

Vermont Facts

- ❖ **Incidence:** Cervical cancer is the fourteenth most common cancer diagnosed in women. Each year approximately 20 cervical cancer cases are diagnosed in women.
- ❖ **Mortality:** Cervical cancer is the sixteenth leading cause of cancer death among women. Each year, approximately six women die from cervical cancer.
- ❖ **Trends:** Incidence rates of cervical cancer have declined, but mortality rates have not changed during 1998-2007.
- ❖ **Vermont vs. U.S.:** The cervical cancer incidence and mortality rates are not different from the U.S.
- ❖ **Age:** As with most cancers, the risk for developing cervical cancer increases with age.
- ❖ **Stage:** In Vermont, 48 percent of invasive cervical cancers are diagnosed at the localized stage (the cancer is limited to the organ of origin), and 45 percent are diagnosed at the regional or distant stages (the cancer has extended beyond the local organ or has metastasized).
- ❖ **Screening:** According to the 2008 BRFSS, 82% of women have been screened for cervical cancer. Screening rates are lower among older women, those that lack health insurance, have less than a high school education, or women who lack a personal doctor.

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Background

Any disease in which abnormal cells develop, divide, grow, and have the potential to spread throughout the body can be called cancer. If the spread of these cancer cells is not controlled, death may result. Cancer cells from a malignant tumor can invade nearby tissues either by direct growth into adjacent tissue or by migration through the bloodstream and lymphatic system to other parts of the body. This process is called metastasis. Cancer that started as cervical cancer and spread to the liver or bone is still cervical cancer.

In 2007, cancer overtook heart disease as the leading cause of death in Vermont, with approximately 1,200 Vermonters dying from cancer each year. In contrast to the dramatic declines in the death rates for heart disease and stroke, the cancer death rate has risen steadily over the past few decades as a result of the aging population and the continued rise in death rates from lung cancer. Roughly one out of every two men and one out of every three women will develop cancer in their lifetime.

Cervical Cancer

Cervical cancer occurs primarily among women infected with the human papillomavirus (HPV). Cervical cancer results when cells in the lining of the cervix (the lower, narrow end of the uterus, or womb) grow abnormally and spread more deeply into the cervix and to surrounding areas. Cervical cancers do not form suddenly. Normal cervical cells gradually undergo pre-cancerous changes that can develop into cancer.

Cervical cytology, also called a Pap smear, was developed in 1940 by George Papanicolaou and detects signs of cervical cancer and pre-cancerous lesions that can be treated before they become invasive cervical cancer. Since the Pap test was widely adopted in the U.S. in the 1950's, early detection of these precancerous changes has been credited with a significant decrease in the incidence of invasive cervical cancer and mortality from the disease.

The Pap test includes the traditional smear and the new liquid-based cytology, both done by a health care provider. During a pelvic exam, the clinician scrapes cells from a woman's cervix and sends them to a laboratory to identify changes or abnormalities. The cost of an annual gynecological exam and Pap test (approximately \$200) is a fraction of the cost for cervical cancer treatment (\$3,807, \$23,187, \$35,853, and \$45,028 for in situ, local, regional, and distant cancers, respectively in the first six months of diagnosis)¹.

Since few women with cervical cancer have symptoms or signs that indicate a problem, widespread screening for early detection is critical. Cervical cancer is one of the few cancers that can actually be prevented by receiving screening tests. Abnormalities can be detected and changes (cervical dysplasia or cervical intraepithelial neoplasia) can be treated by the removal or destruction of abnormal cells before they progress to cancer. Cervical cancer rates have fallen more than 50% in the past 30 years in the U.S. due to the widespread use of the Pap test. The majority of deaths from cervical cancer in the U.S. are among women who are screened infrequently or not at all.

¹ Subramanian, S., J. Trogon, et al. (2010). "Cost of cervical cancer treatment: implications for providing coverage to low-income women under the Medicaid expansion for cancer care." *Women's Health Issues* 20(6):400-405.

Incidence and Mortality

Defined as the number of *new* cases occurring in a population during a defined time interval, incidence rates are a useful measure of the risk of disease.

Table 1. The most commonly diagnosed cancers in females – Vermont, average number of cases per year, 2003-2007.

Female Cancer Site	Cases (per year)	Percent (per year)
Breast	489	29%
Lung	231	14%
Colon and Rectum	167	10%
Uterus	122	7%
Melanoma	98	6%
•	•	•
•	•	•
•	•	•
Cervix	20	1%
All Sites	1,709	100%

New cases per year exclude basal cell and squamous cell skin cancers and in situ (malignant but non-invasive) carcinomas except urinary bladder.

- ❖ An average 1,709 cancers in women are diagnosed each year in Vermont. Of those, an average of 20 women are diagnosed with cervical cancer each year.
- ❖ Cervical cancer is the fourteenth most commonly diagnosed cancer in females and accounts for roughly one percent of all cancers diagnosed in Vermont women.

