



**Indiana**  
**Department**  
**of**  
**Health**

# CANCER CLUSTER INQUIRY INVESTIGATIONS:

USING DATA FROM THE INDIANA  
STATE CANCER REGISTRY

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OUR MISSION:

To promote, protect, and improve the health and safety of all Hoosiers.

OUR VISION:

Every Hoosier reaches optimal health regardless of where they live, learn, work, or play.



# Defining a Cancer Cluster

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A cancer cluster is defined as a greater than expected number of the same or etiologically related cancer cases that occurs within a group of people in a geographic area over a defined period of time.<sup>1</sup>

**In most cases, identified cancer clusters must have one of the following characteristics:**

- Several cases of a rare type of cancer
- Greater-than-expected number of a more common type of cancer
- Type of cancer that is not usually seen within a certain group of people (e.g. children with a type of cancer usually seen in adults)<sup>2</sup>

# Cancer Clusters

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Note the following:

- Confirmation of cancer cluster does not mean that there is a known cause or hazard. A confirmed cancer cluster could be the result of chance, known causes of cancer (e.g. high smoking rates), etc. <sup>2</sup>
- The Indiana Department of Health (IDOH) takes seriously every report of a suspected cancer cluster. While the steps are similar, each investigation is slightly different, based on the type of cancer, number of cases involved and other factors.
- Regardless of whether an inquiry results in a confirmed cancer cluster, IDOH staff understands that each cancer case represents a family or a loved one. Even if statistical significance is not found that these cases are still important.

# Cancer Cluster Inquiry Team

- Inter-agency team comprised of members of IDOH Cancer, IDOH Environmental Health, and the Indiana Department of Environmental Management (IDEM)
- Cancer epidemiologist acts as lead of this team and conducts all analysis
- Meet bi-weekly to discuss current investigations
- Investigates an estimated 10-20 cancer inquiries each year

Position	Agency
Cancer Epidemiologist	IDOH Cancer
Cancer Section Director	IDOH Cancer
Comprehensive Cancer Director	IDOH Cancer
Communications and Partnerships Director	IDOH Cancer
Asthma Environmental Manager	IDOH Environmental
Environmental Health Epidemiologist	IDOH Environmental
Site Manager	IDEM
Site Manager	IDEM

# Steps of a Standard Cancer Cluster Inquiry

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1. Receive inquiry
2. Complete standardized questionnaire with citizen
3. Discuss concern with Cancer Cluster Inquiry Team
  - A. Decide what cancers/environmental concern
  - B. Decide if meets requirements of inquiry
  - C. Look into environmental and site data
  - D. Define time period
4. Age-adjusted rates (AARs) and standardized incidence ratios (SIRs) for area of concern as well as overall county for each type of cancer
5. Create report on findings of data from cancer registry and environmental findings
6. Send letter and report to inquirer and local health department with findings and next steps
7. Continue updating inquiry analysis when new data is available until data matches year of original concern

# Data used in Cancer Cluster Inquiries

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- **Indiana State Cancer Registry (ISCR)**

- In 1986, a law was passed to start the ISCR and mandated that beginning in January 1987, all reportable cancers must be reported to the registry.
- Collects every case of reportable cancer in Indiana from a variety of hospitals, labs, clinics, etc. Extensive data collection follows patient from diagnosis to death and includes data on demographics, diagnosis, treatment, death, etc.

- **US Census Bureau**

- Population data broken down by age/geographic location

- **IDEM Environmental Data**

- Available data includes current environmental sites, past environmental testing etc.



# Martinsville, Morgan County Cancer Inquiry

# Martinsville Inquiry Synopsis

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- Concern brought to IDOH in March 2024
- Multiple plumes including U.S. Environmental Protection Agency (EPA) Superfund site that IDEM is addressing
- Primary contaminants include tetrachloroethylene (PCE) and trichloroethylene (TCE) as well as vinyl chloride. These contaminants, used in dry cleaning and metal degreasing operations, have impacted an area of approximately 60 acres, affecting the aquifer that supplies drinking water to the city's residents.
- In 2002, elevated PCE levels were detected in one of Martinsville's municipal wells. Treatment system was installed to ensure safe drinking water.
- In 2013, the site was added to the EPA's National Priorities List (Superfund) due to the contamination risks. The EPA, in collaboration with IDEM, developed a comprehensive cleanup plan issued in 2021. This plan includes continued operation of the GAC system, treatment of groundwater near the contamination source, and installation of vapor intrusion mitigation systems (VIMS) in affected buildings.

