPV infection.

Persistent infection with certain types of HPV is a leading cause of cervical cancer. Progression from HPV infection to invasive cancer is a slow process, estimated to take 10-15 years or longer. Cervical cancer is an uncommon consequence of HPV infection. Nevertheless, regular screening for cancer with Pap tests can detect cervical abnormalities that can be treated before they

become cancerous. Screening also helps detect cancer at an early stage where it can be cured in over 90 percent of people.

In the past 40 years, widespread cervical cancer screening using the Pap test and treatment of precancerous cervical abnormalities have resulted in a dramatic decrease in the incidence and mortality due to cervical cancer in the United States.

However, each year in the U.S., more than 10,000 women still develop cervical cancer and over 3,000 women die from it. Sadly, of women in the U.S. who develop cervical cancer, about half have never had a Pap test.

For this reason, CDC established an HPV and cervical cancer workgroup that involves scientists from four of CDC's 12 national centers. The workgroup helps us bring our best experts together so we can have more impact on this important health threat.

This Webcast focuses on the prevention of genital HPV infection in men and women. It summarizes key aspects of the epidemiology of HPV infection and its transmission, and discusses the best strategies to prevent HPV infections and its associated diseases. This knowledge can help support the action that we must take to decrease the threat of HPV and protect women and men from the preventable diseases it causes. Thank you.

Thank you, Dr. Gerberding. Now it's time to introduce our guests for today's program.

Dr. John Douglas is the Director of the Division of Sexually Transmitted Disease Prevention of the National Center for HIV, STD, & TB Prevention at CDC.

Dr. Mona Saraiya is a medical epidemiologist working in the Epidemiology and Applied Research Branch of the Division of Cancer Prevention and Control at the National Center for Chronic Disease Prevention and Health Promotion at CDC.

And Dr. Tom Wright is Associate Professor of Pathology at the College of Physicians and Surgeons at Columbia University. Welcome to all of you.

Before we begin, allow me to go over a few details about today's program. This program will be available for viewing at the program website at www.phppo.cdc.gov/PHTN/HPV-05.

We will be offering continuing education credits for various professions based on one hour of instruction. Credit will be available by registering and completing an evaluation at www.phppo.cdc.gov/ phtnonline. The course number for this program is WD0075. Credit will be available through August 2008.

If you need additional help you may call 800-41-TRAIN or 404-639-1292, Monday through Friday, from 8 am until 4:40 pm Eastern time.
Or, you may write us at C-E at C-D-C dot G-O-V. *[PAUSE]*

Now, let's review the objectives for this program.

Upon successful completion, you should be able to identify high-risk and low-risk types of genital HPV infection, and discuss the epidemiology of genital HPV infection in the United States.

You should also be able to describe the natural history of genital HPV infection and identify methods used to detect cervical cellular abnormalities for the prevention of cervical cancer ....and describe the clinical uses of the HPV DNA tests in the context of Pap test screening and management.

Finally, you should be able to summarize appropriate patient counseling messages for genital HPV infection, and identify methods for preventing genital HPV infection.

At the end of the program, there will be a question and answer session, at which time the panel will answer questions that have been previously e-mailed.

We will not be accepting phone calls.

Dr. Douglas, let's begin with you for an introduction to genital HPV infection.

[3]DOUGLAS
Thank you, Kysa.

Genital HPV infection is very common in sexually active men and women.

It's estimated that at least 50 percent of sexually active <u>women</u> are infected with genital HPV at some point in their lives, and it's likely that comparable rates would be found in <u>men</u> ...if there were good HPV testing methods available for men.

Papillomaviruses are a complex group of DNA tumor viruses. They are found in many species, where they can cause benign growths, or papillomas, and cancers. They can't be routinely grown in the lab.

This makes it hard to test experimental treatment. Papillomaviruses are most commonly detected by the presence of DNA.

HPV types are distinguished by genetic sequences, hence their designation as genotypes. More than 30 genotypes of HPV are sexually transmitted and can infect the genital tract.

Genital HPV infection is a sexually transmitted infection, but it's not transmitted like many other STDs, which are passed from partner to partner through semen or other bodily fluids. Instead, it's transmitted through skin-to-skin contact.

Genital HPV infections are transmitted primarily by penetrative genital contact, usually through vaginal or anal sex. But penetration isn't the only way HPV can be transmitted.

