



# Addressing the Cancer Burden in Appalachian Communities 2010

Appalachia  
Community Cancer Network



A program of the National Cancer Institute



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State data used in this publication were provided by:

Data for Kentucky used in this publication (or presentation) were provided by the Kentucky Cancer Registry, Lexington, KY.

Cancer incidence data for Ohio used in this publication were obtained from the Ohio Cancer Incidence Surveillance System (OCISS), Ohio Department of Health (ODH), a registry participating in the National Program of Cancer Registries of the Centers for Disease Control and Prevention (CDC). Use of these data does not imply ODH or CDC either agrees or disagrees with any presentations, analyses, interpretations or conclusions. Information about the OCISS can be obtained at:

[http://www.odh.ohio.gov/odhPrograms/svio/ci\\_surv/ci\\_surv1.aspx](http://www.odh.ohio.gov/odhPrograms/svio/ci_surv/ci_surv1.aspx).

Pennsylvania data were provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions.

The Commonwealth of Virginia and the CDC National Program of Cancer Registries (NDCR), through Cooperative Agreement DP07-703, together fund the Virginia Cancer Registry.

**Suggested Citation**

Appalachia Community Cancer Network. *Addressing the Cancer Burden in Appalachian Communities*, 2010

**Dear Community Members:**

The Appalachia Community Cancer Network (ACCN) is pleased to present this publication of community-based cancer information within the Appalachian region represented by ACCN. This publication is a companion document to last year's publication "The Cancer Burden in Appalachia 2009."

The goals of this publication are to:

- Provide information about cancer risk factors and risk reduction;
- Promote education and cancer awareness activities; and
- Promote community-based cancer planning efforts.

The collaboration of many cancer-related entities is necessary in the fight against cancer. To this purpose, the ACCN came into existence. ACCN is a National Cancer Institute (NCI)-funded research initiative to reduce cancer health disparities in the Appalachian region through community participation in education, research, and training. The ACCN is one of 25 NCI Community Network Programs across the country under the Center to Reduce Cancer Health Disparities at the NCI.

With partners at the University of Kentucky, Ohio State University, Penn State University, West Virginia University, and Virginia Tech, the ACCN serves the Appalachian regions of Kentucky, Maryland, New York, Ohio, Pennsylvania, Virginia, and West Virginia. The activities of the ACCN are based on strong collaborations with Appalachian communities and other partners to conduct cancer education and awareness activities, community-based participatory research projects, and to provide training opportunities throughout the region.

The ACCN focuses its efforts on prevention and early detection of cervical, lung, and colorectal cancers, all of which have high incidence and mortality rates in the seven-state region.

This publication will also be available on the Web at <http://www.accnweb.com>. We hope that you find this information useful in the fight against cancer.

Sincerely,



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Over past decades, scientists have collected a large amount of information on cancer in our society. Through these efforts, information on types of cancers, characteristics of patients, environmental conditions, types of treatments provided, and survival has been accumulated. Review of this information has allowed us to identify factors that we believe increase or decrease cancer risk.

This document focuses on cancer in Appalachia. It is a companion to another document titled 'The Cancer Burden in Appalachia, 2009,' and it is designed to provide descriptions and explanations to help clarify technical information. This document is divided into four main sections. The first provides background on cancer risk. The second section focuses on clinical trials. The third describes cancer in Appalachia, and the fourth reviews important information on different types of cancer that are commonly diagnosed in Appalachia.

## **Understanding Cancer Risk**

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Cancer risk is the chance of developing cancer over a certain time period, such as within the next 10 years, or during a lifetime. A person's cancer risk can be estimated based on a combination of their behavioral, environmental, biological and genetic factors. In this report, incidence rates are used to represent the cancer burden of Appalachian residents (as well as non-Appalachian residents).

### **Incidence and Mortality Rates**

Incidence (new cancers) and mortality rates (cancer deaths) provide a useful way to measure the cancer burden in any size population. Rates can be used to compare demographic groups (*e.g.*, males have higher colorectal cancer incidence rates than females), race/ethnic groups (*e.g.*, African American males have higher prostate cancer mortality rates than white males), or geographic areas (*e.g.*, Appalachian females have a higher cervical cancer mortality rate than non-Appalachian females). The cancer rates in this document represent the number of new cancer cases and new cancer deaths per 100,000 population during a year. Incidence and mortality rates are calculated using invasive cancers only, with the addition of in situ urinary bladder cancers. Cancers that are invasive have spread beyond the layer of tissue in which the tumor began growing.

The number of cancers diagnosed in a specific part of the population or geographic area can be determined from a rate if the population is known. For example, if a county's average annual lung cancer incidence rate is 40.0 per 100,000, this means an average of 40 new cases of lung cancer were diagnosed in the county per year for every 100,000 people.

### **Five-year Relative Survival**

Five-year relative survival is a measure of survival that is calculated by comparing the observed survival of a group of people diagnosed with cancer with the expected survival from a comparable set of people who do not have cancer. Five-year relative survival measures the excess mortality resulting from the cancer diagnosis. Five-year survival rates are useful for many reasons including: comparing the effects of treatments and comparing the survival of different groups of people.

# Clinical Trials

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Clinical trials are research studies that try to answer specific questions about new and better ways to help prevent, diagnose, or treat diseases. Some study new anticancer drugs that have been tested in the laboratory, while others look at new ways to use current drugs or other forms of treatment. Most of today's treatments for cancer are based on the results of earlier clinical trials.

## Why Should People Participate in Clinical Trials?

People choose to enter clinical trials for different reasons. Clinical trials have both benefits and risks. Individuals should talk to their doctor about clinical trials before enrolling.

### Possible Benefits

- Participants will receive, at a minimum, the best standard treatment.
- If the new treatment or intervention is more effective than the usual care given, participants may be among the first to benefit.
- Participants have a chance to help others and improve cancer care.
- Some study sponsors may pay for part or all of participant medical care and treatment expenses during the study.

### Possible Risks

- New treatments may have negative side effects or risks that are unknown.
- Even if a new treatment under study has benefits, it may not work for every participant.
- Participants may have to pay for the costs of travel, childcare, lost work hours, and meals.

The ultimate purpose of a clinical trial is to answer a medical question. People who take part in clinical trials are research participants and may be required to do certain things or have certain tests done to stay in the study. Despite the possible risks, participants in clinical trials receive excellent, compassionate care. In fact, most people enrolled in clinical trials appreciate the extra attention they receive from their health care team. Today, many safeguards are in place for people who join cancer trials to help ensure that the trials are run in an ethical manner. Participant rights and safety are protected through informed consent and required approvals by a scientific review panel and an institutional review board.



## Lists of Clinical Trials

At this time there is no single place to get information on all of the government and privately sponsored clinical trials now enrolling patients. However, there are several resources of which you should be aware:

- The American Cancer Society's Web site at [www.cancer.org/clinicaltrials](http://www.cancer.org/clinicaltrials) provides a matching service through the Coalition of Cancer Cooperative Groups, which matches cancer patients to appropriate clinical trials by answering a few questions. The Society's Web site can also locate the closest National Cancer Institute designated center where many clinical trials are conducted.
- The National Cancer Institute (NCI) sponsors the majority of government-funded cancer clinical trials.

The NCI maintains a database of active studies (those enrolling patients), as well as some privately funded studies. A list of current clinical trials can be obtained by calling the NCI's Cancer Information Service toll free at 1-800-4-CANCER (1-800-422-6237) or visiting the NCI Web site at [www.cancer.gov/clinicaltrials](http://www.cancer.gov/clinicaltrials).

- Cancer Trials Support Unit (CTSU) makes clinical trials available to doctors and patients in the United States and Canada. CTSU members can enroll patients in clinical trials through the program's Web site, which is located at [www.ctsu.org](http://www.ctsu.org). General information about the CTSU is also available on the program's Web site, or by calling 1-888-823-5923.
- The National Institutes of Health (NIH) maintains a large database of clinical trials at [www.clinicaltrials.gov](http://www.clinicaltrials.gov), but not all of these trials are cancer-specific.
- The Coalition of National Cancer Cooperative Groups (CNCCG) provides a list of cancer studies being conducted at member institutions on their Web site at [www.cancertrials-help.org](http://www.cancertrials-help.org).
- The Community Clinical Oncology Program (CCOP) is a large network that enables patients and physicians to participate in clinical trials sponsored by the NCI.
- Major cancer centers (and some community hospitals and doctor's offices) usually offer lists on their Web sites of the clinical trials being conducted there.
- Private companies, such as pharmaceutical or biotechnology firms, may list the clinical trials they are sponsoring on their Web sites. This can be helpful if you are interested in research on a particular experimental treatment and know the company developing it.

Source: American Cancer Society, Ohio Division, Ohio Department of Health, The Ohio State University. *Ohio Cancer Facts & Figures 2009*, Columbus, Ohio: American Cancer Society; 2009.



# Cancer among Residents of Appalachia

This report was developed by the Appalachia Community Cancer Network (ACCN) to describe and explain the burden of cancer in Appalachia to residents of Appalachia, using data from ACCN-participating states (Kentucky, Ohio, New York, Pennsylvania, Virginia and West Virginia). In addition, tools are provided to help communities address the cancer burden in Appalachia.