The mortality rate is a measure of the number of deaths in a population during a specific period of time.

Table 2. The most common cancer deaths in females – Vermont, average number of deaths per year, 2003-2007.

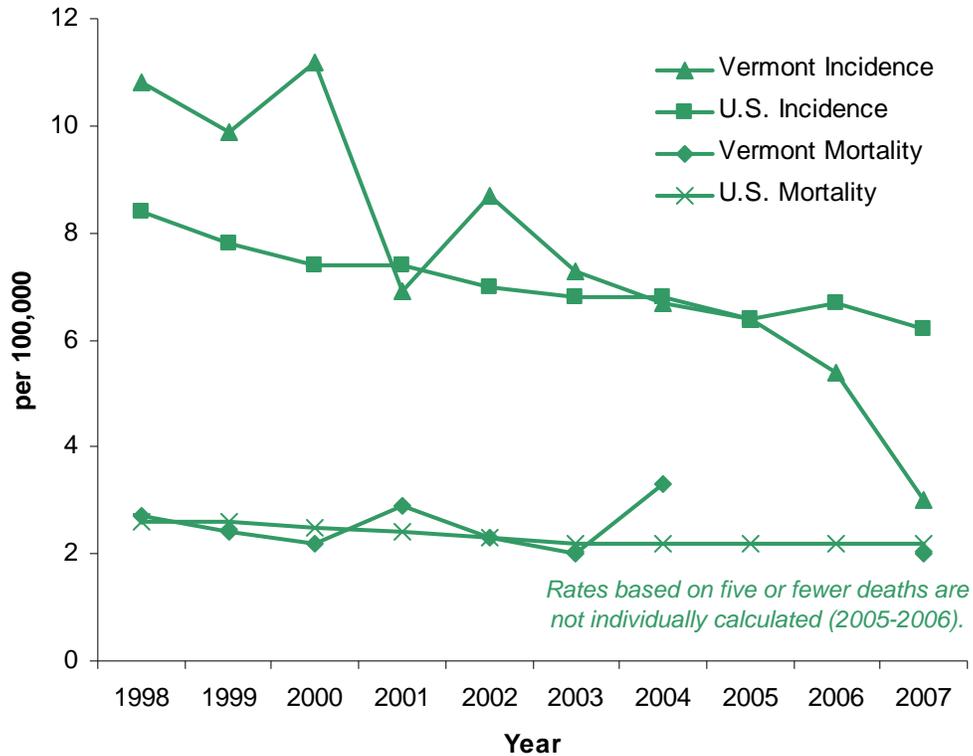
Female Cancer Site	Deaths (per year)	Percent (per year)
Lung	161	27%
Breast	92	15%
Colon and Rectum	62	10%
Pancreas	34	6%
Ovary	30	5%
•	•	•
•	•	•
•	•	•
Cervix	6	1%
All Sites	607	100%

- ❖ An average of 607 women die each year from cancer in Vermont. Of these, an average of 6 women die from cervical cancer.
- ❖ Cervical cancer is the sixteenth leading cause of cancer death among females in Vermont and accounts for roughly one percent of all cancer deaths in women.

Trends

Since the Pap test was widely adopted in the U.S. in the 1950's, it has been credited with a 50 percent decrease in the incidence of cervical cancer and a 70 percent decrease in the cervical cancer death rate.

Figure 1. Incidence and mortality rates of female cervical cancer – Vermont and United States², 1998-2007.



- ❖ From 1998 to 2007, the declines in the incidence of cervical cancer were statistically significant for Vermont and the U.S. The declines in mortality were statistically significant for the U.S.; however, the Vermont trends were not statistically significant.

² The U.S. rates represented in this publication are for whites. Rates based on five or fewer deaths are not individually calculated. See Technical Notes section for more information.

U.S. Comparisons

Table 3. Incidence and mortality rates of cervical cancer – Vermont and United States, per 100,000, yearly averages, 2003-2007.

