



Thyroid Cancer In Ohio, 1999-2003

Ohio
Cancer
Incidence
Surveillance
System

This Report on Thyroid Cancer Contains

- Incidence and Mortality Rates in Ohio and the US
- Incidence Rates by Gender and Race
- Incidence Rates by County of Residence
- Age-specific Incidence Rates by Gender
- Survival Probability and Stage at Diagnosis by Gender
- Histology Information
- Trends in Stage at Diagnosis, Incidence and Mortality
- Risk Factors, Signs and Symptoms
- Clinical Trials Information
- Sources of Data and Additional Information

Thyroid Cancer Incidence and Mortality

Cancers of the thyroid made up 1.4 percent of incident (newly diagnosed) cancers reported to the Ohio Cancer Incidence Surveillance System (OCISS) from 1999 to 2003 (Table 1). The average annual age-adjusted thyroid cancer incidence rate in Ohio from 1999 to 2003 was 6.6 cases per 100,000 residents. The average annual age-adjusted U.S. (SEER¹) incidence rate for 2000-2003 (8.2 cases per 100,000) was 24.2 percent greater than the rate for Ohio. Reporting of invasive thyroid cancers in Ohio was estimated to be 100 percent complete in 1999-2003, allowing for valid comparisons between Ohio and U.S. data. The 1999-2003 Ohio age-adjusted mortality rate for thyroid cancer of 0.4 deaths per 100,000 residents was slightly lower than the 2000-2003 U.S. (NCHS²) mortality rate of 0.5 per 100,000 residents.

Table 1: Leading Sites/Types and Thyroid Cancer: Average Annual Number (N), Percent and Age-adjusted Rates of Invasive Cancer Cases and Cancer Deaths in Ohio, 1999-2003, with Comparison to the US (SEER and NCHS), 2000-2003

Incidence	N	%	Ohio Rate	U.S. Rate	Mortality	N	%	Ohio Rate	U.S. Rate
All Sites/Types	55,813		471.3	471.0	All Sites/Types	24,989		208.4	194.5
Lung and Bronchus	9,014	16.2%	75.3	64.8	Lung and Bronchus	7,339	29.4%	61.2	55.1
Breast (Female)	8,235	14.8%	126.4	129.1	Colon and Rectum	2,652	10.6%	22.1	19.8
Prostate	7,887	14.1%	153.8	170.3	Breast (Female)	1,941	7.8%	28.5	25.8
Colon and Rectum	6,625	11.9%	55.3	52.4	Prostate	1,290	5.2%	29.3	28.5
Urinary Bladder	2,657	4.8%	22.1	20.9	Pancreas	1,236	4.9%	10.3	10.5
Non-Hodgkin's Lymphoma	2,265	4.1%	19.0	19.1	Non-Hodgkin's Lymphoma	1,038	4.2%	8.7	7.7
⋮					⋮				
Thyroid	758	1.4%	6.6	8.2	Thyroid	54	0.2%	0.4	0.5

Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2006.

[1] SEER: Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2006.

[2] NCHS: National Center for Health Statistics, 2005.

Technical Notes:

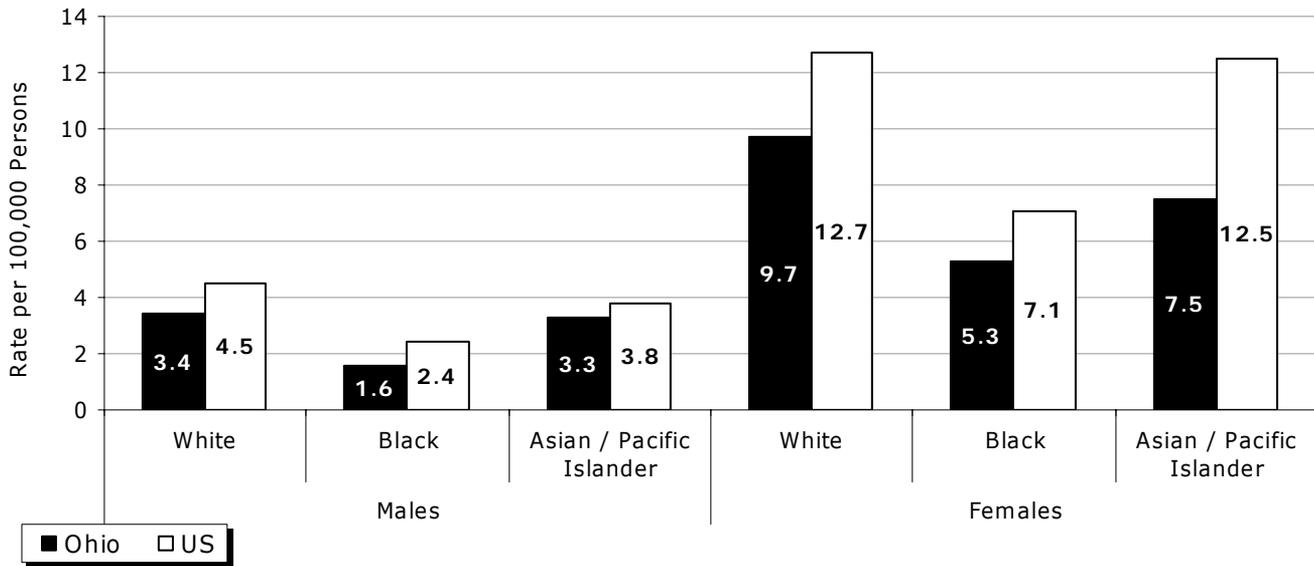
[1] Thyroid cancer cases were defined as follows: International Classification of Diseases for Oncology, Third Edition (ICD-O-3), code C739, excluding histology types 9590-9989. Thyroid cancer deaths were defined as follows: International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10), codes C730-C739.

[2] The 1999-2003 Ohio rates were calculated using the following populations: bridged-race intercensal estimates for July 1, 1999 (U.S. Census Bureau, 2004) and vintage 2004 postcensal estimates for July 1, 2000-2003 (U.S. Census Bureau, 2005). Rates were direct age-adjusted to the U.S. 2000 standard population.

[3] N = Average number of cases per year rounded to the nearest integer.

Thyroid Cancer Incidence in Ohio Compared to the United States

Figure 1: Cancer of the Thyroid: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by Gender and Race in Ohio, 1999-2003, with Comparison to the US (SEER), 2000-2003



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006, and the Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2006.

Figure 1 shows the thyroid cancer age-adjusted incidence rates among females were greater than those of males for each race group. The reason(s) for the large gender difference in thyroid cancer incidence rates may be related to female sex hormones or reproductive factors, although the association remains unclear. The greatest thyroid cancer incidence rates were observed among white and Asian/Pacific Islander females. In both Ohio and the United States, a comparison of the data by race reveals blacks had lower gender-specific thyroid cancer incidence rates compared to both whites and Asian/Pacific Islanders, with whites having the highest incidence rates for both males and females. The Ohio thyroid cancer incidence rates were lower than the rates for the United States for all race/gender groups. The greatest percent difference between Ohio and the United States was observed for Asian/Pacific Islander females, for whom the U.S. rate was 66.7 percent higher than the Ohio rate.

Thyroid Cancer Cases and Rates by County of Residence

Figure 2 presents 1999-2003 average annual age-adjusted thyroid cancer incidence rates by county of residence. County-specific thyroid cancer incidence rates in Ohio ranged from 3.2 to 21.1 per 100,000 residents due to an unusually high rate in Jefferson County. Many counties with the highest incidence rates were located in the central, southwestern and northeastern portions of the state, although the geographic pattern is relatively sporadic. The following counties had the highest incidence rates for this time period (8.8 or more cases per 100,000 residents): Clinton (N = 4), Jefferson (N = 17), Medina (N = 15), Monroe (N = 2), Morgan (N = 1), Scioto (N = 11), Union (N = 5) and Warren (N = 15).