This report includes information used to: assess cancer disparities, incidence and mortality rates, five-year relative survival, socioeconomic measures, lifetime cancer risk, information about leading and additional selected cancer sites/types, and prevention and early detection of cancer. Specific information about the following cancers (which are either leading cancer sites and/or screenable cancer sites) is presented:

- Female Breast Cancer
- Cervical Cancer
- Prostate Cancer
- Colon and Rectum Cancer
- Lung and Bronchus Cancer
- Melanoma of the Skin
- Oral Cavity and Pharyngeal Cancer

## Cancer Disparities between Appalachia and Non-Appalachia

Cancer-related disparities are differences between groups in terms of cancer incidence, prevalence, and mortality, or factors which may influence the risk of these cancer measures (e.g. mammography and tobacco use). As shown in **Table 1**, average annual age-adjusted incidence rates for all sites and types of cancer combined, in the Appalachian regions, ranged from 488.2 (Virginia) to 617.3 per 100,000 males (New York), and from 382.7 (Virginia) to 457.5 per 100,000 females (New York). For both genders combined, the incidence rate in the Appalachian region was greater than that for the non-Appalachian region for Kentucky, New York and Ohio. The greatest percent difference (7.4 %) between Appalachia and non-Appalachia was observed for New York. Also shown in **Table 1**, average annual age-adjusted mortality rates for all sites and types of cancer combined, in the Appalachian regions, ranged from 230.3 (New York) to 300.5 per

100,000 males (Kentucky); and from 159.0 (Virginia) to 189.3 per 100,000 females (Kentucky). For both genders combined, the mortality rate in the Appalachian region was greater than that for the non-Appalachian region for all states, with the exception of Pennsylvania. Similar to incidence, the greatest percent difference (10.0 %) between Appalachian and non-Appalachian mortality occurred for New York. (**Table 1**)

## Socioeconomic Measures

There is some evidence that socioeconomic differences may at least partially explain the cancer-related disparities observed among residents of Appalachia; namely that people with lower incomes and with less education have higher cancer incidence and mortality rates. This is because low income populations often have less access to cancer screening and other health services. There are differences in behaviors as well. For example, national surveys have found that tobacco smoking rates are often higher in low income populations.

### Socioeconomic characteristics of Appalachia that relate to cancer risk include:

- lower income (2002 per capita income of \$25,470, compared to \$30,906 for the United States overall).
- higher poverty rate (13.6% in 2000, compared to the overall rate for the United States of 12.4%).
- lower level of educational attainment (76.8% completing high school in 2000, compared to 80.4% for the United States overall; 17.7% completing college, compared to 24.4% for the United States overall).
- slightly higher unemployment rate (5.6% average unemployment rate for 2001-2003, compared to the overall rate of 5.5% for the United States).

TABLE  
1

**Average Annual Age-adjusted All Sites/Types Combined Cancer Incidence and Mortality by Gender, Appalachia Compared to Non-Appalachia, 2002-2006<sup>1,2,3</sup>**

	Incidence							Mortality						
	Appalachia			Non-Appalachia			% Difference	Appalachia			Non-Appalachia			% Difference
	Male	Female	Total	Male	Female	Total		Male	Female	Total	Male	Female	Total	
Kentucky	613.8	451.5	517.5	606.3	444.2	508.6	1.7%	300.5	189.3	235.0	278.6	175.9	216.0	8.8%
New York	617.3	457.5	524.0	573.6	431.8	487.7	7.4%	230.3	164.7	191.0	208.8	151.7	173.6	10.0%
Ohio	557.5	416.8	473.6	535.5	411.6	460.0	3.0%	261.4	171.5	208.0	248.4	169.1	200.0	4.0%
Pennsylvania	594.8	433.5	490.5	581.1	442.4	502.1	-2.3%	247.8	163.3	196.1	246.9	167.4	197.4	-0.7%
Virginia	488.2	382.7	423.9	519.8	384.1	439.6	-3.6%	247.9	159.0	195.3	234.6	158.6	188.7	3.5%
West Virginia	547.0	422.0	471.0	*	*	*	*	276.7	186.3	216.6	*	*	*	*

<sup>1</sup> (\*) West Virginia is the only state in ACCN that is entirely Appalachian.

<sup>2</sup> Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

<sup>3</sup> See Appendix A for data year by state as there are variations in what data was provided.

**TABLE 2**

**Lifetime Risk of Being Diagnosed with Invasive Cancer for Selected Sites/Types in the US, 2004-2006<sup>1,2,3</sup>**

Primary Cancer Site/Type	Gender	Approximate Risk from Birth to Death
All Sites/Types*	Male	1 in 3 (39.9%)
	Female	1 in 3 (32.9%)
Breast	Female	1 in 9 (11.0%)
Cervix	Female	1 in 153 (0.7%)
Colon & Rectum	Male	1 in 22 (4.6%)
	Female	1 in 25 (4.0%)
Hodgkin's Lymphoma	Male	1 in 427 (0.2%)
	Female	1 in 493 (0.2%)
Leukemia	Male	1 in 78 (1.3%)
	Female	1 in 114 (0.9%)
Lung & Bronchus	Male	1 in 15 (6.9%)
	Female	1 in 18 (5.5%)
Melanoma of the Skin	Male	1 in 49 (2.1%)
	Female	1 in 73 (1.4%)
Non-Hodgkin's Lymphoma	Male	1 in 50 (2.0%)
	Female	1 in 61 (1.6%)
Prostate	Male	1 in 7 (14.7%)
Urinary Bladder	Male	1 in 32 (3.2%)
	Female	1 in 107 (0.9%)
Uterine Corpus & Uterine NOS**	Female	1 in 43 (2.3%)

<sup>1</sup> Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.4.0; Statistical Research and Applications Branch, National Cancer Institute, 2009 (release date May 2009). <http://srab.cancer.gov/devcan>  
<sup>2</sup> Risk for those free of cancer at birth and living to 85, based on cancer cases diagnosed during 2004-2006.  
<sup>3</sup> Numbers are rounded to the nearest whole person.  
\* Excludes basal and squamous cell skin cancer and *in situ* carcinomas except urinary bladder.  
\*\* Not Otherwise Specified.

**Lifetime Cancer Risk**

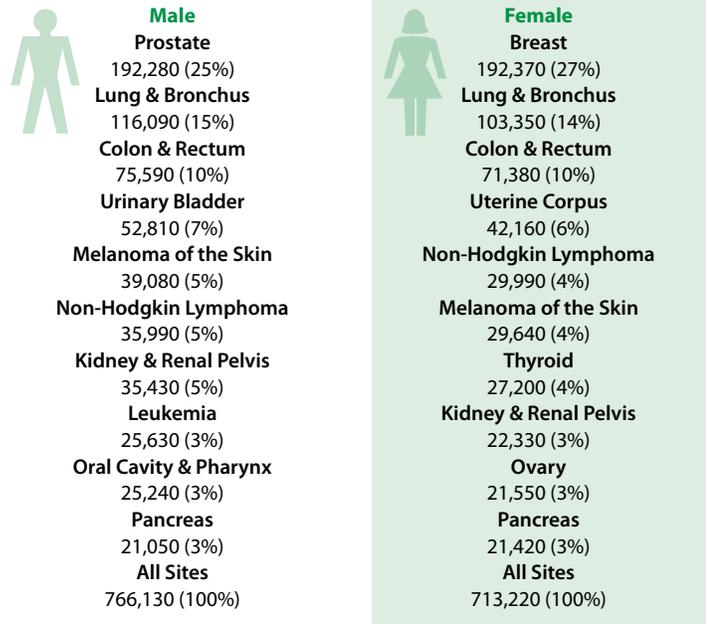
Anyone can develop cancer, but a person's chance of getting cancer increases with age. About 77% of all cancers are diagnosed in persons aged 55 and older. In this report, lifetime risk refers to the probability that an individual born free of cancer and living to age 85 will develop cancer over the course of a lifetime. In the US, men and women have about a 1 in 3 lifetime risk of developing invasive cancer. **Table 2** shows an individual's lifetime risk of developing selected cancers. This table represents a person's average risk which is impacted by individual risk factors - e.g. genetics, environment, behavior.

**Top Selected Cancer Sites/Types Incidence and Mortality for Males and Females in Appalachia**

**Figures 1 and 2** display selected cancer sites/types in the US by percentage of new invasive cancer cases and cancer deaths for males and females, respectively. Prostate cancer is the most frequently diagnosed cancer for men. Prostate cancer represented approximately one-fourth of all cancers diagnosed in males. Breast cancer remains the most frequently diagnosed cancer among women, representing 27% of cancer diagnoses.

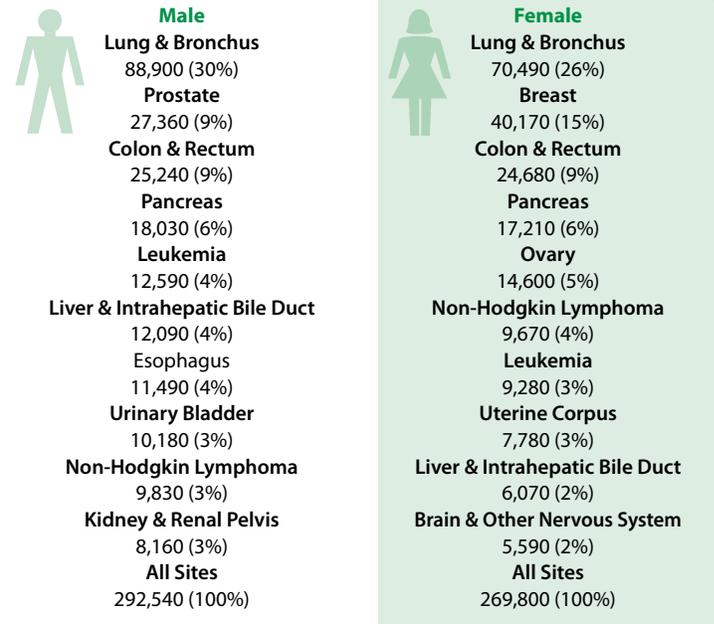
**FIGURE 1**

**Top Selected Cancer Sites/Types Incidence for Males and Females in Appalachia, 2002-2006**



**FIGURE 2**

**Top Selected Cancer Sites/Types Mortality for Males and Females in Appalachia, 2002-2006**



\*Excludes basal and squamous cell skin cancers and *in situ* carcinoma except urinary bladder.  
©2009, American Cancer Society, Inc., Surveillance and Health Policy Research

## Early Detection

The number of adults in Appalachia receiving age appropriate cancer screening is significantly lower than in other parts of the US. The number of Appalachian adults receiving mammography (to detect breast cancer) in the past two years, digital rectal exam (DRE – to detect prostate cancer) in the past year, and Pap smear (to detect cervical cancer) in the past three years were each lower than the numbers in non-Appalachian areas. Colonoscopy or sigmoidoscopy screenings (to detect colorectal cancer) in the past five years and prostate-specific antigen (PSA) tests (to detect prostate cancer) in the past year were lower in some of the Appalachian areas, respectively, compared to non-Appalachia.

