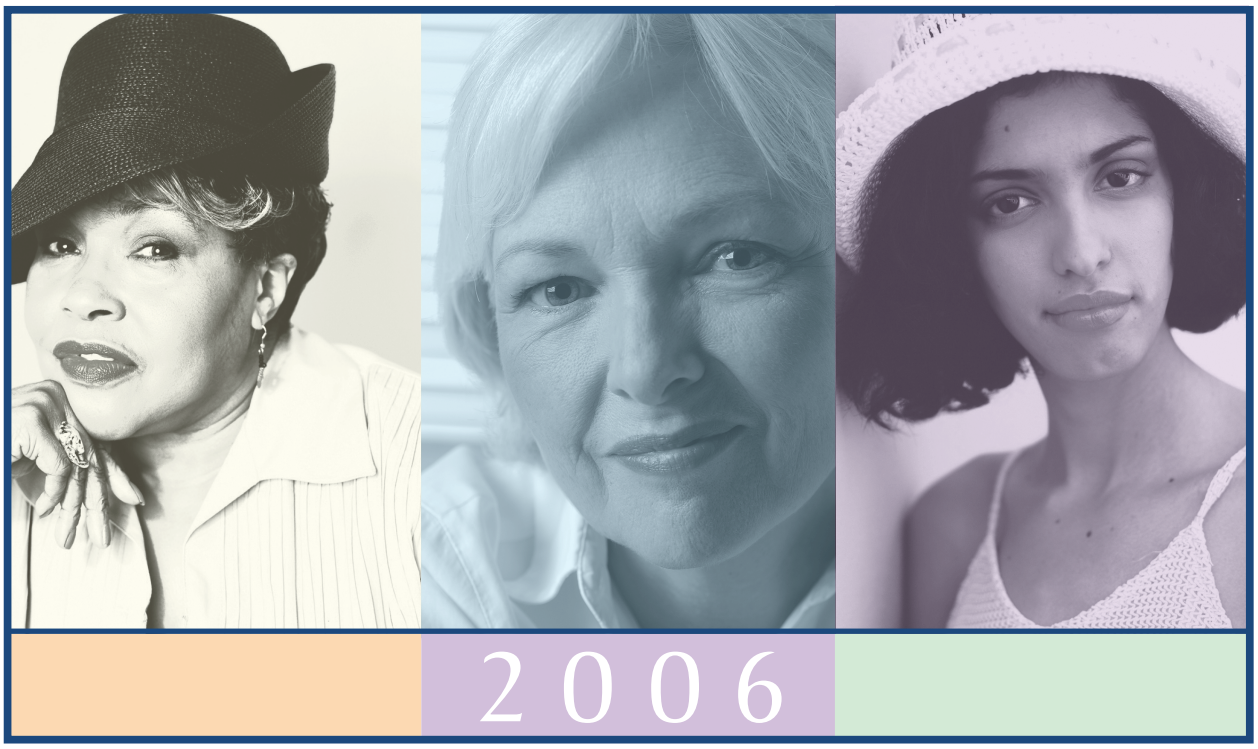
Cervical Cancer in Texas



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Cervical Cancer in Texas

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A special thanks to the dedication and hard work of Texas' cancer registrars and others responsible for cancer data collection across the State.

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Cervical Cancer in Texas, 2006

Cervical Cancer In Texas, 2006, represents just one of the steps taken by the Texas Cancer Registry, Texas Department of State Health Services to describe and better understand the impact of cervical cancer on the residents of our state. Each number and statistic presented not only represents the cancer patient but also family, friends, and countless others affected by this disease. Information provided in this report can be used to describe the epidemiology of cervical cancer in Texas, to better plan cancer control activities, target and evaluate interventions, and ultimately save lives.

Of all cancers, cervical cancer is one of the most preventable and detectable through regular screening. Yet, cervical cancer remains a serious threat to the lives of Texas women. It is estimated that in 2006, approximately 1,168 Texas women will be diagnosed with invasive cervical cancer and 390 women will die of the disease. A distribution of 2006 expected cervical cancer cases and deaths by Texas Regional Councils of Government (COG) is shown in Table 1, and the areas included in each COG are shown in Figure 1.

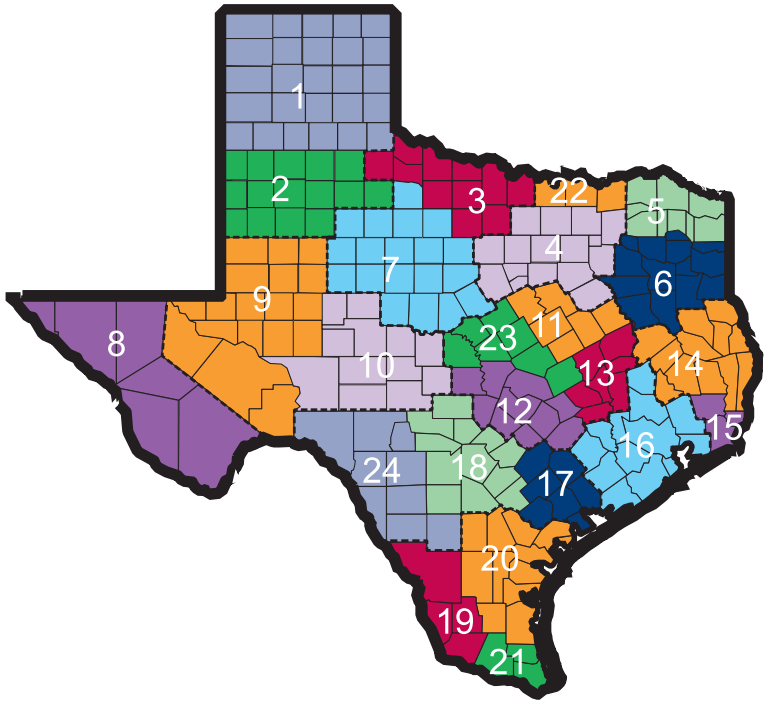
Table 1. Expected New Cervical Cancer Cases and Deaths by Texas Council of Government (COG), 2006

COG	Expected New Cases	Expected Deaths
COG 1	19	7
COG 2	19	7
COG 3	10	4
COG 4	283	94
COG 5	12	5
COG 6	35	15
COG 7	15	6
COG 8	53	15
COG 9	20	7
COG 10	8	3
COG 11	15	6
COG 12	73	23
COG 13	12	4
COG 14	16	7
COG 15	17	7
COG 16	269	90
COG 17	10	4
COG 18	117	37
COG 19	21	6
COG 20	35	11
COG 21	72	20
COG 22	8	3
COG 23	18	6
COG 24	11	3
Total Expected	1,168	390

New cancer cases were estimated by applying California 1998–2002 age-, sex-, and race/ethnic-specific average annual incidence rates to the corresponding Texas 2006 population. Cancer deaths were estimated by applying Texas 1998–2002 age-, sex-, and race/ethnic-specific average annual mortality rates to the corresponding Texas 2006 population.

Source: Texas Cancer Registry, Cancer Epidemiology and Surveillance Branch, Texas Department of State Health Services, January 2006.

Figure I. Regional Councils of Governments



What Is Cervical Cancer?

Cancer begins when cells in a part of the body change and grow abnormally. Most cancers are named for the part of the body from where the cancer starts. Cervical cancer begins in the lining of the cervix. The cervix is the lower part of the uterus and connects the uterus to the vagina.[1]

Cervical cancer does not form suddenly, but rather can take many years to develop. In the early stages of cervical cancer, some cells begin to change and become abnormal. These pre-cancerous changes are not true cancer, but have the potential to develop into cancer if left untreated.

There are two main types of cervical cancer. By far, the most common type is squamous cell carcinoma, which develops from the flat cells that cover the outer surface of the cervix at the top of the vagina. The other type is adenocarcinoma, which develops from the glandular cells that line the cervical canal. A few other types of cervical cancer exist, including a mixed adenosquamous carcinoma.

