



CANCER INCIDENCE DATA REVIEW 1985-2019

MADISON HEIGHTS, MICHIGAN

Michigan Department of Health and Human Services
Division of Environmental Health

May 16, 2023

Table of Contents

Background	3
Objective.....	3
Methods.....	3
Results	5
Discussion	5
Appendix.....	7

Cancer Incidence Data Review: 1985-2019

Madison Heights, Michigan

Background

In 2017, the Michigan Department of Health and Human Services (MDHHS) received a phone call from a Madison Heights resident with questions about lung cancer and their environment. The caller was provided educational information, and their concerns were resolved. After new data became available, MDHHS conducted a review of lung and bronchus cancer incidence rates from 1985-2019 for Madison Heights. This fulfills Public Health Code MCL 333.2221, where the department shall continually and diligently prevent disease, prolong life, and promote the public health through organized programs, including prevention and control of diseases.

This document details the analysis performed by MDHHS Division of Environmental Health, methodology, and the need to conduct additional analyses with local health partners.

Objective

The MDHHS objective was to determine if cancer incidence rates among Madison Heights residents exceeded cancer incidence rates among out-Oakland County residents (those residing elsewhere in Oakland County) and Michigan residents from 1985 through 2019. We examined three groups of cancer diagnoses: (1) all cancer; (2) lung and bronchus cancer; and (3) all cancer excluding lung and bronchus cancer.

Methods

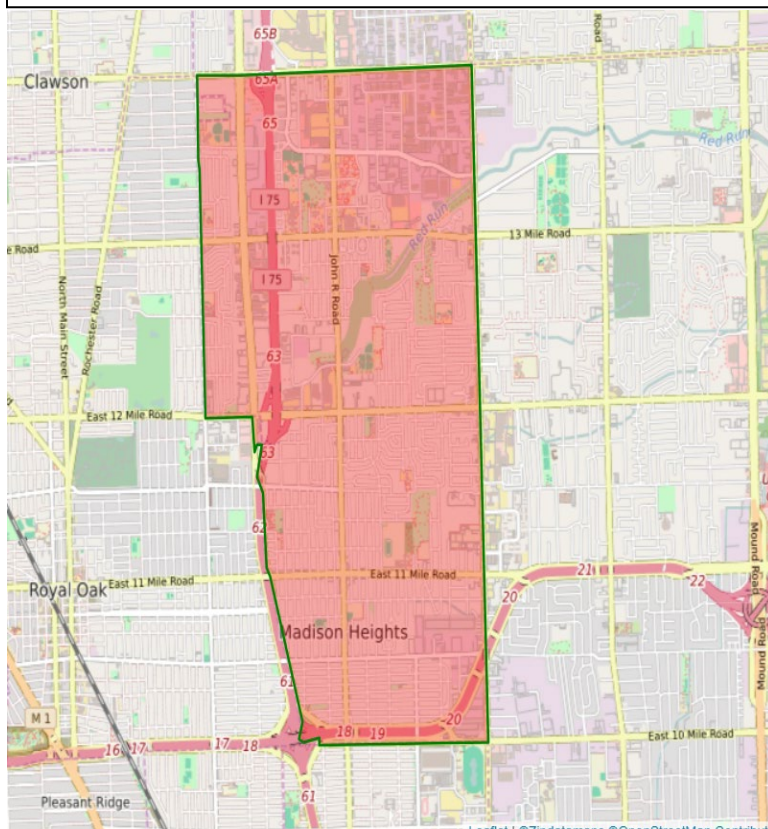
We obtained data from the Michigan Resident Cancer Incidence File managed by the Michigan Cancer Surveillance Program (MCSP). As required by MCL 333.2619 and Administrative Rules R. 325.9050 *et seq.*, all newly diagnosed cases of invasive cancer in Michigan are routinely reported to the MCSP by reporting facilities such as hospitals and independent laboratories. A cancer case is defined as a person with a newly diagnosed cancer where the cancer type is reported to be malignant and primary. The registry collects information on patient age, sex, race, cancer site and type, and residential address at the time of diagnosis. The registry does not collect enough information to evaluate the relationship between risk factors and cancer incidence, including potential exposures to environmental carcinogens. For the calculation of rates, the MDHHS Division of Vital Records and Health Statistics (DVRHS) prepared population data based on estimates released by the National Center for Health Statistics. More information on the Michigan Cancer Surveillance Program can be found here: www.michigan.gov/mcsp.

We compared annual cancer incidence rates for Madison Heights to both out-Oakland County (Oakland County excluding Madison Heights) and Michigan for 1985 through 2019. Madison Heights was defined as ZIP code 48071 since the boundaries of the ZIP code align with the

boundaries of Madison Heights (Figure 1). Cancer incidence rates were age-adjusted by the direct method using the 2000 U.S. Standard Population. For out-Oakland County and Michigan, we used individual year populations for 1985-2019 for annual rate calculations. For ZIP Code 48071, population figures were not available for each of the 35 years and thus in some cases we had to use one figure for several years. Specifically, individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. We also calculated a 35-year rate for the full time period 1985-2019 using the summed population across the period as the denominator. Rates are expressed as the number of incident cases per 100,000 population per year. To protect the identity of persons who have been diagnosed with cancer, counts less than six are not presented in this report. Cancer incidence rates that are based on fewer than 20 cases are considered statistically unstable and have been suppressed.

