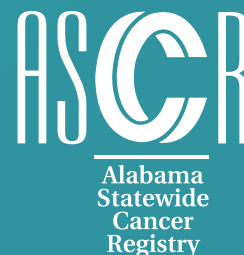




Alabama Cancer  
Statistics 2022:

FOCUS ON  
CERVICAL  
CANCER







Scott Harris, M.D., M.P.H.  
STATE HEALTH OFFICER

September 2022

Dear Colleagues:

I am pleased to present the *Alabama Cancer Statistics: Focus on Cervical Cancer 2022* report produced by the Cancer Prevention and Control Division.

Cervical cancer is both preventable and highly survivable if caught in the earliest stages of the disease. Unfortunately, Alabama is significantly higher in both cervical cancer incidence and mortality rates when compared to the U.S. In fact, Alabama is consistently among the top five states for the highest rates of cervical cancer incidence and mortality rates. Fortunately, HPV vaccination can eliminate the vast majority of cervical cancer cases. Increasing HPV vaccination rates along with increasing access to appropriate screening could greatly reduce the number of women being diagnosed with cervical cancer as well as the number of women that die from cervical cancer in Alabama.

It is my hope that the information presented in this report will assist the partners, agencies, and organizations involved in cervical cancer prevention efforts throughout the state as we continue to work toward reducing Alabama's cervical cancer burden.

Sincerely,

Scott Harris, M.D., M.P.H.  
State Health Officer

SH/JTG

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Visit the Alabama Statewide Cancer Registry (ASCR) website at [alabamapublichealth.gov/ascr](http://alabamapublichealth.gov/ascr) for additional copies of the *Alabama Cancer Statistics 2022: Focus on Cervical Cancer*

## Cervical Cancer Basic Facts

Cervical cancer is a cancer of the female reproductive system. All women, regardless of race, socio-economic status, education level, place of birth, or residence are at risk of developing cervical cancer. However, not only is cervical cancer curable when found early, it can also be prevented. Despite this, Alabama routinely has one of the highest rates of cervical cancer incidence and mortality - significantly worse than the United States (U.S.). Women are more likely to die in Alabama from cervical cancer than most other states in the nation.<sup>1,2</sup>

### How does cancer occur?

All cells have a life cycle. The deoxyribonucleic acid (DNA) in a cell is what creates and directs the development of new cells. Sometimes a change in the cell's DNA can alter the life cycle of the cell causing cells to grow rapidly and uncontrollably. The growing number of cells do not die and begin to form into tumors. If left unchecked, these tumors continue to grow, break off, and spread (metastasize) to other parts of the body.<sup>3</sup>

### How does cervical cancer occur?

The cervix connects the vagina to the uterus. There are two different types of cells in the cervix, flat squamous cells which line the outer cervix that projects into the vagina and glandular column like cells which line the cervical canal. Squamous cell carcinoma is cancer of the squamous cells. The majority of cervical cancers are squamous cell carcinomas. Adenocarcinoma begins in the glandular cells. The two different types of cancers determine the outcome (prognosis) of the cancer and the types of treatment. It is possible to have both squamous cell carcinoma and adenocarcinoma at the same time.<sup>3,4</sup>

Almost all cervical cancer cases are caused by a viral infection from certain types of *Human*



*Papillomavirus* (HPV). Two types are responsible for at least 70 percent of cancer cases, types 16 and 18.<sup>4</sup>

### Why do you need to be screened for cervical cancer?

By the age of 50, at least four out of five women will have been infected with HPV and 10 percent of women will develop lasting HPV infections, placing them at greater risk of developing cervical cancer. Usually, the body's natural immune system can overcome or end the infection within 2 years. When the body cannot rid itself of the HPV infection, the cancer causing HPV types can linger and turn normal cervical cells into abnormal and then cancerous cells. To determine if you are at risk for cervical cancer due to a lasting HPV

### What is HPV?

HPV is the most common sexually transmitted disease (STD); 85 percent of unvaccinated men and women will be infected with HPV in their lifetime. More than 42 million Americans are currently infected and around 13 million individuals are infected in the U.S. each year.<sup>5</sup>

HPV can be spread through anal, vaginal, and oral sex. The virus can cause:

- In women: cervical, vaginal, and vulvar cancers

- In men: penile cancer
- In women and men: anal and oropharyngeal (back of throat, base of tongue, and/or tonsils) cancers.

The majority of the time, HPV will not have any symptoms. It can take years for cancer to develop after a person has been infected. Most cases of HPV infection will go away on their own; however, some cases will not resolve on their own and will cause cancer.<sup>5</sup>

infection, women should go to their doctor for cervical screening. It is essential to screen for and remove abnormal cells caused by HPV before they can become cancerous.<sup>5</sup> Cancer screening involves taking a sample of cells to determine if HPV, precancerous cells, or cancerous cells are present.

### **What are the risk factors for cervical cancer?**

Almost all cervical cancers are caused by persistent infection with certain types of HPV. However, these infections are common in healthy people with a cervix and only rarely cause cancer.<sup>3</sup> Individuals who begin having sex at an early age, who have had many sexual partners, or male partners who have had many sexual partners, are at increased risk for HPV infection.<sup>3,5</sup> Other risk factors for developing cervical cancer include being immunocompromised, being overweight or obese, using contraceptives long term, having given birth to three or more children, and smoking.<sup>3,5</sup>

### **How can cervical cancer be prevented?**

The best way to prevent cervical cancer is through vaccination. The HPV vaccine protects against the types of HPV that cause over 90 percent of all cervical cancers as well numerous other cancers and diseases.<sup>2,3,5</sup> Routine cancer screenings can prevent cervical cancer by detecting and treating precancerous cells. The recommended screening method is a combination of the Papanicolaou (Pap) test and the HPV test. Screening involves a simple procedure where a small sample of cells is collected from the cervix and examined under a microscope. The HPV test can detect HPV infections associated with cervical cancer as well as identify individuals at risk for adenocarcinoma of the cervix. This type of cervical cancer makes up approximately 30 percent of cases and can be missed by the Pap test.<sup>3</sup> Co-testing with both Pap and HPV tests is recommended.<sup>2,3,5</sup>



### **What are the signs of cervical cancer?**

There may be no physical signs of cervical cancer in the early stages. This is why it is so important for a woman to get screened regularly. If the cancer is caught early or in its precancerous form it can be removed before it spreads. Symptoms of more advanced forms of cervical cancer can include vaginal bleeding after sex, vaginal bleeding between periods or after menopause, watery or bloody vaginal discharge that may be heavy or have a foul odor, and pelvic pain or pain during or after intercourse.<sup>3,5</sup>

