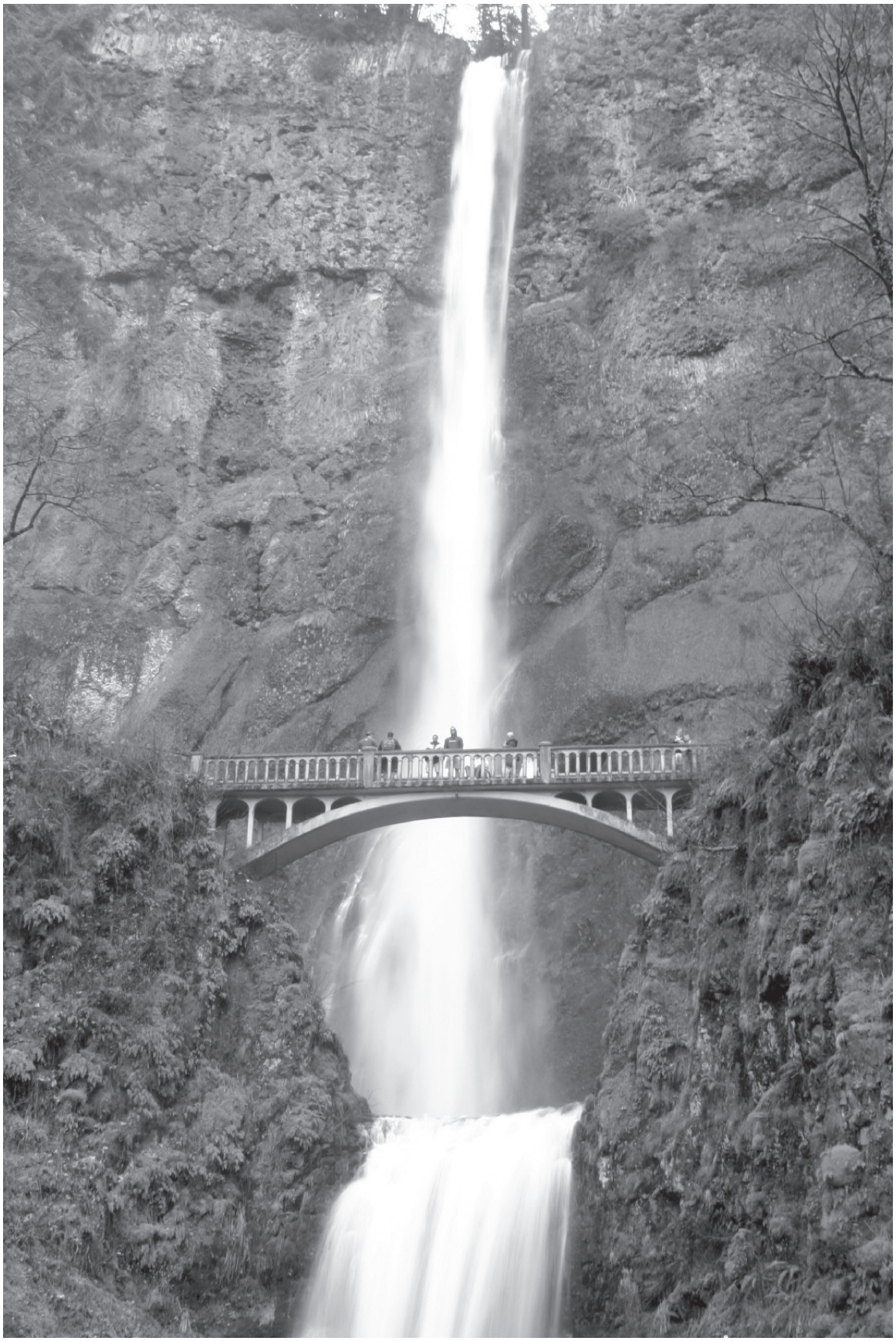
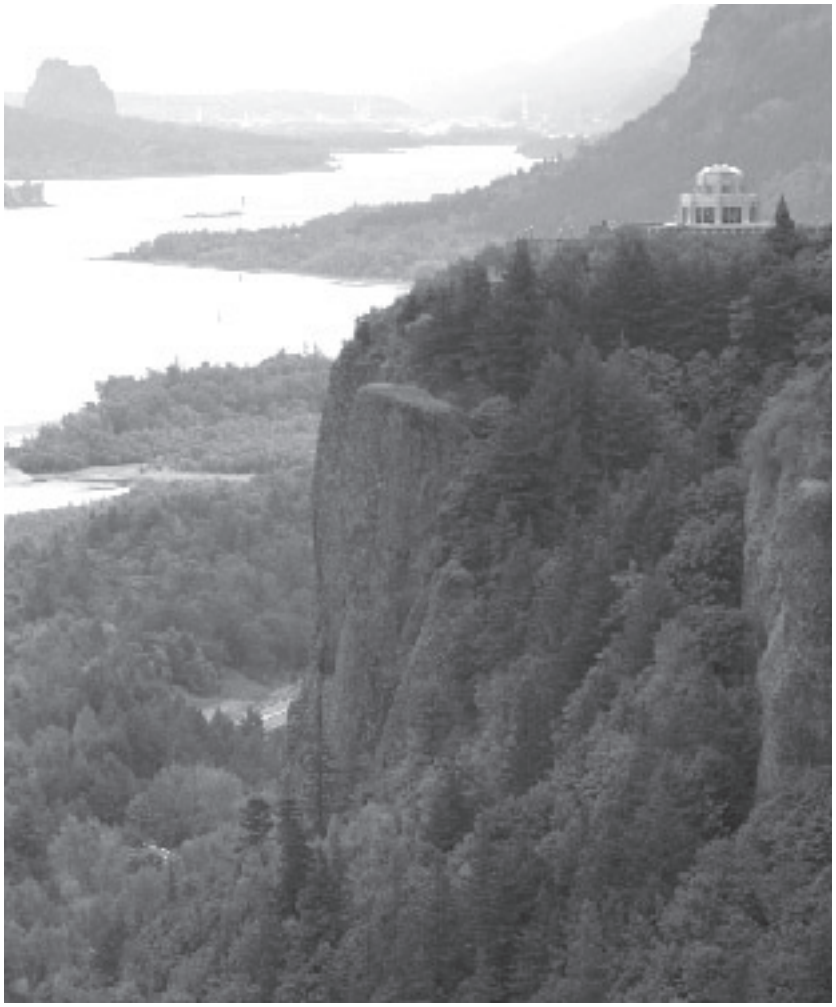
Cancer in Oregon, 2002



Annual Report on Cancer Incidence and Mortality Among Oregonians
Published by the Oregon State Cancer Registry (OSCaR)



Crown Point, Columbia Gorge

Suggested Citation: Sherman RL, Pliska JM. *Cancer in Oregon, 2002: Annual report on cancer incidence and mortality among Oregonians.* Department of Human Services, Oregon Public Health Services, Oregon State Cancer Registry, Portland, Oregon, 2005.

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Report date: June 2005

Cancer in Oregon, 2002

Published by the
Oregon State Cancer Registry (OSCaR)

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Funding Source

The Centers for Disease Control and Prevention (CDC),
National Program of Cancer Registries (NPCR),
Cooperative Agreement #U55/CCU021984

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June 1, 2005

Dear Colleague:

The Oregon State Cancer Registry (OSCaR) is pleased to present its seventh annual report, *Cancer in Oregon, 2002*, which provides you with a resource book for information on cancer in Oregon. This report contains complete surveillance data for the years 1998-2002; trends for selected sites also include data from 1996 forward. For complete historical data, see earlier reports of Cancer in Oregon, which are available on our website www.healthoregon.org/oscar. This report uses current methods for cancer data analysis that conform to national standards. You may find it helpful to review the section *What's New for 2002?*, as well as the technical documentation for specific details.

The information in this report is available due to the diligent efforts of hospital-based cancer registrars, as well as staff from hospitals, ambulatory surgery centers, pathology laboratories, numerous physician offices, and other states in which Oregon residents are diagnosed with and/or treated for cancer. Their cooperation in reporting timely, accurate, and complete cancer incidence data is deeply appreciated.

OSCaR would also like to acknowledge the following organizations that have been supportive of cancer reporting in Oregon: Oregon Medical Association (OMA), Oregon Cancer Registrar's Association (OCRA), the Oregon Association of Hospitals and Health Systems (OAHHS), and the Oregon State Cancer Registry Advisory Committee. We would also like to acknowledge our primary funding source, the Centers for Disease Control and Prevention, National Program of Central Cancer Registries.

For additional copies of this report, please feel free to download a copy from our website: www.healthoregon.org/oscar/. If you need to receive the report in an alternate format, please contact the office at (503) 731-4858.

Sincerely,

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I. Executive Summary

Each day in 2002, 47 Oregonians were diagnosed with an invasive[1], reportable[2] cancer, and 20 Oregonians died due to malignant tumors. Cancer risk increases with age, and Oregon's population is aging. Overall, 75% of cancers in Oregon occur in people over the age of 55. Consequently, there is the potential for an upsurge in cancer incidence and mortality.

It is estimated that 80% of all cancers are due to environmental and lifestyle factors, which means that they are potentially preventable. By controlling modifiable risk factors (see *Cancer Risks*) and appropriately screening for cancers that can be detected at an early stage (see *Cancer Screening and Prevention*), Oregonians can help reduce the burden of cancer in their state.

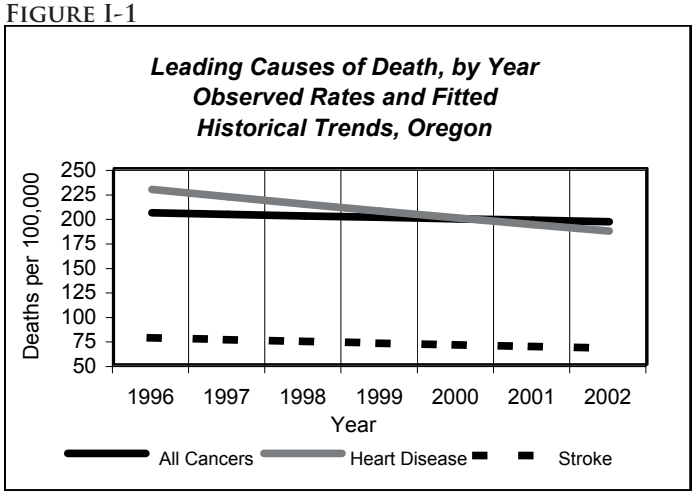
Cancer Leading Cause of Death Among Oregonians

In 2000, a long-standing trend was broken when cancers surpassed heart disease to become the leading cause of death among Oregonians[3]. (See Figure I-1.)

Mortality rates due to cancers[4] have been declining by 1% a year since 1996 while heart disease mortality has been variable. Initially, heart disease declined by 4% a year from 1996-2000. Then from 2000–2002, mortality due to heart disease slowed to a 2% annual decline. The 3rd leading cause of death, cerebrovascular disease (stroke), has been declining steadily by 2% a year since 1996. In 2002, the mortality rate for all cancers combined was 196.5; the rate was 190.5 for heart disease and 68.7 for stroke.

The average age of death due to cancer is younger than the age of deaths due to heart disease. This results in over 30% more years of potential life lost[5] (YPLL) due to cancer than to heart disease. Cancer is the 2nd leading cause of YPLL for men, following accidents and adverse effects and is the leading cause of YPLL for Oregon women. About 22,750 YPLL are lost annually in Oregon due to cancer mortality.

Figure I-1



[1] Invasive cancers exclude *in situ* diagnoses with the exception of bladder cancers.
[2] Reportable cancers do not include basal or squamous cell carcinomas of the skin (except if skin of genitalia) or *in situ* cervical cancers.
[3] Although there were more heart disease deaths in 2000 and in 2002 than cancer deaths, the age-adjusted rate was higher for cancer deaths, which indicates a greater burden among Oregonians. In 2001, both the counts and age-adjusted rates for cancer deaths exceeded those for heart disease.
[4] The all-cancers mortality data exclude *in situ* cases, cases of unknown or uncertain behavior (there is an average of 50 such deaths a year in Oregon), as well as benign neoplasms. Cancers that first became reportable in 2001 are not included in the all-cancers mortality trends. Including these additional cases raises the all-cancers mortality rate and artificially affects the historical trends. Please see the *Technical Section* and/or *Appendix A* for additional information about these newly reportable cases.
[5] YPLL calculated on combined mortality data from 1998-2002 with age 65 as the threshold for age of death.

Leading Cancer Sites

Breast Cancer is the most common reportable malignancy, with 2,749 invasive cases diagnosed among women and 19 among men in 2002. It is the 3rd leading cause of cancer death in Oregon. Among 43 states with high quality cancer incidence data, Oregon consistently has one of the highest female breast cancer incidence rates. However, the mortality rate due to female breast cancer in Oregon is similar to that seen nationally. Appropriate screening through breast exams and mammography could decrease the number of women diagnosed at advanced stages of disease and, thereby, decrease mortality.

Prostate Cancer is the 2nd most common reportable malignancy, with 2,519 invasive cases diagnosed in 2002. It is also the 4th leading cause of cancer death in Oregon. Among 43 states with high quality cancer incidence data, Oregon men rank in the lower third for prostate cancer. Currently, the causes of prostate cancer are poorly understood, and there is no consensus on the benefit of prostate cancer screening.

Lung Cancer is the 3rd most common reportable malignancy, with 2,444 invasive cases diagnosed in 2002. Lung cancer is the leading cause of cancer death in Oregon. At present, there are no effective early detection tools for lung cancer. Therefore, this malignancy is often diagnosed at an advanced stage, resulting in a poor prognosis. Tobacco use is the single, greatest risk factor for lung cancer. In 2002, tobacco use was implicated in 80% of lung cancer deaths. Although lung cancer incidence rates among Oregon men are similar to those seen nationally, Oregon ranks as one of the states with highest lung cancer incidence among women. Decreasing tobacco use in Oregon could significantly lower lung cancer incidence and mortality.

Colorectal Cancer is the 4th most common reportable malignancy, with 1,720 invasive cases diagnosed in 2002. Colorectal cancer is the 2nd most common cause of cancer death among Oregonians. Routine screening can reduce both the incidence and mortality of colorectal cancer through early detection and removal of precancerous polyps.

Bladder Cancer is the 5th most common invasive malignancy with 855 invasive cases diagnosed in 2002. Smoking is the greatest risk factor for bladder cancer. Exposure to chemicals in the workplace can also increase the risk for bladder cancer if safety measures are not taken. Workers at highest risk are rubber, leather, textiles, and paint products workers as well as hairdressers, machinists, printers, and truck drivers. Although there are no recommendations for routine screening tests, blood in the urine is an early sign of bladder cancer. Having the bladder checked by a health care provider at the first sign of blood in the urine can identify bladder cancer in the earliest and most treatable stage.

Melanomas of the Skin are the 6th most common reportable malignancy with 830 invasive cases in 2002[1]. Oregon has one of the highest melanoma incidence rates in the nation, particularly among women, and a higher melanoma mortality rate than the national average. Sun avoidance, particularly during childhood, is the best protective measure against developing melanomas.

[1] Cancer incidence rates are calculated on invasive cancers (no *in situ*) with the exception of bladder cancer. Although there were more total cases of melanomas of the skin, there were fewer invasive cases (1,612 total melanomas, of which 830 were invasive, compared to 855 bladder; all of which were invasive).

Oregon Population Overview

Although the causes of most cancers are unknown, there are specific community characteristics that can influence a population's burden of cancer. The most significant risk factor for cancer is age. According to the 2000 US Census, 12% of Oregonians are aged 65 and over. However, the distribution of Oregon seniors is not constant across the state. (See Figure I-2.)

Regardless of the age of the underlying population, the burden of cancer among Oregonians can be lessened with appropriate, population-based screening for cancers that can be detected at an early or premalignant stage, such as colorectal and cervical cancers. Access to medical care for appropriate screening as well as treatment is imperative to reduce the toll of cancer among Oregonians.

An important factor affecting access to medical care is the physical distance the population lives from where medical services are located. The majority of Oregon counties are classified as Rural or Frontier (extremely rural with < 6 persons per square mile). In many counties, there are urban centers with medical services, however, the distribution of the population living outside of those areas is variable by county. (See Figure I-3.) Most counties with a high percentage of residents residing outside urban areas also have a high percentage of senior residents.

Figure I-2

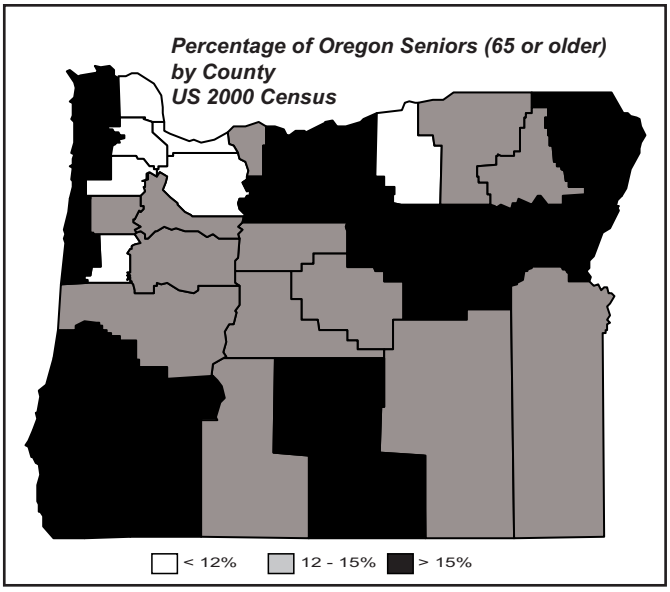
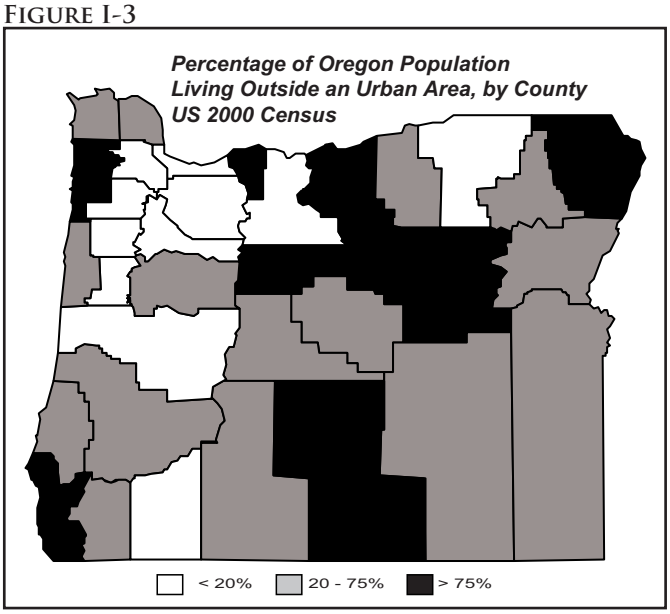
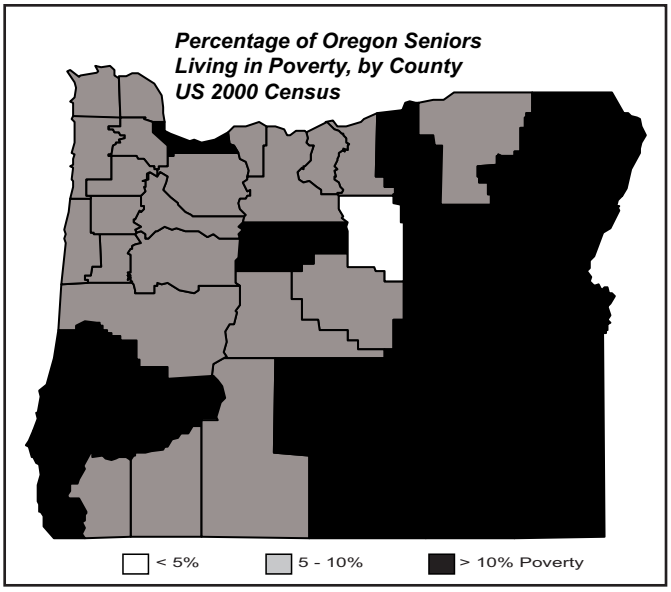


Figure I-3



Cancer burden can also be lessened by controlling modifiable risk factors, such as tobacco use. Regional differences in social and economic conditions affect access to medical care, as well as prevalence of many behavioral risk factors, and overall health. The distribution of seniors in poverty does not conform to the urban/rural continuum, and there are large pockets of impoverished seniors living in both rural and metropolitan areas. (See Figure I-4.)

Figure I-4



II. Introduction

The Oregon State Cancer Registry (OSCaR) was established by the 1995 Oregon Legislature to conduct statewide cancer surveillance and to guide cancer control program planning. The registry began collecting information on all reportable cancers diagnosed in Oregon as of January 1, 1996. The Oregon legislation defines the purpose of OSCaR as follows:

"...to provide information to design, target, monitor, facilitate, and evaluate efforts; determine the causes or sources of cancer among the residents of Oregon; and reduce the burden of cancer and benign tumors in Oregon."

Data from OSCaR provide an overview of all reportable cancers diagnosed in Oregon, including all malignant neoplasms except basal or squamous cell carcinomas of the skin (except if of skin of genitalia) and *in situ* cervical cancers. Cancer incidence data, which are collected by registrars trained in cancer reporting, provide a more complete picture of cancer among Oregonians than can be obtained from mortality data alone. This information is useful for cancer prevention programs, clinicians, policy makers, and for the public to understand the impact of cancer among Oregonians.

By combining information from the statewide cancer registry, death certificates, and health behavior surveys, the data provide an opportunity to answer a variety of epidemiological questions. This information will help cancer control programs identify at-risk populations as well as support epidemiologic studies of risk factors and cancer etiology. Many such questions are covered in this report including the following:

- ✓ *How many Oregonians are diagnosed with cancer each year?*
- ✓ *Which cancers are the most common?*
- ✓ *Which cancers are the deadliest (most deaths per diagnosed case)?*
- ✓ *What are the trends in cancer incidence and mortality?*
- ✓ *How many Oregonians are being screened for cancers?*
- ✓ *Which groups of Oregonians are disproportionately affected by cancer?*
- ✓ *What geographic areas in the state have higher cancer mortality*?

OSCaR also collects information on stage (the level of a cancer's progression) at the time of diagnosis. This is an important indicator of the effectiveness of screening efforts, as well as a determinant of treatment options and a predictor of survival for many types of cancers. For example, detecting female breast cancer in the early stages (through screening such as mammography) is thought to reduce mortality and have the strongest influence over whether a woman with breast cancer can be successfully treated.

III. What's New in 2002?

Diagnosis year 2002 marks the seventh year of complete cancer reporting for Oregon. Five years of complete data are included in this annual report, 1998-2002. Limited data for prior years are included. For historical data, please review prior reports on our website at www.healthoregon.org/oscar/.

Cancer and Race and Ethnicity in Oregon

Limited data were published in prior reports for cancers by race and ethnicity. This year's report includes additional information on cancers by race and ethnicity for selected sites. However, due to issues with the completeness and accuracy of race and ethnicity reporting, these data must be interpreted with caution. Please refer to the *Technical Section* for additional information and an overview of ongoing efforts to improve the race and ethnic origin data in the Registry.

Rates by race and ethnicity are not comparable with data from previous OSCaR annual reports because the 2002 data were analyzed using different racial and ethnic categories. Race and ethnicity categories included in this report now conform to national reporting standards. There are four race categories—African American, American Indian/Alaskan Native, Asian/Pacific Islander, and White. There are two ethnic categories—Hispanic and Non-Hispanic. The categories are no longer mutually exclusive. The race data are reported regardless of ethnicity, and the ethnicity data are reported regardless of race. This change allows for comparability with national data and enables comparisons for tracking progress of Healthy People 2010 objectives.

Denominator Change

Denominator data used to calculate incidence and mortality rates for prior years were population estimates from the Center for Population Research and Urban Studies, Portland State University (PSU), a resource center for population data designated by the US Bureau of the Census. However, the PSU data does not include race or ethnicity population counts with the level of detail needed to age-adjust rates. This year's report uses bridged, intercensal estimates directly from the 2000 US Census. Although the differences in rates are negligible at the state level, some county level rates show modest variation due to the change in calculation. However, this allows direct comparability among the race and ethnicity rates and rates for the general population.

Change in Calculating Age-Adjusted Rates

In reports from prior years, all age-adjusted rates were calculated per 100,000 population using the Year 2000 standard population with 18 age-groups. This year, to allow greater comparability with national mortality data, the age-adjusted rates were calculated using 19 age-groups: infants less than one year of age were put in an age group stratum separate from one year to four-year-olds. Because cancer is more common among the elderly, this analysis change results in minimal data variance.

Trend Data

Two types of trends are presented in this year's report: current trends and historical trends. Current trends include the most recent five years of data, 1998-2002. Historical trends include all available years of data, 1996-2002.

All trend data should be interpreted with caution. Over the years, notable changes in coding and collection standards have occurred, which affect the interpretability of the data. Specifically, in 1999, a national switch from ICD-9 classification to ICD-10 changed how cause of death is recorded and how cancer mortality data correlate with cancer incidence data. In 2001, major changes affecting coding for staging and cancer reportability came into effect for cases collected by cancer registries nationwide. Please review the *Technical Section* for specific information on data collection and analysis changes.

Current trends for 1998-2002 have been calculated for incidence and mortality for each site. The trend is the average annual percent change (APC) per year based on the past five years. These data are presented in *Fast Facts* for selected sites and in the incidence and mortality tables for all cancer sites. The five-year trends are intended to demonstrate general cancer trends.

Historical trends have been calculated and presented only for selected sites and include all available years of data. These trends are intended to show any potential changes in cancer incidence or mortality in recent years. In future reports, these historical trends will continue to be presented with additional years of data, which will increase their applicability. These historical trends are useful for cancer control program evaluation and will assist in understanding shifts in cancer rates in Oregon.

Trends are affected by a number of factors including the following:

- ✓ general reporting improvements from early years,
- ✓ site-specific reporting deficiencies in recent years as more cancers are being treated in outpatient settings (outside of the rigorous hospital reporting system),
- ✓ changes in reporting requirements and/or coding standards,
- ✓ changes in characteristics of underlying populations, natural fluctuations, and
- ✓ true changes in population risk and/or burden.

All trends are based on rates per 100,000 that are age-adjusted to the Year 2000 Standard Population. Please see the *Technical Section* for more detailed discussion.

Cancer Maps

The 2002 report includes mapped rates for incidence and mortality. These maps are not intended to represent individual county rates; county rates are presented in Tables 3-4. These maps depict statistically smoothed county rates to identify regional differences that would not necessarily be apparent when reviewing single county rates. The mapped rates for 2002 differ from last year's report by showing the county rates as above, below, or at the national rates. For additional information about methodology, please see the *Technical Section.*

Cancer incidence and mortality vary by region. These regional variations of cancer rates may lead to concern about exposures to carcinogens or unequal risk in some areas of the states. However, translating regional cancer rate differences into differences in cancer risk is problematic. It is important to recognize that multiple factors influence geographic variation in cancer rates. Despite the multitude of factors influencing cancer variations by region, these maps illustrate regional differences in cancer incidence and mortality and may suggest areas to target screening and prevention programs or to expand treatment facilities.

In addition to true differences in burden or random rate fluctuations, the following are also responsible for regional variation of cancer rates:

Variation in Population Demographics - Some cancers have different rates among different racial or ethnic groups. For example, breast cancer rates are generally higher in white women and prostate cancer rates are generally higher in black men. Therefore, racial makeup of an area should be considered when evaluating regional differences.

Variation in Medical Care/Screening - In areas with higher cancer screening rates, such as PSA testing for prostate cancer, more cancers will be diagnosed. However, for several cancers, notably cervical, breast, and colorectal, a higher percentage of early stage diagnoses associated with higher screening rates can result in more favorable prognosis for these cancers. Comparing both incidence and mortality rates is important to gain a more complete picture of regional cancer differences.

Variation in Reporting - Although OSCaR has a total case completeness rate of over 95%, cancer reporting may differ by region in terms of completeness and type of report source (hospital, physician office). Ongoing efforts by registry staff will help alleviate these sorts of artifactual differences.

IV. Cancer Overview

Risk factors for cancers include biological predisposition (genetics), individual behaviors, and environmental exposures. While some risk factors are inherent and immutable (age, sex, genes), other factors are modifiable and preventable (tobacco use, diet, environmental exposures). No single factor can determine whether a person will get cancer; genetic, lifestyle, and environmental factors together influence the risk of developing cancer.

A. Cancer Risks

Eighty-five percent of cancers occur in people without a family history of cancer. Familial cancers may reflect both shared genes and shared environments. It is estimated that 80% of all cancers are due to environmental and lifestyle factors, which means they are potentially preventable. Internationally, cancer incidence varies widely by country for many cancers. Studies have shown that immigrants gradually acquire the cancer rates of their adopted countries as they become acculturated. This illustrates the considerable influence of environmental and lifestyle factors on cancer incidence.

Environmental and lifestyle factors that affect cancer risk include tobacco use, viral infections, radiation, diet, physical inactivity, and alcohol intake. In addition, occupational or environmental exposures to asbestos, secondhand smoke, and other carcinogens contribute to cancers that are potentially preventable. These exposures interact with genetic factors to determine an individual's risk of developing cancer. In this section, we summarize the leading *known* risk factors for cancer. For additional information, please review the National Toxicology Program's *Report on Carcinogens* available at: http://ntp.niehs.nih.gov/index.cfm?objectid=72016262-BDB7-CEBA-FA60E922B18C2540.

Biological Predisposition

As an individual ages, his or her risk of developing cancer increases. Overall, 75% of cancers in Oregon occur in people over the age of 55 years. A person's sex also affects his or her risk of developing cancer. Certain cancers are clearly sex specific (cervical in women, prostate in men). Other cancers may be more common among persons of a particular sex, such as breast cancers among women.

Genetic predisposition appears to play an important role in many cancers, as demonstrated by the clustering of cancers in some families. A women's risk of breast cancer is doubled if her mother or sister has had breast cancer. If both the woman's mother and sister have had breast cancer, the risk is increased about four times. Risk is further increased when the relative was diagnosed before age 50. Two genes have been identified as "breast cancer genes": BRCA1 and BRCA2, which account for 5-10% of all breast cancers.

Melanoma also appears to have a genetic component. In general, the lighter one's skin, the higher one's risk of developing melanoma. The susceptibility to develop melanoma is related to the propensity for sunburn, which is inherited. About 10% of melanoma cases occur in individuals with a family history of melanoma. Individuals who have one affected relative have a two-fold increased risk of melanoma; those with two affected relatives have a five-fold increased risk. Researchers have identified several genes that may mediate this familial risk. There are two recognized forms of hereditary colorectal cancer: familial adenomatous polyposis (FAP) and hereditary nonpolyposis colorectal cancer (HNPCC). In addition to these well-described hereditary cancers, a family history of colorectal cancers may increase a person's risk of colon cancer two to four fold. Twenty percent of colorectal cancer cases have a recognized familial component. Individuals with first-degree relatives who have had colorectal cancer are at increased risk for developing this cancer, especially if the relative was diagnosed before age 45. If several first-degree relatives have a history of colorectal cancer, the risk is even greater.

Modifiable Behaviors

Tobacco Use – Tobacco use is the greatest preventable risk factor for cancer. Historically, tar has been considered the most important carcinogen in tobacco. However, recent evidence suggests that nicotine disrupts apoptosis, or programmed cell death, which can lead to tumor initiation, progression, or metastasis. Apoptosis is needed to destroy abnormal cells that are a threat to the body, such as cells with DNA damage due to age or an exposure, and is a central self-defense mechanism against cancer. This may explain the synergistic effect smoking has when combined with other exposures, such as sun exposure. Because of its overwhelming importance as a carcinogen, we have devoted an entire section of this report to use of tobacco. (*See Tobacco and Cancer.*)

Diet – Dietary factors appear to increase the risk of developing many cancers. The varying incidence in different parts of the world suggests that diet plays an important role in the development of oral, esophageal, and stomach cancers. Population studies suggest that persons who consume a high-fiber, low-fat diet have a lower risk of developing colorectal cancer. Comparative studies have shown that prostate cancer rates are generally higher in countries in which the population consumes more animal fat.

Physical Activity – Epidemiologic studies suggest that increased physical activity decreases risk of breast, colorectal, and pancreatic cancers. The association has been noted for both occupational, transportation-related, and leisure time physical activity.

Obesity – People who are overweight are at increased risk of multiple cancers, including breast, colorectal, endometrial, kidney, pancreatic, oral, and esophageal cancers.

Alcohol Use – Heavy alcohol consumption is a risk factor for cancers of the oral cavity, pharynx, and larynx. Smoking and alcohol consumption result in a synergistic effect, producing a greater cancer risk in those who do

both than would be expected if their effects were merely additive. These two behaviors account for approximately three-fourths of all oral cancers in the United States. In addition, heavy alcohol consumption increases the risk of developing esophageal and liver cancers and has been implicated in development of cancers at other sites.

Reproductive Behavior – Several epidemiological studies suggest that reproductive patterns influence breast cancer risk. Prolonged exposure to natural and therapeutic estrogen is believed to raise the risk of breast cancers slightly. The number of menstruating years for a woman is one risk factor; early menarche and late menopause increase a woman's risk. An early age at first pregnancy and a high number of full-term pregnancies are protective factors. The effect of lactation is still not clear; however, there is evidence of an increasing protective effect with the greater number of months a woman breastfeeds.

Sexual Behavior – The risk of cervical cancer is linked with the onset of sexual activity. The risk is higher among women who become sexually active at an early age and who have multiple sexual partners. This risk is related to the risk of exposure to human papilloma viruses (HPV), which have been identified as a cause of cervical cancer. Several different types of HPV infect the genital tract, and two of the HPV types cause genital warts. Other types appear to cause cervical dysplasia and cervical cancer. Infection with HPV is the strongest risk factor for developing cervical cancer. HPV is spread primarily through sexual contact, and about 40 HPV variants have been linked to other cancers of the anus, vulva, vagina, penis, oropharynx, mouth, and skin. Currently, vaccines for HPV are being studied in clinical trials for the prevention of cervical cancer and have shown that an HPV vaccine could be effective against the most common strains of HPV that cause cervical cancer.

Sexual activity may also be related to the development of prostate cancer. One study has shown greater sexual activity and frequency of venereal disease in prostate cancer cases compared to controls. This suggests the possibility that some cases of prostate cancer may also result from a sexually transmitted agent; however, no "culprit" has been identified.

Environmental exposures

Environmental Contamination – Exposure to carcinogens in the environment is a risk factor for cancers. However, assessing exposure to environmental contamination is particularly difficult due to the lag time between exposure and diagnosis, as well as the complexity of determining an individual's or community's exposure. Currently, such exposures are thought to contribute to a relatively small proportion of all cancer diagnoses. However, there is sustained concern among the public about environmental hazards, and researchers are continually improving research techniques to address such issues.

Secondhand smoke – Exposure to secondhand smoke increases the risk of lung cancers in non-smokers. Non-smoking spouses of heavy smokers have about double the risk of lung cancers compared to non-smoking spouses of non-smokers.

Ionizing Radiation – Sources of exposure to ionizing radiation include medical imaging and

treatment (x-rays, radiotherapy), radioactive elements in the soil and air (uranium, radon gas), nuclear weapons, and occupational exposure (such as that occurring among nuclear shipyard workers). Ionizing radiation has been related to an increased risk of several cancers, including leukemia, thyroid, breast, and lung cancers.

Occupational Exposures – Many occupational exposures have been associated with increased risk of developing certain cancers. For instance, workers exposed to aniline dyes and certain solvents are at increased risk for bladder cancer. Miners exposed to radon gas have an increased risk of developing lung cancer. Asbestos exposure is the primary risk factor for developing mesothelioma, and workers exposed to vinyl chloride are at increased risk for developing angiosarcoma of the liver.

Sun Exposure – Epidemiologic studies have identified a strong relationship between being sunburned as a child or adolescent and developing melanoma as an adult. Exposure to sun also increases the risk of developing basal and squamous cell carcinomas for the skin. While the use of sunscreen is recommended for general skin health, there is no direct evidence that sunscreen use can prevent skin cancers. Therefore, using sunscreen is not a substitute for avoidance of sun exposure.

Viral Infections – In addition to HPV and its contributory role in developing cervical cancers (*See Sexual Behavior*) as well as cancers of the vulva and penis, several other viruses have been associated with cancers. These include Epstein-Barr virus, which has been associated with Burkitts lymphoma, nasopharyngeal carcinoma, and Hodgkin lymphoma; hepatitis B and C virus, which increase the risk of hepatocellular carcinoma; HTLV-1 virus, which causes adult T-cell leukemia, and the human immunodeficiency virus (HIV), which has been associated with non-Hodgkin's lymphoma and Kaposi sarcomas.

Unknown Factors

The causes of many cancers are still unknown. For instance, most breast cancers (80%) occur in women with no identifiable risk factors other than being female and post-menopausal. Colorectal cancers also frequently occur in individuals without any known risk factors other than age. This emphasizes the importance of population-based preventive screening so that these cancers can be identified early at the most treatable stage. (*See Cancer Screening and Prevention* for recommendations on preventive screenings.)

Causes of other types of cancers are also chiefly unknown, and there is continuing public concern about environmental contamination and industrialization possibly contributing to increasing cancer rates. However, it may not be prudent to use cancer incidence as a rationale for environmental action. Cancers diagnosed today may represent exposures that occurred many years ago. To improve public health, environmental and other exposures that place citizens' health at risk should be addressed before they can lead to increased cancer incidence. Such primary prevention is particularly important for cancer sites that have no early detection methods or viable treatment regimens.

B. Tobacco and Cancer

Smoking contributes to about one in every five deaths in the US and is one of the most important modifiable risk factors leading to premature death. Cigarette smoking resulted in over one million years of potential life lost (YPLL) before age 65, and over five million total YPLL in 1990 alone. More than 6,000 Oregonians die annually from tobacco-related disease. Tobacco annually claims more lives than AIDS, drug and alcohol abuse, motor vehicle crashes, murders, and fires combined. In 2003, 500,000 Oregon adults smoked, and 75,000 adults chewed tobacco. For most smokers, addiction to tobacco began in their youth. Despite gains in preventing youth from starting to smoke, 45,000 Oregon youth still smoke and 13,000 chew tobacco.

Although lung cancer is perhaps the most well-known and well-publicized disease that has been linked to tobacco use, there are a variety of other illnesses and cancers that are associated with tobacco exposure.

Tobacco-Associated Sites

Lung cancer continued to receive enormous amounts of media attention, and its association with tobacco use is a source of numerous recent and pending lawsuits. It is estimated that 85% of all lung cancers are etiologically related to smoking, and smoking confers 12 - 22 times the risk of dying from lung cancer. Other factors, such as occupational and environmental exposures, play a much lesser role in the development of lung cancer. Non-smokers exposed to second-hand smoke have twice the risk of developing lung cancer compared to non-smokers without passive tobacco smoke exposure.

Most people who develop lung cancer die from the disease, and smoking prevention and cessation remain the best hope for reducing mortality from this cancer. After ten years of smoking cessation, the risk of developing lung cancer falls to about 50% of that of a continuing smoker. At 20 years, the risk approaches that of a non-smoker.

Oral cancers include those of the tongue, gums, inner cheeks, lips, tonsils, and palate, and are highly associated with tobacco and heavy alcohol use. These behaviors have a synergistic effect on oral cancer risk. Although oral cancers only account for about 3% of all Oregon invasive malignancies, they are highly preventable because the use of tobacco and alcohol accounts for approximately 75% of these cancers. Preventive measures for these cancers include discouraging the initiation of tobacco use, encouraging the cessation of smoking and smokeless tobacco, and decreasing alcohol use. There is good evidence that oral cancer risk declines quickly with cessation of smoking or smokeless tobacco use. In fact, little or no elevation in risk was found among those who had quit smoking for ten or more years.

Bladder cancer is strongly linked to smoking. Carcinogens in the smoke are absorbed into the bloodstream and partially excreted in the urine. Since the bladder collects and holds urine, the lining of the bladder wall is exposed to carcinogenic tobacco by-products for long periods of time. Cigarette smokers develop bladder cancer two to three times more often than non-smokers do, and the risk increases with the quantity smoked. Heavy smokers have bladder cancer risks up to five times those of non-smokers.

Cervical cancer is most strongly associated with the presence of the human papilloma virus (HPV); however, smoking is also associated with elevated risk for cervical cancer. Studies that controlled for other factors, such as age at first intercourse and number of sexual partners, have found this association with smoking to persist. The Pap smear is a useful screening test to detect early stage and precancerous lesions. Safe sexual practices and abstinence from tobacco are the most effective primary prevention strategies.

Pancreatic Cancer is often diagnosed at later stages when it is difficult to treat because symptoms are frequently vague. Smoking is a significant risk factor for pancreatic cancer. Increased smoking increases the risk of developing pancreatic cancers in a dose-dependent fashion up to two times the baseline risk. Therefore, eliminating any modifiable risk factor, specifically smoking, is important to reduce the burden of this disease.

Gastrointestinal cancers have also been linked to smoking. The strength of the relationship between tobacco and these cancers declines with progression from the esophagus downward to the rectum. Heavy smokers have about five times the risk of developing esophageal cancer, and between one and three times the risk of developing stomach cancer. Recently, several studies have suggested that smoking may be related to adenocarcinoma of the bowel after a long latent period, and other studies have suggested a link between smoking and large bowel polyps. Smokers also have a risk of anal cancer eight times that of non-smokers. Although the anus is at the distal end of the gastrointestinal tract, the anal canal is lined with squamous epithelium, which may be a factor in the stronger association between tobacco smoke and anal cancer.

Tobacco Use Cessation

Tobacco use cessation is always advisable because the risk of developing tobacco-related cancers is correlated with the amount of tobacco exposure. Cutting back or, ideally, quitting smoking altogether not only reduces the risk of the aforementioned cancers, but also decreases the morbidity associated with a variety of other illnesses including chronic bronchitis, emphysema, heart disease, asthma, and stroke. The evidence is clear that quitting use of tobacco early can play a significant role in an individual's health and well-being.

Tobacco Prevention Efforts

Prevention efforts in Oregon have resulted in a dramatic drop in youth and adult tobacco use. Much of this decrease can be attributed to Oregon's statewide campaign against tobacco use. In November 1996, Oregon voters passed Measure 44, an initiative that raised taxes on tobacco and dedicated 10% of the new revenue to tobacco prevention and education. Oregon started a comprehensive tobacco prevention program in 1997. The program includes passage of smokefree workplace ordinances, community education activities, tobacco cessation programs, school-based anti-tobacco programs, anti-tobacco commercials, and billboard advertising. Compared to 1996, there are 75,000 fewer adult and 25,000 fewer youth smokers in Oregon, and 50,000 fewer adults are using smokeless tobacco in 2002. In 2003, there were 2 billion fewer cigarettes sold in Oregon compared to 1996. In addition, 2,700 fewer pregnant women smoked, which resulted in 70 fewer low birth weight babies born in 2003 than in 1996. Besides improved health among Oregonians, reduced tobacco use results in monetary savings in Oregon. The reduction in low birth weight babies saved $2 million in neonatal medical costs for 2002.

Since 1996, Oregonians' tobacco use has declined more rapidly than the rest of the nation. However, in 2003, the Oregon State Legislature reallocated the Measure 44 funding and dismantled the Tobacco Prevention and Education Program (TPEP) to address existing budget constraints. Funding for TPEP was subsequently reinstated but at less than half the level that voters approved with Ballot Measure 44. Nonetheless, tobacco prevention activities are taking place in several communities around the state. The Oregon Tobacco Quit Line is also currently available for Oregonians wanting to quit smoking or chewing tobacco. Since its inception in 1998, the quit line has helped more than 60,000 Oregonians who called seeking help. Follow-up surveys indicate that 20% of those callers were tobacco-free six months after the telephone counseling; this is twice the rate seen among those attempting to quit without quit line support.

C. Cancer Screening and Prevention

In addition to engaging in preventive behaviors, people can reduce their cancer burden by receiving appropriate screening tests. Many cancers, if diagnosed at an early stage, are curable.

The US Preventive Services Task Force (USPSTF) is an independent panel of experts in primary care and prevention that systematically reviews the evidence for the effectiveness of clinical preventive services and develops recommendations for their use. This section lists the USPSTF recommendations for people at average risk for cancer. Individuals with a personal or family history of cancer or other risk factors that increase their personal cancer risk should consult their physician for individualized recommendations. The complete USPSTF recommendations are available on the web at: http://www.ahcpr.gov/clinic/uspstfix.htm.

Recommendations

Mammography – The data are clear that screening women 50-69 years of age every one to two years is of benefit in detecting early stage breast cancer. Estimates of mammography sensitivity in detecting breast cancer range between 75% and 88%. In numerous studies, regular mammography reduced breast cancer mortality in women older than 50 years of age by 20-30%.

The data are less compelling for routine mammography among women 40-49 years of age. This age group may be less effective due to the greater density of the premenopausal breast. Routine, population-based mammography for younger women results in a higher false-positive rate, than for post-menopausal women, which can lead to undue patient anxiety and potentially unnecessary diagnostic tests. Beginning September 2002, the USPSTF began recommending screening mammography, with or without clinical breast examination (CBE), every one to two years for women aged 40 and older. Although there is still considerable debate, these recommendations now correlate with Centers for Disease Control and Prevention (CDC), National Cancer Institute (NCI), American Cancer Society (ACS), American College of Surgeons (ACoS), and American College of Radiologists (ACR) recommendations .

According to the USPSTF, there is no clear evidence of an ideal interval for mammography screening among women in the 40-49 age group. The USPSTF states, “The absolute benefit is smaller because the incidence of breast cancer is lower among women in their 40s than it is among older women. The USPSTF concluded that the evidence is also generalizable to women aged 70 and older (who face a higher absolute risk for breast cancer) if their life expectancy is not compromised by comorbid disease. The absolute probability of benefits of regular mammography increases along a continuum with age, whereas the likelihood of harms from screening (false-positive results and unnecessary anxiety, biopsies, and cost) diminishes from ages 40-70. The balance of benefits and potential harms, therefore, grows favorable as women age. The precise age at which the potential benefits of mammography justify the possible harms is a subjective choice.” This decision can be made between a woman and her provider after discussing the benefits and risks of mammography and subsequent workup.

Pap Smear –The Papanicolaou (Pap) test can detect both precancerous conditions and cervical cancer and has been credited with the decline in cervical cancer diagnoses and deaths seen in the United States over the past few decades. The USPSTF states that direct evidence to determine the optimal starting and stopping age and interval for screening is insufficient to determine evidence-based guidelines. However, the ACS, USPSTF, and American College of Obstetricians and Gynecologists (ACOG) recommend beginning screening within three (3) years of onset of sexual activity or age twenty-one (which ever comes first) and screening at least every three years. ACS and ACOG recommend annual screenings until a woman is age 30 or older. ACS and ACOG recommend screening every 2-3 years for women over 30 with three (3) negative Pap tests. ACS recommends stopping screening for women over 70 with three recent, consecutive negative tests and no abnormal tests in 10 years. USPSTF suggests women over 65 with negative tests who are not at high risk for cervical cancer can discontinue screening, but ACOG does not recommend an upper age-limit for screening cessation.

This test should be considered for all women with a cervix—not just women of childbearing age. Efforts need to be increased to ensure post-menopausal women are receiving this test. It is important that women seek the advice of a physician about when to begin, how often, and when to discontinue cervical screenings–especially if they are at higher than average risk of cervical cancer.

Fecal Occult Blood Tests (FOBT), **Sigmoidoscopy, Colonoscopy, & Double-Contrast Barium Enema** – Routine screening for colorectal cancer is recommended for persons 50 and older. Screening methods include FOBT (a chemical test for blood in stool), sigmoidoscopy (direct visualization of the lower one-third of the bowel using a flexible fiberoptic endoscope), colonoscopy (visualization of the entire colon with a flexible scope), and barium enema (a series of x-rays). The USPSTF does not specify a particular combination of these methods or frequency of screening. However, annual FOBT and sigmoidoscopy every 3-5 years has been advocated by the ACS and other organizations starting at age 50. New data suggest that a full colonoscopy every ten years may be a suitable alternative screening strategy to improve the sensitivity of colorectal cancer detection.

Regular Physical Exams – Clinical exams detect cancer early, particularly breast and oral cancers. A rough, whitish plaque or reddish patch on the mucous membrane frequently precedes oral cancers and can be identified during a regular physical exam. Periodic examination for and treatment of these precancerous conditions could nearly eliminate oral cancers.

Genetic Counseling and Testing - Though not appropriate for routine screening in the general population, individuals with a strong family history for certain cancers (e.g., breast, ovarian, colorectal cancer) may benefit from targeted, more frequent screening beginning at an earlier age. Genetic testing can determine if they carry one of the known high-risk genes for cancer (such as BRCA1 or BRCA2). Referral to a genetic counselor for in-depth evaluation of family history and discussion of the risks and benefits of genetic testing may be appropriate.

Oneonta Falls, Columbia Gorge

V. Cancer Data

During 2002, 18,713 new, reportable cancers were diagnosed among Oregonians[1]; of these, 17,122 were invasive[2]. The 2002 Oregon total cancer mortality rate was 25% above the Healthy People 2010 target of 159.9 deaths per 100,000. Note that the Oregon total cancer mortality rate includes cases that became reportable in 2001. If these cases are excluded for comparison purposes, the Oregon mortality rate is 23% above the Healthy People 2010 target.