We calculated 95-percent confidence intervals (CIs) for each rate. These CIs illustrate statistical variability. The difference between two rates is statistically significant if their 95-percent CIs do not overlap.

Figure 1: Map of Madison Heights Geographic Area



Results

- Between 1985 and 2019, there were 6,107 incident cancer cases for all sites combined for Madison Heights. This corresponds to an average, annual, age-adjusted rate of 553.2 (542.6, 563.8) per 100,000 (Table 1), which is statistically higher than the comparable rates for out-Oakland County [511.3 (509.7, 512.9)] and Michigan [496.2 (495.6, 496.8)].
 - The annual total cancer rate for Madison Heights was statistically higher than out-Oakland County in 1988, 1990, 2012-2015, and 2018.
 - The annual total cancer rate for Madison Heights was statistically higher than Michigan in 1986, 1988, 1991, 1995-1997, 2000, 2002-2003, 2012-2015, and 2018-2019.
- Between 1985 and 2019, there were 1,085 incident lung and bronchus cancer cases for Madison Heights. This corresponds to an average annual, age-adjusted rate of 98.1 (93.4, 102.8) per 100,000 (Table 2), which is statistically higher than out-Oakland County [65.4 (64.8, 66.0)] and Michigan [72.8 (72.6, 73.0)].
 - The annual lung and bronchus cancer rate for Madison Heights was statistically higher than out-Oakland County in 1994-1995, 2000-2003, 2009, 2012-2016, 2018-2019.
 - The annual lung and bronchus cancer rate for Madison Heights was statistically higher than Michigan in 1995, 1997, 2000-2003, 2009, 2012-2016, 2018-2019.
- Between 1985 and 2019, there were 5,022 incident cancer cases for all sites minus lung and bronchus for Madison Heights. This corresponds to an average annual, age-adjusted rate of 455.1 (445.3, 464.9) per 100,000 per year (Table 3), which is statistically higher than Michigan [423.5 (423.0, 424.0)], but not out-Oakland County [445.9 (444.3, 447.5)].
 - The annual cancer rate excluding lung and bronchus cancer for Madison Heights was statistically higher than out-Oakland County in 1988 and 2014.
 - The annual cancer rate excluding lung and bronchus cancer for Madison Heights was statistically higher than Michigan in 1985-1986, 1988, 1997, 2002, and 2013-2015.

Discussion

We found that Madison Heights residents had a higher rate of cancer than out-Oakland County residents and Michigan residents during 1985-2019. However, it appears that this excess was primarily due to lung and bronchus cancer specifically. The annual, age-adjusted cancer incidence rate for Madison Heights was statistically higher for lung and bronchus sites than out-Oakland County and Michigan rates for more than a third (13 years) of the time period. When

comparing cancer rates for all sites minus lung and bronchus, Madison Heights only had a statistically higher incidence rate for two years when compared to out-Oakland County and for eight years when compared to Michigan. These results suggest additional analyses pertaining to lung and bronchus cancer are needed, especially since Madison Heights had a higher incidence rate in seven of the last eight years we examined when compared to both the county and the state.

This is a descriptive review of cancer incidence in Madison Heights. It is important to consider the limitations of these analyses and cancer registry surveillance data, which include:

1. Results of this investigation are based on surveillance data and not an epidemiologic research study of the relationship between any risk factors and cancer incidence. Therefore, these results cannot indicate whether any cancer occurrence is related to or caused by environmental contaminant exposures. Michigan cancer registry records do not include the data necessary to make such an evaluation. The statistical excesses observed do not necessarily mean that the difference is due to an environmental exposure in Madison Heights.
2. Migration of people into and out of Madison Heights limits the interpretation of these data. The Michigan Cancer Surveillance Program records a person's address at the time of cancer diagnosis, which may not reflect where they spent most of their life or the period of time when exposure to a cancer-causing agent occurred (e.g., cancer cases included in this analysis period could be related to exposures they had living in another state).
3. The latency period is the time that passes between being exposed to something that can cause cancer (such as an environmental contaminant) and having symptoms or being diagnosed. Latency periods vary by cancer site and type. Cancer observed during a specific period could be related to an exposure that occurred a long time ago.
4. Furthermore, cancer disease coding and rules for counting cancer cases change over time. This includes occasional changes in diagnostic criteria. The rate at which physicians adopt these changes can lead to varying ways in how a cancer is diagnosed. Because of this, the frequency in which the cancer is detected and reported may change.

Per the recommendation for further investigation of lung and bronchus cancer incidence rates in Madison Heights, MDHHS will conduct a follow-up analysis to examine the observed patterns in more detail. MDHHS will consult with the Oakland County Health Division as we prepare these follow-up analyses.

