

**Cancer Incidence in North Carolina 2003**

State Center for Health Statistics

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## Introduction

### Background

The North Carolina Central Cancer Registry (CCR), located within the State Center for Health Statistics, was established in 1986. The CCR operates under the authority granted in North Carolina General Statute 130A-208.

Legislation declaring cancer reporting to be mandatory in North Carolina became effective in 1947. Authorized funding for establishing a registry, however, was not appropriated until 1986. Between 1986 and 1989, only 50-60 percent of the cases were reported each year. Calendar year 1990 is the first year for which relatively complete statewide reporting was achieved. In 1999, new legislation was passed that requires every healthcare provider that detects, diagnoses, or treats cancer cases to report all cases to the CCR.

The CCR collects, analyzes and disseminates information on newly diagnosed cancer patients in North Carolina with respect to demographics and medical characteristics. There are 132 hospitals in North Carolina which routinely diagnose and treat cancer patients; more than 45 of these hospitals have their own tumor registries. One hundred and eighty five facilities reported their 2003 incidence data to the CCR. Incidence data are reported to the CCR mostly by a secure internet-based database.

### Purpose

*Cancer Incidence in North Carolina 2003* is the tenth annual report of the CCR. The contents of this report represent a summary of the information collected on cancer diagnosed among North Carolina residents in 2003. Previous volumes are located on the State Center for Health Statistics web site located at <http://www.schs.state.nc.us/SCHS/data/cancer.cfm>, under the title "Cancer Incidence in North Carolina, County-Specific Numbers."

### Confidentiality

The CCR is committed to preserving the confidentiality of information obtained for medical, educational, research, and statistical purposes. Thus the CCR demands strict confidentiality and the protection of the identity of both cancer patients and reporting sources in registry data. The CCR does not release any identifying information regarding patients, hospitals, or physicians except under the authority of the General Statute guidelines.

## Technical Notes

### *Overview and Definitions*

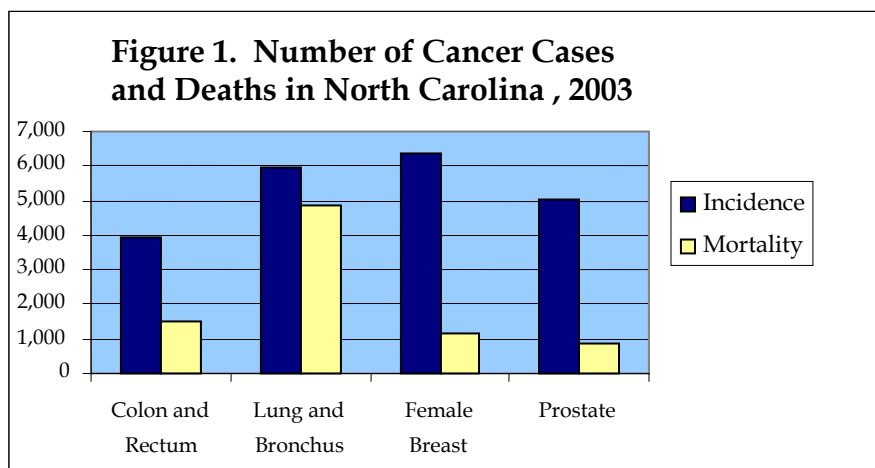
This report presents frequency counts, age-specific rates, and age-adjusted rates to describe newly diagnosed cases of cancer and mortality due to cancer.

### **Cancer Incidence and Mortality**

Cancer incidence is the number of newly diagnosed cancer cases for each county whereas cancer mortality is the number of deaths due to cancer for each county. See Figure 1.

We assume that death certificates provide complete and accurate data on all causes of death. However, the accuracy of recording the cause of death varies for many cancers. For example, at the time of death, the history of cancer may not be known by the physicians, or is considered not to have contributed to the death. Nonetheless, mortality data have been historically used widely to analyze cancer risk in populations.

Instances of under-reporting of cancer incidence have occurred. For some cancers (e.g., melanomas), under-reporting may lead to more cancer deaths being shown than incidence cases. Also, survival following a cancer diagnosis varies by cancer site. In populations with low use of health care services (e.g., rural and minority populations), more cancers are diagnosed at advanced stages when therapies are less successful; or the cases may not be diagnosed until death.



Cancer incidence, mortality, and age-adjusted rates for each county are presented in Table 5 and presented by site in Tables 6-9 for colon/rectum, lung/bronchus, female breast, and prostate cancers, respectively.

## **Differences in Reporting Cancer Incidence and Mortality Data**

Many people living near the Virginia border go outside North Carolina for health care. It is known that Norfolk and Danville, Virginia attract patients for secondary and tertiary care. The State of North Carolina has an exchange agreement with all 50 states for exchanging death certificates, but only has an exchange agreement with 24 states, including our border states of Virginia, Tennessee and South Carolina, for exchanging cancer incidence data.

Because death certificate data are available more quickly than incidence data, the 2003 mortality data include deaths of North Carolina residents who died in other states, but the incidence data do not include all cases diagnosed out-of-state.

Some counties have been found to under-report their cancer incidence due to poor case-finding procedures. These counties, especially rural counties where small hospitals do not have the services of trained tumor registrars, may have inadequate case finding. This results in incomplete reporting of new cancer cases. Death data are considered to be complete. This also contributes to what appears to be an excess of deaths compared to the number of cases for some cancer sites in some of the rural counties.

## **Incidence Rates**

Two types of rates are presented in this report: age-adjusted and age-specific, each of which has a specific purpose. Both rates are expressed in this report as annual or five-year rates per 100,000 population.

### **Age-Adjusted Rates**

An age-adjusted rate accurately describes the cancer experience that the population would have had if it had exactly the same age distribution as the comparison or standard population. Age-adjusted rates provide a single, summary rate for each area. The direct method was used to calculate all age-adjusted rates in this report by multiplying each age-specific rate by the number of people within that age group in the standard population and then summing these products, and dividing by the total population in the standard population. Age-adjusted rates should not be compared with any other type of rate or be used as absolute measurements of vital events; their sole purpose is to provide summary rates that can be compared between populations that have different age structures. The standard population used in the calculation was the 2000 United States Census population.

### **Age-Specific Rates**

The age-specific cancer incidence is the number of cancer cases that occur in the five-year age groups from 0-4 to 85+. Age-specific rates are used to compare rates between population groups of the same age and to examine age patterns for particular cancers. If the age categories are

sufficiently narrow, these rates provide the best estimates of the risk of disease. As expected, age-specific rates have a general tendency to increase with age. See Figure 2. North Carolina has attracted a large number of retirement-age people over the last decade. Understanding migration patterns is important for interpreting the data and is one reason for showing the data by age group. The largest concentrations of older-age residents are in the mountain counties, along the coast, and in the sandhills (along the mid-southern border).

Cancer patterns vary by age group. Children have a very different pattern of cancer than do adults. Leukemia, brain cancer, bone cancer, and lymphomas are the main cancer in people under age 20. In general, North Carolina's pediatric cancer patterns are quite consistent with national patterns.

Young adults (20-44) have an entirely different pattern of cancer than do children. In this age group, lymphomas are even more common, as are some digestive and reproductive tissue cancers. All of these cancers are quite rare and cancer rates in these ages are generally lower than for other age groups.

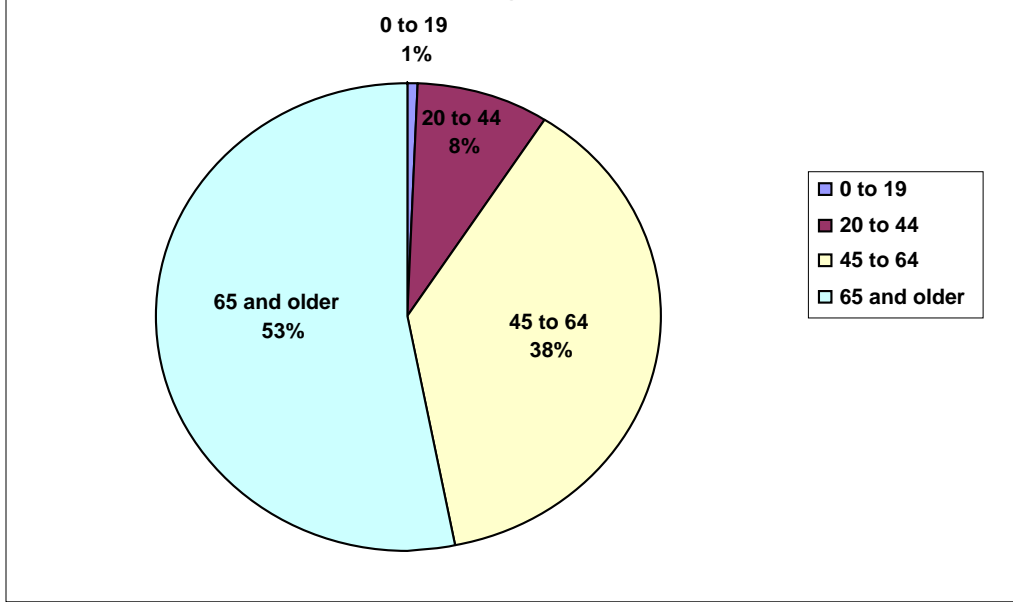
In the middle ages (45-64), cancer rates begin to rise, and the common cancers (lung, breast, and colon) emerge. The incursion of these cancers into younger age groups is the subject of considerable research at this time.

All cancer rates are at a maximum in the 70+ age categories. Prostate cancer is almost exclusively a disease of older men.

These age-specific patterns offer significant direction for screening priorities. For most cancers, the prospect for a normal life expectancy is good when the diagnosis is made early in the disease process. North Carolina legislation and federal programs are focused on increasing the access to screening services in this state. Older and underprivileged people are priority groups for these programs.

As stated before, these rates provide the best estimates of the risk of disease if the age categories are sufficiently narrow. Age-specific cancer incidences and rates are presented in Table 10. The age-specific incidence rates demonstrate how cancer is a disease primarily of the older population.

**Figure 2: Percentage of North Carolina Cancer Cases by Age Group, 2003**

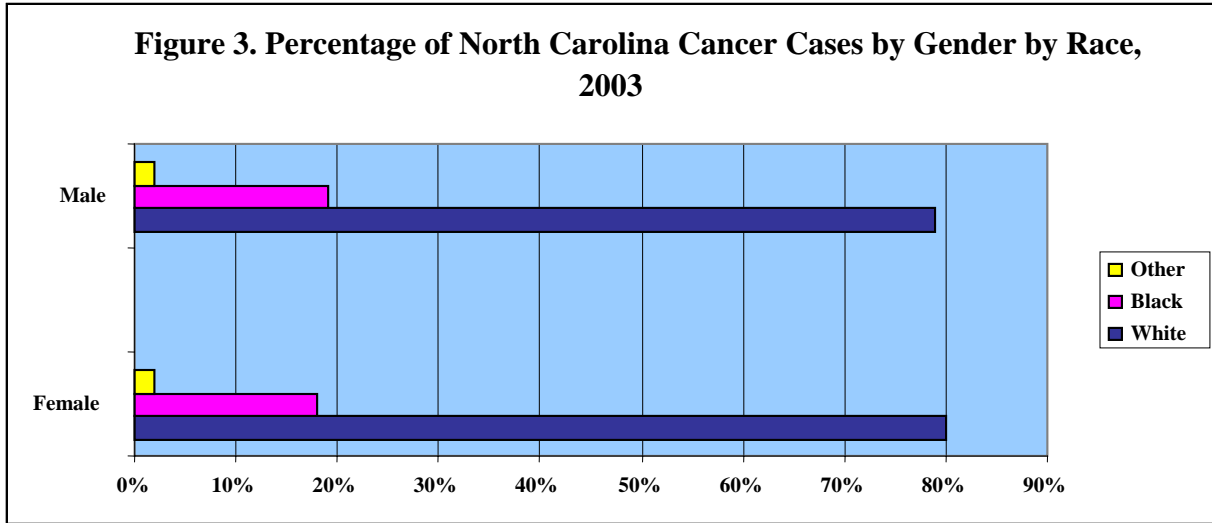


### **Race/Gender Specific Cases and Rates**

The race/gender-specific cancer incidence is the number of cancer cases that occurred in each race/gender group. See Figure 3.