Cancer screening barriers identified among residents of Appalachia are similar to those identified from studies conducted throughout the US. These include an absence of awareness of or knowledge about screening guidelines, provider recommendation, and symptoms, as well as lack of health insurance and child care. In addition, a greater proportion of Appalachians are in lower income categories and/or unemployed, and a greater proportion live in the country, lack transportation, have less access to medical care, and some hold cultural beliefs that may play a role in fewer people receiving appropriate cancer screening.

To address the lower number of cancer screening tests among individuals residing in Appalachia, creative and effective strategies should be developed, put into place, and looked at to determine if they work. Examples of strategies include: 1) local individuals from community-based organizations leading efforts to improve cancer screening awareness and to change attitudes regarding cancer prevention; 2) use of specific communication strategies (such as newspapers, churches, and community leaders) to help people get

The Behavioral Risk Factor Surveillance System includes a questionnaire that the Centers for Disease Control and Prevention administers on an annual basis to gather information on the health of the US population. It is a phone survey, and the same questions are asked across the country. Information from this survey is used to help understand health behaviors within a community, and help health departments and other service organizations better plan to serve the community. For the specific question definitions, the CDC website provides detailed information at: <http://www.cdc.gov/brfss/questionnaires/pdf-ques/2010brfss.pdf>

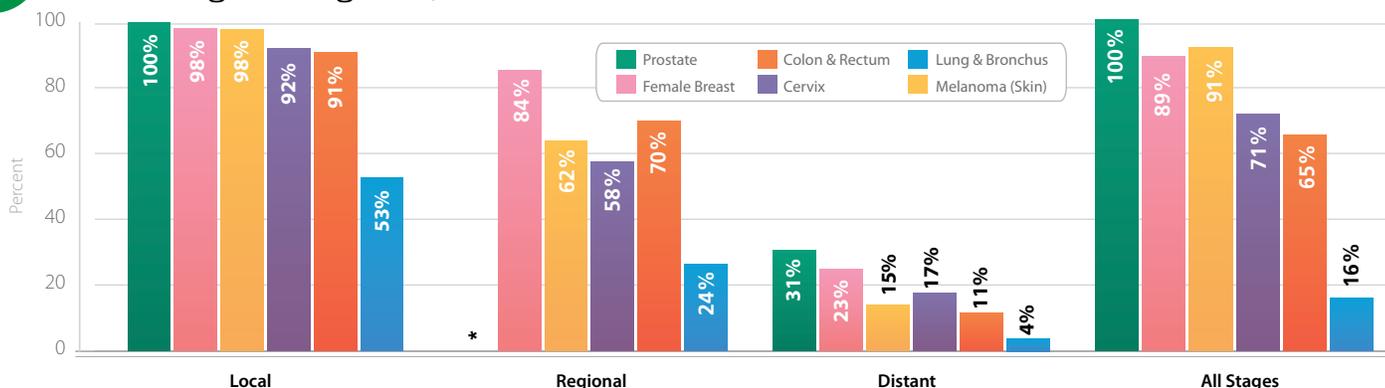
accurate cancer screening information, reinforcing the importance of talking to health care providers about cancer screening, and decreasing the amount of cancer-related information that is misunderstood; 3) best practices to improve provider-patient communication about cancer screening; and 4) system-level activities which are put into place, such as chart reminder systems to help health care professionals remind people to get cancer screening and follow-up, and changes to health care systems to provide needed cancer screening services to the population by establishing local or mobile cancer screening units to serve more rural regions of Appalachia.

## Survival

Regular screening exams by a health care professional can result in the detection of cancers of the breast, colon and rectum, cervix, prostate, testis, oral cavity and pharynx, and skin at earlier stages, when treatment is more likely to be successful. The five-year relative survival probability for selected sites/types of cancer is shown in Figure 3. The five-year chance of surviving these cancers combined is about 84%, and is even higher for selected sites/types. For example, the overall chance of surviving female breast cancer for five years is about 89%, and the chance of surviving melanoma of the skin is about 91%. If all of these cancers were diagnosed at the local stage through regular cancer screenings, the five-year survival probability would increase to about 98% for female breast cancer and 98% for melanoma of the skin. About half of all new cancer cases could be prevented through early detection cancer screening.

FIGURE 3

**US Five-year Relative Survival Probabilities by Cancer Site/Type and Stage at Diagnosis, 1999-2005<sup>1,2</sup>**



<sup>1</sup> Source: Surveillance, Epidemiology, and End Results (SEER) Program, SEER Cancer Statistics Review 1975-2006, National Cancer Institute, 2009.

<sup>2</sup> Percentages are adjusted for normal life expectancy and are based on cases diagnosed in the SEER 13 areas for persons diagnosed from 1999-2005 and the SEER 17 areas for persons diagnosed from 2000-2005, followed into 2006.

\* Percentage for regional stage prostate cancer is not presented because the rate for local stage represents local and regional stages combined.

# Female Breast Cancer

## Overview

In 2009, 192,370 cases of female breast cancer were estimated to have occurred in the US. Female breast cancer was the most frequently diagnosed cancer among females, making up an estimated 27 percent of cancer cases in the US. It was estimated that 15 percent of cancer deaths among females in 2009 were attributed to breast cancer. Nearly all breast cancers can be treated successfully if detected early. The American Cancer Society recommends an annual mammogram beginning at age 40 as the most effective way to detect breast cancer at an early, more curable stage. In general, female breast cancer incidence and mortality rates are not greater in the Appalachian region of the US, compared to the non-Appalachian region.

## Female Breast Cancer Incidence and Mortality in Appalachia

Average annual (2002-2006), age-adjusted female breast cancer incidence rates in the Appalachian regions of six ACCN-participating states ranged from 112.2 (Kentucky) to 126.5 per 100,000 females (New York). New York was the only state for which the female breast cancer incidence rate was higher in the Appalachian region ([Table 3](#)).

Average annual (2002-2006) age-adjusted female breast cancer mortality rates in the Appalachian regions of six ACCN-participating states ranged from 23.4 (New York) to 26.6 per 100,000 females (Ohio). Kentucky was the only state whose mortality rate in the Appalachian region was greater than that for the non-Appalachian region ([Table 3](#)).

## Modifiable Risk Factors

**Not having children:** Women who have had no children or who had their first child after age 30 have higher risk.

**Oral contraceptive use:** Women who currently or recently used oral contraceptives have a slightly increased risk compared with women who stopped using them more than 10 years ago or never used them.

**Post-menopausal hormone therapy (PHT):** Long-term use (several years) of PHT (especially combined estrogen and progestin therapy) is associated with increased risk.

**Not breast feeding:** Women who have never nursed or who have nursed a child less than a year and a half have a slightly increased risk compared to mothers who nurse longer.

**Overweight/obesity:** Overweight/obese women have an increased risk of breast cancer after their periods stop.

**Alcohol:** Women who drink one alcoholic beverage per day have a slight increased risk. Women who drink 2-5 alcoholic beverages daily have 1.5 times the risk of a nondrinker.

**Physical inactivity:** Those who do not engage in vigorous physical activity in addition to usual activity on five or more days a week have higher risk than those who do.

TABLE  
3

**Average Annual Age-adjusted Female Breast Cancer Incidence and Mortality, Appalachia Compared to Non-Appalachia, 2002-2006**

	Incidence			Mortality		
	Appalachia	Non-Appalachia	% Difference	Appalachia	Non-Appalachia	% Difference
Kentucky	112.2	122.8	-8.6%	26.4	25.2	4.8%
New York	126.5	123.9	2.1%	23.4	24.6	-4.9%
Ohio	115.5	121.9	-5.3%	26.6	27.1	-1.8%
Pennsylvania	119.2	126.5	-5.8%	25.9	26.6	-2.6%
Virginia	113.7	122.3	-7.0%	25.7	25.9	-0.8%
West Virginia	115.4	*	*	25.6	*	*

(\* West Virginia is the only state in ACCN that is entirely Appalachian. See Appendix A for data year by state as there are variations in what data was provided.



## Signs & Symptoms

- Lump or swelling in the breast or underarm area.
- Persistent changes in the breast such as skin irritation, thickening, dimpling, swelling, distortion, or tenderness.
- Nipple ulceration or retraction (turning inward).
- Redness or scaliness of the nipple or breast skin.
- Spontaneous discharge other than breast milk.

Any of these symptoms may be caused by cancer or by other, less serious, health problems. If you have any of these symptoms see your doctor.

## Early Detection

Clinical breast exam, breast self-exam and mammography are useful in detecting female breast cancer at an earlier stage. These are all ways of looking for lumps in the breast, in addition to any of the other signs and symptoms listed on this page. A screening mammogram is the best test to find breast cancer early. In the Appalachian regions of five ACCN-participating states, the proportion of females aged 40 and older reporting having had a mammogram in the past two years ranged from 68.1 percent (Kentucky) to 75.0 percent (Pennsylvania). The percent reporting having had a mammogram in the past two years was greater in the non-Appalachian regions of each of these states.