Appendix

Table 1: Age-Adjusted Incidence Rates (per 100,000 Population) by Year for **All Cancer Sites**, Madison Heights, out-Oakland County and Michigan, 1985-2019

	Madison Heights		Out-Oakland County ^c		Michigan	
Year of Diagnosis	Number of Cases ^a	Rate (95% CI) ^b	Number of Cases	Rate (95% CI)	Number of Cases	Rate (95% CI)
1985	125	532.4 (463.9, 600.9)	3,862	462.4 (451.8, 473.0)	36,658	464.6 (461.0, 468.2)
1986	145	540.7 (477.6, 603.8)	4,086	478.2 (467.5, 488.9)	36,963	463.0 (459.4, 466.6)
1987	154	535.8 (472.3, 599.3)	4,128	473.6 (463.1, 484.1)	38,718	477.1 (473.5, 480.7)
1988	160	572.7 (507.7, 637.7)	4,203	471.2 (460.8, 481.6)	39,355	478.1 (474.5, 481.7)
1989	145	501.1 (441.5, 560.7)	4,570	504.1 (493.6, 514.6)	42,782	513.9 (510.3, 517.5)
1990	172	591.3 (527.7, 654.9)	4,728	510.0 (499.6, 520.4)	44,697	528.1 (524.5, 531.7)
1991	185	632.2 (565.2, 699.2)	5,516	584.2 (573.2, 595.2)	48,016	558.6 (554.9, 562.3)
1992	172	602.2 (540.3, 664.1)	5,517	565.9 (555.2, 576.6)	49,000	556.0 (552.3, 559.7)
1993	161	518.3 (460.0, 576.6)	5,456	546.9 (536.3, 557.5)	47,969	535.1 (531.5, 538.7)
1994	182	575.8 (512.2, 639.4)	5,434	533.1 (522.7, 543.5)	46,666	512.7 (509.2, 516.2)
1995	185	590.9 (526.3, 655.5)	5,396	516.2 (505.9, 526.5)	46,326	501.1 (497.6, 504.6)
1996	183	579.6 (517.1, 642.1)	5,696	536.8 (526.5, 547.1)	47,099	501.7 (498.2, 505.2)
1997	189	608.6 (545.0, 672.2)	6,062	561.1 (550.6, 571.6)	48,425	509.7 (506.2, 513.2)
1998	172	549.7 (489.3, 610.1)	6,097	556.4 (546.0, 566.8)	49,416	515.1 (511.6, 518.6)
1999	182	561.0 (497.0, 625.0)	6,281	568.3 (557.8, 578.8)	50,684	522.6 (519.1, 526.1)
2000	190	590.8 (528.4, 653.2)	6,215	552.3 (541.9, 562.7)	51,233	521.2 (517.7, 524.7)
2001	186	578.1 (513.9, 642.3)	6,412	562.5 (552.1, 572.9)	51,823	521.1 (517.7, 524.5)

	Madison Heights		Out-Oakland County ^c		Michigan	
Year of Diagnosis	Number of Cases ^a	Rate (95% CI) ^b	Number of Cases	Rate (95% CI)	Number of Cases	Rate (95% CI)
2002	206	634.8 (567.9, 701.7)	6,556	568.3 (557.9, 578.7)	52,778	524.5 (521.1, 527.9)
2003	194	599.1 (535.9, 662.3)	6,327	539.4 (529.2, 549.6)	53,158	521.8 (518.4, 525.2)
2004	185	563.3 (502.4, 624.2)	6,260	526.9 (516.8, 537.0)	52,154	505.7 (502.3, 509.1)
2005	170	529.5 (467.3, 591.7)	6,263	519.1 (509.2, 529.0)	52,890	507.3 (504.0, 510.6)
2006	170	531.1 (468.8, 593.4)	6,412	520.9 (511.0, 530.8)	53,609	507.7 (504.4, 511.0)
2007	165	494.3 (435.0, 553.6)	6,621	531.0 (521.1, 540.9)	55,900	522.4 (519.0, 525.8)
2008	157	473.5 (416.1, 530.9)	6,098	477.4 (468.0, 486.8)	53,726	495.8 (492.5, 499.1)
2009	170	511.7 (449.6, 573.8)	6,673	514.9 (505.4, 524.4)	54,215	494.1 (490.8, 497.4)
2010	182	552.0 (488.9, 615.1)	6,841	517.4 (508.0, 526.8)	55,378	498.7 (495.4, 502.0)
2011	176	529.5 (467.6, 591.4)	7,019	520.2 (510.8, 529.6)	56,032	498.4 (495.2, 501.6)
2012	189	563.5 (500.8, 626.2)	6,670	483.2 (474.2, 492.2)	54,165	474.7 (471.5, 477.9)
2013	194	582.9 (517.5, 648.3)	6,880	488.8 (479.9, 497.7)	53,702	464.4 (461.3, 467.5)
2014	200	602.4 (536.2, 668.6)	6,994	488.3 (479.4, 497.2)	54,099	461.4 (458.3, 464.5)
2015	193	579.0 (513.9, 644.1)	7,071	485.9 (477.1, 494.7)	55,387	466.2 (463.1, 469.3)
2016	165	499.3 (437.4, 561.2)	6,899	466.6 (457.9, 475.3)	57,058	474.9 (471.8, 478.0)
2017	145	435.1 (376.9, 493.3)	7,110	469.5 (461.0, 478.0)	56,256	461.6 (458.6, 464.6)
2018	181	551.2 (487.8, 614.6)	7,286	474.8 (466.2, 483.4)	56,676	458.8 (455.7, 461.9)
2019	177	528.9 (468.9, 588.9)	7,163	460.6 (452.1, 469.1)	56,605	451.8 (448.8, 454.8)
1985- 2019	6,107	553.2 (542.6, 563.8)	210,802	511.3 (509.7, 512.9)	1,759,618	496.2 (495.6, 496.8)

