

**Southeastern Ohio Epidemiology Region  
Infectious Disease Data Review: 2018-2022**



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Prevent. Promote. Protect.

Belmont, Coshocton, Guernsey,  
Harrison, Jefferson, Monroe,  
Morgan, Muskingum, Noble, Perry,  
and Washington Counties

Developed by Jenna Cannon, BSN, RN, in collaboration with Perry County Health Department,  
Noble County Health Department, and Zanesville-Muskingum County Health Department

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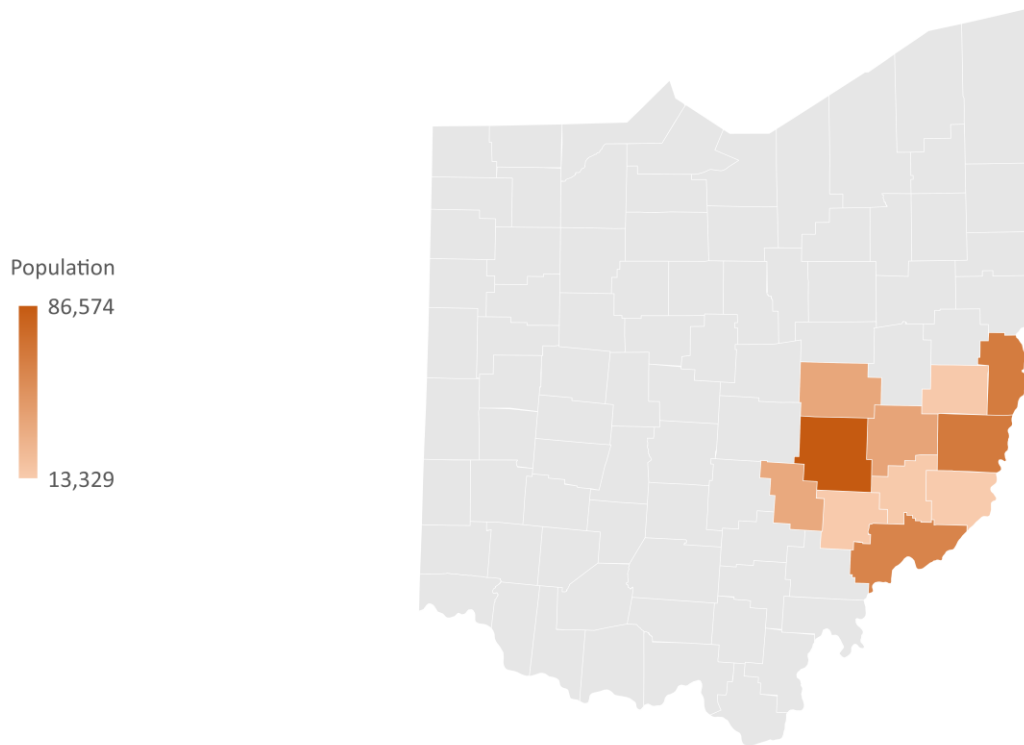
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## Introduction

Southeast Ohio is part of the Appalachian Region which is a 205,000-square-mile region that spans the Appalachian Mountains. Compared to the rest of the nation, the Appalachian region faces significant disparities related to access to healthcare, employment, income, education, and various health outcomes. From 2018 - 2022, the Southeast Ohio Epidemiology Region was comprised of thirteen health districts across eleven Appalachian Ohio counties. These include Belmont, Coshocton, Guernsey, Harrison, Jefferson, Monroe, Morgan, Muskingum, Noble, Perry, and Washington County health districts, as well as the city health districts of Coshocton and Marietta/Belpre. The Epidemiology Region serves approximately 450,000 southeastern Ohio residents. This report provides an overview of infectious disease rates within the Southeast Ohio Region from 2018 to 2022.

### Southeastern Ohio Epidemiology Region



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Source: Census American Communities Survey 2021 (Map created in Microsoft Excel)

**Table 1. Demographics**

	Ohio	Belmont	Coshocton	Guernsey	Harrison	Jefferson
<b>Total Population (n)</b>	11,780,017	65,849	36,618	38,287	14,477	64,789
<b>Population (%)</b>						
0-9	11.8	9.6	13.2	11.2	11.3	9.5
10-19	13.0	11.4	12.7	13.3	11.9	12.9
20-29	12.8	10.4	11.1	11.6	9.7	12.3
30-39	12.9	14.0	12.3	22.5	10.1	10.6
40-49	11.8	11.2	10.5	11.8	11.2	11.5
50-59	12.8	13.9	13.3	14.8	13.9	14.0
60-69	12.9	15.2	14.1	13.5	17.4	15.4
70-79	8.0	10.1	7.8	8.2	9.4	8.9
80+	3.9	4.3	5.0	4.3	5.1	5.0
<b>Sex (%)</b>						
Female	50.7	48.6	50.2	49.9	50.1	51.0
Male	49.3	51.4	49.8	50.1	49.9	49.0
<b>Race/Ethnicity (%)</b>						
White	76.6	93.2	96.3	95.4	95.3	91.2
Black	11.8	4.2	1.2	1.7	2.1	5.5
Asian	2.4	0.5	0.7	0.5	0.3	0.6
Multiracial	4.4	1.8	1.6	2.1	2.0	2.5
Other	0.4	0.3	0.2	0.3	0.3	0.2
Hispanic*	4.3	1.2	1.3	1.3	1.3	1.8

\*Hispanic includes respondents of any race. Other categories are non-Hispanic.  
Data from US Census Bureau (2021).