## Treatment

Treatment options for female breast cancer include:

- **Surgery** – removal of the tumor and surrounding tissue and lymph nodes. If the entire breast is removed, it is called a mastectomy.
- **Radiation therapy** – using X-rays to kill cancer cells or stop them from growing.
- **Chemotherapy** – drugs given either by mouth or through an intravenous line (IV) that kill cancer cells.
- **Hormone therapy** – treatment that fights cancers that rely on hormones for their growth.
- **Targeted biologic therapy** – using your immune system to fight disease or the side-effects of cancer treatment.

Various treatments may be used in combination to best treat the cancer based on: what kind of tumor it is; how big the tumor is; how fast the tumor is growing; how early the cancer was found; where the tumor is located and if it has spread; overall general health; and other factors.

## Survival

In the US, based on individuals diagnosed with female breast cancer from 2000 through 2005, the probability of surviving at least five years after diagnosis for all sizes and types of breast cancer combined was 89.1 percent. The odds of surviving five years after diagnosis decreased when the cancer had spread throughout the body. Those cancers diagnosed early had the highest five-year survival probability (98.3 percent), and those diagnosed at the distant stage (diagnosed later after the cancer had already begun to spread to other parts of the body) had the lowest survival probability (23.3 percent). Further, five-year survival probability was greater for females over the age of 50 years (89.8 percent), compared to those under 50 years (87.6 percent), and for whites (90.3 percent) compared to blacks (77.9 percent).

# Cervical Cancer

## Overview

In 2009, 11,270 cases of cervical cancer were estimated to have occurred in the US. Among females, cervical cancer made up an estimated two percent of cancer cases and two percent of cancer deaths in 2009. Cervical cancer incidence and mortality rates in the Appalachian region of the US are, in general, greater than those of the non-Appalachian region of the US. For women whose precancerous lesions are detected through Pap tests, the survival probability is near 100 percent. Screening tests offer a powerful opportunity for the prevention, early detection, and successful treatment of cervical cancer.

## Cervical Cancer Incidence and Mortality in Appalachia

Average annual (2002-2006) age-adjusted cervical cancer incidence rates in the Appalachian regions of six ACCN-participating states ranged from 7.7 (Pennsylvania and Virginia) to 11.1 per 100,000 females (Kentucky). The incidence rate in the Appalachian region was greater than that for the non-Appalachian region for three states (Kentucky, Ohio and Virginia) (Table 4).

Average annual (2002-2006) age-adjusted cervical cancer mortality rates in the Appalachian regions of six ACCN participating states ranged from 2.1 (Virginia) to 3.5 per 100,000 females (West Virginia). The mortality rate in the Appalachian region was greater than that for the non-Appalachian region of two states (Kentucky and Ohio) (Table 4).

## Modifiable Risk Factors

**Human Papillomavirus (HPV) infection and sexual activity:** Infection with HPV is the greatest risk factor for cervical cancer.

Behaviors that increase the risk of contracting HPV include the following:

- Having multiple sexual partners.
- Sex at an early age.
- Having a sexual partner who has had multiple sexual partners.

**Cigarette smoking:** Women who smoke are about twice as likely as nonsmokers to develop invasive cervical cancer.

**Weakened immunity:** Drugs that weaken the immune system and infection with human immunodeficiency virus (HIV) increase risk for HPV infection due to immunosuppression, leading to an increased risk for cervical cancer.

**Oral contraceptives (OC):** Long-term use (five or more years) of OC increases risk; although, risk decreases if OC use is discontinued.

**Multiple pregnancies:** Women who have had many full-term pregnancies have increased risk.

**No or irregular Pap screening:** Women who do not receive recommended Pap tests at all or within recommended guidelines fail to have early, precancerous lesions detected and treated.

TABLE  
4

**Average Annual Age-adjusted Cervical Cancer Incidence and Mortality, Appalachia Compared to Non-Appalachia, 2002-2006**

	Incidence			Mortality		
	Appalachia	Non-Appalachia	% Difference	Appalachia	Non-Appalachia	% Difference
Kentucky	11.1	8.8	26.1%	3.1	2.7	15.2%
New York	8.2	8.7	-5.7%	2.5	2.6	-3.8%
Ohio	8.7	7.8	11.5%	2.9	2.4	20.8%
Pennsylvania	7.7	8.0	-3.8%	2.2	2.4	-8.3%
Virginia	7.7	6.8	13.2%	2.1	2.1	0.0%
West Virginia	10.2	*	*	3.5	*	*

(\*) West Virginia is the only state in ACCN that is entirely Appalachian. See Appendix A for data year by state as there are variations in what data was provided.



## Signs & Symptoms

Cervical cancer symptoms do not often appear until cancerous cells invade surrounding tissue.

- **Abnormal vaginal bleeding that starts and stops between regular periods or occurs after sexual intercourse, douching, or a pelvic exam.**
- **Bleeding during your period that lasts longer or is heavier than usual.**
- **Vaginal bleeding after your periods have stopped.**
- **Increased vaginal discharge.**

Any of these symptoms may be caused by cancer or by other, less serious, health problems. If you have any of these symptoms see your doctor.

## Early Detection

Receiving recommended Pap smear screening can result in detecting cervical cancer at an earlier, more easily treated and more likely survivable stage. Among women 18 years and older and with an intact cervix, in the Appalachian regions of five ACCN-participating states, the proportion of females reporting having had a Pap smear in the past three years ranged from 78.2 percent (Kentucky) to 84.4 percent (Virginia). The percent reporting having had a Pap smear in the past three years was greater in the non-Appalachian regions of each of these states.

## Treatment

Treatment options for pre-invasive cervical lesions include:

- **Electro-coagulation** – the destruction of tissue through intense heat by electric current.
- **Cryosurgery** – the destruction of cells by extreme cold.
- **Laser surgery** – the destruction of cells by laser.

For cervical cancers, treatment options include:

- **Surgery** – cryosurgery, laser surgery, electro-coagulation, simple hysterectomy (removal of the uterus), and radical hysterectomy (removal of the uterus, surrounding tissue and lymph nodes).
- **Radiation** - using X-rays to kill cancer cells or stop them from growing.
- **Chemotherapy** - drugs given either by mouth (taken as a pill) or through an intravenous line (IV – taken like a shot) that kill cancer cells.

## Survival

In the US, based on individuals diagnosed with cervical cancer from 2000 through 2005 and followed through 2006, the probability of surviving at least five years after diagnosis, for all stages

combined, was 70.6 percent. Five-year survival probability decreased with advancing stage at diagnosis, with those diagnosed at the localized stage having the highest five-year survival probability (91.5 percent), and those diagnosed at distant stage having the lowest survival probability (17.2 percent). Further, five-year survival probability was greater for females under 50 years (78.8 percent), compared to those 50 years and older (58.6 percent), and for whites (72.0 percent) compared to blacks (61.4 percent).

# Colon & Rectum Cancer

## Overview

In 2009, 77,590 cases of colorectal cancer among males and 71,380 cases among females were estimated to have occurred in the US. Colorectal cancer made up an estimated 10 percent of cancer cases among both males and females in the United States in 2009. It was estimated that nine percent of cancer deaths among males and females in 2009 were attributed to colorectal cancer. Colorectal cancer incidence and mortality rates are greater in the Appalachian region of the US, compared to the non-Appalachian region. Colorectal cancer screening tests offer a powerful opportunity for the prevention, early detection, and successful treatment of colorectal cancers.

## Colorectal Cancer Incidence and Mortality in Appalachia

Average annual (2002-2006) age-adjusted colon and rectum cancer incidence rates in the Appalachian regions of six ACCN-participating states ranged from 56.8 (Virginia) to 70.7 per 100,000 males (West Virginia); and from 39.9 (Virginia) to 52.3 per 100,000 females (Kentucky). For both genders combined, the incidence rate in the Appalachian region was greater than that for the non-Appalachian region for all states, with the exception of Virginia (Table 5).

Average annual (2002-2006) age-adjusted colon and rectum cancer mortality rates, in the Appalachian regions of six ACCN-participating states ranged from 21.1 (Virginia) to 26.6 per 100,000 males (West Virginia); and from 13.2 (Virginia) to 19.0 per 100,000 females (Kentucky). For both genders combined, the mortality rate in the Appalachian region was greater than that for the non-Appalachian region for all states, with the exception of Virginia (Table 5).



## Signs & Symptoms

In the early stages of colorectal cancer, there are usually no signs or symptoms. Later stage colorectal cancer may cause any of the following signs or symptoms.

- **Change in bowel habits such as diarrhea, constipation, or narrowing of the stool that lasts for more than a few days.**
- **Feeling the need to have a bowel movement that is not relieved by doing so.**
- **Rectal bleeding or blood in the stool.**
- **Cramping or steady abdominal (stomach area) pain**
- **Weakness and fatigue.**

Any of these symptoms may be caused by cancer or by other, less serious, health problems. If you have any of these symptoms see your doctor.

**TABLE  
5**

**Average Annual Age-adjusted Colon & Rectum Cancer Incidence and Mortality by Gender, Appalachia Compared to Non-Appalachia, 2002-2006**

	Incidence							Mortality						
	Appalachia			Non-Appalachia			% Difference	Appalachia			Non-Appalachia			% Difference
	Male	Female	Total	Male	Female	Total		Male	Female	Total	Male	Female	Total	
Kentucky	69.7	52.3	59.8	67.3	48.9	56.7	5.5%	26.5	19.0	22.2	26.6	18.7	21.9	1.4%
New York	61.0	48.2	53.8	60.8	45.6	52.0	3.5%	22.8	16.0	19.0	22.0	15.6	18.2	4.4%
Ohio	68.1	48.9	57.1	60.5	44.2	51.0	12.0%	25.3	18.4	21.3	23.7	16.7	19.7	8.1%
Pennsylvania	68.9	48.3	56.9	64.2	47.8	54.7	4.0%	25.5	16.5	20.1	24.8	16.8	20.0	0.5%
Virginia	56.8	39.9	47.1	55.5	42.2	48.0	-1.9%	21.1	13.2	16.6	22.1	15.3	18.2	-8.8%
West Virginia	70.7	51.7	61.4	*	*	*	*	26.6	18.4	21.8	*	*	*	*

(\*) West Virginia is the only state in ACCN that is entirely Appalachian.  
See Appendix A for data year by state as there are variations in what data was provided.