These data are provided because race is an important factor in interpreting cancer patterns in North Carolina. Cancer rates vary by race, race distributions vary across the state, and health care use has been found to vary by race. Because cancer risk is strongly associated with lifestyle and behavior, differences among ethnic and cultural groups can provide clues to factors involved in the development of cancer such as dietary patterns, alcohol use, and sexual and reproductive behaviors involved in the development of cancer.

Cancer cases and age-adjusted rates for North Carolina are presented by gender in Table 1 and by race in Table 3.



**Reliability of Rates**

Precautions should always be taken when comparing rates based on health events and population. Both the size of the numbers and the characteristics of the population are important indicator of a rate’s real value. Rates based on small numbers of events over a given period of time or for sparsely populated geographic areas should be viewed with caution. These rates show considerable variation from year to year, thus limiting their usefulness in comparisons and estimation of rare occurrences. See the section titled “Small Numbers” on page 7.

Age-adjusted rates offer a standard method to compare cancer risk across geographic areas or time periods. However, there are limitations to their use and one should be familiar with these types of rates before using them. As already mentioned, age-adjusted rates are only to be used for comparison purposes and only if the same standard population was used in the calculation. This publication uses the 2000 U.S. Census as the standard population.

For assistance in interpreting these data, please contact the CCR statistical staff at (919) 715-4574.

**Morphology (Cell Type) and Behavior**

The specific morphology codes for these primary site categories have been provided in the Appendix in the table “Primary Site Definitions” to clarify counting of these cases. The lymphoma category includes all lymphoma cases with the morphology codes shown regardless of body site. Data on basal and squamous cell skin cancers are not collected by the CCR unless they have spread to tissue beyond the original site. Malignant melanoma may occur at many different body sites; however, this report focuses on melanoma of the skin. Please note that lymphomas are not grouped consistently by all researchers.

In these data, only malignant tumors are included. Data on benign central nervous system and brain and unspecified types are also reported to the CCR, but are not included in this report. Only invasive cervical cancer cases are included.

### **Limitations of Data**

The user should be cautious when making county-to-county comparisons of the data in this report. Under-reporting in areas close to neighboring states and under-reporting for cancers that may not be diagnosed in hospitals must be considered when interpreting cancer incidence data. In addition, comparison of rates (computed with the number of cases and population data) can be easily misinterpreted. The age distributions and racial percentages in counties vary considerably.

Consider a comparison of Moore and Cabarrus counties. In 2003 over 21% percent of the Moore County population was at least 65 years old, while less than 12% percent of the Cabarrus County population was 65 and over. A larger proportion of the Moore County population can be expected to have cancer than the Cabarrus County population just because of the difference in the age pattern for these two counties. The use of age-adjusted rates will facilitate comparisons of risk.

On the other hand, almost 65% percent of Robeson County's population was comprised of minorities while over 97% percent of Watauga County's population is white. This difference in the racial composition of the populations of the two counties can also have a marked influence on the patterns of cancer incidence and mortality. Age-adjusted rates control for differences in the age structures of populations, but they do not control for differences in racial composition.

Interpretations of melanoma data should be treated with caution since the thoroughness of case-finding is suspect due to the likelihood that cases may be treated outside of hospitals and not reported to the CCR.

### **Small Numbers**

Small numbers of cases are a problem for statistical reports of health data. Even for the most common cancers, some counties can expect to have only one or two cases in a year. For example, Tyrrell County, which has the smallest population of any county in the state, can expect to have only one case of female lung cancer each year (based on state lung cancer rates). Between 1999 and 2003, there were 8 cases of female lung cancer in Tyrrell County reported to the CCR. There were 3 cases reported in 1998 and 4 cases reported in 2003. It would appear that the county had an excessive amount of lung cancer in females in 1998 and 2003. However, over the five-year period, the county would average exactly what was expected.

All statistics are subject to chance variation. Rates based on a very small number of events over a specified period of time or for a sparsely populated geographic area should be of particular concern and caution. When the number of events is small, multiple-year summary rates will

sometimes provide a much better measurement of risk. Expanding the period of time studied enlarges the absolute numbers and adds more credence to a statement regarding a rate.

## **Interpretation**

This descriptive report is intended to serve as a baseline report for future reference. Because of the limitations described above, this publication should not be regarded as a definitive description of the cancer incidence in North Carolina. With additional training of hospital staff, collaboration from neighboring states, and increased physician and pathology laboratories reporting, the problems of under-reporting have declined. Although there are important limitations in the use of these data, the observed number of cases within a gender group in a specific county can be used for:

- ◆ planning health services at the county level;
- ◆ identifying high cancer incidence within a county;
- ◆ educating the public;
- ◆ motivating facilities such as hospitals and physicians to report incidence data accurately and in a timely manner; and
- ◆ encouraging more hospitals to organize tumor registries to provide better service to their cancer patients.

## **Comparison to National Data**

This report was prepared to provide data for evaluation of cancer incidence and mortality patterns in North Carolina. The Annual Report to the Nation on the status of cancer, 1975-2003, produced by the North American Association of Cancer Registries (NAACCR) and the National Program of Cancer Registries (NPCR) at <http://www.cdc.gov/cancer/npcr/index.htm> is available for comparison with North Carolina's observed incidence cases from 2003 and previous years.

## **Available Cancer Information**

Cancer is one of only two leading causes of death in the United States that is increasing (diabetes is the other). This increase is largely the result of the aging of the population and the decline in mortality from other causes of death (e.g., heart disease and stroke). It is estimated that by the year 2015, cancer will be the leading cause of death in the United States.

Cancer is expected to strike one in three people sometime during their lifetime. For more information about cancer, contact a local office of the American Cancer Society or call 1-800-ACS-2345. Many communities also have hospital-based cancer programs through which local data and/or cancer-related services may be obtained. In many counties, local health departments have active cancer control programs. Another source of information on cancer is the Cancer Information Service, 1-800-4CANCER (1-800-422-6237). The Cancer Information Service, located at Duke University, is a national program funded by the National Cancer Institute that provides cancer information.

The CCR produces other reports on cancer in North Carolina, many of which are available on the website at <http://www.schs.state.nc.us/SCHS/CCR/>. A notable one is the *South Atlantic North Carolina Cancer Facts and Figures*. This report is published in collaboration with the South Atlantic Division of the American Cancer Society. Also, other units with the State Center for Health Statistics (SCHS) publish many reports on other diseases and on health care and environmental quality measures. For more information about other reports from the CCR please call (919)715-4574. For information from other programs of the SCHS, please call (919)733-4728, or write:

State Center for Health Statistics  
1908 Mail Service Center  
Raleigh, NC 27699-1908

### **Support for Cancer Research and Control**

The CCR is actively involved with cancer research programs at universities in North Carolina, as well as with federal agencies and research institutes located within the state. One feature of this participation is the rapid identification of cancer patients for projects that are designed to collect information before the patient's first course of treatment is completed (e.g., genetic studies). Several organizations in North Carolina work to prevent cancer or to provide for early detection. Others work to promote a higher quality of life for cancer patients undergoing treatment and cancer survivors. Still others are working to understand and reduce the racial/ethnic gaps in cancer diagnosis and mortality.

One program to promote access to cancer screening tests is the Breast and Cervical Cancer Control Program located in the Chronic Disease and Injury Section of the North Carolina Division of Health. The CCR provides statistical and data analysis support for the state's Cancer Control Program that funds cancer treatment for economically disadvantaged North Carolinians. Also, the CCR is associated with many organizations such as the American Cancer Society, and the state's Advisory Committee for Cancer Coordination and Control.

**Table 1: 2003 Incidence Rates By Sex**

Site	Males		Females	
	Cases	Rate <sup>1</sup>	Cases	Rate <sup>1</sup>
<b>All Sites</b>	<b>18,665</b>	<b>514.5</b>	<b>18,320</b>	<b>396.3</b>
<b>Oral Cavity and Pharynx</b>	<b>635</b>	<b>16.4</b>	<b>282</b>	<b>5.9</b>
Lip	37	1.1	13	0.3
Tongue	162	4.1	62	1.3
Salivary Glands	55	1.5	30	0.6
Floor of Mouth	47	1.2	21	0.4
Other Mouth and Pharynx	334	8.5	156	3.3
<b>Digestive System</b>	<b>3,551</b>	<b>98.7</b>	<b>3,032</b>	<b>64.1</b>
Esophagus	315	8.3	84	1.8
Stomach	306	8.5	205	4.3
Small Intestine	84	2.2	68	1.4
Colon and Rectum	2,001	56.3	1,915	40.6
Anus and Anal Canal	49	1.3	63	1.4
Liver and Intrahepatic Bile Duct	248	6.5	91	1.9
Gallbladder	25	0.8	48	1.0
Pancreas	442	12.5	427	8.9
Other Digestive Organs	81	2.3	131	2.8
<b>Respiratory System</b>	<b>3,796</b>	<b>106.2</b>	<b>2,629</b>	<b>56.3</b>
Larynx	298	8.0	80	1.7
Lung and Bronchus	3,413	95.7	2,521	54.0
Other Respiratory Organs	85	2.5	28	0.6
<b>Bones and Joints</b>	<b>40</b>	<b>1.0</b>	<b>29</b>	<b>0.7</b>
<b>Soft Tissues</b>	<b>128</b>	<b>3.4</b>	<b>113</b>	<b>2.5</b>
<b>Melanoma of the Skin</b>	<b>745</b>	<b>20.0</b>	<b>560</b>	<b>12.5</b>
<b>Breast</b>	<b>32</b>	<b>0.9</b>	<b>6,369</b>	<b>139.0</b>
Invasive Breast	28	0.8	5,132	111.9
In Situ Breast	*	*	1,237	27.0
<b>Female Genital System</b>			<b>1,875</b>	<b>40.7</b>
Cervix Uteri			311	7.0
Uterus (Corpus, NOS)			855	18.5
Ovary			546	11.7
Other Female Genital Organs			163	3.5
<b>Male Genital System</b>	<b>5,253</b>	<b>142.1</b>		
Prostate	5,041	137.1		
Testis	185	4.3		
Other Male Genital Organs	27	0.7		
<b>Urinary System</b>	<b>1,881</b>	<b>53.8</b>	<b>853</b>	<b>18.3</b>
Bladder	1,087	32.3	394	8.3
Kidney and Renal Pelvis	752	20.3	426	9.3
Other Urinary System	42	1.2	33	0.7
<b>Eye and Orbit</b>	<b>45</b>	<b>1.2</b>	<b>30</b>	<b>0.6</b>
<b>Brain and CNS</b>	<b>303</b>	<b>7.9</b>	<b>235</b>	<b>5.2</b>
<b>Endocrine System</b>	<b>132</b>	<b>3.3</b>	<b>424</b>	<b>9.6</b>
Thyroid	109	2.7	397	9.0
Other Endocrine and Thymus	23	0.6	27	0.6
<b>Lymphomas</b>	<b>799</b>	<b>21.9</b>	<b>752</b>	<b>16.3</b>
Hodgkins Disease	101	2.5	98	2.3
Non-Hodgkin's Lymphoma	698	19.4	654	14.0
<b>Multiple Myeloma</b>	<b>213</b>	<b>6.0</b>	<b>208</b>	<b>4.4</b>
<b>Leukemia</b>	<b>324</b>	<b>9.2</b>	<b>266</b>	<b>5.7</b>
Acute Lymphocytic Leukemia	*	*	*	*
Chronic Lymphocytic Leukemia	130	3.7	96	2.0
Acute Myeloid Leukemia	113	3.2	114	2.5
Chronic Myeloid Leukemia	36	1.0	20	0.4
Other Leukemia	44	1.3	36	0.8
<b>Ill-Defined and Unspecified</b>	<b>612</b>	<b>17.9</b>	<b>553</b>	<b>11.7</b>

<sup>1</sup> Rates per 100,000 Population  
Age-Adjusted to the 2000 U.S. Census

\* Less than 10 Cases Observed.

