13 · Cervical Cancer

CHAPTER CONTRIBUTORS

COMMITTEE MEMBERS

Ann C. Klassen, PhD (CHAIR)
Johns Hopkins Bloomberg School of Public Health

Tamika Felder
Tamika and Friends, Inc.

Donna Gugel, MHS
Center for Cancer Surveillance and Control,
Maryland Department of Health and Mental Hygiene

Niharika Khanna, MD
Department of Family and Community Medicine,
University of Maryland School of Medicine

Courtney Lewis, MPH, CHES
Center for Cancer Surveillance and Control,
Maryland Department of Health and Mental Hygiene

Helene O'Keefe, CNM, MSN
Center for Maternal and Child Health,
Maryland Department of Health and Mental Hygiene (former)

Sara Seitz, MPH
Center for Cancer Surveillance and Control,
Maryland Department of Health and Mental Hygiene

Judy Trickett, BSN, MPH
Carroll County Health Department

Meredith Truss, MPP
Center for Cancer Surveillance and Control,
Maryland Department of Health and Mental Hygiene

EXPERT GUEST SPEAKERS

Fouad M. Abbas, MD
Sinai Hospital of Maryland

Patti Gravitt, PhD
Johns Hopkins Bloomberg School of Public Health

Connie Trimble, MD
Johns Hopkins School of Medicine

13

CERVICAL CANCER

Of all cancers that affect women, cervical cancer is one of the most preventable. Yet, worldwide, cervical cancer remains the second most common cancer among women. In 2008, there were nearly 530,000 new cervical cancer cases and 275,000 deaths attributed to cervical cancer around the globe.[1]

DID YOU KNOW?

Since the development of the Pap test in the early 1940s the number of women dying from cervical cancer in the US has decreased dramatically. The HPV vaccine also shows promise to aid declines in cervical cancer death.

THE AMERICAN CANCER SOCIETY projects that about 12,000 cases of cervical cancer will be diagnosed nationally in 2010.[2] In that same year in Maryland, it is estimated that approximately 200 women will be told that they have invasive cervical cancer and 80 women will die because of this disease.[3]

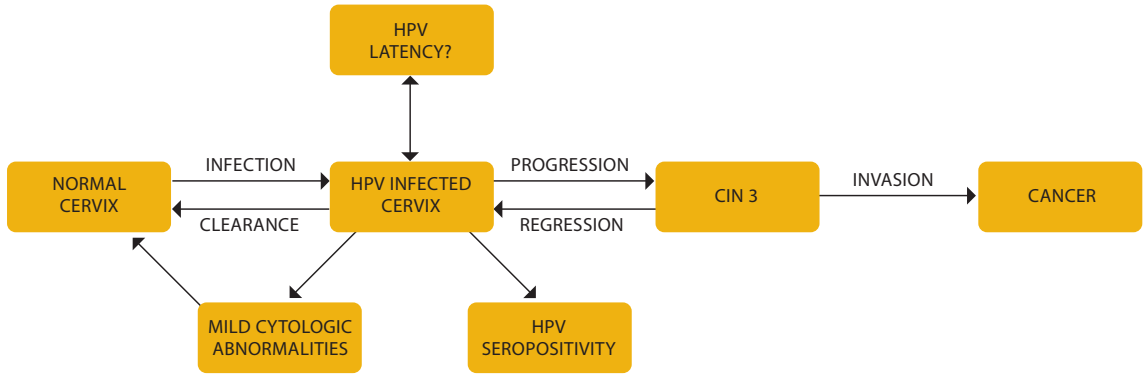
To a greater extent than with many cancers, effective tools for the control of cervical cancer have been identified. Since the development of the Pap test (Pap smear) in the early 1940s, the number of women dying from cervical cancer in the United States has decreased dramatically. Each year, more than 55 million Pap tests are performed in the United States. Of the 79.6% of women in the United States who report having a Pap test within the past three years, approximately 6% will have an abnormal result that requires additional testing.[4] However, the majority of new cervical cancer cases (60% to 80%) are among women who have not had a Pap test in the past five years, demonstrating the success of the Pap test as an early screening tool.[5]

The HPV (human papillomavirus) vaccine also shows promise to aid declines in cervical cancer death.

Natural History of Cervical Cancer

THE LOWER PART OF THE UTERUS is known as the cervix, and it connects the uterus with the birth canal. Cervical cancer originates when cells on the surface of the cervix begin to grow uncontrollably, usually initiated by persistent infection with the human papillomavirus. Initially the

FIGURE 13.1 Natural History of Cervical Cancer



Source: Mark Schiffman, MD, MPH, National Cancer Institute.

uncontrolled growth is not cancerous and may be referred to as cervical dysplasia or SIL (squamous intraepithelial lesions). If left untreated, the dysplasia may worsen and become carcinoma in situ. This is the earliest stage of cancer, when the tumor has not yet spread or invaded surrounding tissues. At this stage, dysplasia and carcinoma in situ can often be removed by a colposcopy-directed biopsy, or LEEP (loop electrosurgical excision).[6] Invasive cancer develops when abnormal cells begin to invade normal cells.

Figure 13.1 describes the natural history of cervical cancer. Changes in the cells of the cervix can range from atypical squamous cells of undetermined significance (ASC-US) to low-grade squamous intraepithelial lesions (LSIL) to high-grade squamous intraepithelial lesions (HSIL) to invasive cancer. The precancerous conditions LSIL and HSIL are also referred to as cervical intraepithelial neoplasia (CIN) 1, 2, and 3. These lesions can persist, regress, or progress to an invasive malignancy. High-grade SIL (CIN 2-3) is more likely to persist or progress and less often regresses spontaneously, while low-grade SIL (CIN 1) often regresses without treatment. The average time for progression of CIN 3 to invasive cancer has been estimated to be 10 to 15 years.[7] There is a small subset of rapidly progressive cervical cancers that are diagnosed within three years of a confirmed negative Pap test. These tumors occur in younger women. One-third of these cancers are adenocarcinomas of endocervical origin, which may not be adequately screened by conventional Pap test methods.[8]

Risk Factors

Biologic Processes and Causal Risk Factors

HPV INFECTION

Cervical infection with HPV is the primary risk for cervical cancer. There are more than 80 types of HPV. About 30 types can infect the cervix and about half of these have been linked to cervical cancer. Infection with this type of HPV is necessary but not sufficient for the development of invasive cervical cancer.[9]

Infection with HPV is extremely common; most women will become infected with HPV at some point in their lives. Most infections are cleared, although emerging research is exploring the issue of HPV latency in the cervix.

OTHER RISKS AND CO-FACTORS

ALTHOUGH HPV INFECTION is the primary risk factor for cervical cancer, other risks have been identified. There are also co-factors that increase the risk for cervical cancer among women infected with HPV. These risks and co-factors are described below:[10]

- Sexual history: Because HPV infections are spread through sexual contact, women who become sexually active at a young age and have many sexual partners have a greater risk of being infected with HPV and developing cervical cancer.

