DR5769 Health Impact Assessment of the Near Westside

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Prevent. Promote. Protect.

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Contents

Notes

The following 2020 census tracts were used to represent the Near Westside for analysis: 342300, 342400, 342500, 342600. All Marion County census tracts were used to represent Marion County, and all geographies within Indiana were used to represent the state as a whole. This applies to all age-adjusted rates. For emergency department and hospital discharge data only, the following zip codes were used to represent the Near Westside: 46221 and 46241. Zip codes with a large population in Marion County were used to represent Marion County, and all Indiana zip codes were used to define Indiana.

Confidence Interval: When estimating statistics such as rates, a range in which the true value is likely to fall is also calculated. This range is called a confidence interval. The probability that the confidence interval includes the true value is the confidence level; this report uses a 95% confidence level. If the width of the confidence interval is too wide, the statistic or rate is considered to be unstable. Unstable rates are not good to use as predictors of what could happen in the future. Rates may become unstable in several ways. For example, if there are only a few events in a population or if the population size is small, then the addition or subtraction of a few more events can drastically change the value of the rate.

Summary

In April of 2024, the Environmental Protection Agency (EPA) conducted community interviews of residents living around the former Reilly Tar site in Indianapolis, Indiana. The site first appeared on the Superfund Program's National Priorities List in 1984. At that time, contaminants were found in soil and on-and off-site groundwater and remediation followed. Currently, contamination on the site does not have an exposure route to human health or the environment. To read more details about the site, see the fact sheet titled "Update on Site Activities & Call for Community Interviews" found here https://semspub.epa.gov/work/05/989898.pdf.

In response to community interest, the EPA asked the Marion County Public Health Department (MCPHD) in Indianapolis, Indiana to conduct a Health Impact Assessment. The number of residents experiencing health conditions related to exposure of ammonia, benzene and pyridine were of concern. These included respiratory conditions (chronic obstructive pulmonary disease (COPD), asthma, chronic bronchitis and emphysema), leukemias, lung cancer and Alzheimer's/dementia.

Data available for this assessment included emergency department visits, hospitalizations, and vital statistics. Rates and standardized incidence ratios (SIRs) were calculated to determine if the community was experiencing more of these health conditions than expected or more than the county as a whole. From the most recent data and information available for this report, the Near Westside is currently experiencing a higher-than-expected number of emergency department visits related to COPD, and deaths related to respiratory conditions and lung cancers. Lifestyle behaviors (i.e tobacco use), genetics and occupational exposures people may have experienced during their lives were not able to be measured. Therefore, it is not possible to determine the role contamination at the site may have played in the development of these health outcomes.

Key Findings

Demographics

Health conditions can vary between demographic groups. These differences can take place because of access to healthcare, income, education, culture and many other factors. The distribution of race/ethnicity, gender, age, and income were examined to determine how they were different on the Near Westside compared to Marion County.

- The Near Westside area has a higher proportion of Latino residents than Marion County and Indiana as a whole.
- The Near Westside area has a higher proportion of residents with household incomes of less than $50,000 per year than Marion County and Indiana as a whole.

Respiratory Conditions, Leukemia, Lung Cancer and Alzheimer's/Dementia

Many individual factors (for example, genetics, smoking, and occupation) can contribute to the development of the health conditions known to be related to the exposures of ammonia, benzene and pyridine. Below are the most meaningful differences found in this analysis for the health conditions of Near Westside residents.

The Near Westside area has higher burden of disease than Marion County and/or Indiana for these conditions:

- Deaths related to respiratory conditions during 2013-2022
- Lung cancer diagnoses from 2016-2022
- Lung cancer mortality from 2013-2022
- COPD-related ED visits from 2012-2023
- Lung cancer hospitalizations were significantly higher than Marion County between 2012-2016, and only moderately higher in 2017-2021

The Near Westside area has a lower burden of disease than Marion County and/or Indiana for these conditions:

- Asthma-related ED visits from 2019-2023
- Alzheimer's and dementia related ED visits from 2019-2023

Introduction

This health impact assessment examines health in the West Indianapolis area following the closure of a local chemical plant. The West Indianapolis chemical plant at 1500 South Tibbs Ave closed after decades of pollution concerns. The plant, now known as 1500 South Tibbs Ave. LLC, has a history of contaminating groundwater and emitting harmful chemicals like benzene, pyridines, and ammonia. Although cleanup efforts have been made over the years, including removing contaminated soil and installing a solar farm, concern about long-term health impacts remain. A tentative agreement has been reached for the plant's owners to take responsibility for the cleanup, but residents worry about the lengthy process and the ongoing risks to health and safety.[1]

This report looks at respiratory conditions, cancer (all cancers combined and leukemia and lung cancer individually), and Alzheimer's/dementia in the Near Westside area (determined by census tracts or zip codes) compared to Marion County and/or Indiana rates over time. These conditions were found to be closely associated with environmental exposures to the chemicals found in the community in the 1980s, specifically ammonia, benzene, and pyridine. Additionally, it addresses the limitations of available data and provides a conclusion to guide public health interventions and inform community safety measures. The findings aim to support informed decision-making in mitigating health risks.

To determine whether the Near Westside was experiencing more diagnoses than expected or than Marion County and/or Indiana as a whole, age-adjusted rates or standardized incidence ratios (SIRs) along with their 95% confidence intervals (CI) were created. These measures are used to compare emergency department visits, counts of diagnosis (prevalence), hospitalizations, and deaths (mortality) across different groups over time. All demographic estimates were obtained using ACS 5-year estimate tables.[2] Measures used for each condition were chosen based on the nature of the condition, data available and whether the counts were small. Population estimates for rate calculations came from MCPHD Epidemiology department population estimate data.

Components of tables:

1. Age-Adjusted Rates: Rates have been adjusted to eliminate effects of different age distributions across populations.[3]
2. 95% Confidence Interval or Level: The range where the true age-adjusted death rate is likely to fall, with 95% statistical confidence.[4]
3. Statistical significance: Tells us whether different results between two groups occurred by random chance (not significant) or by an event, condition or exposure that one group is experiencing more than a comparison group is not (significant).[4]

Below is a map of the Near Westside of Indianapolis, Indiana by 2010 and 2020 census tract boundaries, overlayed with their associated zip codes. When counts for the health conditions were available at the census tract level, tracts 3423, 3424, 3425, and 3426 (shaded green) were used for calculations. When census tract counts were not available, counts for zip codes 46221 and 46241(shaded blue) were used.