It can also be passed through oral-genital, manual-genital, and external genital, genital contact, although we believe these routes of transmission are much less efficient and thus, much less common than sexual intercourse.

In most cases, genital HPV infection is transient, asymptomatic, and resolves without treatment or without a person ever being aware they had the infection.

When clinical manifestations do occur in adults, they most typically include: genital warts, as shown on this slide, cellular abnormalities known as intra-epithelial neoplasia, and anogenital squamous cell cancers.

The most common clinically significant manifestation of genital HPV infection is cervical intra-epithelial neoplasia, or CIN, which is detected by Pap test screening.

CIN is generally classified as low-grade, or CIN1, or high-grade, including CIN 2 or 3. High-grade abnormalities have some risk of progression to cancer and are thus considered cancer precursors.

Finding and treating these high-grade lesions through Pap smear screening is the backbone of cervical cancer prevention programs.

The approximately 30 types of genital HPV are divided into low-risk and high-risk types based on their association with cervical cancer.

Low-risk types of genital HPV can cause genital warts and benign or low-grade cervical cell changes that result in mild Pap test abnormalities.
These abnormalities are not associated with cervical cancer.

An estimated 1.4 million people have genital warts at any one time in the United States. That's about 1% of the sexually active population, making genital warts one of our most common STDs.

Very rarely, genital HPV infection can also occur in the respiratory tract where wart-like lesions cause a syndrome known as recurrent respiratory papillomatosis, or RRP. This syndrome can occur in adults, possibly due to oral-genital sexual contact, but is more common in young children due to perinatal transmission. In children, estimates of the incidence rate for RRP are imprecise,

but range from 0.4 to 1.1 cases per 100,000 children. Although data are limited, cesarean delivery does not appear to be protective and is not recommended to prevent RRP in the children of women with genital warts. The most common low-risk HPV types are types 6 and 11. Other low-risk types include types 40, 42, 43, 44, 54, 61, 72, 73, and 81.
The vast majority of genital warts are caused by types 6 and 11.

While all of the low-risk types can cause low-grade Pap smear abnormalities, .it is important to emphasize that they are rarely associated with higher-grade cervical cell changes.

Because of this, testing for low-risk types is not recommended for clinical management.

Infection with high-risk types of genital HPV can cause both low-grade and high-grade cervical cell abnormalities.

In rare cases, infection with high-risk genital HPV that is not cleared by the immune system
– known as persistent infection
– can cause cancers of the cervix, vulva, anus, and penis.

Common high-risk types of genital HPV are 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, and 82.

HPV 16 is found in approximately half of all women with cervical cancers. HPV 16 is also the single most commonly identified HPV type in CIN 2, 3.

Infection with high-risk types of genital HPV is much more common than infection with low-risk types.

Again, it is important to emphasize that. In addition, an estimated 5%-30% of people infected with genital HPV are infected with multiple types of the virus.

Infection with either low-risk or high-risk types of genital HPV usually causes no clinical signs or symptoms and is transient.

As mentioned, genital HPV infections are primarily transmitted through sexual activity.

And because people infected with genital HPV typically don’t know that they have the virus, infections are commonly shared between sex partners.

Certain risk factors are associated with acquiring a genital HPV infection. These include being 25 years of age or younger, and having first sexual intercourse at the age of 16 or younger.

The risk of acquiring a genital HPV infection increases with an increasing number of lifetime sex partners. In addition, having sex with a new partner may be a stronger risk factor for acquiring a genital HPV infection than having sex with a steady partner. Finally, having sex partners who have had multiple sex partners also increases the risk of infection.

[4]DANIELS
Thank you, Dr. Douglas.

Since genital HPV infections are so common in the United States,
Dr. Saraiya, what can you tell us about the epidemiology of genital HPV infection and cervical cancer in this country?

[5]SARAIYA
Well, Kysa, it's difficult to assess incidence and prevalence information on genital HPV infection because it's not a reportable infection in any state, although genital warts are reportable in a few states.

The reason for this is that most genital HPV infections are brief and symptomatic or sub clinical — that is, they usually have no visible clinical manifestations or clinical consequences. Given the high prevalence of infection, case reporting would be burdensome for providers, health departments, and laboratories while at the same time providing no personal or public health benefit.

However, as already mentioned, infection with genital HPV is believed to be extremely common.

CDC estimates that 15% of the population
--or about 20 million people
--currently have a detectable genital HPV infection, and an estimated 9.2 million sexually active adolescents and young adults 15 to 24 years of age are infected with genital HPV.