**Early Detection**

Receiving recommended colorectal cancer screening, including colonoscopy or sigmoidoscopy, can result in detecting colorectal cancer at an earlier (more easily treated and more likely survivable) stage. Among adults 50 years and older, in the Appalachian regions of five ACCN-participating states, the proportion reporting having had a colonoscopy or sigmoidoscopy in the past five years ranged from 40.0 percent (Ohio) to 66.6 percent (Kentucky). The percent reporting having had a colonoscopy or sigmoidoscopy in the past five years was greater in the non-Appalachian regions of each of the states, with the exception of Kentucky.

**Treatment**

Treatment options for colorectal cancer include:

- **Surgery** – polyps and tumors are removed along with surrounding tissue and lymph nodes. At the time of surgery, the surgeon checks the rest of the intestine and the liver to see if the cancer has spread.
- **Radiation** - using X-rays to kill cancer cells or stop them from growing.
- **Chemotherapy** - drugs given either by mouth (taken as a pill) or through an intravenous line (IV – taken like a shot) that kill cancer cells.
- **Targeted therapies** (e.g. monoclonal antibodies) – some therapies block the effects of hormone-like factors that promote cancer cell growth and others block the growth of blood vessels to the tumor.

**Survival**

In the US, based on individuals diagnosed with colorectal cancer from 2000 through 2005 and followed through 2006, the probability of surviving at least five years after diagnosis, for all stages combined, was 65.2 percent. Five-year survival probability decreased with advancing stage at diagnosis, with those diagnosed at the localized stage having the highest five-year survival probability (90.8 percent), and those diagnosed at the distant stage having the lowest survival probability (11.3 percent). Further, five-year survival probability was greater for whites (66.1 percent) compared to blacks (56.1 percent).

# Lung & Bronchus Cancer

## Overview

In 2009, 116,090 and 103,350 cases of lung and bronchus cancer were estimated to have occurred in the US among males and females, respectively. Lung and bronchus cancer made up an estimated 15 percent of cancer cases among males and 14 percent of cancer cases among females in the US. In 2009, it was estimated that 30 percent of cancer deaths among males and 26 percent of cancer deaths among females were attributed to lung and bronchus cancer. Lung and bronchus cancer incidence and mortality rates are greater in the Appalachian region of the US, compared to the non-Appalachian region. Most lung and bronchus cancers could be prevented if cigarette smoking and other tobacco use were eliminated.

## Lung and Bronchus Cancer Incidence and Mortality in Appalachia

Average annual (2002-2006) age-adjusted lung and bronchus cancer incidence rates, in the Appalachian regions of six ACCN-participating states ranged from 92.8 (Pennsylvania) to 147.6 per 100,000 males (Kentucky); and from 53.6 (Pennsylvania) to 79.9 per 100,000 females (Kentucky). For both genders combined, the incidence rate in the Appalachian region was greater than that for the non-Appalachian region for all states (Table 6).

Average annual (2002-2006) age-adjusted lung and bronchus cancer mortality rates, in the Appalachian regions of six ACCN-participating states ranged from 68.9 (New York) to 125.7 per 100,000 males (Kentucky); and from 38.7 (Pennsylvania) to 60.0 per 100,000 females (Kentucky). For both genders combined, the mortality rate in the Appalachian regions was greater than that for the non-Appalachian regions (Table 6).

TABLE  
6

**Average Annual Age-adjusted Lung & Bronchus Cancer Incidence and Mortality by Gender, Appalachia Compared to Non-Appalachia, 2002-2006**

	Incidence							Mortality						
	Appalachia			Non-Appalachia			% Difference	Appalachia			Non-Appalachia			% Difference
	Male	Female	Total	Male	Female	Total		Male	Female	Total	Male	Female	Total	
Kentucky	147.6	79.9	108.8	127.1	75.7	97.1	12.0%	125.7	60.0	88.2	105.3	54.2	75.1	17.4%
New York	93.5	64.3	76.5	78.5	53.5	63.7	20.1%	68.9	43.9	54.3	58.8	36.7	45.7	18.8%
Ohio	107.5	60.1	80.3	93.7	58.8	73.3	9.5%	89.3	45.6	64.2	79.4	45.3	59.3	8.3%
Pennsylvania	92.8	53.6	69.7	88.2	56.5	69.4	0.4%	74.9	38.7	53.4	70.6	41.5	53.2	0.4%
Virginia	106.2	57.1	77.9	86.9	53.5	67.5	15.4%	90.4	43.8	63.6	72.7	41.7	54.7	16.3%
West Virginia	116.2	63.5	89.1	*	*	*	*	95.7	51.2	69.8	*	*	*	*

(\*) West Virginia is the only state in ACCN that is entirely Appalachian.  
See Appendix A for data year by state as there are variations in what data was provided.

## Early Detection

There is currently no screening test available to detect lung and bronchus cancer at an early stage. Chest x-ray, analysis of cells in sputum, and fiberoptic examination of the bronchial passages have not consistently helped reduce lung cancer deaths. However, newer tests such as low-dose spiral computed tomography (CT) scans and molecular markers in sputum may be more helpful in detecting lung cancers at earlier, more operable stages. The two main types of lung cancer are small cell lung cancer and non-small cell lung cancer. These types are diagnosed based on how the cells look under a microscope.

## Modifiable Risk Factors

**Smoking:** Cigarette, pipe, cigar, and hookah (water pipe) smoking all cause cancer. Risk increases with how much a person smokes every day and how many years a person smokes.

**Secondhand smoke:** Being around other people's smoke increases risk. A nonsmoker living with a smoker has about a 20 to 30 percent greater risk of lung and bronchus cancer.

**Occupational or environmental exposure:** Exposure to substances such as: radon, asbestos, arsenic, air pollution, radioactive ores (e.g., uranium), silica, beryllium, cadmium, vinyl chloride, nickel and chromium compounds, coal products, mustard gas, chloromethyl ethers, and diesel exhaust increases risk.

## Treatment

Treatment options for non-small cell lung and bronchus cancer include:

- **Surgery plus radiation therapy** – removal of the tumor (cancer) followed by treatment using x-rays or other types of radiation to kill cancer cells or stop them from growing.
- **Chemotherapy** – uses drugs to stop the growth of cancer cells, either by killing them or preventing the cells from dividing.
- **Biologic therapy** – uses the patient's own immune system to fight the cancer.
- **Laser therapy** – uses a laser beam of intense light to kill cancer cells.
- **Photodynamic therapy** – uses a drug and a type of laser to kill cancer cells without harming healthy cells.
- **Cryosurgery** – freezes and destroys abnormal tissue.
- **Electrocautery** – uses electric current to destroy abnormal tissue.
- **Antiangiogenesis drugs** – prevent the formation of new blood vessels, so that the tumor cannot grow.

Treatment options for small-cell invasive lung and bronchus cancer include:

- **Chemotherapy plus radiation therapy** – drugs are used to stop the growth of cancer cells in addition to x-rays or other types of radiation to kill cancer cells or keep them from growing.
- **Surgery (rare)** – this cancer is typically found in both lungs, so surgery alone is not often used.
- **Laser therapy** – uses a laser beam to kill cancer cells.

## Survival

In the US, based on individuals diagnosed with lung and bronchus cancer from 2000 through 2005 and followed through 2006, the probability of surviving at least five years after diagnosis, for all stages combined, was 15.6 percent. Five-year survival probability decreased with advancing stage at diagnosis, with those diagnosed at the localized stage having the highest five-year survival probability (52.6 percent), and those diagnosed at the distant stage having the lowest survival probability (3.5 percent). Further, five-year survival probability was greater for females (18.1 percent), compared to males (13.4 percent), and for whites (15.9 percent) compared to blacks (12.4 percent).



## Signs & Symptoms

- **Persistent cough.**
- **Recurring pneumonia or bronchitis.**
- **Chest pain, often aggravated by deep breathing, coughing, or laughing.**
- **Bloody or rust-colored spit or phlegm.**
- **Shortness of breath, wheezing, or hoarseness.**
- **Loss of appetite or weight loss.**

Any of these symptoms may be caused by cancer or by other, less serious, health problems. If you have any of these symptoms see your doctor.

# Melanoma of the Skin

## Overview

In 2009, 39,080 (male) and 29,640 cases (female) of melanoma of the skin were estimated to have occurred in the US. Melanoma of the skin made up an estimated five percent of cancer cases among males and four percent of cancer cases among females in the US in 2009. In 2009, it was estimated that two percent of cancer deaths among males and one percent of cancer deaths among females were attributed to melanoma of the skin. Melanoma of the skin mortality rates are, in general, greater in the Appalachian region of the US, compared to the non-Appalachian region. Nearly all skin cancers, including melanoma of the skin, are preventable by limiting unprotected exposure to the sun.

## Modifiable Risk Factors

**Ultraviolet (UV) radiation:** Excessive exposure to UV rays from sunlight or tanning lamps increases risk of skin cancer.

**Sunburns:** History of sunburns early in life increases risk.

## Melanoma of the Skin - Incidence and Mortality in Appalachia

Average annual (2002-2006) age-adjusted melanoma of the skin incidence rates in the Appalachian regions of six ACCN-participating states ranged from 18.8 (Pennsylvania) to 23.4 per 100,000 males (Kentucky), and from 13.3 (Pennsylvania) to 17.1 per 100,000 females (Kentucky). For both genders combined, the incidence rate in the Appalachian region of New York was greater than that for the non-Appalachian region (Table 7).