**Table 1. Demographics Continued**

	Monroe	Morgan	Muskingum	Noble	Perry	Washington	Region
<b>Total Population (n)</b>	13,329	13,682	86,574	14,176	35,460	59,423	444,679
<b>Population (%)</b>							
0-9	11.1	9.0	13.0	10.5	12.6	9.8	11.1
10-19	11.5	14.3	11.7	9.4	13.1	12.7	12.3
20-29	10.2	9.7	14.0	10.9	11.3	11.7	11.7
30-39	11.3	10.9	10.9	10.5	11.3	11.5	11.6
40-49	10.9	12.5	12.0	7.7	13.5	11.4	11.5
50-59	14.7	13.9	12.8	13.8	14.1	14.5	13.8
60-69	15.0	15.0	13.6	19.7	13.8	14.7	14.7
70-79	9.1	10.5	7.7	10.6	7.1	8.3	8.6
80+	6.1	4.2	4.3	7.0	3.3	5.3	4.7
<b>Sex (%)</b>							
Female	49.2	51.1	49.8	40.3	49.7	50.5	49.9
Male	50.8	48.9	50.2	59.7	50.3	49.5	50.1
<b>Race/Ethnicity (%)</b>							
White	97.3	91.0	92.3	94.8	97.1	95.7	93.9
Black	0.7	2.9	3.0	3.3	0.6	1.3	2.7
Asian	0.2	0.4	0.2	0.3	0.2	0.7	0.4
Multiracial	1.6	4.0	4.0	1.2	1.6	1.9	2.6
Other	0.2	1.7	0.5	0.4	0.5	0.4	0.4
Hispanic*	0.7	1.3	1.0	0.8	1.0	1.2	1.2

\*Hispanic includes respondents of any race. Other categories are non-Hispanic.  
Data from US Census Bureau (2021).

## **Infectious Disease Reporting in Ohio**

Ohio's reporting laws require that certain infectious diseases be reported to the local health district in which an individual resides. Currently, there are over ninety reportable infectious diseases in Ohio (Ohio Department of Health, 2019). Healthcare providers, laboratories, and any individual having knowledge of a person suffering from a disease suspected of being communicable are required to report this information to the local health department. Infectious disease reporting is necessary for disease control and prevention, documentation of the distribution of disease in Ohio, and the identification of outbreaks.

Infectious diseases are classified into class A, B, or C reportable conditions. All conditions are classified based on information provided in the Ohio Infectious Disease Control Manual (IDCM). Class A reportable diseases are diseases of the most significant health concern and require immediate reporting to the local health department. These conditions require a greater response due to their significant negative health outcomes. Class A conditions also include bioterrorist agents. Class B reportable conditions must be reported to the local health department by the end of the next business day once identified. These conditions include those that have the potential for high epidemic spread. Because Class B reportable conditions tend to be more common, they generally have a more significant number of cases and a greater impact on communities. Class C reports include outbreaks of any condition, regardless of their reporting requirements, so that they may still be managed by the local health department in the event of an outbreak.

## **Infectious Disease Surveillance: Public Health Professionals**

Public health professionals are responsible for the surveillance of infectious diseases among communities. This includes the process of suspecting an infectious disease, confirmation of the disease, disease reporting, case investigation, prevention and control, and feedback to healthcare providers. Healthcare providers, laboratories, the local health department, and the state health department all play

a vital role in effective infectious disease surveillance. Reporting requirements, as well as actions taken at the local and state level are dependent upon the type of reportable condition being investigated. Figure 2 represents the typical reporting and investigation process that occurs among local health departments.

**Figure 2. Local Health Department Reporting & Investigation Process**



Figure developed by: Leann Shafer, Perry County Health Department

### Public Health Case Classification

Cases of reportable conditions may be listed as suspected, probable, or confirmed. This classification is based upon the evidence (laboratory, clinical, and epidemiological) collected during the case investigation, and classifications vary between conditions. All case classifications for each reportable condition are outlined within the Ohio Department of Health Infectious Disease Control Manual. Cases

being reviewed are those that have been classified as probable or confirmed cases only. Suspected cases are not included in reporting of infectious disease rates in a community as they lack the necessary testing, clinical evidence, and patient follow-up required to be considered as current confirmed or probable cases of the disease, leading to low data reliability. Probable cases are typically defined as a case that meets the probable laboratory criteria for diagnosis or a clinically compatible case that is epidemiologically linked to a probable or confirmed case of the reportable condition. Confirmed cases are typically defined as a case that meets confirmed laboratory criteria for diagnosis. Public health response to a case may not change based upon case classification, however response may vary based upon investigation findings (Ohio IDCM, 2019).