- Tobacco exposure (co-factor): Smoking and exposure to environmental smoke is associated with increased risk among HPV-infected women although the mechanism is not definitively identified.
- Human Immunodeficiency Virus (HIV) infection (co-factor): Women who are HIV positive have a higher risk for cervical cancer because HIV weakens the immune system and reduces the body's ability to destroy cancer cells.[11]
- Giving birth to many children: Women who have had seven or more full-term pregnancies may have an increased risk for cervical cancer.
- Long-term use of oral contraceptives: Women who have used oral contraceptives ("the pill") for five years or more may have an increased risk for cervical cancer.

TABLE 13.1 **Cervical Cancer Incidence Data by Race, Maryland and the US, 2004-2006**

	TOTAL	WHITES	BLACKS	OTHER
2004				
MD New Cases (count)	226	133	83	s
MD Incidence Rate	7.5	6.7	10.1	**
US SEER Rate	8.2	8.0	11.0	7.2
2005				
MD New Cases (count)	254	155	76	15
MD Incidence Rate	8.5	7.8	9.1	**
US SEER Rate	8.1	8.0	9.2	7.8
2006				
MD New Cases (count)	199	112	57	17
MD Incidence Rate	6.7	5.8	7.1	9.8
US SEER Rate	8.0	7.9	9.4	7.1

Rates are per 100,000 and are age-adjusted to 2000 US standard population.
Total includes cases reported as unknown race.
s = Counts are suppressed in CRF Cancer Report tables to prevent disclosure of data in other cell(s).
** MD incidence rates based on case counts of 1-15 are suppressed per DHMH/MCR Data Use Policy.
Sources: Maryland Cancer Registry, 2004-2006.
NCI SEER*Stat (US SEER 17 rates).

Epidemiologic Patterns of Association

AGE

RATES OF INVASIVE CERVICAL CANCER increase with age. The median age of diagnosis for invasive cervical cancer at all stages is 47. However, the burden of cervical cancer is greatest in older women.[12]

PAP TEST HISTORY

Women who have never had a Pap test or who have not had one for several years have a higher than average risk of developing cervical cancer.[13]

Burden of Cervical Cancer in Maryland

INVASIVE CERVICAL CANCER represents about 2% of all newly diagnosed cancers among Maryland women. In 2006, 199 Maryland women were diagnosed with invasive cervical cancer. The Maryland overall age-adjusted incidence rate for invasive cervical cancer was 6.7 per 100,000, and the national rate was 8.0 per 100,000 (Table 13.1).

Cervical cancer incidence rates in Maryland and in the US are higher for black or African American women than for white women, although the gap has narrowed in recent years (Figure 13.2). National data show that white women are diagnosed at the local stage more frequently than black or African American women.[14] Currently the Maryland Cancer Registry does not calculate survival rates, but national data show that the overall five-year survival rate for invasive cervical cancer is about 73% for white women and 61% for black or African American women. Black or African American women have lower five-year survival rates than white women at each stage (Table 13.2).[15]

In 2006, 69 Maryland women died from invasive cervical cancer, which is a mortality rate of 2.2 per 100,000. Mortality rates for both white and black or African American women are lower than the respective national rates (Table 13.3). However, mortality rates for black or African American women are statistically significantly higher than rates for white women in both Maryland and the United States (Figure 13.3).

Figure 13.4 shows cervical cancer mortality by geographic area compared to the US rate. Baltimore City is the only jurisdiction or region that has a significantly higher cervical cancer mortality rate than the United States.

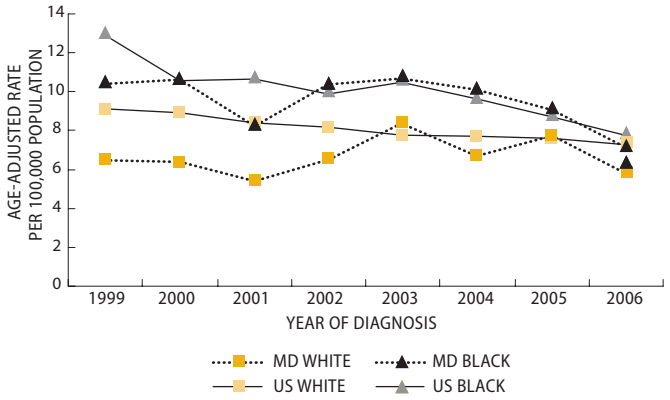
Burden among Other Ethnic and Cultural Groups

Historically reliable data have only been available on cancer rates for whites and blacks or African Americans. The numbers of cancer cases and deaths among other minority groups have been small, making rates unreliable for comparisons. Due to recent improvements in national and state standards, there are now some limited Maryland cervical cancer incidence statistics available for Hispanic or Latina and Asian or Pacific Islander populations.

According to the Census 2008 American Community Survey, about 248,000 Maryland residents are foreign born and entered Maryland in year 2000 or later. This includes an estimated 65% increase in the number of Hispanics or Latinas in Maryland between 2000 and 2008, and an estimated 35% increase in the number of Asians or Pacific Islanders.[16,17]

As shown in Table 13.4, the incidence rates among Hispanics or Latinas in both Maryland and the US are significantly greater than white and or black or African American rates. The Maryland and national Asian or Pacific Islander incidence rates are significantly lower than both the Maryland and national black or African American and Hispanic or Latina rates. There were not enough cervical cancer deaths to provide Maryland statistics on mortality among Hispanic or Latina or Asian or Pacific Islander women.

FIGURE 13.2 Cervical Cancer Incidence Rates by Race Maryland and US, 1999-2006



Rates are age-adjusted to 2000 US standard population.
Sources: Maryland Cancer Registry, 1999-2006.
NCI SEER*Stat (US SEER 13 rates).

TABLE 13.2 Cervical Cancer Five-Year Survival Rates by Stage and Race in the US, 1999-2006

	ALL RACES	WHITE	BLACK
All Stages	70.2%	71.7%	60.7%
Local Stage	91.2%	92.4%	83.5%
Distant Stage	17.0%	17.9%	11.6%

Source: National Cancer Institute, SEER 17 Rates, 1999-2006.

Disparities

RACIAL DISPARITIES in cervical cancer incidence, mortality, and survival are described throughout the Burden of Cervical Cancer in Maryland section of the chapter and include:

- Black or African American women have a statistically significantly higher incidence rate and mortality rate for invasive cervical cancer than white women.
- For each stage, black or African American women have lower five-year survival rates than white women.
- Hispanic or Latina women have statistically significantly higher cervical cancer incidence rates than both black or African American and white women.

