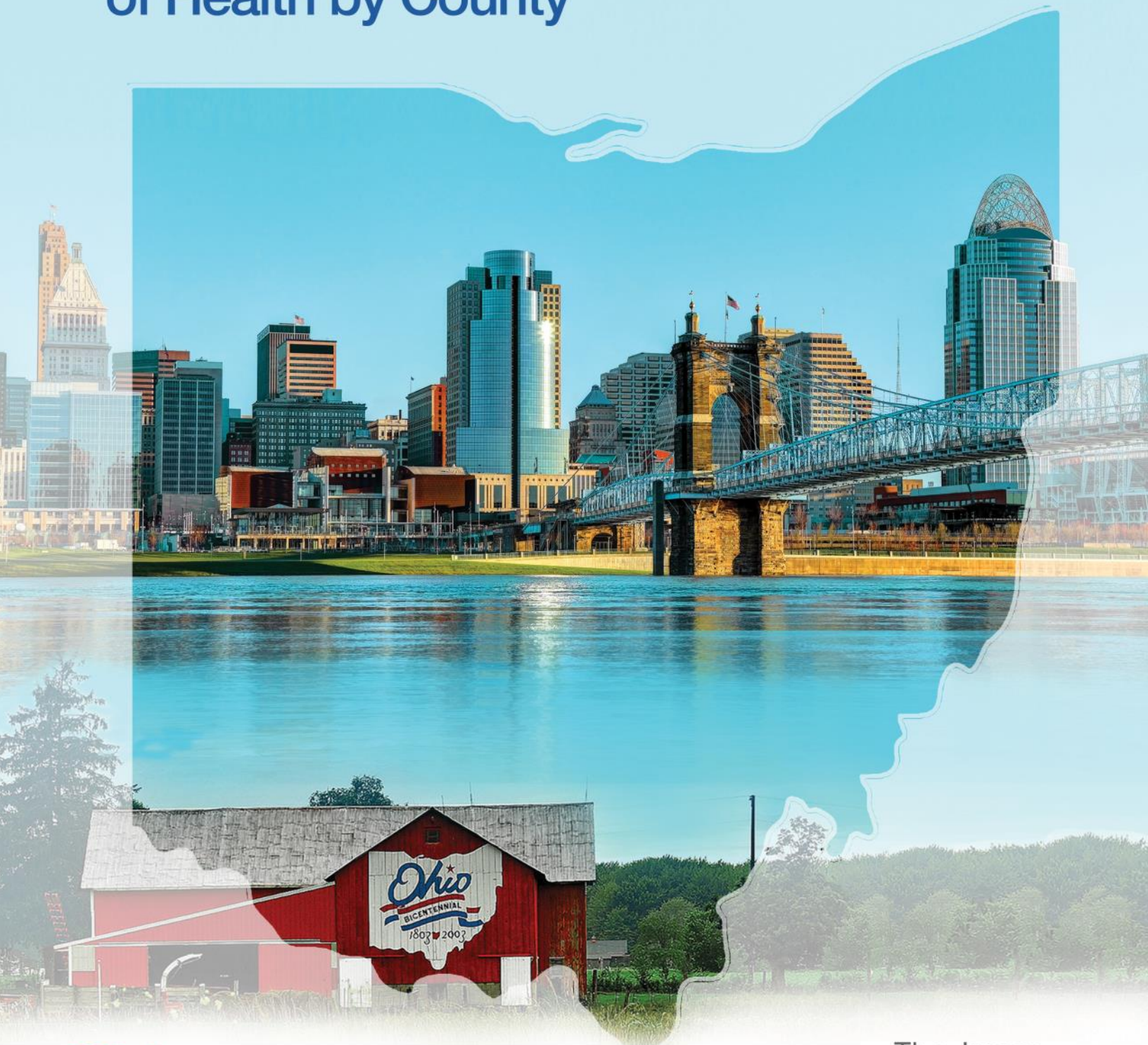


Ohio Cancer Atlas 2019:

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





To protect and improve the health of all Ohioans by preventing diseases, promoting good health, and assuring access to quality health care.

Ohio Department of Health
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Columbus, Ohio 43215

For information:

Ohio Cancer Incidence Surveillance System

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<https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/ohio-cancer-incidence-surveillance-system>

To improve people's lives through innovation in research, education, and patient care.

The James



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Suggested Citation

Ohio Cancer Atlas 2019: Maps of Cancer Incidence, Mortality, Risk Factors and Social Determinants of Health by County. Ohio Cancer Incidence Surveillance System, Ohio Department of Health and The Ohio State University, Columbus, Ohio, January 2019.

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**Ohio Cancer Atlas 2019:
Maps of Cancer Incidence, Mortality, Risk Factors and Social
Determinants of Health by County**

Table of Contents

Introduction and Methods.....	6
Key Findings.....	9
Cancer Incidence and Mortality Figures	
Figure 1 All Cancer Sites/Types Combined: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	12
Figure 2 All Cancer Sites/Types Combined: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	13
Figure 3 Bladder Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	14
Figure 4 Bladder Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	15
Figure 5 Brain & Other Central Nervous System Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	16
Figure 6 Brain & Other Central Nervous System Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	17
Figure 7 Female Breast Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015.....	18
Figure 8 Female Breast Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015.....	19
Figure 9 Colon & Rectum Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	20
Figure 10 Colon & Rectum Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	21
Figure 11 Esophageal Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	22
Figure 12 Esophageal Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	23
Figure 13 Kidney & Renal Pelvis Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	24
Figure 14 Kidney & Renal Pelvis Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	25
Figure 15 Laryngeal Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	26

Table of Contents

Figure 16	Laryngeal Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015.....	27
Figure 17	Leukemia: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	28
Figure 18	Leukemia: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	29
Figure 19	Liver & Intrahepatic Bile Duct Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	30
Figure 20	Liver & Intrahepatic Bile Duct Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	31
Figure 21	Lung & Bronchus Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	32
Figure 22	Lung & Bronchus Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	33
Figure 23	Melanoma of the Skin: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	34
Figure 24	Melanoma of the Skin: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	35
Figure 25	Multiple Myeloma: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	36
Figure 26	Multiple Myeloma: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	37
Figure 27	Non-Hodgkin Lymphoma: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	38
Figure 28	Non-Hodgkin Lymphoma: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	39
Figure 29	Oral Cavity & Pharyngeal Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	40
Figure 30	Oral Cavity & Pharyngeal Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015.....	41
Figure 31	Ovarian Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015.....	42
Figure 32	Ovarian Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015.....	43
Figure 33	Pancreatic Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	44

Table of Contents

Figure 34	Pancreatic Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	45
Figure 35	Prostate Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Males, by County of Residence, Ohio, 2011-2015.....	46
Figure 36	Prostate Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Males, by County of Residence, Ohio, 2011-2015.....	47
Figure 37	Stomach Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	48
Figure 38	Stomach Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015.....	49
Figure 39	Uterine Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015.....	50
Figure 40	Uterine Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2006-2015.....	51
Figure 41	Cervical Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015.....	52
Figure 42	Hodgkin Lymphoma: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015.....	53
Figure 43	Testicular Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Males, by County of Residence, Ohio, 2006-2015.....	54
Figure 44	Thyroid Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015.....	55

Cancer Screening and Stage at Diagnosis Figures

Figure 45	Prevalence of Mammography in the Past Two Years among Women Ages 50-74, by County of Residence, Ohio, 2014-2016.....	56
Figure 46	Prevalence of Mammography in the Past Two Years among Female Medicare Enrollees Ages 67-69, by County of Residence, Ohio, 2014.....	57
Figure 47	Female Breast Cancer: Proportion of Cases (%) Diagnosed at Late (Regional or Distant) Stage, by County of Residence, Ohio, 2011-2015.....	58
Figure 48	Prevalence of Pap Testing in the Past Three Years among Women Ages 21-65, by County of Residence, Ohio, 2014-2016.....	59
Figure 49	Cervical Cancer: Proportion of Cases (%) Diagnosed at Late (Regional or Distant) Stage, by County of Residence, Ohio, 2011-2015.....	60
Figure 50	Prevalence of Meeting Colorectal Cancer Screening Guidelines among Adults Ages 50-75, by County of Residence, Ohio, 2014-2016.....	61

Table of Contents

Figure 51	Colon & Rectum Cancer: Proportion of Cases (%) Diagnosed at Late (Regional or Distant) Stage, by County of Residence, Ohio, 2011-2015.....	62
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Risk Factor, Demographic and Social Determinants of Health Figures

Figure 52	Prevalence of Current Smoking among Adults Ages 18 and Older, by County of Residence, Ohio, 2016.....	63
Figure 53	Prevalence of Obesity among Adults Ages 20 and Older, by County of Residence, Ohio, 2014.....	64
Figure 54	Prevalence of Physical Inactivity among Adults Ages 20 and Older, by County of Residence, Ohio, 2014.....	65
Figure 55	Prevalence of Excessive Drinking among Adults Ages 18 and Older, by County of Residence, Ohio, 2016.....	66
Figure 56	Percent Non-white Race, by County of Residence, Ohio, 2011-2015.....	67
Figure 57	Percent Hispanic Ethnicity, by County of Residence, Ohio, 2011-2015.....	68
Figure 58	Percent of Adults Ages 25 and Older With Less Than a High School Education, by County of Residence, Ohio, 2011-2015.....	69
Figure 59	Percent of the Population Living Below the Poverty Level, by County of Residence, Ohio, 2011-2015.....	70
Figure 60	Percent of the Population Who Were Food Insecure, by County of Residence, Ohio, 2015	71
Figure 61	Percent of the Population Without Health Insurance, by County of Residence, Ohio, 2011-2015.....	72

Technical Notes.....	73
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References.....	74
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Introduction and Methods

Cancer is a group of more than 100 different diseases in which abnormal cells divide without control and can invade nearby tissues.¹ Cancer is the second most common cause of death in Ohio and the United States, accounting for nearly one of every four deaths.² Numerous factors that increase the risk of developing cancer have been identified and include tobacco use, poor diet, lack of physical activity, obesity, genetics, infectious agents and environmental factors, among many others. These factors interact with one another to increase cancer risk; although, the primary causes of many cancers have yet to be identified. Cancer screening can result in the prevention and early detection of cancer, and cancer stage at diagnosis is an important determinant of survival. Social determinants of health such as low income and education also increase cancer risk and impact outcomes. This compendium presents Ohio county-level maps of cancer incidence (new case) and mortality (death) rates, as well as maps of cancer screenings, cancer stage at diagnosis, risk factors, demographics and social determinants of health, to show geographic patterns of cancer rates and associated factors across the state.

Cancer rates vary by age group, sex, race/ethnicity, geographic area and cancer site/type. According to the 2011-2015 American Community Survey five-year estimates, the population for Ohio was 11,575,977 with the following demographics: 51.1 percent female, 48.9 percent male, 15.1 percent age 65 or older, 82.4 percent white, 12.2 percent black and 3.4 percent Hispanic or Latino ethnicity.³ As shown in the map below, Ohio consists of 88 counties and is bordered by Lake Erie to the north and the Ohio River to the south. Ohio contains both metropolitan and non-metropolitan 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 are in the Appalachian region of the United States (shaded in blue in the map below). 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 2011-2015 or, in some cases, 2006-2015. Because increasing age is strongly associated with higher cancer rates, 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+).⁴ Rates based on counts less than five are likely unstable and were therefore not calculated.

CANCER INCIDENCE DATA

Ohio cancer incidence (new case) 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.⁵ 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.⁶

Cancers were coded to the International Classification of Diseases for Oncology, Third Edition (ICD-O-3), codes C00.0-C80.9.⁷ Each cancer was grouped, by ICD-O-3 code, into 23 major site/type groupings in accordance with the methods of the SEER Program.⁸

Introduction and Methods

Cancer cases are categorized as *in situ* or invasive. *In situ* cancers are malignant tumors that have not penetrated the basement membrane (supportive tissue underlying the epithelium) of the organ of origin or extended beyond the epithelial 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 2011 through 2015, an average of 63,955 Ohio residents were diagnosed with invasive cancer each year. After adjusting for age, this equates to an average of 461.6 cancer cases per 100,000 residents, which is 5 percent higher than the U.S. rate of 439.2 per 100,000. The leading site/type of cancer incidence in 2011-2015 was lung and bronchus cancer, followed by cancers of the breast, 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.⁹ U.S. mortality data were provided by the SEER Program.⁶ 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}

Cancer claimed the lives of an average of 25,182 Ohioans each year from 2011 through 2015, corresponding to a rate of 178.9 per 100,000, which is 9 percent higher than the U.S. rate (163.5 per 100,000). Lung and bronchus cancer was the leading cause of cancer death in Ohio in both men and women, followed by colon and rectum, breast and pancreatic cancers. These cancer sites/types were also the leading causes of cancer death in the United States in 2011-2015, in the same order.

CANCER SCREENING AND STAGE AT DIAGNOSIS DATA

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.⁵ Cancer screening data included in this report (i.e., Pap testing, mammography, and colon and rectum cancer screening) were obtained from the 2014-2016 Ohio Behavioral Risk Factor Surveillance System (BRFSS), ODH, and the Dartmouth Atlas of Cancer Care.^{12,13}

Cancer stage at diagnosis refers to the degree to which cancer has spread when the cancer is diagnosed. Stage at diagnosis is an important determinant of survival, with the earliest stages (*in situ* and localized stages) often leading to better prognoses. 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 staging method SEER Summary Stage 2000.¹⁴

RISK FACTOR, DEMOGRAPHIC AND SOCIAL DETERMINANTS OF HEALTH DATA

A cancer risk factor is anything that increases a person's risk of developing cancer. 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, which are the social, economic and physical conditions

Introduction and Methods

in the environment in which people are born, live, learn, play, work and age, also 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 health care 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.¹⁵ 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.

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, 2011-2015 American Community Survey 5-Year Estimates.³ Data on health behaviors and lifestyle factors were obtained from the 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin.¹⁶ This includes data on smoking and excessive drinking obtained from the 2016 Ohio BRFSS; adult obesity and physical inactivity data from the CDC Diabetes Interactive Atlas, National Diabetes Surveillance System; and food insecurity data from Map the Meal Gap 2015: Food Insecurity and Child Food Insecurity Estimates at the County Level, Feeding America.^{12,17,18}

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.¹⁹ In general, maps show county rates or percentages divided into quartiles (four equal groups), with the highest rates or percentages in the darker hue, allowing for comparisons between counties. The exceptions include maps showing the prevalence of mammography, pap testing and colorectal screening, where counties with lower screening rates are indicated by darker green hues. Maps were not produced for a particular cancer site/type if there were 14 or more counties with cancer counts less than five, even for a 10-year time period (i.e., 1996-2015). Therefore, mortality maps for cervical cancer, Hodgkin lymphoma, testicular cancer and thyroid cancer are not included in this atlas.

Maps were evaluated for the following three types of geographic patterns: 1) directional differences (e.g. north, southeast); 2) differences occurring in counties with or adjacent to large cities; and 3) differences occurring in Ohio Appalachian counties. Clearly observed patterns are described in the Key Findings when, in general, rates or proportions varied according to these three geographic patterns. 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 32 and 33) were higher in the south and southeast 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, cancer reporting practices, 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, the patterns for the 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 (northeastern Ohio), Columbus (central Ohio) and Cincinnati and Dayton (southwestern Ohio); whereas mortality rates for breast cancer were higher in southeastern counties. (pages 18 and 19)
- **Cervical cancer:** Incidence rates for cervical cancer were higher in counties in southern Ohio and counties just northwest of central Ohio. (page 52)
- **Colon and rectum cancer:** Incidence and mortality rates for colon and rectum cancer tended to be lower in counties with large cities. (pages 20 and 21)
- **Kidney and renal pelvis cancer:** Incidence rates for kidney and renal pelvis cancer were higher in southern counties. (page 24)
- **Laryngeal cancer:** Incidence and mortality rates for laryngeal cancer were higher in southern counties. (pages 26 and 27)
- **Leukemia:** Incidence rates for leukemia were higher in southeastern counties. (page 28)
- **Liver and intrahepatic bile duct cancer:** Incidence and mortality rates for liver and intrahepatic bile duct cancer tended to be higher in counties with or adjacent to large cities. (pages 30 and 31)
- **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 and southeast. (pages 32 and 33)
- **Prostate cancer:** Incidence rates for prostate cancer were higher in counties with or adjacent to large cities. (page 46)
- **Cancer sites/types for which the pattern of incidence and mortality rates are similar:** These include cancers of the brain and other central nervous system, 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

- **Colorectal cancer screening:** Counties with the lowest colorectal screening rates tended to be those without large cities. (page 61)
 - **Female breast cancer late stage:** Counties with the highest percent late stage for female breast cancer were those without large cities. (page 58)
-

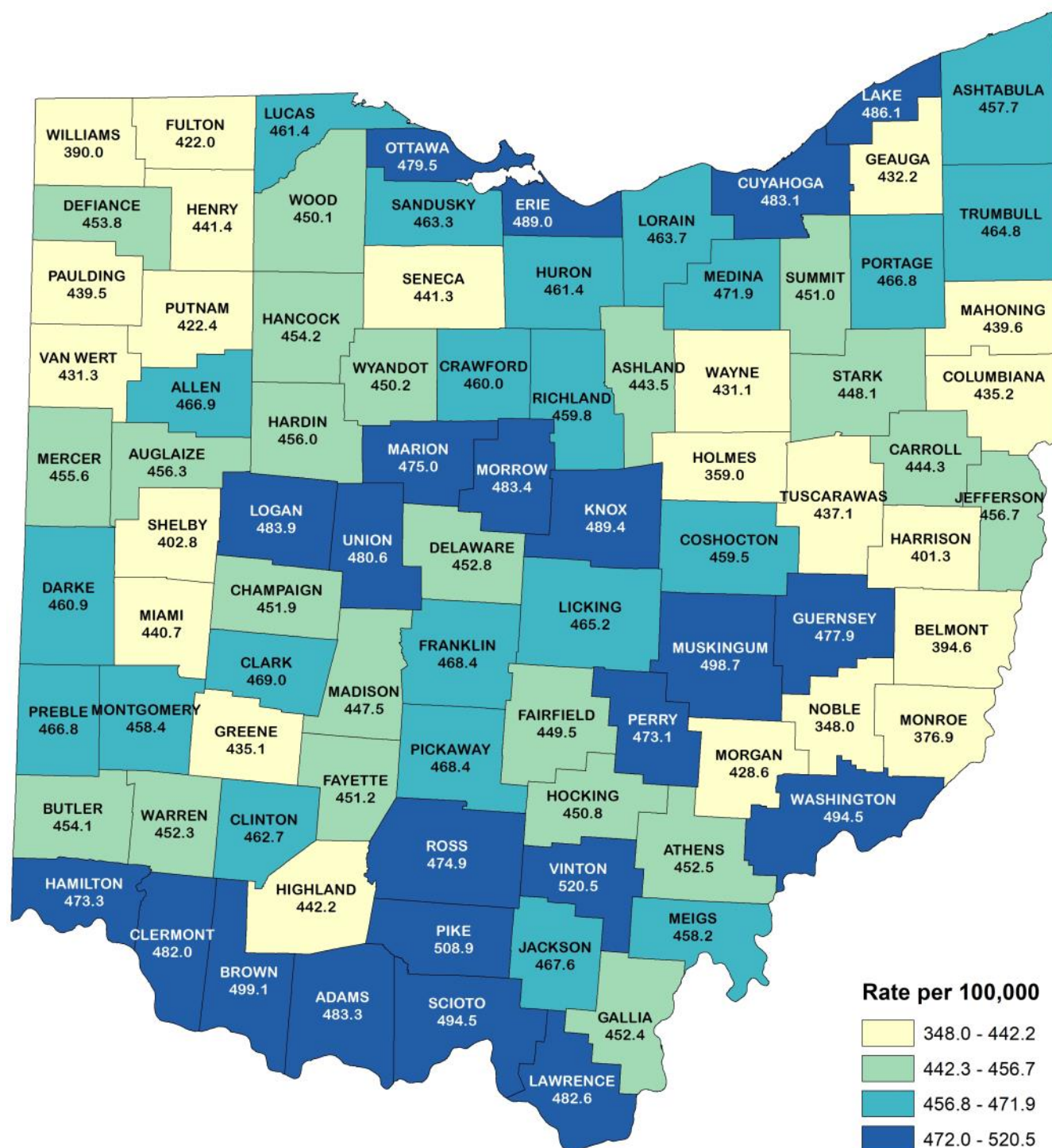
Key Findings

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 63)
 - **Obesity:** The prevalence of obesity among adults ages 20 and older was higher in counties without large cities in southern, southeastern and northwestern Ohio. (page 64)
 - **Physical inactivity:** The prevalence of physical inactivity among adults ages 20 and older was higher in southeastern Ohio and tended to be lower in counties with large cities. (page 65)
 - **Excessive drinking:** The prevalence of excessive drinking among adults ages 18 and older was lower in southern and southeastern Ohio. (page 66)
 - **Less than high school education:** The percentage of adults ages 25 and older with less than a high school education was higher in the south and east/central Appalachia Ohio. (page 69)
 - **Poverty:** The poorest counties, based on the percent of the population living below the poverty level, were primarily located in southern and Appalachia Ohio. (page 70)
 - **Food insecurity:** The percentage of the population who were food insecure was higher in counties with large cities and in Appalachia Ohio. (page 71)
 - **Uninsured:** The percentage of the population without health insurance was higher in Appalachia Ohio. (page 72)
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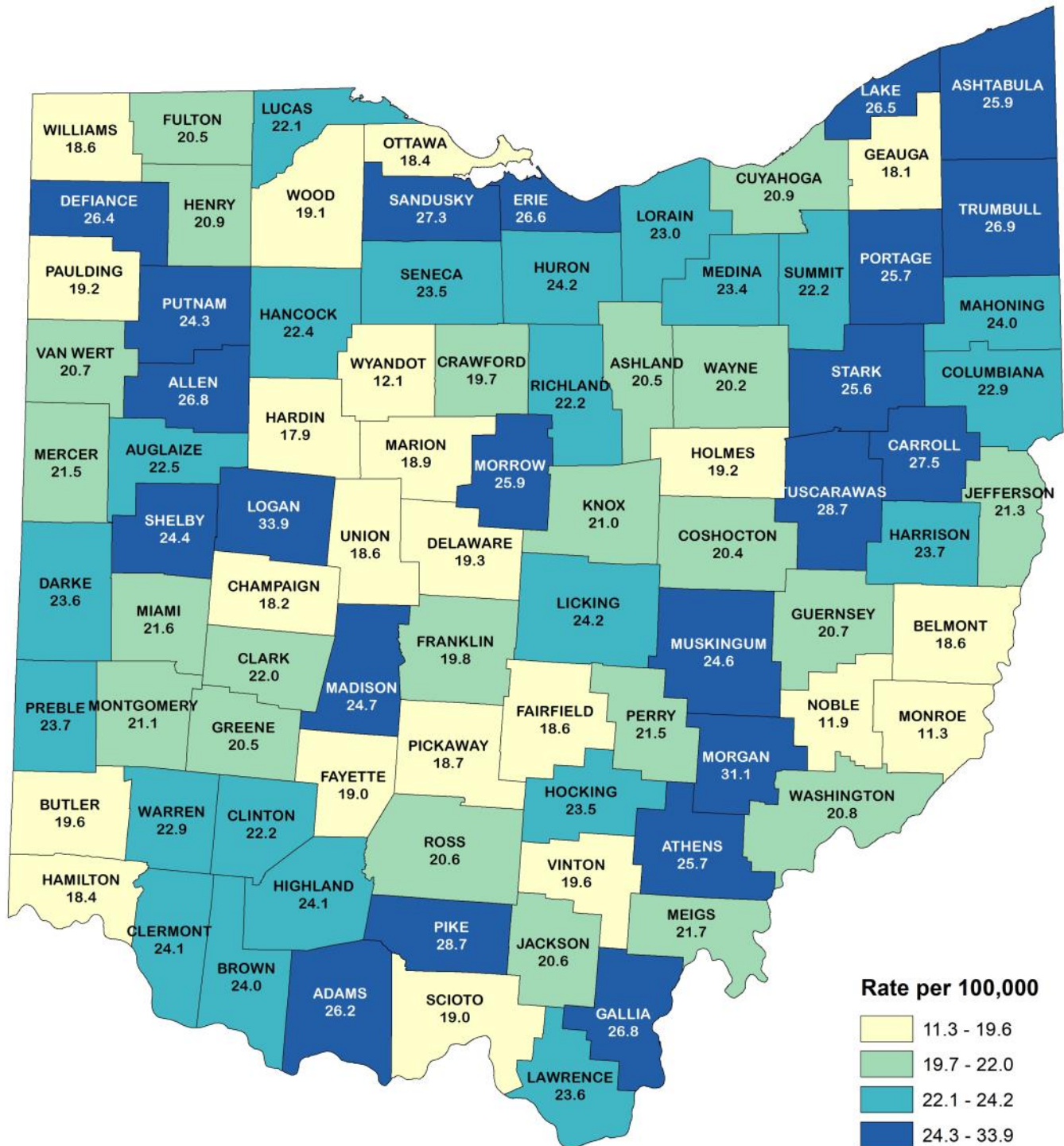
Figure 1. All Cancer Sites/Types Combined: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015