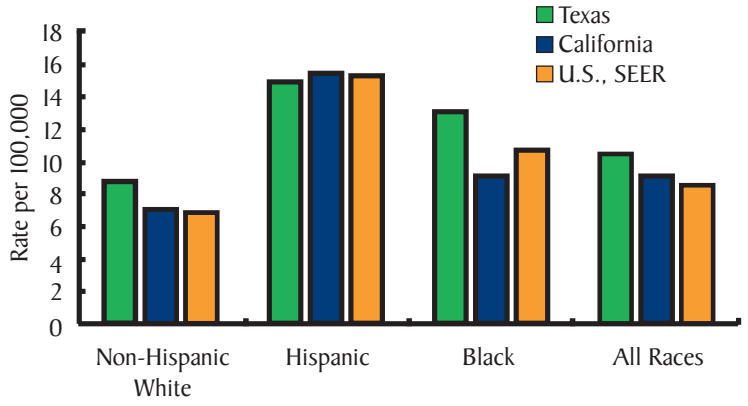
Cervical Cancer Incidence, 1999–2003 and Mortality, 1994–2003

From 1999–2003, a total of 5,415 cases of invasive cervical cancer were newly diagnosed in Texas women, with an average of 1,083 cases per year. The overall average annual age-adjusted cervical cancer incidence rate was 10.6 per 100,000 women. Despite being virtually preventable, cervical cancer killed an average of 335 Texas women annually from 1994–2003. The overall average annual age-adjusted cervical cancer mortality rate was 3.5 deaths per 100,000 women.

Differences by Race/Ethnicity

Cervical cancer incidence and mortality rates were higher in Texas women as compared with California and U.S. SEER for each race/ethnic group with one exception where Texas Hispanic incidence was slightly lower than California and SEER rates (Figures 2–3).[2,3,4]

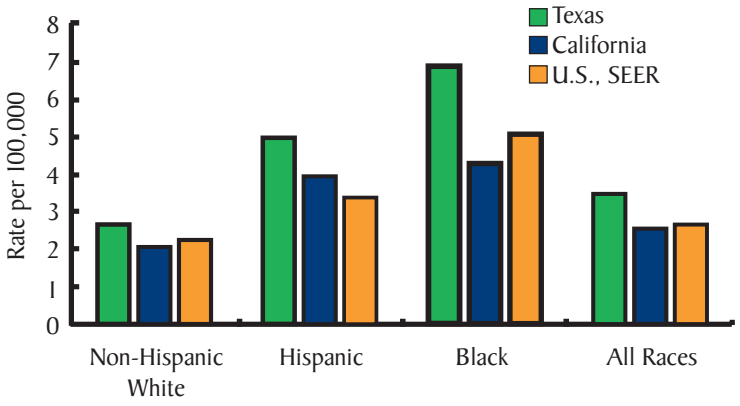
Figure 2. Cervical Cancer Incidence Rates in Texas Compared with California and the U.S. SEER Program, 1999–2003, by Race/Ethnicity



Rates are average annual rates per 100,000, age-adjusted to the 2000 U.S. Standard Population.

Source: Texas Cancer Registry, 1995–2003 SeerStat incidence file as of 12/23/2005; California Cancer Registry; SEER, Public Use Data Set, 1975–2003.

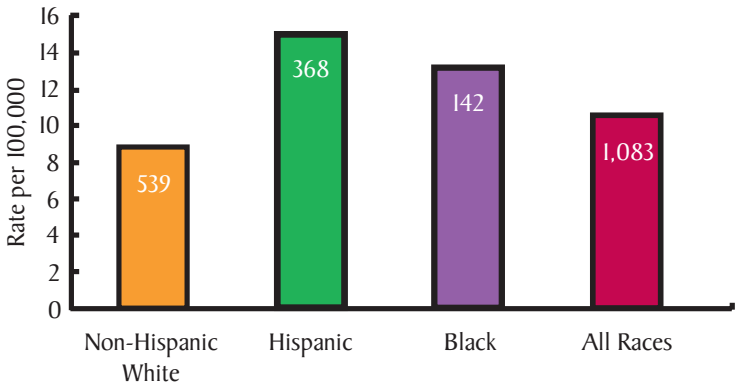
Figure 3. Cervical Cancer Mortality Rates in Texas Compared with California and the U.S. SEER Program, 1999–2003, by Race/Ethnicity



Rates are average annual rates per 100,000, age-adjusted to the 2000 U.S. Standard Population.
Source: Texas Cancer Registry, 1990-2003 SeerStat mortality file; California Cancer Registry, SEER Program SEER*Stat Database: Mortality-All COD, Public Use WithState, Total U.S., 1990-2003.

Being diagnosed with cervical cancer or dying from cervical cancer varied among Texas women by race/ethnicity. From 1999–2003, both Hispanic and Black females experienced higher cervical cancer incidence and mortality rates than Texas non-Hispanic white women. Hispanics had the highest incidence of cervical cancer, followed by Blacks, and non-Hispanic whites (Figure 4). The age-adjusted incidence rate for cervical cancer in Hispanic

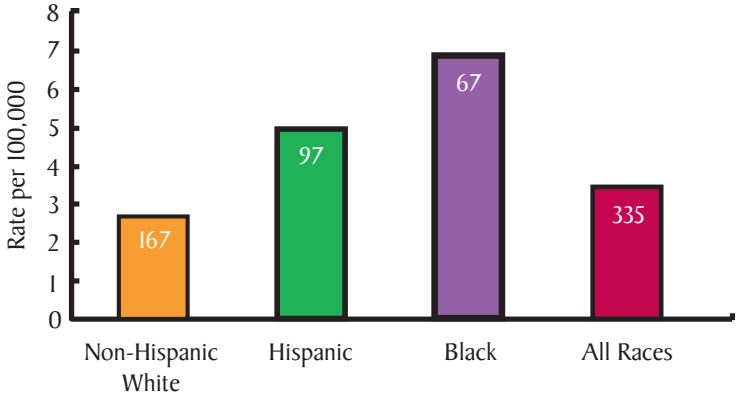
Figure 4. Cervical Cancer Incidence Rates and Average Annual Cases by Race/Ethnicity, Texas, 1999–2003



Rates are average annual rates per 100,000 population, age-adjusted to the 2000 U.S. Standard Population.
Average annual incidence counts are rounded to the nearest whole.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

women (15.0 per 100,000) was 69 percent higher than the rate for non-Hispanic whites (8.9 per 100,000). The age-adjusted cervical cancer incidence rate for Black women (13.2 per 100,000) was almost one and a half times as high as the rate for non-Hispanic whites and was only slightly lower than the rate for Hispanics.

Figure 5. Cervical Cancer Mortality Rates and Average Annual Deaths by Race/Ethnicity, Texas, 1994–2003

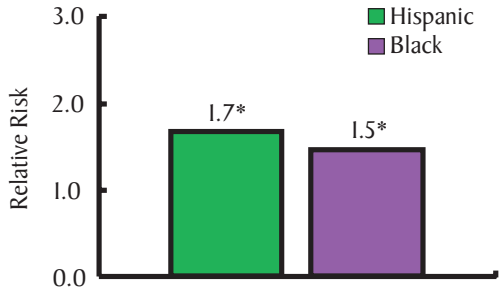


Rates are average annual rates per 100,000 population, age-adjusted to the 2000 U.S. Standard Population.
Average annual mortality counts are rounded to the nearest whole.
Source: Texas Cancer Registry, 1990-2003 SeerStat mortality file.

Despite the fact that Black women had a slightly lower incidence of cervical cancer than Hispanics, their age-adjusted mortality rate from 1994–2003 (6.9 per 100,000) was 38 percent higher than the mortality rate for Hispanic women (5.0 per 100,000) (Figure 5). Black women had the highest age-adjusted cervical cancer mortality rate. This disparity in the Black incidence and mortality rates could be due to a variety of factors, such as later diagnosis resulting in less chance of survival, lack of timely and appropriate treatment, and overall health in general.

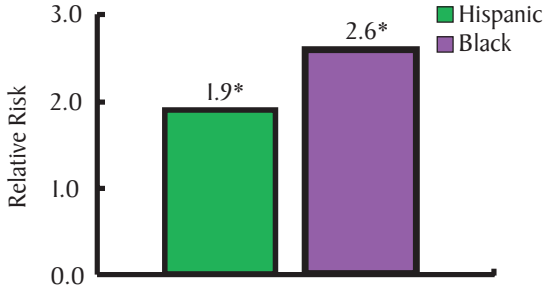
To further illustrate the differences in cervical cancer risk among Texas women by race/ethnicity, the relative risks were calculated comparing Hispanic and Black women to non-Hispanic white women. Differences in the rates were then also tested for statistical significance. The relative risks for being diagnosed with or dying from cervical cancer were statistically significantly elevated for both Hispanic and Black women (Figures 6–7). Hispanic women were 1.7 and Black women 1.5 times more likely to be diagnosed with cervical cancer than non-Hispanic women. However, Black women were 2.6 times more likely to die from cervical cancer, followed by Hispanics who were still almost twice as likely (1.9) when compared with non-Hispanic whites.

