OVARIAN CANCER REPORT

Georgia Department of Community Health | Division of Public Health

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We would like to thank all of the hospitals in Georgia who contributed data to the Georgia Comprehensive Cancer Registry. Without their hard work, this report would not have been possible.

The Georgia Comprehensive Cancer Registry acknowledges the Centers for Disease Control and Prevention, National Program for Cancer Registries (CDC-NPCR) for its support of the collection and distribution of the "Ovarian Cancer in Georgia 2003-2007" report under cooperative management 5U58DP000817-03 awarded to the Department of Community Health, Division of Public Health, Georgia Comprehensive Cancer Registry. The findings and conclusion in this report are those of author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Suggested Citation: Dehal A., McNamara C., Bayakly AR., Moon, T. Ovarian Cancer in Georgia, 2003-2007. Georgia Department of Community Health, Division of Public Health, Chronic Disease, Healthy Behavior and Injury Epidemiology Section, July 2010.

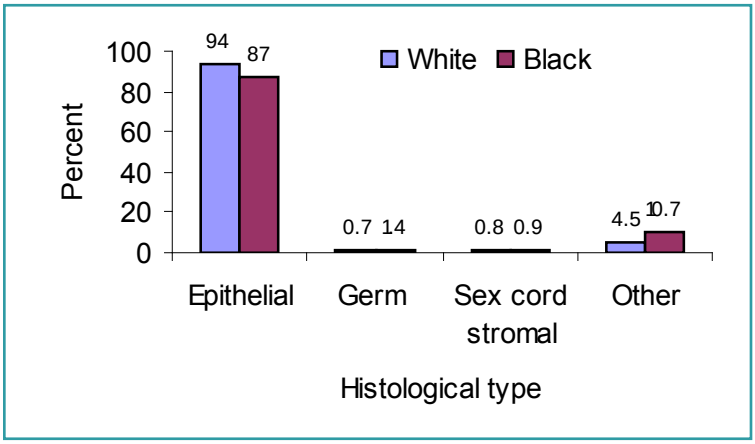
What is Ovarian Cancer?

Ovarian cancer is a malignant (cancerous) tumor that begins in the tissues of the ovary. The ovaries are paired organs in the female reproductive system. They are located in the pelvis, one on each side of the uterus. Each ovary is about the size and shape of an almond. The ovaries have two functions: they produce eggs and female hormones (estrogen and progesterone). These hormones influence the development of a woman's breasts, body shape, and body hair. They also regulate the menstrual cycle and pregnancy.

Tumors in the ovary are named for the kinds of cells the tumor started from and whether the tumor is benign or cancerous. There are three main types of tumors:

- Epithelial tumors: These tumors arise from the cells that cover the outer surface of the ovary. Nearly nine out of 10 ovarian cancers are this type. These tumors are also given a grade depending on how much the cells look like normal cells. Grade one means the cells look more normal; grade three look less normal, and grade two is in between. Usually the higher the grade the worse the outlook
- Germ cell tumors: These tumors arise from the cells that form the eggs (ova). Most germ cell tumors are not cancer, but some can be. Germ cell tumors are rare. As a rule, the treatment prognosis is good; with more than 9 out of 10 patients surviving at least 5 years after the tumor is found. There are subtypes of germ cell tumors. The most common are teratoma, dysgerminoma, endodermal sinus tumor, and choriocarcinoma. Germ cell tumors can also be a mix of more than one subtype
- Stromal tumors: These arise from cells that hold the ovary together and produce the female hormones. Stromal tumors can be either benign (not cancer) or malignant (cancerous). More than half are found in women over age 50, but they can also be found in young girls. Many of these tumors produce hormones. There are many different types of stromal tumors. Types of malignant stromal tumors include granulosa cell tumors, granulosa-theca tumors, and Sertoli-Leydig cell tumors, which are thought to be low-grade cancers

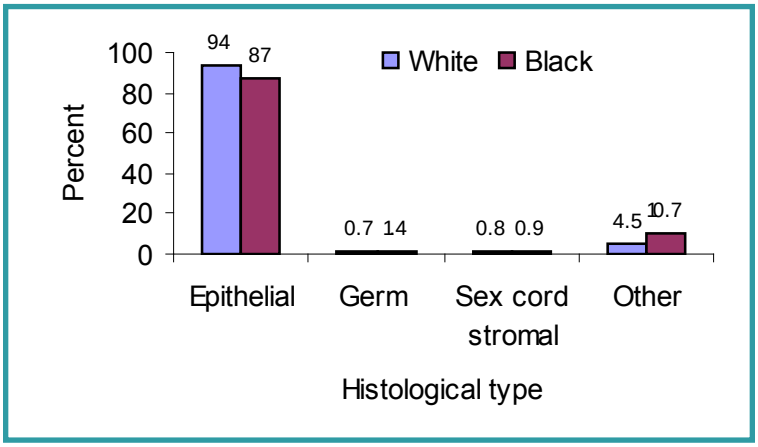
Percent of Ovarian Cancer by Histology, Georgia, 2003-2007



Nationally, nine out of 10 cases of ovarian cancer are epithelial tumors. In Georgia, the picture is slightly different from that of the U.S. Eight out of 10 women who were diagnosed with ovarian cancer had epithelial tumors.

