

Cervical Cancer In Ohio, 2000-2004

This Report on Cervical Cancer Contains:

- Incidence and Mortality Rates in Ohio and the US
- Incidence and Mortality Rates by Race
- Incidence Rates by County of Residence
- Age-specific Incidence and Mortality Rates by Race
- Trends in Incidence and Mortality Rates by Race
- Stage at Diagnosis by Race
- Survival Probability by Stage at Diagnosis
- Trends in Stage at Diagnosis by Race
- Incidence and Mortality Rates by Appalachian Region
- Histology Information
- Risk Factors
- Signs and Symptoms
- Clinical Trials Information
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Cervical Cancer Incidence and Mortality

Cancers of the cervix (also known as cervical cancer) made up less than 1 percent of incident (newly diagnosed) cancers reported to the Ohio Cancer Incidence Surveillance System (OCISS) for 2000 to 2004 (Table 1). The average annual (N) age-adjusted cervical cancer incidence rate in Ohio from 2000 to 2004 was 8.1 cases per 100,000 females (or an average of 489 cases per year). The average annual age-adjusted U.S. (SEER¹) incidence rate for this time period (8.7 cases per 100,000 females) was 7 percent greater than the rate for Ohio. Reporting of invasive cervical cancer in Ohio was estimated to be 93 percent complete in 2000-2004, based on a ratio of Ohio and U.S. incidence and mortality rates. The 2000-2004 U.S. (NCHS²) age-adjusted cervical cancer mortality rate of 2.6 deaths per 100,000 females was identical to that of Ohio.

Table 1: Leading Sites/Types and Cervical Cancer: Average Annual Number (N), Percent and Age-adjusted Rates of Invasive Cancer Cases and Cancer Deaths in Ohio with Comparison to the US (SEER and NCHS), 2000-2004^{1,2}

Incidence	N	%	Ohio Rate	U.S. Rate	Mortality	N	%	Ohio Rate	U.S. Rate
All Sites/Types	55,880		464.8	470.1	All Sites/Types	24,894		205.4	192.7
Lung and Bronchus	9,028	16.2%	74.9	64.5	Lung and Bronchus	7,326	29.4%	60.6	54.7
Breast (Female)*	8,118	14.5%	123.7	127.8	Colon and Rectum	2,577	10.4%	21.2	19.4
Prostate*	7,778	13.9%	149.6	168.0	Breast (Female)*	1,919	7.7%	27.9	25.5
Colon and Rectum	6,559	11.7%	54.2	51.6	Prostate*	1,272	5.1%	28.3	27.9
Bladder	2,638	4.7%	21.8	21.1	Pancreas	1,266	5.1%	10.4	10.6
Non-Hodgkin's Lymphoma	2,276	4.1%	19.0	19.3	Non-Hodgkin's Lymphoma	998	4.0%	8.2	7.6
⋮					⋮				
Cervix*	489	0.9%	8.1	8.7	Cervix*	164	0.7%	2.6	2.6

Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2007.

[1] SEER: Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2007.

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

* The rates of breast, prostate and cervical cancer are gender-specific (i.e., the population denominator is males or females).

Technical Notes

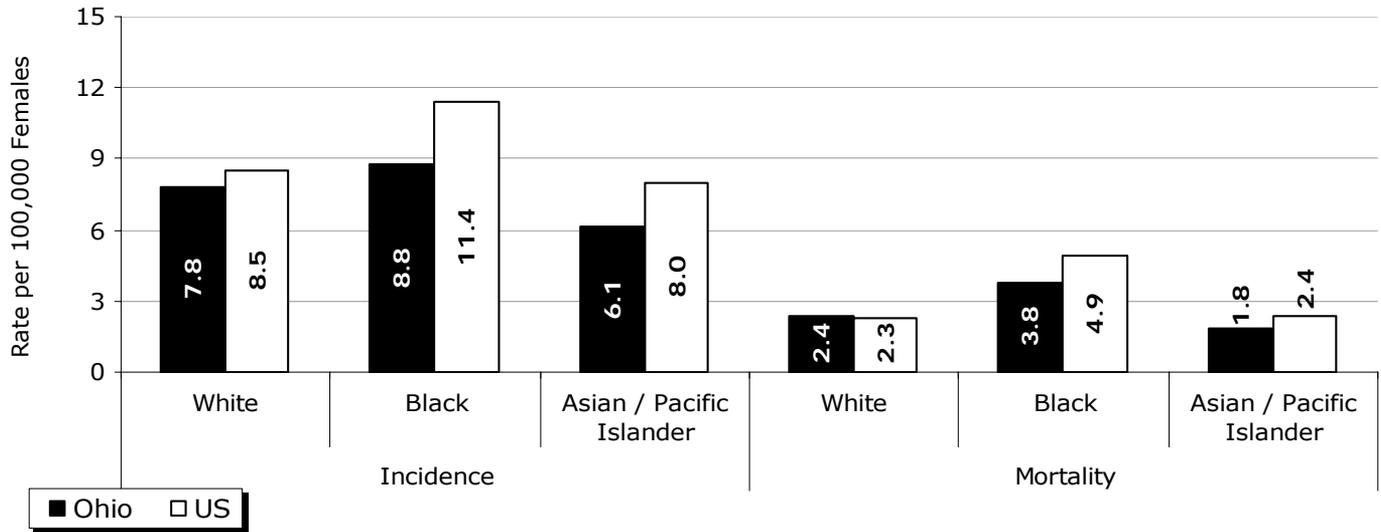
[1] Cervical cancer cases were defined as follows: International Classification of Diseases for Oncology, Third Edition (ICD-O-3), codes C530-C539, excluding histology types 9590-9989. Cervical cancer deaths were defined as follows: International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10), codes C530-C539.