Primary Prevention

AVOIDING RISK FOR HPV INFECTION is one important strategy for primary prevention of cervical cancer. Barrier methods of contraception, and possibly spermicides,[18] may prevent the spread of HPV between partners.

In addition, there are currently two different HPV vaccines offered to young women prior to initial exposure to HPV. The quadrivalent vaccine Gardasil, approved by the FDA in 2006, protects against four HPV types. Gardasil was also recently approved to be administered to boys and men ages 9 to 26 to prevent genital warts. In October

2009, the bivalent HPV vaccine Cervarix was approved for use in US women. Both HPV vaccines protect against HPV types 16 and 18, thought to cause the majority of invasive cervical cancers in US women. Unresolved issues include cost, long-term efficacy, and logistics of storage and delivery of the three-vaccine series. However, uptake has been rapid, with state-level policy initiatives throughout the country ranging from education to mandates for insurance coverage and/or mandatory vaccination for school attendance. Goals for next-generation vaccines include reduction of issues related to cost and delivery and wider effectiveness in regard to HPV types.

As more evidence is established to identify and explain the role of co-factors related to women's risk for persistent HPV infection and cervical abnormalities, efforts to educate and enable women to reduce risk for cervical cancer will benefit from attention to these co-factors. For example, reduction of exposure to both active and passive tobacco use, primary prevention as well as treatment of HIV may be effective strategies to reduce the risk for invasive cervical cancer.

TABLE 13.3 **Cervical Cancer Mortality Data by Race, Maryland and US, 2004-2006**

	TOTAL	WHITES	BLACKS	OTHER
2004				
MD Deaths (count)	77	46	s	<6
MD Mortality Rate	2.5	2.2	3.9	**
US Mortality Rate	2.4	2.2	4.5	2.2
2005				
MD Deaths (count)	62	34	s	<6
MD Mortality Rate	2.0	1.5	3.2	**
US Mortality Rate	2.4	2.2	4.4	1.9
2006				
MD Deaths (count)	69	38	s	<6
MD Mortality Rate	2.2	1.7	3.6	**
US Mortality Rate	2.4	2.2	4.3	2.1

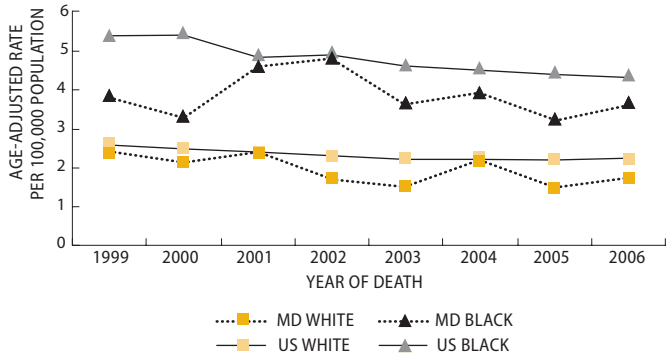
* Rates are per 100,000 and are age-adjusted to 2000 US standard population.
** MD mortality rates based on death counts of 0-15 are suppressed per DHMH/CCSC Mortality Data Suppression Policy.
s = Counts are suppressed in CRF Cancer Report tables to prevent disclosure of data in other cell(s).
<6 = MD death counts of 0-5 are suppressed per DHMH/CCSC Mortality Data Suppression Policy.
Source: NCHS Compressed Mortality File in CDC WONDER.

Secondary Prevention of Invasive Cervical Cancer Through Early Detection

Screening Guidelines

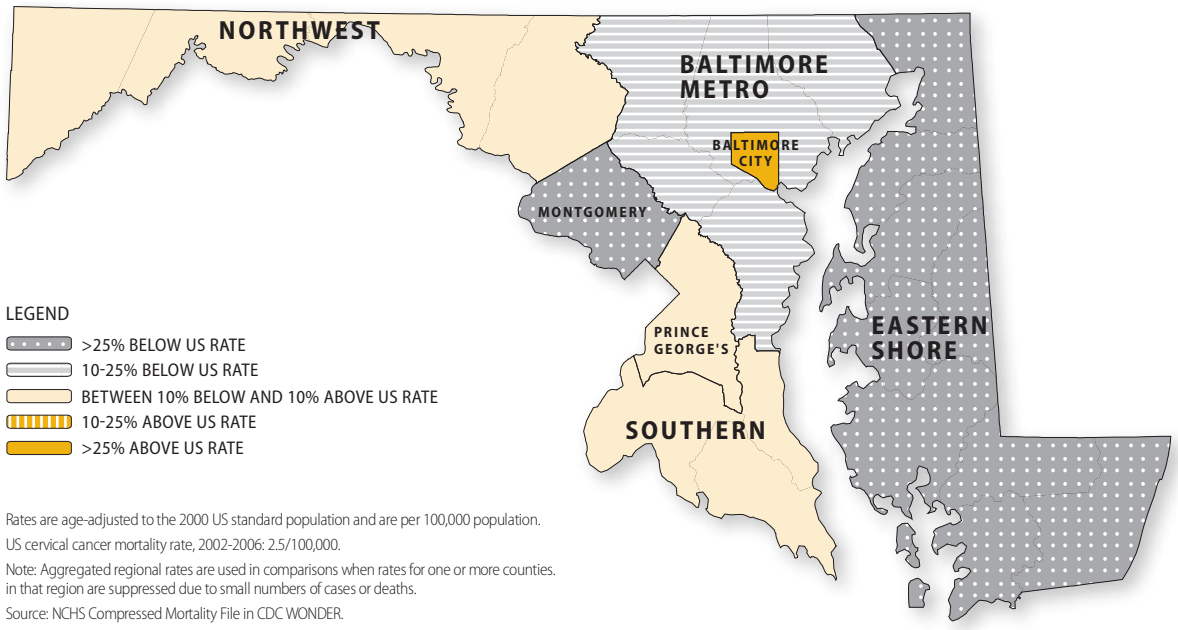
Detection of cervical abnormalities using the Pap test will remain an important tool for reducing the burden of cervical cancer. However, with the evolution of better tools for primary prevention, including vaccination, as well as more sophisticated tools for identifying HPV type and likelihood of progression to invasive cancer, recommendations and best practices for screening across the life course will evolve. New developments can take advantage of knowledge that HPV is the primary cause of cervical cancer. Utilization of both Pap and HPV testing at appropriate intervals across the life course can conserve resources and allow for safer, less frequent screening.

FIGURE 13.3 **Cervical Cancer Mortality Rates by Race Maryland and US, 1999-2006**



Rates are age-adjusted to 2000 US standard population.
Source: NCHS Compressed Mortality File in CDC WONDER.