^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

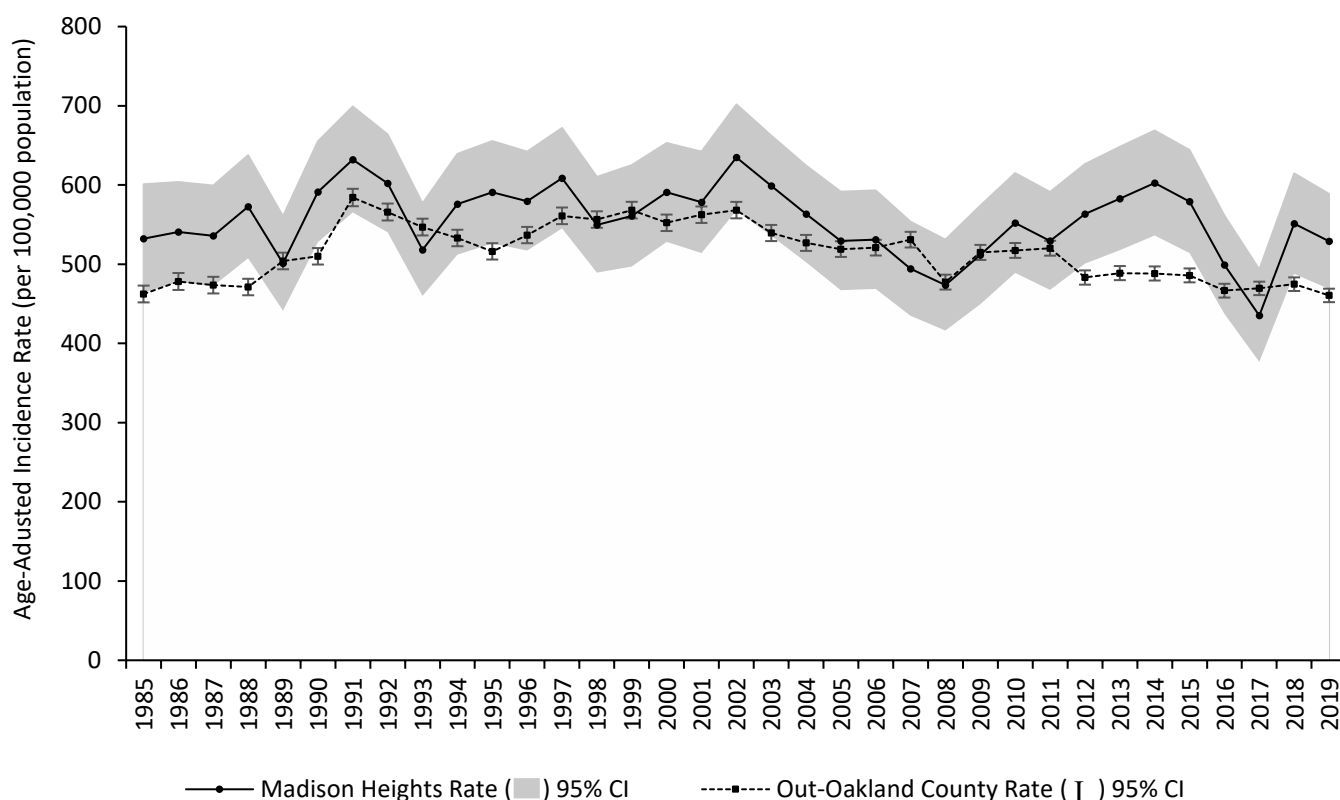
https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

^cOut-Oakland County represents the Oakland County population minus those residing within Madison Heights.

Shading indicates a statistical difference between Madison Heights and the geographic area of comparison.

