

Cancer in Vermont

**A report of 1994-1996 cancer incidence
data from the Vermont Cancer Registry**



Vermont Department of Health
January 2000

Cancer in Vermont • Contents

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Special Thanks The Vermont Department of Health Cancer Registry staff would like to express our sincerest thanks to all of the Vermont hospital registrars, administrators, physicians, and nursing home personnel who make collection of the cancer incidence data for this report possible. We would also like to thank the central cancer registries and vital statistics offices of the many states who furnished cancer incidence case information and death certificates necessary to complete our case research for Vermont residents. Other states have also provided us with the opportunity to learn from their many years of cancer registration experience.



Vermont Department of Health

Agency of Human Services

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Burlington, VT 05402

Dear Vermonter,

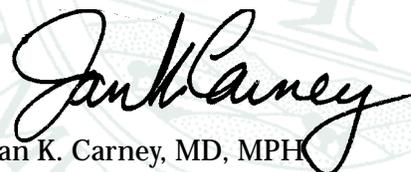
This report contains an analysis of the first three years of cancer incidence data compiled by the Vermont Cancer Registry—1994 through 1996. For the first time, Vermont cancer rates have been calculated for 23 different cancer sites. There are several significant findings:

- Vermont's colorectal cancer incidence rate is statistically worse than the U.S. rate. This points to the need for new efforts to help people lower their risks by getting regular screening, being more physically active and improving their diets.
- Vermont's breast cancer incidence rate is NOT higher than the rest of the country and our breast cancer death rate is declining. This good news reinforces the importance of continuing efforts to make mammograms and clinical breast exams available to all women age 40 and older.
- Vermont has a higher incidence of cervical cancer than the U.S. Cervical cancer is entirely preventable. This points to the need for more widespread use of Pap tests.

This report also shows the damaging effects of tobacco use. The incidence rates for lung cancer and cancer of the larynx are both statistically worse than the U.S. rates, and lung cancer continues to be the leading cause of cancer death for both men and women.

As additional years of data are collected, more detailed analysis will be possible. Future cancer registry reports will include trends in cancer incidence over time, information about the stage at which cancer is diagnosed and the methods of treatment used, as well as county rates for additional cancer sites. The findings will help us more effectively direct cancer prevention and control programs, identify areas where cancer screening efforts should be enhanced and identify populations that would benefit from additional education or services.

I would like to express my heartfelt thanks to all of those who have contributed to the development and success of the Vermont Cancer Registry.



Jan K. Carney, MD, MPH
Commissioner of Health

The Disease of Cancer

Cancer is the name for a group of more than 100 different diseases that have similar characteristics.

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 form into a malignant tumor, also called a malignant neoplasm. Cancer cells can metastasize (break away from the tumor and enter the bloodstream or lymphatic system) to

form new tumors in other parts of the body. Benign tumors are not cancer, as they do not metastasize.

Cancer Sites

There are many different types of cancer. Each is identified by the organ (or primary “site”) where the abnormal cells first develop and by the type of cell involved.

Cancer that has spread from the organ in which it developed is said to have “metastasized”. Cells in the metastatic (or secondary) tumor are like those found in the primary tumor. For

example, if breast cancer cells move to the lung it is called metastatic breast cancer, not lung cancer.

One type of cancer that is not routinely tracked by cancer registries is non-melanoma skin cancer (squamous cell or basal cell carcinoma). Although this is the most common cancer, with more than 600,000 new cases estimated to occur each year in the U.S., it is usually treated in doctors’ offices, and less than 1 percent of non-melanoma skin cancers are fatal.

Cancer in the Population

As the second leading cause of death, following heart disease, in Vermont and the nation, cancer is primarily a disease of middle and older age. Nearly 60 percent of new cancers are diagnosed in people age 65 and older.

Still, almost anyone can



Vermont Facts: Cancer among Females

- From 1994 to 1996, a total of 3,998 new cases of cancer were diagnosed in Vermont females. During that same time period, 1,711 females died from cancer.

Incidence *(new cases, based on data from 1994-1996)*

- For all cancer sites combined, the female cancer incidence rate is statistically better than the U.S. SEER rate. *(A description of U.S. SEER rates may be found on page 17.)*
- For most types of cancer, the female incidence rate is not statistically different from the U.S. SEER rate.
- The female incidence rate is statistically worse than the U.S. SEER rate for colorectal cancer, cancer of the larynx, cervical cancer, and multiple myeloma.
- The female incidence rate is statistically better than the U.S. SEER rate for only one type of cancer—thyroid cancer.

Mortality *(deaths, based on data from 1989-1996)*

- For all sites combined, the female cancer death rate is not statistically different from the U.S. rate.
- For all individual cancer sites, the female death rates are not statistically different from the U.S. rates.

develop cancer, including children and young adults.

There are differences in cancer rates among people of different genders and people of different racial and ethnic backgrounds. For example, in the U.S., African Americans have a vastly different cancer experience from the white population. Compared to whites, African Americans have higher age-adjusted incidence or mortality rates (see page 17), or both, for most types of cancer. Females have much lower rates than males for cancer of the mouth and throat. And, Hispanic Americans have higher rates of

cervical, esophageal, gallbladder and stomach cancers than the U.S. white population.

Causes of Cancer

Cancer develops gradually as a result of a complex mix of factors related to lifestyle, environment and heredity. Each type of cancer is caused by a different set of factors, some well established (such as cigarette smoking causing lung cancer), some uncertain and some unknown. Many cancers are thought to result from more than one risk factor.

A risk factor for cancer is a condition or an activity that increases a person's chance of developing a particular type of cancer. Some of the most common risk factors are associated with lifestyle. These include diet, tobacco, alcohol, lack of exercise, ultraviolet radiation (sun tanning), certain sexually transmitted diseases, and not getting recommended screening tests. Other risk factors include genetics or family history, hormones, and exposure to carcinogens (certain chemicals or naturally occurring substances that are known to cause cancer).

Any of these risk factors may act together or in sequence to initiate or promote cancer. For some cancers, such as oral cancer, the risk is multiplied when two risk factors (in this case, alcohol and tobacco use) are both present.

In cases where the cancer is due to contact with a cancer-causing agent, the disease does



Vermont Facts: Cancer among Males

- From 1994 to 1996, a total of 3,995 new cases of cancer were diagnosed in Vermont males. During that same time period, 1,806 males died from cancer.

Incidence *(new cases, based on data from 1994-1996)*

- For all cancer sites combined, the male cancer incidence rate is statistically worse than the U.S. SEER rate. *(A description of U.S. SEER rate may be found on page 17.)*
- For most types of cancer, the male rate is not statistically different from the U.S. SEER rate.
- The incidence rate is statistically worse than the U.S. SEER rate for lung cancer and cancer of the larynx.
- The incidence rate is statistically better than the U.S. SEER rate for stomach cancer and prostate cancer.

Mortality *(deaths, based on data from 1989-1996)*

- For all sites combined, the male cancer death rate is statistically worse than the U.S. rate.
- The male cancer death rate is statistically worse than the U.S. rate for non-Hodgkin's lymphoma and prostate cancer.
- For all other cancers, the Vermont death rate is not statistically different from the U.S. rate.

not develop immediately. Instead, there is often a long period—as long as 30 years—between exposure and diagnosis of cancer. This is called a latency period. For example, lung cancer is usually the result of smoking habits 20 or more years prior to diagnosis of disease. A long latency period makes pinpointing the cause of cancer even more difficult.

Prevention and Early Detection

Many cancers could be prevented through smoking cessation (and never taking up smoking) and good dietary habits. In addition, many

skin cancers can be prevented by limiting exposure to the sun and by wearing protective clothing and using sunscreens.