[2] The 2000-2004 Ohio rates were calculated using the following populations: vintage 2005 postcensal estimates for July 1, 2000-2004 (U.S. Census Bureau, 2006). 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.

Cervical Cancer Incidence and Mortality by Race in Ohio Compared to the United States

Figure 1: Cancer of the Cervix: Average Annual Age-adjusted Incidence and Mortality Rates per 100,000 Females, by Race in Ohio with Comparison to the US, 2000-2004



Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2007; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2007; and the National Center for Health Statistics, 2005.

Figure 1 shows that the cervical cancer age-adjusted incidence rates in Ohio were lower than those of the United States for whites, blacks and Asian/Pacific Islanders; however, the lower estimated completeness of cervical cancer reporting in Ohio may partially explain why incidence rates in Ohio were lower. In both Ohio and the United States, blacks had higher incidence rates compared to whites and Asian/Pacific Islanders, whereas Asian/Pacific Islanders had the lowest incidence rates. Figure 1 also shows, among blacks and Asian/Pacific Islanders, cervical cancer age-adjusted mortality rates in Ohio were lower than those of the United States; while the mortality rate for whites in Ohio was slightly greater than that of the United States. Similar to incidence, in both Ohio and United States, blacks had the highest mortality rates of cervical cancer. The lowest cervical cancer mortality rate in Ohio was observed for Asian/Pacific Islanders, whereas the lowest U.S mortality rate was observed for whites.

Cervical Cancer Cases and Rates by County of Residence

Figure 2 presents 2000-2004 average annual age-adjusted cervical cancer incidence rates by county of residence. County-specific cervical cancer incidence rates in Ohio ranged from 4.0 to 21.1 per 100,000 female residents. Some counties with the highest incidence rates were located in the northwest region of Ohio as well as the central portion of Appalachia Ohio (see pg. 8 for a discussion of cervical cancer in Appalachia). The following counties had the highest incidence rates for this time period (17.2 or more cases per 100,000 females): Fayette (N = 3), Gallia (N = 3), Hardin (N = 3), Harrison (N = 2), Jackson (N = 3) and Paulding (N = 2).

Cervical Cancer Cases and Incidence Rates by Age at Diagnosis

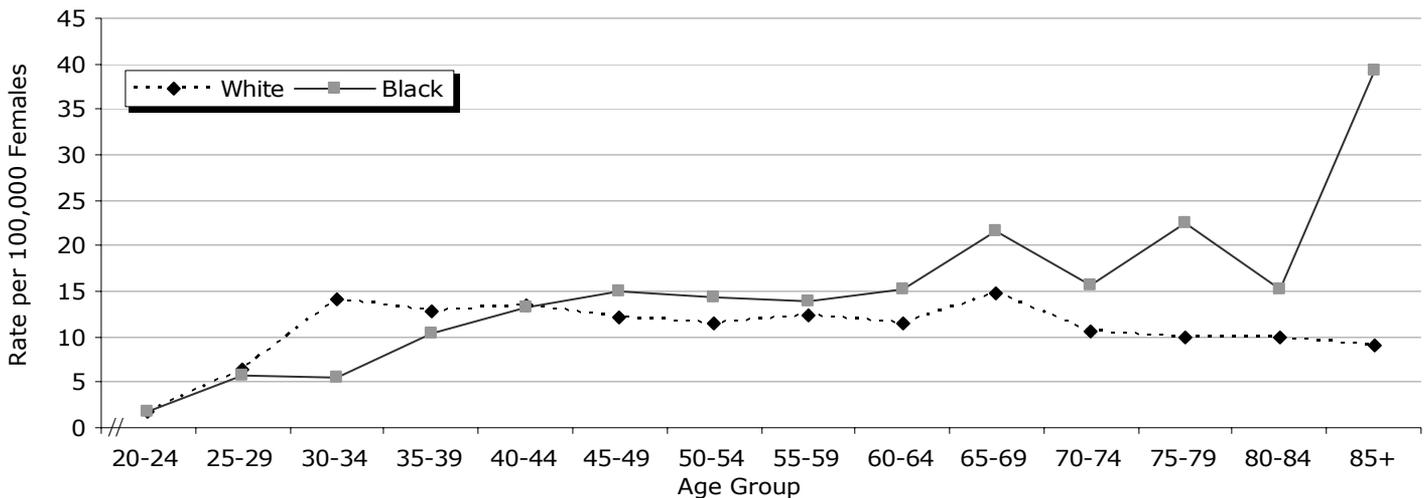
Table 2: Cancer of the Cervix: Average Annual Number of Cases (N), Incidence Rates per 100,000 Females and Cumulative Percentages (Cum%), by Age Group (Ages 10+) and Race in Ohio, 2000-2004