### **Data Selection**

For this report, the focus is on ten of the reportable infectious diseases present within the Southeast Ohio region. Conditions being reviewed have had some of the most significant impact within our communities over the last five years. These conditions are all Class B and include campylobacteriosis, chlamydia, cryptosporidiosis, gonococcal, hepatitis A, hepatitis B, hepatitis C, influenza associated hospitalizations, Lyme disease, and *Streptococcus pneumoniae*, Invasive Disease. Yearly incidence of these illnesses over the last five years will be represented in the following tables. Incidence rates are determined by the number of newly reported cases that are present within a population during a certain time, compared to the total population within each county during that same time. Incidence rates for 2020, 2021, and 2022 may be impacted by the COVID-19 pandemic. During this time, the ability of local health departments to follow-up with cases and collect information for the classification status to be elevated from suspected to probable or confirmed has been limited, and patients have had reduced access to healthcare services. Data for these years that are preliminary are indicated with '\*'. The reportable conditions for each county will be based on the rate per 100,000 persons, as this is the most accurate way to capture the rates of diseases across different counties with varying populations. Data was collected



from the Ohio Disease Reporting System (ODRS) and validated through comparison to reports published by the Ohio Department of Health. Ethical and legal principles concerning public health information were applied and maintained during the duration of data collection, maintenance, and dissemination of epidemiologic data.

## Reportable Conditions

### Campylobacteriosis

According to the CDC (2023), *Campylobacter*, or Campylobacteriosis is the number one cause of bacterial diarrheal illness in the United States. *Campylobacter* can be caused by consuming raw or undercooked meat, untreated drinking water, or by contact with animals. Many chickens, cows, and other animals may asymptotically carry these bacteria. With GI illnesses, such as campylobacteriosis, it is important for public health professionals to identify and address the cause of the infection. If an individual has a sensitive occupation including food handler, there is an increased risk for the spread of bacteria via improper food handling, which can have a large impact on the health of the community. Table 2 represents the rates of campylobacteriosis in the SE Ohio Epidemiology Region from 2018-2022.

**Table 2. Campylobacteriosis**

	2018	2019	2020*	2021*	2022*
<b>Ohio</b>	18.8	20.9	**	**	**
<b>Belmont</b>	10.4	11.9	6.1	13.5	12.15
<b>Coshocton</b>	35.5	27.3	30.2	24.6	19.12
<b>Guernsey</b>	38.4	30.9	12.9	20.8	10.45
<b>Harrison</b>	26.4	19.9	6.7	34.5	6.9
<b>Jefferson</b>	18.2	19.9	15.4	3.1	--
<b>Monroe</b>	21.8	29.3	22.1	37.4	37.5
<b>Morgan</b>	82.2	34.5	35.0	72.5	43.85
<b>Muskingum</b>	31.3	26.7	23.1	18.5	17.3
<b>Noble</b>	48.8	41.6	20.9	92.1	63.5
<b>Perry</b>	36.1	19.4	13.8	14.1	28.2
<b>Washington</b>	73.1	88.5	48.6	100.4	65.6

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\* Data not yet available

Sources: 2018 Annual Summary of Infectious Diseases; 2019 Annual Summary of Infectious Diseases

## Chlamydia

Table 3 represents rates of chlamydia within the SE Ohio Epidemiology region from 2018-2022. Although chlamydia is the most reported sexually transmitted disease among the Southeast Ohio Epidemiology Region, these rates are still generally lower than Ohio's overall rates for this infection. If individuals are not properly treated for chlamydia, this puts others within the community at risk due to the high likelihood of this infection being spread between partners. Providers and public health professionals must follow-up with cases to ensure treatment has been completed, which can decrease the risk of individuals developing antibiotic resistant infections (CDC, 2021).

**Table 3. Chlamydia**

	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022*</b>
<b>Ohio</b>	543.1	561.3	504.8	484.1	**
<b>Belmont</b>	268.0	280.6	207.4	171.4	194.4
<b>Coshocton</b>	292.4	303.3	237.7	251.3	275.9
<b>Guernsey</b>	515.2	352.4	334.4	301.8	313.4
<b>Harrison</b>	217.6	212.8	259.3	158.8	200.3
<b>Jefferson</b>	272.1	339.8	303.1	294.3	285.5
<b>Monroe</b>	116.1	197.7	153.8	156.9	97.5
<b>Morgan</b>	377.2	351.5	296.4	210.1	233.9
<b>Muskingum</b>	483.0	509.2	474.5	394.6	449.5
<b>Noble</b>	250.9	298.1	166.4	163.0	225.7
<b>Perry</b>	285.8	362.5	246.3	234.4	242.5
<b>Washington</b>	269.5	262.2	217.0	199.1	230.6

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\*Data not yet available

Sources: 2017-2021 Ohio Infectious Disease Status Report: Chlamydia

## Cryptosporidiosis

Cryptosporidiosis, or Crypto, is caused by a parasite found in the stool. An individual may develop the infection by swallowing anything that has come in contact with the stool of a person or animal with the bacteria. According to the CDC (2021), individuals with weakened immune systems may develop chronic, or fatal illness if not properly treated for this infection. As with other gastrointestinal illnesses, cases working in sensitive settings require greater public health intervention to prevent further spread of the disease. Table 4 represents the yearly incidence rates of Crypto within the SE Ohio Epidemiology Region from 2018-2022. Three counties (Guernsey, Perry, and Muskingum) saw an increase in their Crypto rates from 2021 to 2022.