Many cancers can be cured if they are detected and treated in the early stages. Checking for cancer (or conditions that may lead to cancer) in a person who does not have any symptoms of the disease is called screening. Screening may involve a physical exam, a laboratory test, or procedures such as a mammogram or sigmoidoscopy that look at an internal organ. Screening, conducted regularly by a health care provider, can result in early detection of cancers of the breast,

Females: Cancer Incidence, rates based on 1994-96

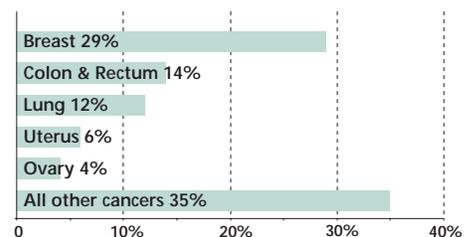
	U.S. SEER rate <i>per 100,000</i>	VT rate <i>per 100,000</i>	(95% CI)	VT cases <i>per year</i>
Breast	114.4	108.3	(101.9, 115.0)	388
Lung	44.2	45.5	(41.4, 50.0)	158
Colon and Rectum	36.4	43.9	(40.1, 48.1) ✗	184
Uterus	22.4	25.2	(22.1, 28.7)	86
Ovary	15.2	14.6	(12.3, 17.3)	51
Non-Hodgkin's Lymphoma	13.0	12.5	(10.4, 15.0)	45
Melanoma of the Skin	12.8	12.1	(10.0, 14.5)	43
Bladder	8.1	9.6	(7.8, 11.8)	36
Cervix	7.0	9.2	(7.5, 11.3) ✗	34
Kidney	6.5	8.2	(6.5, 10.3)	30
Leukemias	8.2	8.0	(6.3, 10.0)	30
Brain and Nervous System	5.1	6.6	(5.0, 8.6)	22
Oral Cavity and Throat	5.9	6.2	(4.7, 8.1)	22
Pancreas	7.4	5.8	(4.5, 7.5)	24
Multiple Myeloma	3.2	5.2	(3.9, 7.0) ✗	19
Thyroid	8.0	5.0	(3.7, 6.7) ★	18
Hodgkin's Disease	2.6	3.0	(2.0, 4.5)	9
Larynx	1.4	2.8	(1.9, 4.2) ✗	9
Stomach	3.5	2.6	(1.8, 3.8)	11
Esophagus	1.6	2.2	(1.4, 3.4)	9
Liver	1.8	---	---	---
All Sites Combined	399.4	362.8	(351.1, 374.8) ★	1,333

★ Vermont rate statistically **better** than U.S. SEER rate

✗ Vermont rate statistically **worse** than U.S. SEER rate

Leading Cancer Sites, 1994-96

Percent of new female cases by site



About this Table:

Vermont rates are based on data from 1994-96. All rates are age-adjusted to the 1970 U.S. standard population and exclude basal cell and squamous cell skin cancers and in situ (malignant but non-invasive) carcinomas except urinary bladder. Rates based on 10 or fewer cases are not individually calculated.

The U.S. SEER rates are 1994-96 white population incidence rates. When the U.S. SEER rate falls within the 95% confidence interval (95% CI) for the Vermont rate, it suggests that there is no statistical difference between the rates.

cervix, colon, rectum, testis, oral cavity and skin when treatment is most likely to be successful. Breast, testicle and skin self-exams can also result in detection of tumors at earlier stages. For these cancers, more widespread use of screening will lead to earlier detection of cancer and to better survival rates.

Cancer Treatment

Today cancer is treated with surgery, radiation, chemotherapy, hormones, and immunotherapy. A team of specialists working with a cancer patient may include a medical oncologist (spe-

cialist in cancer treatment), a surgeon, a radiation oncologist, and others.

Working together, physicians and patients may decide to use a single treatment method or a combination of methods. The treatment will depend on the type and location of the cancer, the stage of the disease, the patient's age and general health, and other factors.

Cancer Surveillance

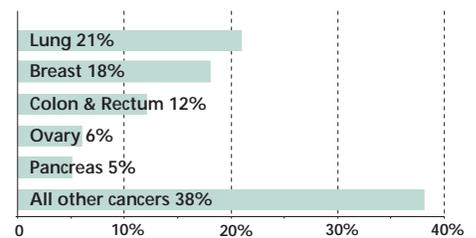
Cancer surveillance is the monitoring of cancer rates and trends in the population, and cancer registries are an important surveillance

Females: Cancer Mortality, rates based on 1989-96

	U.S. rate <i>per 100,000</i>	VT rate <i>per 100,000</i>	(95% CI)	VT deaths <i>per year</i>
Lung	33.5	33.2	(31.0, 35.6)	115
Breast	25.9	25.9	(24.0, 28.0)	95
Colon and Rectum	14.8	15.8	(14.4, 17.3)	68
Ovary	8.0	9.0	(7.9, 10.3)	32
Pancreas	7.0	6.8	(5.9, 7.9)	27
Non-Hodgkin's Lymphoma	5.7	5.7	(4.9, 6.7)	23
Leukemias	4.9	4.7	(3.9, 5.6)	19
Uterus	3.3	3.7	(3.0, 4.5)	15
Cervix	2.5	3.0	(2.4, 3.8)	11
Brain and Nervous System	3.5	3.0	(2.3, 3.8)	10
Stomach	2.6	2.4	(1.9, 3.1)	11
Kidney	2.5	2.4	(1.9, 3.1)	---
Melanoma of the Skin	1.8	2.2	(1.6, 2.9)	---
Multiple Myeloma	2.4	2.1	(1.6, 2.7)	---
Bladder	1.7	1.9	(1.5, 2.5)	---
Liver	1.9	1.9	(1.5, 2.5)	---
Esophagus	1.2	1.6	(1.2, 2.2)	---
Oral Cavity and Throat	1.4	1.5	(1.1, 2.1)	---
Larynx	0.4	0.6	(0.4, 1.1)	---
Hodgkin's Disease	0.4	---	---	---
Thyroid	0.3	---	---	---
All Sites Combined	140.4	144.0	(139.5, 148.6)	545

★ Vermont rate statistically **better** than U.S. rate.
 ✗ Vermont rate statistically **worse** than U.S. rate.

Leading Cancer Deaths, 1989-96
 Percent of female deaths by site



About this Table:

Vermont rates are based on data from 1989-96. All rates are age-adjusted to the 1970 U.S. standard population. Rates based on 10 or fewer cases are not individually calculated.

The U.S. rates are 1989-96 white population mortality rates. When the U.S. rate falls within the 95% confidence interval (95% CI) for the Vermont rate, it suggests that there is no statistical difference between the rates.

tool. Cancer registries are used to gather data to help determine cancer patterns among various populations and monitor cancer trends over time. Data collected in a cancer registry can guide planning and evaluation of cancer control programs, and provide data to help prioritize health resource allocations. It can also be used in clinical, epidemiologic and health services research.

For example, differences in incidence rates might prompt a search for clues as to why the incidence of a certain type of cancer is higher for one group than another. Incidence rates may

also identify specific populations that could benefit from increased public education and access to cancer prevention and screening services.

Cancer Cluster Inquiries and Investigations

Cancer clusters are often suspected when people report they have observed a number of cases in their neighborhood, community or workplace. Because cancer is the second leading cause of death, it is not unusual to know several people who have been diagnosed with this disease. As a population ages, the occurrence of

Males: Cancer Incidence, rates based on 1994-96

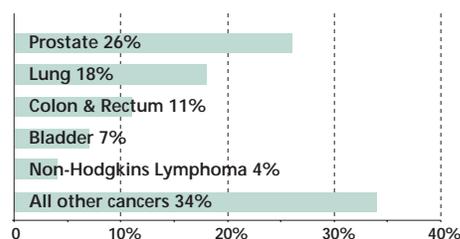
	U.S. SEER rate per 100,000	VT rate per 100,000	(95% CI)	VT cases per year
Prostate	133.6	121.6	(114.3, 129.4) ★	343
Lung	71.7	83.7	(77.6, 90.2) ✗	239
Colon and Rectum	51.2	52.5	(47.7, 57.7)	151
Bladder	30.8	31.8	(28.1, 35.9)	91
Non-Hodgkin's Lymphoma	20.4	19.1	(16.3, 22.3)	56
Melanoma of the Skin	18.8	18.0	(15.3, 21.2)	53
Kidney	13.1	13.7	(11.3, 16.5)	39
Oral Cavity and Throat	14.4	12.6	(10.4, 15.3)	37
Leukemias	13.3	12.3	(10.1, 15.1)	35
Larynx	6.7	10.3	(8.2, 12.9) ✗	28
Pancreas	9.6	9.4	(7.5, 11.8)	27
Brain and Nervous System	7.6	8.4	(6.6, 10.7)	25
Esophagus	5.9	7.2	(5.5, 9.4)	21
Stomach	8.9	6.6	(5.0, 8.7) ★	20
Multiple Myeloma	5.0	5.7	(4.2, 7.6)	17
Testis	5.2	5.4	(4.0, 7.3)	18
Liver	4.7	4.7	(3.3, 6.5)	14
Hodgkin's Disease	3.2	3.4	(2.3, 5.0)	11
Thyroid	3.0	3.1	(2.0, 4.6)	10
All Sites Combined	441.9	461.0	(446.7, 475.8) ✗	1,332

★ Vermont rate statistically **better** than U.S. SEER rate.

✗ Vermont rate statistically **worse** than U.S. SEER rate.