FIGURE 13.4 Maryland Cervical Cancer Mortality Rates by Geographical Area: Comparison to US Rate, 2002-2006



Rates are age-adjusted to the 2000 US standard population and are per 100,000 population.
US cervical cancer mortality rate, 2002-2006: 2.5/100,000.
Note: Aggregated regional rates are used in comparisons when rates for one or more counties in that region are suppressed due to small numbers of cases or deaths.
Source: NCHS Compressed Mortality File in CDC WONDER.

CURRENT RECOMMENDATIONS FOR SCREENING USING THE PAP TEST

The recommendations for the initiation of cervical cancer screenings and the interval in between cervical cancer screenings can differ slightly among national organizations. Several organizations recommend waiting approximately three years following initiation of sexual activity, but no later than age 21, to receive Pap testing because transient HPV infections and insignificant cervical cell changes are common among young women and it typically takes years for a significant abnormality or cancer to develop.[19] A table displaying guidelines from several reputable sources can be found on the Cervical Cancer page of the Maryland Cancer Plan Web site: www.marylandcancerplan.org.

CURRENT RECOMMENDATIONS FOR SUPPLEMENTING PAP TEST WITH HPV TEST

Tests exist to detect the presence of active human papilloma virus in the cervix as well as to test for the presence of antibodies in the blood (seropositivity), indicating prior infection. Testing the cervix for the presence of active HPV infection is not recommended as a routine screening tool for women under age 30 due to the likely transient nature of infections. For women ages 30 and older, several national organizations (including the American Cancer Society, National Cancer Institute, and the American Society for Colposcopy and Cervical Pathology) recommend high-risk HPV DNA testing as an adjunct to the Pap test because the risk of new infection is much lower after age 30. Research suggests the HPV test may identify women who have had a normal Pap test and a negative HPV test who may safely lengthen their screening interval to three years.[20] Further-

TABLE 13.4 Cervical Cancer Incidence Rates among Racial and Ethnic Groups, Maryland and US, 2002-2006

	TOTAL	WHITES	BLACKS	HISPANIC	ASIAN/PACIFIC ISLANDER
MD New Cases (# annual average)	239	142	77	16	8
MD Incidence Rate	8	7.2	9.6	14.4	5.4
US SEER Rate	8.3	7.9	11.1	12.8	7.5

Rates are age-adjusted to the 2000 US standard population and are per 100,000 population.
Source: National Cancer Institute, State Cancer Profiles, www.statecancerprofiles.cancer.gov.

more, it may more accurately identify women who are HPV positive and have had a normal Pap test, who would benefit from repeat screening and closer management.

Scientific research on the effectiveness of HPV testing as primary screening for cervical cancer is ongoing, and it should be noted that the US Preventive Services Task Force found poor evidence to determine the benefits and harms of HPV screening as an adjunct or alternative to regular Pap test screening.[21]

The flow chart in Figure 13.5 demonstrates the FDA-approved use of HPV DNA testing for women ages 30 and older.

Use of HPV testing is also recommended by the American Society for Colposcopy and Cervical Pathology (ASCCP) and the National Comprehensive Cancer Network (NCCN) for the clinical management of women with abnormal Pap test results of "atypical squamous cells of undetermined significance" (ASC-US). HPV testing following an ASC-US Pap test result allows focus of work-up and treatment on women most likely to progress to advanced disease. HPV testing could also be used post-treatment where a positive test may indicate residual disease.[22,23,24,25,26]

The flow chart in Figure 13.6 describes the ASCCP recommendations for ASC-US management.

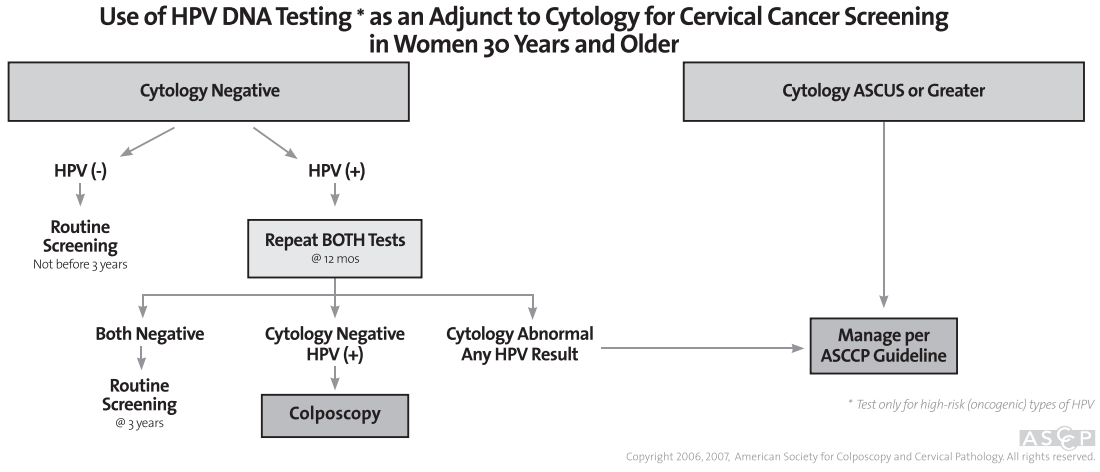
Screening Rates

At this time, the Behavioral Risk Factor Surveillance System (BRFSS) collects data on Pap testing rates but not on HPV testing rates. Data from the BRFSS show that the proportion of Maryland women 18 years and older who reported having a Pap test in the previous three years decreased from about 90% in 2000 to about 84% in 2008. Maryland's Pap test screening rates still remain slightly higher than those for the United States. Pap test screening rates are similar among white and Black or African American women in Maryland. However, while Pap test rates among women between the ages of 25 and 64 years have remained relatively high and stable, Pap test rates have declined among women ages 65 and older and women ages 18 to 24 years (Figure 13.7).

Some of the decline among women ages 65 and older may be a result of the January 2003 recommendation by the US Preventive Services Task Force (USPSTF) that women ages 65 or older did not need routine Pap tests if they have had normal screens in the past and are not otherwise at higher risk for cervical cancer.

