COLORECTAL CANCER IN GEORGIA, 2003 - 2007

Colorectal Cancer

GEORGIA DEPARTMENT OF PUBLIC HEALTH

Acknowledgements

Georgia Department of Public Health
Brenda Fitzgerald, M.D., Commissioner

Health Protection Office
Patrick O'Neal, M.D., Director

Epidemiology Program
Cherie Drenzek, DVM, M.P.H., State Epidemiologist

Chronic Disease, Healthy Behaviors, and Injury Epidemiology Section
A. Rana Bayakly, M.P.H., Chief Epidemiologist

Georgia Comprehensive Cancer Registry
A. Rana Bayakly, M.P.H., Director
Chrissy McNamara, M.S.P.H., Epidemiologist
Victoria Davis, M.P.H., Epidemiologist

Health Promotion & Disease Prevention Programs
Kimberly Redding, M.D., M.P.H., Director

Georgia Comprehensive Cancer Control Program
Tamira Moon, M.P.H., C.H.E.S, Manager

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

Funding for this research was made possible (in part) by cooperative agreement award number 1/U58/DP00817-04 from the Centers for Disease Control and Prevention. The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Suggested Citation: Davis, V., McNamara, C., Bayakly, A., Moon, T. Colorectal Cancer in Georgia, 2003-2007. Georgia Department of Public Health, Health Protection Office, Chronic Disease, Healthy Behaviors, and Injury Epidemiology, August 2011.

Introduction

Colorectal cancer is a collective term for cancers of the colon and rectum. Since cancers of the colon and rectum share many common features, they are often referred to as colorectal cancer. The colon and rectum are parts of the digestive system. Together, they form a long, muscular tube called the large intestine. The colon is the first four to five feet of the large intestine and the last four to six inches is the rectum (Figure 1).

Once food is chewed and swallowed, it travels through the esophagus to the stomach. In the stomach, it is partially digested and transferred to the small intestine. The small intestine continues digesting the food and absorbs most of the nutrients. The food then travels to the large intestine. The waste then moves from the colon into the rectum and passes out of the body through an opening called the anus during a bowel movement.

The colon consists of 4 sections (Figure 1):

The first section is called the ascending colon. It begins where the small intestine attaches to the colon and extends upward on the right side of the abdomen.

The second section, the transverse colon, runs across the body from right to the left side of the upper abdomen.

The third section, the descending colon, continues downward on the left side.

The fourth section, the sigmoid colon, named because of its S-shape, joins the rectum and the colon.

Colorectal cancers develop slowly over a period of several years. Most of them begin as a non-cancerous polyp, a growth of tissue on the lining of the colon or rectum (Figure 2). Polyps are also known as adenomas. Over 95 percent of colorectal cancers are adenocarcinomas, which arise from cells that line the inside of the colon and the rectum. Removing the polyp early may prevent it from becoming cancerous.

Colorectal cancer affects both men and women and most often occurs in people over 50 years of age. It is the third most commonly diagnosed cancer and cause of cancer death among Georgian men and women. The Georgia Comprehensive Cancer Registry estimates that over 4,300 new cases of colorectal cancer will be diagnosed statewide in 2009 and about 1,300 Georgians will die from this disease.

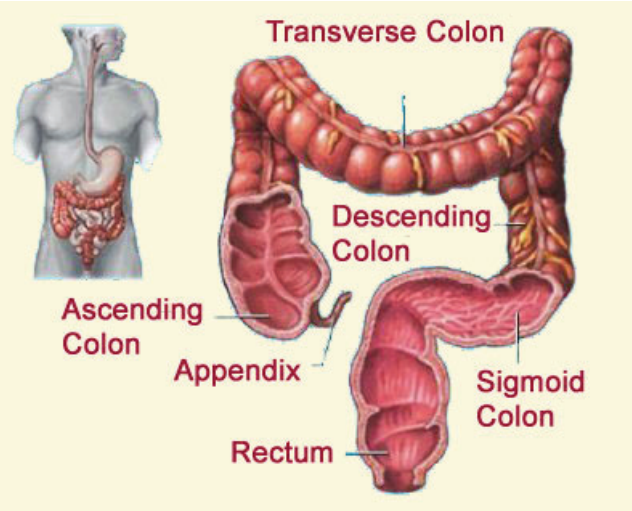


Figure 1. Anatomy of the Digestive System and Sections of Colon

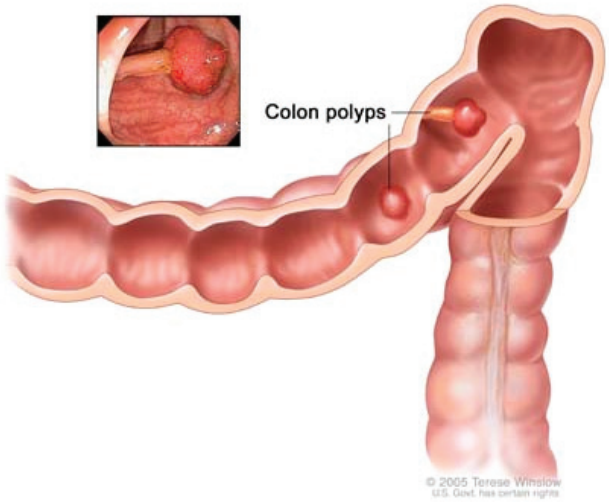


Figure 2. Colon Polyp

Detection and Screening

Screening is the process of looking for cancer in people who have no symptoms of colorectal cancer. Regular screenings for colorectal cancer can find cancer early (when it is most likely to be curable). Screenings can also prevent colorectal cancer by finding polyps and removing them before they turn cancerous. Tests that are used for screening colorectal cancer can by divided into two groups:

Tests that find both colorectal polyps and cancer: These tests look at the structure of the colon to find any abnormal areas.

- **Flexible sigmoidoscopy** During this test, a doctor uses a sigmoidoscope to look inside the rectum and the lower section of the colon. The sigmoidoscope is a flexible lighted tube about 2 feet long with a video camera on the end. Images from the inside of the colon and rectum are displayed on a monitor. The tube is used to detect polyps and if any polyps are found, they are removed. The procedure to remove polyps is called polypectomy
- **Colonoscopy** During this test, a colonoscope is used to look inside the entire length of the colon and rectum. The colonoscope is similar to a sigmoidoscope, but is longer. The doctor may also use the colonoscope to assist with the removal of polyps
- **Double-contrast barium enema (DCBE)** During this test, barium sulfate (chalky liquid) and air are used to show an outline of the colon and rectum. X-ray pictures are taken of the colon and rectum which can show abnormal areas. If any suspicious areas are seen, a colonoscopy may be performed
- **CT colonography (virtual colonoscopy)** This test is a more advanced form of a computed tomography (CT) scan. The CT scan takes multiple pictures of the colon and then combines all the pictures in order to create a 2-dimensional or 3-dimensional view of the inside of the colon and rectum. This test is considered less invasive than the colonoscopy, however if any abnormalities are found, a colonoscopy may be needed in order to determine if a cancer is present

Tests that find cancer: These tests involve testing the stool (feces) for signs that cancer may be present. These types of tests are considered to be less invasive and easier.

- **Fecal occult blood test (FOBT)** Damaged blood vessels from polyps or cancers may release a small amount of blood into the feces. The FOBT detects blood in stool that may not be visible. Before the test, certain medications and foods cannot be consumed because they may interfere with the test. The screening test is given as a take home kit and stool samples are taken and returned to a doctor's office for testing. If the test detects blood, a colonoscopy is performed to determine the source. Other conditions such as hemorrhoids or ulcers may also cause blood to be detected
- **Fecal immunochemical test (FIT)** This test is also used to detect blood in the stool. The FIT is also performed at home but may be easier to use since there are no medication or dietary restrictions that are required to be followed before taking the test (unlike the FOBT). After the stool samples have been collected, the samples are returned to the doctor's office for testing
- **Stool DNA test (sDNA)** Colorectal cancer cells may contain DNA mutations on certain genes. These genes are often shed in the stool, which enables tests to detect them. The sDNA test looks for certain abnormal sections of DNA from cancer or polyp cells. This test is new and how often to be tested has not yet been established

American Cancer Society Recommendations for Colorectal Cancer Early Detection

The **American Cancer Society** recommends that people at average risk for colorectal cancer should begin screening at age 50.