Figure 2: Age-Adjusted Incidence Rates^{a,b} (per 100,000 Population) by Year for **All Cancer Sites, Comparing Madison Heights to out-Oakland County^c, 1985-2019**



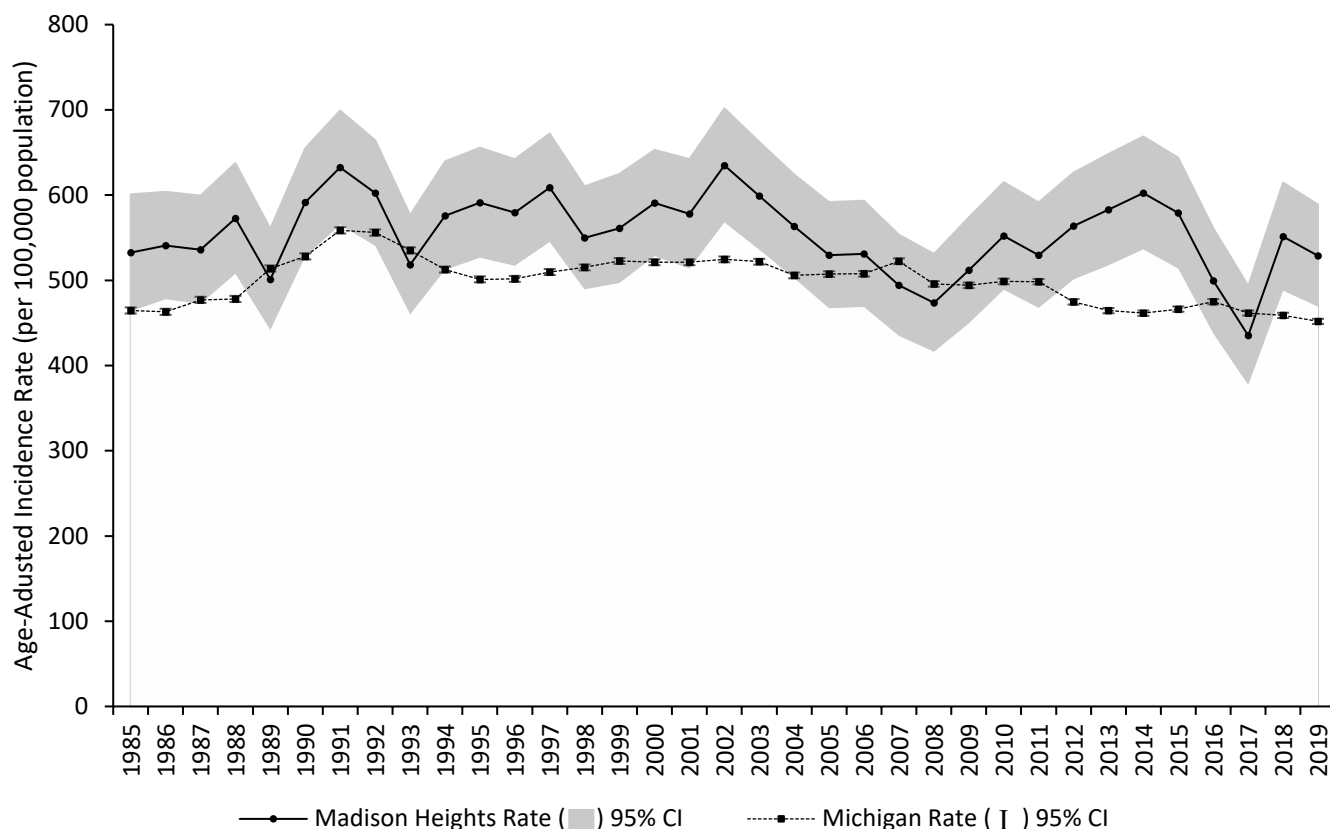
^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

^cOut-Oakland County represents the Oakland County population minus those residing within Madison Heights.

Figure 3: Age-Adjusted Incidence Rates^{a,b} (per 100,000 Population) by Year for All Cancer Sites, Comparing Madison Heights to Michigan, 1985-2019



^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

Table 2: Age-Adjusted Incidence Rates (per 100,000 Population) by Year for Lung and Bronchus Cancer Sites, Madison Heights, out-Oakland County and Michigan, 1985-2019