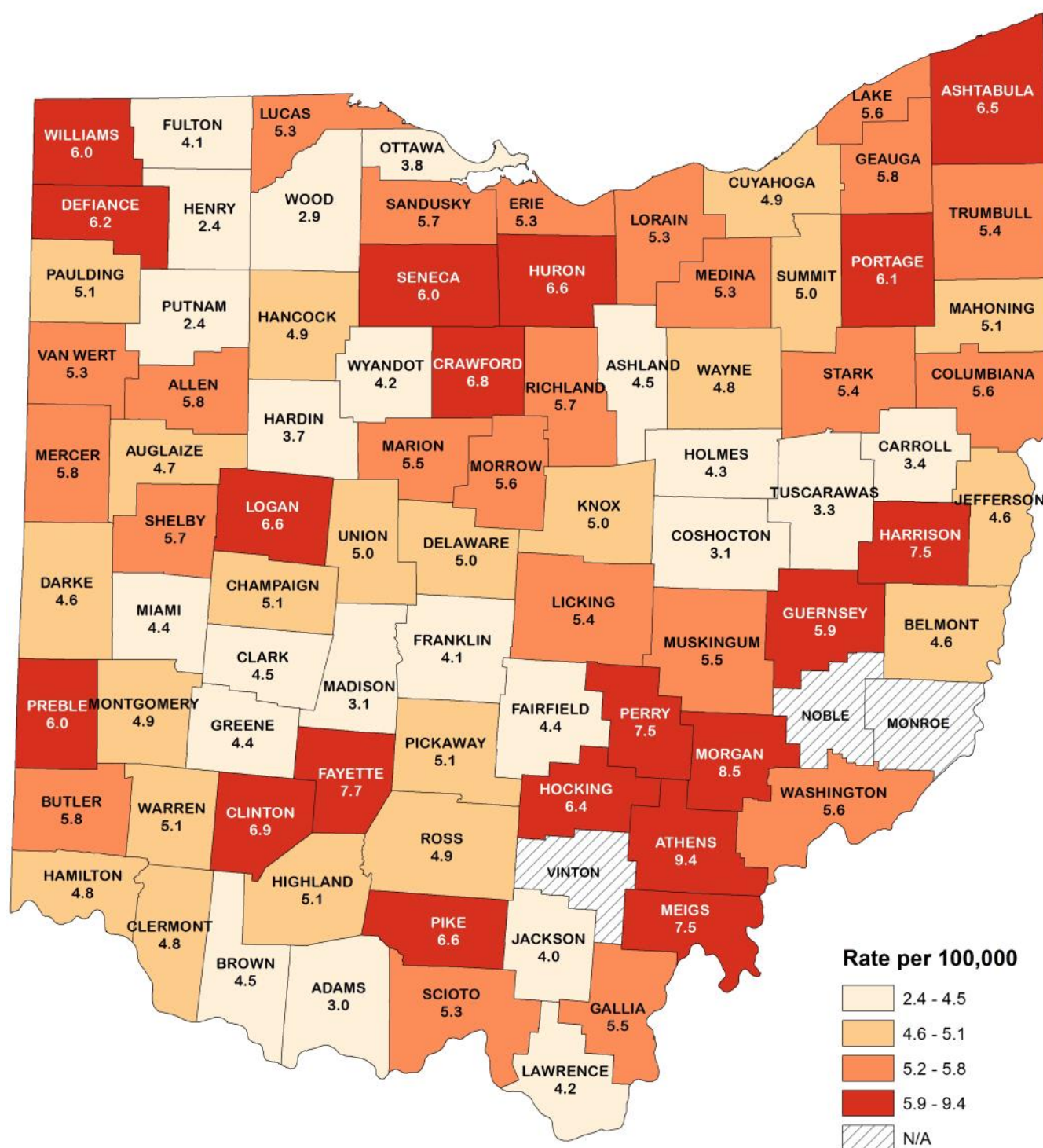
U.S. Rate: 163.5

Figure 3. Bladder Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

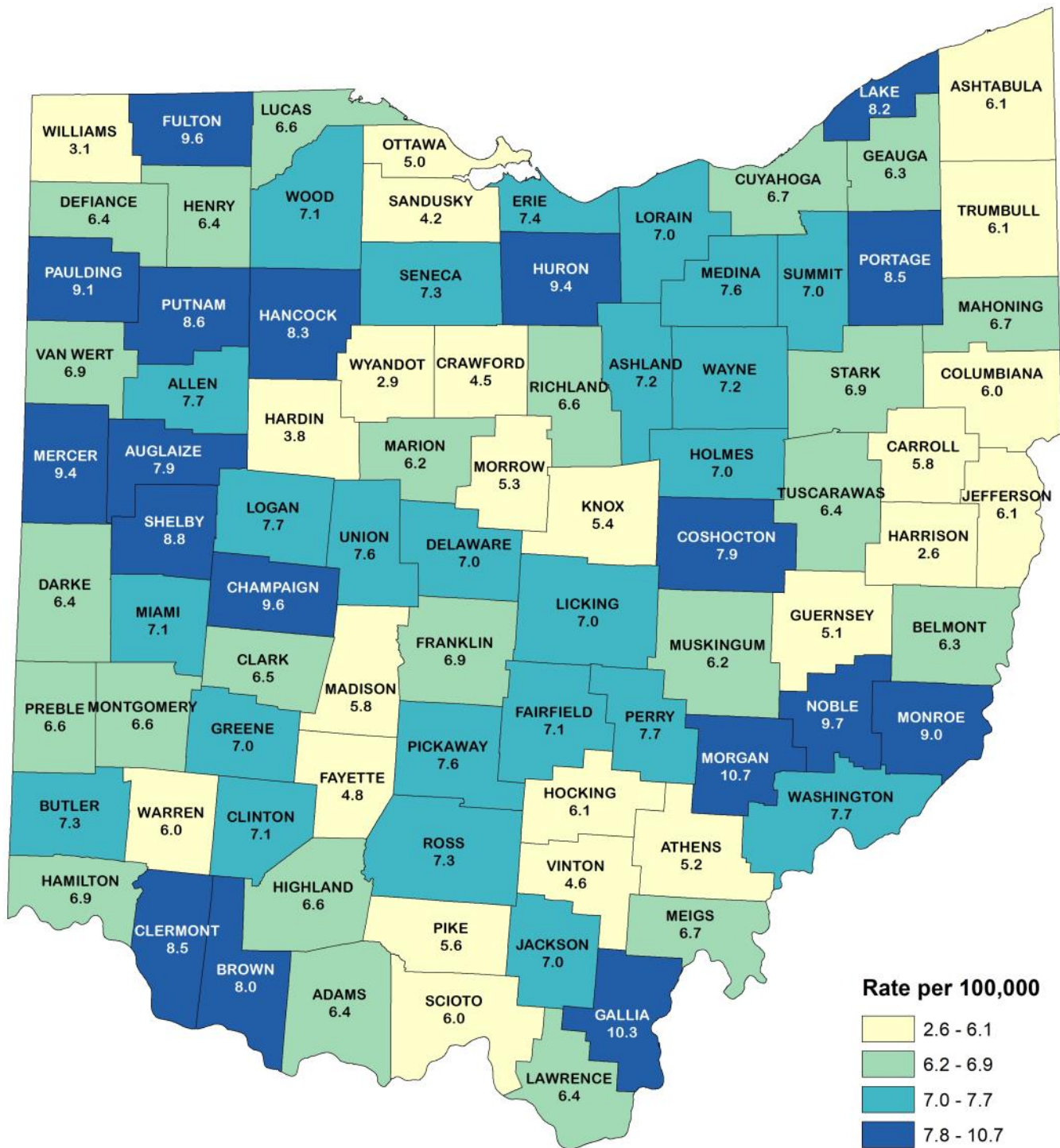
Figure 4. Bladder Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

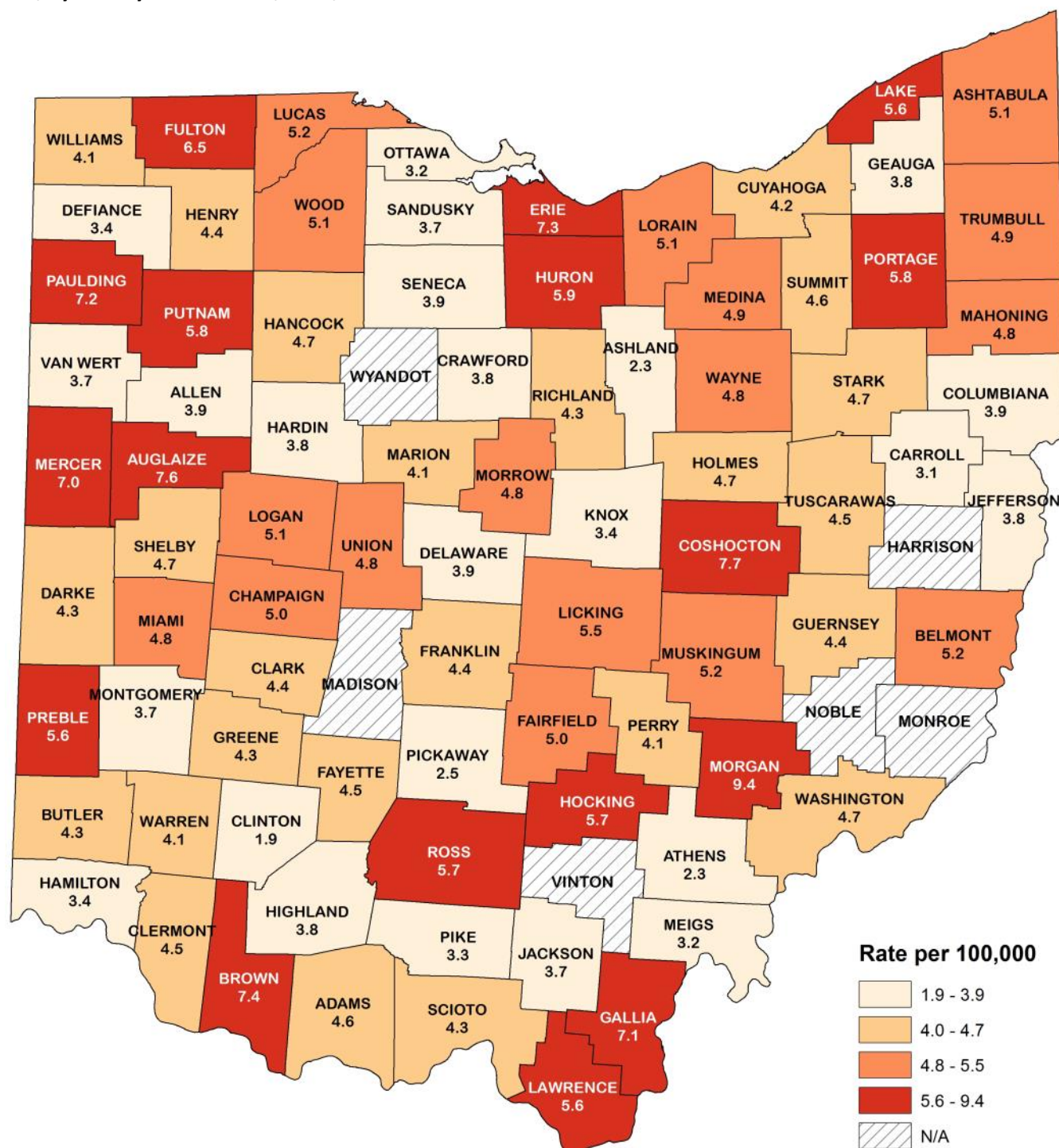
N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Figure 5. Brain & Other Central Nervous System Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Figure 6. Brain & Other Central Nervous System Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2011-2015 is less than five.

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, 2011-2015

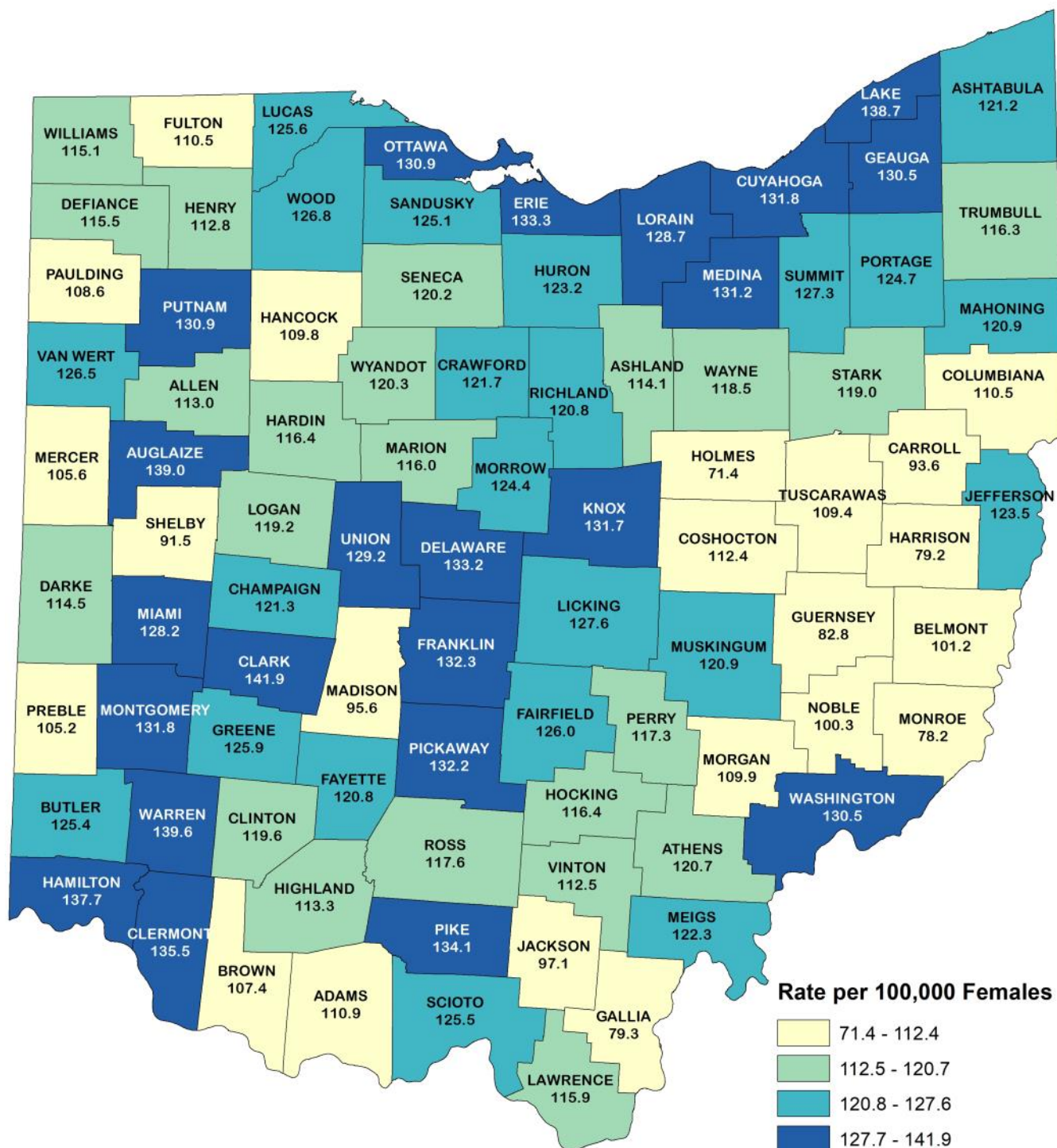
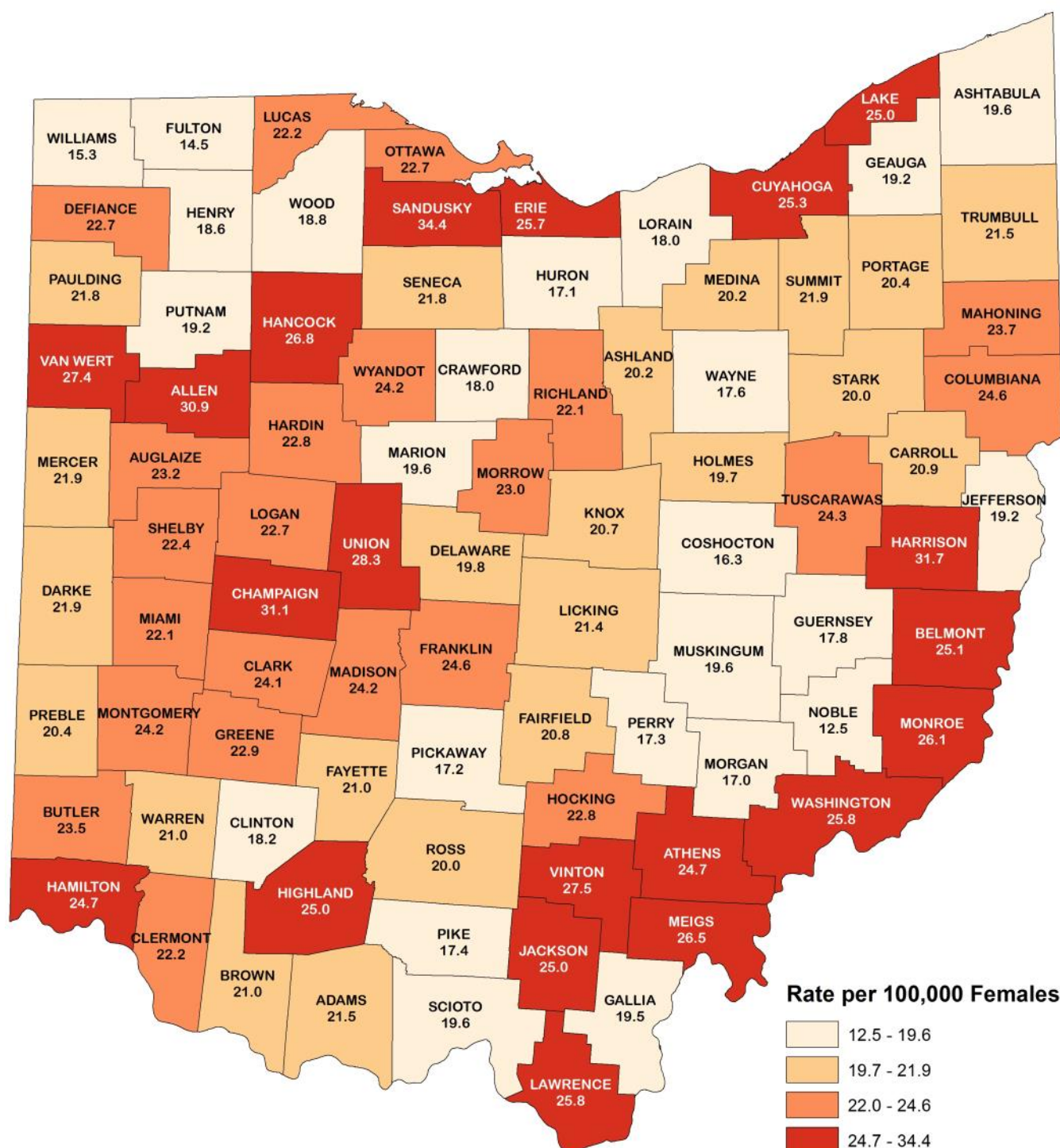


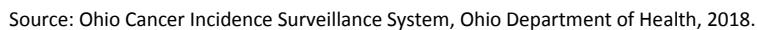
Figure 8. Female Breast Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

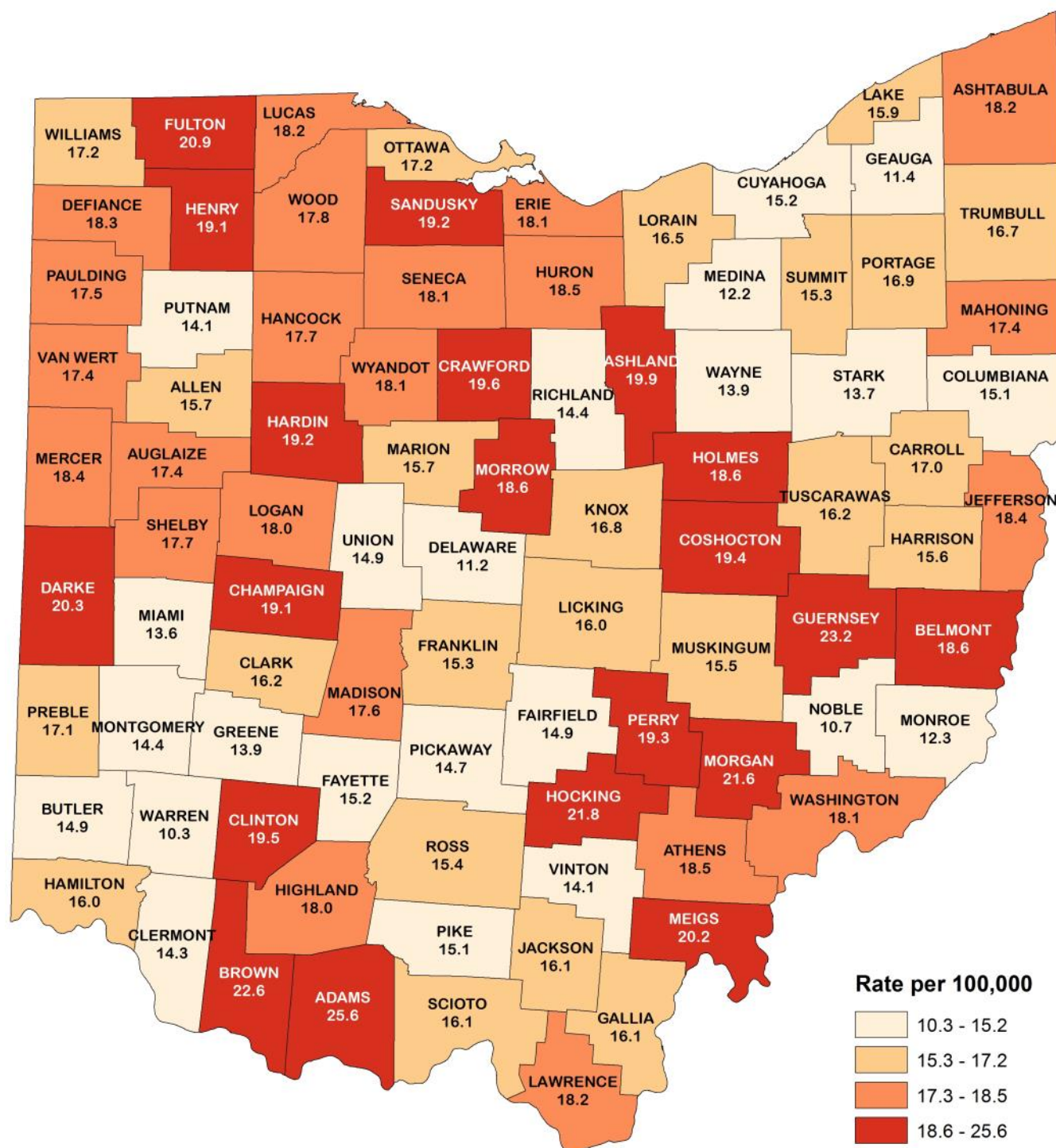
Ohio Rate: 22.8

U.S. Rate: 20.9



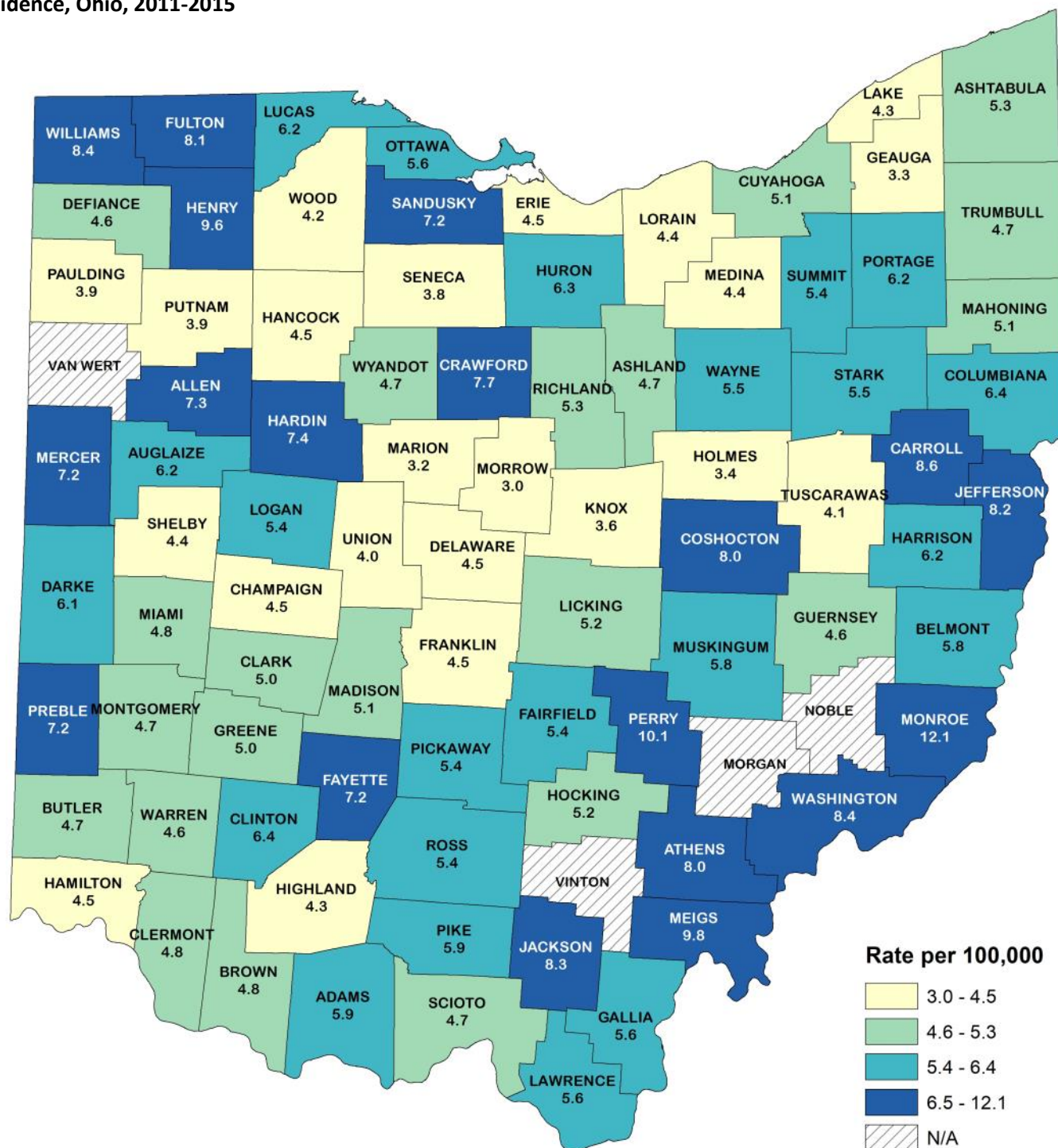
Ohio Rate: 41.7
U.S. Rate: 39.4

Figure 10. Colon & Rectum Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

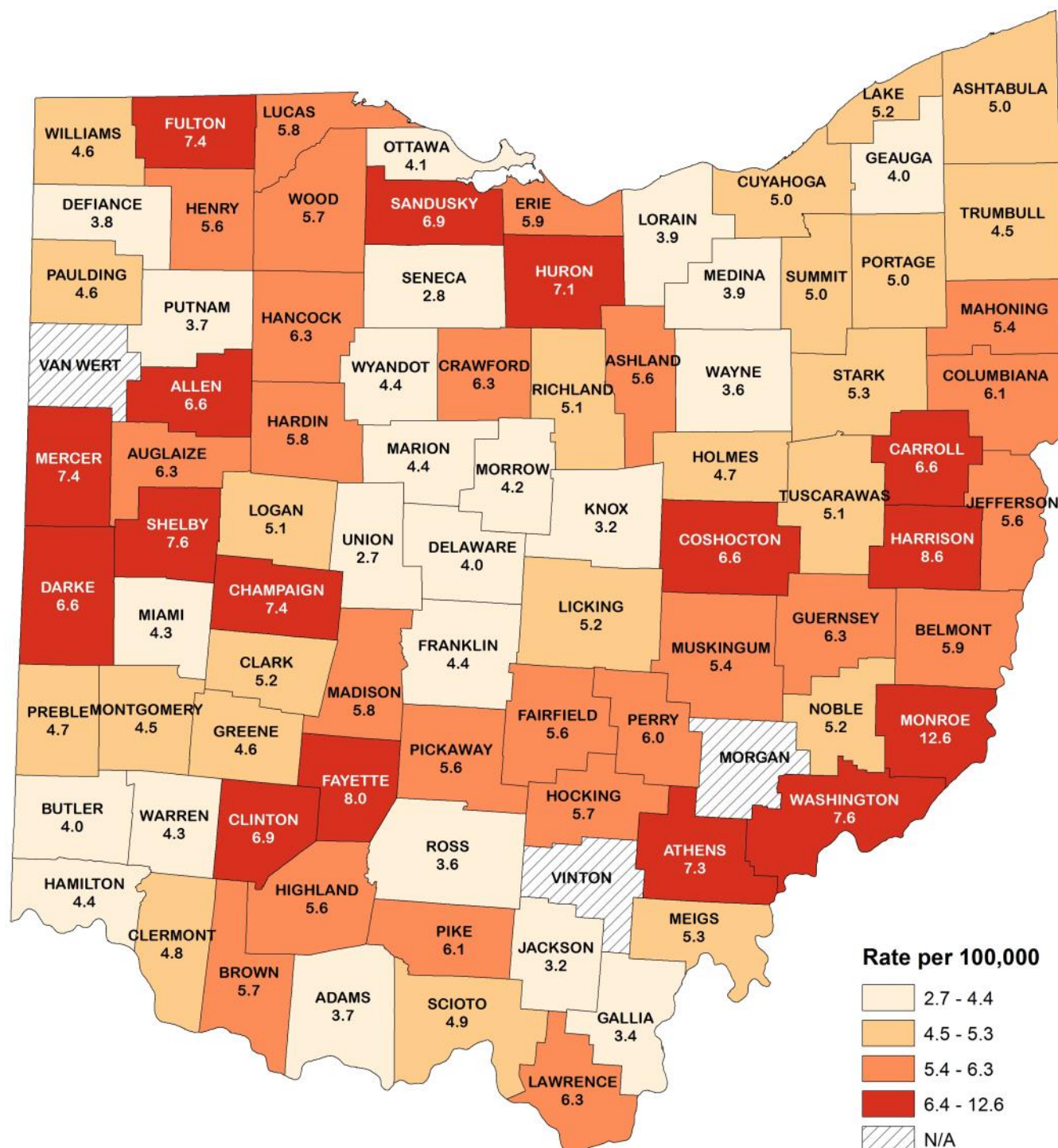
Figure 11. Esophageal Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 5.1
 U.S. Rate: 4.2