Leading Cancer Sites, 1994-96

Percent of new male cases by site



About this Table:

Vermont rates are based on data from 1994-96. All rates are age-adjusted to the 1970 U.S. standard population and exclude basal cell and squamous cell skin cancers and in situ (malignant but non-invasive) carcinomas except urinary bladder. Rates based on 10 or fewer cases are not individually calculated.

The U.S. SEER rates are 1994-96 white population incidence rates. When the U.S. SEER rate falls within the 95% confidence interval (95% CI) for the Vermont rate, it suggests that there is no statistical difference between the rates.

new cancer cases is expected.

A suspected cancer cluster is more likely to be a true cluster if it involves:

- A large number of cases of one type of cancer, rather than several different types;
- A rare type of cancer, rather than a common type; or
- An increased number of cases of a certain type of cancer are found in an age group not usually affected by that type of cancer.

Most geographic differences in cancer rates appear to result from behavioral differences or differences in lifestyle; not from anything in a

person's physical surroundings or environment.

Vermont Cancer Registry

The Vermont Cancer Registry (see page 16) is part of a national effort to gain a better understanding of the disease of cancer. The registry is operated by the Vermont Department of Health and provides ongoing monitoring of cancer incidence and mortality among state residents.

The information maintained by the registry will allow the Health Department and other researchers to study cancer trends and to improve cancer education and prevention efforts.

Males: Cancer Mortality, rates based on 1989-96

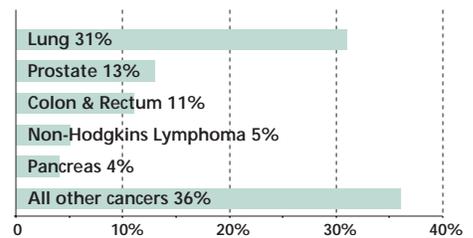
	U.S. rate <i>per 100,000</i>	VT rate <i>per 100,000 (95%CI)</i>	VT deaths <i>per year</i>
Lung	70.6	67.8 (64.4, 71.4)	185
Prostate	23.8	28.7 (26.5, 31.0) ✗	80
Colon and Rectum	21.7	23.0 (21.0, 25.2)	64
Non-Hodgkin's Lymphoma	8.3	10.1 (8.8, 11.5) ✗	28
Pancreas	9.6	9.4 (8.1, 10.8)	26
Leukemias	8.4	8.5 (7.4, 9.9)	24
Bladder	5.8	6.5 (5.5, 7.8)	18
Esophagus	5.6	6.4 (5.4, 7.6)	17
Kidney	5.0	6.0 (5.0, 7.2)	16
Brain and Nervous System	5.6	5.1 (4.2, 6.2)	15
Stomach	5.6	4.8 (3.9, 5.8)	13
Melanoma of the Skin	3.4	4.1 (3.3, 5.0)	12
Multiple Myeloma	3.3	3.9 (3.1, 4.8)	11
Oral Cavity and Pharynx	3.8	3.8 (3.0, 4.7)	10
Liver	4.2	3.7 (3.0, 4.7)	10
Larynx	2.1	2.5 (1.9, 3.3)	---
Hodgkin's Disease	0.6	0.6 (0.3, 1.0)	---
Thyroid	0.3	---	---
Testis	0.2	---	---
All Sites Combined	209.2	216.5 (210.4, 222.8) ✗	598

★ Vermont rate statistically **better** than U.S. rate.

✗ Vermont rate statistically **worse** than U.S. rate.

Leading Cancer Deaths, 1989-96

Percent of male deaths by site



About this Table:

Vermont rates are based on data from 1989-96. All rates are age-adjusted to the 1970 U.S. standard population. Rates based on 10 or fewer cases are not individually calculated.

The U.S. rates are 1989-96 white population mortality rates. When the U.S. rate falls within the 95% confidence interval (95% CI) for the Vermont rate, it suggests that there is no statistical difference between the rates.

Breast Cancer

Among women, breast cancer is the most commonly diagnosed cancer and a leading cause of cancer death in the United States.

Nationally, breast cancer accounts for about 16.5 percent of all cancer deaths among women, and a woman's risk for developing breast cancer in her lifetime is about one in eight.

Breast cancer incidence increases with age. After age, the next strongest risk factor is a family history of premenopausal breast cancer in a sister or mother. Modest increases in risk are also associated with first pregnancy after age 30, never bearing children, menstruation onset before age 12, and menopause after age 50.

While many factors have been associated with the risk of breast cancer, most of these "established" risk factors only relate to a moderate increase in risk. This suggests that multiple factors may play a role in each woman's disease and that

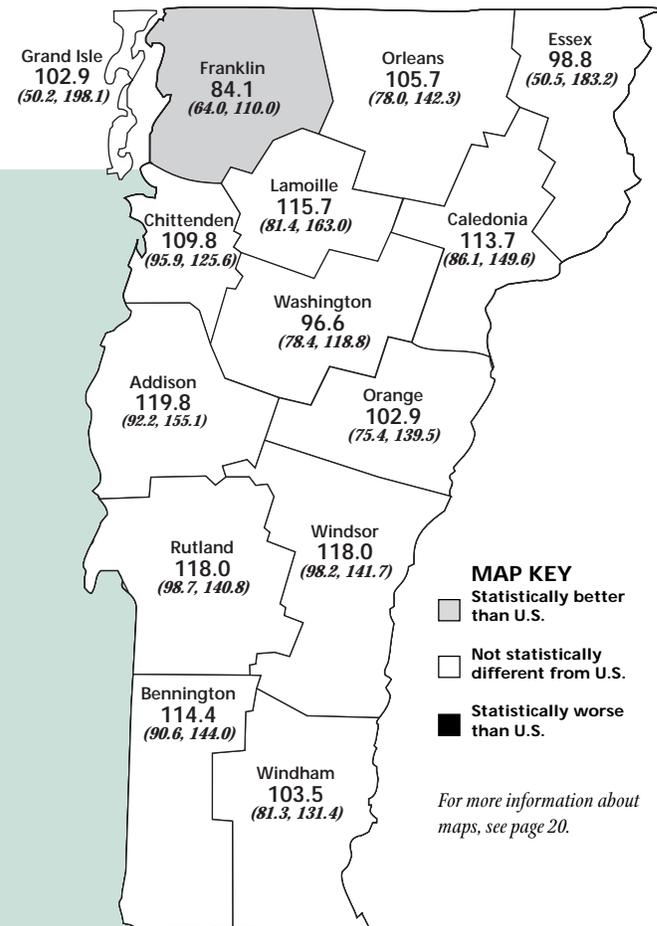
unrecognized factors may also exist.

Nationally, the majority of women who get breast cancer are over age 50. The incidence rates for women before age 45 are higher among African American women; after age 45 the rates are higher for white women. Overall, African American women have lower incidence rates but higher mortality rates than white women.

Currently, there is no known way to prevent breast cancer. Early detection increases the chances of long-term survival. Mammography, combined with clinical breast exam, is the most effective means of early detection. Although mammography can detect small tumors in younger women, contro-

Breast Cancer Incidence, 1994-96

Age-adjusted rates (with 95% confidence intervals) per 100,000 females



Vermont Facts:

Incidence (new cases, based on data from 1994-1996)

- Vermont's breast cancer incidence rate is 108.3 (101.9, 115.0) per 100,000 women. This is not statistically different from the U.S. SEER rate of 114.4.
- From 1994 to 1996, 1,165 new cases of breast cancer were diagnosed.
- For Franklin County, the breast cancer incidence rate is statistically better than the U.S. SEER rate.
- For all other counties, there are no statistical differences between incidence rates and the U.S. SEER rate.

versy persists regarding whether it reduces mortality in women younger than age 50.