Average annual (2002-2006) age-adjusted melanoma of the skin mortality rates in the Appalachian regions of six ACCN-participating states ranged from 3.9 per 100,000 males (New York) to 5.9 per 100,000 males (West Virginia); and from 1.8 per 100,000 females (Pennsylvania) to 2.6 per 100,000 females (Virginia). For both genders combined, the mortality rate in the Appalachian region was greater than or equal to that for the non-Appalachian region for all states, with the exception of Pennsylvania (Table 7).

TABLE  
7

**Average Annual Age-adjusted Melanoma of the Skin Cancer Incidence and Mortality by Gender, Appalachia Compared to Non-Appalachia, 2002-2006**

	Incidence							Mortality						
	Appalachia			Non-Appalachia			% Difference	Appalachia			Non-Appalachia			% Difference
	Male	Female	Total	Male	Female	Total		Male	Female	Total	Male	Female	Total	
Kentucky	23.4	17.1	19.7	25.7	17.5	20.7	-4.8%	4.8	2.2	3.3	5.0	2.1	3.3	0.0%
New York	21.7	14.8	17.6	17.9	11.1	13.9	26.6%	3.9	2.4	3.1	3.0	1.5	2.1	47.6%
Ohio	20.3	14.9	17.0	21.0	15.2	17.4	-2.3%	4.3	1.9	2.9	3.7	1.7	2.5	16.0%
Pennsylvania	18.8	13.3	15.4	24.2	16.5	19.6	-21.4%	4.0	1.8	2.7	4.5	2.1	3.1	-12.9%
Virginia	20.5	13.8	16.7	24.7	14.7	18.9	-11.6%	4.2	2.6	3.3	4.0	1.9	2.8	17.9%
West Virginia	22.4	15.4	16.2	*	*	*	*	5.9	2.5	3.1	*	*	*	*

(\*) West Virginia is the only state in ACCN that is entirely Appalachian.  
See Appendix A for data year by state as there are variations in what data was provided.



## Signs & Symptoms

The following 'ABCD' rule outlines the warning signals of melanoma. Check moles for the following:

- **A is for asymmetry. One half of the mole does not match the other half.**
- **B is for border irregularity. The edges are ragged, notched, or blurred.**
- **C is for color. The pigmentation is not uniform, with variable degrees of tan, brown, or black.**
- **D is for diameter greater than 6 millimeters.**  Although, in recent years more melanomas that are between 3 and 6 millimeters have been diagnosed. Any sudden or progressive increase in size should be of concern.

Any of these symptoms may be caused by cancer or by other, less serious, health problems. If you have any of these symptoms see your doctor.

## Early Detection

The most common sign of skin cancer is any change on the skin, especially a new growth or a sore that does not heal (See Signs & Symptoms on this page). Adults should look at their own skin in the mirror regularly and have any changes looked at by a doctor (dermatologists specialize in this area) immediately, in addition to regular annual skin checks. Suspicious areas of skin or a sudden or progressive change in skin's appearance should be evaluated promptly by a physician.

## Treatment

Treatment options for melanoma of the skin include:

- **Surgery – removal of the tumor (cancer).**
- **Immunotherapy – treatment attempts to stimulate the immune system to reject and destroy tumors.**
- **Chemotherapy for advanced disease – uses drugs to stop the growth of cancer cells, either by killing them or preventing the cells from dividing.**
- **Radiation therapy in some cases –using X-rays to kill cancer cells or stop them from growing.**

## Survival

In the US, based on individuals diagnosed with melanoma of the skin from 2000 through 2005 and followed through 2006, the probability of surviving at least five years after diagnosis, for all stages combined, was 91.4 percent. Five-year survival probability decreased with advancing stage at diagnosis, with those diagnosed at the localized stage having the highest five-year survival probability (98.1 percent), and those diagnosed at the distant stage having the lowest survival probability (15.3 percent). Further, five-year survival probability was greater for females (94.0 percent), compared to males (89.3 percent), and for whites (91.2 percent) compared to blacks (77.3 percent).

# Oral Cavity & Pharyngeal Cancer

## Overview

In 2009, 25,240 and 10,480 cases of oral cavity and pharyngeal cancer (cancers located in the mouth, head, and neck) were estimated to have occurred in the US among males and females, respectively. Oral cavity and pharyngeal cancer made up an estimated three percent of cancer cases among males and two percent of cancer cases among females in the United States in 2009. It was estimated that two percent of cancer deaths among males and one percent of cancer deaths among females in 2009 were attributed to oral cavity and pharyngeal cancer. Examination of the oral cavity and examination of the head and neck are the best ways to detect oral cavity and pharyngeal cancers early.

## Oral Cavity and Pharyngeal Cancer Incidence and Mortality in Appalachia

Average annual (2002-2006) age-adjusted oral cavity and pharyngeal cancer incidence rates in the Appalachian regions of six ACCN participating states ranged from 14.3 (Virginia) to 18.4 per 100,000 males (Kentucky); and from 4.7 (Virginia) to 6.7 per 100,000 females (New York). For both genders combined, the incidence rate in the Appalachian region was greater than that for the non-Appalachian region for three states (New York, Ohio and Pennsylvania) (Table 8).

Average annual (2002-2006) age-adjusted oral cavity and pharyngeal cancer mortality rates in the Appalachian regions of six ACCN-participating states ranged from 3.7 (New York and Pennsylvania) to 4.4 per 100,000 males (Kentucky); and from 1.1 (Ohio and Virginia) to 1.4 per 100,000 females (Kentucky and New York). For both genders combined, the mortality rate in the Appalachian region was greater than that for the non-Appalachian region of New York (Table 8).

## Modifiable Risk Factors

**Tobacco use:** Most patients with this cancer type use tobacco (cigarette, cigar, pipe, or smokeless tobacco), and risk increases with the amount and duration of use.

**Alcohol:** Drinking alcohol increases risk, especially if combined with tobacco use.

**Human Papillomavirus (HPV):** Persistent HPV infection increases the risk of head and neck cancer.

**UV radiation:** Lip cancer is more common among those who have prolonged exposure to sunlight.

**Diet:** Inadequate consumption of fruits and vegetables increases risk.

TABLE  
8

**Average Annual Age-adjusted Oral Cavity & Pharyngeal Cancer Incidence and Mortality by Gender, Appalachia Compared to Non-Appalachia, 2002-2006**

	Incidence							Mortality						
	Appalachia			Non-Appalachia			% Difference	Appalachia			Non-Appalachia			% Difference
	Male	Female	Total	Male	Female	Total		Male	Female	Total	Male	Female	Total	
Kentucky	18.4	6.1	11.8	18.8	6.0	11.8	0.0%	4.4	1.4	2.8	4.7	1.5	2.9	-3.4%
New York	16.7	6.7	11.4	14.5	5.9	9.7	17.5%	3.7	1.4	2.4	3.5	1.3	2.3	4.3%
Ohio	16.1	5.5	10.4	14.1	5.3	9.3	11.8%	4.2	1.1	2.5	4.0	1.5	2.6	-3.8%
Pennsylvania	16.2	5.7	10.5	14.9	5.7	9.8	7.1%	3.7	1.2	2.3	3.6	1.3	2.3	0.0%
Virginia	14.3	4.7	9.1	15.1	5.8	10.0	-9.0%	3.9	1.1	2.3	3.6	1.3	2.3	0.0%
West Virginia	**	**	**	*	*	*	*	4.1	1.3	2.6	*	*	*	*

(\*) West Virginia is the only state in ACCN that is entirely Appalachian.

(\*\*) Insufficient or missing data

See Appendix A for data year by state as there are variations in what data was provided.



## Signs & Symptoms

- Sore in mouth that bleeds easily and does not heal.
- Pain in mouth that doesn't go away.
- Persistent lump or thickening in the cheek.
- Persistent white or red patch on gums, tongue, tonsil, or lining of mouth.
- Sore throat or feeling of something caught in throat.
- Difficulty chewing, swallowing, or moving the jaw or tongue.
- Numbness of tongue or other area of mouth.
- Voice changes.
- Loosening of teeth or pain and swelling around teeth or jaw.
- Lump or mass in neck.
- Weight loss.
- Persistent bad breath.

Any of these symptoms may be caused by cancer or by other, less serious, health problems. If you have any of these symptoms see your doctor.

## Early Detection

Examination of the head, neck, mouth, and throat by a doctor or dentist during a routine checkup are the best ways to find early oral cavity and pharyngeal cancer. If any of the signs and symptoms mentioned on this page are present, see a doctor immediately if symptoms don't go away after a day or two. If in doubt, have a doctor check it out!

## Treatment

Treatment options for oral cavity and pharynx cancer include:

- **Surgery** – removal of the tumor (cancer).
- **Radiation** – uses X-rays to kill cancer cells or stop them from growing.
- **Chemotherapy** – uses drugs to stop the growth of cancer cells, either by killing them or preventing the cells from dividing.
- **Targeted therapies (e.g. monoclonal antibodies)** – treatments that use drugs or other substances to identify and attack cancer cells while doing little damage to normal cells.

## Survival

In the US, based on individuals diagnosed with oral cavity and pharyngeal cancer from 2000 through 2005 and followed through 2006, the probability of surviving at least five years after diagnosis, for all stages combined, was 61.0 percent. Five-year survival probability decreased with advancing stage at diagnosis, with those diagnosed at the localized stage having the highest five-year survival probability (82.7 percent), and those diagnosed at the distant stage having the lowest survival probability (31.8 percent). Further, five-year survival probability was greater for females (63.3 percent), compared to males (59.9 percent), and for whites (62.8 percent) compared to blacks (42.6 percent).

# Prostate Cancer

## Overview

In 2009, 192,280 cases of prostate cancer were estimated to have occurred in the US. Prostate cancer was the most frequently diagnosed cancer among males - an estimated 25 percent of cancer cases and nine percent of cancer deaths in 2009 were attributed to prostate cancer. In general, prostate cancer incidence and mortality rates are the same in the Appalachian region of the US, compared to the non-Appalachian region. All men should talk to their doctors about having tests to detect prostate cancer early.