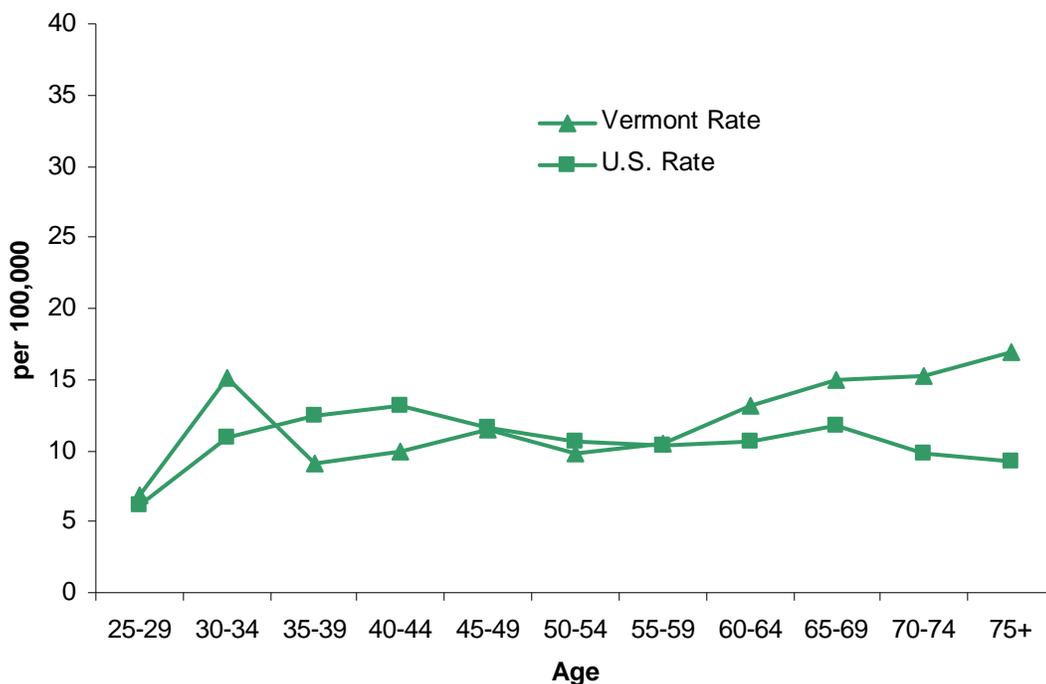
	Incidence	Mortality
Vermont Females	5.8	1.6
U.S. Females	6.6	2.2

- ❖ The cervical cancer incidence and mortality rates among Vermont females are not different from the U.S.

Age

The incidence of many cancers increase with age. In the U.S. and Vermont there has been a leveling of cervical cancer rates after the age of 40, an unusual pattern of age related risk compared to that of other similar cancers.

Figure 2. Incidence rates of female cervical cancer, by age – Vermont and United States, 1998-2007.



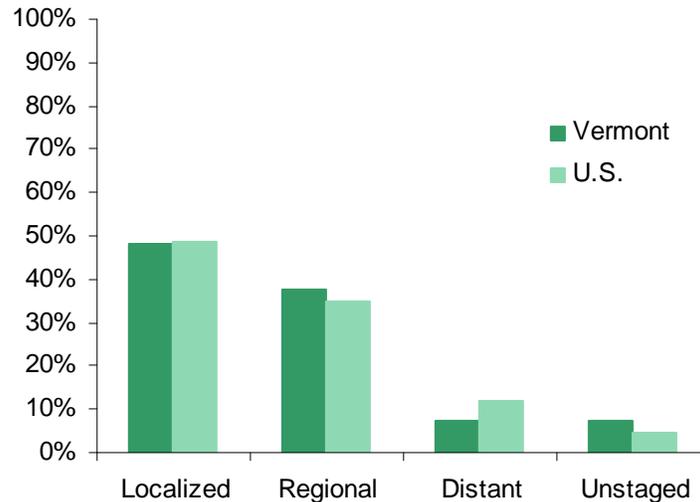
Age Group	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
Vermont Rate	6.9	15.1	9.1	10.0	11.5	9.8	10.5	13.2	14.9	15.3	16.9
U.S. Rate	6.2	10.9	12.4	13.2	11.6	10.6	10.4	10.6	11.7	9.8	9.2

- ❖ Vermont women age 75 and older have the highest age-specific incidence of cervical cancer, at a rate of 16.9 per 100,000.
- ❖ Between 1998 and 2007, Vermont women age 75 and older have higher incidence rates of cervical cancer compared to the U.S. There are no other differences in age-specific incidence rates of cervical cancer between Vermont and U.S. females.

Stage at Diagnosis

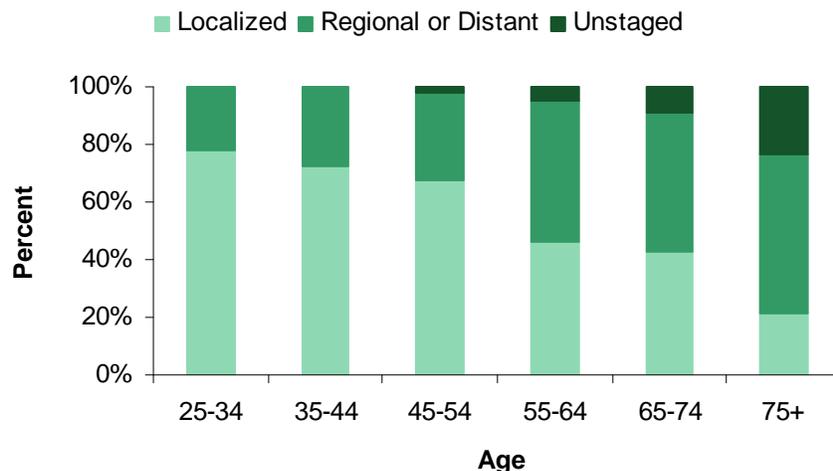
Stage describes the extent to which the cancerous cells have spread from the original site to another part of the body; it helps determine prognosis and treatment options. Invasive cervical cancer can be grouped into the following stage categories: localized, regional, distant, and unstaged. The earlier a cancer is diagnosed, the better a person's prognosis is likely to be. Cancers occurring in parts of the body that can be easily seen or felt (skin, breast) are easier to detect at a localized stage compared to cancers of internal organs, which require imaging procedures and/or laboratory tests to detect.