Figure 6. Relative Risk of Developing Cervical Cancer Compared with Non-Hispanic Whites, Texas, 1999–2003



Rates are average annual rates per 100,000 population, age-adjusted to the 2000 U.S. Standard Population.
*Rates are statistically significantly different at the p<0.05 level.
Source: Texas Cancer Registry, 1995-2003 SEERStat incidence file as of 12/23/2005 .

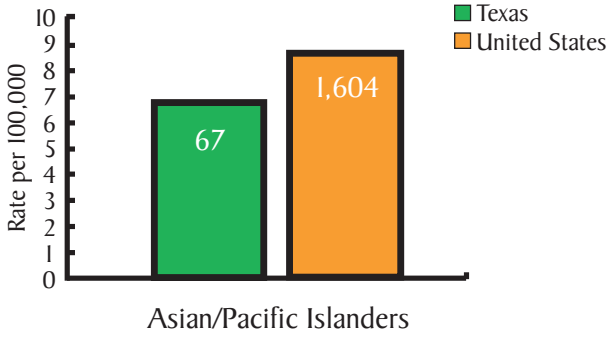
Figure 7. Relative Risk of Dying From Cervical Cancer Compared with Non-Hispanic Whites, Texas, 1994–2003



Rates are average annual rates per 100,000 population, age-adjusted to the 2000 U.S. Standard Population.
*Rates are statistically significantly different at the p<0.05 level.
Source: Texas Cancer Registry, 1990-2003 SEERStat mortality file.

In addition to the race/ethnic differences described above, 1999–2002 cervical cancer incidence rates for Texas Asian/Pacific Islander (Asian/PI) women were compared to U.S. Asian/PI women (Figure 8). The Texas Asian/PI cervical cancer rates were provided by the Centers for Disease Control and Prevention (CDC), due to the lack of Texas Asian/PI population estimates or projections from the Texas State Data Center and Office of the State Demographer. According to the CDC, Texas Asian/PI women have lower cervical cancer incidence (6.9 per 100,000) compared to U.S. Asian/PI women (8.7 per 100,000 women).

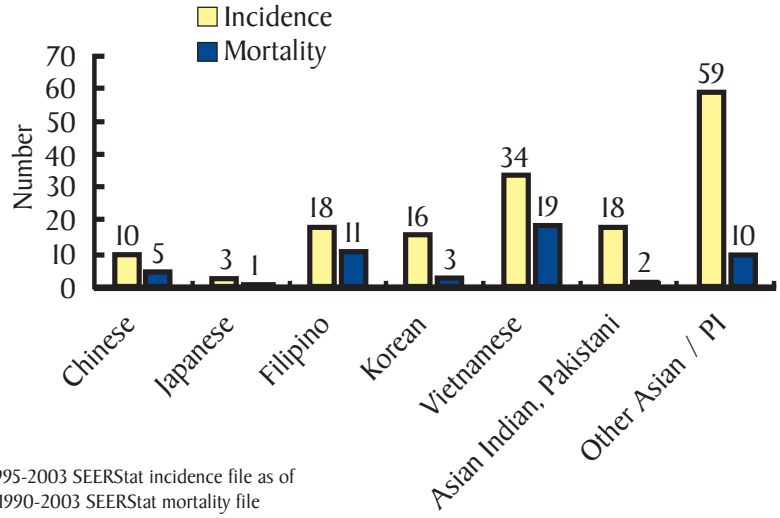
Figure 8. Cervical Cancer Incidence Rates, Asians / Pacific Islanders, Texas and the United States, 1999–2002



Rates are average annual rates per 100,000, age-adjusted to the 2000 U.S. Standard Population.
Source: CDC Wonder, Centers for Disease Control and Prevention, http://wonder.cdc.gov/, accessed 11/17/2006.

Numbers of Texas cervical cancer cases and deaths by more specific Asian/PI ethnic sub-categories are provided as well (Figure 9). The Texas Asian sub-group with the largest number of cervical cancer cases and deaths was Other Asian/PI women, followed by Vietnamese, Asian/Indian Pakistani, and Filipino women. The Texas Cancer Registry is currently participating in a national workgroup to improve the ethnic classification of Asian/PI cancer data so that more cancer cases can be classified in their more specific Asian/PI sub-categories rather than the non-specific Other Asian/PI grouping.

Figure 9. Cervical Cancer Total Cases (1995–2003) and Deaths (1994–2003), by Asian / Pacific Islander Sub-group, Texas



Source: Texas Cancer Registry, 1995-2003 SEERStat incidence file as of 12/23/205,Texas Cancer Registry, 1990-2003 SEERStat mortality file

Differences by Age and Race/Ethnicity

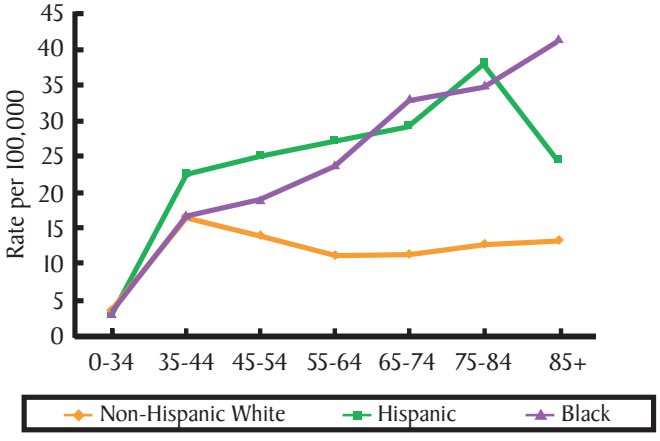
Of the 1,083 average annual cases of cervical cancer diagnosed among Texas women from 1999–2003, 723 (66.7%) were diagnosed in women younger than 55 years of age (Table 2). The highest age-specific rates of cervical cancer occurred among Hispanics with the exception of Black women being highest for ages 65–74 and 85+ (Figure 10). Black women 85 years of age and older had the highest rates of all Texas women. Cervical cancer incidence rises rapidly and peaks in non-Hispanic whites at ages 35–44. In contrast, Hispanics and Blacks peak later at ages 75–84, and ages 85+, respectively. This finding is particularly troublesome because research indicates that women who are diagnosed with cervical cancer at age 50 years and older are more likely to have advanced stage of disease.[5]

Table 2. Average Annual Cervical Cancer Cases and Percentage of Total New Cancers by Age at Diagnosis, Texas, 1999–2003

Age	No. of Cases	% Total New Cases
00-34	184	17.0
35-44	302	27.8
45-54	237	21.9
55-64	142	13.1
65-74	108	10.0
75-84	80	7.4
85+	30	2.8

Average annual incidence counts are rounded to the nearest whole.
Percentages are based on unrounded counts and total (N=1,083).
Cases included invasive cancers only.

Figure 10. Age-Specific Cervical Cancer Incidence Rates by Race/Ethnicity, Texas, 1999–2003



Rates are age-specific rates per 100,000 population.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

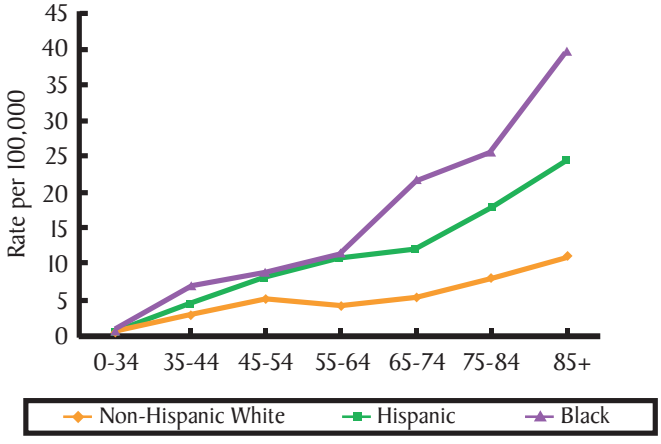
Of the 335 average annual cervical cancer deaths among Texas women from 1994–2003, 171 (51.1%) were among women 55 years of age and older (Table 3). In all three race/ethnic groups, cervical cancer mortality was almost nonexistent until age 35, when mortality rates generally increased with each subsequent decade for all but 55–64 year old non-Hispanic white women (Figure 11). A sharp increase in mortality rates occurred at 55–64 years of age for Black women, while for Hispanic women a slightly less dramatic increase occurred at ages 65–74. The highest cervical cancer death rates occurred among Black women in every age group. Black women ages 85 and older experienced both the highest cervical cancer incidence and mortality.