# Martinsville and Morgan County

- Martinsville is a city with a population of 11,952 individuals as of 2024. The city is the county seat of Morgan County.
- Morgan County has one of the highest rates of overall cancer in Indiana.
- This can make it difficult to distinguish if possible elevated levels of cancer in Martinsville are due to an issue specific to Martinsville OR are due to Morgan County having high levels of cancer overall
- To attempt to combat this, data is analyzed at both ZIP code and county level

**Total Population:**  
**73,825**

### Incidence

Type of Cancer 2018-2022	Indiana		Morgan County	
	Count	Rate	Count	Rate
All Cancer	192,208	466.83	2,567	538.01
Lung & Bronchus	28,786	66.78	426	85.23*
Female Breast	27,194	130.54	314	130.22
Prostate	23,736	114.30	262	103.40
Colorectal	17,003	42.15	219	47.44
Kidney & Renal	7,967	19.68	121	25.12*
Leukemias	5,766	14.52	98	20.54*†
Oral Cavity & Pharynx	5,573	13.35	82	17.55*
Thyroid	4,011	11.36	62	17.15*
Urinary Bladder	8,535	20.37	133	27.95*

### Mortality

Type of Cancer 2018-2022	Indiana		Morgan County	
	Count	Rate	Count	Rate
All Cancer	67,472	162.62	873	181.07
Lung & Bronchus	17,700	41.35	256	52.41*
Colorectal	6,063	14.94	71	15.25
Female Breast	4,613	22.88	61	26.31
Prostate	3,412	18.01	34	14.23
Kidney & Renal	1,666	4.03	28	6.56*

### Morgan County Cancer Rankings

- All Cancer Incidence: 5th Highest Rate
- All Cancer Mortality: 27th Highest Rate
- Female Breast Cancer Incidence: 35th Highest Rate
- Female Breast Cancer Mortality: 25th Highest Rate
- Colorectal Cancer Incidence: 27th Highest Rate
- Colorectal Cancer Mortality: 57th Highest Rate
- Lung Cancer Incidence: 11th Highest Rate
- Lung Cancer Mortality: 17th Highest Rate
- Prostate Cancer Incidence: 55th Highest Rate
- Prostate Cancer Mortality: 76th Highest Rate

Data Source: Indiana State Cancer Registry  
 Excludes in situ and benign tumors  
 Rates are age adjusted to the US Standard 2000 Population  
 \*Statistically significantly different (high or low) compared to Indiana (p<0.05)



# Cancer Types of Concern

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## TCE-PCE-and Vinyl Chloride Related Cancers

- Kidney and Renal Pelvis
- Non-Hodgkin Lymphoma
- Liver
- Urinary Bladder
- Myeloma
- Brain
- Lung and Bronchus
- Leukemia

## Other Requested Cancers of Concern from the Community

- Colorectal
- Female Breast
- Prostate
- Stomach
- Small Intestine
- Gallbladder
- Thyroid
- Pancreas
- Melanoma
- Oropharyngeal

***Note: This is the largest inquiry we have received in both time-period and types of cancers***

# Methodology/Defining Population

- P-value of 0.05 was used to assess statistical significance
- Defined population: individuals diagnosed from 2000-2019 with postal code of residence 46151
  - Due to lack of ZIP code population data prior to 2005, Martinsville data was looked at from 2005-2019
  - Postal Code utilized instead of Martinsville town lines due to how data is available in the registry

## Martinsville Cancer Study Design



### Geographic Focus



### Study Design

**20 -Year Study:**  
Retrospective over a 20-year period

**Data Source:**  
Indiana State Cancer Registry (ISCR)

**Calculations**  
Age-adjusted rates and standardized incidence (SIRs) calculated for 5-year intervals.

### Cancer Types Analyzed



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#### Cancer Types associated with TCE, PCE, Vinyl Chloride Related Investigated Cancers