## Prostate Cancer Incidence and Mortality in Appalachia

Average annual (2002-2006) age-adjusted prostate cancer incidence rates in the Appalachian regions of six ACCN-participating states ranged from 116.8 (Virginia) to 181.7 per 100,000 males (New York). The incidence rate in the Appalachian region was greater than that for the non-Appalachian region of New York (Table 9).

Average annual (2002-2006) age-adjusted prostate cancer mortality rates in the Appalachian regions of six ACCN - participating states ranged from 23.6 per (Virginia) to 26.6 per 100,000 males (Kentucky and West Virginia). The mortality rate in the Appalachian region was greater than that for the non-Appalachian region of New York (Table 9).

TABLE  
9

**Average Annual Age-adjusted Prostate Cancer Incidence and Mortality, Appalachia Compared to Non-Appalachia, 2002-2006**

	Incidence			Mortality		
	Appalachia	Non-Appalachia	% Difference	Appalachia	Non-Appalachia	% Difference
Kentucky	134.2	146.0	-8.1%	26.6	26.6	0.0%
New York	181.7	164.8	10.3%	25.2	24.3	3.7%
Ohio	138.4	143.6	-3.6%	25.1	27.4	-8.4%
Pennsylvania	148.5	164.2	-9.6%	25.8	29.1	-11.3%
Virginia	116.8	160.4	-27.2%	23.6	29.0	-18.6%
West Virginia	139.5	*	*	26.6	*	*

(\*) West Virginia is the only state in ACCN that is entirely Appalachian.  
See Appendix A for data year by state as there are variations in what data was provided.

## Early Detection

A Prostate-Specific Antigen (PSA) test (a blood test) and Digital Rectal Exam (DRE – physical exam) can add to the clinical information a physician uses to detect prostate cancer at an earlier stage. In the Appalachian regions of five ACCN-participating states, the proportion of males ages 50 and older reporting having had a PSA test in the past year ranged from 51.9 percent (Kentucky) to 72.8 percent (Virginia). There is little variation between Appalachia and Non-Appalachia in percent reporting having had a PSA test. In the Appalachian regions of these same states, the proportion of males reporting having had a DRE in the past year ranged from 47.4 percent (Ohio) to 80.1 percent (Kentucky). The percent reporting having had a DRE in the past two years was slightly greater than the non-Appalachian regions of each of the states.



## Signs & Symptoms

Early prostate cancer usually does not have signs or symptoms.

- **Weak or interrupted urine flow.**
- **Inability to urinate or start and/or stop urine flow.**
- **Need to urinate more frequently.**
- **Blood in urine.**
- **Difficulty having an erection (impotence).**
- **Pain in pelvic bone, spine, hips, or ribs.**
- **Weakness or numbness in the legs or feet.**
- **Loss of bladder or bowel control.**

Any of these symptoms may be caused by cancer or by other, less serious, health problems. If you have any of these symptoms see your doctor.

## Treatment

Treatment options for invasive prostate cancer include:

- **Surgery** – removal of the tumor (cancer).
- **Radiation therapy** (external beam, seed implants) – uses X-rays or radioactive seeds to kill cancer cells or stop them from growing.
- **Hormone therapy** – treatment that fights cancers that rely on hormones for their growth.
- **Chemotherapy** – uses drugs to stop the growth of cancer cells, either by killing them or preventing the cells from dividing.
- **Watchful waiting depending upon stage of disease** – no treatment at the current time (patient and doctor agree to monitor the cancer and see if it should be treated in the future).

## Survival

In the US, based on individuals diagnosed with prostate cancer from 2000 through 2005 and followed through 2006, the probability of surviving at least five years after diagnosis, for all stages combined, was 99.7 percent. Five-year survival probability decreased with advancing stage at diagnosis, with those diagnosed at the localized stage having the highest five-year survival probability (100.0 percent), and those diagnosed at the distant stage having the lowest survival probability (30.6 percent). Further, five-year survival probability was greater for whites (99.9 percent) compared to blacks (96.5 percent).

# Environmental Causes of Cancer

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According to the National Cancer Institute, environmental factors are defined by scientists as factors outside the body that interact with humans. Environmental causes of cancer include: infectious diseases and exposure to chemicals and radiation both at home and at work. Some individuals are more susceptible to cancer-causing substances in the environment which interact with factors inside the body and interfere with a person's ability to eliminate these cancer-causing substances. Trace levels of pollutants in the air, drinking water, and food impact personal cancer risk on a much smaller level. High levels of pollutants with long-term, intense exposures can increase cancer risk.

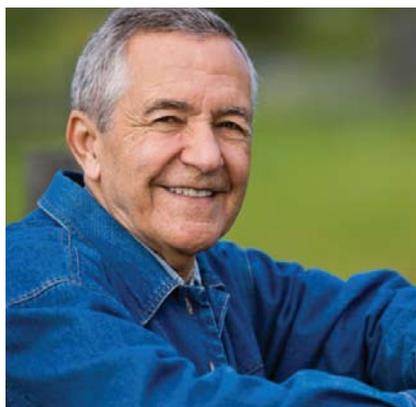
## Viruses, Bacterial Exposure and Cancer Risk

Specific viruses and bacteria are connected to some cancers. Human Papillomavirus (HPV) is a sexually transmitted disease that is the primary cause of cervical, anal cancer, and oral cavity and pharyngeal cancer. Hepatitis B (HBV) and Hepatitis C (HCV) infections are major causes of liver cancer. Epstein-Barr virus (EBV), the virus that causes mononucleosis, is linked to some types of lymphoma. A particular type of sarcoma is linked to Kaposi's sarcoma-associated herpes virus (KSHV or HHV-8). The cancer risk for people with EBV or KSHV is low except when a person's immune system is weak, such as in people infected with human immunodeficiency virus (HIV), the virus that causes AIDS. Helicobacter pylori (H. Pylori) is a bacterium which causes peptic ulcers and chronic gastritis and contributes to the development of stomach cancer in some people. The majority of infections with any of these viruses or bacteria do not result in cancer. Persistent infections that last for many years are typically those that cause cancer.



## Chemical Exposure and Cancer Risk

Benzene and asbestos are known to cause cancer in humans. Dichlorodiphenyl-trichloroethane (DDT), formaldehyde, and polychlorinated biphenyls (PCBs) cause cancer in animals and are suspected to cause cancer in humans as well. Exposure to any of these chemicals should be avoided. It is a good idea to carefully read labels on bottles before using any chemicals.



## Radiation Exposure and Cancer Risk

Ionizing radiation (comes from radioactive materials) and ultraviolet radiation (UV – comes from the sun) are the only types of radiation proven to cause cancer in humans. Scientists know this from studying atomic bomb survivors, patients receiving radiation therapy, and uranium miners. Ionizing radiation affects bone marrow and the thyroid gland, as well as other parts of the body. Currently, diagnostic x-rays are set at the lowest dose levels possible to eliminate as much risk as possible. Exposure to sunlight (UV) has some benefits in terms of vitamin D absorption that the body needs. Too much exposure to sunlight (UV) can lead to skin cancer. The thinning of the earth's ozone layer from the use of aerosol propellant results in a higher exposure to UV radiation over time.

Radon is an odorless, invisible radioactive gas released from the normal decay of uranium in rocks and soil. Radioactive particles from radon can damage cells that line the lungs and lead to lung cancer. Radon is the second leading cause of lung cancer in the US following smoking which causes 87% of all lung cancer. Testing is the only way to know if your home has elevated radon levels. The risk from radon is much higher in people who smoke, and radon is the leading cause of lung cancer in non-smokers.

## **Pesticide Exposure and Cancer Risk**

The concentration of pesticides typically found in foods has not been associated with increased cancer risk. People who eat large amounts of fruits and vegetables have actually been found to have lower cancer risk than people who don't. High doses of pesticides have been shown to cause cancer in animals, and industrial or farm workers exposed to pesticides may be at higher risk for certain cancers. Safety precautions should be taken to reduce exposure to pesticides as much as possible.

DDT was banned as a pesticide for use in agriculture, but unfortunately remains in the environment for many years after use by accumulating in body fat. There is no conclusive evidence that DDT residue is a risk factor for breast cancer.



## **Non-ionizing Radiation and Cancer Risk**

Low-frequency electromagnetic radiation comes from microwaves, radio waves, radar, cell phones, household appliances, and any other electric or magnetic fields that are created as a result of electric currents. Although extensively researched, low-frequency electromagnetic radiation has not been found to cause cancer in humans.

## **Toxic Waste and Cancer Risk**

Toxic chemicals found in toxic waste dumps can cause cancer when a human is exposed to high doses through the pollution of water, air, or soil. Studies of community exposures mainly appear to show very low or negligible dose levels. Clean-up of old toxic dump sites and closer control of toxic materials should remove any threat and protect the health of the public.

## **Nuclear Power Plants and Cancer Risk**

Communities near nuclear power plants are exposed to negligible levels of ionizing radiation. Studies of reported cancer clusters in communities surrounding nuclear power plants have raised great concern in these areas, but cancer levels have not been found in these areas to be any higher than in other communities.

## **Tobacco**

Tobacco use is associated with increased risk of 10 anatomic sites/types of cancer, including cancers of the lung and bronchus, oral cavity and pharynx, and cervix. All these sites/types show differences in the number of cancer cases and cancer deaths in Appalachia compared to non-Appalachia. Cigarette smoking was found to be more frequent in the Appalachian counties than the national average in nine of 13 states. The number of adults reporting current cigarette smoking among both males and females 18 years of age and older was greater in the Appalachian than in the non-Appalachian areas of Kentucky, Ohio, Pennsylvania, and Virginia. Those who are poor, low-income and less educated have a higher number of adults who smoke cigarettes compared to their more privileged counterparts. Healthy People 2010 identified "blue collar smokers," those with low-income, no college education, and 25 years old or younger, as a special population of tobacco users in need of interventions to quit. Smoking remains the most preventable cause of death. Smoking accounts for an estimated 30 percent of all cancer deaths, and 87 percent of lung cancer deaths.