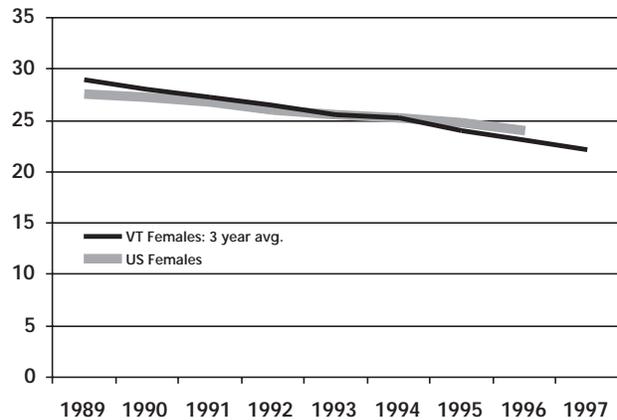
Breast Cancer Screening

- From 1993 to 1997, 63.2 percent of Vermont women age 50 and older had a mammogram and clinical breast exam within the past two years.
- In 1997, only 48 percent of women age 50 and older with incomes below \$15,000 got recommended screening, compared to 79 percent of women with incomes over \$75,000.
- According to a 1996 Health Department survey, Vermont primary care physicians said that the major barriers to routine mammograms for women age 50 and older are:

- Lack of patient acceptance/patient refusal
- Visit for immediate care only
- High cost/inadequate insurance
- Patient age over 75 years

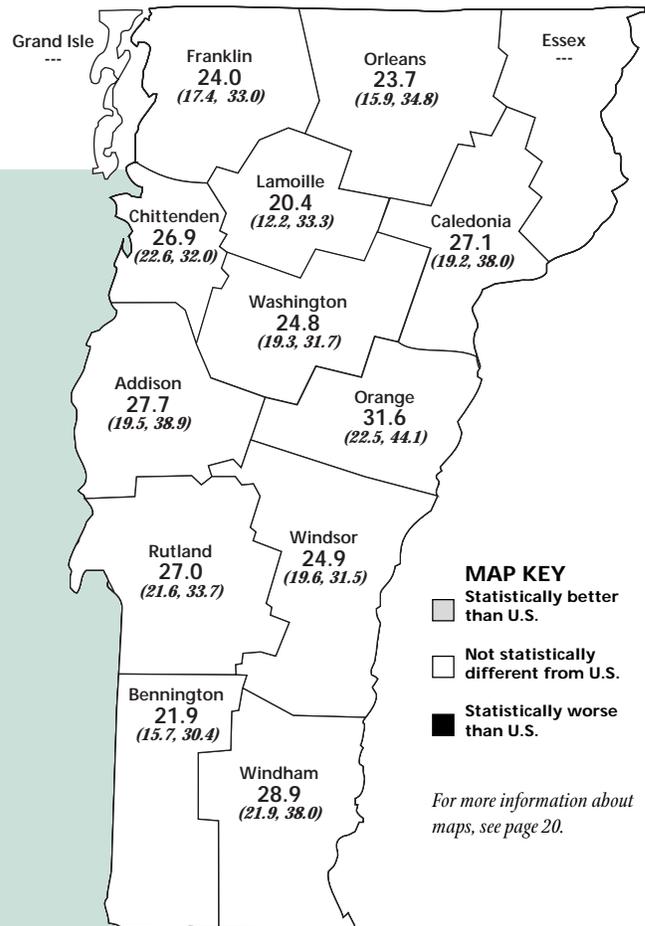
Breast Cancer Mortality

Age-adjusted death rates per 100,000 females by year



Breast Cancer Mortality, 1989-96

Age-adjusted death rates (with 95% confidence intervals) per 100,000 females



Vermont Facts:

Mortality (deaths, based on data from 1989-1996)

- Vermont's breast cancer mortality rate is 25.9 (24.0, 28.0) per 100,000 women. This is not statistically different from the U.S. rate of 25.9.
- The breast cancer death rate has decreased significantly in the past 10 years. Still, an average of 95 women die from breast cancer every year.
- Vermont ranks 23rd in the nation for breast cancer deaths (1992-96).
- There are no statistical differences between death rates in Vermont counties and the U.S. rate.

Colorectal Cancer

Nationally, colorectal cancer is the second leading cause of cancer death after lung cancer. Among men, it is the third most commonly diagnosed cancer (after lung and prostate cancer); among women, it ranks third (after lung and breast cancer).

Together, the colon and rectum make up the large bowel, or large intestine. The colon refers to the upper five or six feet of the large intestine and the rectum refers to the last five or six inches. Because these cancers are similar and sometimes hard to distinguish from one another, they are generally grouped as colorectal cancer.

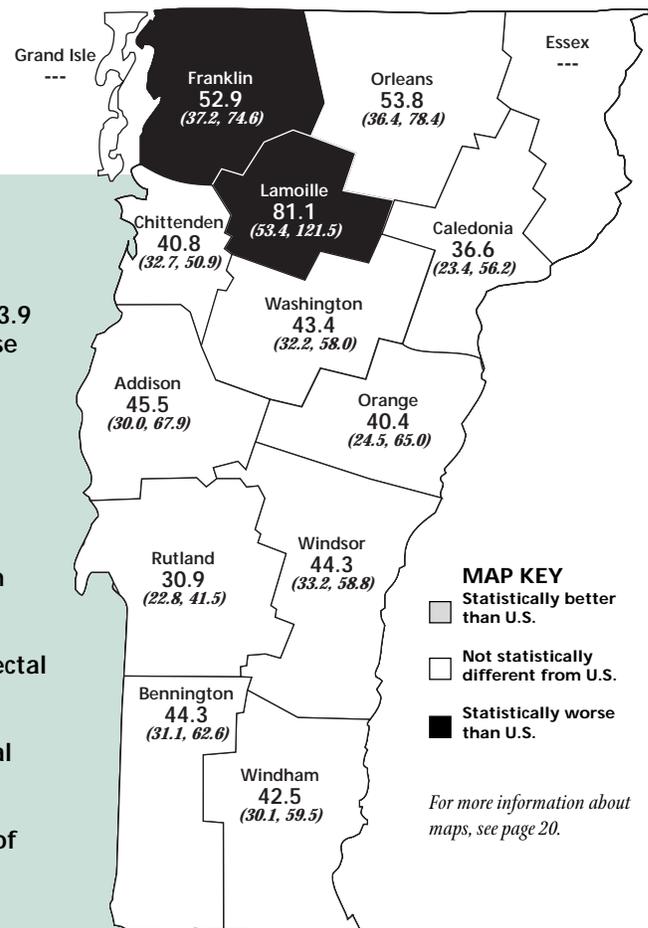
In the U.S., about 75 percent of all new cases of colorectal cancer occur in people with no known risks for the disease. The remaining cases occur in people who have a family history of colorectal cancer, previous adenomatous polyps, or a condition such as inflammatory bowel disease.

The incidence of colorectal cancer, as with many cancers, is extremely low in childhood and increases dramatically with age. The U.S. median age of diagnosis is 70 for men and 73 for women.

Colorectal cancer is one of few cancers that can be prevented through a screening test. Research shows that colorectal cancer develops gradually from benign polyps. Polyps detected by sigmoidoscopy or colonoscopy can be removed before they become malignant.

Screening recommendations for people age 50 years and older are: fecal occult blood test every year, sigmoidoscopy every 5 years, or a combination of the two.

Female Colorectal Cancer Incidence, 1994-96
Age-adjusted rates (with 95% confidence interval) per 100,000 females



Vermont Facts: Women

Incidence (new cases, based on data from 1994-1996)

- Vermont's female colorectal cancer incidence rate is 43.9 (40.1, 48.1) per 100,000 women. This is statistically worse than the U.S. SEER rate of 36.4.
- From 1994 to 1996, there were 551 new diagnoses of colorectal cancer in women.

Mortality (deaths, based on data from 1989-1996, map not shown)

- The female colorectal cancer death rate is 15.8 per 100,000 women. This is not statistically different from the U.S. rate of 14.8.
- Between 1989 and 1996, 540 women died from colorectal cancer.
- Vermont ranks 19th in the nation for female colorectal cancer deaths (1992-96).
- For Franklin County, the colorectal cancer death rate of 23.9 (17.4, 32.6) is statistically worse than the U.S. rate.

Individuals can lower their risk by getting regular screening tests, being more physically active, and eating more vegetables. Recent studies appear to suggest that eating less red meat and taking a daily multivitamin that contains folic acid may reduce risk as well.