Thyroid Cancer Cases and Rates by Age at Diagnosis

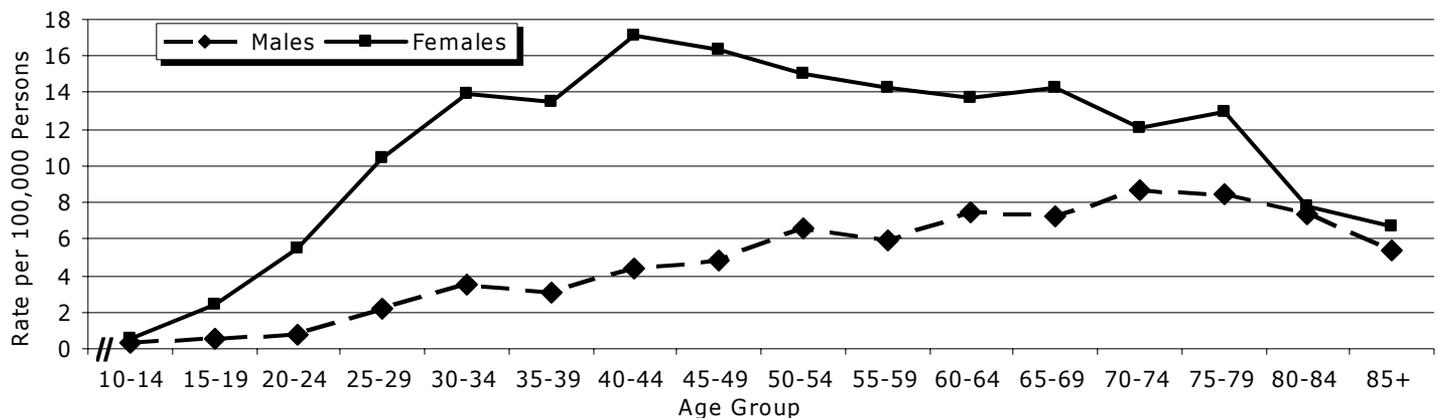
Table 2: Cancer of the Thyroid: Average Annual Number of Cases (N), Incidence Rates per 100,000 Persons and Cumulative Percentages (Cum%), by Age Group and Gender in Ohio, 1999-2003

Age Group	Males			Females			Total		
	N	Rate	Cum%	N	Rate	Cum%	N	Rate	Cum%
1-4	<1	*	0.0%	<1	*	0.1%	<1	*	0.1%
5-9	<1	*	0.2%	<1	*	0.1%	<1	*	0.2%
10-14	1	0.3	0.9%	2	0.5	0.5%	3	0.4	0.6%
15-19	2	0.6	2.1%	9	2.4	2.1%	12	1.4	2.1%
20-24	3	0.8	3.7%	21	5.5	5.8%	24	3.1	5.3%
25-29	8	2.2	8.0%	37	10.4	12.3%	45	6.3	11.2%
30-34	14	3.5	15.3%	54	13.9	21.8%	68	8.7	20.2%
35-39	13	3.1	22.2%	58	13.5	32.0%	71	8.4	29.6%
40-44	20	4.4	32.9%	79	17.1	45.9%	99	10.8	42.7%
45-49	20	4.8	43.9%	72	16.4	58.5%	92	10.7	54.9%
50-54	24	6.6	56.9%	58	15.0	68.6%	82	10.9	65.7%
55-59	17	5.9	65.8%	43	14.3	76.2%	60	10.2	73.6%
60-64	17	7.5	74.7%	34	13.7	82.1%	51	10.8	80.3%
65-69	13	7.2	81.7%	31	14.3	87.6%	44	11.1	86.2%
70-74	14	8.7	89.3%	25	12.1	92.1%	40	10.6	91.4%
75-79	11	8.5	95.3%	25	13.0	96.5%	36	11.1	96.2%
80-84	6	7.3	98.5%	11	7.8	98.4%	17	7.6	98.4%
85+	3	5.4	100.0%	9	6.7	100.0%	12	6.3	100.0%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

* Rates may be unstable and are not presented when the case count for 1999-2003 is less than five (i.e., N<1).

Figure 3: Cancer of the Thyroid: Age-specific Incidence Rates (Ages 10+) per 100,000 Persons, by Gender in Ohio, 1999-2003

