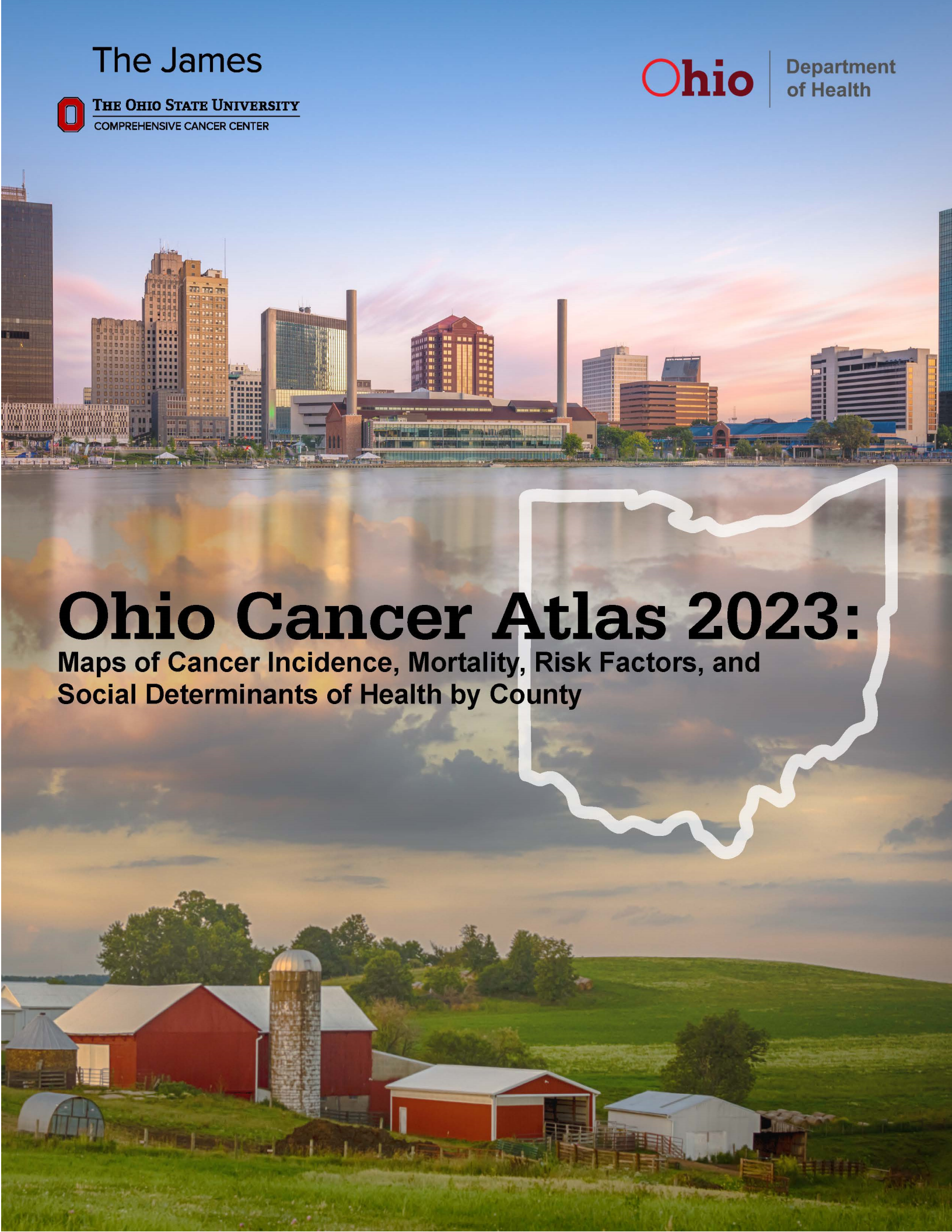
The James

THE OHIO STATE UNIVERSITY
COMPREHENSIVE CANCER CENTER

Ohio Department of Health



Ohio Cancer Atlas 2023:

Maps of Cancer Incidence, Mortality, Risk Factors, and Social Determinants of Health by County

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Ohio Cancer Atlas 2023:
Maps of Cancer Incidence, Mortality, Risk Factors, and Social Determinants of Health by County

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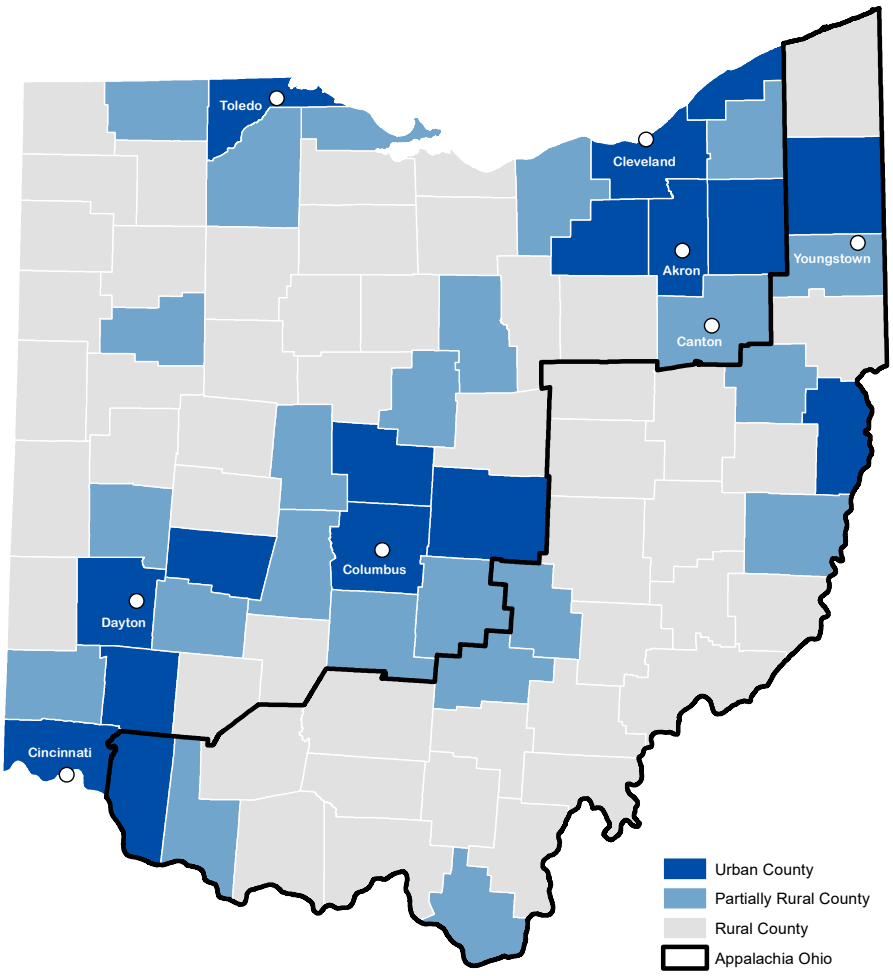
Introduction and Methods

Cancer is a group of more than 100 different diseases in which abnormal cells grow uncontrollably and spread to other parts of the body.[1] Cancer is the second leading cause of death in Ohio and the United States, accounting for nearly one in every four deaths.[2] This atlas presents Ohio county-level maps showing cancer incidence (new case) rates and mortality (death) rates, as well as cancer screening behaviors, cancer stage at diagnosis, risk factors, demographics, and social determinants of health. This document was created to assist public health practitioners and others interested in the cancer burden in Ohio with identifying geographic areas with higher incidence and mortality rates, as well as areas with lower prevalence of cancer screening, later stage at diagnosis, and higher prevalence of adverse cancer-related behaviors.

Cancer rates vary by age group, sex, race/ethnicity, geographic area (e.g., county, Appalachia), and cancer site/type. According to the 2015-2019 American Community Survey five-year estimates, the population for Ohio was 11,655,397 with the following demographics: 51.0% female, 49.0% male, 16.7% age 65 or older, 81.3% white race, 12.4% Black race, and 3.8% Hispanic or Latino ethnicity.[3] As shown in the map below, Ohio consists of 88 counties. Ohio contains both urban and rural areas, and the population size of cities and counties varies widely across the state. Thirty-two counties along the eastern and southern border of Ohio (thick, black outline in the map below) are considered part of the Appalachian region of the United States. Thus, there is demographic variability of Ohio residents across the state which should be accounted for in assessments of cancer rates and risks as well as in the development of cancer prevention, early detection, and control programs.



The cancer rates in this atlas represent the number of new cases or deaths per 100,000 population per year during 2015-2019 or, in some cases, 2010-2019. Because increasing age is strongly associated with higher cancer rates, incidence and mortality rates were age-adjusted using the 2000 U.S. Standard Population by 19 five-year age groups (i.e., <1, 1-4, 5-9, 10-14, …,85+).[3] Rates based on less than 10 people are likely unstable due to small numbers and therefore are not presented.

Introduction and Methods

CANCER INCIDENCE DATA

Ohio cancer incidence data were provided by the Ohio Cancer Incidence Surveillance System (OCISS) at the Ohio Department of Health (ODH). OCISS is Ohio's central cancer registry responsible for collecting data on cancers diagnosed among Ohio residents.[4] All primary cancers are required to be reported, with the exception of basal and squamous cell skin cancer and cervical cancer *in situ*. In addition, benign and borderline brain and other central nervous system (CNS) tumors diagnosed on or after January 1, 2004 are required to be reported. U.S. cancer incidence data were provided by the Surveillance, Epidemiology, and End Results (SEER) Program at the National Cancer Institute.[5]

Cancers were coded using the International Classification of Diseases for Oncology, Third Edition (ICD-O-3), codes C00.0-C80.9.[6] Each cancer was grouped, by ICD-O-3 code, into 23 major site/type groupings in accordance with the methods of the SEER Program.[7]

Cancer cases are categorized as *in situ* or invasive. *In situ* cancers are malignant tumors that have not penetrated surrounding tissue whereas invasive cancers have infiltrated the tissue of the organ in which the tumor originated. Incidence case counts and rates include invasive cancers only, with the addition of *in situ* bladder cancers. The inclusion of *in situ* bladder cancers in the calculation of incidence rates is consistent with the methodology of the SEER Program.

From 2015 to 2019, an average of 68,972 Ohio residents were diagnosed with invasive cancer each year. After adjusting for age, this equates to an average of 471.4 cancer cases per 100,000 population, which is 5.8% higher than the U.S. rate of 445.5 per 100,000 population. The leading sites/types of cancer incidence in 2015-2019 were lung and bronchus and female breast cancers, followed by cancers of the prostate and colon and rectum. Prostate cancer was the leading site/type among men, and breast cancer was the leading site/type among women.

CANCER MORTALITY DATA

Ohio cancer mortality data were provided by the Ohio Bureau of Vital Statistics at the Ohio Department of Health.[8] U.S. mortality data were provided by the SEER Program.[9] Data represent the underlying cause of death and were coded using the International Statistical Classification of Diseases and Related Health Problems, version 10 (ICD-10), and are presented for 23 primary site/type groupings in accordance with the SEER Program's Cause of Death Recode.[10,11]

An average of 25,372 Ohioans died from cancer each year during 2015-2019, corresponding to a cancer mortality rate of 169.4 per 100,000 population, which is 13.4% higher than the U.S. rate (149.4 per 100,000 population). Lung and bronchus cancer was the leading cause of cancer death in Ohio in both men and women, followed by prostate, colon and rectum, and pancreatic cancers in men and breast, colon and rectum, and pancreatic cancers in women. These cancer sites/types were also the leading causes of cancer death in the United States during 2015-2019.

Introduction and Methods

CANCER SCREENING AND STAGE AT DIAGNOSIS DATA

Cancer screening can result in the prevention and early detection of cancer, and cancer stage at diagnosis is an important determinant of survival. Regular screening examinations by a healthcare professional can result in the prevention and detection of some cancers at earlier stages when treatment is more likely to be successful. Cancers that can be prevented or detected earlier by screening account for more than half of all new cancer cases in Ohio.[4] Cancer screening data included in this report (i.e., Pap testing, mammography, and colon and rectum cancer screening) were obtained from the Ohio Behavioral Risk Factor Surveillance System (BRFSS) at ODH.[12]

Cancer stage at diagnosis refers to the degree to which cancer has spread at the time of diagnosis. Stage at diagnosis is an important determinant of survival, with diagnosis at the earliest stages (*in situ* and localized stages) often leading to better outcomes. Late stage refers to diagnoses at the regional and distant stages. Information about cancer stage at diagnosis is included in data collected by OCISS and is characterized using the SEER Summary Stage 2000 staging method.[13]

RISK FACTOR, DEMOGRAPHIC, AND SOCIAL DETERMINANTS OF HEALTH DATA

A cancer risk factor is anything that increases a person's risk of developing cancer. These factors interact with one another to increase cancer risk, although the primary causes of many cancers have yet to be identified. Cancer risk factors include demographics (e.g., age, sex, race, ethnicity), genetics (e.g., genetic mutations, family history), health behaviors and lifestyle factors (e.g., tobacco use, obesity, physical inactivity), and environmental factors (e.g., radiation, infectious agents, workplace exposures). Social determinants of health are the social, economic, and physical conditions in the environment in which people are born, live, learn, play, work, and age. Social determinants of health affect a wide range of health, functional, and quality-of-life risks and outcomes, including those related to cancer. Social determinants of health include education, income, discrimination, quality of healthcare, and access to healthy foods, among many others.

A substantial proportion of cancers could be prevented. For example, cancers caused by tobacco use and heavy alcohol consumption could be prevented completely. Almost one-third of the cancer deaths in Ohio and the United States are caused by cigarette smoking.[14] However, it is often not just one risk factor that increases a person's risk of developing cancer; rather, cancer most often results from a complex interaction of multiple factors, sometimes over long periods of time.

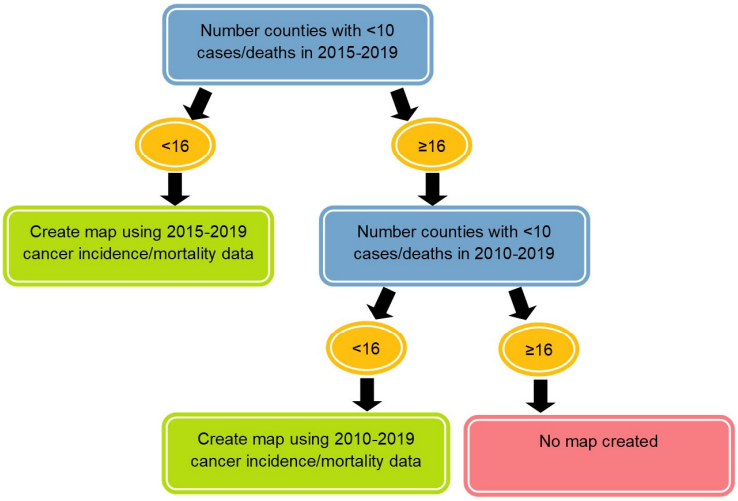
Data concerning health-related behaviors (current smoking, obesity, physical inactivity, and excessive drinking) were obtained from the 2022 University of Wisconsin Population Health Institute's County Health Rankings National Findings.[15]

Ohio demographic data (i.e., non-white race, Hispanic ethnicity) and social determinants of health data (i.e., less than high school education, poverty, food insecurity, no health insurance) were obtained from the U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates.[3]

Introduction and Methods

CREATION AND INTERPRETATION OF MAPS

Environmental Systems Research Institute's (ESRI) ArcMap® version 10 software was used to produce the maps in this cancer atlas.[16] In general, maps show county rates or percentages divided into quartiles (four equal or nearly equal groups), with the highest rates or percentages in the darkest hue, allowing for comparisons between counties. The exceptions include maps showing the prevalence of mammography, Pap testing, and colon and rectum cancer screening, where counties with lower screening rates are indicated by darker green hues. Incidence and mortality rates based on counts less than 10 are likely unstable and are therefore not presented. Incidence and mortality maps were based on five years of data (2015-2019) or 10 years of data (2010-2019) depending on the number of counties that were suppressed. Five-year maps were produced if less than 16 counties had counts less than 10 in 2015-2019. If this rule was not met, 10-year maps were produced if less than 16 counties had counts less than 10 in 2010-2019 (see diagram below). Based on these rules, incidence maps could not be created for Hodgkin lymphoma and testicular cancer, and mortality maps could not be created for cervical cancer, Hodgkin lymphoma, laryngeal cancer, stomach cancer, testicular cancer, and thyroid cancer.



For cancer screening data included in this report (i.e., Pap testing, mammography, and colon and rectum cancer screening), estimates based on fewer than 50 respondents or with a relative standard error greater than 30 percent are considered statistically unreliable and not reported.

Maps were evaluated for geographic patterns by location (e.g., north, southwest, Appalachian region); proximity to large cities; and urban/rural status. For reference, see the map on page 6.

Maps with apparent geographic patterns are described in the Key Findings. For some cancers or risk factors, a geographic pattern was identified at the county level, while no geographic pattern was apparent for others. For example, lung and bronchus cancer incidence and mortality rates (pages 34 and 35) were higher in the southern and southeastern areas of Ohio, while no clear pattern was observed for brain and other central nervous system cancer (pages 16 and 17). There are many possible explanations for geographic variations in cancer rates, including differences in lifestyles/behaviors (e.g. smoking, obesity, alcohol consumption), access to medical care, screening practices, stage at diagnosis, poverty, environmental exposures, etc. Elevated rates in some areas may also be due to chance, particularly for relatively rare cancers and in areas with small populations. Geographic patterns for some cancers in Ohio were found to be similar to the patterns for known cancer risk factors. For example, patterns for tobacco-related and poverty-related cancers, including lung and bronchus, laryngeal, and cervical cancers, were similar to geographic patterns for smoking and poverty. However, cancers arise as the result of complex, multifactorial processes, and not as the result of one risk factor acting alone. Because of this, caution should be used in interpreting patterns displayed in these maps.

Key Findings

CANCER INCIDENCE AND MORTALITY

- **All cancer sites/types combined**: Incidence and mortality rates for all cancer sites/types combined were higher in southern Ohio (pages 12 and 13).
- **Breast cancer (female)**: Incidence rates for breast cancer were higher in counties with or adjacent to large cities, including Cleveland and Akron (northeastern Ohio), Columbus (central Ohio) and Cincinnati and Dayton (southwestern Ohio) (page 18).
- **Cervical cancer**: Incidence rates for cervical cancer were higher in counties in southern Ohio and counties just northwest of central Ohio (page 20).
- **Colon and rectum cancer**: Counties with the highest colon and rectum cancer incidence and mortality rates tended to be in rural counties of Ohio (pages 22 and 23).
- **Esophageal cancer**: Incidence rates for esophageal cancer tended to be higher in the Appalachian region of Ohio (page 24).
- **Kidney and renal pelvis cancer**: Incidence rates for kidney and renal pelvis cancer were higher in southern and southeastern border counties (page 26).
- **Laryngeal cancer**: Incidence rates for laryngeal cancer were higher in southern counties (page 28).
- **Liver and intrahepatic bile duct cancer**: Incidence rates for liver and intrahepatic bile duct cancer tended to be higher in southern counties and in counties with large cities (page 32).
- **Lung and bronchus cancer**: Both incidence and mortality rates for lung and bronchus cancer show a clear geographic pattern in Ohio, as higher rates were concentrated in the south (pages 34 and 35).
- **Oral cavity and pharyngeal cancer:** Incidence rates for oral cavity and pharyngeal cancer were higher in the Appalachian region of Ohio (page 42).
- **Prostate cancer**: Incidence rates for prostate cancer were higher in counties with large cities and in northwestern Ohio (page 48).
- **Uterine cancer**: There was a pattern of higher incidence rates for uterine cancer in the east-central region of Ohio (page 54).
- **Cancer sites/types for which the pattern of incidence and mortality rates are similar**: These include cancers of the esophagus, liver and intrahepatic bile duct, lung and bronchus, and pancreas. Patterns of cancer incidence and mortality may be similar because the survival probability for these cancers is extremely low, that is, a large majority of individuals die from these cancers.

CANCER SCREENING AND LATE STAGE DIAGNOSIS

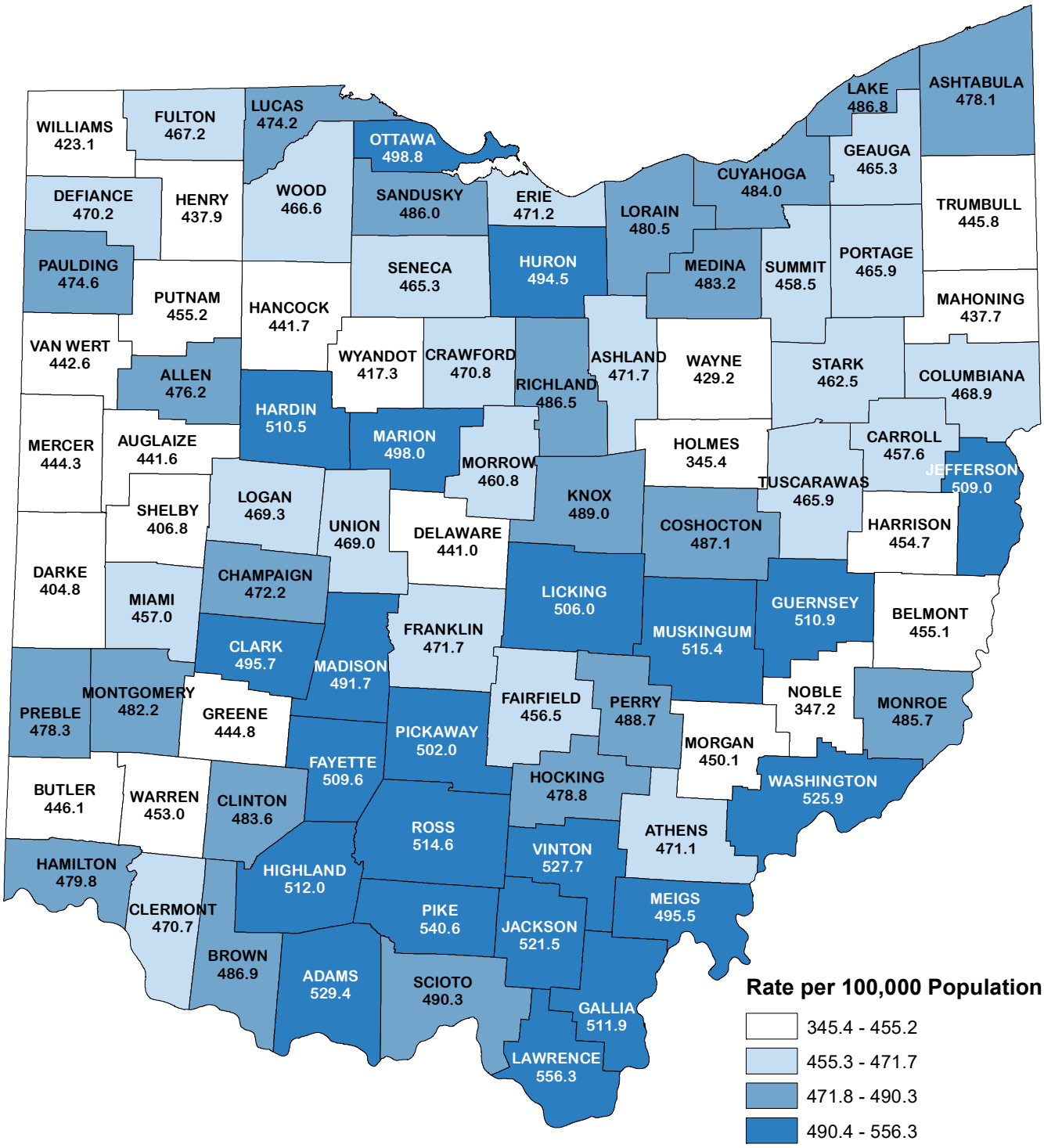
- **Female breast cancer screening**: Counties with the lowest mammography prevalence tended to be rural (page 56).
- **Female breast cancer late stage**: Counties with the highest percentage of late stage diagnoses for female breast cancer tended to be rural (page 57).
- **Colon and rectum cancer screening**: Counties with the lowest colon and rectum screening rates tended to be rural (page 60).

Key Findings

RISK FACTORS, DEMOGRAPHICS, AND SOCIAL DETERMINANTS OF HEALTH

- **Smoking**: The prevalence of smoking among adults ages 18 and older was higher in southern and Appalachia Ohio (page 62).
- **Obesity**: The prevalence of obesity among adults ages 18 and older was higher in counties without large cities and in southern Ohio (page 63).
- **Physical inactivity**: The prevalence of physical inactivity among adults ages 18 and older was higher in Appalachia Ohio (page 64).
- **Excessive drinking**: The prevalence of excessive drinking among adults ages 18 and older was lower in southern Ohio (page 65).
- **Non-white race**: The percentage of non-white residents was higher in urban counties (page 66).
- **Hispanic or Latino ethnicity**: The percentage of Hispanic or Latino residents was higher in counties with large cities and in northwestern Ohio (page 67).
- **Less than high school education**: The percentage of adults ages 25 and older with less than a high school education was higher in Appalachia Ohio (page 68).
- **Poverty**: The poorest counties, based on the percent of the population living below the poverty level, were primarily located in Appalachia Ohio (page 69).
- **Food insecurity**: The percentage of the population who were food insecure was higher in Appalachia Ohio (page 70).
- **Uninsured**: The percentage of the population without health insurance tended to be lower in northwestern Ohio (page 71).

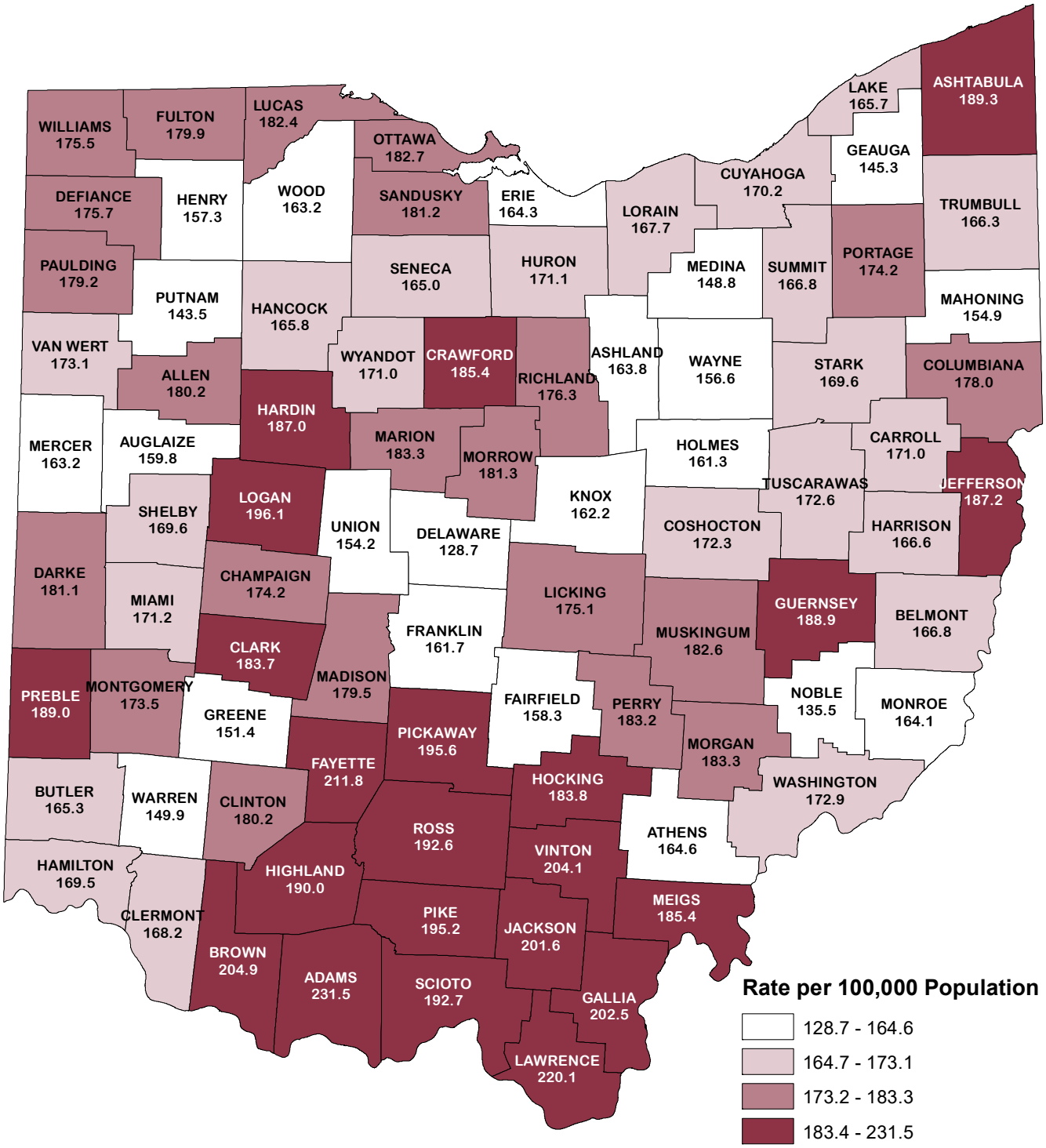
Figure 1. All Cancer Sites/Types Combined: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 471.5
U.S. Rate: 445.5

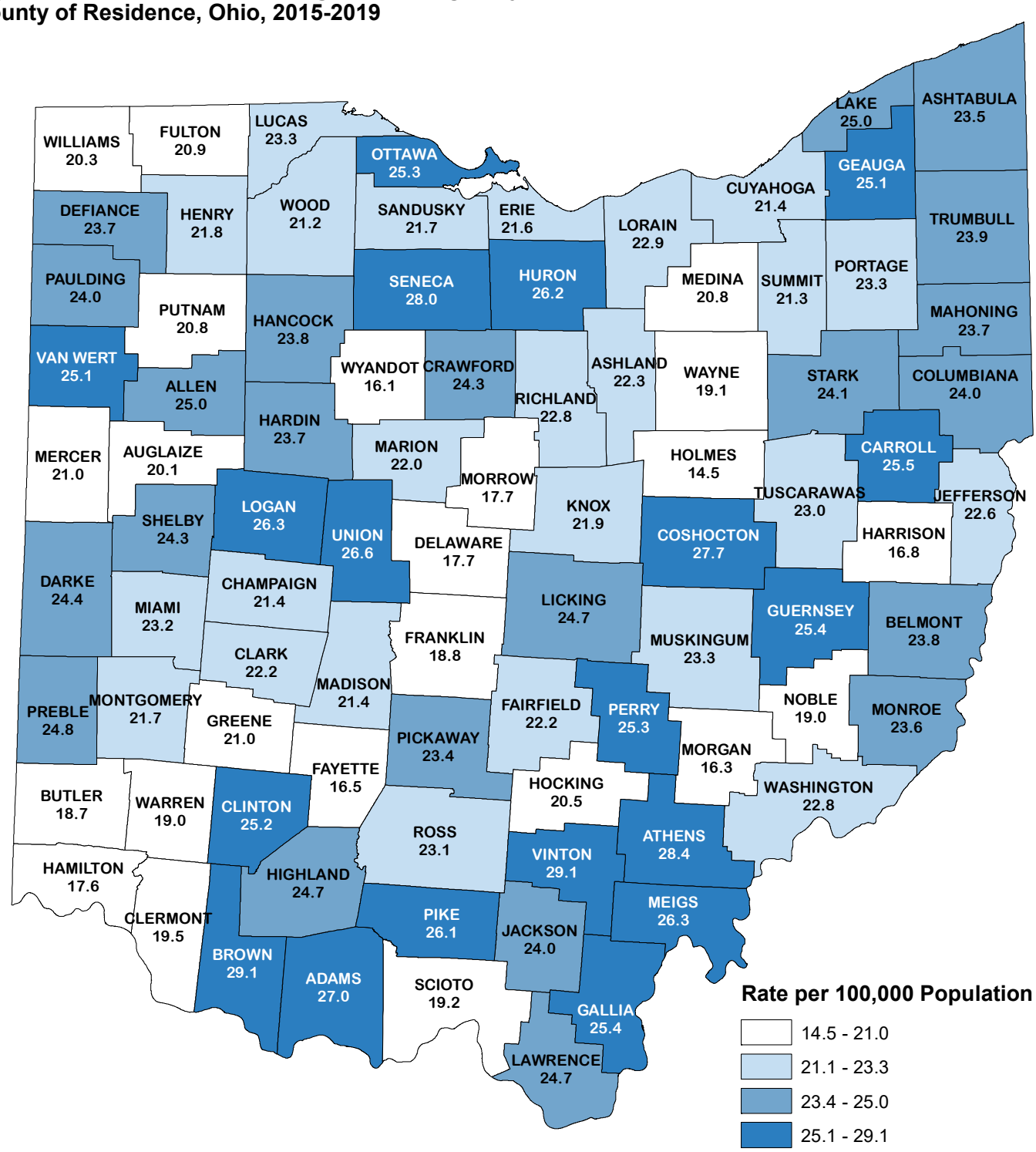
Figure 2. All Cancer Sites/Types Combined: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.