# Cervical Cancer Data Section

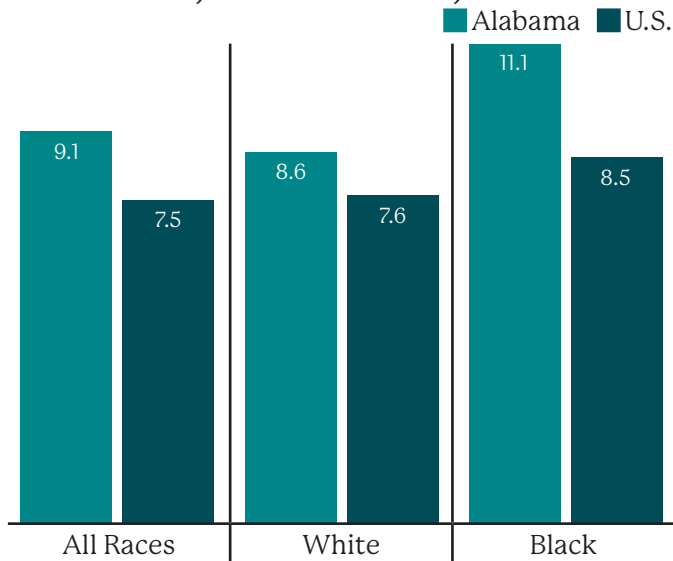
## 2022 Projections

In 2022, an estimated 240 new cases of cervical cancer are expected to occur in Alabama.<sup>3</sup> On average, 33 women die each year from cervical cancer in Alabama.<sup>1</sup>

## Incidence Rates

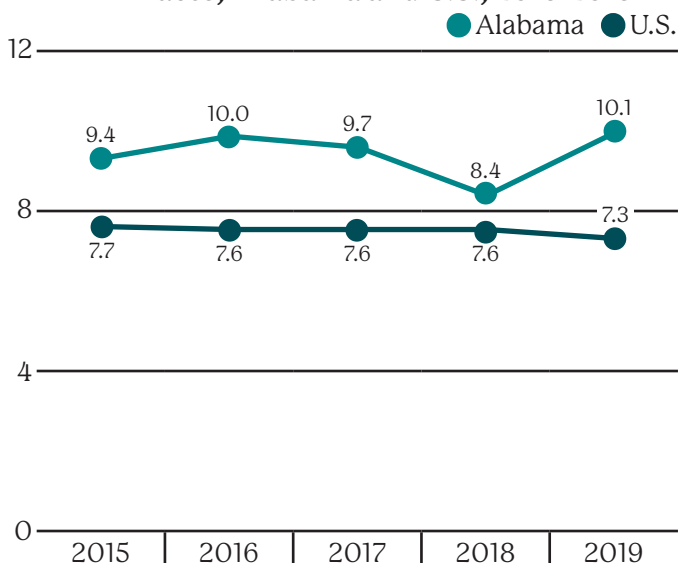
The cervical cancer incidence rate for all races in Alabama is 9.1, which is significantly higher than the U.S. rate of 7.5.<sup>1,6</sup> Black females have a significantly higher incidence rate compared to white females with a rate of 11.1 versus 8.6.<sup>1</sup>

**Figure 1. Cervical Cancer Incidence Rates by Race, Alabama and U.S., 2010-2019**



Malignant only, per 100,000 and age-adjusted to the 2000 U.S. standard population. Sources: ASCR and Surveillance, Epidemiology, and End Results Program (SEER), 2022.

**Figure 2. Cervical Cancer Incidence Trends, All Races, Alabama and U.S., 2015-2019**



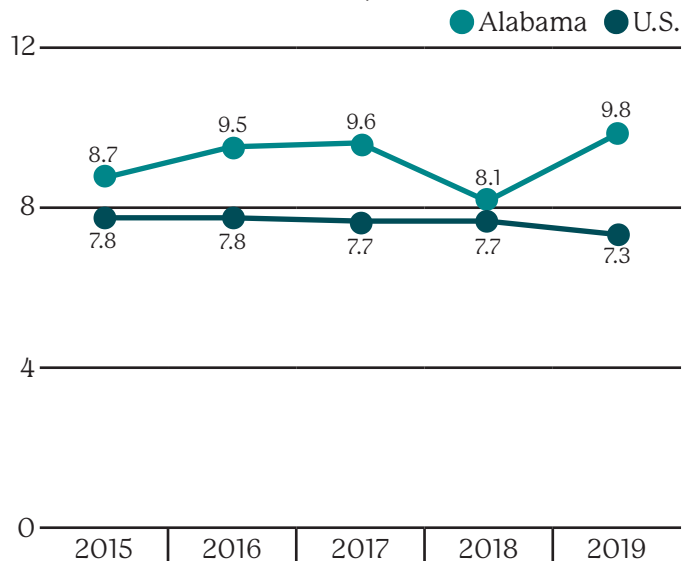
Malignant only, per 100,000 and age-adjusted to the 2000 U.S. standard population. Sources: ASCR and SEER, 2022.

Both rates are significantly higher than their U.S. comparisons of 8.5 for black females and 7.6 for white females.<sup>6</sup> (See Figure 1.)

## Incidence Trends

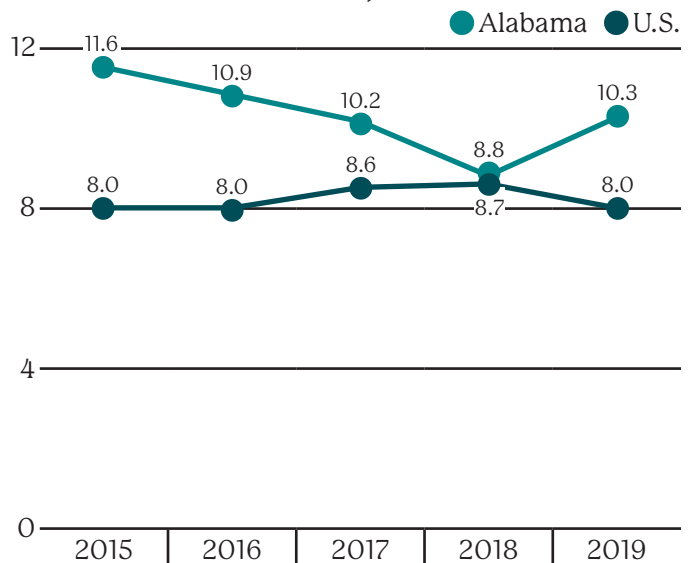
For all races combined from 2015-2019, there was no significant trend in incidence rates for either Alabama or the U.S.<sup>1,6</sup> (See Figure 2.) For white females in Alabama and the U.S., there was also no significant trend in incidence rates from 2015-2019.<sup>1,6</sup> (See Figure 3.) For black females in Alabama, there was a small decline in incidence rates but not enough to be statistically significant.<sup>1</sup> For black females in the U.S., there was no significant trend in incidence rates.<sup>6</sup> (See Figure 4.)

**Figure 3. Cervical Cancer Incidence Trends, White, Alabama and U.S., 2015-2019**



Malignant only, per 100,000 and age-adjusted to the 2000 U.S. standard population. Sources: ASCR and SEER, 2022.

**Figure 4. Cervical Cancer Incidence Trends, Black, Alabama and U.S., 2015-2019**



Malignant only, per 100,000 and age-adjusted to the 2000 U.S. standard population. Sources: ASCR and SEER, 2022.