Cancer Data Overview and Leading Sites

A brief overview of Oregon's 2002 cancer data reveals the following: (See Figure V-1.)

1. Overall, Oregon's 2002 age-adjusted cancer incidence rate of 469.3 per 100,000 was 1% higher than the 1997-2001 national rate of 462.8. Oregon's age-adjusted cancer mortality rate of 199.2 was 2% higher than the 2002 national rate of 195.6.

2. Although more total cancers were reported in women, men had a higher incidence rate of invasive cancers and a higher mortality rate than women.

3. Breast cancers have the highest incidence in Oregon; lung cancers have the highest mortality.

4. Among Oregon females, breast cancers were the most frequently diagnosed cancer followed by lung, colorectal, and uterine cancers[3], and then lymphomas. Lung cancer had the highest mortality for women, followed by breast, colorectal, ovarian, and pancreatic cancers. (See Figure V-2.)

5. Among Oregon males, prostate cancers were the most frequently diagnosed cancers followed by lung, colon, and bladder cancers, and melanomas of the skin. Lung cancers had the highest mortality for men followed by prostate, colorectal, and pancreatic cancers and then lymphomas. (See Figure V-3.)

6. Of the 43 states with central registry data meeting national data quality standards in 2001, Oregon men ranked 23rd for all-cancer incidence and Oregon women ranked 8th. Oregon women ranked in the top ten due to high rates of breast and lung cancers.

7. Among all 50 states, Oregon men ranked in the lower half, 29th, and women ranked 8th in all-cancer mortality for 2002. The higher ranking for Oregon women is primarily due to the high rates of lung cancer mortality.

[1] These numbers represent the cancers that are reportable to OSCaR, which exclude the most frequently diagnosed cancers (*in situ* cervical cancers as well as basal and squamous cell carcinomas of the skin [except if skin of genitalia]).
[2] Invasive cancers exclude *in situ* diagnoses with the exception of in situ bladder cancers.
[3] Uterine cancers include uterine sarcomas.

All Cancers Fast Facts

Figure V-1

All Cancers Fast Facts Oregon 2002	***All Sexes*** [1]	***Male***	***Female***
Cancer Incidence			
All Cases Total	***18,713***	***9,152***	***9,559***
In situ	2,053	868	1,184
Localized	7,807	3,889	3,913
Regional	3,773	1,680	2,093
Distant	3,566	1,882	1,685
Unstaged	1,514	828	683
Invasive Rates			
Oregon Crude	486.6	494.1	479.0
Oregon Age-adjusted	469.3	525.8	430.9
Oregon Current Annual Trend (5-Year)	-0.9	-1.4	-0.5
US SEER Age-adjusted[2]	462.8	539.9	409.9
US SEER Annual Trend (5-Year)[2a]	*-1.1	*-1.2	*-1.3
Cancer Mortality			
Total Deaths	***7,334***	***3,732***	***3,602***
Mortality Rates			
Oregon Crude	205.4	210.3	200.6
Oregon Age-adjusted	199.2	235.1	174.8
Oregon Current Annual Trend (5-Year)	-0.8	*-1.4	-0.4
US Age-adjusted[3]	195.6	241.8	164.6
US Annual Trend[4]	*-1.1	-0.4	*-1.5
Prognosis and Burden [5]			
Prognosis: M/I Ratio	0.41	0.42	0.41
Burden: YPLL before age 65	22,736	11,264	11,472

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

[1] *All Sexes* counts may exceed male/female combined due to additional sex coding

[2] Year 2001, SEER 9 Registry data, SEERSTAT 5.2.2

[2a] Years 1997-2001, SEER 9 Registry data, SEERSTAT 5.2.2

[3] 2002 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[4] *Annual Report to the Nation on the Status of Cancer*, most current trend of 3 years or more.

[5] Calculations based on combined years 1998-2002

Leading Sites of Cancer Incidence and Mortality

Figure V-2

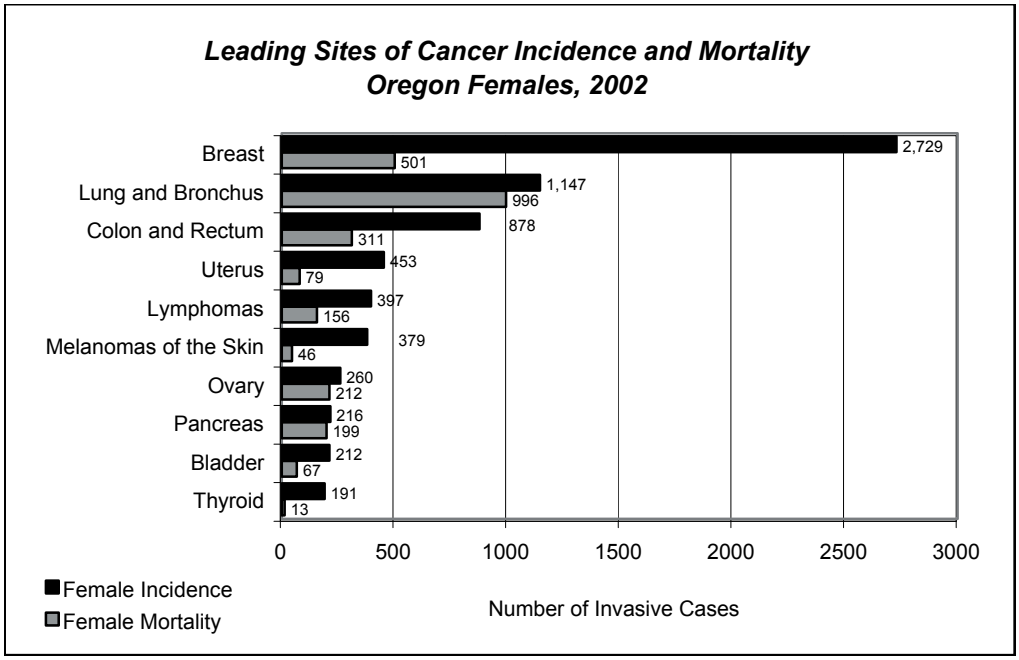
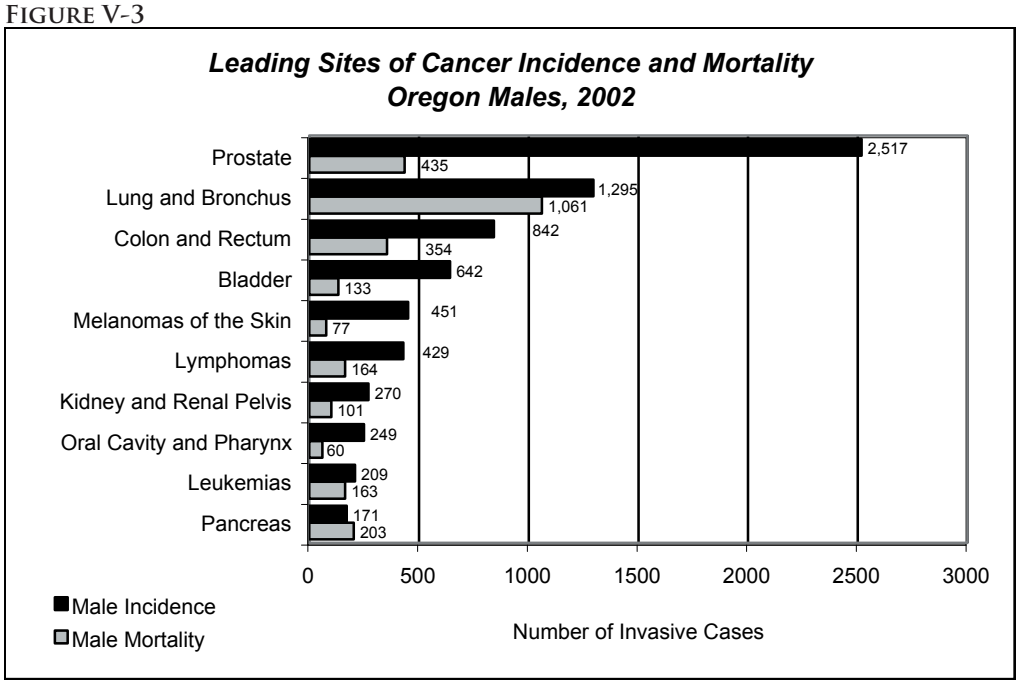


Figure V-3



Stage at Diagnosis

Of public health importance is the percentage of early stage diagnoses, which is a proxy for success of population-based screening efforts. From 1996 to 2002, the percentage of early stage diagnoses remained the same for female breast cancers and decreased for cervical cancers. The percentage of early stage diagnoses for colorectal cancers increased, and, although there is no national recommendation for prostate cancer screening, the percentage of early stage prostate cancer diagnoses has increased since 1996. (See Figure V-4.)

Although the percentage of female breast cancers diagnosed at an early stage has remained the same, the percentage of *in situ* diagnoses has increased, which will likely improve outcomes. The percentage of colorectal cancers diagnosed both *in situ* and localized has increased from 1996 to 2002.

Despite variability in the percentage of cases diagnosed at an early stage, all of these screenable cancers demonstrated reductions in mortality. (See Figure V-5.) It is likely that the decrease in mortality is due to a combination of improved screening and enhanced treatment.

Figure V-4

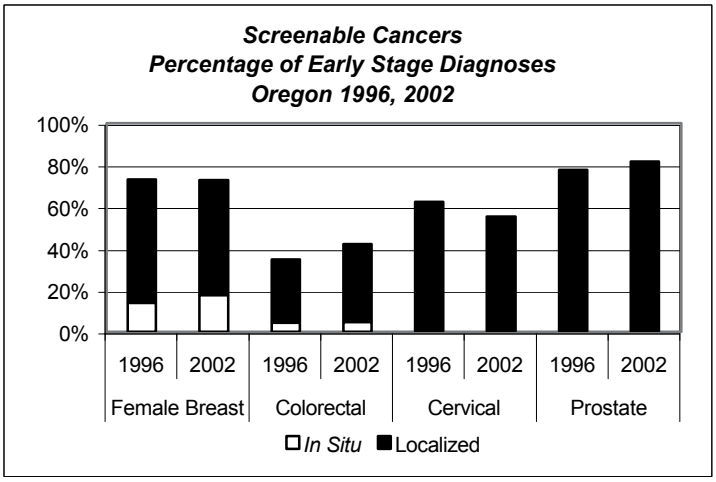
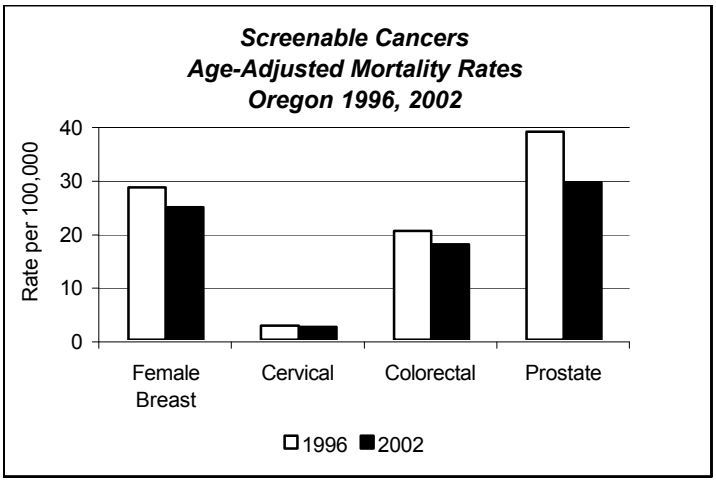


Figure V-5



Disease Severity

The M/I (mortality-to-incidence) ratio, also known as case-fatality ratio, provides a measure of disease severity. In general, the closer a M/I value is to 1.0, the poorer the expected outcome for a patient with cancer of that type. A M/I value over 1.0 indicates the poorest prognosis. This means more people died of the particular cancer type than were diagnosed in the same year.

Overall, Oregon's M/I ratio for all cancers was 0.41 for the years 1998 - 2002. Pancreatic cancer had the worst prognosis, with a M/I ratio of 1.00, and was followed by esophageal cancer with a ratio of .96. Figure V-6 shows M/I ratios for each cancer site.

Figure V-6

M/I (Mortality-to-Incidence) Ratios
Oregon 1998 - 2002

Selected Sites	Total	Male	Female
All Sites	0.41	0.42	0.41
Pancreas	1.00	1.01	1.00
Esophagus	0.96	0.97	0.92
Liver and Intrahepatic Bile Duct	0.93	0.87	1.05
Lung and Bronchus	0.81	0.82	0.79
Brain and CNS	0.80	0.78	0.84
Myeloma	0.78	0.74	0.84
Ovary	0.68	n/a	0.68
Mesothelioma	0.67	0.66	0.76
Leukemias	0.65	0.65	0.66
Stomach	0.61	0.56	0.69
Soft Tissue including Heart	0.52	0.45	0.59
Gallbladder	0.51	0.55	0.50
Lymphomas	0.42	0.41	0.44
Bladder	0.21	0.19	0.25
Bones and Joints	0.38	0.43	0.32
Kidney and Renal Pelvis	0.38	0.39	0.37
Colon and Rectum	0.38	0.39	0.37
Larynx	0.32	0.32	0.33
Cervix Uteri	0.28	n/a	0.28
Oral Cavity and Pharynx	0.27	0.24	0.31
Small Intestine	0.19	0.14	0.24
Breast	0.19	0.24	0.18
Uterus	0.18	n/a	0.18
Prostate	0.17	0.17	n/a
Melanomas of Skin	0.14	0.17	0.11
Eye and Orbit	0.11	0.08	0.14
Thyroid	0.07	0.09	0.07
Testis	0.06	0.06	n/a

n/a = not applicable

Years of Potential Life Lost

The measure of Years of Potential Life Lost (YPLL) takes into consideration the greater societal costs of a person dying young. For example, using 65 years as a standard age of death, a person dying of cancer at age 25 would have 40 YPLL. The YPLL measure is one way of evaluating the burden of a disease upon a defined population. Lost productivity due to an individual dying prematurely of cancer should be interpreted as a loss of both economic and non-economic contributions to society.

Figure V-7 shows the leading causes of YPLL for Oregonians. *Accidents and Adverse Effects* were the leading causes of YPLL for male Oregonians, and cancer was the leading cause of YPLL for female Oregonians. However, due to the high injury rate for men, unintentional injuries were the leading cause of YPLL with both sexes combined. It is interesting to note that, when a preset standard age at death of 70 or greater (rather than 65) is used in the calculation, cancer becomes the leading cause of YPLL among all Oregonians.

Lung cancers are the leading cancer-related cause of YPLL for all Oregonians, followed by breast, brain/central nervous system, and colorectal cancers. Brain cancer is not a leading cancer site but is a leading cause of YPLL because over half of deaths from this cancer occur in Oregonians younger than 65. Leukemias and lymphomas are additional cancer sites with over 1,000 YPLL each year.

Figure V-7

Leading Causes of YPLL (Years of Potential Life Lost) Prior to Age 65, Average Numbers of Years Lost Annually Oregon 1998 - 2002

Cause of Death	*Total*	*Male*	*Female*
All Causes of Death	132,889	77,530	55,359
Accidents and Adverse Effects	23,697	16,946	6,752
All Malignant Cancers	**22,736**	**11,264**	**11,472**
Lung and Bronchus	**4,361**	**2,330**	**2,032**
Breast	**2,671**	**9**	**2,662**
Brain and CNS	**2,007**	**1,162**	**845**
Colon and Rectum	**1,684**	**996**	**688**
Leukemias	**1,359**	**785**	**575**
Lymphomas	**1,215**	**795**	**419**
Pancreas	**884**	**522**	**362**
Melanomas of the Skin	**873**	**575**	**298**
Ovary	**753**	**n/a**	**753**
Liver/Intrahepatic Bile Duct	**614**	**441**	**173**
Kidney and Renal Pelvis	**525**	**371**	**154**
Esophagus	**510**	**419**	**91**
Soft Tissue including Heart	**481**	**252**	**228**
Cervix Uteri	**466**	**n/a**	**466**
Oral Cavity and Pharynx	**432**	**327**	**105**
Stomach	**378**	**233**	**145**
Myeloma	**265**	**161**	**104**
Bones and Joints	**240**	**163**	**77**
Bladder	**238**	**143**	**95**
Prostate	**229**	**229**	**n/a**
Uterus	**188**	**n/a**	**188**
Diseases of Heart	17,398	9,544	7,854
Suicide and Self-Inflicted Injury	10,507	8,433	2,074
Cerebrovascular Diseases	3,725	1,402	2,323
Homicide and Legal Intervention	3,721	2,648	1,073
Chronic Liver Disease/Cirrhosis	2,809	1,898	912
Diabetes Mellitus	2,499	1,350	1,149
Pneumonia and Influenza	2,225	804	1,421
Chronic Obstructive Pulmonary Disease (COPD)	1,757	796	961
Human Immunodeficiency Virus (HIV)	1,610	1,449	161

Counts for total may exceed male and female combined; YPLL calculations are rounded to the nearest whole year.
n/a = Not applicable

Race and Ethnicity

Age-adjusted cancer rates by race and ethnicity are shown in Figures V-8-11. These differences among racial/ethnic populations are important because they may reflect differences in screening rates, treatment, access to care, or modifiable risk behaviors. However, due to issues with completeness and accuracy of race and ethnicity reporting, data must be interpreted with care. Please refer to the *Technical Section* for additional information.

Figure V-8

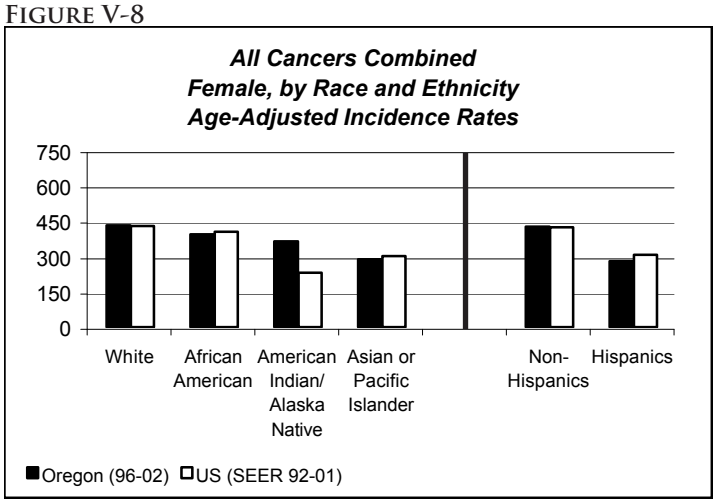
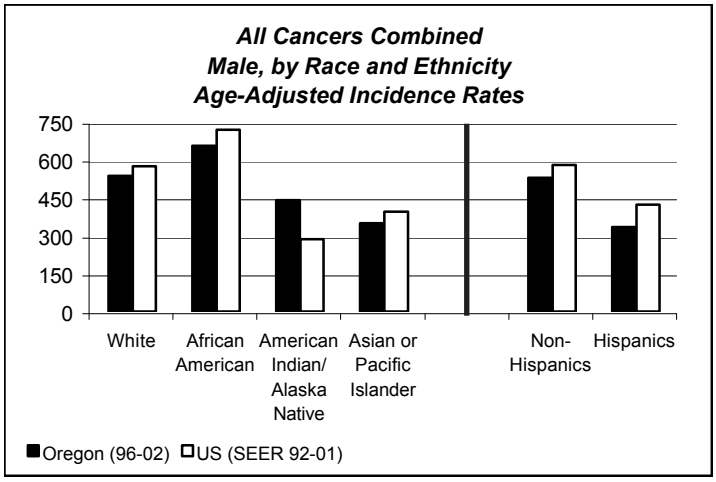


Figure V-9

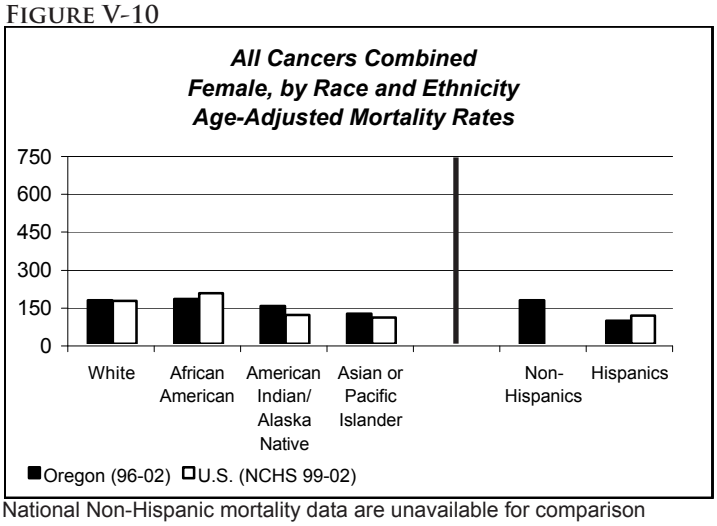


As seen nationally, African American (AA) men in Oregon have the highest rate of cancer incidence and mortality, followed by whites. (See Figures V-9 and V-11.) Among women in Oregon and nationally, whites have the highest cancer incidence rates, but AA women have higher mortality rates. (See Figures V-8 and V-10.) Oregon American Indian/Alaskan Natives (AI/AN) have higher cancer rates than are seen nationally. Nationwide, AI/AN cancer incidence and mortality are the lowest among the four racial groups. Hispanics have lower cancer rates than Non-Hispanics both in Oregon and nationally.

Historically, Oregon's AI/AN population had the lowest rate of cancer of all racial/ ethnic groups. The low incidence rate among AI/AN persons was a phenomenon reported by other population-based cancer registries. OSCaR and other registries have found that AI/AN cases are often misclassified as another race or Hispanic. When AI/AN individuals are properly classified, rates are substantially higher. OSCaR links annually with local and national Indian Health Service and tribal clinic registries to correct racial coding for AI/AN persons. Because of this, Oregon may have higher rates than those seen nationally. As similar linkage projects are conducted in more states, it is hoped racial misclassification will have a progressively smaller effect in artificially suppressing AI/AN cancer rates nationally.

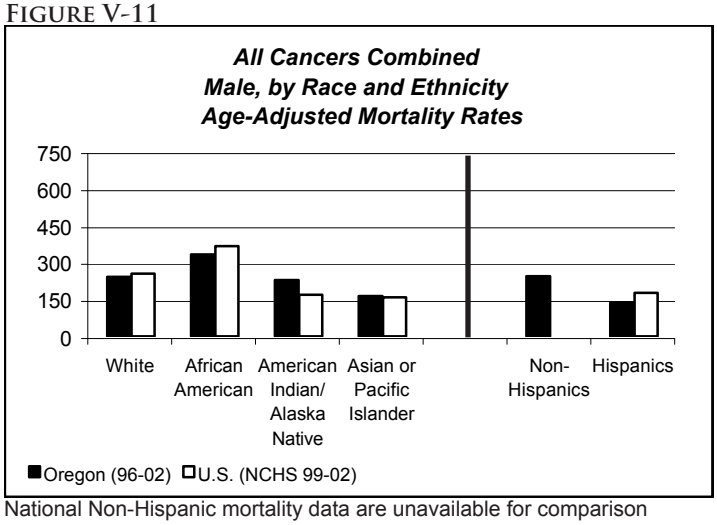
There are also differences in distribution of cancer by anatomic site among the race and ethnic groups. Regardless of race or ethnicity, among men, prostate was the most common cancer site for men in Oregon and nationwide, while breast was the most

Figure V-10



National Non-Hispanic mortality data are unavailable for comparison

Figure V-11



National Non-Hispanic mortality data are unavailable for comparison

common cancer site for women. (See Figure V-12.) However, lung cancers represent a greater burden among Oregon Hispanics and AI/AN women in Oregon than nationally. Cervical cancers could potentially be eliminated with appropriate, population-based screening, but are the third most common cancer among Hispanic women for both Oregon and the nation. Melanomas of the skin are the 5th most common cancer among White Oregonians, but are not in the top 5 leading cancer sites nationally for Whites. Lymphomas also represent a greater burden among AI/AN and AA women in Oregon than they do nationally.

For men, lung cancers were the most common cause of cancer death among all racial and ethnic groups in Oregon (See Figure V-13.) For women, lung cancers were also the leading cause of cancer death except among Asian/ Pacific Islanders (A/PI) and hispanics, where breast cancers were the leading cause of cancer death. Oregon A/PI have a higher percentage of liver cancer deaths compared to other racial groups. This may be because hepatitis B is more prevalent among this group. Deaths from stomach cancers are also more common in this group as well as in AA men. Generally considered rare cancers, multiple myeloma and brain/central nervous system cancers are among the top 5 cancer causes of death among AA women and AI/AN men, respectively.

Race and Ethnicity—Top 5 Most Common Cancer Incidence Sites

Figure V-12

Top 5 Most Common Cancers
Percentage of Incidence by Sex and by Race and Ethnicity

Oregon (1996 - 2002) vs US (SEER 1996 - 2001)

MEN				WOMEN			
US			**OREGON**	**US**			**OREGON**
African American				***African American***			
Prostate	38%	30%	Prostate	Breast	31%	32%	Breast
Lung and Bronchus	17%	20%	Lung and Bronchus	Colon and Rectum	13%	13%	Colon and Rectum
Colon and Rectum	10%	10%	Colon and Rectum	Lung and Bronchus	13%	11%	Lung and Bronchus
Lymphomas	4%	5%	Lymphomas	Uterus	4%	5%	Lymphomas
Bladder	3%	4%	Kidney Renal	Pancreas	3%	4%	Uterus
American Indian or Alaska Native				***American Indian or Alaska Native***			
Prostate	18%	19%	Prostate	Breast	28%	23%	Breast
Lung and Bronchus	16%	19%	Lung and Bronchus	Colon and Rectum	13%	20%	Lung and Bronchus
Colon and Rectum	14%	13%	Colon and Rectum	Lung and Bronchus	9%	11%	Colon and Rectum
Kidney Renal	6%	6%	Lymphomas	Uterus	5%	5%	Lymphomas
Stomach	5%	4%	Bladder	Ovary	4%	3%	Pancreas
Asian or Pacific Islander				***Asian or Pacific Islander***			
Prostate	25%	19%	Prostate	Breast	33%	32%	Breast
Lung and Bronchus	15%	14%	Lung and Bronchus	Colon and Rectum	12%	12%	Colon and Rectum
Colon and Rectum	14%	14%	Colon and Rectum	Lung and Bronchus	9%	9%	Lung and Bronchus
Stomach	5%	8%	Liver	Uterus	6%	5%	Uterus
Liver	6%	6%	Stomach	Thyroid	4%	5%	Stomach
White				***White***			
Prostate	30%	29%	Prostate	Breast	32%	32%	Breast
Lung and Bronchus	14%	16%	Lung and Bronchus	Lung and Bronchus	12%	14%	Lung and Bronchus
Colon and Rectum	11%	8%	Colon and Rectum	Colon and Rectum	11%	10%	Colon and Rectum
Bladder	7%	8%	Bladder	Uterus	6%	6%	Uterus
Lymphomas	5%	5%	Melanomas of Skin	Lymphomas	4%	4%	Melanomas of Skin
Hispanic				***Hispanic***			
Prostate	29%	21%	Prostate	Breast	30%	29%	Breast
Colon and Rectum	11%	13%	Lung and Bronchus	Colon and Rectum	9%	9%	Lung and Bronchus
Lung and Bronchus	9%	8%	Colon and Rectum	Cervix Uteri	7%	8%	Cervix Uteri
Lymphomas	7%	8%	Lymphomas	Lung and Bronchus	7%	7%	Colon and Rectum
Stomach	4%	4%	Bladder	Uterus	5%	5%	Uterus
Non Hispanic				***Non Hispanic***			
Prostate	30%	29%	Prostate	Breast	32%	32%	Breast
Lung and Bronchus	15%	16%	Lung and Bronchus	Lung and Bronchus	12%	14%	Lung and Bronchus
Colon and Rectum	11%	10%	Colon and Rectum	Colon and Rectum	12%	10%	Colon and Rectum
Bladder	6%	7%	Bladder	Uterus	6%	5%	Uterus
Lymphomas	5%	5%	Melanomas of Skin	Lymphomas	4%	4%	Melanomas of Skin

National race data calculated from 11 SEER Registries for Expanded Race (1996-2001)
National Ethnic Origin data calculated from 11 SEER Registries for Hispanics (1996-2001)
Oregon Data 1996-2002

Race and Ethnicity—Top 5 Most Common Cancer Mortality Sites

Figure V-13

Top 5 Most Common Cancer Deaths
Percentage of Mortality, by Race and Ethnicity
Oregon 1996 - 2002

MEN			WOMEN
African American (AA)			
Lung	32%	18%	Lung
Prostate	17%	17%	Breast
Colon and Rectum	8%	12%	Colon and Rectum
Pancreas	6%	10%	Pancreas
Stomach	3%	4%	Myeloma; Uterus (tied)
American Indian or Alaska Native (AI/AN)			
Lung	36%	31%	Lung
Colon and Rectum	13%	11%	Breast
Prostate	5%	9%	Colon and Rectum
Esophagus	5%	5%	Lymphomas; Leukemias (tied)
Brain and CNS	5%	5%	Pancreas
Asian or Pacific Islander (A/PI)			
Lung	25%	19%	Breast
Liver and Bile Duct	16%	15%	Lung
Colon and Rectum	11%	10%	Colon and Rectum
Stomach	8%	8%	Stomach
Prostate	5%	7%	Liver and Bile Duct
White			
Lung	31%	27%	Lung
Prostate	13%	15%	Breast
Colon and Rectum	9%	10%	Colon and Rectum
Pancreas	5%	6%	Ovary
Lymphomas	5%	6%	Pancreas
Hispanic			
Lung	23%	14%	Breast
Prostate	11%	14%	Lung
Pancreas	8%	9%	Colon and Rectum
Leukemias	8%	5%	Pancreas; Lymphomas (tied)
Lymphomas	7%	5%	Stomach
Non Hispanic			
Lung	29%	27%	Lung
Colon and Rectum	10%	15%	Breast
Prostate	7%	10%	Colon and Rectum
Pancreas	5%	6%	Pancreas
Lymphomas	5%	6%	Ovary

Oregon data 1996-2002
Due to incompatibility of race/ethnicity coding, national mortality data are not presented for comparison

There is also variation in the M/I ratios, or prognosis for cancers, by race and ethnicity. (See Figure V-14.) Although Whites have the second highest incidence and mortality rates, they have the lowest M/I ratio among Oregonians, which indicates better survival. Nationally, A/PI have the lowest M/I ratio followed by Whites.

Some of the disparity may be driven by differences in stage at diagnosis. (See Figure V-15.) Whites have the highest percentage of cancers diagnosed at an early stage and AI/AN have the lowest. Although Hispanics have a lower M/I ratio, they also have a lower percentage of cases diagnosed at an early stage than Non-Hispanics. This discrepancy could result from differences in how the Cancer Registry and the Oregon Center for Health Statistics record ethnicity. This divergence could also be seen if Hispanics were more likely to leave Oregon after a diagnosis of cancer than are other groups.

Figure V-14

All Cancers Mortality/Incidence (M/I) Ratios By Sex, Race and Ethnicity

	Male		Female	
Race and Ethnicity	**Oregon**	**US**	**Oregon**	**US**
White	0.45	0.44	0.40	0.39
African American	0.51	0.51	0.45	0.50
American Indian/ Alaska Native	0.52	0.59	0.41	0.50
Asian or Pacific Islander	0.47	0.40	0.42	0.34
Non-Hispanics	0.46	n/a	0.41	n/a
Hispanics	0.41	0.42	0.32	0.37

Oregon Data 1996-2002—National Data 1992-2001

Figure V-15

Percentage of Early Stage Diagnoses By Sex, Race and Ethnicity

	Male		Female	
Race and Ethnicity	**Oregon**	**US**	**Oregon**	**US**
White	56%	58%	57%	58%
African American	43%	52%	49%	49%
American Indian/ Alaska Native	41%	44%	46%	50%
Asian or Pacific Islander	44%	48%	50%	54%
Non-Hispanics	56%	57%	57%	57%
Hispanics	45%	51%	50%	54%

Oregon Data 1996-2002—National Data 1992-2001

Age-Specific Cancer Rates

The greatest risk factor for developing and dying from cancer is age. Figure V-16 shows age-specific cancer incidence and mortality rates for Oregon men and women. For diagnosis year 2002, cancer occurred at a rate of less than 100 per 100,000 Oregonians before age 35. Between the ages of 40 and 54, the rate of increase is nearly 2-fold for each 5-year incremental increase in age. After age 50, incidence rates continue to rise, but the rate of the rise slowly declines. After age 60, cancer incidence was greater than 1,000 per 100,000.

Cancer mortality generally increased with age for both men and women. The *All Cancers* mortality was greater for men than women for most age-groups.

Figure V-17 shows the same data on a log-scale to demonstrate the variation in rates among Oregon's younger populations. Between the ages of 15 and 24, the rate increases nearly 2-fold with each 5-year increment in age. Between the ages of 25 and 39, the rate increases about 1.5-fold with each 5-year increment in age.

Males under 5 and ages 10-14 had a higher incidence of cancer. Then from age 15 to age 54, women had a higher incidence of cancer. The situation reversed again in those aged 55 and older when men had a higher rate of cancer. This is most likely due to female-specific cancers (i.e., breast, cervix, and uterine cancers), which begin to affect women after puberty. National data follow similar patterns.

In Oregon, age-specific mortality rates were higher for men compared to women except for children under 10 and the 40-59 age group. This mortality pattern was similar to the national data with female mortality rising at an earlier age. The higher mortality from women age 40-59 is predominately due to the rate of female breast cancer.

Figure V-16

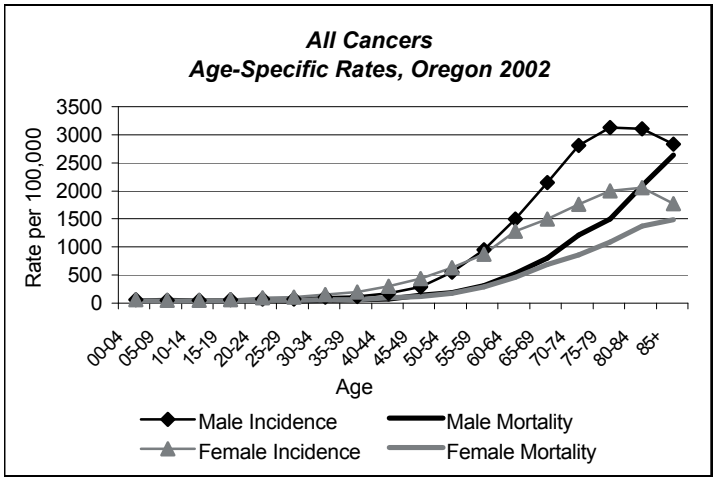
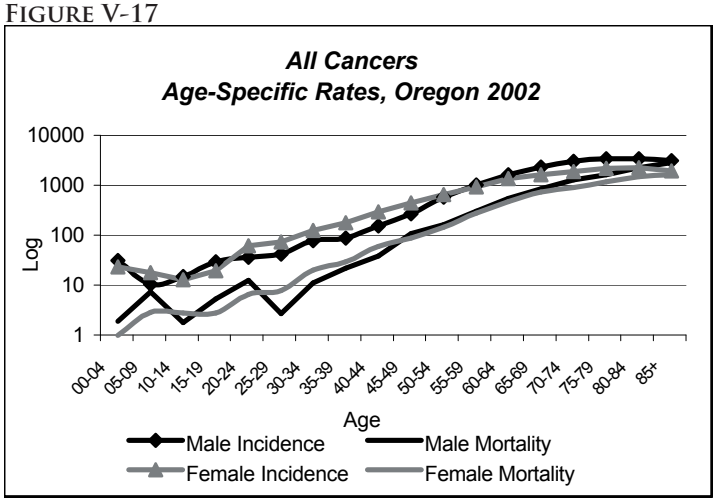


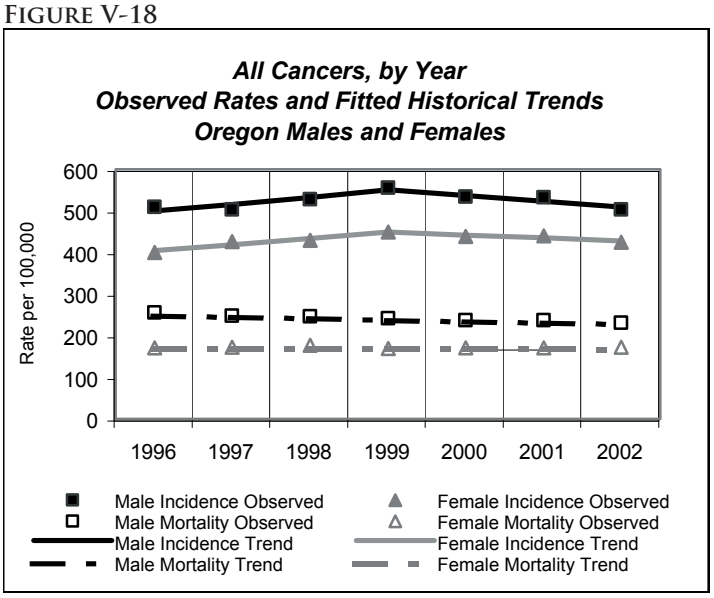
Figure V-17



Historical Trends (1996 - 2002)

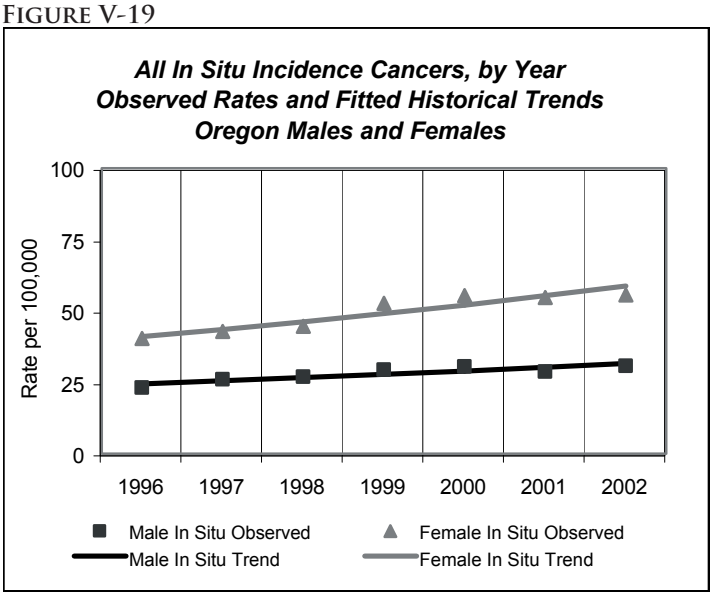
Total invasive cancer incidence for both men and women has been variable since 1996. (See Figure V-18.) Originally, all-sites cancer incidence increased 4% annually for men and women from 1996-1999. This trend was followed by an annual decrease from 1999-2002—3% for men and 2% for women. This variation is likely due to improvements in reporting from the early years of the Cancer Registry. Cancer mortality has been more constant since 1996 with a steady 1% annual decrease among men. Mortality among women, however, has been increasing slightly (<½% a year) since 1996.

Figure V-18



Incidence for *in situ* cancers has been steadily increasing. (See Figure V-19.) The rate of *in situ* cancers has increased 4% annually for men and 6% for women. This increase in *in situ* diagnoses likely reflects a combination of improved reporting for these cases, which are often diagnosed and treated outside of the rigorous hospital cancer reporting system, as well as improvements in cancer screening across the state.

Figure V-19



Regional Variation (Combined Five-Year Rates: 1998-2002)

Cancer rates vary across the state of Oregon. Differences in screening and reporting rates, access to medical services, and underlying risk factors, such as regional smoking rates, affect these patterns.

All-Sites Cancer Incidence has a clear regional pattern. In general, the I-5 corridor and surrounding counties have higher incidence rates than are seen nationally, and most of the coastal region and Eastern Oregon have lower incidence rates than are seen nationally. The Northeast region along the Columbia Gorge has rates similar to those seen nationally.

All-Sites Cancer Mortality does not follow the same patterns as incidence. The northern portion of the state and the Southwest have cancer mortality rates higher than rates seen nationally. Central Oregon and parts of Southern Oregon have mortality rates lower than are seen nationally. The remainder of the state reflects similar rates to those seen nationally.

Figure V-20

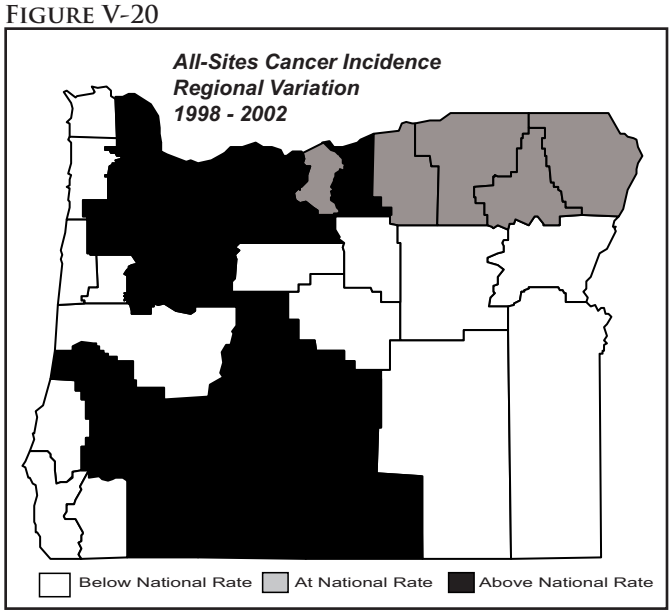
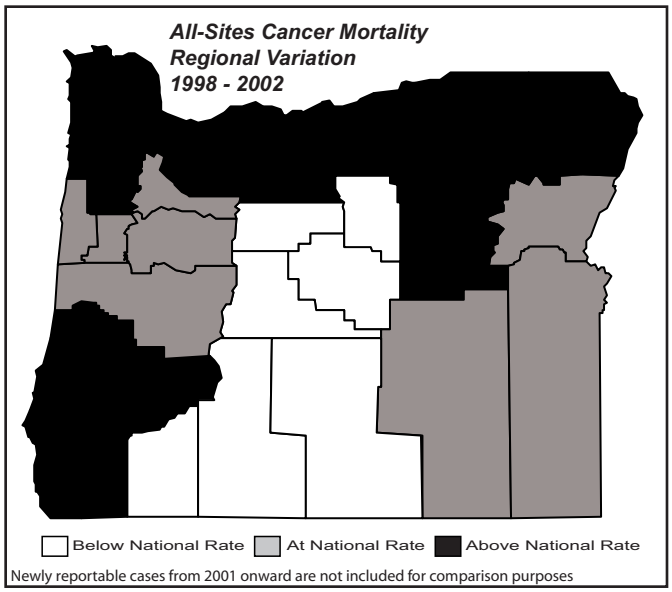
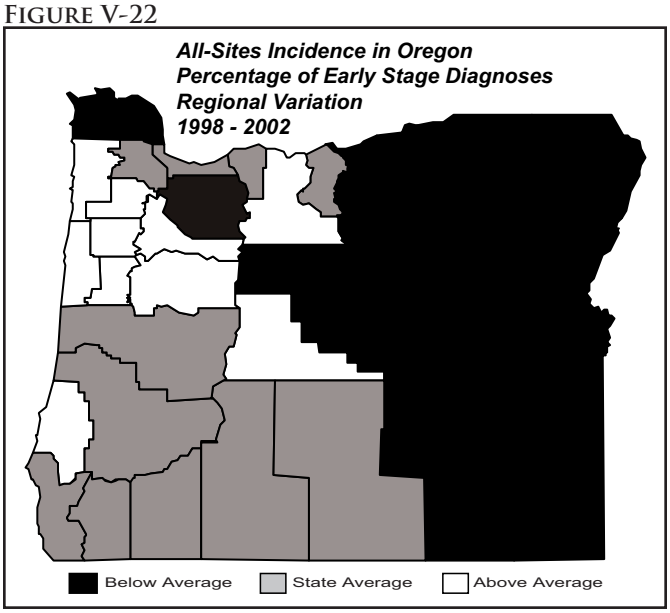


Figure V-21



These patterns in incidence and mortality are not entirely explained by differences in effective screening. The percentage of cancers diagnosed at an early stage is generally lower in Eastern Oregon and higher in Western Oregon. (See Figure V-22.) Although Washington and Multnomah Counties have average percentages of cases diagnosed at an early stage, some of the surrounding region has higher percentages. These variations are likely a combination of regional reporting differences, regional screening practices, and differences in health behaviors of the underlying county populations.

Figure V-22



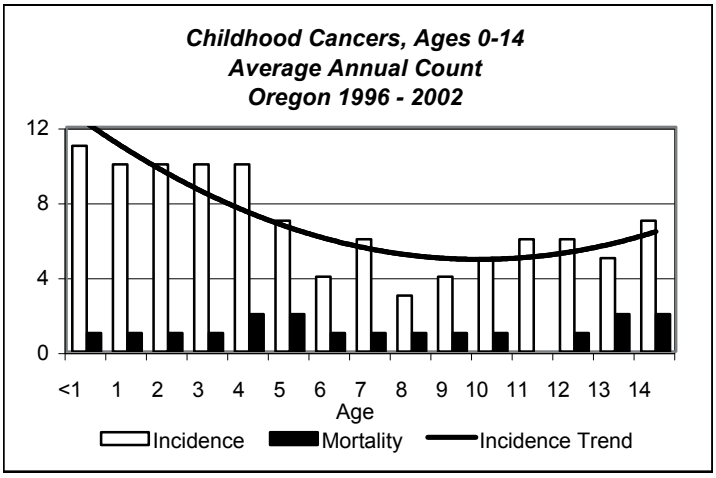
VI. Childhood Cancers

The incidence of cancers among children in Oregon (0-14 years of age) is low compared to adults. In 2002, there were 115 invasive cancers diagnosed in Oregon children, and 19 children died from cancer. The 1998-2002 incidence rate for cancers in Oregon children was 14.9 per 100,000; similar to the national five-year 1997-2001 aggregate rate of 14.8. This represents a 1% annual increase for the period 1996 through 2002 for Oregon. Oregon's 2002 childhood cancer mortality rate of 2.7 was also similar to the 2002 national rate of 2.6.

During 1996-2002, about half of all childhood cancers in children under 14 years of age occurred in children less than 5 years of age. (See Figure VI-1.) Incidence counts were higher at very young ages (<6). Incidence then increases again during the teenage years. These patterns were similar to national data. Mortality among children due to cancer is low. Half of the deaths occurred in children less than 7 years of age.

Nationally, childhood cancer survival rates have shown a dramatic increase over the past few decades. Since the 1960's, the five-year relative survival rate has increased from 30% to approximately 70%. Currently, the Registry does not collect follow-up data, so Oregon-specific survival data are not available.

Figure VI-1



Childhood Cancers

Figure VI-2

Childhood Cancers in Oregon, (0-14 Years of Age)
Incidence, Average Number of Cases per Year

Invasive Cancers (Primary Site)	*Total**	*Male*	*Female*	*Synopsis*
Leukemia *Acute Lymphocytic Leukemia (ALL)*	34 *28*	18 *15*	16 *13*	Nationally, acute leukemias are the most frequent childhood cancers with a higher incidence among boys than girls. Children with certain genetic disorders, particularly Down Syndrome, are at a higher risk for ALL.
Brain and Central Nervous System (CNS)	22	12	10	Nationally, brain and CNS cancers are the 2nd most common cancers among children and are more common among boys than girls. Nationally, nearly 17% of these malignancies develop in children under 20 years of age.
Lymphoma *Hodgkin Lymphoma (HL)* *Non-Hodgkin (NHL)*	10 *4* *3*	8 *3* *3*	3 *2* *0*	Nationally, lymphoma is the 3rd most common cancer among children. NHL rates are generally higher among males than females. HL is fairly rare in early childhood with a peak frequency at age 25-29 and again late in life.
Sympathetic Nervous System	7	4	3	Nationally, neuroblastomas account for approximately 8% of all childhood cancers and normally arise during fetal life.
Soft Tissue Sarcomas	6	3	3	Nationally, 7% of childhood cancers are soft tissue sarcomas with rhabdomyosarcomas being the most common.
Renal Tumors (Wilms Tumor)	6	2	3	Nationally, kidney/renal tumors account for 6% of childhood cancers. Wilms tumors are the most common form of renal cancer in children with a peak incidence occurring under 5 years of age.
Carcinomas/Other Malignant Epithelial Neoplasms	4	2	2	Nationally, thyroid cancer and malignant melanomas are the most common carcinomas of children. Generally, carcinomas are more common among girls than boys.
Germ Cell, Trophoblastic/ Other Gonadal Neoplasms (GCTOG)	4	2	1	Nationally, 4% of childhood cancers are GCTOG tumors. GCTOG tumors are more common in the adolescent years (15-19 year age group) and constitute about 16% of cancer cases in that age group.
Malignant Bone Cancers *Ewing sarcomas* *Osteosarcoma*	5 *3* *2*	3 *2* *1*	2 *1* *1*	Nationally, bone tumors constitute about 6% of all childhood cancers with osteosarcoma and Ewing sarcoma predominating.
Retinoblastomas	2	1	1	Nationally, 11% of retinoblastoma cancers occur in the first year of life.
Hepatic Tumors	2	1	1	Liver tumors are rare in children. Nationally, only 1% of childhood cancers are liver tumors; hepatoblastoma is the most common in children younger than 4 years of age.