	Madison Heights		Out-Oakland County ^c		Michigan	
Year of Diagnosis	Number of Cases ^a	Rate (95% CI) ^b	Number of Cases	Rate (95% CI)	Number of Cases	Rate (95% CI)
1985	16	*	566	67.5 (63.0, 72.0)	5,830	73.4 (71.8, 75.0)
1986	21	79.0 (54.0, 104)	633	73.5 (68.8, 78.2)	5,905	73.6 (72.0, 75.2)
1987	31	105.7 (73.5, 137.9)	626	71.8 (67.3, 76.3)	6,006	73.8 (72.2, 75.4)
1988	25	89.8 (61.4, 118.2)	645	72.5 (68.0, 77.0)	6,211	75.3 (73.7, 76.9)
1989	30	103.5 (74.3, 132.7)	695	77.0 (72.5, 81.5)	6,709	80.5 (78.9, 82.1)
1990	23	83.1 (59.1, 107.1)	624	67.4 (63.2, 71.6)	6,696	79.1 (77.5, 80.7)
1991	30	96.9 (64.8, 129.0)	741	78.8 (74.3, 83.3)	7,231	84.1 (82.5, 85.7)
1992	31	106.8 (75.2, 138.4)	755	78.1 (73.7, 82.5)	7,122	80.7 (79.2, 82.2)
1993	28	89.3 (60.7, 117.9)	742	74.8 (70.5, 79.1)	7,305	81.4 (79.9, 82.9)
1994	34	107.4 (76.3, 138.5)	712	70.6 (66.6, 74.6)	7,212	79.1 (77.6, 80.6)
1995	39	126.1 (96.5, 155.7)	742	71.9 (67.8, 76.0)	7,223	78.0 (76.5, 79.5)
1996	30	93.6 (64.8, 122.4)	758	72.7 (68.7, 76.7)	7,221	76.8 (75.4, 78.2)
1997	33	106.4 (77.5, 135.3)	806	76.0 (72.0, 80.0)	7,173	75.5 (74.1, 76.9)
1998	28	86.3 (57.5, 115.1)	814	75.4 (71.3, 79.5)	7,341	76.5 (75.1, 77.9)
1999	30	91.3 (63.9, 118.7)	763	70.4 (66.5, 74.3)	7,290	75.3 (73.9, 76.7)
2000	35	106.7 (78.7, 134.7)	733	66.4 (62.6, 70.2)	7,335	74.8 (73.4, 76.2)
2001	36	112.8 (83.0, 142.6)	776	69.7 (65.9, 73.5)	7,406	74.7 (73.3, 76.1)
2002	35	108.1 (78.3, 137.9)	812	72.0 (68.1, 75.9)	7,403	73.9 (72.6, 75.2)

	Madison Heights		Out-Oakland County ^c		Michigan	
Year of Diagnosis	Number of Cases ^a	Rate (95% CI) ^b	Number of Cases	Rate (95% CI)	Number of Cases	Rate (95% CI)
2003	44	131.4 (102.4, 160.4)	816	71.4 (67.5, 75.3)	7,993	78.7 (77.3, 80.1)
2004	31	94.5 (68.4, 120.6)	777	67.4 (63.7, 71.1)	7,681	74.8 (73.5, 76.1)
2005	27	81.6 (56.4, 106.8)	792	67.6 (63.9, 71.3)	7,876	75.8 (74.5, 77.1)
2006	27	80.8 (57.5, 104.1)	785	65.3 (61.8, 68.8)	7,887	74.8 (73.5, 76.1)
2007	31	91.1 (67.1, 115.1)	852	69.6 (66.0, 73.2)	8,155	76.2 (74.9, 77.5)
2008	24	71.9 (50.9, 92.9)	732	58.1 (55.0, 61.2)	7,875	72.3 (71.0, 73.6)
2009	33	100.7 (71.4, 130.0)	783	61.1 (58.0, 64.2)	7,795	70.5 (69.3, 71.7)
2010	29	85.9 (61.7, 110.1)	879	67.5 (64.3, 70.7)	8,102	72.2 (71.0, 73.4)
2011	25	74.6 (51.6, 97.6)	804	60.3 (57.3, 63.3)	7,969	70.1 (68.9, 71.3)
2012	43	126.9 (97.4, 156.4)	816	59.5 (56.6, 62.4)	7,919	68.1 (66.9, 69.3)
2013	36	107.2 (77.5, 136.9)	817	57.9 (55.1, 60.7)	7,801	66.0 (64.9, 67.1)
2014	33	96.4 (72.6, 120.2)	877	60.4 (57.5, 63.3)	8,062	67.0 (65.9, 68.1)
2015	34	99.5 (73.8, 125.2)	832	56.3 (53.5, 59.1)	8,080	66.3 (65.2, 67.4)
2016	39	119.2 (87.8, 150.6)	828	54.9 (52.2, 57.6)	8,168	65.7 (64.6, 66.8)
2017	24	74.4 (48.1, 100.7)	809	51.8 (49.2, 54.4)	8,171	64.6 (63.5, 65.7)
2018	33	100.8 (73.0, 128.6)	853	53.9 (51.2, 56.6)	8,057	62.7 (61.6, 63.8)
2019	37	109.9 (81.9, 137.9)	795	49.3 (46.7, 51.9)	8,130	62.3 (61.2, 63.4)
1985-2019	1,085	98.1 (93.4, 102.8)	26,790	65.4 (64.8, 66.0)	260,340	72.8 (72.6, 73.0)