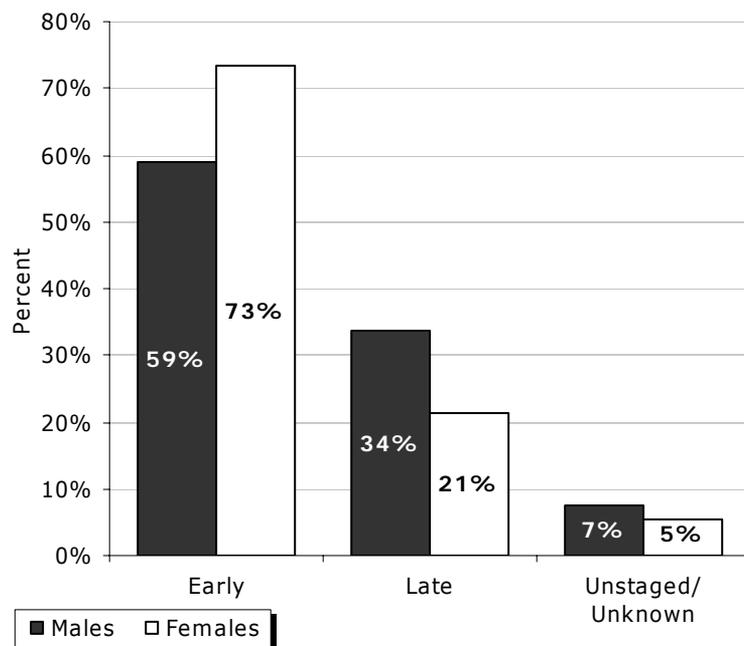


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Table 2 and Figure 3 show age-specific incidence rates for thyroid cancer by gender. The median age at diagnosis of thyroid cancer occurred in the 50 to 54 years age group for males and in the 45 to 49 years age group for females. Among males, thyroid cancer incidence rates generally increased with advancing age group from ages 10-14 years to 70-74 years and then declined. Among females, incidence rates reached a peak in the 40-44 years age group, followed by a decrease among older age groups. The cumulative percentages in Table 2 indicate nearly three-fourths of thyroid cancers were diagnosed among persons ages 59 years and younger.

Thyroid Cancer Cases and Survival by Stage at Diagnosis

Figure 4: Cancer of the Thyroid: Proportion of Cases (%) by Stage at Diagnosis and Gender in Ohio, 1999-2003



N = 758 cases per year

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

The stage at diagnosis of thyroid cancer is an important determinant of survival. For *in situ* cancers, the tumor has not invaded or penetrated surrounding tissue. In the localized stage, the tumor is confined to the organ in which it originated. In the regional stage, the tumor has spread to surrounding tissues. In the distant stage, the malignancy has spread, or metastasized, to other organs. In 1999-2003, only two females and no males in Ohio were diagnosed with *in situ* thyroid cancer. The 1999-2003 Ohio data presented in Figure 4 reveal 59 percent of thyroid cancers among males were diagnosed at the localized (early) stage, which is less than the 73 percent of females diagnosed early stage. Although the incidence of thyroid cancer is higher among females, 34 percent of males compared to only 21 percent of females were diagnosed at later (regional and distant) stages. The percentage of thyroid cancer cases reported unstaged/unknown stage was slightly greater among males (7 percent) compared to females (5 percent). There is no known reason(s) accounting for the gender differences in stage at diagnosis of thyroid cancer.

Table 3 shows the U.S. (SEER) five-year survival probability for thyroid cancer in 1996-2002 was 96.7 percent for all stages combined. Five-year survival probabilities were 99.7 percent at the localized stage, 96.9 percent at the regional stage and only 56.4 percent for distant-stage tumors. Five-year survival probability for all stages combined was slightly higher for whites (97.0 percent) compared to blacks (94.2 percent) and was greater for females (97.3 percent) compared to males (94.5 percent).

Table 3: Cancer of the Thyroid: Five-year Survival Probability (%) by Stage at Diagnosis in the US (SEER), 1996-2002

Stage	Overall Five-year Survival Probability (%)
All Stages	96.7%
Localized	99.7%
Regional	96.9%
Distant	56.4%

Source: SEER Cancer Statistics Review 1975-2003, National Cancer Institute, 2006.