Colorectal Cancer Screening

- According to a 1996 Health Department survey, the percentage of Vermont primary care physicians who routinely test patients age 50 and older was:

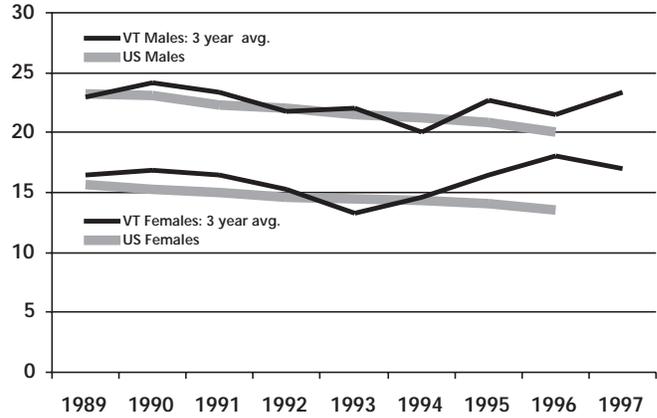
Digital rectal exam	52%
Fecal occult blood	51%
Sigmoidoscopy	6%

- Vermont primary care physicians said the major barriers to sigmoidoscopy are:

- High cost to patient
- Visit for immediate care only
- Lack of patient acceptance/patient refusal

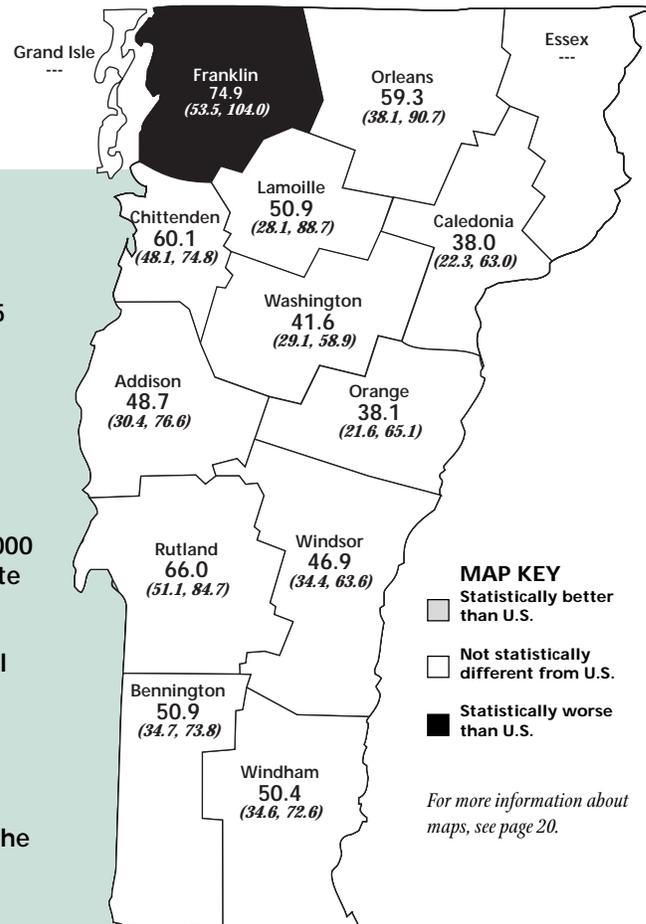
Colorectal Cancer Mortality

Age-adjusted death rates per 100,000 people by year



Male Colorectal Cancer Incidence, 1994-96

Age-adjusted rates (with 95% confidence intervals) per 100,000 males



Vermont Facts: Men

Incidence (new cases, based on data from 1994-1996)

- Vermont's male colorectal cancer incidence rate is 52.5 (47.7, 57.7) per 100,000 men. This is not statistically different from the U.S. SEER rate for men of 51.2.
- From 1994 to 1996, there were 454 new diagnoses of colorectal cancer in men.

Mortality (deaths, based on data from 1989-1996, map not shown)

- The male colorectal cancer death rate is 23.0 per 100,000 men. This is not statistically different from the U.S. rate of 21.7.
- Between 1989 and 1996, 508 men died from colorectal cancer.
- Vermont ranks 19th in the nation for male colorectal cancer deaths (1992-96).
- The Franklin County death rate of 31.9 (23.3, 43.4) and the Essex County death rate of 46.3 (25.6, 80.4) are both statistically worse than the U.S. rate.

Lung Cancer

Nationally, lung cancer is the leading cause of cancer death among both men and women. It accounts for about 15 percent of all newly diagnosed cancer cases; however, it accounts for 29 percent of cancer deaths.

Cigarette smoking is the major cause of lung cancer. It is estimated that about 85 percent of all lung cancer deaths in the U.S. are attributable to smoking.

Nationally, since 1990, the lung cancer death rate among men has declined, while the rate among women has continued to increase. The lung cancer incidence rate among women has risen as well, reflecting an increase in cigarette smoking among females over the past several decades. Since 1987, more women have died each year from lung cancer than from breast cancer.

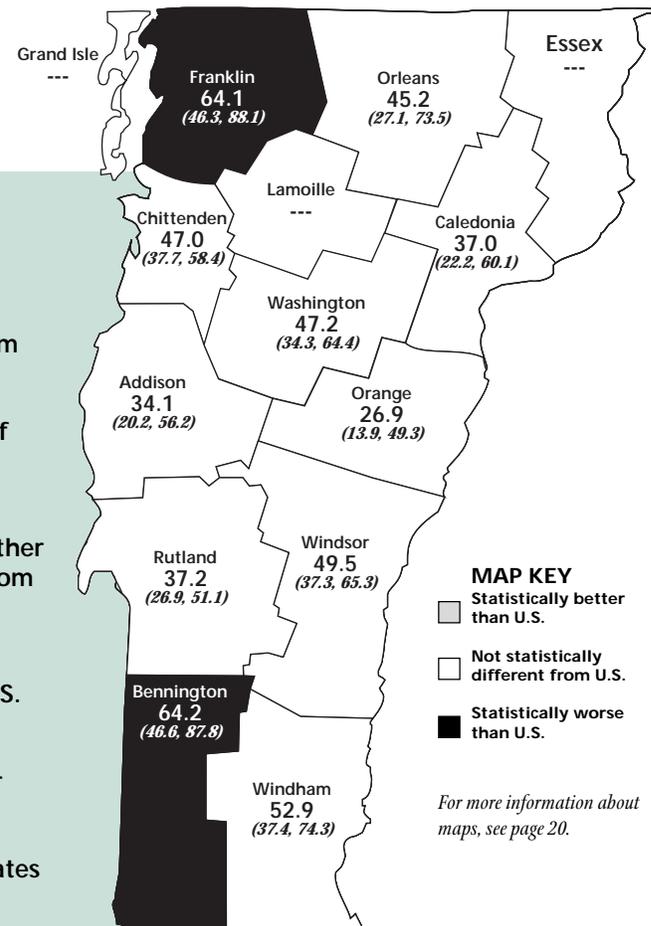
Quitting smoking greatly reduces the risk of dying from lung cancer. Ten years after quitting,

the risk of lung cancer death among former smokers is about 50 percent of the risk for people who continue to smoke.

Additional risks for lung cancer include environmental tobacco smoke (secondhand smoke), radon gas, and occupational exposures to substances like asbestos. Increased risk of lung cancer has also been associated with the smoking of pipes and cigars. The combination of cigarette smoking and asbestos exposure increases the risk of lung cancer fifty-fold.

Currently, there are no screening tests for lung cancer. Symptoms often do not appear until the disease is quite advanced.

Female Lung Cancer Incidence, 1994-96
Age-adjusted rates (with 95% confidence intervals) per 100,000 females



Vermont Facts: Women

Incidence (new cases, based on data from 1994-1996)

- Vermont's female incidence rate is 45.5 (41.4, 50.0) per 100,000 women. This is not statistically different from the U.S. SEER rate of 44.2.
- From 1994 to 1996, there were 475 new diagnoses of lung cancer in women.

Mortality (based on data from 1989-1996, map not shown)

- Lung cancer kills more women each year than any other cancer. Between 1989 and 1996, 920 women died from lung cancer.
- The lung cancer death rate for women is 33.2 per 100,000. This is not statistically different from the U.S. rate of 33.5.
- Vermont is ranked 15th in the nation for lung cancer deaths in females (1992-96).
- There are no statistical differences between death rates in Vermont counties and the U.S.

Lung Cancer and Smoking

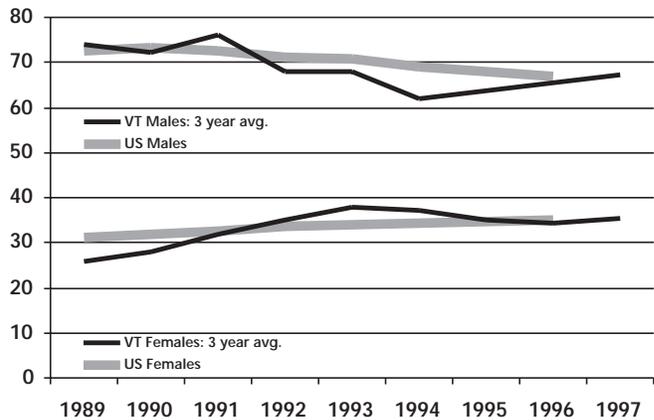
Deaths from lung cancer today reflect people's smoking habits of decades ago. The single most effective way to prevent lung cancer is to not smoke.