Table 3. Average Annual Cervical Cancer Deaths and Percentage of Total Cancer Deaths by Age at Death, Texas, 1994–2003

Age	No. of Cases	% Total New Cases
00-34	24	7.0
35-44	63	18.8
45-54	78	23.1
55-64	51	15.2
65-74	51	15.2
75-84	45	13.3
85+	25	7.4

Average annual incidence counts are rounded to the nearest whole.
Percentages are based on unrounded counts and total (N=335).
Cases included invasive cancers only.

Figure 11. Age-Specific Cervical Cancer Mortality Rates by Race/Ethnicity, Texas, 1994–2003



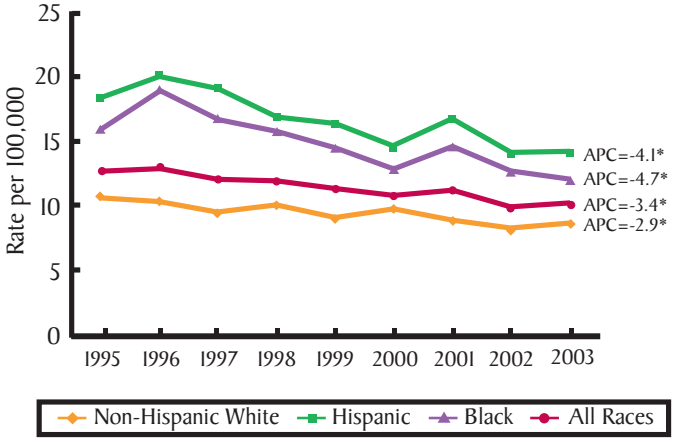
Rates are age-specific rates per 100,000 population.
Source: Texas Cancer Registry, 1990-2003 SeerStat mortality file.

Cervical Cancer Incidence and Mortality Trends in Texas by Race/Ethnicity

Trends in cervical cancer incidence were also examined to determine whether the rates are changing over time. Figure 12 presents trends in cervical cancer incidence (1995–2003) for a 9-year time period. During this time, cervical cancer incidence rates declined in Texas for all races combined and for each race/ethnic group. These declines were all statistically significant. Overall, Texas cervical cancer incidence rates declined 3.4 percent per year, with Hispanic and Black women experiencing the greatest declines (4.1 percent and 4.7 percent respectively).

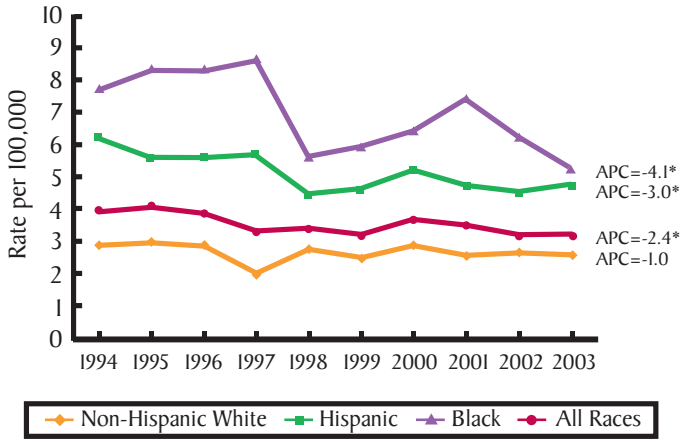
Figure 13 presents trends in cervical cancer mortality rates overall and by race/ethnicity for the ten-year period of 1994–2003. Since 1994, cervical cancer mortality rates decreased for all race/ethnic groups, ranging from 1.0 percent per year for non-Hispanic white women to 4.1 percent per year for Black women. The declining trend is statistically significant overall (-2.4%), and for Hispanic (-3.0%) and Black (-4.1%) women. While incidence rates were the highest for Hispanic women for all years, Black women experienced the highest mortality for all years. This finding suggests that despite increased cervical cancer screening efforts not all women appear to be benefiting to the same extent.

Figure 12. Trends in Age-Adjusted Cervical Cancer Incidence Rates by Race/Ethnicity, Texas, 1995–2003



*Estimated annual percent change (APC) is statistically significant at $p < 0.05$.
Rates are per 100,000 and age adjusted to the 2000 U.S. Standard Population.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

Figure 13. Trends in Age-Adjusted Cervical Cancer Mortality Rates by Race/Ethnicity, Texas, 1994–2003



*Estimated annual percent change (APC) is statistically significant at $p < 0.05$.
Rates are per 100,000 and age adjusted to the 2000 U.S. Standard Population.
Source: Texas Cancer Registry, 1990-2003 SeerStat mortality file.

Stage of Disease at Diagnosis, 1999–2003

Stage denotes the physical characteristics of malignant tumors, particularly size and the degree of growth and spread. In cervical cancer, as in most cancers, the stage at diagnosis determines treatment options as well as an estimate of survival. While many different kinds of detailed staging systems have been developed for different kinds of cancer, the basic classifications are very similar. Unlike most other types of cancer, in-situ cervix cancer data are no longer collected by the Texas Cancer Registry nor by most other states.

Invasive cervical cancer tumors are classified in the following three summary stage categories:

Localized – tumor is entirely confined to the cervix.

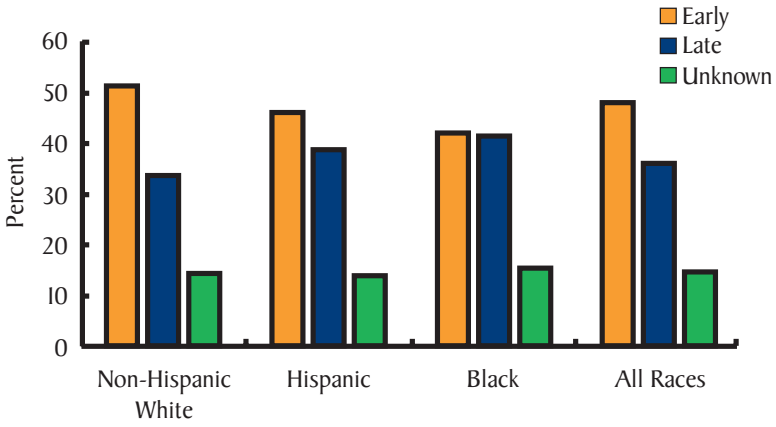
Regional – tumor has extended directly to adjacent organs, tissues, or lymph nodes.

Distant – tumor has spread to distant organs or lymph nodes, a process known as metastasis.

For comparison purposes, this report combines the three invasive stages of disease into two more general categories. "Early" cervical cancer is limited to the localized stage only, while "late" includes both regional and distant stages.

From 1999–2003, 48.4 percent of all cervical cancer cases were diagnosed at the early stage and 36.3 percent were diagnosed at the late stage (Figure 14). However, 15.3 percent of cases during that time period had an unspecified stage at diagnosis. The greatest proportion of early cervical cancer diagnoses was found among Texas non-Hispanic whites (51.2%), followed by Hispanic (46.2%), and Black (42.6%) women. Hispanic and Black females had higher percentages of cases diagnosed at the late stage (39.1% and 41.6%, respectively) than non-Hispanic white females (33.8%). This may represent differences in Pap test/screening prevalence among Hispanics and Blacks and may contribute to the higher cervical cancer mortality experienced by these women.

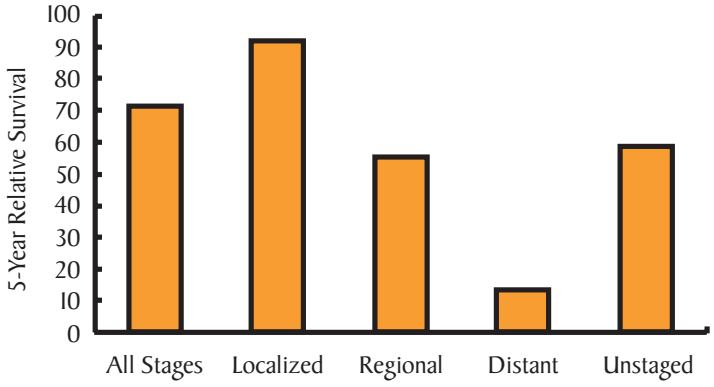
Figure 14. Percent Distribution of Cervical Cancer Stage at Diagnosis by Race/Ethnicity, Texas, 1999–2003



Note: Early excludes in situ cases. Late = regional + distant stages.
Percent of cervical cancer cases within each race/ethnic group.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

As the stage at diagnosis moves across the categories into more advanced or extensive stages, the chance of cure declines. There are important public health implications to cervical cancer stage at diagnosis; cervical cancer diagnosed at an early stage can be better treated and chances of survival are significantly improved. The TCR does not yet calculate cancer survival statistics, so stage-specific survival data are shown for the U.S. SEER program (Figure 15). Cervical cancer diagnosed at the localized stage has far better survival than cervical cancer diagnosed at later stages.