Age Group	White			Black			Total		
	N	Rate	Cum%	N	Rate	Cum%	N	Rate	Cum%
10-14	<1	*	0.0%	0	*	0.0%	<1	*	0.0%
15-19	<1	*	0.1%	0	*	0.0%	<1	*	0.1%
20-24	6	1.8	1.6%	1	1.8	1.7%	7	1.9	1.6%
25-29	19	6.3	6.1%	3	5.7	6.6%	23	6.5	6.3%
30-34	46	14.1	17.4%	3	5.5	11.4%	52	13.4	17.0%
35-39	47	12.9	28.8%	5	10.4	20.8%	54	12.9	28.1%
40-44	54	13.5	41.9%	7	13.3	33.6%	65	14.1	41.5%
45-49	47	12.1	53.3%	8	15.1	46.7%	56	12.7	53.0%
50-54	40	11.5	63.1%	6	14.3	57.1%	48	12.1	62.8%
55-59	35	12.4	71.5%	4	13.9	64.4%	41	13.0	71.1%
60-64	26	11.5	77.9%	4	15.3	70.9%	30	12.0	77.4%
65-69	29	14.8	84.9%	5	21.6	79.2%	34	15.4	84.2%
70-74	19	10.6	89.6%	3	15.7	84.4%	23	11.4	89.0%
75-79	18	10.0	93.9%	4	22.6	90.7%	22	11.5	93.5%
80-84	13	9.9	97.2%	2	15.2	93.4%	16	10.8	96.8%
85+	12	9.1	100.0%	4	39.3	100.0%	16	11.5	100.0%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2007.

* Rates may be unstable and are not presented when the case count for 2000-2004 is less than five (i.e., N<1).

Figure 3: Cancer of the Cervix: Age-specific Incidence Rates (Ages 20+) per 100,000 Females in Ohio, 2000-2004

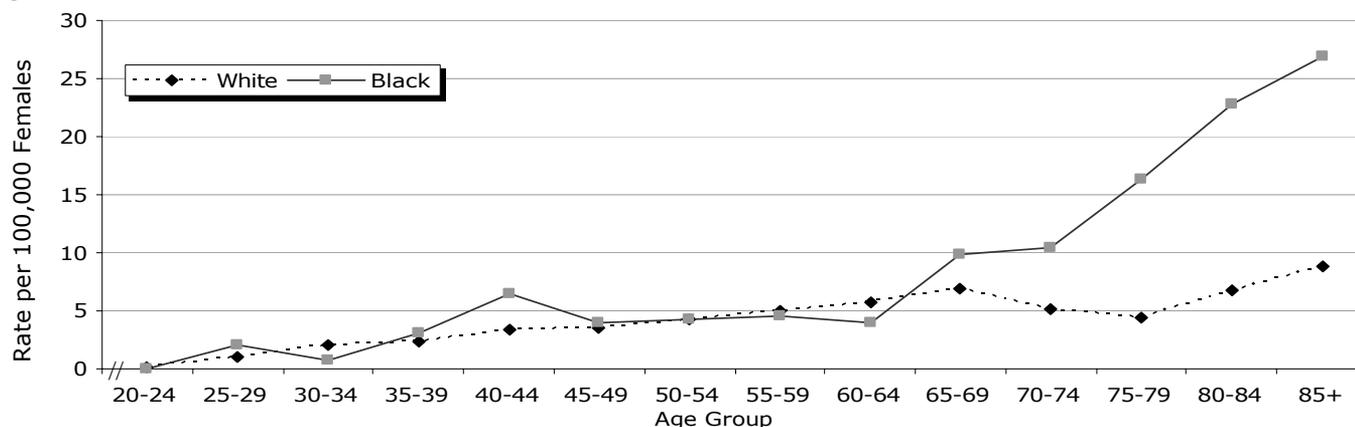


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2007.

