

# Non-Hodgkin Lymphoma in Ohio 2024

February 2024

## Key Findings

- An average of 2,775 cases of NHL were diagnosed each year in Ohio during 2016-2020.
- The NHL incidence rate in Ohio was 19.0 per 100,000 population, compared with the national rate of 18.7 per 100,000 during 2016-2020.
- An average of 848 deaths from NHL occurred each year in Ohio during 2016-2020.
- NHL occurs more often in males than in females.
- White people have higher incidence and mortality rates of NHL than Black people and Asian/Pacific Islanders in Ohio and the United States.
- In Ohio during 2016-2020, NHL was most frequently diagnosed among people in the 65-74 age group (29.2%).
- Trends in NHL incidence rates remained stable, while mortality rates decreased for men and women in Ohio from 1996 to 2020.
- In Ohio, there was no clear geographic pattern of NHL incidence by county during 2016-2020.
- The five-year relative survival for NHL was 75.1%, based on Ohio cases diagnosed during 2013-2019.
- Five-year relative survival has improved from 1996 (55.6%) to 2015 (75.6%).

## New Cases

Non-Hodgkin lymphoma (NHL) is a cancer that begins in cells called lymphocytes (white blood cells), which are a part of the body's immune system. NHL made up 4% of newly diagnosed (incidence) cancer cases in Ohio reported to the Ohio Cancer Incidence Surveillance System (OCISS) during 2016-2020. An average of 2,775 cases of NHL were diagnosed annually in Ohio during this five-year period (Table 1). The average annual age-adjusted incidence rate for NHL in Ohio was 19.0 per 100,000 population, compared with the national Surveillance, Epidemiology, and End Results (SEER) Program incidence rate of 18.7 per 100,000. The incidence rate among males diagnosed with NHL (23.2 per 100,000) was 1.5 times higher than the rate among females (15.5 per 100,000), and the incidence rate was 1.5 times higher among White Ohioans (19.5 per 100,000), compared with Black Ohioans (12.8 per 100,000) in Ohio during 2016-2020.

## Deaths

An average of 848 deaths from NHL occurred each year in Ohio during 2016-2020 (Table 1). The average annual age-adjusted mortality rate for NHL in Ohio was 5.7 per 100,000 population, compared with the U.S. mortality rate of 5.1 per 100,000. The mortality rate was 1.7 times higher for males (7.5 per 100,000) than females (4.3 per 100,000) in Ohio during this time period.

**Table 1. Average Annual Number and Age-Adjusted Rates of NHL Cases and Deaths per 100,000 Population by Sex, Race, and Age Group, Ohio and the United States, 2016-2020**

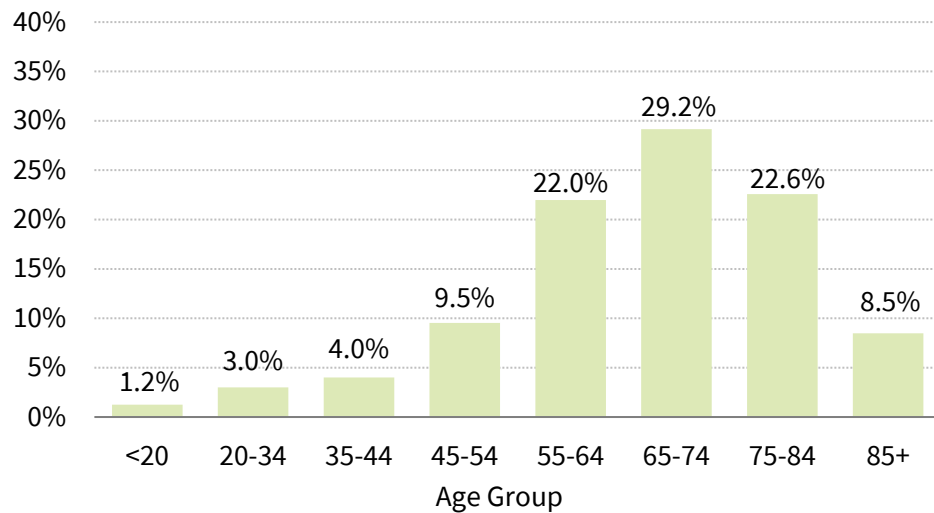
		Incidence			Mortality		
		Ohio Cases	Ohio Rate	U.S. Rate	Ohio Deaths	Ohio Rate	U.S. Rate
Total		2,775	19.0	18.7	848	5.7	5.1
Sex	Male	1,540	23.2	22.5	481	7.5	6.7
	Female	1,235	15.5	15.5	368	4.3	3.9
Race	White	2,505	19.5	19.6	786	5.9	5.4
	Black	196	12.8	14.0	56	3.9	3.8
	A/PI	26	10.8	13.2	3	1.9	3.5
Age Group	<65	1,104	9.2	8.9	162	1.2	1.2
	65+	1,671	29.2	28.4	686	5.7	5.1