Figure 15. Five-Year Relative Stage-Specific Survival Rates, Cervical Cancer in U.S. SEER Program, 1996–2002



Survival Rates are from the SEER 17 areas, and are based on follow-up of patients into 2003.
SEER Cancer Statistics Review, 1975-2003, N.C.I., Table V-5.

Early Detection and Cervical Cancer Screening in Texas

It is very important for cervical cancer to be detected and treated during the early pre-cancerous stages. The earlier abnormal cells are detected, the greater the chance of successful treatment and prevention of developing invasive cervical cancer. Many pre-cancerous cervical conditions can be detected through routine pelvic exams and Pap tests. Since pre-cancerous changes rarely cause any symptoms, regular examinations are critical to cervical cancer detection and prevention.

In 2000, the United States Department of Health and Human Services published their objectives for improving health across the country in Healthy People 2010. One of the objectives consists of increasing the proportion of women aged 18 years and older who have received a Pap test within the previous three years to 90 percent.

The Texas Department of State Health Services, Behavioral Risk Factor Surveillance System (BRFSS) Program conducts surveys on a monthly basis to collect data on lifestyle risk factors. The survey in 2004 included a Pap test screening question for Texas women, age 18 and over.[6] Of the women surveyed, 82 percent reported having had a Pap test within the past three years (Table 4). Although Black women experience a disproportionate amount of cervical cancer incidence and mortality compared to non-Hispanic whites in Texas and were found to have the greatest percentage of late stage cervical cancer at the time of diagnosis, they reported the highest proportion of having been screened for cervical cancer in the last three years (91%). This suggests possible differences in timely and appropriate treatment, more aggressive disease, or in overall health.

Women aged 65 years and over reported a lower percentage (72%) of having had a recent pap test than women aged 40–64 (82%) and 18–39 (84%). Only 79 percent of women with less than a high school education reported a recent Pap test. There also were some important regional differences. The proportion of women having had a recent Pap test who live along the Texas-Mexico Border was lower (79%) compared to non-Border women (83%), as was the proportion of women having a recent Pap test who live in rural counties (77%) compared to women living in urban portions of the state (83%). Possible reasons for these disparities include access to health care, inadequate health insurance, as well as the need for culturally sensitive preventive healthcare.

Table 4. Percentages of Women 18 and Older Who Have Had a Recent Pap Test, Texas, 2004

Pap Smear Within Past 3 Years	Percentage
White, Non-Hispanic	84
Hispanic	79
Black	91
18 years and older	82
18-39 years old	84
40-64 years old	82
65 years and older	72
Low Education*	79
Border Counties	79
Non-Border Counties	83
Rural Counties	77
Urban Counties	83

Source: Texas Behavioral Risk Factor Surveillance System, Statewide BRFSS Survey, 2004.
Border counties are 32 Texas counties defined by the Office of Border Health, Texas Department of State Health Services.
Rural counties defined by the U.S. Office of Management & Budget, 2003.
*Women 40 years and older with less than a high school education.

Regional Variation

The Texas–Mexico Border and large rural portions of our state make Texas unique, presenting a number of challenges for reducing the burden of cervical cancer (see Tables 5 and 6 for county listings of these regions).

A 2003 study funded by the Centers for Disease Control and Prevention found that Hispanic women, particularly those who live in counties along the United States–Mexico Border, are less likely than non-Hispanic white women to receive routine screenings for breast and cervical cancers. This report cited that lack of access to healthcare in the Border region and the need for culturally sensitive preventive healthcare may partly account for these low screening rates among Hispanic women.[7]

Another Centers for Disease Control and Prevention study found that women living in rural areas also are less likely than women living in urban areas to have had a recent mammogram or Pap test. Women in rural areas of the United States have been found to have higher rates of cervical cancer and late stage disease than women in non-rural areas.[8] This report also cited lack of access to healthcare, inadequate health insurance, as well as lower education and income levels in rural areas as accounting for the lower screening rates.

As mentioned in the previous section, the 2004 Texas BRFSS Program survey confirmed that in Texas as in the CDC studies, a lower proportion of women who live along the Texas–Mexico Border or who live in the rural portions of the state reported having had a Pap test within the last three years compared to women who live in other regions of the state.

Table 5. Texas-Mexico Border Counties

Texas-Mexico Border Counties		
Brewster	Hudspeth	Reeves
Brooks	Jeff Davis	Starr
Cameron	Jim Hogg	Sutton
Crockett	Kenedy	Terrell
Culberson	Kinney	Uvalde
Dimmit	La Salle	Val Verde
Duval	Maverick	Webb
Edwards	McMullen	Willacy
El Paso	Pecos	Zapata
Frio	Presidio	Zavala
Hidalgo	Real	

Border counties are the 32 Texas counties defined by the Office of Border Health, Texas Department of State Health Services.

Table 6. Texas Urban or Metro Counties

Texas Urban or Metro Counties				
Aransas	Carson	Gregg	Medina	Travis
Archer	Chambers	Guadalupe	Midland	Upshur
Armstrong	Clay	Hardin	Montgomery	Victoria
Atascosa	Collin	Harris	Nueces	Waller
Austin	Comal	Hays	Orange	Webb
Bandera	Coryell	Hidalgo	Parker	Wichita
Bastrop	Crosby	Hunt	Potter	Williamson
Bell	Dallas	Irion	Randall	Wilson
Bexar	Delta	Jefferson	Robertson	Wise
Bowie	Denton	Johnson	Rockwall	
Brazoria	Ector	Jones	Rusk	
Brazos	Ellis	Kaufman	San Jacinto	
Burleson	El Paso	Kendall	San Patricio	
Caldwell	Fort Bend	Lampasas	Smith	
Calhoun	Galveston	Liberty	Tarrant	
Callahan	Goliad	Lubbock	Taylor	
Cameron	Grayson	McLennan	Tom Green	

Urban/rural designations by the U.S. Office of Management & Budget, 2003.
Rural county designations are all other counties not listed here.

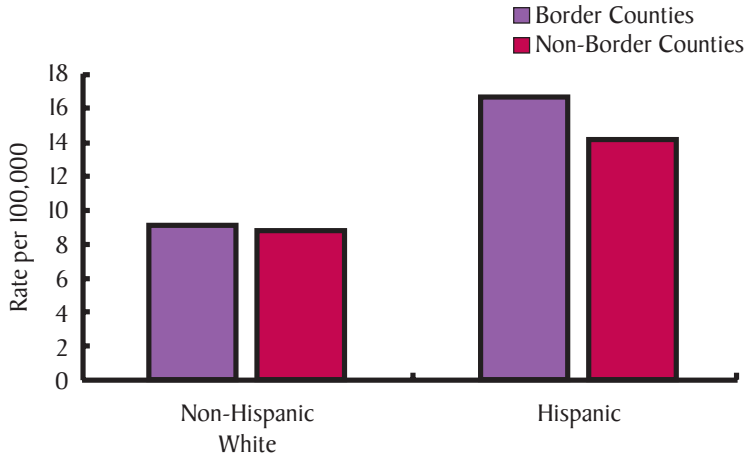
Cervical Cancer Along the Texas-Mexico Border

Thirty-two counties along the Texas-Mexico border are designated by the DSHS Office of Border Health as Border counties (Table 5). The Border counties revealed an extremely small population of Black women, and thus very few cervical cancer cases or deaths (4 and 1, respectively). As a result, the numbers of cases and deaths for these women were too small for inclusion in the Border/non-Border county analyses.

From 1999–2003, Non-Hispanic whites and Hispanics in the Texas-Mexico Border counties experienced higher cervical cancer incidence rates (9.2 and 16.6 per 100,000, respectively) when compared to their non-Border counterparts (8.9 and 14.2 per 100,000, respectively) (Figure 16). However, the difference between Border and non-Border non-Hispanic whites was very small, suggesting a greater disparity in cervical cancer rates among Border Hispanic women.