Figure 1. Map of the Near Westside of Marion County, Indiana with Census Tracts and Zip Codes Areas Shaded

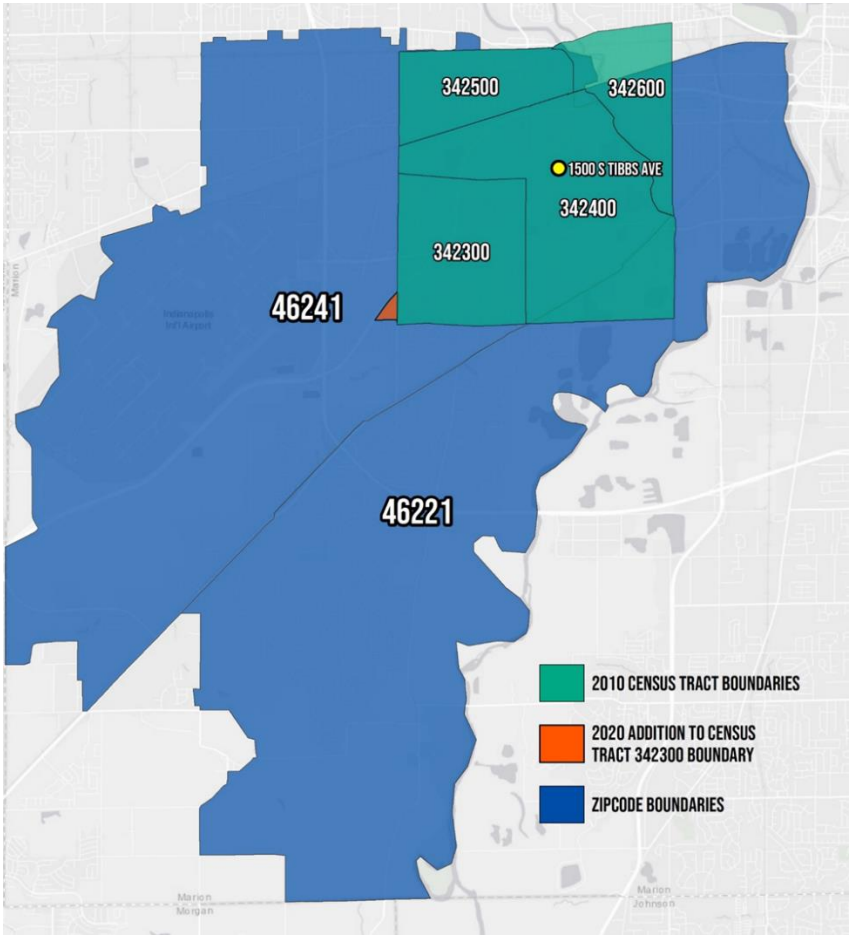


Figure 1 is a map of the Near Westside area by 2010 and 2020 census tracts to allow for transparency in any census tract boundary changes over time. The 2020 census tracts were used in all age-adjusted mortality rates and zip codes were used in all hospital discharge and emergency department age adjusted rates.
Source: Esri; U.S. Department of Commerce, Census Bureau; U.S. Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Geodetic Survey (NGS)

Demographics

Demographic Information

While predominantly White non-Latino, a larger proportion of Latino Americans live in the Near Westside area (15.19%) compared to Marion County (11.34%) and Indiana (7.69%) (Table 1). Many general population characteristics are similar between the small Near Westside area, all of Marion County, and Indiana, including the percent by age and sex (Table 2, 3). More than one-half (53.5%) of Near Westside residents have a household income lower than $50,000 compared to 42.5% of Marion County residents and 37.3% of all Indiana residents (Table 4).

Table 1: Race/ Ethnicity Population Estimates within Near Westside Area and all of Marion County, 2022[3]

Race/ Ethnicity within Near Westside Area and all of Marion County, 2022						
Race/ Ethnicity	**Near Westside (#)**	**Near Westside (%)**	**Marion County (#)**	**Marion County (%)**	**Indiana (#)**	**Indiana (%)**
White non-Latino	12,530	76.5	514,648	52.7	5,334,075	77.5
Black non-Latino	848	5.2	281,534	28.8	674,352	9.8
Latino	2,489	15.2	110,830	11.3	529,001	7.7
Asian non-Latino	117	0.7	40,090	4.1	183,695	2.7
American Indian non-Latino	39	0.2	1,766	0.2	15,956	0.2
Hawaiian/Pacific Is. non-Latino	3	0.0	185	0.0	2,878	0.0
2 or more races, non-Latino	357	2.2	27,955	2.9	141,445	2.1

Data Source: U.S. Census Bureau, American Community Survey 5-year estimates (2022), percentages rounded up to one decimal point. Results for Near Westside were created based on census tracts.

Table 2: Sex within Near Westside Area and Marion County, Population Estimates 2022[3]

Sex within Near Westside Area and all of Marion County, 2022						
Sex	**Near Westside (#)**	**Near Westside (%)**	**Marion County (#)**	**Marion County (%)**	**Indiana (#)**	**Indiana (%)**
Male	8,133	51.1	472,073	48.4	3,415,083	49.6
Female	8,004	48.9	504,374	51.7	3,466,321	50.4
Total	16,383		976,447		6,881,404	

Data Source: U.S. Census Bureau, American Community Survey 5-year estimates (2022), percentages rounded up to one decimal point. Results for Near Westside were created based on census tracts.

Table 3: Age Distribution for Near Westside Area, Marion County, and Indiana, Population Estimates 2022[3]

Age Distribution for Near Westside Compared to the Rest of Marion County, 2022						
Age Distribution	**Near Westside (#)**	**Near Westside (%)**	**Marion County (#)**	**Marion County (%)**	**Indiana (#)**	**Indiana (%)**
Under Age 1	221	1.4	13,667	1.4	79,985	1.2
Age 1 to 4	902	5.5	53,935	5.5	332,775	4.8
Age 5 to 14	2,428	14.8	1,353,915	13.9	908,248	13.2
Age 15 to 25	2,106	12.9	129,494	13.3	950,008	13.8
Age 25 to 34	2,352	14.4	162,385	16.6	903,748	13.1
Age 35 to 44	2,194	13.4	130,555	13.4	868,508	12.6
Age 45 to 54	1,988	12.1	109,082	11.2	828,901	12.1
Age 55 to 64	1,845	11.3	114,184	11.7	883,221	12.8
Age 65 to 74	1,564	9.6	80,913	8.3	688,570	10.0
Age 75 to 84	621	3.8	33,765	3.5	319,900	4.7
Age 85 and over	163	1.0	13,635	1.4	117,538	1.7

Data Source: U.S. Census Bureau, American Community Survey 5-year estimates (2022), percentages rounded up to one decimal point. Results for Near Westside were created based on census tracts.

Table 4: Household Income for Near Westside, Marion County, and Indiana, Population Estimates 2022[4]

Income Range for Near Westside, Marion County, and all of Indiana, 2022			
Income Range	**Near Westside (%)**	**Marion County (%)**	**Indiana (%)**
Households with Income Less Than $10,000	6.1	6.8	5.0
Households with Income $10,000 to $14,999	4.2	4.1	3.7
Households with Income $15,000 to $24,999	11.0	8.6	7.7
Households with Income $25,000 to $34,999	16.3	8.8	8.4
Households with Income $35,000 to $49,999	15.9	14.2	12.5
Households with Income $50,000 to $74,999	20.7	18.2	18.0
Households with Income $75,000 to $99,999	14.7	12.7	14.0
Households with Income $100,000 to $149,999	5.9	14.2	16.8
Households with Income $150,000 to $199,999	3.6	6.4	7.2
Households with Income $200,000 or more	1.8	6.1	6.7

Data Source: U.S. Census Bureau, American Community Survey 5-year estimates (2022), rounded up to one decimal point. Results for Near Westside were created based on census tracts.