Sources: Ohio Cancer Incidence Surveillance System and Bureau of Vital Statistics, Ohio Department of Health, 2023; Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2023.  
A/PI = Asian/Pacific Islander.

## New Cases by Age Group

In Ohio during 2016-2020, NHL was most frequently diagnosed among people in the 65-74 age group (29.2%). The incidence of NHL among children and adolescents (less than 20 years old) made up 1.2% of cases (Figure 1).

**Figure 1. Percent of New NHL Cases by Age Group, Ohio, 2016-2020**

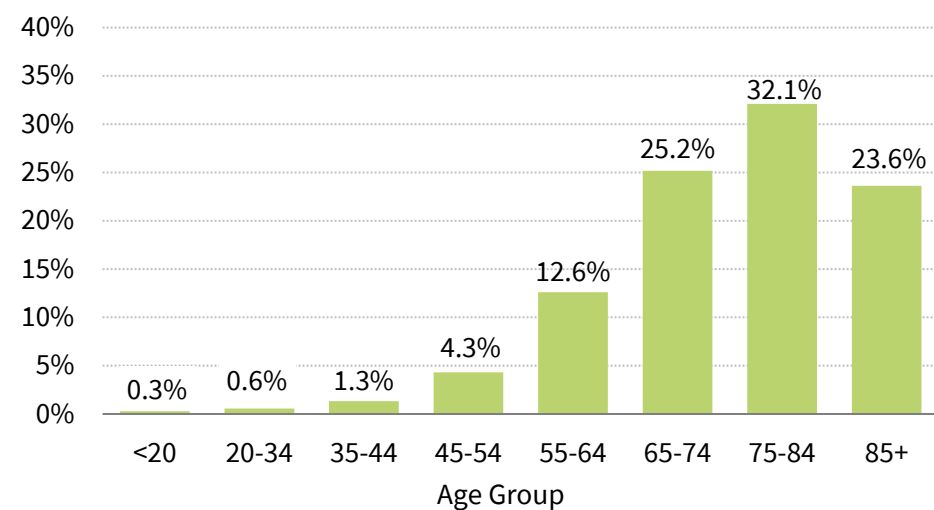


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2023.

## Deaths by Age Group

The percentage of NHL deaths was highest among Ohioans in the 75-84 age group (32.1%) (Figure 2).