Figure 3. Invasive female cervical cancer by stage at diagnosis – Vermont and the United States, 2003-2007.



- ❖ Among Vermont women, approximately 48 percent of invasive cervical cancers are diagnosed at the localized stage, 38 percent are diagnosed at a regional stage, and 7 percent are diagnosed at a distant stage. In the U.S., 49 percent of cervical cancers are diagnosed at the early stage, 35 percent are diagnosed at a regional stage, and 12 percent are diagnosed at a distant stage.
- ❖ There is no difference between Vermont and the U.S. for stage at diagnosis.

Figure 4. Distribution of cervical cancer by stage at diagnosis and age – Vermont, 1998-2007.

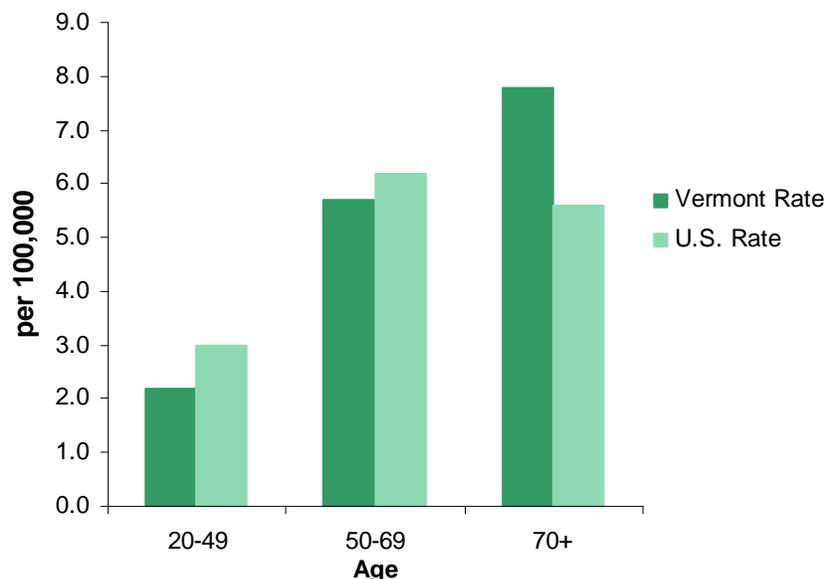


- ❖ The percentage of cervical cancers diagnosed in the regional or distant stages increases with age.

Advanced Stage at Diagnosis

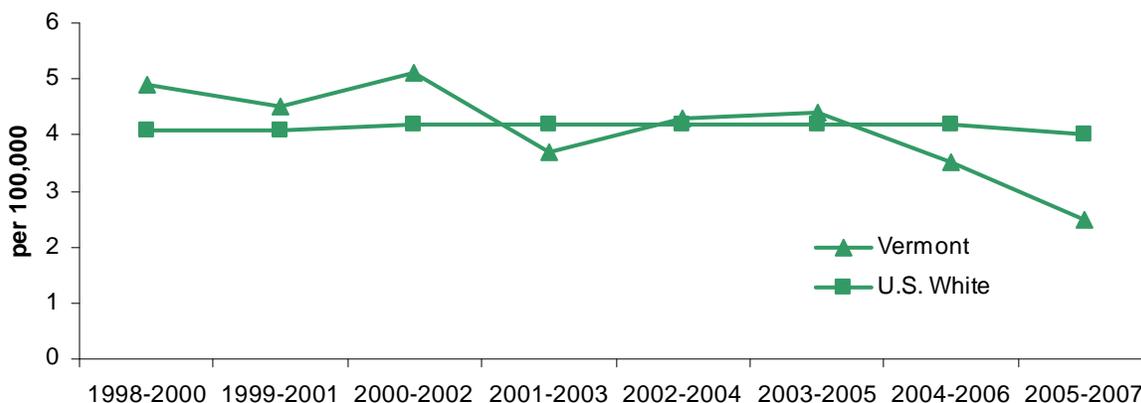
The rate of cases of cancer that are diagnosed at an advanced stage (regional or distant) is a measure of the effectiveness of cancer screening efforts.

Figure 5. Incidence rates of advanced stage cervical cancer (age 20+) - Vermont and the United States, 1998-2007.



- ❖ Between 2003 and 2007 the Vermont rate of advanced stage cervical cancer among women age 20 and older (3.4 per 100,000) was not different from the U.S. rate (4.1 per 100,000).
- ❖ For Vermont and the U.S., advanced stage cervical cancer is higher among older women compared to women ages 20 to 49.