Table 2 and Figure 3 show age-specific incidence rates of cervical cancer by race. The median age at diagnosis of cervical cancer occurred in the 40-44 years age group for whites and in the 45-49 years age group for blacks. Rates were similar among white and black females until age 29. For ages 30 to 39 years, whites had higher incidence rates than blacks; whereas rates were similar for whites and blacks in the 40-44 years age group. Blacks had higher incidence rates compared to whites among women ages 45 years and older, with the greatest increase among black women ages 85 years and older. Table 2 shows more than two-thirds of cervical cancers were diagnosed among women less than 60 years of age.

Cervical Cancer Mortality Rates by Age at Diagnosis

Figure 4: Cancer of the Cervix: Age-specific Mortality Rates (Ages 20+) per 100,000 Females, by Race in Ohio, 2000-2004

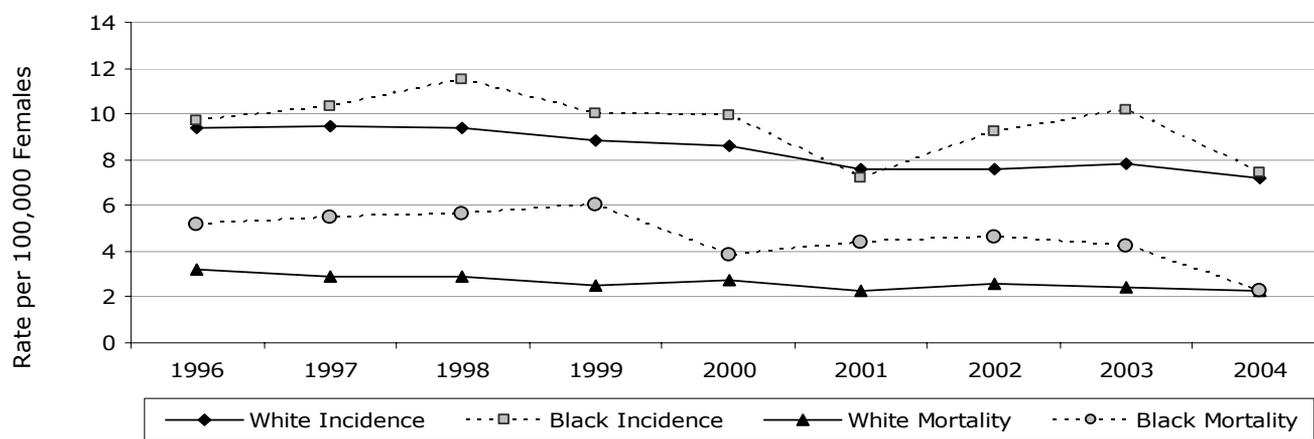


Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2007.

Figure 4 shows mortality rates of cervical cancer according to age group by race. Among whites, mortality rates increased from ages 20-24 years to 65-69 years, declined through the 75-79 years age group, and then increased among women ages 80 and older. Among blacks, mortality rates increased from 30-34 years to 40-44 years, remained relatively stable between ages 45 and 64 years, and then greatly increased with advancing age. The greatest difference in mortality rates by race occurs in older age groups, where blacks have considerably higher mortality rates than whites.

Cervical Cancer Incidence and Mortality Trends

Figure 5: Cancer of the Cervix: Trends in Average Annual Age-adjusted Incidence and Mortality Rates per 100,000 Females, by Race in Ohio, 1996-2004

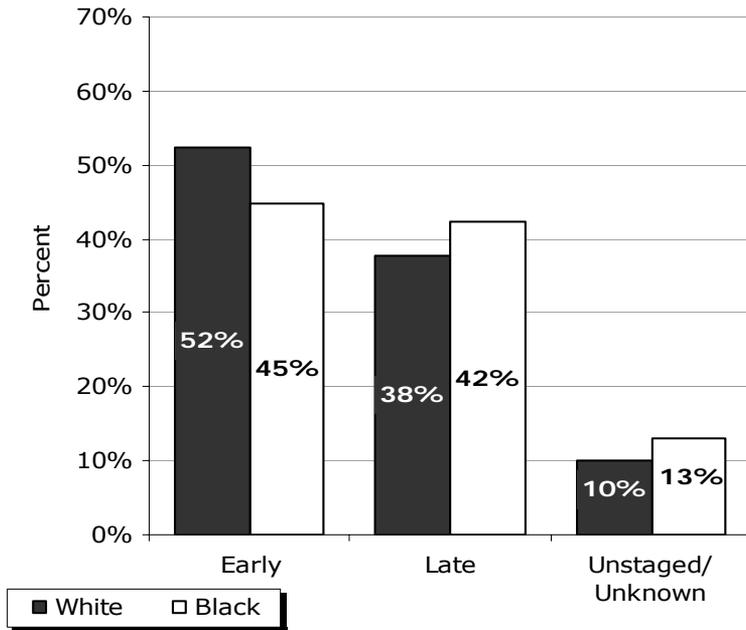


Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2007.