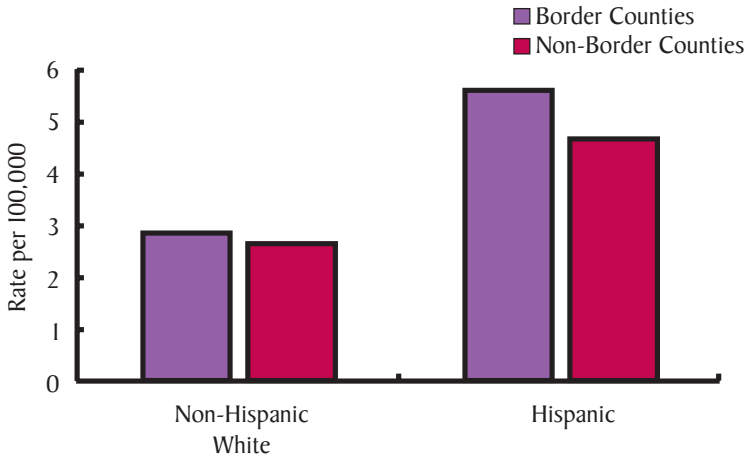
A similar pattern was observed for cervical cancer mortality. From 1994–2003, cervical cancer mortality was only slightly higher in non-Hispanic white women (2.9 per 100,000) along the Border compared to non-Hispanic whites in non-Border counties (2.7 per 100,000) (Figure 17). However, Border county Hispanic women had a 19 percent higher cervical cancer mortality rate (5.6 per 100,000) than non-Border Hispanics (4.7 per 100,000).

Figure 16. Cervical Cancer Incidence Rates Compared by Texas-Mexico Border and Non-Border Counties, Texas, 1999–2003



Rates are average annual rates per 100,000, age-adjusted to the 2000 U.S. Standard Population.
Border counties are the 32 Texas counties defined by the Office of Border Health, Texas Department of State Health Services.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

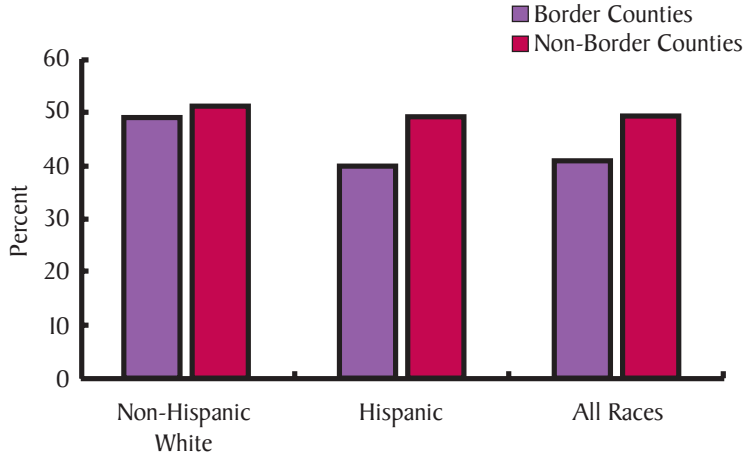
Figure 17. Cervical Cancer Mortality Rates Compared by Texas-Mexico Border and Non-Border Counties, Texas, 1994–2003



Rates are average annual rates per 100,000, age-adjusted to the 2000 U.S. Standard Population.
Border counties are the 32 counties as defined by the Office of Border Health, Texas Department of State Health Services.
Source: Texas Cancer Registry, 1990-2003 SeerStat mortality file.

There were also differences between Border and non-Border women when comparing stage of disease at the time of diagnosis (1999–2003). Overall, 41.0 percent of women living along the Border were diagnosed at the early stage compared with 49.5 percent of non-Border women (Figure 18). When examined by race/ethnicity, only 40.2 percent of Border Hispanic women were diagnosed at the early stage compared with 49.3 percent of non-Border Hispanic women. Border non-Hispanic white women had slightly lower early stage cervical cancer diagnosis (49.3%) when compared to non-Hispanic white women residing in non-Border Texas counties (51.2%). Higher percentages of cervical cancer diagnosed at the late and unknown stages were also observed for Border women compared to non-Border women. However, some caution must be used when evaluating differences in cervical cancer stage at diagnosis due to the large number of cases with unknown stage in both Border and non-Border counties (17.2% and 15.0%, respectively).

Figure 18. Percent Distribution of Early Cervical Cancer Stage at Diagnosis by Race/Ethnicity, Texas-Mexico Border and Non-Border Counties, Texas, 1999–2003



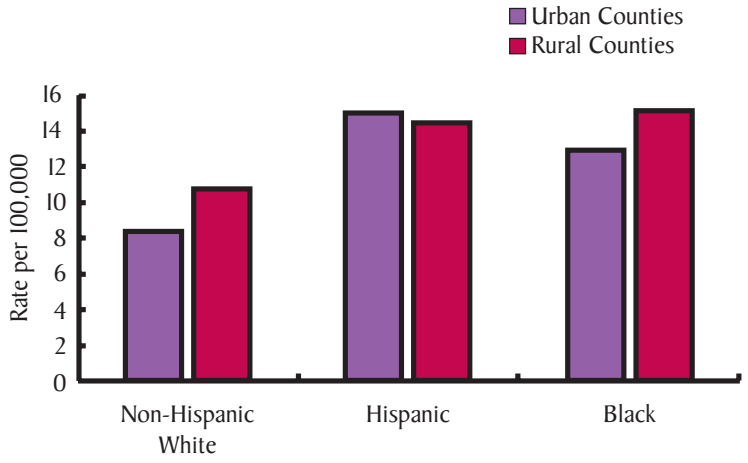
Note: Early excludes in situ cases. Percent of localized cervical cancer cases within each race/ethnic group.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

Cervical Cancer in Urban and Rural Counties

Texas Metro (or urban) counties are designated by the U.S. Office of Management and Budget, 2003 (Table 6). From 1999–2003, urban Hispanic women experienced slightly higher cervical cancer incidence rates than rural Hispanic women (15.1 per 100,000 and 14.5 per 100,000, respectively) (Figure 19). However, rural county non-Hispanic white women had a 27 percent higher cervical cancer incidence rate (10.9 per 100,000) than urban county non-Hispanic whites (8.6 per 100,000). For rural Black women, the cervical cancer incidence rate (15.2 per 100,000) was 17 percent higher than the cervical cancer incidence rate in urban county Black women (13.0 per 100,000).

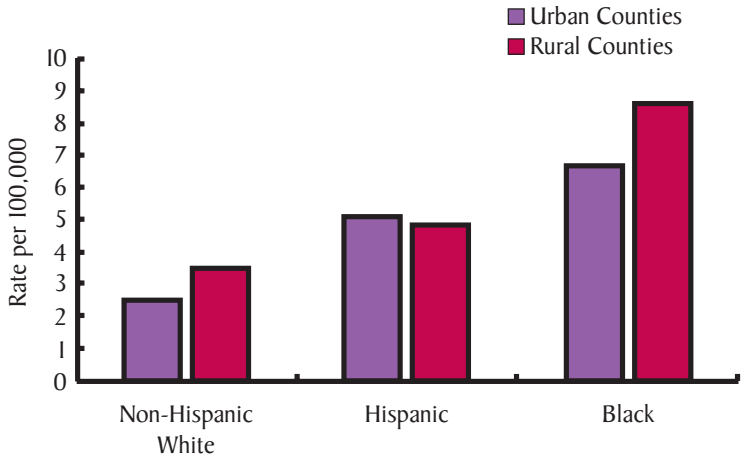
From 1994–2003, rural county non-Hispanic whites had higher mortality rates (3.5 per 100,000) than urban county non-Hispanic whites (2.5 per 100,000) (Figure 20). Rural county Black women also had a higher rate (8.6 per 100,000) compared to their urban counterparts (6.7 per 100,000). Similar to the urban/rural incidence comparisons, urban Hispanic women had slightly higher cervical cancer mortality rates than the rural Hispanic women (5.1 per 100,000 and 4.9 per 100,000 respectively).