Ohio Rate: 178.9
U.S. Rate: 163.5

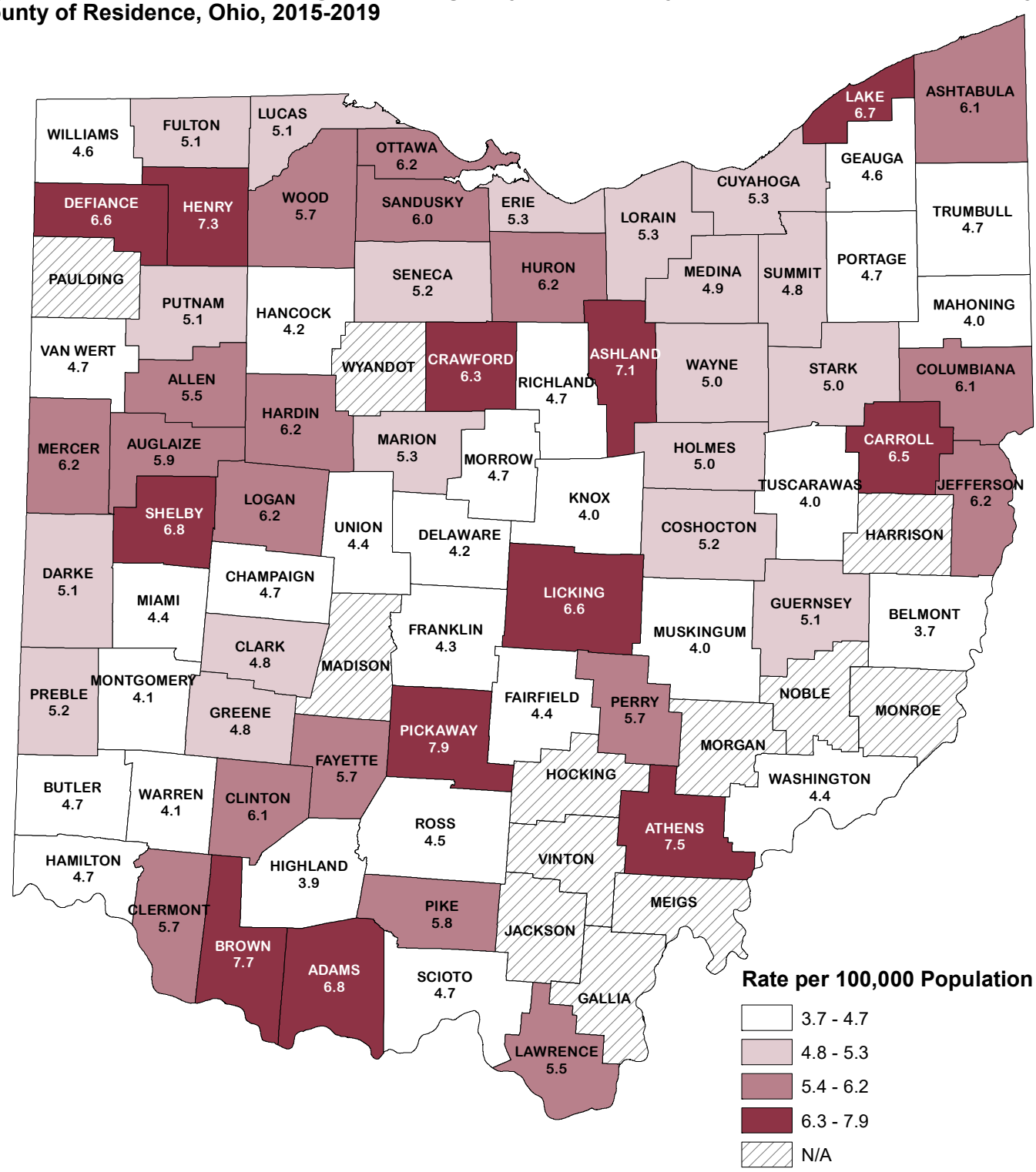
Figure 3. Bladder Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 21.7
U.S. Rate: 18.7

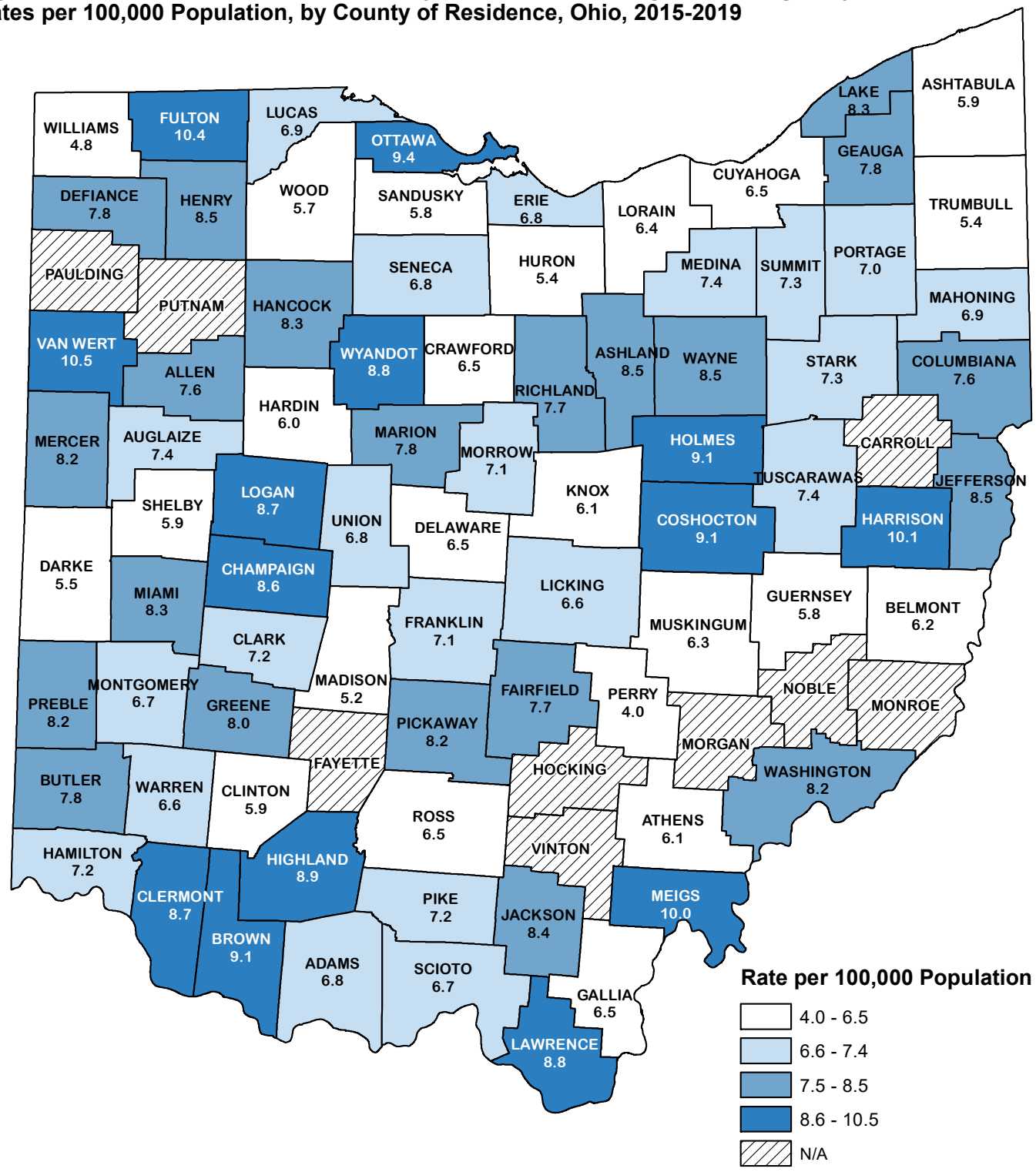
Figure 4. Bladder Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2015-2019 is less than 10.

Ohio Rate: 5.0
U.S. Rate: 4.4

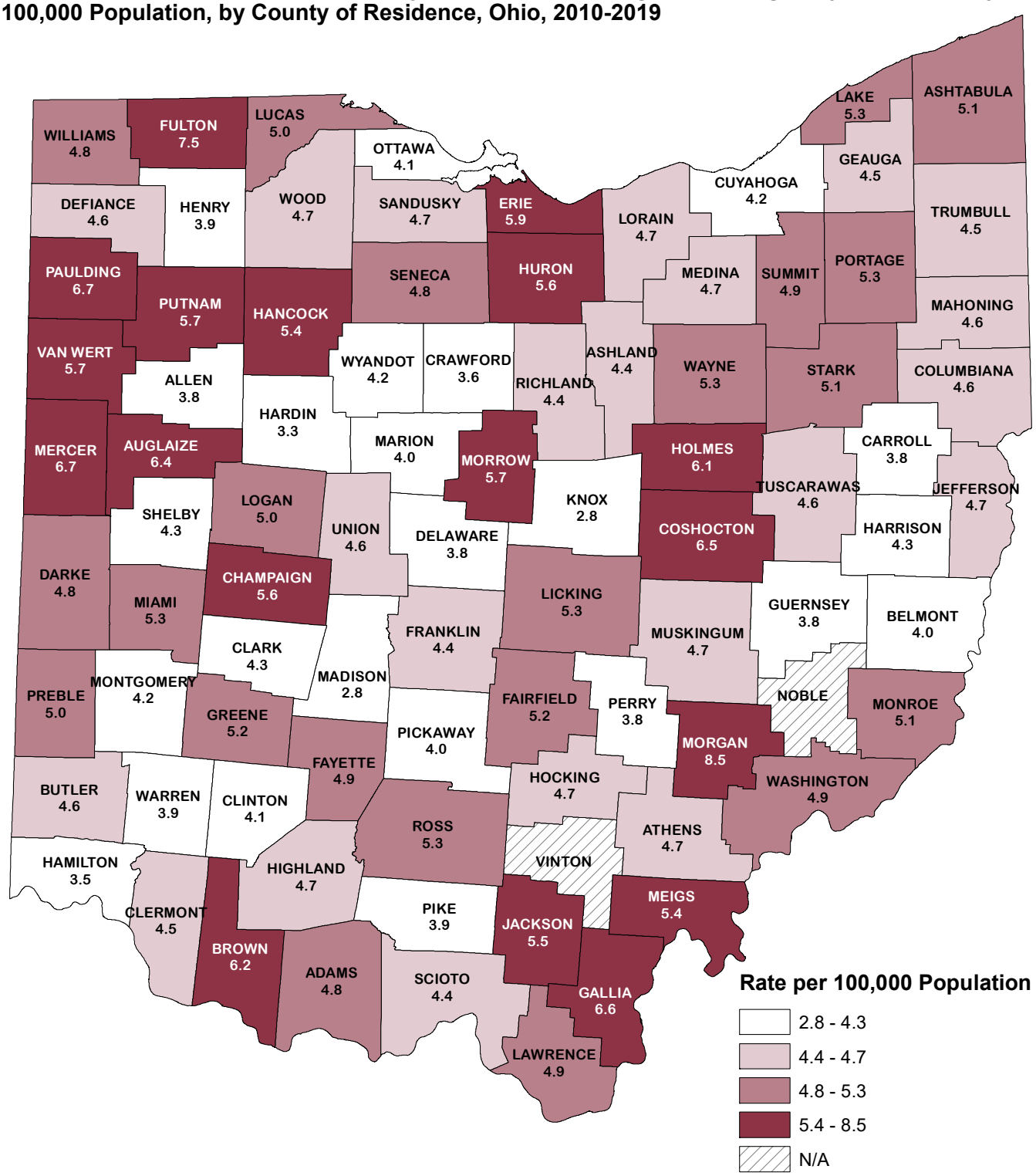
Figure 5. Brain & Other Central Nervous System Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 7.1
U.S. Rate: 6.3

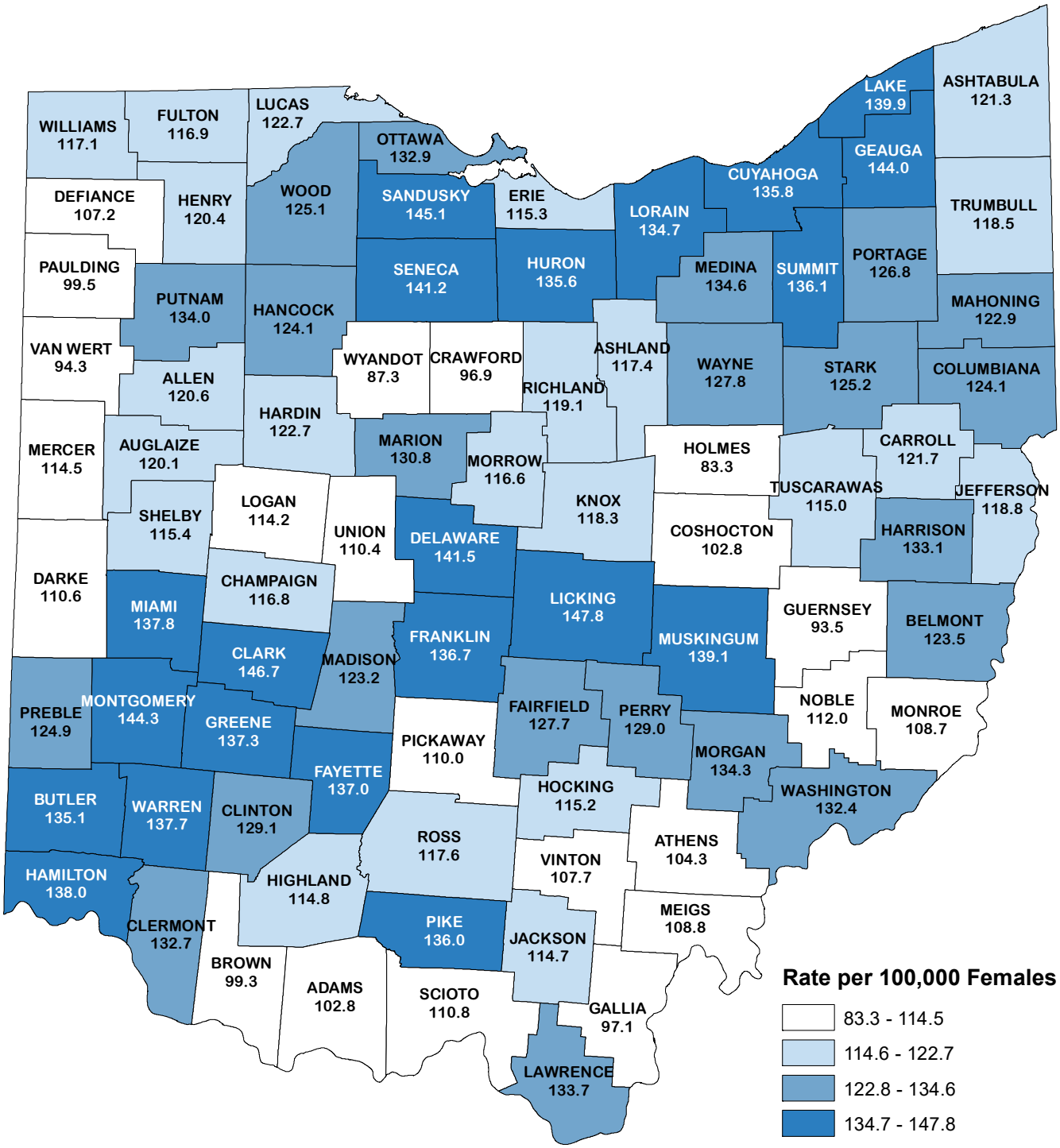
Figure 6. Brain & Other Central Nervous System Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2010-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2010-2019 is less than 10.

Ohio Rate: 4.5
U.S. Rate: 4.4

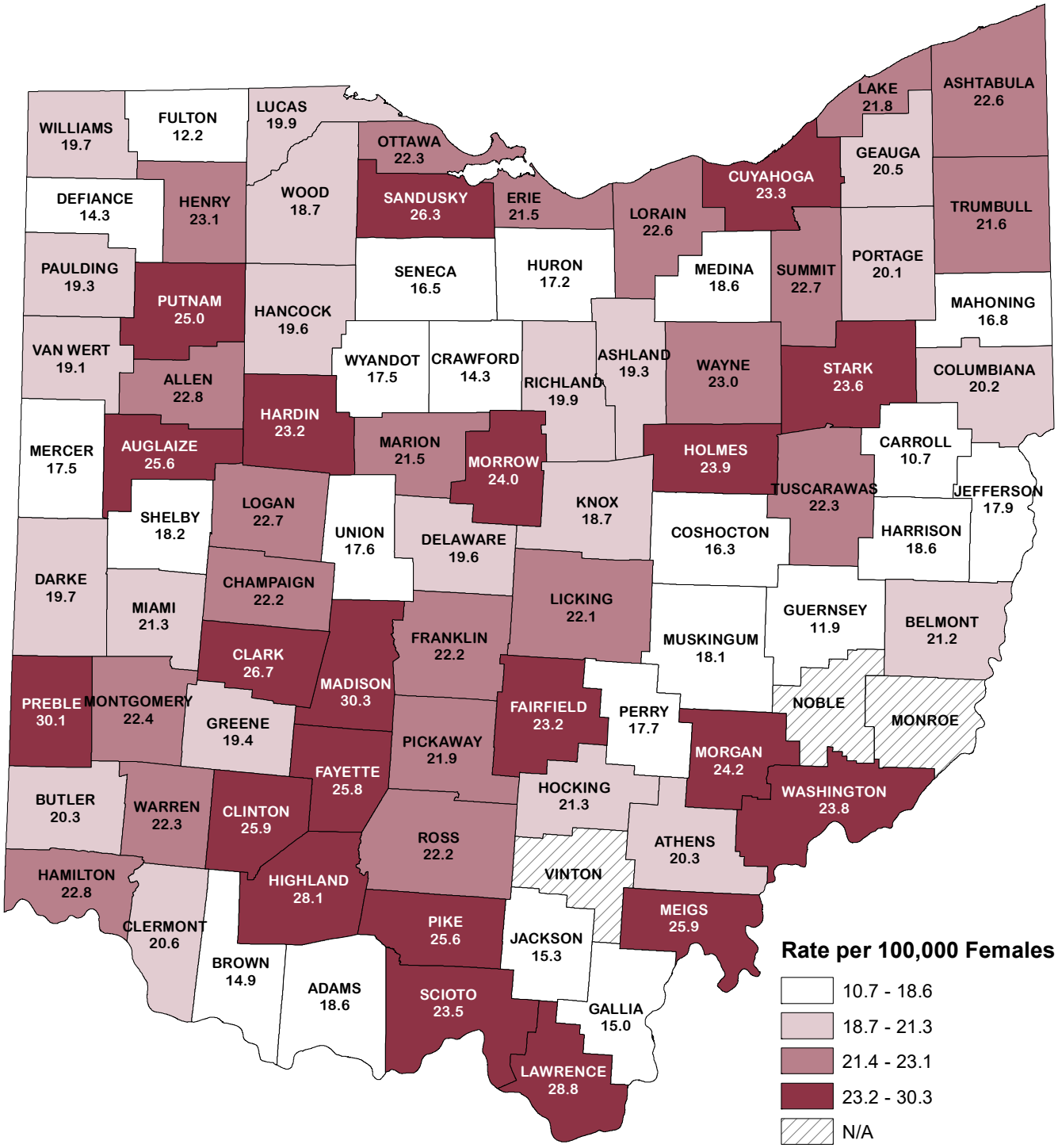
Figure 7. Female Breast Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 130.3
U.S. Rate: 128.3

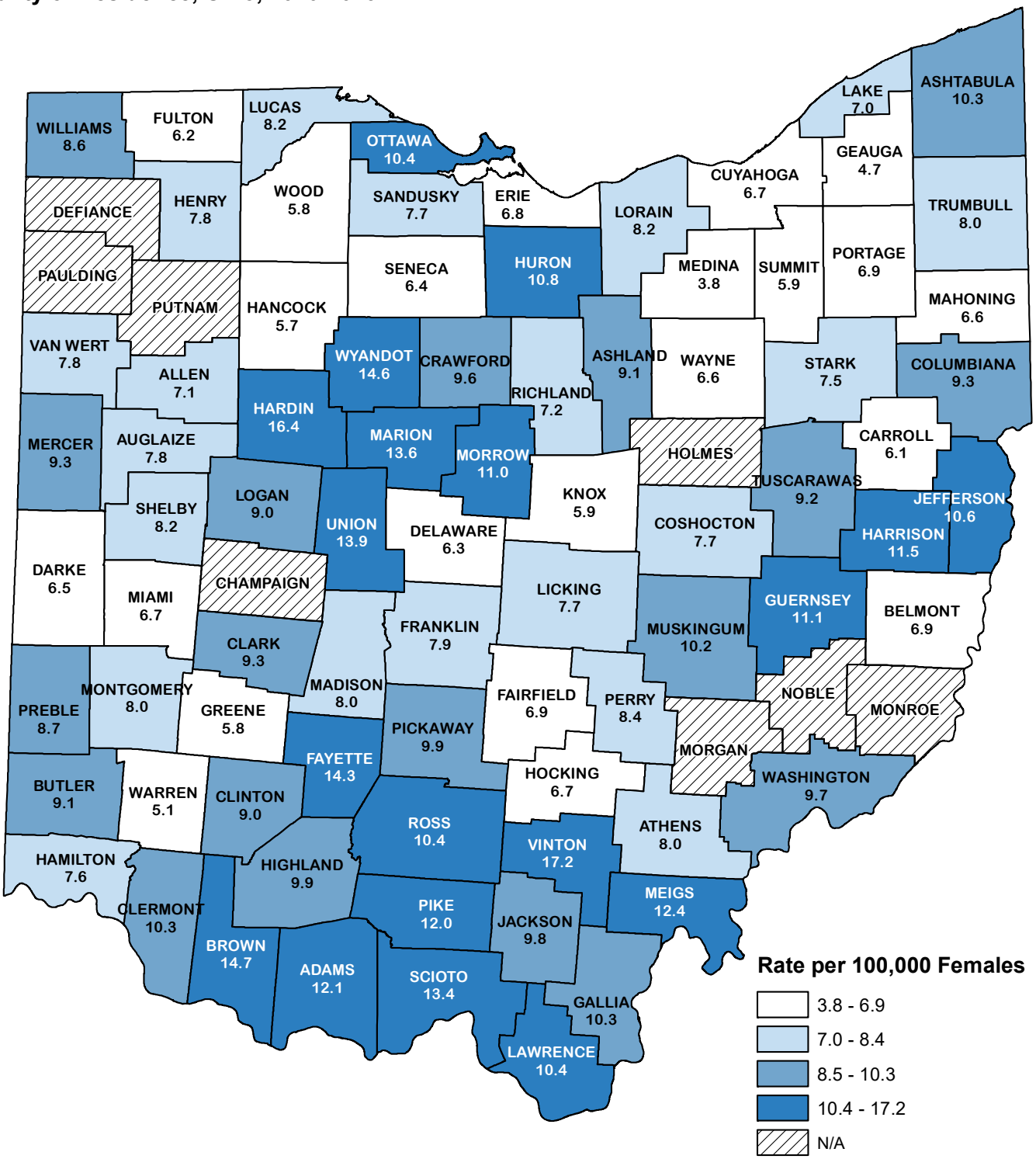
Figure 8. Female Breast Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2015-2019 is less than 10.

Ohio Rate: 21.6
U.S. Rate: 19.6

Figure 9. Cervical Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2010-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2010-2019 is less than 10.

Ohio Rate: 7.7
U.S. Rate: 7.8

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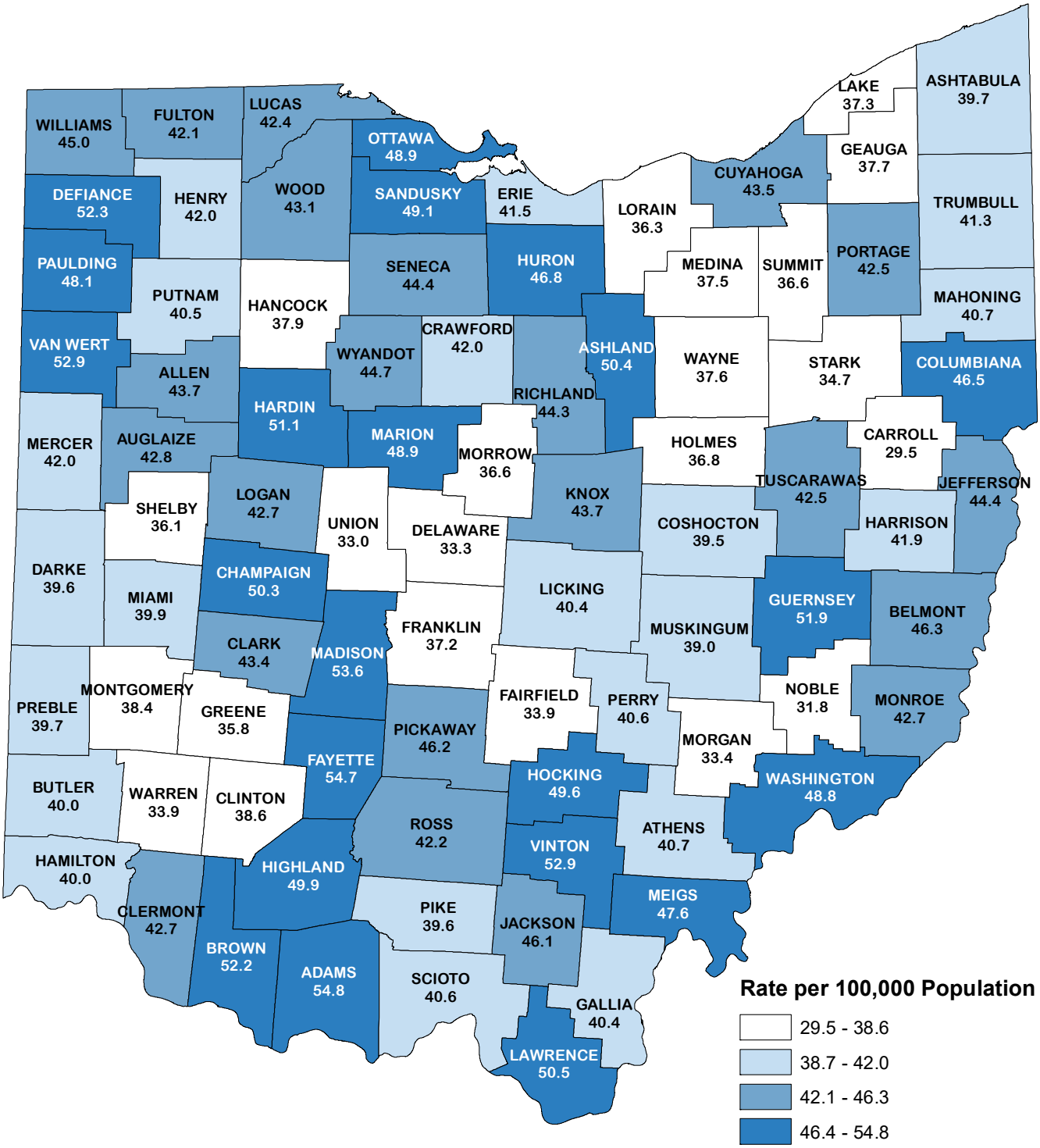
Mortality rates are not presented by county for cervical cancer.

See page 9 for details on suppression rules.