**Figure 2. Percent of NHL Deaths by Age Group, Ohio, 2016-2020**

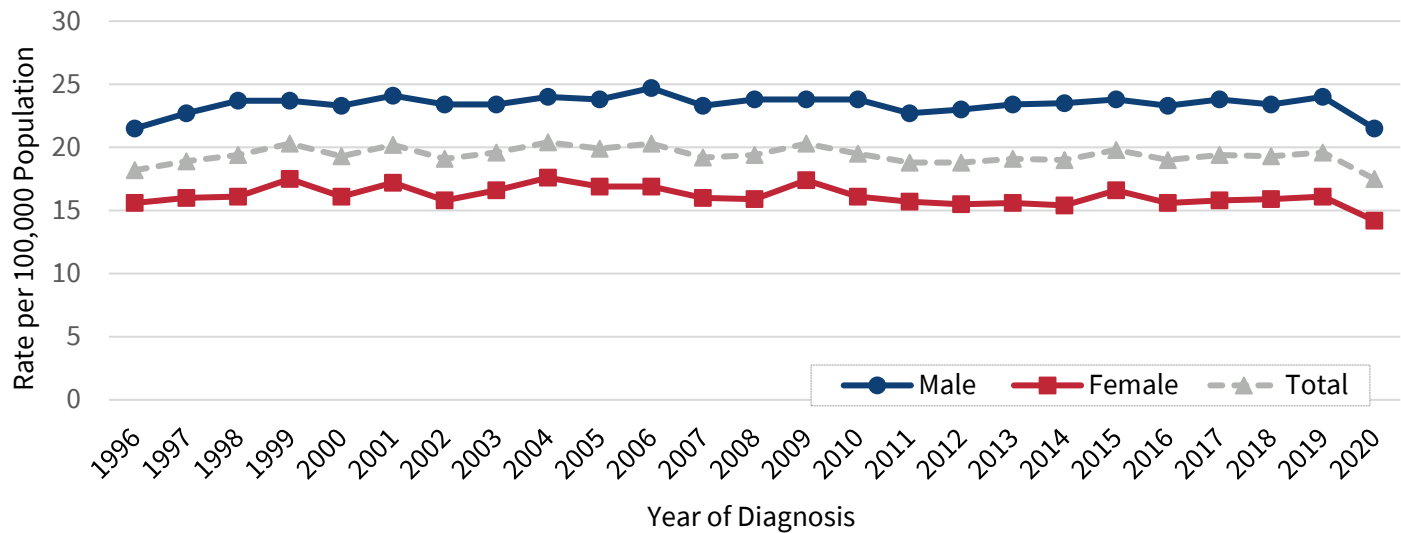


Source: Bureau of Vital Statistics, Ohio Department of Health, 2023.

## Trends in Incidence and Mortality

Figure 3 shows incidence rates of NHL according to year of diagnosis (1996 through 2020) for males and females in Ohio. For each year, the incidence rate was higher among Ohio males, compared with females. From 1996 to 2020, NHL incidence rates have remained stable for both males and females in Ohio.

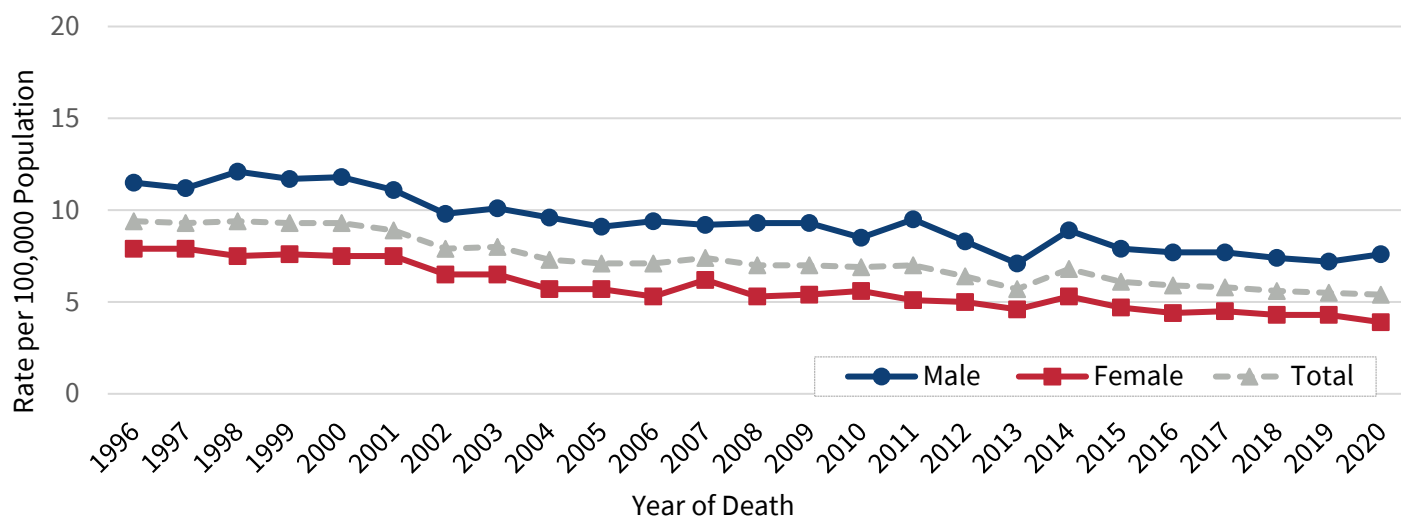
**Figure 3. Trends in Age-Adjusted NHL Incidence Rates per 100,000 Population by Sex, Ohio, 1996-2020**



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2023.