The percentages of germ and sex cord stromal histological types in Georgia were similar to those of the U.S.

Percent of Ovarian Cancer by Histology and Race, Georgia, 2003-2007



Among women diagnosed with ovarian cancer, white women were more likely to be diagnosed with epithelial tumors than black women. Black women were twice as likely to be diagnosed with germ cell tumors as white women. The percentages of sex cord stromal tumors were similar for both white and black Georgian women. However, black women were more likely to be diagnosed with other histologies than white women.

How is Ovarian Cancer Detected?

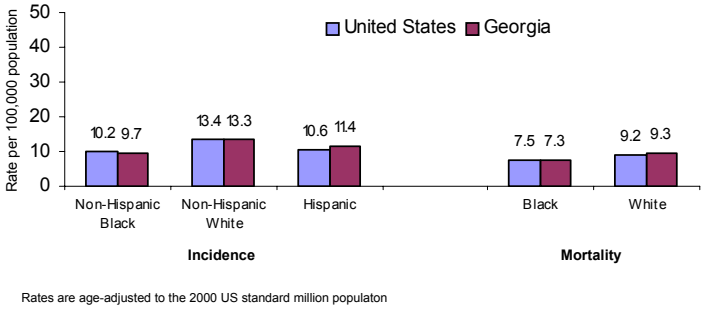
The earlier ovarian cancer is found and treated, the better a woman's chance for recovery. Unfortunately, there is no standard or routine screening test for ovarian cancer. Many times, women with ovarian cancer have no symptoms or mild symptoms until the disease is at an advanced stage. Screening for ovarian cancer is under study and there are clinical trials taking place in many parts of the country. Scientists are exploring the usefulness of measuring the level of tumor marker CA-125. They are also evaluating transvaginal ultrasound, a test that may help detect the disease early. Current studies of women at average risk for ovarian cancer show that these tests did not lower the number of deaths caused by ovarian cancer. For this reason, these tests are not used for routine screening of women who do not have strong risk factors.

- Transvaginal ultrasound: Transvaginal ultrasound is a procedure used to examine the vagina, uterus, fallopian tubes, and bladder. An ultrasound transducer (probe) is inserted into the vagina and used to bounce high-energy sound waves (ultrasound) off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram
- CA-125 assay: A CA-125 assay is a test that measures the level of CA-125 in the blood. An increased CA-125 level is sometimes a sign of certain types of cancer, including ovarian cancer, or other conditions

Scientists at the National Cancer Institute are studying the combination of ultrasound and CA-125 levels as a way to get more accurate results from the screening tests.

Who Develops Ovarian Cancer?

Ovarian Cancer Incidence and Mortality Rates* by Race and Ethnicity, Georgia (Incidence: 2003-2007; Mortality: 2003-2007) and United States (Incidence: 2003-2007; Mortality: 2002-2006)



Rates are age-adjusted to the 2000 US standard million populaton

Yearly, over 530 cases of ovarian cancer were reported to the Georgia Comprehensive Cancer Registry. White women were more likely to be diagnosed with the disease than were black or Hispanic women.

Yearly, over 380 Georgia women died from ovarian cancer. The mortality rate for white women was higher than that for black women.

Overall, Georgia's ovarian cancer incidence and mortality rates were similar to the U.S. average for black, white and Hispanic women.

What are the Causes and Risk Factors for Ovarian Cancer?

We do not yet know exactly what causes ovarian cancer, but we do know that certain risk factors are linked to the disease. A risk factor is anything that indicates a person has a higher than normal chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, such as obesity, can be controlled. Others, like a person's age or family history, cannot be controlled. But having a risk factor, or even several, does not mean that a person will get the disease.