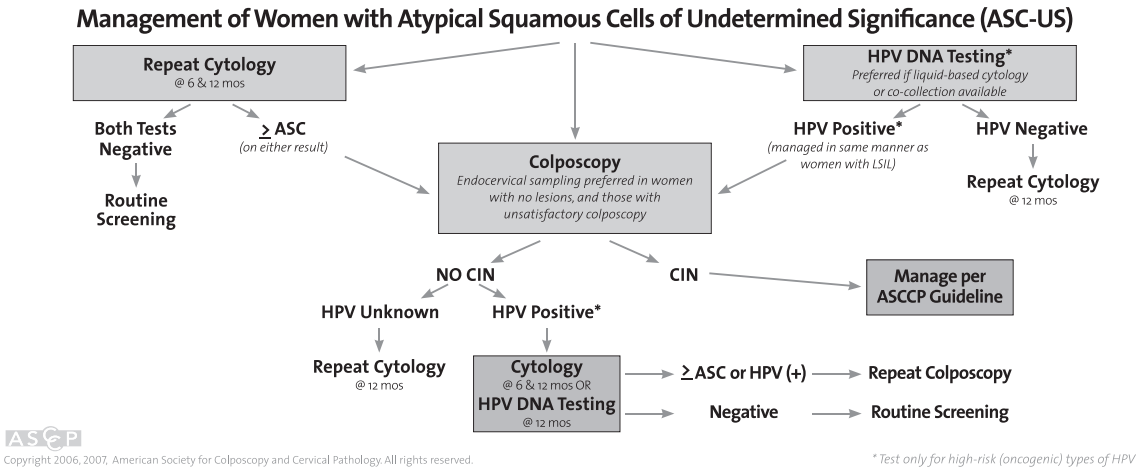
The same USPSTF recommendation advised that women should begin Pap testing at age 21 or within three years of initiation of sexual activity, whichever came first. This may also account for some of the reduction in the younger age group.

FIGURE 13.5



Reprinted from The Journal of Lower Genital Tract Disease Vol. 11 Issue 4, with the permission of ASCCP© American Society for Colposcopy and Cervical Pathology 2007. No copies of the algorithms may be made without prior consent of ASCCP.

FIGURE 13.6



Reprinted from The Journal of Lower Genital Tract Disease Vol. 11 Issue 4, with the permission of ASCCP© American Society for Colposcopy and Cervical Pathology 2007. No copies of the algorithms may be made without prior consent of ASCCP.

The percentage of women ages 18 to 24 who reported never having a Pap test increased from about 13% in 2000 to more than 33% in 2008. If younger women are only delaying routine Pap testing until their mid-to-late 20s, there may be little impact on the cervical cancer incidence rates because of the low incidence rate in that age group and the slow progression of the disease. However, if this is the start of a trend of no routine Pap testing, rates of cervical cancer may increase for this cohort within 20 to 30 years.

Screening Behavior: Facilitators and Barriers

Multiple, complex factors may affect cervical cancer screening behavior in women, including socioeconomic status, age, beliefs, and experiences, among other factors. Factors that influence screening behavior can be categorized as facilitators and barriers. Studies on this topic illuminate the following facilitators and barriers to obtaining cancer screening.

FACILITATORS

The presence of one or more facilitators increases the likelihood that a woman will get regular Pap tests.

- Fewer competing priorities (such as being a younger age).
- Urban or suburban residence.
- A history of utilization of preventive health services, particularly receiving regular mammograms, having a regular source of healthcare, or having contact with an OB/GYN.[27]
- Positive past experiences and relationships with healthcare providers.[28]
- Medical recommendation for a Pap test.
- Personal health concerns or a history of cancer.
- Advice or encouragement from a spouse, family member, or friend.
- Easy access to health insurance and/or affordable screenings.
- Availability of transportation to medical appointments.[29]

BARRIERS

The presence of one or more barriers increases the likelihood that a woman will not receive regular Pap tests.

- Lack of transportation.
- Social and geographic isolation.
- Competing priorities (advanced age, health issues, limited time, economic and/or social resources).
- Insufficient availability of healthcare and/or insurance.
- Perception of good health and/or insufficient knowledge about Pap testing.
- Fear of past and future negative experiences.
- Modesty/discomfort.

- History of self-care traditions.[30]
- Language and cultural barriers.[31]
- Fear or apathy regarding cancer diagnoses.[32]

Screening in the Hospital Setting

In 1977, the Maryland legislature passed Senate Bill 59, which requires hospitals to offer a Pap test to all female inpatients. In many hospitals, this is implemented not through testing during the inpatient visit itself, but by referring interested women to outpatient sources post-discharge. However, in cases where hospitals have provided resources to offer testing during the inpatient stay, such as establishing a dedicated Pap-testing nurse who visits all appropriate new admissions, there is some evidence that this can successfully screen women at high risk for cervical abnormality.[33]

Physician Practices and Barriers

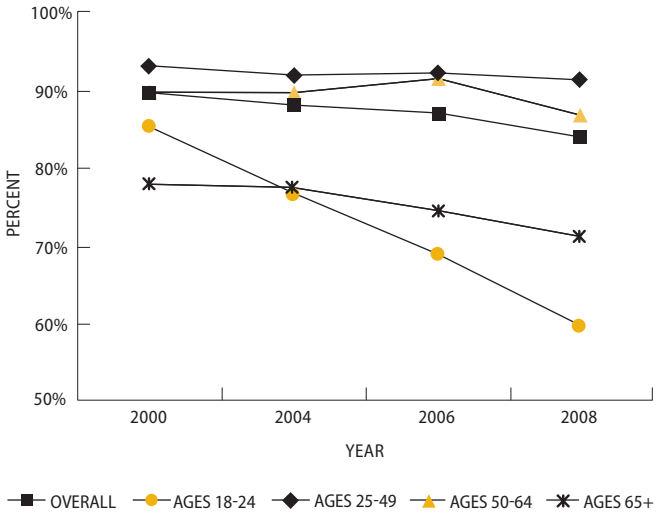
Physicians play an important role in recommending and providing cancer screening. A recently published national survey examined physician practices regarding Pap testing. The survey found that more than 75% of OB/GYNs ordered or performed more than 40 Pap tests per month, compared with 5.2% of internists and 12.7% of general or family practice physicians. OB/GYNs were also more likely than internists or general or family practice physicians to use patient reminders for Pap testing. Less than half of Pap-test providers reported using physician reminders such as chart reminders and computer prompts. The survey also found that physician recommendations for Pap-test screening were generally found to be inconsistent with major guidelines.[34] Deviance from guideline-based screening has also been demonstrated in several other studies.[35,36,37]

The recent introduction of the HPV vaccine for primary cervical cancer prevention has led to the continued examination of cervical-cancer-screening strategies, including the cost-effectiveness of such strategies.[38,39,40] As newer HPV-testing technologies enter the US market, appropriate screening with both HPV and Pap testing will depend on the evolving natural history of cervical HPV infections in HPV-vaccinated women as well as non-vaccinated females and males.[41] There is a need for continued education of clinical providers in the state of the science to ensure adherence to changing guidelines and screening methodologies and to maintain cost-effectiveness of primary and secondary cervical cancer prevention.[42]

Diagnosis and Treatment of Cervical Cancer

WHEN ABNORMAL CELLS are diagnosed early and treated appropriately, most cases of cervical cancer can be prevented. Diagnostic procedures include colposcopy, endocervical curettage, and loop electrosurgical excision procedure (LEEP). When cervical cancer is diagnosed, pathologists and oncologists work together to determine the extent, or stage, of the cancer. Staging the cancer allows providers to best recommend treatment options. Treatment for cervical cancer can include surgery, chemotherapy, radiation, or a combination of these therapies. More information regarding cervical cancer diagnosis and treatment can be found in the National Cancer Institute publication, "What You Need to Know About Cervical Cancer"

FIGURE 13.7 **Percentage of Maryland Women Reporting a Pap Test within Previous Three Years by Age, 2000-2008**



Source: Maryland BRFSS, 2000-2008.

at http://www.cancer.gov/cancertopics/wyntk/cervix.pdf.