Kidney and Renal Pelvis • Non-Hodgkin Lymphoma • Liver • Urinary Bladder • Myeloma • Brain • Lung and Bronchus • Leukemias

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#### Other Cancers of Community Concern Investigated

Colorectal • Female Breast • Prostate • Stomach • Small Intestine • Gallbladder • Thyroid • Pancreas • Melanoma • Oropharyngeal



\*TCE acts as a "complete carcinogen," meaning it can both cause genetic mutations and promote tumor growth. The EPA has stated that TCE is carcinogenic through all routes of exposure (inhalation, ingestion, and dermal contact). CDC

\*Pathologic complete response (pCR) in cancer refers to the absence of all detectable cancer in tissue samples removed during surgery or biopsy following neoadjuvant (pre-operative) treatment, such as chemotherapy or radiation. Achieving pCR is a key indicator of treatment efficacy and often correlates with improved long-term prognosis and better survival.

\*Vinyl chloride is a known human carcinogen, strongly linked to a rare liver cancer called hepatic angiosarcoma, as well as hepatocellular carcinoma. Sources: CDC, NIH

# Data Pull

State	Indiana		County	Morgan		ZipCode	46151	
Site	Lung Cancer		Site	Lung Cancer		Site	Lung Cancer	
Age	Count	Population	Age	Count	Population	Age	Count	Population
All Ages			All Ages			All Ages		
0-4			0-4			0-4		
5-9			5-9			5-9		
10-14			10-14			10-14		
15-19			15-19			15-19		
20-24			20-24			20-24		
25-29			25-29			25-29		
30-34			30-34			30-34		
35-39			35-39			35-39		
40-44			40-44			40-44		
45-49			45-49			45-49		
50-54			50-54			50-54		
55-59			55-59			55-59		
60-64			60-64			60-64		
65-69			65-69			65-69		
70-74			70-74			70-74		
75-79			75-79			75-79		
80-84			80-84			80-84		
85+			85+			85+		

- Excel spreadsheet pulled out like this example for each time-period and cancer type
- SIRs are best for small areas such as community level studies and compared to expected number of cases
- AARs look at overall occurrence of cancer
- Utilizing both allows to get a better “full picture” of cancer in the area



# Analysis

## Example of AAR Results

Directly Standardized Rate Estimates Rate Multiplier = 100000									
Race	Study Population			Reference Population		Standardized Rate			
	Observed Events	Population-Time	Crude Rate	Expected Events	Population-Time	Estimate	Standard Error	95% Normal Confidence Limits	
Indiana	33653	40095852	83.9314	187294	274634000	68.1977	0.3786	67.4555	68.9398
Morgan	465	420282	110.6	226512	274634000	82.4777	3.9259	74.7831	90.1724

Rate Effect Estimates (Rate Multiplier = 100000)								
Race		Rate Ratio	95% Lognormal Confidence Limits		Log Rate Ratio	Standard Error	Z	Pr >  Z
Indiana	Morgan							
68.1977	82.4777	0.8269	0.752733	0.908289	-0.1901	0.0479	-3.97	<.0001

## Example SIR Results

Standardized Morbidity/Mortality Ratio							
Observed Events	Expected Events	SMR	Standard Error	95% Normal Confidence Limits		Z	Pr >  Z
465	386.945	1.2017	0.0557	1.0925	1.3109	3.62	0.0003

Indirectly Standardized Rate Estimates Rate Multiplier = 100000									
Study Population			Reference Crude Rate	Expected Events	SMR	Standardized Rate			
Observed Events	Population-Time	Crude Rate				Estimate	Standard Error	95% Normal Confidence Limits	
465	420282	110.6	83.9314	386.945	1.2017	100.9	4.6774	91.6947	110.0

These analyses done for each time-period and cancer type for both county and ZIP code compared to Indiana

# Significant Results of TCE-, PCE- and Vinyl-Chloride Related Cancers



# Kidney Cancer

Morgan County and Martinsville had statistically significant high AARs and SIRs from 2010-2019