An estimated 6.2 million new genital HPV infections occur each year.

It is important to emphasize that only a small percentage of women infected with genital HPV develop persistent infections.

And only women who develop these persistent infections are at risk for developing high-grade cancer precursors and cancers.

The most critical risk factor for developing cervical cancer is not participating in a routine cervical cancer screening program.

Other risk factors that may increase the chance of developing cervical cancer precursors and cervical cancers include:

-- Cigarette smoking which has been consistently shown to be an independent risk factor
-- Less consistent, but A few well-designed studies have also shown that long-term use of oral contraceptives and having a high number of live births is also a risk factor.

And co-infection with Chlamydia trachomatis or *herpes simplex virus type 2* may be considered cofactors along with HPV

Cervical cancer once claimed the lives of more American women than any other type of cancer.

But over the last 40 years, widespread cervical cancer screening using the Pap test and treatment of precancerous cervical abnormalities has resulted in a marked reduction in the incidence of and mortality due to cervical cancer in the United States.

Incidence of new cervical cancer cases has fallen by approximately 75% since the introduction of Pap screening programs.

This slide here using cancer registry data shows how both new cases and deaths from cervical cancer have dropped approximately 30 to 40 percent over the last 25 years.

According to the American Cancer Society, there will be 10,370 new cases of cervical cancer and 3,710 deaths from the disease in 2005.

But there are disparities in both incidence and mortality in cervical cancer among certain racial and ethnic subgroups.

For example, using data from CDC's National Program of Cancer Registries and NCI's SEER Cancer Registries, we see that incidence rates for cervical cancer among black women is about 1.5 times that in white women.

Similarly, rates for Hispanic women are 1.5 times higher than that of non-Hispanic women and, although not shown on this slide, incidence for certain Asian subgroups, such as Vietnamese women, are much higher than other Asian subgroups.

In general, women born outside the United States have higher mortality rates from cervical cancer than U.S. born women.

This map shows that even in the U.S., there are some regional disparities. The red areas indicate the higher mortality rates.

As you can see, the Appalachian states, states in the south, and states bordering Mexico have higher mortality rates from cervical cancer.

At least some of these variations are explained by differences in socioeconomic indicators such as income, education, possibly cultural barriers, and access to screening.

Usually we think in terms of predisposing factors which contribute to cervical cancer incidence for example,
- HPV,
- sexual activity at an early age,
- multiple sexual partners, and
- smoking), .but we've now identified that the most serious factor contributing to cervical cancer incidence and mortality is lack of screening.

This pie chart highlights experience with cervical cancer screening among women who actually develop cervical cancer.

While there are a variety of factors contributing to failure of the prevention program, such as; false negative cytology tests and inadequate follow up, by far the largest factor is lack of screening.

Up to 60% of cervical cancer cases in the United States occur among women who have never been screened or rarely been screened.

Even when it comes to Pap testing in the U.S., there are some women who are less likely to have had a recent Pap. Data from a 2000 national health interview survey shows that, overall, 83 percent of women reported a Pap in the last 3 years —but the data also showed considerably lower screening rates among
- women without health insurance,
- recent immigrant women, and
- women of Hispanic or Asian origin.

[6]DANIELS
Thank you, Dr. Saraiya.

Now, for the natural history of genital HPV infection, let's go to Dr. Wright.

[7]WRIGHT
Thanks, Kysa.

As we've stated, most genital HPV infections are asymptomatic or sub clinical, and are transient. They have no clinical consequences in immunocompetent individuals.

The interval between first exposure and clinical signs is unclear, but it's probably three weeks to one year for genital warts.

Most genital HPV infections clear spontaneously within 1-2 years.
HPV 16 is more likely to persist than other HPV types, but in most cases, even with HPV 16, infection becomes undetectable within two years.

The gradual development of an effective immune response is thought to be the likely mechanism for HPV DNA clearance.

Currently it is unclear whether those genital HPV infections that become non-detectable using standard molecular tests have completely cleared or whether they remain latent in basal cells with the potential for later reactivation.

If the virus is able to remain in a nondetectable dormant state and reactivate many years later, it may explain why some older women in a mutually monogamous relationship can begin to shed genital HPV.

It's also important to note that HPV is more likely to be detected in people who are immunosuppressed,.such as those who are HIV-infected, have had an organ transplant, or are undergoing chemotherapy.