Figure 4 shows NHL mortality rates in Ohio according to year of death (1996 through 2020) for males and females. For each year, NHL mortality rates were higher among males, compared with females in Ohio. From 1996 to 2020, NHL mortality rates decreased 34% and 51% among males and females, respectively.

**Figure 4. Trends in Age-Adjusted NHL Mortality Rates per 100,000 Population by Sex, Ohio, 1996-2020**

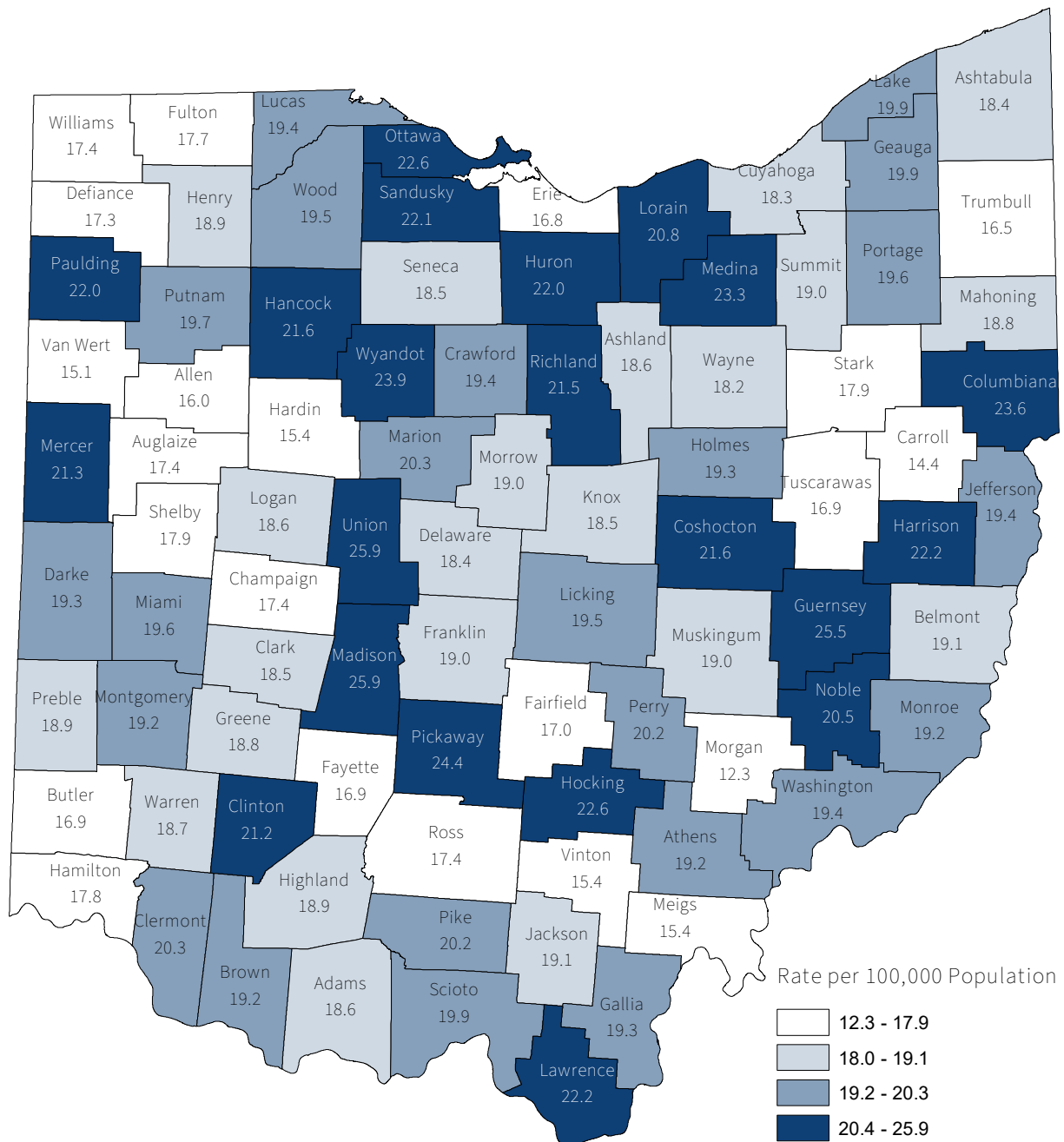


Source: Bureau of Vital Statistics, Ohio Department of Health, 2023.

## Incidence by County

Figure 5 shows 2016-2020 average annual age-adjusted NHL incidence rates by county of residence. County-specific NHL incidence rates in Ohio ranged from 12.3 to 25.9 per 100,000 population, compared with Ohio's rate of 19.0 per 100,000. There was no clear geographic pattern of NHL incidence rates by county.

**Figure 5. Average Annual Age-Adjusted NHL Incidence Rates per 100,000 Population by County of Residence, Ohio, 2016-2020**

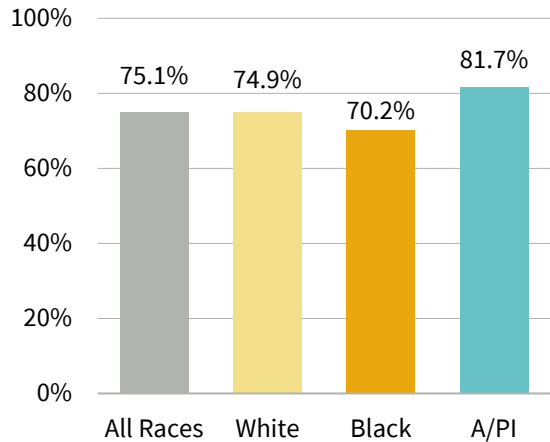


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2023.  
Each category represents approximately 25% of the 88 Ohio counties.