Figure 12. Esophageal Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



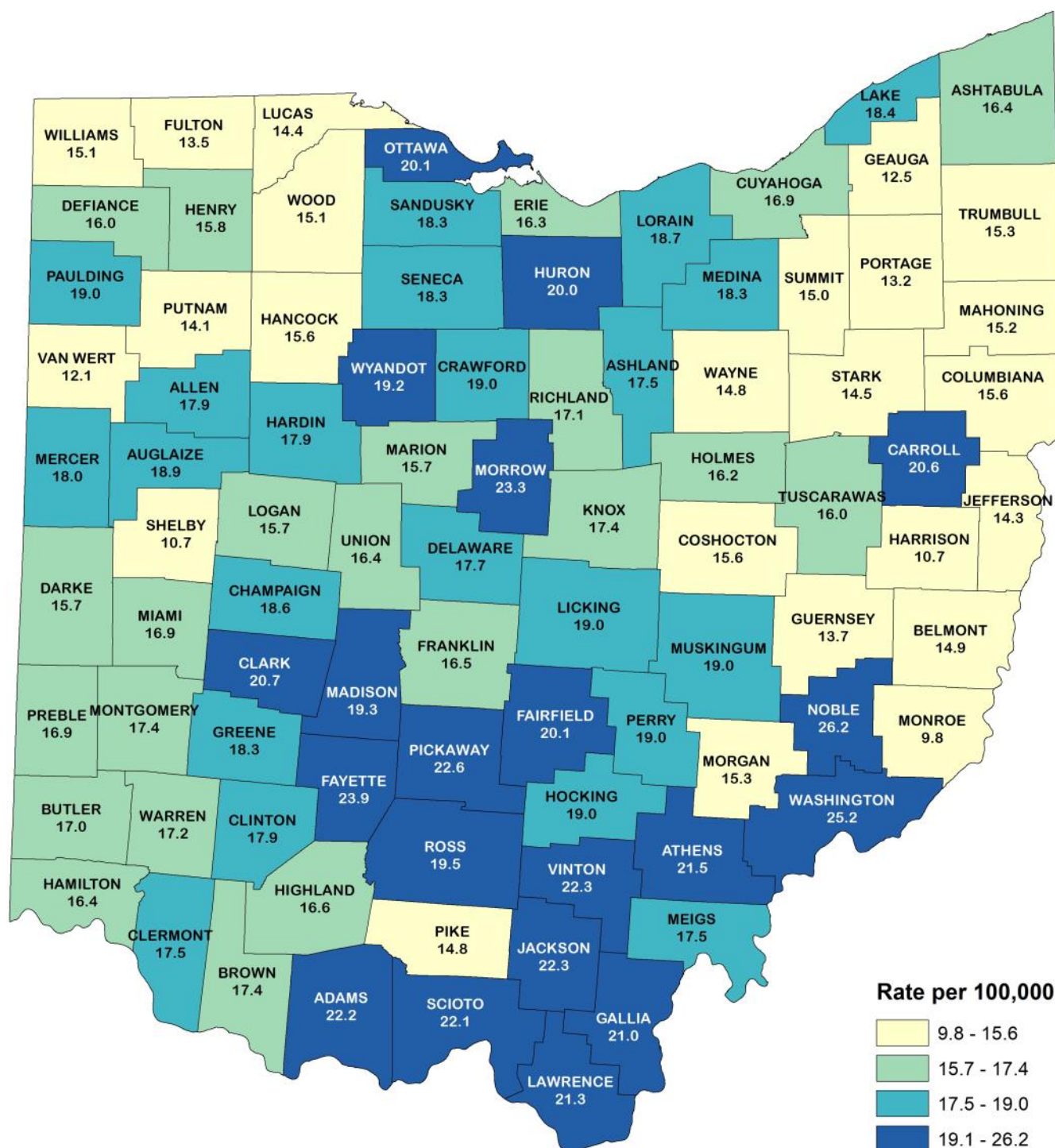
Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 5.0

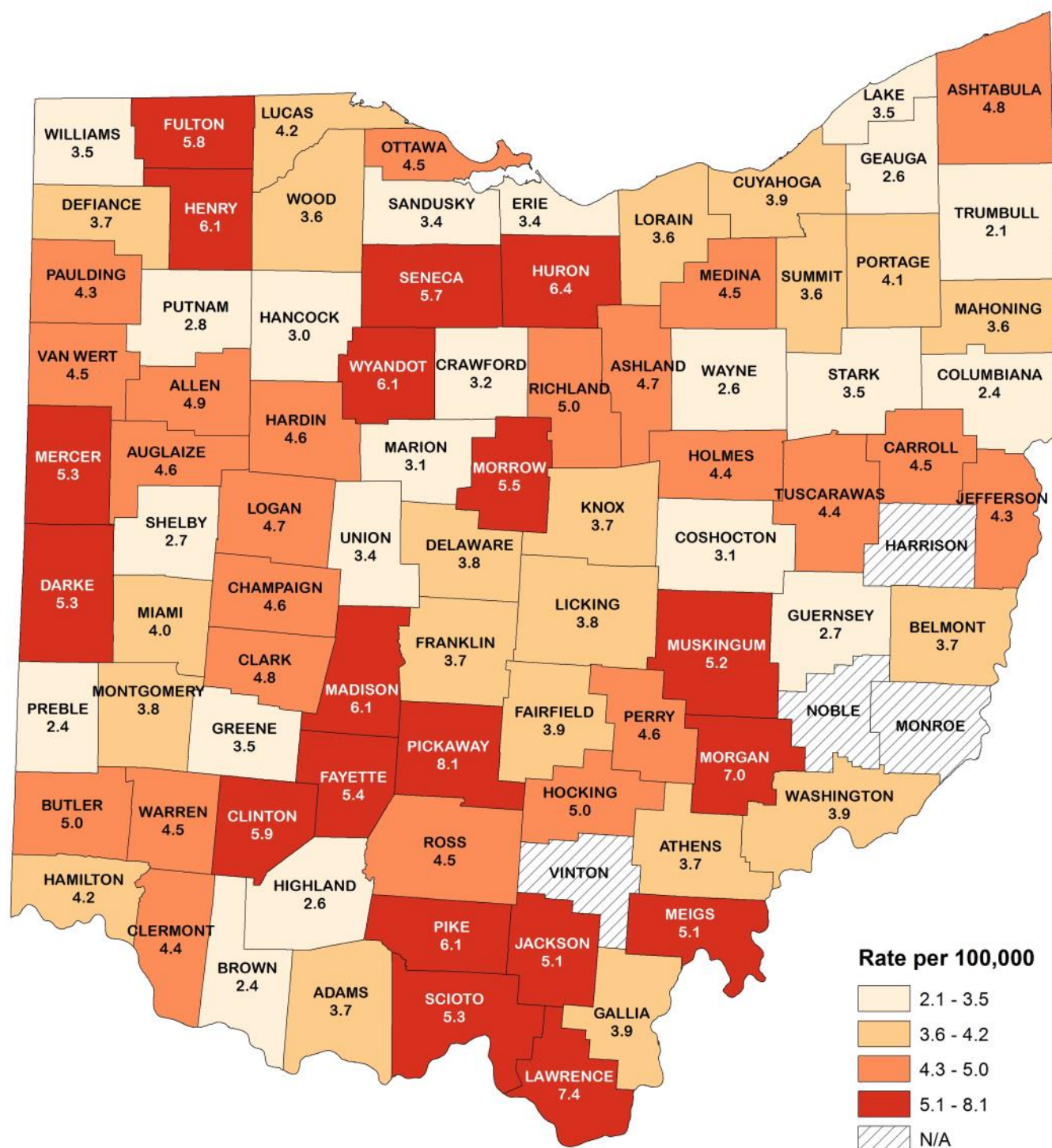
U.S. Rate: 4.0

Figure 13. Kidney & Renal Pelvis Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Figure 14. Kidney & Renal Pelvis Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



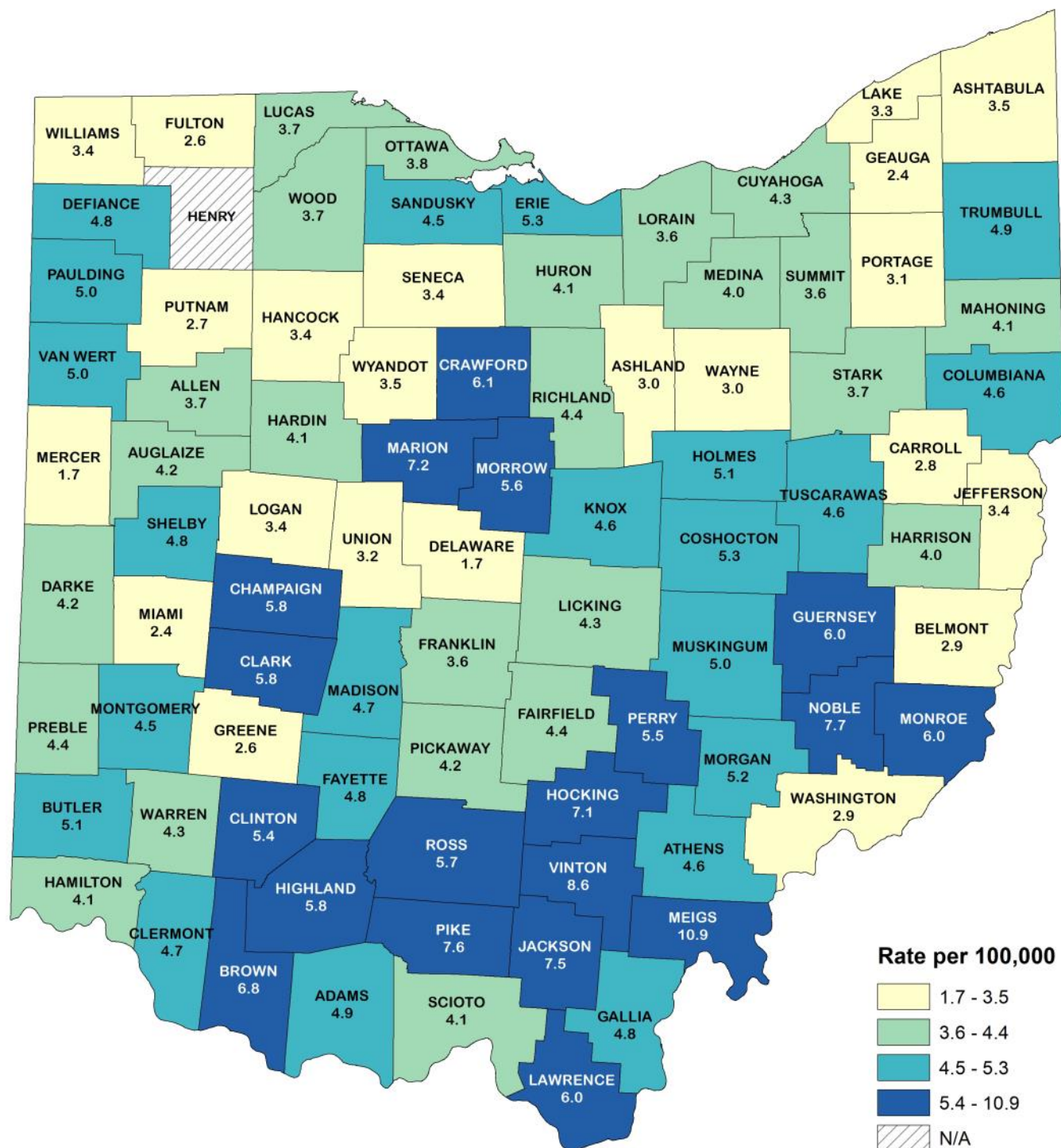
Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 4.0

U.S. Rate: 3.8

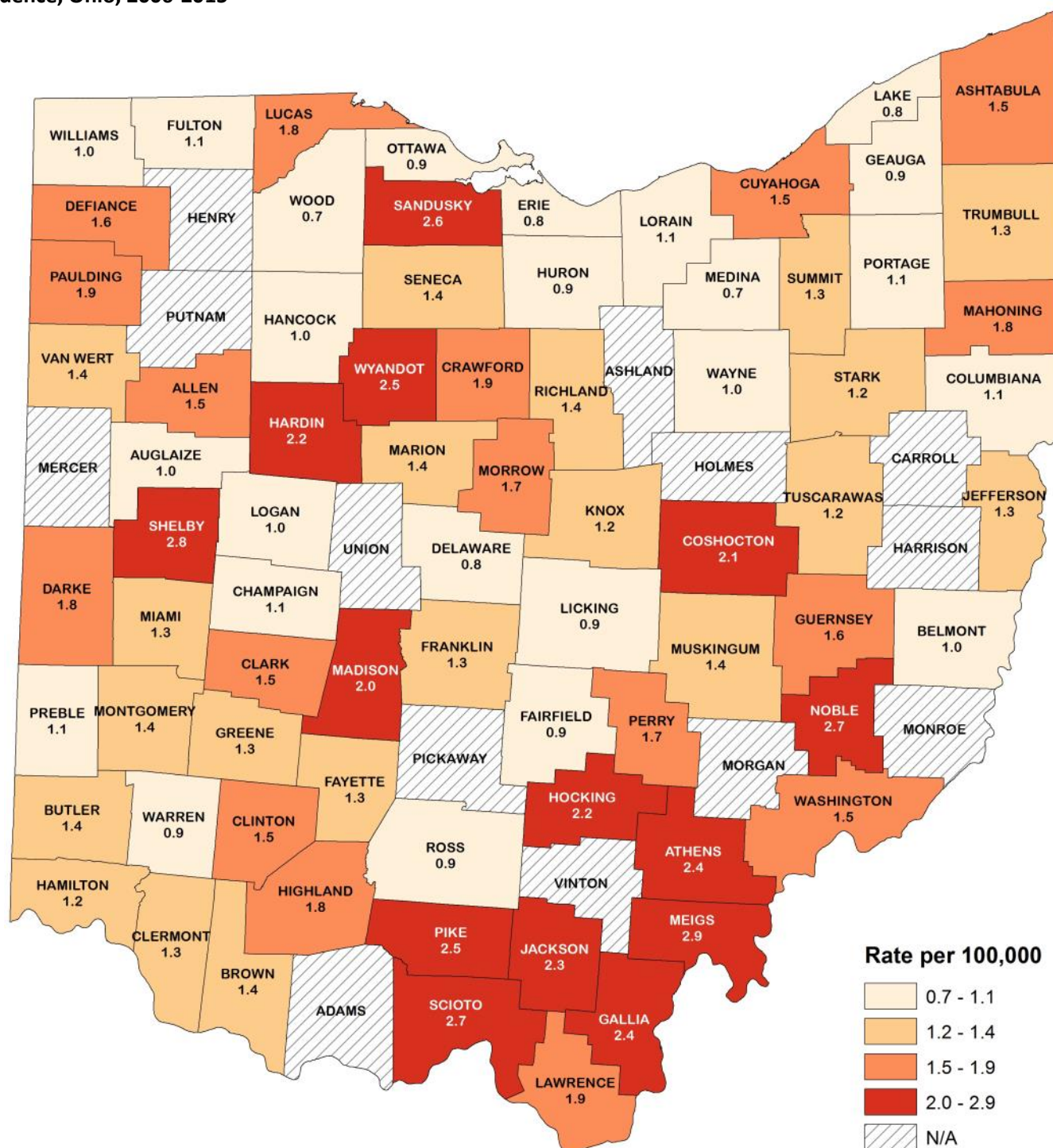
Figure 15. Laryngeal Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 4.1
U.S. Rate: 3.0

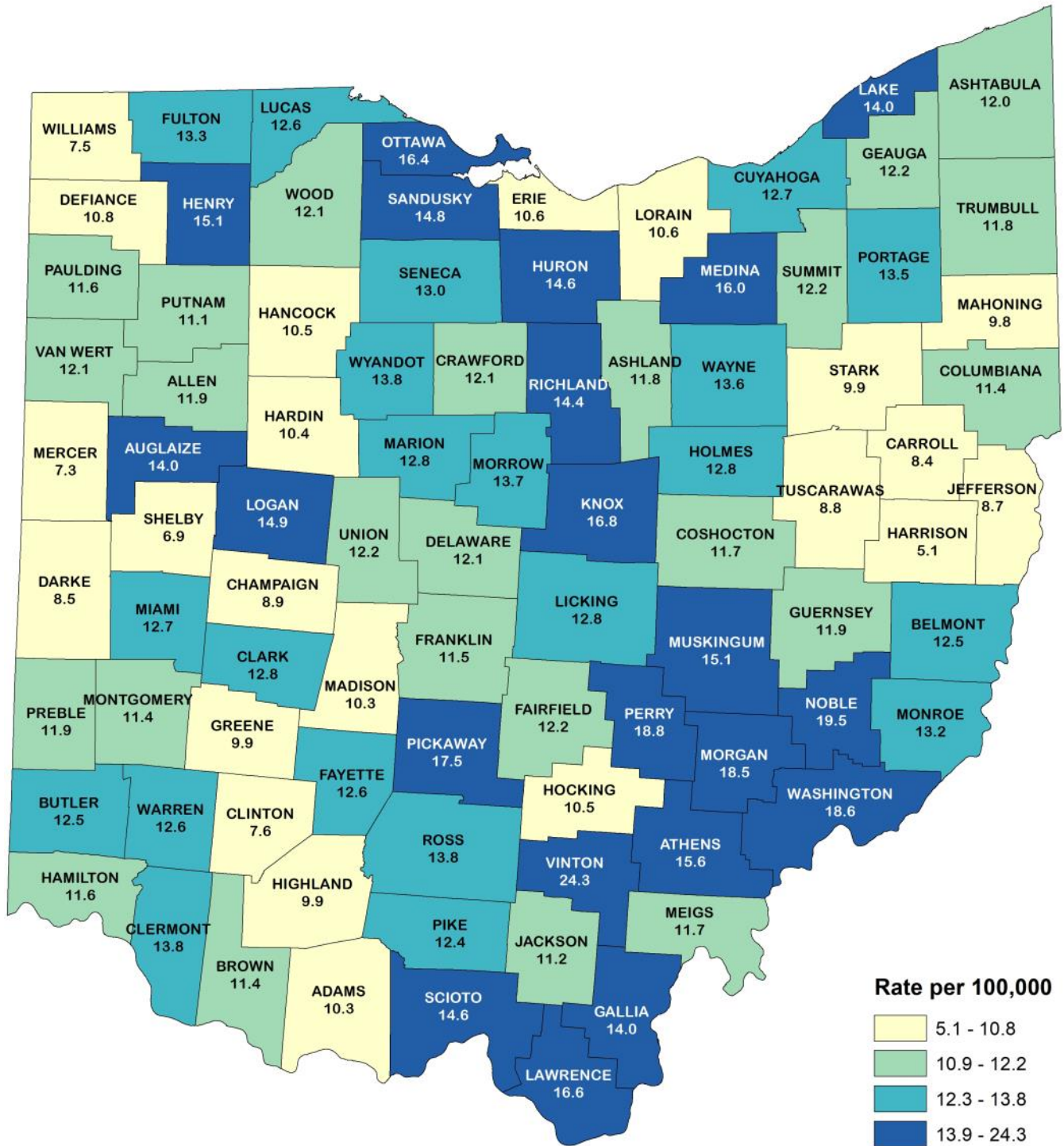
Figure 16. Laryngeal Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

N/A: Rate not calculated when the case count for 2006-2015 is less than five.