*Due to rounding, counts for total may not equal male and female combined; calculations are rounded to the nearest whole case.

VII. Selected Sites

The following section contains detailed information on seven selected sites: breast, cervix uteri, colon and rectum, lung and bronchus, melanomas of the skin, oral, and prostate cancers. These sites are of public health importance because there are existing opportunities for public health intervention to reduce morbidity and/or mortality, such as reducing lung cancers through smoking cessation, or because the specific cancer impacts large numbers of Oregonians, such as prostate cancers. Each selected site section includes a general data overview, early detection data, age-specific rates, historical trends, and regional maps of incidence and mortality. When possible, data on race, ethnicity, and screening are also included for each site.

A. Breast Cancers

Although the cause of breast cancer is unknown, the major risk factors for breast cancer are one's sex (female) and age (older). These risk factors, like heredity, cannot be controlled. Having a first-degree relative (i.e., mother or sister) with breast cancer increases an individual's risk, yet over 80% of breast cancer patients have no family history of the disease. Early detection through routine mammograms and breast exams can decrease severity of illness and mortality rates.

Oregon consistently ranks among the top five states for breast cancer incidence.

As seen nationally, breast cancer is the most common invasive cancer among women and the 2nd leading cause of cancer death among women in Oregon. In Oregon, however, breast cancer is the most common invasive cancer in the state—even among men and women combined. Oregon consistently ranks among the top five states for breast cancer incidence.

The Oregon female breast cancer mortality rate of 24.7 for 2002 was 11% above the Healthy People 2010 target of 22.3 deaths per 100,000 women. Reducing breast cancer incidence and mortality has been identified as a priority by the Oregon Partnership for Cancer Control.

Female Breast Cancers Fast Facts Overview

A brief overview of breast cancer in Oregon shows the following: (See Figure VII-A-1.)

1. In 2002, 3,293 new cases of breast cancer were diagnosed among Oregon women. Of these, 2,730 were invasive cases. In all, 501 women died of breast cancer. (19 men were diagnosed with breast cancer, all invasive, and 2 men died of breast cancer.)

2. Current five-year trends show age-adjusted, invasive female breast cancer incidence rates have been decreasing about 1% annually in Oregon and nationally. Oregon's mortality rate also mirrors the national mortality trend with a 2% decline.

3. Oregon's age-adjusted 2002 incidence rate for female breast cancer was 4% higher than the national rate for 1997-2001, while Oregon's 2002 mortality rate was similar to the 2002 national mortality rate.

4. Of the 43 states with central registries meeting national data quality standards in 2001, Oregon was 3rd highest in breast cancer incidence. Among all 50 states, Oregon ranked in the lower half, tied for 28th, for breast cancer mortality in 2002.

5. Breast cancer is the leading cancer incidence site for all Oregon women regardless of race or ethnicity. It is the 2nd leading cause of cancer mortality for most Oregon women, but it is the leading cause of cancer mortality for Asian/Pacific Islander and Hispanic women.

6. In Oregon in 2002, 17% of breast cancers were diagnosed at the *in situ* stage, 56% were diagnosed at the localized stage, and 27% were diagnosed at later stages. (See Figure VII-A-2)

7. Current five-year trends show incidence of *in situ* breast cancers has been increasing in Oregon about 3% annually while the nation has shown a nearly 3% decline in *in situ* breast cancers. However, the age-adjusted 2002 rate of *in situ* breast cancers in Oregon was 11% lower than the national rate for 1997-2001.

8. During 1998-2002, Oregon's M/I ratio for female breast cancer was 0.18, suggesting a relatively good prognosis for this disease. However, breast cancer is the 2nd leading cancer site for YPLL with an average of 2,662 years lost annually.

Female Breast Cancers Fast Facts

Figure VII-A-1

Female Breast Cancers Fast Facts ***Oregon 2002***	***Female***
Cancer Incidence	
All Cases Total	***3,293***
In situ	563
Localized	1,800
Regional	770
Distant	105
Unstaged	55
In situ Rates	
Oregon Crude	31.8
Oregon Age-adjusted	29.2
Oregon Current Annual Trend (5-Year)	+3.1
US SEER Age-adjusted[1]	32.8
US SEER Annual Trend(5-Year)[1a]	-2.7
Invasive Rates	
Oregon Crude	154.0
Oregon Age-adjusted	139.8
Oregon Current Annual Trend (5-Year)	-1.3
US SEER Age-adjusted[1]	134.8
US SEER Annual Trend (5-Year)[1a]	-0.8
Cancer Mortality	
Total Deaths	***501***
Mortality Rates	
Oregon Crude	28.3
Oregon Age-adjusted	24.7
Oregon Current Annual Trend (5-Year)	-2.4
US Age-adjusted[2]	25.6
US Annual Trend[3]	*-2.3
Prognosis and Burden [4]	
Prognosis: M/I Ratio	0.18
Burden: YPLL before age 65	2,662

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

[1] Year 2001, SEER 9 Registry data, SEERSTAT 5.2.2

[1a] Years 1997-2001, SEER 9 Registry data, SEERSTAT 5.2.2

[2] 2002 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[3] *Annual Report to the Nation on the Status of Cancer,* most current trend of 3 years or more

[4] Calculations based on combined years 1998-2002

Stage at Diagnosis

At present, breast cancer cannot be prevented. However, mortality can be reduced by early detection through mammography and breast examinations. Breast cancers detected at early stages are the most easily treated. Although there is some controversy over the benefits of mammography screening for women 40-49 years of age, there is agreement on the benefits for women ages 50 and older. Routine screening is now recommended for women starting at age 40. (See Section IV-C of *Cancer Overview* for mammography recommendations.)

In 2002, 73% of females were diagnosed at an early stage. (See Figure VII-A-2.) Although the percentage of cases diagnosed *in situ* has been increasing since 1996, the percentage of cases diagnosed at a localized stage has been declining at a similar rate. Therefore, the overall percentage of cases diagnosed at an early stage has remained about the same. (See Figure VII-A-3.) Targeted screening efforts that increase the percentage of cases diagnosed at *in situ* and localized stages could further decrease the burden of female breast cancer in Oregon.

Up to age 80, as age increases, the percentage of early stage diagnoses also increases. (See Figure VII-A-4.) This pattern may be due to increased awareness of risk among older women, screening recommendations and programs targeting older women, the greater effectiveness of mammography for older women, or increased severity and quicker progression of the cancer when diagnosed in younger women. It is likely a combination of all of these factors.

Figure VII-A-2

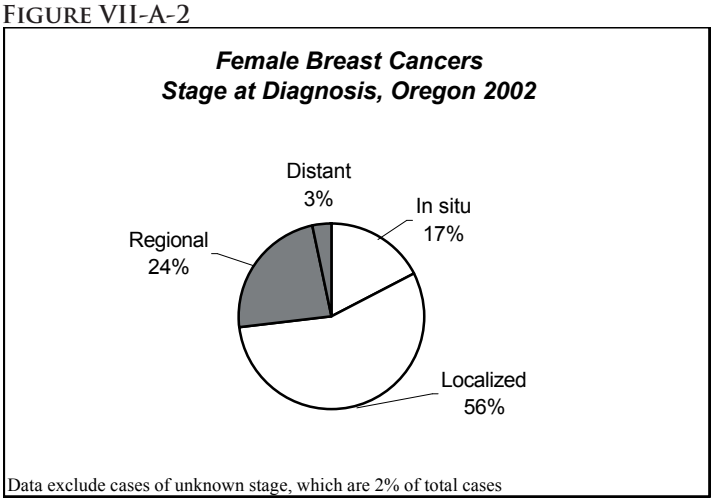


Figure VII-A-3

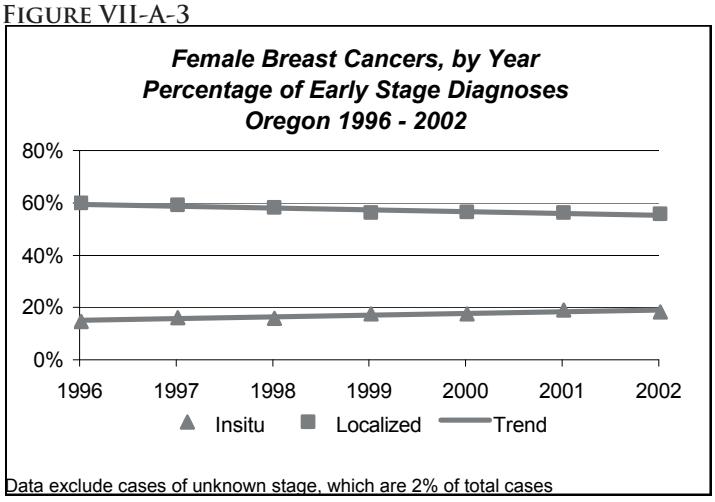
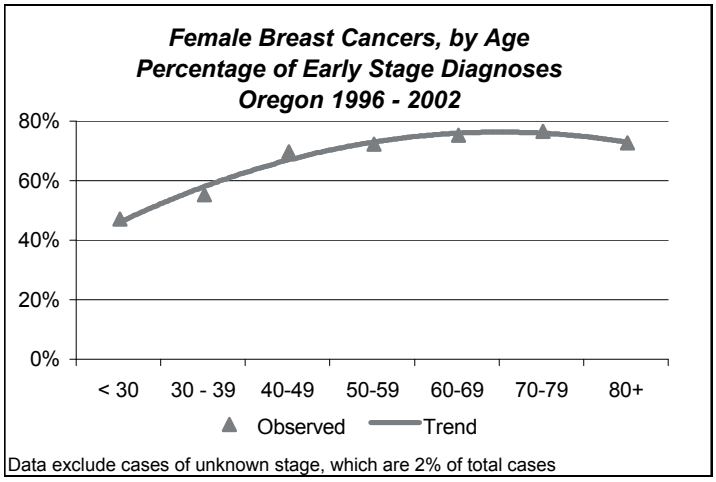


Figure VII-A-4

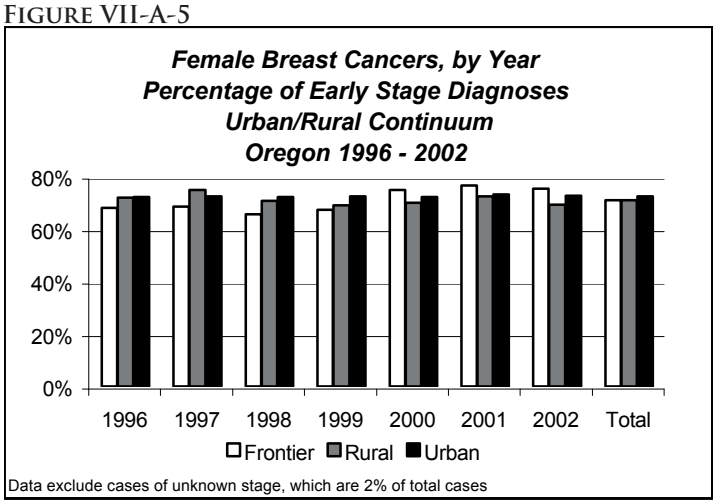


Where a woman resides could influence whether or not her breast cancer is diagnosed at an early, more treatable stage. Historically, there had been a higher percentage of *in situ* diagnoses in the Portland metropolitan area compared to the rest of the state. Differences in access to screening facilities and differences with transportation distance and infrastructure across the state are plausible explanations. Using census categories, which divide counties into Frontier (extremely rural [<6 persons per square mile]), Rural, and Urban, we can evaluate the percentage of early stage diagnoses by population density.

Although there is variation from year to year, in general, increasing population density correlates with the increasing percentage of early stage diagnoses. (See Figure VII-A-5.) Please review *Appendix C* for a list of counties and Urban/Rural codes.

While there has been little improvement in the percentage of early stage breast cancer among women living in Rural and Urban counties, there has been a 7% increase for women living in Frontier counties since 1996.

Figure VII-A-5



Routine Screening

During the past decade, rates of routine mammography screening (women aged 52 or older receiving a mammogram within the last two years) have been steadily increasing in Oregon. (See Figure VII-A-6.) According to the 2004 National Healthcare Quality Report, Oregon ranked "Average" for routine mammography screening for both 2000 and 2002.

The trend for mammography by age initially mirrors the early stage by age trend. However, mammography rates increase up to age 70, and then decline slightly for the 70 - 79 age groups. The 80+ group has lower mammography rates similar to the 40 - 49 group. (See Figure VII-A-7.)

The percentage of women reporting routine mammography also increased by population density. (See Figure VII-A-8.)

Figure VII-A-6

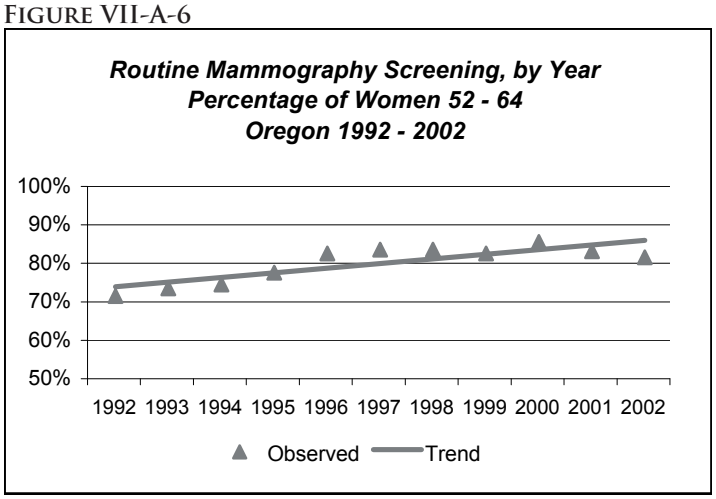


Figure VII-A-7

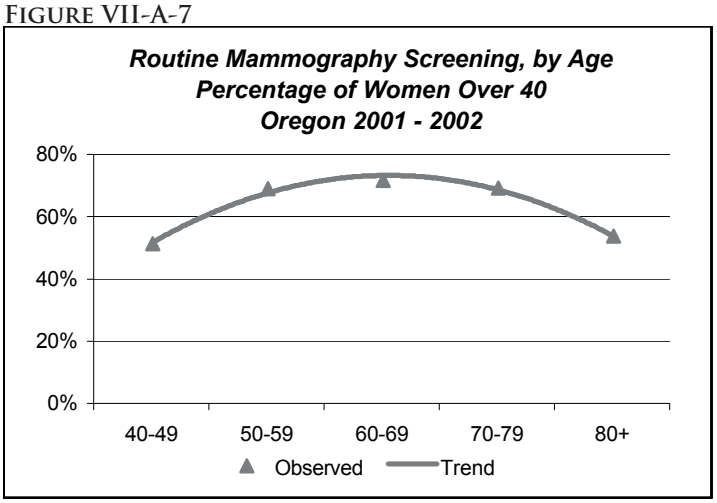
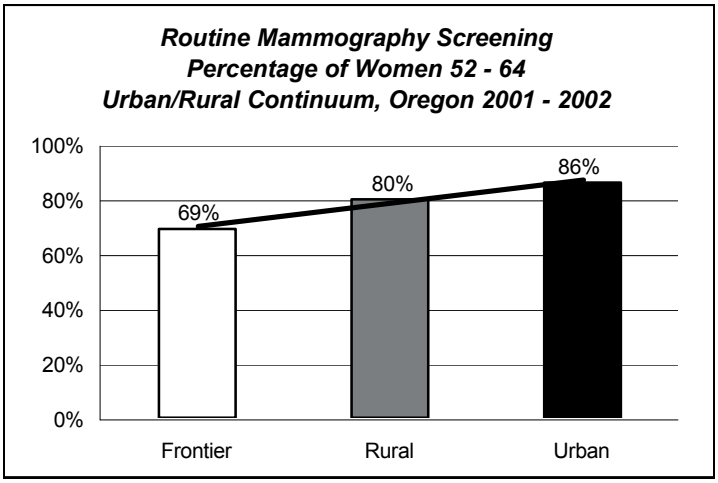


Figure VII-A-8



Race and Ethnicity

Although race and ethnicity data need to be interpreted cautiously due to reporting issues (please see the *What's New in 2002?* and the *Technical Section* for additional details), breast cancer is the leading cancer site among all women regardless of race or ethnicity. Breast cancer is the 2nd leading cause of cancer mortality for most Oregon women except for Asian/Pacific Islanders (A/PI) and Hispanics, for whom it is the leading cause of cancer mortality.

As is seen nationally, although Whites have the highest incidence rate, African American (AA) women have the highest mortality rates. (See Figure VII-A-9.) Non-Hispanics have higher incidence and mortality rates than Hispanics. (See Figure VII-A-9.)

Both AA and A/PI have higher Mortality to Incidence (M/I) ratios than either Whites or American Indians/Alaska Natives (AI/AN). Non-Hispanics have a higher M/I ratio than Hispanics. Higher M/I ratios mean poorer prognosis. (See Figure VII-A-10.)

Some of the difference in prognosis may be explained by differences in stage at diagnosis by race and ethnicity. Among the four race categories, AA have the lowest percentage of breast cancers diagnosed at an early stage and White women have the highest. (See Figure VII-A-11.)

The M/I ratio for Hispanic women is lower than for non-Hispanics, as is overall mortality. Yet, Hispanic women have a low percentage of breast cancers diagnosed at an early stage. (See Figure VII-A-10.) This incongruence between prognosis and stage at diagnosis may reflect differences in how the Registry and Center for Health

Figure VII-A-9

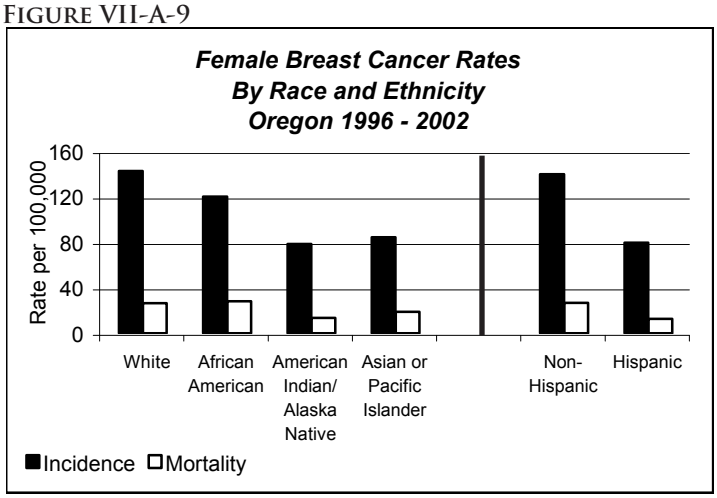
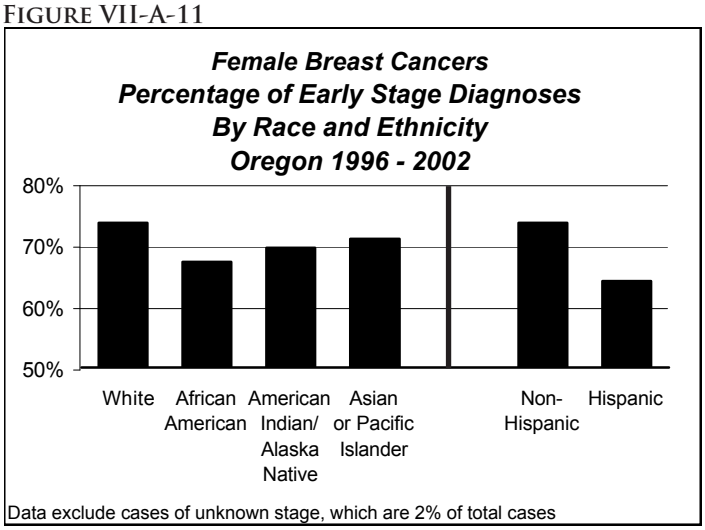


Figure VII-A-10

Female Breast Cancers
Mortality to Incidence Ratios (M/I)
By Race and Ethnicity
Oregon 1996 - 2002

Race and Ethnicity	M/I Ratio
African American	0.24
Asian/Pacific Islander	0.22
White	0.19
American Indian/Alaska Native	0.17
Non-Hispanic	0.19
Hispanic	0.16

Figure VII-A-11



Statistics report ethnicity. This divergence could also result if Hispanic women are more likely to leave Oregon after a diagnosis of breast cancer than are other women.

There are also racial differences in the percentage of cases that are unknown stage at diagnosis. Generally, a breast cancer is not staged at diagnosis because of an extremely poor prognosis or because comorbidities, like advanced age, contraindicate surgery and/or treatment. However, some unstaged breast cancer cases may be early stage cases for women that refuse clinical treatment for ideological or other reasons. All cases that are identified by a death certificate are reported as unstaged-at-diagnosis cases. These cases may represent patients that had difficulty getting access to health care or were only using health care services near the end of their life.

AA and AI/AN women have twice the number of unstaged cases as other women (4% versus 2%) and more breast cancers identified by death certificate only. These stage-at-diagnosis differences may indicate differences in treatment options, patient treatment choices, disease severity, or access to health care among racial groups. There was no difference in percentage of unstaged-at-diagnosis breast cancer cases between Hispanics and Non-Hispanics.

Male Breast Cancer

Everyone is at risk of breast cancer. Even though breast cancer is far less common among men, men are less likely to survive the disease. Although breast cancer may be more severe in men, the poorer prognosis may also be due to later stage at diagnosis among men than women. Many men do not know they can get breast cancer, and this lack of awareness may contribute to the low percentage of men diagnosed at an early stage compared with women. (See Figure VII-A-12.) Self-exams, clinical exams, and x-rays or ultrasounds of the chest are tools to aid in early detection of breast cancer among men. However, there are no recommended tests for population-based screening for male breast cancer.

Figure VII-A-12

Breast Cancers, Prognosis Indicators, by Sex Oregon 1998 - 2002

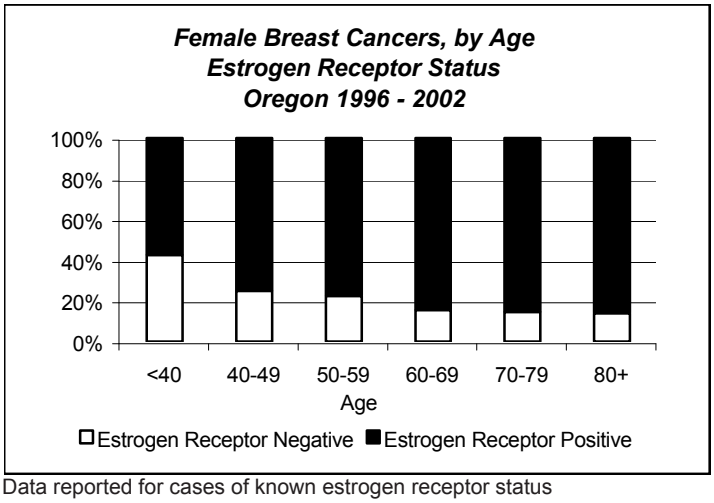
	Male	***Female***
Percentage of Early Stage	51%	72%
M/I Ratio	0.24	0.18

Estrogen Receptor Status

While the cause of breast cancers remains unknown, exposures to hormones, including estrogen and progesterone, are a significant risk factor. This is why certain life choices (not having children, having a first child after age 30, lack of breast-feeding) and individual factors (early menstruation and late menopause) are associated risk factors for breast cancer. It also suggests why modifiable behaviors (alcohol use, lack of physical exercise, and weight gain after menopause) that increase estrogen levels are associated with higher breast cancer risk.

Some breast cancers respond to hormones and some do not. The cancers that do respond have receptors on the cell that are stimulated by hormones. This stimulation causes growth and division of the cancer cells. An estimated 70% of breast cancers are estrogen receptor positive. As you can see in Figure VII-A-13, this percentage is higher in older women and lower in younger women. Hormone receptor status gives us information about how a given cancer will behave (prognostic factor) and how it will respond to treatment (predictive factor).

Figure VII-A-13

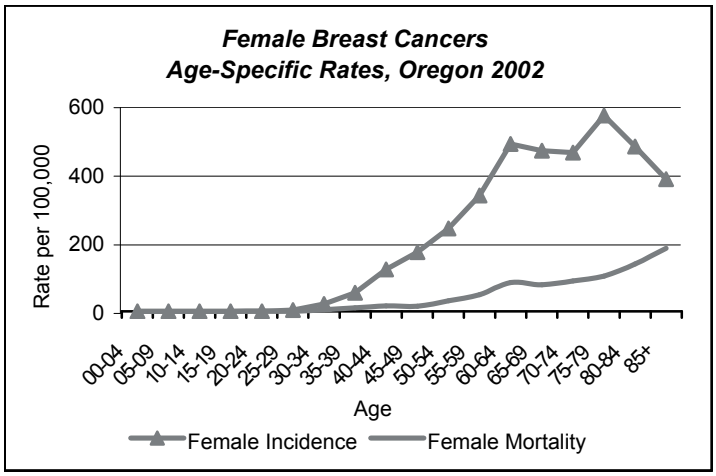


Data reported for cases of known estrogen receptor status

Age-Specific Incidence and Mortality

As with other types of cancer, the risk of developing breast cancer increases with age. Figure VII-A-14 shows the age-specific incidence and mortality rates for breast cancer. About 80% of breast cancers occur in women aged 50 years or older. Age-specific breast cancer incidence rates increase sharply around age 40 and drop after age 80, which is similar to the national trend. Breast cancer mortality increases steadily with age.

Figure VII-A-14

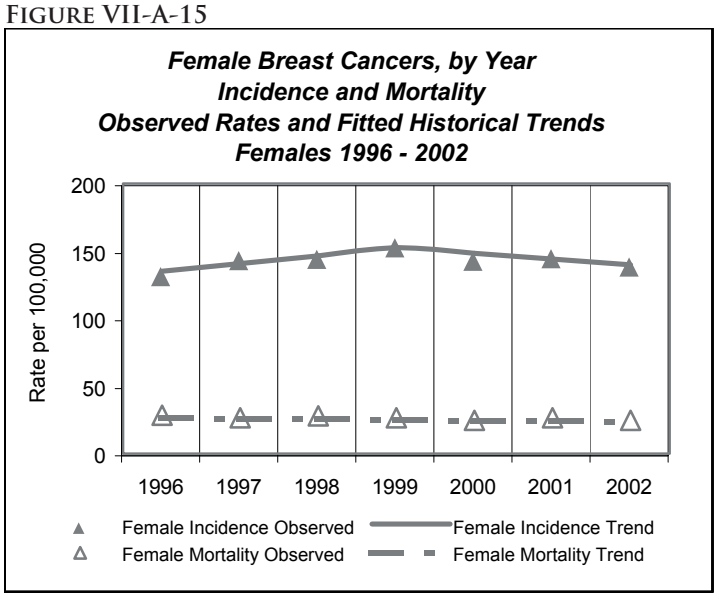


Historical Trends (1996-2002)

Historically, female breast cancer incidence in Oregon increased 4% annually from 1996-1999. From 1999-2002, female breast cancer incidence began to decrease nearly 3% a year. (See Figure VII-A-15.) This is consistent with national patterns of a 2% annual increase from 1995-1998 followed by a decrease of nearly 2% a year from 1998-2001.

While incidence has been variable, female breast cancer mortality has been steadily decreasing about 1% a year since 1996 in Oregon. This also follows national patterns with a steady decrease of about 2% a year since 1990. It is likely that mortality patterns diverge from incidence patterns due to a combination of increased screening as well as improved treatments for breast cancer. With the recent decline in breast cancer incidence, mortality rates will likely decrease more sharply in the next few years.

Figure VII-A-15



Regional Variation (Combined Five-Year Rates: 1998-2002)

Breast cancer incidence shows regional variation that corresponds with the distribution of Oregon's population. (See Figure VII-A-16.) The area along the I-5 corridor has higher female breast cancer incidence rates than those seen nationally for the period 1996-2001. Most counties surrounding the high-risk area have rates similar to the nation. The remainder of the state, most of Eastern Oregon and the northern and southern tips of the coast, has lower female breast cancer rates than the nation.

Contrary to the East/West gradient seen with incidence, female breast cancer mortality shows a North/South pattern. (See Figure VII-A-17.) Female breast cancer mortality is higher than is seen nationally for the years 1999-2002 for most northern counties. The southern half of the state has mortality rates at or below the national rates.

The northern coast region and the southeast portion of Oregon have both low incidence and low mortality, which may be of epidemiologic interest for investigating risk factors for breast cancer. Much of Central Oregon and the northeast region have low breast cancer incidence but high mortality, which may represent areas in need of targeted screening efforts.

Figure VII-A-16

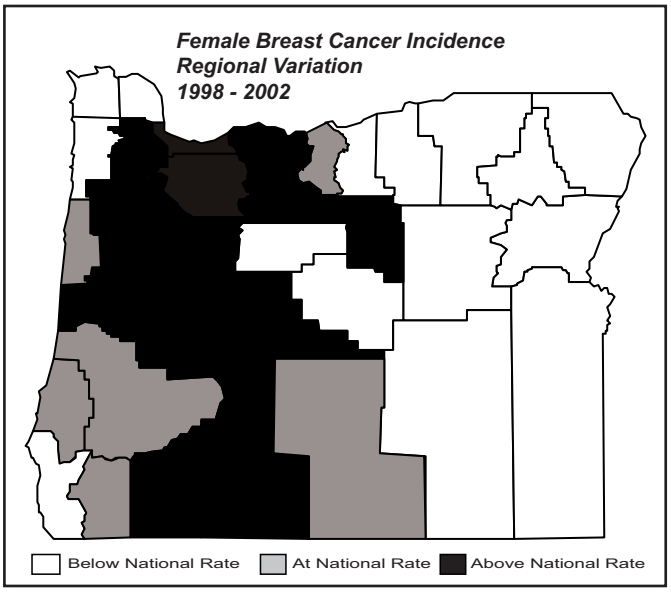
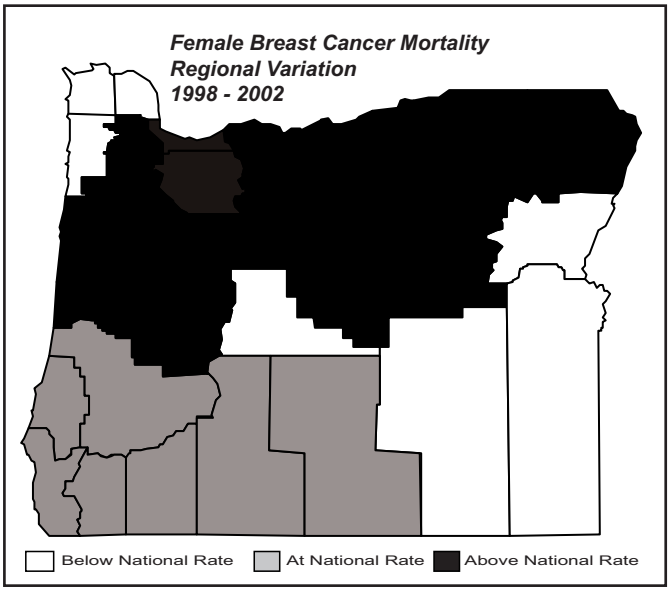


Figure VII-A-17



B. Cervical Cancers

Cancer of the cervix is associated with early onset of sexual activity and multiple sexual partners. The most important risk factor is infection by specific types of human papilloma virus (HPV), a group of communicable viruses that also cause genital warts. Vaccines for HPV are currently being studied in clinical trials for the prevention of cervical cancer. One promising vaccine targets HPV types that cause approximately 70 percent of cervical cancer cases worldwide. Early findings have shown that the vaccine is effective. Additionally, cervical cancer can be prevented. The precancerous growths caused by HPV can be treated before the growths develop into cervical cancer.

Cervical cancer used to be a common cause of cancer death for women and remains a leading cause in some areas of the world. In the United States, the number of deaths due to cervical cancer has declined drastically due to the use of the Papanicolaou (Pap) screening test. Not only can mortality be reduced, but cervical cancer could be largely eradicated with routine cervical cancer screening, which can identify precancerous cell growths.

The Oregon cervical cancer mortality rate of 2.4 in 2002 was 20% above the Healthy People 2010 target of 2.0 per 100,000 women. The Oregon Partnership for Cancer Control has made reducing cervical cancer mortality through screening a priority for Oregon.

Not only can mortality be reduced, but cervical cancer could be largely eradicated with routine cervical cancer screening, which can identify precancerous cell growths.

Cervical Cancers Fast Facts Overview

Because the numbers are low, some data included in the cervical section are calculated using five or more years of aggregated data to ensure stable descriptions. A brief overview of Oregon's cervical cancer rates shows the following: (See Figure VII-B-1.)

1. In 2002,126 new cases of invasive cervical cancer were diagnosed in Oregon, and 45 women died due to cervical cancer. *In situ* stage diagnoses are not reportable to OSCaR because they are often indistinguishable from pre-cancerous disease.

2. Current five-year trends show age-adjusted cervical cancer incidence in Oregon has been decreasing 4% annually from 1998-2002. Nationally, cervical cancer incidence has been decreasing 5% annually for 1997-2001. Mortality rates for cervical cancer in Oregon increased 9% a year while national rates decreased 4% a year. The national decreases for both incidence and mortality cervical cancer rates are statistically significant.

3. Oregon's 2002 incidence rate of 7.0 per 100,000 was 11% below the national rate of 7.9 for 1997-2001. Oregon's 2002 mortality rate of 2.4 was similar to the national rate of 2.5.

4. Although cervical cancer rates are extremely low, this is the 3rd most common cancer site for Hispanic women in Oregon and nationally. This suggests a potential target population for screening programs like Oregon's Breast and Cervical Cancer Program.

5. Among all 50 states, Oregon tied for 32nd nationally for cervical cancer mortality in 1999-2002. While the ranking is low, cervical cancer mortality in Oregon could be virtually eliminated through enhanced early detection.

6. In 2002, 55% of cervical cancer cases were diagnosed at a localized stage, which is similar to the 56% diagnosed in 2001.

7. During 1998-2002, Oregon's M/I ratio for cervical cancer was 0.28, and cervical cancer led to 466 YPLL annually. Since cervical cancer that is detected in a localized stage is essentially 100% curable, this indicates an area for public health intervention.

Cervical Cancers Fast Facts

Figure VII-B-1

Cervical Cancers Fast Facts Oregon 2002	***Female***
Cancer Incidence	
All Cases Total	***126***
In situ	*Not Reportable*
Localized	68
Regional	44
Distant	11
Unstaged	3
Invasive Rates	
Oregon Crude	7.1
Oregon Age-adjusted	7.0
Oregon Current Annual Trend (5-Year)	-4.4
US Age-adjusted[1]	7.9
US Annual Trend[1a]	*-4.8
Cancer Mortality	
Total Deaths	***45***
Mortality Rates	
Oregon Crude	2.5
Oregon Age-adjusted	2.4
Oregon Current Annual Trend (5-Year)	+8.6
US Age-adjusted[2]	2.5
US Annual Trend[3]	*-3.8
Prognosis and Burden [4]	
Prognosis: M/I Ratio	0.28
Burden: YPLL before age 65	466

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

[1] Year 2001, US SEER 9 Registry Data, SEERSTAT 5.2.2

[1a] Years 1997-2001, US SEER 9 Registry Data, SEERSTAT 5.2.2

[2] 2002 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[3] *Annual Report to the Nation on the Status of Cancer*, most current trend of 3 years or more.

[4] Calculations based on combined years 1998-2002

Stage at Diagnosis

Although OSCaR does not collect information on precancerous conditions or carcinoma *in situ* for cervical cancers, it does collect stage at diagnosis for invasive cervical cancer. The percentage of early stage (localized) diagnoses ranges from 51-63% annually with a current five-year average of 59%. (See Figure VII-B-2.)

Although the majority of cervical cancers were diagnosed at an early stage, the percentage of early stage cervical cancers diagnosed decreases with increasing age. (See Figure VII-B-3.)

As with breast cancer, place of residence can influence whether or not a women is diagnosed with cervical cancer at an early stage. In this case, less populated counties historically have had higher percentages of cervical cancers diagnosed at an early stage. (See Figure VII-B-4.)

This disparity has been lessening, and diagnosis year 2001 was the first year to have a greater percentage of early stage diagnoses in urban areas. However, this is not due to an overall improvement in the percentage of early stage diagnoses. While there has been a 2% increase since 1996 in the percentage of early stage cervical cancer diagnoses for women living in urban counties, women in rural areas have had a 10% decrease in the percentage of early stage diagnoses.

Figure VII-B-2

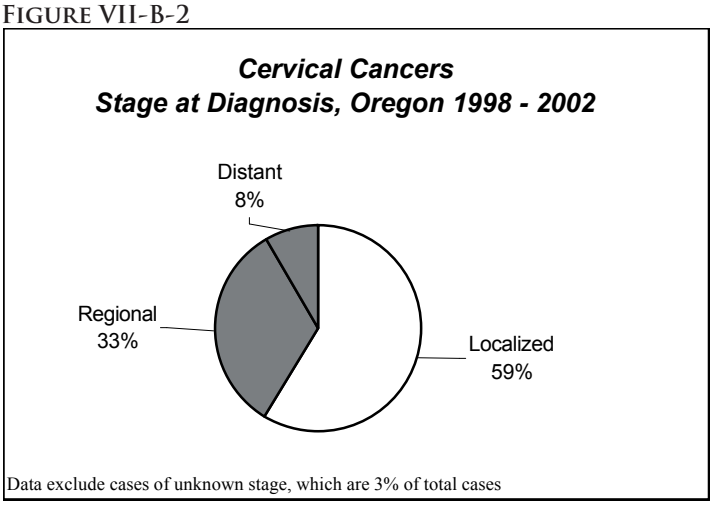


Figure VII-B-3

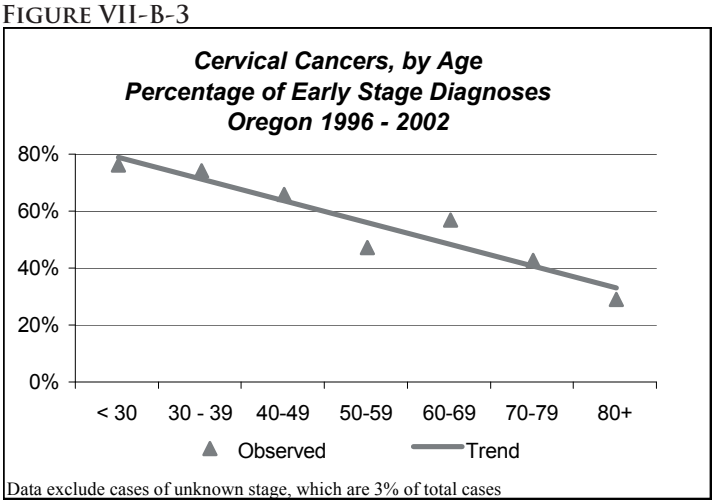
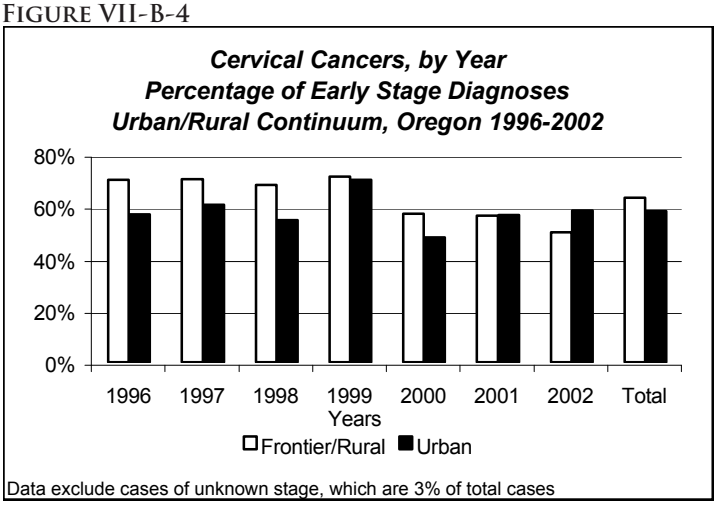


Figure VII-B-4



Routine Screening

Routine Pap screening among Oregon women remained fairly stable in the last decade. (See Figure VII-B-5.) According to the 2004 National Healthcare Quality Report, Oregon ranked "Below Average" for routine Pap screening for both 2000 and 2002.

Screening rates followed the same pattern seen in percentage of early stage diagnoses by age. The percentage of women receiving routine Pap smears declines as age increases. (See Figure VII-B-6.)

For the combined years 2001-2002, an increase in routine Pap screening correlated with increased population density. (See Figure VII-B-7.) Again, please review *Appendix B* for a list of counties and their urban/rural code designations.

Figure VII-B-5

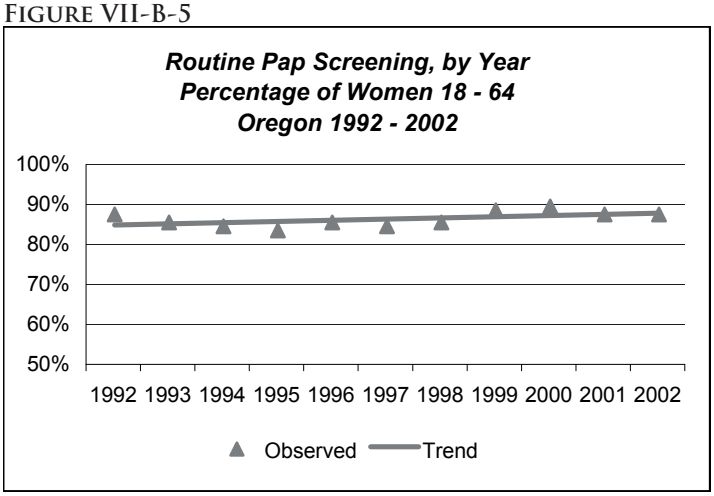


Figure VII-B-6

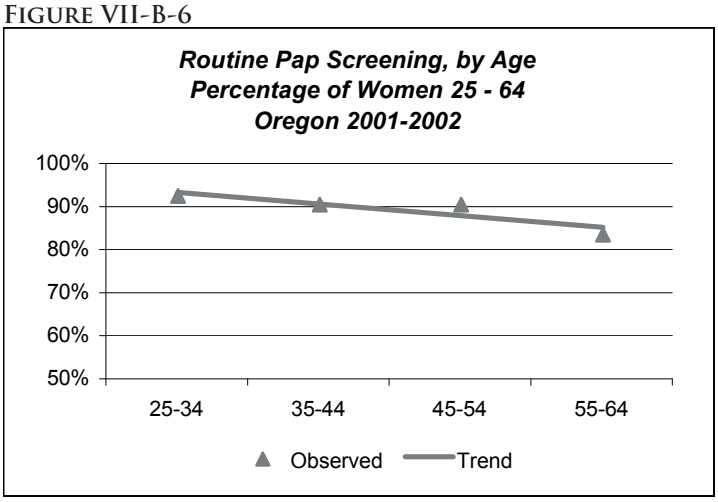
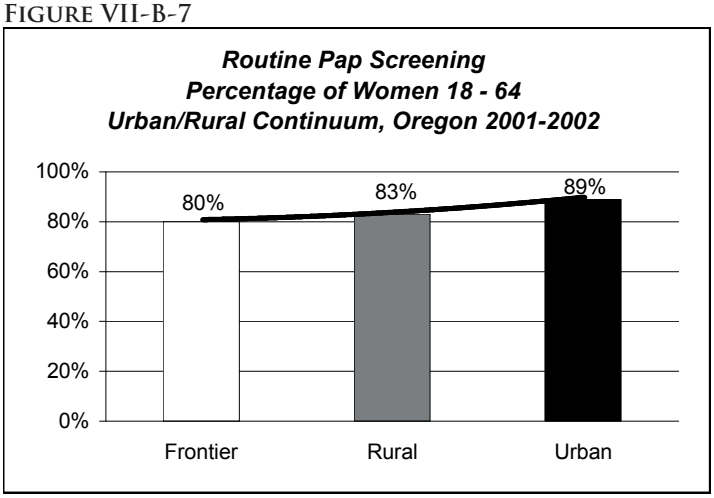


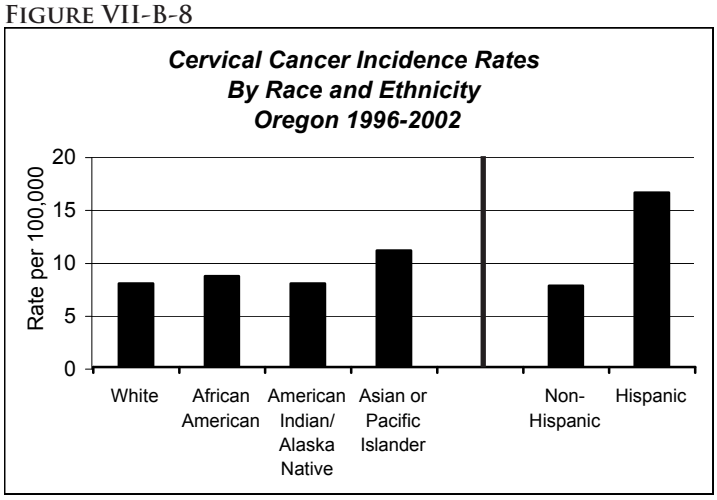
Figure VII-B-7



Race and ethnicity

Although race and ethnicity data need to be interpreted cautiously due to reporting issues (please see the *What's New in 2002?* and the *Technical Section* for additional details), cervical cancer is the 3rd most common cancer among Hispanic women in Oregon and nationwide. Hispanic women have a higher cervical cancer rate than Non-Hispanic women. Among racial groups, Asian/Pacific Islander women have the highest cervical cancer rates followed by African American women. (See Figure VII-B-8.) There are too few cervical cancer deaths in Oregon to calculate stable mortality rates by race or ethnicity.

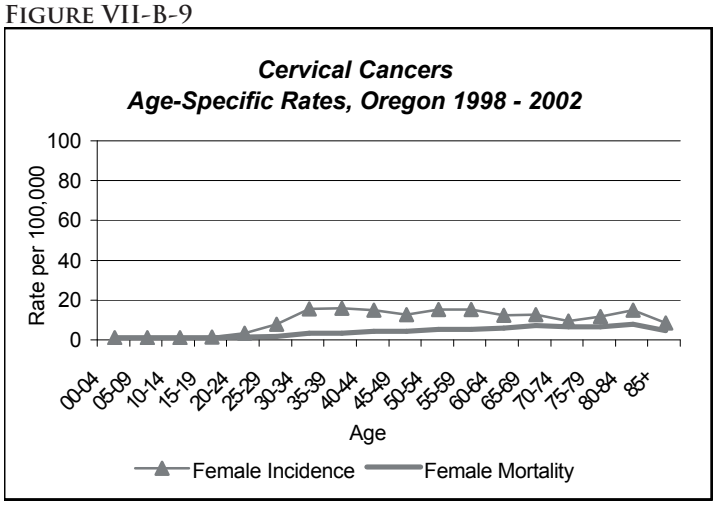
Figure VII-B-8



Age-Specific Incidence and mortality

Once sexual activity has begun, the risk of developing cervical cancer does not vary significantly with age. Figure VII-B-9 shows the age-specific incidence and mortality rates for cervical cancer in Oregon. Mortality rates do increase after age 30, consistent with the decline in the percentage of early stage diagnosis as age increases.

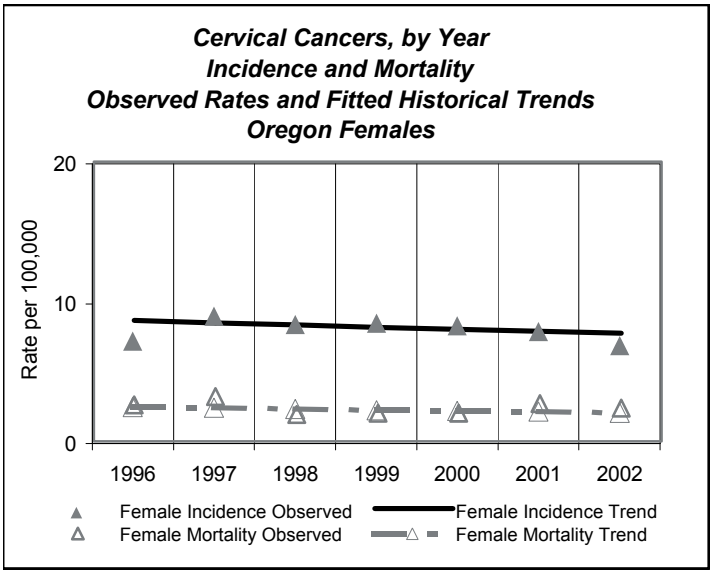
Figure VII-B-9



Historical Trends (1996-2002)

Since 1996, both cervical cancer incidence and mortality rates have steadily declined; mortality has decreased 2% a year while incidence has decreased 1%. (See Figure VII-B-10.)