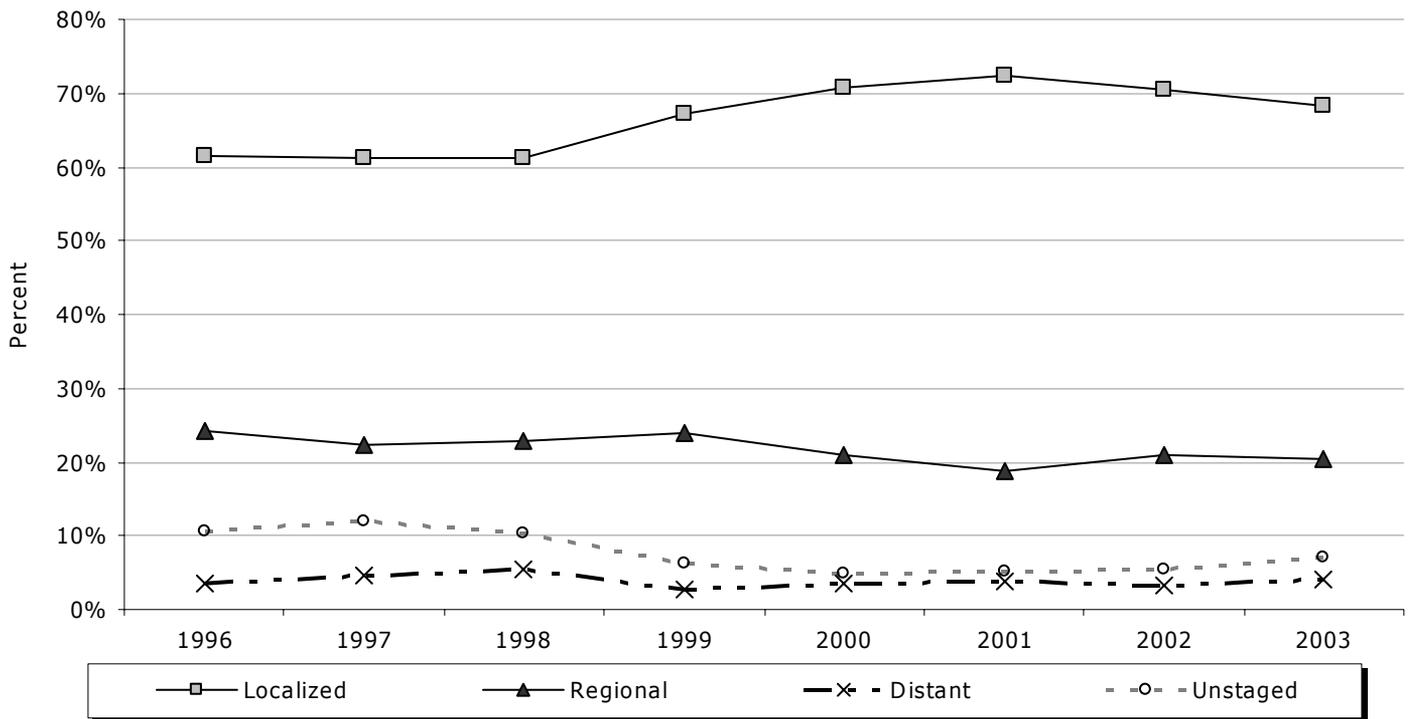
At present, there is no known screening test for use in detecting thyroid cancers at earlier stages.

Thyroid Cancer Histology

Histology refers to the cancer tissue or cell type. There are four primary histological types of thyroid cancer: papillary, follicular, medullary and anaplastic. Papillary tumors, the most common histological type of thyroid cancer, develop in cells that produce thyroid hormones and usually present as irregular solid or cystic masses. Follicular thyroid cancers are the second-most common type and have a slightly less favorable prognosis compared to papillary thyroid cancers. Generally, the two most common forms (papillary and follicular) are slow-growing tumors and have a relatively favorable prognosis. The medullary form of thyroid cancer develops from C cells that produce the hormone calcitonin to regulate calcium metabolism. The prognosis for medullary tumors is good if they are restricted to the thyroid gland and less favorable if they have spread beyond the thyroid gland. The anaplastic form is thought to develop from a papillary or follicular form and is fast growing and usually poorly responsive to therapy.

Thyroid Cancer Stage at Diagnosis Trends

Figure 5: Cancer of the Thyroid: Trends in the Proportion of Cases (%) by Stage at Diagnosis in Ohio, 1996-2003



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Figure 5 shows the distribution of stage at diagnosis of thyroid cancer according to year of diagnosis from 1996 to 2003. The proportion of thyroid cancer cases diagnosed at the distant stage was relatively similar for each year, whereas the proportion diagnosed at the localized stage increased from 61 percent in 1996 to 68 percent in 2003. This was accompanied by decreases in the proportion of thyroid cancers diagnosed with a regional stage (24 percent in 1996 to 20 percent in 2003) and with an unstaged/unknown stage at diagnosis (11 percent in 1996 to 7 percent in 2003) during this time period.