^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

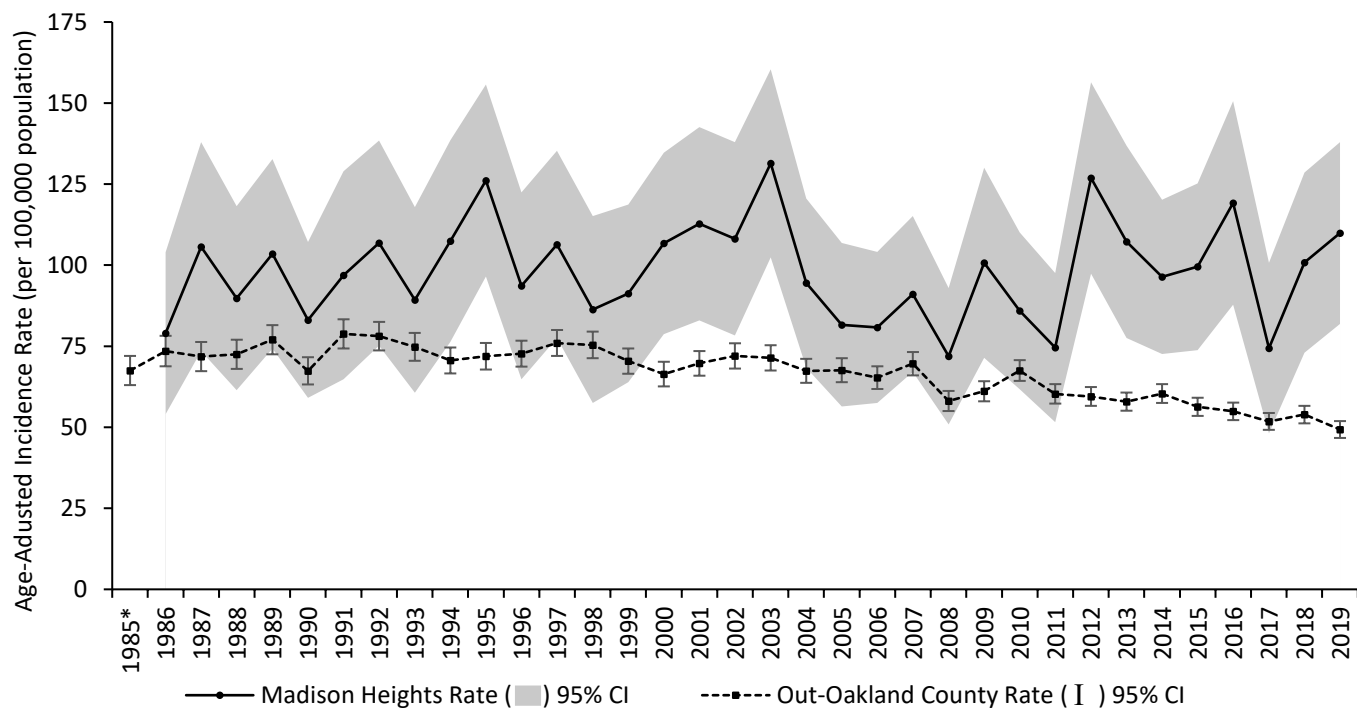
^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

^cOut-Oakland County represents the Oakland County population minus those residing within Madison Heights.

*Rate is considered statistically unreliable since it is based on <20 cases.

Shading indicates a statistical difference between Madison Heights and the geographic area of comparison.

Figure 4: Age-Adjusted Incidence Rates^{a,b} (per 100,000 Population) by Year for Lung and Bronchus Cancer Sites, Comparing Madison Heights to out-Oakland County^c, 1985*-2019



^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

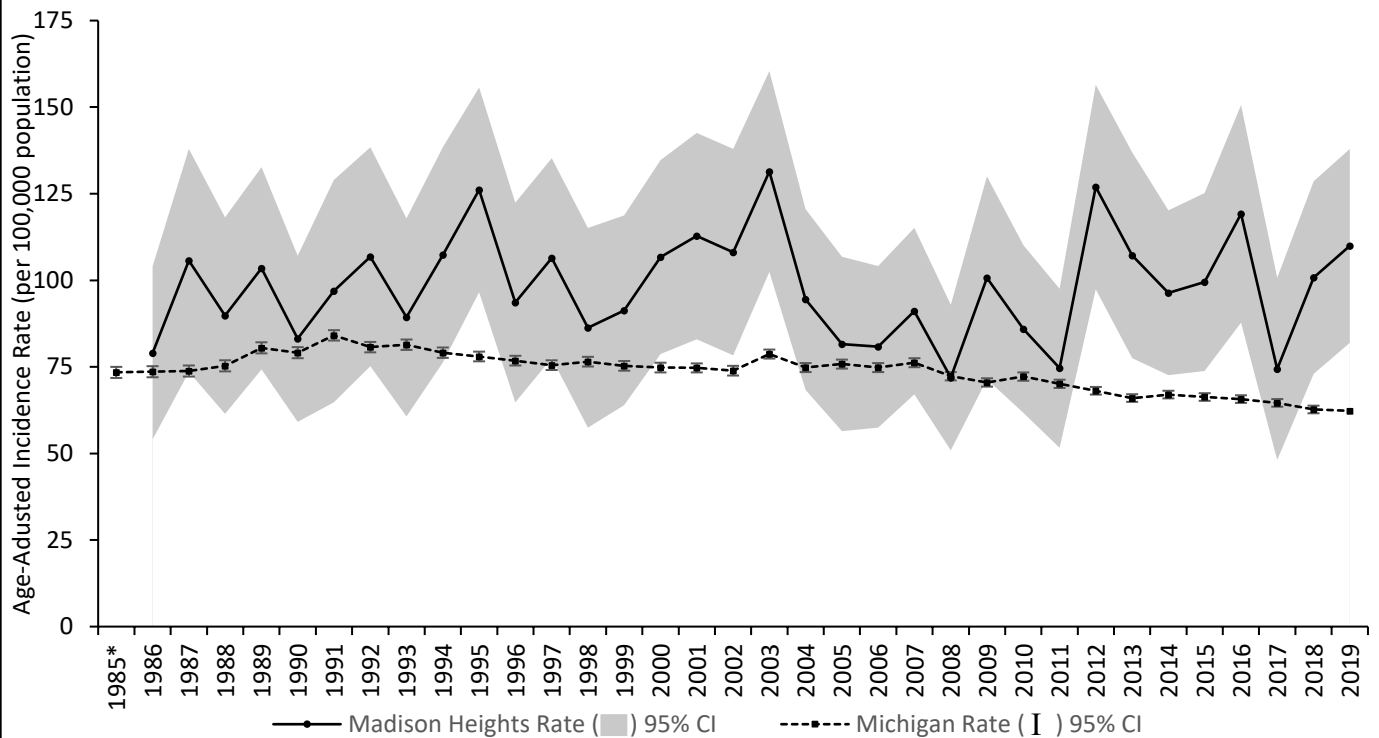
https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