## Incidence Rates Rural vs. Urban

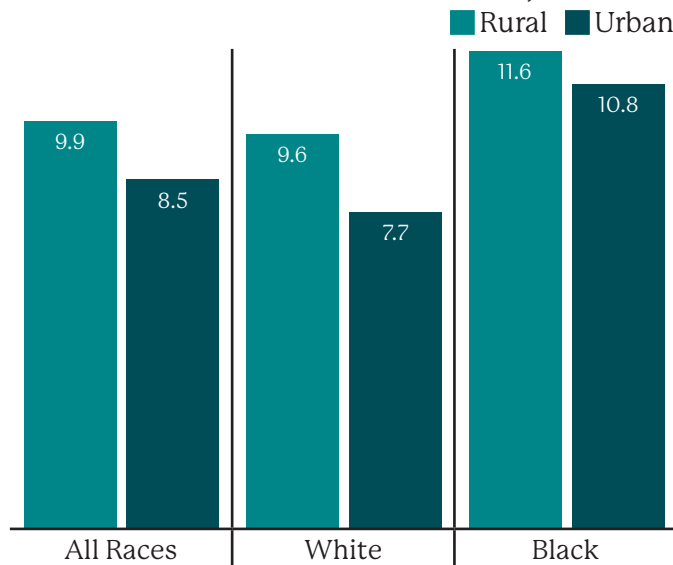
Using the Alabama Rural Health Association (ARHA) definition of rural and urban, the incidence rate of cervical cancer for all races was significantly higher in rural counties vs urban counties, 9.9 vs. 8.5.<sup>1</sup> For white females, the incidence rate was also significantly higher in rural counties compared to urban counties, 9.6 vs. 7.7.<sup>1</sup> For black females, the incidence rate was higher in rural counties compared to urban counties but not significantly higher, 11.6 vs. 10.8.<sup>1</sup> (See Figure 5.) For more information on the ARHA definition of rural and urban, please see the Material and Methods on page 17.<sup>7</sup>

## Cancer Staging

Being diagnosed with cervical cancer at an early stage leads to higher survivability compared with being diagnosed at a later stage. According to SEER data from 2012-2018, the 5-year relative survival for cervical cancer overall is 66.7 percent. For localized (confined to the primary site) cancer, the 5-year relative survival is 91.8 percent. This percentage decreases to 59.4 percent for regional (spread to lymph nodes) and 17.1 percent for distant (metastatic). For unstaged tumors, the 5-year relative survival is 53.6 percent. Unstaged tumors are generally thought to be a mix of regional and distant tumors.<sup>8</sup>

In Alabama from 2010-2019 for all races, 42.5 percent of women were diagnosed with cervical cancer at localized stage. Overall, 32.0 percent of cases were diagnosed at regional and 12.9 percent were diagnosed at distant stage. Finally, 12.6 percent of cases were diagnosed at an unknown stage.<sup>1</sup> (See Figure 6.) These figures only represent malignant cases because cervical cancer *in situ* is not reportable.

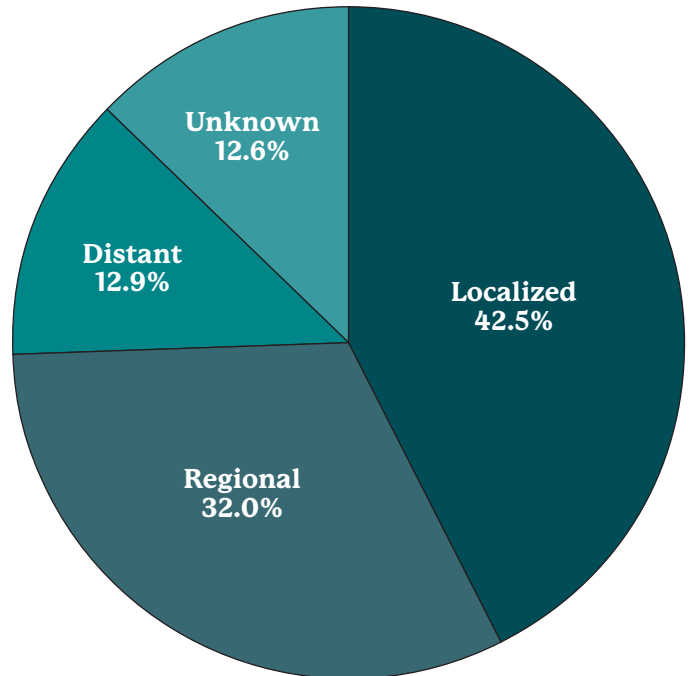
**Figure 5. Cervical Cancer Incidence Rates by Race and Rural/Urban Status in Alabama, 2010-2019**



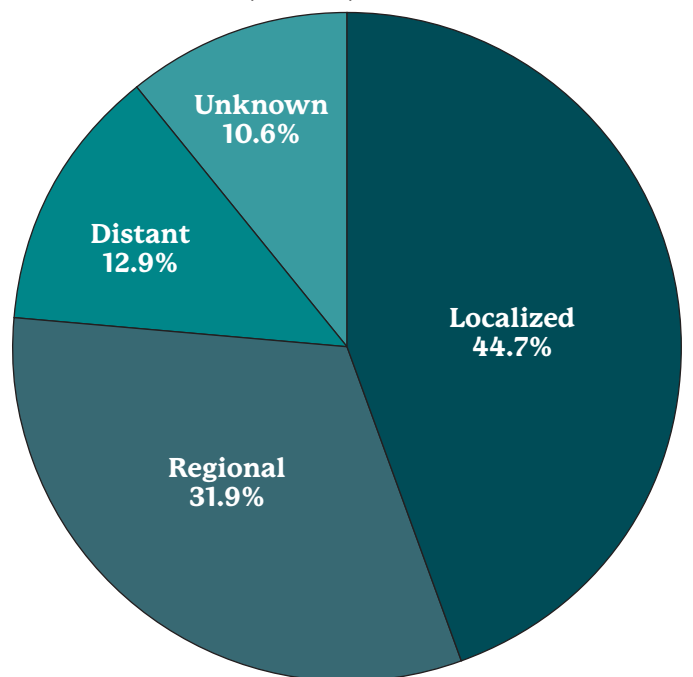
Malignant only, per 100,000 and age-adjusted to the 2000 U.S. standard population.  
Sources: ASCR and Surveillance, Epidemiology, and End Results Program (SEER), 2022.

For white females with cervical cancer in Alabama from 2010-2019, 44.7 percent were diagnosed at a localized stage, 31.9 percent were diagnosed at regional stage, 12.9 percent were diagnosed at distant stage, and 10.6 percent were diagnosed at an unknown stage. (See Figure 7.) For black females with cervical cancer in Alabama from 2010-2019, 36.5 percent were diagnosed at a localized stage, 32.7 percent were diagnosed at regional stage, 13.7 percent were diagnosed at distant stage, and 17.1 percent were diagnosed at an unknown stage. (See Figure 8.) At the