An HPV infection that persists is required for high-grade cervical cancer precursors and invasive cervical cancers to develop.

A persistent infection is an infection that is not cleared by the immune system and is characterized by persistently detectable HPV DNA.

Factors associated with persistent infection include being 30 years of age and older, having high-risk HPV types, and having a suppressed immune system.

However, it's important to note that most women with persistent HPV infection do not develop precancerous cervical cell changes or cervical cancer.

[8]DANIELS
What do clinicians need to know about cervical cancer screening and current recommendations, Dr. Saraiya?

[9]SARAIYA
Cervical cell abnormalities are frequently attributed to the transient presence of certain HPV types. These abnormalities usually have no signs or symptoms, and they often regress spontaneously without either detection or treatment.

When cervical cell abnormalities are detected, it's usually by cervical cytology — the Pap test. Cervical cytology is used as a screening tool to identify women who need a diagnostic biopsy. Characteristic changes in the cells shed and scraped from the surface are predictive of underlying changes.

Histological evaluation, on the other hand, requires a full thickness biopsy or excision.

Biopsies are usually obtained while visualizing lesions with colposcopy—a magnified examination of the cervix.

Biopsies are considered the "gold standard" and key to diagnosis of cervical cell abnormalities.

Here is a slide that shows the difference between histology and cytology.

The Pap test does not directly detect HPV. It detects - epithelial cell changes that are frequently due to genital HPV infection.

If they are not detected, these changes may lead to cervical cancer.

There are two Pap test methods - the conventional Pap test and the newer liquid-based cytology or LBC. Each has pros and cons.

In a conventional Pap test, cells are scraped from the cervix and placed on a slide to be examined in a laboratory.

The sensitivity of a single conventional cytology test is between 51% and 88%, although the sensitivity increases with repeated testing as is currently recommended.

The specificity of a single conventional cytology test is between 95% and 98%.
False negatives in conventional Pap tests can occur for a number of reasons:
- samples may not contain enough cervical cells,
- abnormal cells may be hard to see because of inflammation or mucus,
- or a lab technician may simply not see abnormal cells.

For LBC, cells are suspended in liquid medium and then applied to a slide in a laboratory as a thin cellular layer, eliminating most blood, mucus, and inflammatory cells. There has been a lot of controversy about the comparative sensitivities and specificities of the 2 approaches, largely due to a lack of well-designed studies.

The Liquid based Pap has a higher sensitivity but lower specificity. The evidence based on sensitivity and specificity of conventional Pap vs. liquid-based cytology does not indicate that LBC should be the standard.

There are other factors, though, that might make LBC more attractive. Because only a portion of the LBC sample is used in preparing the slide for cytologic examination, residual material can be used for HPV DNA testing when very mild cytological abnormalities are found which are referred to as ASC-US.

Conventional cytology requires the collection of a separate sample at the time of the cervical swab or a return visit by the patient for collection of a new sample.

More satisfactory results have been reported with LBC, in part because the technique reduces problems with preparation of the sample.

The disadvantage of LBC tests is that they are more expensive than conventional cytology.

The 2001 Bethesda System is a modification of the previous one from the 1990's for classifying PAP test results. I'll be focusing today on squamous cell abnormalities in the Bethesda system, which differs from the older classification system in that it subdivides atypical squamous cells, or ASC, that don't appear to be completely normal into two categories.

The first is atypical squamous cells of undetermined significance, or ASC-US. ASC–US changes are usually mild or equivocal abnormalities, and are sometimes related to genital HPV infection.

These are quite common in the United States. Approximately 4%-5% of all cervical cytology results are reported as ASC-US.

The second is ASC–H, or *atypical squamous cells* that cannot exclude a high-grade squamous intraepithelial lesion, or HSIL.

ASC–H changes are more likely to be precancerous abnormalities.

A separate category is low-grade squamous intraepithelial lesion, or LSIL, which are generally cellular changes due to a transient infection with a high-risk HPV type. This encompasses HPV, mild dysplasia, and CIN 1.

The last category is high-grade squamous intraepithelial lesion, or HSIL--generally cellular changes due to a persistent infection with a high-risk HPV type with a higher risk for progression to cervical cancer.

This encompasses: moderate and severe dysplasia, CIN 2, CIN 3 and CIS.

This slide shows us just how common these Pap test abnormalities are.