Respiratory conditions

Background

The three respiratory conditions of interest are Asthma, COPD, and Pulmonary Fibrosis.

Asthma is a condition that impacts breathing due to airways that narrow, swell, and create extra mucus. Patients with asthma often experience coughing, wheezing, and shortness of breath. Asthma attacks are a rapid worsening of symptoms and decreased ability to breathe. These can be triggered by exercise, allergens, or other airborne irritants such as chemical fumes, gases, or dust. Sometimes an asthma attack can be remedied with a quick-relief inhaler, but a severe asthma attack may require seeking emergency medical care.[5]

Chronic obstructive pulmonary disease, or COPD, is caused by long-term lung damage. This damage is the result of chronic exposure to irritants such as smoke, fumes, dust, or chemicals. Cigarette smoke is the most common cause of COPD. Lung damage leads to inflammation in the airways that limits airflow in the lung. Common symptoms include chronic cough, wheezing, and excess mucus. COPD includes emphysema and chronic bronchitis. Emphysema is when damaged to the alveoli, or air sacs, in the lungs that prevents oxygen from entering the bloodstream. Chronic bronchitis is inflammation of the tubes of the lungs, or bronchi, which prevents air from moving.[6]

Pulmonary Fibrosis is caused by scarred lung tissue, and its cause is often unknown. This condition causes difficulty breathing and worsens over time.[7]

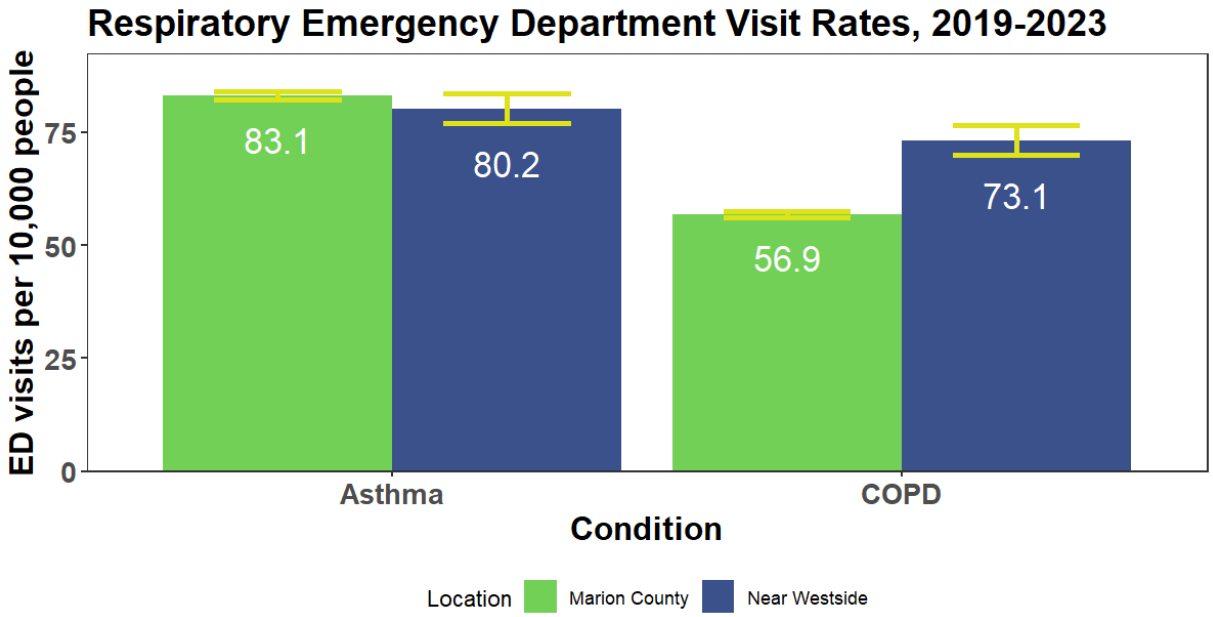
Emergency Department Visits

Respiratory emergency department visits included any Marion County resident who utilized an emergency department in the state of Indiana during the specified time period (2019-2023). Asthma cases were included based on the definition established by the Centers for Disease Control and Prevention definition of asthma. COPD includes chronic obstructive pulmonary disease, emphysema, and chronic bronchitis, as established by the CDC Environmental Public Health Tracking Network definition of COPD.

The following ICD 10 (International Classification of Diseases, Tenth Revision) codes were used:

- J44: Chronic obstructive pulmonary disease (COPD)
- J45: Asthma

Figure 2.



Data Source: Indiana ESSENCE Emergency Department Data. Zip codes were used to approximate the area of the Near Westside.

Table 5. Rates of Emergency Department Visits for Asthma and COPD, 2019-2023

Respiratory Emergency Department Visits, 2019 - 2023				
Condition	**Group**	**Age Adjusted Rate per 10,000**	**95% CI Lower Limit**	**95% CI Upper Limit**
Asthma	Marion County	83.1	82.3	83.9
	Near Westside	80.2	76.9	83.6
COPD	Marion County	56.9	56.2	57.6
	Near Westside	73.1	70.0	76.5

DR5777 Kaitlin Brown-Krapf MCPHD EPI (epidemiology@marionhealth.org) 2024-10-21, Data Source: ESSENCE Emergency Department Data. Marion County Population Estimates are used in age-adjusted rate calculations. Zip codes were used to approximate the area of the Near Westside.

The Near Westside shows a slightly lower rate of asthma emergency department visits and a higher rate of COPD emergency department visits than that of Marion County (Table 5). The difference in rates suggests that the Near Westside experiences more emergency department utilization for COPD and less for asthma relative to the population size.

Caution should be exercised when interpreting the findings in this report. Exposure to allergens, pollution, and tobacco smoke also contribute to asthma and COPD exacerbation[6, 8] and cannot be measured in this report.

Therefore, the report cannot determine an exact cause as to what may cause the asthma and COPD exacerbation that leads to emergency department visits.