Figure 5 shows incidence and mortality rates of cervical cancer according to year of diagnosis by race. Cervical cancer incidence and mortality rates decreased among both whites and blacks from 1996 to 2004, although minor rate fluctuations were observed during the time period. The percent decrease in incidence rates from 1996 to 2004 was similar for whites and blacks; whereas the percent decrease in mortality rates was greater among blacks.

Cervical Cancer Cases and Survival by Stage at Diagnosis

Figure 6: Cancer of the Cervix: Proportion of Cases (%) by Stage at Diagnosis and Race in Ohio, 2000-2004



N = 489 cases per year

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2007.

Note: *In situ* cervical cancers are not required to be reported in Ohio.

The stage at diagnosis of cervical 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. The 2000-2004 Ohio data presented in Figure 6 reveal 52 percent of cervical cancers among whites were diagnosed at an early (localized) stage, which is greater than the 45 percent of blacks diagnosed early stage (Please note: *in situ* cervical cancers are not required to be reported in Ohio and thus are not included in the percentage of early stage tumors). Blacks had a higher percentage (42 percent) of later (regional and distant) stage diagnoses compared to whites (38 percent). In addition, there was a higher percentage of cervical cancer cases reported unstaged/unknown stage among blacks (13 percent) compared to whites (10 percent).

Table 3 shows the U.S. (SEER) five-year survival probability for cervical cancers diagnosed from 1996 to 2003 was 71.6 percent for all stages combined. Five-year survival probabilities were 92.0 percent at the localized stage, 55.7 percent at the regional stage and only 16.5 percent for distant-stage tumors. The five-year survival probability for all stages combined was higher for whites (72.9 percent) compared to blacks (62.2 percent), and was greater for women under 50 years of age (79.5 percent) compared to women 50 years and older (60.1 percent).

Table 3: Cancer of the Cervix: Five-year Survival Probability (%) by Stage at Diagnosis in the US (SEER), 1996-2003

Stage	Overall Five-year Survival Probability (%)
All Stages	71.6%
Localized	92.0%
Regional	55.7%
Distant	16.5%