It is estimated that of the 50 million Pap tests that are performed every year, approximately
-- 2 million are ASC-US Paps, these include a small proportion that are ASC-H,
-- 1 million are LSIL Paps, and
-- 300,000 HSIL Paps.

In addition to these new Bethesda Classifications, several organizations provide guidelines for cervical cancer screening, including:
- the age to begin screening,
- screening intervals, and
- special considerations.

These organizations include the American Cancer Society (ACS), the American College of Obstetricians and Gynecologists ACOG), and the U.S. Preventive Services Task Force (USPSTF).

These organizations have agreed on several things in the last decade, in particular the age to start screening, and who not to screen.

However, there are some differences. They also differ in how often to screen, and on the use of HPV testing in cervical cancer screening.

All 3 organizations suggest that cytologic screening begin within three years of onset of sexual intercourse or age 21, whichever comes first, and that women be screened at least every three years.

However, the ACS recommends that screening be conducted yearly with conventional Pap tests and biennially with liquid-based cytology methods up until age 30.

ACOG recommends yearly screening up until age 30, regardless of the Pap test type used.

According to the ACS and ACOG, regardless of the Pap test women at or older than age 30 who have had 3 consecutive, technically satisfactory normal/negative cytology results may be screened every two to three years.

Of course, women who have a history of in-utero DES exposure, are HIV positive, or are immuno- compromised. These women may require more frequent screening.

As to when to stop screening, the USPSTF and ACS recommends against routinely screening women older than 65 to 70 respectively if they have had adequate recent screening with normal Pap smears and are not otherwise at high risk for cervical cancer.

ACOG states that it is difficult to set an upper age limit, and that it should be determined on an individual basis, based on medical history and risk factors for CIN.

The USPSTF, ACOG, and ACS recommend against routine Pap smear screening in women who have had a total hysterectomy for benign disease. A molecular test to detect HPV DNA has been approved by the FDA.
This test, known as solution hybridization, detects most of the high-risk types and several of the more common low-risk types of HPV.

The FDA approved the high-risk HPV DNA test to be used in basically 2 ways:
-- For management of women with ASC-US Pap tests in the context of screening.
-- HPV DNA testing may be added to cervical cytology for screening in women 30 years of age and older.

This has been called adjunct screening, primary screening, or HPV with PAP test screening.

Tom will provide more detail on this later.

As you can see in this slide, several organizations have followed with recommendations on the use of the HPV test for both ASC-US triage and for HPV testing with the Pap test for routine cervical cancer screening. Although the USPSTF did not address HPV testing for management of abnormal Pap tests, USPSTF found insufficient evidence for primary screening.

The American Cancer Society stated that HPV testing along with the Pap test for routine cervical cancer screening is an option.

The American College of Obstetricians and Gynecologists recommends — as does the American Society of Colposcopy and Cervical Pathology —HPV testing for both indications.

[10]DANIELS
Thanks, Dr. Saraiya. Dr. Wright, can you provide more detail in the role that HPV DNA testing plays in cervical cancer screening and management of abnormal Pap tests?

[11]WRIGHT
With the recent FDA approval of HPV DNA testing as an adjunct to the Pap test to screen for cervical cancer in women 30 years or older, this approach is beginning to be used by some clinicians. Both the American Cancer Society and the American College of Obstetricians and Gynecologists consider this to be an acceptable approach to screening women 30 years and older.

Recently ACS, NCI, and ASCCP published guidance to help in the management of specific test results when HPV testing is used as an adjunct:

Women who are negative by both HPV DNA testing and cytology, which should be the majority of women, should not be rescreened before three years. This is because their risk of developing CIN is quite low.

Women who are cytology negative but HPV DNA positive should not undergo colposcopy.

Instead HPV DNA testing along with cervical cytology should be repeated at 6-12 months.

Finally, women who has a LSIL or greater PAP test should be referred to colposcopy, irrespective of their HPV result.

Use of the combination of HPV DNA testing and cervical cytology should be discontinued at the same age, and under the same circumstances, as discontinuance of cervical cytology screening.

However, because 5%-15% of women age 30 and older will be high-risk HPV DNA positive, concern has been raised about the potential negative impacts of using HPV DNA testing for screening.

These concerns are related to lack of counseling of women with respect to their risk of cervical disease, the source of their infection, and their infectivity. There is also fear that HPV DNA positive women without CIN 2, 3 or cancer will undergo unnecessarily intensive and expensive follow-up or treatment.