Screening options include:

Tests that find polyps and cancer

- Flexible sigmoidoscopy- every 5 years*
- Double contrast barium enema- every 5 years*
- CT colonography (virtual colonoscopy-) every 5 years*
- Colonoscopy- every 10 years

Tests that mainly find cancer

- Fecal occult blood test (FOBT)-test every year*+
- Fecal immunochemical test (FIT)-test every year+
- Stool DNA test (sDNA)- interval uncertain**

***Colonoscopy should be done if tests results are positive**

+For FOBT or FIT used as a screening test, the take-home multiple sample method should be used.

****Combined testing is preferred over either annual FOBT or FIT, or FSIG every 5 years alone**

For people with Medicare, the most common colorectal cancer screening tests are covered

According to the Georgia Behavioral Risk Factor Surveillance System (BRFSS):

- The percent of sigmoidoscopy/colonoscopy screening and FOBT screening is similar among men and women
  50 years of age and older
- Adults 65 years of age and older have a significantly higher prevalence of receiving either screening when compared to adults 50 to 64 years of age
- The Healthy People 2010 objective was reached for adults age 50 years and older who ever had a sigmoidoscopy/colonoscopy
- The Healthy People 2010 objective was not reached for adults age 50 years and older who had a FOBT within the last 2 years

Figure 3. Percent of Adults Age 50+, Who Ever Had a Sigmoidoscopy/ Colonoscopy by Sex, Georgia 2004-2008

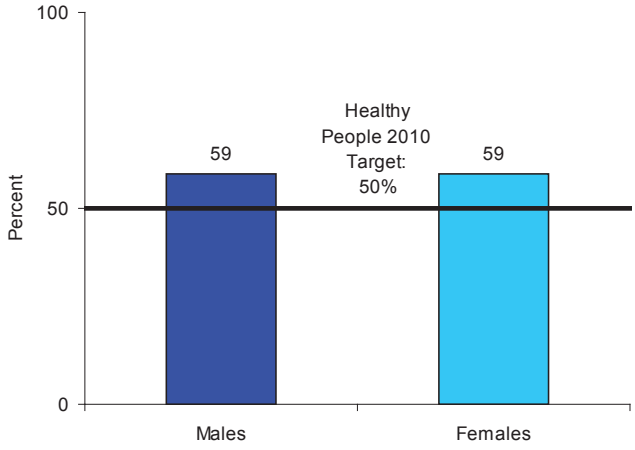


Figure 4. Percent of Adults age 50+, Who Ever Had a Sigmoidoscopy/ Colonoscopy by Age Group, Georgia 2004-2008

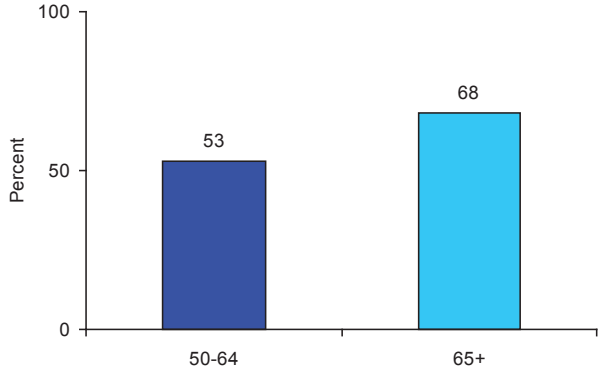


Figure 5. Percent of Adults age 50+, Who Had a Fecal Occult Blood Test (FOBT) in the Past 2 years, by Sex, Georgia 2004-2008

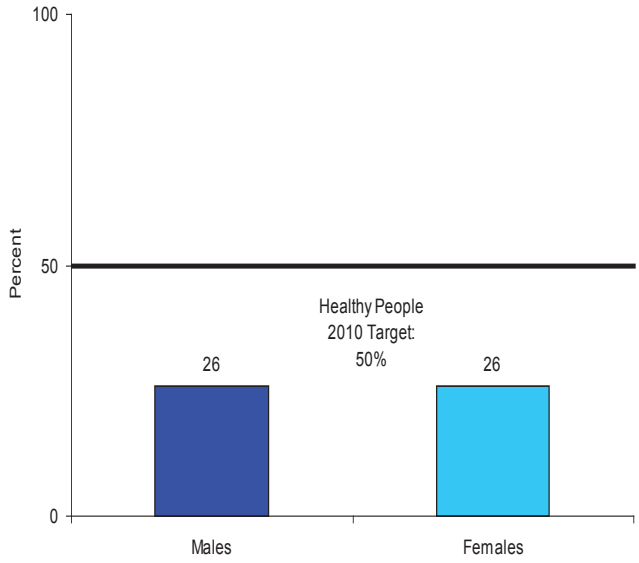
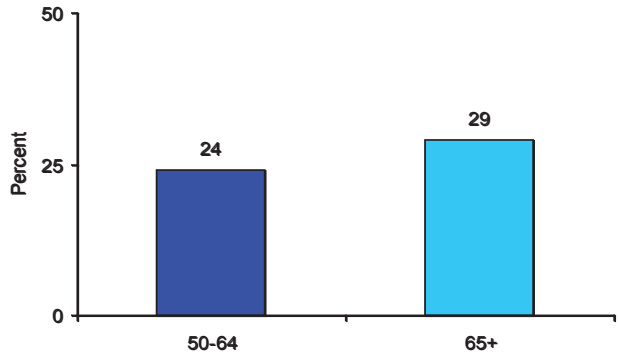


Figure 6. Percent of Adults age 50+, Who Had a Fecal Occult Blood Test (FOBT) in the Past 2 years, by Age Group, Georgia 2004-2008



Incidence and Mortality

- The overall age-adjusted colorectal cancer incidence rate in Georgia is 48 per 100,000 in males and females combined. Males are 39% more likely to be diagnosed with colorectal cancer than females (age-adjusted rate 57/100,000 vs. 41/100,000)
- The overall age-adjusted colorectal cancer mortality rate in Georgia is 17 per 100,000 in males and females combined. Males are 40% more likely to die of colorectal cancer than females (age-adjusted rate 21/100,000 vs. 15/100,000)
- In Georgia and the U.S., non-Hispanic black males and females are more likely than non-Hispanic white males and females to be diagnosed with colorectal cancer.
- Black males are more likely than white males to die of colorectal cancer in Georgia and the U.S. Similarly, black females are more likely than white females to die of this disease
- The overall age-adjusted colon cancer incidence rate in Georgia is 35 per 100,000 in males and females combined. Males are 32% more likely to be diagnosed with colon cancer than females (41/100,000 vs. 31/100,000)
- The overall age-adjused colon cancer mortality rate in Georgia is 14 per 100,000 in males and females combined. Males are 42% more likely to die from colon cancer than females (17/100,000 vs. 12/100,000)

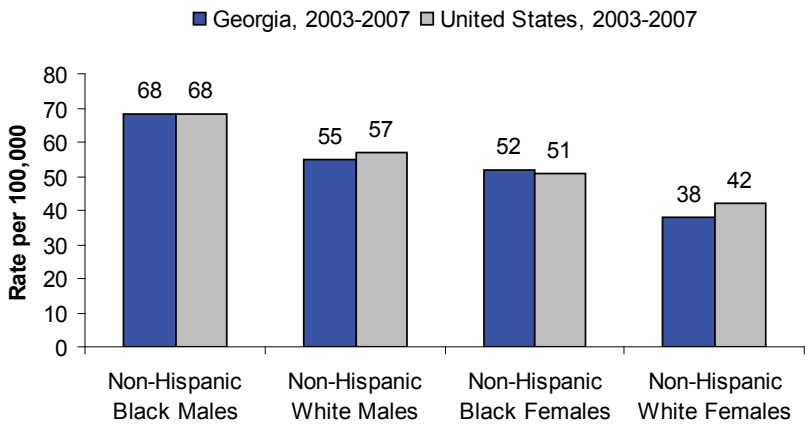


Figure 7. Age-adjusted Incidence Rate by Race and Sex, 2003-2007

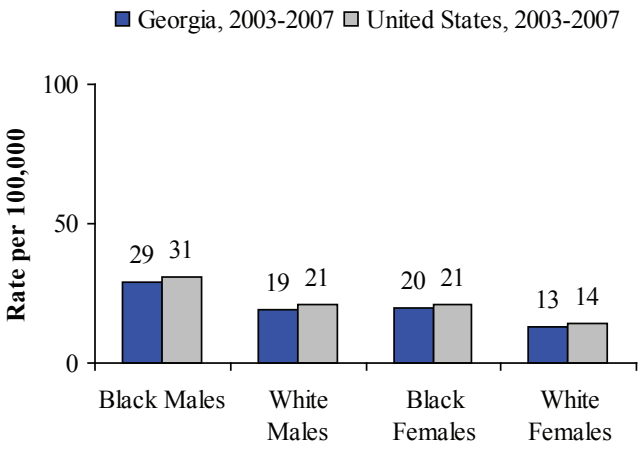


Figure 8. Age-adjusted Mortality Rate by Race and Sex, 2003-2007

Causes and Risk Factors

A risk factor is anything that increases the chance of getting a disease such as cancer. Different cancers have different risk factors. Although it is hard to measure the contribution of a risk factor or know the exact cause of precancerous polyps or cancer, some factors may increase the risk of colorectal cancer development. However, some individuals develop colorectal cancer in the absence of any apparent risk factors.