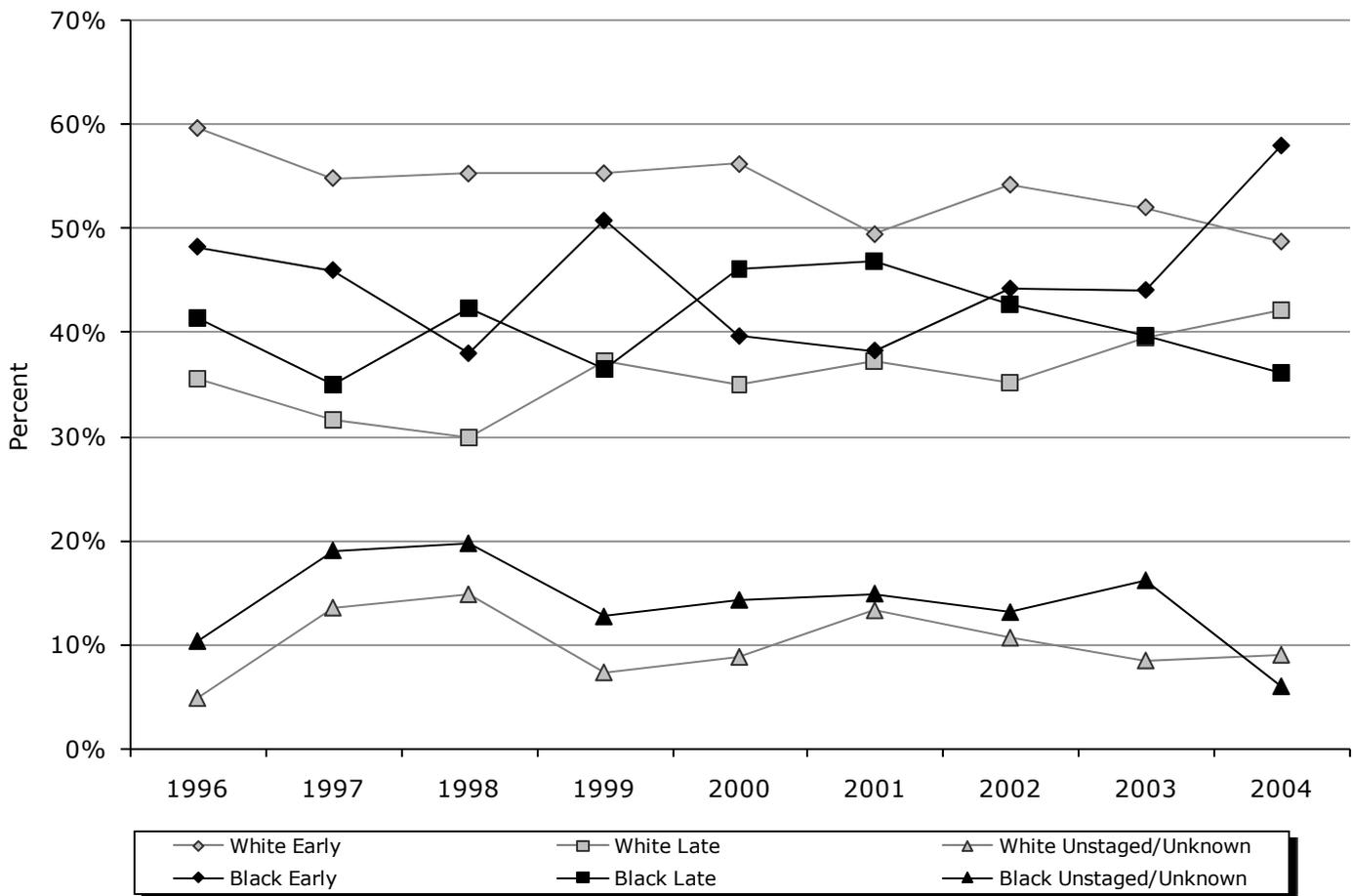
Source: SEER Cancer Statistics Review 1975-2004, National Cancer Institute, 2007.

Did You Know?

It is important to have regular Pap tests because Pap tests can detect cervical cancer and pre-cancerous cervical lesions at an early stage, before symptoms appear. Early-stage cervical cancer and precancerous cervical lesions are nearly 100 percent curable.

Cervical Cancer Stage at Diagnosis Trends

Figure 7: Cancer of the Cervix: Trends in the Proportion of Cases (%) by Stage at Diagnosis (Early, Late and Unstaged/Unknown) and Race in Ohio, 1996-2004