	Age-Adjusted Rates						Standardized Incidence Ratios					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	4,927	15.93	63	19.29	NA	NA	1.20	0.90-1.49	0.1920	NA	NA	NA
<b>2005-2009</b>	5,869	17.55	62	16.51	NA	NA	0.96	0.72-1.20	0.7383	NA	NA	NA
<b>2010-2014</b>	6,676	8.40	96	<b><u>23.56*</u></b>	47	<b><u>27.57*</u></b>	<b><u>1.28*</u></b>	1.02-1.53	0.0342	<b><u>1.46*</u></b>	1.04-1.87	0.0315
<b>2015-2019</b>	7,605	19.50	117	<b><u>26.12*</u></b>	60	<b><u>31.46*</u></b>	<b><u>1.34*</u></b>	1.10-1.58	0.006	<b><u>1.50*</u></b>	0.57-1.65	0.6918

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Myeloma

Martinsville had a statistically significantly high AAR and SIR from 2010-2014

	Age-Adjusted Rates						Standardized Incidence Ratios					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	1,763	5.73	21	6.67	NA	NA	1.17	0.67-1.66	0.5161	NA	NA	NA
<b>2005-2009</b>	2,119	6.38	22	6.67	NA	NA	0.98	0.57-1.39	0.9372	NA	NA	NA
<b>2010-2014</b>	2,556	7.04	35	8.91	22	<b>13.11*</b>	1.24	0.83-1.64	0.02599	<b>1.83*</b>	1.07-2.60	0.0332
<b>2015-2019</b>	2,724	6.88	35	7.46	16	6.86U	1.13	0.76-1.50	0.4991	1.11	0.57-1.65	0.6918

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

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Excludes in situ and benign tumors

NA data is Not Available

# Lung and Bronchus Cancer

- Morgan County had statistically significantly high AARs from 2000-2004 and 2010-2019.
- The SIR for Morgan County were statistically significant from 2015-2019.
- No significant results for Martinsville

	Age-Adjusted Rates						Standardized Incidence Ratios					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	25,022	81.38	294	<b><u>93.95*</u></b>	NA	NA	1.13	1.00-1.26	0.0528	NA	NA	NA
<b>2005-2009</b>	26,725	80.57	313	89.21	NA	NA	1.09	0.97-1.21	0.1464	NA	NA	NA
<b>2010-2014</b>	27,189	74.46	340	<b><u>84.96*</u></b>	144	87.30	1.12	0.99-1.24	0.0532	1.12	0.94-1.30	0.2013
<b>2015-2019</b>	28,662	70.57	382	<b><u>81.99*</u></b>	146	67.35	<b><u>1.16*</u></b>	1.04-1.28	0.0057	0.94	0.79-1.10	0.4220

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Leukemias

Martinsville AAR and SIR was statistically significant from 2015-2019.  
Will continue to monitor as new data becomes available

	Age-Adjusted Rates						Standardized Incidence Ratios					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	4,153	13.51	48	14.86	NA	NA	1.13	0.81-1.45	0.4167	NA	NA	NA
<b>2005-2009</b>	4,496	13.71	41	12.49	NA	NA	0.87	0.61-1.14	0.3594	NA	NA	NA
<b>2010-2014</b>	5,198	14.75	62	16.88	31	18.47	1.11	0.83-1.38	0.4426	1.29	0.84-1.75	0.2081
<b>2015-2019</b>	5,384	14.16	70	14.16	40	<b>21.38*</b>	1.17	0.90-1.45	0.2136	<b>1.45*</b>	1.00-1.90	0.0497

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Significant Results of Other Cancers of Interest



# Female Breast Cancer

- Morgan County had statistically significant AARs and SIRs from 2005-2014
- No statistically significant results for Martinsville

	AAR						SIR					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	20,935	132.50	208	123.30	NA	NA	0.94	0.78-1.06	0.2390	NA	NA	NA
<b>2005-2009</b>	21,514	127.30	283	<b><u>153.20*</u></b>	NA	NA	<b><u>1.21</u></b> * -	1.07-1.35	0.0031	NA	NA	NA
<b>2010-2014</b>	23,429	129.70	302	<b><u>150.30*</u></b>	129	142.30	<b><u>1.16</u></b> * -	1.03-1.29	0.0177	1.09	0.90-1.27	0.3640
<b>2015-2019</b>	26,044	135.3	303	138.30	19	138.90	1.03	0.91-1.14	0.6379	1.05	0.87-1.22	0.6093