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 2: 1999 - 2003 Ten Most Frequently Diagnosed Cancers  
By Sex**

**Males**

<b>Cancer</b>	<b>Incidence</b>		<b>Mortality</b>	
	<b>Cases</b>	<b>Rate<sup>1</sup></b>	<b>Deaths</b>	<b>Rate<sup>1</sup></b>
Oral Cavity	2,972	16.2	703	4.0
Colon/Rectum	9,748	56.9	3,769	23.4
Pancreas	1,986	11.7	2,080	12.5
Lung/Bronchus	16,692	96.6	14,847	88.6
Melanoma (skin)	3,366	18.6	725	4.2
Prostate	26,789	152.0	4,574	33.2
Bladder	99	0.6	61	0.4
Kidney	3,158	17.4	1,098	6.6
Leukemia	2,146	12.3	1,543	9.6
Non-Hodgkin's	3,354	19.0	1,542	9.5

**Females**

<b>Cancer</b>	<b>Incidence</b>		<b>Mortality</b>	
	<b>Cases</b>	<b>Rate<sup>1</sup></b>	<b>Deaths</b>	<b>Rate<sup>1</sup></b>
Colon/Rectum	9,641	41.7	3,862	16.5
Gallbladder	257	1.1	162	0.7
Pancreas	1,980	8.5	2,154	9.2
Lung/Bronchus	11,389	49.9	9,275	40.6
Melanoma (Skin)	2,615	11.9	432	1.9
Female Breast	32,889	147.3	5,786	25.5
Cervix Uteri	1,745	8.1	609	2.7
Corpus Uteri	4,498	19.9	926	4.0
Ovary	2,998	13.3	1,998	8.7
Hodgkin's	3,066	13.4	1,413	6.1

<sup>1</sup> Rates per 100,000 Population  
Age-Adjusted to the 2000 U.S. Census

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**Table 3: 2003 Cancer Incidence Rates By Race**

<i>Site</i>	<i>Whites</i>		<i>Minorities</i>	
	<i>Cases</i>	<i>Rate<sup>1</sup></i>	<i>Cases</i>	<i>Rate<sup>1</sup></i>
<b><i>All Sites</i></b>	<b>29,467</b>	<b>437.6</b>	<b>7,423</b>	<b>455.6</b>
<b><i>Oral Cavity and Pharynx</i></b>	<b>707</b>	<b>10.3</b>	<b>204</b>	<b>11.4</b>
Lip	47	0.7	*	*
Tongue	178	2.6	46	2.6
Salivary Glands	77	1.1	*	*
Floor of Mouth	50	0.7	17	1.0
Other Mouth and Pharynx	355	5.2	133	7.4
<b><i>Digestive System</i></b>	<b>5,025</b>	<b>74.7</b>	<b>1,542</b>	<b>97.2</b>
Esophagus	315	4.6	84	5.0
Stomach	335	5.0	174	11.0
Small Intestine	112	1.6	40	2.5
Colon and Rectum	3,040	45.3	871	55.2
Anus and Anal Canal	87	1.3	25	1.5
Liver and Intrahepatic Bile Duct	262	3.9	77	4.3
Gallbladder	51	0.8	21	1.3
Pancreas	654	9.7	208	13.7
Other Digestive Organs	169	2.5	42	2.7
<b><i>Respiratory System</i></b>	<b>5,310</b>	<b>78.4</b>	<b>1,104</b>	<b>70.3</b>
Larynx	287	4.2	89	5.4
Lung and Bronchus	4,929	72.8	997	63.7
Other Respiratory Organs	94	1.4	18	1.2
<b><i>Bones and Joints</i></b>	<b>56</b>	<b>0.9</b>	<b>13</b>	<b>0.6</b>
<b><i>Soft Tissues</i></b>	<b>184</b>	<b>2.8</b>	<b>57</b>	<b>3.2</b>
<b><i>Melanoma of the Skin</i></b>	<b>1,283</b>	<b>19.3</b>	<b>15</b>	<b>0.9</b>
<b><i>Female Breast</i></b>	<b>5,093</b>	<b>141.1</b>	<b>1,265</b>	<b>128.6</b>
Female Invasive Breast	4,084	113.1	1,040	105.4
Female In Situ Breast	1,009	28.1	225	23.2
<b><i>Female Genital System</i></b>	<b>1,476</b>	<b>40.8</b>	<b>393</b>	<b>41.0</b>
Cervix Uteri	207	6.2	103	10.2
Uterus (Corpus, NOS)	677	18.5	176	19.1
Ovary	468	12.7	78	8.0
Other Female Genital Organs	124	3.4	36	3.7
<b><i>Male Genital System</i></b>	<b>3,815</b>	<b>124.7</b>	<b>1,411</b>	<b>221.7</b>
Prostate	3,626	119.3	1,394	220.0
Testis	167	5.1	17	1.7
Other Male Genital Organs	22	0.7	*	*
<b><i>Urinary System</i></b>	<b>2,283</b>	<b>34.0</b>	<b>442</b>	<b>28.0</b>
Bladder	1,302	19.4	178	12.1
Kidney and Renal Pelvis	913	13.6	264	15.9
Other Urinary System	68	1.0	*	*
<b><i>Eye and Orbit</i></b>	<b>69</b>	<b>1.0</b>	<b>*</b>	<b>*</b>
<b><i>Brain and CNS</i></b>	<b>459</b>	<b>7.0</b>	<b>78</b>	<b>4.2</b>
<b><i>Endocrine System</i></b>	<b>449</b>	<b>6.8</b>	<b>103</b>	<b>5.2</b>
Thyroid	413	6.2	89	4.4
Other Endocrine and Thymus	36	0.6	14	0.8
<b><i>Lymphomas</i></b>	<b>1,312</b>	<b>19.7</b>	<b>238</b>	<b>13.8</b>
Hodgkins Disease	149	2.3	50	2.5
NH Lymphoma	1,163	17.4	188	11.3
<b><i>Multiple Myeloma</i></b>	<b>281</b>	<b>4.2</b>	<b>139</b>	<b>8.9</b>
<b><i>Leukemia</i></b>	<b>491</b>	<b>7.4</b>	<b>96</b>	<b>5.8</b>
Acute Lymphocytic Leukemia	*	*	*	*
Chronic Lymphocytic Leukemia	193	2.9	33	2.1
Acute Myeloid Leukemia	186	2.8	39	2.3
Chronic Myeloid Leukemia	41	0.6	14	0.8
Other Leukemia	70	1.1	10	0.6
<b><i>Ill-Defined and Unspecified</i></b>	<b>934</b>	<b>14.0</b>	<b>230</b>	<b>14.8</b>
<b><i>All other cancers - uncategorized</i></b>	<b>218</b>	<b>3.4</b>	<b>64</b>	<b>3.2</b>

<sup>1</sup> Rates per 100,000 Population  
Age-Adjusted to the 2000 U.S. Census  
\* Less than 10 Cases Observed.

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 4: 1999-2003 Ten Most Frequently Diagnosed Cancers  
By Race**

<b>Cancer</b>	<b>Whites</b>			
	<b>Incidence</b>		<b>Mortality</b>	
	<b>Cases</b>	<b>Rate<sup>1</sup></b>	<b>Deaths</b>	<b>Rate<sup>1</sup></b>
Female Breast	26,675	151.6	4,288	23.5
Lung/Bronchus	23,254	70.5	19,806	60.3
Prostate	19,850	136.0	2,971	26.0
Colon/Rectum	15,292	46.9	5,830	18.1
Bladder	6,533	20.0	1,275	4.0
Melanoma (skin)	5,871	18.1	1,130	3.5
Non-Hodgkin's Lymphoma	5,489	16.9	2,581	8.0
Kidney	4,014	12.2	1,407	4.3
Corpus Uteri	3,623	20.3	627	3.3
Oral Cavity	3,334	10.2	818	2.5

<b>Cancer</b>	<b>Minorities</b>			
	<b>Incidence</b>		<b>Mortality</b>	
	<b>Cases</b>	<b>Rate<sup>1</sup></b>	<b>Deaths</b>	<b>Rate<sup>1</sup></b>
Prostate	6,784	223.8	1,603	69.7
Female Breast	6,131	127.9	1,498	31.6
Lung/Bronchus	4,812	62.5	4,316	57.1
Colon/Rectum	4,065	52.9	1,800	24.1
Oral Cavity	988	11.6	298	3.6
Kidney	1,079	13.2	329	4.3
Non-Hodgkin's	922	11.0	374	4.9
Pancreas	889	12.0	948	12.9
Stomach	790	10.3	580	7.8
Corpus Uteri	868	19.0	299	6.7

<sup>1</sup> Rates per 100,000 Population  
Age-Adjusted to the 2000 U.S. Census

Cancer Incidence in North Carolina 2003  
State Center for Health Statistics  
N.C. Division of Public Health

**Table 5: 2003 Total Cancer Incidence and Mortality Rates By County**

<b>County</b>	<b>Cases</b>	<b>Rate<sup>1</sup></b>	<b>Deaths</b>	<b>Rate<sup>1</sup></b>
<b>NORTH CAROLINA</b>	36,986	442.3	16,107	196.3
<i>Alamance</i>	689	475.1	293	200.2
<i>Alexander</i>	131	361.8	69	202.8
<i>Alleghany</i>	63	401.9	24	151.6
<i>Anson</i>	111	405.3	52	183.5
<i>Ashe</i>	146	425.4	69	191.6
<i>Avery</i>	92	411.8	43	195.7
<i>Beaufort</i>	288	506.2	111	193.1
<i>Bertie</i>	122	508.3	49	201.3
<i>Bladen</i>	149	405.9	72	195.4
<i>Brunswick</i>	426	382.6	196	178.9
<i>Buncombe</i>	1,037	417.1	504	197.5
<i>Burke</i>	435	446.6	198	205.8
<i>Cabarrus</i>	681	507.2	264	199.1
<i>Caldwell</i>	369	423.7	166	191.6
<i>Camden</i>	28	334.6	26	322.4
<i>Carteret</i>	412	498.0	175	214.8
<i>Caswell</i>	99	367.1	58	216.9
<i>Catawba</i>	715	475.7	293	198.4
<i>Chatham</i>	271	435.9	124	194.6
<i>Cherokee</i>	110	295.3	81	211.8
<i>Chowan</i>	91	468.6	29	142.0
<i>Clay</i>	29	190.8	33	207.2
<i>Cleveland</i>	502	477.8	223	213.4
<i>Columbus</i>	240	395.6	133	222.1
<i>Craven</i>	529	535.6	216	220.1
<i>Cumberland</i>	1,092	471.0	448	208.9
<i>Currituck</i>	35	164.8	42	203.8
<i>Dare</i>	110	286.1	79	213.7
<i>Davidson</i>	702	428.4	341	212.6
<i>Davie</i>	169	405.5	81	196.1
<i>Duplin</i>	212	415.3	95	188.3
<i>Durham</i>	895	451.9	376	196.5
<i>Edgecombe</i>	316	554.7	130	232.2
<i>Forsyth</i>	1,507	464.1	613	190.4
<i>Franklin</i>	148	309.9	99	212.6
<i>Gaston</i>	835	416.4	417	210.7
<i>Gates</i>	33	266.1	27	217.5
<i>Graham</i>	22	200.4	19	166.6
<i>Granville</i>	280	539.8	104	214.3
<i>Greene</i>	81	415.3	41	214.5
<i>Guilford</i>	1,917	460.2	751	183.4
<i>Halifax</i>	292	449.9	137	207.0
<i>Harnett</i>	408	484.3	174	215.9
<i>Haywood</i>	308	406.9	135	165.2
<i>Henderson</i>	609	443.5	259	178.8
<i>Hertford</i>	136	480.6	54	187.4
<i>Hoke</i>	121	458.8	47	192.6
<i>Hyde</i>	20	290.9	*	**
<i>Iredell</i>	591	437.3	263	196.6
<i>Jackson</i>	148	385.8	63	159.6
<i>Johnston</i>	568	481.2	214	190.9
<i>Jones</i>	61	508.0	22	173.0