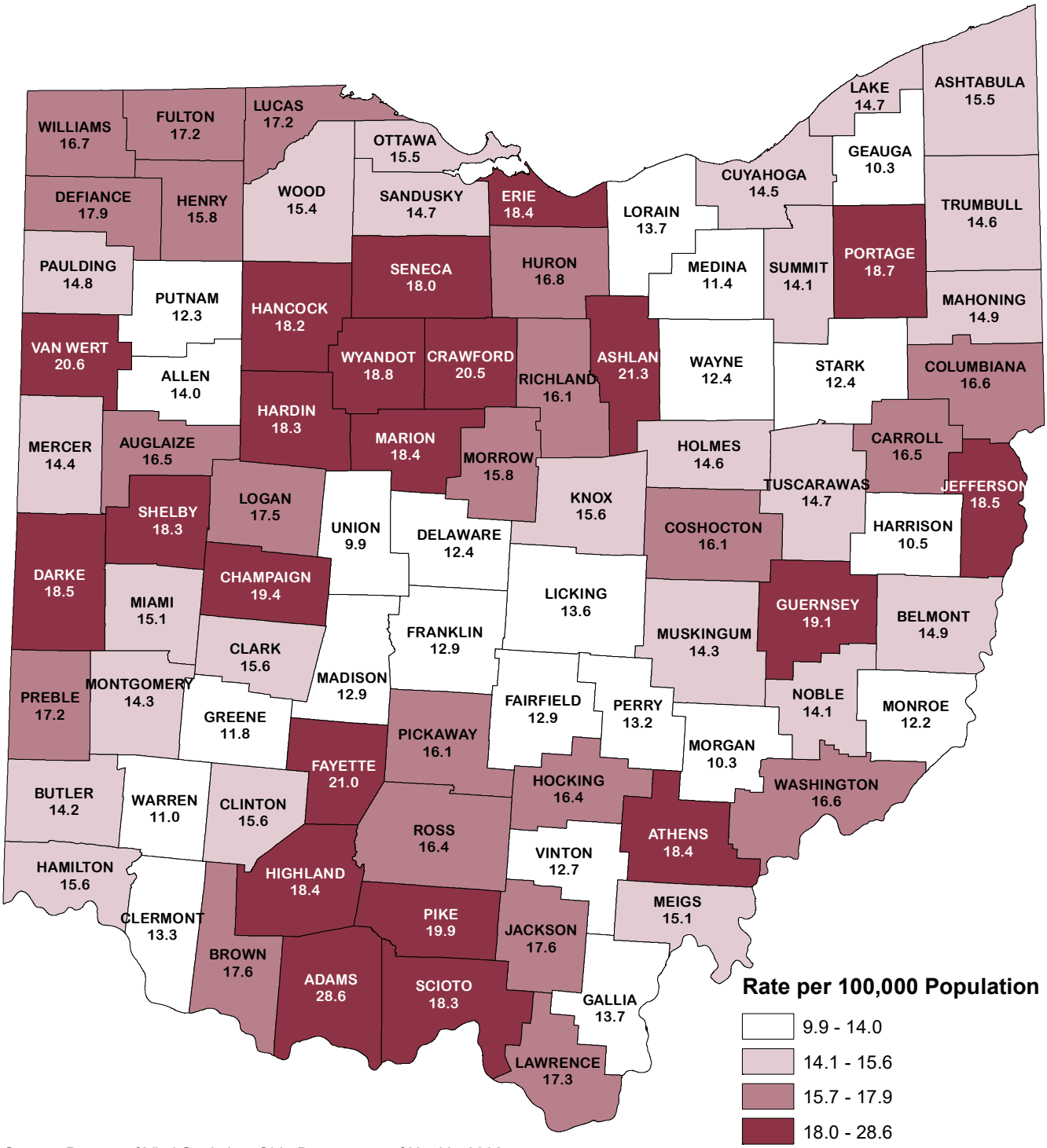
Figure 10. Colon & Rectum Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 40.5
U.S. Rate: 37.7

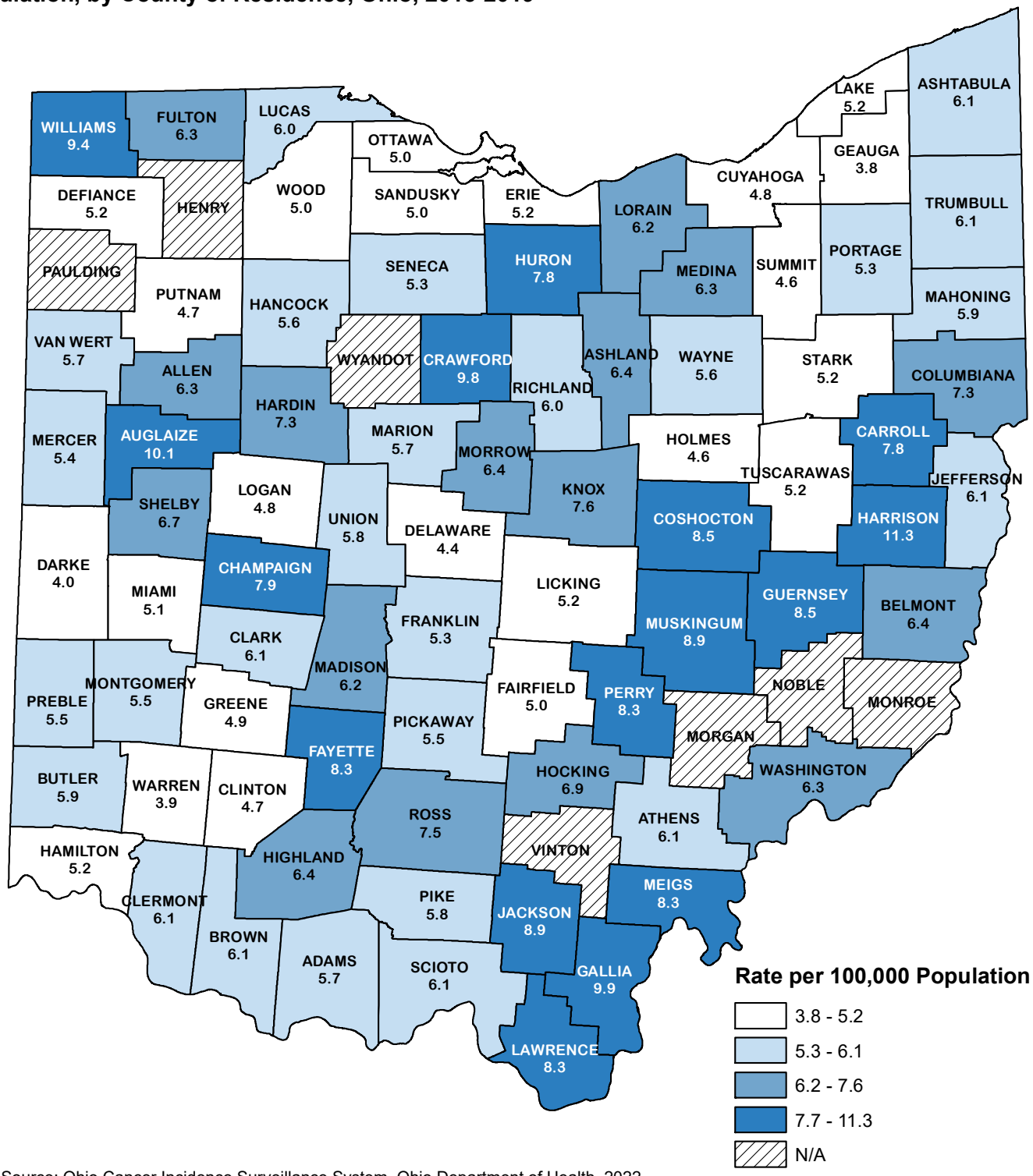
Figure 11. Colon & Rectum Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.

Ohio Rate: 14.8
U.S. Rate: 13.1

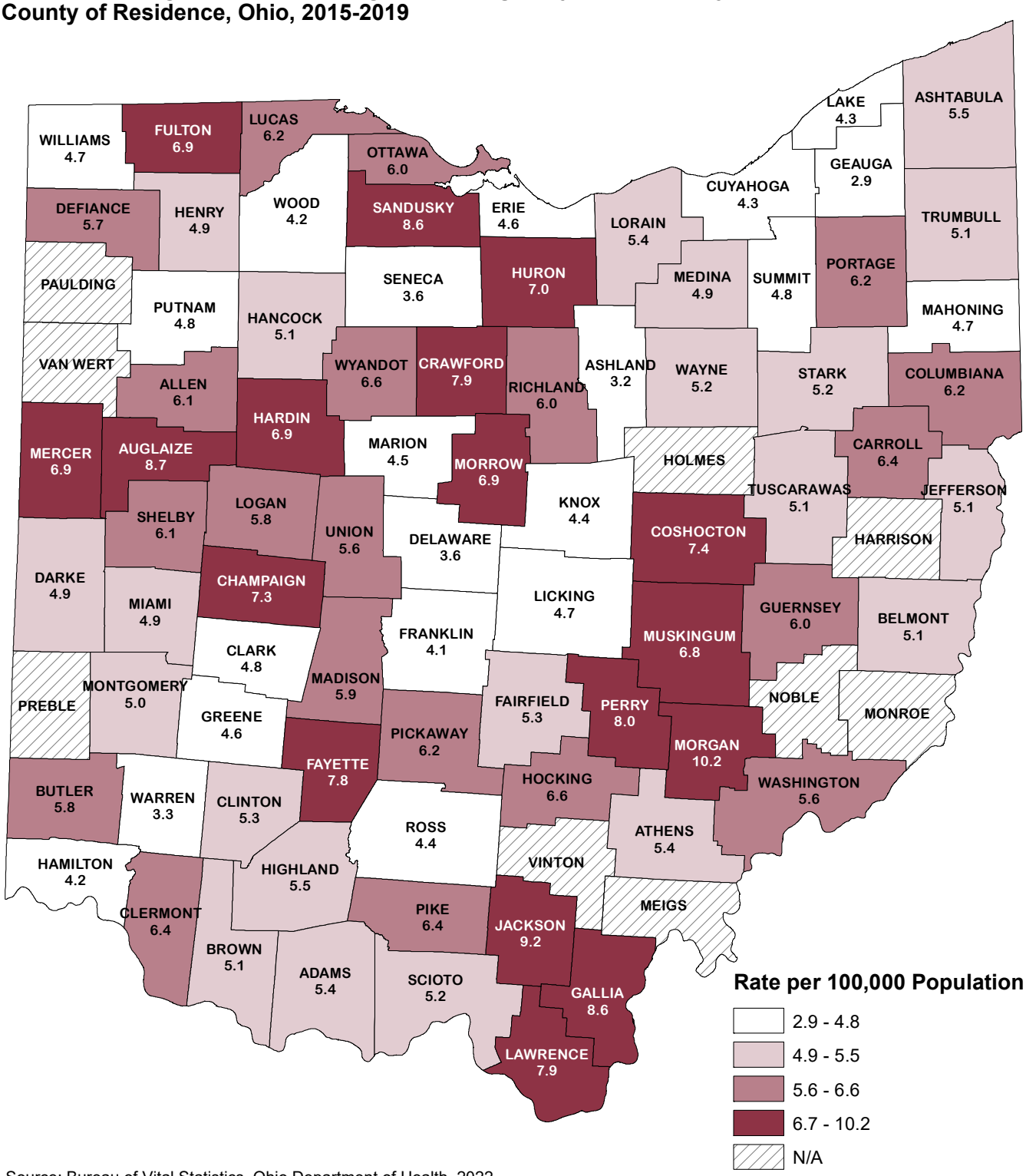
Figure 12. Esophageal Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 5.6
U.S. Rate: 4.2

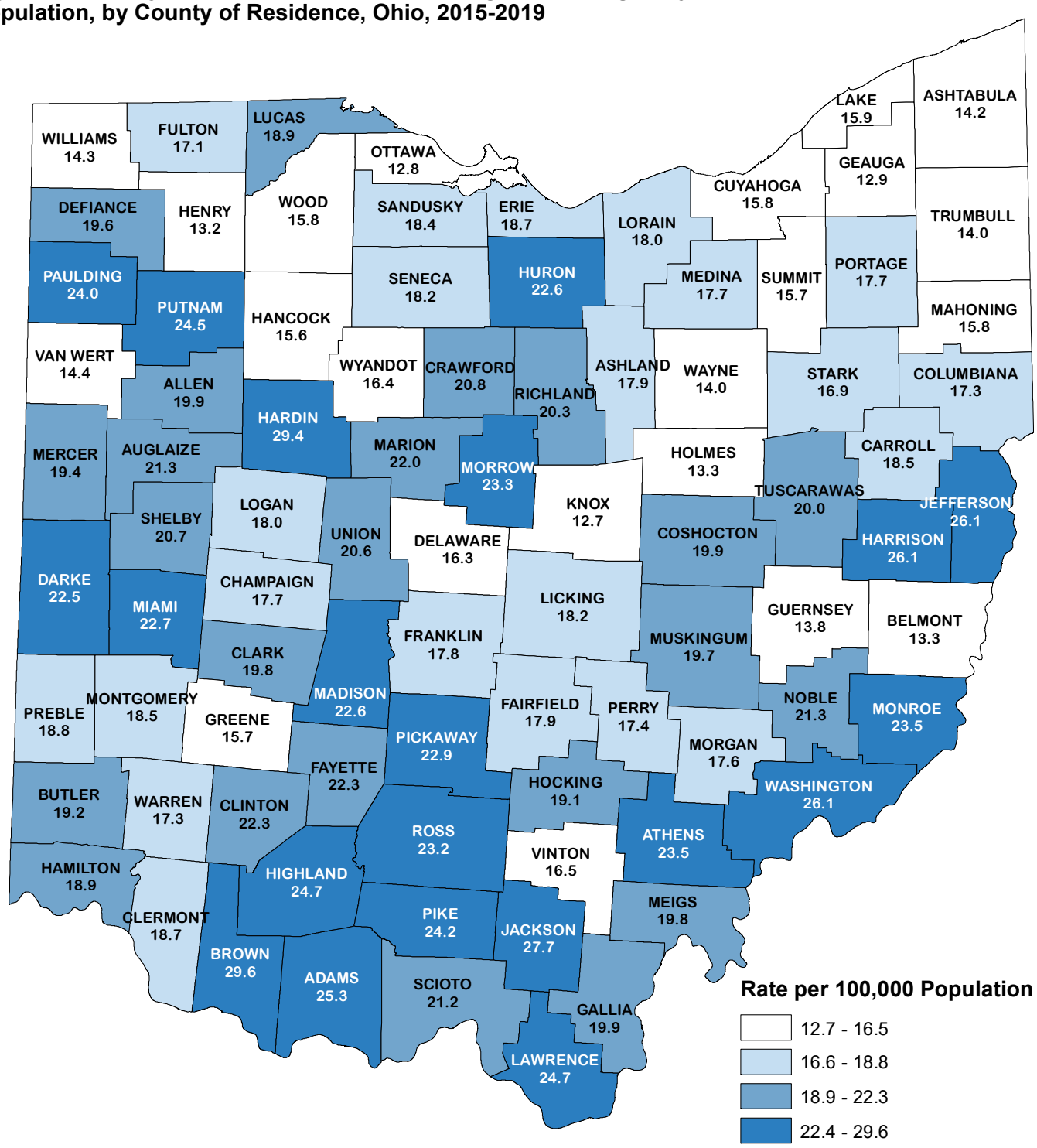
Figure 13. Esophageal Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2015-2019 is less than 10.

Ohio Rate: 5.0
U.S. Rate: 3.8

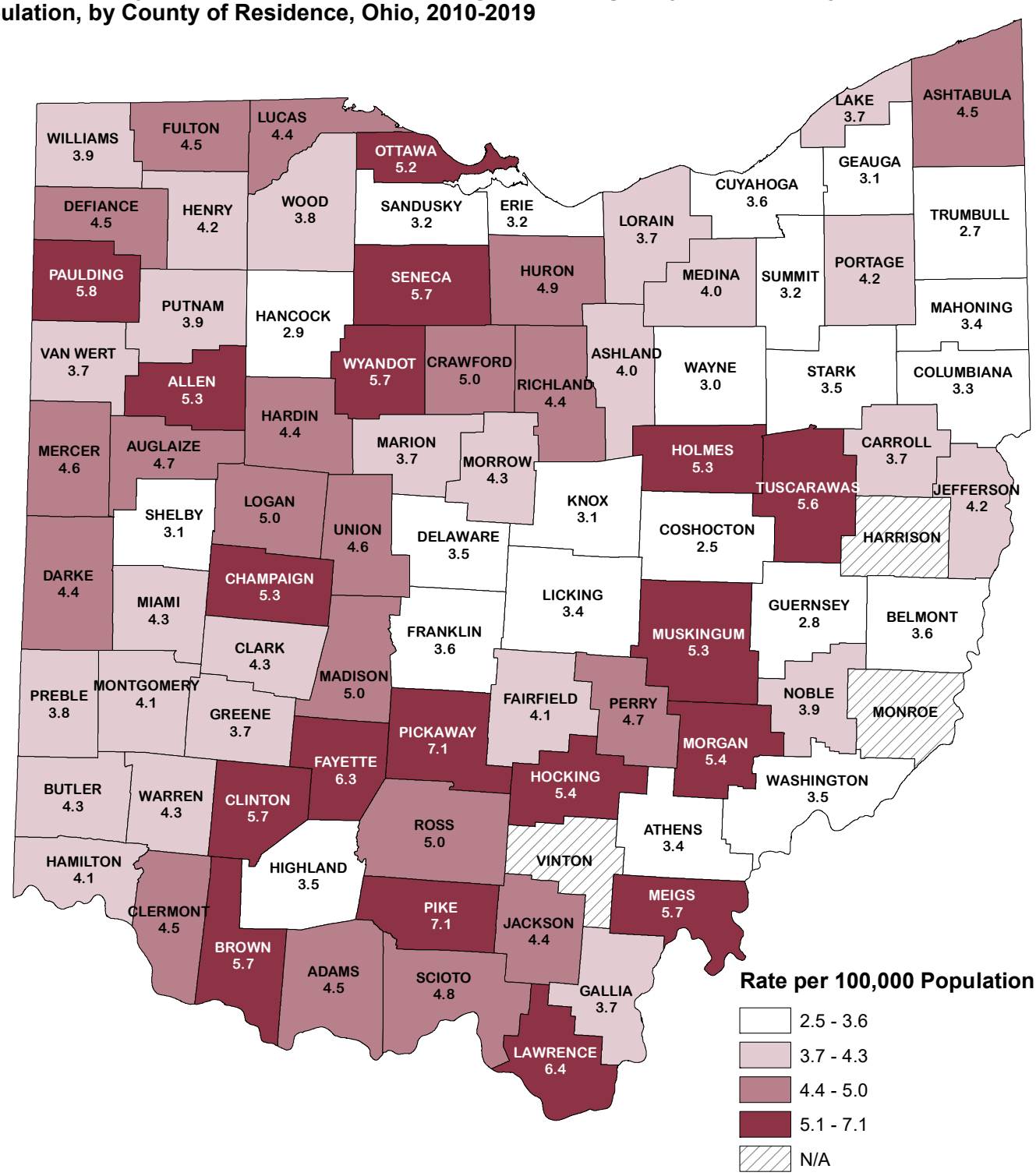
Figure 14. Kidney & Renal Pelvis Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 17.9
U.S. Rate: 17.3

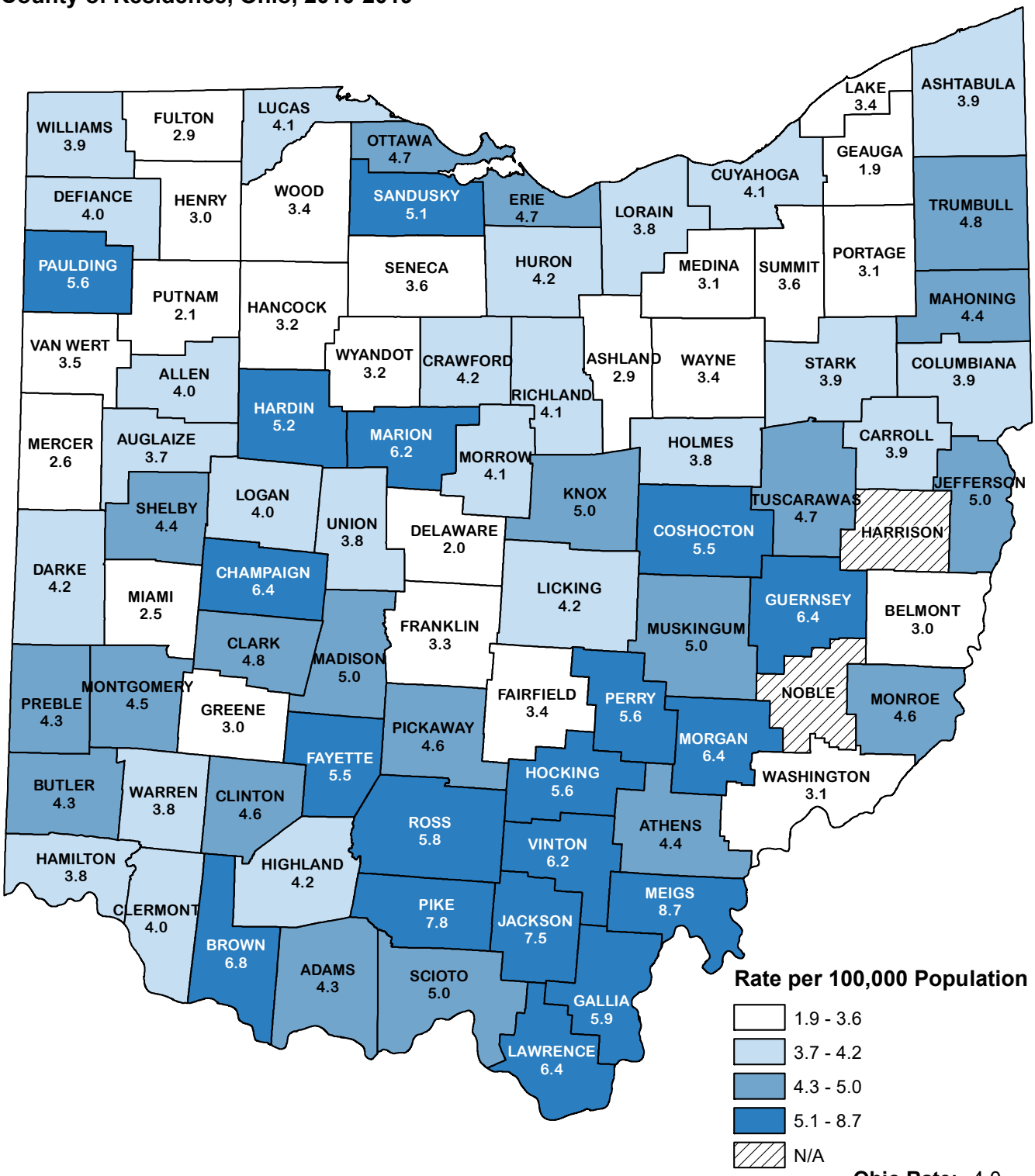
Figure 15. Kidney & Renal Pelvis Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2010-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2010-2019 is less than 10.

Ohio Rate: 3.9
U.S. Rate: 3.7

Figure 16. Laryngeal Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2010-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2010-2019 is less than 10.

Ohio Rate: 4.0
U.S. Rate: 3.0

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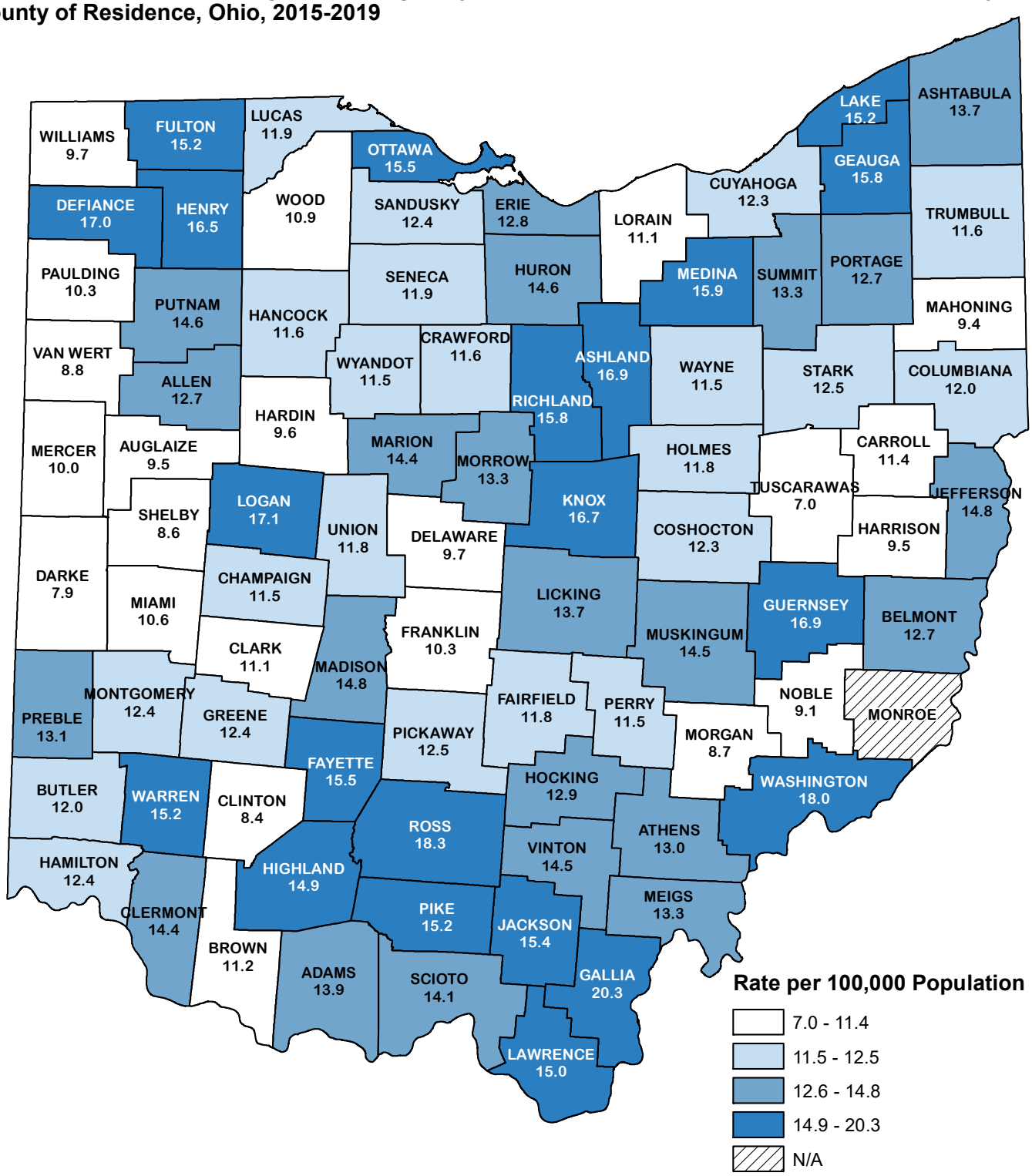
Mortality rates are not presented by county for laryngeal cancer.

See page 9 for details on suppression rules.