Figure 17. Leukemia: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Ohio Rate: 12.2
U.S. Rate: 13.8

Figure 18. Leukemia: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015

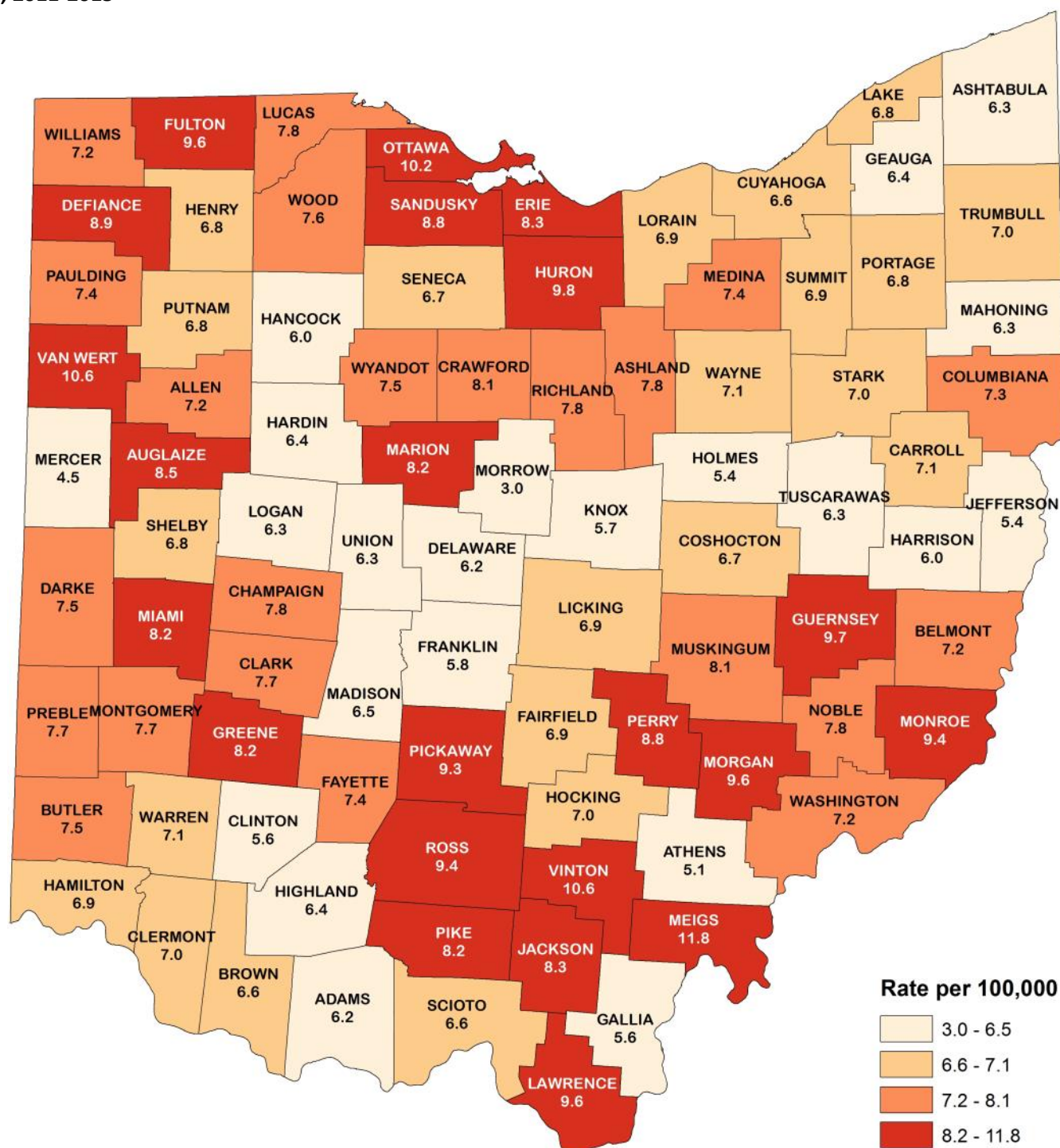
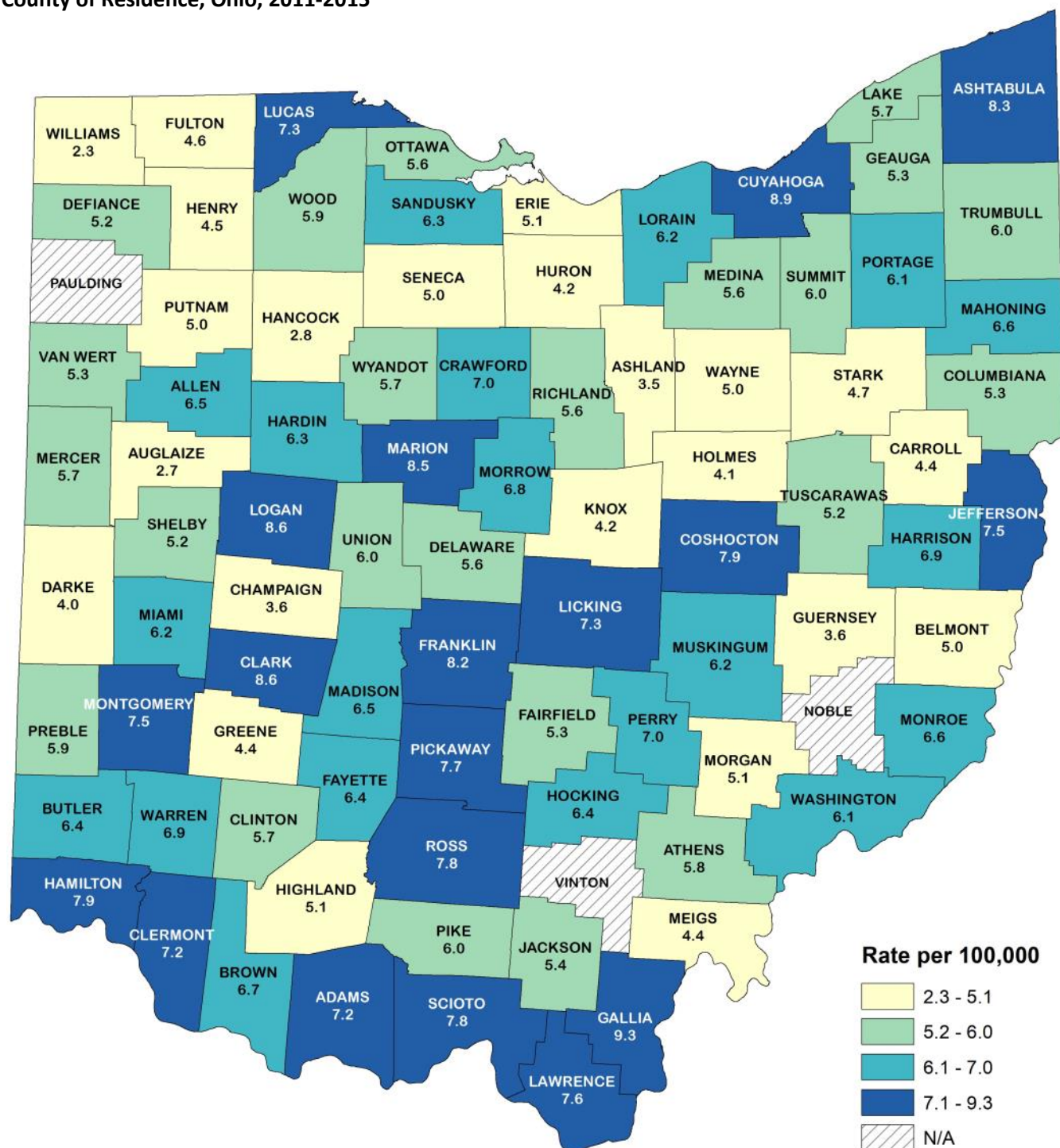


Figure 19. Liver & Intrahepatic Bile Duct Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 6.7
U.S. Rate: 8.8



1.6 - 4.6

4.7 - 5.2

5.3 - 6.0

6.1 - 10.6

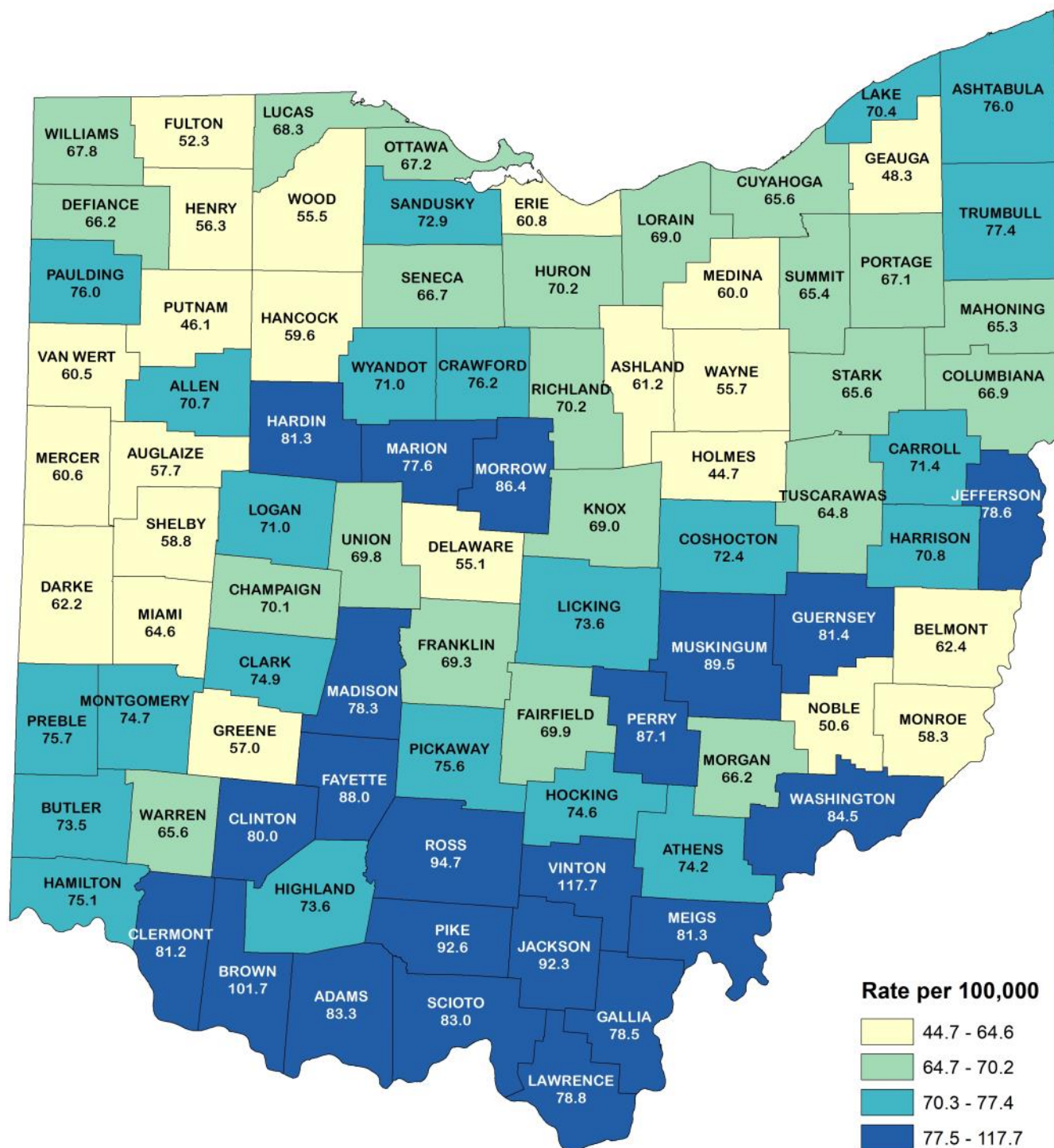
 N/A

N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 5.7

U.S. Rate: 6.4

Figure 21. Lung & Bronchus Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Ohio Rate: 69.3
U.S. Rate: 54.6

Figure 22. Lung & Bronchus Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015

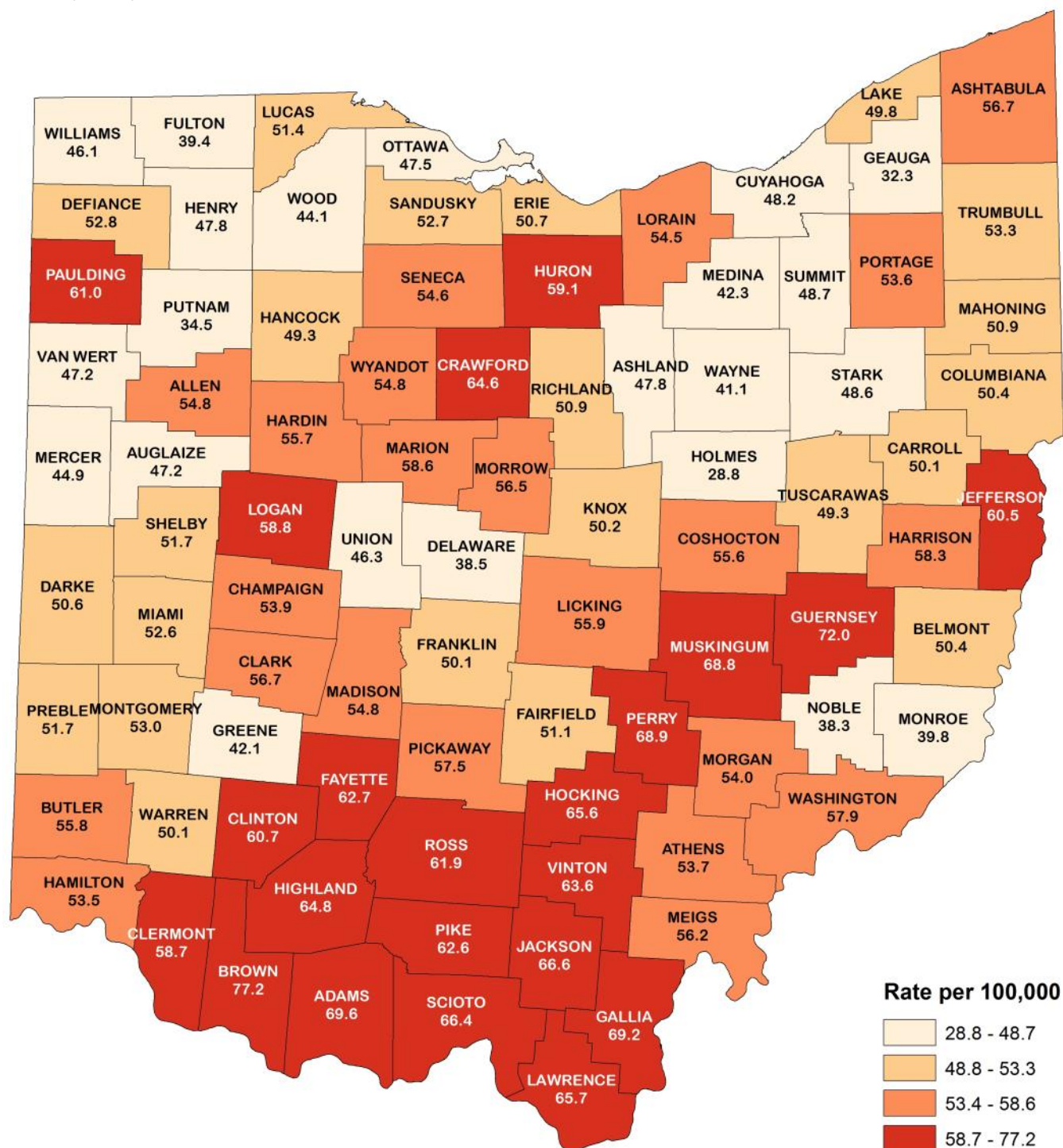
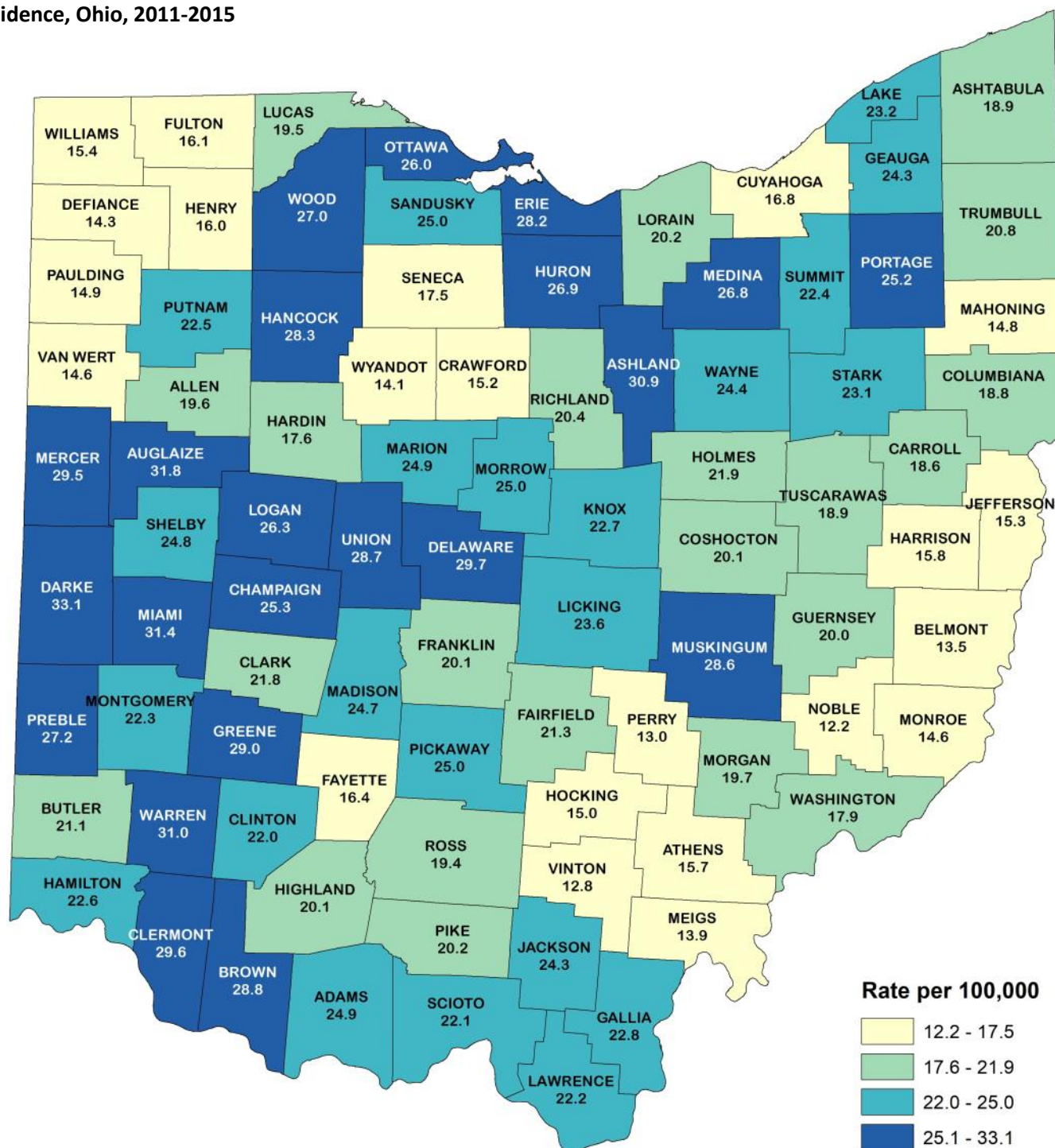


Figure 23. Melanoma of the Skin: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



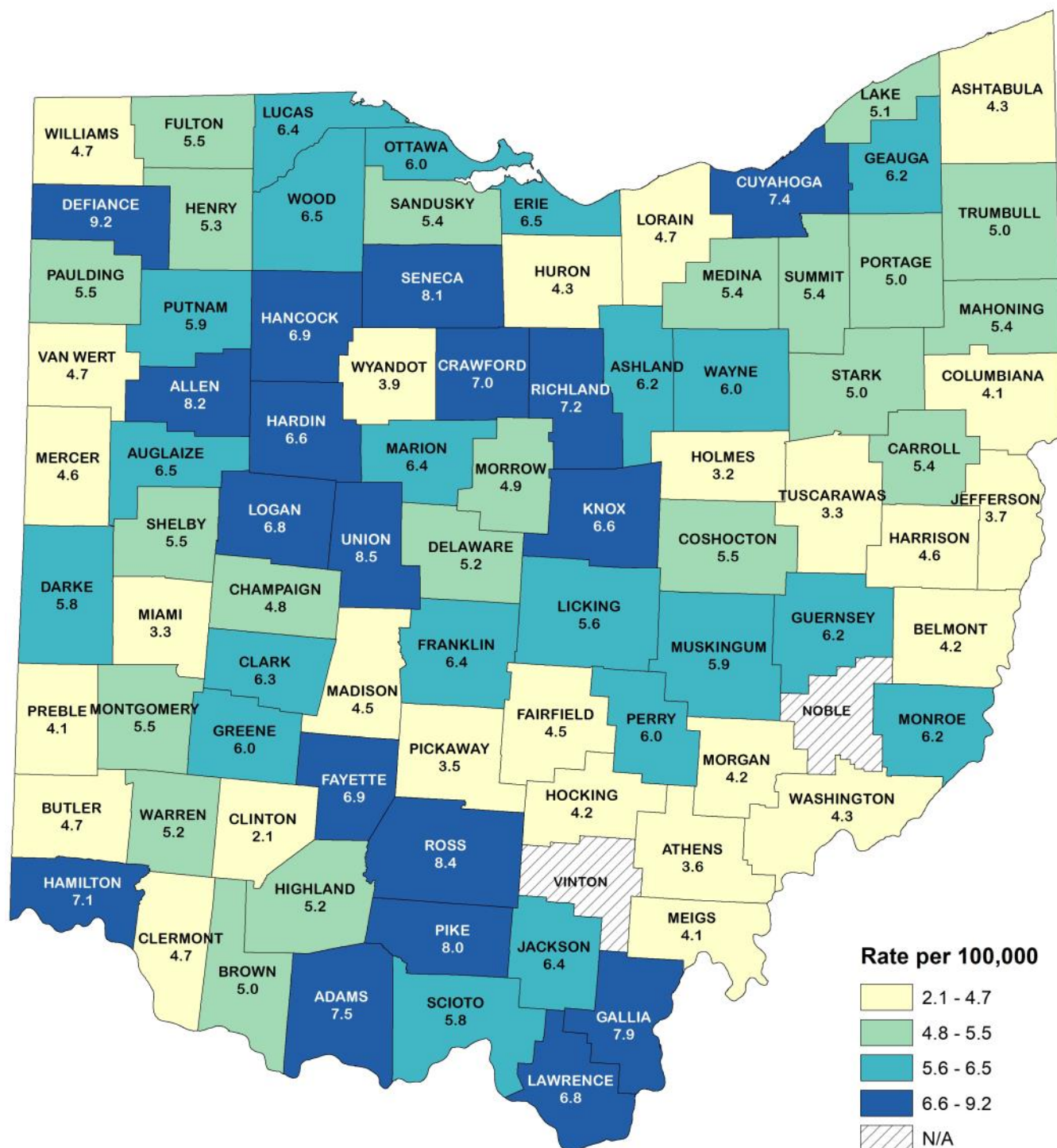
Ohio Rate: 21.7
U.S. Rate: 22.8

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.



U.S. Rate: 2.6

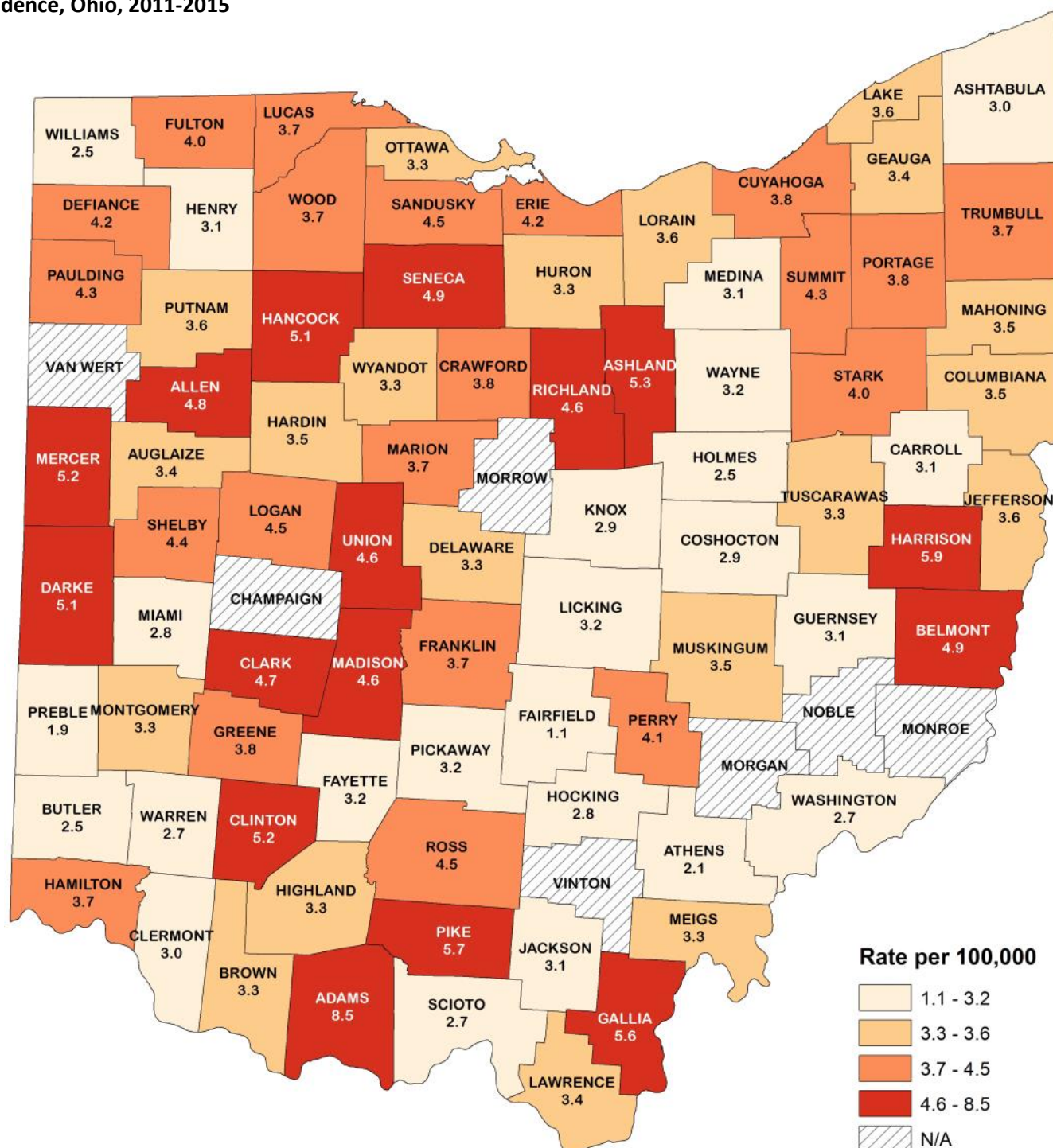
Figure 25. Multiple Myeloma: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 5.9
U.S. Rate: 6.5

Figure 26. Multiple Myeloma: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015

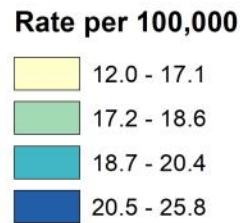


Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

N/A: Rate not calculated when the case count for 2011-2015 is less than five.