<sup>1</sup> Rates per 100,000 Population  
Age-Adjusted to the 2000 U.S. Census

\* Less than 10 Cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 5: 2003 Total Cancer Incidence and Mortality Rates By County**

<b>County</b>	<b>Cases</b>	<b>Rate<sup>1</sup></b>	<b>Deaths</b>	<b>Rate<sup>1</sup></b>
<b>NORTH CAROLINA</b>	36,986	442.3	16,107	196.3
<i>Lee</i>	282	548.1	114	227.4
<i>Lenoir</i>	363	528.5	142	209.7
<i>Lincoln</i>	293	431.8	131	199.4
<i>McDowell</i>	184	376.3	85	173.3
<i>Macon</i>	180	357.2	82	163.2
<i>Madison</i>	103	419.7	50	201.7
<i>Martin</i>	109	360.0	57	185.0
<i>Mecklenburg</i>	2,440	409.2	1,060	191.5
<i>Mitchell</i>	82	382.8	50	218.4
<i>Montgomery</i>	112	364.9	52	165.4
<i>Moore</i>	548	479.0	220	182.7
<i>Nash</i>	471	509.2	184	201.8
<i>New Hanover</i>	809	455.2	333	190.2
<i>Northampton</i>	119	430.8	58	202.6
<i>Onslow</i>	462	494.0	171	196.5
<i>Orange</i>	439	453.5	176	190.5
<i>Pamlico</i>	79	413.1	25	140.6
<i>Pasquotank</i>	165	418.0	90	227.1
<i>Pender</i>	229	462.3	96	198.6
<i>Perquimans</i>	72	431.7	35	206.0
<i>Person</i>	210	515.3	108	269.5
<i>Pitt</i>	599	518.5	230	209.7
<i>Polk</i>	82	293.0	55	164.3
<i>Randolph</i>	562	410.7	292	217.4
<i>Richmond</i>	219	434.0	102	202.2
<i>Robeson</i>	488	440.8	233	216.2
<i>Rockingham</i>	535	495.4	257	235.9
<i>Rowan</i>	507	358.1	262	183.5
<i>Rutherford</i>	332	434.3	140	180.5
<i>Sampson</i>	253	404.5	143	230.6
<i>Scotland</i>	148	414.3	73	215.7
<i>Stanly</i>	257	392.6	132	200.2
<i>Stokes</i>	231	489.5	112	234.6
<i>Surry</i>	394	461.3	151	172.9
<i>Swain</i>	41	254.4	26	155.3
<i>Transylvania</i>	156	339.9	69	152.3
<i>Tyrrell</i>	16	313.9	15	299.7
<i>Union</i>	544	447.3	211	185.5
<i>Vance</i>	242	541.4	111	247.0
<i>Wake</i>	2,387	459.9	854	184.8
<i>Warren</i>	106	419.9	61	234.5
<i>Washington</i>	75	457.1	35	206.1
<i>Watauga</i>	192	499.1	70	181.2
<i>Wayne</i>	451	397.5	216	198.0
<i>Wilkes</i>	307	394.4	151	194.7
<i>Wilson</i>	388	486.2	147	184.1
<i>Yadkin</i>	170	413.4	63	156.4
<i>Yancey</i>	102	423.7	36	140.6

<sup>1</sup> Rates per 100,000 Population  
Age-Adjusted to the 2000 U.S. Census

\* Less than 10 Cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 6: 2003 Colon/Rectum Cancer Incidence Rates**

<i>County</i>	<i>Cases</i>	<i>Rate<sup>1</sup></i>
<b>NORTH CAROLINA</b>	3,916	47.3
<i>Alamance</i>	93	62.7
<i>Alexander</i>	12	34.1
<i>Alleghany</i>	10	60.6
<i>Anson</i>	*	**
<i>Ashe</i>	13	36.8
<i>Avery</i>	11	49.4
<i>Beaufort</i>	37	64.0
<i>Bertie</i>	15	65.4
<i>Bladen</i>	14	40.0
<i>Brunswick</i>	40	36.9
<i>Buncombe</i>	99	39.3
<i>Burke</i>	41	42.7
<i>Cabarrus</i>	75	57.4
<i>Caldwell</i>	47	55.1
<i>Camden</i>	*	**
<i>Carteret</i>	45	53.6
<i>Caswell</i>	13	44.7
<i>Catawba</i>	71	46.7
<i>Chatham</i>	24	39.0
<i>Cherokee</i>	12	29.8
<i>Chowan</i>	11	52.0
<i>Clay</i>	*	**
<i>Cleveland</i>	53	51.2
<i>Columbus</i>	21	35.9
<i>Craven</i>	52	52.5
<i>Cumberland</i>	142	63.9
<i>Currituck</i>	*	**
<i>Dare</i>	19	47.2
<i>Davidson</i>	73	45.2
<i>Davie</i>	11	26.8
<i>Duplin</i>	22	42.4
<i>Durham</i>	87	45.3
<i>Edgecombe</i>	31	54.4
<i>Forsyth</i>	144	44.6
<i>Franklin</i>	23	48.3
<i>Gaston</i>	114	56.9
<i>Gates</i>	*	**
<i>Graham</i>	*	**
<i>Granville</i>	33	61.6
<i>Greene</i>	*	**
<i>Guilford</i>	206	50.0
<i>Halifax</i>	38	58.4
<i>Harnett</i>	48	57.5
<i>Haywood</i>	30	36.7
<i>Henderson</i>	49	33.6
<i>Hertford</i>	17	60.6
<i>Hoke</i>	14	57.4
<i>Hyde</i>	*	**
<i>Iredell</i>	65	49.2
<i>Jackson</i>	27	66.4

<sup>1</sup> Rates per 100,000 Population

Age-Adjusted to the 2000 U.S. Census

\* Less than 10 Cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed

**Table 6: 2003 Colon/Rectum Cancer Incidence Rates**

<b>County</b>	<b>Cases</b>	<b>Rate<sup>1</sup></b>
<b>NORTH CAROLINA</b>	3,916	47.3
<i>Jones</i>	*	**
<i>Lee</i>	44	86.0
<i>Lenoir</i>	29	43.6
<i>Lincoln</i>	33	51.6
<i>McDowell</i>	21	40.8
<i>Macon</i>	24	45.6
<i>Madison</i>	*	**
<i>Martin</i>	15	47.8
<i>Mecklenburg</i>	253	43.8
<i>Mitchell</i>	13	57.9
<i>Montgomery</i>	*	**
<i>Moore</i>	70	59.4
<i>Nash</i>	49	54.7
<i>New Hanover</i>	63	35.8
<i>Northampton</i>	14	52.6
<i>Onslow</i>	32	38.3
<i>Orange</i>	42	46.3
<i>Pamlico</i>	*	**
<i>Pasquotank</i>	23	59.0
<i>Pender</i>	20	39.9
<i>Perquimans</i>	17	96.4
<i>Person</i>	22	52.9
<i>Pitt</i>	43	38.5
<i>Polk</i>	10	29.2
<i>Randolph</i>	55	40.4
<i>Richmond</i>	27	53.4
<i>Robeson</i>	53	50.9
<i>Rockingham</i>	67	61.3
<i>Rowan</i>	57	39.6
<i>Rutherford</i>	37	46.7
<i>Sampson</i>	30	48.3
<i>Scotland</i>	19	55.7
<i>Stanly</i>	19	28.9
<i>Stokes</i>	27	58.9
<i>Surry</i>	35	40.2
<i>Swain</i>	*	**
<i>Transylvania</i>	18	42.1
<i>Tyrrell</i>	*	**
<i>Union</i>	60	54.0
<i>Vance</i>	35	78.0
<i>Wake</i>	225	46.5
<i>Warren</i>	*	**
<i>Washington</i>	14	84.3
<i>Watauga</i>	20	50.7
<i>Wayne</i>	48	41.8
<i>Wilkes</i>	23	30.4
<i>Wilson</i>	42	52.6
<i>Yadkin</i>	11	25.3
<i>Yancey</i>	16	67.4

<sup>1</sup> Rates per 100,000 Population

Age-Adjusted to the 2000 U.S. Census

\* Less than 10 Cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed

**Table 7: 2003 Lung/Bronchus Cancer Incidence Rates**

<i>County</i>	<i>Cases</i>	<i>Rate<sup>1</sup></i>
<b>NORTH CAROLINA</b>	5,934	71.4
<i>Alamance</i>	104	70.8
<i>Alexander</i>	29	80.6
<i>Alleghany</i>	10	62.7
<i>Anson</i>	20	74.6
<i>Ashe</i>	24	68.3
<i>Avery</i>	20	88.9
<i>Beaufort</i>	53	90.9
<i>Bertie</i>	21	85.3
<i>Bladen</i>	31	83.2
<i>Brunswick</i>	67	56.3
<i>Buncombe</i>	148	58.7
<i>Burke</i>	79	80.1
<i>Cabarrus</i>	111	84.4
<i>Caldwell</i>	63	70.3
<i>Camden</i>	*	**
<i>Carteret</i>	61	71.1
<i>Caswell</i>	15	54.4
<i>Catawba</i>	100	66.9
<i>Chatham</i>	37	58.3
<i>Cherokee</i>	29	79.5
<i>Chowan</i>	10	49.1
<i>Clay</i>	*	**
<i>Cleveland</i>	78	74.1
<i>Columbus</i>	37	60.0
<i>Craven</i>	87	86.6
<i>Cumberland</i>	168	74.5
<i>Currituck</i>	*	**
<i>Dare</i>	26	69.3
<i>Davidson</i>	142	86.5
<i>Davie</i>	33	78.4
<i>Duplin</i>	27	52.2
<i>Durham</i>	147	78.5
<i>Edgecombe</i>	49	85.0
<i>Forsyth</i>	231	71.3
<i>Franklin</i>	32	70.2
<i>Gaston</i>	156	78.2
<i>Gates</i>	*	**
<i>Graham</i>	*	**
<i>Granville</i>	60	119.5
<i>Greene</i>	10	52.0
<i>Guilford</i>	291	71.2
<i>Halifax</i>	37	56.5
<i>Harnett</i>	70	84.6
<i>Haywood</i>	55	66.6
<i>Henderson</i>	104	71.8
<i>Hertford</i>	17	57.8
<i>Hoke</i>	26	105.1
<i>Hyde</i>	*	**
<i>Iredell</i>	96	71.7
<i>Jackson</i>	21	52.1

<sup>1</sup>Rates per 100,000 Population

Age-Adjusted to the 2000 U.S. Census

\* Less than 10 Cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 7: 2003 Lung/Bronchus Cancer Incidence Rates**