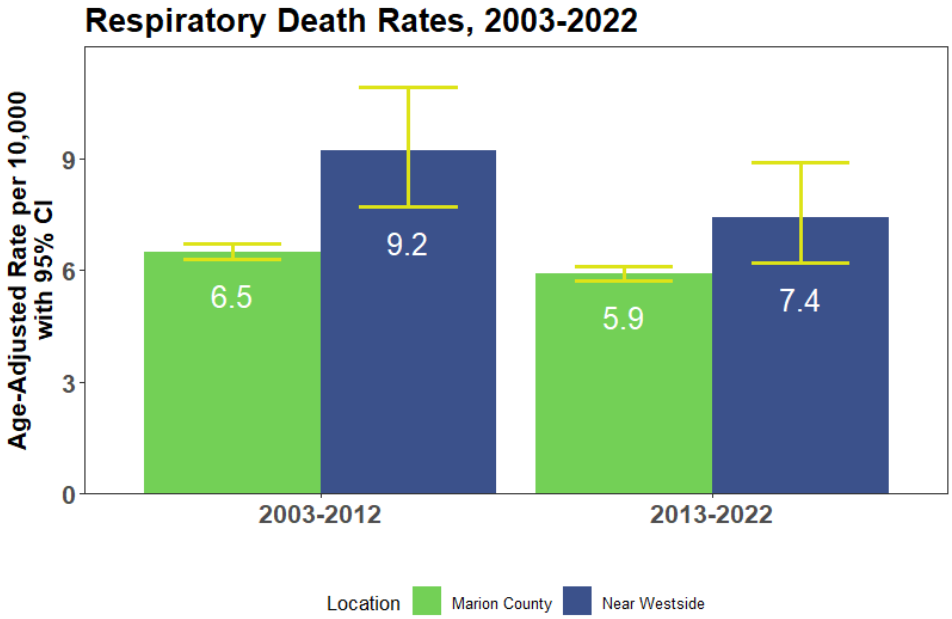
Respiratory Deaths

Respiratory deaths include any death during the specified time period (2003-2022) with the following ICD Code:

- J44.90: Chronic obstructive pulmonary disease (COPD)
- J45.90: Asthma, unspecified

- J84.10: Pulmonary fibrosis, unspecified

Figure 3.



Data Source: Marion County Death Certificates, 2003-2022. Census tracts were used to approximate the area of the Near Westside.

Table 6. Deaths from Respiratory Conditions Combined, 2003-2022

Refer to the Appendix for graphs for rate comparisons

Respiratory Deaths, 2003 - 2022				
Year	**Group**	**Age-Adjusted Rate per 10,000**	**95% CI Lower Limit**	**95% CI Upper Limit**
2003 - 2012	Near Westside	9.2	7.7	10.9
	Marion County	6.5	6.3	6.7
	Indiana	4.7	4.6	4.7
2013 - 2022	Near Westside	7.4	6.2	8.9
	Marion County	5.9	5.7	6.1
2013 – 2020	Indiana[1]	5.1	5.0	5.2

DR5776 Emily Plamondon MCPHD EPI (epidemiology@marionhealth.org) 2024-09-04, Data Source: Marion County Death Certificates. Marion County Population Estimates are used in age-adjusted rate calculations. CDC WONDER, Underlying Cause of Death, 1999-2020. Census tracts were used to approximate the area of the Near Westside.

The Near Westside shows a consistently higher rate of respiratory deaths than Marion County and Indiana (Table 6). The high rates suggest that the Near Westside experiences more respiratory deaths relative to the population size. Caution should be used when interpreting the implications of these results. Factors that cannot be measured by this data, such as lifestyle, genetics, and other environmental factors, may be contributing to the respiratory deaths. These include cigarette smoking, environmental air pollution, or chronic exposure to lung irritants. [9]

[1] CDC WONDER Underlying Cause of Death data with bridged-race categories provides age-adjusted rates by cause of death at the state level from 1999-2020.

Cancer

Leukemia

Background

Rates of leukemia, particularly acute myeloid leukemia (AML), have been found to be higher in studies of workers exposed to high levels of benzene, such as those in the chemical, shoemaking, and oil refining industries[10]. Due to small counts for each kind of leukemia in the Near Westside, all were combined for the calculation of rates below.

Leukemia SIRS

Due to small numbers, a standardized incidence ratio (SIR) was calculated to determine whether there was an excess number of cases. A SIR is a ratio that compares the number of observed cases in a population of interest in a defined geographic area to the expected number of cases in larger geographic area. If a SIR is less than 1, the count in the population of interest is less than what is expected when compared to the larger population. A SIR greater than 1 indicates that there is a higher than expected number of cases in the population of interest.[11] The tables below compare leukemia counts for the census tracts of interest compared to counts in Indiana. ICD9 codes used were 204.0 to 208.99 and ICD10 C91.0 to C95.99. For all census tracts combined, the number of counts for all cancers combined and leukemia is lower than expected. Counts of leukemia in the census tracts were too low for comparisons. However, looking at the census tracts individually for all cancers combined was possible. For all cancers, the counts are lower than expected. These results indicate that the census tracts are not experiencing more leukemia diagnosis, or all cancers diagnosis than expected.

Table 7. All Cancers Combined and Leukemia for Census Tracts, Standardized Incidence Ratios (SIRs) 2016-2020

Type of Cancer	Marion County Census Tracts 3423,3424, 3425, and 34256			
	Count	SIR	95% CI	P-Value
All Cancer	290	0.45	0.37-0.47	<0.0001
Leukemias	10	0.49	0.18-0.79	0.0008

Data Source: Indiana State Cancer Registry and population data from Census.gov Excludes in situ and benign cancers, 10/22/2024. Census tracts were used to approximate the area of the Near Westside.

Table 8. Individual Census Tracts, All Cancers Combined, Standardized Incidence Ratios (SIRs) 2016-2020

Census Tract	Marion County Census Tracts 3423,3424, 3425, and 34256			
	Count	SIR	95% CI	P-Value
3423	117	.04	0.36-0.52	<0.0001
3424	27	.28	0.17-0.38	<0.0001
3425	103	.58	0.47-0.69	<0.0001
3426	43	.27	0.19-0.36	<0.0001

Data Source: Indiana State Cancer Registry and population data from Census.gov Excludes in situ and benign cancers, 10/22/2024. Census tracts were used to approximate the area of the Near Westside.

Leukemia Hospitalizations

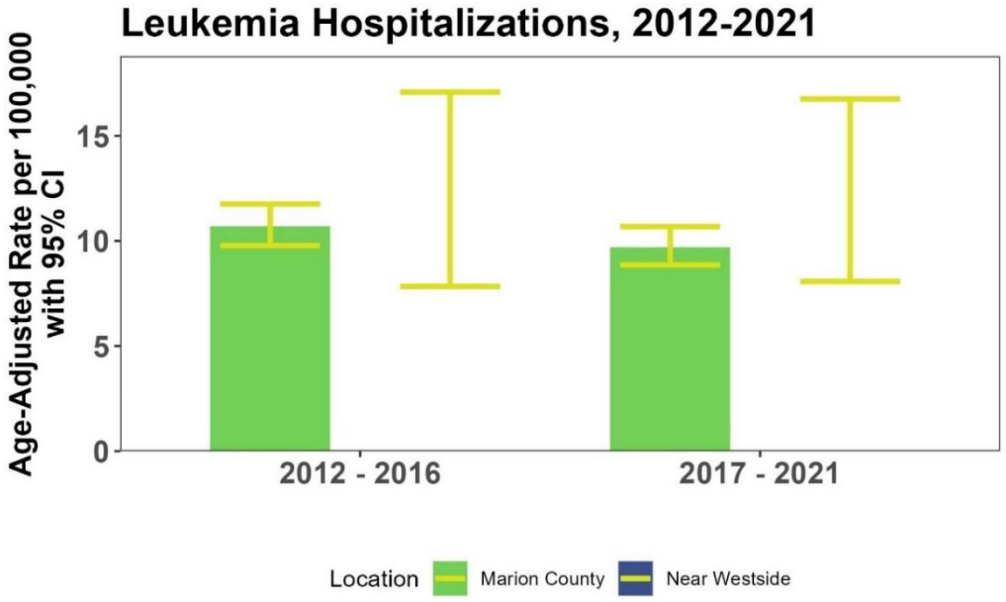
Leukemia hospitalization discharge rates were used to give an estimate of the prevalence of leukemia in the zip codes of interest. ICD9 codes used were 204.0 to 208.99 and ICD10 C91.0 to C95.99. Counts in the zip codes ended up being too small for accurate comparisons with Marion County rates.