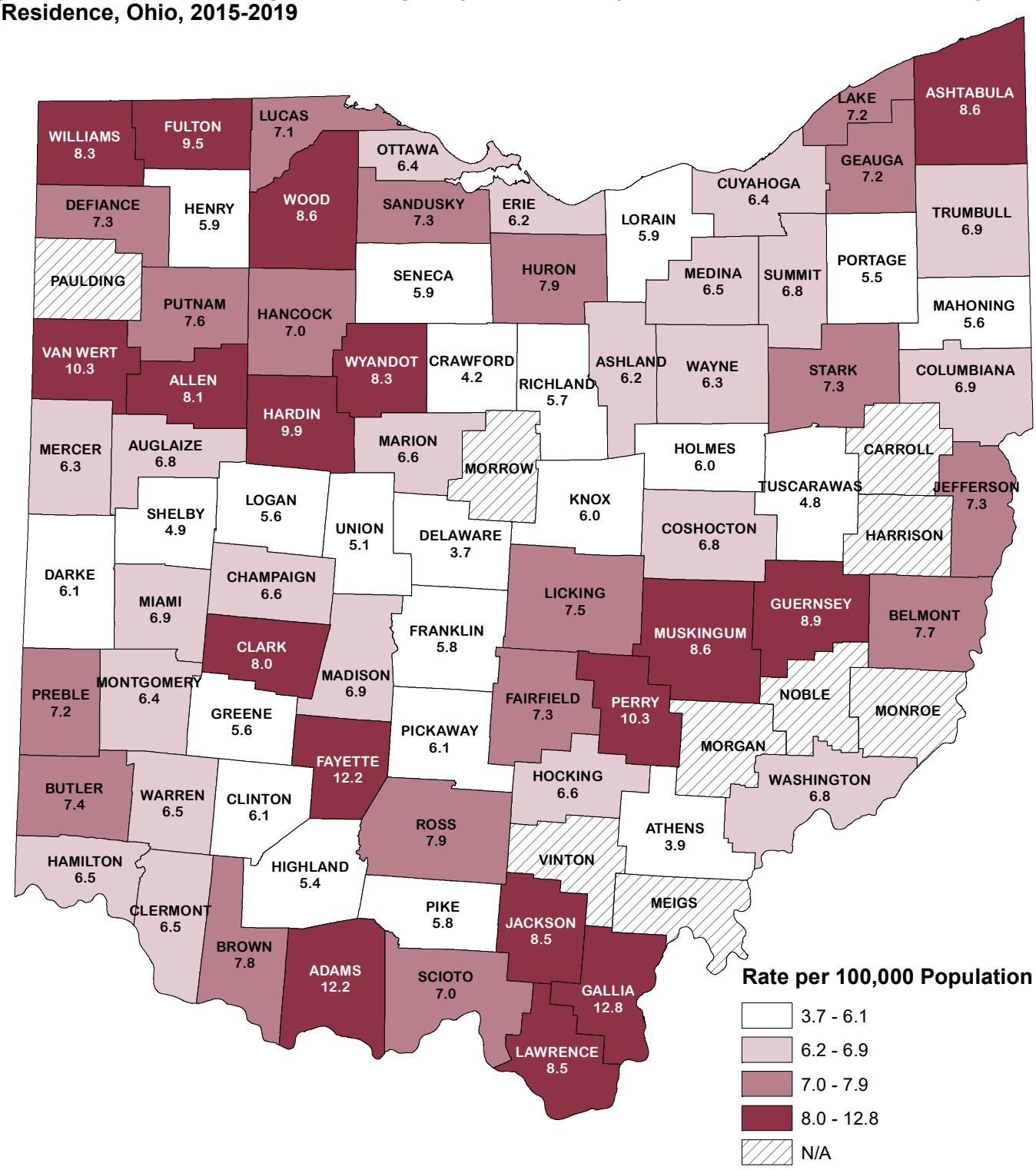
Figure 17. Leukemia: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 12.4
U.S. Rate: 14.1

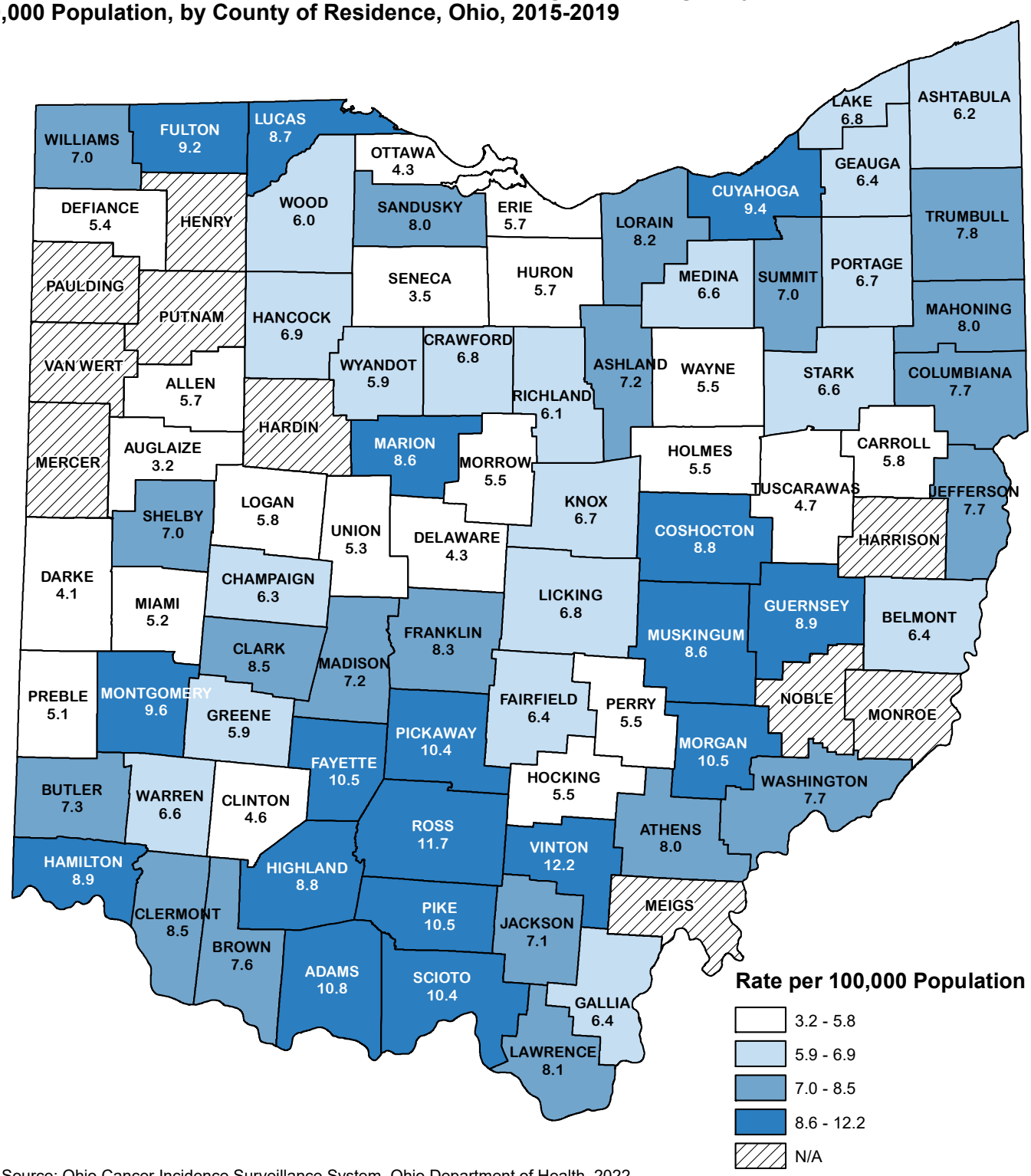
Figure 18. Leukemia: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2015-2019 is less than 10.

Ohio Rate: 6.6
U.S. Rate: 6.0

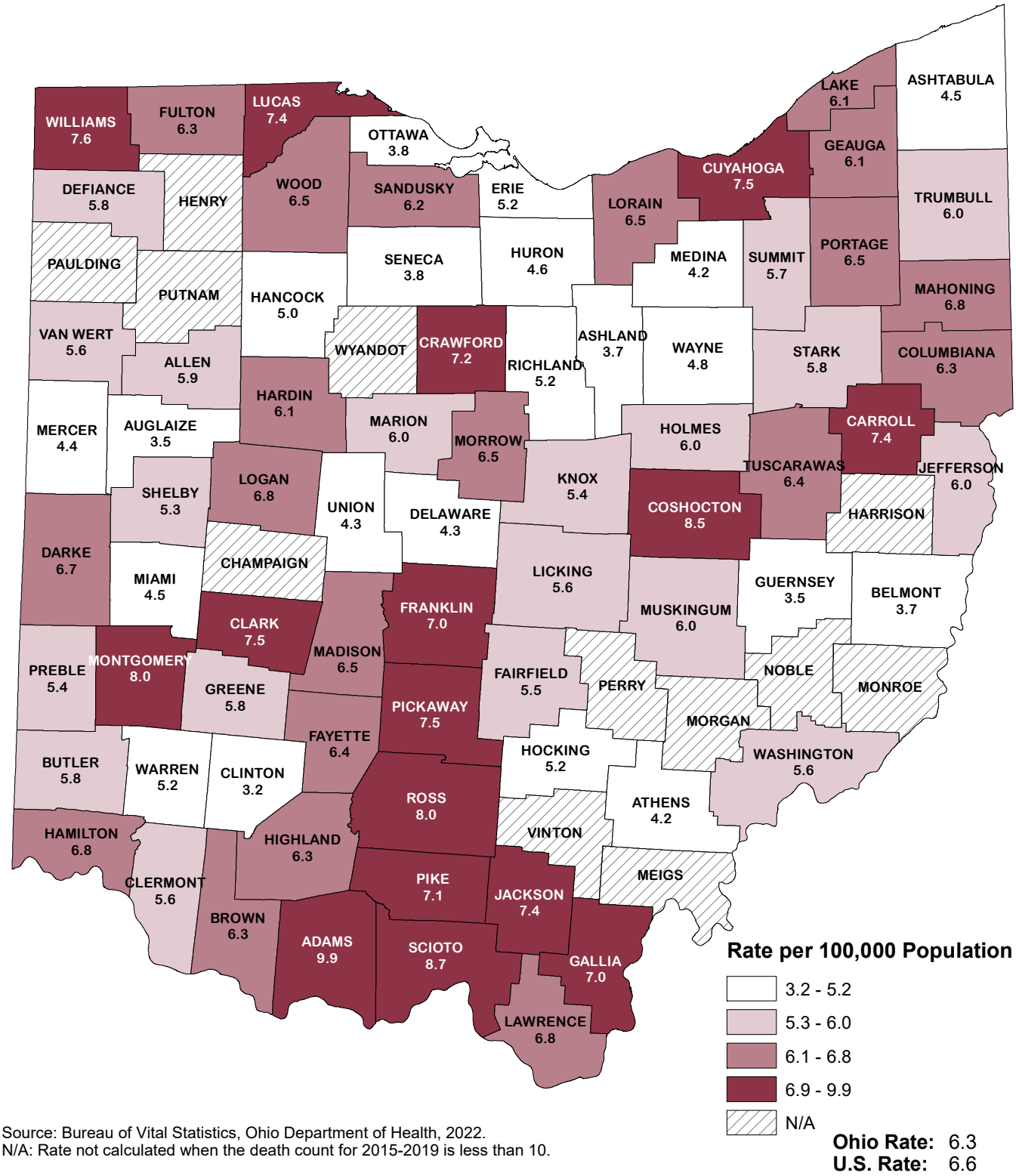
Figure 19. Liver & Intrahepatic Bile Duct Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 7.6
U.S. Rate: 9.5

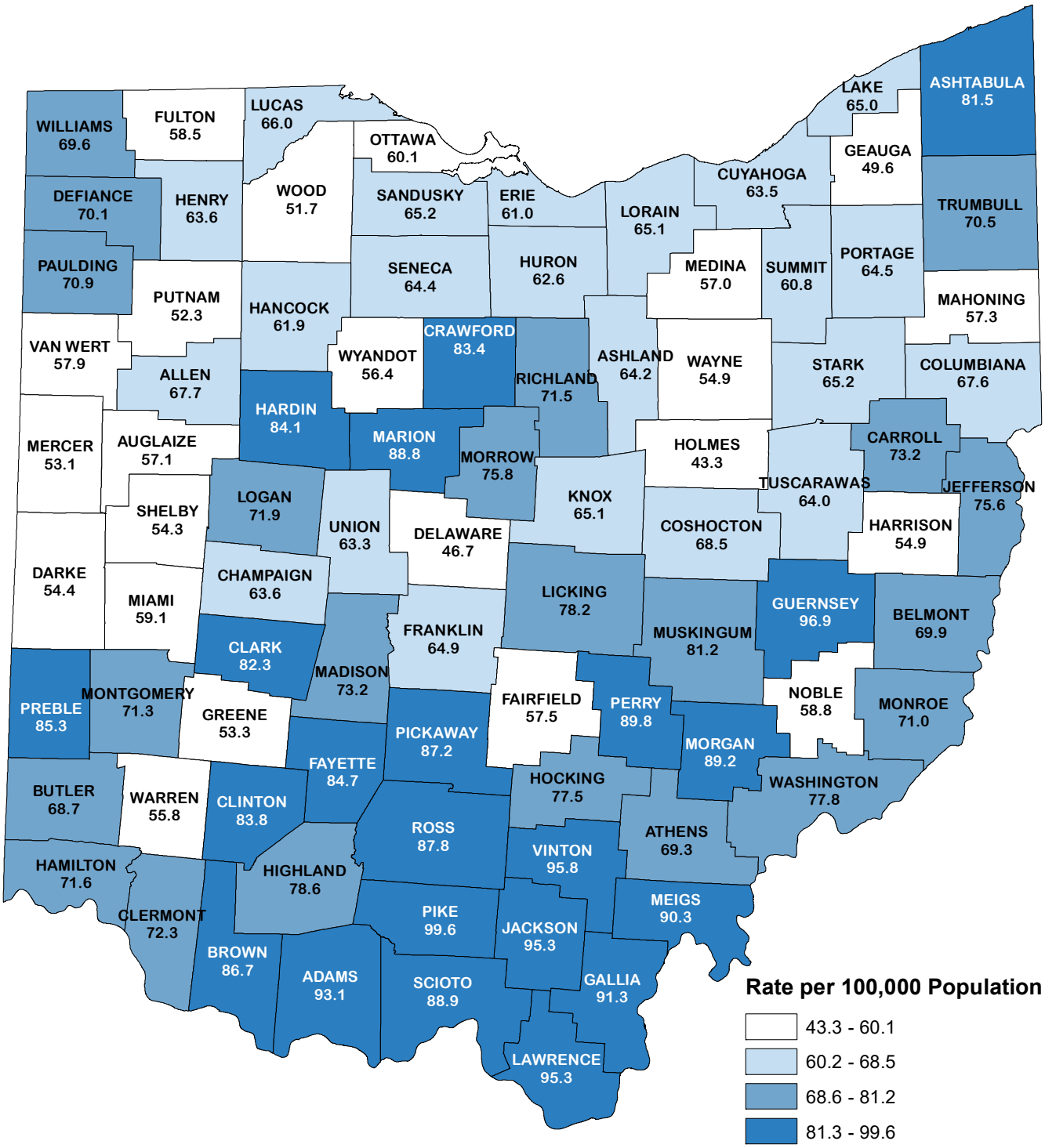
Figure 20. Liver & Intrahepatic Bile Duct Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2015-2019 is less than 10.

Ohio Rate: 6.3
U.S. Rate: 6.6

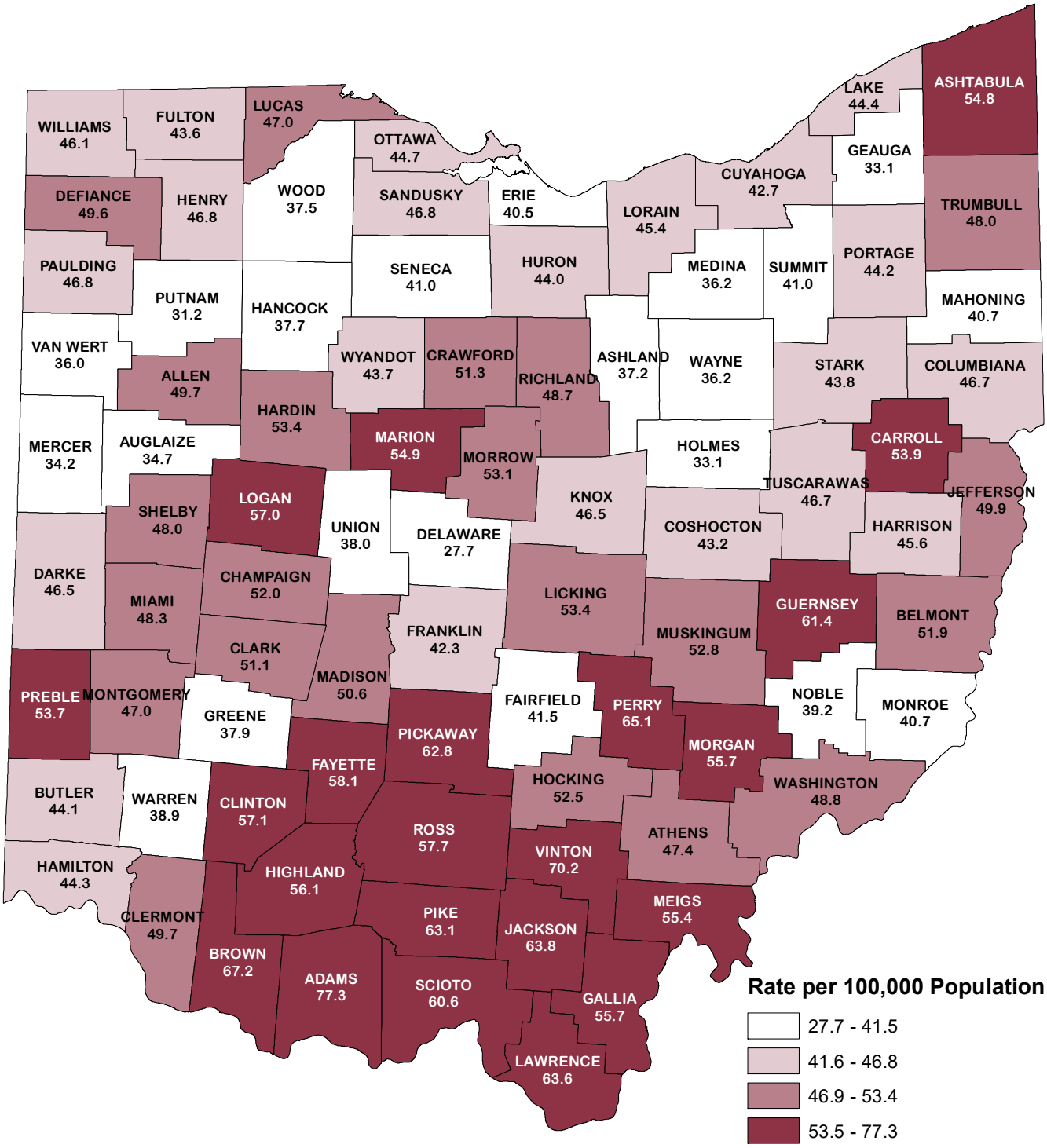
Figure 21. Lung & Bronchus Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 66.7
U.S. Rate: 52.0

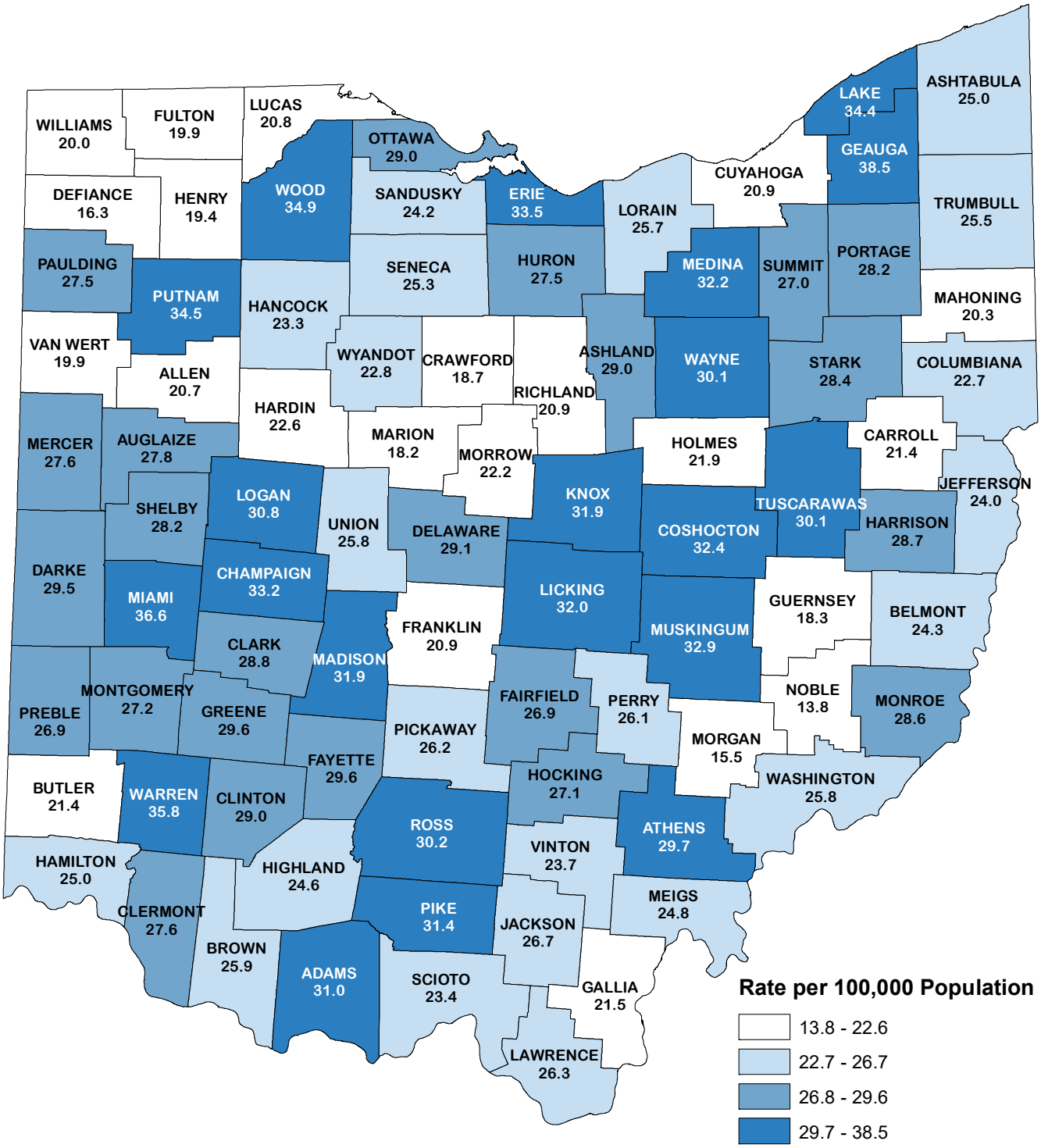
Figure 22. Lung & Bronchus Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.

Ohio Rate: 45.0
U.S. Rate: 35.0

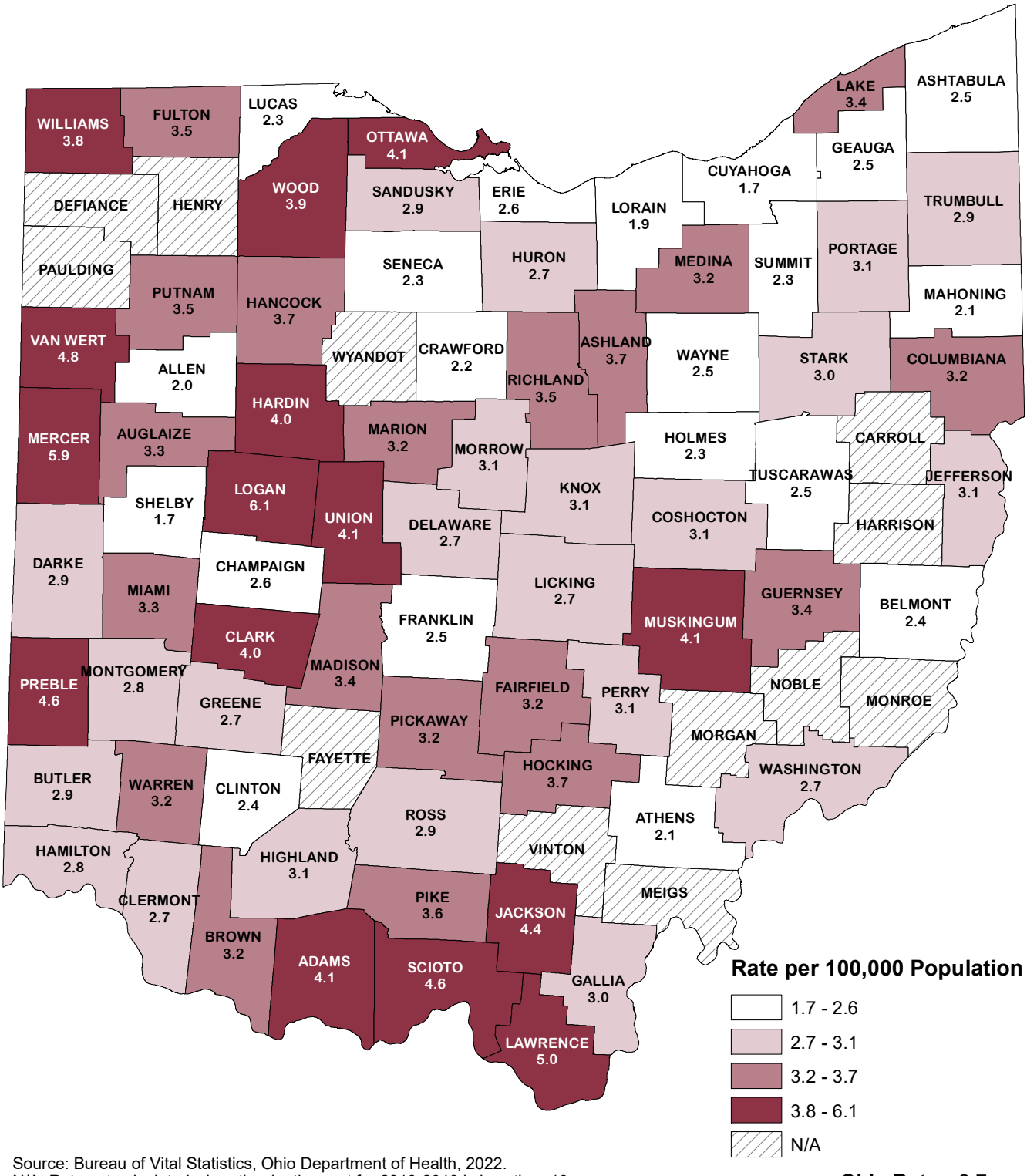
Figure 23. Melanoma of the Skin: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 25.6
U.S. Rate: 21.5

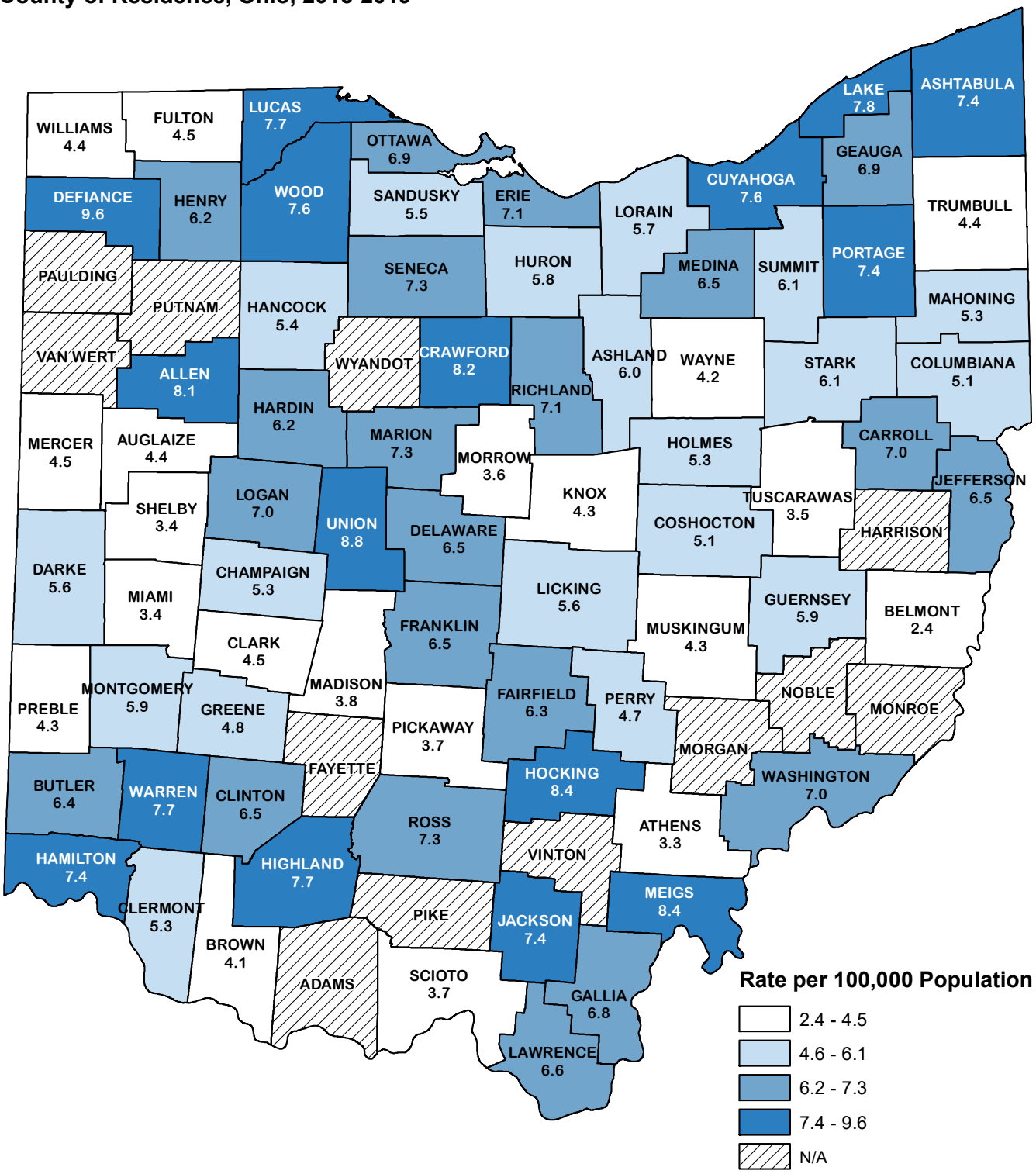
Figure 24. Melanoma of the Skin: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2010-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2010-2019 is less than 10.