**Table 4. Cryptosporidiosis**

	<b>2018</b>	<b>2019</b>	<b>2020*</b>	<b>2021*</b>	<b>2022*</b>
<b>Ohio</b>	5.5	5.9	**	**	**
<b>Belmont</b>	4.4	1.5	--	3.0	3.0
<b>Coshocton</b>	5.5	8.2	2.7	8.2	8.2
<b>Guernsey</b>	2.6	5.1	--	2.6	10.5
<b>Harrison</b>	--	6.6	--	--	--
<b>Jefferson</b>	7.6	3.1	--	4.6	1.5
<b>Monroe</b>	--	--	--	--	--
<b>Morgan</b>	13.7	27.6	7.2	21.9	21.9
<b>Muskingum</b>	15.1	22.0	9.3	11.6	22.0
<b>Noble</b>	7.0	--	7.1	7.1	--
<b>Perry</b>	5.6	5.5	14.1	8.5	25.4
<b>Washington</b>	5.0	5.0	--	5.1	--

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\* Data not yet available

Sources: 2018 Annual Summary of Infectious Diseases; 2019 Annual Summary of Infectious Diseases

## Gonorrhea

Table 5 represents rates of gonorrhea within the SE Ohio Epidemiology region from 2018-2022. Gonorrhea is the second most reported bacterial sexually transmitted infection in the Southeastern Ohio Epidemiology Region. As with chlamydia, if individuals and their partners are not properly treated for this condition, others within the community may be at risk due to the high likelihood of this infection being spread between partners. Providers and public health professionals must follow-up with cases to ensure treatment has been completed, which can decrease the risk of individuals developing antibiotics resistant infections. When comparing rates of gonorrhea within the region, counties such as Muskingum and Jefferson County tend to report greater rates of illness, especially when compared to some of our more rural counties such as Noble and Monroe.

**Table 5. Gonorrhea**

	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022*</b>
<b>Ohio</b>	216.2	223.8	262.6	238.8	**
<b>Belmont</b>	40.0	22.4	97.0	49.6	38.0
<b>Coshocton</b>	92.9	95.6	73.8	49.2	49.2
<b>Guernsey</b>	128.2	66.9	90.0	98.9	49.6
<b>Harrison</b>	39.6	6.6	26.6	27.6	41.5
<b>Jefferson</b>	123.1	81.1	122.5	145.6	140.5
<b>Monroe</b>	--	51.3	43.9	7.5	22.5
<b>Morgan</b>	102.9	89.6	13.8	36.2	51.2
<b>Muskingum</b>	247.3	170.5	169.0	167.8	108.6
<b>Noble</b>	83.6	48.5	27.7	49.6	28.2
<b>Perry</b>	61.0	102.4	58.1	59.3	45.1
<b>Washington</b>	63.2	110.2	73.4	78.6	62.3

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\*Data not yet available

Sources: 2017-2021 Ohio Infectious Disease Status Report: Gonorrhea

**Hepatitis A**

Hepatitis A is a liver infection caused by the hepatitis A virus. Because hepatitis A is typically contracted through consuming contaminated food or drinks or through close contact with an infected person, public health follow-up and response is important in identifying the source of these infections to prevent outbreaks. Hepatitis A is a vaccine-preventable disease, and public health professionals play an important role in administering and educating individuals on the hepatitis A vaccine. Table 6 represents yearly Hepatitis A rates within the SE Ohio Epidemiology region from 2018-2022. See page 13 for a possible explanation of the increase in Hepatitis A rates within our region from 2018-2021.

**Table 6. Hepatitis A**

	<b>2018</b>	<b>2019</b>	<b>2020*</b>	<b>2021*</b>	<b>2022*</b>
<b>Ohio</b>	15.7	13.9	**	**	**
<b>Belmont</b>	3.0	10.4	18.2	3.0	--
<b>Coshocton</b>	--	10.9	19.2	8.2	--
<b>Guernsey</b>	7.7	--	41.3	7.8	2.6
<b>Harrison</b>	--	13.3	66.6	6.9	--
<b>Jefferson</b>	--	53.6	6.2	3.1	--
<b>Monroe</b>	7.3	7.3	7.4	--	--
<b>Morgan</b>	6.8	6.9	28.0	21.7	--
<b>Muskingum</b>	7.0	51.0	6.9	1.2	1.1
<b>Noble</b>	20.9	62.4	20.9	--	--
<b>Perry</b>	8.3	58.1	8.3	2.8	--
<b>Washington</b>	66.5	15.0	21.8	16.7	--