Lifestyle-Related Risk Factors

Diet: A diet high in red meats (beef, lamb, or liver), processed meats, and animal fat, or low in calcium, fiber, and folate may increase the risk of developing colorectal cancer. Also, cooking meats at high temperatures such as frying, grilling, or broiling may increase cancer risk. Diets high in vegetables and fruits have been linked with a decreased risk of colorectal cancer. More research is needed to better understand how diet affects colorectal cancer risk

Physical inactivity: There is a greater chance of developing colorectal cancer if a person is not physically active. Participating in regular physical activity may reduce this risk. To gain substantial health benefits, the U.S. Department of Health and Human Services recommends 2 hours and 30 minutes of moderate-intensity aerobic physical activity each week (i.e. 30 minutes, 5 times a week) for adults.

Obesity: People who are obese have an increased risk of developing colorectal cancer and an increased risk of dying of colorectal cancer when compared to people who are considered to be at normal weight.

Smoking: Long term smokers are more likely than non-smokers to develop and die from colorectal cancer.

Alcohol consumption: Heavy use of alcohol may increase the risk of developing colorectal cancer. The American Cancer Society recommends that alcohol use should be limited to no more than 2 drinks per day for men and 1 drink per day for women.

Diabetes: People with Type 2 diabetes have an increased risk of developing colorectal cancer. They may also have a less favorable prognosis after diagnosis.

Risk Factors You Cannot Change

Age: The risk of developing colorectal polyps and cancer increase with age. More than 90% of people diagnosed with colorectal cancer are older than 50.

Family history: Parents, siblings, and children of a person who has had colorectal cancer or adenomatous polyps are more likely to develop colorectal cancer. The risk increases if any first-degree relative is affected at a young age or if more than one first-degree relative is affected. Cancers diagnosed frequently within the same family may also be due to inherited genes, shared exposure to environmental carcinogens, diet, or lifestyle factors.

Inherited syndromes: Certain genetic syndromes can increase the risk of developing colorectal cancer. These syndromes cause 5%-10% of all colorectal cancers. The 2 most common syndromes are familial adenomatous polyposis (FAP) and hereditary non-polyposis colorectal cancer (HNPCC). People with FAP develop hundreds or thousands of polyps in their colon and rectum in their teens or early adulthood. Cancer may develop in these polyps as early as age 20. Similar to FAP, HNPCC develops when people are relatively young. However, individuals with HNPCC have fewer polyps and develop colorectal cancer at an average age of 44.

Racial and ethnic background: African Americans have the highest colorectal cancer incidence and mortality rates of all racial groups in the United States. The reason for this is not yet understood.

Personal history of colorectal cancer or polyps: A person who has had colorectal cancer is more likely to develop new cancers in other areas of the colon or rectum. Some types of polyps, such as adenomatous polyps and hyperplastic polyps increase the risk of colorectal cancer.

Personal history of bowel disease: Inflammatory Bowel Disease (IBD), which includes Ulcerative Colitis and Crohn's disease, is a condition in which the colon is inflamed over a long period of time. People with IBD have an increased risk of developing colorectal cancer and should be screened for colorectal cancer on a more frequent basis.

Prevalence of Behavioral Risk Factors

Table 1: Prevalence (%) of Colorectal Cancer Risk Factors, Behavioral Risk Factor Surveillance System (BRFSS), 2009						
	Georgia			United States		
Risk Factors	All	Males	Females	All	Males	Females
Obesity	28	28	27	27	29	26
Smoking	18	20	16	18	20	17
Physical Inactivity	24	21	27	24	22	26
Diabetes	10	10	9	8	9	8

According to the Georgia 2009 Behavioral Risk Factor Surveillance System (Table1):

- The prevalence of obesity in males and females is similar
- Males are more likely to be current smokers than females, however this difference is not significant
- Females are significantly more likely to be physically inactive than males
- The prevalence of diabetes is similar in males and females

Symptoms

In the early stages of colorectal cancer, individuals may not have any symptoms. Symptoms usually appear when the disease has advanced. Signs and symptoms of colorectal cancer include:

- A change in bowel habits such as diarrhea, constipation, or narrowing of the stool that lasts for more than a few days
- A feeling that the bowel does not empty completely
- Rectal bleeding or blood in the stool
- Persistent cramping or abdominal pain
- Weakness and fatigue
- Unexplained weight loss

Other conditions such as hemorrhoids and inflammatory bowel (IBD) disease may also have symptoms that mimic colorectal cancer. If you have any of the above symptoms, it is very important to talk to your doctor because it could be a sign of a serious medical condition such as colorectal cancer.

Leading Causes of Cancer Incidence and Mortality

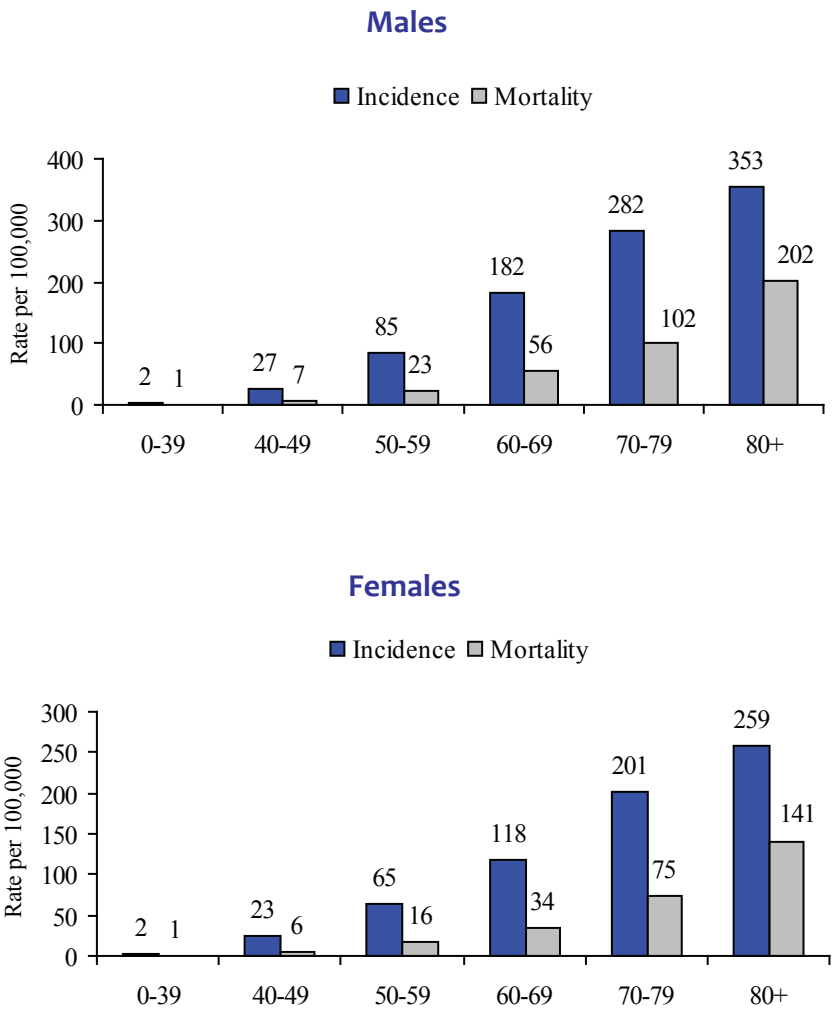
Table 2: Leading Causes of Cancer Incidence and Mortality, Georgia 2003-2007			
Top 5 Causes of Cancer Incidence		Top 5 Causes of Cancer Mortality	
Males	Females	Males	Females
Prostate	Breast	Lung & bronchus	Lung & Bronchus
Lung & Bronchus	Lung & Bronchus	Prostate	Breast
Colorectal	Colorectal	Colorectal	Colorectal
Bladder	Uterus	Pancreas	Pancreas
Melanoma	Melanoma	Leukemia	Ovary

Colorectal cancer is the third most commonly diagnosed cancer and cause of cancer death among males and females in Georgia.