Ohio Rate: 2.7
U.S. Rate: 2.4

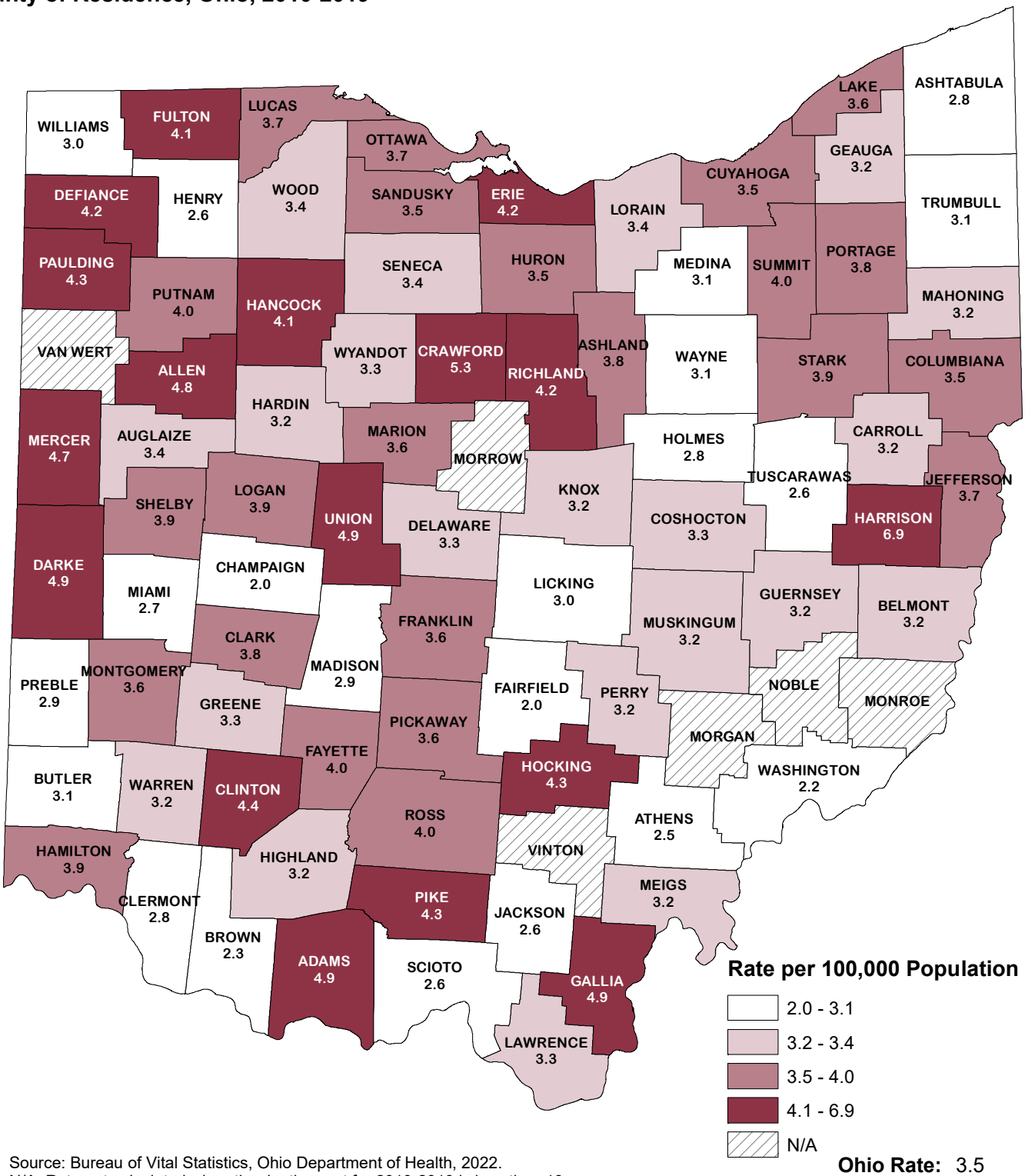
Figure 25. Multiple Myeloma: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 6.2
U.S. Rate: 7.1

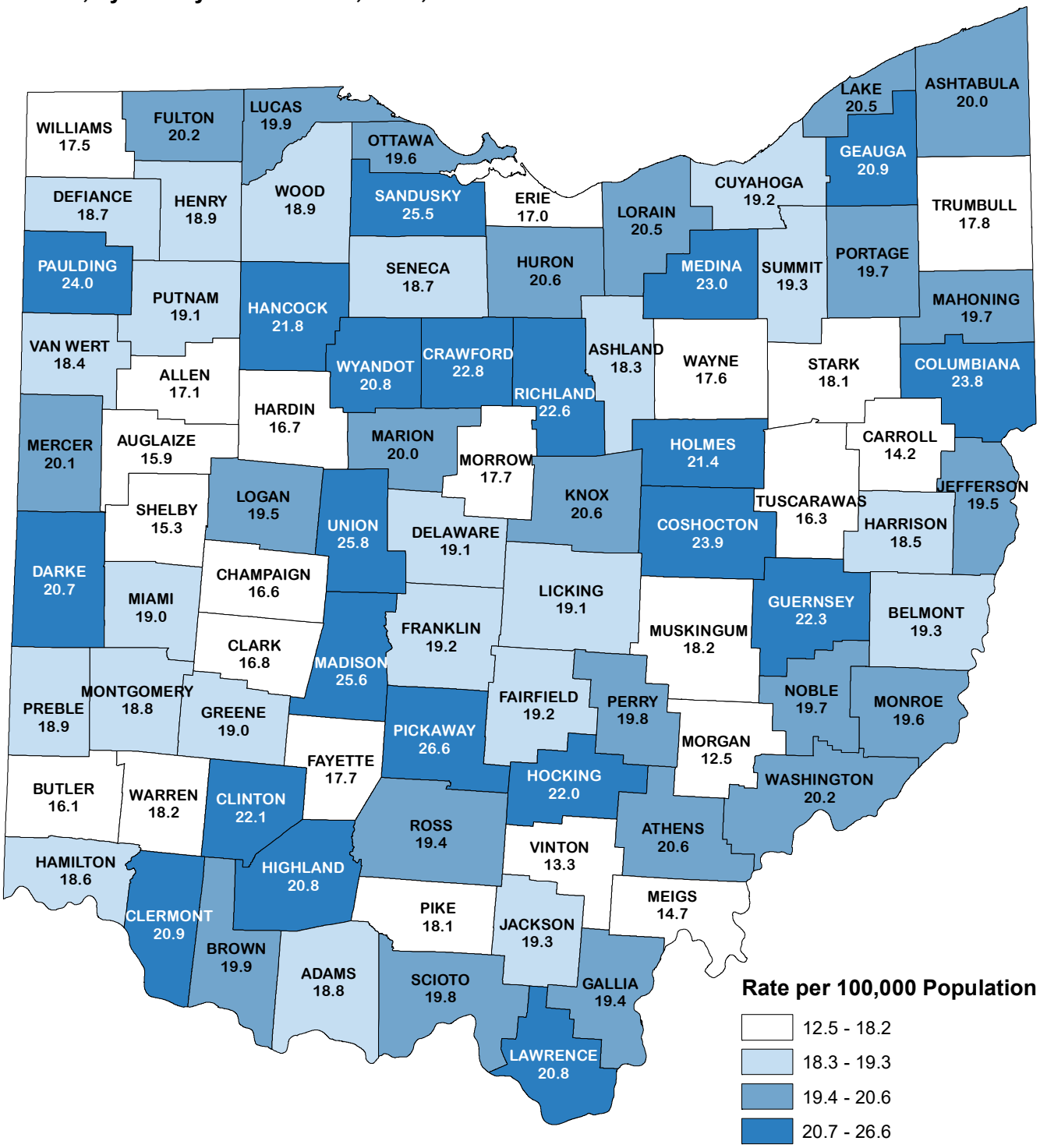
Figure 26. Multiple Myeloma: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2010-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2010-2019 is less than 10.

Ohio Rate: 3.5
U.S. Rate: 3.2

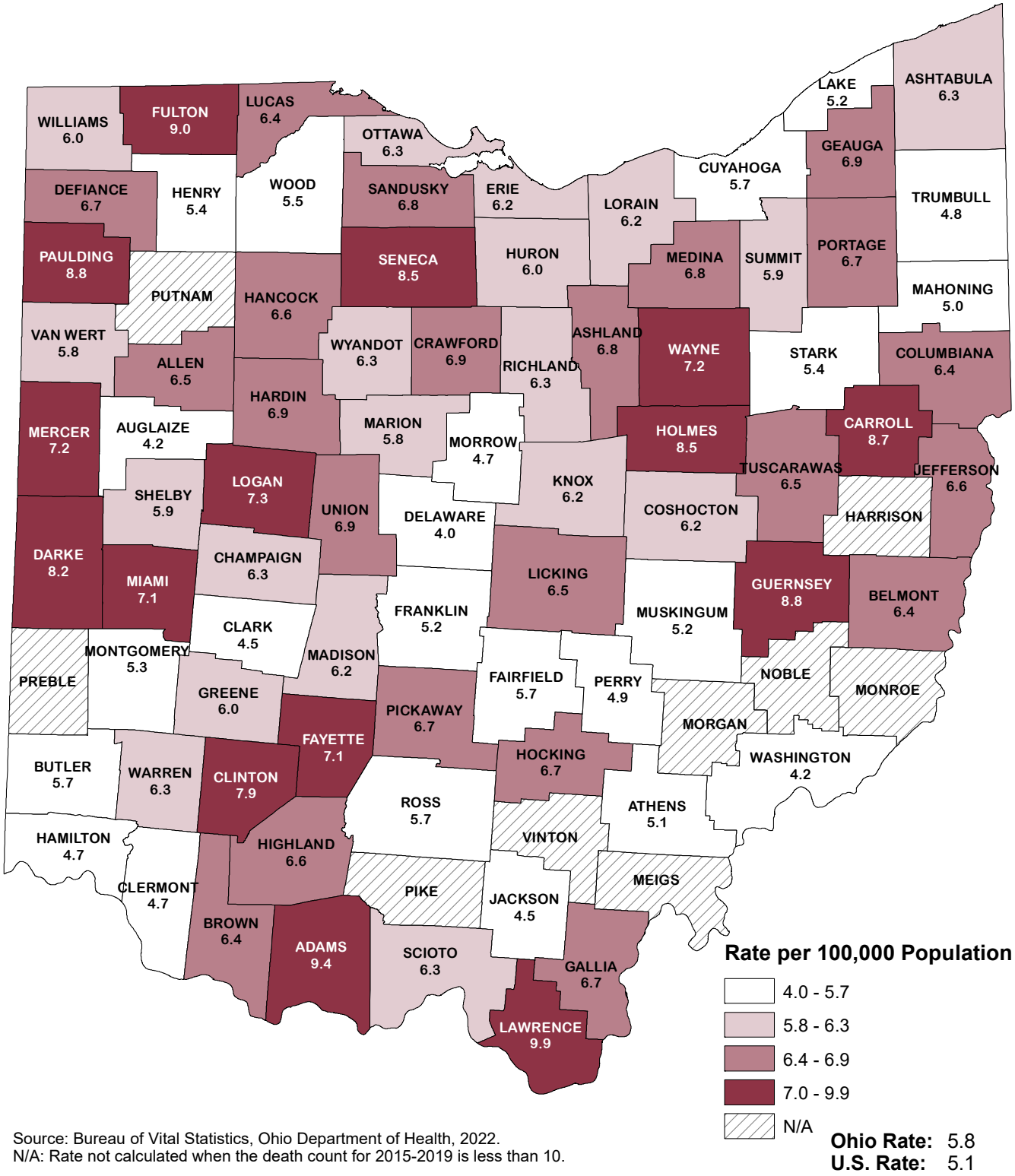
Figure 27. Non-Hodgkin Lymphoma: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 19.3
U.S. Rate: 19.0

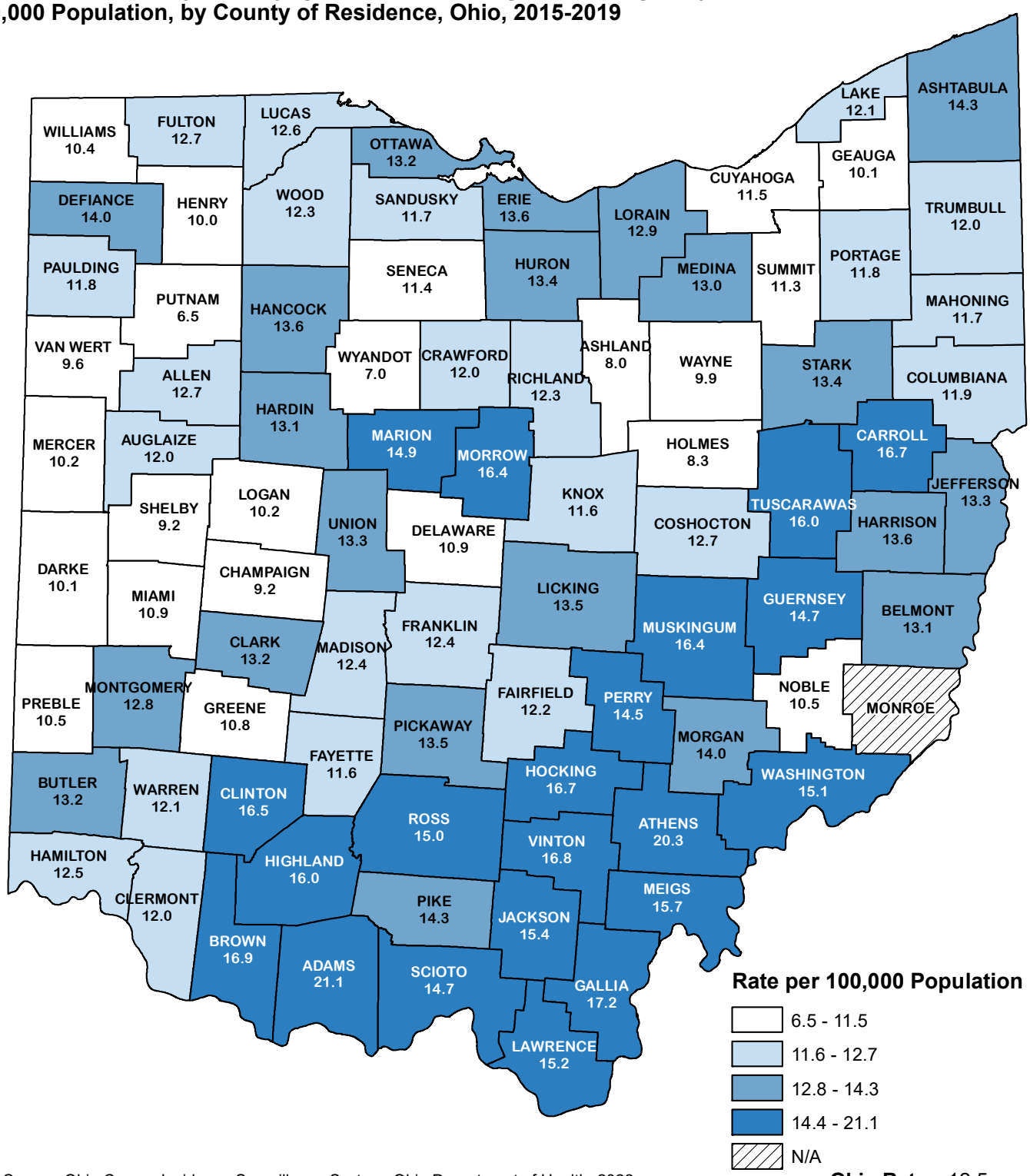
Figure 28. Non-Hodgkin Lymphoma: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2015-2019 is less than 10.

Ohio Rate: 5.8
U.S. Rate: 5.1

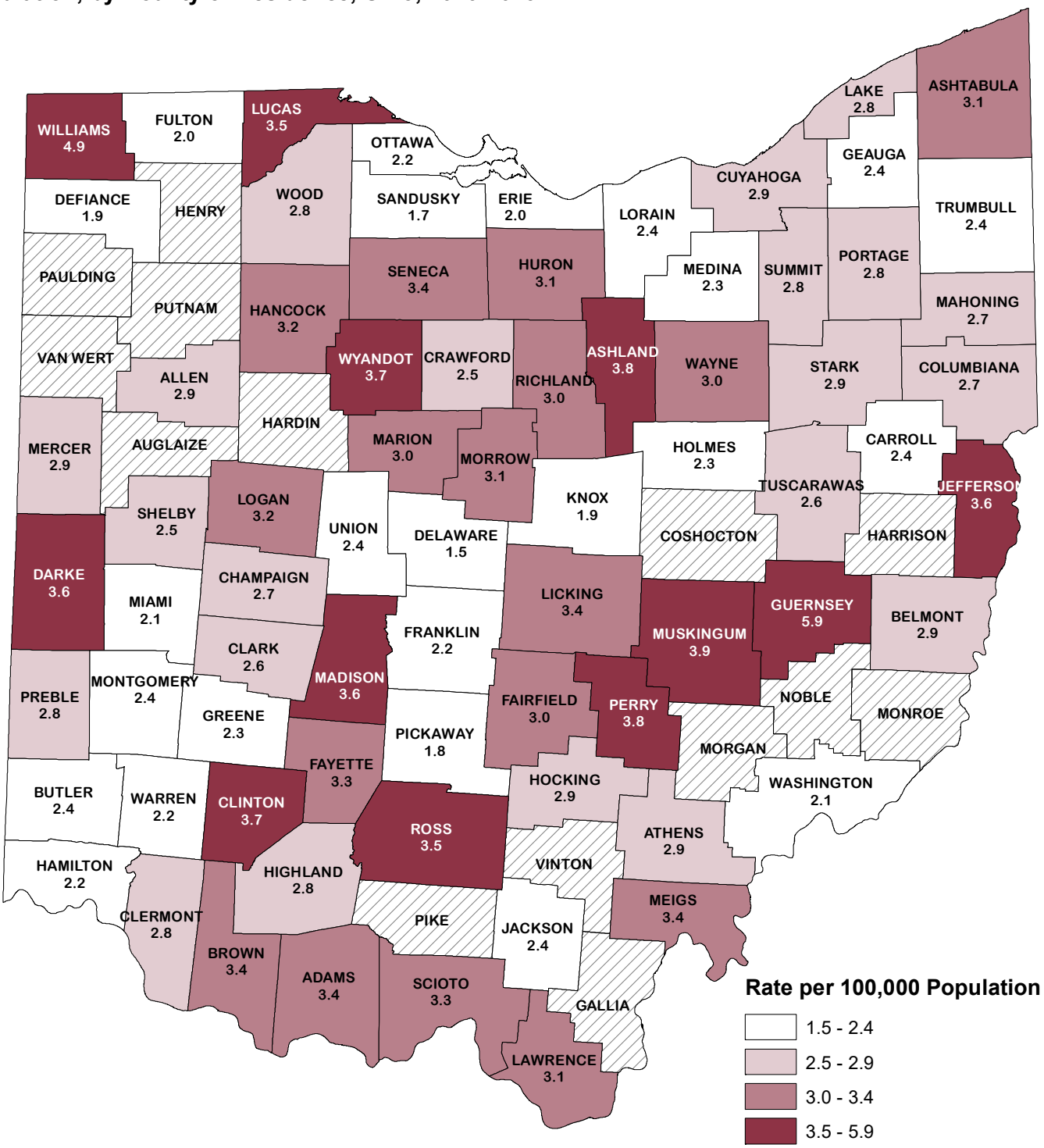
Figure 29. Oral Cavity & Pharyngeal Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 12.5
U.S. Rate: 11.5

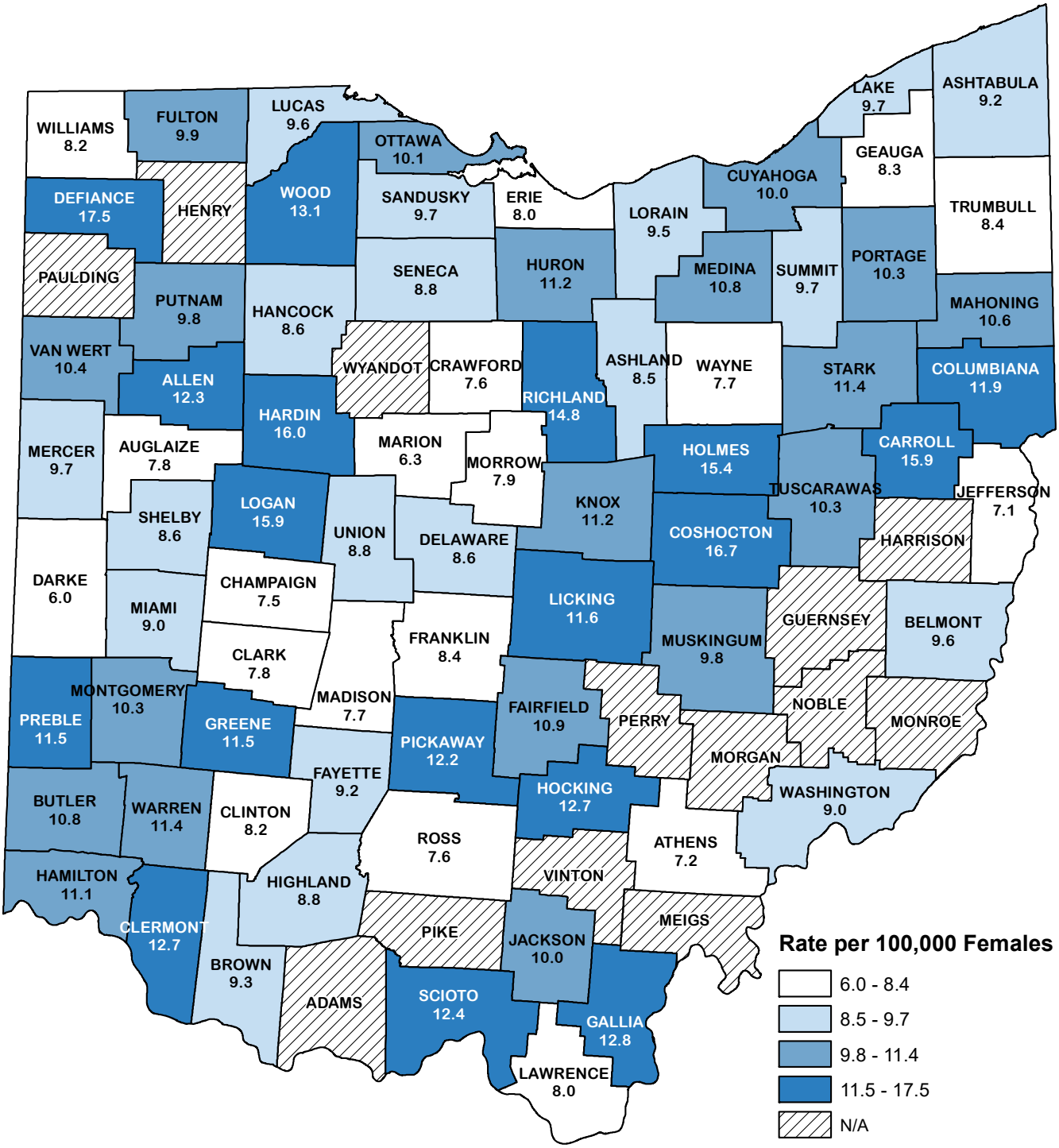
Figure 30. Oral Cavity & Pharyngeal Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2010-2019



Ohio Rate: 2.7
U.S. Rate: 2.5

Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2010-2019 is less than 10.

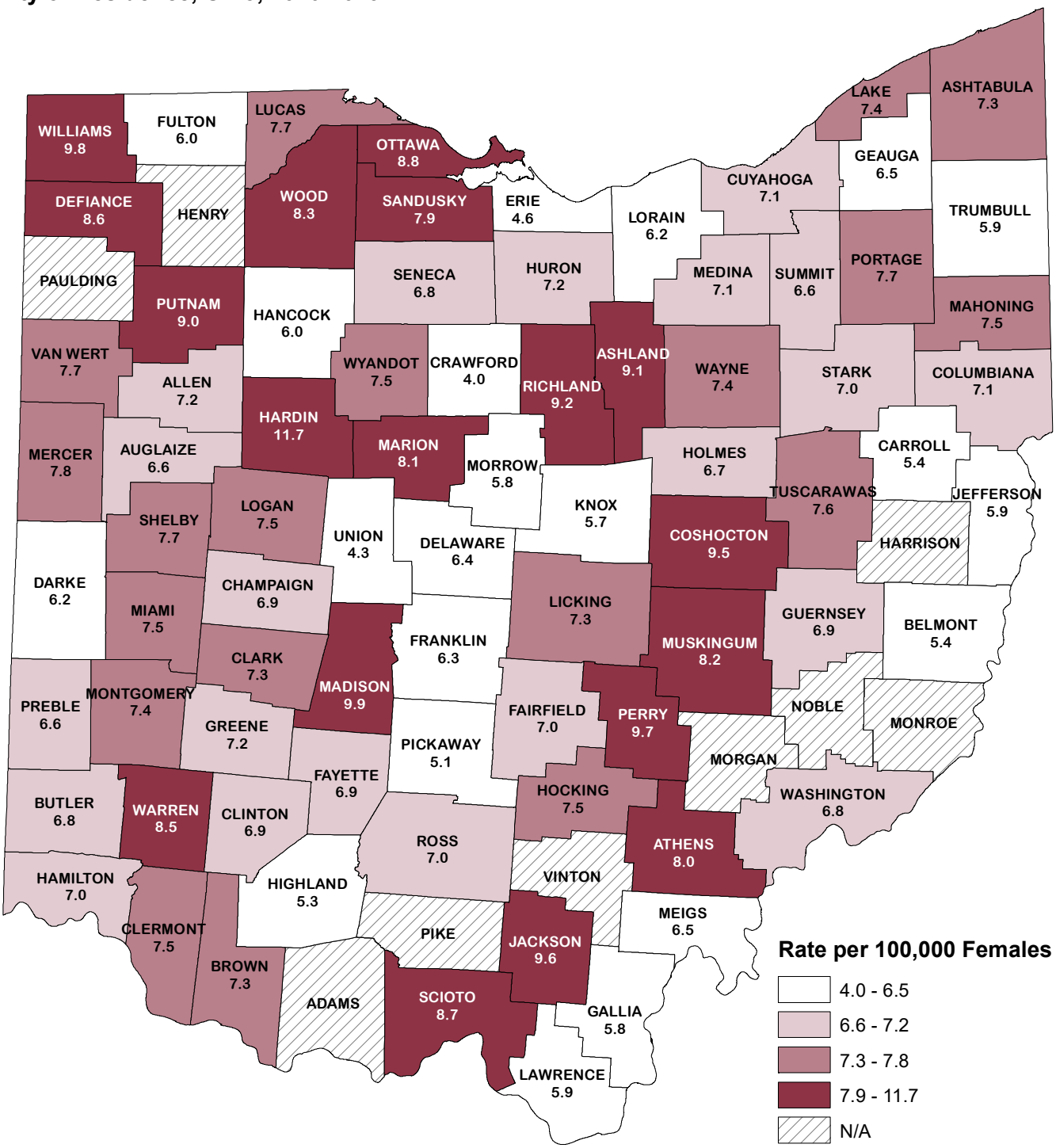
Figure 31. Ovarian Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 10.0
U.S. Rate: 10.6

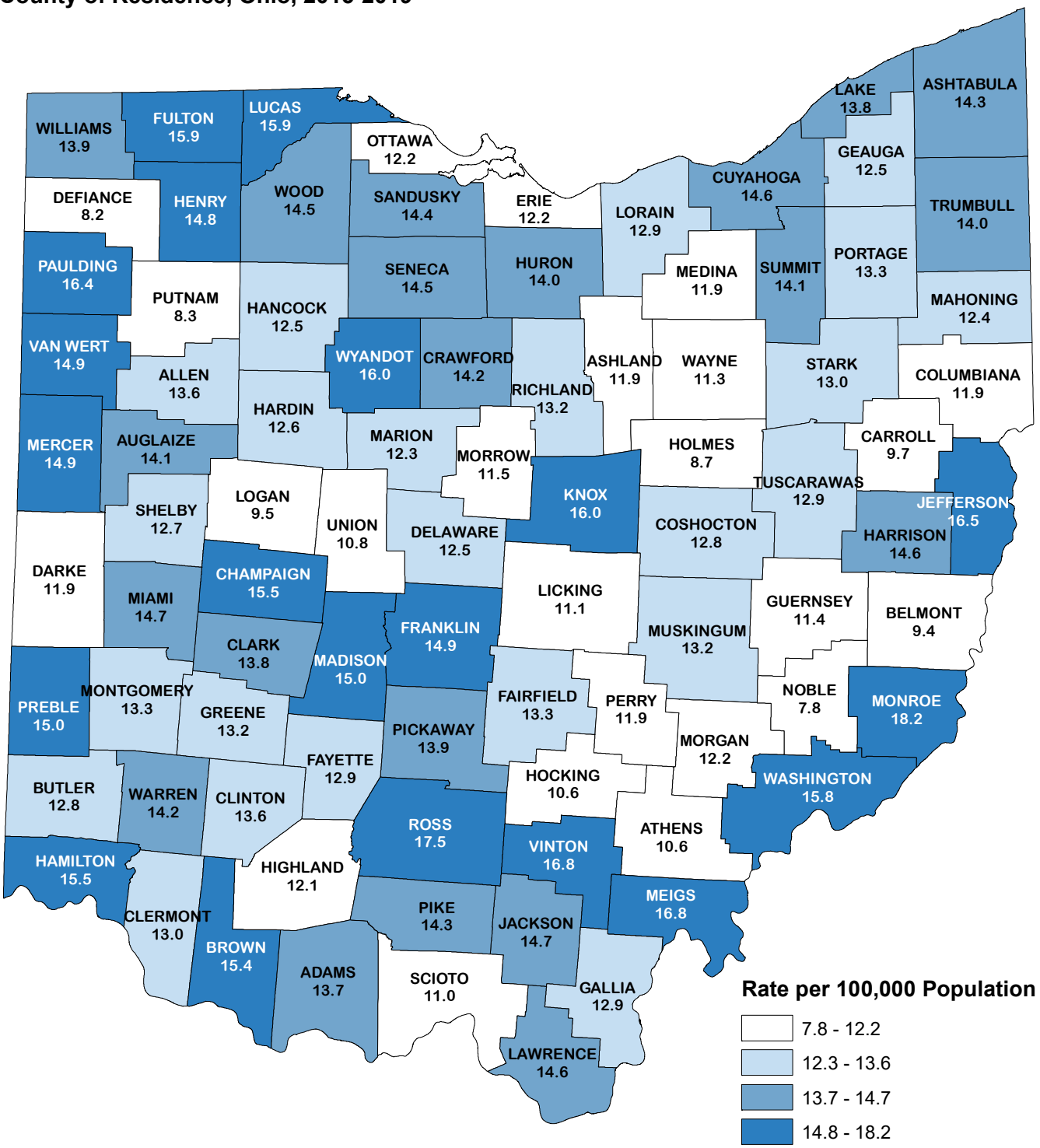
Figure 32. Ovarian Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2010-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2010-2019 is less than 10.