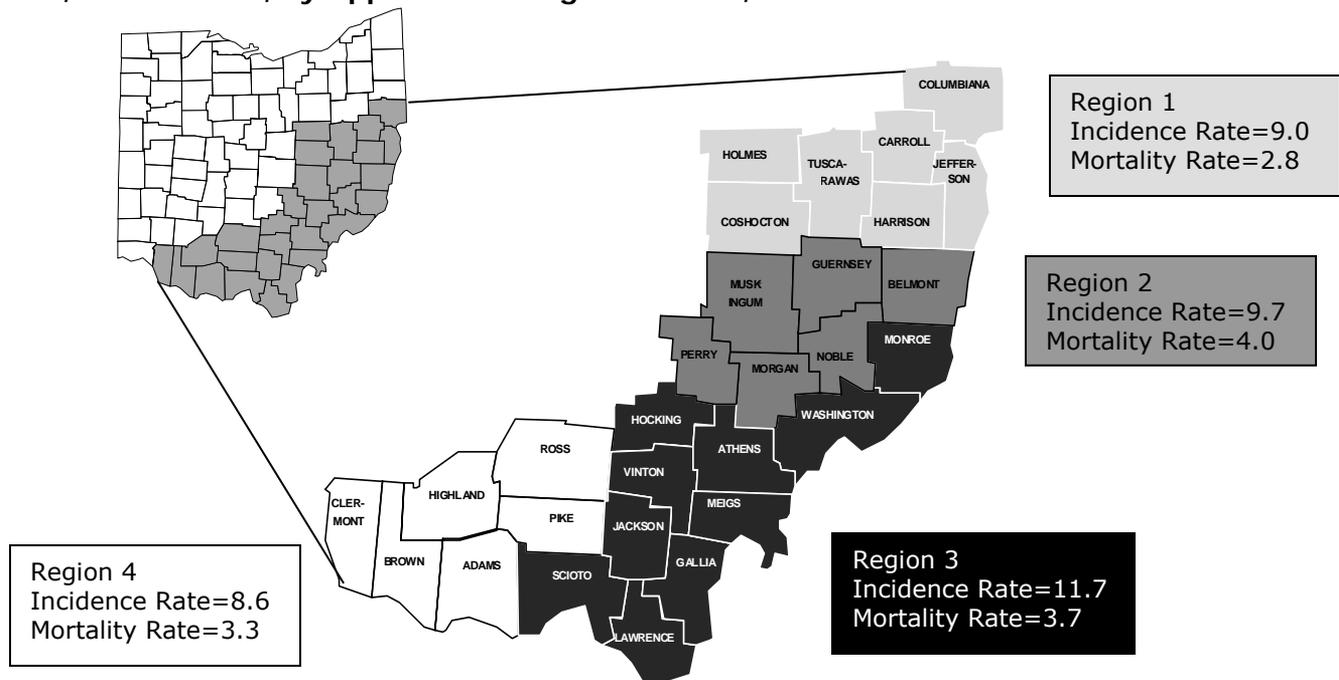


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2007.

Figure 7 shows stage at diagnosis of cervical cancer according to race and year of diagnosis in Ohio from 1996 to 2004. The proportion of whites diagnosed at early stage decreased from 60 percent in 1996 to 49 percent in 2004; whereas the proportion of blacks at diagnosed early stage increased from 48 percent in 1996 to 58 percent in 2004. In contrast, the proportion of whites at diagnosed late stage increased from 36 percent in 1996 to 42 percent in 2004; whereas the proportion of blacks at diagnosed late stage decreased from 41 percent in 1996 to 36 percent in 2004. These changes were accompanied by a slight decrease in the proportion of blacks with an unstaged/unknown stage at diagnosis and an increase in the proportion of whites with an unstaged/unknown stage at diagnosis.

Cervical Cancer Incidence and Mortality in Appalachia

Figure 8: Cancer of the Cervix: Average Annual Age-adjusted Incidence and Mortality Rates per 100,000 Females, by Appalachian Region in Ohio, 2000-2004



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2007.

Several recent reports have shown that there are higher cervical cancer incidence and mortality rates in the Appalachian region of the United States. In Ohio, the Appalachian region consists of 29 counties along the eastern and southeastern border, as shown in Figure 8. For the entire Appalachia Ohio region, the 2000-2004 average annual age-adjusted cervical cancer incidence rate (9.7 per 100,000 females) was 24.4 percent greater than the rate for non-Appalachia Ohio (7.8 per 100,000 females); while the average annual age-adjusted mortality rate in Appalachia Ohio (3.4 per 100,000 females) was 41.7 percent greater than the rate for non-Appalachia Ohio (2.4 per 100,000 females).

The Appalachian counties of Ohio were divided into four geographic regions to determine if cervical cancer incidence and mortality rates vary across Appalachia Ohio. Although all four regions had cervical cancer incidence and mortality rates greater than those of non-Appalachia Ohio in 2000-2004, the northern and western regions (Regions 1 and 4, respectively) had lower incidence and mortality rates compared to the central regions (Regions 2 and 3). The highest incidence rate was found in Region 3 (11.7 per 100,000 females) and the highest mortality rate was found in Region 2 (4.0 per 100,000 females). These higher incidence and mortality rates in Appalachia Ohio probably result from a complex mixture of factors, including a greater prevalence of tobacco smoking and high-risk sexual behaviors, as well as lower socioeconomic status resulting in limited use and access to regular Pap tests.

Electra Paskett, Ph.D., professor and cancer researcher at The Ohio State University Comprehensive Cancer Center, is leading a project funded by the National Cancer Institute that may help reduce or eliminate the cervical cancer disparity in Appalachia Ohio. The aims of the project include: identifying social-, environmental- and individual-level barriers to obtaining Pap smears; developing and evaluating a health education program to improve Pap smear use; testing a lay-led smoking cessation intervention; and assessing the causes of cervical abnormalities.

Cervical Cancer Histology

Histology refers to the cancer tissue or cell type. As shown in Table 4, the majority of cervical cancers in 2000-2004 were squamous cell carcinomas, which develop from the cells lining the inner part of the cervix. In both Ohio and the United States, blacks had a greater proportion of squamous cell cervical carcinomas compared to whites during this time period. Adenocarcinomas of the cervix develop from the column-shaped cells that line the mucous-producing glands of the cervix. Whites had a greater proportion of cervical adenocarcinomas compared to blacks in both Ohio and the United States. Higher proportions of adenocarcinomas were found in the United States compared to Ohio for both whites and blacks; whereas Ohio had higher proportions of "other histologies" compared to the United States for both race groups.