Pictured is the Super Colon, which is a 20 foot replica of the human colon. Participants walking through the Super Colon are able to see what healthy colon tissue, non-malignant diseases (i.e. Crohn's disease and colitis), polyps, and different stages of colorectal cancer looks like.

Age at Diagnosis

Figure 9. Age-specific Colorectal Cancer Incidence and Mortality Rate by Sex, Georgia 2003-2007



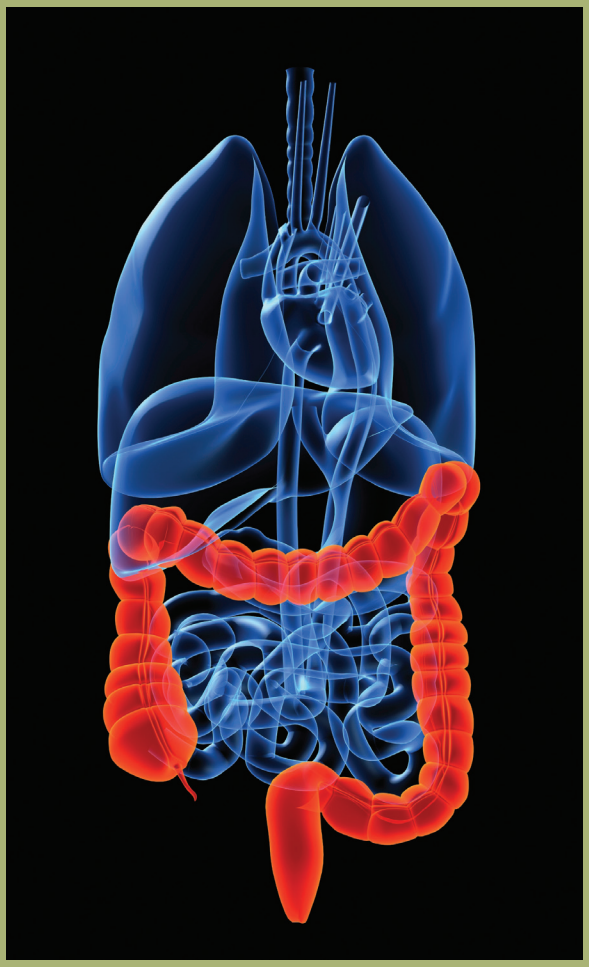
- Males have higher incidence and mortality rates of colorectal cancer in all age groups
- The incidence and mortality rates of colorectal cancer increase with age for both males and females (Figure 9)
- The risk of being diagnosed with and dying from colorectal cancer increases sharply between ages 50-59 years for both males and females
- In both men and women less than 40 years of age, less than 65 cases and 15 deaths due to colorectal cancer occur each year

Spotlight:

In July 2010, CDC Awarded Georgia a Grant for Colorectal Cancer Screening

The Centers for Disease Control and Prevention has awarded the state of Georgia a grant to provide colorectal cancer education and screening services for low-income residents age 50 years and older, who are underinsured or uninsured. The goal is to increase population-level screening among all persons age 50 years and older and to reduce the incidence and mortality of colorectal cancer, and health disparities in colorectal cancer screening.

According to Laura Seeff, M.D., medical director of CDC's colorectal cancer screening program, "This screening program has tremendous potential to address the disparities that exist in colorectal cancer screening and to save lives."



Treatment

Different types of treatment are available for patients with colorectal cancer. The choice of treatment depends on a variety of factors such as age, overall health, and type and stage of colorectal cancer. The three standard types of treatment used in colorectal cancer are: surgery, radiation therapy, and chemotherapy. Depending on the stage of cancer, multiple treatment modalities may be used at the same time or one after another.

Surgery This is the main treatment for early stage colorectal cancer. If the cancer is found at an early stage, the doctor may remove it without cutting the abdomen by using a colonoscope (a tube that is inserted through the rectum). This procedure is called a local excision. If cancerous polyps are found and removed, the procedure is called a polypectomy. If the polyp is larger, the doctor performs a colectomy which removes a section of the large intestine on either side of the cancer including some lymph nodes and connects the healthy parts of the intestine together. If the doctor is not able to connect the ends of the colon back together, an opening is made in the abdomen and a bag is placed over the opening to collect waste. This procedure is called a colostomy.

Radiation Therapy This treatment uses high energy x-rays to kill cancer cells. There are two types of radiation therapies: external radiation and internal radiation. External radiation comes from a machine and is directed at the cancer. During internal radiation therapy, radioactive material is placed directly into or near the cancer. Radiation therapy can be used to kill any cancer cells remaining that might not have been completely removed by surgery.

Chemotherapy This treatment uses drugs to kill cancer cells. Systemic chemotherapy uses drugs that are injected into a vein or taken by mouth. These drugs enter the bloodstream and reach cancer cells throughout the body. In regional chemotherapy, drugs are placed directly into an artery leading to a part of the body where the tumor is located.

Adjuvant and Neoadjuvant Chemotherapy Adjuvant chemotherapy is used after surgery when there is no evidence of cancer remaining but there is a chance the cancer will return. Neoadjuvant chemotherapy is used for rectal cancers before surgery (along with radiation), to shrink the tumor size. Chemotherapy helps to shrink tumors, relieve symptoms from the tumor, and extend survival for some patients.

Stages of Colorectal Cancer

Staging is a standardized way to summarize information about how far a cancer has spread and helps determine a treatment plan. The TNM staging system is used at hospitals to guide treatment options, however, many central cancer registries, such as The Georgia Comprehensive Cancer Registry and the National Program of Cancer Registries (NPCR) use SEER summary stage for surveillance purposes, categorizing cancer into these groups:

Localized: Cancer that is confined to the organ where it started

Regional: Cancer that has spread from its primary site to nearby lymph nodes or organs

Distant: Cancer that has spread from its primary site to distant organs or lymph nodes. Also referred to as distant metastasis

Incidence of Colorectal Cancer by Stage of Disease

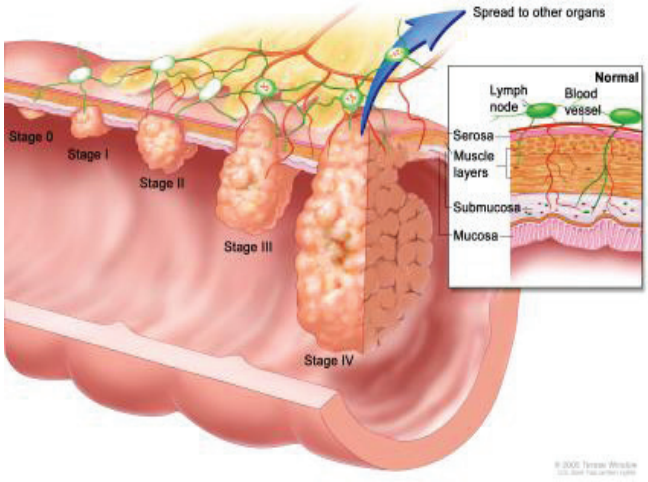
Table 3: Percent of Colorectal Cancer Found by Stage of Disease, Sex and Race, Georgia (2003-2007) and United States (1999-2006)

	Localized (%)	Regional (%)	Distant (%)
US Males	40	37	19
GA Males	37	34	18
US Females	38	37	19
GA Females	38	33	17
US Black Males	35	35	25
GA Black Males	35	31	22
US White Males	40	37	19
GA White Males	38	34	17
US Black Females	35	35	24
GA Black Females	38	30	20
US White Females	38	38	19
GA White Females	38	34	16

The distribution of stage at diagnosis for colorectal cancer patients in Georgia is similar to colorectal cancer patients in the U.S.

*Unknown/unstated category is not shown

Figure 10. Stages of Colorectal Cancer



The TNM system is based on the size of the tumor (T), the spread of the tumor to the lymph nodes (N), and the presence of distant metastasis (M). The TNM system is then used to determine the stage of the cancer. The stages of colorectal cancer are:

Stage 0: The cancer is found only in the innermost lining of the colon or rectum, also known as carcinoma in situ.

Stage I: The tumor has grown into the inner wall of the colon or rectum. The tumor has not grown through the wall.

Stage II: The tumor extends more deeply into or through the wall of the colon or rectum. It may have invaded nearby tissue, but cancer cells have not spread to the lymph nodes.

Stage III: The cancer has spread to nearby lymph nodes, but not to other parts of the body.