Ohio Rate: 7.0
U.S. Rate: 6.9

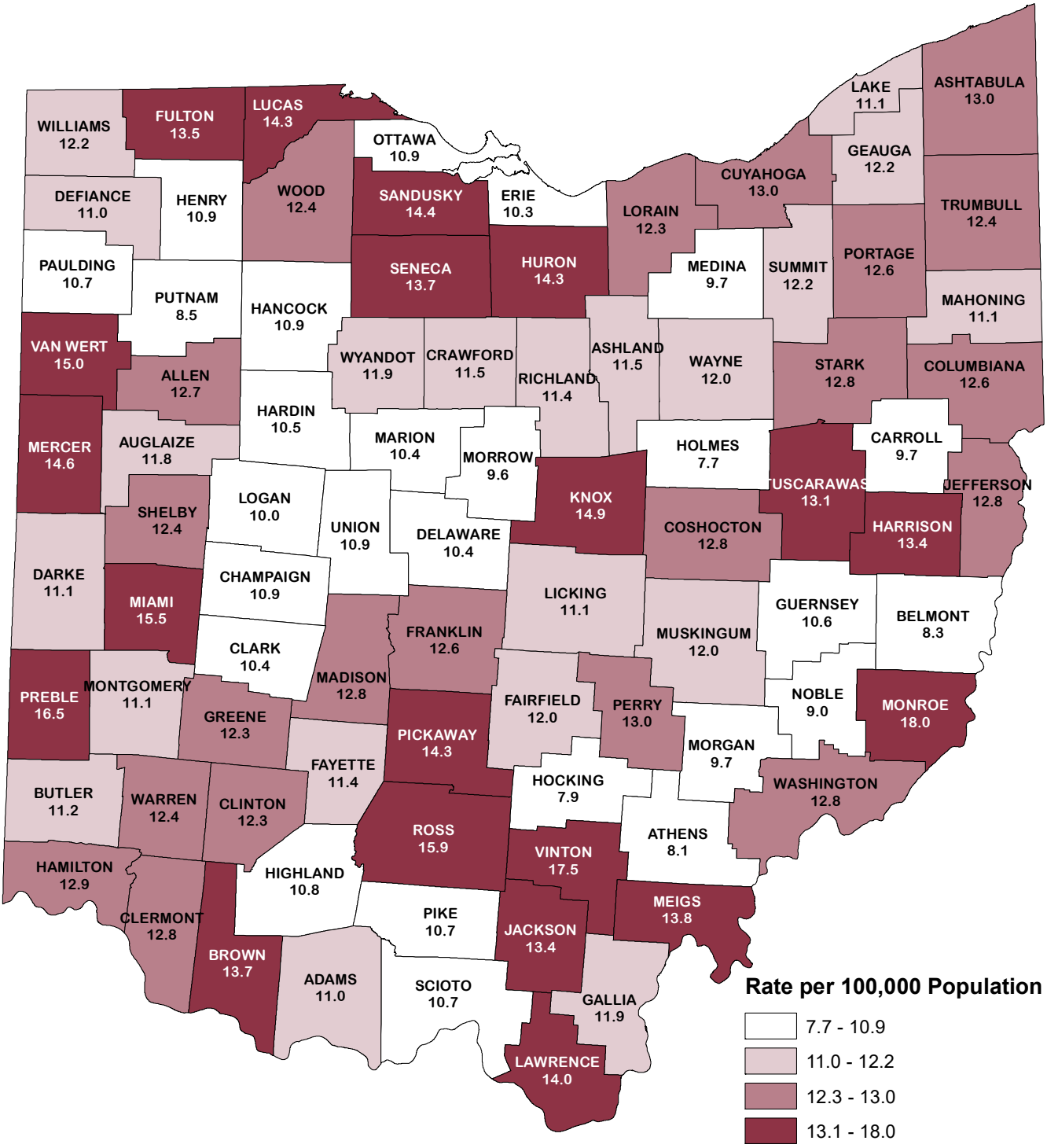
Figure 33. Pancreatic Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 13.7
U.S. Rate: 13.3

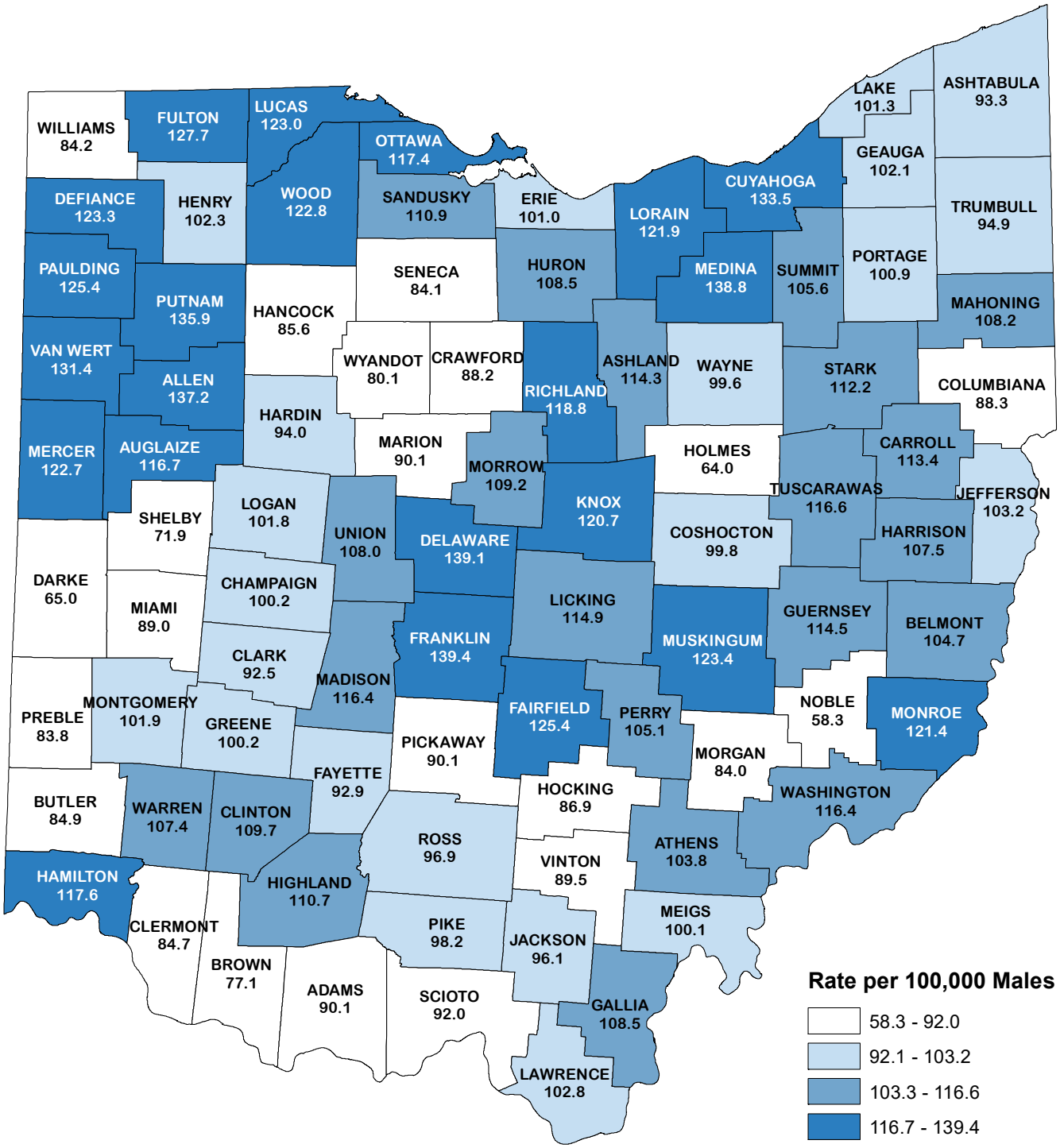
Figure 34. Pancreatic Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.

Ohio Rate: 12.2
U.S. Rate: 11.1

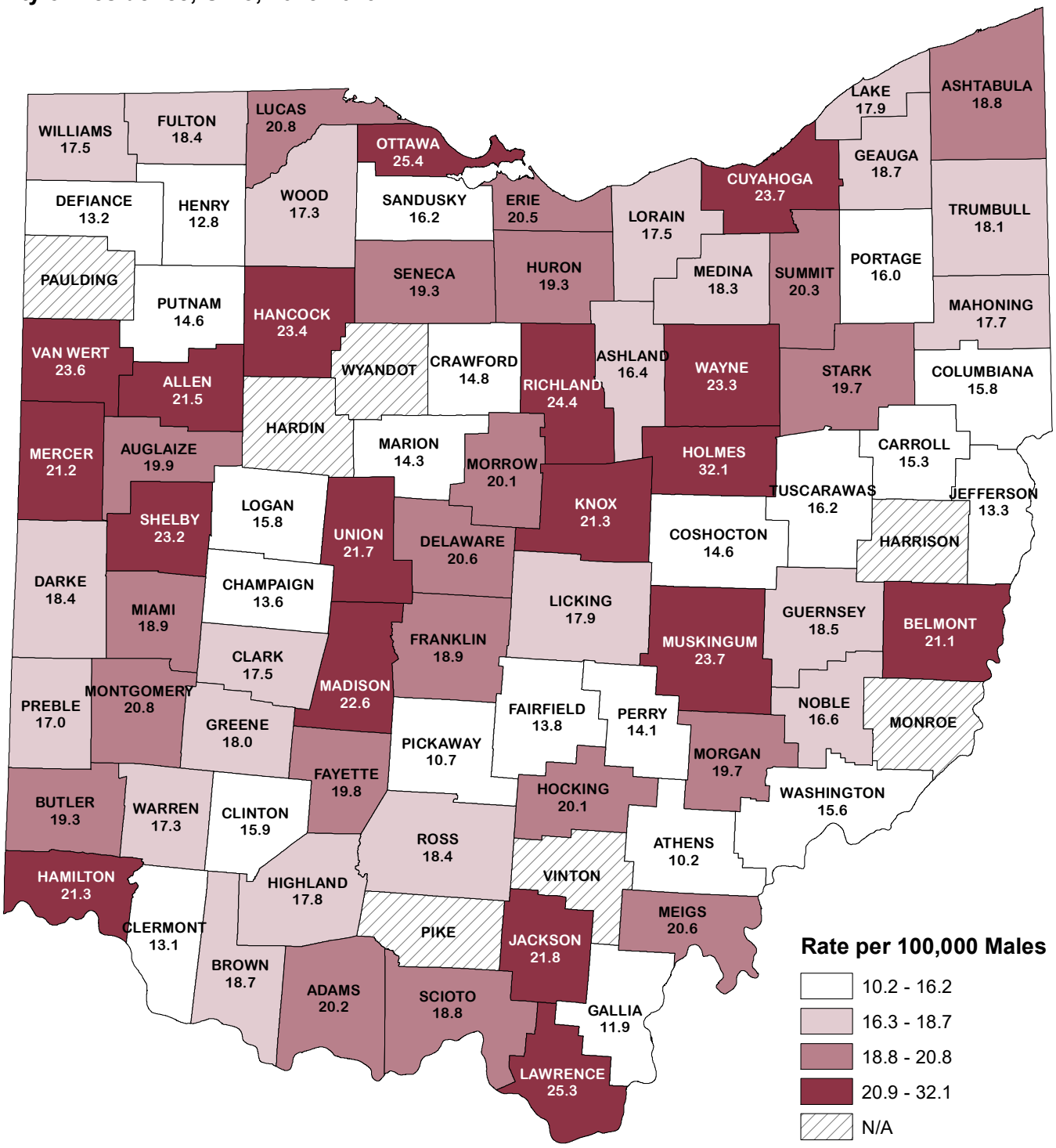
Figure 35. Prostate Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Males, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 112.5
U.S. Rate: 112.7

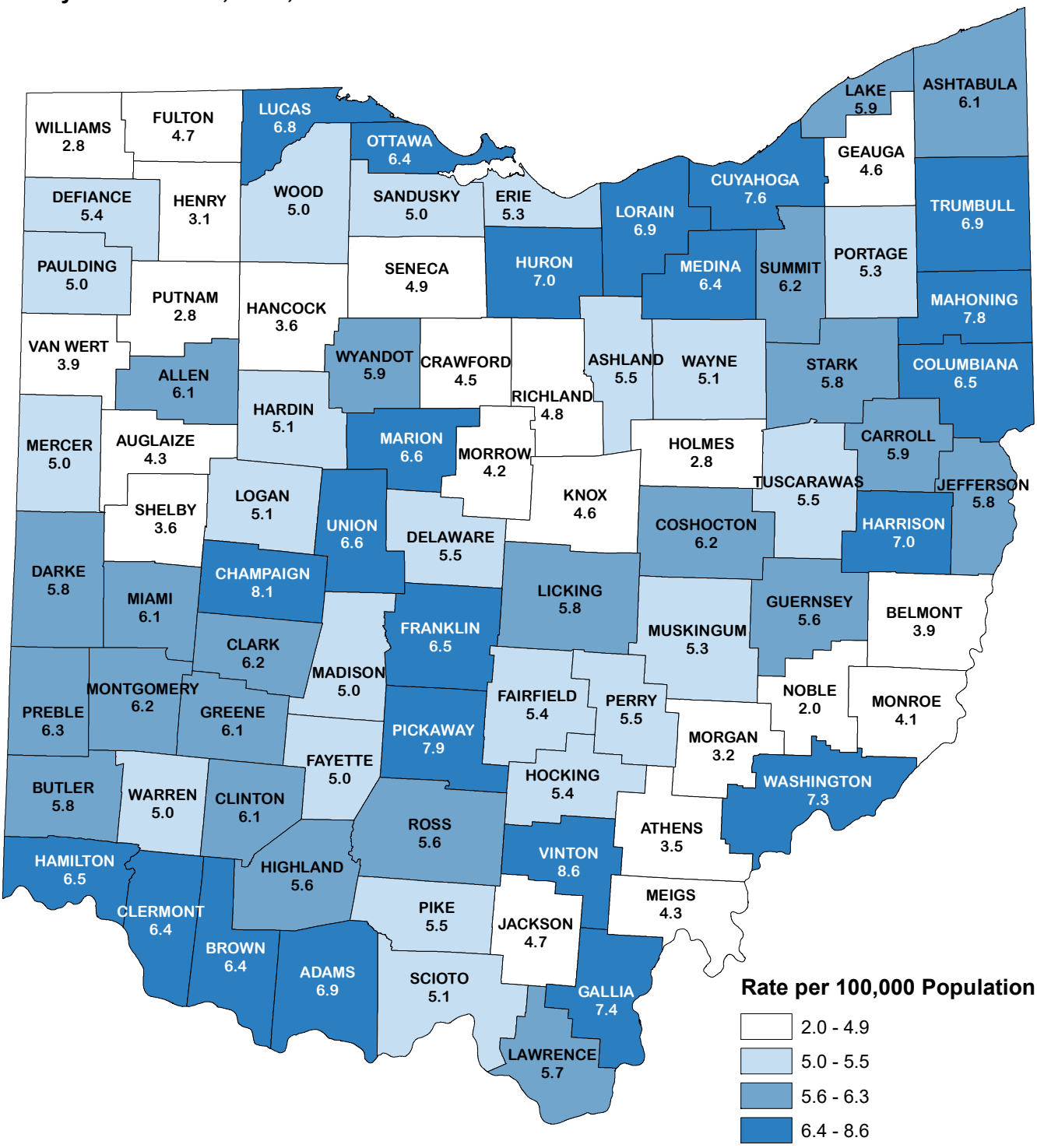
Figure 36. Prostate Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Males, by County of Residence, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2015-2019 is less than 10.

Ohio Rate: 19.4
U.S. Rate: 18.8

Figure 37. Stomach Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2010-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 6.1
U.S. Rate: 7.2

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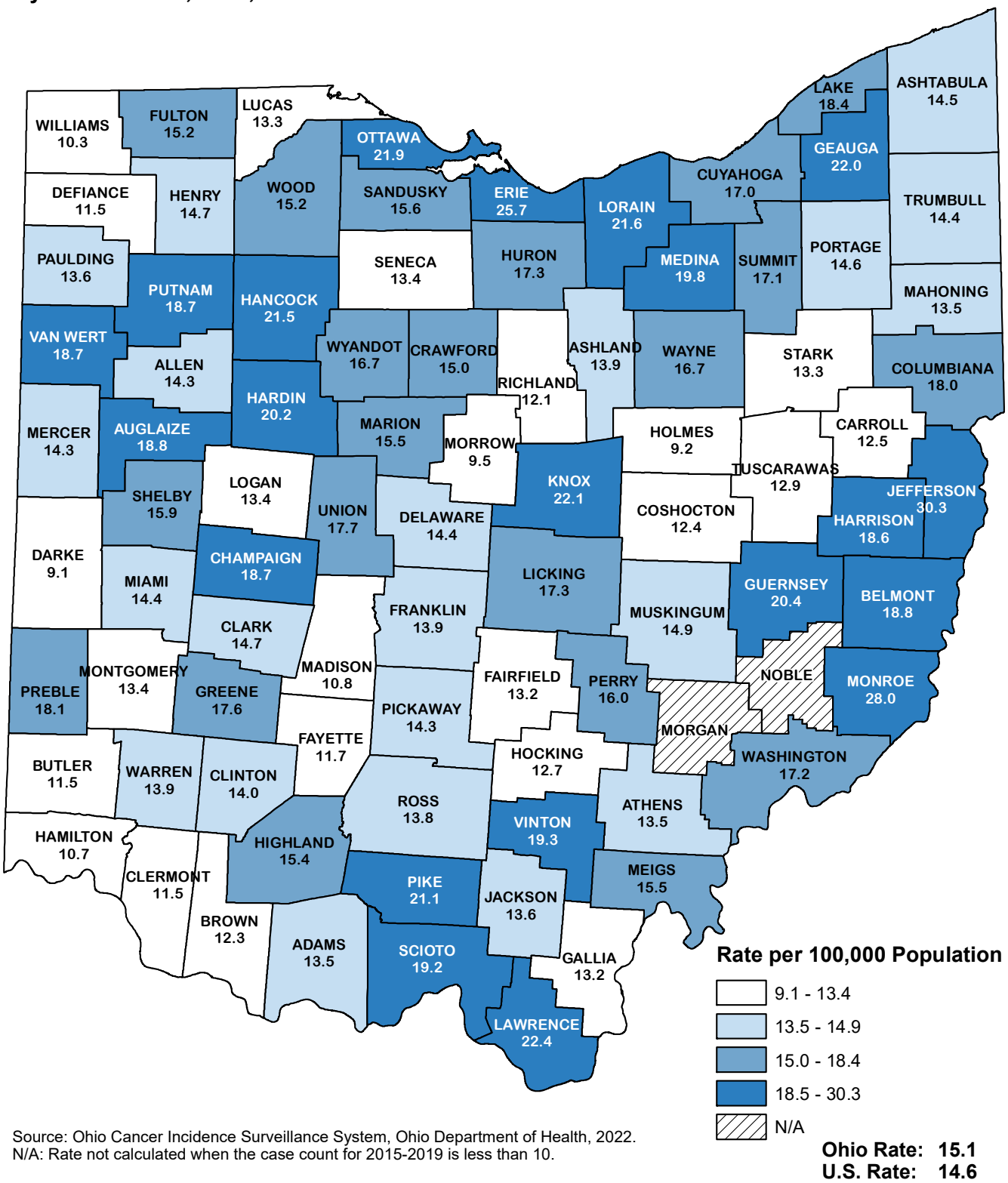
Mortality rates are not presented by county for stomach cancer.

See page 9 for details on suppression rules.

Figure 38. Thyroid Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Population, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Rate not calculated when the case count for 2015-2019 is less than 10.

Ohio Rate: 15.1
U.S. Rate: 14.6

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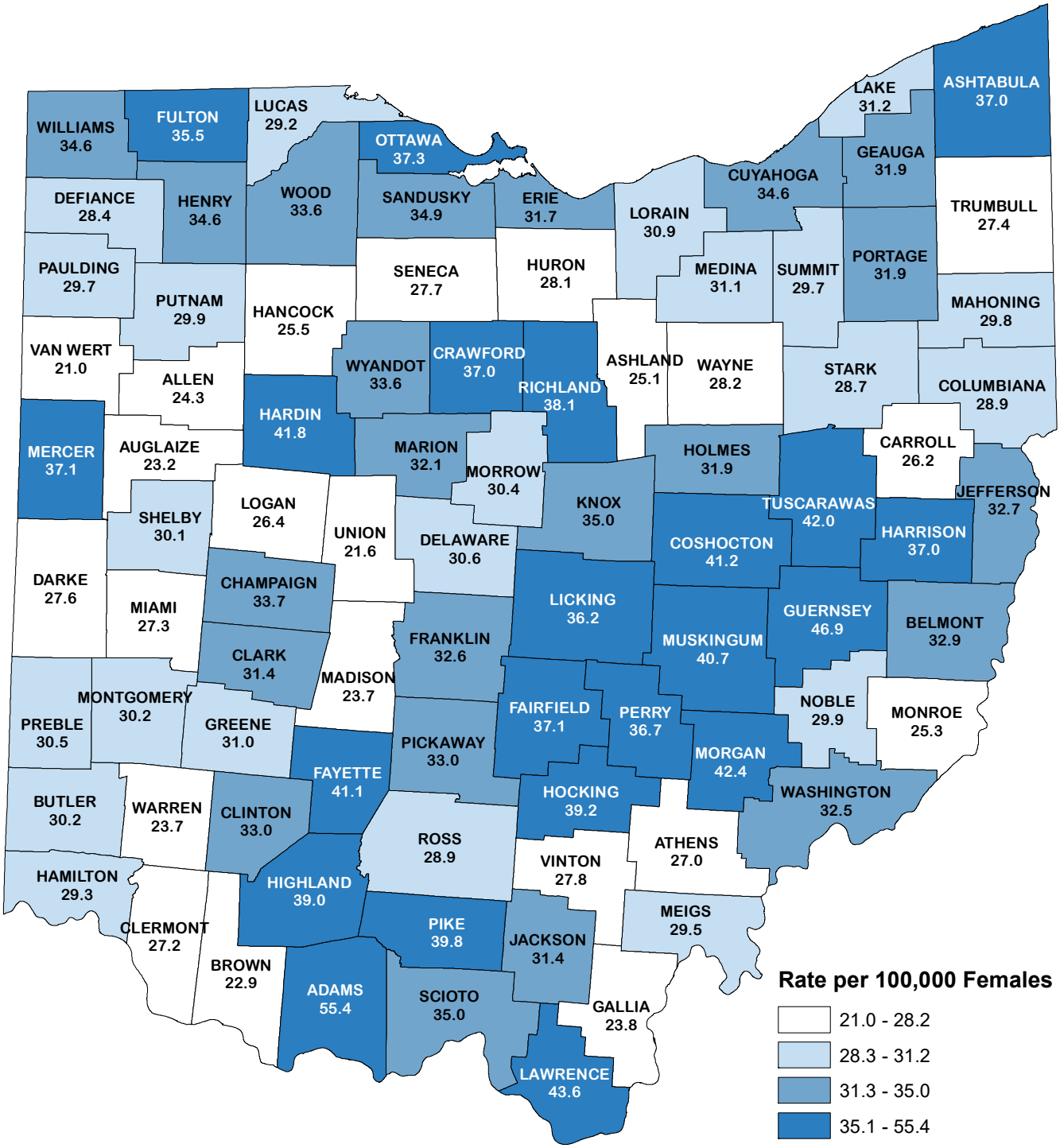
Mortality rates are not presented by county for thyroid cancer.

See page 9 for details on suppression rules.

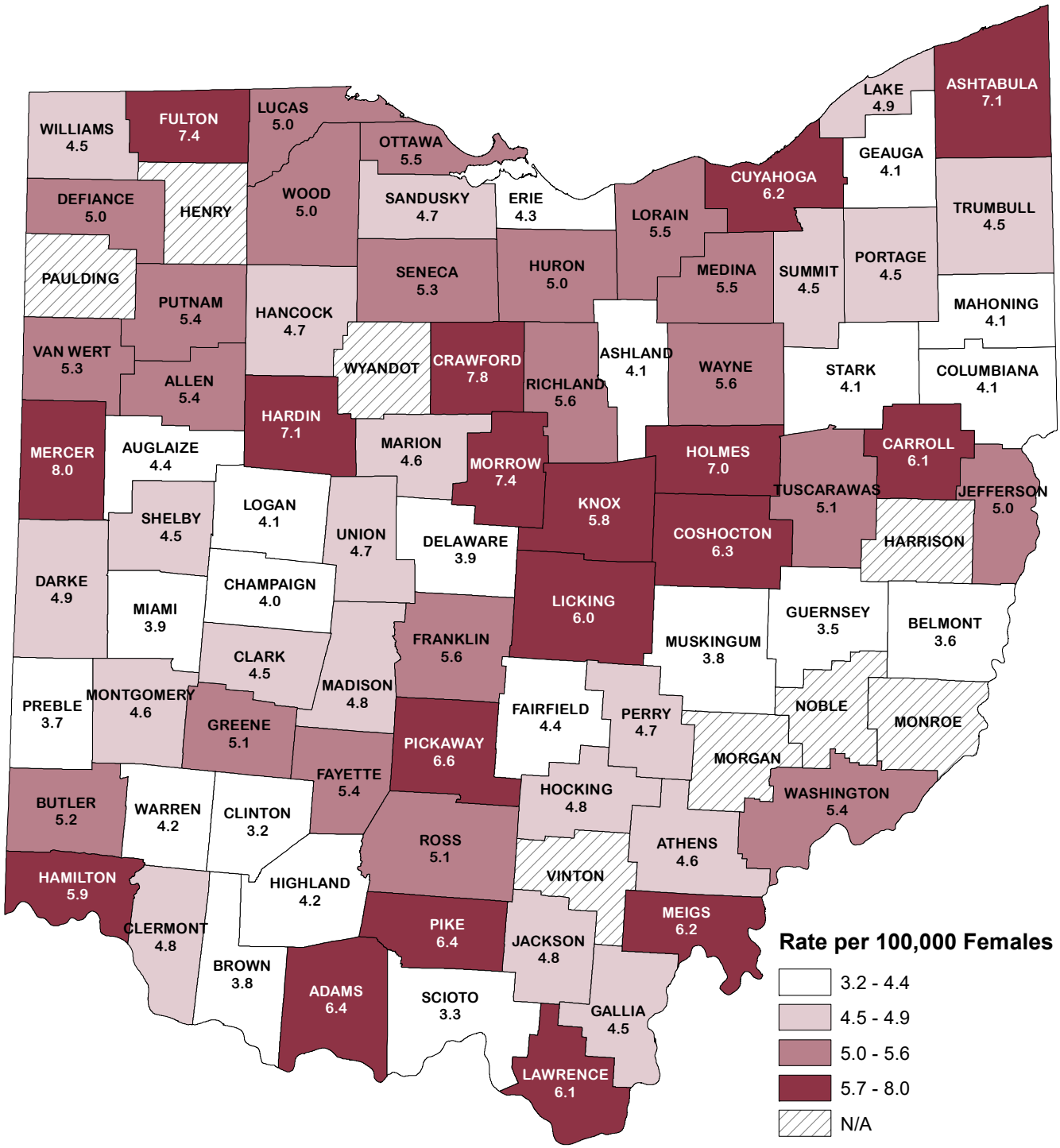
Figure 39. Uterine Cancer: Average Annual Age-Adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio Rate: 31.4
U.S. Rate: 27.8

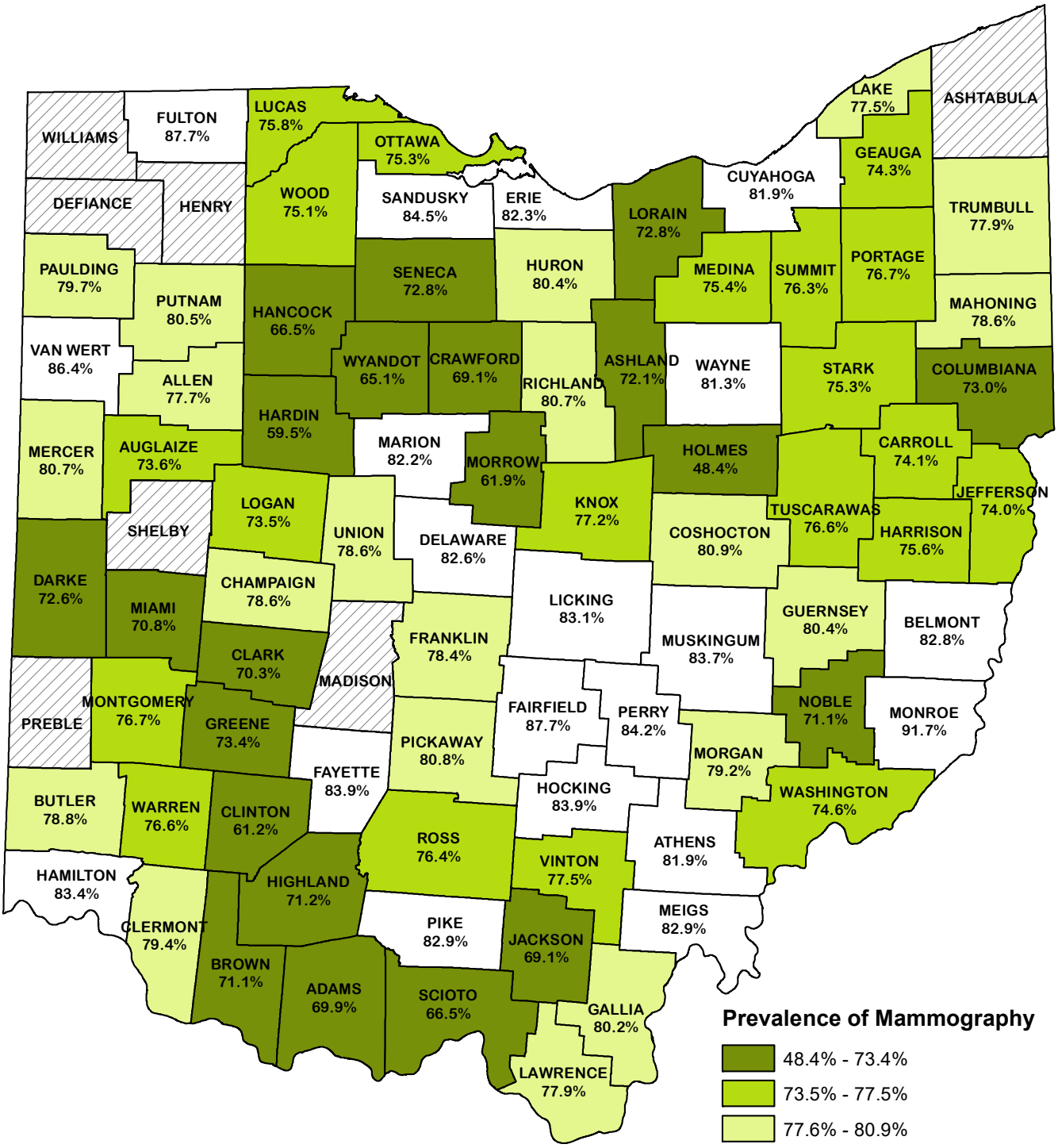
Figure 40. Uterine Cancer: Average Annual Age-Adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2010-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
N/A: Rate not calculated when the death count for 2010-2019 is less than 10.