Figure 6. Incidence rates of advanced stage cervical cancer (age 20+) - Vermont and the United States, 1998-2007.



- ❖ From 1997 to 2007, there has been no change in advanced stage cervical cancer incidence rates in Vermont or the U.S.

Risk Factors and Prevention

A risk factor is a condition, an activity, or an exposure that is associated with an increased risk of developing a disease. Cancer develops gradually as a result of a complex mix of factors related to lifestyle choices, environment and genetics. Each type of cancer is caused by a different set of factors, some well established, some uncertain, and some unknown. While the exact cause of most cancers is unknown, researchers have identified risk factors that may increase a person's chance of getting certain cancers.

Human papillomavirus (HPV) infection is a risk factor in the development of nearly all cases of cervical cancer. Certain strains of this virus can cause cells on the cervix to change, resulting in cervical dysplasia, and over time these cells may become malignant. There are over 100 different strains of HPV, and more than 30 of them are sexually transmitted. Other types of HPV are responsible for genital warts and some "high risk" strains can produce the changes in the cervix that cause cancer. Other cancers can also be caused by HPV infection, including vulvar (40 percent), vaginal (70 percent), penile (40 percent), anal (85 percent), and head and neck cancers such as of the mouth (25 percent) and throat (35 percent).

HPV Prevention

HPV infection is very common and is usually sexually transmitted. About 20 million men and women in the U.S. are infected with HPV, and each year approximately 6 million Americans acquire a new infection. Researchers estimate that at least 50 percent of sexually active men and women will be infected at some point during their lifetime. Each time a woman has a new sexual partner she has a 15 percent chance of getting HPV, and multiple sexual partners or a change in partners increases her risk. Despite the large numbers of women with HPV infection, relatively few develop cervical cancer. This is because not all strains of HPV cause cervical cancer, and most women's bodies can effectively fight the virus. Most people with an HPV infection have no symptoms, and therefore are unaware that they can transmit the virus to a sex partner. Recently, efforts towards eliminating cervical cancer by preventing HPV have focused in two areas:

- ❖ **Safer Sexual Practices:** Sexual abstinence is the only way to virtually eliminate cervical cancer risk. However, for individuals who choose to be sexually active, safer sex (consistent condom use) will help to reduce overall risk. Additional strategies to reduce risk include delaying age at first sexual contact, limiting the number of sexual partners or being in a long-term, mutually monogamous relationship with an uninfected partner.
- ❖ **HPV Vaccines:** The U.S. Federal Drug Administration (FDA) has approved two vaccines (*Gardasil* and *Cervarix*) to prevent HPV infection. Both vaccines protect against two types of HPV, which are known to lead to about 70 percent of cervical cancers and provide partial protection against a few additional HPV types that can cause cervical cancer. One of the vaccines protects against two additional HPV infections that account for 90 percent of genital warts. Overall, about 30 percent of cervical cancers, and 10 percent of genital warts, will *not* be prevented by these vaccines.

Both vaccines have proven to be effective *only* if given before infection with HPV, so it is recommended that they be given before an individual is sexually active. The FDA approved *Gardasil* for use in females ages 9 to 26 and approved *Cervarix* for use in females ages 10 to 25. Additionally the FDA approved *Gardasil* for use in males ages 9 to 26 to prevent genital warts. As of May 2010 there were 8,722 (approximately 22.5 percent) females aged 9-18 who have received any doses of HPV Vaccine (Vermont Immunization Registry, 2010).

Risk Factors for Progression of HPV Infection to Cervical Cancer

While screening for cervical cancer through the use of the Pap test is the most effective way of decreasing the risk of progression from HPV infection to cervical cancer, some women are at increased risk due to the following risk factors:

- ❖ **Weakened Immune System:** Women with Human Immunodeficiency Virus (HIV) infection have a suppressed immune system, which makes it hard to fight infections such as HPV, and early cancers.

- ❖ **Smoking:** Women who smoke cigarettes are about twice as likely to get cervical cancer as non-smokers. The carcinogenic chemicals in tobacco can damage the DNA in cervical cells, making smokers more prone to developing cancer.
- ❖ **Exposure to DES (diethylstilbestrol):** Between 1940 and 1971, health care providers prescribed DES to pregnant women with a history of miscarriage. The daughters of women who took DES have a slightly increased risk of vaginal or cervical cancer.
- ❖ **Chlamydia Infection:** Chlamydia, spread by sexual contact, is a relatively common bacterium that can infect the reproductive system and cause pelvic inflammation, or even infertility. Some studies have also indicated women with Chlamydia infection are at higher risk for cervical cancer.
- ❖ **Diet:** Women with diets low in fruits and vegetables may be at increased risk for cervical cancer.
- ❖ **Body Weight:** Women who are overweight are more likely to develop certain cervical cancers.
- ❖ **Oral Contraceptives:** Some research suggests that taking oral contraceptives for a long time, over five years, increases the risk of developing cervical cancer. Risk decreases after oral contraceptives are stopped.
- ❖ **Multiple Full-term Pregnancies:** Women who have had three or more full-term pregnancies have an increased risk of developing cervical cancer.
- ❖ **Young Age at First Full-term Pregnancy:** Women who were younger than 17 years when they had their first full-term pregnancy are more likely to develop cervical cancer.
- ❖ **Access to Screening:** Women who lack access to adequate preventive health care services may not be screened or treated for cervical pre-cancers.
- ❖ **Family History:** Close relatives (mother or sisters) of an individual with a history of cervical cancer are more likely to develop this disease. Researchers believe that an inherited condition may make some women less able to fight off HPV infection or women from the same family may share other risk factors.