It needs to be stressed that HPV DNA testing with the Pap test is not approved as a screening method for women under age 30.

This is because there's a very high rate of transient HPV infection in this age group.

In adolescents and young adults in their 20's, the prevalence of high-risk HPV DNA positivity is high, while the prevalence of cancer is relatively low.

HPV DNA testing is also not recommended for use in women who are immuno-suppressed for any reason including infection with HIV. This is because testing has no proven role in clinical management.

The other way in which HPV DNA testing is widely used in the United States is to determine which women with very mild cytological abnormalities, referred to as ASCUS, require additional workup. As already mentioned, ASCUS results are quite common, about 5% of all Pap tests.

The 2001 Consensus Guidelines identify three approaches to managing women with ASCUS.

These include:
-- repeating the Pap test twice at 4-6 month intervals,
-- performing immediate colposcopy, or
-- testing for high-risk HPV DNA.

HPV DNA testing identifies those women with ASCUS who are at greatest risk for having a high-grade cervical cancer precursor and who need colposcopy.

In contrast, women with ASCUS who are HPV DNA negative can simply be followed-up with a repeat cytology in one year.

It needs to be pointed out that HPV DNA testing is not indicated in a number of situations. These include women or men diagnosed with external genital warts, for women or men as a general screening test for HPV.

HPV testing is also not indicated for women with LSIL, HSIL, or ASC-H Pap test results.

Testing is not recommended in those situations because there is no evidence that it improves clinical management.

And for men, HPV DNA test reliability is not well defined.

[12]DANIELS
Dr. Wright, *how should providers counsel and educate their patients about genital HPV infection?*

[13]WRIGHT
Kysa, the general U.S. population has very limited knowledge about genital HPV infection and its relationship with cervical cancer. Nonetheless, studies have found a high level of anxiety and concern among women when informed that they are infected with genital HPV.

Patient counseling and education about HPV should take place
-- when genital warts are diagnosed,
-- at Pap screening visits,
-- when a Pap test result is abnormal, and
-- when a HPV test is positive.

Counseling should include:
- general information about HPV infection,
- how HPV infection is transmitted,
- how to prevent HPV infection and its clinical manifestations, and.
- partner issues.

Counseling may be assisted by the use of written materials.

The general information about genital HPV infection that patients need to know starts with the fact that most sexually active adults will become infected with genital HPV at some point in their lives, and the infection usually goes away.

Patients need to know that the interval between time of infection and onset of signs or symptoms is variable, and it is often difficult to determine the source of infection.

They also need to know that there are two types of genital HPV.

Low-risk genital HPV types that are associated with mild Pap test abnormalities and genital warts and high-risk types that can be associated with high-grade cancer precursor lesions as well as cancers of the cervix, vulva, anus, and penis.

When counseling patients, it needs to be stressed that persistent infection over many years with a high-risk genital HPV type is necessary but is not sufficient for the development of cervical cancer.

The vast majority of women infected with low-risk or high-risk HPV types will not develop significant cervical cancer precursors and will never develop cervical cancer.

As for how genital HPV infections are transmitted, patients need to know that it’s usually difficult to determine the source of infection, and that infection is not evidence of infidelity.

Moreover, the likelihood of transmission and duration of infectivity with or without treatment cannot be predicted in an individual patient.

Strategies to prevent genital HPV infection include:
- abstinence from sexual activity,
- mutual monogamy with an uninfected partner,
- limiting the number of sex partners, and
- using condoms.

Having said this, the most important thing sexually active women can do to avoid getting cervical cancer is to have regular cervical cancer screening.

With respect to partner issues, the key counseling points are:
First, patients need to know that genital HPV is commonly transmitted between sex partners, making it likely that partners are already infected once an HPV infection is detected.

Second, the value of disclosing a past diagnosis of genital HPV infection to future partners is unclear, although candid discussions about past STDs should be supported whenever possible.

And finally, sex partners of patients diagnosed with genital warts may benefit from an examination to assess for the presence of genital warts and other STDs.

[14]DANIELS
Thank you, Dr. Wright.

Dr. Douglas, *can you elaborate on preventing the transmission of genital HPV infections?*

[15]DOUGLAS
Sure, Kysa.
In general, strategies to prevent transmission of sexually transmitted infections include:
-- reducing the duration of infectiousness by treatment,
-- decreasing the efficiency of transmission by measures aimed at reducing infectivity, and
-- reducing the number of sex partners.