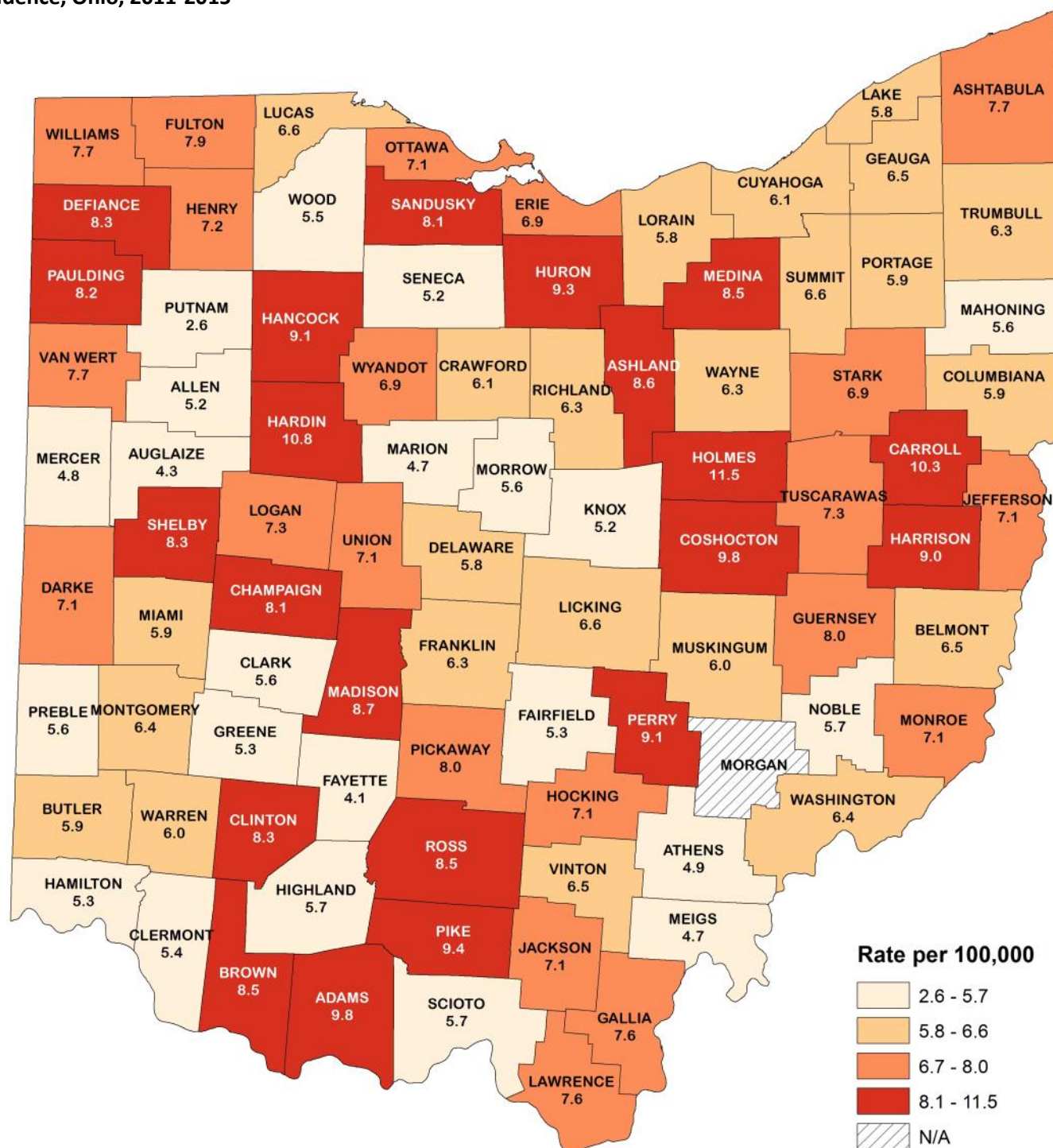
Ohio Rate: 3.6

U.S. Rate: 3.3



Ohio Rate: 19.0
U.S. Rate: 19.4

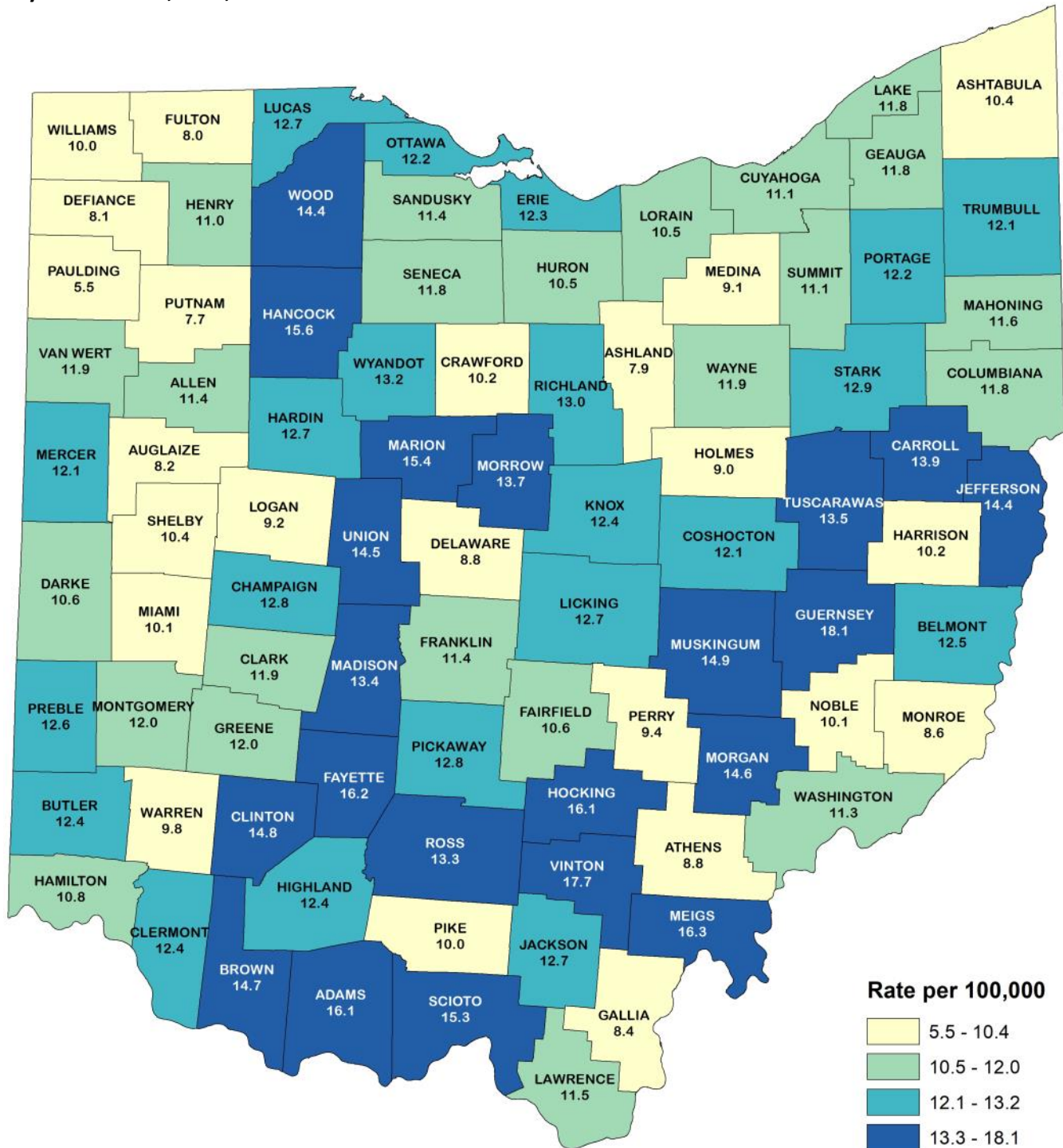
Figure 28. Non-Hodgkin Lymphoma: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 6.4
U.S. Rate: 5.7

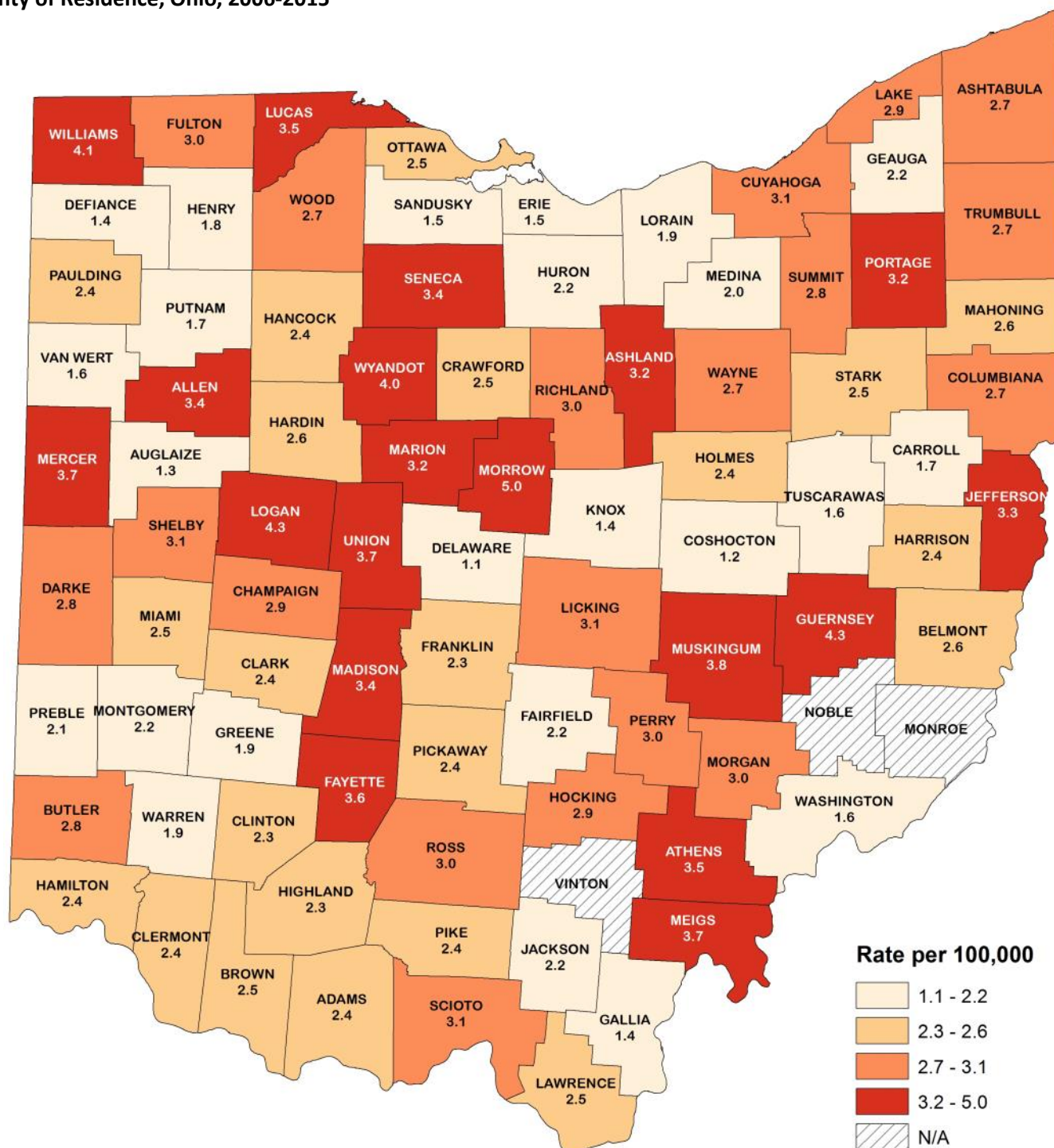
Figure 29. Oral Cavity & Pharyngeal Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Ohio Rate: 11.7
U.S. Rate: 11.3

Figure 30. Oral Cavity & Pharyngeal Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015



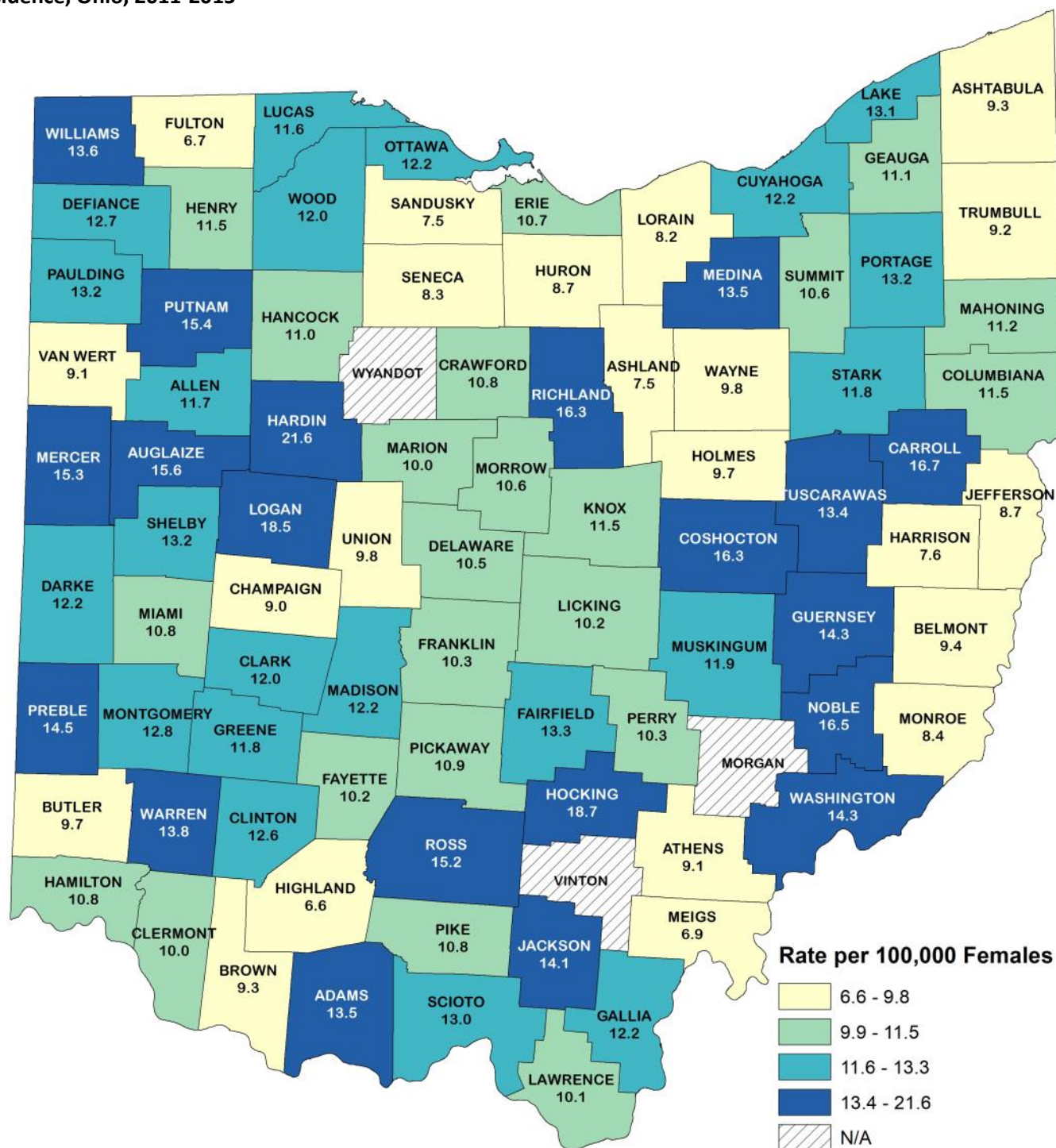
Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

N/A: Rate not calculated when the case count for 2006-2015 is less than five.

Ohio Rate: 2.6

U.S. Rate: 2.5

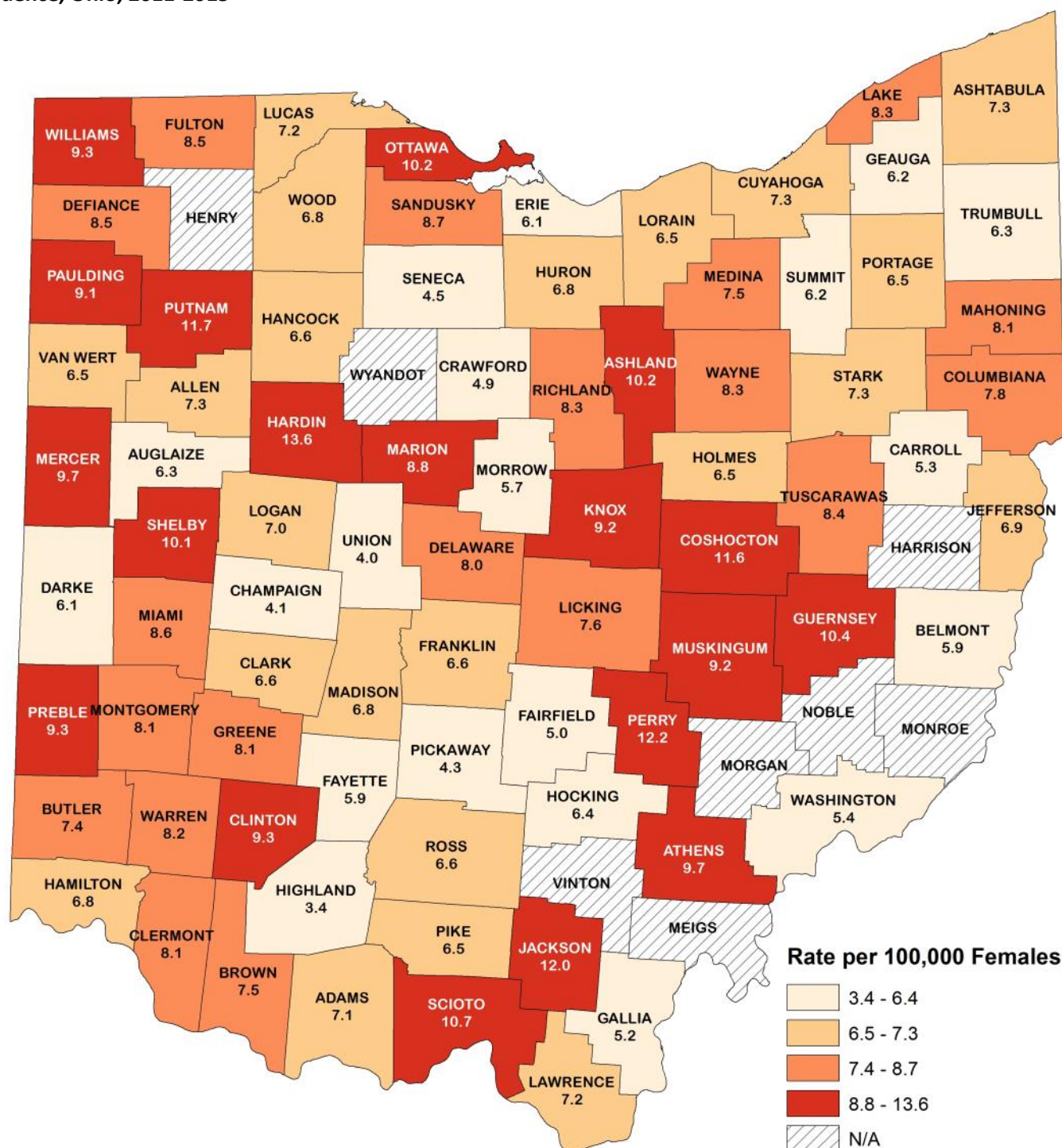
Figure 31. Ovarian Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 11.4
U.S. Rate: 11.6

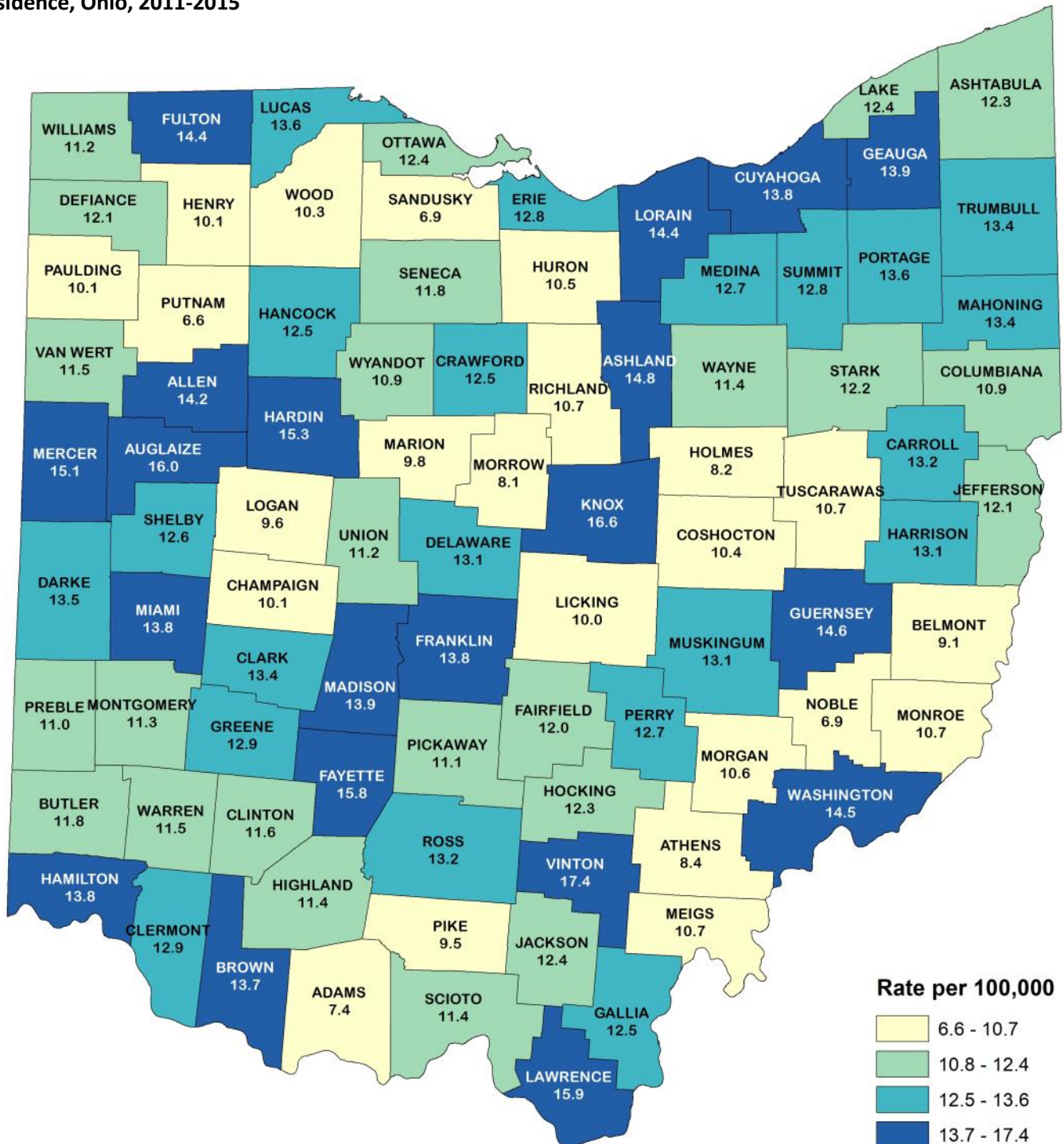
Figure 32. Ovarian Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2011-2015 is less than five.

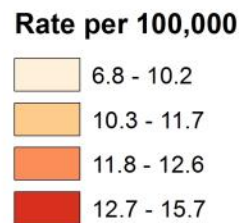
Ohio Rate: 7.3
 U.S. Rate: 7.2

Figure 33. Pancreatic Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



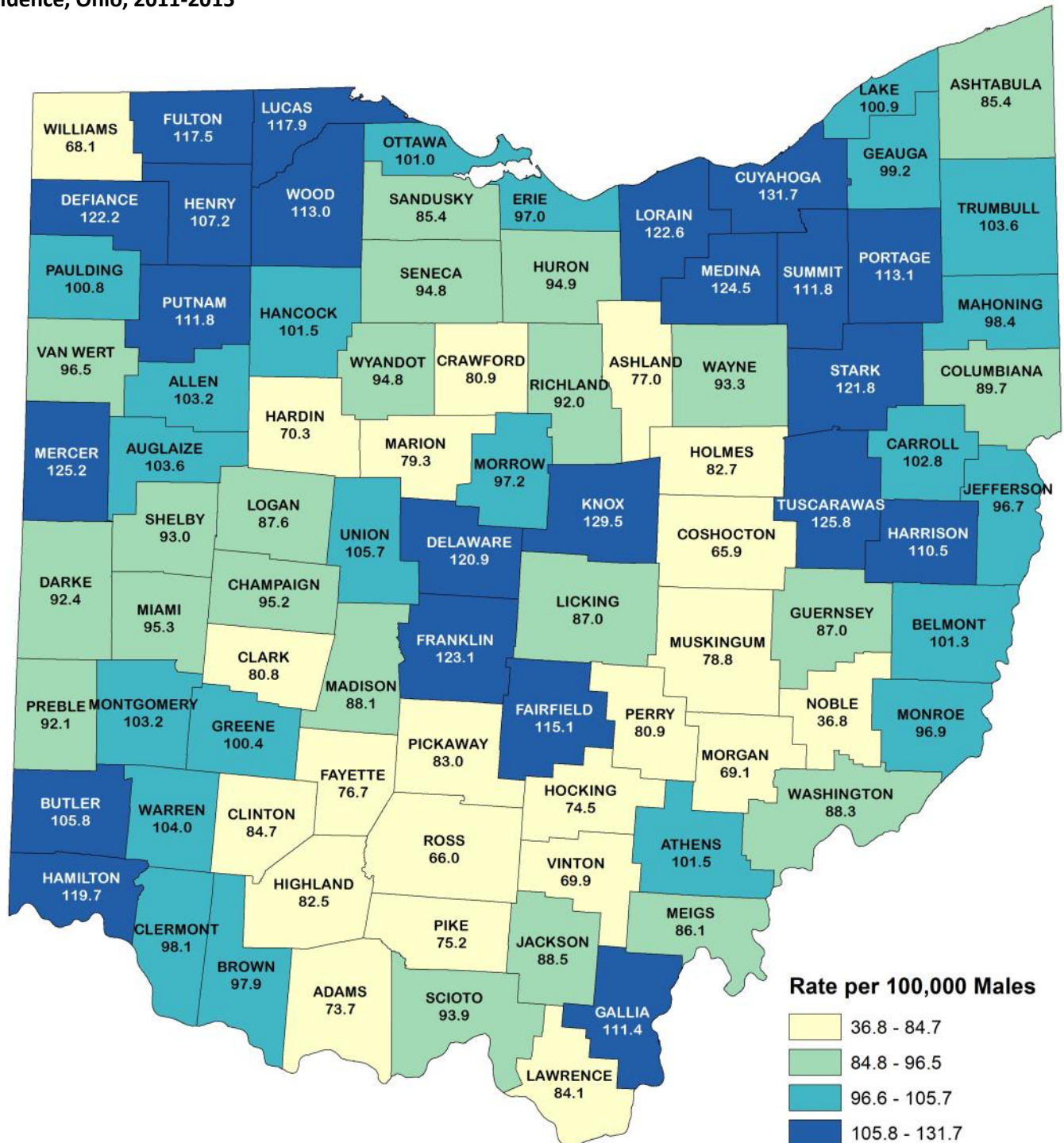
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Ohio Rate: 12.7
U.S. Rate: 12.6