## Survival

Relative survival is the percentage of people who are alive at a designated time period (usually five years) after a diagnosis divided by the percentage expected to be alive in the absence of a diagnosis based on normal life expectancy.

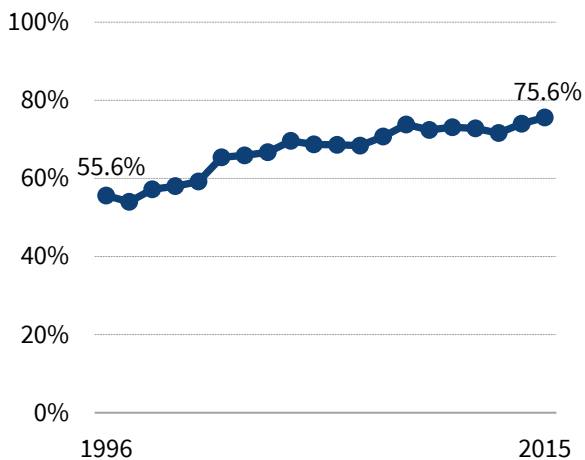
**Figure 6. Five-Year Relative Survival (%) for NHL, Ohio, 2013-2019**



- The five-year relative survival for NHL was 75.1%, based on Ohio cases diagnosed during 2013-2019.
- Five-year relative survival was lower among Black Ohioans (70.2%) than White Ohioans (74.9%) and Asians/Pacific Islanders (81.7%) (Figure 6).

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2023.  
A/PI = Asian/Pacific Islander.

**Figure 7. Trend in Five-Year Relative Survival (%) for NHL, Ohio, 1996-2015**



- As shown in Figure 7, there was an improvement in five-year relative survival for NHL in Ohio from 1996 (55.6%) to 2015 (75.6%).

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2023.

## Types of NHL

There are many types of NHL that form from different types of white blood cells (i.e., B-cells, T-cells, natural killer cells). Most types of NHL form from B-cells. NHL may be indolent (slow-growing) or aggressive (fast-growing). The most common types of NHL in adults are diffuse large B-cell lymphoma, which is usually aggressive, and follicular lymphoma, which is usually indolent.