Screening

As part of the Vermont State Cancer Plan 2015 and Healthy Vermonters 2010, the objective is to increase percentage of women (age 21+) who have had a Pap test in the past three years.

Goal:	90 percent
VT 2008:	82 percent

Screening Schedules

Either the standard Pap test or liquid-based cytology is used for cervical cancer screening. The recommended frequency for screening adult women depends on age and the results of previous tests. The American Congress of Obstetricians and Gynecologists (ACOG) recommends:

- **Under age 21:** Screening is not recommended, regardless of sexual history.
- **Age 21-29:** Every two years.
- **Age 30+:** Every two years. After three consecutive normal tests, a woman in this age group may have

tests every three years if she does not have a history of moderate or severe dysplasia, she is not infected with HIV, her immune system is not weakened and she was not exposed to diethylstilbestrol (DES) before birth.

- **Age 65+:** Screening may be discontinued if a woman has had three consecutive normal tests and has no history of abnormal screening in the last 10 years. Screening can also be stopped if a woman has a hysterectomy for benign disease with no history of abnormal tests. ACOG continues to recommend an annual well-woman exam regardless of age.

Among Vermont women, cervical cancer incidence increases after the age of 40. This indicates a need to continue screening some women beyond the age of 65 for cervical cancer and to examine for other gynecological health issues.

HPV testing examines cervical cells for DNA of 13 high-risk strains of HPV associated with cervical cancer. This test has been approved in combination with a Pap test, a complete medical history and an evaluation of other risk factors, for screening women over 30 years of age. However, the United States Preventative Services Task Force (USPSTF) does not recommend HPV testing as an addition or alternative to regular Pap testing because HPV testing is costly and has not been studied long enough.

Barriers to Cervical Cancer Screening

In Vermont, cervical cancer screening rates have declined from 86 percent in 2000 to 82 percent in 2008. Furthermore, certain populations report lower rates of cervical cancer screening than other populations. The following characteristics are significant predictors of cervical cancer screening:

- **Having a personal doctor:** 84 percent of women with a personal doctor are getting screened for cervical cancer compared to 61 percent of those without a personal doctor.
- **Health insurance:** 84 percent of women with health insurance get screened for cervical cancer compared to 71 percent of those without insurance.
- **Age:** 93 percent of women between the ages of 25-44 report having a cervical cancer screening in the past three years compared to only about 60 percent of Vermont women age 65 and older.
- **Educational status:** 85 percent of women who have completed college have had a Pap test in the past three years compared to only 76 percent of women who did not finish high school.

Intervention, Policy, and Recommendations

The **Vermont Ladies First Program**³ provides low-income, uninsured, and underserved women access to timely, high-quality screening and diagnostic services to detect breast cancer, cervical cancer, as well as cardiovascular disease at the earliest stages. This program is funded by the Center for Disease Control's (CDC) National Breast and Cervical Cancer Early Detection Program (NBCCEDP) and WISEWOMAN program. Based on federal guidelines, Ladies First provides services to uninsured and underinsured women at or below 250% of the federal poverty line. The Vermont program provides cervical cancer screening to women ages 40-64 and 21-39 with an abnormal result. Between January 2004 and December 2008, the Ladies First Program provided cervical cancer screening to 5,252 Vermont women. The program diagnosed 439 women with cervical cancer or cervical dysplasia (pre-cancer changes in cervical cells) during this same time period.

Treatment for cancer is costly, and many private health insurance plans will pay a percentage of the fees. However, these costs are insurmountable for the millions of Americans who are uninsured. In recognition of the complexity of the issue of treatment costs, coverage and access to care, the United States Congress passed the Breast and Cervical Cancer Prevention and Treatment Act in 2000. In addition to providing funds

³For membership and eligibility information visit http://healthvermont.gov/prevent/ladies_first.aspx or contact Ladies First at 1-800-508-2222.

for screening and diagnostic testing as discussed earlier, the “Medicaid Treatment Act” allows states to provide medical assistance through Medicaid to eligible women who were screened through a CDC program like Ladies First, if they were found to have breast or cervical cancer or pre-cancerous conditions. Vermont passed legislation in 2001 to adopt this Act. In order for a woman to be eligible for Medicaid under this Act, she must have been screened for and found to have breast or cervical cancer (including precancerous conditions) through Ladies First, be under age 65, be uninsured and otherwise not eligible for Medicaid.