The Survivorship Experience

AS MORE WOMEN ARE DIAGNOSED with cervical cancer at earlier stages and also benefit from improved treatment and follow-up, the number of women living as cervical cancer survivors has increased. Many important issues arise in the treatment and post-treatment periods for survivors.

Because cervical cancer is a disease of the reproductive organs, quality of life for cervical cancer survivors includes not just quality of overall health and well-being, but also important considerations specific to sexuality and reproductive health across the life course. For women who are diagnosed with cervical cancer prior to menopause, there are additional important considerations related to treatment effects on fertility and childbearing.

Access to high-quality healthcare can ensure early detection and appropriate treatment. Beyond extending the survivorship period, this also minimizes the burden of morbidity related to treatment and improves reproductive health throughout survivorship.

Because cervical cancer is a relatively rare disease, especially among women of reproductive age, the importance of both clinical and nonclinical resources for cervical cancer survivors is substantial. Contact with other cervical cancer survivors through support groups and organizations can allow women with cervical cancer important clinical and psychosocial support. More information on survivor resources can be found at www.marylandcancerplan.org.

Ideal Model for Cervical Cancer Control

THERE ARE SIX STEPS in the ideal cervical cancer control process. A table with detailed information on this ideal model can be found on the Cervical Cancer page of the Maryland Cancer Plan (www.marylandcancerplan.org) and is summarized here.

STEP 1 Primary prevention is done at the population level, including HPV vaccination and reduction of co-factor exposures.

STEP 2 Patients have knowledge of and access to screening, diagnosis, treatment, and survivorship resources.

STEP 3 Primary-care providers provide or refer for long-term preventative care including appropriate Pap and HPV testing/follow-up for all patients and are aware of resources for women who are uninsured or underinsured.

STEP 4 Pap tests are sent to labs in compliance with the Clinical Laboratory Improvement Act (CLIA) and read by cytotechnologists or cytopathologists who report results using the Bethesda System and who have passed the Cytology Proficiency Testing Program of the state of Maryland.

STEP 5 If a diagnosis is required, various diagnostic procedures are carried out by a trained colposcopist.

STEP 6 Treatment is performed by a gynecologist, gynecologic oncologist, or other trained specialist to remove precancerous or cancerous lesions of the cervix.

Barriers to implementing some steps of the ideal cervical cancer control process have been identified throughout the chapter. The following barriers were identified by the Cervical Cancer Committee as specific to Maryland residents, and many are addressed in the Goals, Objectives, and Strategies to follow.

- Achieving herd immunity for the HPV vaccine may be difficult due to potential provider concerns with reimbursement, the cost of the vaccine to patients, and costs associated with stocking the vaccination.
- The Maryland Breast and Cervical Cancer Program has only enough funds to screen 15% to 20% of uninsured women ages 40 to 64 in the state for cervical cancer.
- Accessibility to screening services may be limited because of hours of operation, availability of public transportation, or lack of knowledge among patients and providers about the availability of existing services, especially for the socioeconomically disadvantaged.
- A lack of written information in patients' native languages or reading level and limited availability of language and translation services

may prevent women from seeking screening and treatment.
- There is a need to educate physicians (particularly primary care providers) regarding screening, follow-up guidelines, and new technologies.
- Residents in rural Maryland counties may encounter longer wait times for diagnostic or treatment services due to a limited number of specialists practicing in their local area.
- Many women who lack insurance and the financial means to pay for their care may go without diagnostic tests and treatment.

Current/Ongoing Efforts in Maryland

THE MARYLAND DEPARTMENT OF HEALTH AND MENTAL HYGIENE (DHMH) Breast and Cervical Cancer Program (BCCP) is a statewide program that provides breast and cervical cancer screening services to uninsured or underinsured low-income (less than 250% of the federal poverty level) women 40 to 64 years of age. Across the state, the DHMH awards funds to each jurisdiction to coordinate the provision of breast and cervical cancer outreach, patient and public education, screening, referral, follow-up, and case management services for its residents. The DHMH formed a Cervical Cancer Medical Advisory Committee, which develops clinical guidelines: "Minimal Clinical Elements for Cervical Cancer Detection and Diagnosis." This document provides guidance for public health programs that screen for cervical cancer.

The Maryland BCCP provides approximately 6,000 Pap tests annually. Thirty percent of the women screened in the BCCP indicated that they were never or rarely screened (not in the past five years) for cervical cancer.

In addition to the BCCP, funding from the Cigarette Restitution Fund has been awarded to the University of Maryland Medical System/ University Care to provide breast and cervical cancer screening for low-income uninsured or underinsured women who live in Baltimore City. Several other Maryland jurisdictions also offer cervical cancer education and screening services under this program. These local programs provide approximately 700 Pap tests and educate about 23,000 people on cervical cancer annually.

THERE ARE SEVERAL OTHER PROGRAMS IN MARYLAND that provide testing, diagnostic, treatment, and support services for women including, but not limited to, the following.

- The Maryland Family Planning Program offers a variety of services including Pap tests according to current evidenced-based guidelines, access to colposcopy services, and education and counseling on reproductive health topics. The program serves more than 75,000 clients each year, is open to women and men of reproductive age, and provides services under a sliding fee scale.
- The Maryland Breast and Cervical Cancer Diagnosis and Treatment Program is state-funded and reimburses participating medical providers for breast and cervical cancer diagnostic and/or treatment services for Maryland residents who have received an abnormal breast or cervical test result or are diagnosed with either breast or cervical cancer, meet income guidelines (250% of the poverty level), and are either uninsured or underinsured for these services. This program is not restricted by age.
- The Women's Breast and Cervical Cancer Health Program provides Medicaid coverage to eligible women screened under the BCCP who have been diagnosed with either breast or cervical cancer. Women in this program are eligible for full Medical Assistance while they are undergoing treatment for breast or cervical cancer.
- The American Cancer Society (ACS) provides educational and support services for cervical cancer patients, including several support groups. Assistance with transportation for cancer treatments can be obtained in some areas of the state through the Road to Recovery program. The ACS publishes numerous educational brochures and can send speakers to community meetings.

GOALS • OBJECTIVES • STRATEGIES

GOAL 1

Decrease the incidence of invasive cervical cancer in Maryland by reducing risk and improving early detection.