Table 9. Zip Codes Combined, Leukemia Hospitalization Rates, 2012-2021

Leukemia Hospitalizations, Zip Codes 46221 and 46241, Age-Adjusted Rates 2012-2021				
Year	**Group**	**Age-Adjusted Rate per 100,000**	**95% CI Lower Limit**	**95% CI Upper Limit**
2012-2016	Near Westside	*	7.8	17.1
	Marion County	10.7	9.8	11.8
2017-2021	Near Westside	*	8.1	16.8
	Marion County	9.7	8.9	10.7

DR5827 Amanda Raftery MCPHD EPI (epidemiology@marionhealth.org) 2024-10-16, Data Source: Marion County Hospital Discharge Data 2012-2021. Census tracts were used to approximate the area of the Near Westside.

Figure 4.



Data Source: Marion County Hospital Discharge Data 2012-2021. Blue bar for the Near Westside not shown due to small numbers. Census tracts were used to approximate the area of the Near Westside.

Leukemia Deaths

Leukemia deaths include any death during the specified period (2003-2022) with the following ICD Codes:

- C91.9: Lymphoid Leukemia
- C92.0: Acute Myeloblastic Leukemia
- C93.1: Chronic Myelomonocytic Leukemia
- C948: Other Leukemias of Specified Cell Type
- C95.9: Leukemia, Unspecified

Table 10. Deaths Rates for Leukemia, 2003-2022

A cell with an (*) indicates an unstable or suppressed rate. Refer to the Appendix for graphs for side-by-side comparisons.

Leukemia Deaths, 2003 - 2022				
Year	**Group**	**Age-Adjusted Rate per 10,000**	**95% CI Lower Limit**	**95% CI Upper Limit**
2003-2012	Near Westside	*	0.2	0.9
	Marion County	0.5	0.5	0.6
	Indiana	0.8	0.8	0.8
2013 – 2022	Near Westside	*	0.2	1.1
	Marion County	0.4	0.4	0.5
2013 – 2020	Indiana[2]	0.7	0.7	0.7

DR5776 Emily Plamondon MCPHD EPI (epidemiology@marionhealth.org) 2024-09-04, Data Source: Marion County Death Certificates, CDC WONDER, Underlying Cause of Death, 1999-2020. Census tracts were used to approximate the area of the Near Westside.

The Near Westside has a suppressed age-adjusted rate with a 95% confidence interval of 0.2 to 0.9, indicating the true rate is likely within this range. The age-adjusted rate for leukemia deaths in Marion County is 0.5 (2003-2012) and 0.4 (2013-2022), which are not values outside that of the Near Westside (Table 10). It is unlikely that there is a significant difference between the rates of the Near Westside and Marion County.

Lung Cancer

Background

Several risk factors can make you more likely to develop lung cancer. These factors are related to the risk of lung cancer in general. Some of these people can change, others are harder to avoid.[12]

Risk factors people can change are:

- Tobacco Smoking and Secondhand Smoke
- Radon Exposure
- Asbestos Exposure
- Workplace Exposures (radioactive ores, inhaled chemicals, diesel exhaust)

Risk factors people cannot change are:

- Air Pollution
- Personal or Family History

Lung Cancer SIRs

For comparisons to leukemia and all cancers combined, a standardized incidence ratio (SIR) was calculated for lung cancer to determine whether there was an excess number of cases. A SIR is a ratio that compares the number of observed cases in a population of interest in a defined geographic area to the expected number of cases in larger geographic area. If a SIR is less than 1, the count in the population of interest is less than what is expected when compared to the larger population. A SIR greater than 1 indicates that there is a higher than expected number of cases in the population of interest.[11] The tables below compare lung cancer counts for the census tracts of interest compared to Indiana. ICD9 codes used were 162.0 to 162.99 and ICD10 codes were C34.0 to C34.9. Counts for all cancers combined were lower in the census tracts compared to Indiana. For lung cancer, the counts were higher than expected. When looking at the census tracts individually, counts were significantly higher in tract 3424 compared to Indiana. The other tracts also showed a higher number of expected counts, but these were not

[2] CDC WONDER Underlying Cause of Death data with bridged-race categories provides age-adjusted rates by cause of death at the state level from 1999-2020.

significant.

Table 11. Census Tracts Combined for All Cancers Combined and Lung Cancer, Standardized Incidence Ratios (SIRs) 2016-2020

Type of Cancer	Marion County Census Tracts 3423,3424, 3425, and 34256			
	Count	SIR	95% CI	P-Value
All Cancer	290	0.45	0.37-0.47	<0.0001
Lung Cancer	80	1.39	1.09-1.6977	0.0117

Data Source: Indiana Department of Health State Cancer Registry and population data from Census.gov Excludes in situ and benign cancers, 10/22/2024

Table 12. Individual Census Tracts, Lung Cancer Standardized Incidence Ratios (SIRs) 2016-2020

Census Tract	Marion County Census Tracts 3423,3424, 3425, and 34256			
	Count	SIR	95% CI	P-Value
3423	28	1.29	0.81-1.77	0.2304
3424	10	1.20	0.46-1.95	0.5952
3425	29	1.99	1.26-2.71	0.0074
3426	13	1.01	0.46-1.56	0.09765

Data Source: Indiana Department of Health State Cancer Registry and population data from Census.gov Excludes in situ and benign cancers. 10/22/2024