Ohio Rate: 11.6
U.S. Rate: 10.9

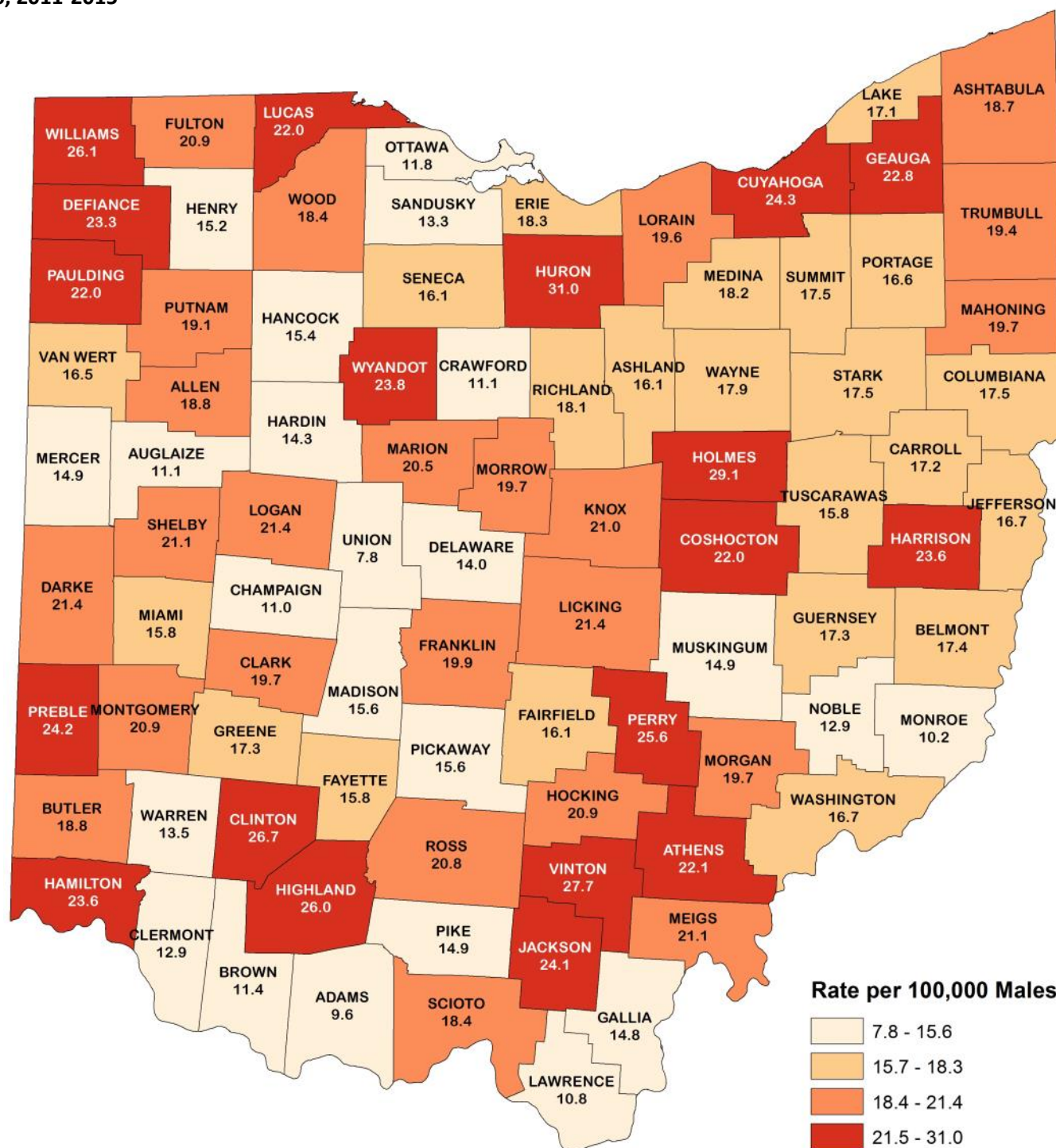
Figure 35. Prostate Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Males, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Ohio Rate: 108.0
U.S. Rate: 112.6

Figure 36. Prostate Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Males, by County of Residence, Ohio, 2011-2015

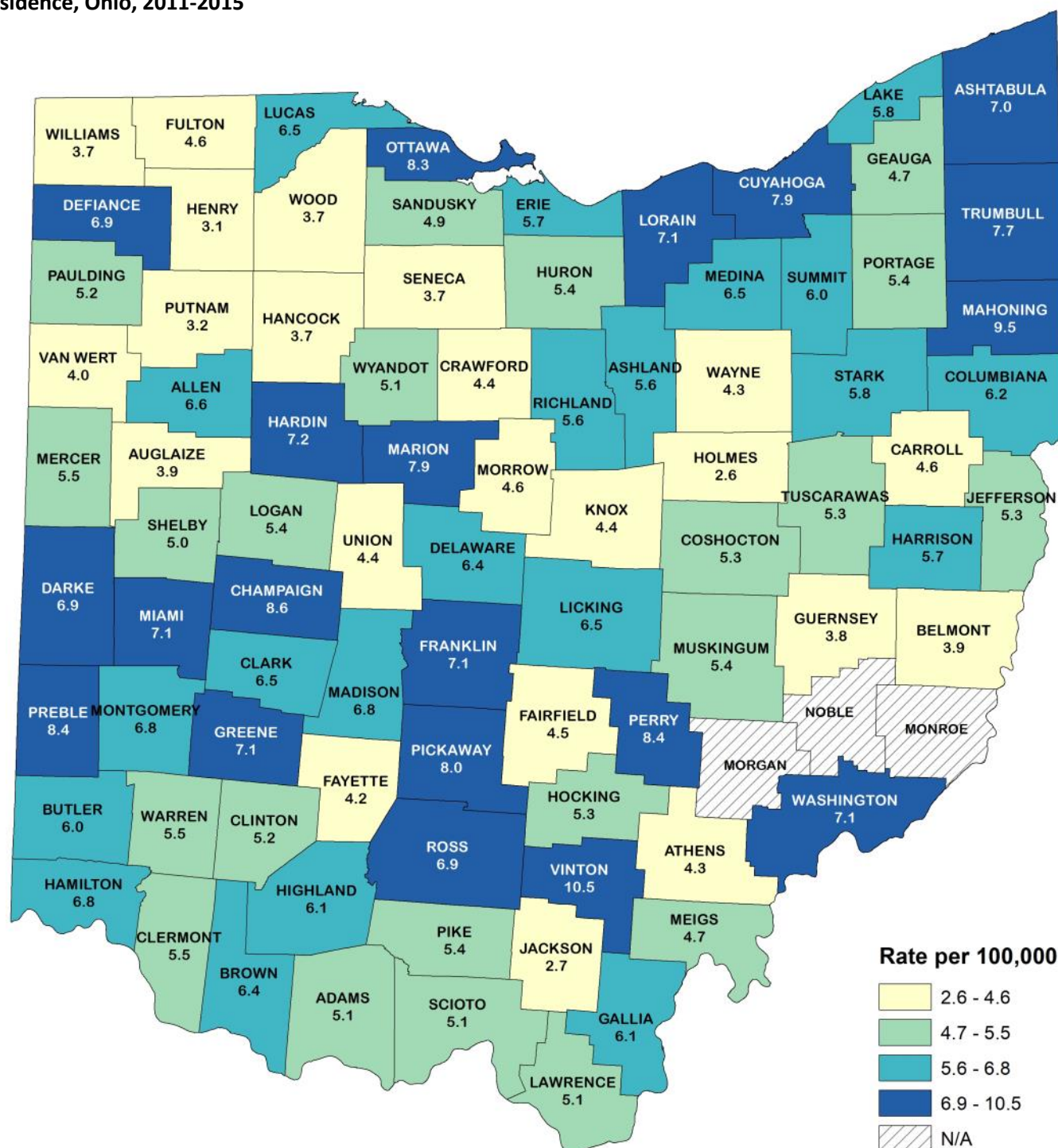


Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

Ohio Rate: 19.4

U.S. Rate: 19.5

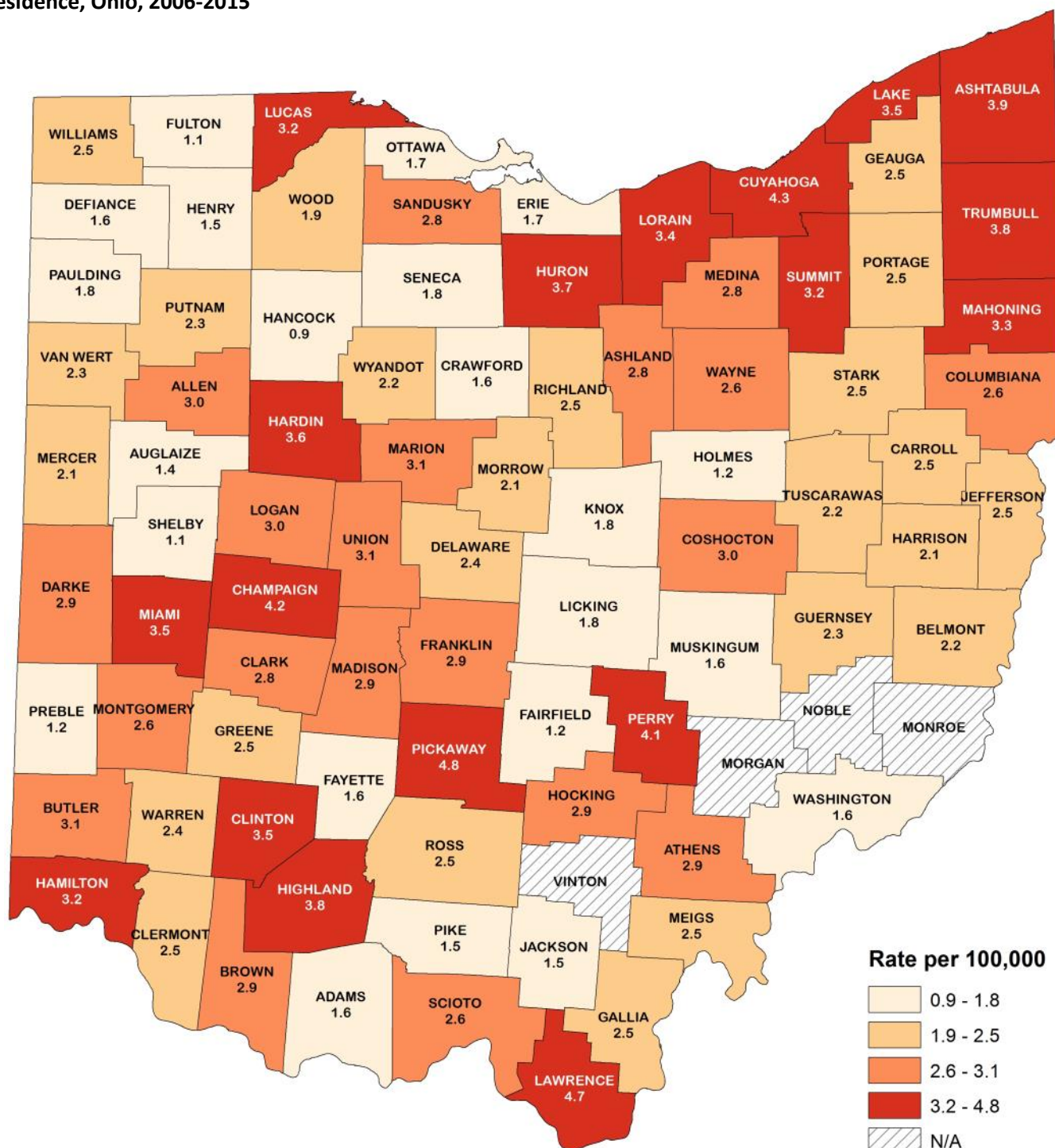
Figure 37. Stomach Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 6.4
U.S. Rate: 7.2

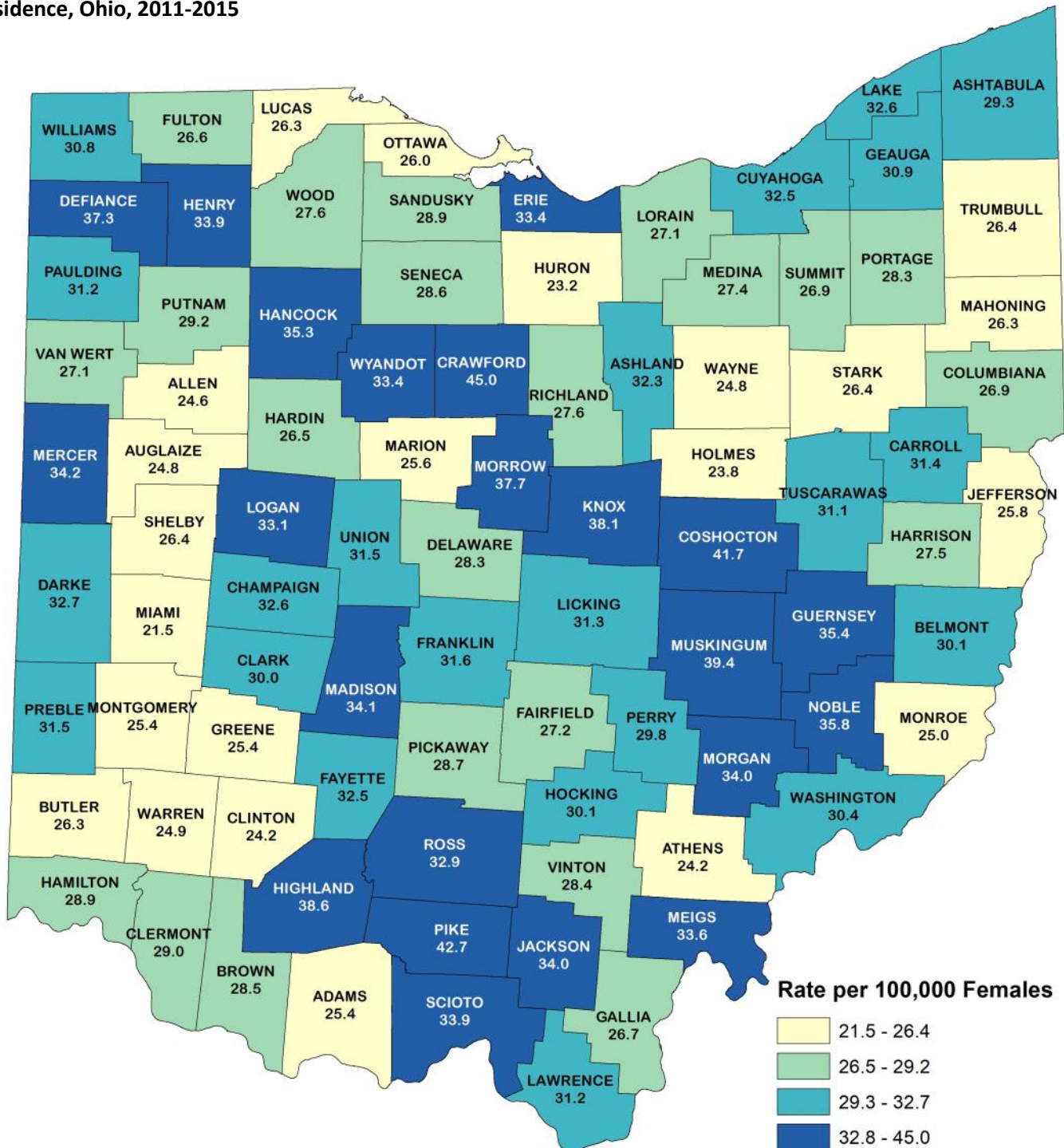
Figure 38. Stomach Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015



Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.
 N/A: Rate not calculated when the case count for 2006-2015 is less than five.

Ohio Rate: 2.7
U.S. Rate: 3.3

Figure 39. Uterine Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Figure 40. Uterine Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Females, by County of Residence, Ohio, 2006-2015

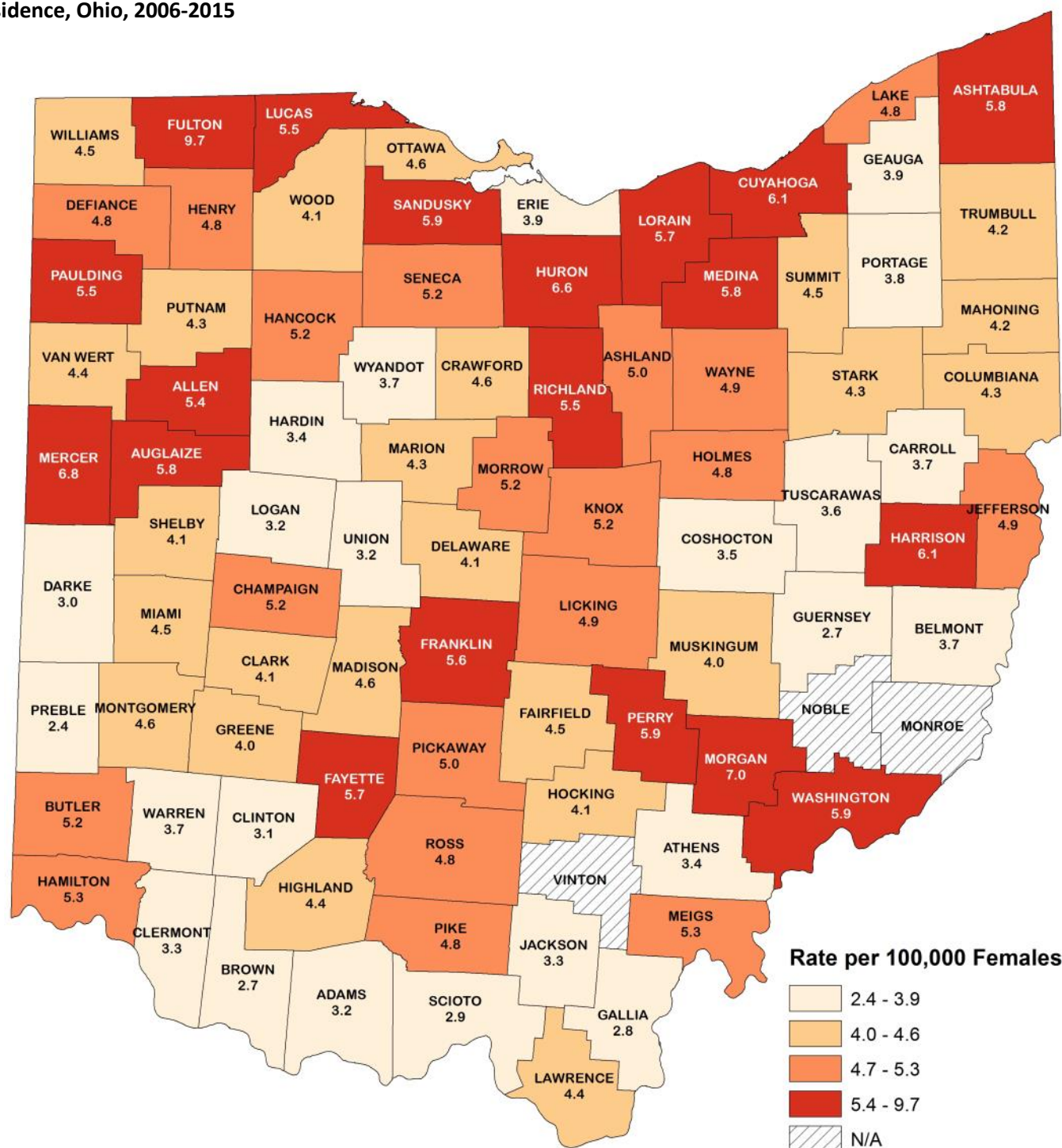
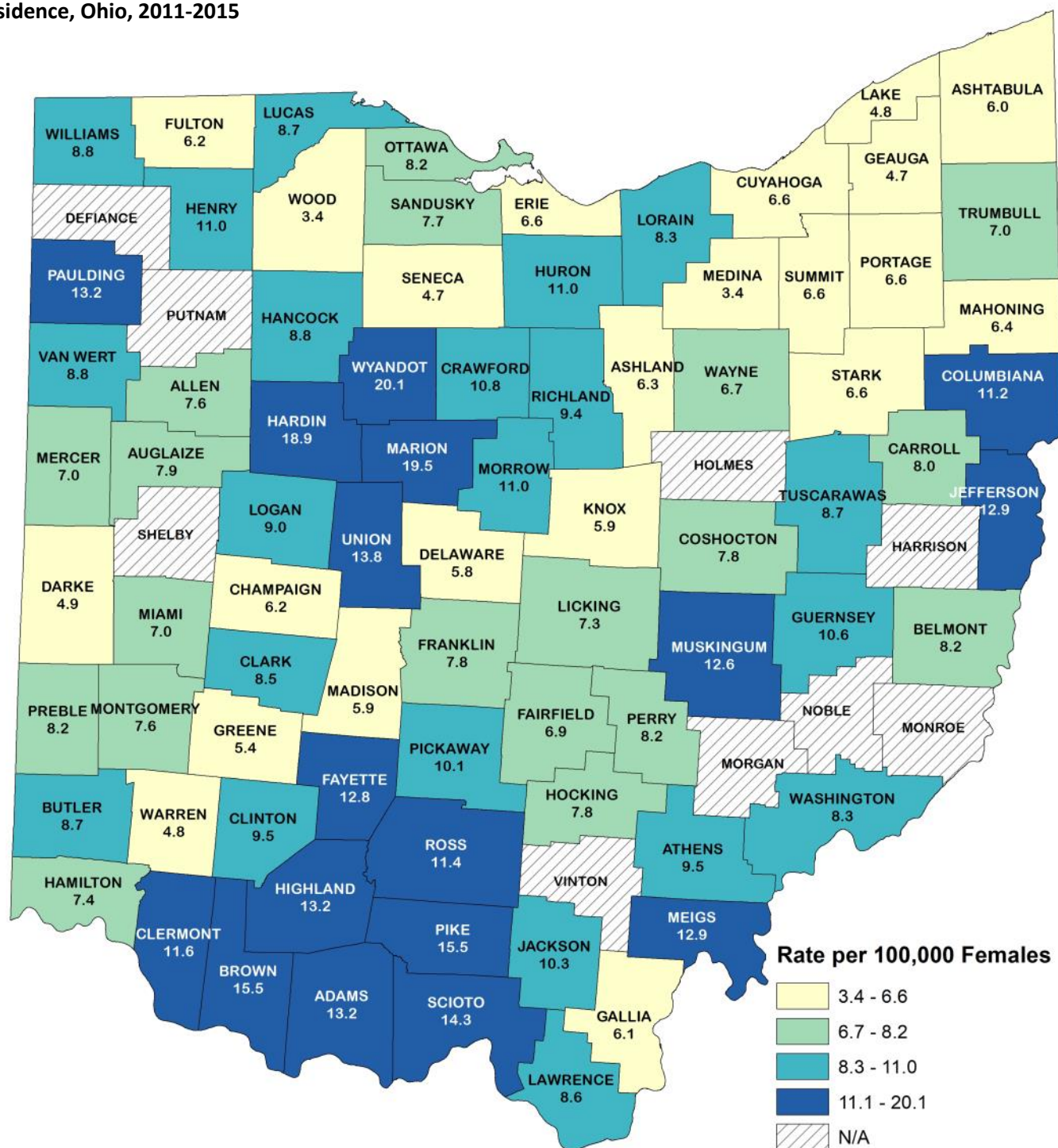


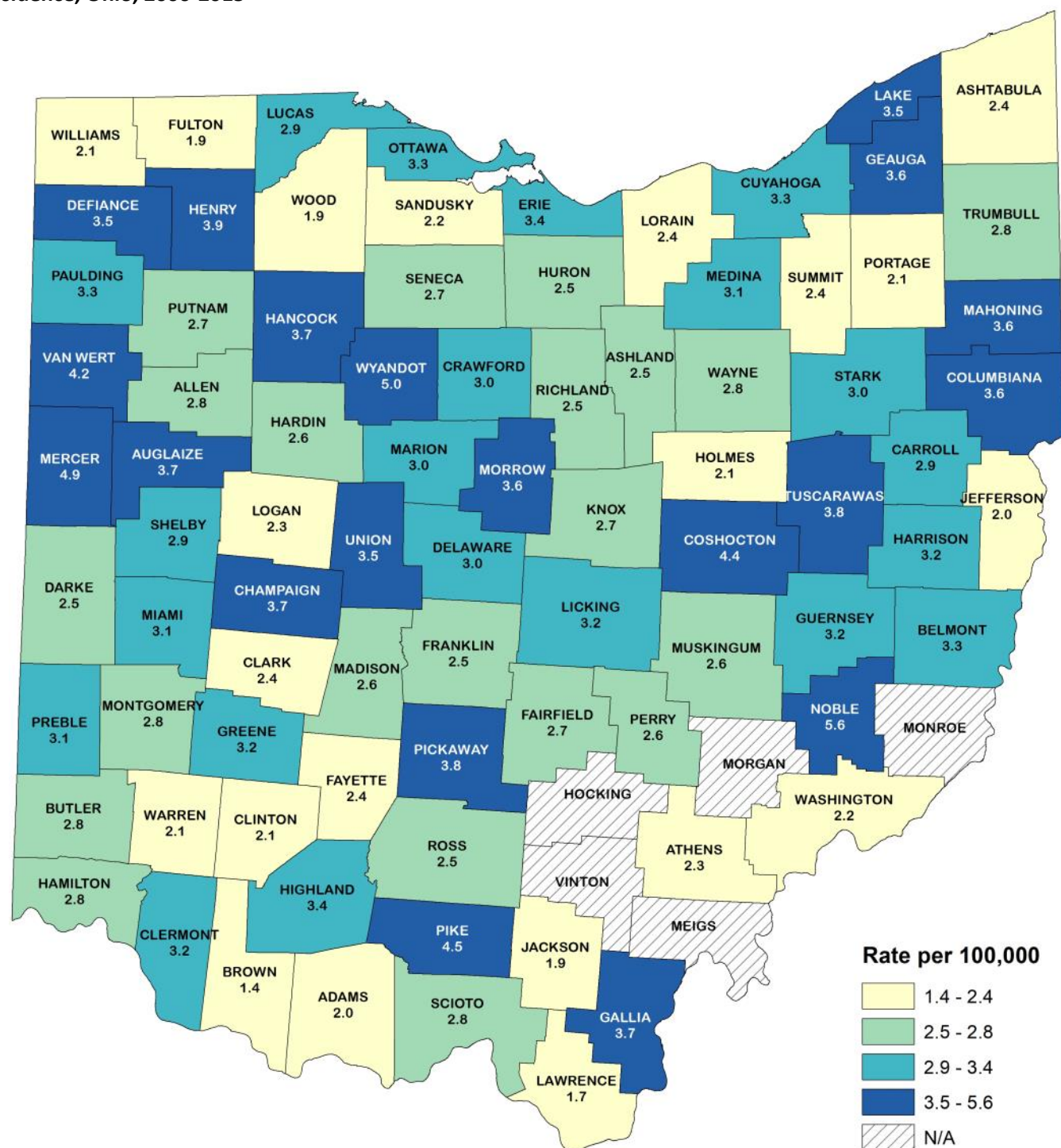
Figure 41. Cervical Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Females, by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
N/A: Rate not calculated when the case count for 2011-2015 is less than five.