First, regarding treatment, currently there is no effective systemic treatment for genital HPV infection.

Genital warts are treated with topical pharmacologic agents.

Cervical cancer precursors are treated with local measures such as cryotherapy, electrocautery, or surgical excision.

Evidence indicates that currently available therapies for HPV-related cervical cell abnormalities and genital warts may reduce infectiousness, but probably don't eliminate it.

Second, the most common approach to decreasing the efficiency of transmission of a STD is to use a physical barrier such as a condom.

However, because genital HPV infections are transmitted through skin-to-skin contact, and because infections can occur in male and female genital areas that are not covered by a latex condom as well as those areas that are covered, condoms can't offer complete protection from genital HPV infection.

Because of inadequate existing scientific studies, just how effective condoms are in preventing genital HPV infection is unknown and thus they cannot be relied upon as a primary strategy for prevention of these infections.

However, condoms have been associated with lower rates of genital warts and cervical cancer.

Third, the most effective way to avoid acquiring genital HPV infection is to limit the number and type of sex partners.

The surest way to prevent future genital HPV infection is to abstain from any genital contact, including non-penetrative intimate contact of the genital area.

For those who choose to be sexually active, long-term mutual monogamy with a single uninfected partner is likely to be the next most effective way to prevent infection.

However, as we discussed, it is difficult to determine whether a partner who has been sexually active in the past is currently infected with HPV because there is no general screening test for HPV —and most infected people are asymptomatic and have no clinical manifestations of infection.

For people who are sexually active who are not in a long-term mutually monogamous relationship, reducing the number of sex partners and choosing a partner who is less likely to be infected with genital HPV —meaning a partner with no or few previous sex partners —may reduce the risk of acquiring genital HPV infection.

Finally, the most important thing sexually active women can do to avoid getting cervical cancer is to have *regular cervical cancer screening* with the Pap test and follow up as recommended.

[16]DANIELS
Dr. Douglas, *is there a vaccine for genital HPV infections?*

[17]DOUGLAS
Not currently, Kysa.
However, several potential HPV vaccine approaches are under investigation. These vaccines use viral-like particles (VLPs), which preserve native conformation of viral proteins but are non-infectious because they lack viral DNA.

In a recent double-blind, multi-center randomized clinical trial, administration of an HPV type 16 VLP vaccine was highly effective in preventing persistent HPV 16 infection and also HPV-16-related CIN.

Likewise, a study of a combined HPV 16-18 vaccine was also highly effective in preventing persistent infections and abnormal Pap smears caused by both types.

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 may be an important prevention measure.

However, because vaccines are unlikely to provide 100% protection and because they likely will not include all types of genital HPV, an effective HPV vaccine would <u>not</u> replace other prevention strategies such as reduced sexual exposure and regular Pap tests.

[18]DANIELS
In closing, Dr. Douglas, *what are the bottom line key messages about genital HPV infection that clinicians should convey to their patients?*

[19]DOUGLAS
Well Kysa, there a number of messages that clinicians should convey to their patients.

First, HPV infection is common in sexually active adults.

Second, most HPV infections are transient and have no signs or symptoms.

Third, persistent infection with a high-risk HPV type is necessary but not sufficient for the development of cervical cancer.

And last, cervical cancer is by far the most important problem caused by genital HPV infection.

The most important tool to prevent it is regular Pap test screening and follow-up for all sexually active women.

[20]DANIELS
Doctors, thank you for bringing us up to date on preventing and treating genital human papillomavirus infection and cervical cancer.

Now we'll move on to the question and answer segment of our program.

Please be reminded that these questions were submitted via email prior to this webcast by you, our viewing audience.

(Q & A 10 minutes not scripted)

[21]DANIELS
Thank you, doctors. That ends our question and answer period.

And, thank you for your attention during this Webcast. We have attempted to provide you with an update on prevention strategies for genital HPV infections and cervical cancer.

We hope that this presentation will help clinicians understand, diagnose, and manage genital HPV infections.

I'd like to thank our panelists...Doctors John Douglas, Mona Saraiya, and Tom Wright.

This brings us to the close of *"Human Papillomavirus (HPV) and Cervical Cancer: An Update on Prevention Strategies."*

I'm Kysa Daniels and it has been my pleasure to be your moderator today.

Good-bye.

****