<i>County</i>	<i>Cases</i>	<i>Rate<sup>1</sup></i>
<b>NORTH CAROLINA</b>	5,934	71.4
<i>Jones</i>	14	115.4
<i>Lee</i>	50	97.2
<i>Lenoir</i>	56	80.5
<i>Lincoln</i>	47	69.5
<i>McDowell</i>	42	83.5
<i>Macon</i>	26	52.2
<i>Madison</i>	17	68.0
<i>Martin</i>	19	62.2
<i>Mecklenburg</i>	326	59.0
<i>Mitchell</i>	14	60.9
<i>Montgomery</i>	25	81.0
<i>Moore</i>	100	80.5
<i>Nash</i>	71	76.6
<i>New Hanover</i>	126	70.9
<i>Northampton</i>	*	**
<i>Onslow</i>	88	97.6
<i>Orange</i>	45	50.0
<i>Pamlico</i>	*	**
<i>Pasquotank</i>	21	52.6
<i>Pender</i>	38	75.6
<i>Perquimans</i>	10	56.3
<i>Person</i>	26	64.9
<i>Pitt</i>	86	77.3
<i>Polk</i>	*	**
<i>Randolph</i>	88	65.5
<i>Richmond</i>	50	96.3
<i>Robeson</i>	87	78.8
<i>Rockingham</i>	102	93.5
<i>Rowan</i>	110	77.3
<i>Rutherford</i>	46	59.8
<i>Sampson</i>	50	78.9
<i>Scotland</i>	24	65.3
<i>Stanly</i>	54	80.4
<i>Stokes</i>	44	89.1
<i>Surry</i>	68	78.4
<i>Swain</i>	*	**
<i>Transylvania</i>	25	50.7
<i>Tyrrell</i>	*	**
<i>Union</i>	83	69.5
<i>Vance</i>	56	124.0
<i>Wake</i>	308	66.4
<i>Warren</i>	19	76.4
<i>Washington</i>	10	60.3
<i>Watauga</i>	19	47.8
<i>Wayne</i>	76	68.1
<i>Wilkes</i>	55	71.4
<i>Wilson</i>	57	70.0
<i>Yadkin</i>	32	76.2
<i>Yancey</i>	14	53.5

<sup>1</sup>Rates per 100,000 Population  
Age-Adjusted to the 2000 U.S. Census

\* Less than 10 Cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 8: 2003 Female Breast Cancer Incidence Rates**

<b>County</b>	<b>Cases</b>	<b>Rate<sup>2</sup></b>
<i>North Carolina</i>	6,369	139.0
<i>Alamance</i>	90	114.4
<i>Alexander</i>	26	131.3
<i>Alleghany</i>	*	**
<i>Anson</i>	16	120.5
<i>Ashe</i>	13	77.0
<i>Avery</i>	*	**
<i>Beaufort</i>	45	148.1
<i>Bertie</i>	23	176.2
<i>Bladen</i>	26	133.0
<i>Brunswick</i>	75	131.2
<i>Buncombe</i>	196	143.6
<i>Burke</i>	75	141.8
<i>Cabarrus</i>	117	157.1
<i>Caldwell</i>	62	130.3
<i>Camden</i>	*	**
<i>Carteret</i>	59	138.0
<i>Caswell</i>	11	79.3
<i>Catawba</i>	140	170.7
<i>Chatham</i>	51	157.6
<i>Cherokee</i>	12	65.3
<i>Chowan</i>	17	182.0
<i>Clay</i>	*	**
<i>Cleveland</i>	82	141.6
<i>Columbus</i>	31	97.8
<i>Craven</i>	61	118.3
<i>Cumberland</i>	176	132.1
<i>Currituck</i>	*	**
<i>Dare</i>	18	88.7
<i>Davidson</i>	86	98.2
<i>Davie</i>	21	97.4
<i>Duplin</i>	35	123.3
<i>Durham</i>	175	155.3
<i>Edgecombe</i>	65	194.8
<i>Forsyth</i>	233	129.8
<i>Franklin</i>	17	61.8
<i>Gaston</i>	115	105.0
<i>Gates</i>	*	**
<i>Graham</i>	*	**
<i>Granville</i>	43	160.4
<i>Greene</i>	15	144.0
<i>Guilford</i>	309	132.4
<i>Halifax</i>	50	138.8
<i>Harnett</i>	72	152.6
<i>Haywood</i>	59	151.2
<i>Henderson</i>	109	154.0
<i>Hertford</i>	26	165.6
<i>Hoke</i>	13	83.5
<i>Hyde</i>	*	**
<i>Iredell</i>	94	129.3

<sup>2</sup> Rates per 100,000 Population

Sex specific populations are used to calculate rates for sex-specific cancers.  
Age-Adjusted to the 2000 U.S. Census

\* Less than 10 cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 8: 2003 Female Breast Cancer Incidence Rates**

<b>County</b>	<b>Cases</b>	<b>Rate<sup>4</sup></b>
<i>North Carolina</i>	6,369	139.0
<i>Jackson</i>	27	124.2
<i>Johnston</i>	104	157.9
<i>Jones</i>	*	**
<i>Lee</i>	36	128.6
<i>Lenoir</i>	59	154.6
<i>Lincoln</i>	57	154.7
<i>McDowell</i>	23	91.7
<i>Macon</i>	27	101.7
<i>Madison</i>	17	132.9
<i>Martin</i>	19	110.6
<i>Mecklenburg</i>	575	164.5
<i>Mitchell</i>	*	**
<i>Montgomery</i>	14	87.0
<i>Moore</i>	84	151.1
<i>Nash</i>	100	193.6
<i>New Hanover</i>	174	178.5
<i>Northampton</i>	21	150.0
<i>Onslow</i>	75	143.1
<i>Orange</i>	113	203.5
<i>Pamlico</i>	15	158.8
<i>Pasquotank</i>	39	178.3
<i>Pender</i>	39	153.7
<i>Perquimans</i>	13	167.7
<i>Person</i>	32	144.0
<i>Pitt</i>	116	175.8
<i>Polk</i>	22	172.1
<i>Randolph</i>	83	110.1
<i>Richmond</i>	27	97.9
<i>Robeson</i>	79	126.6
<i>Rockingham</i>	85	144.8
<i>Rowan</i>	77	104.9
<i>Rutherford</i>	46	112.0
<i>Sampson</i>	42	126.6
<i>Scotland</i>	29	143.9
<i>Stanly</i>	41	119.1
<i>Stokes</i>	36	137.2
<i>Surry</i>	54	123.0
<i>Swain</i>	*	**
<i>Transylvania</i>	20	86.9
<i>Tyrrell</i>	*	**
<i>Union</i>	92	133.2
<i>Vance</i>	30	120.9
<i>Wake</i>	510	167.7
<i>Warren</i>	15	102.5
<i>Washington</i>	10	119.0
<i>Watauga</i>	32	158.5
<i>Wayne</i>	89	144.5
<i>Wilkes</i>	46	106.6
<i>Wilson</i>	61	136.1
<i>Yadkin</i>	22	100.7
<i>Yancey</i>	15	124.3

<sup>4</sup> Rates per 100,000 Population

Sex specific populations are used to calculate rates for sex-specific cancers.

Age-Adjusted to the 2000 U.S. Census

\* Less than 10 cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 9: 2003 Prostate Cancer Incidence Rates**

<i>County</i>	<i>Cases</i>	<i>Rate<sup>2</sup></i>
<i>North Carolina</i>	5,041	137.1
<i>Alamance</i>	77	125.3
<i>Alexander</i>	19	113.4
<i>Alleghany</i>	*	**
<i>Anson</i>	23	182.5
<i>Ashe</i>	26	161.4
<i>Avery</i>	18	164.6
<i>Beaufort</i>	44	169.7
<i>Bertie</i>	26	249.7
<i>Bladen</i>	19	109.5
<i>Brunswick</i>	52	84.9
<i>Buncombe</i>	135	119.4
<i>Burke</i>	58	137.9
<i>Cabarrus</i>	77	134.1
<i>Caldwell</i>	46	112.6
<i>Camden</i>	*	**
<i>Carteret</i>	61	152.0
<i>Caswell</i>	15	124.2
<i>Catawba</i>	85	129.5
<i>Chatham</i>	43	153.9
<i>Cherokee</i>	*	**
<i>Chowan</i>	12	136.6
<i>Clay</i>	*	**
<i>Cleveland</i>	68	150.1
<i>Columbus</i>	44	147.6
<i>Craven</i>	100	217.6
<i>Cumberland</i>	151	151.6
<i>Currituck</i>	*	**
<i>Dare</i>	11	54.0
<i>Davidson</i>	84	111.5
<i>Davie</i>	20	102.1
<i>Duplin</i>	31	146.7
<i>Durham</i>	145	169.0
<i>Edgecombe</i>	46	187.5
<i>Forsyth</i>	189	139.7
<i>Franklin</i>	17	87.3
<i>Gaston</i>	109	129.9
<i>Gates</i>	10	170.8
<i>Graham</i>	*	**
<i>Granville</i>	32	131.0
<i>Greene</i>	13	154.2
<i>Guilford</i>	261	145.9
<i>Halifax</i>	45	164.0
<i>Harnett</i>	59	166.2
<i>Haywood</i>	27	76.0
<i>Henderson</i>	92	142.1
<i>Hertford</i>	30	246.9
<i>Hoke</i>	12	115.9
<i>Hyde</i>	*	**
<i>Iredell</i>	87	147.0

<sup>2</sup> Rates per 100,000 Population

Sex specific populations are used to calculate rates for sex-specific cancers.

Age-Adjusted to the 2000 U.S. Census

\* Less than 10 cases observed

\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 9: 2003 Prostate Cancer Incidence Rates**

<i>County</i>	<i>Cases</i>	<i>Rate<sup>4</sup></i>
<i>North Carolina</i>	5,041	137.1
<i>Jackson</i>	14	81.3
<i>Johnston</i>	80	171.8
<i>Jones</i>	11	198.6
<i>Lee</i>	34	145.8
<i>Lenoir</i>	73	242.9
<i>Lincoln</i>	35	110.4
<i>McDowell</i>	29	126.6
<i>Macon</i>	28	120.4
<i>Madison</i>	12	104.3
<i>Martin</i>	12	92.5
<i>Mecklenburg</i>	342	135.5
<i>Mitchell</i>	11	107.1
<i>Montgomery</i>	17	121.4
<i>Moore</i>	58	102.9
<i>Nash</i>	49	121.6
<i>New Hanover</i>	92	112.9
<i>Northampton</i>	25	195.4
<i>Onslow</i>	63	147.6
<i>Orange</i>	67	160.9
<i>Pamlico</i>	17	193.5
<i>Pasquotank</i>	31	181.3
<i>Pender</i>	34	141.8
<i>Perquimans</i>	*	**
<i>Person</i>	38	220.6
<i>Pitt</i>	94	195.5
<i>Polk</i>	*	**
<i>Randolph</i>	76	125.9
<i>Richmond</i>	30	139.1
<i>Robeson</i>	93	195.2
<i>Rockingham</i>	55	117.5
<i>Rowan</i>	41	64.5
<i>Rutherford</i>	43	131.2
<i>Sampson</i>	41	147.9
<i>Scotland</i>	27	166.1
<i>Stanly</i>	22	74.7
<i>Stokes</i>	17	88.1
<i>Surry</i>	50	132.4
<i>Swain</i>	*	**
<i>Transylvania</i>	30	126.9
<i>Tyrrell</i>	*	**
<i>Union</i>	83	148.2
<i>Vance</i>	31	178.6
<i>Wake</i>	323	149.1
<i>Warren</i>	12	107.5
<i>Washington</i>	*	**
<i>Watauga</i>	27	148.6
<i>Wayne</i>	58	120.0
<i>Wilkes</i>	42	111.3
<i>Wilson</i>	47	143.3
<i>Yadkin</i>	25	129.4
<i>Yancey</i>	12	106.6