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Prostate Cancer

- Morgan County had statistically significantly high AARs and SIRs from 2000-2004 and 2010-2019.
- No statistically significant results for Martinsville

	AAR						SIR					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	19,598	130.60	262	162.00*	NA	NA	1.23*	1.09-1.39	0.0020	NA	NA	NA
<b>2005-2009</b>	20,478	121.30	239	123.10	NA	NA	1.03	0.90-1.16	0.7018	NA	NA	NA
<b>2010-2014</b>	17,831	92.11	247	<b>107.40*</b>	120	104.70	<b>1.18*</b>	1.03-1.32	0.0179	1.16	0.95-1.37	0.1325
<b>2015-2019</b>	20,705	95.19	279	<b>108.30*</b>	127	105.80	1.13	1.00-1.26	0.0518	1.09	0.90-1.28	0.3614

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Thyroid Cancer

- Morgan County had a statistically significantly high AAR from 2015-2019
- No statistically significant results found for Martinsville

	AAR						SIR					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	2,296	7.46	33	10.05	NA	NA	1.29	0.85-1.73	0.1955	NA	NA	NA
<b>2005-2009</b>	3,330	10.36	30	8.42	NA	NA	0.81	0.52-1.10	0.2019	NA	NA	NA
<b>2010-2014</b>	4,042	12.10	52	13.86	29	17.17	1.16	0.84-1.47	0.3220	1.44	0.92-1.96	0.1044
<b>2015-2019</b>	4,245	12.41	62	<b>17.45*</b>	29	17.39	1.32	0.99-1.65	0.0544	1.38	0.88-1.89	0.1349

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Melanoma

Morgan County and Martinsville had statistically significantly high AARs and SIRs from 2010-2019

	AAR						SIR					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	5,108	16.59	67	20.18	NA	NA	1.21	0.92-1.51	0.1477	NA	NA	NA
<b>2005-2009</b>	5,962	18.13	65	18.00	NA	NA	1.00	0.76-1.24	0.9934	NA	NA	NA
<b>2010-2014</b>	6,758	19.14	101	<b><u>26.35*</u></b>	55	<b><u>31.10*</u></b>	<b><u>1.35*</u></b>	1.08-1.61	0.0098	<b><u>1.60*</u></b>	1.18-2.02	0.0054
<b>2015-2019</b>	8,652	22.85	136	<b><u>31.01*</u></b>	62	<b><u>30.94*</u></b>	<b><u>1.39*</u></b>	1.16-1.63	0.0010	<b><u>1.39*</u></b>	1.05-1.74	0.0261

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Oropharyngeal Cancer

- Morgan County had statistically significant AARs from 2010-2014 and 2015-2019 and SIR from 2010-2014
- Martinsville had a statistically significant AAR and SIR from 2010-2014

	AAR						SIR					
	Indiana		Morgan County		Martinsville ZIP Code 46151		Morgan County			Martinsville ZIP Code 46151		
	#	Rate	#	Rate	#	Rate	SIR	95% CI	P-Value	SIR	95% CI	P-Value
<b>2000-2004</b>	3,375	10.86	48	13.98	NA	NA	1.31	0.94-1.68	0.1015	NA	NA	NA
<b>2005-2009</b>	3,981	11.71	42	10.99	NA	NA	0.95	0.66-1.23	0.7068	NA	NA	NA
<b>2010-2014</b>	4,658	12.51	74	<b>16.48*</b>	40	<b>19.94*</b>	<b>1.40*</b>	1.08-1.71	0.0147	<b>1.65*</b>	1.14-2.17	0.0124
<b>2015-2019</b>	5,321	13.31	76	<b>17.66*</b>	33	16.24	1.23	0.96-1.51	0.0951	1.18	0.78-1.58	0.3776

Data Source: Indiana State Cancer Registry

Rates are Age-adjusted to the US 2000 Standard Population

\*County/ZIP code rate is statistically significantly higher or lower than the state rate