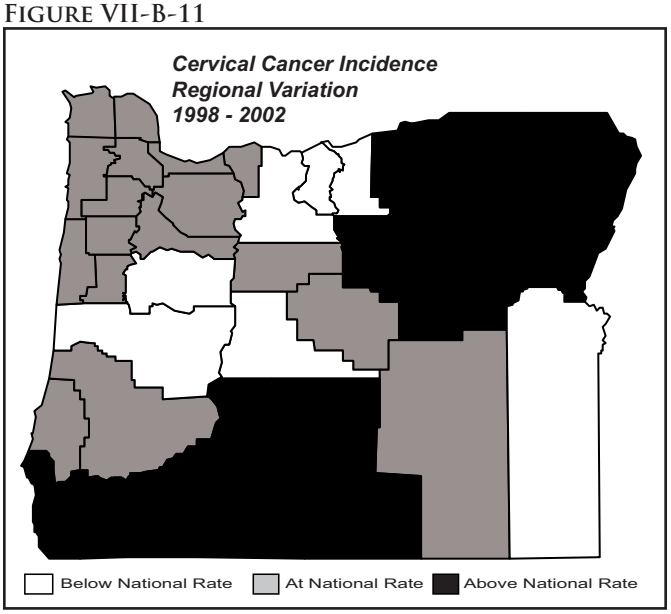
Figure VII-B-10



Regional Variation (Combined seven-year rates: 1996-2002)

Cervical cancer incidence is higher than the national rate in Northeast Oregon and much of Southern Oregon. (See Figure VII-B-11.) The Portland Metropolitan area, along with much of the coast and parts of Central Oregon, are at the national rate for cervical cancer. The central Columbia Gorge, Malheur County, and the Lane/ Linn/Deschutes area have lower cervical cancer rates than the national rate.

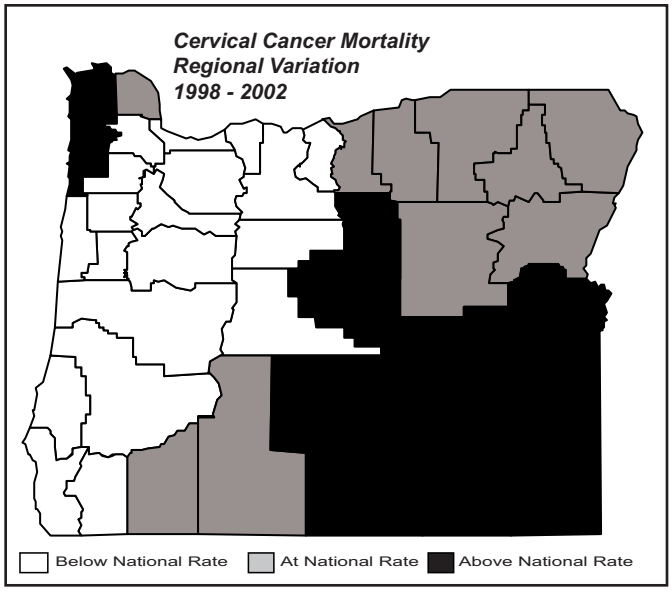
Figure VII-B-11



Mortality does not follow the geographic pattern of cervical cancer incidence, which may indicate regional differences in screening. Mortality is higher than the national rate in the northern tip of the Oregon coast and Southeast Oregon. (See Figure VII-B-12.)

Since cervical cancer is curable in the early stages, the areas of high mortality should be targeted for screening efforts.

Figure VII-B-12



C. Colorectal Cancers

Although a family history of colorectal cancer is a risk factor, three-quarters of colorectal cancers occur in individuals with no known risk factors other than age. Eating a low-fat/high-fiber diet and not smoking may help prevent colorectal cancer. Routine screening can also reduce both morbidity and mortality of colorectal cancer through early diagnosis and removal of precancerous polyps.

Colorectal cancer is the 3rd most common cancer among all Oregonians combined and the 2nd most common cause of cancer-related death. The 2002 Oregon colorectal cancer mortality rate of 17.8 was 28% above the Healthy People 2010 target of 13.9 per 100,000 persons. Reducing colorectal cancer incidence and mortality through screening has been identified as a priority by the Oregon Partnership for Cancer Control.

Routine screening can reduce both morbidity and mortality of colorectal cancer through early diagnosis and removal of precancerous polyps.

Colorectal Cancers Fast Facts Overview

A brief overview of Oregon's colorectal cancer data shows the following: (See Figure VII-C-1.)

1. In 2002, 1,799 new cases of colorectal cancer were diagnosed in Oregon, of which 1,720 were invasive. There were 665 Oregonians who died of colorectal cancer.

2. Current five-year trends show that age-adjusted colorectal cancer incidence rates have decreased 2% a year for women and 3% a year for men, similar to the decline seen nationally. Age-adjusted colorectal cancer mortality rates among Oregon men have remained fairly flat while the colorectal cancer mortality rate for men has been increasing by 2% a year nationally. Oregon women have a higher rate of decline for colorectal cancer mortality than the national average, 4% a year for Oregon women and 2% for women nationally.

3. Oregon's 2002 colorectal cancer incidence rate was 10% lower than the 1997-2001 national aggregate rate. Oregon's 2002 mortality rate was 9% lower than the 2002 national mortality rate.

4. Of the 43 states with central registries meeting national data quality standards in 2001, Oregon ranked low in colorectal cancer incidence; 32nd for men and 36th for women. Among all 50 states, Oregon also ranked low in colorectal cancer mortality; 35th for men and 45th for women in 2002.

5. Colorectal cancer is the 3rd most common cancer among Oregon men regardless of race or ethnicity. Colorectal cancer is also the 3rd most common cancer for American Indian/Alaska Native women and White women in Oregon. It is the 2nd most common cancer for African American Women and Asian/Pacific Islander women, and the 4th most common cancer site among Hispanic women. Colorectal cancer is the 3rd leading cause of cancer mortality among women regardless of race or ethnicity. However, it is the 2nd leading cause of cancer mortality among American Indian/Alaskan Native men. Colorectal cancer is not in the top five mortality sites for Hispanic men.

6. In 2002, 42% of colorectal cancer cases were diagnosed in the early, more treatable stages (*in situ* or localized). Early stage diagnoses have increased 20% since 1996, when 35% were diagnosed in the early stages.

7. During 1998-2002, Oregon's M/I ratio for colorectal cancer was 0.38, suggesting a fair prognosis for this disease. Colorectal cancer was responsible for 1,684 YPLL each year.

Colorectal Cancers Fast Facts

Figure VII-C-1

Colorectal Cancers Fast Facts Oregon 2002	All Sexes [1]	Male	Female
Cancer Incidence			
All Cases Total	**1,799**	**890**	**909**
In situ	79	48	31
Localized	641	314	327
Regional	686	323	363
Distant	307	166	141
Unstaged	86	39	47
Invasive Rates			
Oregon Crude	48.9	48.2	49.5
Oregon Age-adjusted	46.5	51.8	42.6
Oregon Current Annual Trend (5-Year)	-2.6	-2.8	-2.1
US SEER Age-adjusted[2]	51.8	60.5	44.8
US SEER Annual Trend[2a]	*-2.2	*-2.9	-1.9
Cancer Mortality			
Total Deaths	**665**	**354**	**311**
Mortality Rates			
Oregon Crude	18.9	20.3	17.5
Oregon Age-adjusted	17.8	22.4	14.4
Oregon Current Annual Trend (5-Year)	-1.9	-0.1	*-3.6
US Age-adjusted[3]	19.6	23.7	16.6
US Annual Trend[4]	n/a	*2.0	*-1.8
Prognosis and Burden [5]			
Prognosis: M/I Ratio	0.38	0.39	0.37
Burden: YPLL before age 65	1,684	996	688

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

[1] *All Sexes* counts may exceed male/female combined due to additional sex coding

[2] Year 2001, SEER 9 Registry data, SEERSTAT 5.2.2

[2a] Years 1997-2001, SEER 9 Registry data, SEERSTAT 5.2.2

[3] 2002 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[4] *Annual Report to the Nation on the Status of Cancer*, most current trend of 3 years or more.

[5] Calculations based on combined years 1998-2002

Stage at Diagnosis

Because prognosis is strongly influenced by stage at diagnosis, detecting colorectal cancer early can decrease mortality. Early detection can also reduce incidence by identifying precancerous polyps, which could then be removed before developing into cancerous tumors. In 2002, nearly 42% of cancers were detected in the early stages (*in situ* or localized). (See Figure VII-C-2.)

Men generally have a higher percentage of colorectal cancers diagnosed at an early stage than women. (See Figure VII-C-3.)

As seen with other cancers, where an individual resides can influence the stage at diagnosis of colorectal cancer. There is a modest correlation between the percentage of colorectal cancers diagnosed at an early stage (*in situ* or localized) and population density. (See Figure VII-C-4.) Frontier counties generally have a lower percentage of colorectal cancers diagnosed at an early stage, while Urban and Rural counties have a similar, slightly higher percentage.

Figure VII-C-2

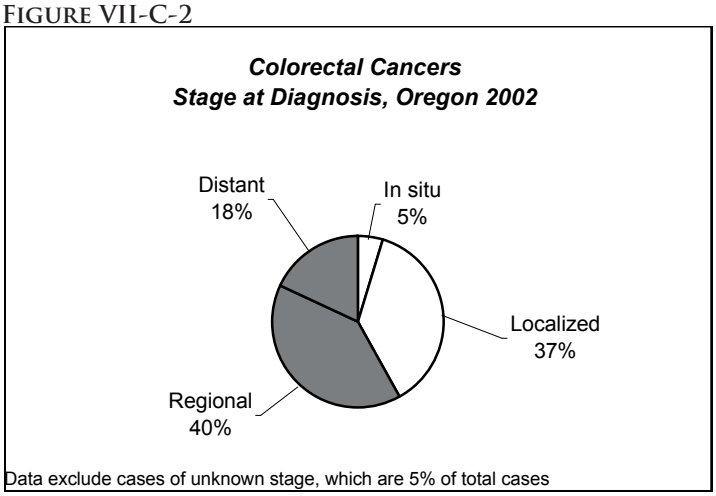


Figure VII-C-3

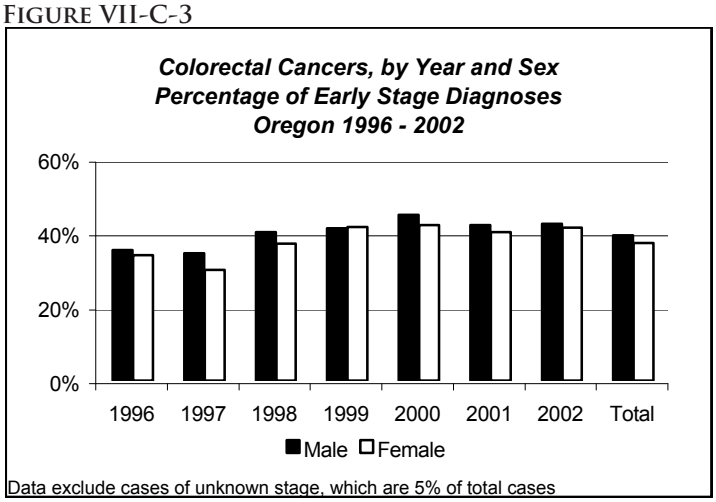
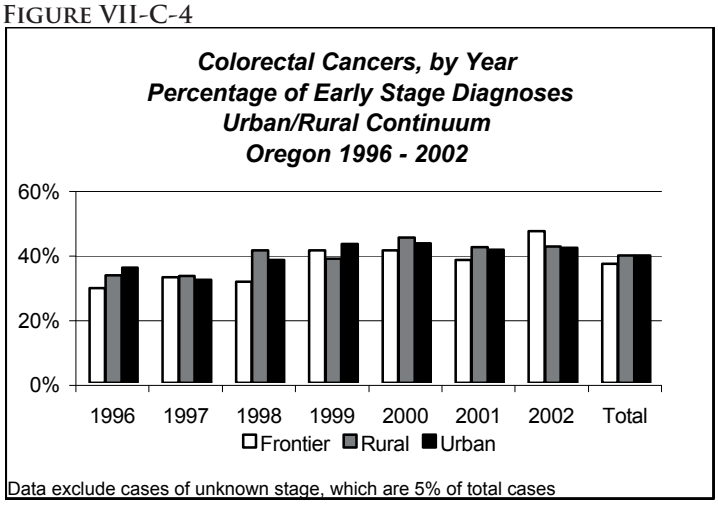


Figure VII-C-4



Routine Screening

The US Preventive Services Task Force (USPSTF) recommends colorectal cancer screening, for persons age 50 and over, by one of four methods: fecal occult blood test (FOBT), sigmoidoscopy, colonoscopy, or double-contrast barium enema. Although the USPSTF does not recommend a particular screening frequency, many organizations recommend annual FOBT, sigmoidoscopy or barium enema every five years, or colonoscopy every ten years. The American Cancer Society (ACS) preferred method is an annual FOBT and a sigmoidoscopy every five years. In 2002, however, only 48% of Oregonians aged 50 or older reported receiving either FOBT or endoscopy (sigmoidoscopy or colonoscopy) within the recommended time periods and only 11% reported receiving the ACS preferred method.

The percentage of Oregonians who report having ever received FOBT has been consistently higher for women than men since 1997. (See Figure VII-C-5.) Historically, men reported higher rates of ever receiving endoscopy, but, since 2001, women have reported higher endoscopy screening. According to the 2004 National Healthcare Quality Report, Oregon was considered "Above Average" for endoscopy and FOBT screening in 2000, but the rating fell to "Average" in 2001.

While the percentage of Oregonians ever receiving endoscopy has been increasing for both men and women, the greatest increase has been reported by women (8% increase among men and 23% increase among women). Reported screening rates were higher among women in 2002 than men (13% of women and 10% of men received ACS preferred screening; 49% of women and 47% of men received either test within the recommended time periods).

Although county-level data for colorectal cancer screening should be interpreted cautiously due to sampling issues, data consistently suggest that screening rates are lower in Frontier (extremely rural with less than 6 persons per square mile) counties and similar in Urban and Rural counties. (See Figure VII-C-6.)

Figure VII-C-5

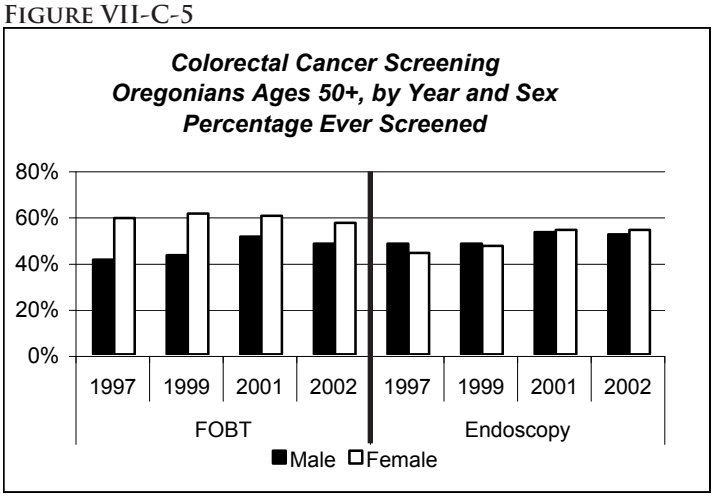
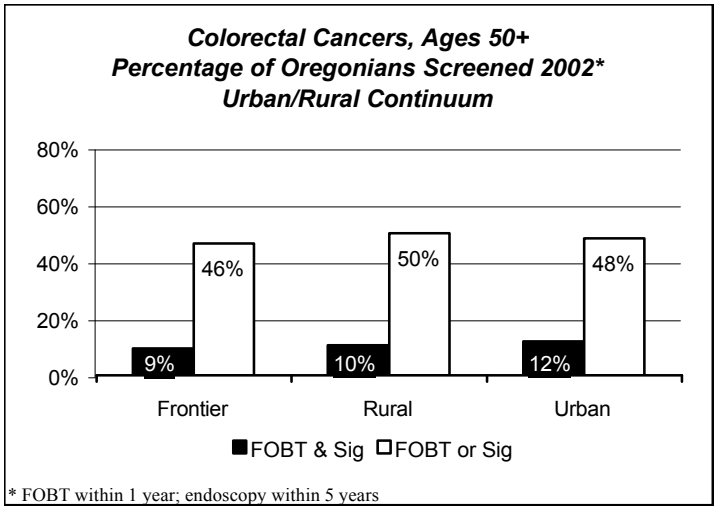


Figure VII-C-6



Race and ethnicity

Although race and ethnicity data need to be interpreted cautiously due to reporting issues (please see the *What's New in 2002?* and the *Technical Section* for additional details), colorectal cancer is among the top 5 cancers for all Oregonians regardless of race or ethnicity. African Americans (AA) have the highest colorectal cancer incidence followed by American Indians/Alaskan Natives (AI/AN). (See Figure VII-C-7.) AI/AN rank higher for colorectal cancer incidence in Oregon than nationally. This may be partially explained by the efforts of the Oregon Registry to improve reporting for this group. Asian/Pacific Islanders (A/PI) have the lowest colorectal cancer incidence and Hispanics have lower colorectal cancer incidence than Non-Hispanics. Mortality due to colorectal cancer follows the incidence patterns by race and ethnicity. As with incidence, AI/AN rank higher for colorectal cancer mortality in Oregon than nationally.

Although AA have the highest colorectal cancer incidence, the mortality to incidence (M/I) ratios for AI/AN and Whites are higher. Non-Hispanics have a higher M/I ratio than Hispanics. Higher M/I ratios mean poorer prognosis. (See Figure VII-C-8.)

Some of the differences in prognosis may be explained by differences in stage at diagnosis by race and ethnicity. Among the four race categories, A/PI have the lowest percentage of colorectal cancer diagnosed at an early stage and Whites have the highest percentage. (See Figure VII-C-9.)

Figure VII-C-7

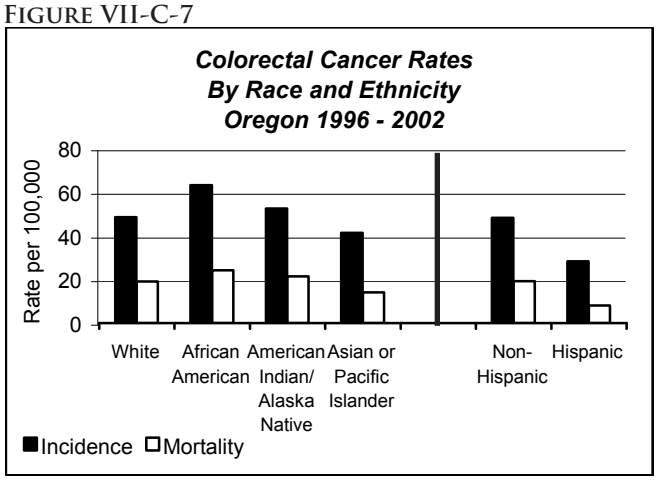
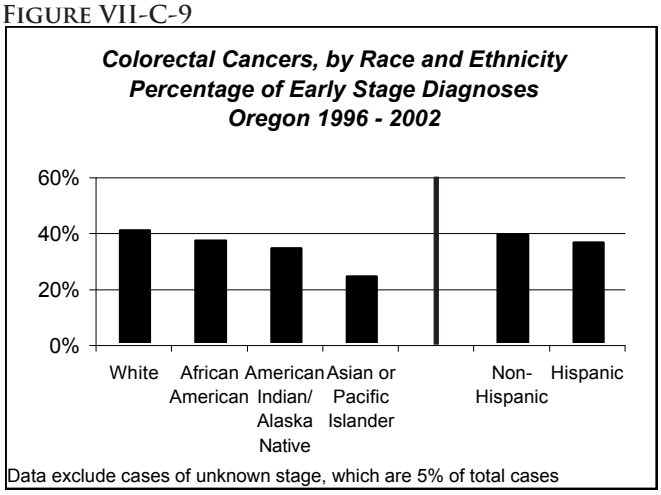


Figure VII-C-8

Colorectal Cancers
M/I Ratios, by Race and Ethnicity
Oregon 1996 - 2002

Race and Ethnicity	M/I Ratio
American Indian/Alaskan Native	0.41
White	0.39
African American	0.38
Non-Hispanic	0.40
Hispanic	0.29

Figure VII-C-9



Surprisingly, the M/I ratio for Hispanics is lower than for Non-Hispanics, yet Hispanics have a lower percentage of colorectal cancers diagnosed at an early stage. This pattern is also seen with A/PI who have a good prognosis but a low percentage of colorectal cancers diagnosed at an early stage. These differences may represent incompatibility between how the cancer Registry system and Center for Health Statistics system report race and ethnicity. This divergence could also result if these groups are more likely to leave Oregon after a diagnosis of lung cancer than are other race or ethnic populations.

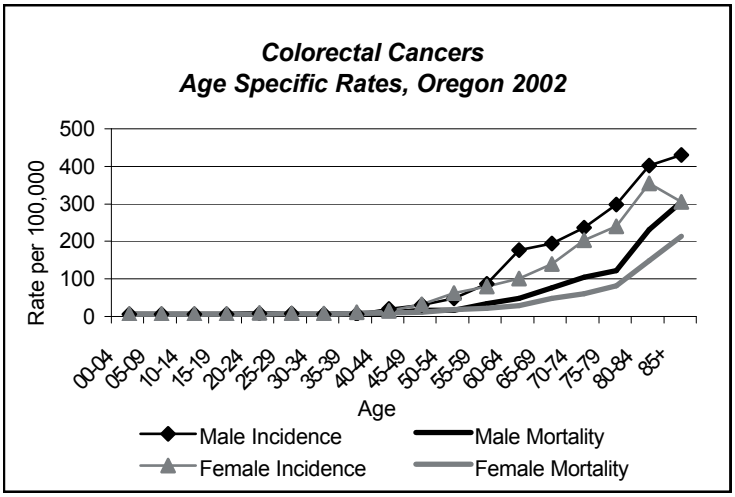
There are also differences by race in the percentage of cases that were unstaged at diagnosis. Generally, a colorectal cancer is not staged at diagnosis because of an extremely poor prognosis, or because comorbidities (or advanced age) contraindicate surgery and/or treatment. However, some unstaged colorectal cancer cases may be early stage cases among patients that refuse clinical treatment for ideological or other reasons. All cases that are identified by a death certificate only are reported as unstaged at diagnosis cases. These cases may represent patients who had difficulty gaining access to health care or were only in the health care system near the end of their life.

A/PI have the lowest percentage of unstaged cases (3%) and AA (9%) and AI/AN have the highest percentage (7%). These stage-at-diagnosis differences may reflect differences in treatment options, patient treatment choices, disease severity, or may indicate unequal access to health care among these groups.

Age-Specific Incidence and Mortality

As with other types of cancer, the risk of developing colorectal cancer increases with age. Figure VII-C-10 shows the age-specific incidence and mortality rates. Colorectal cancer incidence rates begin to increase sharply after age 50 for both men and women. Oregon's age-specific incidence and mortality rates are greater among males than females at nearly every age.

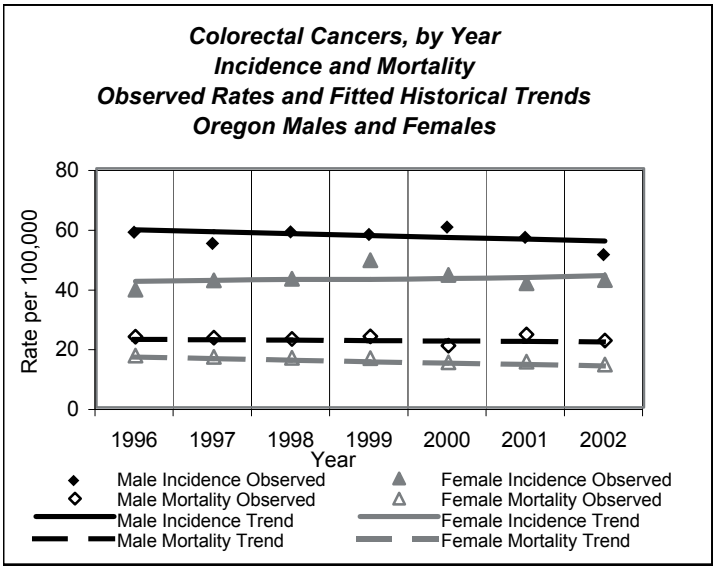
Figure VII-C-10



Historical Trends (1996-2002)

Colorectal cancer incidence in Oregon has been fairly flat for men with a slight decrease of 1% a year over the past seven years. In contrast, incidence for women has increased about 1% annually. Colorectal cancer mortality has been decreasing for both men and women since 1996. Mortality trends for men mirror incidence with a nominal decrease of 1% a year. Mortality for women, however, is decreasing over 3% annually. This divergence between incidence and mortality among women may be the result of increased screening among Oregon women in recent years. (See Figure VII-C-11.)

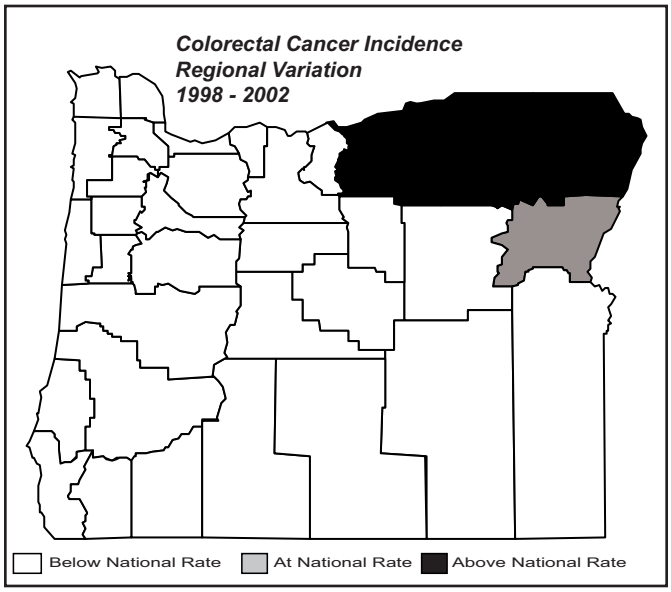
Figure VII-C-11



Regional Variation (Combined Five-Year Rates: 1996-2002)

With the exception of the Northeast portion of the state, the majority of Oregon has lower colorectal cancer incidence rates than the nation. (See Figure VII-C-12.)

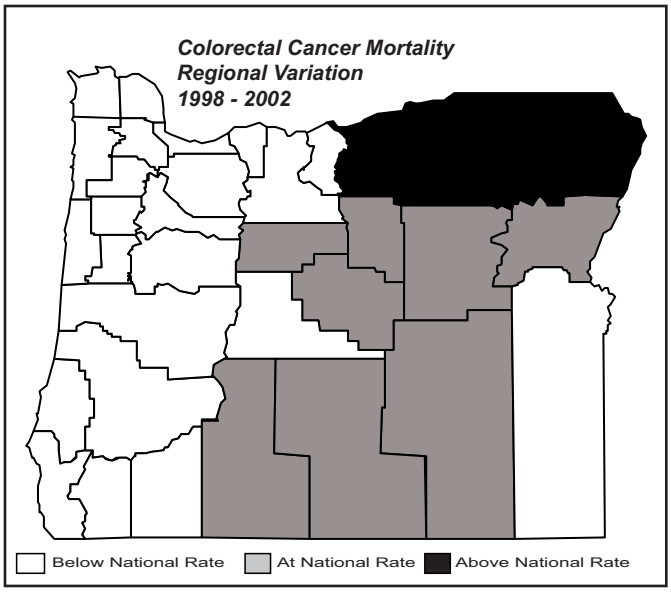
Figure VII-C-12



Mortality rates for colorectal cancer are also higher than the nation in Northeast Oregon. The western portion of the state has lower colorectal cancer mortality rates and the majority of the eastern part of the state has colorectal cancer mortality rates similar to those seen nationally. (See Figure VII-C-13.)

The high incidence and high mortality seen in Northeast Oregon may be of epidemiologic importance in determining the risk factors for colorectal cancer. This area may also benefit from additional colorectal cancer screening.

Figure VII-C-13



D. Lung Cancers

Lung cancer is Oregon's leading cause of cancer-related death and is the state's 3rd most frequently reported cancer. Tobacco use is the primary cause of lung cancer. In 2002, 80% of lung cancer deaths in Oregon were linked to tobacco use. In 2002, an estimated 20% of Oregon adults smoked cigarettes. Among Oregon youth, an estimated 12% of 8th Graders and 21% of 11th Graders smoked in 2002.

The 2002 Oregon lung cancer mortality rate of 56.7 was 26% above the Healthy People 2010 target of 44.9 deaths per 100,000 persons. Due to the potential for primary prevention through tobacco control efforts, the reduction of lung cancer incidence and mortality has been identified as a priority for the Oregon Partnership for Cancer Control.

In 2002, 80% of lung cancer deaths in Oregon were linked to tobacco use.

Lung Cancers Fast Facts Overview

A brief overview of Oregon's lung cancer data shows the following: (See Figure VII-D-1.)

1. In 2002, 2,446 new cases of lung cancer were diagnosed in Oregonians; all but 2 were invasive. There were 2,057 Oregonians who died of lung cancer. Age-adjusted incidence and mortality rates were higher for men than women, as anticipated due to the higher smoking rates among men than women.

2. The current five-year trend for lung cancer incidence rates is a 2% annual decrease both nationally and in Oregon. Mortality rates have been declining for men, 2% a year nationally and 3% per year among Oregon men, whereas lung cancer mortality rates have been increasing among women, <1% a year nationally and 1% a year among Oregon women.

3. Oregon's age-adjusted 2002 lung cancer incidence rate of 67.6 per 100,000 was 11% higher than the national rate of 61.1. The excess is largely due to an 18% higher rate of lung cancer among Oregon women than their national counterparts. Among men, the Oregon 2002 incidence rate was 3% higher than the national rate for 1997-2001. Oregon's 2002 mortality rate was 2% higher than the national mortality rate. However, while the mortality rate for Oregon men was 11% lower than the national rate, the 2002 lung cancer mortality rate for Oregon women was 18% higher than the national rate for women.

4. Of the 43 states with central registries meeting national data quality standards in 2001, Oregon ranked 30th for men and 5th for women in lung cancer incidence. Of all 50 states, Oregon's lung cancer mortality rate ranked 33rd for men but 5th for women in 2002.

5. Lung cancer is the 2nd most common cancer for all men regardless of race or ethnicity, and is the 2nd most common cancer for most women except African American and Asian/Pacific Islander women, for whom it is the 3rd most common cancer. Lung cancer is the most common cause of cancer-related death for all men and most women. However, it is the 2nd most common cause of cancer-related death for female Asian/Pacific Islanders as well as for women of Hispanic ethnicity.

6. In 2002, only 19% of lung cancers among Oregonians were diagnosed at an early stage. Currently, there are no population-based screening recommendations to detect lung cancer in its early stages.

7. During 1998-2002, Oregon's M/I ratio for lung cancer was 0.81, suggesting a poor prognosis for this disease. The M/I ratio was worse for men than women. Lung cancer is the leading cancer site for YPLL with 4,361 years lost annually.

Lung Cancers Fast Facts

Figure VII-D-1

Lung Cancers Fast Facts Oregon 2002	All Sexes [1]	Male	Female
Cancer Incidence			
All Cases Total	***2,446***	***1,299***	***1,147***
In situ	2	2	0
Localized	415	210	205
Regional	592	311	281
Distant	1,173	634	539
Unstaged	264	140	124
Invasive Rates			
Oregon Crude	69.4	74.2	64.7
Oregon Age-adjusted	67.6	80.5	58.1
Oregon Current Annual Trend (5-Year)	-1.7	*-3.0	-0.6
US SEER Age-adjusted[2]	61.1	77.6	49.1
US SEER Annual Trend[2a]	*-2.3	*-2.9	*-1.8
Cancer Mortality			
Total Deaths	***2,057***	***1,061***	***996***
Mortality Rates			
Oregon Crude	58.4	60.7	56.2
Oregon Age-adjusted	56.7	66.5	49.4
Oregon Current Annual Trend (5-Year)	-1.1	-3.3	+1.3
US Age-adjusted[3]	55.8	74.9	41.8
US Annual Trend[4]	n/a	*-1.9	+0.2
Prognosis and Burden [5]			
Prognosis: M/I Ratio	0.81	0.82	0.79
Burden: YPLL before age 65	4,361	2,330	2,032

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

n/a = Not available

[1] *All Sexes* counts may exceed male/female combined due to additional sex coding

[2] Year 2001, SEER 9 Registry data, SEERSTAT 5.2.2

[2a] Years 1997-2001, SEER 9 Registry data, SEERSTAT 5.2.2

[3] 2002 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[4] *Annual Report to the Nation on the Status of Cancer,* most current trend of 3 years or more.

[5] Calculations based on combined years 1998-2002

Stage at Diagnosis

Lung cancer is typically asymptomatic in the early stages, and currently there are no widely accepted screening methods for this cancer type. Therefore, the majority of lung cancers are diagnosed at a late stage. (See Figure VII-D-2.) However, the national lung screening trial is currently evaluating the effectiveness of spiral CT (Computed Tomography–an x-ray imaging technique) as a potential screening tool to detect early stage lung cancer compared to a standard chest x-ray. Late detection contributes to the fact that lung cancer has one of the poorest prognoses of all cancers.

Regardless of the absence of population-based screening recommendations, there are several consistent patterns in the percentage of early stage diagnoses for lung cancer by sex, age, and population density.

Women have a higher percentage of early stage diagnoses. (See Figure VII-D-3).

Oregonians diagnosed before age 30 have the highest percentage of early stage diagnoses. After age 50, the percentage of early stage diagnoses increases with age. (See Figure VII-D-4.)

Figure VII-D-2

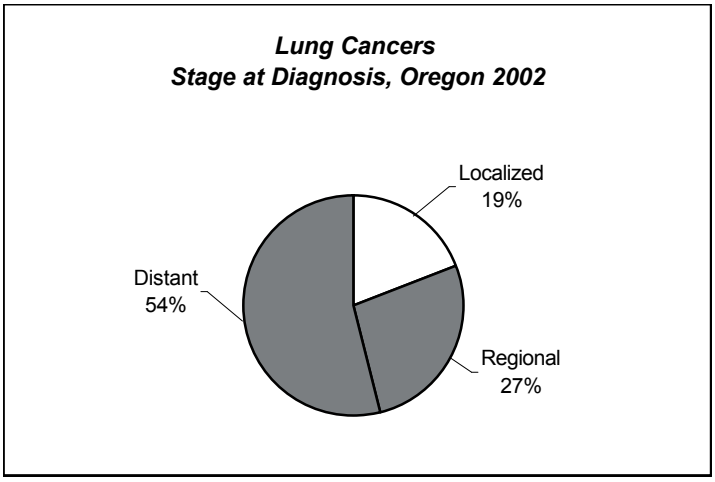


Figure VII-D-3

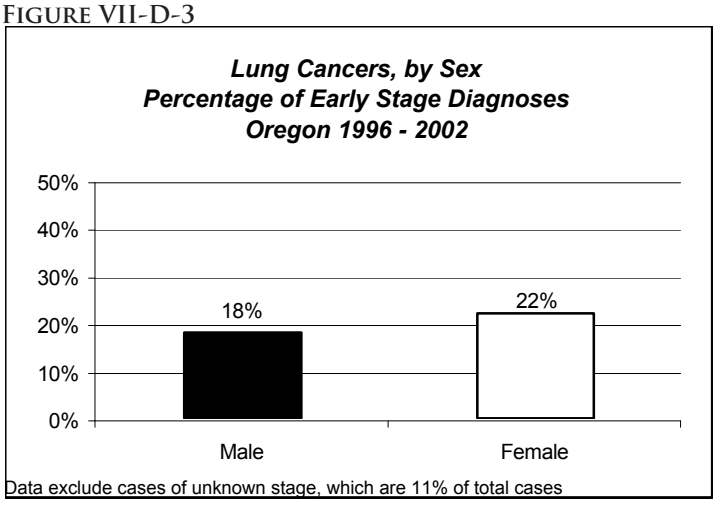
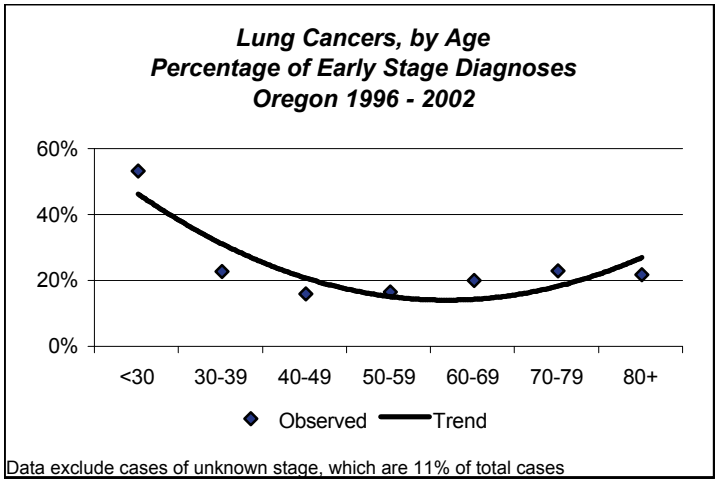
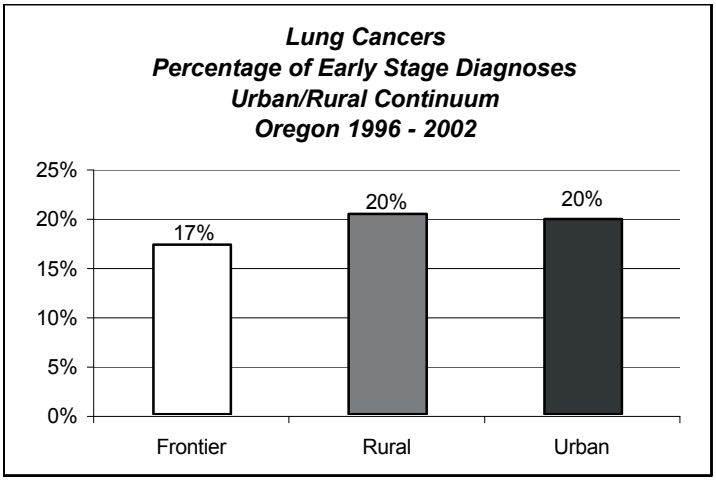


Figure VII-D-4



Although the percentage of lung cancer diagnosed at an early stage is similar for Urban and Rural counties, Frontier counties (extremely rural with < 6 persons per square mile) have a lower percentage of early stage cases. (See Figure VII-D-5.)

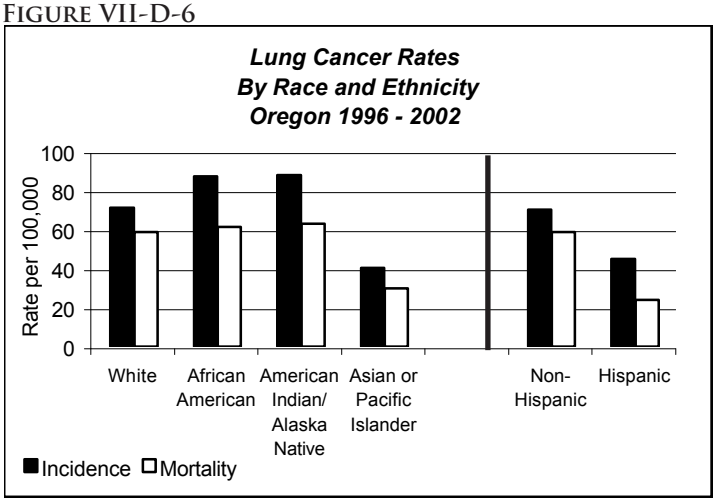
Figure VII-D-5



Race and Ethnicity

Although race and ethnicity data need to be interpreted cautiously due to reporting issues (please see the *What's New in 2002?* and the *Technical Section* for additional details), lung cancer rates vary by race and ethnicity. (See Figure VII-D-6.) Among the four race categories, American Indian/Alaskan Natives (AI/AN) have the highest rate of lung cancer incidence and mortality, and Asian/Pacific Islanders (A/PI) have the lowest lung cancer incidence rates in Oregon. As is seen with colorectal cancer, AI/AN have higher lung cancer incidence than is seen nationally, which may be partially explained by the improved race reporting for this group in Oregon. Paralleling the nation, Hispanics in Oregon have lower lung cancer incidence and mortality rates than Non-Hispanics. As is seen with incidence, mortality rates among AI/AN in Oregon are higher than the national rates for this population.

Figure VII-D-6



Variations by race and ethnicity for lung cancer rates could be related to variations in smoking rates among the different populations. (See Figure VII-D-7.) AI/AN report the highest percentage while A/PI report the lowest percentage of smokers in the adult population. Hispanics report lower smoking rates than Non-Hispanic Whites.

Figure VII-D-7

Percentage of Adults Who Smoke By Race and Ethnicity Oregon 2000 - 2001

Race and Ethnicity	Percent
American Indian	44%
African American	27%
White (Non-Hispanic)	21%
Hispanic	18%
Asian/Pacific Islander	14%

Unlike many other cancer sites, Whites have the highest Mortality to Incidence ratio (M/I) for lung cancer. As seen with other cancer sites, Hispanics have a lower M/I ratio than Non-Hispanics. Higher M/I ratios mean poorer prognosis. (See Figure VII-D-7.)

African Americans (AA) have the lowest percentage of lung cancers diagnosed at an early stage and have a higher M/I ratio than AI/AN. (See Figure VII-D-8.) While Whites and AI/AN have comparable percentages of lung cancer cases diagnosed in an early stage, Whites have a higher M/I ratio, which indicates poorer prognosis. Interestingly, the low M/I ratio for Hispanics is not a result of differences in the stage of diagnosis between Hispanics and Non-Hispanics. (See Figure VII-D-8.) These differences may represent incompatibility between how the Cancer Registry and Center for Health Statistics report race and ethnicity. This divergence could also result if Hispanics are more likely to leave Oregon after a diagnosis of lung cancer than are Non-Hispanics.

There are also differences in the percentage of cases that were unstaged at diagnosis by race and ethnicity. Generally, a lung cancer is not staged at diagnosis because of an extremely poor prognosis or because of comorbidities (or advanced age) contraindicate surgery and/or treatment. All cases that are identified by a death certificate are reported as unstaged-at-diagnosis cases. These cases may represent patients that had difficulty getting access to health care or were only using health care services near the end of their life.

Although the percentage of unstaged lung cancer cases is similar among Hispanics and Non-Hispanics, there is variation in the percentage of unstaged, or unknown stage, lung cancer cases among the four race categories. However, there is no clear correlation between the high percentage of unstaged cases and poor prognosis by race. (See Figure VII-D-8.)

Figure VII-D-8

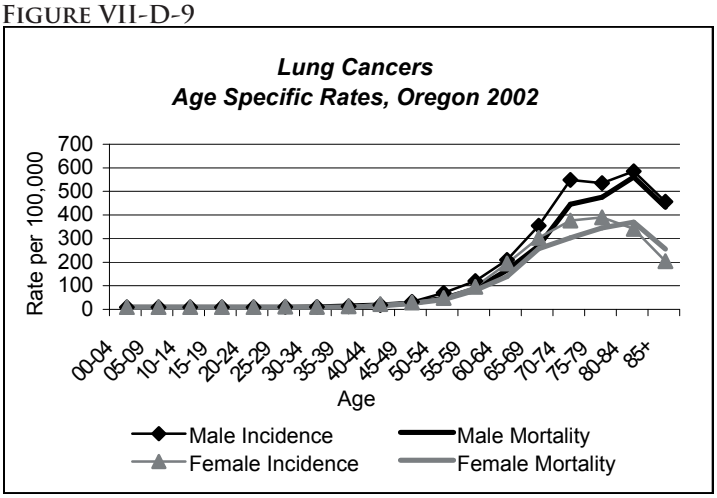
Lung Cancers, Prognosis Indicators By Race and Ethnicity Oregon 1996 - 2002

Race and Ethnicity	M/I Ratio	Percent of Early Stage	Percent Unstaged
Alaskan Indian/Alaska Native	0.72	15%	17%
African American	0.74	12%	11%
White	0.83	15%	16%
Asian/Pacific Islander	0.70	14%	12%
Non-Hispanic	0.84	14%	16%
Hispanic	0.53	14%	17%

Age-Specific Incidence and Mortality

Lung cancer incidence increases with age until age 75 when rates begin to taper off. Oregon's age-specific data show incidence rates higher among men than women for all age groups. Mortality rates show similar sex and age patterns. (See Figure VII-D-9.)

Figure VII-D-9

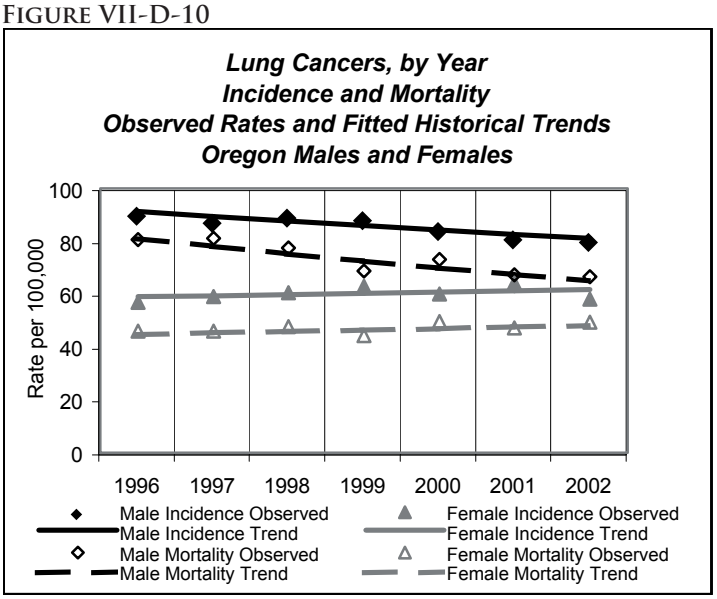


Historical Trends (1996-2002)

Lung cancer incidence for men in Oregon has been decreasing 2% a year while incidence for women in Oregon has been increasing 1% a year since 1996. (See Figure VII-D-10.) Nationally, lung cancer incidence has been decreasing for both men and women, 2% a year for men and 1% a year for women, over a similar time period.

Following incidence trends, lung cancer mortality has been decreasing for men and increasing for women since 1996. (See Figure VII-D-10.) Mortality has been decreasing nearly 4% a year for men and increasing 1% a year for women. Nationally among men there has been a 4% annual decrease over a similar time period compared to < ½% a year increase among women since 1995. However, lung cancer mortality is difficult to compare over this time period due to changes in coding in 1999 that significantly impact the mortality numbers for lung cancer. Please see the *Technical Section* for information about the change to ICD-10 mortality coding.

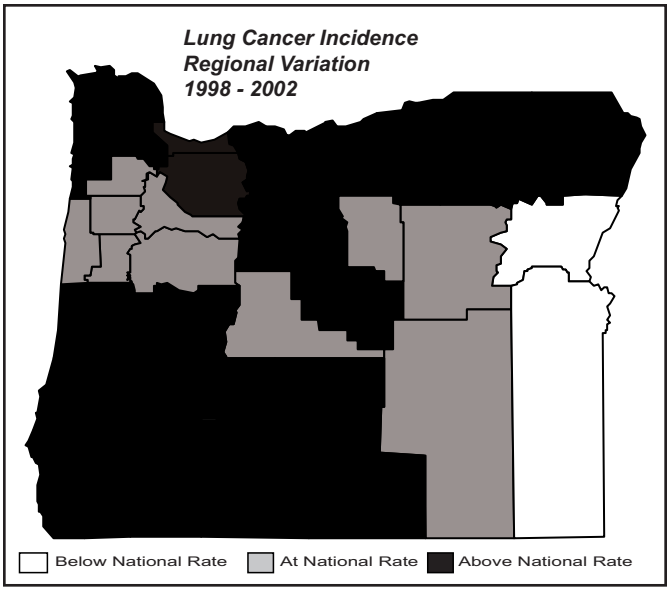
Figure VII-D-10



Regional Variation (Combined Five-Year Rates: 1998-2002)

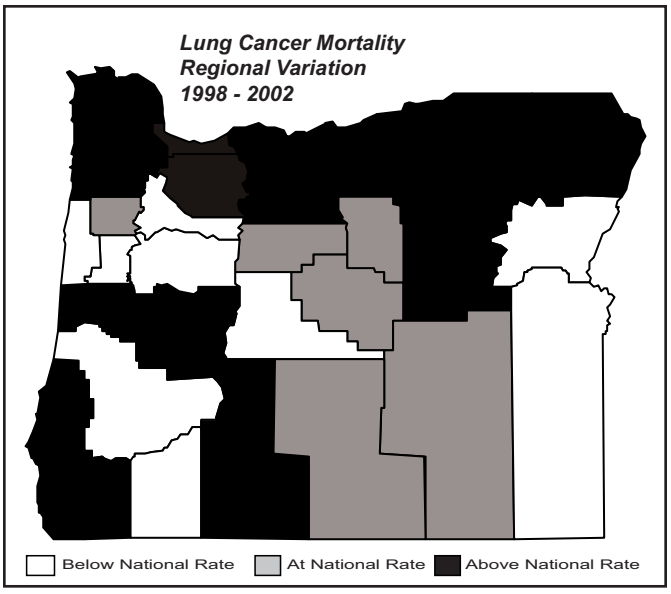
Much of the state has higher lung cancer incidence rates than the national rate. (See Figure VII-D-11.) Lung cancer incidence is higher than is seen nationally for all of the northern counties, and many of the coastal counties and the southwest portion of the state. Portions of the Willamette Valley and Central Oregon have incidence rates similar to those seen nationally. Only a small portion of the eastern region, including the counties of Baker and Malheur, have lung cancer incidence rates lower than the national average.