## Risk Factors and Populations at High Risk

Anything that increases your risk of getting a disease is called a risk factor. Having a risk factor does not mean that you will get cancer; not having risk factors doesn't mean that you will not get cancer. The following is a list of risk factors for NHL:

### Potentially Modifiable Risk Factors

**Certain viruses:** Having an infection with the Epstein-Barr virus (EBV), HIV, *Helicobacter pylori*, human herpes virus 8 (HHV8), or human T-cell leukemia/lymphoma type I (HTLV-1) increases risk of developing NHL.

**Certain chemicals:** Chemicals such as benzene and certain herbicides and insecticides (weed- and insect-killing substances) are linked with an increased risk of NHL.

**Radiation:** Studies of survivors of atomic bombs and nuclear reactor accidents have shown they have an increased risk of developing NHL. Patients treated with radiation therapy for some other cancers, such as Hodgkin disease, have a slightly higher risk of developing NHL later in life.

### Non-Modifiable Risk Factors

**Age:** Risk of NHL increases with advancing age.

**Sex:** Overall, the risk of NHL is higher in men, compared with women, but there are certain types of NHL that are more common in women.

**Race:** White people are more likely to develop NHL than Black people or Asians/Pacific Islanders.

**Weakened immune system:** The risk of developing NHL is increased by having a weakened immune system (such as from an inherited condition or certain drugs used after an organ transplant).

## Signs and Symptoms

NHL can cause many symptoms:

- Swollen, painless lymph nodes in the neck, armpits, or groin.
- Unexplained weight loss.
- Fever.
- Soaking night sweats.
- Coughing, trouble breathing, or chest pain.
- Weakness or tiredness that will not go away.
- Pain, swelling, or a feeling of fullness in the abdomen.

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

## Early Detection

At present, there are no screening tests available for the early detection of NHL. The best strategy for early detection is prompt attention to signs and symptoms.

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## 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 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., 2016-2020). 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.

**Census Data:** The 1996-2020 rates were calculated using population estimates from the U.S. Census Bureau and National Center for Health Statistics. Population data were compiled from bridged-race intercensal population estimates for July 1, 1990-July 1, 1999; revised bridged-race intercensal population estimates for July 1, 2000-July 1, 2004 (Oct. 26, 2012); revised bridged-race intercensal population estimates for July 1, 2005-July 1, 2009 (released June 26, 2014); and vintage 2020 bridged-race postcensal population estimates for July 1, 2010-July 1, 2020 (released Sept. 22, 2021).

**Incidence:** The number of cases diagnosed during a specified time period (e.g., 2016-2020). NHL cases were defined by the International Classification of Diseases for Oncology, Third Edition (ICD-O-3), and categorized by site and histology codes in accordance with the SEER Program of the National Cancer Institute.

**Mortality:** The number of deaths during a specified time period (e.g., 2016-2020). NHL deaths were defined as follows: International Statistical Classification of Diseases and Related Health Problems, Ninth Edition (ICD-9), codes 200, 202.0-202.2, 202.8-202.9 for 1996-1998 and International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10), codes C820-C859 or C963 for 1999+.

**Rate:** The number of cases or deaths per unit of population (e.g., per 100,000 population) during a specified time period (e.g., 2016-2020). Rates may be unstable and are not presented when the case count is less than five or the death count is less than 10.

**Relative Survival:** The percentage of people who are alive at a designated time period (usually five years) after a cancer diagnosis divided by the percentage expected to be alive in the absence of cancer based on normal life expectancy. Relative survival does not distinguish between patients who have no evidence of cancer and those who have relapsed or are still in treatment.