The Vermont State Cancer Plan⁴, published by the Vermont Department of Health and **Vermonters Taking Action Against Cancer (VTAAC)**, provides a strategic roadmap for reducing the burden of cancer in Vermont by 2015. The Plan identifies state-wide priorities in the following areas: prevention, early detection, treatment access and quality, quality of life, and end-of-life care.

Cancer affects everyone in some way, either we have had cancer ourselves or someone we know has. The burden of cancer for all Vermonters can be reduced and the 2015 Vermont State Cancer Plan provides specific goals to move our state forward. Goals related to cervical cancer are:

Prevent future cancers by reducing exposure to known risk factors:

- Reduce tobacco use among all Vermonters. For more information about the Vermont Tobacco Control Plan visit: <http://healthvermont.gov/prevent/tobacco>.
- Decrease the prevalence of obesity among all Vermonters through nutrition and physical activity. For more information about the Fit & Healthy Vermonters Plan visit: <http://healthvermont.gov/fitandhealthy.aspx>.
- Prevent HPV infections among young Vermont women through HPV vaccination.

Detect new cancers as early as possible through appropriate screening:

- Increase early detection of cervical cancer among Vermont women.

Increase access to optimal cancer treatment and care:

- Increase informed decision making for Vermont cancer patients and oncologists.
- Reduce pain, discomfort, and distress among Vermont cancer patients and survivors.
- Increase integration of complementary and alternative medicine (CAM) and oncology.
- Reduce financial and practical barriers to optimal cancer care among Vermonters.

Improve the quality of life for people living with, through and beyond cancer, as well as **improve end-of-life** care for cancer patients:

- Promote optimal health among cancer survivors in Vermont.
- Increase the use of hospice care for Vermont cancer survivors.
- Improve planning for end of life care for cancer survivors and other Vermonters.

Vermonters Taking Action Against Cancer (VTAAC) is a statewide coalition of more than 240 people – cancer survivors, advocates, public health and health care professionals, and others – all dedicated to reducing the impact of cancer for all Vermonters. The Vermont Department of Health and VTAAC are working together to raise awareness, prevent cancer where possible, and improve the prospect of survival for those who are diagnosed with cancer.

For more information about VTAAC visit <http://vtaac.org>. For more information on the State Cancer Plan or current activities and progress, visit: <http://healthvermont.gov/cancer>.

⁴ Vermont State Cancer Plan, 2015: <http://healthvermont.gov/prevent/cancer/documents/2015VermontStateCancerPlan-1-21-11.pdf>.

Eliminating Cervical Cancer in Vermont

In 2004, **Women In Government**⁵ launched the Challenge to Eliminate Cervical Cancer Campaign. This bipartisan initiative mobilizes state legislators to address cervical cancer prevention in their states. The Campaign engages state legislators nationwide in policy and awareness initiatives to advance cervical cancer prevention efforts. In the course of six years, all 50 states have introduced and enacted legislation aimed at the elimination of cervical cancer, from creating cervical cancer prevention task forces, to enhancing access to screenings and vaccines, to initiating public education campaigns and mobilizing efforts to reach underserved populations.

In April 2006, the Vermont General Assembly enacted legislation charging the Commissioner of Health to form a Task Force to study the possibility of eliminating cervical cancer in Vermont. This Task Force of policy makers, healthcare advocates, clinicians, and public health professionals considered cervical cancer incidence, mortality, screening recommendations and barriers, as well as prevention of HPV infection, treatment issues and survivorship. In January 2007, the Task Force reported its findings to the Commissioner of Health, who forwarded this report with her comments to the General Assembly as required by the legislation⁶. The recommendations from the Task Force addressed best practices of healthcare providers; information necessary for women and girls; and improved access to health services like HPV vaccinations, cervical cancer screenings, treatment and follow-up care.

The Vermont Task Force to Eradicate Cervical Cancer concluded that Vermont is in a position to reduce the impact of cervical cancer among women. The task force recommended that the Vermont Department of Health provide leadership to develop approaches to work toward access to cervical cancer screening and HPV vaccine for all women who would benefit from them. The Commissioner of Health accepted the task force recommendations as follows:

- ❖ Assure that clinicians are informed about and apply best practice standards and guidelines regarding HPV vaccinations and testing, cervical cancer screening for women of all ages, treating precancerous conditions and treating cervical cancer.
- ❖ Assure that women and their families are informed, have the resources and necessary supports to actively manage their own care in collaboration with the primary care physician and other members of their health care team. This includes understanding causes of HPV infection and cervical cancer, the importance of screening, and the roles of HPV vaccination and testing.
- ❖ Assure that policies and practices of regulators, insurers, and healthcare providers remove barriers to affordable and appropriate healthcare for women of all ages, economic, ethnic and cultural groups. These services include vaccination, screening, treatment of precancerous conditions and cervical cancer, and follow-up care for cervical cancer survivors.