There are many theories about the causes of ovarian cancer. Some of them came from looking at the conditions that change the risk of ovarian cancer. For example, pregnancy and taking birth control pills both lower the risk of ovarian cancer. Since both reduce the number of times the ovary releases an egg, some researchers think that there may be a link between the release of eggs and the risk of getting ovarian cancer. Also, we know that women who have had their tubes tied or who have had a hysterectomy have a lower risk of ovarian cancer. One theory to explain this is that some cancer-causing substances may enter the body through the vagina and pass through the uterus and fallopian tubes to reach the ovaries. While all women are at risk for ovarian cancer, the following factors can increase a woman's chances of having the disease.

Risk Factors That Can Be Controlled

- Childbearing: Women who have never had children are more likely to develop ovarian cancer than women who had children. In fact, the more children a woman has, the less likely she is to develop ovarian cancer
- Menopausal hormone therapy: Some studies have suggested that women who take estrogen by itself (estrogen without progesterone) for 10 or more years may have an increased risk of ovarian cancer
- Obesity: A study from the American Cancer Society found a higher rate of death from ovarian cancer in women who were overweight. The risk increased by 50% in the heaviest women
- Diet: A recent study of women who followed a low-fat diet for at least four years showed a lower risk of ovarian cancer. Some studies have shown a reduced rate of ovarian cancer in women who ate a diet high in vegetables, but other studies disagree
- Fertility drugs: Some studies have found that use of the fertility drug Clomid for longer than one year, especially if no pregnancy took place, may increase the risk of ovarian cancer
- Male hormones: Androgens are male hormones. A recent study found a link between danazol, a drug that increases androgen level (used to treat endometriosis), and an increased risk of ovarian cancer
- Smoking and alcohol use: Some studies have found an increased association with mucinous tumors, that is a rare form of ovarian cancer
- Talcum powder: Some studies have shown a slight increase in risk of ovarian cancer among women who used talcum powder on the genital area

Risk Factors That Cannot Be Controlled

- Family history: First-degree relatives (mother, daughter, or sister) of a woman who has had ovarian cancer are at increased risk of developing this type of cancer themselves. The likelihood is especially high if two or more first-degree relatives have had the disease. The risk is somewhat less, but still above average, if other relatives (grandmother, aunt, or cousin) have had ovarian cancer. Research has shown that a woman's risk of developing ovarian cancer is greatly increased if she inherits a deleterious (harmful) BRCA1 or BRCA2 mutation. Also, women with a family history of cancer of the breast, uterus, colon, or rectum may also have an increased risk of ovarian cancer
- Age: The likelihood of developing ovarian cancer increases as a woman gets older. Most ovarian cancers occur in women over the age of 55
- Personal history: Women who have had cancer of the breast, uterus, colon, or rectum may have a greater chance of developing ovarian cancer than women who have not had these cancers
- Menstrual periods: According to the American Cancer Society, women who started menstruating at an early age (before age 12) and/or experienced menopause after age 50 may have an increased risk of ovarian cancer

Prevalence of Self-Reported Risk Factors for Georgia Women

Based on the Georgia Behavioral Risk Factor Surveillance System for 2003-2007:

- Overweight/Obesity: Participants were asked to report their height and weight, and their resulting Body Mass Index (BMI) was calculated based on those responses. BMI greater than or equal to 25 is considered overweight and greater than or equal to 30 is considered obese. Fifty-five percent of participating women had a calculated BMI that placed them as overweight or obese, while 45% of women were considered normal weight
- Alcohol Use: Participants were asked if they had at least one alcoholic drink in the previous 30 days. For those who said yes (40%), they were asked how many drinks they averaged on the days they drank. Among all women who reported having drunk alcohol in the past month, 45% averaged 2-5 drinks per occasion. Average daily alcohol consumption was also calculated for those who reported current drinking and was 0.43 drinks per day
- Smoking: Participants were asked if they had smoked at least one hundred cigarettes during their life time. Eighteen percent of participants said yes

Ovarian cancer often shows no obvious signs or symptoms until late in its development. Signs and symptoms of ovarian cancer may include:

- General abdominal discomfort and/or pain (gas, indigestion, pressure, swelling, bloating, cramps)
- Nausea, diarrhea, constipation, or frequent urination
- Loss of appetite
- Feeling of fullness even after a light meal
- Weight gain or loss with no known reason
- Abnormal bleeding from the vagina
- Feeling very tired all the time

These symptoms may be caused by ovarian cancer or by other, less serious conditions. It is important to check with a doctor about any of these symptoms.

What are the Leading Causes of Cancer Incidence and Mortality in Women?