U Rates for cases less than 20 are statistically unstable

^ Case counts fewer than 5 are suppressed

Excludes in situ and benign tumors

NA data is Not Available

# Conclusions

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- The results do not show sufficient evidence of a cancer cluster
- Because both Morgan County and Martinsville have higher than expected amounts of cancer, it is difficult to isolate what results are due to Morgan County having high rates and which results are due to Martinsville specifically
- Where a statistically significant result is shown, no conclusions regarding causation can be drawn from this report
- IDOH will/has continued to update the TCE, PCE, and vinyl chloride cancer analysis when newer years of data becomes available. Final report will only be updated if updated analysis changes the overall conclusion
- Final report can be found on our website [https://www.in.gov/health/cdpc/cancer/cancer-surveillance-and-data/#What is a cancer cluster](https://www.in.gov/health/cdpc/cancer/cancer-surveillance-and-data/#What%20is%20a%20cancer%20cluster)

# Limitations of Cancer Cluster Inquiries

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- Cancer registry data lags
- Residence based registry data
- Population data availability
- Defining time period and geographic areas of concern
- Complexity of cancer
  - 100s of different types of cancer
  - Many risk factors
  - Genetics
  - Length of time between possible exposure and development of cancer
- Lack of causality

# Community Engagement

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- Reporting cancer cluster concerns helps pinpoint surveillance efforts
- Information that inquirers share with us drives the investigation
- Clear communication and engagement needed to help combat
  - Mistrust of process
  - Unrealistic expectations
  - Interpretation restraints of cancer cluster analyses
- Buy in from community is also needed to allow cancer education and share best practices
- Recent changes of CDC Guidelines helped IDOH revamp our process to ensure all individuals are better heard, all cancer cluster inquiries are fully addressed, and communities are included as part of the process

# Additional Resources

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- <https://www.in.gov/health/cdpc/files/InquiryReportMartinsvilleFinal-2.pdf>
- <https://www.cdc.gov/cancer-environment/media/pdfs/Challenges-and-Limitations-508.pdf>
- <https://www.cdc.gov/cancer-environment/media/pdfs/Standardized-Incidence-Ratio-Fact-Sheet-508.pdf>
- [www.epa.gov/newsreleases/epa-extends-public-comment-period-proposed-cleanup-plan-pike-and-mulberry-streets-pce](http://www.epa.gov/newsreleases/epa-extends-public-comment-period-proposed-cleanup-plan-pike-and-mulberry-streets-pce)
- [www.epa.gov/newsreleases/epa-selects-1192-million-cleanup-plan-pike-mulberry-superfund-site-Martinsville](http://www.epa.gov/newsreleases/epa-selects-1192-million-cleanup-plan-pike-mulberry-superfund-site-Martinsville)
- [www.atsdr.cdc.gov/HAC/pha/PikeMulberryStreetsPCEPlume/Pike\\_MulberryStrts\\_PC\\_E\\_Plume\\_HC-508.pdf](http://www.atsdr.cdc.gov/HAC/pha/PikeMulberryStreetsPCEPlume/Pike_MulberryStrts_PC_E_Plume_HC-508.pdf)
- [www.in.gov/idem/cleanups/sites-of-special-interest/martinsville,-in/](http://www.in.gov/idem/cleanups/sites-of-special-interest/martinsville,-in/)
- [https://www.in.gov/idem/files/factsheet\\_olq\\_si\\_martinsville\\_dump.pdf](https://www.in.gov/idem/files/factsheet_olq_si_martinsville_dump.pdf)

# References

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1. "Cancer Clusters Fact Sheet - NCI. [www.cancer.gov](http://www.cancer.gov), 2018, [www.cancer.gov/about-cancer/causes-prevention/risk/substances/cancer-clusters-fact-sheet#:~:text=That%20is%2C%20clusters%20of%20cancer](http://www.cancer.gov/about-cancer/causes-prevention/risk/substances/cancer-clusters-fact-sheet#:~:text=That%20is%2C%20clusters%20of%20cancer). Accessed 5 June 2024.
2. CDC. "Guidelines for Examining Unusual Patterns of Cancer and Environmental Concerns." *Unusual Patterns of Cancer, the Environment, and Community Concerns*, 17 Apr. 2024, [www.cdc.gov/cancer-environment/php/guidelines/index.html](http://www.cdc.gov/cancer-environment/php/guidelines/index.html). Accessed 5 June 2024.

# Questions?

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