**Figure 6. Cervical Cancer by SEER Stage Group in Alabama, All Races, 2010-2019**

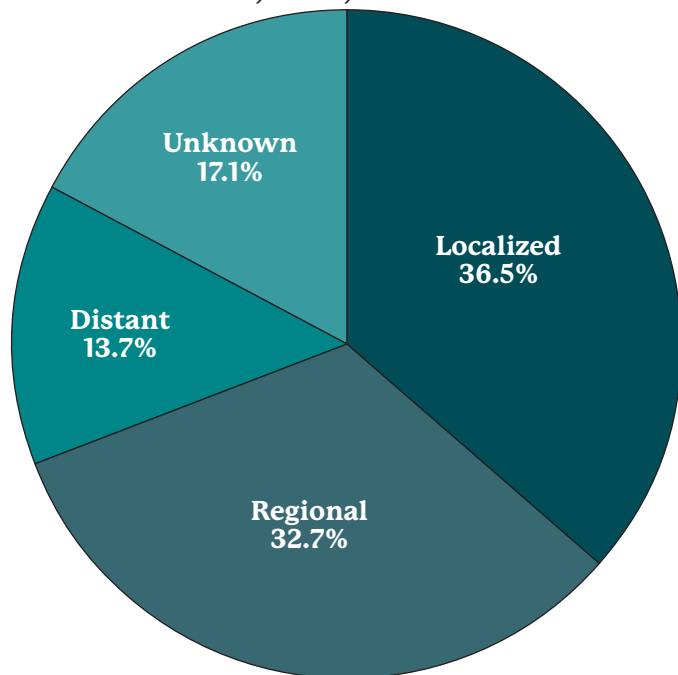


**Figure 7. Cervical Cancer by SEER Stage Group in Alabama, White, 2010-2019**





**Figure 8. Cervical Cancer by SEER Stage Group in Alabama, Black, 2010-2019**



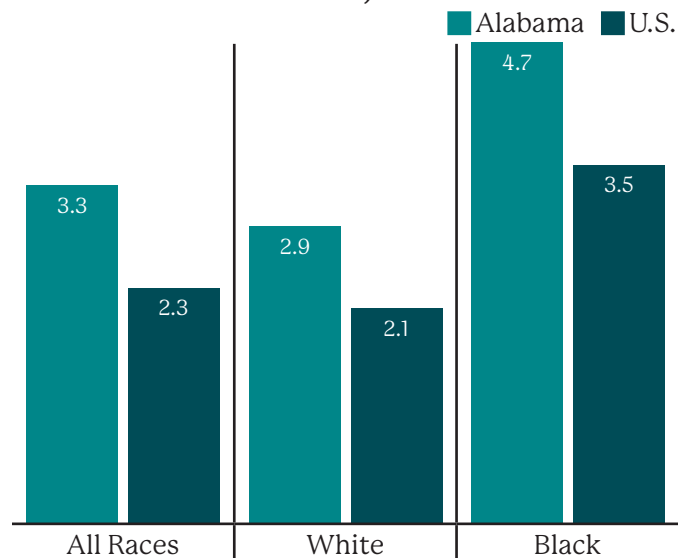
95 percent confidence level, the proportion of white females diagnosed at localized stage was significantly higher than black females ( $p$  value=0.0003). Black females had higher proportions of cases diagnosed at regional and distant stage groups than white females, but there was no significant difference between the proportion of cases for regional ( $p$  value=0.6965) or distant ( $p$  value=0.5823) stage groups. However, black females were significantly more likely to be diagnosed at an unknown stage than white females ( $p$  value<0.0001). Because cases with unknown stage are considered to be a mixture of regional and distant cases, it is probable that if black women had similar proportions of unknown stage as white women, that the differences seen in regional and distant would be large enough to be significant. There were no significant differences in proportion of stage groups for rural compared to urban for any race group.<sup>1</sup>

### Cancer Screening

The Behavioral Risk Factor Surveillance System (BRFSS) is a national health-related telephone survey which collects health-related risk behaviors, chronic health conditions, and use of preventative services. More than 400,000 interviews of U.S. adults are conducted each year. For cervical cancer, the BRFSS tracks the percentages of women ages 21-65 who have had a Pap test in the past 3 years.

In 2020, 79.5 percent of Alabama women surveyed had a Pap test in the past 3 years which was higher than the U.S. percentage of 77.6 percent. Black women in Alabama had significantly higher

**Figure 9. Cervical Cancer Mortality Rates by Race Alabama and U.S., 2010-2019**



Per 100,000 and age-adjusted to the 2000 U.S. standard population.

Sources: ASCR and Centers for Disease Control and Prevention (CDC), 2022.

screening rates than white women, 85.5 percent vs. 76.4 percent. Women with less than a high school education had the lowest screening rates at 66.7 percent which was less than the U.S. average of 68.7 percent. College graduates had the highest screening rates at 88.6 percent and were significantly higher than the U.S. average of 83.2 percent.<sup>9</sup>

### Mortality Rates

The cervical cancer mortality rate for all races in Alabama is 3.3, significantly higher than the U.S. rate of 2.3.<sup>10</sup> Black females have a significantly higher mortality rate compared to white females with a rate of 4.7 vs. 2.9.<sup>1</sup> Both rates are significantly higher than their U.S. comparisons of 3.5 for black females and 2.1 for white females.<sup>10</sup> (See Figure 9.)

### Mortality Trends

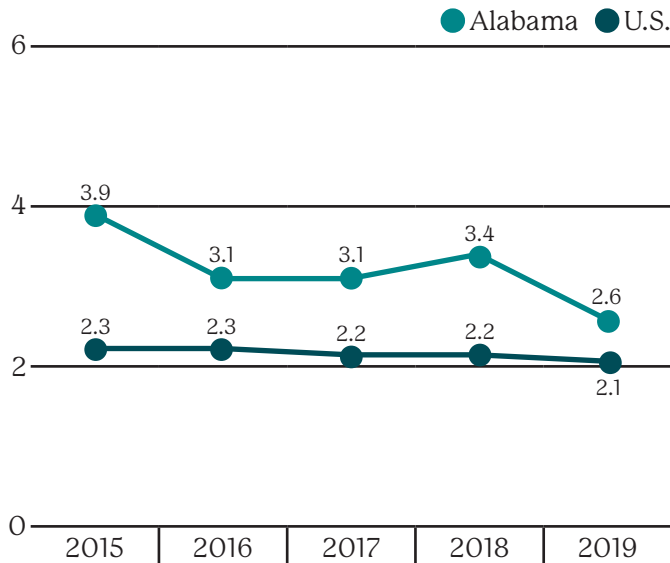
For all races combined from 2015-2019, there was a non-statistically significant decline in mortality rates for Alabama and no significant trend in mortality rates for the U.S. (See Figure 10.) For white females there was a small decline in mortality rates but not enough to be statistically significant for Alabama and no significant trend in mortality rates for the U.S. from 2015-2019 (See Figure 11.) For black females in Alabama, there was a small decline in mortality rates but not enough to be statistically significant. For black females in the U.S., there was no significant trend in mortality rates.<sup>1,10</sup> (See Figure 12.)

### Mortality Rates Rural vs. Urban

Using the ARHA definition of rural and urban, the mortality rate of cervical cancer for all races was significantly higher in rural counties vs.

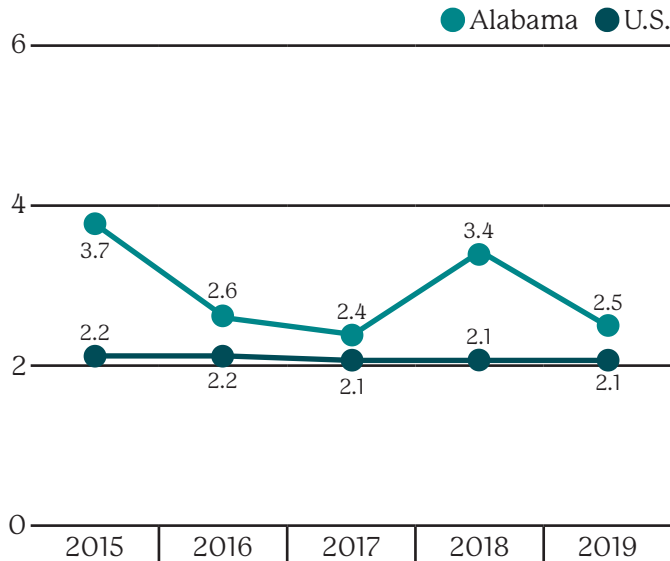
urban counties, 3.5 vs. 3.1. For white females the mortality rate was also significantly higher in rural counties compared to urban counties, 3.2 vs. 2.7.