Figure 19. Cervical Cancer Incidence Rates Compared by Urban and Rural Counties, Texas, 1999–2003



Rates are average annual rates per 100,000, age-adjusted to the 2000 U.S. Standard Population.
Urban/rural designations by the U.S. Office of Management and Budget, 2003.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

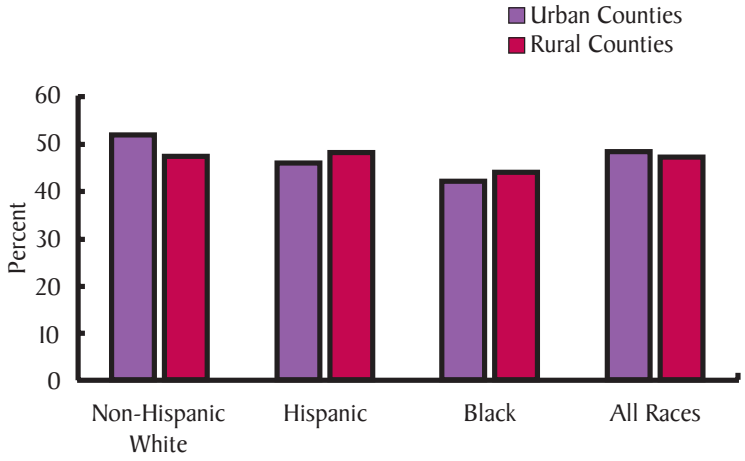
Figure 20. Cervical Cancer Mortality Rates Compared by Urban and Rural Counties, Texas, 1994–2003



Rates are average annual rates per 100,000, age-adjusted to the 2000 U.S. Standard Population.
Urban/rural designations by the U.S. Office of Management and Budget, 2003.
Source: Texas Cancer Registry, 1990-2003 SeerStat mortality file.

There also were small differences between urban and rural women when comparing stage of disease at the time of diagnosis (1999–2003). Overall, 47.3 percent of women living in rural areas were diagnosed at the early stage, compared with 48.6 percent of urban women (Figure 21). Non-Hispanic whites in rural areas had a lower percentage of cervical cancer diagnosed at the early stage (47.5%) than urban non-Hispanic whites (52.1%). Conversely, Hispanics and Blacks experienced slightly higher percentages of women diagnosed at the early stage in rural areas. For Hispanics the percentage of cervical cancer diagnosed at the early stage in rural areas was 48.6 percent and urban 45.9 percent, and for Black women, 44.2 percent and 42.3 percent respectively. However, caution also must be used when evaluating differences in cervical cancer stage at diagnosis due to the large number of cases with unknown stage in both rural and urban counties (17.3% and 14.9%, respectively).

Figure 21. Percent Distribution of Early Cervical Cancer Stage at Diagnosis by Race/Ethnicity, Urban and Rural Counties, Texas, 1999–2003



Note: Early excludes in situ cases. Percent of localized cervical cancer cases within each race/ethnic group.
Source: Texas Cancer Registry, 1995-2003 SeerStat incidence file as of 12/23/2005.

Risk Factors

While the causes of cervical cancer are not yet completely understood, researchers have identified several risk factors that are consistently associated with the disease. A risk factor is something that puts a person at an increased risk of developing the disease. Some risk factors can be controlled (such as smoking, diet), and some cannot (age, race). Through studies of women all over the world, researchers have identified the following risk factors for cervical cancer:[9,10,11]

Human Papillomavirus (HPV): Infection with HPV has been identified as the most important risk factor for cervical cancer. Some sexually transmitted HPVs, such as HPV 16 and HPV 18, may promote the growth of abnormal cells in the cervix.

Human Immunodeficiency Virus (HIV): Many studies have shown that women whose immune systems are weakened from HIV are more likely to develop cervical cancer.

Sexual Activity: Women who begin having sexual intercourse before the age of 18 are at an increased risk, as well as women who have had many sexual partners (or have sex with men who have had many partners). This is due in part to the increased risk of contracting a sexually transmitted virus, such as HPV (Human Papilloma Virus) or HIV (Human Immunodeficiency Virus).

Multiple Pregnancies: Women who have had many full-term pregnancies have an increased risk of developing cervical cancer.

Smoking: Tobacco smoke contains chemicals absorbed in the blood that may damage the cellular structure of the cervix and make cancer more likely to develop. Some studies have shown that women who smoke are about twice as likely as non-smokers to get cervical cancer. The risk appears to increase with how often a woman smokes and with the number of years she has smoked.

Diet: Poor nutrition has been identified as a risk factor. A poor diet weakens the immune system and increases the risk for infections and cancer. Diets low in fruits and vegetables have been associated with an increased risk of cervical cancer and several other cancers.

Low Socioeconomic Status: Low socioeconomic status is a risk factor for cervical cancer. Women with low incomes may not receive adequate health care, including pelvic exams and Pap tests, or proper nutrition.

Age: Cervical cancer differs from most cancers that tend to occur more often as people get older. While the median age-group for being diagnosed with cervical cancer in Texas is 40–44 years, young women in their teens and early twenties are often affected. It is important that women begin regular Pap tests no more than three years after they begin intercourse, and no later than 21 years of age. Appropriate screening should then be continued throughout life.

Family History: As with some other cancers, research has shown that women whose mother or sister has been diagnosed with cervical cancer are more likely to develop the disease themselves.

Race/Ethnicity: Cervical cancer occurs more often in Hispanics and Blacks than in non-Hispanic whites.

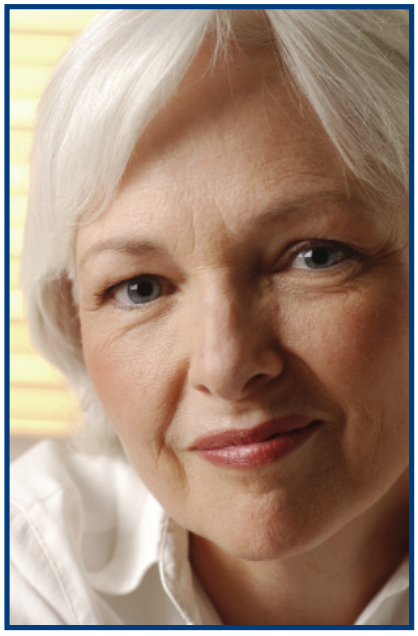
It is important to remember that having one of the cervical cancer risk factors, or even several, does not mean that a person will get cervical cancer. Risk factors do, however, increase the chance of developing the disease. Rarely do women without any of the above risk factors develop cervical cancer. Understanding these risk factors is particularly important for determining appropriate cervical cancer screening and other preventative measures, such as vaccination against HPV 16 and 18 infection.

Summary

In summary, cervical cancer remains a serious threat to the lives of Texas women. Cervical cancer incidence and mortality vary by age, race/ethnicity, and geographic region. Texas Hispanic women experienced the highest cervical cancer incidence while Texas Black women experienced the highest cervical cancer mortality. Hispanic cervical cancer incidence was 1.7 times higher than non-Hispanic white females, while Black cervical cancer mortality was 2.5 times as high as non-Hispanic white females and 38 percent higher than Hispanic women. Black women 85 years of age and older had the highest cervical cancer incidence and mortality rates of all Texas women and experienced the highest rates of cervical cancer death in every age group. Hispanic and Black women also had a higher percentage of cases diagnosed at the late stage. This report indicates that Hispanic and especially Black women bear a disproportionate amount of the cervical cancer burden in Texas. Such differences in their cervical cancer experience from non-Hispanic whites suggest disparities in screening and early diagnosis, timely and appropriate treatment, culturally sensitive preventive health care, and possibly even overall health.

Regional differences in cervical cancer incidence and mortality also occurred across the state. Hispanic women living along the Texas-Mexico Border had higher cervical cancer incidence and mortality than Hispanic women who lived in non-Border counties. More Hispanic and non-Hispanic white Border women were also diagnosed at a late stage of disease compared to their non-Border counterparts. Non-Hispanic white and Black women who lived in rural counties experienced higher cervical cancer incidence and mortality than urban Non-Hispanic whites and Blacks, and fewer rural women reported having had a pap screen in the last three years.

Although cervical cancer is considered one of the most preventable cancers, much work remains to reduce the impact of this disease on the residents of our State.



Technical Notes

Sources of Data

The Texas Cancer Registry (TCR) is a population based cancer surveillance (reporting) system that includes incident reports of certain benign, borderline, in-situ, and malignant neoplasms occurring in Texas among state residents. The TCR was first established in 1979, but statewide, population-based reporting of newly diagnosed cancer cases was not fully implemented until 1995. Regional offices cover the entire state and assist with data collection and record processing.

Texas hospitals and cancer treatment centers are the primary sources of case reporting. Reports also are received from outpatient clinics, free-standing pathology labs, and other state central cancer registries when a Texas resident is diagnosed or treated at a facility outside of Texas. The data used in this report were primarily abstracted from medical records and pathology reports.

Cancer mortality data for 1994–2003 were extracted from electronic files provided by the DSHS, Center for Health Statistics (CHS), and collected by the Texas DSHS Vital Statistics Unit. These files contained demographic and cause of death information from Texas death certificates for all deaths occurring among Texas residents.