Thyroid Cancer Incidence and Mortality Trends

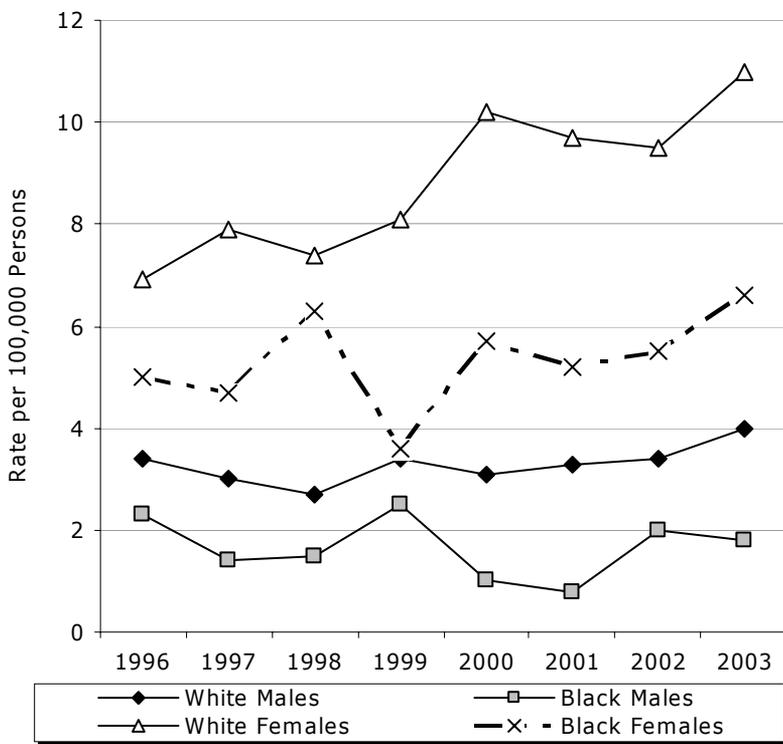
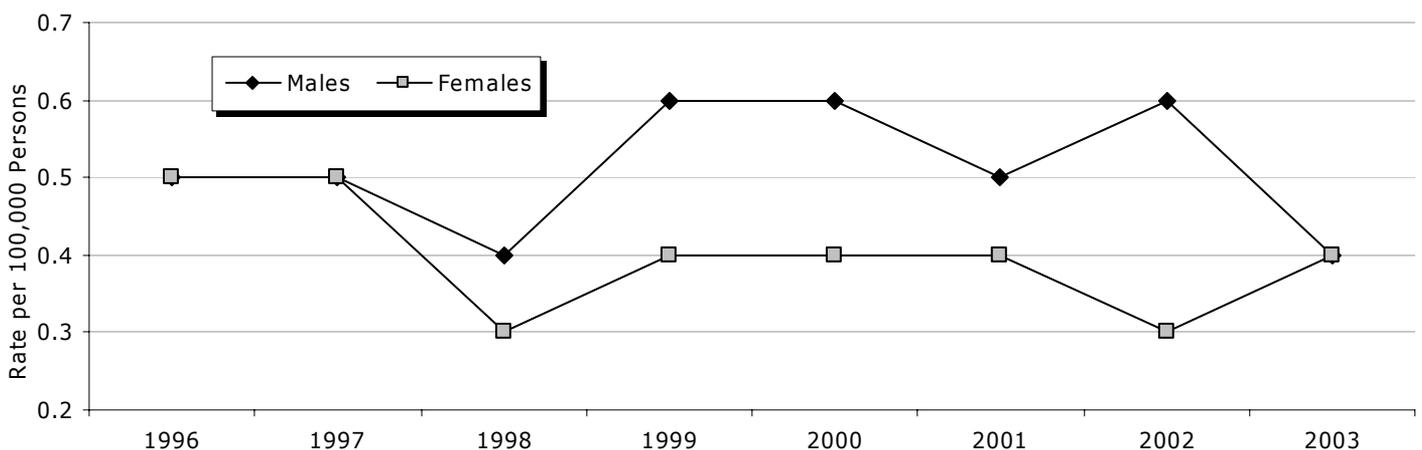


Figure 6: Cancer of the Thyroid: Trends in Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by Gender and Race in Ohio, 1996-2003

Figure 6 shows incidence rates of thyroid cancer according to year of diagnosis by race/gender group. From 1996 to 2003, there was an increase in thyroid cancer incidence rates among white males and females and black females, although the increase among white males was very slight. The greatest increase in thyroid cancer incidence rates was observed for white females (59.4 percent greater in 2003 as compared to 1996). Among black males, although the incidence rates were variable throughout the time period, the incidence rate in 2003 was slightly lower than the rate for 1996.