<sup>4</sup> Rates per 100,000 Population

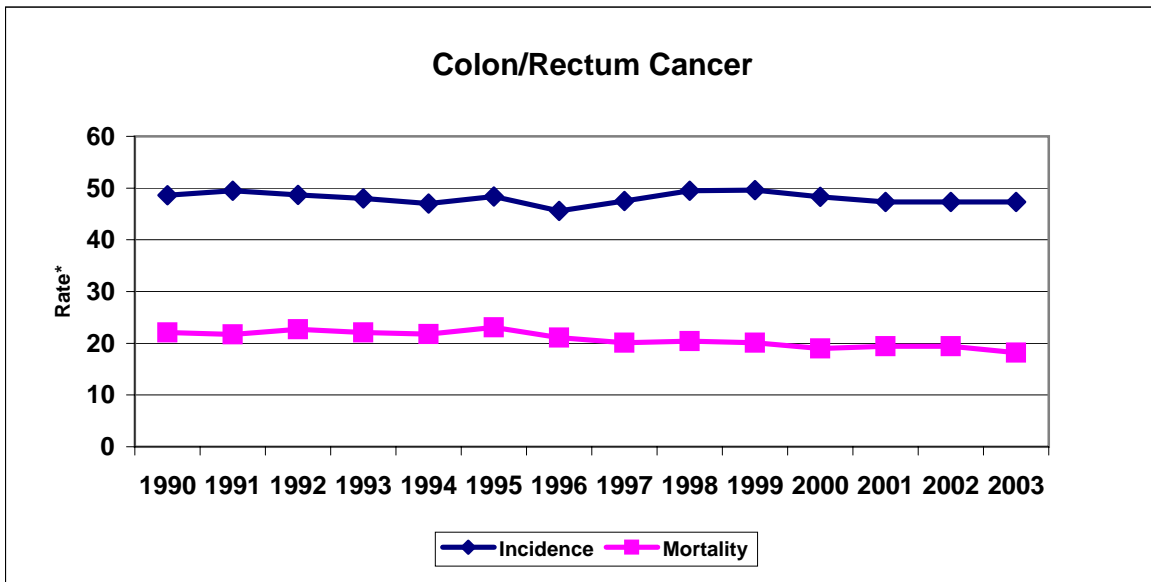
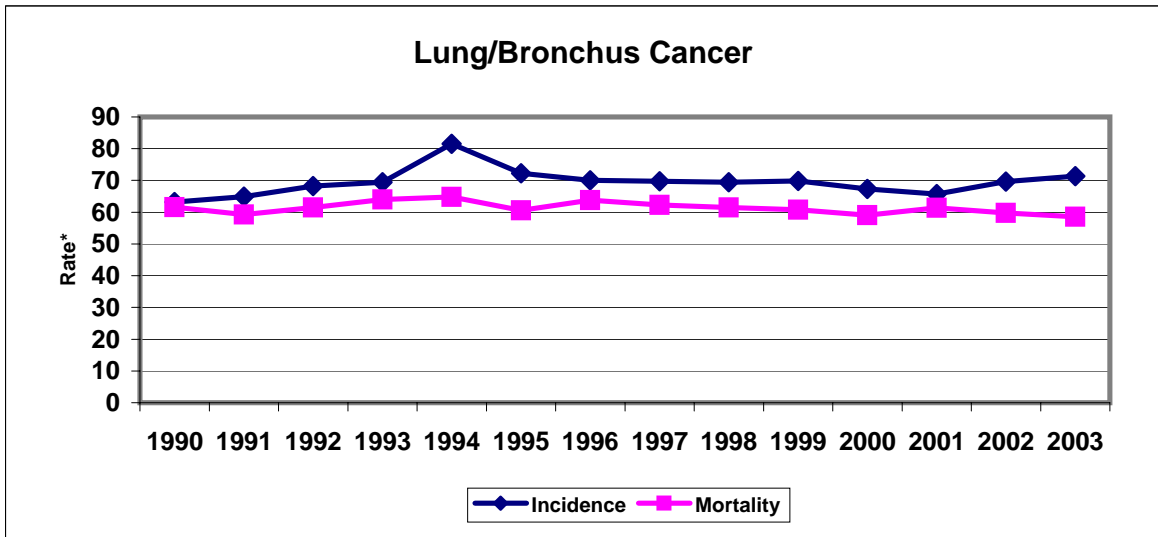
Sex specific populations are used to calculate rates for sex-specific cancers.

Age-Adjusted to the 2000 U.S. Census

\* Less than 10 cases observed

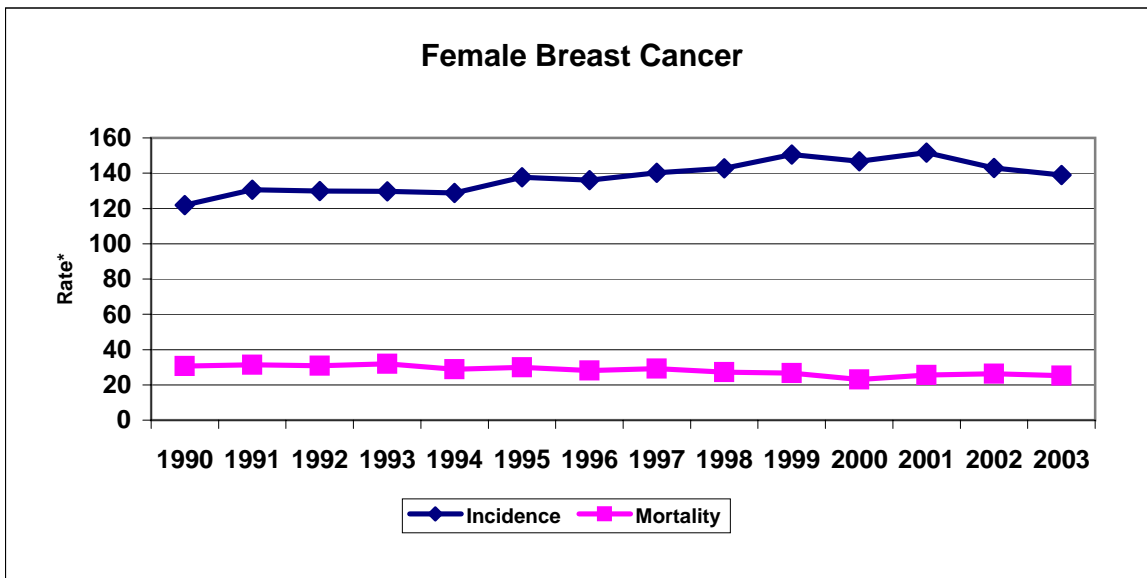
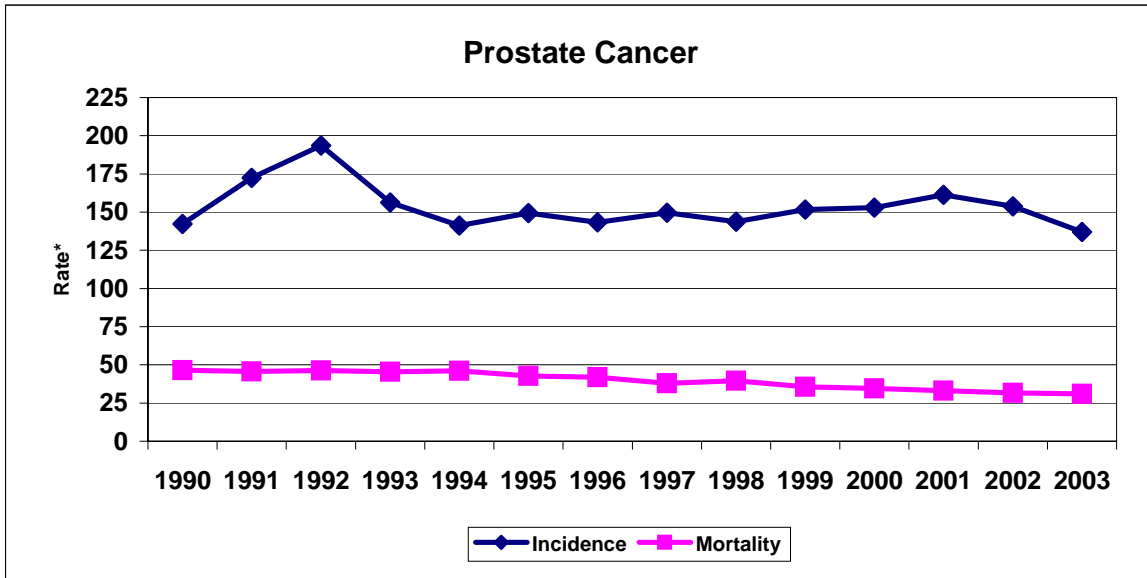
\*\* Rates based on less than 10 cases are unstable and therefore suppressed.

**Chart 1: Trends For The Four Major Cancers  
1990-2003**



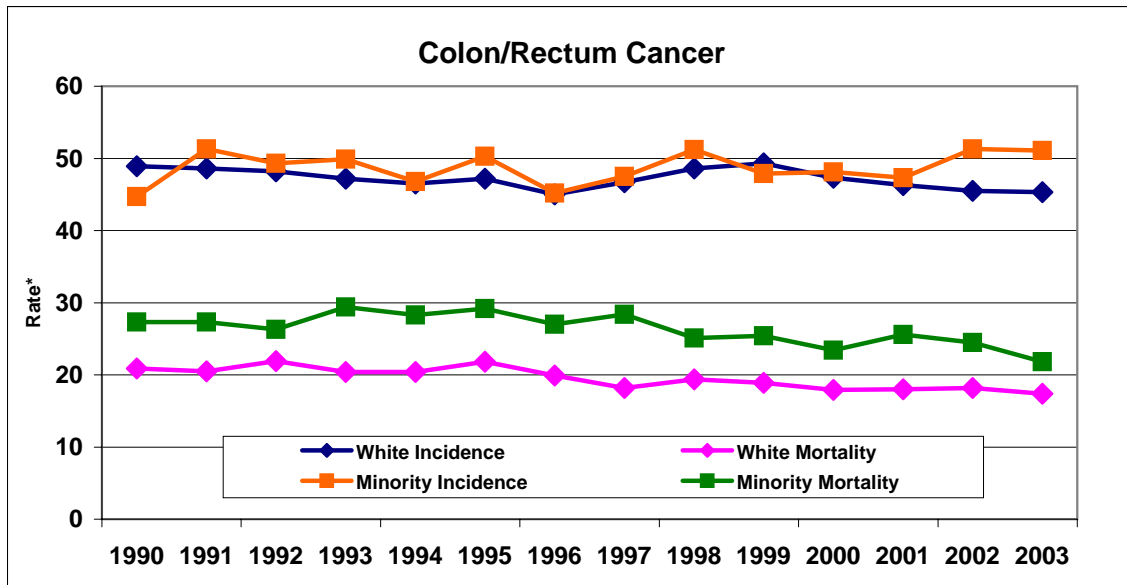
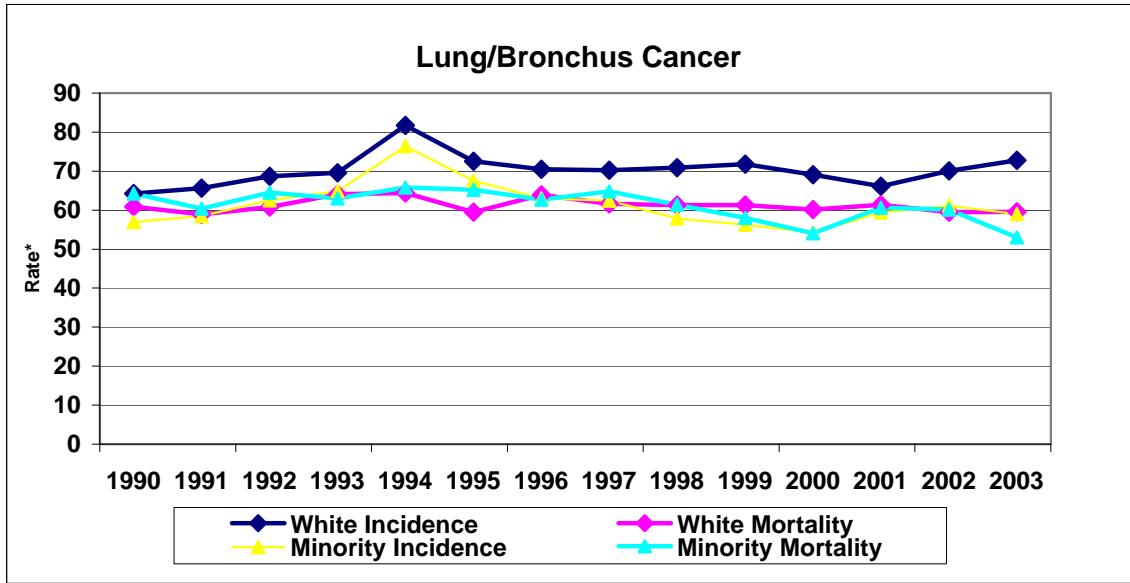
Cancer Incidence in North Carolina 2003  
State Center for Health Statistics  
N.C. Division of Public Health