Confidentiality

Protecting the confidentiality of persons whose cancers are reported to the TCR is the highest priority of the Registry in all aspects of operations, and required by state law and rule (Health and Safety Code, §82.009; Texas Administrative Code, Title 25, Part 1, Chapter 91, Subchapter A). No data presented in this report are intended to be used to identify individuals who have been diagnosed with cancer.

Classification by Anatomic Site

Primary anatomic site and histologic type were coded for each cancer incident case using the International Classification of Diseases for Oncology (ICD-O). For cases diagnosed from 1995–2000, the second edition was used (ICD-O-2)[12] and cases were then recoded to ICD-O-3 for analysis. For cases diagnosed from 2001–2003, the third edition was used (ICD-O-3).[13] Cases were then recoded into SEER program site recode groups for classifying types of cancer, using SeerPrep version 2.3.2 software. The ICD-O-3 codes for cervical cancer incidence included in this report are C530–C539 (excluding morphological types 9050:9055; 9140, 9590:9989). The SEER site recodes for this report can be found at http://seer.cancer.gov/siterecode/ICDO3_d01272003.

For cancer mortality data, the TCR classifies anatomic site according to the SEER "Cause of Death Recode," as given by the SEER Cause of Death Recode 1969+ (9/17/2004) (http://seer.cancer.gov/codrecode/1969+_d09172004/index.html). For reporting of cancer mortality data, SEER has defined major site groups based on the International Statistical Classification of Diseases and Related Health Problems (ICD) versions 8–10 and recoded to ICD version 10.[14] These site groups are defined consistently across time to facilitate reporting of long term trends. The ICD10 site code for cervical cancer mortality is C53.

Classification by Race/Ethnicity

Race/ethnicity information for cancer cases is based primarily on information contained in the patient's medical record. This information may be supplied directly by the patient, may be determined by admissions staff or other medical personnel, and/or can be based on last name, race/ethnicity of parents, birthplace, or maiden name. The reporting of race/ethnicity may be influenced by the race/ethnic distribution of the local population, by local interpretation of data collection guidelines, and other factors. Race/ethnicity information for cancer deaths is based on the information coded on the death certificate. This information is provided by the informant, who may be next-of-kin, friend, medical examiner, funeral director, attending physician, justice of the peace, or other source. This method is consistent with the classification schema used by other state programs. It is possible that some differences in race/ethnic-specific rates reflect classification biases rather than true differences in risk.

The race and ethnicity of each cancer patient and death is classified according to the categories defined in the North American Association of Central Cancer Registries (NAACCR) coding manual.[15] The race/ethnic groups used in this report for generating incidence and mortality rates include the following mutually-exclusive categories: non-Hispanic white, Black, Hispanic, and Other Races (includes Asians and Pacific Islanders and American Indians and Alaskan Natives). The Hispanic designation can therefore be of any race, but in 2000, 98.8 percent of Hispanics in Texas diagnosed with cancer were of the white race. Unless persons of unknown race are coded as Hispanic, (only 1.7% in 1999–2003) they are not included in any of the race/ethnic-specific categories, but are included in the total for All Races. Therefore, the race/ethnic sub-categories provided in this report will not sum to the total for All Races.

Data Quality

The Texas Cancer Registry employs multiple procedures to assure the quality of incoming data, and these are described in the Texas Cancer Registry Cancer Reporting Handbook, distributed to all cancer reporters in the state.[16] Numerous quality assurance procedures were applied to the data based on SEER, NPCR, NAACCR, and TCR standards. Quality control included both internal and external processes to insure the reliability, completeness, consistency, and comparability of TCR data. Examples of internal consolidation and quality assurance processes include 1) a review of multiple abstracts on the same patient for multiple primaries, 2) identifying possible duplicate records, 3) correcting unacceptable codes or inter-field inconsistencies, and 4) reviewing unusual code combinations for site/sex, age/site, age/morphology or site/morphology. Inconsistencies and unknown values for date of birth, race, ethnicity, sex, county of residence, date of diagnosis, site, and histologic type were rectified to the greatest extent possible. External procedures included training of reporting facility staff, on-site casefinding, and re-abstracting studies.

Cancer death certificate files were also matched against reported incident cases for an additional reporting completeness check. To further assist identifying any cancer cases not reported to the TCR, information on all death certificates with the underlying cause of death due to a malignant neoplasm were obtained from the DSHS–CHS. Institutions listed on the death certificates as the place of death were queried for additional cancer case information. Missed cases not identified from any institution were added to the cancer database as "death certificate only" (DCO) cases. These DCO cases for which the only available information is from the death certificate, were included in this report.

Data Analysis

Texas Cancer Registry cancer incidence and mortality analysis files are created using NCI SEER*Prep software (version 2.3.2). Calculation of incidence and mortality rates are done using SEER*Stat software (version 6.1.4). This software was developed by the NCI SEER program to analyze population-based cancer registry data, and provides the age-adjusted incidence and mortality rates for a standard set of cancer sites and site groups. More detailed information regarding availability and use of this software can be found on the SEER web site: http://seer.ims.nci.gov/Scientific Systems.

The Texas population distribution for 1994–2003 by race/ethnicity includes non-Hispanic whites, with 55.5 percent of the total population, Hispanics (30.1%), followed by Blacks (11.6%), and Other Races (2.9%). Population-at-risk data used in the calculation of age-adjusted rates were for 1994–2003 and provided by the DSHS-CHS. Average annual cancer incidence (1999–2003) and mortality rates (1994–2003) were age-adjusted using the direct method, and nineteen age groups up to age 85+. Age-adjustment enables the direct comparison of incidence or mortality rates by eliminating the effect of differences in the age-distributions between various comparison populations. Direct standardization weights the age-specific rates for a given sex, race/ethnicity, or geographic area by the age distribution of the standard population. The 2000 United States standard population (19 age groups) was used as the standard for all calculations.[17]

Incidence data in this report are based on Texas resident primary cancer cases and diagnosed from January 1, 1995 through December 31, 2003, and in the Texas Cancer Registry database by December 23, 2005. Case reporting for 1999–2003 was estimated to be over 96.6 percent complete at that time. However, additional cases diagnosed during this time period will continue to be reported and included in the TCR analytic database. As a result, future reports which include 1999–2003 data will vary slightly from this publication in the number of cancer cases included.

Comparisons of Cancer Incidence and Mortality Rates

Figures 6–7 in this report make comparisons of the relative risk of being diagnosed with or dying from cervical cancer in Texas Blacks and Hispanics compared with Texas non-Hispanic whites. This is calculated by dividing the age-adjusted rate in the relevant Black or Hispanic population by the age-adjusted rate in the corresponding non-Hispanic white population. A relative risk of 1.0 therefore means the incidence or mortality from cancer is the same in each group. If the relative risk is greater than 1.0, the cancer incidence or mortality rate is higher in the group being studied (Blacks or Hispanics) than in the comparison population (non-Hispanic white). If the relative risk is lower than 1.0, the cancer incidence or mortality rates are lower in the group being studied (Blacks or Hispanics) than in the comparison population (non-Hispanic white).

The differences between these rates were then tested for statistical significance by calculating the 95% confidence interval for the ratio of the rate in one group compared with the other, and determining whether that confidence interval excluded 1.0. The 95% confidence intervals were obtained by the logarithmic transformation of the pooled rate ratio.[18]

Readers are cautioned that statistically significant variation in rates can occur for a variety of unknown factors, and additional assessment of any significant differences may be needed to determine which differences represent true public health problems. Statistical significance also does not reflect the overall importance of the result (that is non-significant differences may be important, and statistically significant differences may be unimportant).

Trend Analysis

The Annual Percent Change (APC) represents the average percent increase or decrease in cancer rates per year over a specified period of time. The APC is calculated by fitting a linear regression to the natural logarithm of the annual rates, using calendar year as a predictor variable (formula: ln(r) = m(year) + b). From the slope of the regression line, m, APC is calculated as:

$$APC = 100 \times (e^{m} - 1).$$

Testing the hypothesis that the APC is equal to zero is equivalent to testing the hypothesis that the slope of the line in the regression is equal to zero. Statistical significance was set at alpha = 0.05, thus a trend in rates was considered statistically significant if there was less than a five percent chance that the difference was the result of random variation. The APC assumes that the cancer rate is changing at a constant rate over the interval examined.[19]

Asterisks indicate that the change is statistically significant ($p < 0.05$). Trends should be interpreted with caution because of the relatively short time period for which data are available.

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