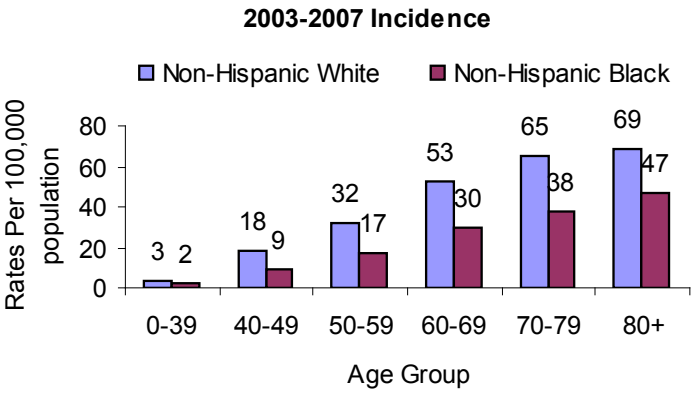
Top Ten Cancer Sites and Cancer-Related Deaths, Georgia Females, 2003-2007

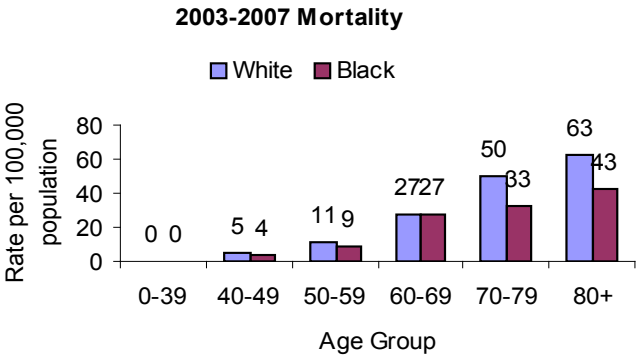
Cases	Deaths
1. Breast	1. Lung
2. Lung & Bronchus	2. Breast
3. Colon & Rectum	3. Colon & Rectum
4. Uterus	4. Pancreas
5. Melanoma	5. Ovary
6. Non-Hodgkin	6. Leukemia
7. Ovary	7. Non-Hodgkin
8. Thyroid	8. Uterus
9. Kidney	9. Multiple Myeloma
10. Pancreas	10.Brain

Ovarian cancer is the seventh most common cancer diagnosed and the fifth leading cause of cancer death among women in Georgia. Nationally, ovarian cancer is the eighth most common cancer diagnosed and the fifth leading cause of cancer death.

At What Age is Ovarian Cancer Most Often Diagnosed?

Georgia Ovarian Cancer Incidence (2003-2007) and Mortality (2003-2007) Rates by Age Group and Race





Although ovarian cancer incidence and mortality rates are highest in older women, ovarian cancer may also occur in younger women. In Georgia, women over the age of 60 have the highest rate of ovarian cancer. Mortality rates steadily increase with age; the highest mortality rates are seen in women 80 years of age and older. In all age groups, white women have higher incidence and mortality rates than black women. Before the age of 40, ovarian cancer deaths are very rare, but they do occur occasionally. Every year, from 2003 to 2007, 38 Georgian women under 40 years of age died from ovarian cancer. For both incidence and mortality, the highest increase in the rate of ovarian cancer is between the age group (0-39) and (40-49) for both white and black women.

What is the Treatment for Ovarian Cancer?

Each type of treatment has benefits and side effects. Age, overall health, and the stage of the cancer are all factors that need to be considered. Staging is a standardized way to summarize information about how far a cancer has spread from its point of origin. In situ ovarian cancers are those in which the tumor has not invaded or penetrated surrounding tissue. In the localized stage, the tumor is confined to the ovary. In the regional stage, the tumor has spread to the surrounding tissues such as the fallopian tubes and uterus. Distant ovarian cancers have spread to sites such as the liver, lung, spleen, and brain.

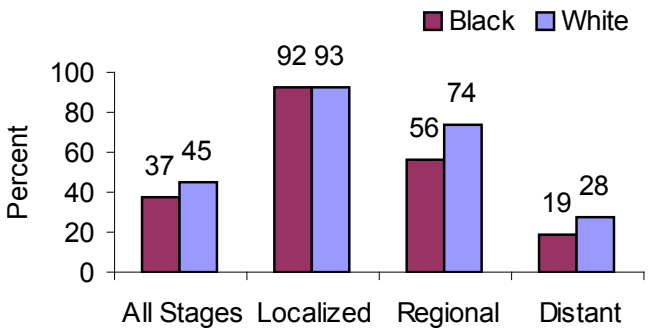
There are three main types of treatment for ovarian cancer: surgery, radiation therapy, and chemotherapy. Most women have surgery and chemotherapy; radiation therapy is rarely used for treating ovarian cancers. Depending on the stage of cancer, multiple treatment modalities may be used at the same time or one after another.