Lung Cancer Hospitalizations

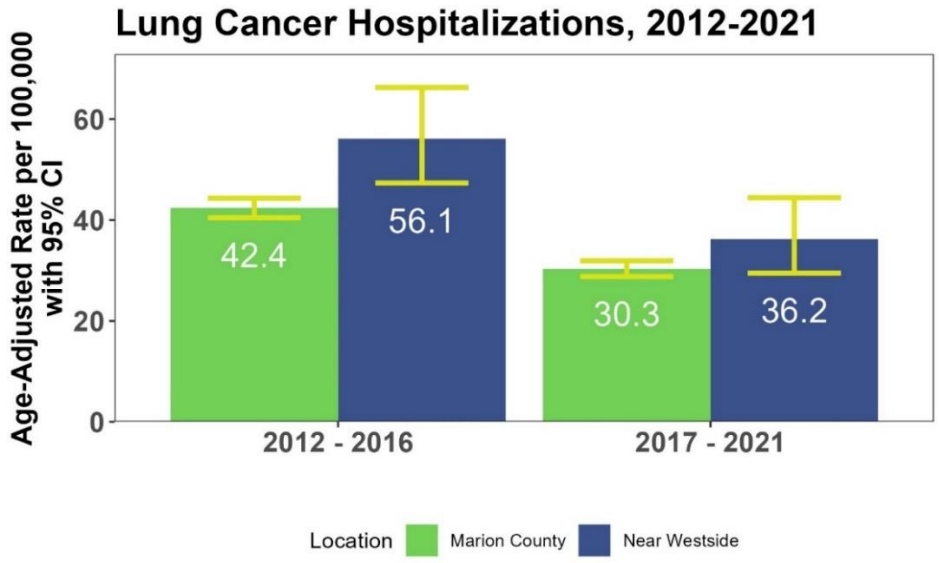
Lung cancer hospitalization discharge rates were used to determine lung cancer prevalence. ICD9 codes 162.0 to 162.9 and ICD10 codes C34.0 to C349.9 were used to gather counts. Age-adjusted rates for the Near Westside and time frame of interest were calculated. Compared to Marion County, the rates were significantly higher in 2012-2016. This was not the case in 2017-2021. Looking at the rates between the two timeframes, Marion County and the Near Westside had a significant drop in 2017-2021 compared to 2012-2016.

Table 13. Zip Codes Combined, Lung Cancer Hospitalization Rates, 2012-2021

Lung Cancer Hospitalizations, Zip Code 46221 and 46241, Age-Adjusted Rates 2012-2021				
Year	Group	Age-Adjusted Rate per 100,000	95% CI Lower Limit	95% CI Upper Limit
2012-2016	Near Westside	56.1	47.3	66.3
	Marion County	42.3	40.5	44.3
2017-2021	Near Westside	36.2	29.5	44.4
	Marion County	30.3	28.8	31.9

DR5827 Amanda Raftery MCPHD EPI (epidemiology@marionhealth.org) 2024-10-16, Data Source: Marion County Hospital Discharge Data 2012-2021.

Figure 5.



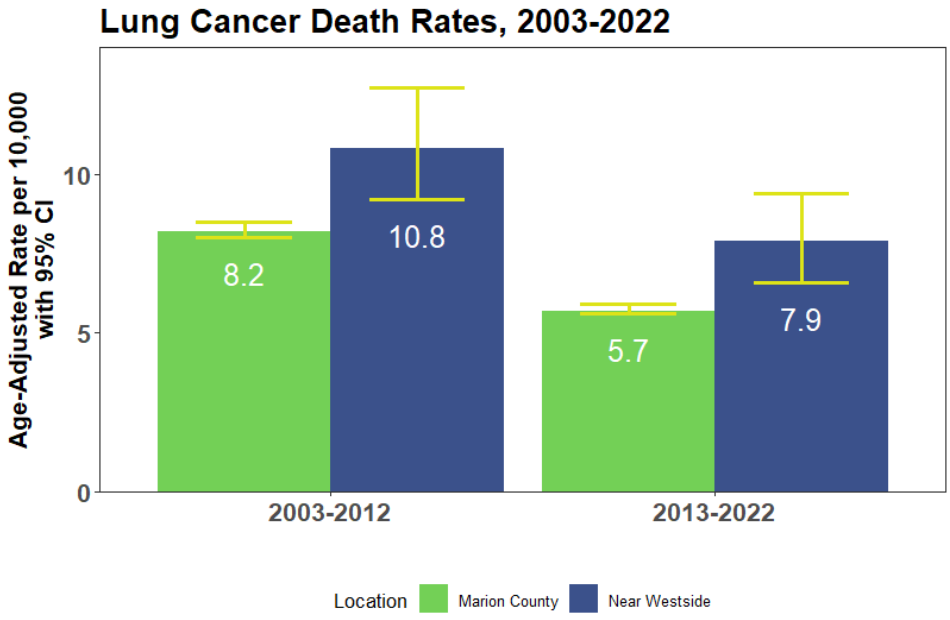
Data Source: Marion County Hospital Discharge Data 2012-2021. Census tracts were used to approximate the area of the Near Westside.

Lung Cancer Deaths

Lung Cancer deaths include any death during the specified period (2003-2022) using ICD Code

- C34.9: Malignant neoplasm of unspecified part of unspecified bronchus or lung

Figure 6.



Data Source: Marion County Death Certificates, 2003 – 2022. Census tracts were used to approximate the area of the Near Westside.

Table 14. Lung Cancer Death Rates, 2003-2012

A cell with an (*) indicates an unstable or suppressed rate. Refer to the Appendix for graphs with side-by-side rate comparisons.

Lung Cancer Deaths, 2003 - 2022				
Year	**Group**	**Age-Adjusted Rate per 10,000**	**95% CI Lower Limit**	**95% CI Upper Limit**
2003 - 2012	Near Westside	10.8	9.2	12.7
	Marion County	8.2	8.0	8.5
	Indiana	6.0	5.9	6.0
2013 - 2022	Near Westside	7.9	6.6	9.4
	Marion County	5.7	5.6	5.9
2013 - 2020	Indiana[3]	4.8	4.7	4.8

DR5776 Emily Plamondon MCPHD EPI (epidemiology@marionhealth.org) 2024-09-04, Data Source: Marion County Death Certificates, CDC WONDER, Underlying Cause of Death, 1999-2020. Census tracts were used to approximate the area of the Near Westside.

The Near Westside shows a consistently higher rate of lung cancer deaths than that of Marion County and Indiana (Table 14). The difference in rates suggests that the Near Westside experiences more respiratory deaths relative to the population size. Caution should be used when interpreting the implication of this rate as there may be confounding variables in lung cancer death risk. Established environmental risk factors for lung cancer include smoking cigarettes, occupational lung carcinogens, radiation, and outdoor/indoor air pollution. [13] This report is unable to determine what may have caused any individuals lung cancer.

[3] CDC WONDER Underlying Cause of Death data with bridged-race categories provides age-adjusted rates by cause of death at the state level from 1999-2020.

Neurological Conditions

Alzheimer's Disease and Related Dementias (ADRD)

Background

Alzheimer's Disease and related dementias (ADRD) refer to neurodegenerative conditions that impair memory, cognitive function, and daily activities. Alzheimer's is the most common form, accounting for most dementia cases. Modifiable risk factors include:

- Low educational attainment
- Hearing loss
- Hypertension
- Smoking
- Obesity
- Depression
- Physical inactivity
- Diabetes
- Excessive alcohol consumption
- Traumatic brain injury
- Air pollution
- Social isolation
- High LDL cholesterol
- Untreated vision loss

Non-modifiable risk factors include:

- Age
- Genetics
- Gender
- Down syndrome

These risk factors were identified in a comprehensive review by the Lancet Commission on dementia risk reduction.[14]

Dementia is not a specific disease, but instead a set of symptoms that impact memory, thinking and social abilities. For most people with dementia, it impacts their daily lives and ability to function. Multiple diseases can cause dementia, but the most common is Alzheimer's disease.[15] Alzheimer's disease is caused by a buildup of specific proteins in the brain. This causes brain cells to die and brain shrinkage. This condition mostly affects individuals aged 75 or older. Symptoms of the disease begin with forgetting recent happenings, but over time leads to long term memory loss and an inability to function in daily life. There are no treatments or cures, but medication does exist to slow disease progression.[16]

Alzheimer's Disease Prevalence

Prevalence refers to the number of people who have a disease over a specified period of time.[17] Table 15 presents Alzheimer's disease prevalence as a percentage of the population of the age group of interest that has the disease. Data was not available past county level.