Figure VII-D-11



Lung cancer mortality is more variable across the state. (See Figure VII-D-12.) As seen with incidence, the northern counties have higher mortality rates than the national average. But only parts of Southwestern Oregon have higher mortality rates. Most of Central Oregon, parts of the coast, and Eastern Oregon have lung cancer mortality rates at or below the rate seen nationally.

Figure VII-D-12



Areas of high incidence and mortality, such as the northern counties in Oregon, may indicate areas that would benefit from targeted tobacco cessation programs.

E. Melanomas of the Skin

Although basal and squamous cell cancers of the skin, which are not reportable to the Registry, account for the vast majority of skin cancers, melanomas account for the majority of skin cancer deaths. Unlike basal and squamous cell cancers, which are nearly always curable, melanomas are a serious disease. Melanomas can be successfully treated in an early stage, but unlike basal or squamous cell skin cancers, melanomas often spread to other parts of the body and become less treatable.

Sun exposure is the primary risk factor for melanomas of the skin. Having certain types of moles is also a risk factor for developing melanomas. Although anyone can develop melanomas, the risk of melanoma is much higher for Whites than African Americans.

Melanomas of the skin are the 6th most common invasive cancer diagnosed in Oregon and the 6th leading cause of cancer-related death among Oregonians. Oregon's melanoma mortality rate of 29.4 for 2002 was 2% above the Healthy People 2010 target of 28.8 deaths per 100,000 men. Despite a lack of agreement on population-based screening guidelines, the Oregon Partnership for Cancer Control has identified reducing melanoma mortality as a priority because of the high incidence and mortality in the state.

Melanomas can be successfully treated in an early stage, but unlike basal or squamous cell skin cancers, melanomas often spread to other parts of the body and become less treatable.

Melanomas of the Skin Fast Facts Overview

A brief overview of Oregon's melanoma data shows the following: (See Figure VII-E-1.)

1. In 2002, 1,613 Oregonians were diagnosed with melanomas, of which, 831 were invasive. Melanomas were the causes of death for 123 Oregonians.

2. Melanoma incidence and mortality in Oregon has increased 2% annually over the past five years. These trends are similar to the national trends.

3. Oregon's age-adjusted 2002 incidence rate of 22.8 was 22% higher than the national rate of 18.7. Additionally, the Oregon 2002 mortality rate was 27% higher than the national rate for 2002.

4. Of the 50 states, Oregon tied for 2nd for melanoma mortality in 1999-2002.

5. The majority, nearly 95%, of melanomas were diagnosed at an early (*in situ* or localized) stage in 2002.

7. During 1998-2002, Oregon's M/I ratio for melanomas was 0.14, suggesting a good prognosis for this disease. Melanomas are responsible for 873 YPLL each year among Oregonians.

Melanomas of the Skin Fast Facts

Figure VII-E-1

Melanomas of the Skin Fast Facts Oregon 2002	***All Sexes*** [1]	***Male***	***Female***
Cancer Incidence			
All Cases Total	***1,613***	***840***	***773***
In situ	782	388	394
Localized	725	383	342
Regional	57	36	21
Distant	24	17	7
Unstaged	25	16	9
Invasive Rates			
Oregon Crude	23.6	25.8	21.4
Oregon Age-adjusted	22.8	26.7	20.3
Oregon Current Annual Trend (5-Year)	+2.0	+2.2	+2.4
US SEER Age-adjusted[2]	18.7	23.1	15.6
US SEER Annual Trend (5-Year)[2a]	*+1.6	*+1.9	+1.3
Cancer Mortality			
Total Deaths	***123***	***77***	***46***
Mortality Rates			
Oregon Crude	3.5	4.4	2.6
Oregon Age-adjusted	3.3	4.8	2.3
Oregon Current Annual Trend (5-Year)	1.6	2.1	2.7
US Age-adjusted[3]	2.6	3.8	1.7
US Annual Trend[4]	n/a	*+3.1	*+2.2
Prognosis and Burden [5]			
Prognosis: M/I Ratio	0.14	0.17	0.11
Burden: YPLL before age 65	873	575	298

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

[1] All Sexes counts may exceed male/female combined due to additional sex coding

[2] Year 2001, SEER 9 Registry data, SEERSTAT 5.2.2

[2a] Years 1997-2001, SEER 9 Registry data, SEERSTAT 5.2.2

[3] 2002 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[4] *Annual Report to the Nation on the Status of Cancer*, most current trend of 3 years or more

[5] Calculations based on combined years 1998-2002

Stage at Diagnosis

Sun avoidance, including wearing protective clothing and avoiding the sun during high intensity hours, may help prevent melanomas. In 1999, the last year for which data are available, 38% of Oregonians reported getting a sunburn within the last 12 months.

As with other cancers, mortality due to melanomas can be reduced through early detection. Melanomas can be found early through self-exam and physician exams. However, there are no national screening recommendations for melanomas.

The majority of melanomas diagnosed in 2002 were diagnosed at an early, treatable stage. (See Figure VII-E-2.) This high percentage likely has contributed to the good prognosis of these cancers.

Regardless of the absence of national screening recommendations, there are several patterns in the percentage of early stage diagnoses for melanomas by sex, age, and population density.

Although the percentages are both over 90%, women have a higher percentage of early stage diagnoses, 95% for men and 97% for women. (See Figure VII-E-3.)

Although the decline is slight, the percentage of melanomas diagnosed at an early stage decreases with age. (See Figure VII-E-4.)

Figure VII-E-2

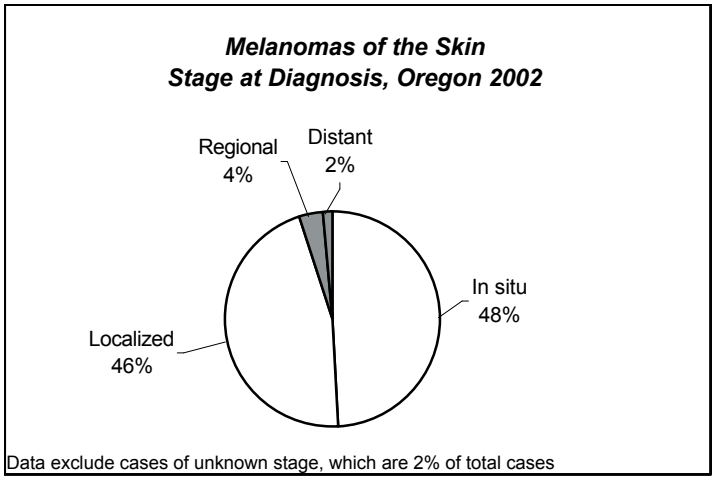


Figure VII-E-3

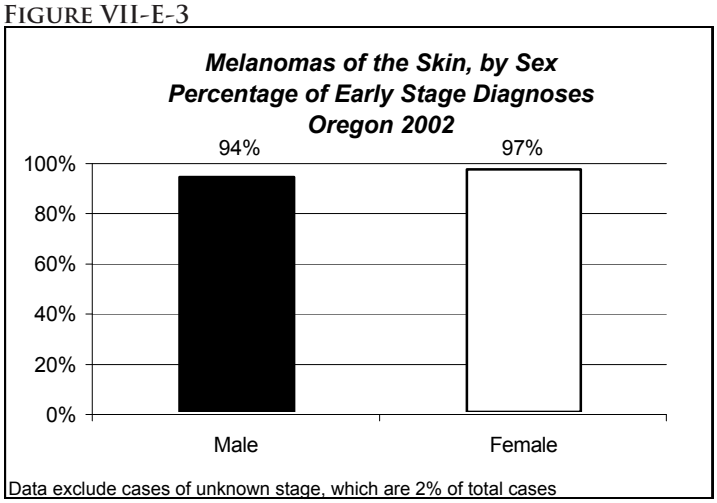
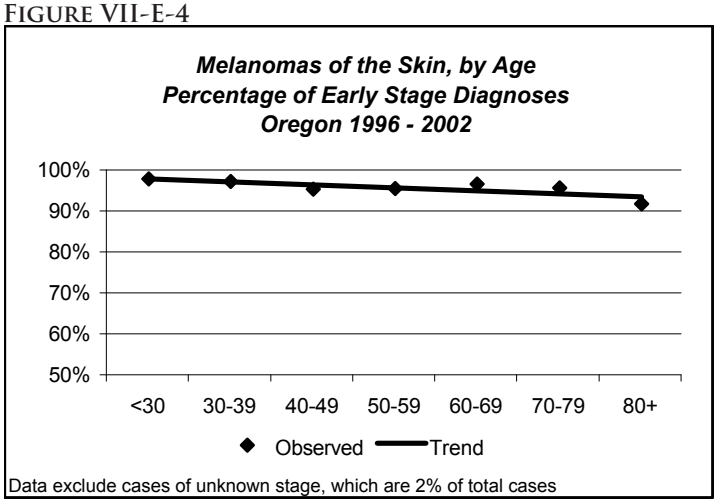
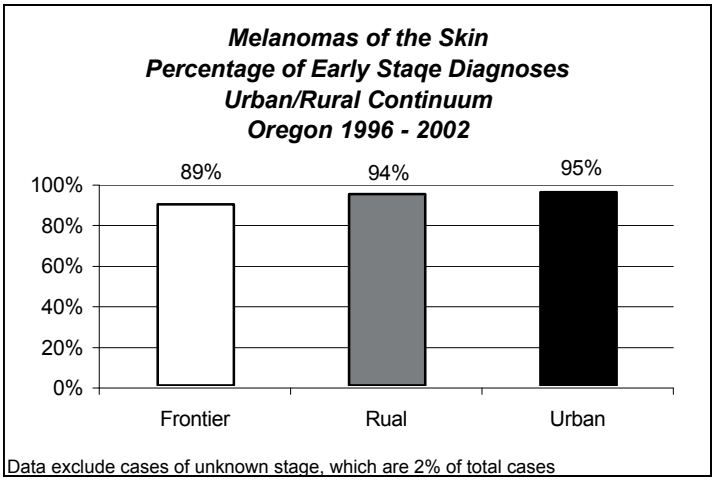


Figure VII-E-4



Moreover, although the percentage of melanomas diagnosed at an early stage is similar for Urban and Rural counties, Frontier counties (extremely rural with <6 persons per square mile) have a lower percentage. Frontier counties have 89% of melanomas diagnosed at an early stage while Rural and Urban counties have, respectively, 94% and 95% diagnosed at an early stage. (See Figure VII-E-5.)

Figure VII-E-5

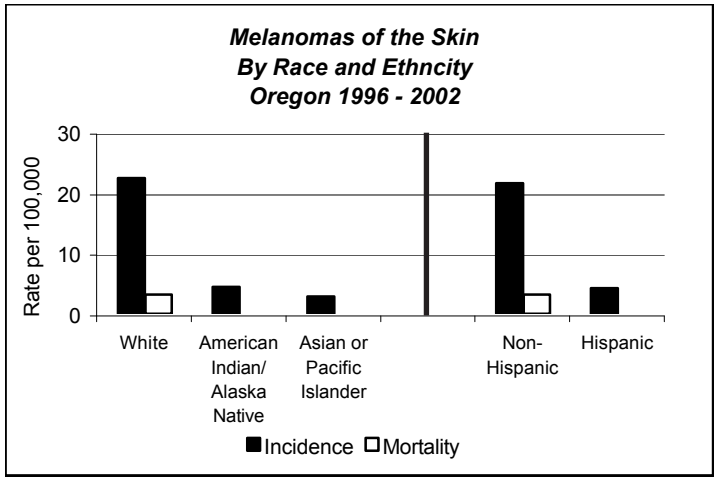


Race and Ethnicity

Although race and ethnicity data need to be interpreted cautiously due to reporting issues (please see the *What's New in 2002?* and the *Technical Section* for additional details), melanoma cancer rates vary by race and ethnicity. (See Figure VII-E-6.) African Americans (AA) have too few cases of melanomas to calculate incidence or mortality rates. Among the three other race categories, Whites have the highest rate of melanoma cancer incidence, and Asian/Pacific Islanders have the lowest incidence rates in Oregon. Hispanics in Oregon have lower melanoma cancer incidence and mortality rates than Non-Hispanics. There are too few cases to calculate stable mortality rates for any race or ethnic group besides Whites and Non-Hispanics.

The difference in rates of melanomas by race and ethnicity is principally genetic. Because skin pigment has a protective effect, the risk of melanomas of the skin is about 20 times higher for Whites than for AA. Particularly, those with fair skin with a tendency to freckle or burn easily are at highest risk. However, anyone, regardless of skin color, can develop melanoma.

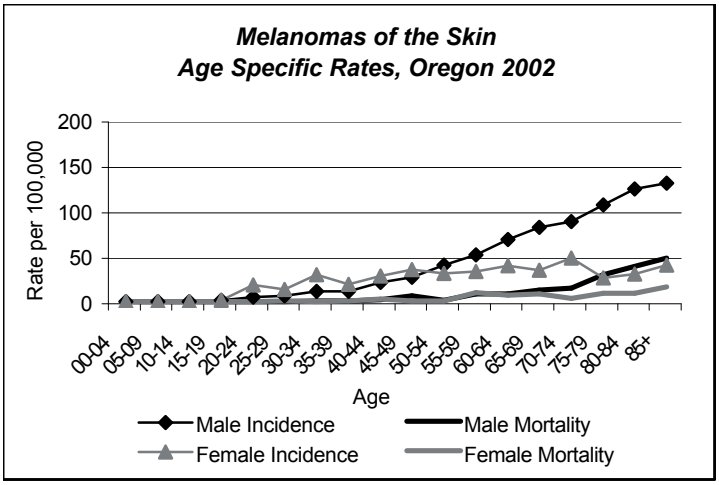
Figure VII-E-6



Age-Specific Incidence and Mortality

As with other types of cancer, the risk of developing melanomas increases with age. Figure VII-E-7 shows the age-specific incidence and mortality rates for melanoma. Oregon's age-specific incidence steadily increases for men with increasing age. The age-specific melanoma incidence fluctuates for women under 50 then increases with age until the rate begins to drop after age 75. With the exception of the 15-50 age groups, men have higher melanoma incidence rates than women. In general, mortality due to melanomas is higher for men than women. As seen with incidence, mortality due to melanomas increases steadily with age for men but is more variable for women.

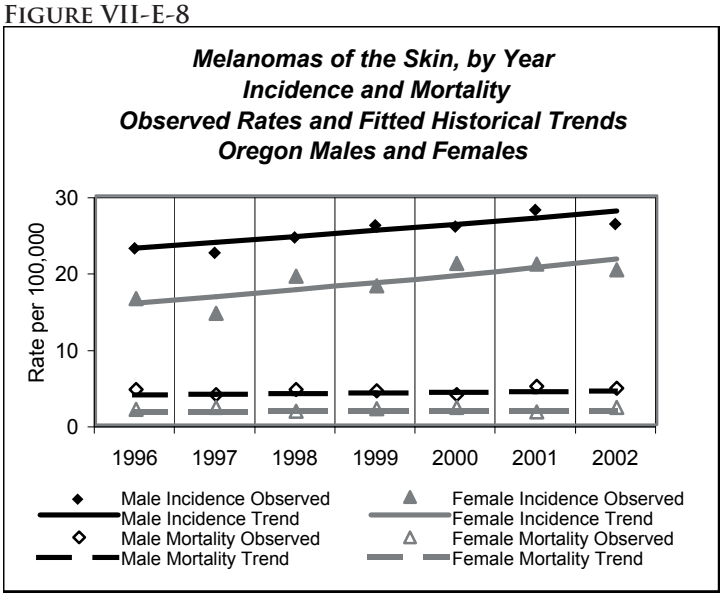
Figure VII-E-7



Historical Trends (1996-2002)

Incidence rates for melanomas have been increasing for both men and women since 1996, but the annual rate of increase has been greater for women (5% for women and 3% for men). (See Figure VII-E-8). For mortality due to melanomas, rates have also been increasing (2% for women and 1% a year for men).

Figure VII-E-8



Regional Variation (Combined Five-Year Rates: 1998-2002)

Regional variation for melanomas is difficult to interpret because any potential variation could be due to individual climate of the region as well as individual behaviors, such as sun avoidance or seeking medical care early. With this in mind, incidence of melanoma has an East/West gradient across Oregon. (See Figure VII-E-9.) Much of Eastern Oregon has rates of melanomas incidence that are lower than are seen nationally. The remainder of the state has rates higher than the rates seen nationally.

The geographic pattern seen with incidence is not as clear for mortality due to melanomas. (See Figure VII-E-10.) In general, the rate of mortality due to melanomas is higher than is seen nationally in the southern part of Oregon as well as along the central gorge. In addition to Eastern Oregon, the North Coast, and most of the Portland Metropolitan area, the Willamette Valley, and Central Oregon, have lower melanoma mortality rates than are seen nationally.

Figure VII-E-9

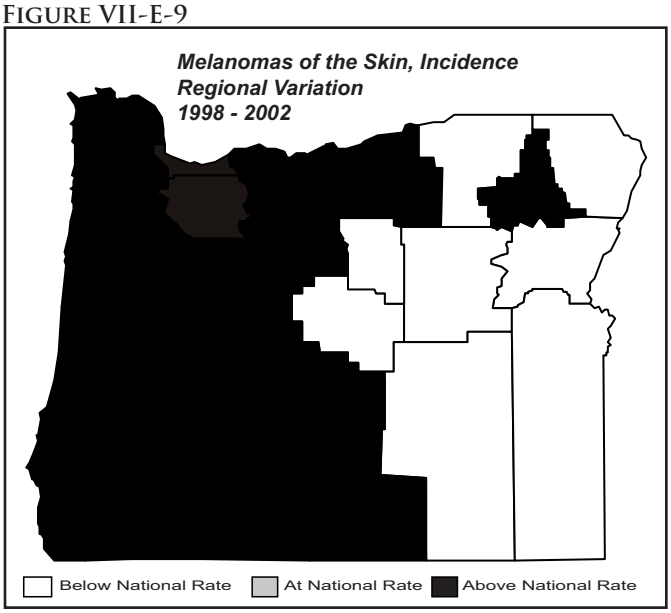
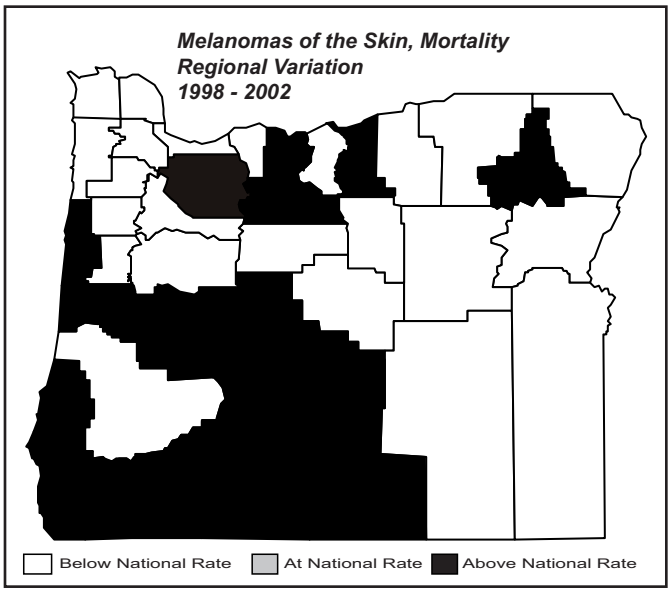


Figure VII-E-10



F. Oral Cancers

Combining tobacco and alcohol increases one's risk of oral cancers dramatically, and the risk rises with the amount and length of use. Over 80% of people with oral cancers are considered heavy tobacco and/or alcohol users. In addition to the 20% of Oregonians who smoke, an estimated 3% of Oregon adults used smokeless (chewing) tobacco in 2002. Among Oregon youth, an estimated 3% of 8th graders and 7% of 11th graders used smokeless tobacco in 2002. In 2002, 8% of adult males and 6% of adult females were considered heavy drinkers. In 2002, an estimated 24% of 8th graders and 44% of 11th graders reported drinking alcohol in the 30 days preceding the survey.

Over 80% of people with oral cancers are considered heavy tobacco and/or alcohol users.

About 15% of newly diagnosed patients with oral cancers will have another cancer in nearby areas such as the larynx, esophagus, or lung. Another 10% to 40% will develop cancer of one of these organs or a second cancer of the oral cavity later. For this reason, it is very important for patients with oral cancers to have follow-up examinations throughout their lives and to avoid risk factors, like tobacco and alcohol use, which increase the risk for these secondary cancers.

Early detection is possible through an oral exam to look for precancerous plaques or early disease. Regular dental and medical check-ups for evaluation of symptoms and precancerous lesions may be useful in detecting oral cancers early. Due to the potential for primary prevention through tobacco control efforts, the reduction of oral cancers incidence and mortality has been identified as a priority for the Oregon Partnership for Cancer Control.

Oral Cancers Fast Facts Overview

Oral cancers are the 8th leading cancer site for men. A brief overview of Oregon's oral cancers data shows the following: (See Figure VII-F-1.)

1. In 2002, 398 new cases of oral cancers were diagnosed in Oregonians, of which 385 were invasive. In 2002, 98 Oregonians died due to oral cancers.

2. There has been a 2% annual decrease in oral cancer incidence rates over the past five years in Oregon. Mortality has also declined over this period, but this reduction is artificially amplified by a change in mortality coding in 1999. Please review the *Technical Section* for discussion of ICD-9 versus ICD-10 coding for oral cancers.

3. Oregon's age-adjusted oral cancer incidence and mortality rates are similar to national rates. As seen nationally, age-adjusted incidence and mortality rates were higher for men than women in Oregon.

4. Of all 50 states, Oregon tied for 18th for oral cancer mortality rates in 2002.

5. Over half, 51%, of oral cancers were diagnosed at an early stage (*in situ* or localized).

6. During 1998-2002, Oregon's M/I ratio for oral cancers was 0.27, suggesting a good prognosis for this disease. The M/I ratio was worse for women than men. Oral cancers leads to 432 YPLL each year in Oregon.

Oral Cancers Fast Facts

Figure VII-F-1

Oral Cancers Fast Facts Oregon 2002	***All Sexes*** [1]	***Male***	***Female***
Cancer Incidence			
All Cases Total	***398***	***256***	***142***
In situ	13	7	6
Localized	183	107	76
Regional	162	114	48
Distant	23	15	8
Unstaged	17	13	4
Invasive Rates			
Oregon Crude	10.9	14.2	7.7
Oregon Age-adjusted	10.5	14.5	6.9
Oregon Current Annual Trend (5-Year)	-2.3	-2.8	-1.6
US SEER Age-adjusted[2]	10.4	14.9	6.6
US SEER Annual Trend[2a]	-2.4	-3.2	-1.2
Cancer Mortality			
Total Deaths	***98***	***60***	***38***
Mortality Rates			
Oregon Crude	2.8	3.4	2.1
Oregon Age-adjusted	2.7	3.7	1.8
Oregon Current Annual Trend (5-Year)	-4.7	-1.6	-9.2
US Age-adjusted[3]	2.7	4.1	1.6
US Annual Trend[4]	n/a	*2.8	*-2.5
Prognosis and Burden [5]			
Prognosis: M/I Ratio	0.27	0.24	0.31
Burden: YPLL before age 65	432	327	105

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

[1] All Sexes counts may exceed male/female combined due to additional sex coding

[2] Year 2001, SEER 9 Registry data, SEERSTAT 5.2.2

[2a] Years 1997-2001, SEER 9 Registry data, SEERSTAT 5.2.2

[3] 2001 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[4] *Annual Report to the Nation on the Status of Cancer* for the period 1992 - 2001

[5] Calculations based on combined years 1998-2002

Stage at Diagnosis

Identifying and treating precancerous conditions could nearly eliminate this group of cancers. Periodic examination of the mouth, by a health professional or by self-exam, to detect early precancerous lesions is an important prevention strategy. The Healthy People 2010 target is for 85% of dentists to counsel their patients about smoking cessation. In 1997, the only year for which data are available, 59% of dentists nationally were counseling their patients to stop using tobacco.

Despite the lack of a specific population-based screening test, 51% of the oral cancers cases were diagnosed at an early stage. (See Figure VII-F-2.)

As seen with lung cancer, women have a greater percentage of early stage oral cancers at diagnosis than men. (See Figure VII-F-3.)

Following the curve by age seen with lung cancer, Oregonians less than 40 years of age are more likely to have oral cancers diagnosed at an early stage. The percentage of early stage cases increases with age from age 50 on. (See Figure VII-F-4.)

Figure VII-F-2

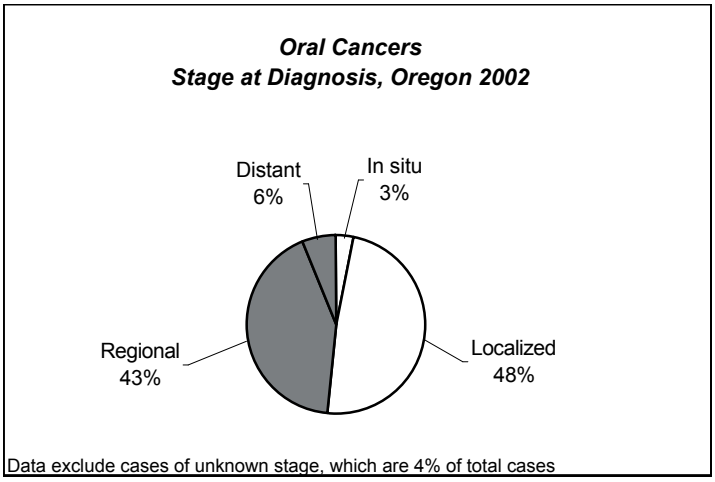


Figure VII-F-3

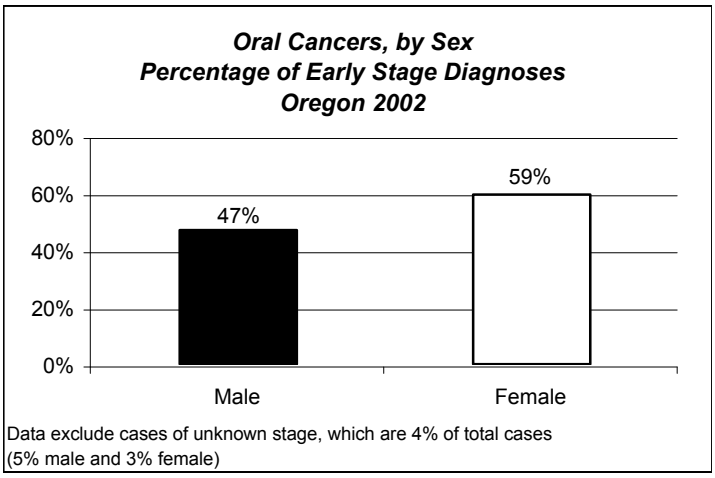
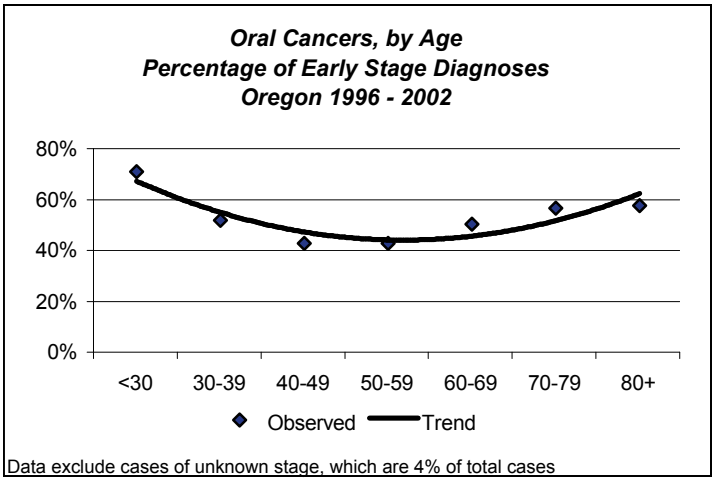
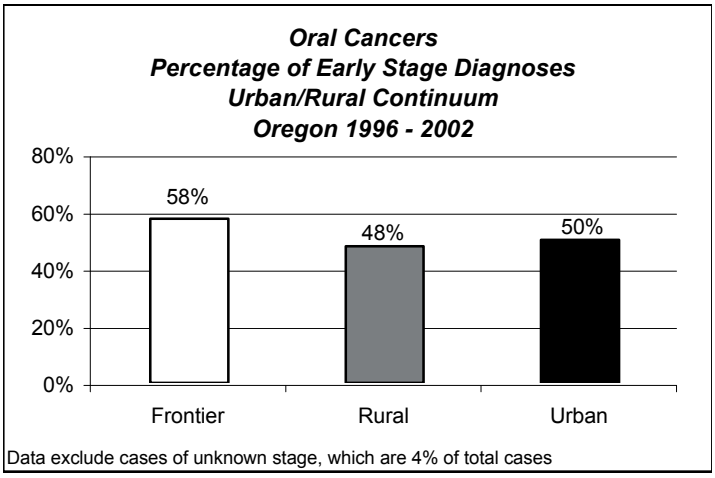


Figure VII-F-4



Like lung cancer, the percentage of oral cancers diagnosed at an early stage is similar for Rural and Urban counties. However, Frontier counties (extremely rural counties with less than 6 persons per square mile) have a larger percentage of cases diagnosed at an early stage. (See Figure VII-F-5.)

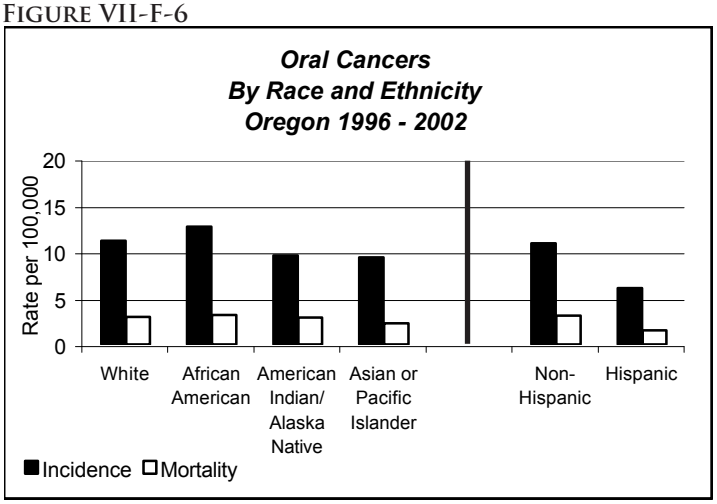
Figure VII-F-5



Race and Ethnicity

Although race and ethnicity data need to be interpreted cautiously due to reporting issues (see the *What's New in 2002?* and *Technical Section* for additional details), oral cancer incidence varies by race and ethnicity. (See Figure VII-F-6.) African Americans (AA) have the highest oral cancer incidence and mortality rates and Asian/Pacific Islanders (A/PI) have the lowest oral cancer rates. Nationally, it is American Indian/Alaska Natives (AI/AN) who have the lowest oral cancer rates. Oregon likely diverges from the national rates for AI/AN due to increased efforts to properly identify these persons in the Oregon Registry. There are too few deaths due to oral cancers to evaluate stage at diagnosis by race or ethnicity.

Figure VII-F-6



Among racial groups in Oregon, the ranking of oral cancer incidence does not correlate with reported rates of smokeless tobacco use. (See Figure VII-F-7.) As with smoking rates, AI/AN report the highest smokeless tobacco usage while AA have the lowest rate of smokeless tobacco use but the highest oral cancer incidence rate.

Figure VII-F-7

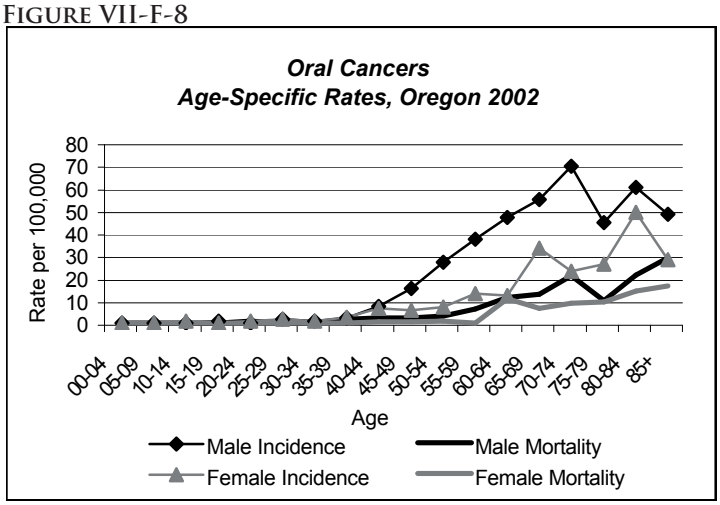
Percentage of Adults Who Use Smokeless Tobacco, by Race and Ethnicity Oregon 2000 - 2001

Race and Ethnicity	Percent
American Indian/Alaskan Native	16%
White (Non-Hispanic)	8%
Asian/Pacific Islander	2%
African American	1%
Hispanic	2%

Age-Specific Rates

Oral cancer incidence and mortality rates increase with age. Incidence and mortality rates are greater for men than women in all age groups. (See Figure VII-F-8.)

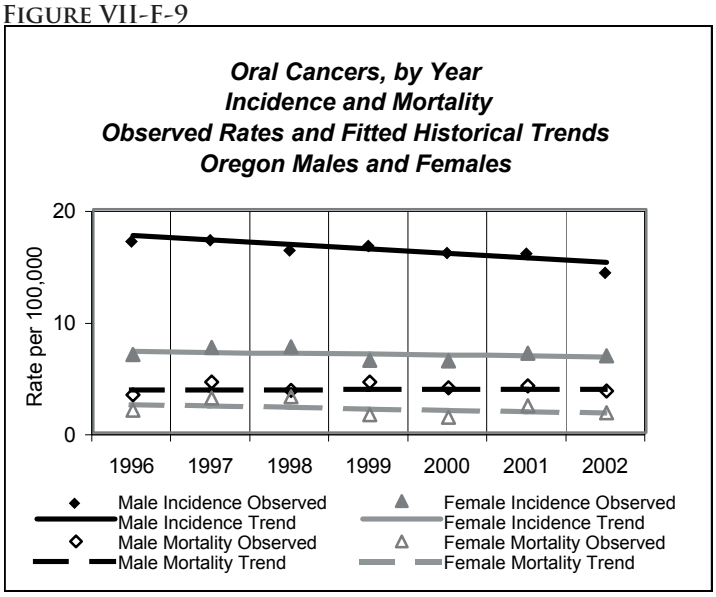
Figure VII-F-8



Historical Trends (1996-2002)

Oral cancer incidence rates have been declining, 2% a year for men and 1% a year for women. (See Figure VII-F-9.) While oral cancer mortality also decreased for women by 6% a year, mortality has risen 1% a year for men. It should be noted that oral cancer mortality is difficult to compare over this time period due to changes in coding in 1999 that significantly affect the mortality numbers for oral cancers. Please see the *Technical Section* for information about the change to ICD-10 mortality coding.

Figure VII-F-9



Regional Variation (Combined Seven-Year Rates: 1996-2002)

Oral cancer incidence has an East/West gradient. Most of the counties East of the Cascades have lower oral cancer incidence rates than are seen nationally. The Portland Metropolitan region extending through the central gorge region has higher oral cancer incidence rates than are seen nationally. (See Figure VII-F-10.).

Oral cancer mortality has a less defined geographical pattern than incidence. This may be due to regional differences in diagnosing or treating oral cancers. Mortality is higher in the Portland area, Southern Oregon, and part of Central Oregon than is seen nationally. Much of the coast, the Willamette Valley, and southeast Oregon have lower mortality rates due to oral cancers than are seen nationally. (See Figure VII-F-11.)

The high mortality areas around the Portland metropolitan area and Southern Oregon indicate areas that may benefit from targeted tobacco cessation programs.

Figure VII-F-10

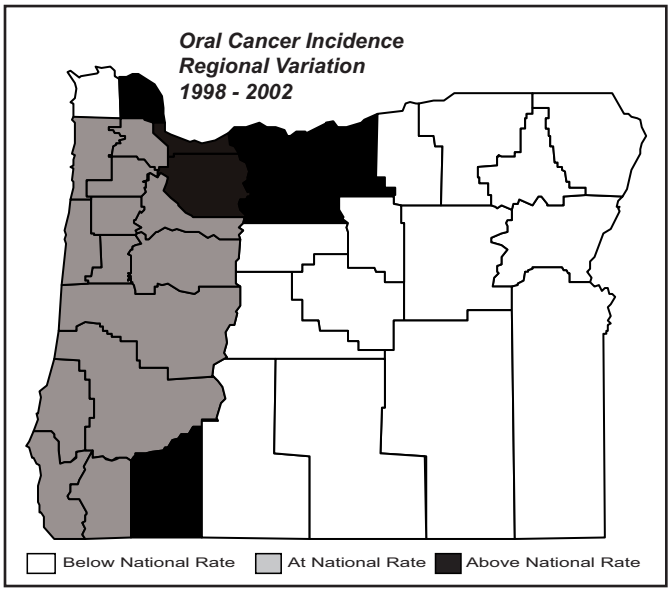
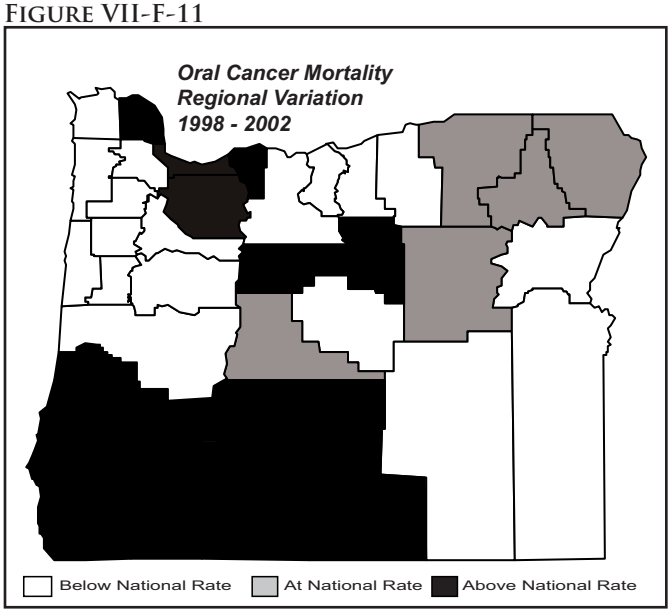


Figure VII-F-11



G. Prostate Cancers

Age is the most important risk factor for prostate cancers with 65% of the diagnoses in men age 65 and older. While screening tests are available, routine screening for prostate cancer is controversial. There are some highly aggressive prostate cancers with high mortality, which warrant treatment. However, most prostate cancers occur in older men and are indolent tumors. They grow slowly and do not generally result in death even when left untreated. Current screening tests cannot reliably differentiate between slow growing and aggressive forms of prostate cancer. Unfortunately, the potential harms of treatment, including unnecessary surgery or surgical complications such as incontinence and impotence, can significantly affect a man's quality of life. Currently, there is no consensus public health recommendation regarding prostate cancer screening except to encourage men to discuss options with their health care providers.

Age is the most important risk factor for prostate cancers with 65% of the diagnoses in men age 65 and older.

Prostate cancer is the 2nd most common cancer diagnosed in Oregon, and the 2nd leading cause of cancer-related death among Oregon men. Oregon's prostate cancer mortality rate of 29.4 for 2002 was 2% above the Healthy People 2010 target of 28.8 deaths per 100,000 men. Despite a lack of consensus on screening and treatment issues, the Oregon Partnership for Cancer Control has identified reducing prostate cancer mortality as a priority because of the large number of Oregonians affected by prostate cancer.

Prostate Cancers Fast Facts Overview

A brief overview of Oregon's prostate cancer data shows the following: (See Figure VII-G-1.)

1. In 2002, 2,519 Oregon men were diagnosed with prostate cancers; of which all were invasive. Prostate cancer was the cause of death for 435 Oregon men.

2. Prostate cancer incidence in Oregon has decreased 2% annually in the past five years. Nationally, there has been a 1% yearly increase. However, prostate cancer mortality rates have declined 4% per year during this period both in Oregon and nationally.

3. Oregon's age-adjusted 2002 incidence rate of 153.1 was 13% lower than the national rate of 176.8. In contrast, the Oregon 2002 mortality rate was 5% higher than the national rate.

4. Of the 43 states with central registries meeting national data quality standards in 2001, Oregon ranked 18th for prostate cancer incidence. Of the 50 states, Oregon tied for 19th in prostate cancer mortality in 2002.

5. Prostate is the leading cancer incidence site for males regardless of race or ethnicity. Prostate cancers are the 2nd leading cancer mortality site for African Americans and Whites as well as Hispanics. Prostate cancers rank 3rd for cancer mortality among American Indian/Alaskan Natives, 5th among Pacific Islanders, and 3rd among Non-Hispanic males.

6. The majority, 81%, of prostate cancers were diagnosed at an early (*in situ* or localized) stage in 2002.

7. During 1998-2002, Oregon's M/I ratio for cancer of the prostate was 0.17, suggesting a relatively good prognosis for this disease. Prostate cancers are responsible for 229 YPLL each year among Oregon men.

Prostate Cancers Fast Facts

Figure VII-G-1

Prostate Cancers Fast Facts Oregon 2002	***Male***
Cancer Incidence	
All Cases Total	***2,519***
In situ	0
Localized	1,891
Regional	317
Distant	113
Unstaged	198
Invasive Rates	
Oregon Crude	144.1
Oregon Age-adjusted	153.1
Oregon Current Annual Trend (5-Year)	-1.9
US SEER Age-adjusted[1]	176.8
US SEER Annual Trend (5-Year)[1a]	+1.1
Cancer Mortality	
Total Deaths	***435***
Mortality Rates	
Oregon Crude	24.9
Oregon Age-adjusted	29.4
Oregon Current Annual Trend (5-Year)	*-3.7
US Age-adjusted[2]	27.9
US Annual Trend[3]	*-4.1
Prognosis and Burden [4]	
Prognosis: M/I Ratio	0.17
Burden: YPLL before age 65	229

* Indicates a statistically significant trend

M/I = Mortality-to-Incidence Ratio

YPLL = Years of Potential Life Lost

[1] Year 2001, SEER 9 Registry data, SEERSTAT 5.2.2

[1a] Years 1997-2001, SEER 9 Registry data, SEERSTAT 5.2.2

[2] 2002 mortality rate calculated from CDC Wonder: http://wonder.cdc.gov

[3] *Annual Report to the Nation on the Status of Cancer*, most current trend of 3 years or more.

[4] Calculations based on combined years 1998-2002

Stage at Diagnosis

The majority of prostate cancer diagnoses in 2002 were made at an early stage. (See Figure VII-G-2.) This represents a 4% increase in the percentage diagnosed at an early stage since 1996.

The percentage of prostate cases diagnosed at an early stage increases with age until the 80 and older group. (See Figure VII-G-3.) This decrease in early stage cases in the oldest age group may be likely due to decisions by these patients and their health care providers to be less aggressive with surgical intervention. Indeed, the percentage of unstaged cases increases with age. (See Figure VII-G-3.)

There is no distinct pattern of early stage diagnosis along the urban/ rural continuum (See Figure VII-G-4.)

Routine Screening

Prostate cancers can often be found early by evaluating the amount of PSA (prostate-specific antigen) in blood. Another screening tool is a physician digital rectal exam (DRE). There are no national screening recommendations for prostate cancers. However, in 2002, 34% of Oregon men 40 and older reported having a PSA test within the last year, and 35% reported having a digital rectal exam.

Figure VII-G-2

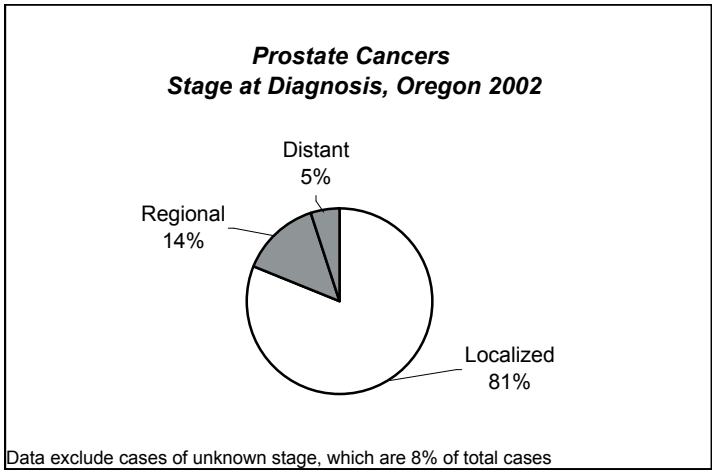


Figure VII-G-3

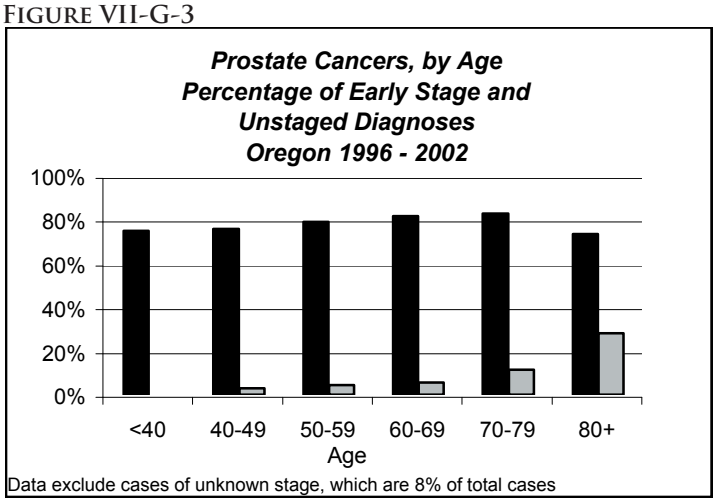
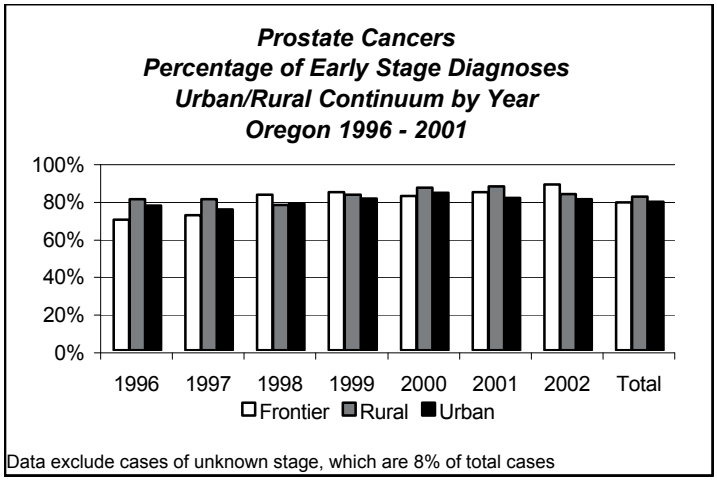


Figure VII-G-4



Race and Ethnicity

Although race and ethnicity data need to be interpreted cautiously due to reporting issues (please see the *What's New in 2002?* and the *Technical Section* for additional details), prostate cancer rates vary by race and ethnicity. (See Figure VII-G-5.) Among the four race categories, African Americans (AA) have the highest rate of prostate cancer incidence, and Asian/Pacific Islanders (A/PI) have the lowest incidence rates in Oregon. Nationally, it is American Indian/Alaska Natives (AI/AN) who have the lowest prostate cancer rates. Oregon likely diverges from the national rates for AI/AN due to increased efforts to properly identify these persons in the Oregon Registry. As is seen nationally, Hispanics in Oregon have lower prostate cancer incidence and mortality rates than Non-Hispanics. Mortality due to prostate cancer follows the incidence patterns by race and ethnicity.

AA have the highest prostate cancer rates and the highest mortality to incidence (M/I) ratio. (See Figure VII-G-6.) AI/AN also have a higher M/I ratio than Whites. A/PI have the lowest M/I ratio. There is no difference among Hispanics or Non-Hispanics for M/I ratio. Higher M/I ratios mean poorer prognosis. Some of the differences in prognosis may be due to differences in stage at diagnosis by race and ethnicity. Among the four race categories, Whites have the highest percentage of prostate cancer cases diagnosed at an early stage followed closely by A/PI. (See Figure VII-G-6.) The poorer prognosis for AI/AN may be partially explained by the lower percentages of prostate cases diagnosed at an early stage in this population. However, Hispanics have the same M/I ratio as Non-Hispanics, yet they have a lower percentage of prostate cases diagnosed at an early stage. These differences may represent incompatibility between how the Cancer Registry and Center for Health Statistics report race and ethnicity. This divergence could also result if Hispanics are more likely to leave Oregon after a diagnosis of prostate cancer than are Non-Hispanics.