**Figure 10. Cervical Cancer Mortality Trends, All Races, Alabama and U.S., 2015-2019**



Per 100,000 and age-adjusted to the 2000 U.S. standard population.  
Sources: ASCR and SEER, 2022.

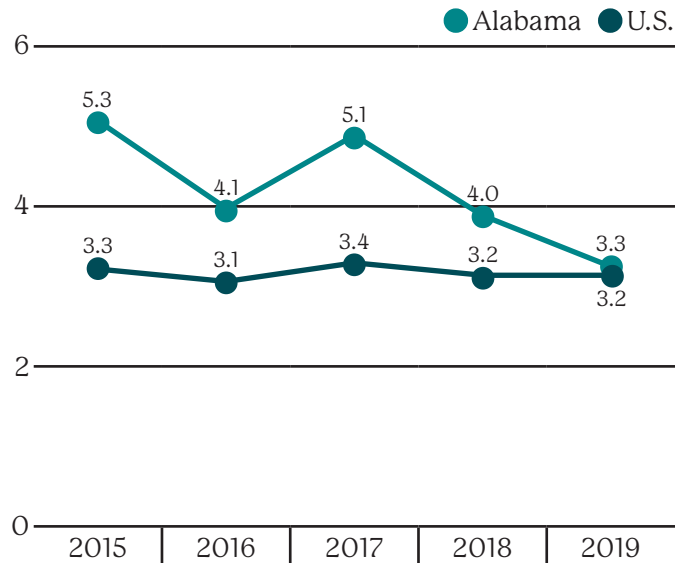
**Figure 11. Cervical Cancer Mortality Trends, White, Alabama and U.S., 2015-2019**



Per 100,000 and age-adjusted to the 2000 U.S. standard population.  
Sources: ASCR and SEER, 2022.

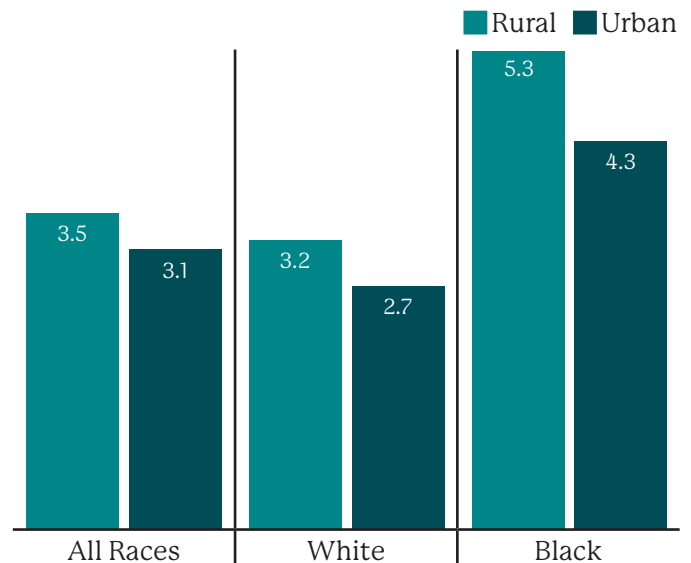
For black females, the mortality rate was higher in rural counties compared to urban counties but not significantly higher, 5.3 vs. 4.3.<sup>1</sup> (See Figure 13.)

**Figure 12. Cervical Cancer Mortality Trends, Black, Alabama and U.S., 2015-2019**



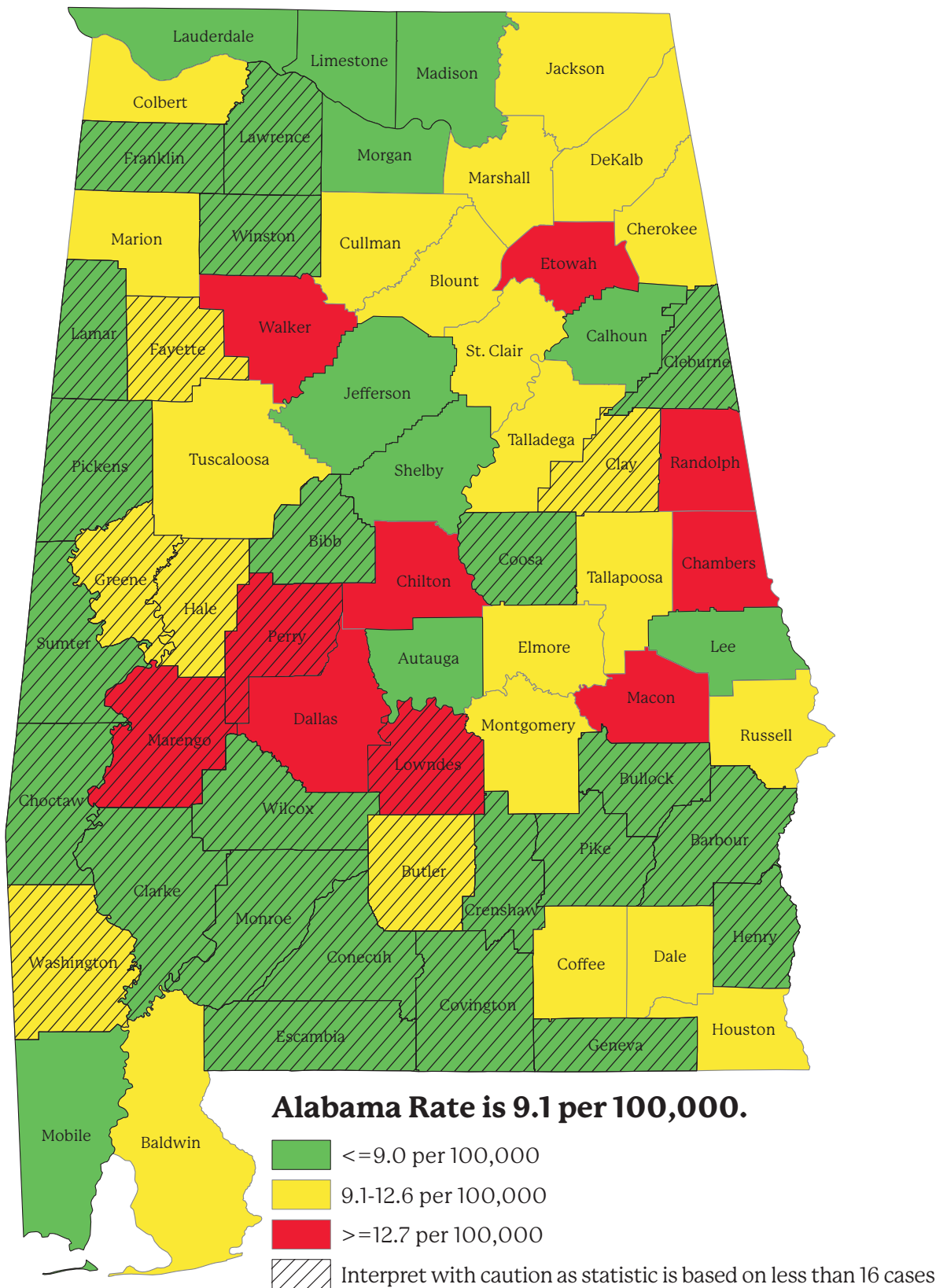
Per 100,000 and age-adjusted to the 2000 U.S. standard population.  
Sources: ASCR and SEER, 2022.