Table 15. Population, Cases, and Prevalence of Alzheimer's Disease in Marion County, Indiana

Location	Total Pop. Age 65+ (nearest 100)	AD Cases Age 65+ (nearest 100)	AD Prevalence (Age 65+)
Marion County	126,600	15,600	12.3%
Indiana	1,115,300	121,300	10.9%

Data retrieved from Alzheimer's Association Facts and Figures, 2023.[18]

Alzheimer's Disease Deaths

Alzheimer's Disease deaths include any death during the specified period (2003-2022) with the following ICD Code:

- G30.9: Alzheimer's disease, unspecified
- G30.0: Alzheimer's Disease with early onset
- G30.1: Alzheimer's Disease with late onset

Table 16. Death Rates for Alzheimer's Disease, 2003-2022

A cell with an (*) indicates an unstable or suppressed rate. Refer to the Appendix for side-by-side rate comparisons.

Alzheimer's Disease Deaths, 2003 - 2022				
Year	Group	Age-Adjusted Rate per 10,000	95% CI Lower Limit	95% CI Upper Limit
2003 – 2012	Near Westside	*	1.5	3.3
	Marion County	2.3	2.2	2.4
	Indiana	2.7	2.7	2.7
2013 – 2022	Near Westside	*	1.2	2.9
	Marion County	2.8	2.7	2.9
2013 – 2020	Indiana[4]	3.3	3.2	3.3

DR5776 Emily Plamondon MCPHD EPI (epidemiology@marionhealth.org) 2024-09-04, Data Source: Marion County Death Certificates, CDC WONDER, Underlying Cause of Death, 1999-2020. Census tracts were used to approximate the area of the Near Westside.

The Near Westside has a suppressed age-adjusted rate with a 95% confidence interval of 1.5 to 3.3, indicating the true rate is likely within this range. County-wide rates indicate 2.3 (95% CI: 2.2, 2.4) deaths per 10,000 for Alzheimer's Disease deaths. The confidence interval (Table 16) for the Near Westside area suggests that rates may be comparable. Indiana had the highest overall rate of deaths due to Alzheimer's Disease.

Dementia

Dementia Deaths

Dementia deaths include any death during the specified period (2003-2022) with the following ICD Code:

- F02: Dementia in Other Diseases Classified Elsewhere
- F03: Unspecified Dementia
- F03.9: Unspecified Dementia, unknown severity

[4] CDC WONDER Underlying Cause of Death data with bridged-race categories provides age-adjusted rates by cause of death at the state level from 1999-2020.

Table 17. Death Rates for Dementia, 2003-2022

A cell with an (*) indicates an unstable or suppressed rate. Refer to the Appendix for side-by-side rate comparisons.

Dementia Deaths, 2003 - 2022				
Year	**Group**	**Age-Adjusted Rate per 10,000**	**95% CI Lower Limit**	**95% CI Upper Limit**
2003 – 2012	Near Westside	*	1.0	2.6
	Marion County	3.7	3.5	3.8
	Indiana	2.6	2.6	2.7
2013 – 2022	Near Westside	*	1.2	2.8
	Marion County	3.6	3.5	3.8
2013 – 2020	Indiana[5]	3.7	3.6	3.7

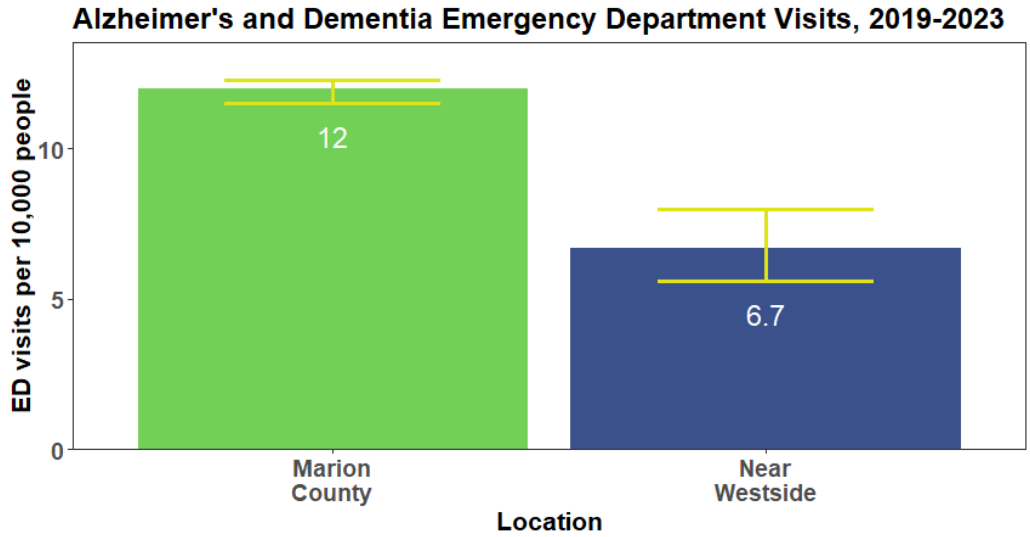
DR5776 Emily Plamondon MCPHD EPI (epidemiology@marionhealth.org) 2024-09-04, Data Source: Marion County Death Certificates, CDC WONDER, Underlying Cause of Death, 1999-2020. Census tracts were used to approximate the area of the Near Westside.

Although age-adjusted rates for the Near Westside are suppressed, county-wide rates indicate 3.7 (95% CI: 3.5, 3.8) deaths per 10,000 for Dementia deaths. The confidence interval (Table 17) for the Near Westside area suggests that rates may be comparable. Indiana's dementia death rate increased from 2003-2012 to 2013-2022 by 1.1 per 10,000, reaching similar rates to Marion County.

Alzheimer's Disease and Dementia

Dementia and Alzheimer's disease emergency department visits data include any Marion County resident who utilized an emergency department in the state of Indiana during the specified time (2019-2023). These conditions were analyzed together due to overlap in how they are coded into ESSENCE, the emergency department visit database.

Figure 7.



Data Source: Indiana ESSENCE Emergency Department Data. Census tracts were used to approximate the area of the Near Westside. Age-adjusted rates per 10,000 for emergency department visits related to neurological conditions within the Near Westside Community compared to Marion County.

[5] CDC WONDER Underlying Cause of Death data with bridged-race categories provides age-adjusted rates by cause of death at the state level from 1999-2020.

Table 18. Table containing the age-adjusted rates of emergency department visits due to neurological conditions.