Figure VII-G-5

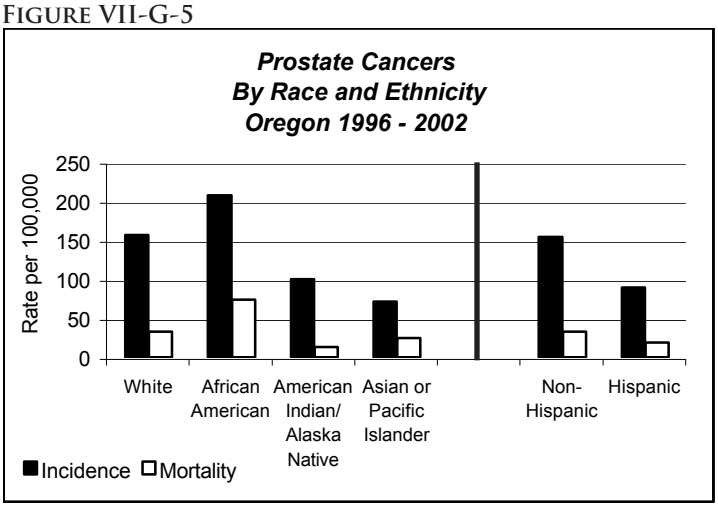


Figure VII-G-6

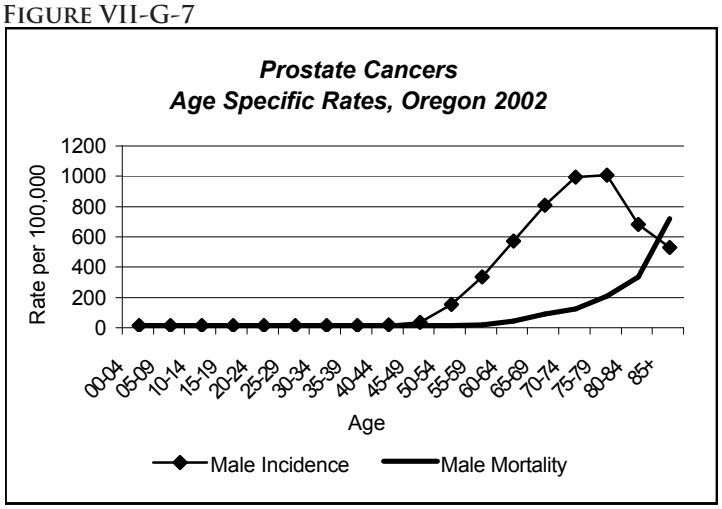
Prostate Cancers, Prognosis Indicators By Race and Ethnicity Oregon 1996 - 2002

Race and Ethnicity	M/I Ratio	Percent of Early Stage
African American	0.36	76%
White	0.21	80%
American Indian/Alaska Native	0.35	73%
Asian/Pacific Islander	0.13	79%
Non-Hispanic	0.21	80%
Hispanic	0.21	74%

Age-Specific Incidence and Mortality

As with other types of cancer, the risk of developing prostate cancer increases with age. Figure VII-G-7 shows the age-specific incidence and mortality rates for prostate cancer. Oregon's age-specific incidence rates sharply increase at age 50 and peak in males aged 70-74. After age 75, the incidence begins to drop. Mortality rates increase sharply at age 70 and surpass incidence rates in the 85 and over age group.

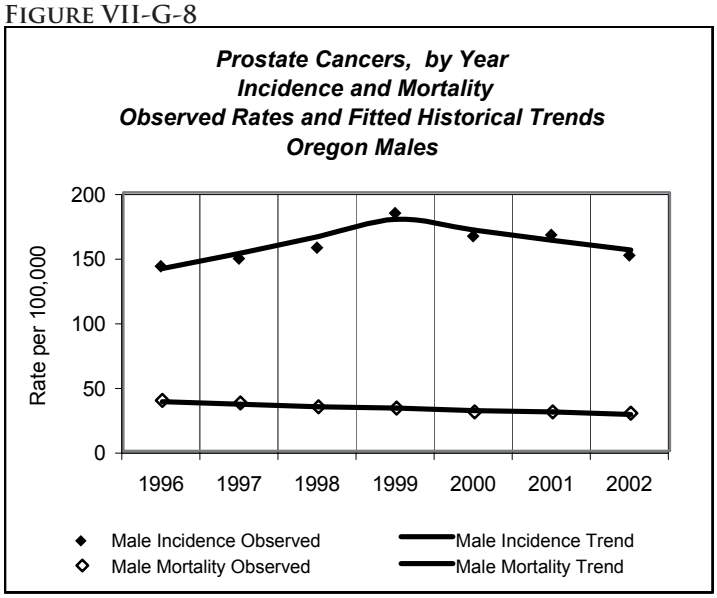
Figure VII-G-7



Historical Trends (1996-2002)

Prostate cancer incidence and mortality trends have been variable since 1996. Initially, prostate cancer incidence was increasing 9% a year from 1996-1999. From 1999-2002, the trend reversed and incidence began to decrease 5% a year. Mortality due to prostate cancer has been consistently decreasing over the same time period, but the rate of decrease has slowed in the last couple of years. Initially, mortality decreased 6% a year from 1996-2000 and then slowed to a 1% annual decrease from 2000-2002. (See Figure VII-G-8.)

Figure VII-G-8



Regional Variation (Combined Five-Year Rates: 1998-2002)

Prostate cancer incidence has a loose diagonal gradient across Oregon. (See Figure VII-G-9.) However, because prostate cancer screening rates vary throughout the state, it is difficult to interpret this distribution of incidence rates. Prostate cancer incidence rates are higher than are seen nationally in Northeast Oregon. Rates are lower than are seen nationally in the Portland area and most of the Willamette Valley region, the north and south tips of the coast, and sections of Central and Southeast Oregon.

Most of Oregon has higher prostate cancer mortality rates than are seen nationally. (See Figure VII-G-10.) Sections of the state with lower prostate cancer incidence rates than the nation but higher mortality may represent areas of under-reporting or lower screening rates than the national average.

Figure VII-G-9

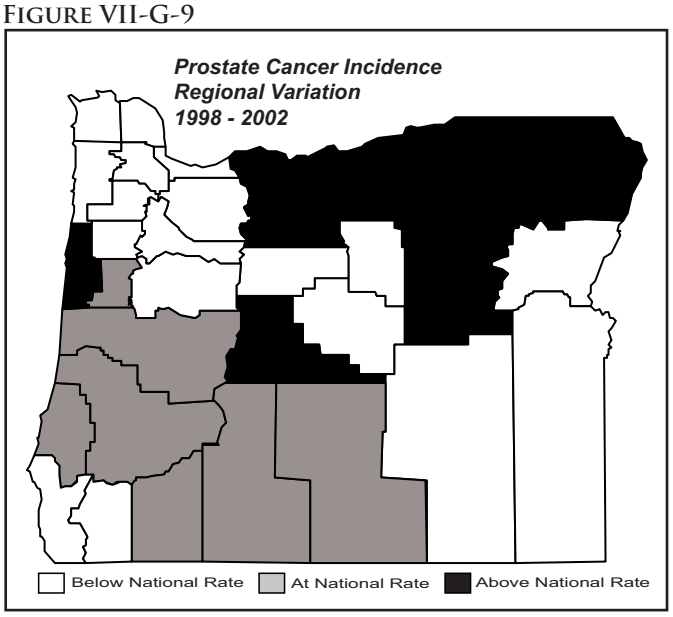
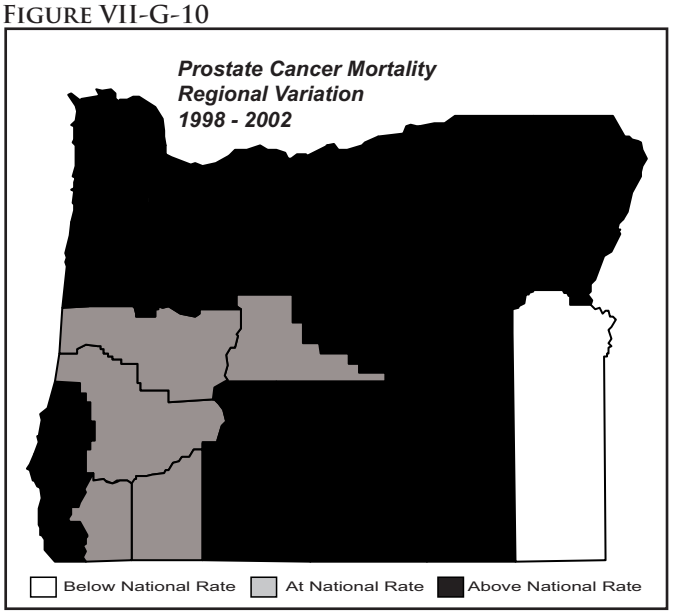


Figure VII-G-10



VIII. Data Uses

Providing data for cancer prevention and control is a fundamental purpose of the Oregon State Cancer Registry. Early Registry efforts were focused on planning and implementation. The initial objective was to establish a system through which the Registry could collect complete and accurate data on all reportable cancers diagnosed or treated in Oregon. The Registry is now in a position to support use of the cancer data for cancer prevention and control. The Registry produces annual reports containing general, descriptive epidemiologic data on cancer in Oregon and facilitates research efforts to better understand the natural history of specific cancers and to improve cancer-related care. Cancer control programs within the Department of Human Services, Oregon Health Services, and independent researchers have used OSCaR data.

In addition to funded research, OSCaR fulfills data requests on a regular basis from the media, legislators and policy makers, individual physicians, collaborative partners (such as the American Cancer Society and Northwest Portland Area Indian Health Board), and concerned citizens. OSCaR responds to over 200 such public access data requests annually.

Research Protocol – The Registry has provided data to outside researchers on a variety of approved cancer projects. Before the release of any confidential data, the following criteria must be reviewed for compliance:

1. The proposed research will be used to determine the sources of cancer among the residents of Oregon or to reduce the burden of cancer in Oregon;

2. the data requested are necessary for the efficient conduct of the study;

3. adequate protections are in place to provide secure conditions to use and store the data;

4. assurances are given that the data will only be used for the purposes of the study, and assurances that confidential data will be destroyed at the conclusion of the study (See *Researcher Assurances Form in Appendix D.*);

5. the researcher has adequate resources to carry out the proposed research;

6. the proposal has been reviewed and approved by the Committee for the Protection of Human Subjects or is exempt from such review;

7. any additional safeguards needed to protect the data from inadvertent disclosure due to unique or special characteristics of the proposed research have been required of the researcher;

8. the research methodology has been reviewed for scientific excellence by a nationally recognized peer group, or if such a review has not taken place, that an ad hoc peer review subcommittee of the OSCaR Advisory Committee containing appropriately qualified scientists has performed a peer review of the research.

Research Protocol

Patient Notification – OSCaR has a unique system of patient notification to inform patients that their information has been reported to OSCaR and to identify patients who are willing to participate in case study research. At the time of notification, patients receive a patient notification letter. (*See Appendix E.)* Oregon is one of a few states to notify patients of their inclusion in the cancer registry and the only state to give patients the opportunity to inform the Registry of their preference regarding participation in research projects. A form accompanies the letter asking if they are willing to participate in research projects. Those who decide "yes" will be contacted if a research project for which they are eligible becomes available. Those who decide "no" will never be contacted. If the form is not returned, researchers will consult with the patient's physician before contacting the patient.

This "pre-consent" identifies potential study participants for researchers. Consent is still required as is stipulated by each project's Institutional Review Board (IRB) approval, and the patient is not required to participate in a study even if they are eligible. However, patients do not have an option to opt out of the Registry database. The entire database is available for approved academic research that does not require patient contact.

IX. Technical Section

To comprehend and interpret cancer data, it is important to understand the sources of data, collection methods, data quality, and the significance of reported measures.

The following section provides the essential background for understanding and interpreting the data contained in this report.

A. Data Sources

Oregon Incidence Data – All cancer incidence data were obtained directly from the Oregon State Cancer Registry. A number of changes in cancer incidence reporting and collection were implemented in 2001, including transitions to Summary Stage 2000 and ICD-O-3. These changes create problems when comparing data across years. However, the updated reporting requirements and coding guidelines are intended to reflect current medical knowledge of the behavior, pathology, prognosis, and treatment of cancers, and should increase the applicability of registry data for surveillance and research.

Specifically, incidence for ovarian cancers, lymphomas, leukemias, and other hematopoietic diseases will be difficult to compare across years due to changes in ICD-O-3 definitions and reporting requirements implemented in 2001. In addition, comparing stage data for lung, ovarian, and colorectal cancers across years is problematic based on the new Summary Stage 2000 guidelines.

Changes in Stage Coding - Staging is the grouping of cases into broad categories based on extent of disease. Summary Stage is a coded format that has been used by cancer registries since 1977. It allows electronic analysis of cases with similar characteristics. Increasing stage number means more widespread involvement or severity. New guidelines for staging cancer, called Summary Stage 2000, were put into effect for cancer cases diagnosed on or after January 1, 2001.

Overall, changes in the guidelines should result in increased accuracy and consistency in coding of stage. Instructions are highly detailed, site-specific, and include illustrations to assist coders. However, differences in timing rules for determining stage and some sites are coded differently using the new guidelines. For instance, a lung cancer with a separate tumor nodule in a different lobe (same lung) was staged as localized using the old summary staging system but is now coded distant/metastatic in Summary Stage 2000.

This means, for some sites, comparing stage data from 1996-2000 with current data is difficult. In particular, the staging criteria for lung, ovarian, and colorectal cancers have changed with Summary Stage 2000. However, differences in coding stage reflect a new understanding of the natural history of cancer, and the new criteria should improve the usefulness of staging as an accurate predictor of prognosis and survival for cases staged under the new system. The new guidelines are detailed in SEER Summary Staging Manual – 2000 available on the web at: http://seer.cancer.gov/tools/ssm/.

Changes in Reportable Cancers –The International Classification of Diseases for Oncology (ICD-O) has been the standard coding system for neoplasms for over 25 years. ICD-O includes a four-character code for primary site, four-digit numeric code for cell type, one-digit code for tumor behavior, and a one-digit code for tumor aggressiveness. An updated version of the ICD-O system, ICD-O-3, is now used for cases diagnosed on or after January 1, 2001.

The changes in ICD-O-3 do not affect primary site codes but there are significant changes regarding cell type (histology). This affects leukemias and lymphomas particularly. A small number of cancers that were coded as borderline behavior are now coded as malignant, including refractory anemia, polycythemia vera, papillary meningioma, and a number of other hematopoietic diseases. (See *Appendix A*.) There are a number of previously reported borderline tumors of the ovary that are now considered benign. This means that counts of ovarian cancers, lymphomas, leukemias, and some hematopoietic diseases will change due to changes in reportability or definition. As with coding of stage, it is difficult to compare cases for those cancer sites diagnosed on or after January 1, 2001, with data from prior years. Nevertheless, like Summary Stage 2000, these amendments reflect advances in the understanding of pathology and behavior of cancers.

Other changes in ICD-O-3 include new codes, terms, synonyms, and guidelines intended to improve accuracy and consistency of coding. The ICD-O-3 manual is available from the World Health Organization's North American distributor, WHO Publications Center USA, 49 Sheridan Avenue, Albany, NY 12210.

Oregon Mortality Data – Cancer mortality data include all deaths among Oregon residents with malignant tumors as the primary cause of death. These data exclude cases in which benign or *in situ* neoplasms or those of unknown behavior are listed as the cause of death, with the exception of newly reportable cases based on the adoption of ICD-O-3 in 2001.

All of the cancer mortality data were obtained from the Center for Health Statistics and Vital Records (CHS) death certificate data. CHS is the state's depository for all vital records and is a major information source for vital statistics and health survey data about Oregonians. Mortality data from this report are age-adjusted and are, therefore, not comparable to the crude rates published by CHS. Moreover, invalid age or cause of death codes are excluded, so mortality counts presented in this report may differ from data presented in CHS publications.

Changes in Cause of Death Coding – There has been a methodological change that alters how mortality data are presented but does not represent a true variation in the underlying burden of cancer in Oregon. In 1999, vital record departments across the nation were required to switch from the ninth revision of the International Classification of Diseases (ICD) to the tenth revision for recording cause of death. The ICD is the classification used to code and classify mortality data from death certificates. The ICD has been revised approximately every ten years since its inception in the late 1800's. The intent of the revisions is to better reflect medical advances in disease nomenclature and understanding of etiology. ICD-10 is far more detailed than ICD-9 with approximately 3,000 additional codes. ICD-10 also uses an alphanumeric system, whereas ICD-9 is numeric only. The ICD-10 system is closely compatible with the ICD-

Oncology (ICD-O) system used for reporting cancer cases, based on topography, or site of origin, whereas the ICD-9 system was not entirely compatible.

Although the ICD-10 and ICD-O systems correspond more directly with each other, switching to the ICD-10 system creates issues affecting the interpretation of the mortality data over time. Specifically for cancer deaths, the number of overall cancer deaths using the ICD-9 and the ICD-10 systems is essentially the same. However, causes of death are moved among different categories.

One notable change in cancer mortality coding involves lung cancer deaths. Lung cancer is classified as secondary to some other cancers in ICD-10. Therefore, some of the lung cancer deaths classified in ICD-9 were moved to one of 15 other primary sites in ICD-10. The result is a lower number of cancer deaths defined as lung cancer. *This is an artifact due to a change in classification and not a true change in mortality.*

Another important change for cancer death coding involves cancers with multiple primary sites. Using the ICD-9 system, individuals who died with two primary cancer sites were classified based on the site first listed on the death certificate. Under the new ICD-10 system, the same individuals are coded into the miscellaneous site group. The result is a higher rate of cancer death determined as miscellaneous cancer site and lower rates of cancer in sites with common secondary cancers such as oral cancer. *This is an artifact due to a change in classification and not a true change in mortality rates.*

An additional change in cancer coding in ICD-10 concerns mesothelioma. Mesothelioma is a rare form of cancer with cancerous cells found in the lining of the chest (pleura) or abdomen (peritoneum). This cancer was indistinguishable from respiratory and digestive system cancers in the ICD-9 system. The new ICD-10 coding creates a separate site code for these cases. The result is a decrease in the number of respiratory system cases, which comprise the majority of malignant mesotheliomas.

Oregon Screening Data – Cancer screening data were obtained from the Behavior Risk Factor Surveillance System (BRFSS) maintained by Oregon's Center for Health Statistics. BRFSS is an annual telephone survey of adults concerning health-related behaviors. Information is used to guide health promotion and disease prevention programs. BRFSS includes questions on health behavior risk factors such as seat belt use, diet, weight control, tobacco and alcohol use, physical exercise, preventive health screening, and use of preventive and other health care services.

Oregon Population Data – Denominators used to calculate Oregon incidence and mortality rates are population estimates from the Population Estimates Branch of the US Census Bureau. Denominator data for 1996-1999 were based on the State and County Characteristics Population Estimates from the 1990 and 2000 US Census. Denominator data for 2000-2002 were based on the National Center for Health Statistics (NCHS) estimates of the July 1, 2000-July 1, 2002, United States resident population from the Vintage 2002 postcensal series by year, age, sex, race, and Hispanic origin, prepared under a collaborative arrangement with the US Census Bureau 2003. Available on the Internet at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

Prior to the US 2000 Census, race was reported as only one category, whereas in 2000 respondents were allowed to report one

or more races. Registry data, or numerator data, are also single race categories. It is essential to have comparable numerator data (cancer counts) and denominator data (population counts) to calculate rates. Therefore, population data for years 2000 forward are 2000 US Census data bridged from a multiple race count to a single race population count. Allocation probabilities developed by the NCHS were applied to the Census Bureau's April 1, 2000, Modified Race Data Summary File population counts to assign multiple-race persons to single-race categories. See the NCHS website http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm for specific information about the bridging methodology.

National Data – National incidence data were calculated from the Surveillance, Epidemiology, and End Results (SEER) Program [www.seer.cancer.gov, SEER*Stat Database Incidence-SEER 9 Regs Public-Use, Nov 2003 Sub (1973-2001), National Cancer Institute (NCI), DCCPS, Surveillance Research Program (SRP), Cancer Statistics Branch (CSB), released April 2004, based on the Nov 2003 submission] SEER data were used to calculate a five-year aggregate rate for 1997-2001.

National race incidence data were calculated from the SEER Program [SEER*Stat Database Incidence - SEER 11 Regs + AK Public-Use, Nov 2003 Sub for Expanded Races (1992-2001), NCI, DCCPS, SRP, CSB, released Apr 2004, based on the Nov 2003 submission]

National ethnicity incidence data were calculated from the SEER Program [SEER*Stat Database Incidence - SEER 11 Regs Public-Use, Nov 2003 Sub for Hispanics (1992-2001), NCI, DCCPS, SRP, CSB, released April 2004, based on the Nov 2003 submission]

National mortality data and rankings were calculated using CDC Wonder at: http://wonder.cdc.gov/ and additional national incidence and national trend data were obtained from Jemal et al, (*Annual Report to the Nation on the Status of Cancer, 1975-2001, with a Special Feature Regarding Survival*) July 2004;101(1):3-27.

National incidence rankings were obtained from US Cancer Statistics Working Group. *United States Cancer Statistics: 1999-2001 Incidence and Mortality Web-based Report Version*. Atlanta (GA): Department of Health and Human Services, CDC, and NCI; 2004. Available at: www.cdc.gov/cancer/npcr/uscs.

National rates used in the Public-Use Database and CDC Wonder were calculated using national census 2000 population data for denominators.

B. Data Quality

Data Review – When OSCaR receives reports, they are closely reviewed and edited for quality control. The anatomical site of origin of the cancer was known and reported for 97.8% of cancers reported in 2002. Stage of progression of the cancer at the time of diagnosis was determined for 91.9% of cancers reported in 2002.

The accuracy and usability of OSCaR data has increased through efforts on several different levels. Data review protocols to review Hispanic ethnicity for American Indians and Filipinos have been instituted to increase accuracy of ethnicity data. A protocol for reviewing sex coding is currently being developed. Increased use of registry data in linkage projects through academic research as well as general registry operations like death clearance (see page 101) helps ensure that Registry data are reviewed and corrected on many levels in addition to the standard internal data review protocols.

One notable effort is in race coding for American Indians/Alaskan Natives (AI/AN). Due to a cooperative effort among state registries, the Northwest Portland Area Indian Health Board, the Indian Health Service (IHS), and the Centers for Disease Control, OSCaR links annually with local tribal clinic registry data and national IHS patient data to determine if AI/AN are miscoded as white or some other race. One-third of the AI/AN cases currently in the OSCaR database were identified as miscoded and have been corrected due to this effort.

In addition to internal Registry operations, OSCaR conducts audits of reporting hospitals and facilities across the state to assess quality and completeness of data maintained in the central registry. Initially, hospitals to be audited were selected based on the identification of reporting problems (i.e., a high number of missed cases). However, because overall reporting has improved from early years, the Registry now performs random facility audits every quarter. Hospitals are divided into groups based on the total number of hospital patients. The sampling method used ensures that all sizes of facilities are selected each time for auditing. OSCaR is beginning to audit other reporting facilities such as freestanding clinics and cancer centers.

External Data Review – Federal funding requires that OSCaR is audited by an outside agency every five years to assess the quality and completeness of registry data. In July 2003, Macro International Inc. conducted an audit of OSCaR data. The results of the audit estimated OSCaR's overall case completeness rate as 98.9%, and the overall data accuracy rate for 13 essential data elements was 96.0%. OSCaR was commended for exceeding national standards for both outcomes.

The North American Association of Central Cancer Registries (NAACCR) annually reviews cancer registries for their ability to produce complete, accurate, and timely data. The NAACCR certification program recognizes registries that meet the highest standards with a Gold or Silver Certification. OSCaR data for diagnosis year 2002 received Gold Certification. OSCaR has received certification for every year of complete data. Additional information about NAACCR certification is available on the web: http://www.naaccr.org/index.asp?Col_SectionKey=12&Col_ContentID=54.

C. Cancer Reporting

Reportable Cancers – Not all cancers diagnosed in Oregon are reportable to the Oregon State Cancer Registry (OSCaR). Cancers that are reportable include all malignant neoplasms that are *in situ* or invasive (ICD-O behavior codes 2 and 3) with the following exceptions:

- Basal and squamous cell carcinoma of the skin (except of genitalia)
- Carcinoma *in situ* of the cervix

Although incidence is high for these cancers, they have an extremely high treatment success rate. In addition, *in situ* cervical cancer is a diagnosis that is inconsistently used. Carcinoma *in situ* of the cervix overlaps with some diagnoses that indicate precancerous conditions.

Reporting Source – By law, outside of the above exceptions, all cancers diagnosed or treated in Oregon must be reported to OSCaR by the patient's physician. However, most hospitals retain cancer registrars that are trained to collect and report cancer cases in accordance with national standards. Most of the cases included in this report were reported from hospitals by cancer registrars. Some case reports originated from doctors' offices and a few from death certificates. Since cancer reporting started in 1996, 88% of new cancer diagnoses have come from hospitals, 11% from physician offices, and 1% were identified from review of death certificates. The remaining cases were identified by review of pathology reports from laboratories or by autopsy. Many of the physician office cases were initially identified through active follow-up from laboratory reports or death certificates, and the physician was queried for additional information.

Death Clearance – Death clearance is a process used to identify cases diagnosed by a physician but not reported to the Registry as well as cases diagnosed through autopsy. Death certificates are compared, or cleared, with Registry files. Deaths due to cancer that are not found in the Registry are investigated further by contacting the certifying physician listed on the certificate. Cases with no physician response and subsequent report are classified as death certificate only (DCO) cases. Cases for which a response and full report are received are classified as a physician office report. Deaths due to cancer diagnosed prior to the Registry's first reporting year, 1996, are not included in the Registry.

Full death clearance procedures were not necessary during the first few years of Registry operation since most of the cancer deaths were due to cancers diagnosed prior to 1996. Initially, death clearance was performed only for selected cancer sites that have known short-term survival. Death clearance on all sites was first performed for 1999 deaths.

Initial death clearance efforts focused on deaths due to cancers of the esophagus, liver, lung, pancreas, stomach, multiple myeloma, and cancers with unknown primaries for years 1996-1998. For the year 1998, lung cancer deaths were aggressively reviewed in this process. For the year 1999, death certificate review procedures were expanded to include all cancer sites. Consequently, there is a higher percentage of cases reported from death certificates since 1999. Typically, cancer cases identified by death certificate are the cases that had a poor prognosis often with the stage distant or not determinable due to health of the patient.

Due to increased review, more DCO cases were identified from 1999 to present. These

cases differ from other cases due to increased severity of disease and lack of information about the cases. DCO cases are staged unknown due to lack of information. This requires caution when comparing stage of diagnosis from year to year.

Changes in the death clearance process resulted in increased data quality and completeness for diagnosis year 2000 onward. Prior to 2000, Registry cases and the death certificate data were linked on Social Security Number in an external system. Any cancer deaths not reported in the Registry were followed back to the physician or hospital to see if they were missed cases. The death clearance process is now performed using an automated program within the main Registry system. The deterministic match criteria are extremely stringent and have resulted in the identification of thousands of discrepancies in demographic information between death certificate data and the Cancer Registry. The discrepancies are reviewed and corrected.

This process improves completeness of race data reporting by supplying race information from the death certificate on cases in the Registry that were reported as *unknown* race. Moreover, sex data reporting improved. Discrepancies between the death certificate and registry data for sex of male breast cases prompted further review of these cases. In 1999, 24 male breast cancer cases were reported. After review of each case, only 17 were actually male. Seven of the cases had been miscoded and were in fact female.

Primary Site Definitions – Cancer data presented in the current incidence and mortality sections of this report follow nationally accepted standards for groupings of site categories for analysis. Cancer groupings for analysis are classified using the National Cancer Institute's SEER Program Recodes. (Please see Appendices F and G.) The majority of neoplasms are grouped by the organ in which they originate. Neoplasms of the lymphatic, hematopoietic, and reticuloendothelial systems, however, are grouped by their histologies (leukemias, lymphomas, etc.), and not by the anatomic site where they occurred. Melanoma of the skin is a combination of both anatomic site and histologic type.

For mortality years 1996-1998, the ICD-9 codes did not directly match ICD-O codes. Therefore, minor discrepancies exist for those years between Oregon's Center for Health Statistics (CHS) counts and the mortality counts reported in this publication. Beginning in 1999, with the change to ICD-10 coding, mortality coding and counts match exactly for most sites. However, since 2001, the all-site mortality and miscellaneous cancer mortality differ due to the inclusion of newly reportable cancers which are excluded from the CHS counts. Additionally, cases of unknown age or invalid ICD-10 code are excluded from the data in this report, which also results in occasional differences in counts from CHS.

Multiple Primaries – The majority of cancer diagnoses reported to OSCaR were the first primary cancer diagnosed for the patient. However, nearly 20% of the cancer diagnoses occur in individuals with a previous cancer, so the number of cancer cases and number of people with cancer are not the same (not the number of individuals with cancer). Rates are calculated using the number of cancer cases as the numerator and population as the denominator.

Case Ascertainment/Completeness – The Registry conducts random case finding audits to monitor case reporting completeness from hospitals and contacts physician offices that

have a reduction in case reporting. Identifying missed cases through review of pathology reports and death certificates is part of normal Registry procedure. Data sharing agreements among neighboring states help identify Oregon patients diagnosed elsewhere.

The 2002 data have a greater than expected number of cases based on national models. The estimated percentage of case completeness is calculated in accordance with procedures outlined by the North American Association of Central Cancer Registries (NAACCR). However, using mathematical models based on national numbers to estimate reporting completeness for individual states has inherent limitations and is the subject of national debate.

D. Epidemiologic measures

Cancer Rates – In analyzing Oregon's cancer data, we looked at various measures commonly used in epidemiologic studies of cancer. One measure is a rate. Rates help compare the burden of disease across populations of various sizes.

Incidence rates provide information on the frequency with which cancers occur in the population. Incidence rates include cases of invasive cancer only in the rate calculation except in the case of cancer of the bladder, which includes *in situ* cases in the incidence rate calculations. The mortality rate describes the frequency of deaths due to cancer.

All rates in this report are per 100,000 population. Rates based on counts < 11 are likely unstable and are not presented.

Crude Rates – Crude rates are desirable when a summary measurement is needed and there is no need to adjust for confounding factors, such as age. Since cancer risk is very dependent upon age, age-adjusted rates are more useful measurements for comparison among regions, time periods, etc. Crude rates are not included in the tables in the annual report but are still reported for individual sites in the *Selected Sites* sections.

The denominators in Figure IX-1 can be used to calculate additional crude rates.

Figure IX-1

Oregon's Population by Year

Year	*Total*	*Male*	*Female*
1996	3,247,111	1,604,527	1,642,584
1997	3,304,469	1,634,309	1,670,160
1998	3,352,449	1,659,190	1,693,259
1999	3,393,941	1,681,715	1,712,226
2000	3,430,707	1,701,604	1,729,103
2001	3,472,629	1,723,589	1,749,040
2002	3,520,355	1,748,055	1,772,300

Age-Adjusted Rates – Age-adjusted rates are calculated to allow comparisons between two different populations (i.e., Oregon and the US) whose age distributions differ. Age-adjusted rates are calculated by the direct method, using the age distribution of the Year 2000 United States Standard Population. All age-adjusted rates are expressed as events per 100,000 individuals per year.

In the past, a number of different standard populations have been used. Most vital statistics data were age-adjusted using a standard population based on the 1940 United States population. Most cancer data were

age-adjusted using a standard population based on the 1970 United States population. Age-adjusted rates calculated using different standard populations are not comparable. All age-adjusted rates presented in this report are calculated using the Year 2000 Standard to ensure comparability.

The Year 2000 Standard has a higher percentage of individuals in the middle and older age groups. Hence, more weight is applied to cancer cases or deaths of individuals in these age groups using the direct standardization method. These are the same age groups that have higher numbers of cancer. Therefore, using the Year 2000 Standard for age-adjusting results in cancer rates that are higher than rates using older population standards.

Childhood Cancer Classification – The classification system used in this report to record the occurrence of childhood cancer is the International Classification of Childhood Cancer (ICCCO), which was developed by the World Health Organization's International Agency for Research on Cancer (IARC). This system places a greater emphasis on tumor morphology than does the International Classification of Diseases (ICD) classification system, which emphasizes tumor location. Childhood cancers are defined as cancers diagnosed in individuals less than 15 years of age. The five-year age group stratification for childhood cancers is 0-4, 5-9, and 10-14. The following are included in the IARC classification system for lymphomas: Hodgkin lymphoma, non-Hodgkin lymphoma, Burkitt lymphoma, Histiocytosis X, unspecified lymphomas, and other reticuloendothelial neoplasms. Histologic confirmation is obtained on nearly every diagnoses of childhood cancer reported to OSCaR.

Geographic Comparisons

County Comparisons – This report compares incidence and mortality rates across county geographic boundaries. These analyses may help target screening and/or educational efforts. Because some counties with small populations only have a few cases reported, rates for those counties are unstable and must be interpreted with caution.

Regional Comparisons – Regional maps depict "smoothed" or fitted county rates and should not be used to evaluate individual county rates. Data smoothing is a statistical technique intended to limit the influence of randomness in data. Through this process, information (cancer rates) is interpolated or "borrowed" from neighboring areas to stabilize results for less populated areas.

The statistical algorithm used for the regional maps is a weighted, median-based method intended for non-point, spatial data called "head-banging". The observed rate for each county is compared to the median rates of neighboring counties. The county rates are weighted by population size to ensure that statistically stable rates are not modified based on rates from sparsely populated counties. Please see http://srab.cancer.gov/headbang/ for additional information.

This process stabilizes the county cancer rates for counties with low population density to allow potential, geographic patterns to emerge. However, the smoothed rates for individual counties are not appropriate for single county comparisons. To compare single county rates, please use the county rates presented in Tables 3 and 4.

Incidence Counts – All primary reportable malignancies diagnosed among Oregon residents are reported to OSCaR. Cases are categorized based on the International Classification of Diseases for Oncology (ICD-O) and are presented using the Surveillance, Epidemiology, and End Results (SEER) Program recodes. (*See Appendix F.*)

Cancer counts represent the number of primary cancers reported to OSCaR, not the number of persons with cancers. People may be diagnosed with more than one primary tumor (e.g. lung cancer and Hodgkin Lymphoma), and, therefore, counted as more than one case. About 20% of the cases reported to OSCaR occur in a person who has already been diagnosed with another cancer.

The number of cancers is reported in two ways – *total* cancers and *invasive* cancers. The invasive cancer category excludes *in situ* cancers with the exception of urinary bladder cancer. The *Total* cancer category includes all cancers, regardless of stage at diagnosis, with the exception of cervical cancer since *in situ* cervical cancer is not reported to the Registry.

The *All Sexes* and *Total* categories used in this report for cancer incidence include cases defined as male, female, and other (i.e., hermaphrodite, transsexual) and may exceed the total of male and female alone.

Prognosis and Burden – Several methods are used to measure the prognosis and burden of cancer within a defined population. In this report we use two such measures: the mortality to incidence ratio (M/I ratio) and the years of potential life lost (YPLL).

The M/I ratio provides a measure of disease severity. The M/I ratio is the number of deaths among a population divided by the number of invasive cases (of that particular cancer) within the same population. In general, the closer a value is to 1.0, the poorer the prognosis for that cancer site. Occasionally, a M/I ratio will exceed 1.0 when there are more deaths than diagnoses within a particular time period.

The years of potential life lost (YPLL) index quantifies premature mortality from cancer occurring in younger age groups. Lost potential years can be interpreted as lost productive years (both economic and non-economic) that a person dying prematurely of cancer would have contributed to society if he or she had survived. A person dying of cancer at age 35 years would have had 30 more years of potential life lost than a person dying of cancer at age 65.

Race and Ethnicity – The data used in the Race and Ethnicity section of the overview do not include those cases with race or ethnicity listed as “unknown”. The “Unknown” race category is the second most frequently reported after “white” (3% of cases in 2002) and is the second most frequently reported Hispanic origin category after “Non-Hispanic” (6% of cases in 2002). There are ongoing registry efforts to improve the quality of race and ethnicity reporting from hospitals.

Software – All incidence and mortality counts, including counts used for the analysis of stage at diagnosis, crude and age-adjusted rates, and current (5-year) trends were generated using SEER*Stat [Surveillance Research Program, National Cancer Institute SEER*Stat software (www.seer.cancer.gov/seerstat) Version 5.2.2., April 2004]. Data were formatted for SEER*Stat using SEER Prep [Surveillance Research Program, National Cancer

Institute SEER*Prep software Version 2.3.0., September 2004]. Historical, six-year trends were calculated using Joinpoint Regression Software [(www.srab.cancer.gov/joinpoint) Version 2.7, September 2003, National Cancer Institute]. Smoothed rates for regional maps were calculated using Headbang [Hansen Simonson and Surveillance Research Program, NCI Headbang software (http://srab.cancer.gov/headbang) Version 3.0].

Trends – All trends are calculated using age-adjusted rates and are reported as an annual percent change (APC). The APC is calculated by fitting a weighted, least squares regression line to the natural logarithm of the rates, using year as a regressor variable.

Current Five-Year Trends – These trends are calculated using two-year averages of the age-adjusted rates as endpoints. The purpose of these trends is to allow comparison of general Oregon trends with national trends based on direction (increase or decrease) and slope (rapid or slow change). This trend analysis is intended to describe broad, temporal changes of cancer rates in Oregon.

Historical Trends – Historical trends are calculated using age-adjusted rates for all years of data (1996-2002, seven years, for this report). Because of limitations due to a small number of years of data, analysis was done assuming no joinpoints (constant annual percent change for all years) and were then compared to results using one joinpoint to determine if any change in trends is statistically significant. The number of joinpoints considered statistically significant is determined using the permutation test. In subsequent years, the number of joinpoints analyzed will increase with increasing years of data available for analysis.

The purpose of these trends is to determine if there are any recent changes in Oregon trends. This trend analysis is intended to describe temporal changes in Oregon cancer rates with greater precision. Please review Kim et al document listed in the reference for further information.

X. Statistical Tables

The following tables show cancer incidence and mortality data for Oregonians. The cancer incidence rates represent invasive cancers only, *in situ* cases are excluded with the exception of bladder cancers. The counts will differ from the cancer incidence counts reported as *All Cases* totals in the *Selected Sites* section. All rates are age-adjusted to the year 2000 US (18 age groups) standard and per 100,000 population.

A. State Data Tables Overview

The incidence and mortality tables are broken down by site, year, and sex. The *All Sexes* category includes cancer cases of males, females, transsexuals, and other; therefore, *All Sexes* may exceed the total of male and female alone.

"APC" is the trend–-the average, current, five-year annual percent change. The current APC for trends may differ from the historical (seven-year) trends reported in the *Executive Summary* and *Selected Sites* sections. Any current trend with an asterisk (*) is statistically stable.

Rates based on small numbers of events for a given period of time or for a rare cancer must be viewed with caution. A small number of events results in considerable random variation in the rate estimates, thus limiting their usefulness. If the number of cancer events (new cases or deaths) is 10 or fewer, the calculated rate is considered unstable. In the tables, such a rate is not shown and is replaced by a carat (^). If the number of average cases per year is 10 or fewer, the trend is not shown and is replaced by a caret (^).

TABLE 1: CANCER INCIDENCE By Site, Year, and Sex		ALL SEXES		MALE		FEMALE	
Primary Sites	Year	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend
ALL SITES	**Annual Average**	**17,151**	**487.5**	**8,710**	**553.6**	**8,439**	**442.1**
	5-Year APC (Trend)		-0.9		-1.4		-0.5
	1998	16,463	483.2	8,378	551.0	8,085	436.1
	1999	17,512	506.5	8,952	581.9	8,558	454.9
	2000	17,164	488.6	8,691	554.3	8,472	443.3
	2001	17,493	490.2	8,900	555.9	8,591	445.2
	2002	**17,129**	**469.3**	**8,637**	**525.8**	**8,490**	**430.9**
BONES AND JOINTS	**Annual Average**	**32**	**0.9**	**19**	**1.1**	**13**	**0.7**
	5-Year APC (Trend)		+3.4		-1.4		+11.4
	1998	31	0.9	23	1.4	8	^
	1999	32	0.9	17	1.0	15	0.8
	2000	29	0.8	18	1.0	11	0.6
	2001	32	0.9	15	0.9	17	1.0
	2002	**38**	**1.1**	**23**	**1.4**	**15**	**0.8**
BRAIN AND CNS	**Annual Average**	**247**	**7.1**	**145**	**8.8**	**103**	**5.6**
	5-Year APC (Trend)		+0.3		-0.7		+1.7
	1998	243	7.2	144	9.0	99	5.5
	1999	225	6.6	137	8.4	88	4.9
	2000	264	7.5	153	9.2	111	6.0
	2001	249	7.1	141	8.5	108	5.8
	2002	**256**	**7.1**	**149**	**8.6**	**107**	**5.5**
Brain	**Annual Average**	**235**	**6.7**	**138**	**8.3**	**97**	**5.2**
	5-Year APC (Trend)		+0.4		-0.2		+1.2
	1998	229	6.7	136	8.5	93	5.1
	1999	218	6.4	133	8.1	85	4.8
	2000	244	6.9	141	8.5	103	5.5
	2001	240	6.8	136	8.2	104	5.6
	2002	**242**	**6.7**	**144**	**8.4**	**98**	**5.0**
BREAST	**Annual Average**	**2,765**	**78.3**	**16**	**1.0**	**2,749**	**145.8**
	5-Year APC (Trend)		-1.4		+4.4		-1.3
	1998	2,659	78.0	10	0.6	2,649	145.4
	1999	2,868	82.8	21	1.4	2,847	153.8
	2000	2,742	77.7	16	1.1	2,726	144.3
	2001	2,809	78.2	16	1.0	2,793	146.1
	2002	**2,749**	**74.8**	**19**	**1.1**	**2,730**	**139.8**
DIGESTIVE SYSTEM	**Annual Average**	**2,938**	**82.9**	**1,545**	**99.1**	**1,393**	**69.9**
	5-Year APC (Trend)		-1.5		-2.2		-0.4
	1998	2,839	82.8	1,531	102.0	1,308	67.3
	1999	2,992	85.9	1,512	99.4	1,480	75.0
	2000	3,029	85.6	1,622	104.2	1,407	70.5
	2001	2,894	80.5	1,565	98.8	1,329	66.0
	2002	**2,936**	**79.6**	**1,494**	**91.3**	**1,442**	**70.4**

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard

APC = Average Annual Percent Change

Counts for *All Sexes* may exceed male/female combined due to additional sex coding

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

n/a = not applicable

TABLE 1: CANCER INCIDENCE By Site, Year, and Sex		ALL SEXES		MALE		FEMALE	
Primary Sites	Year	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend
Colon and Rectum	**Annual Average**	**1,777**	**50.1**	**893**	**57.6**	**884**	**44.2**
	5-Year APC (Trend)		-2.6		-2.8		-2.1
	1998	1,731	50.5	890	59.4	841	43.1
	1999	1,859	53.3	885	58.6	974	49.3
	2000	1,830	51.8	943	61.0	887	44.3
	2001	1,743	48.4	905	57.6	838	41.5
	2002	**1,720**	**46.5**	**842**	**51.8**	**878**	**42.6**
Esophagus	**Annual Average**	**186**	**5.2**	**141**	**8.9**	**45**	**2.2**
	5-Year APC (Trend)		**+3.4**		**+3.4**		**+2.1**
	1998	**158**	**4.6**	**127**	**8.3**	**31**	**1.6**
	1999	**168**	**4.9**	**122**	**8.1**	**46**	**2.4**
	2000	**207**	**5.9**	**149**	**9.5**	**58**	**3.0**
	2001	**206**	**5.8**	**153**	**9.5**	**53**	**2.6**
	2002	**189**	**5.1**	**153**	**9.2**	**36**	**1.7**
Gallbladder	**Annual Average**	**34**	**1.0**	**8**	**0.5**	**26**	**1.3**
	5-Year APC (Trend)		*+15.1		^		+16.2
	1998	21	0.6	6	^	15	0.8
	1999	32	0.9	5	^	27	1.3
	2000	34	1.0	9	^	25	1.2
	2001	38	1.0	10	^	28	1.3
	2002	**44**	**1.2**	**10**	^	**34**	**1.7**
Liver and Intrahepatic Bile Duct	**Annual Average**	**138**	**3.9**	**91**	**5.6**	**47**	**2.4**
	5-Year APC (Trend)		-0.1		-2.1		+3.2
	1998	119	3.5	83	5.3	36	1.9
	1999	147	4.2	92	5.8	55	2.8
	2000	153	4.3	108	6.6	45	2.3
	2001	130	3.6	81	4.9	49	2.5
	2002	**140**	**3.8**	**91**	**5.2**	**49**	**2.5**
Liver	**Annual Average**	**117**	**3.3**	**80**	**4.8**	**37**	**1.9**
	5-Year APC (Trend)		+0.5		-1.0		+2.5
	1998	102	3.0	72	4.6	30	1.6
	1999	127	3.6	79	4.9	48	2.5
	2000	121	3.4	93	5.6	28	1.4
	2001	107	2.9	71	4.3	36	1.8
	2002	**126**	**3.4**	**83**	**4.7**	**43**	**2.2**
Pancreas	**Annual Average**	**378**	**10.7**	**182**	**11.7**	**196**	**9.8**
	5-Year APC (Trend)		-1.0		-1.2		-0.8
	1998	365	10.6	166	11.2	199	10.2
	1999	404	11.6	195	12.7	209	10.5
	2000	346	9.8	177	11.5	169	8.5
	2001	385	10.7	198	12.6	187	9.2
	2002	**388**	**10.6**	**172**	**10.7**	**216**	**10.4**

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard

APC = Average Annual Percent Change

Counts for *All Sexes* may exceed male/female combined due to additional sex coding

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

n/a = not applicable

TABLE 1: CANCER INCIDENCE By Site, Year, and Sex		ALL SEXES		MALE		FEMALE	
Primary Sites	Year	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend
Small Intestine	**Annual Average**	**54**	**1.5**	**30**	**1.9**	**24**	**1.2**
	5-Year APC (Trend)		+1.7		-2.1		+6.9
	1998	53	1.6	33	2.2	20	1.1
	1999	50	1.4	28	1.8	22	1.1
	2000	55	1.6	28	1.8	27	1.4
	2001	52	1.5	31	1.9	21	1.1
	2002	**61**	**1.7**	**32**	**1.9**	**29**	**1.5**
Stomach	**Annual Average**	**208**	**5.9**	**137**	**8.9**	**71**	**3.5**
	5-Year APC (Trend)		-4.1		*-8.9		+5.5
	1998	227	6.6	167	11.3	60	3.1
	1999	195	5.6	134	8.9	61	3.1
	2000	232	6.5	142	9.0	90	4.4
	2001	177	5.0	115	7.3	62	3.1
	2002	**208**	**5.7**	**128**	**7.9**	**80**	**4.0**
ENDOCRINE SYSTEM	**Annual Average**	**248**	**7.1**	**70**	**4.1**	**178**	**10.1**
	5-Year APC (Trend)		*+2.6		-2.7		*5.1
	1998	232	6.8	73	4.4	159	9.2
	1999	235	6.8	73	4.4	162	9.2
	2000	250	7.2	67	4.0	183	10.4
	2001	257	7.3	65	3.8	192	10.8
	2002	**268**	**7.5**	**72**	**4.1**	**196**	**10.9**
Thyroid	**Annual Average**	**231**	**6.6**	**61**	**3.6**	**170**	**9.7**
	5-Year APC (Trend)		*+3.6		-3.2		*+6.6
	1998	213	6.3	65	3.9	148	8.5
	1999	213	6.2	64	3.8	149	8.5
	2000	232	6.7	56	3.3	176	10.0
	2001	248	7.1	61	3.6	187	10.6
	2002	**251**	**7.0**	**60**	**3.4**	**191**	**10.6**
EYE AND ORBIT	**Annual Average**	**36**	**1.0**	**19**	**1.2**	**17**	**0.9**
	5-Year APC (Trend)		+1.8		-1.3		+3.5
	1998	36	1.1	17	1.1	19	1.1
	1999	34	1.0	24	1.5	10	^
	2000	37	1.1	16	1.0	21	1.1
	2001	29	0.8	17	1.0	12	0.6
	2002	**44**	**1.2**	**21**	**1.2**	**23**	**1.2**
GENITAL SYSTEM FEMALE	**Annual Average**	**966**	**51.4**	**n/a**	**n/a**	**965**	**51.4**
	5-Year APC (Trend)		-2.4		n/a		-2.4
	1998	939	51.7	n/a	n/a	939	51.7
	1999	987	53.3	n/a	n/a	986	53.3
	2000	1,031	54.9	n/a	n/a	1,031	54.9
	2001	953	50.2	n/a	n/a	953	50.2
	2002	**918**	**47.0**	**n/a**	**n/a**	**918**	**47.0**

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Counts for *All Sexes* may exceed male/female combined due to additional sex coding