Ohio Rate: 5.1
U.S. Rate: 4.8

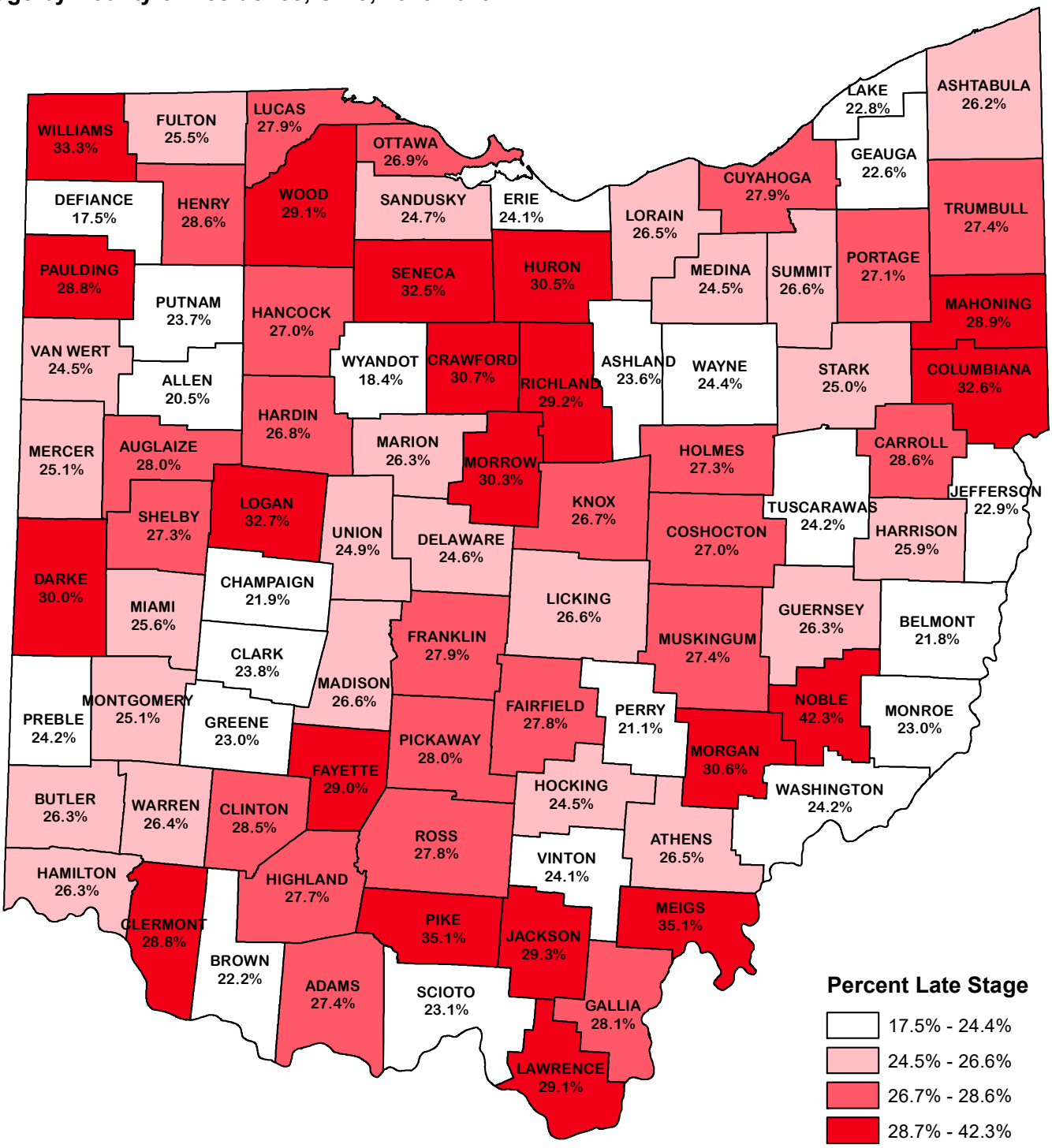
Figure 41. Prevalence of Mammography in the Past Two Years Among Women Ages 50-74, by County of Residence, Ohio, 2018-2020



Source: 2018-2020 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2022.
N/A: Estimates based on fewer than 50 respondents or with a relative standard error greater than 30 percent are considered statistically unreliable and not reported.
* U.S estimate is based on 2018 and 2020 data.

Ohio: 77.9%
U.S.: 78.6%*

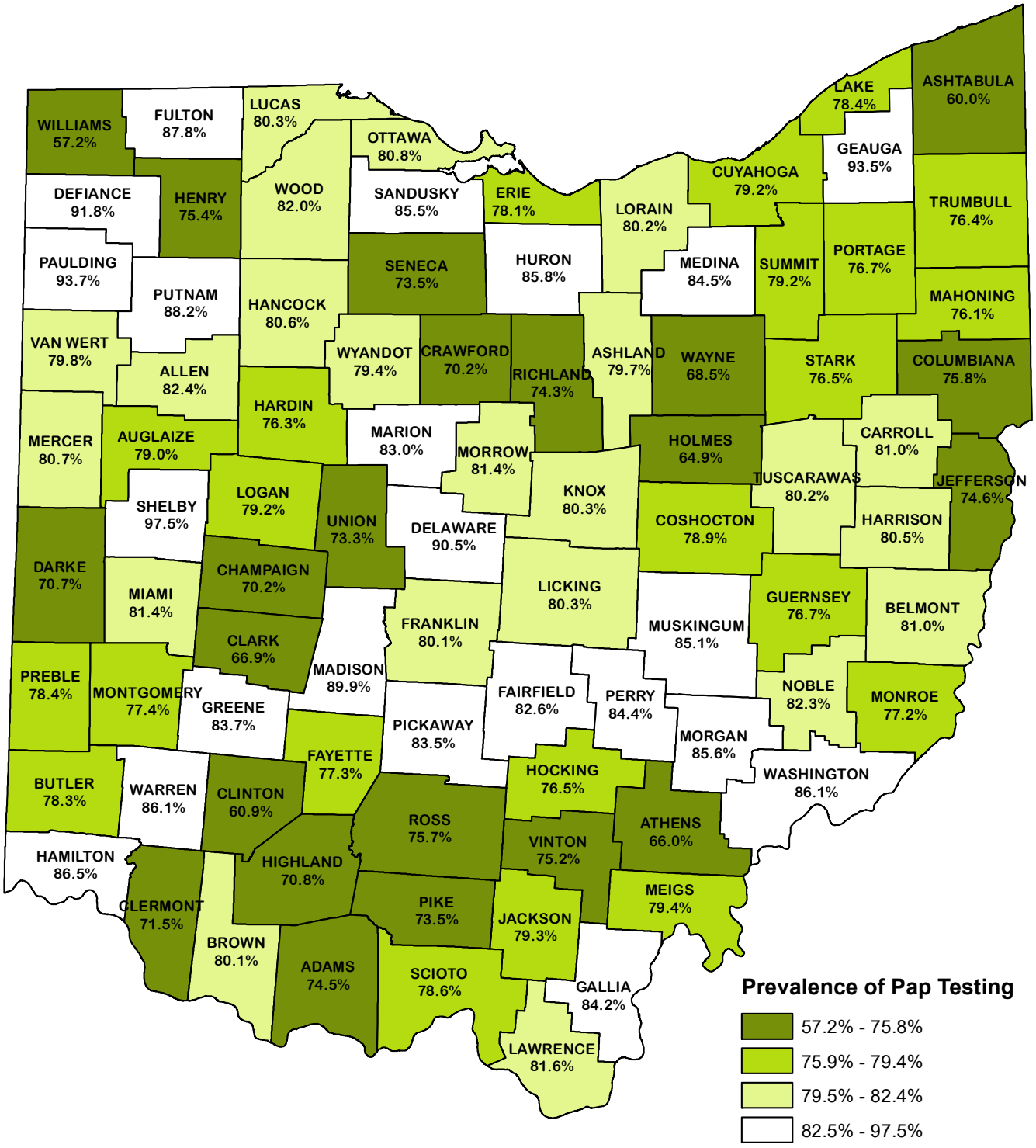
Figure 42. Female Breast Cancer: Proportion of Cases (%) Diagnosed at Late (Regional or Distant) Stage by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio: 26.6%
U.S.: 31.6%

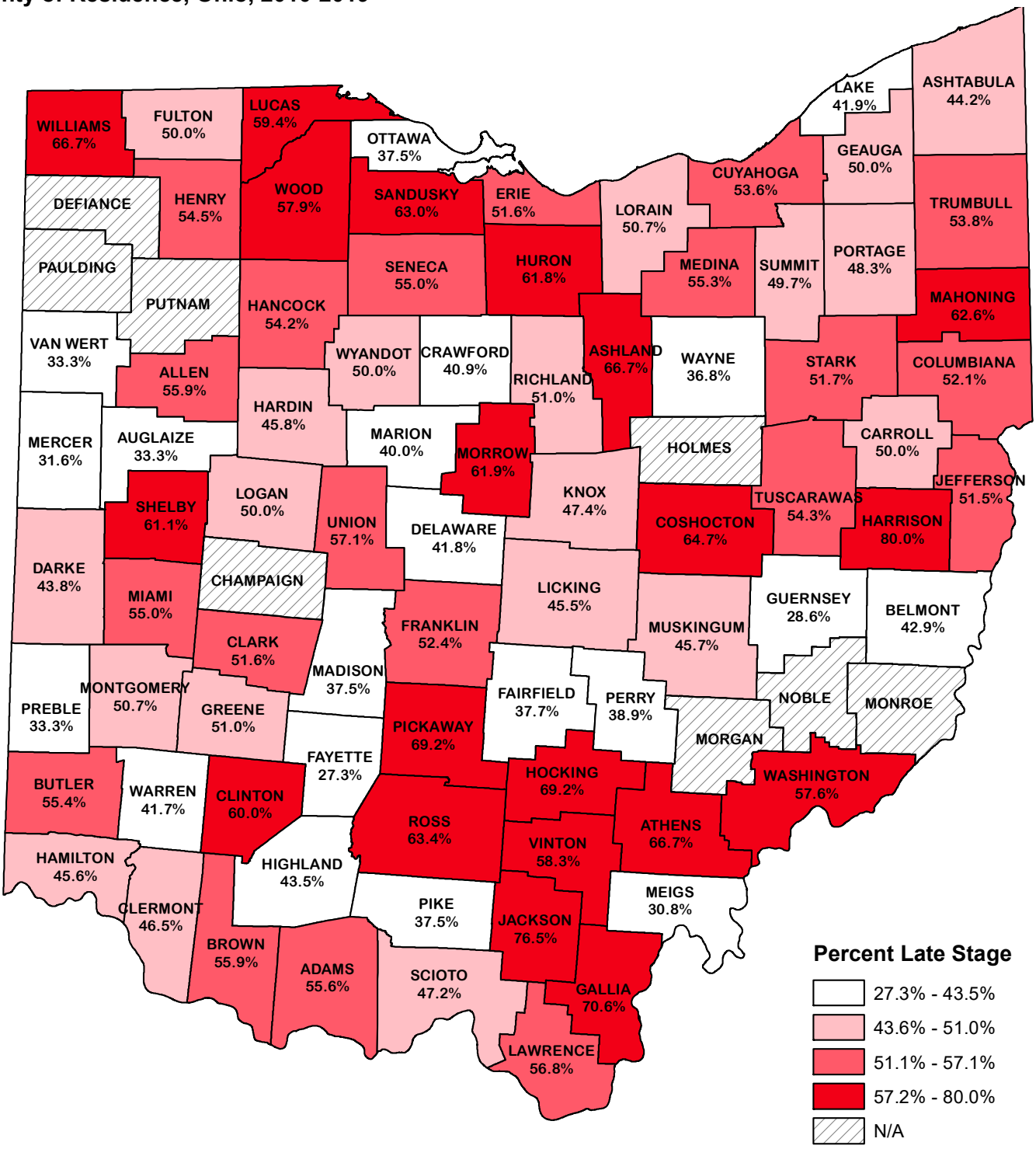
Figure 43. Prevalence of Pap Testing in the Past Three Years Among Women Ages 21-65, by County of Residence, Ohio, 2016 and 2018-2020



Source: 2016 and 2018-2020 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2022.
N/A: Estimates based on fewer than 50 respondents or with a relative standard error greater than 30 percent are considered statistically unreliable and not reported.
* U.S estimate is based on 2018 and 2020 data.

Ohio: 79.5%
U.S.: 78.7%*

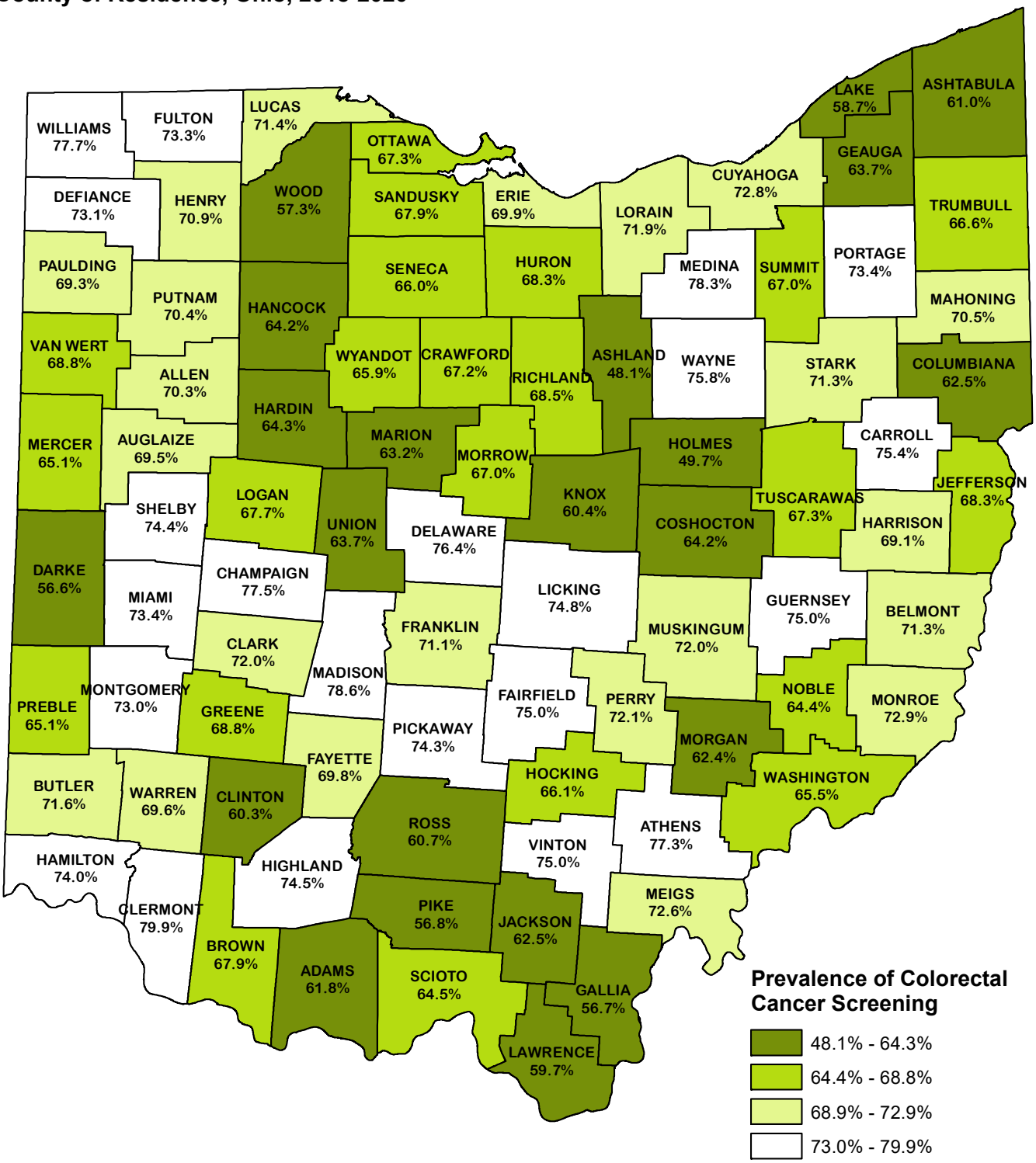
Figure 44. Cervical Cancer: Proportion of Cases (%) Diagnosed at Late (Regional or Distant) Stage by County of Residence, Ohio, 2010-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
N/A: Proportion not calculated when the case count for 2010-2019 is less than 10.

Ohio: 50.8%
U.S.: 49.4%

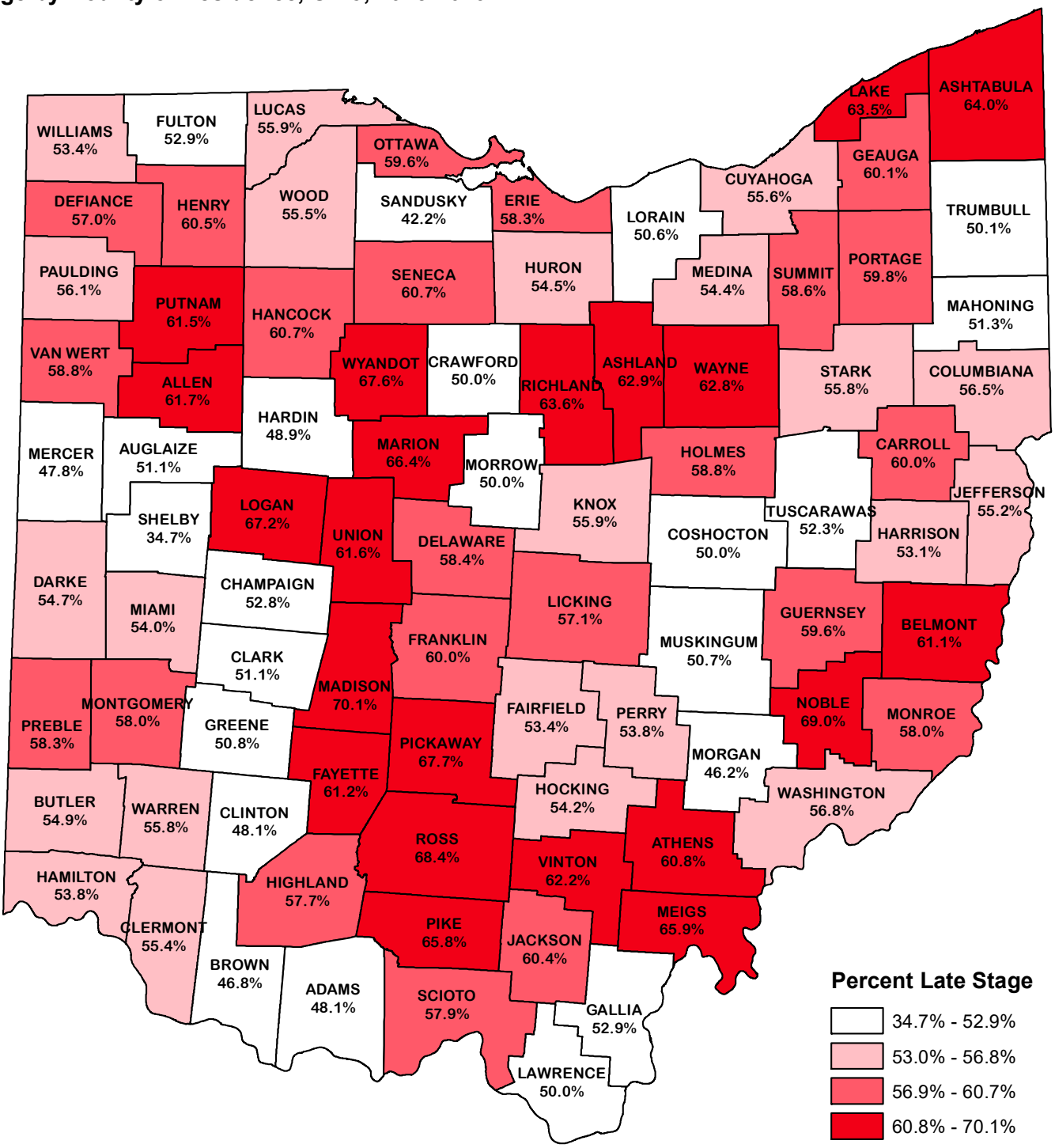
Figure 45. Prevalence of Meeting Colorectal Cancer Screening Guidelines Among Adults Ages 50-75, by County of Residence, Ohio, 2018-2020



Source: 2018-2020 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2022.
* U.S estimate is based on 2018 and 2020 data.

Ohio: 70.2%
U.S.: 70.8%*

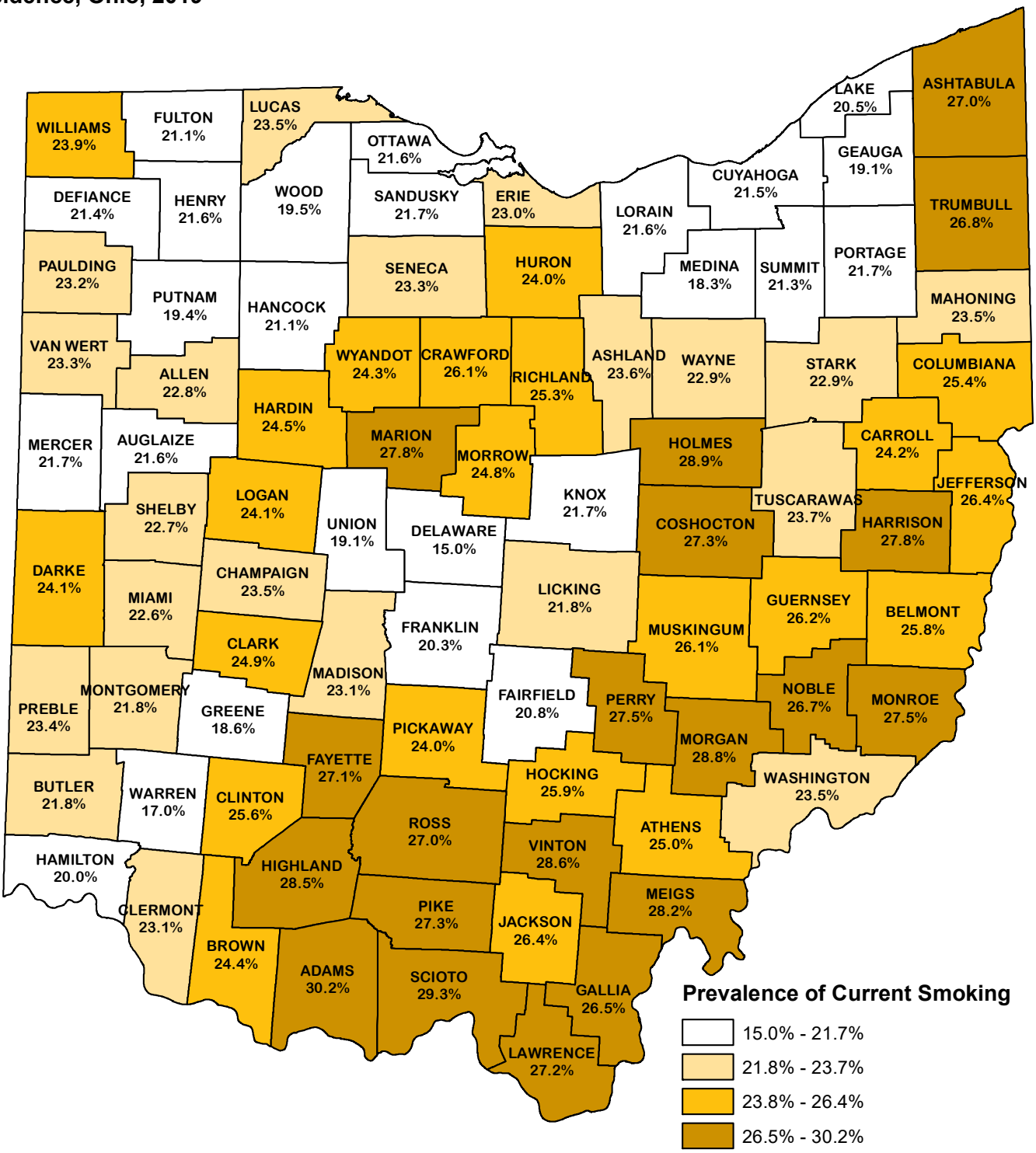
Figure 46. Colon & Rectum Cancer: Proportion of Cases (%) Diagnosed at Late (Regional or Distant) Stage by County of Residence, Ohio, 2015-2019



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Ohio: 56.4%
U.S.: 58.8%

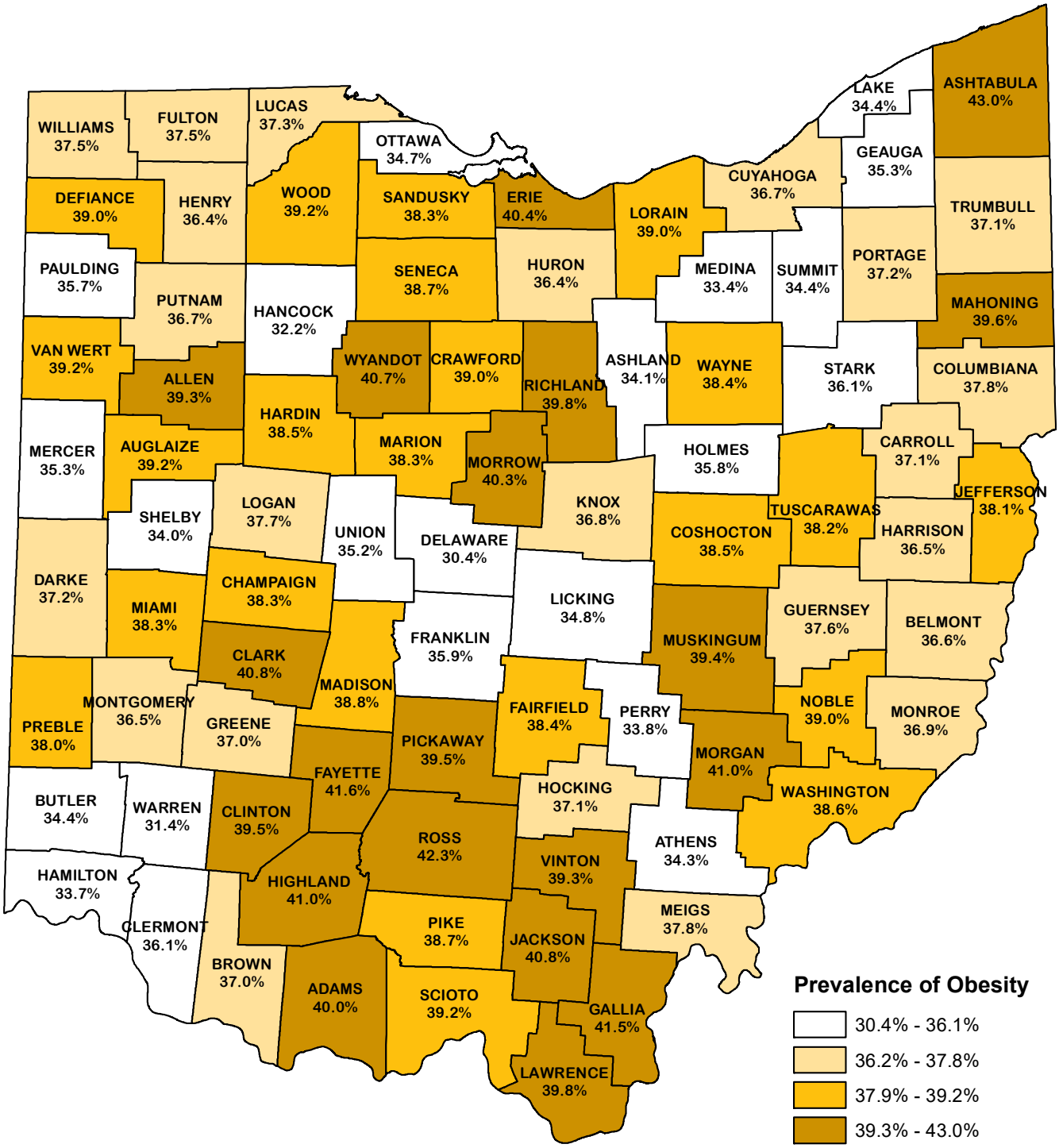
Figure 47. Prevalence of Current Cigarette Smoking Among Adults Ages 18 and Older, by County of Residence, Ohio, 2019



Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health. Published in County Health Rankings & Roadmaps, University of Wisconsin Population Health Institute, 2022.

Ohio: 21.8%

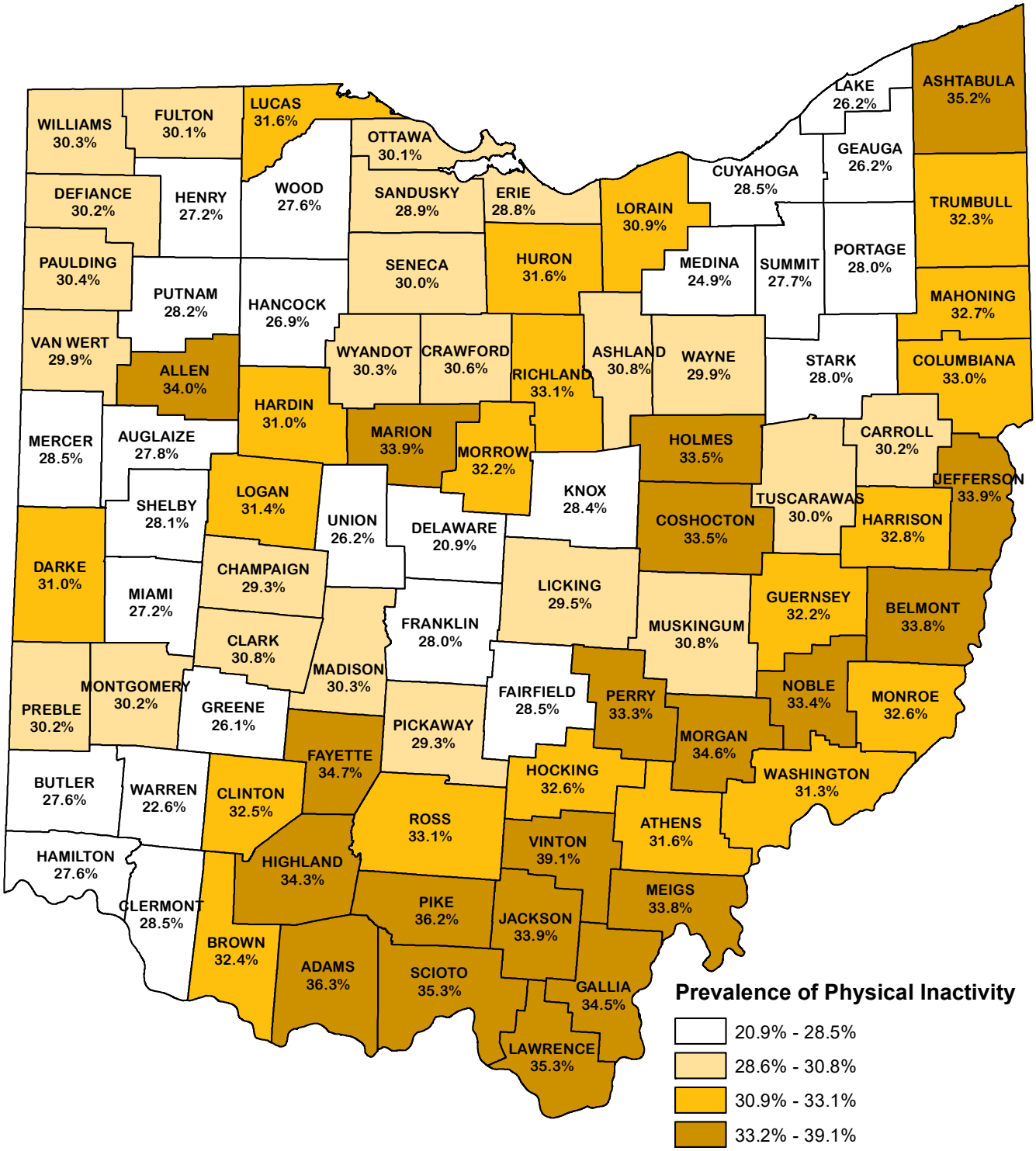
Figure 48. Prevalence of Obesity Among Adults Ages 18 and Older, by County of Residence, Ohio, 2019



Source: Behavioral Risk Factor Surveillance System. Published in County Health Rankings & Roadmaps, University of Wisconsin Population Health Institute, 2022.