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**Table 2. Average Annual Number and Age-Adjusted Rates of NHL Cases and Deaths per 100,000 Population by County of Residence, Ohio and the United States, 2016-2020**

	Incidence		Mortality			Incidence		Mortality	
	Cases	Rate	Deaths	Rate		Cases	Rate	Deaths	Rate
Ohio	2,775	19.0	848	5.7	Lawrence	18	22.2	6	8.0
U.S.		18.7		5.1	Licking	43	19.5	11	5.4
Adams	7	18.6	4	10.0	Logan	11	18.6	4	7.0
Allen	21	16.0	8	6.1	Lorain	85	20.8	26	6.2
Ashland	14	18.6	5	7.0	Lucas	101	19.4	32	5.9
Ashtabula	25	18.4	8	6.1	Madison	14	25.9	4	8.2
Athens	13	19.2	4	5.4	Mahoning	58	18.8	19	5.0
Auglaize	10	17.4	3	4.8	Marion	17	20.3	5	5.8
Belmont	19	19.1	6	6.2	Medina	54	23.3	14	5.8
Brown	11	19.2	4	6.9	Meigs	5	15.4	<2	*
Butler	73	16.9	25	5.9	Mercer	11	21.3	4	6.6
Carroll	7	14.4	3	7.8	Miami	28	19.6	10	7.1
Champaign	10	17.4	3	5.0	Monroe	4	19.2	<2	*
Clark	33	18.5	9	4.9	Montgomery	133	19.2	40	5.4
Clermont	50	20.3	12	4.5	Morgan	3	12.3	<2	*
Clinton	12	21.2	4	7.2	Morrow	9	19.0	2	5.1
Columbiana	33	23.6	11	6.8	Muskingum	22	19.0	6	5.3
Coshocton	11	21.6	3	6.4	Noble	3	20.5	<2	*
Crawford	11	19.4	4	5.9	Ottawa	15	22.6	5	6.3
Cuyahoga	295	18.3	96	5.6	Paulding	6	22.0	<2	*
Darke	13	19.3	6	8.3	Perry	9	20.2	2	5.0
Defiance	9	17.3	4	6.8	Pickaway	17	24.4	4	5.8
Delaware	40	18.4	8	4.1	Pike	7	20.2	<2	*
Erie	19	16.8	6	5.2	Portage	38	19.6	14	6.9
Fairfield	32	17.0	11	6.0	Preble	10	18.9	<2	*
Fayette	6	16.9	3	7.4	Putnam	9	19.7	<2	*
Franklin	244	19.0	60	5.0	Richland	36	21.5	10	5.7
Fulton	10	17.7	6	9.8	Ross	17	17.4	4	4.9
Gallia	8	19.3	3	6.1	Sandusky	17	22.1	6	6.6
Geauga	27	19.9	9	7.0	Scioto	20	19.9	8	7.2
Greene	40	18.8	13	5.9	Seneca	14	18.5	6	7.8
Guernsey	13	25.5	5	8.6	Shelby	11	17.9	4	6.4
Hamilton	168	17.8	44	4.7	Stark	92	17.9	28	5.0
Hancock	21	21.6	7	6.9	Summit	136	19.0	43	6.0
Hardin	6	15.4	2	5.3	Trumbull	48	16.5	14	4.6
Harrison	6	22.2	<2	*	Tuscarawas	21	16.9	8	6.4
Henry	7	18.9	<2	*	Union	15	25.9	3	6.4
Highland	11	18.9	5	7.8	Van Wert	6	15.1	2	4.6
Hocking	8	22.6	2	5.1	Vinton	2	15.4	<2	*
Holmes	9	19.3	3	7.4	Warren	49	18.7	15	5.9
Huron	16	22.0	4	5.3	Washington	17	19.4	5	5.0
Jackson	8	19.1	2	4.7	Wayne	27	18.2	10	6.9
Jefferson	18	19.4	7	6.6	Williams	9	17.4	3	6.7
Knox	15	18.5	6	7.0	Wood	29	19.5	8	5.4
Lake	65	19.9	18	5.1	Wyandot	6	23.9	<2	*

Source: Ohio Cancer Incidence Surveillance System and Bureau of Vital Statistics, Ohio Department of Health, 2023; Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute, 2023.

\*Rate not presented when the death count for 2016-2020 is less than 10 (i.e., the average annual count is less than two).



## Sources of Data and Additional Information

**Ohio Cancer Incidence Surveillance System:**

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

**National Cancer Institute:**

<https://www.cancer.gov/types/lymphoma>

**American Cancer Society:**

<https://www.cancer.org/cancer/types/non-hodgkin-lymphoma.html>

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