**Figure 13. Cervical Cancer Mortality Rates by Race and Rural/Urban Status in Alabama, 2010-2019**



Per 100,000 and age-adjusted to the 2000 U.S. standard population.  
Sources: ASCR, 2022.

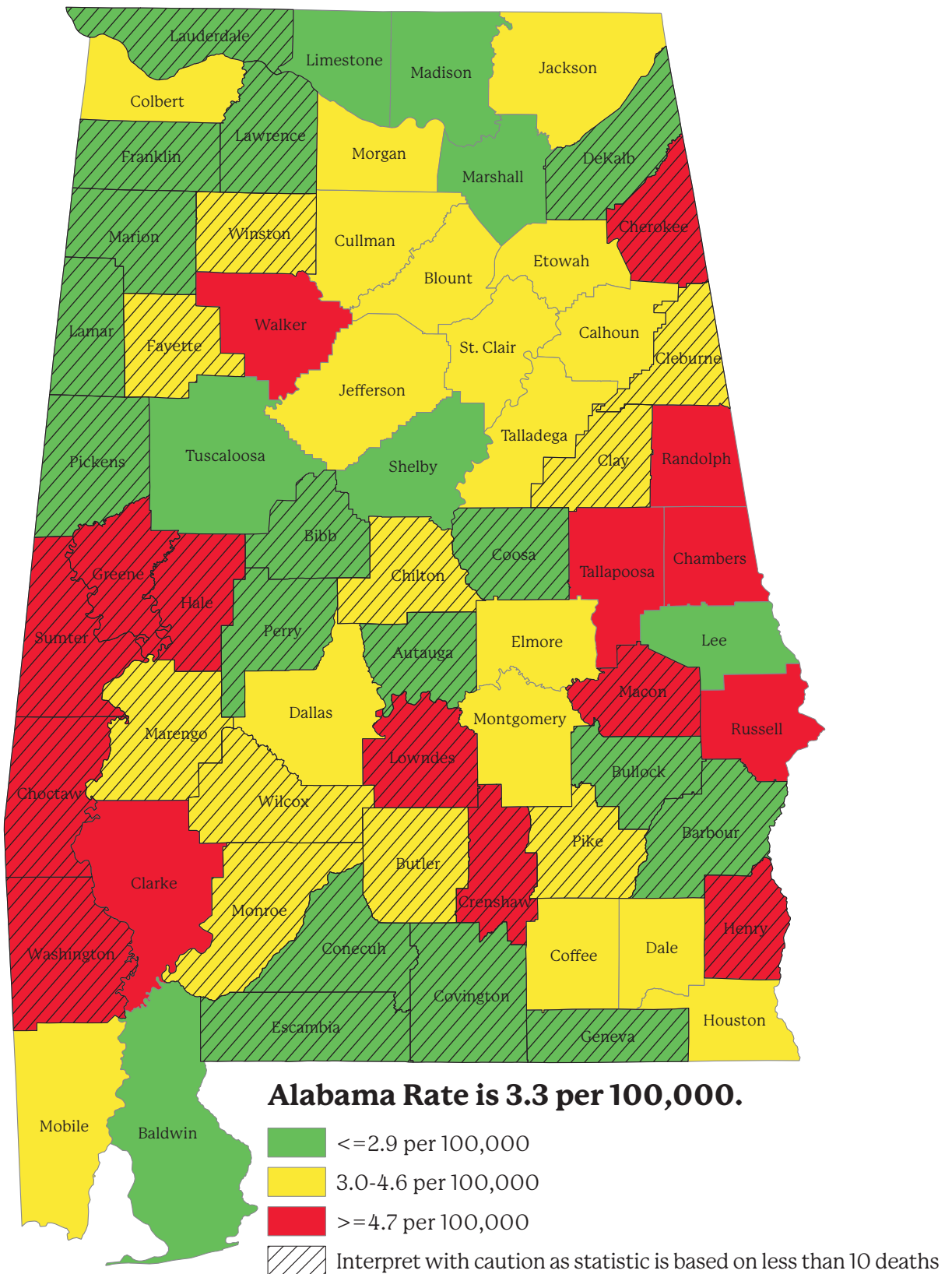
# Cervical Cancer Incidence Rates in Alabama 2010-2019, All Races Combined



Rates per 100,000, are for malignant tumors only, and are age-adjusted to the 2000 U.S. (19 age group) standard. County groupings were determined using natural breaks (Jenks).

**Source: Alabama Statewide Cancer Registry and Alabama Department of Vital Statistics, 2022**

# Cervical Cancer Mortality Rates in Alabama 2010-2019, All Races Combined



Rates per 100,000, are for malignant tumors only, and are age-adjusted to the 2000 U.S. (19 age group) standard. County groupings were determined using natural breaks (Jenks).

Source: Alabama Statewide Cancer Registry and Alabama Department of Vital Statistics, 2022

## Cervical Cancer Prevention

According to the Centers for Disease Control and Prevention (CDC), the HPV vaccination provides safe, effective, and lasting protection against the HPV infections that most commonly cause cancer. The first vaccination, Gardasil® was released by Merck in 2006 and it prevented the infection of four strains of HPV. In 2014, Gardasil® 9 was approved by the Food and Drug Administration (FDA) and it prevented nine strains of HPV infection. These nine are the strains that are most responsible for cervical cancer, anal cancer, and throat cancer, as well as genital warts cases. Since 2017, Gardasil® 9 is the only HPV vaccination available in the U.S. As of 2020, the FDA approved the vaccination for the prevention of oropharyngeal cancer and other head and neck cancers.<sup>5</sup>

### VACCINATION RECOMMENDATIONS

- Everyone ages 9 to 26 should be vaccinated for HPV. The earlier the vaccine is received the better, because the vaccine has a better chance of protection prior to the initiation of sex and contact with the virus.
- It is recommended that both males and females between the ages of 9 and 14 get two doses of Gardasil® 9, with the second dose given 6-12 months after the first dose.
- For males and females 15 years and older, it is recommended that three doses of Gardasil® 9 be given over a 6-month period.
- The HPV vaccination is recommended for those 27-45, after speaking with their medical provider about risks for new HPV infections and possible benefits. The vaccinations provide less benefit to adults because more people in this age range have been exposed to HPV.

The Alabama Department of Public Health (ADPH) Immunization Division's goal is to increase immunization rates and reduce vaccine preventable diseases. The National Immunization Survey for Teens (NIS-Teen) Division monitors how many teens are up-to-date with specific immunizations. The NIS-Teen is an annual, national telephone survey conducted by the CDC in which guardians report the vaccination status of their children. The percentage of teens in Alabama that were up-to-date for HPV vaccination increased for all groups from 2019 to 2020. The Alabama percentages are below the U.S. percentage of 58.65 percent for up-to-date teens, 13-17.<sup>11</sup>

Age Group	2019			2020		
	Female	Male	Female & Male	Female	Male	Female & Male
13 - 15	47.9	43.6	45.8	58.7	51.3	55.0
13 - 17	52.2	42.5	47.3	57.0	49.1	52.9

According to the Alabama Study Commission for Gynecological Cancers, barriers to HPV vaccination reported by parents include lack of knowledge and lack of a recommendation by their pediatrician. Pediatricians report that parents are often reluctant to vaccinate against an STD, and some parents express safety concerns. Overall, a strong recommendation by a trusted health care provider followed by reassurance that the vaccine is completely safe often results in higher vaccination rates.<sup>2</sup>

The Alabama Adolescent and Adult Task Force (A3VTF) was created in 2018 to bring together organizations with a common goal in order to increase Alabama adolescent and adult vaccination rates, with a specific focus on HPV vaccination. Twenty-five organizations across the state are members and the group meets quarterly. Current efforts of A3VTF include participation in national, regional, and statewide meetings to coordinate efforts, statewide awareness campaigns (social media, traditional media, letters to school nurses), and professional education for state health providers, including dentists, to increase HPV vaccine usage.