Neurological Condition Emergency Department Visits, 2019 - 2023			
Group	**Age Adjusted Rate per 10,000**	**95% CI Lower Limit**	**95% CI Lower Limit**
Marion County	12.0	11.5	12.3
Near Westside	6.7	5.6	8.0

DR5777 Kaitlin Brown-Krapf MCPHD EPI (epidemiology@marionhealth.org) 2024-10-21, Data Source: ESSENCE Emergency Department Data. Marion County Population Estimates used in age-adjusted rate calculations. Census tracts were used to approximate the area of the Near Westside.

The Near Westside has a lower rate of emergency department visits than Marion County. The County-wide rate indicates 12.0 (95% CI: 11.5, 12.3) emergency department visits per 10,000 population, while the Near Westside rate indicates 6.7 (95% CI: 5.6, 8.0) emergency department visits per 10,000 population.

Limitations

- Emergency department data was extracted utilizing queries and standardized definitions based on patient's chief complaint and discharge diagnosis. Some observations may be unintentionally included or excluded from the data set.
- Emergency department visits relating to cancers were not included in this report. This is because the data consisted mostly of patients experiencing complications from cancer treatments and was not a reliable metric of cancer prevalence.
- Census tract level information is not available for emergency department visits or hospital discharge, so zip code was used as a proxy for area of interest. This method includes additional geography to the south of the area of interest.
- Data used to describe geographic areas of interest (Near Westside) may not represent the population demographic distribution over time. The American Community Survey 5-year estimates in 2022 are based on data collected over 5 years, which means they may not reflect past or current conditions, especially for small populations or geographies.
- A direct comparison between the Near Westside, Marion County, and Indiana is not available due to limitations in CDC WONDER data. Specifically, CDC WONDER only provides data from 1999-2020 using the same statistical weighting, while this analysis uses data from 2003-2022. As a result, the time periods do not align, which may affect the consistency of comparisons across geographic levels.

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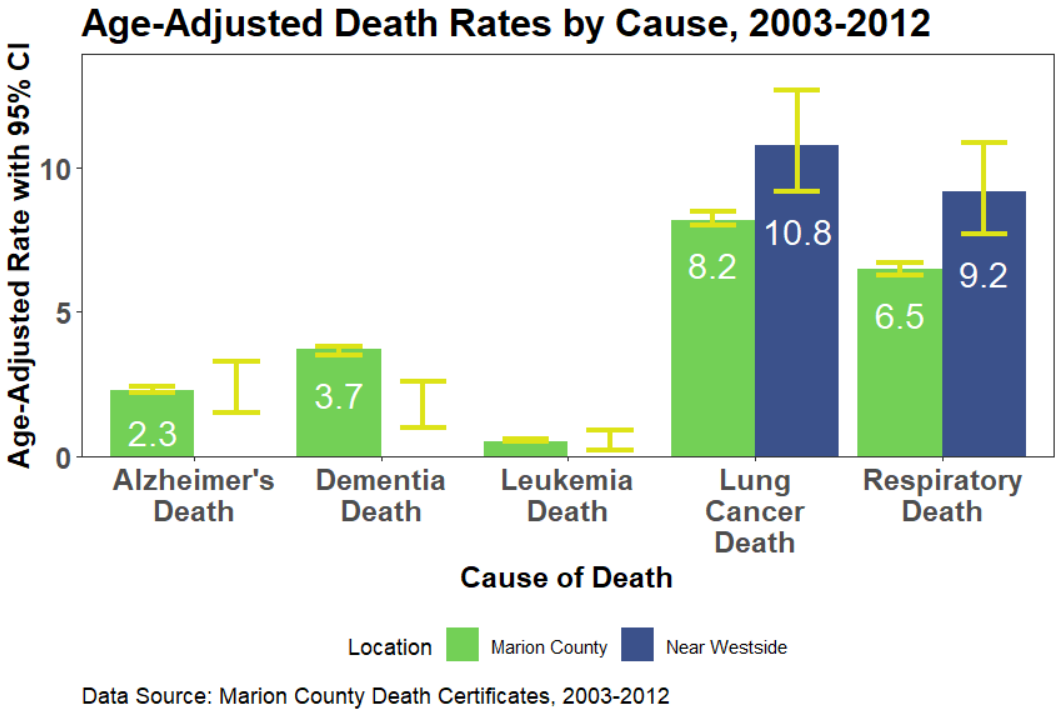
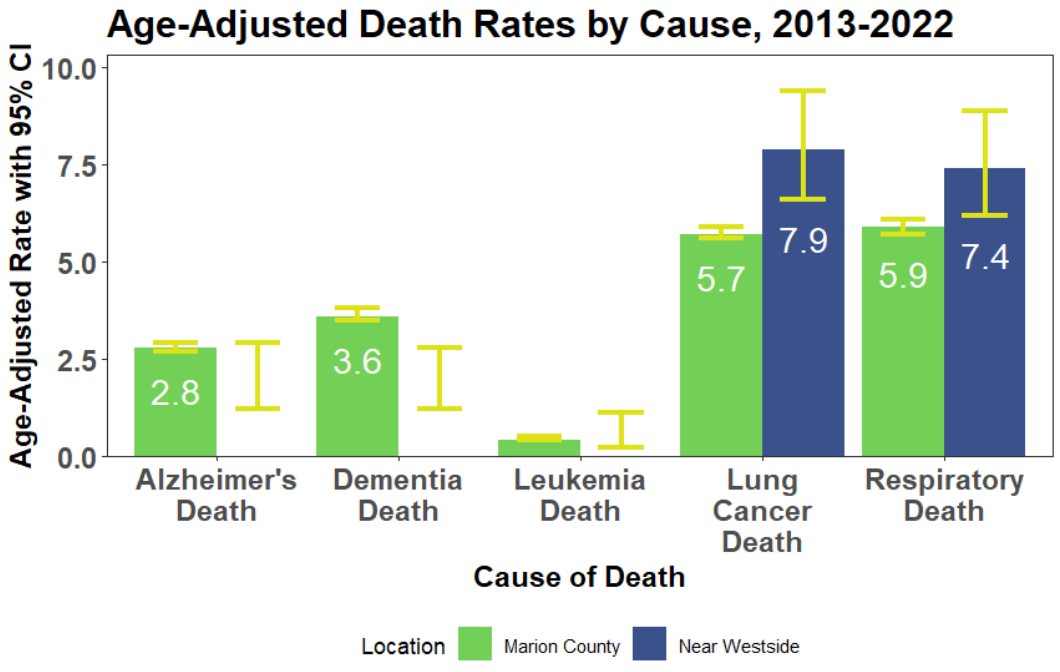
Appendix

Appendix Item: a) Bar graph depicting the age-adjusted rates by Cause of Death and Location from 2003-2012. For all suppressed rates, only error bars were generated to show confidence intervals.



Data Source: Marion County Death Certificates, 2003-2012

Appendix Item: a) Bar graph depicting the age-adjusted rates by Cause of Death and Location from 2013-2012. For all suppressed rates, only error bars were generated to show confidence intervals.



Data Source: Marion County Death Certificates, 2013-2022