Ohio Rate: 7.6
U.S. Rate: 7.4

Figure 42. Hodgkin Lymphoma: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence, Ohio, 2006-2015

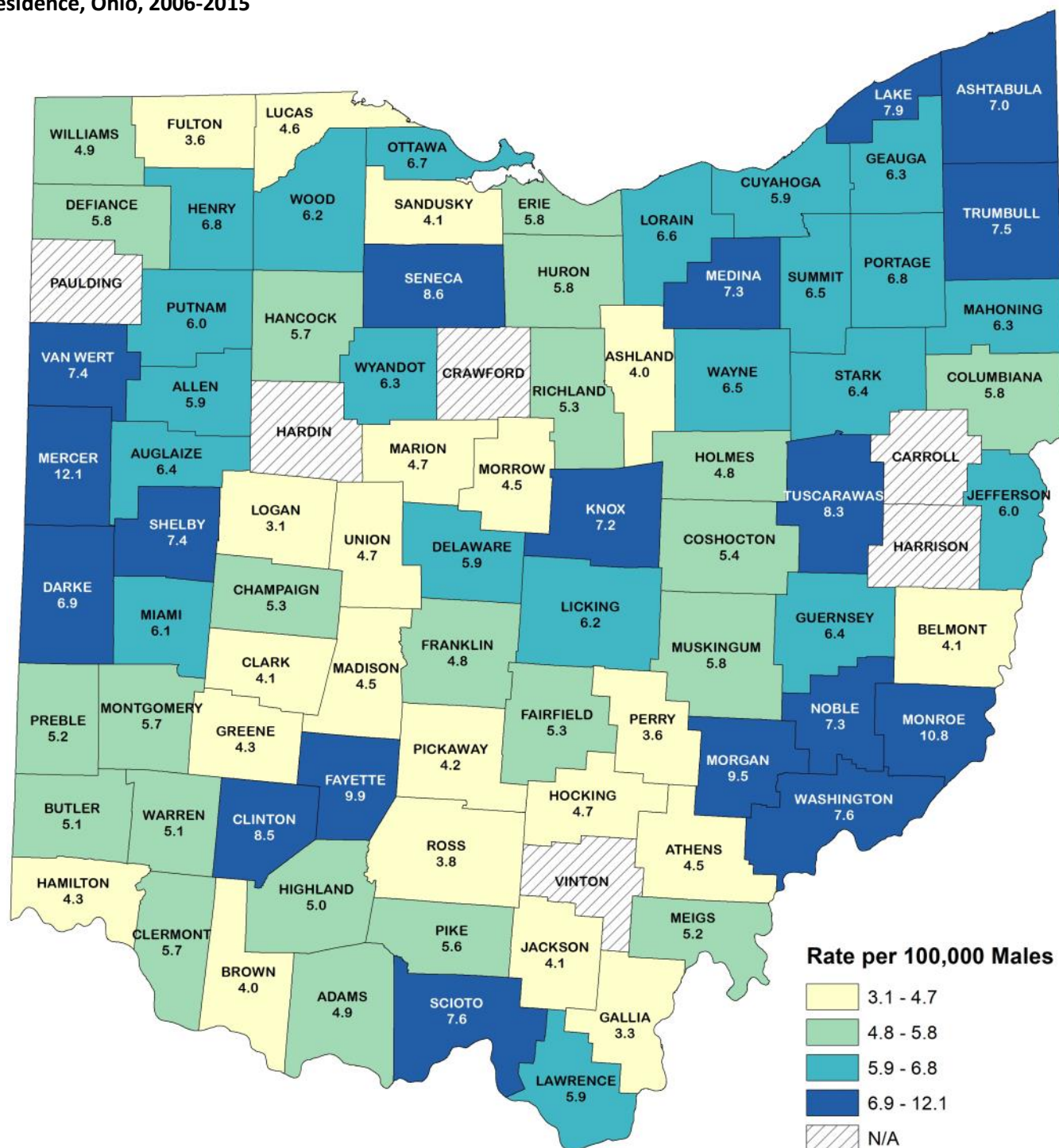


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Ohio Rate: 2.8

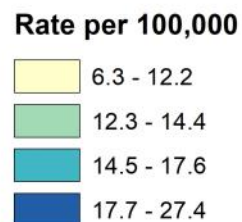
U.S. Rate: 2.5

Figure 43. Testicular Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Males, by County of Residence, Ohio, 2006-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
N/A: Rate not calculated when the case count for 2011-2015 is less than five.

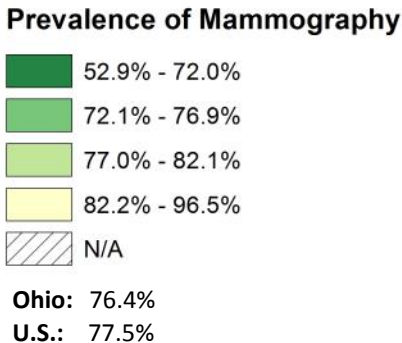
Ohio Rate: 5.6
U.S. Rate: 5.7



U.S. Rate: 19.5

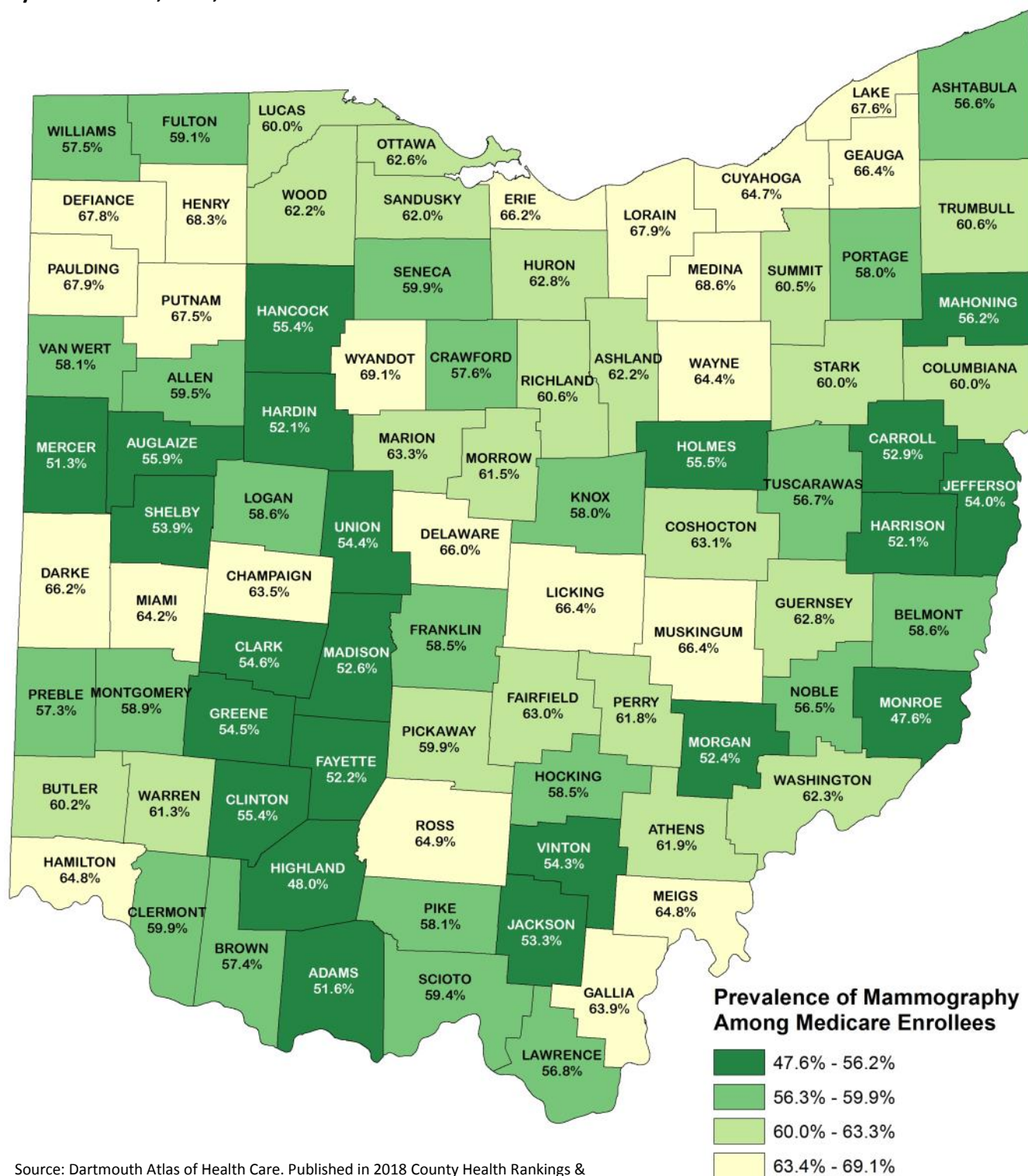
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Year	Actual (%)	Projected (%)
1950	7.0	-
1960	8.0	-
1970	9.0	-
1980	10.0	-
1990	11.0	-
2000	12.0	12.0
2010	-	13.5
2020	-	15.0
2030	-	16.5
2040	-	18.0
2050	-	18.5

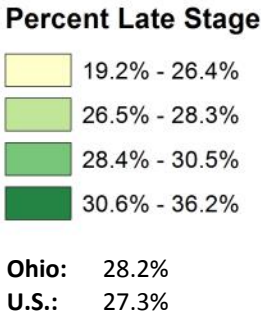


N/A: Estimates based on fewer than 50 respondents or with a relative standard error greater than 30 percent are considered statistically unreliable and not reported.

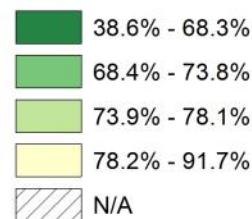
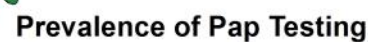
Figure 46. Prevalence of Mammography in the Past Two Years among Female Medicare Enrollees Ages 67-69, by County of Residence, Ohio, 2014



Source: Dartmouth Atlas of Health Care. Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, 2018.



Ohio: 28.2%
U.S.: 27.3%



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.

Ohio:	75.6%
U.S.:	79.7%



20.0% - 42.9%

43.0% - 52.9%

53.0% - 61.3%

61.4% - 100.0%






 N/A

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.
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.

Ohio: 51.9%

U.S.: 51.9%



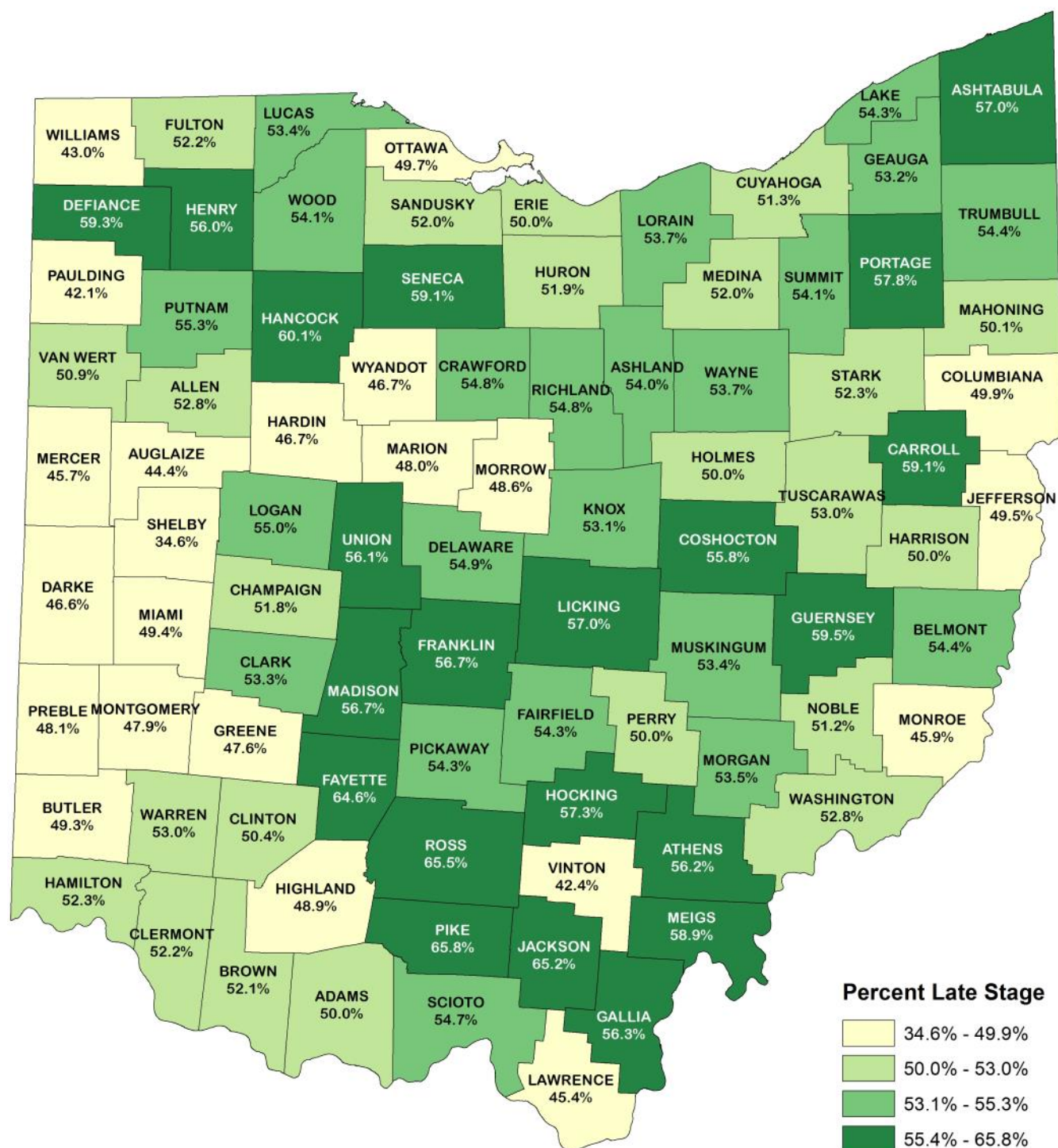
	42.0% - 60.8%
	60.9% - 65.7%
	65.8% - 68.3%
	68.4% - 75.3%
	N/A

Ohio: 66.4%
U.S.: 67.1%

Source: 2014-2016 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2018.

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.





Figure 51. Colon & Rectum Cancer: Proportion of Cases (%) Diagnosed at Late (Regional or Distant) Stage by County of Residence, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Ohio: 52.7%
U.S.: 53.1%

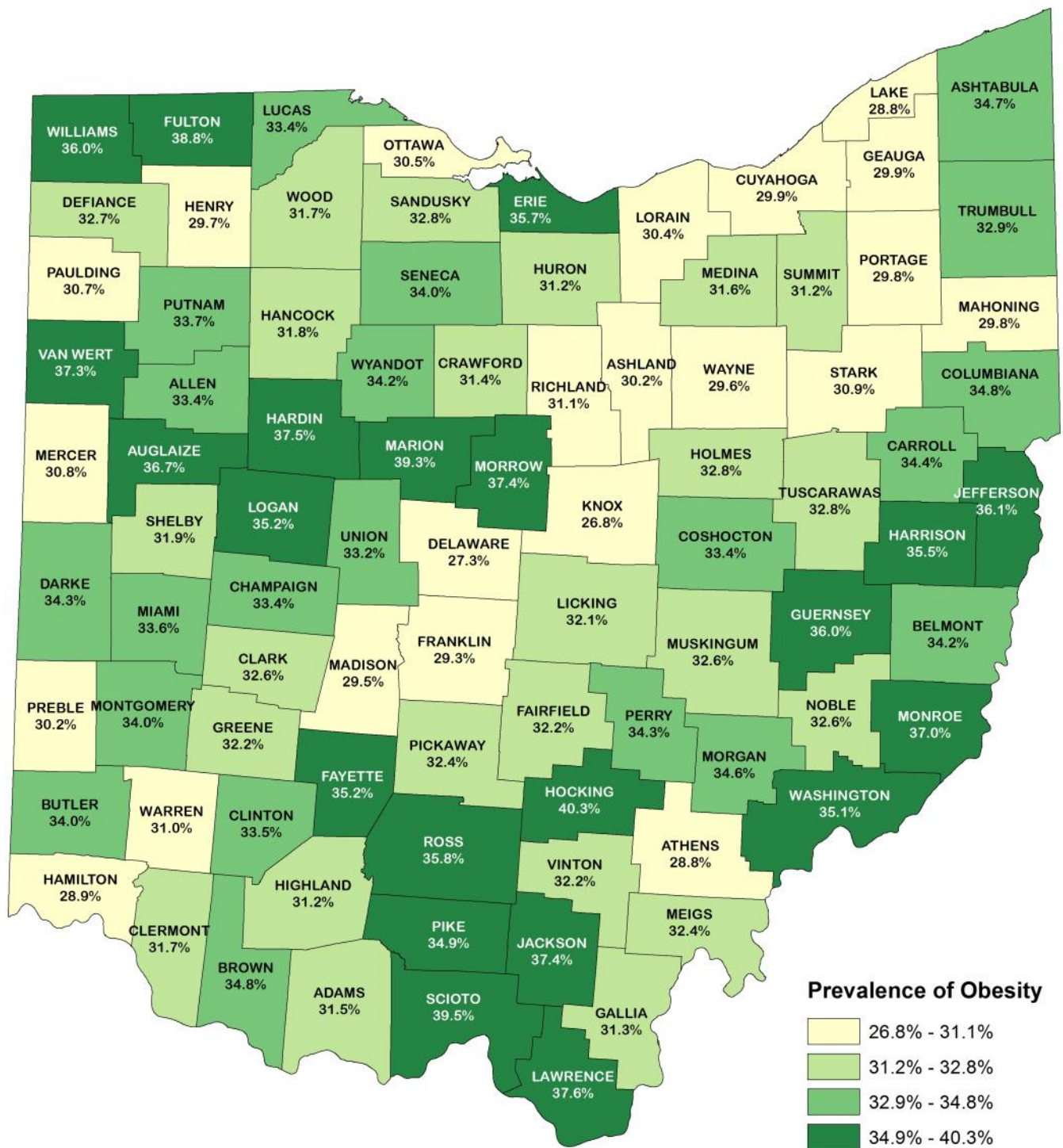


	13.6% - 19.1%
	19.2% - 20.3%
	20.4% - 21.7%
	21.8% - 25.3%

Ohio: 22.5%
U.S.: 17.1%

Source: 2016 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health. Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, 2018.

Figure 53. Prevalence of Obesity among Adults Ages 20 and Older, by County of Residence, Ohio, 2014



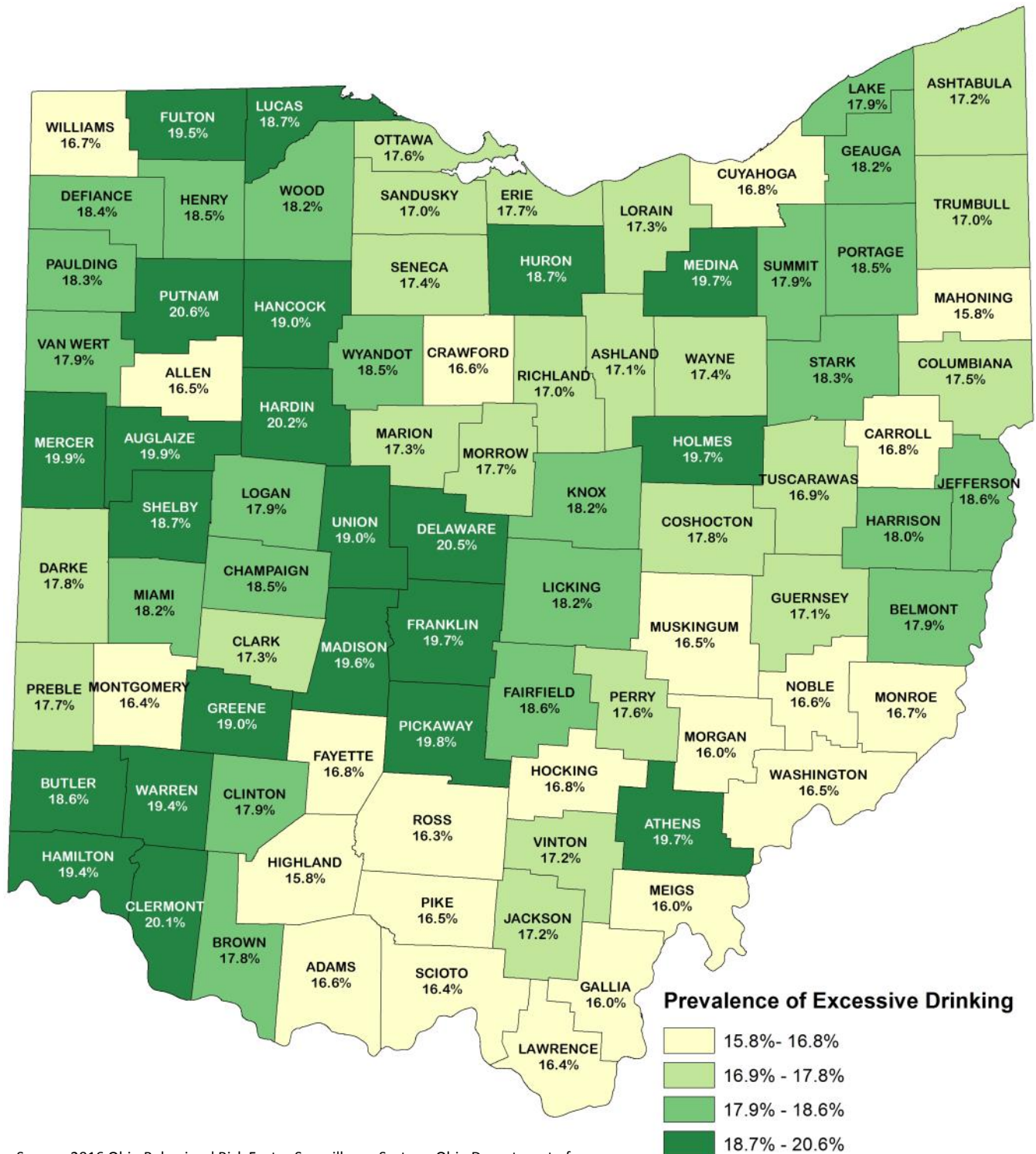
Source: CDC Diabetes Interactive Atlas, National Diabetes Surveillance System.
Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson
Foundation and the University of Wisconsin Population Health Institute, 2018.