Stage IV: The cancer has spread to other parts of the body, such as the liver or lung. It may or may not have spread to nearby lymph nodes.

Survival

Early detection saves lives. Individuals diagnosed at an early stage (localized) have a better chance of surviving five years after diagnosis than those diagnosed at a later stage (Figures 11 and 12).

Figure 11. Colorectal Cancer Five-Year Survival Rates by Sex and Stage, United States, 1999-2006

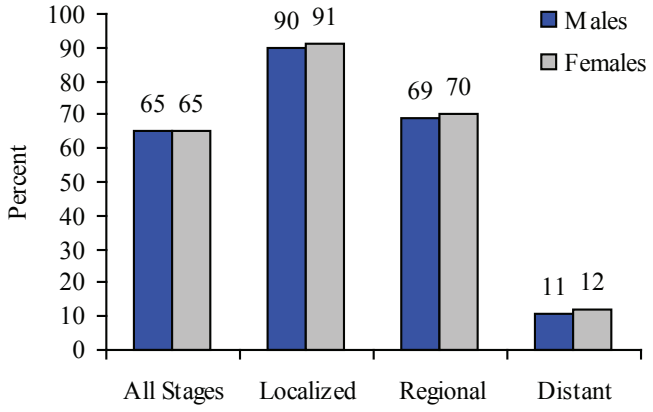
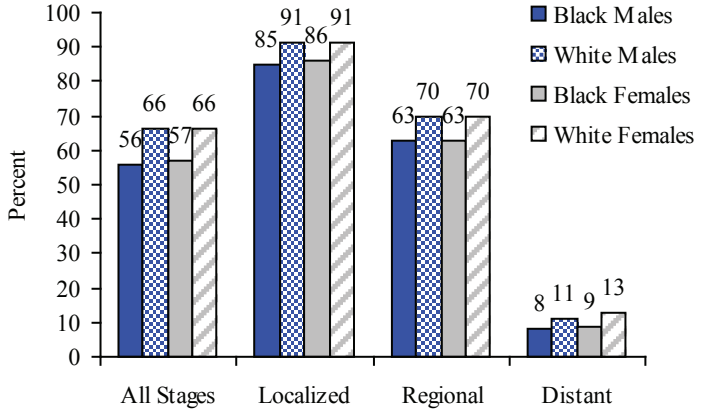


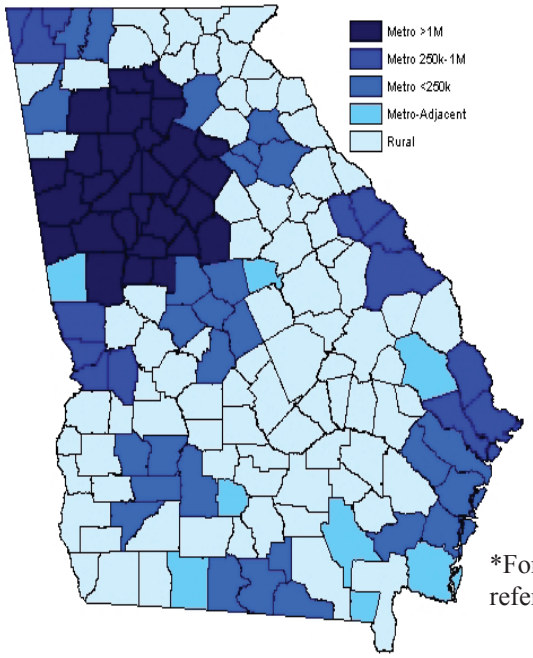
Figure 12. Colorectal Cancer Five-Year Survival Rates by Sex, Race, and Stage, United States, 1999-2006



- Overall, the five-year survival rate for the United States is 65% for both males and females at all stages. The five-year survival rate is highest in both males and females when detected at the localized stage
- The five-year survival rates for white males and white females for all stages are higher than those for black males and black females
- Five-year survival rates drop significantly for individuals when diagnosed at the distant stage

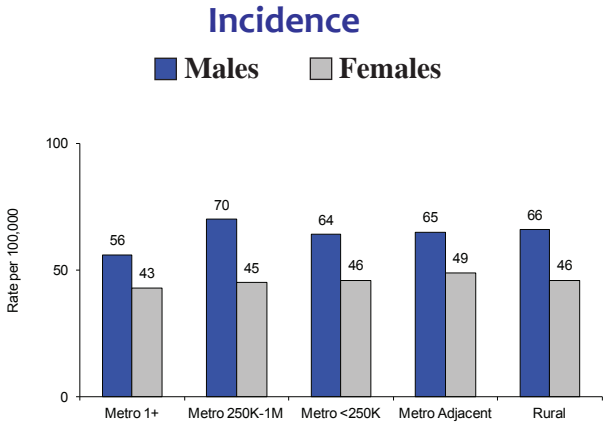
Urban vs. Rural Georgia

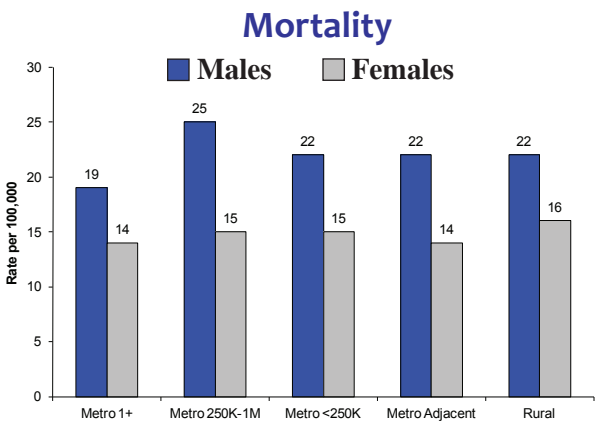
Figure 13. Metro, Metro Adjacent, and Rural Counties, Georgia 2003



*For a more specific description, please refer to the technical notes

Figure 14. Age-Adjusted Colorectal Cancer Incidence and Mortality Rate by Geography and Sex, Georgia, 2003-2007

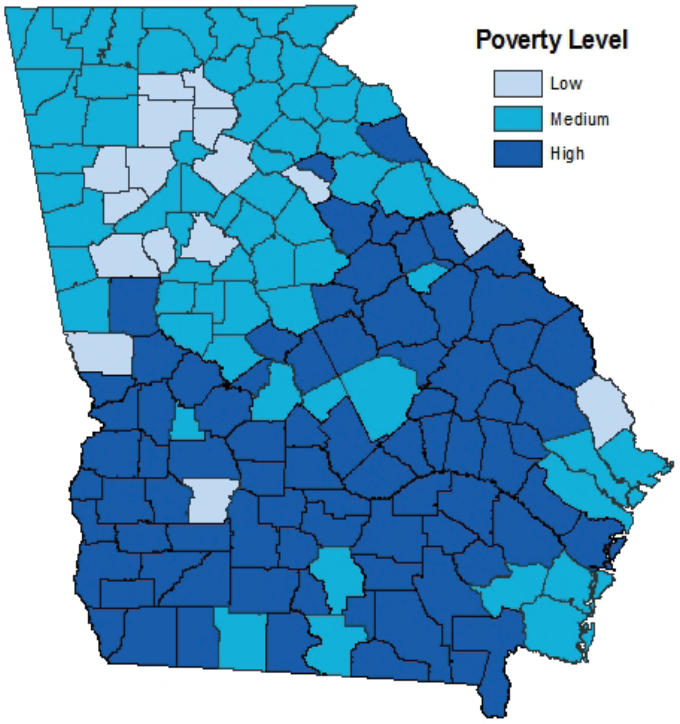




- Age-adjusted colorectal cancer incidence and mortality rates are consistently higher among males than among females regardless of geographical area
- Males living in metropolitan counties (250,000 to 1 million people) have the highest incidence and mortality rates. Males living in metropolitan counties (1 million or more) have the lowest incidence and mortality rates.
- Males living in metropolitan counties with a population of 1 million or more have significantly lower incidence rates than males living in all other counties
- Females living in metro adjacent and rural counties have significantly higher incidence rates than females living in metro counties with a population of 1 million or more
- Mortality rates for males living in metropolitan counties (250,000 to 1 million) are significantly higher than males living in metropolitan counties with a population of 1 million or more
- Mortality rates for females are similar among all geographical areas