HPV vaccination is a primary prevention strategy in the Alabama State Cancer Plan. The goal is to increase the percentage of adolescents who have initiated and completed the HPV vaccine series for prevention of cervical and possibly oral and anal cancer. Strategies to reach this goal include:

- Improving the reporting of HPV vaccination in the ADPH Immunization Patient Registry with Internet Technology (ImmPRINT).
- Improving health professional knowledge, practice behaviors, and systems support related to provision of or referral for immunizations for HPV.
- Addressing disparities in care related to counseling and provision of vaccinations.
- Increasing access to HPV immunizations and public awareness of HPV's relationship to cervical and other types of cancer.

## Cervical Cancer Early Detection and Screening

For the past 30 years, the CDC National Breast and Cervical Cancer Early Detection Program has provided access to breast and cervical cancer screening services to underserved women in all 50 states, the District of Columbia, 5 United States territories, and 11 tribes. In Alabama, the program is the Alabama Breast and Cervical Cancer Early Detection Program (ABCCEDP).

From 2011-2019, 32,687 women in Alabama were screened for cervical cancer through ABCCEDP. Of those women, 57 percent were white, 38 percent were black/African American, 85 percent were non-Hispanic, and 14 percent were Hispanic. During that period, 1,736 pre-cancers (365 *in situ*) and 74 cancers were detected and 697 women initiated cancer treatment.<sup>12</sup>

Through ABCCEDP, cervical cancer screening and, if needed, diagnostic services, are provided to women ages 21-64 who have an income at or below 250 percent of the federal poverty level, and who do not have insurance or are under-insured. If cancer is found during screening, eligible women can receive treatment through the Alabama Medicaid Agency.<sup>12</sup> Current eligibility guidelines are:

- Women age 40-64: co-test every 5 years or Pap test every 3 years.
- Women age 21-39 (those who have had tubal ligation or partial hysterectomy with cervix remaining).
  - Ages 21-29: Pap test only every 3 years
  - Ages 30-39: Co-test every 5 years or Pap test every 3 years
- Women ANY AGE with a past personal history (biopsy) of cervical intraepithelial neoplasia 2 or 3 (CIN II or CIN III), or invasive cervical cancer.
- Women age 21-64 (those NOT eligible for Family Planning) with one of the following: Diethylstilbestrol (DES) exposure in utero, immuno-compromised due to health condition, organ transplant, or Human Immunodeficiency Virus (HIV).
  - Ages 21-29: Annual Pap test
  - Ages 30-64: Co-test every 3 years, or Annual Pap test
- Women age 21-39 who need diagnostic follow-up services for abnormal cervical cancer screening results if uninsured or under-insured.

- Women age 65 or older with no insurance or Medicare Part A only must meet American Society of Colposcopy and Cervical Pathology (ASCCP) guidelines for continued screening.

As part of the CDC funding, ABCCEDP collaborates with Federally Qualified Health Centers (FQHCs) to assist in increasing the breast and cervical cancer screenings in their clinics in Alabama. FQHCs are community-based health care providers that provide primary care services to underserved areas in the United States. As of 2022, there are 126 FQHCs located in Alabama. Each year, ABCCEDP releases a Request for Proposal so FQHCs can apply for funds to make changes within their individual clinics. These changes are initiated by clinic staff after implementing quality improvement processes and evidence-based interventions (EBIs) recommended by The Community Guide.<sup>13</sup>

The Community Guide recommends health systems implement multi-component strategies within the clinical setting to increase client demand and access, and to improve provider delivery of cancer screening. EBIs include client (patient) reminders, provider reminders, provider assessment and feedback, and reduction of structural barriers. In addition, supporting activities such as small media, patient navigation, community health workers, provider education, and professional development are suggested to supplement EBIs in ensuring patients complete screening.<sup>13</sup>



## Cervical Cancer Screening Recommendations

The U.S. Preventative Services Task Force (USPSTF) updated their cervical cancer screening recommendations in 2018. These recommendations were endorsed in 2021 by the American College of Obstetricians, American Society for Colposcopy and Cervical Pathology, and the Society of Gynecological Oncology.<sup>14</sup>

Recommendations are as follows:

- For women 21-29: Screening with a cervical cytology test alone every three years
- For women 30-65: Screening with a cervical cytology test alone every 3 years, screening

with a high-risk human papillomavirus (hrHPV) test alone every 5 years, or screening with a combination of cytology and hrHPV (cotesting).

The USPSTF does not recommend screening for cervical cancer for the following groups:

- Women under the age of 21
- Women 21-65 with a hysterectomy with removal of the cervix and no history of high-grade precancerous lesion or cervical cancer or cervical cancer
- Women older than 65 years who have had adequate prior screening and are not at otherwise high risk for cervical cancers.

Note: USPSTF is currently working on an update for screening guidelines.



## Materials and Methods

### Technical Notes

International Classification of Diseases codes used for this report were based on the North American Association of Central Cancer Registries (NAACCR) list for incidence and mortality. The International Classification of Diseases for Oncology, Third Edition (ICDO) in addition to the World Health Association Classification of Tumors of Hematopoietic and Lymphoid Tissues were used for incidence data. The International Classification of Diseases, Tenth Revision, Clinical Modification was used for mortality data. The 95 percent confidence intervals were calculated for incidence and mortality data and used to determine the level of significance when comparing two rates. If the confidence intervals overlapped, it was determined that no difference existed between the two rates.

### Population Estimates

The population estimates for the denominators of incidence and mortality rates are race-specific (all races, white, black) and sex-specific county population estimates. The county population estimates were incorporated into the National Cancer Institute's (NCI) SEER\*STAT software to calculate cancer incidence and mortality rates. The SEER\*STAT population estimates are a slight modification of the annual time series of July 1 county population estimates (by age, sex, and race) produced by the Population Estimates Program of the U.S. Bureau of the Census with support from NCI through an interagency agreement.

### Data Sources

Data from cancer registries, health information departments, histopathologic laboratories, and physician offices were reported to the ASCR as of January 1, 2022. For cancer cases diagnosed during 2010-2019, the ASCR considered as reportable all incident cases with a behavior code of 3 (invasive, primary site only) in the ICDO. The primary source of cancer incidence data is medical records. Staff at healthcare facilities abstract cancer incidence data from patients' medical records, enter the data into the facility's own cancer registry if it has one, and send the data to the ASCR. All reporting sources collect data using uniform data items and codes as documented by the NAACCR. This uniformity means that data items collected by all reporting sources are comparable. For this report, information on primary cancer sites was coded according to the appropriate ICDO edition and was grouped according to revised SEER recodes dates

March 19, 2013, which define standard groupings of primary cancer sites. The SEER/World Health Organization 2008 recodes were used to ensure consistent site-type definitions over time and consistency with other published cancer incidence and mortality data. Invalid site codes were excluded from the analysis.