Ohio: 31.6%



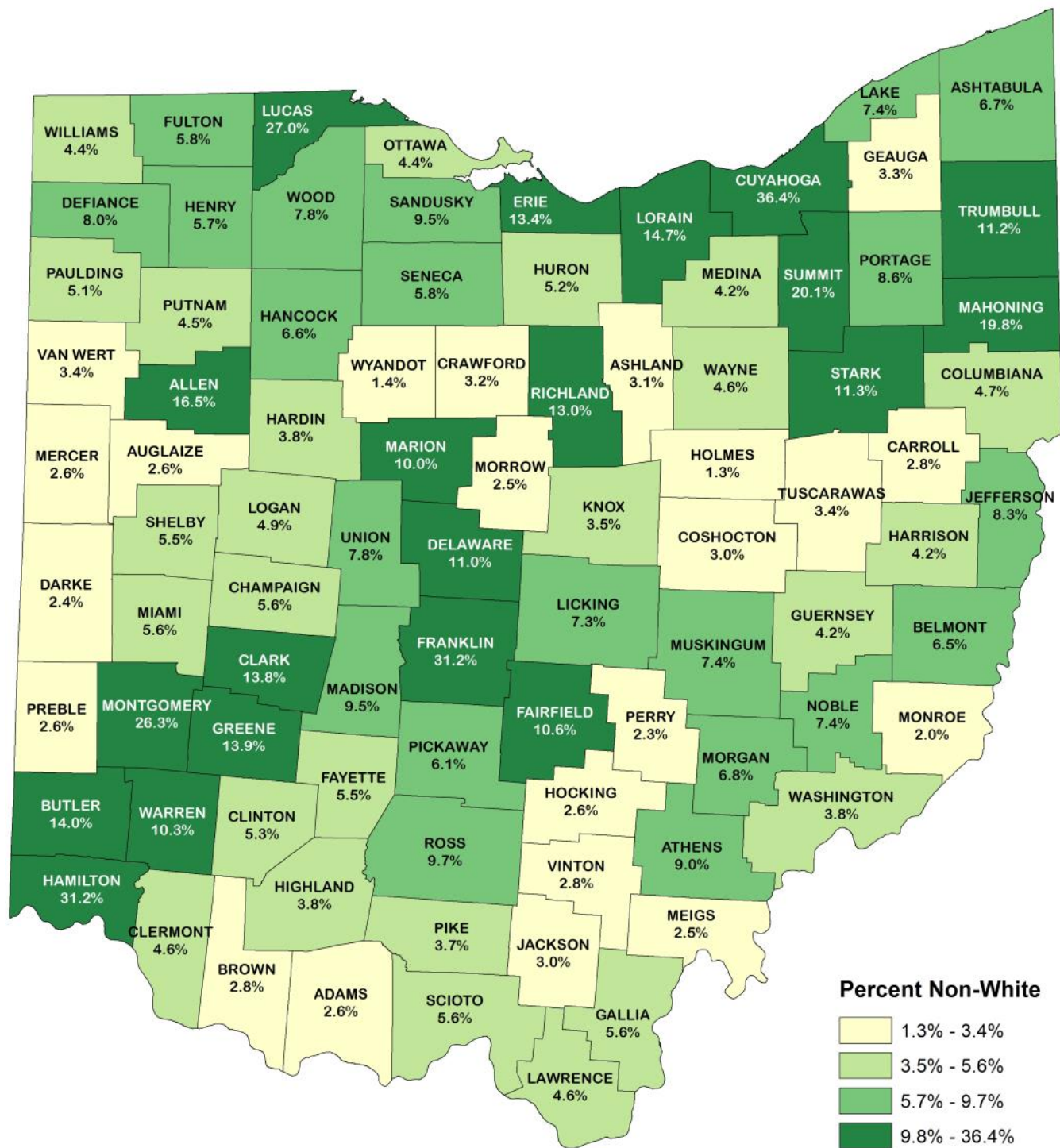
Ohio: 25.7%

Figure 55. Prevalence of Excessive Drinking among Adults Ages 18 and Older, by County of Residence, Ohio, 2016



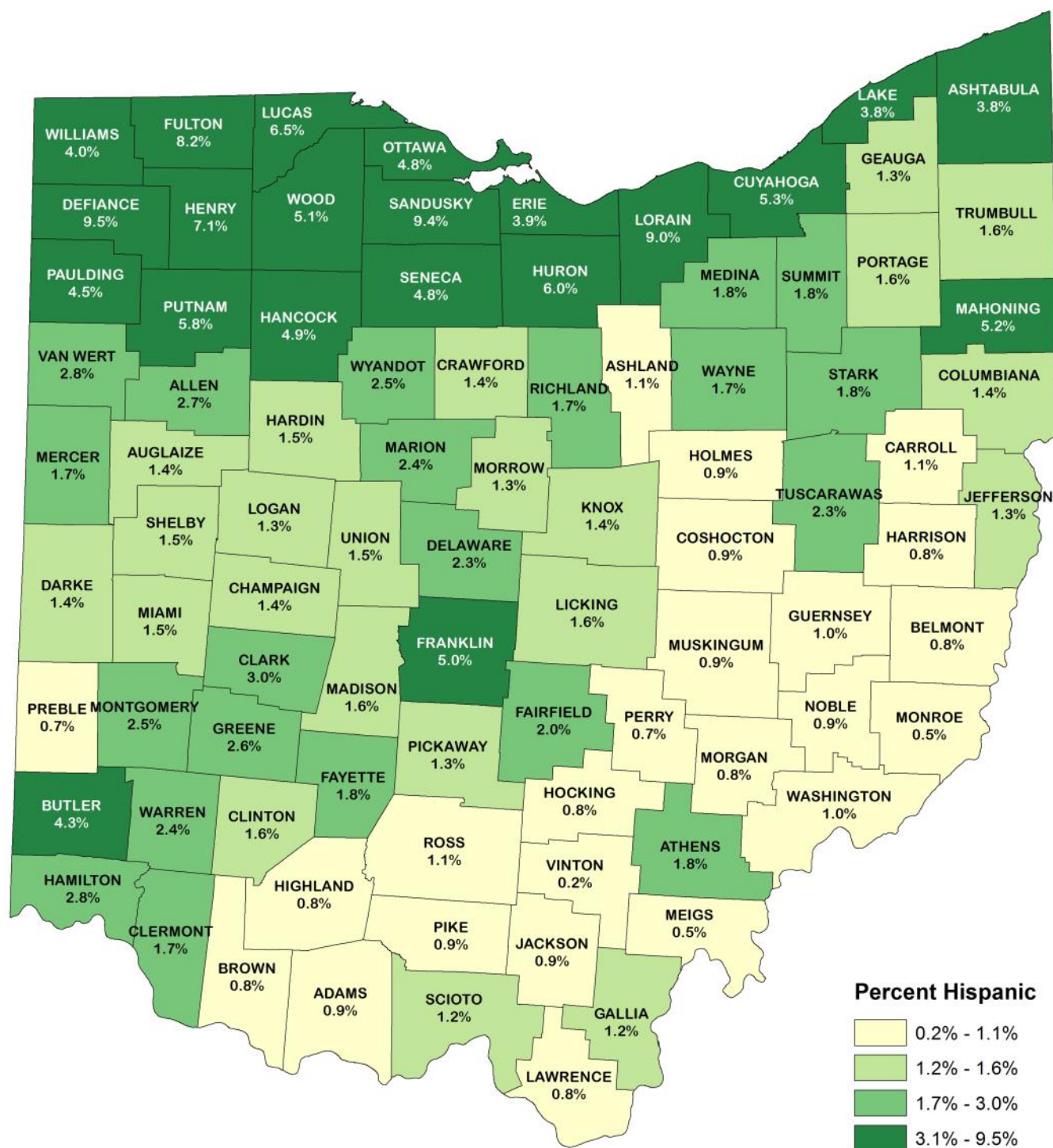
Source: 2016 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health. Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, 2018.

Figure 56. Percent Non-white Race, by County of Residence, Ohio, 2011-2015



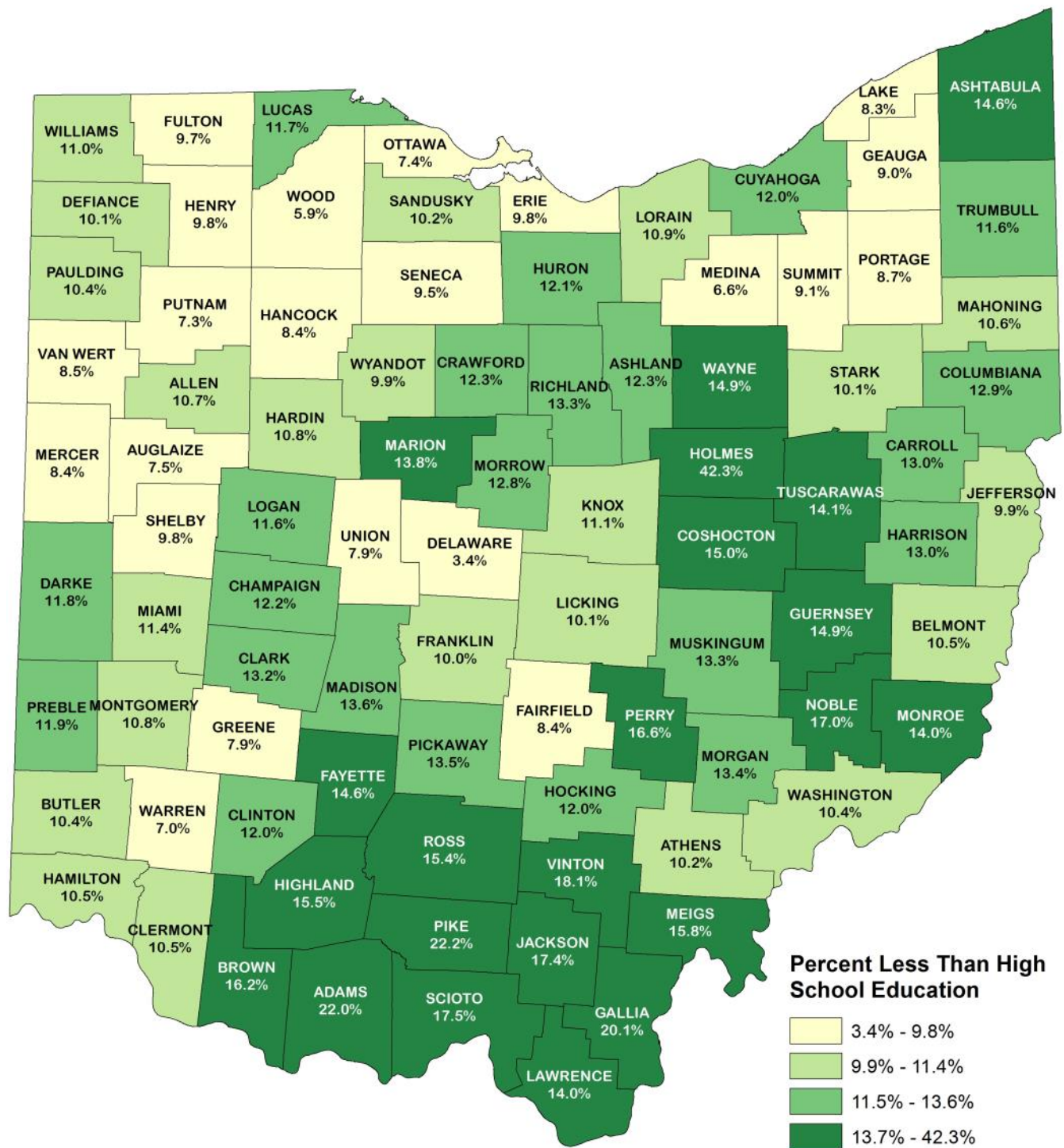
Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates.

Ohio:	17.6%
U.S.:	26.4%



Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates.

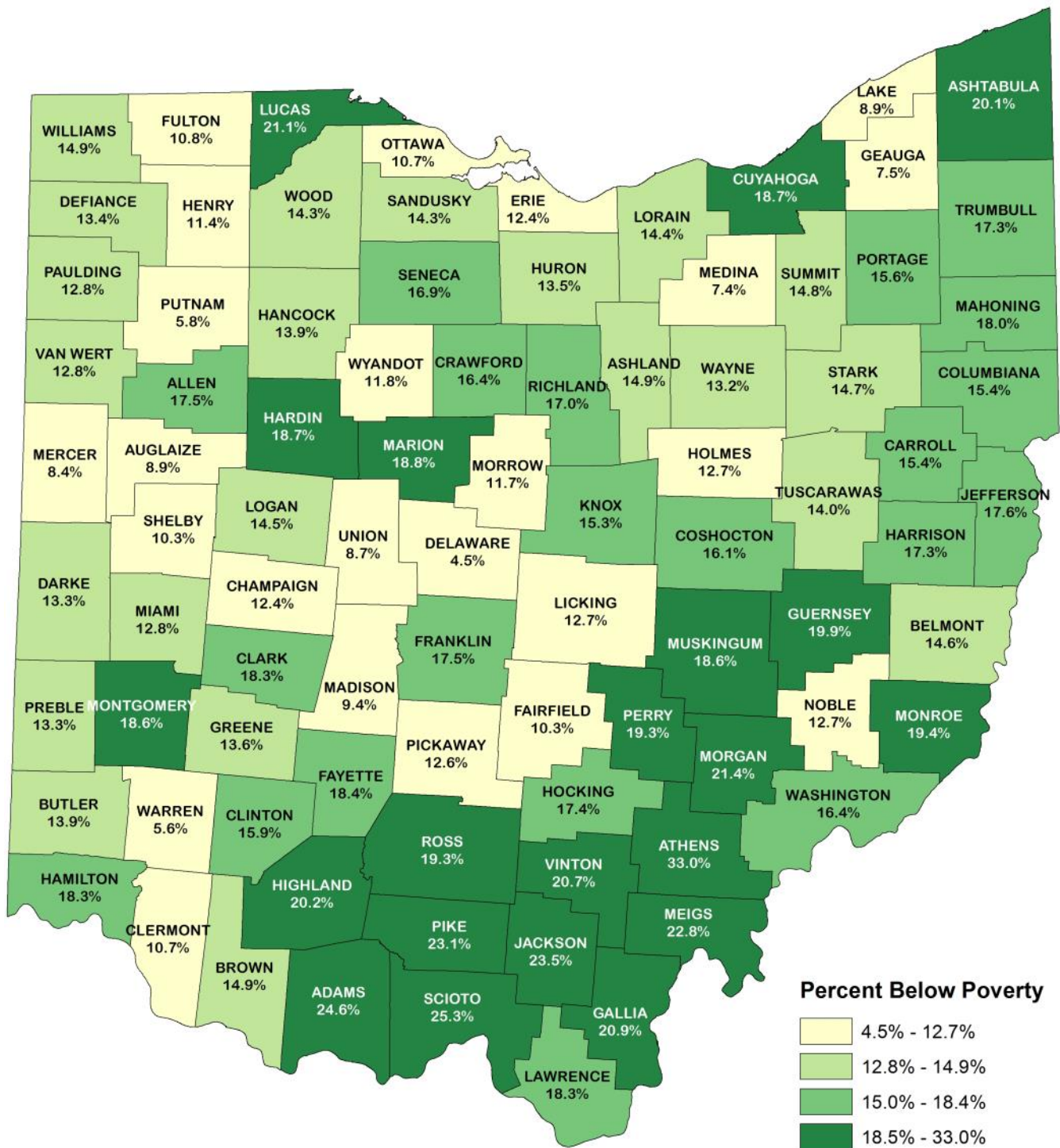
Figure 58. Percent of Adults Ages 25 and Older With Less Than a High School Education, by County of Residence, Ohio, 2011-2015



Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates.

Ohio: 10.9%
U.S.: 13.3%

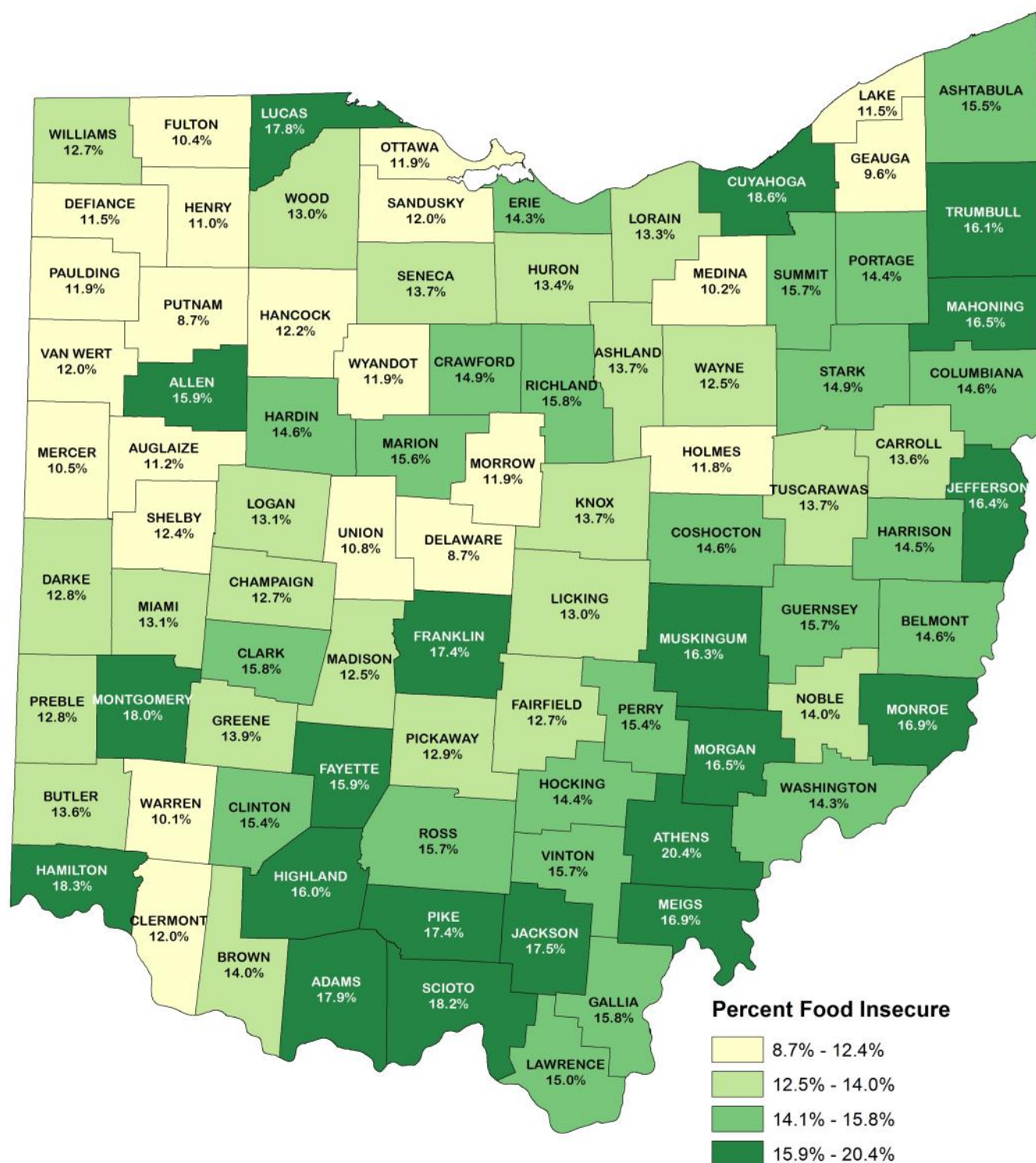
Figure 59. Percent of the Population Living Below the Poverty Level, by County of Residence, Ohio, 2011-2015



Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates.

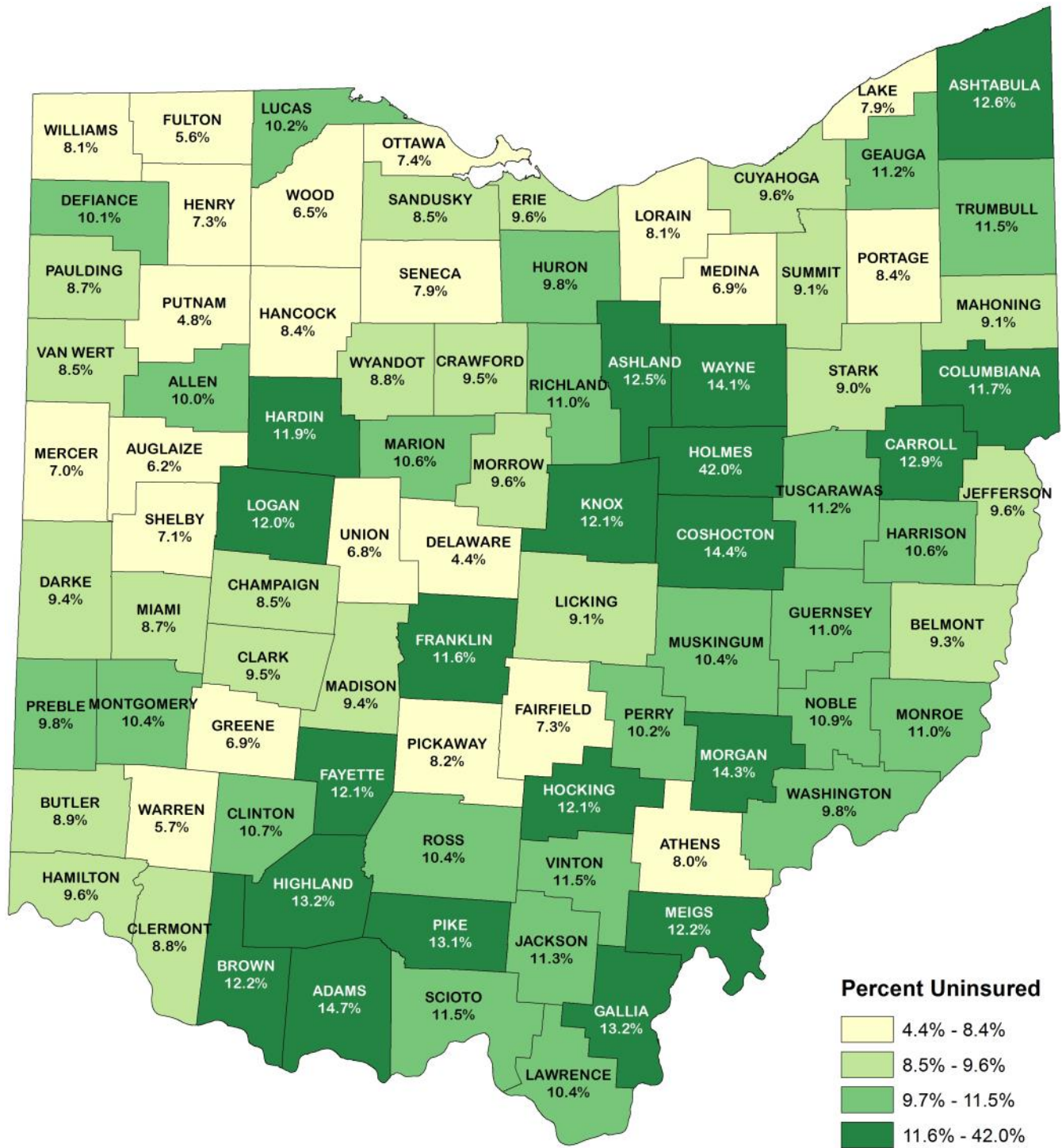
Ohio: 15.8%
U.S.: 15.5%

Figure 60. Percent of the Population Who Were Food Insecure, by County of Residence, Ohio, 2015



Source: Map the Meal Gap 2015: Food Insecurity and Child Food Insecurity Estimates at the County Level. Feeding America, 2015. Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, 2018.

Figure 61. Percent of the Population Without Health Insurance, by County of Residence, Ohio, 2011-2015



Ohio: 9.7%
U.S.: 13.0%

Source: U.S. Census Bureau, 2011-2015 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., 2011-2015). 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., 2011-2015).

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., 2011-2015).

Population Data for Calculating Rates: The 1996-2015 rates were calculated using bridged-race intercensal population estimates for July 1, 1996-July 1, 1999 (U.S. Census Bureau and National Center for Health Statistics, 2004); revised bridged-race intercensal population estimates for July 1, 2000-July 1, 2009 (U.S. Census Bureau and National Center for Health Statistics, 2012); and vintage 2016 bridged-race postcensal population estimates for July 1, 2010-July 1, 2015 (U.S. Census Bureau and National Center for Health Statistics, 2017).

Percent Below Poverty: Percent (%) of the population living below the poverty level. Poverty level is dependent on household size. For example, the poverty level for a household of four is \$24,000.

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 among those ages 50-75.

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 Mammography Among Medicare Enrollees: Percent (%) of female Medicare enrollees ages 67-69 that received mammography screening in the past two years.

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 persons) during a specified time period (e.g., 2011-2015). Rates may be unstable and are not presented when the case count is less than five.

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.

References

1. National Cancer Institute website. *What Is Cancer?* Updated February 9, 2015. <https://www.cancer.gov/about-cancer/understanding/what-is-cancer>. Accessed August 21, 2018.
 2. American Cancer Society. *Cancer Facts & Figures 2018*. Atlanta: American Cancer Society; 2018. <https://www.cancer.org/>.
 3. U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates; American FactFinder, <http://factfinder.census.gov>. Accessed September 28, 2018.
 4. Day, Jennifer Cheeseman, *Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1995 to 2050*, U.S. Bureau of the Census, Current Population Reports, P25-1130, U.S. Government Printing Office, Washington, DC, 1996. <https://www.census.gov/prod/1/pop/p25-1130/p251130.pdf>.
 5. Ohio Cancer Incidence Surveillance System. Ohio Department of Health. 1996-2015 data, released February 8, 2018.
-

References

6. National Cancer Institute. Surveillance, Epidemiology and End Results (SEER) Program. SEER 18 Registry Research Data (1973-2015), released April 2018, based on the November 2017 submission. <https://seer.cancer.gov/>.
 7. International Classification of Diseases for Oncology, Third Edition. World Health Organization, Geneva, Switzerland, 2000.
 8. National Cancer Institute. Surveillance, Epidemiology and End Results (SEER) Program. Site recode ICD-O-3 (WHO 2008 Definition). https://seer.cancer.gov/siterecode/icdo3_dwhoheme/index.html.
 9. Ohio Department of Health. Bureau of Vital Statistics. Columbus, OH: Ohio Department of Health, 2018.
 10. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. World Health Organization, Geneva, Switzerland, 2010.
 11. National Cancer Institute. Surveillance, Epidemiology and End Results (SEER) Program. SEER Cause of Death Recode 1969+, May 2018. https://seer.cancer.gov/codrecode/1969_d03012018/index.html.
 12. Ohio Department of Health. Ohio Behavioral Risk Factor Surveillance System. Columbus, OH: Chronic Disease Epidemiology and Evaluation Section, Ohio Department of Health, 2018.
 13. Dartmouth Atlas of Health Care. Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, March 2018.
 14. Young JL Jr, Roffers SD, Ries LAG, Fritz AG, Hurlbut AA (eds). *SEER Summary Staging Manual - 2000: Codes and Coding Instructions*, National Cancer Institute, NIH Pub. No. 01-4969, Bethesda, MD, 2001.
 15. *The Impact of Tobacco Use on Cancer in Ohio*. Ohio Cancer Incidence Surveillance System, Ohio Department of Health and The Ohio State University, Columbus, OH, July 2018. <https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/ohio-cancer-incidence-surveillance-system/resources/impact-of-tobacco-use-on-cancer-in-ohio>.
 16. County Health Rankings & Roadmaps website. 2018 County Health Rankings, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, March 2018. www.countyhealthrankings.org.
 17. CDC Diabetes Interactive Atlas, National Diabetes Surveillance System, 2016. Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, March 2018.
 18. Map the Meal Gap 2015: Food Insecurity and Child Food Insecurity Estimates at the County Level. Feeding America, 2015. Published in 2018 County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, 2016.
 19. ArcGIS versions 10.2 and 10.4 for Desktop, Environmental Systems Research Institute, Inc. (Esri), Redlands, CA, 2015.
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Acknowledgements

The following individuals contributed to this report:

Holly L. Sobotka, M.S.; John Kollman, M.S.; Emily Bunt, M.A.; Justina Moore, M.P.H.
Ohio Department of Health

James L. Fisher, Ph.D.; Julie A. Stephens, M.S.; Ryan D. Baltic, M.P.H.; Electra D. Paskett, Ph.D.
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Sincere appreciation to the OCISS, cancer registrars, medical records technicians and other health professionals who improve the collection and quality of cancer data in Ohio.

Suggested Citation

Ohio Cancer Atlas 2019: Maps of Cancer Incidence, Mortality, Risk Factors and Social Determinants of Health by County. Ohio Cancer Incidence Surveillance System, Ohio Department of Health and The Ohio State University, Columbus, Ohio, January 2019.

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The OCISS is supported in part by the State of Ohio and the Centers for Disease Control and Prevention (CDC), National Program of Cancer Registries, cooperative agreement number 5NU58DP006284. The Ohio Behavioral Risk Factor Surveillance System is supported in part by CDC, Behavioral Risk Factor Surveillance System, cooperative agreement number 6NU58DP006046, partially funded by the Prevention and Public Health Fund. The contents are the sole responsibility of the authors and do not necessarily represent the official views of the CDC.