**Chart 1: Trends For The Four Major Cancers  
1990-2003**

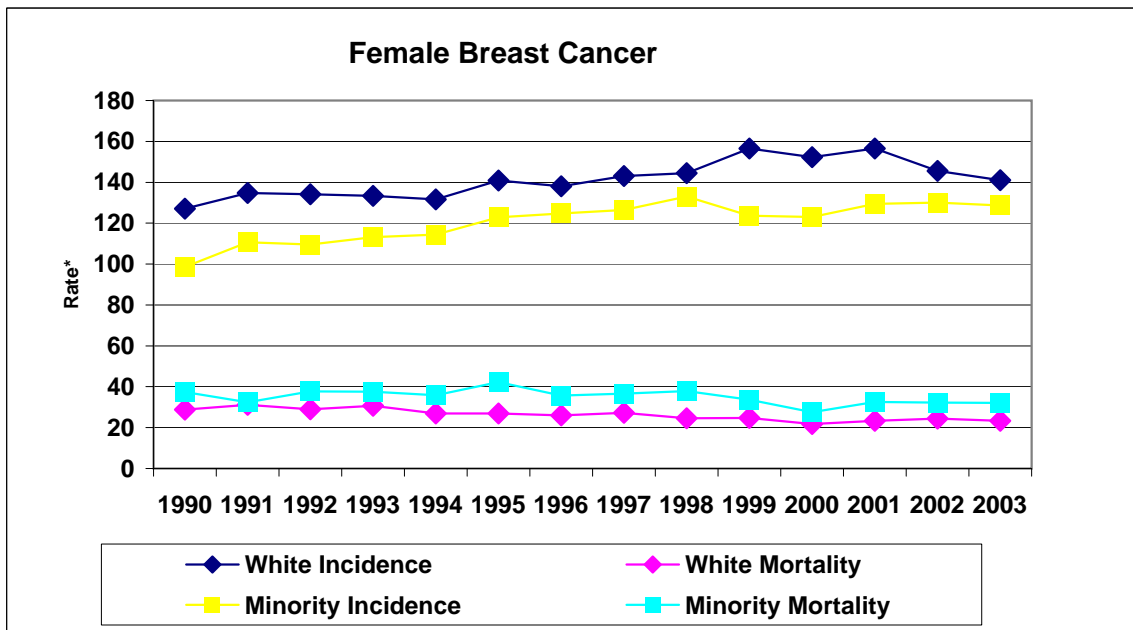
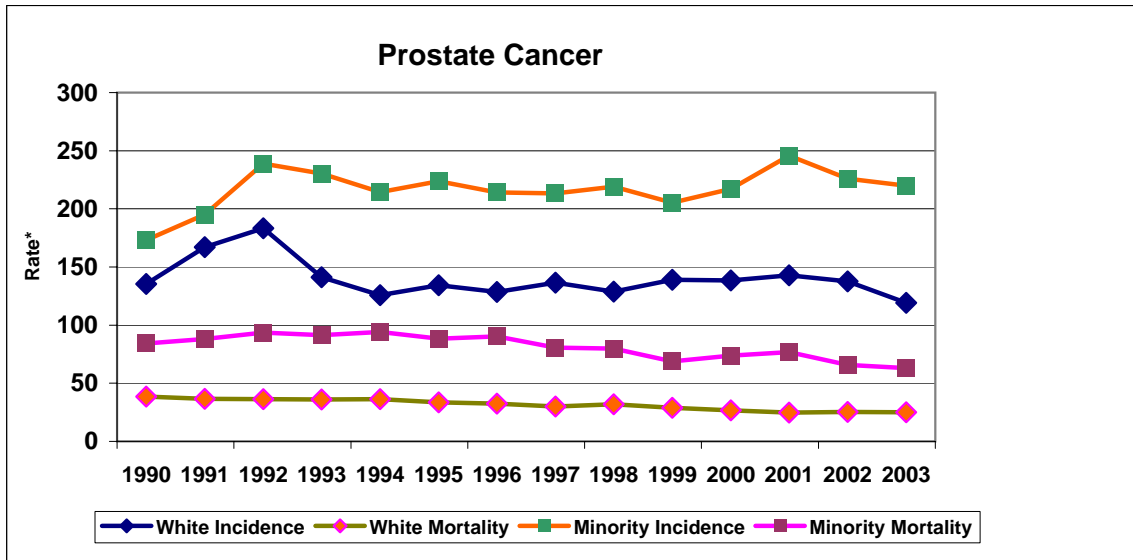


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**Chart 2: White and Minority Trends For The Four Major Cancers  
1990-2003**



**Chart 2: White and Minority Trends For The Four Major Cancers  
1990-2003**



Cancer Incidence in North Carolina 2003  
State Center for Health Statistics  
N.C. Division of Public Health

**Table 10: Five Most Frequently Diagnosed Cancers By Age Group, 2003**

*The Cancers listed are the five most frequently diagnosed cancers for each age group. Different age groups are at higher risks for different types of cancer. As age increases, risk of cancer increases.*

Ages 0-14			Ages 15-19		
Type	Cases	Rate*	Type	Cases	Rate*
Leukemia	75	4.4	Melanoma(Skin)	15	2.6
Brain/central Nervous System	44	2.6	Brain/Central Nervous Syst	10	1.7
Non-Hodgkin's Lymphoma	17	1.0	Hodgkin's Disease	#	**
Bone	13	0.8	Leukemia	#	**
Endocrine	12	0.7	Non-Hodgkin's Lymphoma	#	**
Ages 20-24			Ages 25-29		
Type	Cases	Rate*	Type	Cases	Rate*
Testes <sup>1</sup>	21	6.3	Melanoma(Skin)	32	5.7
Melanoma(Skin)	20	3.2	Testes <sup>1</sup>	31	10.7
Endocrine	16	2.6	Endocrine	29	5.1
Hodgkin's Disease	16	2.6	Hodgkin's Disease	29	5.1
Leukemia	12	1.9	Female Breast <sup>1</sup>	22	8.0
Ages 30-34			Ages 35-39		
Type	Cases	Rate*	Type	Cases	Rate*
Female Breast <sup>1</sup>	87	27.7	Female Breast <sup>1</sup>	230	72.9
Melanoma(Skin)	76	11.9	Melanoma(Skin)	72	11.4
Endocrine	52	8.2	Colon/Rectum	55	8.7
Testes <sup>1</sup>	33	10.2	Endocrine	47	7.4
Hodgkin's Disease	29	4.5	Non-Hodgkin's Lymphoma	45	7.1
Ages 40-44			Ages 45-49		
Type	Cases	Rate*	Type	Cases	Rate*
Female Breast <sup>1</sup>	504	151.3	Female Breast <sup>1</sup>	720	228.2
Lung/Bronchus	110	16.7	Lung/Bronchus	219	35.5
Melanoma(Skin)	105	15.9	Colon/rectum	188	30.4
Colon/Rectum	101	15.3	Melanoma(Skin)	105	17.0
Kidney	57	8.6	Prostate <sup>1</sup>	102	33.8

\*Rates Per 100,000 Population

# Less than 10 cases observed

\*\* Rates based on less than 10 Cases are unstable and therefore suppressed.

<sup>1</sup> Sex specific populations are used to calculate rates for sex-specific cancers.

**Table 10: Five Most Frequently Diagnosed Cancers By Age Group, 2003**

The Cancers listed are the five most frequently diagnosed cancers for each age group. Different age groups are at higher risks for different types of cancer. As age increases, risk of cancer increases.

Ages 50-54			Ages 55-59		
Type	Cases	Rate*	Type	Cases	Rate
Female Breast <sup>1</sup>	730	258.4	Female Breast <sup>1</sup>	814	335.1
Prostate <sup>1</sup>	376	141.6	Prostate <sup>1</sup>	701	309.2
Lung/Bronchus	370	67.5	Lung/Bronchus	626	133.3
Colon/Rectum	309	56.4	Colon/Rectum	399	85.0
Oral Cavity	127	23.2	Kidney	142	30.2
Ages 60-64			Ages 65-69		
Type	Cases	Rate*	Type	Cases	Rate*
Prostate <sup>1</sup>	881	514.7	Lung/Bronchus	1,015	347.1
Lung/Bronchus	775	214.7	Prostate <sup>1</sup>	994	740.2
Female Breast <sup>1</sup>	743	391.6	Female Breast <sup>1</sup>	687	434.3
Colon/Rectum	416	115.3	Colon/Rectum	530	181.2
Bladder	177	49.0	Bladder	202	69.1
Ages 70-74			Ages 75-79		
Type	Cases	Rate*	Type	Cases	Rate*
Lung/Bronchus	1,025	416.1	Lung/Bronchus	939	460.8
Prostate <sup>1</sup>	865	804.4	Prostate <sup>1</sup>	586	712.9
Female Breast <sup>1</sup>	671	483.4	Colon/Rectum	561	275.3
Colon/Rectum	532	216.0	Female Breast <sup>1</sup>	552	454.1
Bladder	247	100.3	Bladder	266	130.5
Ages 80-84			Ages 85+		
Type	Cases	Rate*	Type	Cases	Rate*
Lung/Bronchus	551	393.0	Colon/Rectum	368	308.7
Colon/Rectum	413	294.6	Female Breast <sup>1</sup>	267	310.8
Female Breast <sup>1</sup>	337	374.1	Lung/Bronchus	262	219.8
Prostate <sup>1</sup>	315	628.6	Prostate <sup>1</sup>	182	546.1
Bladder	193	137.7	Bladder	135	113.2

\*Rates Per 100,000 Population

# Less than 10 cases observed

\*\* Rates based on less than 10 Cases are unstable and therefore suppressed.

<sup>1</sup> Sex specific populations are used to calculate rates for sex-specific cancers.