### Age-adjusted Incidence and Mortality Rates

Because the occurrence of many cancers increases with age and because the age distribution of a population can change over time and can be different in different geographic areas, cancer rates must be age adjusted. Age adjusting the rates ensures that differences in incidence from 1 year to another or from one geographic area to another are not due to differences in age distribution. The standard population used to age adjust the rates for this report is the 2000 U.S. standard population, in accordance with a 1998 Department of Health and Human Services recommendation. The 2000 U.S. standard population is based on the proportion of the 2000 population in these age groups and serve as weights for calculating age-adjusted incidence rates. Mortality data for Alabama was obtained from the Alabama Department of Public Health Center for Health Statistics. The age-adjusted mortality rates were calculated using the 2000 U.S. standard population.

### Interpreting the Data

Published age-adjusted cancer incidence and mortality rates for years before 1999 were calculated using standard populations other than the 2000 U.S. standard population. Beginning with the publication date for the 1999 diagnosis year, or year of death, cancer incidence and mortality rates were age-adjusted to more closely reflect the current age distribution of the U.S. population and the current burden of cancer. Because of the aging of the U.S. population, the 2000 U.S. standard population gives more weight to older age categories than did the previous standard population. Geographic variation in incidence and mortality rates may be the result of regional differences in the exposure of the population to known or unknown risk factors. Differences may arise because of differences in sociodemographic characteristics of the populations (e.g., age, race, ethnicity, geographic region, urban or rural residence), screening use, health-related behaviors (e.g., behaviors related to tobacco use, diet, physical activity), exposure to cancer-causing agents, or factors related to registry operations (e.g., completeness, timeliness, specificity in

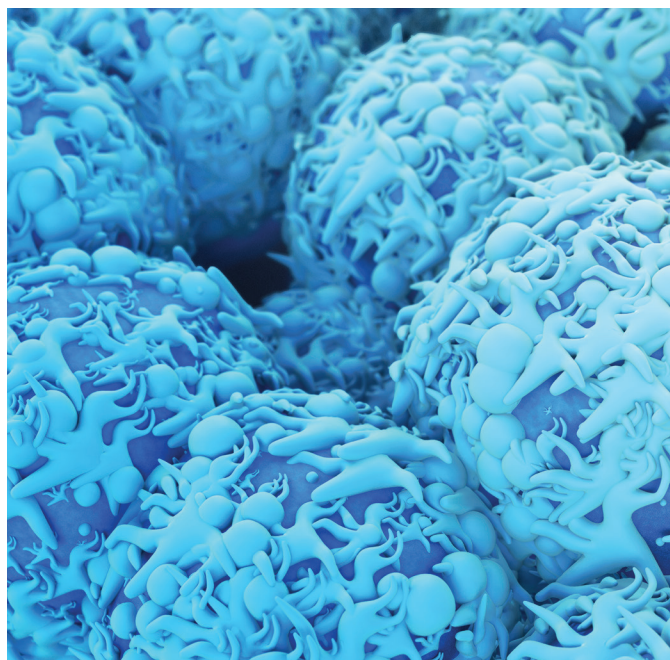


coding cancer sites). Work continues to ensure the reporting of high-quality data. Please note that differences in registry database completeness and data quality do influence the estimated cancer incidence rates. Because 2019 cases were estimated to be 99 percent complete at the time of this publication, some rates may vary slightly from the “true” or final rates for the Alabama population. The rates presented here have not been adjusted for completeness differences across the database. The ASCR may update the previous years’ data as cancer registries submit data for the new diagnosis year and additional cases from the previous diagnosis years. Users of cancer incidence data should be mindful of this issue for all data used in their comparisons. Race information reported to the ASCR is not self-reported by the patient. Information on race is abstracted from medical records, coded according to standard procedures, and grouped into standard race groupings. In this report, cancer incidence and mortality data are presented for all races combined and for white and black populations in Alabama.

### **Rural and Urban Definitions**

The ARHA rural/urban definition is based on the following four factors:

- The percentage of total employment in the county which is comprised by those employed by the public elementary and secondary school systems.
- The dollar value of agricultural production per square mile of land.
- The population per square mile of land.
- The population of the largest city in the county and other cities in the county.



Using the ARHA definition, 55 Alabama counties are considered rural with only the following 12 counties being considered urban: Calhoun, Etowah, Houston, Jefferson, Lauderdale, Lee, Madison, Mobile, Montgomery, Morgan, Shelby, and Tuscaloosa.

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## Sources

1. Alabama Statewide Cancer Registry, 2022. Data Years: 2010-2019 Incidence and Mortality. Alabama Department of Public Health.
2. Alabama Study Commission for Gynecologic Cancers, 2019. *Alabama Study Commission for Gynecologic Cancers, March 5, 2019 report*. [http://images.pcmac.org/Uploads/LauraCrandallBrown/LauraCrandallBrown/SubDepartments/DocumentsCategories/Documents/Alabama percent20Study percent20Commission percent20for percent20Gynecologic percent20Cancers percent20- percent20Final percent20Report percent20- percent20March percent202019 percent7BSIS14F35AFD8073 percent7D.pdf](http://images.pcmac.org/Uploads/LauraCrandallBrown/LauraCrandallBrown/SubDepartments/DocumentsCategories/Documents/Alabama%20Study%20Commission%20for%20Gynecologic%20Cancers%20-%20Final%20Report%20-%20March%202019%207BSIS14F35AFD8073%207D.pdf)
3. American Cancer Society. *Cancer Facts & Figures 2022*. Atlanta: American Cancer Society; 2022.
4. World Health Organization, 2022. *Cervical cancer*. <https://www.who.int/news-room/fact-sheets/detail/cervical-cancer>.
5. Centers for Disease Control and Prevention (CDC), 2022. *Human Papillomavirus*. <https://www.cdc.gov/hpv/index.html>.
6. Surveillance, Epidemiology, and End Results (SEER) Program SEER\*Stat Database: Incidence - SEER Research Data, 18 Registries, Nov 2021 Submission. [www.seer.cancer.gov](http://www.seer.cancer.gov) Data Years: 2010-2019.
7. Alabama Rural Health Association, 2022. *Analysis of Urban vs. Rural*. <https://arhaonline.org/analysis-of-urban-vs-rural/>
8. SEER, 2022. *Cancer Stat Facts: Cervical Cancer*. <https://seer.cancer.gov/statfacts/html/cervix.html>
9. Behavioral Risk Factor Surveillance System, 2022. Centers for Disease Control and Prevention
10. CDC National Center for Health Statistics, National Vital Statistics System, 2022. [wonder.cdc.gov/cancer.html](http://wonder.cdc.gov/cancer.html). Data Years: 2010-2019.
11. CDC National Immunization Surveys (NIS), 2022. *NIS for Teens*. Data Years 2019-2020. <https://www.cdc.gov/vaccines/imz-managers/nis/>
12. Alabama Breast and Cervical Cancer Early Detection Program, 2022. Data Years: 2011-2019 Alabama Department of Public Health.
13. The Community Guide, 2022. *Guide to Community Preventative Services*. <https://www.thecommunityguide.org/>
14. U.S. Preventive Services Task Force, 2018. *Final Recommendation Statement Cervical Cancer Screening*. <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening>

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