The Commissioner of Health has charged the Vermont Department of Health Cancer Control Program with integrating these recommendations into the priorities and activities of the Vermont State Cancer Plan and convening appropriate workgroups of Vermont's statewide cancer coalition, Vermonters Taking Action Against Cancer (VTAAC), to develop strategies for implementation. In addition, the Department will work with the Department of Vermont Health Access (DVHA), insurers and health care provider organizations to address accessibility and availability of HPV vaccine for Vermont women.

⁵ <http://www.womeningovernment.org/oncology/>.

⁶ The full report by the Vermont task Force to Eradicate Cervical Cancer is available at: <http://healthvermont.gov/prevent/cancer/documents/SiteSpecificCervical1999-2003082108.pdf>.

Data Sources

Vermont Cancer Registry: The Vermont Cancer Registry is a central bank of information on all cancer cases diagnosed among Vermont residents as well as out of state residents who are diagnosed or treated in Vermont. The registry enables the state to collect information on new cases (incidence) of cancer since January 1, 1994. The information maintained by the registry allows the Health Department to study cancer trends and improve cancer education and prevention efforts. Vermont Department of Health Cancer Registry, 1998-2007. The Vermont Cancer Registry can be contacted at 802-865-7749 (http://healthvermont.gov/research/cancer_registry/registry.aspx).

Vermont Vital Statistics: In Vermont, all deaths are registered using an Electronic Death Registration System which is maintained by the Vermont Department of Health (VDH), Vital Statistics. Death certificates are available from towns with appropriate jurisdiction or the VDH Vital Records Office. Vital Statistics Bulletins are posted at: <http://healthvermont.gov/research/index.aspx#vital>.

Behavioral Risk Factor Surveillance System: Since 1990, Vermont and 49 other states and three territories track risk behaviors using a telephone survey of adults called the Behavioral Risk Factor Survey. Suggested citation: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2008.

Surveillance, Epidemiology, and End Results: The National Cancer Institute funds a network of Surveillance, Epidemiology and End Results (SEER) registries. The SEER Program currently collects and publishes cancer incidence and survival data from 14 population-based cancer registries and three supplemental registries covering approximately 26 percent of the U.S. population. These rates are used to estimate the U.S. cancer incidence rates. U.S. incidence is based on the SEER 9 Registries white rates. Suggested Citation: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). SEER Cancer Statistics Review, 1975-2007, National Cancer Institute. Bethesda, MD, 2010 (http://www.seer.cancer.gov/csr/1975_2007).

U.S. Vital Statistics: The U.S. Public Use Database Vital Statistical System maintains the U.S. mortality rates. Rates represented in this report are for the U.S. white population. Suggested Citation: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Public-Use With State, Total U.S. (1969-2007), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2010. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Technical Notes and Definitions

Age Adjustment: All rates in this document are age-adjusted to the 2000 U.S. standard population. This allows the comparison of rates among populations having different age distributions by standardizing the age-specific rates in each population to one standard population.

Incidence: Incidence refers to the number or rate of newly diagnosed cases of cancer. The incidence rate is calculated as the number of new cervical cancer cases diagnosed in the state during one year divided by the number of residents in the state during the same year. The incidence data presented in this report were coded using the International Classification of Disease for Oncology (ICD-O) coding system. Cervical cancer cases were defined as invasive neoplasms with ICD-O-3 histology code C53.0-C53.9 with the exception of histology 9590-9989 (or equivalent for older data).

Mortality: Mortality refers to the number or rate of deaths from cancer. The mortality data presented here were coded using the International Classification of Diseases (ICD). Cause of death was coded according to ICD-10. Cause of death before 1999 was coded according to ICD-9. Comparability ratios were applied to pre-1999 mortality rates to allow for continuity in trends across the ICD revisions.

Race: U.S. incidence and mortality rates for whites, rather than those for all races, are used for comparison because racial minority groups were estimated to make up 3.9 percent of the total Vermont population, compared with the total U.S. non-white population of 34 percent in 2007. Nationwide, whites have a higher risk compared to people of other races for female breast, melanoma, and bladder cancer incidence. Whites have a lower risk compared to other races for prostate, colorectal, and cervical cancer. The much smaller populations of Vermont residents

of other races may have very different risks of these cancers. Combining data over many years will be required to determine cancer rates.

Federal Poverty Level (FPL): The set minimum amount of income that a family needs for food, clothing, transportation, shelter and other necessities. In the United States, this level is determined by the Department of Health and Human Services. FPL varies according to family size. The number is adjusted for inflation and reported annually in the form of poverty guidelines. Public assistance programs, such as Medicaid in the U.S., define eligibility income limits as some percentage of FPL.

Statistical Significance: A statistically significant difference indicates that there is statistical evidence that there is a difference that is unlikely to have occurred by chance alone.

Small Numbers: Rates are not presented in this report if they are based on fewer than 6 cases.

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