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

n/a = not applicable

TABLE 1: CANCER INCIDENCE By Site, Year, and Sex		ALL SEXES		MALE		FEMALE	
Primary Sites	Year	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend
Cervix Uteri	**Annual Average**	**144**	**8.1**	**n/a**	**n/a**	**144**	**8.1**
	5-Year APC (Trend)		-4.4		n/a		-4.4
	1998	148	8.5	n/a	n/a	148	8.5
	1999	150	8.6	n/a	n/a	150	8.6
	2000	150	8.4	n/a	n/a	150	8.4
	2001	144	8.0	n/a	n/a	144	8.0
	2002	**126**	**7.0**	**n/a**	**n/a**	**126**	**7.0**
Ovary	**Annual Average**	**294**	**15.5**	**n/a**	**n/a**	**294**	**15.5**
Trend should be	5-Year APC (Trend)		-4.6		n/a		-4.6
interpreted with caution	1998	291	16.0	n/a	n/a	291	16.0
for this site, due to	1999	305	16.5	n/a	n/a	305	16.5
changes in ICD-O-3	2000	319	16.9	n/a	n/a	319	16.9
coding, affecting data	2001	295	15.2	n/a	n/a	295	15.2
from 2001 forward.	**2002**	**260**	**13.1**	**n/a**	**n/a**	**260**	**13.1**
Uterus	**Annual Average**	**452**	**23.9**	**n/a**	**n/a**	**452**	**23.9**
	5-Year APC (Trend)		-0.8		n/a		-0.8
	1998	430	23.5	n/a	n/a	430	23.5
	1999	459	24.5	n/a	n/a	459	24.5
	2000	470	24.9	n/a	n/a	470	24.9
	2001	448	23.6	n/a	n/a	448	23.6
	2002	**453**	**23.0**	**n/a**	**n/a**	**453**	**23.0**
GENITAL SYSTEM MALE	**Annual Average**	**2,755**	**174.6**	**2,755**	**174.6**	**n/a**	**n/a**
	5-Year APC (Trend)		-1.2		-1.7		n/a
	1998	2,535	166.4	2,535	166.4	n/a	n/a
	1999	2,969	193.1	2,969	193.1	n/a	n/a
	2000	2,764	175.8	2,764	175.8	n/a	n/a
	2001	2,850	177.5	2,850	177.5	n/a	n/a
	2002	**2,656**	**160.9**	**2,656**	**160.9**	**n/a**	**n/a**
Prostate	**Annual Average**	**2,619**	**166.7**	**2,618**	**166.7**	**n/a**	**n/a**
	5-Year APC (Trend)		-1.9		-1.9		n/a
	1998	2,412	159.1	2,412	159.1	n/a	n/a
	1999	2,841	185.6	2,841	185.6	n/a	n/a
	2000	2,625	167.7	2,625	167.7	n/a	n/a
	2001	2,698	168.8	2,698	168.8	n/a	n/a
	2002	**2,519**	153.1	**2,519**	153.1	**n/a**	**n/a**
Testis	**Total**	**123**	**7.1**	**123**	**7.1**	**n/a**	**n/a**
	5-Year APC (Trend)		+2.3		+2.1		n/a
	1998	115	6.7	115	6.7	n/a	n/a
	1999	119	6.9	119	6.9	n/a	n/a
	2000	120	6.9	120	6.9	n/a	n/a
	2001	134	7.6	134	7.6	n/a	n/a
	2002	**126**	**7.1**	**126**	**7.1**	**n/a**	**n/a**

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* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

n/a = not applicable

TABLE 1: CANCER INCIDENCE By Site, Year, and Sex		ALL SEXES		MALE		FEMALE	
Primary Sites	Year	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend
KAPOSI SARCOMA	**Total**	**10**	**0.3**	**9**	**0.5**	**1**	**^**
	5-Year APC (Trend)		^		^		^
	1998	14	0.4	11	0.7	3	^
	1999	8	^	8	^	0	^
	2000	13	0.4	12	0.7	1	^
	2001	7	^	7	^	0	^
	2002	**6**	**^**	**6**	**^**	**0**	**^**
LEUKEMIAS	**Total**	**407**	**11.7**	**230**	**14.6**	**177**	**9.3**
Trend should be inter-	5-Year APC (Trend)		-2.4		-2.2		-2.0
preted with caution for	1998	388	11.5	223	14.6	165	8.9
this site, due to changes	1999	437	12.7	250	16.1	187	9.8
in ICD-O-3 coding, affecting	2000	399	11.4	209	13.4	189	9.8
data from 2001 forward.	2001	454	12.8	258	16.3	196	10.3
	2002	**359**	**10.0**	**209**	**12.8**	**150**	**7.7**
LYMPHOMAS	**Annual Average**	**784**	**22.3**	**417**	**26.0**	**367**	**19.2**
Trend should be inter-	5-Year APC (Trend)		+0.4		-0.5		+1.4
preted with caution for	1998	740	21.7	396	25.5	344	18.3
this site, due to changes	1999	786	22.7	418	26.7	368	19.6
in ICD-O-3 coding, affecting	2000	794	22.6	432	27.2	362	18.9
data from 2001 forward.	2001	775	21.7	408	24.8	367	19.0
	2002	**825**	**22.6**	**429**	**25.8**	**396**	**20.0**
Hodgkin	**Annual Average**	**91**	**2.6**	**51**	**3.0**	**40**	**2.3**
Disease	5-Year APC (Trend)		-0.3		-3.6		+4.2
Trend should be inter-	1998	92	2.7	56	3.3	36	2.1
preted with caution for	1999	96	2.8	51	3.0	45	2.6
this site, due to changes	2000	88	2.5	54	3.2	34	1.9
in ICD-O-3 coding, affecting	2001	74	2.1	40	2.3	34	2.0
data from 2001 forward.	**2002**	**105**	**3.0**	**54**	**3.1**	**51**	**2.9**
Non-Hogkin	**Annual Average**	**693**	**19.6**	**366**	**23.0**	**327**	**16.9**
Lymphoma	5-Year APC (Trend)		+0.5		+0.0		+1.0
Trend should be inter-	1998	648	19.0	340	22.1	308	16.3
preted with caution for	1999	690	19.9	367	23.7	323	17.0
this site, due to changes	2000	706	20.1	378	24.0	328	17.0
in ICD-O-3 coding, affecting	2001	701	19.5	368	22.5	333	17.0
data from 2001 forward.	**2002**	**720**	**19.7**	**375**	**22.7**	**345**	**17.1**
MESOTHELIOMA	**Annual Average**	**46**	**1.3**	**39**	**2.6**	**7**	**0.4**
	5-Year APC (Trend)		+1.0		+3.0		^
	1998	40	1.2	32	2.2	8	^
	1999	54	1.6	46	3.0	8	^
	2000	47	1.3	38	2.5	9	^
	2001	37	1.1	29	1.9	8	^
	2002	**54**	**1.5**	**50**	**3.1**	**4**	**^**

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* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

n/a = not applicable

TABLE 1: CANCER INCIDENCE By Site, Year, and Sex		ALL SEXES		MALE		FEMALE	
Primary Sites	Year	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend
MYELOMA	**Annual Average**	**183**	**5.2**	**105**	**6.7**	**78**	**4.0**
	5-Year APC (Trend)		+1.0		+0.7		+0.9
	1998	175	5.1	103	6.8	72	3.8
	1999	178	5.1	98	6.5	80	4.2
	2000	169	4.8	97	6.3	72	3.7
	2001	202	5.6	120	7.4	82	4.1
	2002	**189**	**5.2**	**107**	**6.6**	**82**	**4.1**
ORAL CAVITY AND PHARYNX	**Annual Average**	**395**	**11.2**	**261**	**16.1**	**133**	**6.9**
	5-Year APC (Trend)		-2.3		-2.8		-1.6
	1998	401	11.8	258	16.5	143	7.7
	1999	394	11.3	269	16.9	125	6.5
	2000	386	11.0	262	16.3	124	6.4
	2001	408	11.3	269	16.2	139	7.1
	2002	**385**	**10.5**	**249**	**14.5**	**136**	**6.9**
RESPIRATORY SYSTEM	**Annual Average**	**2,632**	**75.1**	**1,421**	**91.4**	**1,210**	**63.0**
	5-Year APC (Trend)		-1.9		*-3.0		-0.9
	1998	2,629	77.2	1,452	96.8	1,177	62.8
	1999	2,687	77.9	1,458	95.8	1,229	65.1
	2000	2,596	74.2	1,407	90.9	1,189	61.9
	2001	2,668	75.3	1,388	87.5	1,280	66.0
	2002	**2,578**	**71.3**	**1,401**	**86.7**	**1,177**	**59.6**
Larynx	**Annual Average**	**114**	**3.2**	**90**	**5.6**	**23**	**1.3**
	5-Year APC (Trend)		*-6.8		*-5.1		*-13.9
	1998	123	3.6	95	6.2	28	1.5
	1999	123	3.6	95	6.1	28	1.5
	2000	113	3.2	89	5.5	24	1.3
	2001	107	3.0	86	5.2	21	1.1
	2002	**102**	**2.8**	**86**	**5.2**	**16**	**0.8**
Lung and Bronchus	**Annual Average**	**2,489**	**71.0**	**1,314**	**84.7**	**1,174**	**61.1**
	5-Year APC (Trend)		-1.7		*-3.0		-0.6
	1998	2,478	72.8	1,342	89.5	1,136	60.6
	1999	2,536	73.5	1,345	88.6	1,191	63.0
	2000	2,456	70.2	1,302	84.5	1,154	60.0
	2001	2,531	71.4	1,287	81.3	1,244	64.1
	2002	**2,444**	**67.6**	**1,295**	**80.4**	**1,149**	**58.2**
SKIN	**Annual Average**	**840**	**23.9**	**457**	**28.1**	**383**	**21.1**
Excludes Basal and	5-Year APC (Trend)		+1.9		+2.1		+2.3
Squamous Carcinoma	1998	779	22.9	416	26.2	363	20.6
	1999	794	23.0	449	28.0	345	19.1
	2000	851	24.3	449	28.0	402	22.3
	2001	898	25.2	499	30.2	399	21.8
	2002	**879**	**24.1**	**474**	**28.1**	**405**	**21.7**

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^ Rate is not calculated due to instability of small numbers

n/a = not applicable

TABLE 1: CANCER INCIDENCE By Site, Year, and Sex		ALL SEXES		MALE		FEMALE	
Primary Sites	Year	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend	Invasive Cancer Counts	Rate/ Current Trend
Melanomas of Skin	**Annual Average**	**795**	**22.6**	**433**	**26.5**	**362**	**20.0**
	5-Year APC (Trend)		+2.0		+2.1		+2.4
	1998	736	21.7	395	24.8	341	19.4
	1999	752	21.8	425	26.4	327	18.2
	2000	802	22.9	423	26.2	379	21.1
	2001	854	24.0	470	28.4	384	21.0
	2002	**831**	**22.8**	**452**	**26.7**	**379**	**20.3**
SOFT TISSUE INCLUDING HEART	**Annual Average**	**104**	**3.0**	**55**	**3.4**	**48**	**2.6**
	5-Year APC (Trend)		-0.7		-1.8		+1.9
	1998	96	2.8	54	3.5	42	2.3
	1999	104	3.0	56	3.5	48	2.6
	2000	114	3.3	62	3.9	52	2.8
	2001	101	2.8	43	2.6	58	3.2
	2002	**103**	**2.8**	**61**	**3.5**	**42**	**2.3**
URINARY SYSTEM	**Annual Average**	**1,272**	**36.1**	**906**	**58.3**	**366**	**18.8**
	5-Year APC (Trend)		-0.5		-1.0		+1.0
	1998	1,238	36.3	885	59.0	353	18.6
	1999	1,301	37.6	941	61.8	359	18.8
	2000	1,200	34.0	850	54.4	350	17.9
	2001	1,304	36.3	927	58.8	376	19.0
	2002	**1,318**	**36.1**	**927**	**57.5**	**391**	**19.4**
Bladder	**Annual Average**	**849**	**24.1**	**642**	**41.9**	**207**	**10.4**
	5-Year APC (Trend)		-1.4		-1.5		-1.2
	1998	846	24.7	626	42.2	220	11.4
	1999	874	25.2	676	44.9	197	10.1
	2000	799	22.7	612	39.6	187	9.4
	2001	873	24.3	653	42.2	219	10.9
	2002	**855**	**23.5**	**643**	**40.5**	**212**	**10.3**
Kidney and Renal Pelvis	**Annual Average**	**392**	**11.1**	**246**	**15.2**	**146**	**7.7**
	5-Year APC (Trend)		+2.3		+1.0		+4.3
	1998	357	10.5	236	15.3	121	6.6
	1999	395	11.5	247	15.6	148	8.0
	2000	369	10.5	219	13.6	150	7.8
	2001	404	11.2	256	15.4	148	7.7
	2002	**435**	**11.9**	**270**	**16.1**	**165**	**8.4**
MISCELLANEOUS SITES A trend cannot be calculated for this category, due to changes in coding, affecting cases diagnosed from 2001 forward.	**Annual Average**	**492**	**13.8**	**242**	**15.9**	**249**	**12.3**
	5-Year APC (Trend)		n/a		n/a		n/a
	1998	449	13.1	215	14.6	234	11.9
	1999	427	12.2	206	14.0	221	11.0
	2000	449	12.6	217	14.3	232	11.2
	2001	566	15.6	283	18.2	282	13.7
	2002	**567**	**15.4**	**288**	**18.0**	**278**	**13.5**

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard

APC = Average Annual Percent Change

Counts for *All Sexes* may exceed male/female combined due to additional sex coding

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

n/a = not applicable

TABLE 2: CANCER MORTALITY By Site, Year, and Sex		TOTAL		MALE		FEMALE	
Primary Sites	Year	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend
ALL CAUSES OF DEATH	**Annual Average**	**29,890**	**831.4**	**14,704**	**987.4**	**15,185**	**709.2**
	5-Year APC Trend		-0.6		-1.3		-0.0
	1998	29,345	849.0	14,626	1027.2	14,719	712.1
	1999	29,356	834.5	14,430	992.5	14,926	709.6
	2000	29,541	824.0	14,491	976.9	15,050	704.0
	2001	30,125	821.7	14,688	964.5	15,437	710.0
	2002	**31,081**	**828.3**	**15,286**	**977.4**	**15,795**	**710.9**
ALL MALIGNANT CANCERS	**Annual Average**	**7,087**	**198.6**	**3,640**	**238.4**	**3,492**	**172.2**
	5-Year APC Trend		*-0.6		*-1.1		-0.2
	1998	7,008	204.3	3,599	245.8	3,409	176.7
	1999	6,904	198.2	3,572	241.4	3,332	170.0
	2000	6,989	197.5	3,584	237.2	3,405	171.2
	2001	7,199	199.7	3,712	240.4	3,712	172.7
	2002	**7,334**	**199.2**	**3,732**	**235.1**	**3,602**	**174.8**
BONES AND JOINTS	**Annual Average**	**12**	**0.4**	**8**	**0.5**	**4**	**0.2**
	5-Year APC Trend		-1.2		^		^
	1998	9	^	5	^	4	^
	1999	14	0.4	9	^	5	^
	2000	18	0.5	12	0.7	6	^
	2001	9	^	7	^	2	^
	2002	**12**	**0.3**	**8**	**^**	**4**	**^**
BRAIN AND CNS	**Annual Average**	**198**	**5.6**	**112**	**6.9**	**86**	**4.6**
	5-Year APC Trend		-1.5		-2.5		-0.6
	1998	229	6.7	129	8.1	100	5.5
	1999	155	4.5	96	6.0	59	3.2
	2000	195	5.5	106	6.5	89	4.7
	2001	194	5.4	109	6.6	85	4.4
	2002	**218**	**5.9**	**122**	**7.0**	**96**	**4.9**
BREAST	**Annual Average**	**512**	**14.4**	**4**	**0.3**	**508**	**26.1**
	5-Year APC Trend		-2.6		^		-2.4
	1998	531	15.5	6	^	525	27.8
	1999	513	14.7	3	^	510	26.6
	2000	484	13.7	2	^	482	24.7
	2001	530	14.7	7	^	523	26.5
	2002	**503**	**13.6**	**2**	**^**	**501**	**24.7**
DIGESTIVE SYSTEM	**Annual Average**	**1,565**	**43.9**	**853**	**55.7**	**711**	**34.6**
	5-Year APC Trend		-0.1		+1.2		-1.8
	1998	1,502	43.8	789	53.6	713	36.1
	1999	1,551	44.4	833	55.6	718	35.5
	2000	1,533	43.1	842	55.0	691	33.5
	2001	1,628	45.0	904	58.2	724	34.6
	2002	**1,609**	**43.3**	**899**	**55.8**	**710**	**33.4**

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YPLL calculations are rounded to the nearest whole year

APC = Average Annual Percent Change

Counts may not match Center for Health Statistics publications because invalid ages and site codes are excluded from the data

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

n/a = Not Applicable

TABLE 2: CANCER MORTALITY By Site, Year, and Sex		TOTAL		MALE		FEMALE	
Primary Sites	Year	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend
Colon and Rectum	**Annual Average**	**671**	**18.8**	**345**	**22.9**	**325**	**15.6**
	5-Year APC Trend		-1.9		-0.1		*-3.6
	1998	670	19.5	334	22.9	336	16.6
	1999	687	19.6	349	23.8	338	16.5
	2000	629	17.6	314	20.7	315	15.1
	2001	702	19.3	375	24.4	327	15.3
	2002	**665**	**17.8**	**354**	**22.4**	**311**	**14.4**
Esophagus	**Annual Average**	**177**	**5.0**	**136**	**8.7**	**41**	**2.0**
	5-Year APC Trend		+2.6		+2.8		+1.1
	1998	164	4.8	121	8.0	43	2.2
	1999	166	4.8	127	8.3	39	2.0
	2000	168	4.8	134	8.7	34	1.7
	2001	203	5.6	161	10.1	42	2.0
	2002	**186**	**5.0**	**137**	**8.3**	**49**	**2.3**
Gallbladder	**Annual Average**	**17**	**0.5**	**4**	**0.3**	**13**	**0.6**
	5-Year APC Trend		+17.3		^		+14.7
	1998	7	^	1	^	6	^
	1999	17	0.5	4	^	13	0.6
	2000	18	0.5	3	^	15	0.7
	2001	28	0.8	10	^	18	0.9
	2002	**17**	**0.5**	**4**	^	**13**	**0.6**
Liver and Intrahepatic Bile Duct	**Annual Average**	**128**	**3.6**	**79**	**4.9**	**49**	**2.5**
	5-Year APC Trend		+5.5		+4.5		+6.7
	1998	108	3.2	70	4.6	38	2.1
	1999	105	3.0	64	4.0	41	2.1
	2000	152	4.3	93	5.8	59	2.9
	2001	128	3.5	77	4.7	51	2.5
	2002	**147**	**3.9**	**91**	**5.3**	**56**	**2.7**
Liver	**Annual Average**	**96**	**2.7**	**63**	**3.9**	**33**	**1.7**
	5-Year APC Trend		+2.1		+1.7		+2.1
	1998	88	2.6	56	3.6	32	1.8
	1999	81	2.3	54	3.4	27	1.4
	2000	118	3.3	78	4.8	40	2.0
	2001	88	2.4	60	3.7	28	1.4
	2002	**107**	**2.9**	**67**	**3.8**	**40**	**1.9**
Pancreas	**Annual Average**	**379**	**10.7**	**183**	**11.9**	**196**	**9.7**
	5-Year APC Trend		+1.0		*+4.1		-1.9
	1998	361	10.5	164	11.1	197	10.1
	1999	378	10.9	165	10.8	213	10.6
	2000	357	10.1	186	12.2	171	8.4
	2001	397	11.0	195	12.6	202	9.9
	2002	**402**	**10.9**	**203**	**12.6**	**199**	**9.5**

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n/a = Not Applicable

TABLE 2: CANCER MORTALITY By Site, Year, and Sex		TOTAL		MALE		FEMALE	
Primary Sites	Year	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend
Small Intestine	**Annual Average**	**10**	**0.3**	**4**	**0.3**	**6**	**0.3**
	5-Year APC Trend		^		^		^
	1998	14	0.4	7	^	7	^
	1999	8	^	5	^	3	^
	2000	9	^	2	^	7	^
	2001	7	^	3	^	4	^
	2002	**13**	**0.4**	**5**	**^**	**8**	**^**
Stomach	**Annual Average**	**126**	**3.5**	**77**	**5.1**	**49**	**2.4**
	5-Year APC Trend		-5.5		-6.4		-5.9
	1998	136	3.9	78	5.5	58	3.0
	1999	137	3.9	93	6.3	44	2.2
	2000	130	3.6	77	5.1	53	2.5
	2001	100	2.8	59	3.9	41	2.0
	2002	**128**	**3.5**	**79**	**4.9**	**49**	**2.4**
ENDOCRINE SYSTEM	**Annual Average**	**32**	**0.9**	**14**	**0.9**	**18**	**0.9**
	5-Year APC Trend		+4.3		+8.0		+1.7
	1998	24	0.7	12	0.7	12	0.6
	1999	35	1.0	13	0.8	22	1.1
	2000	34	1.0	15	1.0	19	1.0
	2001	30	0.8	13	0.8	17	0.8
	2002	**36**	**1.0**	**18**	**1.1**	**18**	**0.9**
Thyroid	**Annual Average**	**17**	**0.5**	**5**	**0.3**	**11**	**0.6**
	5-Year APC Trend		+9.3		^		+11.5
	1998	10	^	2	^	8	^
	1999	20	0.6	8	^	12	0.6
	2000	15	0.4	6	^	9	^
	2001	17	0.5	3	^	14	0.7
	2002	**21**	**0.6**	**8**	**^**	**13**	**0.7**
EYE AND ORBIT	**Annual Average**	**4**	**0.1**	**2**	**^**	**2**	**^**
	5-Year APC Trend		^		^		^
	1998	5	^	1	^	4	^
	1999	3	^	0	^	3	^
	2000	3	^	1	^	2	^
	2001	0	^	0	^	0	^
	2002	**9**	**^**	**6**	**^**	**3**	**^**
GENITAL SYSTEM FEMALE	**Annual Average**	**343**	**n/a**	**n/a**	**n/a**	**343**	**17.5**
	5-Year APC Trend		n/a		n/a		+0.4
	1998	345	n/a	n/a	n/a	345	18.2
	1999	313	n/a	n/a	n/a	313	16.2
	2000	340	n/a	n/a	n/a	340	17.4
	2001	358	n/a	n/a	n/a	358	18.0
	2002	**358**	**n/a**	**n/a**	**n/a**	**358**	**17.7**

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n/a = Not Applicable

TABLE 2: CANCER MORTALITY By Site, Year, and Sex		TOTAL		MALE		FEMALE	
Primary Sites	Year	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend
Cervix Uteri	**Annual Average**	**40**	**n/a**	**n/a**	**n/a**	**40**	**2.2**
	5-Year APC Trend		n/a		n/a		+8.6
	1998	34	n/a	n/a	n/a	34	1.9
	1999	36	n/a	n/a	n/a	36	2.0
	2000	36	n/a	n/a	n/a	36	2.0
	2001	51	n/a	n/a	n/a	51	2.7
	2002	**45**	**n/a**	**n/a**	**n/a**	**45**	**2.4**
Ovary	**Annual Average**	**200**	**n/a**	**n/a**	**n/a**	**200**	**10.2**
	5-Year APC Trend		n/a		n/a		-0.2
	1998	197	n/a	n/a	n/a	197	10.5
	1999	192	n/a	n/a	n/a	192	10.0
	2000	202	n/a	n/a	n/a	202	10.3
	2001	199	n/a	n/a	n/a	199	10.0
	2002	**212**	**n/a**	**n/a**	**n/a**	**212**	**10.4**
Uterus	**Annual Average**	**83**	**n/a**	**n/a**	**n/a**	**83**	**4.1**
	5-Year APC Trend		n/a		n/a		-4.5
	1998	99	n/a	n/a	n/a	99	5.1
	1999	70	n/a	n/a	n/a	70	3.5
	2000	86	n/a	n/a	n/a	86	4.3
	2001	83	n/a	n/a	n/a	83	4.1
	2002	**79**	**n/a**	**n/a**	**n/a**	**79**	**3.8**
GENITAL SYSTEM MALE	**Annual Average**	**447**	**n/a**	**447**	**31.6**	**n/a**	**n/a**
	5-Year APC Trend		n/a		*-3.4		n/a
	1998	468	n/a	468	34.4	n/a	n/a
	1999	451	n/a	451	33.1	n/a	n/a
	2000	428	n/a	428	30.4	n/a	n/a
	2001	442	n/a	442	30.4	n/a	n/a
	2002	**448**	**n/a**	**448**	**30.1**	n/a	n/a
Prostate	**Annual Average**	**439**	**n/a**	**439**	**31.1**	**n/a**	**n/a**
	5-Year APC Trend		n/a		*-3.7		n/a
	1998	461	n/a	461	33.9	n/a	n/a
	1999	445	n/a	445	32.7	n/a	n/a
	2000	420	n/a	420	29.9	n/a	n/a
	2001	434	n/a	434	30.0	n/a	n/a
	2002	**435**	**n/a**	**435**	**29.4**	**n/a**	**n/a**
Testis	**Annual Average**	**7**	**n/a**	**7**	**0.4**	**n/a**	**n/a**
	5-Year APC Trend		n/a		^		n/a
	1998	6	n/a	6	^	n/a	n/a
	1999	4	n/a	4	^	n/a	n/a
	2000	7	n/a	7	^	n/a	n/a
	2001	6	n/a	6	^	n/a	n/a
	2002	**12**	**n/a**	**12**	**0.7**	**n/a**	**n/a**

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^ Rate is not calculated due to instability of small numbers

n/a = Not Applicable

TABLE 2: CANCER MORTALITY By Site, Year, and Sex		TOTAL		MALE		FEMALE	
Primary Sites	Year	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend
LEUKEMIAS	**Annual Average**	**265**	**7.5**	**149**	**9.8**	**116**	**5.7**
	5-Year APC Trend		+1.2		+1.8		+0.9
	1998	254	7.4	150	10.3	104	5.2
	1999	250	7.2	127	8.6	123	6.1
	2000	268	7.6	150	9.9	118	5.7
	2001	280	7.8	154	9.9	126	6.2
	2002	**274**	**7.5**	**163**	**10.5**	**111**	**5.4**
LYMPHOMAS	**Annual Average**	**331**	**9.3**	**170**	**11.2**	**161**	**7.8**
	5-Year APC Trend		-2.7		*-3.5		-1.4
	1998	346	10.0	180	12.2	166	8.3
	1999	327	9.3	172	11.4	155	7.6
	2000	316	8.9	163	11.0	153	7.6
	2001	346	9.5	172	11.2	174	8.4
	2002	**320**	**8.6**	**164**	**10.3**	**156**	**7.3**
Hodgkin Lymphomas	**Annual Average**	**16**	**0.5**	**9**	**0.5**	**7**	**0.4**
	5-Year APC Trend		-3.2		^		^
	1998	19	0.6	10	^	9	^
	1999	15	0.4	11	0.7	4	^
	2000	17	0.5	7	^	10	^
	2001	12	0.3	7	^	5	^
	2002	**18**	**0.5**	**10**	**0.6**	**8**	^
Non-Hodgkin Lymphomas	**Annual Average**	**315**	**8.8**	**161**	**10.7**	**154**	**7.4**
	5-Year APC Trend		-2.7		-3.5		-1.4
	1998	327	9.5	170	11.6	157	7.8
	1999	312	8.9	161	10.7	151	7.4
	2000	299	8.4	156	10.5	143	7.0
	2001	334	9.2	165	10.8	169	8.2
	2002	**302**	**8.1**	**154**	**9.7**	**148**	**6.8**
MESOTHELIOMA (ICD-10 only)**	**Annual Average**	**31**	**0.9**	**26**	**1.7**	**6**	**0.3**
	5-Year APC Trend		n/a		n/a		n/a
Years 1999 and later only	1998	n/a	n/a	n/a	n/a	n/a	n/a
	1999	30	0.9	26	1.9	4	^
	2000	46	1.3	36	2.4	10	^
	2001	52	1.5	44	2.8	8	^
	2002	**28**	**0.8**	**22**	**1.4**	**6**	^
MYELOMA	**Annual Average**	**143**	**4.0**	**78**	**5.2**	**65**	**3.2**
	5-Year APC Trend		+3.0		+2.1		+2.8
	1998	135	3.9	63	4.4	72	3.6
	1999	148	4.2	88	6.1	60	3.0
	2000	124	3.5	70	4.6	54	2.7
	2001	136	3.7	81	5.2	55	2.6
	2002	**173**	**4.7**	**87**	**5.5**	**86**	**4.2**

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TABLE 2: CANCER MORTALITY By Site, Year, and Sex		TOTAL		MALE		FEMALE	
Primary Sites	Year	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend
ORAL CAVITY/PHARYNX	**Annual Average**	**105**	**3.0**	**64**	**4.0**	**42**	**2.1**
Trend should be interpreted with	5-Year APC Trend		-4.7		-1.6		-9.2
caution for this site due to changes	1998	120	3.5	59	3.8	61	3.2
in ICD-10 coding, which moved	1999	103	2.9	70	4.5	33	1.6
some previously coded oral cases	2000	91	2.6	62	4.0	29	1.4
into the Miscellaneous category,	2001	115	3.2	68	4.2	47	2.4
affecting deaths from 1999 forward.	**2002**	**98**	**2.7**	**60**	**3.7**	**38**	**1.8**
RESPIRATORY	**Annual Average**	**2,062**	**58.7**	**1,118**	**72.8**	**944**	**48.4**
SYSTEM Trend should be	5-Year APC Trend		-1.1		-3.2		+1.2
interpreted with caution for this	1998	2,118	62.0	1,192	80.1	926	48.6
site due to changes in ICD-10 cod-	1999	1,927	55.7	1,066	70.9	861	44.9
ing, which moved Mesothelioma	2000	2,122	60.5	1,141	75.0	981	50.5
into a separate category, affect-	2001	2,032	57.2	1,089	69.7	943	48.1
ing deaths from 1999 forward.	**2002**	**2,109**	**58.1**	**1,101**	**69.0**	**1,008**	**50.0**
Larynx	**Annual Average**	**37**	**1.0**	**29**	**1.9**	**8**	**0.4**
	5-Year APC Trend		*+9.8		*+6.1		^
	1998	31	0.9	25	1.7	6	^
	1999	30	0.9	27	1.8	3	^
	2000	36	1.0	26	1.7	10	^
	2001	40	1.1	31	2.0	9	^
	2002	**46**	**1.3**	**35**	**2.1**	**11**	**0.6**
Lung and Bronchus	**Annual Average**	**2,013**	**57.3**	**1,082**	**70.5**	**931**	**47.7**
Trend should be interpreted with	5-Year APC Trend		-1.1		-3.3		+1.3
caution for this site due to changes	1998	2,065	60.5	1,153	77.5	912	47.8
in ICD-10 coding, which coded	1999	1,886	54.5	1,034	68.8	852	44.4
some lung cases into other site	2000	2,078	59.3	1,112	73.1	966	49.7
categories, affecting deaths from	2001	1,981	55.7	1,052	67.3	929	47.3
1999 forward.	**2002**	**2,057**	**56.7**	**1,061**	**66.5**	**996**	**49.4**
SKIN	**Annual Average**	**140**	**3.9**	**92**	**5.8**	**48**	**2.5**
Excludes basal and	5-Year APC Trend		+2.8		*+3.0		+4.2
squamous cell	1998	127	3.7	85	5.5	42	2.2
	1999	128	3.7	85	5.4	43	2.3
	2000	146	4.1	93	5.9	53	2.7
	2001	142	3.9	97	6.0	45	2.1
	2002	**155**	**4.2**	**98**	**6.0**	**57**	**2.8**
Melanomas	**Annual Average**	**113**	**3.2**	**73**	**4.6**	**40**	**2.1**
of the Skin	5-Year APC Trend		+1.6		+2.1		+2.7
	1998	106	3.1	72	4.6	34	1.8
	1999	110	3.2	71	4.4	39	2.1
	2000	107	3.0	63	3.9	44	2.3
	2001	118	3.2	83	5.0	35	1.7
	2002	**123**	**3.3**	**77**	**4.8**	**46**	**2.3**

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TABLE 2: CANCER MORTALITY By Site, Year, and Sex		TOTAL		MALE		FEMALE	
Primary Sites	Year	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend	Cancer Deaths	Rate/ Current Trend
SOFT TISSUE INCLUDING HEART	**Annual Average**	**54**	**1.5**	**25**	**1.6**	**29**	**1.5**
	5-Year APC Trend		-7.3		-7.0		-8.1
	1998	61	1.8	26	1.7	35	1.9
	1999	61	1.8	30	1.9	31	1.7
	2000	47	1.3	23	1.5	24	1.2
	2001	47	1.3	23	1.4	24	1.2
	2002	**52**	**1.4**	**23**	**1.4**	**29**	**1.5**
URINARY SYSTEM	**Annual Average**	**336**	**9.4**	**227**	**15.2**	**109**	**5.3**
	5-Year APC Trend		+1.4		-0.1		+3.6
	1998	330	9.6	221	15.6	109	5.4
	1999	316	9.0	221	15.1	95	4.7
	2000	328	9.2	219	14.6	109	5.4
	2001	328	9.0	233	15.5	95	4.5
	2002	**379**	**10.2**	**242**	**15.3**	**137**	**6.4**
Urinary Bladder	**Annual Average**	**175**	**4.9**	**123**	**8.5**	**52**	**2.4**
	5-Year APC Trend		+3.6		+2.5		+4.9
	1998	160	4.6	110	8.1	50	2.4
	1999	169	4.8	119	8.4	50	2.4
	2000	164	4.6	118	8.2	46	2.2
	2001	183	4.9	136	9.2	47	2.1
	2002	**200**	**5.4**	**133**	**8.7**	**67**	**3.1**
KIDNEY AND RENAL PELVIS	**Annual Average**	**149**	**4.2**	**96**	**6.1**	**54**	**2.7**
	5-Year APC Trend		-0.4		-1.9		+1.6
	1998	155	4.5	99	6.6	56	2.9
	1999	133	3.8	91	5.9	42	2.2
	2000	156	4.4	95	6.0	61	3.1
	2001	137	3.8	92	5.9	45	2.2
	2002	**165**	**4.4**	**101**	**6.0**	**64**	**3.0**
MISCELLANEOUS SITES Trend should be interpreted with caution for this site due to changes in ICD-10 coding, which defined more cancer cases as Miscellaneous, affecting deaths from 1999 forward.	**Annual Average**	**506**	**13.0**	**251**	**15.2**	**256**	**11.4**
	5-Year APC Trend		n/a		n/a		n/a
	1998	404	11.8	213	14.5	191	9.7
	1999	579	16.6	282	19.4	297	14.8
	2000	466	13.0	221	14.7	245	11.7
	2001	530	14.6	269	17.6	261	12.3
	2002	**553**	**14.8**	**269**	**17.2**	**284**	**13.1**

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B. County Tables Overview

Tables 3A-3E provide data on selected cancer sites at the county level for the years 1998-2002. Tables 4A-4H provide data on selected cancer sites at the county level for the years 1996-2002. The data in the tables include average annual invasive incidence and mortality counts, age-adjusted rates for incidence and mortality, and average APC for incidence and mortality in each of Oregon's 36 counties. Any statistically significant trend is indicated with an asterisk (*).

Interpretation of inter-county differences in the rates for a particular type of cancer must be made with caution due to the following:

- The rarity of some cancers can cause the number of cases occurring in some regions to be so small that the calculated rate might be statistically unstable.
- Correlations between incidence of a disease and prevalence of risk factors for that disease in a geographical area can be misleading. To examine the relationships between a risk factor and a disease, detailed analytical epidemiological studies are necessary.
- For many cancers, there is a long time interval between exposure to a risk factor and diagnosis of disease. Migration between geographical areas can result in individuals being exposed to a risk factor in one geographical area and then diagnosed in a different geographical area.
- There may be differences between geographical areas with respect to availability of screening and/or early detection programs.
- It is possible that the completeness of case reporting differs by area of the state.

A small number of events can result in considerable random variation in the rate estimates; thus limiting their usefulness. Therefore, if the number of cancer events (new cases or deaths) is ten or fewer, the calculated rate is considered unstable. Such a rate is not shown and is replaced with a carat (^), and the rate is not shown. However, the number of events is shown.

Oregon Counties

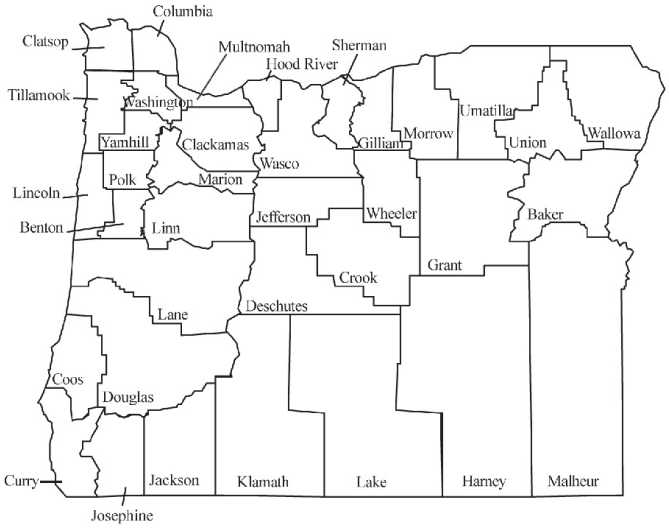

TABLE 3: HIGH INCIDENCE CANCER SITES - CURRENT FIVE-YEAR AVERAGE

TABLE 3A All Cancers Combined Years 1998 - 2002 Oregon Counties	INCIDENCE Average Invasive Cases Per Year	Age-Adjusted Rate	Current 5-Year Trend APC	MORTALITY Average Malignant Deaths Per Year	Age-Adjusted Rate	Current 5-Year Trend APC
State	**17,152**	**487.5**	**-0.9**	**7,127**	**199.8**	**-0.4**
Baker	107	453.8	-8.3	49	198.5	-3.8
Benton	304	447.0	-1.7	110	163.5	-7.5
Clackamas	1,627	491.4	-2.3	649	200.0	-1.5
Clatsop	196	460.2	-1.9	91	207.3	-1.0
Columbia	229	528.2	-3.7	102	239.2	+0.6
Coos	486	556.4	-1.9	207	226.7	-0.6
Crook	94	418.1	+3.5	41	185.5	-4.8
Curry	175	464.1	-8.3*	84	210.7	+2.5
Deschutes	674	542.1	+2.3	228	185.5	-1.4
Douglas	672	512.9	-0.7	289	212.0	-0.3
Gilliam	14	534.7	+17.3	6	212.8	^
Grant	42	411.7	-3.0	23	218.1	*-5.6
Harney	39	441.7	-0.5	19	208.9	-2.0
Hood River	88	436.8	+0.7	36	174.9	-0.2
Jackson	1,105	508.4	+0.2	437	193.2	+0.5
Jefferson	80	424.0	+2.8	35	190.9	*+9.4
Josephine	502	463.6	*+3.5	243	212.5	+0.9
Klamath	355	486.1	-3.0	157	212.1	-2.8
Lake	53	538.5	-3.4	22	218.0	+3.3
Lane	1,594	466.8	+0.2	697	200.0	-0.7
Lincoln	322	511.4	*-4.5	143	223.4	-1.2
Linn	523	451.9	-0.7	243	204.1	+0.7
Malheur	127	390.8	-5.5	55	161.4	-3.8
Marion	1,391	502.8	+0.3	582	206.1	+0.8
Morrow	46	468.0	+0.6	20	207.3	-7.8
Multnomah	3,116	507.7	-1.5	1,295	210.1	+0.2
Polk	319	458.1	+0.7	123	165.9	+4.8
Sherman	10	431.8	^	3	132.1	^
Tillamook	161	469.5	-4.0	71	203.3	*-4.6
Umatilla	335	485.2	-2.4	142	202.1	-0.9
Union	133	482.6	-1.5	52	180.4	+0.0
Wallowa	47	462.9	-6.1	21	192.5	-3.1
Wasco	144	494.4	+1.3	62	204.2	*+6.2
Washington	1,650	457.6	-0.9	621	178.6	-1.0
Wheeler	11	470.7	-12.0	5	172.4	^
Yamhill	381	473.1	-1.3	163	198.5	-1.5

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age group) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 3: HIGH INCIDENCE CANCER SITES - CURRENT FIVE-YEAR AVERAGE

TABLE 3B	***INCIDENCE***			***MORTALITY***		
Female Breast Cancers Years 1998 - 2002 Oregon Counties	***Average Invasive Cases Per Year***	***Age-Adjusted Rate***	***Current 5-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 5-Year Trend APC***
State	**2,749**	**145.8**	**-1.3**	**508**	**26.1**	**-2.4**
Baker	16	136.7	-5.6	3	20.9	^
Benton	51	139.4	+1.8	9	24.5	^
Clackamas	288	156.4	-1.0	41	22.1	-9.4
Clatsop	26	114.3	+0.4	5	20.0	^
Columbia	29	125.1	-6.9	6	24.1	^
Coos	66	146.6	-4.1	12	24.1	-16.7
Crook	15	128.3	+0.7	4	33.7	^
Curry	21	120.0	-22.1	4	18.8	^
Deschutes	93	141.6	+3.5	15	23.4	+9.4
Douglas	91	137.3	-0.1	15	22.1	+11.0
Gilliam	1	^	^	1	^	^
Grant	6	120.1	^	2	^	^
Harney	5	110.0	^	1	^	^
Hood River	15	140.4	-3.3	4	31.3	^
Jackson	167	146.8	+0.0	31	26.0	+1.5
Jefferson	9	103.2	^	2	^	^
Josephine	77	139.5	-2.3	16	27.1	-12.9
Klamath	56	151.4	-2.6	10	27.4	+1.7
Lake	7	139.8	^	2	^	^
Lane	262	143.0	-2.5	57	30.2	-5.0
Lincoln	53	156.2	-3.3	11	31.8	+10.8
Linn	82	137.1	-6.3	14	23.2	-15.2
Malheur	18	114.7	-4.8	3	13.7	^
Marion	232	156.0	+0.6	43	27.7	-3.7
Morrow	5	108.7	^	1	^	^
Multnomah	523	154.4	-0.5	94	27.0	+1.4
Polk	57	152.6	-2.1	8	20.7	^
Sherman	2	^	^	0	^	^
Tillamook	23	133.0	-8.2	5	27.3	^
Umatilla	44	122.2	+2.2	11	29.8	-2.7
Union	21	139.8	-4.9	3	20.0	^
Wallowa	5	102.4	^	2	^	^
Wasco	20	138.1	-1.0	4	29.8	^
Washington	296	145.7	+1.1	54	26.4	+0.6
Wheeler	1	^	^	0	^	^
Yamhill	66	156.8	-3.8	14	32.1	-0.3

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

[1] Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 3: HIGH INCIDENCE CANCER SITES - CURRENT FIVE-YEAR AVERAGE

TABLE 3C Colon and Rectum Cancer Years 1998 - 2002 Oregon Counties	***INCIDENCE***			***MORTALITY***		
	Average Invasive Cases Per Year	***Age-Adjusted Rate***	***Current 5-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 5-Year Trend APC***
State	**1,777**	**50.1**	**-2.6**	**671**	**18.8**	**-1.9**
Baker	13	52.4	-20.1	5	20.8	^
Benton	34	49.7	-1.3	11	16.7	-18.8
Clackamas	161	49.4	-4.0	62	19.0	-3.2
Clatsop	23	52.3	-1.5	9	20.9	^
Columbia	26	61.0	-8.6	10	23.5	^
Coos	46	50.4	-9.7	15	16.1	-5.5
Crook	9	39.0	^	5	20.7	^
Curry	21	53.0	-13.5	9	20.5	^
Deschutes	67	54.4	-2.2	22	18.3	-7.4
Douglas	70	52.2	+0.5	25	18.9	+4.4
Gilliam	2	^	^	1	^	^
Grant	5	43.7	^	4	32.9	^
Harney	3	34.7	^	2	^	^
Hood River	10	50.5	^	3	16.8	^
Jackson	128	56.8	+0.5	45	19.9	-1.6
Jefferson	9	47.0	^	4	20.6	^
Josephine	53	46.5	+6.9	21	18.7	-6.6
Klamath	37	50.5	+1.3	14	18.4	-0.3
Lake	7	74.1	^	1	^	^
Lane	152	43.7	+1.6	55	15.8	-2.0
Lincoln	35	53.9	-0.6	13	20.5	+2.5
Linn	57	48.5	-5.0	26	21.4	+7.1
Malheur	15	44.3	-4.3	6	16.7	^
Marion	155	55.2	-1.8	57	20.1	+4.6
Morrow	7	69.0	^	2	^	^
Multnomah	303	49.3	-3.8	118	19.0	-2.1
Polk	36	49.4	-1.0	13	17.2	+8.3
Sherman	0	^	^	0	^	^
Tillamook	16	44.5	-13.4	6	17.8	^
Umatilla	41	59.6	+1.1	16	22.4	-2.9
Union	18	62.1	-2.4	8	28.9	*+23.6
Wallowa	3	31.7	^	1	^	^
Wasco	13	44.2	+4.6	6	18.3	^
Washington	167	47.8	-5.2*	60	17.2	-10.6
Wheeler	1	^	^	0	^	^
Yamhill	36	44.4	+0.0	14	17.1	-13.7

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 3: HIGH INCIDENCE CANCER SITES - CURRENT FIVE-YEAR AVERAGE

TABLE 3D Lung Cancer Years 1998 - 2002 Oregon Counties	***INCIDENCE***			***MORTALITY***		
	Average Invasive Cases Per Year	***Age-Adjusted Rate***	***Current 5-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 5-Year Trend APC***
State	**2,489**	**71.0**	**-1.7**	**2,013**	**57.3**	**-1.1**
Baker	14	56.9	+4.0	12	50.2	+3.7
Benton	35	53.2	-9.9	26	39.9	-10.1
Clackamas	215	66.7	-5.1	174	54.2	-4.2
Clatsop	30	70.1	-4.9	26	59.2	-11.7
Columbia	40	91.8	-2.3	32	74.5	+5.4
Coos	87	96.3	+0.1	72	77.8	+0.8
Crook	17	75.5	+5.5	13	56.9	-2.2
Curry	29	70.2	-2.8	25	61.8	-1.1
Deschutes	79	63.2	-2.7	64	52.1	+0.6
Douglas	116	84.4	-2.9	91	66.2	-2.9
Gilliam	1	^	^	1	^	^
Grant	5	51.6	^	4	36.1	^
Harney	6	64.2	^	5	59.5	^
Hood River	11	54.0	+8.8	9	42.4	^
Jackson	167	74.6	+0.2	126	55.6	+3.5
Jefferson	10	52.2	^	9	44.6	^
Josephine	90	78.9	+4.0	75	65.8	+7.0
Klamath	60	79.5	-8.8	44	59.2	-12.2*
Lake	7	68.9	^	6	56.6	^
Lane	240	70.2	+2.2	204	59.2	+0.6
Lincoln	54	82.9	-1.3	43	66.2	+4.0
Linn	77	66.4	-2.4	67	56.5	-3.0
Malheur	18	53.8	-0.6	18	52.5	-0.3
Marion	196	71.1	-4.1	162	58.4	-2.6
Morrow	7	70.7	^	6	65.3	^
Multnomah	460	77.8	-0.2	360	60.6	-1.1
Polk	42	59.7	-1.9	31	44.2	+1.1
Sherman	1	^	^	1	^	^
Tillamook	28	79.3	-11.9	23	65.9	-5.5
Umatilla	49	71.6	-3.8	40	58.2	-0.8
Union	16	56.9	-2.2	14	47.3	+1.1
Wallowa	7	63.9	^	5	47.4	^
Wasco	23	76.3	*+5.2	19	61.5	*+17.2
Washington	198	58.9	-3.5	161	48.1	-4.2
Wheeler	2	^	^	2	^	^
Yamhill	52	64.6	-5.5	45	56.0	-5.8

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

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TABLE 3: HIGH INCIDENCE CANCER SITES - CURRENT FIVE-YEAR AVERAGE

TABLE 3E	***INCIDENCE***			***MORTALITY***		
Prostate Cancer	***Average Invasive Cases***		***Current 5-Year Trend***	***Average Malignant Deaths***		***Current 5-Year Trend***
Years 1998 - 2002 Oregon Counties	***Per Year***	***Age-Adjusted Rate***	***APC***	***Per Year***	***Age-Adjusted Rate***	***APC***
State	**2,618**	**166.7**	**-1.9**	**439**	**31.1**	***-3.7**
Baker	20	169.7	-13.3	4	39.1	^
Benton	54	184.1	+2.7	8	30.7	^
Clackamas	238	162.9	-4.7	36	30.3	-4.4
Clatsop	31	159.9	-6.5	7	37.9	^
Columbia	31	157.1	*-12.5	4	26.8	^
Coos	75	175.8	*-5.4	12	31.1	+3.9
Crook	17	153.8	+20.0	2	^	^
Curry	33	167.5	-6.5	6	33.6	^
Deschutes	146	242.2	+0.6	12	22.7	*-21.1
Douglas	112	174.2	-3.5	20	34.3	-11.8
Gilliam	3	235.1	^	0	^	^
Grant	7	143.6	^	2	^	^
Harney	9	210.2	^	1	^	^
Hood River	18	200.3	+2.5	2	^	^
Jackson	173	170.7	+0.3	32	32.5	-10.1
Jefferson	15	159.5	+15.8	3	44.6	^
Josephine	72	134.7	*+11.7	18	35.5	+11.9
Klamath	51	144.7	-9.4	11	37.7	+10.7
Lake	10	195.6	^	2	^	^
Lane	261	170.9	-1.4	42	29.8	-5.0
Lincoln	53	177.7	-1.0	10	41.5	^
Linn	78	147.7	+0.0	16	31.8	-0.5
Malheur	19	123.9	-9.6	3	17.8	^
Marion	209	174.4	+5.2	34	30.1	-6.3
Morrow	7	144.1	^	1	^	^
Multnomah	393	156.4	-5.2	73	32.3	+3.7
Polk	52	169.1	+10.9	9	28.6	^
Sherman	2	^	^	0	^	^
Tillamook	25	146.4	+7.7	4	32.5	^
Umatilla	62	196.7	-8.7	10	38.2	^
Union	29	228.2	*-13.0	4	36	^
Wallowa	10	195.5	^	2	^	^
Wasco	27	194.7	+5.6	3	26.5	^
Washington	216	148.3	-6.3	32	26.2	-5.9
Wheeler	3	185.8	^	0	^	^
Yamhill	54	154.5	+0.6	11	33.6	-0.1