## Appendix A

### *Primary Site Definitions*

International Classification of Disease for Oncology (ICD-O-3) Codes for Newly Diagnosed Neoplasms<sup>1</sup>

Primary Site	ICD-O-3
<b>All Sites</b>	<b>C000-C809</b>
<b>Oral Cavity and Pharynx:</b>	<b>C000-C148</b>
❖ Lips	C000-C009
❖ Tongue	C019-C029
❖ Salivary Glands	C079-C089
❖ Floor of Mouth	C040-C049
❖ Nasopharynx	C110-C119
❖ Oropharynx	C100-C109
❖ Hypopharynx	C129-C139
❖ Other Mouth and Pharynx	C030-C039, C050-C069, C090-C099, C140, C142-C148
<b>Digestive System:</b>	<b>C150-C269, C480-C488</b>
❖ Esophagus	C150-C159
❖ Stomach	C160-C169
❖ Small Intestine	C170-C179
❖ Colon and Rectum	C180-C209, C260
❖ Anus, Anal Cavity and Anorectum	C210-C212, C218
❖ Liver and Intrahepatic Bile Duct	C220-C221
❖ Gallbladder	C239
❖ Pancreas	C250-C259
❖ Other Digestive Organs	C240-C249, C268-C269, C480-C488
<b>Respiratory System:</b>	<b>C300-C399</b>
❖ Larynx	C320-C329
❖ Lung and Bronchus	C340-C349
❖ Other Respiratory Organs	C300-C319, C339, C381-C399
<b>Bones and Joints</b>	<b>C400-C419</b>
<b>Soft Tissues</b>	<b>C380, C470-C479, C490-C499</b>
<b>Skin</b>	<b>C440-C449</b>
❖ Melanoma of Skin	C440-C449 (M8720-M8790)
❖ Other Skin	C440-C449 (Other histology)
<b>Breast</b>	<b>C500-C509</b>
❖ Invasive	C500-C509 (Behavior=3)
❖ In Situ	C500-C509 (Behavior=2)
<b>Female Genital Organs:</b>	<b>C530-C589</b>
❖ Cervix Uteri	C530-C539
❖ Uterus (Corpus, NOS)	C540-C559
❖ Ovary	C569
❖ Other Female Genital Organs	C510-C529, C570-C589

**Appendix A**  
**Primary Site Definitions**

International Classification of Disease for Oncology (ICD-O-3) Codes for Newly Diagnosed Neoplasms<sup>1</sup>

<b>Male Genital Organs:</b>	<b>C600-C639</b>
❖ Prostate	C619
❖ Testis	C620-C629
❖ Penis	C600-C609
❖ Other Male Genital Organs	C630-C639
<b>Urinary System:</b>	<b>C649-C689</b>
❖ Bladder	C670-C679
❖ Kidney and Renal Pelvis	C649, C659
❖ Ureter	C669
❖ Other Urinary System	C680-C689
<b>Eye &amp; Orbit:</b>	<b>C690-C699</b>
<b>Brain &amp; Central Nervous System (CNS):</b>	<b>C700-C729</b>
<b>Endocrine System:</b>	<b>C379, C739-C759</b>
❖ Thyroid	C739
❖ Other Endocrine and Thymus	C379, C740-C759
<b>Lymphomas:</b>	<b>M9590-M9717</b>
❖ Hodgkin's Disease	M9650-M9667
❖ Non-Hodgkin's	M9590-M9596, M9670-M9671, M9673,M9675,M9678-M9680,M9684,M9687,M9689-M9691,M9695,M9698- M9702,M9705,M9708-M9709,M9714-M9719,M9727-M9729,M9823,M9827
<b>Multiple Myeloma:</b>	<b>M9731-M9732,M9734</b>
<b>Leukemia:</b>	<b>M9800-M9948</b>
❖ Acute Lymphocytic	M9826, M9835-M9837
❖ Chronic Lymphocytic	M9823
❖ Acute Myeloid	M9840, M9861, M9866, M9867, M9871-M9874, M9895-M9897,M9910,M9920
❖ Chronic Myeloid	M9863,M9875,M9876, M9945,M9946
❖ Other Leukemia	M9733, M9742,M9800-M9801,M9805, M9827,M9831, M9870, M9931, M9948, M9963-M9964
III-Defined & Unspecified	M9740-M9741,M9750-M9758,M9760- M9769,M9950-M9960-M9962,M9970,M9975,M9980,M9982-M9978,M9989

<sup>1</sup> Based on the SEER Incidence Site ICD-O-3 Recode, 1/27/2003  
<http://seer.cancer.gov/siterecode/>

**Note:** Except for lymphoma, multiple myeloma, and leukemia, all categorized sites exclude M9590-M9989 unless otherwise stated.

## Appendix B

### Formulae

Mathematical definitions:

**Age Group (I):**

0-4	45-49
5-9	50-54
10-14	55-59
15-19	60-64
20-24	65-69
25-29	70-74
30-34	74-79
35-39	80-84
40-44	85+

**Age-specific rate:**

$$r_i = (c_i/r_i)*100,000$$

where  $r_i$  is the age-specific rate for age group ( $i$ ),  $c_i$  is the count of cases for that age group ( $i$ ) and  $r_i$  is the count of persons at risk (i.e., the population) for that age group ( $i$ ); rates in all tables are presented per 100,000.

**Observed:**

- ◆ Male Observed = Number of males with cancer
- ◆ Female Observed = Number of females with cancer

**Age-adjusted rate:**

$$A.A.R. = \sum_{i=0-4}^{85+} (w_i r_i)$$

where  $w_i$  is the proportion of the age group in the 2000 U.S. Standard and  $r_i$  is the age-specific rate for age group.

**Appendix C: Population By County And Race/Gender  
North Carolina, 2003**

<b>County</b>	<b>White Males</b>	<b>White Females</b>	<b>Minority Males</b>	<b>Minority Females</b>
<i>Alamance</i>	52606	55230	13193	15343
<i>Alexander</i>	16172	16225	1038	1097
<i>Alleghany</i>	5213	5377	122	78
<i>Anson</i>	6253	6274	6292	6405
<i>Ashe</i>	12257	12458	201	170
<i>Avery</i>	8915	8285	789	104
<i>Beaufort</i>	15660	16515	6131	7283
<i>Bertie</i>	3498	3731	5799	6785
<i>Bladen</i>	9740	9820	6132	7092
<i>Brunswick</i>	34254	34981	5972	6603
<i>Buncombe</i>	92700	99905	9541	10100
<i>Burke</i>	38628	39374	5980	4808
<i>Cabarrus</i>	61268	61808	9708	10649
<i>Caldwell</i>	36072	36887	2581	2592
<i>Camden</i>	3224	3278	647	695
<i>Carteret</i>	27152	28270	2536	2616
<i>Caswell</i>	7711	7396	4429	4184
<i>Catawba</i>	63428	64198	9155	9677
<i>Chatham</i>	22064	22156	4450	5014
<i>Cherokee</i>	11795	12451	505	529
<i>Chowan</i>	4264	4599	2496	3007
<i>Clay</i>	4506	4730	56	76
<i>Cleveland</i>	36851	38871	10200	11626
<i>Columbus</i>	17409	18054	8966	10128
<i>Craven</i>	34350	32524	12571	13247
<i>Cumberland</i>	93402	84992	62592	66870
<i>Currituck</i>	9450	9537	758	853
<i>Dare</i>	16162	15885	642	639
<i>Davidson</i>	66626	68672	7789	8848
<i>Davie</i>	16999	17450	1350	1423
<i>Duplin</i>	18636	17464	6741	7934
<i>Durham</i>	64293	64227	49741	57827
<i>Edgecombe</i>	10895	11417	14366	17399
<i>Forsyth</i>	111189	116663	41188	48603
<i>Franklin</i>	18189	17933	7430	8100
<i>Gaston</i>	78443	81980	14317	16496
<i>Gates</i>	3272	3307	2048	2207
<i>Graham</i>	3616	3798	299	331
<i>Granville</i>	17710	16137	10193	8402
<i>Greene</i>	5968	5548	4324	4042
<i>Guilford</i>	137931	144350	69390	79528
<i>Halifax</i>	11438	12555	15661	17220
<i>Harnett</i>	36653	36497	11819	12825
<i>Haywood</i>	26155	28310	646	711
<i>Henderson</i>	43778	46416	2125	2177
<i>Hertford</i>	4338	4606	6557	8254
<i>Hoke</i>	9659	8763	9071	9497
<i>Hyde</i>	1878	1751	1231	860
<i>Iredell</i>	55826	56658	9725	11071
<i>Jackson</i>	14846	15516	2329	2299
<i>Johnston</i>	57184	56465	10971	11684

**Appendix C: Population By County And Race/Gender  
North Carolina, 2003**

<b>County</b>	<b>White Males</b>	<b>White Females</b>	<b>Minority Males</b>	<b>Minority Females</b>
<i>Jones</i>	3238	3260	1697	1989
<i>Lee</i>	19637	19326	5079	5750
<i>Lenoir</i>	16737	17480	11350	13333
<i>Lincoln</i>	31301	31304	2321	2468
<i>McDowell</i>	20070	20420	1518	1072
<i>Macon</i>	14672	16030	390	284
<i>Madison</i>	9697	9977	176	126
<i>Martin</i>	6332	6941	5178	6477
<i>Mecklenburg</i>	253451	248114	116884	131772
<i>Mitchell</i>	7759	7992	81	93
<i>Montgomery</i>	10546	10321	3308	3157
<i>Moore</i>	31703	33397	6083	7043
<i>Nash</i>	27829	28976	15481	17340
<i>New Hanover</i>	67709	70296	14260	16785
<i>Northampton</i>	4247	4418	6171	6962
<i>Onslow</i>	67453	52479	19383	17652
<i>Orange</i>	47106	50427	10703	12645
<i>Pamlico</i>	4821	4834	1797	1540
<i>Pasquotank</i>	10193	10546	7597	8096
<i>Pender</i>	17017	16421	5104	5157
<i>Perquimans</i>	4116	4358	1466	1772
<i>Person</i>	12871	13334	5022	5753
<i>Pitt</i>	43356	45536	22783	27332
<i>Polk</i>	8428	9263	569	636
<i>Randolph</i>	62146	62910	4830	5094
<i>Richmond</i>	15199	15339	7749	8203
<i>Robeson</i>	22441	21817	38985	42311
<i>Rockingham</i>	35915	37672	8881	9955
<i>Rowan</i>	54660	55071	11443	11960
<i>Rutherford</i>	26847	28751	3820	4014
<i>Sampson</i>	21329	20727	9801	10357
<i>Scotland</i>	8755	9506	7894	9351
<i>Stanly</i>	24998	25544	4328	4190
<i>Stokes</i>	21199	21997	1147	1261
<i>Surry</i>	33455	34554	1953	2018
<i>Swain</i>	4326	4640	2138	2249
<i>Transylvania</i>	13318	14493	815	842
<i>Tyrrell</i>	1271	1194	1047	714
<i>Union</i>	63173	62143	9396	9996
<i>Vance</i>	10668	11094	10140	11958
<i>Wake</i>	266199	260611	81832	90861
<i>Warren</i>	4033	4024	5883	6114
<i>Washington</i>	3253	3379	3113	3723
<i>Watauga</i>	20747	20785	631	609
<i>Wayne</i>	36733	36441	19450	21364
<i>Wilkes</i>	31470	32109	1632	1698
<i>Wilson</i>	22045	22504	14321	16792
<i>Yadkin</i>	17413	17897	730	781
<i>Yancey</i>	8699	9020	102	105
<i>North Carolina</i>	3131107	3159966	1009255	1117762

## Appendix D: U.S. Standard Million Population 2000

Ages 0-4	69135
Ages 5-9	72532
Ages 10-14	73032
Ages 15-19	72168
Ages 20-24	66478
Ages 25-29	64530
Ages 30-34	71044
Ages 35-39	80762
Ages 40-44	81851
Ages 45-49	72118
Ages 50-54	62716
Ages 55-59	48454
Ages 60-64	38793
Ages 65-69	34264
Ages 70-74	31773
Ages 75-79	27000
Ages 80-84	17842
Ages 85+	15508

Source: U.S. Bureau of the Census, Census of Population: 2000.