Most recent Vermont statistics:

- 22 percent of adults report that they currently smoke cigarettes (1998)
- 31 percent of students in grades 8-12 report smoking on one or more days during the past 30 days (1999)
- 13 percent of students in grades 8-12 report smoking every day (1999)

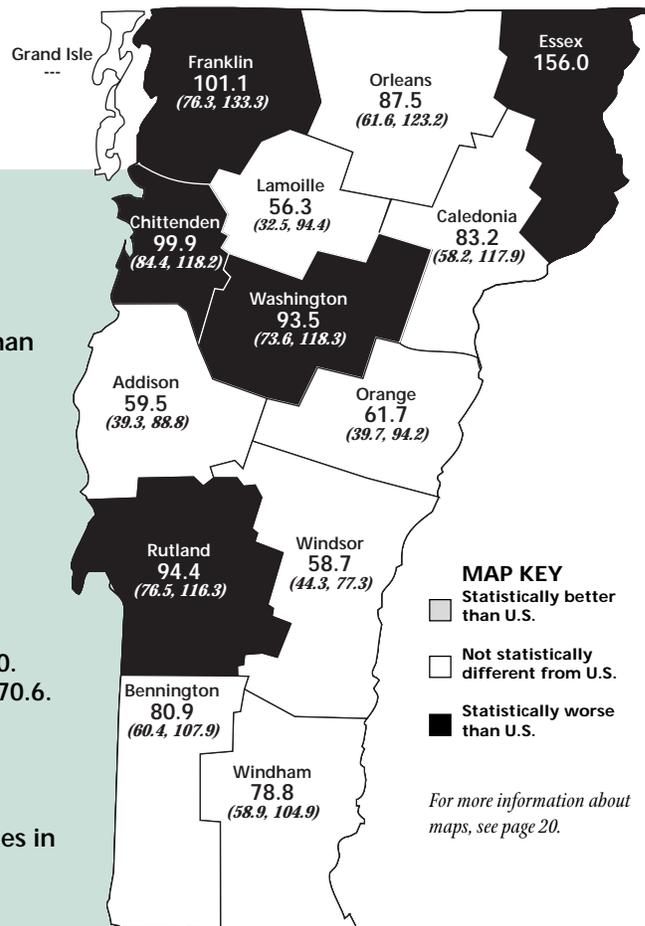
Lung Cancer Mortality

Age-adjusted death rates per 100,000 people by year



Male Lung Cancer Incidence, 1994-96

Age-adjusted rates (with 95% confidence intervals) per 100,000 males



Vermont Facts: Men

Incidence (new cases, based on data from 1994-1996)

- The Vermont lung cancer incidence rate for men is 83.7 (77.6, 90.2) per 100,000. This is statistically worse than the U.S. SEER rate of 71.7.
- From 1994 to 1996, there were 718 new diagnoses of lung cancer in men.

Mortality (deaths, based on data from 1989-1996, map not shown)

- Lung cancer kills more men each year than any other cancer. Between 1989 and 1996, 1,481 men died from lung cancer.
- The lung cancer death rate for men is 67.8 per 100,000. This is not statistically different from the U.S. rate of 70.6.
- Vermont is ranked 31st in the nation for lung cancer deaths in males (1992-96).
- There are no statistical differences between death rates in Vermont counties and the U.S.

Prostate Cancer

Cancer of the prostate is one of the most commonly diagnosed cancers among men in the U.S., with an incidence rate exceeding that for lung cancer. It is the second leading cause of cancer death among men (following lung cancer).

Prostate cancer is primarily a disease of the elderly; the U.S. median age at diagnosis is 72. About 80 percent of prostate cancer is diagnosed in men over age 65.

Nationally, prostate cancer incidence rates are significantly higher among African American men compared to white men. In fact, African American men have the highest prostate cancer incidence rate in the world. Death rates are twice as high for African American men as white men.

Experts have not reached consensus on prevention, early detection and treatment methods. The impact on illness and survival rates of surgery

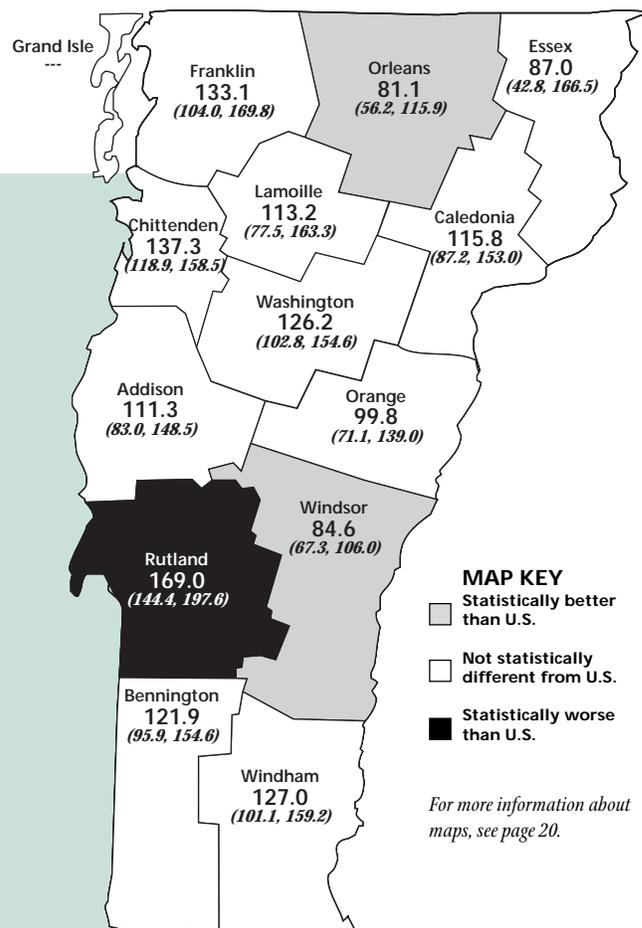
compared to watchful waiting in cases of operable prostate cancer is uncertain.

In addition, whether to screen all men for prostate cancer with prostate-specific antigen (PSA) testing is controversial. Although there is no scientific consensus that PSA screening decreases prostate cancer deaths, research is rapidly evolving in this area.

Generally, it is recommended that men talk with their physician about prostate cancer, the symptoms to watch for, and a schedule for checkups. Together, they can develop a course of action based on the risks and benefits of diagnosis and treatment, as well as the man's age, medical history

Prostate Cancer Incidence, 1994-96

Age-adjusted rates (with 95% confidence intervals) per 100,000 males



Vermont Facts:

Incidence (new cases, based on data from 1994-1996)

- Vermont's reported prostate cancer incidence rate is 121.6 (114.3, 129.4) per 100,000 men. This is statistically better than the U.S. SEER rate of 133.6.
- From 1994 to 1996, there were 1,029 new cases of prostate cancer diagnosed and reported to the Vermont Cancer Registry.
- The reported incidence rates in Orleans and Windsor counties are statistically better than the U.S. SEER rate.
- The reported incidence rate in Rutland County is statistically worse than the U.S. SEER rate.

and other factors.

The risk factors for prostate cancer include: increasing age, African American race, family history, and a diet high in animal fat.

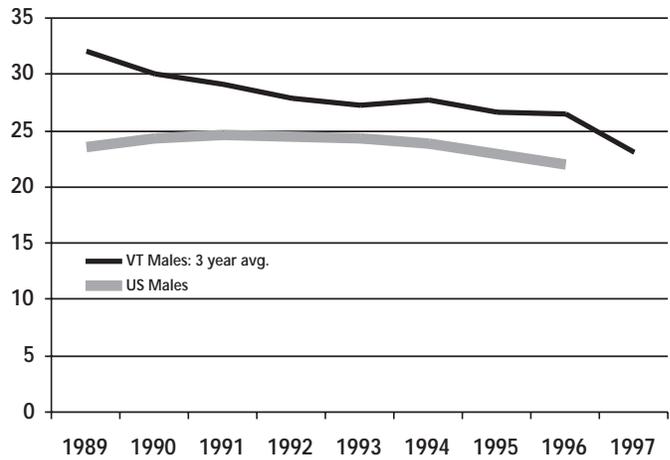
Prostate Cancer Reporting

To date, the most complete reporting of prostate cancer cases has been from Vermont hospitals. There is still considerable variation in reporting of outpatient data. Underreporting could cause Vermont's prostate cancer incidence rate to appear lower than it actually is.

The Vermont Cancer Registry will continue to work with hospitals, physicians and other health care providers to reach our goal of 100 percent reporting for all cancer sites.