Associations between Poverty and Geography

Figure 15. Counties by Poverty Level, Georgia, 2005



*For a more specific description, please refer to the technical notes

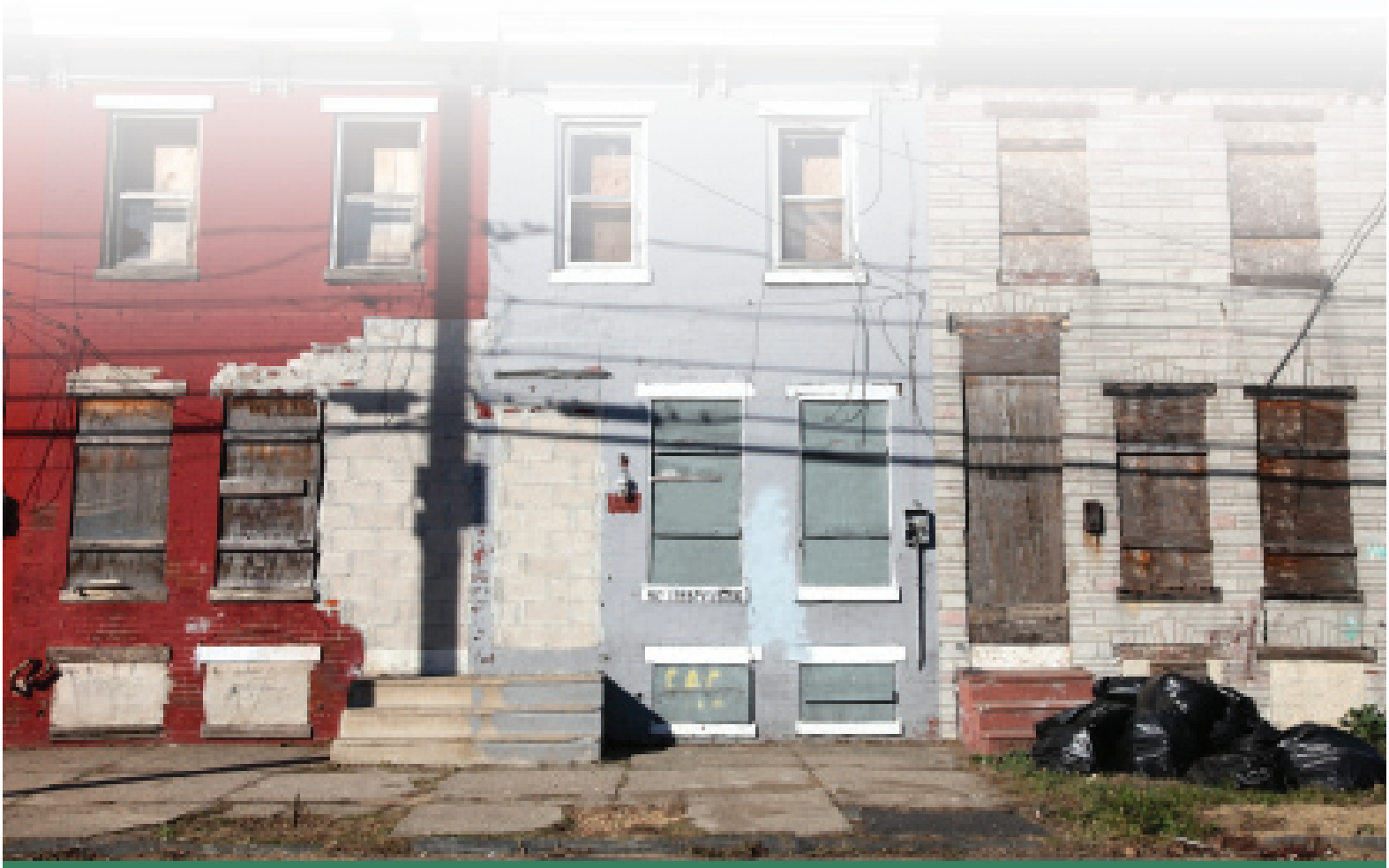


Table 4. Age-Adjusted Incidence Rate, by Sex, Geography and Poverty, Georgia 2003-2007						
	Level of Poverty					
	Males			Females		
Metro Level	Low	Medium	High	Low	Medium	High
Metro 1M+	55	57	79	42	43	39
Metro 250K-1M	58	67*	77*	39	44	47
Metro <250K	60	63*	66*	41	46	47
Metro Adjacent	-	64	65*	-	51*	47
Rural	-	66*	66*	-	48*	45

- Males have consistently higher incidence rates than females (Table 4)
- Males living in low poverty metro counties (1 million or more) have significantly higher incidence rates than females living in the same area
- Incidence rates are highest in males living in high poverty metropolitan counties (1 million or more)
- The lowest incidence rates occur in females living in high poverty metropolitan counties (1 million or more) and low poverty metropolitan counties (250,000 to 1 million)
- Among males, regardless of geographical region, incidence rates increase as poverty level increase
- In low poverty counties, incidence rates increase as metro level moves from large metropolitan counties to metro (less than 250,000) counties among males
- Incidence rates for females living in medium poverty counties increase as metro level moves from large metropolitan counties to metro adjacent counties
- Females living in medium poverty rural counties and medium poverty metro adjacent counties have significantly higher incidence rates than females living in low poverty metro counties (1 million or more)

* Rate is statically significantly different
** Less than 20 cases
- There were no counties classified as low poverty metro adjacent or low poverty rural

Table 5. Age-Adjusted Incidence Rate, Males, by Race, Geography and Poverty, Georgia 2003-2007						
	Level of Poverty					
	Black			White		
Metro Level	Low	Medium	High	Low	Medium	High
Metro 1M+	60	66	140*	57	54	**
Metro 250K-1M	112	85*	92*	54	63	69*
Metro <250K	**	76*	85*	59	63*	59
Metro Adjacent	-	61*	80	-	65	60
Rural	-	78*	73*	-	65*	65*

- Black males have consistently higher incidence rates than white males, except black males living in medium poverty metro adjacent counties (Table 5)
- Incidence rates for black males and white males living in low poverty metro counties (1 million or more) are similar
- Incidence rates for black males living in high poverty counties decrease as metro level moves from large metropolitan counties to rural counties
- Incidence rates for white males living in medium poverty counties increase as metro level moves from large metropolitan to rural counties
- Incidence rates are significantly higher for black males in metro (1 million or more, 250,000 to 1 million, and less than 250,000) and rural counties living in high poverty, metro (250,000 to 1 million, less than 250,000, and adjacent) and rural counties living in medium poverty compared to black males living in low poverty metro counties (1 million or more)
- Incidence rates are significantly higher for white males in metro (250,000 to 1 million) and rural counties living in high poverty and metro (less than 250,000) and rural counties living in medium poverty compared to white males living in low poverty metro counties (1 million or more)

* Rate is statically significantly different
** Less than 20 cases
- There were no counties classified as low poverty metro adjacent or low poverty rural

Table 6. Age-Adjusted Incidence Rate, Females, by Race, Geography and Poverty, Georgia 2003-2007						
	Level of Poverty					
	Black			White		
Metro Level	Low	Medium	High	Low	Medium	High
Metro 1M+	49	54	**	41	38	**
Metro 250K-1M	**	62*	57	35	39	41
Metro <250K	**	53	57	38	45	40
Metro Adjacent	-	66*	60	-	46	44
Rural	-	63*	54	-	47*	41

- Black females have consistently higher incidence rates than white females (Table 6)
- Black females living in low poverty metro counties (1 million or more) have significantly higher incidence rates than white females living in the same area
- The highest incidence rates occur in black females living in medium poverty metro adjacent counties
- Incidence rates for white females living in medium poverty levels increase as metro level move from large metropolitan to rural counties
- Incidence rates for both black and white females living in medium poverty rural counties are significantly higher than their counterparts living in low poverty metro counties (1 million or more)
- Additionally, black females living in medium poverty metro counties (250,000- 1 million and adjacent) have significantly higher incidence rates than black females living low poverty metro counties (1 million or more)

* Rate is statically significantly different
** Less than 20 cases
- There were no counties classified as low poverty metro adjacent or low poverty rural

Table 7. Age-Adjusted Mortality Rate, by Sex, Geography and Poverty, Georgia 2003-2007						
	Level of Poverty					
	Males			Females		
Metro Level	Low	Medium	High	Low	Medium	High
Metro 1M+	19	19	**	14	15	**
Metro 250K-1M	23	25*	26*	9	15	16
Metro <250K	**	22	23	**	14	17
Metro Adjacent	-	23	20	-	15	13
Rural	-	19	25*	-	16	15