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

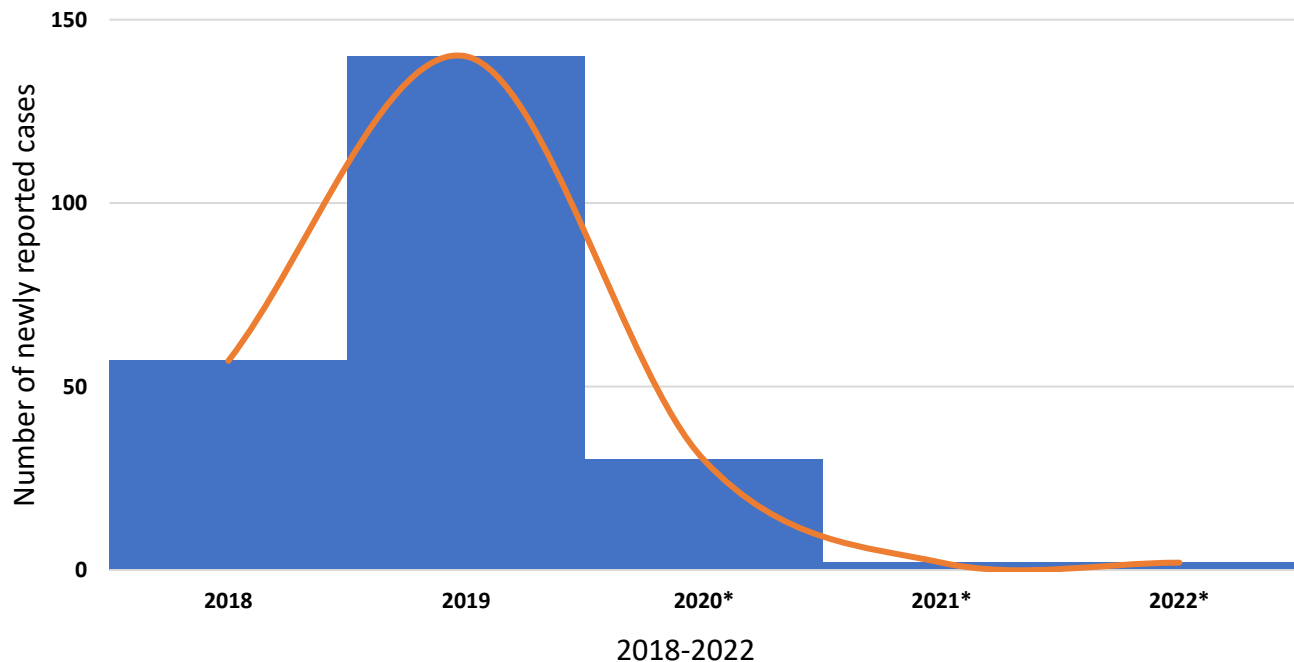
\*\* Data not yet available

Sources: 2018 Annual Summary of Infectious Diseases; 2019 Annual Summary of Infectious Diseases

### Statewide Hepatitis A Outbreak

In June 2018, the Ohio Department of Health declared a statewide community outbreak of Hepatitis A. Both the state and local health departments played a vital role in mitigating the outbreak, which was officially closed out in July of 2022. Each county within our region experienced Hepatitis A cases at some point during this outbreak. Therefore, the case rates within our region reflected in Table 6 from 2018 through 2021 were likely impacted by the statewide community outbreak of hepatitis A. Figure 3 represents the yearly confirmed and probable hepatitis A case incidence in the Southeastern Epidemiology Region. The yearly regional incidence was selected to represent this data as it best accounted for the differences in local health department’s ability to follow up with and reclassify these cases during the outbreak.

**Figure 3. Statewide Hepatitis A Outbreak  
SE OH Epidemiology Region**



\*Statistics created utilizing data from the Ohio Disease Reporting System. Data is preliminary and subject to change. Sources: 2018 Annual Summary of Infectious Diseases; 2019 Annual Summary of Infectious Diseases

## Hepatitis B

Hepatitis B virus is a highly infectious disease that can be transmitted in various ways. According to the CDC (2022), there is an estimated 580,000 to 1.7 million people infected with hepatitis B virus in the United States. Table 7 represents yearly incidence rates of Hepatitis B within the SE Ohio Epidemiology region from 2018-2022. Hepatitis B cases included in the overall rates include both newly identified chronic hepatitis B infections as well as acute infections. Because hepatitis B is a vaccine preventable disease, it is important that both children and adults are current on their hepatitis B vaccine. Based on the preliminary data from 2021 and 2022, counties within the region saw an overall decrease in hepatitis B cases, except for Morgan and Monroe, and Muskingum.