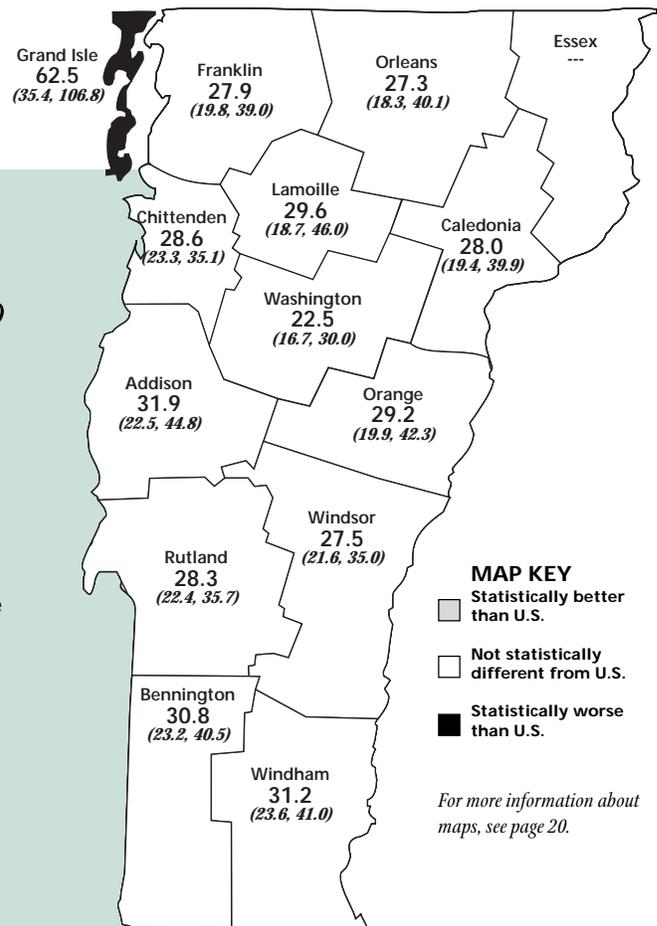
Prostate Cancer Mortality

Age-adjusted death rates per 100,000 males by year



Prostate Cancer Mortality, 1989-96

Age-adjusted death rates (with 95% confidence intervals) per 100,000 males



Vermont Facts:

Mortality (deaths, based on data from 1989-1996)

- Vermont's prostate cancer death rate is 28.7 (26.5, 31.0) per 100,000 men. This is statistically worse than the U.S. rate of 23.8.
- From 1989 to 1996, there were 642 prostate cancer deaths.
- Vermont is ranked 12th in the nation for prostate cancer deaths.
- For Grand Isle County, the prostate cancer death rate is statistically worse than the U.S. rate.

The Vermont Cancer Registry

The Vermont Cancer Registry is a central bank of information on all cancer cases diagnosed or treated in Vermont since 1994. State law requires physicians and hospitals to report specific information on all cases of cancer they diagnose or treat in Vermont to the registry.

Four types of data are collected.

Demographic — including the cancer patient's name, age, sex, race, ethnic background, marital status, birth place, residence and occupation

Administrative — including the date the cancer was diagnosed and the source of information

Diagnostic — including the type (histology) of cancer, the organ of origin (site), the size of the cancer and the spread of the disease

First Course of Treatment — including surgery, radiation, chemotherapy, hormones, immunotherapy and other cancer-directed treatment.

Data Confidentiality

The limited number of years of data in the registry and the small population of the state require registry policies and procedures to prevent the unintentional identification of individuals. Producing statistics with small numbers increases the risk that individuals can be identified in the data.

By law, all information that could possibly be used to identify an individual Vermonter is kept "confidential and privileged" by the Vermont Cancer Registry. This specifically includes identifying information regarding individual patients, health care providers and health care facilities. The law permits disclosure of certain confidential data to other cancer registries and federal cancer control agencies to collaborate in a national cancer registry and to health researchers for cancer control and prevention research studies. However, strict requirements, including prior approval of the researcher's academic committee for the protection of human subjects, must be met.

Data Collection

All 15 Vermont hospitals report to the Vermont

Cancer Registry on a regular basis, following federally established protocols. The hospital cancer registrars are charged not only with reporting cases, but also with identifying all of the cases that meet eligibility requirements seen in the hospital.

Accurate and timely incidence reporting of cancer in the State of Vermont relies on the ability of cancer registrars to perform exhaustive searches of their institutions' records for reportable cases of cancer. This casefinding process involves review of pathology logs, radiology logs, discharge summaries, and multiple other information sources.

Physicians report any cancer they diagnose or treat if the patient is not admitted to a Vermont hospital.

The Vermont Department of Health maintains legal reciprocal agreements with other states for the purpose of sharing confidential cancer data. Through these agreements, Vermont is able to collect information about Vermont residents who are diagnosed or treated in other states such as New Hampshire, New York or Florida. Conversely, Vermont is required to provide cancer information about nonresidents who are treated or diagnosed in Vermont to their state of residence.

Data Quality

The Vermont Cancer Registry collaborates with hospitals and other reporting sources to report data of the highest quality in the most efficient manner. There are several procedures in place to evaluate the accuracy of data submitted by reporting institutions. The data initially undergo electronic edit checks to evaluate acceptance. Cases are visually reviewed, and reporting sources are contacted with any questions pertaining to the accuracy of the data.

Death clearance is used as a final means to identify missed or incomplete cases. To avoid reporting errors, duplicate records are assessed, and cases are consolidated. The most accurate patient and tumor information is compiled and merged into one record.

Statistical Terms and Methods

- **Age Adjustment:** All rates in this document are age-adjusted to the 1970 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.
- **Confidence Intervals:** A confidence interval is a range of values within which the true rate is expected to fall. If the confidence intervals of two groups (such Vermont and the U.S.) overlap, then any difference between the two rates is not statistically significant. All rates in this report are calculated at a 95 percent confidence level. For example, the age-adjusted Vermont male colorectal cancer incidence rate is 52.5 (47.7,57.7) per 100,000 population. There is 95 percent chance that the true age-adjusted Vermont male colorectal cancer incidence rate is between 47.7 and 57.7.
- **Incidence vs. Mortality:** Incidence refers to the number or rate of newly diagnosed cases of cancer. The incidence rate is calculated as the number of new cancers diagnosed in the state during one year divided by the number of residents in the state during the year. Mortality refers to the number or rate of deaths from cancer.
- **Interpretive Biases:** U.S. SEER comparison rates for whites are used instead of those for all races because the nonwhite population in Vermont, averaged over 1992 to 1996, was 1.5 percent, compared with the total U.S. nonwhite population of 16.9 percent. Nationwide, people of white race have a higher risk compared to 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.
- **Rate Comparisons:** To determine if there is a statistically significant difference between cancer incidence in Vermont compared to the U.S., the Vermont rate is compared to the U.S. SEER rate. If the SEER rate falls within the confidence interval for the state rate, it suggests that the rates are not statistically different from one another. For example, the Vermont female breast cancer incidence rate is 108.3 (101.9,115.0) per 100,000 population and the SEER rate is 114.4 . Since the SEER rate is found within the confidence interval (101.9,115.0) of the Vermont rate, no statistical difference exists between the two rates.
- **Small Numbers:** With very small counts, it is often difficult to distinguish between random fluctuation and actual health issues. According to the National Center for Health Statistics, considerable caution must be observed in interpreting the data when the number of events is small (perhaps less than 100) and the probability of such an event is small (such as being diagnosed with a rare disease).

The limited number of years of data in the registry and the small population of the state require policies and procedures to prevent the unintentional identification of individuals. To protect patient privacy, county-specific data are published only for the four most commonly diagnosed cancer sites. Data on rare cancer sites, race, and other variables that could potentially identify individual are not published.
- **U.S. Mortality Rates:** Based on the U.S. Public Use Database Vital Statistical System, the U.S. mortality rates are 1989-96 white population rates.
- **U.S. SEER Rates:** The National Cancer Institute funds a network of Surveillance, Epidemiology and End Results (SEER) registries. SEER is composed of 13 population-based registries, which represent approximately 14 percent of the national population and provide a reasonably representative subset of the U.S. population. These rates are used to estimate the U.S. cancer incidence rates.