- Males have consistently higher mortality rates than females (Table 7)
- Mortality rates for males living in low poverty metro counties (1 million or more) are significantly higher than females living in the same area
- Among males, the highest mortality rates occur in high poverty metropolitan counties (250,000 to 1 million). The lowest mortality rates occur in low and medium poverty metropolitan counties (1 million or more) and medium poverty rural counties
- Among females, the highest mortality rates occur in high poverty metropolitan counties (less than 250,000). The lowest mortality rates occur in low poverty metropolitan counties (250,000 to 1 million).
- Mortality rates for males living in medium and high poverty metropolitan counties (250,000 to 1 million) and high poverty rural counties are significantly higher than males living in large low poverty metro counties

Table 8. Age-Adjusted Mortality Rate, Males, by Race, Geography and Poverty, Georgia 2003-2007						
	Level of Poverty					
	Black			White		
Metro Level	Low	Medium	High	Low	Medium	High
Metro 1M+	26	27	**	19	17	**
Metro 250K-1M	**	29	35	23	24	22
Metro <250K	**	29	33	**	21	19
Metro Adjacent	-	35	23	-	20	19
Rural	-	23	32	-	18	22

- Black males have consistently higher mortality rates than white males (Table 8)
- The mortality rates for black males and white males living in low poverty metro counties (1 million or more) are similar
- Black males living in high poverty metropolitan counties (250,000 to 1 million) and medium poverty metro adjacent counties have the highest mortality rates
- White males living in medium poverty metro counties (1 million or more) have the lowest mortality rates
- Regardless of geographic location or poverty level, mortality rates for black males and white males are similar to their counterparts living in low poverty metro counties (1 million or more)

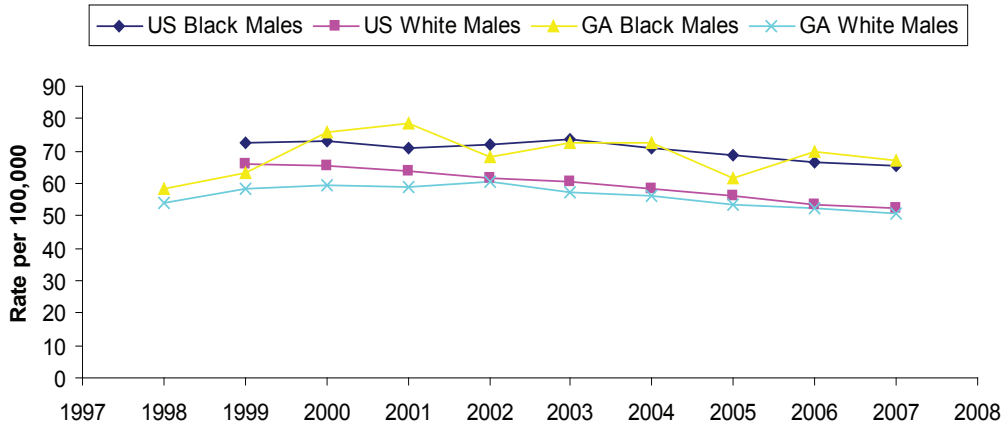
Table 9. Age-Adjusted Mortality Rate, Females, by Race, Geography and Poverty, Georgia 2003-2007						
	Level of Poverty					
	Black			White		
Metro Level	Low	Medium	High	Low	Medium	High
Metro 1M+	21	21	**	13	12	**
Metro 250K-1M	**	21	19	**	13	13
Metro <250	**	23	22	**	13	14
Metro Adjacent	-	23	18	-	11	12
Rural	-	21	20	-	15	13

- Black females have consistently higher mortality rates than white females (Table 9)
- Black females living in low poverty metro counties (1 million or more) have significantly higher mortality rates than white females living in the same area
- Black females living in medium poverty metro (less than 250,000) and metro adjacent counties have the highest mortality rates
- White females living in medium poverty metro adjacent counties have the lowest mortality rates
- Regardless of geographic location or poverty level, mortality rates for black females and white females are similar to their counterparts living in low poverty metro counties (1 million or more)

* Rate is statically significantly different
** Less than 20 cases
- There were no counties classified as low poverty metro adjacent or low poverty rural

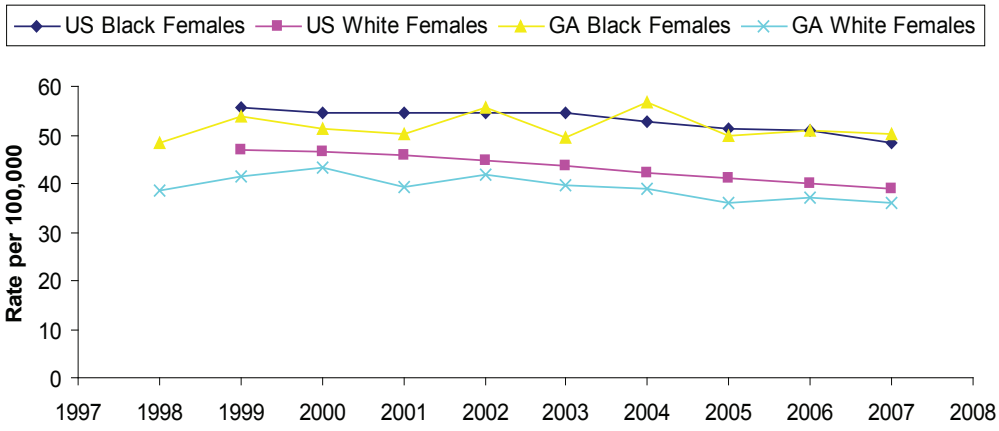
Incidence Trends

Figure 16. Age-adjusted Colorectal Cancer Incidence Rates among Males by Race, Georgia (1998-2007) vs. United States (1999-2007)



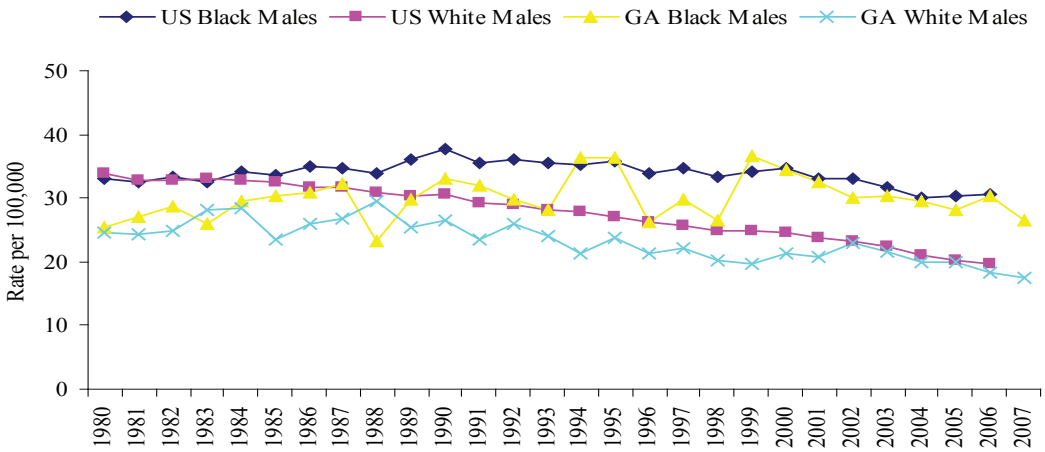
- White males generally have lower incidence rates than black males, in both Georgia and the U.S.
- Georgia incidence rates are slightly lower than the U.S. incidence rates for black and white males
- Among U.S. black males, incidence rates declined by 1.2% per year during 1999 to 2007
- Among black males in Georgia, incidence rates increased from 1998 to 2001. Since 2001, the rates have been declining slightly
- Among U.S. white males, incidence rates declined by 2.4% per year during 1999 to 2007
- Incidence rates for white males in Georgia increased from 1998-2002. From 2002 to 2007, incidence rates have significantly declined at 3.7% per year

Figure 17. Age-adjusted Colorectal Cancer Incidence Rates among Females by Race, Georgia (1998-2007) vs. United States (1999-2007)