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Figure 7: Cancer of the Thyroid: Trends in Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by Gender in Ohio, 1996-2003



Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2006.

Figure 7 shows trends in mortality rates of thyroid cancer according to year of death (1996-2003) by gender. In general, mortality rates of thyroid cancer are low, with each rate less than or equal to 0.6 per 100,000 residents. There does not appear to be a consistent increase or decrease in the thyroid cancer mortality rates for males or females during the time period. However, although incidence rates among females are about three times higher than the rates for males, mortality rates are generally higher among males compared to females.

Risk Factors for Thyroid Cancer

- **Age** — Thyroid cancer, especially the papillary and follicular histological subtypes, is more common among people who are 20 to 60 years of age.
- **Gender** — Thyroid cancer is about three times more common among females. Hormonal and reproductive factors may be responsible for this difference; however, current research is inconclusive.
- **Race** — Thyroid cancer is more common among whites compared to blacks.
- **Inherited Conditions** — Three inherited medical conditions (Gardner's syndrome, familial polyposis and Cowden's disease) increase the risk of thyroid cancer. In addition, a change or alteration in the RET gene greatly increases the risk of a certain type of thyroid cancer known as familial medullary carcinoma.
- **Radiation** — Exposure to high levels of radiation increases thyroid cancer risk. An important source of radiation exposure is X-ray treatment to the head and neck during childhood. In addition, exposure to radioactive fallout (either from nuclear power plant accidents or nuclear weapons), especially among children, may increase thyroid cancer risk.
- **Low Dietary Iodine** — A diet low in iodine increases follicular thyroid cancer risk; however, because iodine is added to many foods including salt, insufficient dietary iodine is uncommon in the United States.

Thyroid Cancer Signs and Symptoms

Most early-stage thyroid cancers do not cause any signs or symptoms. A palpable lump or nodule in the front of the neck, around the Adam's apple, is the primary sign of thyroid cancer. Symptoms may develop as the tumor progresses through stages. When symptoms are present, they include the following: pain in the neck area; difficulty in swallowing or breathing; hoarseness; persistent cough not resulting from a cold; and swollen lymph nodes (especially in the neck area). None of these symptoms is a definitive indication of thyroid cancer; many conditions cause these symptoms. If you have any of these symptoms, you should talk to your doctor.

Clinical Trials Information

Clinical trials test many types of treatments including new drugs, surgical procedures, radiation therapy and combinations of these. The goal of conducting clinical trials is to find better ways to treat cancer. To obtain information concerning clinical trials for thyroid cancer, please talk with your doctor or visit one of the following Web sites:

- **National Cancer Institute:**
<http://www.cancer.gov/clinicaltrials>
 - **American Cancer Society:**
http://www.cancer.org/docroot/ETO/ETO_6.asp?sitearea=ETO
 - **Comprehensive Cancer Center at The Ohio State University/The Arthur G. James Cancer Hospital and Richard J. Solove Research Institute:**
<http://www.jamesline.com/trials>
 - **The Cleveland Clinic:**
<http://cms.clevelandclinic.org/cancer/body.cfm?id=68&oTopID=68>
 - **Case Western Reserve University Comprehensive Cancer Center:**
<http://henge.case.edu/sip/SIPControlServlet>
 - **University of Cincinnati:**
<http://uccancercenter.uc.edu/research/clinicaltrials>
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Sources of Data and Additional Information

- **Ohio Cancer Incidence Surveillance System:**
http://www.odh.ohio.gov/ODHPrograms/svio/ci_surv/ci_surv1.aspx
- **National Cancer Institute:**
<http://www.cancer.gov/cancertopics/types/thyroid>
- **American Cancer Society:**
http://www.cancer.org/docroot/CRI/CRI_2x.asp?sitearea=&dt=43

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