Ohio: 34.6%

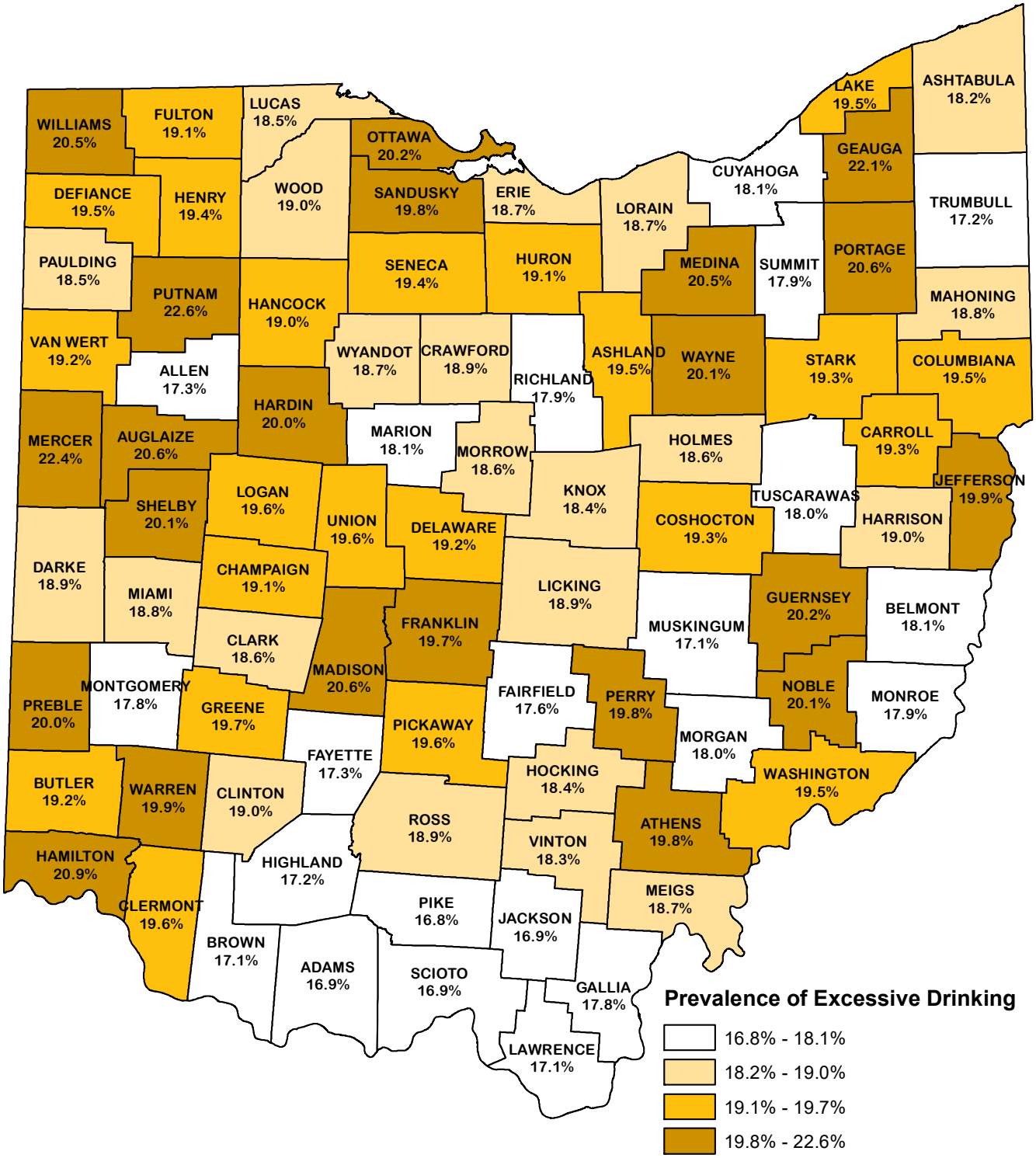
Figure 49. Prevalence of Physical Inactivity Among Adults Ages 18 and Older, by County of Residence, Ohio, 2019



Source: Behavioral Risk Factor Surveillance System. Published in County Health Rankings & Roadmaps, University of Wisconsin Population Health Institute, 2022.

Ohio: 27.6%

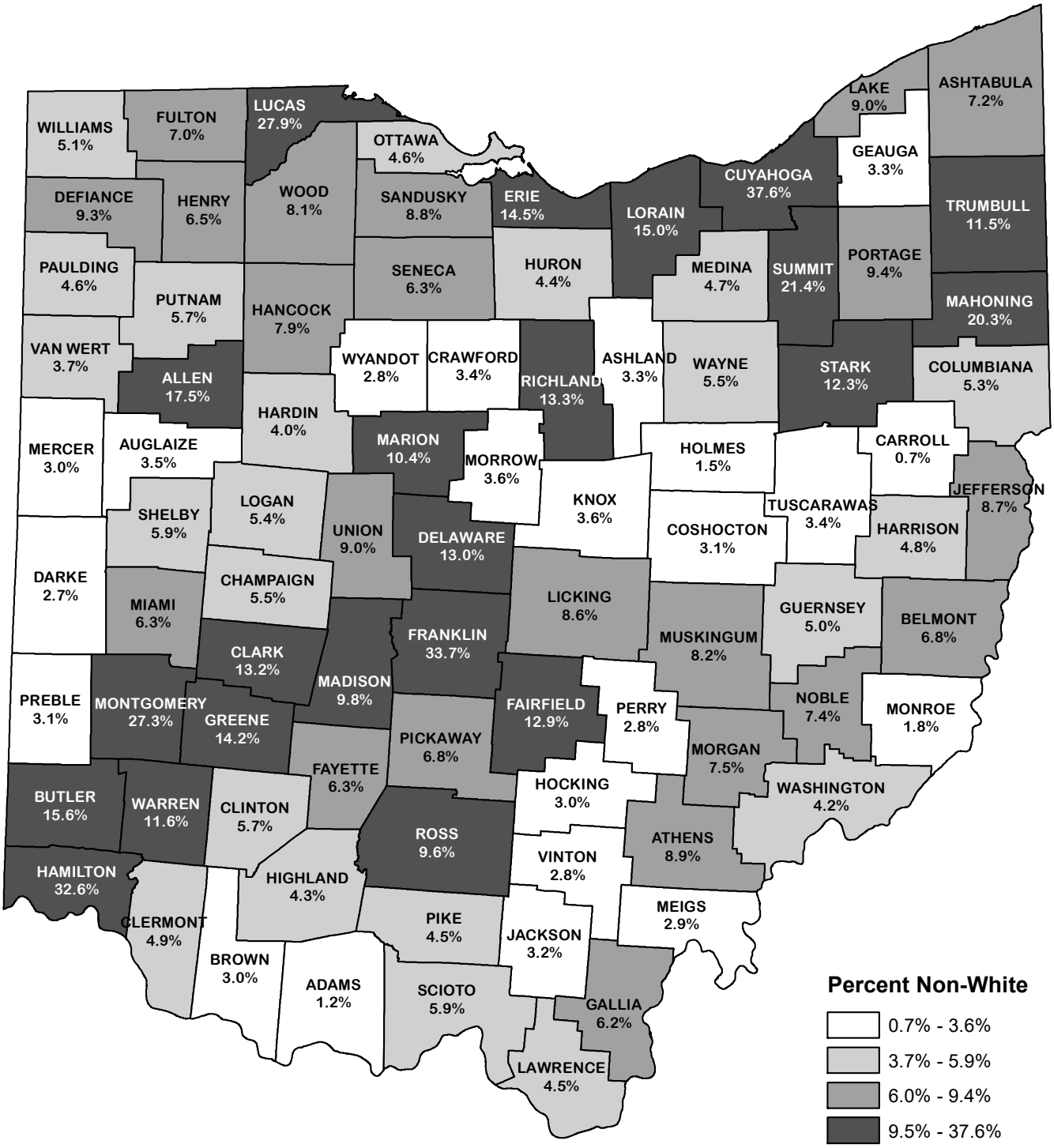
Figure 50. Prevalence of Excessive Drinking Among Adults Ages 18 and Older, by County of Residence, Ohio, 2019



Source: Behavioral Risk Factor Surveillance System. Published in County Health Rankings & Roadmaps, University of Wisconsin Population Health Institute, 2022.

Ohio: 20.7%

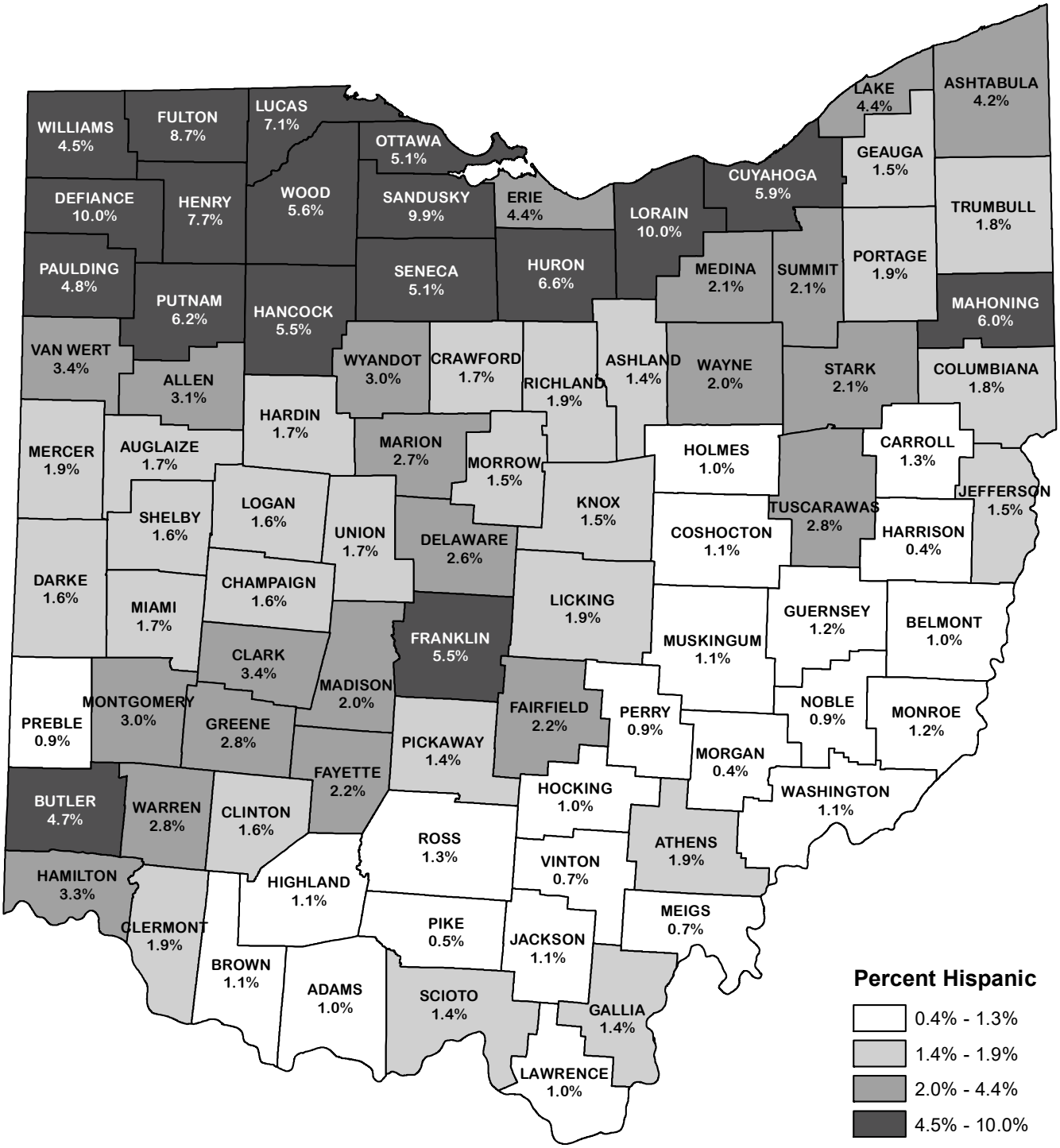
Figure 51. Percentage of the Population who are of Non-White Race, by County of Residence, Ohio, 2015-2019



Ohio: 18.7%
U.S.: 27.5%

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates.
Percentages include those of any race other than 'White Alone'.

Figure 52. Percentage of the Population who are of Hispanic or Latino Ethnicity, by County of Residence, Ohio, 2015-2019



Ohio: 3.8%
U.S.: 18.0%

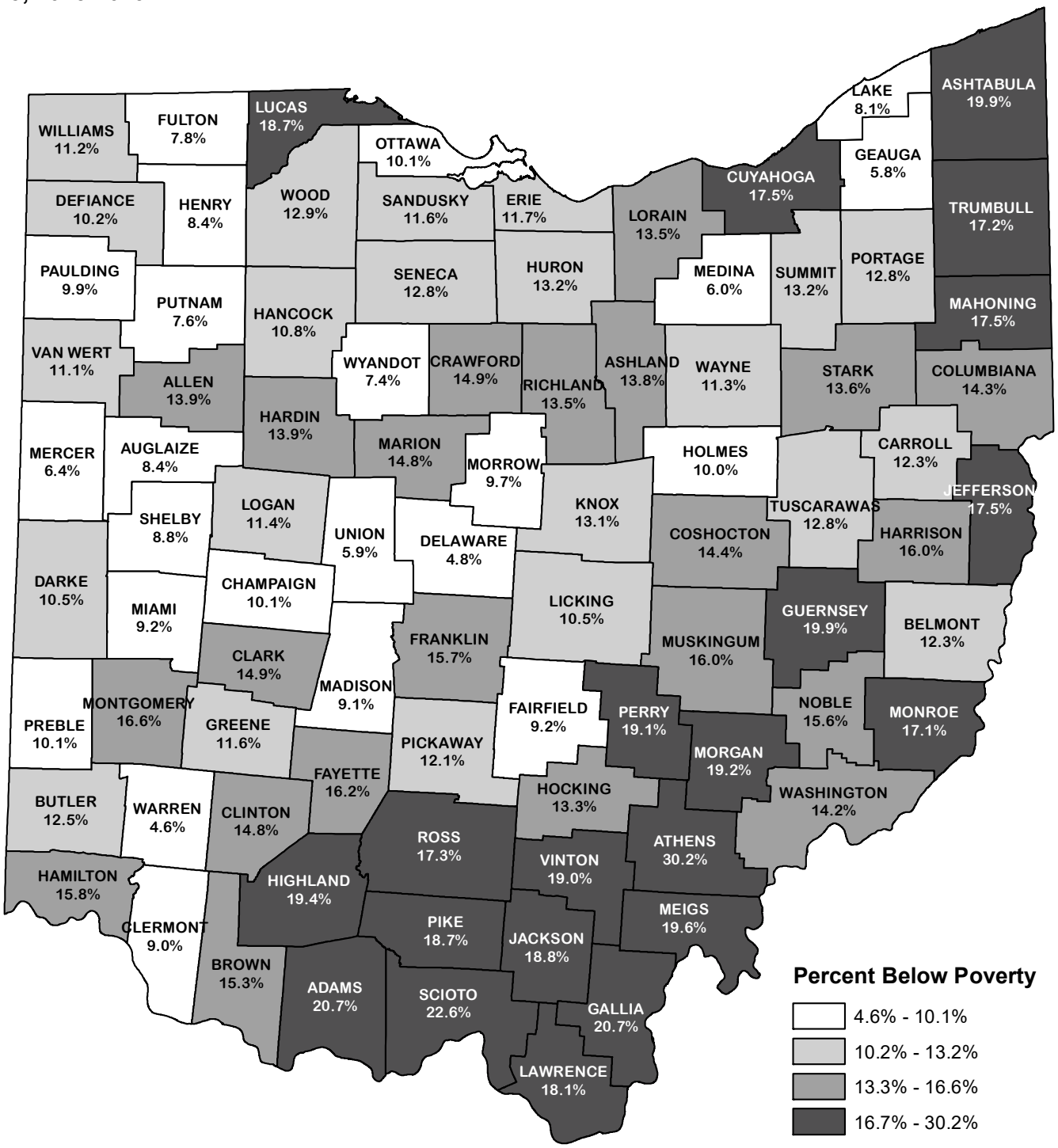
Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates.

Figure 53. Percentage of Adults Ages 25 and Older With Less Than a High School Education, by County of Residence, Ohio, 2015-2019

Ohio: 9.6%
U.S.: 12.0%

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates.

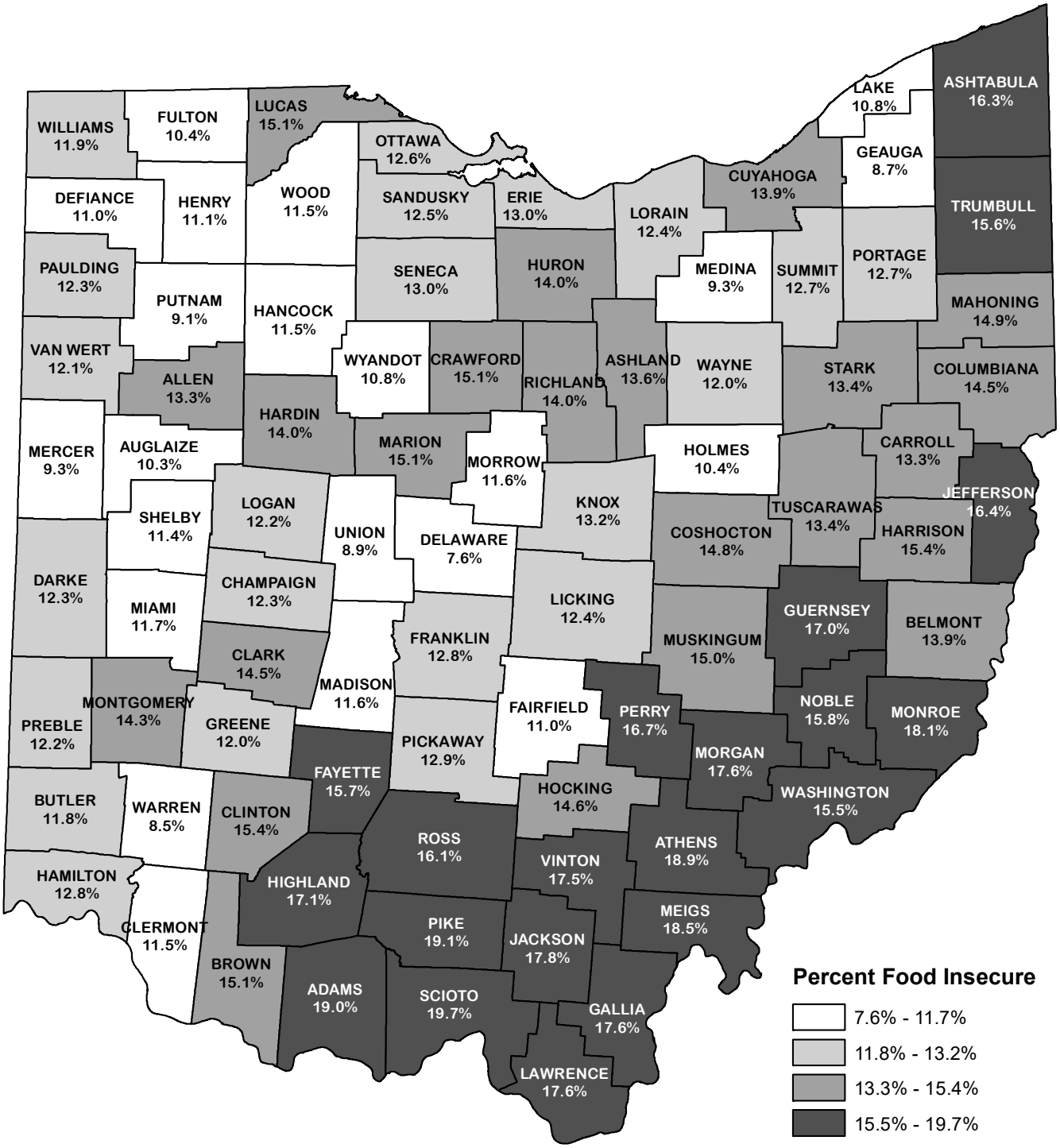
Figure 54. Percentage of the Population Living Below the Poverty Level, by County of Residence, Ohio, 2015-2019



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates.

Ohio: 14.0%
U.S.: 13.4%

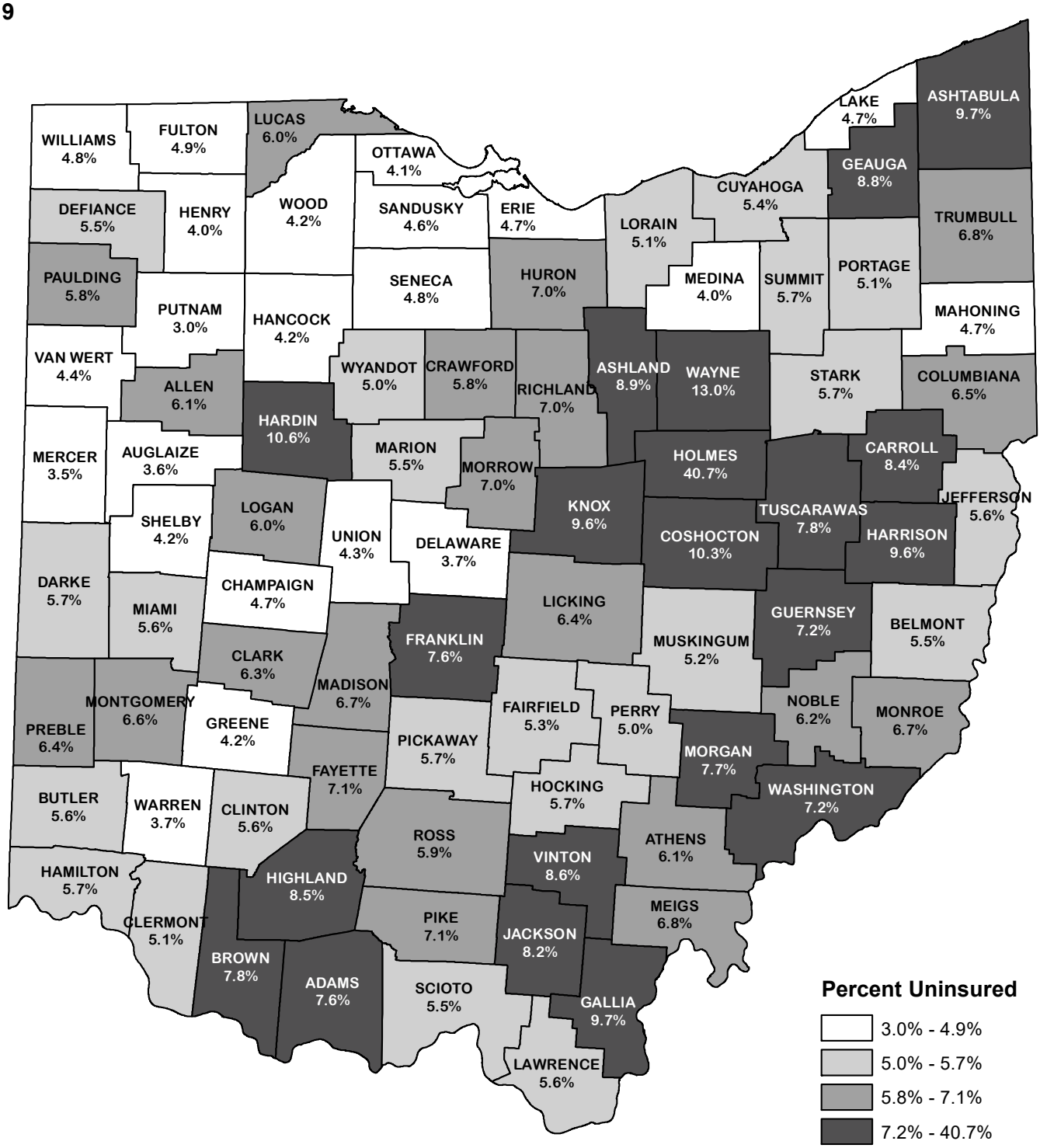
Figure 55. Percentage of the Population who are Food Insecure, by County of Residence, Ohio, 2019



Source: Map the Meal Gap. Published in County Health Rankings & Roadmaps, University of Wisconsin Population Health Institute, 2022.

Ohio: 13.2%

Figure 56. Percentage of the Population Without Health Insurance, by County of Residence, Ohio, 2015-2019



Ohio: 6.1%
U.S.: 8.8%

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates.

Technical Notes

Age-Adjusted Rate: A summary rate that is a weighted average of age-specific rates, where the weights represent the age distribution of a standard population (direct adjustment). The incidence and mortality rates presented in this report were standardized to the age distribution of the 2000 U.S. Standard Population. Under the direct method, the population was first divided into 19 five-year age groups, i.e., <1, 1-4, 5-9, 10-14, 15-19...85+, and the age-specific rate was calculated for each age group. Each age-specific rate was then multiplied by the standard population proportion for the respective age group.

Average Annual Number: The number of cases or deaths diagnosed per year, on average, for the time period of interest (e.g., 2015-2019). Average annual numbers are calculated by summing the number of cases or deaths for a given time period, dividing by the number of years that comprise the time period and rounding to the nearest whole number.

Incidence: The number of cases diagnosed during a specified time period (e.g., 2015-2019). Cancer cases were coded using the International Classification of Diseases for Oncology, Third Edition (ICD-O-3).

Invasive Cancer: A malignant tumor that has infiltrated the organ in which the tumor originated. Invasive cancers consist of those diagnosed at the local, regional, distant, and unstaged/missing stages. Only invasive cancers were included in the calculation of incidence rates in this document, with the exception of the addition of *in situ* bladder cancers.

Mortality: The number of deaths during a specified time period (e.g., 2015-2019). Cancer deaths were coded using the International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10).

Population Data for Calculating Rates: The 2010 to 2019 rates were calculated using population estimates from the U.S. Census Bureau and National Center for Health Statistics. Population data are from vintage 2020 bridged-race postcensal population estimates for July 1, 2010 to July 1, 2020 (released Sept. 22, 2021).

Percent Below Poverty: Percent (%) of the population living below the poverty level. Poverty level is dependent on several factors including household size. For example, in 2019 the poverty level for a household of four was $25,750.

Percent Less Than High School Education: Percent (%) of adults age 25 and older with less than a high school diploma or equivalency.

Percent Uninsured: Percent (%) of the population without health insurance.

Prevalence: The proportion of people with a certain disease or characteristic at a given time.

Prevalence of Colorectal Cancer Screening: Percent (%) of adults age 50-75 meeting the colorectal cancer screening guidelines. Recommended screenings include a high-sensitivity fecal occult blood test (FOBT) every year; or sigmoidoscopy every five years with FOBT every three years; or colonoscopy every 10 years.

Prevalence of Current Smoking: Percent (%) of adults age 18 and older who are current smokers. Current smoker is defined as adults who smoked at least 100 cigarettes in their life and currently smoke, every day or some days.

Prevalence of Excessive Drinking: Percent (%) of adults age 18 and older who reported heavy drinking or binge drinking in the past 30 days. Heavy drinking is defined as adult men having more than 14 drinks per week and adult women having more than seven drinks per week. Binge drinking is defined as having five or more drinks per occasion for men and four or more drinks per occasion for women.

Prevalence of Food Insecurity: Percent (%) of the population who did not have access to a reliable source of food during the past year.

Prevalence of Mammography: Percent (%) of women age 50 and older who reported getting a mammogram in the past two years.

Technical Notes

Prevalence of Pap Testing: Percent (%) of women ages 21-65 who reported having a Pap test in the past three years.

Prevalence of Physical Inactivity: Percent (%) of adults age 20 and older who reported no leisure-time physical activity in the past 30 days.

Prevalence of Obesity: Percent (%) of adults age 20 and older who reported a body mass index of 30 or higher. BMI = weight in kilograms divided by height in meters squared (kg/m^2).

Rate: The number of cases or deaths per unit of population (e.g., per 100,000 population) during a specified time period (e.g., 2015-2019). Rates may be unstable and are not presented when the case or death count is less than 10.

Stage at Diagnosis: The degree to which a tumor has spread from its site of origin at the time of diagnosis. Cancer stage is often related to survival and is used to select appropriate treatment. Patients with early stage disease often have better long-term survival, and detecting cancers at an early stage may lead to a reduction in mortality. The stages of diagnosis, in the order of increasing spread, are *in situ*, local, regional, and distant. In general, *in situ* and local tumors are referred to as early stage tumors, and regional and distant tumors are termed late stage. Cancers diagnosed at the local, regional, distant, and unstaged/missing stages are categorized as invasive.

in situ: Noninvasive cancer that has not penetrated surrounding tissue.

Local: A malignant tumor confined entirely to the organ of origin.

Regional: A malignant tumor that has extended beyond the organ of origin directly into surrounding organs or tissues or into regional lymph nodes.

Distant: A malignant tumor that has spread to parts of the body (distant organs, tissues, and/or lymph nodes) remote from the primary tumor.

Unstaged/Missing: Insufficient information is available to determine the stage or extent of the disease at diagnosis.

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The Ohio State University
Comprehensive Cancer Center

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