- Surgery: This is the usual initial treatment for women diagnosed with ovarian cancer. The ovaries, the fallopian tubes, the uterus, and the cervix are usually removed. This operation is called a hysterectomy with bilateral salpingo-oophorectomy. Staging during surgery generally involves removing lymph nodes, samples of tissue from the diaphragm and other organs in the abdomen, and fluid from the abdomen. If the cancer has spread, the surgeon usually removes as much of the cancer as possible in a procedure called tumor debulking to be treated later with chemotherapy or radiation therapy
- Chemotherapy: Intraperitoneal chemotherapy can be given directly into the abdomen and pelvis through a thin tube. Systemic chemotherapy is given using anti-cancer drugs that are injected into a vein or taken by mouth. These drugs reach all areas of the body through the bloodstream, making them potentially useful against cancers that have metastasized to other parts of the body
- Radiation Therapy: This treatment uses x-rays or other types of radiation to kill cancer cells. There are two types of radiation therapies: External – radiation comes from a machine and is directed to the cancer. Internal – radioactive material/implants are put directly into or near the cancer.

Research into treatment includes testing methods now in use, as well as finding new treatments. New chemotherapy combinations which may help treat cancers that resist current treatments are always being studied. Also, new drugs are being developed to help in treating patients with ovarian cancer. Another treatment currently under study is the production of an ovarian cancer vaccine, which will help the immune system to better spot cancer and to make monoclonal antibodies, which are similar to those produced by our bodies to fight the infection.

Who Survives Ovarian Cancer?

Percent of U.S. Women Surviving Five Years after Diagnosis of Ovarian Cancer, by Stage of Disease and Race, 1999-2006



Percent of Ovarian Cancers found by Stage* of Disease and Race, U.S. Women and Georgia Women

	Localized	Regional	Distant
US White†	14%	17%	63%
US Black†	15%	14%	62%
GA White†	13%	20%	59%
GA Black†	18%	13%	61%

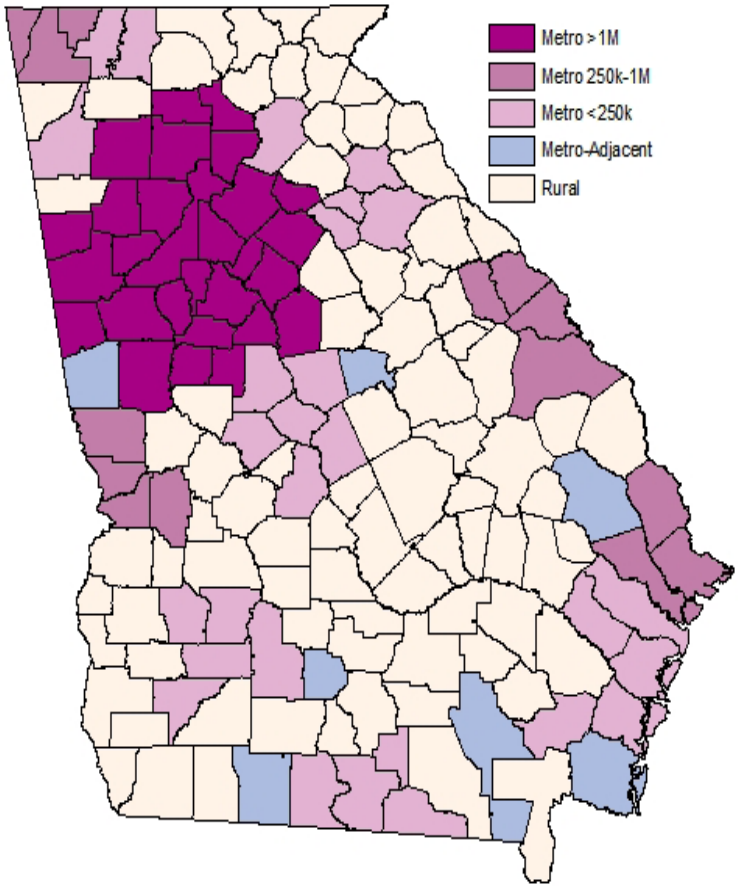
*Unstaged/unknown tumors are not shown.
†US data is for 1999-2006, GA data is for 2003-2007

Survival rates depend mainly on two elements: how early the cancer is detected, and the pathology of the tumor (how aggressive it is). Early detection is important because survival for early stage ovarian cancer is much greater than that for later stage disease. Nine out of 10 women treated for early stage ovarian cancer will live longer than 5 years after the cancer is found. Unfortunately, there is no reliable test for finding ovarian cancer early, but several large studies are in progress to learn how best to find ovarian cancer in its earliest stage.