INCIDENCE TARGET (2015)

Less than 6.7 per 100,000
(2006 baseline: 6.7 per 100,000)

Source: Maryland Cancer Registry.

OBJECTIVE 1

By 2015, increase the proportion of guideline-eligible populations who are informed and have access to HPV vaccinations.

STRATEGIES

1. **EXPAND EXISTING SURVEILLANCE** and monitoring systems to collect information on the education of and access to HPV vaccinations in order to establish a baseline and monitor progress.
2. **INCREASE THE DISSEMINATION** of state-of-the-art HPV vaccination guidelines to health professionals and other stakeholders.
3. **REDUCE BARRIERS** to access, affordability, and administration of HPV vaccinations as identified in the "Maryland Human Papilloma Virus Vaccines Subcommittee Report" (available at www.marylandcancerplan.org).
4. **IMPLEMENT PARTNERSHIPS** between private, nonprofit, and governmental healthcare groups to increase Maryland residents' knowledge about the HPV vaccine, particularly those in at-risk populations, as outlined in the "Maryland Human Papilloma Virus Vaccines Subcommittee Report."

OBJECTIVE 2

By 2015, collaborate with state, local, and community partners to reduce the risks related to co-factors of cervical cancer (including HIV and the use of tobacco products).

STRATEGIES

1. **INCREASE SAFE REPRODUCTIVE HEALTH PRACTICES** through public education and increased access to male and female condoms.
2. **IMPLEMENT INNOVATIVE SYSTEMS** and health-based approaches to prevent and control HIV and the use of tobacco products. *See Chapter 5, Tobacco-Use Prevention/Cessation and Lung Cancer, for specific objectives and strategies on decreasing the use of tobacco products.*

OBJECTIVE 3

By 2015, utilize state-of-the-art recommendations to:

- **Increase the proportion of women ages 21 to 70 receiving a Pap test in the last three years to greater than 88% (2008 baseline: 88%).**
  Source: Maryland BRFSS.
- **Increase the number of women who have had appropriate HPV testing.**

STRATEGIES

1. **EXPAND EXISTING SURVEILLANCE** and monitoring systems to collect information on HPV testing in order to establish a baseline and monitor progress.
2. **INCREASE THE DISSEMINATION** of state-of-the-art screening recommendations to healthcare providers.
3. **INCREASE OUTREACH EFFORTS** by public health organizations and healthcare providers to women who have never or rarely been screened.
4. **INCREASE PAP TESTING** of hospital inpatients by amending Senate Bill 59, Section 19-348 language to require hospitals to "provide" Pap tests to all inpatients. Examine hospitals that succeed at providing Pap tests to inpatients and share lessons learned with other hospitals.

GOAL 2

Decrease the mortality and morbidity of cervical cancer in Maryland.

MORTALITY TARGET (2015)

1.4 per 100,000
(2006 baseline: 2.2 per 100,000)

Source: CDC WONDER.

OBJECTIVE 1

By 2015, utilize state-of-the-art guidelines—such as the American Society for Colposcopy and Cervical Pathology (ASCCP)—to educate Maryland providers about the appropriate use of diagnostic procedures and the potential negative outcomes of overuse and underuse of diagnostic methods.

STRATEGIES

1. **DISSEMINATE STATE-OF-THE-ART GUIDELINES** to healthcare providers through Web-based methods and provider meetings and conferences.
2. **ENCOURAGE QUALITY ASSURANCE MONITORING** of cervical cancer diagnostic procedure management by providers.

OBJECTIVE 2

By 2015, increase access to cervical diagnostic and treatment services including:

- **An increase in the percentage of women who are diagnosed within 90 days of abnormal screening, and**
- **An increase in the percentage of women whose treatment is initiated within 90 days of diagnosis.**

STRATEGIES

1. **UTILIZE EXISTING FRAMEWORKS** and clinical data to develop a tracking system that will establish the baseline rates and measure progress for Objective 2.
2. **CONTINUE TO EDUCATE THE GENERAL PUBLIC** on the availability of screening, diagnostic, and treatment programs throughout Maryland.
3. **ENCOURAGE MORE GYNECOLOGIC SPECIALISTS** or gynecologic oncologists to practice (permanently or traveling) in rural and underserved areas in Maryland.
4. **PROVIDE EDUCATION ACTIVITIES** on the importance of obtaining diagnostic and treatment services in a timely manner.

OBJECTIVE 3

By 2015, ensure that Maryland cervical cancer survivors have a survivorship cancer plan in order to minimize morbidity and quality-of-life burden from their disease and treatment.

STRATEGIES

1. **ASSESS THE NUMBER OF CERVICAL CANCER SURVIVORS** in Maryland who receive survivorship care plans in order to establish a baseline and measure progress.
2. **ENSURE THAT SURVIVORSHIP CARE PLANS** include survivorship resources (such as informational resources and support groups).
3. **INCREASE AWARENESS** among primary care practitioners and gynecologic oncologists of survivorship issues, needs for medical care, and survivorship resources.
4. **MONITOR THE UNMET NEEDS** for survivors through data collection from both providers and survivors.

OBJECTIVE 4

By 2015, conduct Maryland-specific surveillance research on barriers to cervical cancer detection and treatment by establishing a statewide follow-back study mechanism to allow for monitoring of failures through follow-back and to evaluate and modify intervention strategies.

STRATEGIES

1. **MODEL A PROGRAM** after the Fetal Infant Mortality Review Program to establish and maintain mechanisms to:
   - Collect information on factors that influence or hinder health-seeking behaviors and influence screening, diagnosis, and treatment of cervical cancer.
   - Monitor the proportion of cervical cancer cases and deaths attributable to failures of detection and treatment.
   - Identify strategies and implement activities to minimize failures of detection and treatment.
2. **CONSIDER THE INCLUSION OF CIN 3** in the tumor registry reporting to the Maryland Cancer Registry to aid in the surveillance research.

REFERENCES

1 Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. GLOBOCAN 2008, Cancer incidence and mortality worldwide: IARC CancerBase No. 10 [Internet]. Lyon (France): International Agency for Research on Cancer; 2010 [cited 2010 Aug 10]. Available from: http://globocan.iarc.fr

2 American Cancer Society. Cancer facts & figures 2010 [report on the Internet]. Atlanta (GA): The Society; 2010 [cited 2010 Aug 10]. Available from: http://ww2.cancer.org/downloads/STT/Cancer_Facts_and_Figures_2010.pdf

3 American Cancer Society. Cancer facts & figures 2010 supplemental data: dases and deaths by site and state 2010 [report on the Internet]. Atlanta (GA): The Society; 2010 [cited 2010 Aug 1]. Available from: http://www.cancer.org/Research/CancerFactsFigures/CancerFactsFigures/supplemental-data-2010

4 National Cancer Institute (US). Pap test [Internet]. Bethesda (MD): National Cancer Institute (US); 2010 [cited 2010 Mar 9]. Available from: http://www.cancer.gov/cancertopics/factsheet/Detection/Pap-test

5 American Cancer Society. Cancer prevention & early detection facts & figures 2009. Report. Atlanta (GA): The Society; 2009.