Age-adjusted Cancer Incidence Rates, 1994-1996 Per 100,000 Population by Site and Gender

	Total US SEER rate 410.9	Total VT rate (95% CI) 402.1 (393.2, 411.3)	New Cases per year 2665	Female US SEER rate 399.4	Female VT rate 362.8	Male US SEER rate 441.9	Male VT rate 461.0
All Sites							
Oral Cavity and Throat	9.8	9.1 (7.8, 10.7)	59	5.9	6.2	14.4	12.6
Esophagus	3.5	4.5 (3.6, 5.6)	30	1.6	2.2	5.9	7.2
Stomach	5.8	4.4 (3.5, 5.5)	31	3.5	2.6	8.9	6.6
Colon and Rectum	42.9	47.8 (44.8, 51.0)	335	36.4	43.9	51.2	52.5
Liver	3.1	2.4 (1.7, 3.2)	---	1.8	---	4.7	4.7
Pancreas	8.4	7.6 (6.4, 8.9)	51	7.4	5.8	9.6	9.4
Larynx	3.8	6.3 (5.2, 7.6)	38	1.4	2.8	6.7	10.3
Lung	55.9	62.0 (58.5, 65.7)	398	44.2	45.5	71.7	83.7
Melanoma of the Skin	15.4	14.6 (12.9, 16.4)	96	12.8	12.1	18.8	18.0
Breast (female)	61.3	57.8 (55.0, 60.8)	388	114.4	108.3	n/a	n/a
Cervix	3.6	4.8 (4.0, 5.7)	34	7.0	9.2	n/a	n/a
Uterus	12.1	13.4 (12.0, 15.0)	86	22.4	25.2	n/a	n/a
Ovary	8.1	7.7 (6.5, 9.2)	51	15.2	14.6	n/a	n/a
Prostate	58.9	53.9 (51.1, 56.9)	343	n/a	n/a	133.6	121.6
Testis	2.6	2.7 (2.1, 3.5)	18	n/a	n/a	5.2	5.4
Bladder	17.9	19.1 (17.2, 21.3)	127	8.1	9.6	30.8	31.8
Kidney	9.5	10.7 (9.2, 12.3)	70	6.5	8.2	13.1	13.7
Brain and Nervous System	6.3	7.5 (6.2, 8.9)	47	5.1	6.6	7.6	8.4
Thyroid	5.5	4.0 (3.2, 5.1)	28	8.0	5.0	3.0	3.1
Hodgkin's Disease	2.9	3.2 (2.4, 4.2)	20	2.6	3.0	3.2	3.4
Non-Hodgkin's Lymphoma	16.5	15.3 (13.6, 17.3)	101	13.0	12.5	20.4	19.1
Multiple Myeloma	4.0	5.3 (4.3, 6.5)	36	3.2	5.2	5.0	5.7
Leukemias	10.4	9.8 (8.4, 11.4)	66	8.2	8.0	13.3	12.3

About this Table:

All rates are age-adjusted to the 1970 U.S. standard population and exclude basal cell and squamous cell skin cancers and in situ (malignant but non-invasive) carcinomas except urinary bladder.

Rates based on 10 or fewer cases are not individually calculated.

The U.S. SEER data are based on the SEER Cancer Incidence Public Use Database. U.S. SEER rates are 1994-96 white population incidence rates. Female and male incidence tables that include confidence intervals (95% CI) and Vermont cases per year can be found on pages 4 and 6.

Site group definitions are available in the Vermont Department of Health report, Cancer Registration in Vermont. Call (802) 865-7749 for a copy.

Female cases per year and confidence intervals on page 4; male on page 6.

Age-adjusted Cancer Mortality Rates, 1989-96 Per 100,000 Population by Site and Gender

	Total		Total Deaths per year	Female		Male	
	US rate	VT rate (95% CI)		US rate	VT rate	US rate	VT rate
All Sites	168.2	173.4 (169.8, 177.1)	1143	140.4	144.0	209.2	216.5
Oral Cavity and Pharynx	2.6	2.5 (2.1, 3.1)	16	1.4	1.5	3.8	3.8
Esophagus	3.3	3.8 (3.2, 4.4)	24	1.2	1.6	5.6	6.4
Stomach	3.9	3.5 (3.0, 4.1)	24	2.6	2.4	5.6	4.8
Colon and Rectum	17.7	18.9 (17.7, 20.1)	131	14.8	15.8	21.7	23.0
Liver	2.9	2.7 (2.3, 3.2)	---	1.9	1.9	4.2	3.7
Pancreas	8.2	8.0 (7.3, 8.9)	53	7.0	6.8	9.6	9.4
Larynx	1.1	1.4 (1.1, 1.9)	9	0.4	0.6	2.1	2.5
Lung	49.3	48.0 (46.0, 50.0)	300	33.5	33.2	70.6	67.8
Melanoma of the Skin	2.4	3.0 (2.5, 3.5)	19	1.8	2.2	3.4	4.1
Breast (female)	14.4	14.3 (13.3, 15.4)	95	25.9	25.9	n/a	n/a
Cervix	1.4	1.6 (1.3, 2.0)	11	2.5	3.0	n/a	n/a
Uterus	1.8	2.1 (1.8, 2.6)	15	3.3	3.7	n/a	n/a
Ovary	4.4	5.0 (4.4, 5.7)	32	8.0	9.0	n/a	n/a
Prostate	9.0	10.9 (10.1, 11.8)	80	n/a	n/a	23.8	28.7
Testis	0.0	---	---	n/a	n/a	0.2	---
Bladder	3.2	3.8 (3.3, 4.4)	27	1.7	1.9	5.8	6.5
Kidney	3.5	4.0 (3.5, 4.6)	26	2.5	2.4	5.0	6.0
Brain and Nervous System	4.6	4.0 (3.5, 4.7)	25	3.5	3.0	5.6	5.1
Thyroid	0.3	0.2 (0.1, 0.4)	---	0.3	---	0.3	---
Hodgkin's Disease	0.6	0.4 (0.2, 0.6)	---	0.4	---	0.6	0.6
Non-Hodgkin's Lymphoma	6.8	7.6 (6.9, 8.5)	51	5.7	5.7	8.3	10.1
Multiple Myeloma	2.7	2.9 (2.4, 3.4)	19	2.4	2.1	3.3	3.9
Leukemias	6.4	6.3 (5.7, 7.1)	43	4.9	4.7	8.4	8.5

About this Table:

All rates are age-adjusted to the 1970 U.S. standard population.

Rates based on 10 or fewer cases are not individually calculated.

The U.S. rates are based on the Vital Statistical System of the United States Public Use Database. U.S. rates are 1989-96 white population mortality rates.

Site group definitions are available in the Vermont Department of Health report, Cancer Registration in Vermont. Call (802) 865-7749 for a copy.

Female deaths per year and confidence intervals on page 5; male on page 7.

References:

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About Cancer Incidence Maps on pages 8, 10, 11, 12, 13, and 14: Rates are age-adjusted to 1970 U.S. standard population and exclude basal cell and squamous skin cancers and in situ (malignant but non-invasive) carcinomas except urinary bladder. Rates based on 10 or fewer cases are not calculated. Maps are color-coded based on comparison to the U.S. SEER rate. When the U.S. rate falls within the 95 percent confidence interval (shown in parentheses), it suggests that there is no statistical difference.

About Cancer Mortality Maps on pages 9 and 15: Rates are age-adjusted to 1970 U.S. standard population. Rates based on 10 or fewer cases are not calculated. Maps are color-coded based on comparison to the U.S. mortality rates. When the U.S. rate falls within the 95 percent confidence interval (shown in parentheses), it suggests that there is no statistical difference.

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This report can be made available in other accessible formats.

For More Information:

U.S.

- American Cancer Society (<http://www.cancer.org>) 1-800-ACS-2345
- National Vital Statistics Reports distributed by the NCHS (<http://www.cdc.gov/nchswww/default.htm>) 301-458-4636
- National Cancer Institute (<http://cancer.net.nci.nih.gov>) 1-800-4CANCER
- National Program of Cancer Registries, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, 1999 (<http://www.cdc.gov/cancer/npcr/index.htm>) 1-888-842-6355
- North American Association of Central Cancer Registries (<http://www.naaccr.org>) 217-698-0800

Vermont

- Vermont Vital Statistics (<http://www.state.vt.us/health/vs98/>) 802-863-7300
- *Cancer Registration in Vermont*, a detailed explanation of data collection standards and methods.

How to Request the Public Use Data Set or Copies of this Report:

The data on which the cancer incidence rates in this report are based are available for research purposes in a public use file. All personal identifiers and other data fields which might lead to the identification of individuals have been deleted. For additional information on the public use file, or to obtain a copy, contact:

Vermont Department of Health Vermont Cancer Registry
108 Cherry Street • P.O. Box 70 • Burlington, VT 05402-0070

(802) 865-7749 or (800) 464-4343, ext. 7749
email: VTCancerRegistry@vdh.state.vt.us

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