Five-year survival for tumors found in the localized stage is 92 percent among U.S. black women and 93 percent among U.S. white women. If the cancer is diagnosed at the distant stage, five-year survival drops to about 19 percent for U.S. black women and 28 percent for U.S. white women. In Georgia, about three out of five of all ovarian cancers are diagnosed at the distant stage.

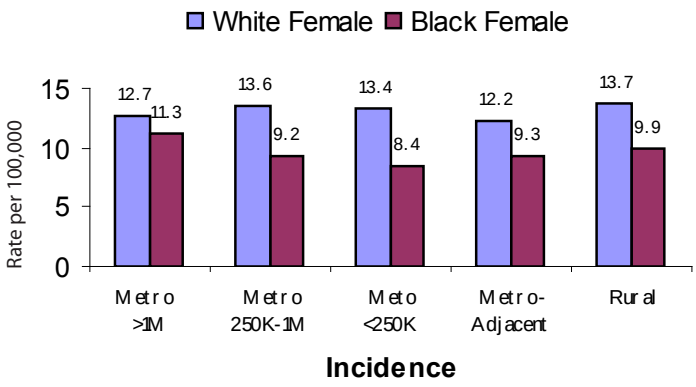
How Does Ovarian Cancer Vary by Region?

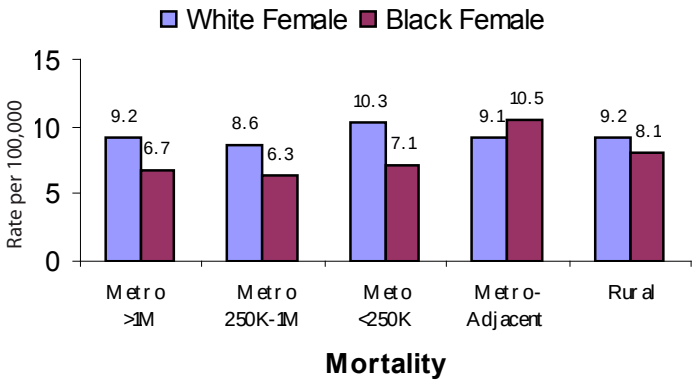
Metro, Metro-Adjacent, and Rural Counties in Georgia, RUCC, 2003



Please see technical notes for more information on metro/rural classification (RUCC, 2003)

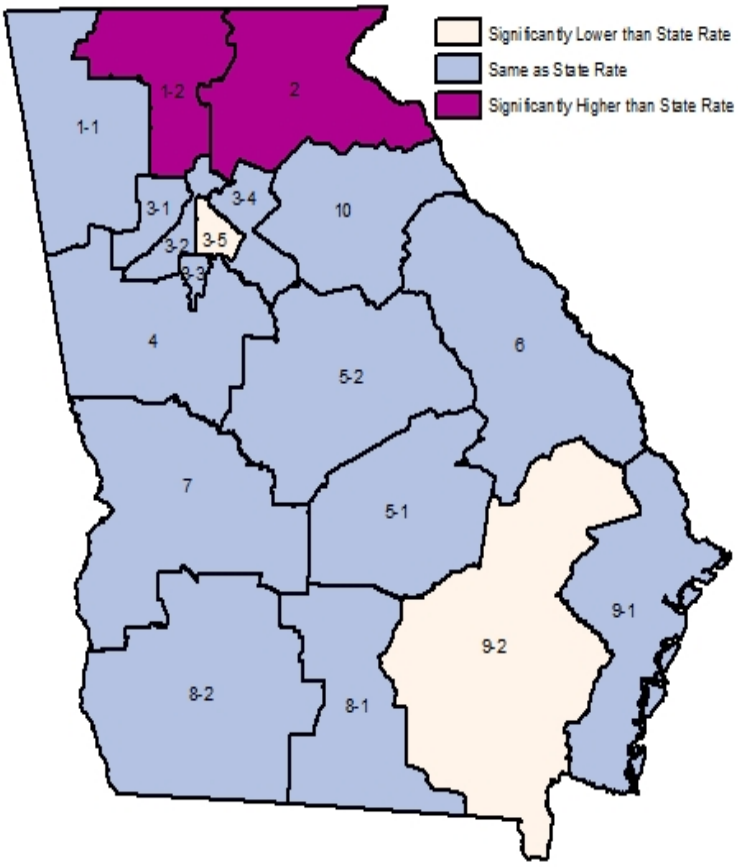
Georgia Ovarian Cancer Incidence and Mortality Rates* by Race and Geography, 2003-2007





*Rates are age-adjusted to the 2000 U.S. standard million population.