**Table 7. Hepatitis B (excluding cases diagnosed in correctional facilities)**

	2018	2019	2020	2021	2022*
<b>Ohio</b>	22.9	22.2	16.2	16.5	**
<b>Belmont</b>	8.8	4.5	10.6	25.0	--
<b>Coshocton</b>	13.7	5.5	13.7	13.7	10.9
<b>Guernsey</b>	17.9	12.9	2.6	23.4	10.5
<b>Harrison</b>	13.1	19.9	6.7	41.4	--
<b>Jefferson</b>	24.1	24.5	24.6	46.0	9.26
<b>Monroe</b>	14.3	7.3	22.1	7.5	7.5
<b>Morgan</b>	13.6	--	14.0	21.7	36.5
<b>Muskingum</b>	30.2	18.6	6.9	15.0	15.0
<b>Noble</b>	20.8	20.8	7.0	34.1	7.1
<b>Perry</b>	33.3	24.9	16.6	33.9	14.1
<b>Washington</b>	29.8	20.0	3.4	30.1	20.2

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\* Data not yet available

Sources: Hepatitis B: Five-year Status Report (2017-2021)

## Hepatitis C

Hepatitis C is a continued concern for individuals nationwide. Many counties within the region have experienced increased rates of this condition when compared to the state of Ohio. The data provided in Table 8 includes both newly identified chronic hepatitis C infections as well as acute infections. In our region, most newly identified hepatitis C cases were considered chronic infections. According to a study published in *Open Forum Infectious Disease* (2021), rural counties in Ohio were found to have twice the rate of acute hepatitis C virus infections when compared to urban communities. Results from this study also showed that rural counties in Ohio had less office-based buprenorphine prescribing, which may indicate a lack of access to care for certain individuals within the region. Table 8 demonstrates the yearly incidence rates of Hepatitis C within the SE Ohio Epidemiology Region from 2018-2021. All counties, except for Monroe, saw a decrease in Hepatitis C rates from 2021 to 2022. To continue to address the public health concerns of hepatitis C within communities, public health professionals must work together to educate and advocate individuals on the risk factors for this condition, as well as work to increase access to care for individuals, especially within rural communities.

**Table 8. Hepatitis C (excluding cases diagnosed in correctional facilities)**

	2018	2019	2020	2021	2022*
<b>Ohio</b>	157.5	135.6	111.0	105.4	**
<b>Belmont</b>	173.5	152.2	138.8	127.9	65.3
<b>Coshocton</b>	109.5	82.0	62.8	60.1	46.4
<b>Guernsey</b>	186.7	149.2	136.3	150.9	78.4
<b>Harrison</b>	98.6	73.1	86.4	48.3	69.1
<b>Jefferson</b>	200.4	166.9	145.4	111.9	74.1
<b>Monroe</b>	100.4	102.5	65.9	74.7	75.0
<b>Morgan</b>	170.0	220.6	131.0	123.2	109.6
<b>Muskingum</b>	160.2	121.8	86.8	83.3	75.1
<b>Noble</b>	118.0	117.9	76.3	76.8	63.5
<b>Perry</b>	161.0	141.1	91.3	81.9	67.7
<b>Washington</b>	163.9	163.6	130.2	140.5	124.5

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\* Data not yet available

Sources: ODH Hepatitis C: Five Year Status Report (2017-2021)



## Influenza Associated Hospitalization

Influenza associated hospitalizations is defined by the admission of an individual to an inpatient unit of a hospital due to an illness that can be linked to the influenza virus (flu). Both influenza A and B virus infections are included in influenza associated hospitalization case rates. Because the flu is a vaccine preventable disease, it is important to monitor the case rates of hospitalizations due to this virus. Table 9 represents the yearly incidence rates of influenza associated hospitalizations within the SE Ohio Epidemiology Region from 2018-2022. The pandemic, as well as the protective measures that were put in place due to the pandemic such as masking and social distancing, likely had an overall impact on the decreased rates that were seen in 2021 among counties in the region.

**Table 9. Influenza Associated Hospitalization**

	2018	2019	2020*	2021*	2022*
<b>Ohio</b>	123.5	93.1	**	**	**
<b>Belmont</b>	93.3	43.3	53.1	--	28.9
<b>Coshocton</b>	51.9	73.8	98.8	8.2	76.5
<b>Guernsey</b>	79.4	90.0	64.5	7.8	133.2
<b>Harrison</b>	33.0	106.4	73.3	--	48.4
<b>Jefferson</b>	176.4	73.5	70.8	4.6	37.0
<b>Monroe</b>	87.0	51.3	73.6	--	22.5
<b>Morgan</b>	95.9	103.4	76.9	21.7	175.4
<b>Muskingum</b>	131.2	170.5	100.7	16.2	161.8
<b>Noble</b>	76.6	20.8	41.8	7.1	148.1
<b>Perry</b>	66.6	132.8	85.6	8.5	95.9
<b>Washington</b>	133.0	85.1	102.3	6.7	104.3

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\* Data not yet available

Sources: 2018 Annual Summary of Infectious Diseases; 2019 Annual Summary of Infectious Diseases

**Lyme Disease**

Lyme disease cases are represented below and are based upon the case classification system outlined within the Ohio Department of Health Infectious Disease Control Manual. Table 10 displays the yearly incidence rate of confirmed and probable Lyme disease infections in Ohio, as well as within each county in the SE OH Epidemiology region. Lyme disease seems to have a more significant impact in our region's northernmost counties, though rates seem to be increasing over time throughout the region.