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

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TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4A	***INCIDENCE***			***MORTALITY***		
Bladder Cancer	***Average Invasive Cases Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***
Years 1996 - 2002 Oregon Counties						
State	**827**	**23.8**	**+0.2**	**169**	**4.8**	***+2.5**
Baker	4	15.8	^	2	7.4	^
Benton	14	21.3	-0.8	2	2.8	^
Clackamas	82	25.9	-0.9	16	5.1	+8.2
Clatsop	9	19.9	^	3	5.7	^
Columbia	14	32.7	+4.1	3	7.4	^
Coos	29	32.6	-0.4	6	6.1	^
Crook	6	27.1	^	2	7.5	^
Curry	11	26.9	-3.3	3	6.0	^
Deschutes	31	26.1	+8.4	4	3.9	^
Douglas	31	23.0	-0.7	6	4.4	^
Gilliam	1	^	^	0	^	^
Grant	2	22.3	^	1	^	^
Harney	2	23.3	^	0	^	^
Hood River	4	17.3	^	1	^	^
Jackson	56	25.3	-0.5	12	5.4	-3.9
Jefferson	3	16.7	^	1	^	^
Josephine	30	25.8	-1.9	7	6.3	^
Klamath	17	23.6	-2.8	4	5.2	^
Lake	2	23.4	^	0	^	^
Lane	74	22.0	+1.3	19	5.4	+7.3
Lincoln	15	23.5	-10.9	2	3.5	^
Linn	28	23.9	-5.9	6	5.1	^
Malheur	6	18.8	^	1	^	^
Marion	63	22.8	+1.3	12	4.2	+4.0
Morrow	2	16.7	^	0	^	^
Multnomah	145	23.9	-1.2	30	4.7	-2.5
Polk	14	19.2	-3.4	2	3.1	^
Sherman	1	^	^	0	^	^
Tillamook	10	27.2	^	1	^	^
Umatilla	13	19.7	+3.4	3	5.0	^
Union	7	23.3	^	1	^	^
Wallowa	1	^	^	1	^	^
Wasco	8	26.5	^	1	^	^
Washington	73	22.0	+4.2	13	4.0	+3.7
Wheeler	0	^	^	0	^	^
Yamhill	21	26.3	-1.2	3	4.1	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4B	***INCIDENCE***			***MORTALITY***		
Brain/CNS Cancer	***Average Invasive Cases Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***
Years 1996 - 2002 Oregon Counties						
State	**249**	**7.3**	**-1.6**	**195**	**5.6**	**-0.7**
Baker	1	^	^	2	7.7	^
Benton	5	7.2	^	4	5.6	^
Clackamas	25	7.6	-1.4	21	6.5	*+9.4
Clatsop	4	10.8	^	2	5.4	^
Columbia	4	9.3	^	3	6.5	^
Coos	4	6.0	^	4	4.6	^
Crook	1	^	^	1	^	^
Curry	2	7.2	^	2	5.3	^
Deschutes	10	8.9	^	7	6.1	^
Douglas	9	8.0	^	9	7.3	^
Gilliam	0	^	^	0	^	^
Grant	0	^	^	0	^	^
Harney	0	^	^	0	^	^
Hood River	1	^	^	1	^	^
Jackson	13	^	+1.9	12	5.9	+2.0
Jefferson	1	^	^	1	^	^
Josephine	7	7.2	^	7	6.7	^
Klamath	4	5.8	^	3	4.8	^
Lake	0	^	^	0	^	^
Lane	24	7.4	-4.9	19	5.8	-1
Lincoln	6	10.7	^	5	7.9	^
Linn	7	7.0	^	6	5.4	^
Malheur	1	^	^	1	^	^
Marion	24	8.7	-8.5	15	5.6	+1.0
Morrow	1	^	^	1	^	^
Multnomah	43	6.9	+0.3	33	5.3	-7.6
Polk	5	8.4	^	4	5.4	^
Sherman	0	^	^	0	^	^
Tillamook	2	5.3	^	1	^	^
Umatilla	4	6.5	^	3	4.2	^
Union	1	^	^	1	^	^
Wallowa	0	^	^	0	^	^
Wasco	1	^	^	2	6.5	^
Washington	28	7.1	+5.9	20	5.5	-2.7
Wheeler	1	^	^	1	^	^
Yamhill	5	5.8	^	4	4.5	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4C	***INCIDENCE***			***MORTALITY***		
Cervical Cancer	***Average Invasive Cases Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***
Years 1996 - 2002 Oregon Counties						
State	**142**	**8.1**	**-1.7**	**44**	**2.4**	**-2.3**
Baker	1	^	^	0	^	^
Benton	3	7.9	^	1	^	^
Clackamas	10	5.4	^	4	2.4	^
Clatsop	2	9.4	^	1	^	^
Columbia	2	9.2	^	1	^	^
Coos	4	12.3	^	1	^	^
Crook	1	^	^	0	^	^
Curry	2	11.8	^	0	^	^
Deschutes	4	6.7	^	1	^	^
Douglas	5	9.3	^	2	2.9	^
Gilliam	0	^	^	0	^	^
Grant	0	^	^	0	^	^
Harney	1	^	^	0	^	^
Hood River	1	^	^	0	^	^
Jackson	10	10.6	^	3	2.8	^
Jefferson	1	^	^	0	^	^
Josephine	3	8.1	^	1	^	^
Klamath	3	10.5	^	1	^	^
Lake	0	^	^	0	^	^
Lane	11	6.5	+1.9	3	1.9	^
Lincoln	3	12.2	^	1	^	^
Linn	5	8.5	^	1	^	^
Malheur	1	^	^	0	^	^
Marion	12	8.3	-0.3	4	2.7	^
Morrow	1	^	^	0	^	^
Multnomah	29	8.6	-6.6	8	2.4	^
Polk	2	4.9	^	1	^	^
Sherman	0	^	^	0	^	^
Tillamook	1	^	^	1	^	^
Umatilla	4	12.3	^	1	^	^
Union	1	^	^	0	^	^
Wallowa	0	^	^	0	^	^
Wasco	1	^	^	0	^	^
Washington	16	7.4	-1.5	4	2.0	^
Wheeler	0	^	^	0	^	^
Yamhill	5	11.6	^	1	^	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4D	***INCIDENCE***			***MORTALITY***		
Corpus/Uterus Cancer Years 1996 - 2002 Oregon Counties	***Average Invasive Cases Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***
State	**453**	**13.1**	**-1.7**	**81**	**4.1**	**-1.1**
Baker	3	13.1	^	0	^	^
Benton	11	17.2	*+11.8	2	5.4	^
Clackamas	42	12.6	+2.0	8	4.2	^
Clatsop	5	12.3	^	1	^	^
Columbia	7	14.8	^	1	^	^
Coos	13	15.4	+2.3	3	5.1	^
Crook	3	12	^	1	^	^
Curry	4	10.6	^	1	^	^
Deschutes	13	11	-10.0	3	4.8	^
Douglas	16	12.5	-0.7	3	4.0	^
Gilliam	0	^	^	0	^	^
Grant	1	^	^	0	^	^
Harney	1	^	^	0	^	^
Hood River	2	10.9	^	0	^	^
Jackson	30	14	-4.7	5	4.0	^
Jefferson	2	10.9	^	1	^	^
Josephine	13	12.1	+5.7	2	4.0	^
Klamath	9	13.3	^	2	3.9	^
Lake	2	16.5	^	0	^	^
Lane	39	11.8	-5.6	7	3.7	^
Lincoln	7	11.5	^	1	^	^
Linn	13	11.3	-6.3	4	5.7	^
Malheur	3	9.7	^	1	^	^
Marion	38	14.1	+5.7	7	4.4	^
Morrow	1	^	^	0	^	^
Multnomah	87	14.3	-4.1	16	4.4	-1.0
Polk	9	13.5	^	2	4.5	^
Sherman	0	^	^	0	^	^
Tillamook	4	12.7	^	0	^	^
Umatilla	7	10.3	^	1	^	^
Union	3	11.7	^	1	^	^
Wallowa	2	24.1	^	0	^	^
Wasco	4	12.6	^	0	^	^
Washington	47	13.5	+0.2	6	3.2	^
Wheeler	0	^	^	0	^	^
Yamhill	11	13.8	*+10.0	1	^	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4E Leukemias Years 1996 - 2002 Oregon Counties	***INCIDENCE***			***MORTALITY***		
	Average Invasive Cases Per Year	***Age-Adjusted Rate***	***Current 7-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***
State	**386**	**11.2**	**+1.7**	**270**	**7.8**	**-1.7**
Baker	2	8.3	^	2	9.2	^
Benton	7	9.9	^	5	8.3	^
Clackamas	37	11.7	+5.5	26	8.5	-1.1
Clatsop	4	11.1	^	2	5.2	^
Columbia	6	15.5	^	3	7.7	^
Coos	10	11.4	^	8	9.1	^
Crook	1	^	^	1	^	^
Curry	4	9.7	^	3	8.7	^
Deschutes	11	9.7	-1	8	7.1	^
Douglas	14	10.8	-0.1	11	8.3	-3.1
Gilliam	0	^	^	0	^	^
Grant	1	^	^	1	^	^
Harney	2	18.3	^	1	^	^
Hood River	2	9.1	^	1	^	^
Jackson	24	11.5	-3.5	18	8.0	*-9.4
Jefferson	2	13.4	^	1	^	^
Josephine	8	7.9	^	6	5.7	^
Klamath	9	12.5	^	4	6.2	^
Lake	1	^	^	1	^	^
Lane	33	9.8	+5	31	8.9	-6.5
Lincoln	5	8.5	^	3	4.2	^
Linn	10	8.9	^	9	7.7	^
Malheur	4	11.4	^	3	8.1	^
Marion	36	12.9	-0.4	21	7.4	-0.1
Morrow	1	^	^	1	^	^
Multnomah	78	12.7	+4.6	50	8.0	+3.1
Polk	7	10.1	^	5	7.5	^
Sherman	0	6.9	^	0	^	^
Tillamook	3	9.1	^	4	10.7	^
Umatilla	6	9.2	^	5	6.9	^
Union	3	10.1	^	2	7.0	^
Wallowa	2	18.6	^	1	^	^
Wasco	3	9.6	^	1	^	^
Washington	43	12.0	+1.9	26	7.6	-4.0
Wheeler	0	^	^	0	^	^
Yamhill	8	9.5	^	5	6.4	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4F Lymphomas Years 1996 - 2002 Oregon Counties	INCIDENCE Average Invasive Cases Per Year	Age-Adjusted Rate	Current 7-Year Trend APC	MORTALITY Average Malignant Deaths Per Year	Age-Adjusted Rate	Current 7-Year Trend APC
State	**759**	**21.9**	**+1.3**	**324**	**9.2**	**-0.6**
Baker	5	21.5	^	2	9.7	^
Benton	14	19.6	-2.1	4	6.5	^
Clackamas	76	23.2	+1.5	31	9.7	-1.9
Clatsop	7	18.0	^	3	8	^
Columbia	12	29.0	-0.5	5	12.5	^
Coos	19	22.8	-3.8	8	9	^
Crook	4	18.0	^	1	^	^
Curry	5	16.8	^	3	6.8	^
Deschutes	24	20.8	+2.1	10	8.6	^
Douglas	28	22.3	-2.0	12	9.1	-8.5
Gilliam	1	^	^	0	^	^
Grant	2	20.2	^	1	^	^
Harney	1	^	^	1	^	^
Hood River	4	21.7	^	1	^	^
Jackson	49	23.6	*+9.8	16	7.3	+2.8
Jefferson	4	21.4	^	2	11.3	^
Josephine	22	21.6	+2.6	11	9.5	-0.1
Klamath	14	20.0	+11.6	6	9.2	^
Lake	2	27.8	^	1	^	^
Lane	70	21.0	+3.8	29	8.5	-3.3
Lincoln	11	19.5	-1.4	7	10.5	^
Linn	20	17.6	-2.8	11	9.2	-2.5
Malheur	6	18.9	^	2	7.1	^
Marion	60	21.6	+1.5	27	9.4	+5.3
Morrow	1	^	^	1	^	^
Multnomah	144	22.9	-1.8	62	10	-1.4
Polk	14	21.2	+3.3	7	10.2	^
Sherman	0	^	^	0	^	^
Tillamook	6	17.7	^	3	7.4	^
Umatilla	13	19.4	+5.2	8	11.4	^
Union	6	22.9	^	3	11.3	+8.4
Wallowa	2	23.7	^	1	^	^
Wasco	9	30.1	^	3	11	^
Washington	84	22.8	+0.6	32	9.6	-1.3
Wheeler	0	^	^	0	^	^
Yamhill	17	21.5	+2.8	7	8.8	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4G	***INCIDENCE***			***MORTALITY***		
Melanomas of Skin Years 1996 - 2002 Oregon Counties	***Average Invasive Cases Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***
State	**745**	**21.6**	***+3.9**	**110**	**3.1**	**+1.1**
Baker	3	13.8	^	0	^	^
Benton	12	17.6	+1.3	1	^	^
Clackamas	82	24.2	+2.0	11	3.4	+7.8
Clatsop	6	14.2	^	2	4.8	^
Columbia	7	15.6	^	2	3.9	^
Coos	24	31.4	+3.8	3	4.1	^
Crook	4	19.0	^	1	^	^
Curry	6	19.9	^	1	^	^
Deschutes	38	32.4	*+9.5	5	4.4	^
Douglas	34	29.0	+3.7	3	2.2	^
Gilliam	0	^	^	0	^	^
Grant	1	^	^	1	^	^
Harney	1	^	^	0	^	^
Hood River	4	17.6	^	1	^	^
Jackson	50	25.9	-1.2	8	3.9	^
Jefferson	2	11.9	^	1	^	^
Josephine	16	18.1	*+6.4	3	3.6	^
Klamath	9	12.6	^	2	3.1	^
Lake	2	21.0	^	0	^	^
Lane	79	23.8	-4.1	10	3.0	^
Lincoln	8	15.4	^	3	5.0	^
Linn	19	17.8	+2.9	3	2.7	^
Malheur	3	11.1	^	1	^	^
Marion	50	18.4	+15.4*	9	3.3	^
Morrow	2	22.3	^	1	^	^
Multnomah	135	20.8	*+6.5	17	2.7	-1.6
Polk	11	17.6	*+7.1	1	^	^
Sherman	0	^	^	0	^	^
Tillamook	7	24.2	^	2	5.9	^
Umatilla	11	15.6	-1.0	2	2.5	^
Union	5	19.7	^	1	^	^
Wallowa	2	24.7	^	0	^	^
Wasco	5	18.0	^	0	^	^
Washington	93	23.7	+4.9	11	3.1	+9.4
Wheeler	1	^	^	0	^	^
Yamhill	13	16.8	-0.1	3	3.7	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

TABLE 4: LOW INCIDENCE CANCER SITES - CURRENT SEVEN-YEAR AVERAGE

TABLE 4H	***INCIDENCE***			***MORTALITY***		
Oral and Pharynx Cancer Years 1996 - 2002 Oregon Counties	***Average Invasive Cases Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***	***Average Malignant Deaths Per Year***	***Age-Adjusted Rate***	***Current 7-Year Trend APC***
State	**394**	**11.4**	***-1.8**	**105**	**3.0**	**-2.3**
Baker	2	11.1	^	1	^	^
Benton	5	7.6	^	1	^	^
Clackamas	38	11.4	+1.8	11	3.3	-5.6
Clatsop	4	10.1	^	1	^	^
Columbia	6	13.2	^	1	^	^
Coos	12	14.7	+2.6	3	3.9	^
Crook	1	^	^	0	^	^
Curry	4	11.1	^	1	^	^
Deschutes	12	10.0	-10.2	3	2.7	^
Douglas	14	11.0	-14.1	4	3.0	^
Gilliam	1	^	^	0	^	^
Grant	1	^	^	0	^	^
Harney	0	^	^	0	^	^
Hood River	2	7.9	^	1	^	^
Jackson	26	12.2	+0.6	6	2.9	^
Jefferson	2	11.6	^	1	^	^
Josephine	11	10.4	-7.0	4	4.1	^
Klamath	6	7.9	^	3	3.6	^
Lake	1	^	^	0	^	^
Lane	36	10.7	-2.7	8	2.5	^
Lincoln	9	15.3	^	3	4.4	^
Linn	12	10.8	-6.1	4	3.6	^
Malheur	3	9.4	^	1	^	^
Marion	29	10.6	-7.1	6	2.3	^
Morrow	2	16.2	^	0	^	^
Multnomah	86	14.0	-1.5	24	3.9	-1.7
Polk	6	8.6	^	2	2.5	^
Sherman	0	^	^	0	^	^
Tillamook	4	11.5	^	1	^	^
Umatilla	6	9.2	^	2	2.7	^
Union	2	7.2	^	1	^	^
Wallowa	0	^	^	0	^	^
Wasco	4	13.2	^	1	^	^
Washington	38	10.8	-0.5	8	2.3	^
Wheeler	1	^	^	0	^	^
Yamhill	8	10.6	^	2	2.1	^

Rates are per 100,000 and age-adjusted to the 2000 U.S. (19 age groups) standard.

APC = Average Annual Percent Change

Counts may not match state data tables due to cases in unknown counties

* Indicates a statistically significant trend

^ Rate is not calculated due to instability of small numbers

XI. Appendices

Ponytail Falls, Columbia Gorge

Reportable Incidence Cases

ICD-9-CM DIAGNOSIS CODE (W/ PREFERRED ICDO-3 TERMINOLOGY)

Reportable cases (with diagnosis date 2004 or later) include all invasive and *in situ* malignant neoplasms and benign specified neoplasms of the brain and CNS as listed below:

ICD-9-CM	Terminology
140.0 – 208.9	Malignant neoplasms (primary and secondary)
225.0	Benign neoplasm of brain, NOS
225.1	Benign neoplasm of cranial nerves
225.2	Benign neoplasm of cerebral meninges; cerebral meningioma
225.3	Benign neoplasm of spinal cord, cauda equina
225.4	Benign neoplasm of spinal meninges; spinal meningioma
225.8	Benign neoplasm of other specified sites of nervous system
225.9	Benign neoplasm of nervous system, part unspecified
227.3	Benign neoplasm of pituitary, craniopharyngeal duct, craniobuccal pouch, hypophysis, Rathke's pouch, sella turcica
227.4	Benign neoplasm of pineal gland, pineal body
230.0 – 234.9	Carcinoma *in situ* (excludes 232-skin* and 233.1-cervix uteri*)
237.0	Neoplasm of uncertain behavior of pituitary gland and craniopharyngeal duct
237.1	Neoplasm of uncertain behavior of pineal gland
237.5	Neoplasm of uncertain behavior of brain and spinal cord
237.6	Neoplasm of uncertain behavior of meninges; NOS, cerebral, spinal
237.70	Neurofibromatosis, Unspecified von Recklinghausen Disease
237.71**	Neurofibromatosis, Type One von Recklinghausen Disease
237.72	Neurofibromatosis, Type Two von Recklinghausen Disease
237.9	Neoplasm of uncertain behavior of other/unspecified parts of nervous system; cranial nerves
238.4	Polycythemia vera
238.6	Solitary plasmacytoma, extramedullary plasmacytoma
238.7	Other lymphatic and hematopoietic tissue diseases: Chronic myeloproliferative disease Myelosclerosis with myeloid metaplasia Essential thrombocythemia Refractory cytopenia with multilineage dysplasia Myelodysplastic syndrome with 5q syndrome Therapy-related myelodysplastic syndrome
239.0 – 239.9**	Neoplasms of unspecified nature
273.2	Gamma heavy chain disease; Franklin disease
273.3	Waldenstrom macroglobulinemia
284.9	Refractory anemia without sideroblasts; Refractory anemia, unspecified
285.0	Refractory anemia with ringed sideroblasts; excess blasts; with excess blasts in transformation
288.3	Hypereosinophilic Syndrome
289.8	Acute myelofibrosis

***Note*: Reportable diagnoses include VIN III, VAIN III, AIN III, juvenile astrocytoma, pilocytic, astrocytoma and piloid astrocytoma.**

*** Exclusions: Basal/squamous cell carcinoma of skin, except of the genitalia, and *in situ* carcinoma of the cervix uteri and PIN III are not reportable.**

**** Code 237.71 and Codes 239.0 – 239.9 may not be reportable, however, these diagnoses may indicate a reportable condition and should be reviewed.**

1/2005

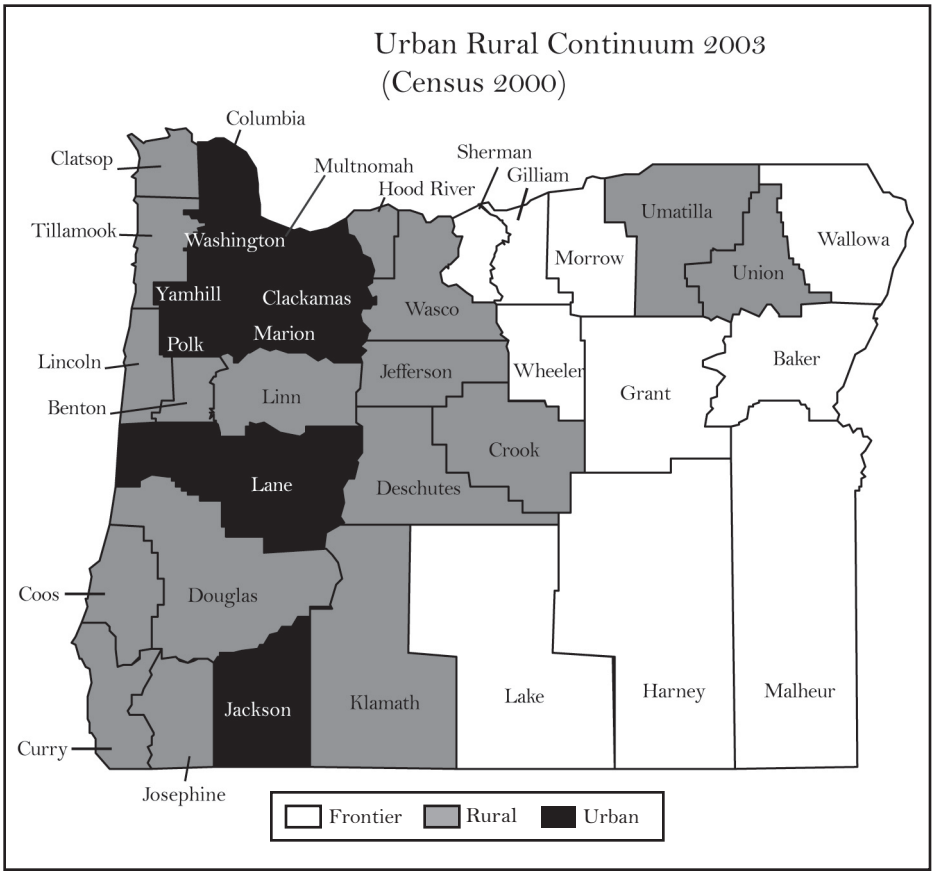
Mortality Recodes for Cancers Newly Reportable in 2001

ICD-9	ICD-O Histology (Site C42.1)	ICD-10	Added to Miscellaneous Mortality Category
238.4 207.1	9950/3	D45	Polycythemia Vera
284.9 238.7 285.0	9980/3 9982/3 9983/3 9984/3 9985/3 9986/3 9987/3 9989/3	D46	Myelodysplastic Syndrome
238.7	9960/3 9961/3	D47.1	Chronic myeloproliferative disease (myelofibrosis with myeloid metaplasia, myelproliferative disease, NOS, myelosclerosis (megakaryocytic) with myeloid metaplasia)
238.7	9962/3	D47.3	Essential (hemorrhagic) thrombocythemia (idiopathic hemorrhagic thrombocythemia)

Urban/Rural Continuum

Urban/Rural Continuum Codes for Oregon, 2003	
County	Density Designation
Baker	Frontier
Benton	Rural
Clackamas	Urban
Clatsop	Rural
Columbia	Urban
Coos	Rural
Crook*	Rural
Curry	Rural
Deschutes	Rural
Douglas	Rural
Gilliam	Frontier
Grant	Frontier
Harney	Frontier
Hood River	Rural
Jackson	Urban
Jefferson	Rural
Josephine	Rural
Klamath	Rural
Lake	Frontier
Lane	Urban
Lincoln	Rural
Linn	Rural
Malheur	Frontier
Marion	Urban
Morrow	Frontier
Multnomah	Urban
Polk	Urban
Sherman	Frontier
Tillamook	Rural
Umatilla	Rural
Union	Rural
Wallowa	Frontier
Wasco	Rural
Washington	Urban
Wheeler	Frontier
Yamhill	Urban

* Classified as Frontier in previous reports based on 1990 census



Assurances Form

The undersigned agrees to (initial each statement, sign and date):

___ accept responsibility for the ethical conduct of the study and the protection of the rights, privacy and welfare of the individuals whose private health information is retained in the OSCaR registry;

___ conduct this study in compliance with the protocol as reviewed and approved by OSCaR and/or the Advisory Committee;

___ submit all proposed study changes, including those accepted by an IRB, to OSCaR to seek approval prior to implementing changes. This includes but is not limited to change in venue, change in PI or other investigators, change in study focus, and any change requiring IRB approval;

___ report upon discovery all unanticipated problems, protocol violations, and breaches of confidentiality to OSCaR;

___ submit copies of literature and formal presentations generated using OSCaR data;

___ pay all relevant fees prior to receiving OSCaR data (see Schedule of Research Fees); and

___ complete dataset received from OSCaR will be destroyed upon conclusion of the study and OSCaR will be informed.

I agree to comply with the above requirements. I attest that information in this Research Proposal Review Form and attachments are true and complete. I also attest that I have no conflicts of interests to disclose regarding this study.

Non-compliance to this agreement may result in termination of the study approval. This means approval for OSCaR study data may be revoked. If this occurs, proof is required that all data obtained from OSCaR for the purposes of this study are destroyed. If this occurs, no investigator on this study may benefit from the use of OSCaR data either monetarily, including grant funding, nor through publications, presentations, or any other means.

_____ Date _____ (P.I. signature)

Patient Notification Letter

Oregon
Ted Kulongoski, Governor

Department of Human Services
Health Services
Oregon State Cancer Registry
800 NE Oregon Street, Suite 730
Portland, OR 97232-2162
(503) 731-4858 Telephone
(503) 731-4848 Fax
(971) 673-0372 TTY-Nonvoice

May 23, 2005

Dear _____:

In 1995, the Oregon State Legislature established the Oregon State Cancer Registry (OSCaR). At the time, Oregon was one of only a few states without a statewide cancer registry. Today, every state has one. The purpose of the registry is to understand how cancer affects Oregonians and what can be done to fight it. Information from the registry is used to target early detection of cancer and prevention efforts, develop screening and treatment programs, and evaluate cancer clusters. Registry information is also used in academic research studying the causes and/or treatment of specific cancer types.

Sometime in the last couple of years, you had a medical evaluation that showed cancer or a closely related condition. This letter is to inform you that your case has been reported to OSCaR, in compliance with Oregon law (statute ORS 432.520). Information such as your name, address, age, sex, characteristics and type of cancer, and details of diagnosis and treatment are included in this HIGHLY CONFIDENTIAL record. The information in the registry is granted legal protection under Oregon law and cannot be accessed even by court subpoena (statute ORS 432.530).

So that this information can help in future cancer research, we are enclosing a form on which you can indicate your willingness to participate in research studies. Before the release of any confidential data, all research studies must be reviewed for compliance with strict criteria as provided by law (statute 432.540). If you do not return the research participation form, researchers will consult with your physician if you qualify for a study. Regardless of how you are contacted, your participation in any research project is strictly voluntary and you may decline at any time.

If you have any questions, please contact OSCaR's Program Manager at (503) 731-4858 or via email OSCaR.OHD@state.or.us. Visit our website for general information about OSCaR, to view our latest annual report, *Cancer in Oregon*, and to see a list of current research activities: www.healthoregon.org/oscar

Sincerely yours,

Richard Leman

Richard Leman, MD
Medical Epidemiologist, Oregon State Cancer Registry

SEER Site Recode ICD-O-3 Definition

Site Group	Primary Site	Histologic Type
Oral cavity and Pharynx		
Lip	C000-C009	excluding 9590-9989, and sometimes 9050-9055, 9140*
Tongue	C019-C029	
Salivary gland	C079-C089	
Floor of mouth	C040-C049	
Gum & other mouth	C030-C039,C050-C059,C060-C069	
Nasopharynx	C110-C119	
Tonsil	C090-C099	
Oropharynx	C100-C109	
Hypopharynx	C129,C130-C139	
Other Oral Cavity and Pharynx	C140,C142-C148	
Digestive system		
Esophagus	C150-C159	excluding 9590-9989, and sometimes 9050-9055, 9140*
Stomach	C160-C169	
Small intestine	C170-C179	
Colon and Rectum		
Colon excluding rectum		
Cecum	C180	excluding 9590-9989, and sometimes 9050-9055, 9140*
Appendix	C181	
Ascending Colon	C182	
Hepatic Flexure	C183	
Transverse Colon	C184	
Splenic Flexure	C185	
Descending Colon	C186	
Sigmoid Colon	C187	
Large Intestine, NOS	C188-C189,C260	
Rectum & Rectosigmoid Junction		
Rectosigmoid Junction	C199	excluding 9590-9989, and sometimes 9050-9055, 9140*
Rectum	C209	
Anus, Anal Canal & Anorectum	C210-C212,C218	
Liver & Intrahepatic Bile Duct		
Liver	C220	excluding 9590-9989, and sometimes 9050-9055, 9140*
Intrahepatic Bile Duct	C221	
Gallbladder	C239	
Other Biliary	C240-C249	
Pancreas	C250-C259	
Retroperitoneum	C480	
Peritoneum, Omentum & Mesentery	C481-C482	
Other Digestive Organs	C268-C269,C488	

SEER Site Recode ICD-O-3 Definition (Continued)

Respiratory System		
Nose, Nasal Cavity and Middle Ear	C300-C301,C310-C319	excluding 9590-9989, and sometimes 9050-9055, 9140*
Larynx	C320-C329	
Lung and Bronchus	C340-C349	
Pleura	C384	
Trachea, Mediastinum & Other Respiratory Organs	C339,C381-C383,C388,C390,C398,C399	
Bones and joints	C400-C419	excluding 9590-9989, and sometimes 9050-9055, 9140*
Soft tissue including Heart	C380,C470-C479,C490-C499	
Skin excluding Basal and		
Melanomas of the Skin	C440-C449	8720-8790
Other Non-Epithelial Skin	C440-C449	excluding 8000-8005, 8010-8045, 8050-8084, 8090-8110, 8720-8790, 9590-9989, and sometimes 9050-9055, 9140*
Breast	C500-C509	excluding 9590-9989, and sometimes 9050-9055, 9140*
Female Genital System		
Cervix	C530-C539	excluding 9590-9989, and sometimes 9050-9055, 9140*
Corpus and Uterus, NOS		
Corpus	C540-C549	
Uterus, NOS	C559	
Ovary	C569	
Vagina	C529	
Vulva	C510-C519	
Other Female Genital Organs	C570-C589	
Male Genital System		
Prostate	C619	excluding 9590-9989, and sometimes 9050-9055, 9140*
Testis	C620-C629	
Penis	C600-C609	
Other Male Genital Organs	C630-C639	
Urinary System		
Urinary Bladder	C670-C679	excluding 9590-9989, and sometimes 9050-9055, 9140*
Kidney and Renal Pelvis	C649,C659	
Ureter	C669	
Other Urinary Organs	C680-C689	
Eye & Orbit	C690-C699	sometimes 9050-9055, 9140*
Brain and Other Nervous System		
Brain	C710-C719	excluding 9530-9539, 9590-
Cranial Nerves Other Nervous System	C710-C719	9530-9539
	C700-C709,C720-C729	excluding 9590-9989, and sometimes 9050-9055, 9140*

SEER Site Recode ICD-O-3 Definition (Continued)

Endocrine system		
Thyroid	C739	excluding 9590-9989, and sometimes 9050-9055, 9140*
Other Endocrine (including	C379,C740-C749,C750-C759	
Lymphomas		
Hodgkin Lymphoma		9650-9667
Hodgkin—Nodal	C024,C098–C099,C111, C142,C379,C422,C770-C779	
Hodgkin—Extranodal	All other sites	
Non-Hodgkin lymphoma		
NHL—Nodal	C024,C098,C099,C111,C142, C379,C422,C770-C779	9590-9596, 9670- 9671, 9673, 9675, 9678-9680, 9684, 9687, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9714-9719, 9727- 9729, 9823, 9827
NHL— Extranodal	All sites except C024, C098-C099, C111, C142, C379, C422, C770-C779	9590-9596, 9670- 9671, 9673, 9675, 9678-9680, 9684, 9687, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9714-9719, 9727-9729
	All sites except C024, C098-C099, C111, C142, C379, C420-C422, C424, C770-C779	9823, 9827
Myeloma		9731-9732, 9734
Leukemia		
Lymphocytic Leukemia		
Acute Lymphocytic Leukemia		9826, 9835-9837
Chronic Lymphocytic Leukemia	C420-C421,C424	9823
Other Lymphocytic Leukemia		9820, 9832-9834, 9940
Myeloid and Monocytic Leukemia		
Acute Myeloid Leukemia		9840, 9861, 9866, 9867, 9871-9874, 9895-9897, 9910, 9920
Acute Monocytic Leukemia		9891
Chronic Myeloid Leukemia		9863, 9875, 9876, 9945, 9946
Other Myeloid/Monocytic Leukemia		9860, 9930
Other Leukemia		
Other Acute Leukemia		
Other Chronic Leukemia		9801, 9805, 9931
Aleukemic, Subleukemic and NOS		9733, 9742, 9800, 9831, 9870, 9948, 9963, 9964
	C420-C421, C424	9827
Mesothelioma+		9050-9055
Kaposi's Sarcoma+		9140
Miscellaneous		9740-9741, 9750- 9758, 9760-9769, 9950, 9960-9962, 9970, 9975, 9980, 9982-9987, 9989
	C760-C768, C809	excluding 9590-9989, and sometimes 9050-9055, 9140*
	C42-0-C424	
	C770-C779	
Invalid	Site or histology code not within valid range or site code not found in this table.	

+ The Site Recode variable can be created with or without Mesothelioma (9050-9055) and Kaposi Sarcoma (9140) as separate groupings. The table above documents both possibilities.

SEER Cause of Death Recodes

Cancer Causes of Death	ICD-9 (1979-1998) #	ICD-10 (1999+) #
All Malignant Cancers	140-208, 238.6	C00-C97
Oral Cavity and Pharynx		
Lip	140	C00
Tongue	141	C01-C02
Salivary Gland	142	C07-C08
Floor of Mouth	144	C04
Gum and Other Mouth	143, 145	C03, C05-C06
Nasopharynx	147	C11
Tonsil	146.0-146.2	C09
Oropharynx	146.3-146.9	C10
Hypopharynx	148	C12-C13
Other Oral Cavity and Pharynx	149	C14
Digestive System		
Esophagus	150	C15
Stomach	151	C16
Small Intestine	152	C17
Colon and Rectum		
Colon excluding Rectum	153, 159.0	C18, C26.0
Rectum and Rectosigmoid Junction	154.0-154.1	C19-C20
Anus, Anal Canal and Anorectum	154.2-154.3, 154.8	C21
Liver and Intrahepatic Bile Duct		
Liver	155.0, 155.2	C22.0, C22.2-C22.4, C22.7, C22.9
Intrahepatic Bile Duct	155.1	C22.1
Gallbladder	156	C23
Other Biliary	156.1-156.2, 156.8-156.9	C24
Pancreas	157	C25
Retroperitoneum	158	C48.0
Peritoneum, Omentum and Mesentery	158.8-158.9	C45.1+, C48.1-C48.2
Other Digestive Organs	159.8-159.9	C26.8-C26.9, C48.8
Respiratory System		
Nose, Nasal Cavity and Middle Ear	160	C30-C31
Larynx	161	C32
Lung and Bronchus	162.2-162.5, 162.8-162.9	C34
Pleura	163	C38.4, C45.0+
Trachea, Mediastinum and Other Respiratory Organs	162.0, 164.2-164.3, 164.8-164.9, 165	C33, C38.1-C38.3, C38.8, C39
Bones and Joints	170	C40-C41
Soft Tissue including Heart	164.1, 171	C47, C49, C38.0, C45.2+
Skin excluding Basal and		
Melanoma of the Skin	172	C43
Other Non-Epithelial Skin	173	C44, C46+
Breast	174-175	C50

SEER Cause of Death Recodes (Continued)

Female Genital System		
Cervix Uteri	180	C53
Corpus and Uterus, NOS		
Corpus Uteri	182	C54
Uterus, NOS	179	C55
Ovary	183	C56
Vagina	184	C52
Vulva	184.1-184.4	C51
Other Female Genital Organs	181, 183.2-183.5, 183.8-183.9, 184.8-184.9	C57-C58
Male Genital System		
Prostate	185	C61
Testis	186	C62
Penis	187.1-187.4	C60
Other Male Genital Organs	187.5-187.9	C63
Urinary System		
Urinary Bladder	188	C67
Kidney and Renal Pelvis	189.0-189.1	C64-C65
Ureter	189.2	C66
Other Urinary Organs	189.3-189.4, 189.8-189.9	C68
Eye and Orbit	190	C69
Brain and Other Nervous System	191, 192	C70, C71, C72
Endocrine System		
Thyroid	193	C73
Other Endocrine including Thymus	164.0, 194	C37, C74-C75
Lymphoma		
Hodgkin Lymphoma	201	C81
Non-Hodgkin Lymphoma	202.9	C82-C85, C96.3
Myeloma	203.0, 238.6	C90.0, C90.2
Leukemia		
Lymphocytic Leukemia		
Acute Lymphocytic Leukemia	204	C91.0
Chronic Lymphocytic Leukemia	204.1	C91.1
Other Lymphocytic Leukemia	202.4, 204.2, 204.8-204.9	C91.2-C91.4, C91.7, C91.9
Myeloid and Monocytic Leukemia		
Acute myeloid	205.0, 207.0, 207.2	C92.0, C92.4-C92.5, C94.0, C94.2
Acute Monocytic Leukemia	206	C93.0
Chronic Myeloid Leukemia	205.1	C92.1
Other Myeloid/Monocytic Leukemia	205.2-205.3, 205.8-205.9, 206.1-206.2, 206.8-206.9	C92.2-C92.3, C92.7, C92.9, C93.1 C93.2, C93.7, C93.9
Other Leukemia		
Other Acute Leukemia	208	C94.4, C94.5, C95.0
Aleukemic, subleukemic and NOS	203.1, 207.1, 207.8, 208.1-208.2, 208.8-208.9	C94.7, C95.1, C95.2, C95.7, C95.9
Mesothelioma (ICD-10 only) +	N/A	C45+
Kaposi Sarcoma (ICD-10 only) +	N/A	C46+
Miscellaneous Malignant Cancer	159.1, 195-199, 202.3, 202.5-202.6, 203.8	C26.1, C45.7+, C45.9+, C76-C80, C88, C96.0-C96.2, C96.7, C96.9, C97

All ICD codes are tested for validity prior to generating this variable. Those deemed invalid are classified as Unknown/missing/invalid COD. Those deemed valid but not meeting the definition of any above grouping are classified as Other Cause of Death.

+ This variable can be created with or without Mesothelioma (C45) and Kaposi Sarcoma (C46) as separate groupings. The table above documents both possibilities. Note this is only possible with ICD-10.

Glossary

African American –The race rates for African Americans include all cases classified as African American regardless of ethnicity (Hispanic origin).

Age – The age of the patient is in completed years (rounded) at the time of diagnosis or death.

Age-Adjusted Rate – Since cancer rates tend to vary with age, and since populations vary with respect to their age distribution, incidence and mortality rates are age-adjusted to allow comparison of rates between different populations with different age distributions. In this report, age-adjusted rates are calculated by the direct method, using the age distribution of the 2000 United States standard population with 19 age groups. All age-adjusted rates are expressed per 100,000 individuals per year and include rates of invasive cancer only.

Age-Specific Incidence Rate – The number of new cases diagnosed per 100,000 individuals over a specified time period for a specified age group. Age-specific rates show the variation in cancer incidence by age group and are presented for males, females, and for the total population. Age groups are divided into five-year age groupings.

American Indian/Alaskan Native – The race rates for American Indian/Alaskan Natives include all cases classified as American Indian/Alaskan Native regardless of ethnicity (Hispanic origin).

APC (Trend) – Average Annual Percent Change, or trend, is the average percent change in the annual rate among years for time period analyzed.

Asian/Pacific Islander – The race rates for Asian/Pacific Islander include all cases classified as Asian or Pacific Islander regardless of ethnicity (Hispanic origin).

Benign – A benign tumor has abnormal growth without cancerous behavior.

Cancer Site – The human organ or system in which the malignancy originates; the anatomical site.

Carcinogen – A substance scientifically proven to cause cancer.

CDC – Centers for Disease Control and Prevention is a federal agency that develops and applies disease prevention and control, environmental health, health promotion and education activities to improve the health of the people of the United States.

Childhood Cancer – Cancer occurring in an individual between the ages of 0 and 14 is classified as a childhood cancer.

Colonoscopy – An examination of the entire colon with a flexible scope that allows a doctor to see and closely inspect the inside of the entire colon for signs of cancer or polyps.

Crude Rate – The number of new cases of cancer, or cancer deaths, during the year expressed as a rate per 100,000 persons in the population, without regard to the age distribution of the population.

Current Trend – Trend based on the latest five-years of available data.

Ethnicity – Rates based on ethnicity are for persons of Hispanic origin only.

Fecal Occult Blood Test (FOBT) – A chemical test to detect blood in stool, used as a screening test for colorectal cancer.

Frontier County – Frontier counties are extremely rural counties with a population of < 6 people per square mile.

Healthy People 2010 – Healthy People 2010 is the prevention agenda for the United States. It is a statement of national health objectives designed to identify the most significant preventable threats to health and to establish national goals to reduce these threats.

Hispanic – An ethnic category that is not mutually exclusive from whites or other racial groups.

Histology – Also known as morphology, this describes the cell type of the tumor, its structure, and biologic activity.

Historical Trend – Trend based on all available years of data.

ICCC – The International Classification of Childhood Cancer (ICCC) is used for tumors occurring in children, ages 0-14, and is based on tumor morphology rather than the site of the tumor, as for adults.

ICD-9 – The Ninth Revision of the International Classification of Diseases. Mortality data for years 1996-1998 are recorded using ICD-9. This classification system is not directly compatible with the ICD-O classification system used for cancer reporting.

ICD-10 – The 10th Revision of the International Classification of Diseases. Mortality data recording converted to ICD-10 with death year 1999. This classification system mirrors the ICD-O system used for cancer reporting.

ICD-O-3 – The Third Edition of the International Classification of Diseases for Oncology. A further classification of the ICD system designed for use specifically for cancer. Cancer incidence is reported to the Registry using the ICD-O system. The ICD-10 cancer site classifications are based on this system.

Incidence – The number of new cases of a given type of cancer diagnosed during a specified time period. Cancer incidence is not the same as the number of Oregonians diagnosed with cancer since one person could be diagnosed with more than one cancer.

In Situ Cancer – An *in situ* cancer is a tumor that fulfills all microscopic criteria for malignancy but does not invade or penetrate surrounding tissue. *In situ* cancers are not included in the calculation of incidence rates and thus are not presented in incidence tables, with the exception of *in situ* bladder cancer. However, *in situ* cancers are classified as early stage and are included in the sections presenting stage at diagnosis.

Invasive Cancer – A malignant tumor that has penetrated surrounding tissue. These are cancers diagnosed in the local, regional, or metastatic stages – no *in situ* diagnoses with the exception of urinary bladder cancers.

Localized – A cancer of localized stage is a tumor that is invasive but remains restricted to the site of origin. Localized cancers are classified as early stage cancers.

Leukemias – Cancers that develop in blood-forming tissue.

Lymphomas – Cancers that develop from cells in the lymphatic system

Malignant – A tumor made up of cancer cells of a type that can spread to other parts of the body is considered malignant.

Mammography – The use of x-rays to create a picture of the breast (mammogram) that can show signs of breast cancer before it can be felt.

Metastatic/Distant – The most advanced stage of a cancer in which cells from the original tumor break away, travel to other parts of the body, and continue to grow. Although the cancer has spread to an additional site or sites, it is still named after the original site of the tumor. These cancers are classified as late stage cancers.

Morbidity – The incidence or prevalence (i.e., the number of people living with cancer) of a disease in a population.

Mortality –The number of deaths with cancer as the underlying cause of death during a specified time period.

M/I Ratio – The M/I (mortality-to-incidence) ratio provides a measure of disease severity. The M/I ratio is the number of deaths divided by the number of invasive cases (for a particular cancer). The closer a value is to 1.0, the poorer the prognosis for that cancer. It is possible to have an M/I Ratio exceed 1.0 if the number of deaths for a population is greater than the number of new diagnoses during the specific time period.

NAACCR (North American Association of Central Cancer Registries) – NAACCR is a professional organization that develops and promotes uniform data standards for cancer registration; provides education and training; certifies population-based registries; aggregates and publishes data from central cancer registries; and promotes the use of cancer surveillance data and systems for cancer control and epidemiologic research, public health programs, and patient care to reduce the burden of cancer in North America.

Non-Hispanic – An ethnic category that is not mutually exclusive from whites or other racial groups.

NPCR (National Program of Cancer Registries) – NPCR was established by the Centers for Disease Control and Prevention (with the passage of Public Law 102-515). NPCR collects information on cancer cases from registries covering 96% of the nation's population.

Papanicolaou (Pap) Smear – The collection of cells from the cervix (the lower, narrow end of the uterus that forms a canal between the uterus and vagina) and their examination under a microscope.

Race – There are four, mutually exclusive race categories used in this report: African American, American Indian/ Alaskan Native, Asian/Pacific Islander, and White.

Regional – An invasive malignant tumor that has spread by direct extension to adjacent organs or tissues and/or has spread to regional lymph nodes, but appears to have spread no further. Regional cancers are classified as late stage cancers.

Routine Cancer Screening – For purposes of analysis, routine cancer screening is defined as follows:

> ***Breast Cancer Screening*** – Historically, routine mammography has been defined as women, ages 52-64, who received a mammogram within the past two years. A minimum age of 52 is used to allow women two years to receive their first routine mammogram. This is the definition used for analysis purposes for this report. Now routine mammography is recommended for women starting at age 40. Subsequent reports will include screening data for both age-groups.
>
> ***Cervical Cancer Screening*** - Routine cervical cancer screening is defined as all women 18-64 who have a cervix and have received a Pap test within the past three years.
>
> ***Colorectal Cancer Screening*** - Routine colorectal screening is defined as persons age 50 and older who have 1) received FOBT within the last year <u>and</u> endoscopy within the last five years (the preferred screening method of the American Cancer Society), or 2) who have received FOBT within the last year <u>and/or</u> endoscopy within the last five years.

Rural County – A county without a major city (50,000 people or more), not in an urbanized area with a population of at least 100,000, and with a population density > 6 persons per square mile.

SEER (Surveillance, Epidemiology, and End Results) – A program of the National Cancer Institute, SEER is an authoritative source of information on cancer incidence and survival in the United States.

Sigmoidoscopy/Proctosigmoidoscopy – An exam of the rectum and the lower part of the colon with a thin, flexible, lighted scope to find polyps, abnormal areas, and tumors.

Stage at Diagnosis – The degree to which a tumor has spread from its site of origin at the time of diagnosis. Cancer stage is often related to survival and is used to select appropriate treatment. Patients with early stage disease have better long-term survival. Detecting cancers at an early stage may lead to a reduction in mortality. The cancer stages, in order of increasing spread, are *in situ*, localized, regional, and distant. *In situ* and localized tumors are referred to as early stage tumors; regional and distant tumors are referred to as late stage tumors. A number of cancers are also reported as unstaged (unknown stage at diagnosis).

Unstaged/Unknown – Insufficient information is available to determine the stage of disease at the time of diagnosis, or the case was reported with missing stage data. Cancer cases are often unstaged because the patient's current medical situation contraindicates clinical workup required to stage the case (often due to advanced age or comorbid conditions) or because the patient decides to forgo standard treatment or procedures. Unstaged/unknown cases can sometimes be classified as late stage diagnoses, but they are removed from the stage at diagnoses analysis for this report.

Urban County – A county with at least one major city (50,000 people or more) or an urbanized area with a population of at least 100,000. Counties that experience a high degree of social and economic "attachment" to a metropolitan area are also considered part of that metropolitan area.

Appendix I

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