Age-Adjusted ovarian cancer Incidence Rates, Georgia, Female, 2003-2007



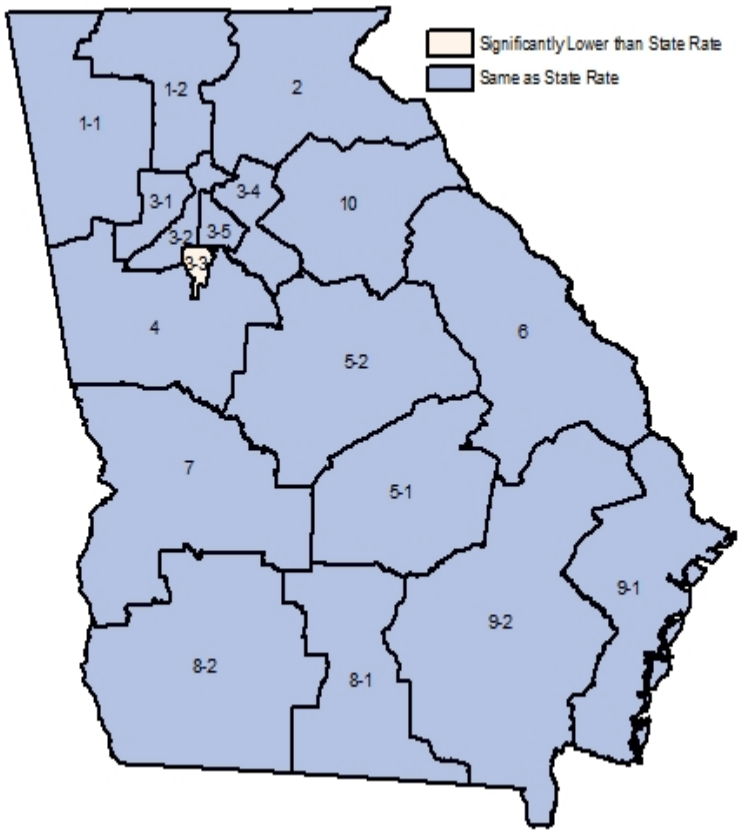
Incidence and mortality rates for white females were nearly similar across the different geographical regions. Incidence rates for black women living in metropolitan counties (>1M population) were higher than those for black women living in metro-adjacent and rural counties. White women living in rural counties of Georgia have the highest ovarian cancer incidence rates (13.7 per 100,000) and black women living in the metropolitan counties (<250K population) have the lowest incidence rates in Georgia (8.4 per 100,000). None of the geographical regions were found to have significantly different incidence rates comparing to the state rates.

Mortality rates for white women living in metropolitan counties (<250K population) were higher than those among white women living in metro-adjacent and rural counties.

The metro/rural difference seems to have diminished while the racial difference in both incidence and mortality rates persists. This may be due to the fact that as of 2007, 81% of Georgia's population lived in counties classified as metropolitan.

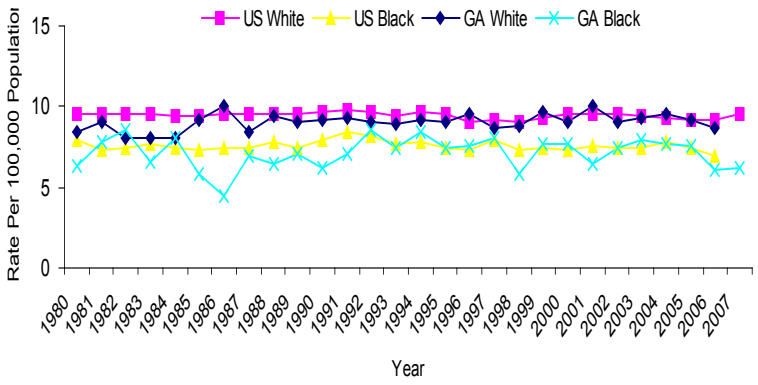
Black women living in metro-adjacent counties of Georgia have the highest ovarian cancer mortality rates in Georgia (10.5 per 100,000) and are the only group of black women to have higher mortality rates than their white counterparts. Black women living in metropolitan counties (250K-1M population) have the lowest mortality rates (6.3 per 100,000). None of the geographical regions were found to have significantly different mortality rates comparing to the state rates.

Age-Adjusted ovarian cancer Mortality Rates, Georgia, Female, 2003-2007



Southeast and DeKalb Health districts have significantly lower ovarian cancer incidence rates than the state as a whole. Dalton and Gainesville health districts have significantly higher rates. Clayton health district has significantly lower ovarian cancer mortality rates than the state as a whole.