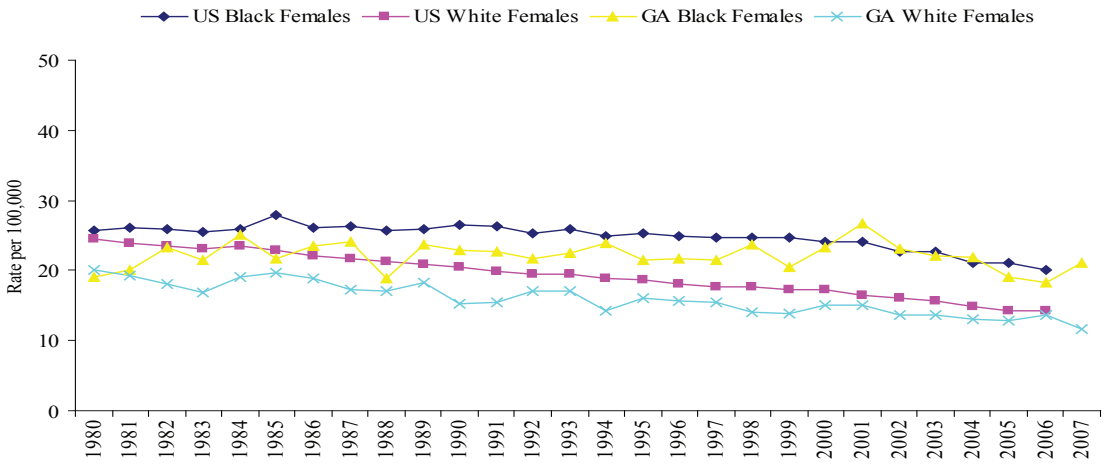
- White females have consistently lower incidence rates than black females, in both Georgia and the U.S.
- Georgia incidence rates are consistently lower than the U.S. incidence rates for black and white females
- Incidence rates for black females in the U.S. declined by 1.5% from 1999-2007
- Among Georgia black females, incidence rates have been stable since 1998
- Incidence rates for white females in the U.S. declined by 2% from 1999-2007
- Among Georgia white females, incidence rates significantly declined at 1.5% during 1998-2007

Figure 18. Age-adjusted Colorectal Cancer Mortality Rates among Males by Race, Georgia (1980-2007) vs. United States (1980-2006)



- Mortality rates are generally lower among white females than black females, in both Georgia and the U.S.
- Georgia mortality rates are consistently lower than the U.S. incidence rates for black and white females
- Since 2001, mortality rates for U.S. black females have significantly declined by 3.5% per year
- Among black females in Georgia, mortality rates were stable from 1980 to 2007
- Among U.S. white females, mortality rates declined significantly from 1980 to 2001 and 2001 to 2006 (1.8% and 3.4% per year respectively)
- Since 1980, mortality rates have declined significantly by 1.6% per year among white females in Georgia

Figure 19. Age-adjusted Colorectal Cancer Mortality Rates among Females by Race, Georgia (1980-2007) vs. United States (1980-2006)



- Mortality rates are generally lower among white females than black females, in both Georgia and the U.S.
- Georgia mortality rates are consistently lower than the U.S. incidence rates for black and white females
- Since 2001, mortality rates for U.S. black females have significantly declined by 3.5% per year
- Among black females in Georgia, mortality rates were stable from 1980 to 2007
- Among U.S. white females, mortality rates declined significantly from 1980 to 2001 and 2001 to 2006 (1.8% and 3.4% per year respectively)
- Since 1980, mortality rates have declined significantly by 1.6% per year among white females in Georgia

Mortality Trends

Colorectal Cancer Resources:

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

American Cancer Society
Telephone: 1-800-ACS-2345 (1-800-227-2345)
Website: www.cancer.org

Centers for Disease Control and Prevention
Telephone: 1-800-CDC-INFO
Website: www.cdc.gov

National Cancer Institute, Cancer Information Service
Telephone: 1-800-4-CANCER (1-800-422-6237)
Website: www.cancer.gov

National Colorectal Cancer Research Alliance
Telephone: 1-213-481-3101
Website: www.eifoundation.org/programs/eifs-national-colorectal-cancer-research-alliance

Cancer Research and Prevention Foundation
Telephone: 1-800-227-2732
Website: www.preventcancer.org

Cancer Control Planet
Website: http://cancercontrolplanet.cancer.gov/

Colon Cancer Alliance
Telephone: 1-877-422-2030
Website: www.ccalliance.org

Georgia Comprehensive Cancer Registry
Telephone: 404-657-6611
Website: http://health.state.ga.us/programs/gccr/index.asp

Technical Notes

Definitions:

Age-Adjusted Rate is calculated in a manner that minimizes the effects of differences in age composition when comparing rates derived from populations with different age structures. It is expressed per 100,000 population.

Cancer Incidence Rate is a measure of the development of new cancer cases in a population within a specified period of time. It is expressed as a rate per 100,000 population.

Cancer Mortality Rate is defined as the number of deaths, due to cancer, occurring in a specified population during a specified period of time. It is also expressed as a rate per 100,000 population.

Average Risk Population includes most people who develop colorectal cancer and have no identifiable risk factors. People at increased risk of colorectal cancer consist of those with personal or family history of colorectal cancer, those with colorectal cancer symptoms or those who already have inflammatory bowel disease or certain genetic conditions.

Obesity is defined as a body mass index (BMI) between 30.0 and 99.8.

Smoking is defined as an adult smoking at least 100 cigarettes in their lifetime and is currently smoking.

Physical Inactivity is defined as not participating in any physical activities within last 30 days.

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 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

Poverty Codes: The Georgia Comprehensive Cancer Registry categorizes the poverty percent into three groups:
Low poverty areas = less than 10% of county's population is below United States poverty level
Medium poverty areas = 10%-19% of county's population is below United States poverty level
High poverty areas = 20% or more of county's population is below United States poverty level

Data Sources:

The number of new cases and incidence rates for the state of Georgia were obtained from the Georgia Department of Public Health, Georgia Comprehensive Cancer Registry.

Incidence rates for the United States were obtained from the North American Association of Central Cancer Registries (NAACCR).

The number of deaths and mortality rates for the State of Georgia were obtained from the Georgia Department of Public Health, Vital Records Program.

Mortality rates for the United States were obtained from the North American Association of Central Cancer Registries (NAACCR) and from the Surveillance, Epidemiology, and End Results (SEER) program, National Cancer Institute. The mortality rates for the United States trend analysis were obtained from the National Center for Health Statistics, Centers for Disease Control and Prevention (CDC).

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

Prevalence of risk factors, such as obesity, smoking, physical inactivity, and diabetes (for the year 2009) and screening for colorectal cancer (average of years 2004, 2005, 2006, 2008) in Georgia were analyzed from the Behavioral Risk Factor Surveillance System (BRFSS), Epidemiology Program, Georgia Department of Public Health. National data for the prevalence of similar risk factors was retrieved from Centers for Disease Control and Prevention at www.cdc.gov/brfss/

Clinical information on colorectal cancer was retrieved from the Mayo Clinic at www.mayoclinic.com , Colorectal Cancer Medline Plus at www.nlm.nih.gov/medlineplus, National Cancer Institute at www.cancer.gov , and the American Cancer Society at www.cancer.org.

Methods:

Incidence rates were calculated per 100,000 population and age-adjusted by the direct method to the 2000 US standard population. Except where calculated to show trends, the incidence rates are five-year average annual rates for the period 2003 through 2007. Incidence rates are calculated for the non-Hispanic black and non-Hispanic white populations for Georgia. Incidence data were coded using ICD-O-3 codes. The ICD-O-3 codes used for colorectal cancer are C180:C209, C260.

Mortality rates were calculated per 100,000 population and age-adjusted by the direct method to the 2000 US standard population. Except where calculated to show trends, the mortality rates are five-year average annual rates for the period 2003 through 2007. Mortality data were coded using ICD-9 codes (1980-1998) and ICD-10 codes (1999-2007). The ICD-9 codes for colorectal cancer are 153.0–154.1, 159.0, while the ICD-10 codes for colorectal cancer are C180:C209, C260.

The estimated number of cases for 2009 was calculated by multiplying age-specific incidence rates for 2003-2007 by age-specific population projections for 2009. The estimated number of deaths for 2009 was calculated by multiplying age-specific mortality rates for 2003-2007 by age-specific population projections for 2009. Population projections were retrieved from the U.S. Census Bureau.

Trend analysis was performed using the Joinpoint Regression Program Software developed and maintained by the National Cancer Institute. Incidence and mortality rates for the United States used in the trend analysis were obtained from the CDC Wonder Database.

The Rural-Urban classification of Georgia counties was based on the 2003 Rural-Urban Continuum Codes from the United States Department of Agriculture, Economic Research Service. Information about the Rural-Urban Continuum Codes can be retrieved from

http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/.

Poverty data for Georgia was retrieved from the U.S Census Bureau's Small Area Income and Poverty Estimates (SAIPE) Program at http://www.census.gov/did/www/saipe/.