**Table 10. Lyme Disease (Confirmed or Probable Cases Only)**

	<b>2018</b>	<b>2019</b>	<b>2020*</b>	<b>2021*</b>	<b>2022*</b>
<b>Ohio</b>	2.5	3.9	3.5	4.6	**
<b>Belmont</b>	31.1	41.8	33.4	63.2	69.9
<b>Coshocton</b>	16.4	46.4	22.0	57.4	38.2
<b>Guernsey</b>	33.3	61.7	41.3	7.8	10.4
<b>Harrison</b>	59.3	139.6	93.3	158.8	55.3
<b>Jefferson</b>	36.5	52.0	50.8	49.0	15.4
<b>Monroe</b>	--	--	--	22.4	7.5
<b>Morgan</b>	--	--	--	14.5	14.6
<b>Muskingum</b>	9.3	12.8	27.8	22.0	22.0
<b>Noble</b>	--	20.8	--	70.9	14.1
<b>Perry</b>	--	2.8	5.5	2.8	--
<b>Washington</b>	3.3	3.3	--	--	1.7

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

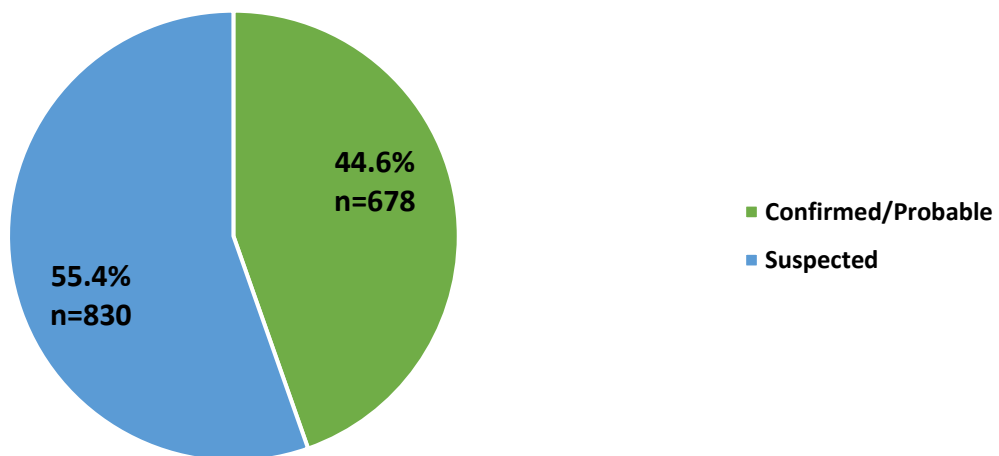
\*\* Data not yet available

Sources: Ohio Vector-borne Disease Surveillance Update (2020 Tickborne Diseases, 2021 Tickborne Diseases, 2022 Tickborne Diseases)

### Lyme Disease Cases Based on Case Classification

Figure 4 represents the total number of reported confirmed or probable Lyme disease cases from 2018-2022 versus the total number of suspected Lyme disease cases reported within this timeframe. Although suspected cases are not included in reporting of Lyme disease case rates within communities, the data provided may offer greater understanding of the burden of tickborne disease to local health departments and individuals within the community. This data also shows the importance of proper follow-up to be completed by local health departments and healthcare providers to ensure Lyme disease is accurately represented within the region.

**Figure 4. Southeastern Ohio Epidemiology Region  
Total Reported Lyme Disease Cases 2018-2022  
n= 1,508**



### ***Streptococcus pneumoniae*, Invasive Disease**

Pneumonia and meningitis are two examples of invasive infections caused by *Streptococcus pneumoniae*. Infection with this bacterium can be fatal if not diagnosed and treated appropriately, which is why identification and follow up is especially important for individuals diagnosed with this condition. According to the CDC (2020), since initiation of pneumococcal conjugate vaccines, invasive pneumococcal

disease has dramatically declined in both children and adults in the United States. Table 11 represents the yearly incidence rates of this condition in the SE Ohio Epidemiology Region from 2018-2022.

**Table 11. *Streptococcus pneumoniae*, Invasive Disease**

	2018	2019	2020*	2021*	2022*
<b>Ohio</b>	11.1	10.9	**	**	**
<b>Belmont</b>	16.3	23.9	9.0	4.6	7.6
<b>Coshocton</b>	13.7	13.7	2.7	2.7	8.2
<b>Guernsey</b>	12.8	15.4	20.8	5.2	20.9
<b>Harrison</b>	--	19.9	--	--	13.8
<b>Jefferson</b>	25.8	23.0	10.7	7.7	6.2
<b>Monroe</b>	7.3	7.4	--	--	--
<b>Morgan</b>	13.7	27.6	7.3	14.6	65.8
<b>Muskingum</b>	9.3	20.9	10.4	22.0	25.4
<b>Noble</b>	20.9	13.9	7.1	14.1	14.1
<b>Perry</b>	19.4	19.4	17.0	16.9	11.3
<b>Washington</b>	33.2	20.0	15.1	5.1	11.8

\*County-level statistics created utilizing data from the Ohio Disease Reporting System and U.S. Census Bureau. Data is preliminary and subject to change.