Table 4: Cancer of the Cervix: Average Annual Number of Cases (N) and Percent Distribution by Histology Type in Ohio, 2000-2004, and the US, 2001-2004

Histological Type (Histology)	White			Black		
	N	Ohio Percent	US Percent	N	Ohio Percent	US Percent
Adenocarcinoma	93	22.8%	26.3%	9	14.9%	15.5%
Adenocarcinoma, NOS (8140)	54	13.3%	13.8%	3	5.9%	7.0%
Adenosquamous carcinoma (8560)	17	4.2%	4.2%	2	3.8%	3.3%
Other adenocarcinomas ¹	21	5.2%	8.3%	3	5.2%	5.2%
Squamous cell carcinoma	284	69.4%	68.0%	44	75.4%	78.7%
Papillary carcinoma (8050, 8052, 8053)	2	0.5%	0.4%	<1	0.3%	*
Squamous cell carcinoma (8070-8075, 8077)	270	65.9%	61.0%	41	71.3%	73.7%
Squamous cell carcinoma, microinvasive (8076)	11	2.7%	6.3%	2	3.8%	4.3%
Other specific types (8054-8069, 8078-8089)	1	0.2%	0.3%	0	0.0%	*
Other histologies²	32	7.9%	5.7%	6	9.7%	5.8%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2007; and the Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2007.

[1] Includes histologies 8141-8389, 8401, 8408, 8410, 8411, 8413, 8441, 8450, 8460, 8470, 8480-8482, 8490, 8500, 8503, 8504, 8510, 8520, 8525, 8530, 8571-8574, 8576, 9070, 9110.

[2] Includes all histologies not otherwise listed in Table 4 or footnote [1] above.

* Statistic not shown due to fewer than 16 cases during the time period.

Did You Know?

Gardasil is a vaccine that helps guard against diseases caused by human papillomavirus (HPV) types 6, 11, 16 and 18. HPV types 16 and 18 cause about 70 percent of cervical cancer cases. Gardasil has been approved by the Food and Drug Administration for use in females ages 9 to 26 years and is most effective if given before a woman becomes sexually active.

Risk Factors for Cervical Cancer

- **Infection with the human papillomavirus (HPV):** Infection with HPV is the primary cause of cervical cancer. More than 100 HPV viruses have been identified. Of these, 30 types can infect the cervix, and about half of these 30 types have been associated with cervical cancer. The majority (two-thirds) of all cervical cancers are caused by one of two specific types of HPV: HPV-16 and HPV-18.
- **Sexual behavior:** Because HPV is sexually transmitted, sexual behavior is associated with cervical cancer risk. Risky behaviors include: early age at first sexual intercourse; having numerous lifetime sexual partners; having a sexual partner who has had multiple sex partners; lack of use of barrier contraceptive methods (such as condoms); and having uncircumcised male sexual partner(s).
- **Numerous full-term pregnancies:** Having seven or more full-term pregnancies increases risk.
- **Long-term use of oral contraceptives:** Using oral contraceptives more than five years increases risk.
- **Low socioeconomic status (SES):** Women of low SES are at higher risk, at least in part because of reduced access to adequate health care services, such as regular Pap tests.
- **Tobacco smoking:** Women who smoke are two times more likely to develop cervical cancer compared to nonsmokers.
- **Not having regular Pap tests:** Women who do not have regular Pap tests have increased risk.
- **Immune suppression:** HIV infection and organ transplantation suppress the immune system, increasing risk of cervical cancer.

In addition, the following factors **may** increase cervical cancer risk:

- **Infection with Chlamydia or other sexually transmitted diseases**
- **Family history of cervical cancer**
- **Diet low in fruits and vegetables**
- **Having a mother who took diethylstilbestrol (DES) during pregnancy to prevent miscarriage**

Cervical Cancer Signs and Symptoms

Many women with early-stage cervical cancer have no signs or symptoms. Symptoms usually appear only after abnormal cells have invaded nearby tissue.

Symptoms include:

Abnormal vaginal bleeding;
Heavier, long-lasting menstrual bleeding;
Unusual vaginal discharge; and
Pelvic pain.

These symptoms may be caused by other conditions and diseases, such as sexually transmitted diseases. It is important to see your doctor if you have any of these symptoms.

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 cervical 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/clinicaltrials>
- **The Ohio State University Comprehensive Cancer Center-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>
- **Toledo Community Hospital Oncology Program:**
<http://www.tchop.com>
- **Dayton Clinical Oncology Program:**
<http://www.med.wright.edu/dcop>
- **Columbus Community Clinical Oncology Program:**
<http://www.columbusccop.org>

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/cervical/>
 - **American Cancer Society:**
http://www.cancer.org/docroot/CRI/CRI_2x.asp?sitearea=&dt=8
-

The Ohio Cancer Incidence Surveillance System (OCISS)

Ohio Department of Health

and

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