Exposure to secondhand tobacco smoke can contribute to illness and increase cancer risk by exposing large numbers of nonsmokers to the carcinogens (substances that are directly involved in causing cancer) in tobacco smoke.

## Human Papillomavirus (HPV) and Cancer

HPV is the most common sexually transmitted virus. It may be as common as getting a cold virus. It is estimated that up to 75 percent of people who have ever had sex will have HPV sometime in their lifetime. HPV is most prevalent in 15 to 25-year olds. When we refer to HPV, we are actually referring to more than 100 related viruses. These viruses are then grouped into HPV types. Some types of HPV cause warts or papillomas (non-cancerous tumors). The HPVs that cause the common types of warts on the hands and feet differ from those found in the throat or genital area. Some types of HPV are called high-risk, oncogenic, or carcinogenic HPVs and are associated with cancers of the cervix, anus, vulva, vagina, penis, and oral cavity and pharynx. HPVs live in squamous epithelial cells in the body. HPVs will not grow in other parts of the body.

### How does a person get HPV?

The virus is spread through skin-to-skin contact with an infected person during vaginal, oral, or anal sex. In extremely rare cases, a person can have HPV and never have had sex.

### How do I know if I have HPV?

Genital HPV generally has no symptoms unless it is a type of HPV that causes genital warts. Not all types of HPV cause genital warts. The virus may also be found in women when a Pap test is abnormal, an HPV lab test is positive, or through a biopsy. There are currently no tests to detect genital HPV in men. HPV in the oral cavity and pharynx can be detected in both men and women through an oral rinse that allows detection of HPV infected cells.

### How is HPV related to cancer?

Approximately 99 percent of all cervical cancers are due to HPV (Source: American Cancer Society). About two-thirds of these are caused by HPV types 16 and 18. Many precancerous cell changes of the cervix, vagina, and vulva are also caused by types 16 or 18. Changes in the cervix may happen suddenly many years after exposure to HPV. Many anal cancers (about 90 percent) are caused by the same types of HPV that cause cervical cancer. Having regular Pap smears can reduce a woman's risk of cancer by treating precancerous cells before they become cancer. Pap smears also detect cancer early when it is most treatable.

### How is HPV treated?

Treatments cannot cure HPV. However, most HPV infections will be cleared by the body's immune system within 2 years. Genital warts, precancerous cell changes, and cervical, anal, and genital cancers can be treated with medicine, cryosurgery, electro surgery, and laser therapy.

### Can HPV be prevented?

Receiving the HPV vaccination before being exposed to HPV will prevent some types of HPV. Risk may be reduced by limiting the number of sex partners and avoiding sex with people who have had many sex partners. Condoms may not prevent the spread of HPV because the virus may be spread from skin-to-skin contact in areas not covered by the condom.

## Nutrition and Physical Activity

Both males and females in Appalachia are more likely to report not eating enough fruits and vegetables, compared to national recommendations, and no physical activity in the past month. More adults are obese in the Appalachian areas of Kentucky, Ohio, Pennsylvania, and Virginia compared to the non-Appalachia areas of these states. There has been limited research concerning why dietary factors, physical activity, and overweight and obesity are higher in Appalachia.



The American Cancer Society currently recommends that **Gardasil** be routinely given to females aged 11 to 12 and as early as age 9 at the discretion of doctors, and agrees that "catch-up" vaccinations should be given to females aged 13 to 18. Women aged 19 to 26 years should talk with their health care provider about the risk of previous HPV exposure and potential benefit from vaccination before deciding to get vaccinated.

# Glossary

**Age adjustment** - A statistical method used to compare rates among groups of people of different ages. This method applies a standard age to the groups being compared to remove the effect of age. Rates in this publication are age-adjusted to the 2000 US standard population.

**Benign** - Noncancerous.

**Bone Marrow** - The soft center of bones that makes red blood cells which carry oxygen to the rest of the body.

**Burden** - Overall impact of disease in a community.

**Cancer** - Uncontrolled abnormal cell growth, which may lead cells to invade surrounding tissues and spread to other parts of the body.

**Cancer clusters** - When a lot of cancer is found in a family or in a community, it is called a cancer cluster.

**Carcinogen** - Anything chemical, physical, or viral – that causes cancer.

**Carcinoma** - These cancers begin in the epithelium - the skin and tissue near organs in the body. Carcinomas are the most common type of cancer. Eighty to ninety percent of all cancers are carcinomas.

**Contributing factor** - Something that contributes to the development cancer.

**Ethnicity** - The heritage, nationality group, lineage, or country of birth of a person or his parents or ancestors before their arrival in the United States. People who identify their ethnic origin as Spanish, Hispanic, or Latino may be of any race.

**Five-year survival probability** - The percentage of people with a given cancer who survive five years or longer with the disease. Although the term “five-year survival rate” is commonly used, the expression actually refers to a probability of survival.

**Incidence rate** - The number of new cases of a disease that occur in a defined population per 100,000 during a specified period of time.

**Invasive cancer** - Cancer that has spread beyond the layer of cells where it first developed to involve adjacent tissues.

**Lifestyle choices** - Choices made about the way you live that are either good for your health, like eating vegetables and exercising, or not good for your health, like smoking.

**Lifetime risk** - The probability that an individual, over the course of a lifetime, will develop or die from cancer.

**Leukemia** – This cancer begins in the white blood cells.

**Lymph nodes** - Small bean shaped organs that trap and filter foreign particles.

**Lymphatic system** - The tissues and organs that make, store, and carry white blood cells, which fight infection and disease.

**Lymphoma** – This cancer begins in the lymph nodes.

**Malignant** - Cancerous. A condition characterized by abnormal cell division with the ability to invade, metastasize, and recur.

**Metastasis** - The spread of cancer cells to other parts of the body through the lymph system or blood system.

**Morbidity** - Any abnormal condition that impairs normal function.

**Mortality rate** - The number of deaths that occur in a defined population per 100,000 during a specified period of time.

**Myeloma** – This cancer begins in the blood cells found in the bone marrow.

**Oncology** - The branch of medicine concerned with the diagnosis and treatment of cancer.

**Prevalence** - The proportion of people with a certain disease or characteristic at a given time.

**Primary cancer site** - The tissue or organ where the cancer originated.

**Radon** - A gas that comes from the earth and may cause cancer.

**Rate** - The frequency of an event in a defined population during a given period of time, often expressed per 100,000 people.

**Risk factor** - Anything that increases a person's probability of getting a disease such as cancer. Risk factors can be lifestyle-related, environmental, genetic (inherited), or a combination of these factors.

**Sarcomas** – These cancers begin to grow in bones, muscles, fat, nerves, joints, blood vessels, or deep skin tissues.

**Screening** – A test to check for cancer before there are warning signs or symptoms.

**Secondhand Smoke** - Passive smoking. When a non-smoker is exposed to smoke by being around someone who smokes or being in an environment with smokers.

**Stage at diagnosis** - The process of describing the extent or spread of the disease from the site of origin. Often classified into the following stages:

***In situ*** - Noninvasive cancer that has not penetrated surrounding tissue.

**Local** - A malignant tumor confined entirely to the organ of origin.

**Regional** - A malignant tumor that has extended beyond the organ of origin directly into surrounding organs or tissues or into regional lymph nodes.

**Distant** - A malignant tumor that has spread to parts of the body (distant organs, tissues, and/or lymph nodes) remote from the primary tumor.

**Unstaged/Unknown** - Insufficient information is available to determine the stage or extent of the disease at diagnosis.

**Tumor** - An abnormal lump or mass of tissue. Tumors can be benign (noncancerous) or malignant (cancerous).

**Underserved** - People who do not have access to the current standard of care due to finances, geography, or public policy.

**Watchful Waiting** - Small slow-growing cancers may not cause any problems, especially in older men. Many men live for years without any treatment and do not have problems related to their cancer. The doctor will offer treatment if symptoms occur or get worse.

**White Blood Cells** - Help your body fight infection and disease.

## Potential Partners for Community Assessment Workgroups

Maximize community strengths by identifying key stakeholders and building collaborations

### Potential Partners

- Local, regional, and state health department staff (e.g. health commissioners, chronic disease directors, cancer program director, cancer registry director)
- Local, regional, and state coalitions interested in cancer
- Local grantees of funds
- Local and national advocacy partners
- Funding agencies, such as national and state governments
- State education agencies, school districts, and other educational groups
- Universities and educational institutions
- Local government, state legislators, and state governors
- Mayors
- Privately owned businesses/Worksites and business associations
- Hospital systems/Health systems and the medical community
- Religious/Faith-based organizations
- Community organizations/Service organizations/ Non-profit organizations
- Private citizens/Cancer survivors/Healthcare professionals/Business leaders
- Program critics
- Representatives of populations disproportionately affected by the problem
- Law enforcement representatives



## Appendix A: Years of Data Provided by ACCN Participating States

	Surveillance & Vital Statistics			
	Incidence Data	Mortality Data	Staging Data	Mortality Trends
Kentucky	2002-2006	2001-2005	2002-2006	1996-2005
New York	2002-2006	2002-2006	2002-2006	1996-2006
Ohio	2002-2005	2002-2006	2002-2005	1996-2006
Pennsylvania	2002-2006	2002-2006	2002-2006	1996-2006
Virginia	2002-2006	2002-2006	2002-2006	1996-2006
West Virginia	2001-2004	2002-2006	No gender specific data	1996-2005



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