6 US Department of Health and Human Services. Cervical cancer [Internet]. Washington (DC): US Department of Health and Human Services; 2010 [cited 2010 Mar 9]. Available from: http://w.4women.gov/faq/ccervix.htm

7 National Cancer Institute (US). PDQ cancer information summary: cervical cancer prevention [Internet]. Bethesda (MD): National Cancer Institute (US); 2010 [cited 2010 Jul 28]. Available from: http://www.nci.nih.gov/cancerinfo/pdq/prevention/cervical/healthprofessional/

8 Schwartz PE, Hadjimichael O, Lowell DM, et al. Rapidly progressive cervical cancer: the Connecticut experience. Am J Obstet and Gynecol. 1996 Oct;175(4 Pt 2):1105-1109.

9 See note 7

10 See note 7

11 National Cancer Institute (US). HIV infection and cancer risk [Internet]. Bethesda (MD): National Cancer Institute (US); last reviewed 2010 Jan 29 [cited 2010 Aug 10]. Available from: http://www.cancer.gov/cancertopics/factsheet/risk/hiv-infection

12 Watson M, Saraiya M, et al. Burden of cervical cancer in the United States, 1998-2003. Cancer. 2008 Nov 15;113(10 Suppl):2855-64.

13 See note 7

14 Horner MJ, Ries L, et al. SEER cancer statistics review, 1975-2006 [Internet]. Bethesda (MD): National Cancer Institute (US); 2009 [cited 2010 Jul 28, based on November 2008 SEER data submission, posted to the SEER web site, 2009]. Available from: http://seer.cancer.gov/csr/1975_2006/

15 Ibid.

16 US Census Bureau. 2008 American Community Survey 1-year estimates [Internet]. Washington (DC): US Census Bureau; 2008 [cited 2010 Aug 13]. Available from: http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=datasets_2&_lang=en&_ts

17 US Census Bureau. United States Census 2000 [Internet]. Washington (DC): US Census Bureau; 2000 [cited 2010 Aug 13]. Available from: http://www.census.gov/main/www/cen2000.html

18 See note 7

19 US Preventive Services Task Force. Cervical cancer screening update. Guide to clinical preventive services. 3rd ed., 2000-2003 [Internet]. Rockville (MD): US Preventive Services Task Force; 2003 [cited 2010 Mar 16]. Available from: http://www.ahcpr.gov/clinic/uspstf/ uspscerv.htm

20 Solomon D, Papillo J, Davey D. On behalf of the Cytopathology Education and Technology Consortium. Statement on HPV DNA test utilization. Am J Clin Pathol. 2009;131:768-769.

21 US Preventive Services Task Force. Screening for cervical cancer [Internet]. Rockville (MD): US Preventive Services Task Force; 2003 Jan [cited 2010 Aug 16]. Available from: http://www.uspreventiveservicestaskforce.org/uspstf/uspscerv.htm

22 Morin C, Bairati I, Bouchard C, et al. Managing atypical squamous cells of undetermined significance in Papanicolaou smears. J Reproduc Med. 2001 Sep;46(9):799-805.

23 Cuzick, J. Human papillomavirus in cervical screening. Presentation at International Federation of Gynecology & Obstetrics; 2000 Sep; Washington (DC).

24 Ekalaksananan T, Pientong C, Kotimanusvanij D, et al. The relationship of human papillomavirus detection to Pap smear classification of cervical-scraped cells in asymptomatic women in northeast Thailand. J Obstet Gynecol Res. 2001 Jun;27(3)117-24.

25 Sasieni, P. Human papillomavirus and cervical cancer prevention. J Am Med Wom Assoc. 2000;55:216-219.

26 Nobbenhuis M, Walboomers J, Helmerhorst TJ, et al. Relation of human papillomavirus status to cervical lesions and consequences for cervical cancer screening: a prospective study. Lancet. 1999 Jul 3;354(9172):20-5.

27 Leach C, Schoenberg, N. The vicious cycle of inadequate early detection: a complementary study on barriers to cervical cancer screening among middle-aged and older women. Prev Chronic Dis. 2007 Oct 4(4):1-12.

28 Nguyen TT, et al. Predictors of cervical Pap smear screening awareness, intention, and receipt among Vietnamese-American women. Am J of Prev Med. 2002 Oct;23(3):207-14 .

29 Ogedebe G, et al. Perceptions of barriers and facilitators of cancer early detection among low-income minority women in community health centers. J Natl Med Assoc. 2005 Feb;97(2):162-70.

30 See note 27

31 See note 28

32 See note 29

33 Trimble CL, Richardson L, Wilgus-Wegweiser B, et al. Effectiveness of screening for cervical cancer in an inpatient hospital setting. Obstet Gynecol. 2004 Feb;103(2):310-6.

34 Yabroff KR, Saraiya M, et al. Specialty differences in primary care physician reports of papanicolaou test screening practices: a national survey, 2006 to 2007. Ann Intern Med. 2009 Nov 3;151(9):602-11.

35 Saslow D, Runowicz CD, et al. American Cancer Society guideline for the early detection of cervical neoplasia and cancer. CA Cancer J Clin. 2002;52(6):342-362.

36 Saint M, Gildengorin G, Sawaya GF. Current cervical neoplasia screening practices of obstetrician/gynecologists in the US. Am J Obstet Gynecol. 2005 Feb;192(2):414-421.

37 Markowitz L, Unger E, Saraiya M. Primary and secondary prevention of cervical cancer—opportunities and challenges. J Natl Cancer Inst. 2009 Apr 1;101(7):439-40.

38 Goldhaber-Fiebert, JD, NK Stout, et al. Cost-effectiveness of cervical cancer screening with human papillomavirus DNA testing and HPV-16, 18 vaccination. J Natl Cancer Inst. 2008;100(5):308-320.

39 Franco EL, Cuzick J, et al. Chapter 20: Issues in planning cervical cancer screening in the era of HPV vaccination. Vaccine. 2006;24(53):S171-S177.

40 Franco, EL, Cuzick J. Cervical cancer screening following prophylactic human papillomavirus vaccination. Vaccine. 2008;26s:A16-A23.

41 Wheeler C, Hunt W, et al. Human papillomavirus genotype distributions: implications for vaccination and cervical cancer screening in the United States. J Natl Cancer Inst. 2009;101(7):1-13.

42 Huh W, Einstein MH, et al. What is the role of HPV typing in the United States now and in the next five years in a vaccinated population? Gynecol Oncol. 2010 Jun;117(3):481-5.