\*\* Data not yet available

Sources: 2018 Annual Summary of Infectious Diseases; 2019 Annual Summary of Infectious Diseases

## Conclusion

The Appalachian Southeastern Ohio Epidemiology Region faces significant disparities related to access to healthcare, employment, income, education, and various health outcomes. Due to the primarily rural composition of the region, data available to local health districts is limited and often lacks county-level health data essential for development of public health programs. The information provided in this report will help to support the collaboration between local health departments to address infectious disease issues. This report can also provide valuable information to healthcare professionals, agencies, and community members so that they may better understand the prevalence of infectious diseases within their communities.

## References

### Text References

Brook DL, Hetrick AT, Chettri SR, et al. The relationship between hepatitis C virus rates and office-based buprenorphine access in Ohio. *Open Forum Infectious Disease*. May 17, 2021.

doi:10.1093/ofid/ofab242

CDC (2023). *Campylobacter Questions and Answers*. Retrieved from

<https://www.cdc.gov/campylobacter/faq.html>

CDC (2022). *Viral Hepatitis Overview and Statistics*. Retrieved from

<https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm#overview>

CDC (2021). Chlamydial Infections. Retrieved from [https://www.cdc.gov/std/treatment-](https://www.cdc.gov/std/treatment-guidelines/chlamydia.htm)

[guidelines/chlamydia.htm](https://www.cdc.gov/std/treatment-guidelines/chlamydia.htm)

CDC (2021). *Parasites- Cryptosporidium*. Retrieved from

<https://www.cdc.gov/parasites/crypto/index.html>

Ohio Department of Health (2019). *Know Your ABCS: A quick guide to reportable infectious diseases in*

*Ohio*. Retrieved from [https://odh.ohio.gov/know-our-programs/infectious-disease-control-](https://odh.ohio.gov/know-our-programs/infectious-disease-control-manual/section1/abcs-guide-to-reportable-infectious-diseases-in-ohio)

[manual/section1/abcs-guide-to-reportable-infectious-diseases-in-ohio](https://odh.ohio.gov/know-our-programs/infectious-disease-control-manual/section1/abcs-guide-to-reportable-infectious-diseases-in-ohio)

Ohio Department of Health (2019). *Infectious Disease Control Manual*. Retrieved from

<https://odh.ohio.gov/know-our-programs/infectious-disease-control-manual>

United States Census Bureau. American Community Survey 2021 Population Estimates. Retrieved from

<https://censusreporter.org/>

### Table References

Southeastern Ohio Epidemiology Region: Infectious Disease Data Review

Ohio Department of Health (2019). *Annual Summary of Infectious Diseases*. Retrieved from

<https://odh.ohio.gov/know-our-programs/infectious-diseases/reports/2019-annual-summary>

Ohio Department of Health (2018). *Annual Summary of Infectious Diseases*. Retrieved from

<https://odh.ohio.gov/know-our-programs/infectious-diseases/reports/2018-annual-summary>

Ohio Department of Health (2021). *2017-2021 Ohio Infectious Disease Status Report: Chlamydia*.

Retrieved from <https://odh.ohio.gov/know-our-programs/std-surveillance/resources/chlamydia-five-year-report>

Ohio Department of Health (2021). *2017-2021 Ohio Infectious Disease Status Report: Gonorrhea*

Retrieved from <https://odh.ohio.gov/know-our-programs/std-surveillance/resources/gonorrhea-five-year-report>

Ohio Department of Health (2022). *Hepatitis B: Five Year Status Report*. Retrieved from

[https://odh.ohio.gov/know-our-programs/viral-hepatitis/data-statistics/hbv\\_5yr\\_report](https://odh.ohio.gov/know-our-programs/viral-hepatitis/data-statistics/hbv_5yr_report)

Ohio Department of Health (2022). *Hepatitis C: Five Year Status Report*. Retrieved from

[https://odh.ohio.gov/know-our-programs/viral-hepatitis/data-statistics/hcv\\_5yr\\_report](https://odh.ohio.gov/know-our-programs/viral-hepatitis/data-statistics/hcv_5yr_report)

Ohio Department of Health (2021). *Ohio Vectorborne Disease Surveillance Update*. Retrieved from

<https://odh.ohio.gov/know-our-programs/zoonotic-disease-program/news/vectorborne-disease-update>

Ohio Department of Health (2022). *Ohio Vectorborne Disease Surveillance Update*. Retrieved from

<https://odh.ohio.gov/know-our-programs/zoonotic-disease-program/news/vectorborne-disease-update>

United States Census Bureau. *American Community Survey 2021 Population Estimates*. Retrieved from

<https://censusreporter.org/>