Ovarian Cancer Mortality Rate*, by Year of diagnosis and Race, Georgia, 1980-2007 vs. U.S., 1980-2006



*Rates are age-adjusted to 2000 U.S. population

Overall, there has been no significant change in the ovarian cancer mortality rates among Georgian and U.S. women over the last three decades. This can be attributed to the fact that there have not been many advances regarding screening, diagnosis and treatment of ovarian cancer over this period. The rates among Georgia females have remained stable and similar to those among U.S. females.

Where Can I Find Out More about Ovarian Cancer?

You can learn more about ovarian cancer from the following organizations:

American Cancer Society
Telephone: 1-800-ACS-2345
Internet Address: http://www.cancer.org

National Cancer Institute, Cancer Information Service
Telephone: 1-800-4-CANCER
Internet Address: http://www.nci.nih.gov

National Coalition for Cancer Survivorship
Telephone: 1-877-NCCS-YES or 877-622-7937
Internet Address: http://www.canceradvocacy.org/

National Ovarian Cancer Coalition
Telephone: 214.273.4200 or 1.888.OVARIAN
Internet Address: http://www.ovarian.org

Technical Notes

Definitions:
Age-adjusted rate: A rate calculated in a manner that allows for the comparison of rates derived from populations with different age structures.

Cancer incidence rate: The number of new cancer cases occurring in a population during a specified period of time. Often expressed per 100,000 population.

Cancer mortality rate: The number of cancer deaths occurring in a population during a specified period of time. Often expressed per 100,000 population.

2003 Rural-Urban Continuum Codes: Rural-Urban Continuum Codes form a classification scheme that distinguishes metropolitan (metro) counties by the population size of their metro area, and nonmetropolitan (nonmetro) counties by degree of urbanization and adjacency to a metro area or areas:

1 = Counties in metro areas of 1 million population or more
2 = Counties in metro areas of 250,000 to 1 million population
3 = Counties in metro areas of fewer than 250,000 population
4 = Urban population of 20,000 or more, adjacent to a metro area
5 = Urban population of 20,000 or more, not adjacent to a metro area
6 = Urban population of 2,500 to 19,999, adjacent to a metro area
7 = Urban population of 2,500 to 19,999, not adjacent to a metro area
8 = Completely rural or less than 2,500 urban population, adjacent to a metro area
9 = Completely rural or less than 2,500 urban population, not adjacent to a metro area

The above codes were regrouped into the following five categories:

1 = Metro >1M
2 = Metro 250K-1M
3 = Metro <250K
4 = Metro-Adjacent
5 = there are no counties in Georgia that fit category number 5
6, 7, 8 and 9 = Rural

Data Sources

The number of deaths and mortality rates for the state of Georgia were obtained from the Georgia Department of Community Health, Division of Public Health, Vital Records Branch. The number of deaths and mortality rates for the United States were obtained from the North American Association of Central Cancer Registries (NAACCR) and from CDC Wonder. Mortality data were coded using ICD-9 codes (1980-1998) and ICD-10 codes (1999-2007). The ICD-9 code for ovarian cancer is 183.0, while the ICD-10 code for ovarian cancer is C56.

The number of new cases and incidence rates for the state of Georgia were obtained from the Georgia Department of Community Health, Division of Public Health, Georgia Comprehensive Cancer Registry. The number of new cases and incidence rates for the United States were obtained from the North American Association of Central Cancer Registries (NAACCR). Incidence data were coded using ICD-O-3 codes. The ICD-O-3 code used for ovarian cancer is C56.9.

Cancer stage and survival data for the United States were obtained from the Surveillance, Epidemiology, and End Results (SEER) program, National Cancer Institute.

Data for the prevalence of self-reported risk factors for Georgia women were obtained from Georgia Behavioral Risk Factor Surveillance System (BRFSS). The Georgia BRFSS data were analyzed to assess the prevalence of obesity, alcohol use, and smoking patterns among Georgian women.

Population estimates for 1980-2007 and the 2000 U.S. standard population were obtained from the U.S. Bureau of the Census.

Methods:
Incidence rates were calculated per 100,000 population and age-adjusted by the direct method to the 2000 U.S. standard population. The incidence rates are five-year average annual rates for the period 2003 through 2007.

Mortality rates were calculated per 100,000 population and age-adjusted by the direct method to the 2000 U.S. standard population. Except where calculated to show trends, the mortality rates are five-year average annual rates for the period 2003 through 2007.


Georgia Department of
Community Health