^cOut-Oakland County represents the Oakland County population minus those residing within Madison Heights.

*ZIP Code Rates not statistically reliable for 1985 due to rate being based on <20 cases.

Figure 5: Age-Adjusted Incidence Rates^{a,b} (per 100,000 Population) by Year for Lung and Bronchus Cancer Sites, Comparing Madison Heights to Michigan, 1985*-2019



^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

*ZIP Code Rates not statistically reliable for 1985 due to rate being based on <20 cases.

Table 3: Age-Adjusted Incidence Rates (per 100,000 Population) by Year for All Cancer Sites Minus Lung and Bronchus, Madison Heights, out-Oakland County and Michigan, 1985-2019

	Madison Heights		Out-Oakland County ^c		Michigan	
Year of Diagnosis	Number of Cases ^a	Rate (95% CI) ^b	Number of Cases	Rate (95% CI)	Number of Cases	Rate (95% CI)
1985	109	466.0 (401.0, 531.0)	3,296	394.9 (385.1, 404.7)	30,828	391.2 (387.9, 394.5)
1986	124	461.7 (402.5, 520.9)	3,453	404.7 (394.8, 414.6)	31,058	389.4 (386.1, 392.7)
1987	123	430.1 (373.1, 487.1)	3,502	401.9 (392.2, 411.6)	32,712	403.2 (399.9, 406.5)
1988	135	482.9 (422.3, 543.5)	3,558	398.7 (389.1, 408.3)	33,144	402.8 (399.5, 406.1)
1989	115	397.6 (343.8, 451.4)	3,875	427.1 (417.3, 436.9)	36,073	433.3 (430.0, 436.6)
1990	149	508.2 (448.1, 568.3)	4,104	442.5 (432.7, 452.3)	38,001	449.0 (445.6, 452.4)
1991	155	535.3 (473.9, 596.7)	4,775	505.4 (495.1, 515.7)	40,785	474.4 (471.0, 477.8)
1992	141	495.4 (440.0, 550.8)	4,762	487.9 (477.8, 498.0)	41,878	475.3 (471.9, 478.7)
1993	133	429.0 (376.4, 481.6)	4,714	472.1 (462.1, 482.1)	40,664	453.7 (450.4, 457.0)
1994	148	468.4 (410.5, 526.3)	4,722	462.6 (452.8, 472.4)	39,454	433.7 (430.4, 437.0)
1995	146	464.8 (405.4, 524.2)	4,654	444.2 (434.5, 453.9)	39,103	423.1 (419.9, 426.3)
1996	153	485.9 (428.1, 543.7)	4,938	464.1 (454.4, 473.8)	39,878	424.9 (421.7, 428.1)
1997	156	502.2 (443.3, 561.1)	5,256	485.1 (475.2, 495.0)	41,252	434.2 (431, 437.4)
1998	144	463.4 (408.0, 518.8)	5,283	481.0 (471.1, 490.9)	42,075	438.6 (435.4, 441.8)
1999	152	469.7 (410.1, 529.3)	5,518	497.9 (487.9, 507.9)	43,394	447.4 (444.1, 450.7)
2000	155	484.1 (426.6, 541.6)	5,482	486.0 (476.1, 495.9)	43,898	446.5 (443.2, 449.8)
2001	150	465.3 (406.4, 524.2)	5,636	492.8 (482.9, 502.7)	44,417	446.4 (443.2, 449.6)
2002	171	526.7 (464.5, 588.9)	5,744	496.3 (486.4, 506.2)	45,375	450.6 (447.4, 453.8)

	Madison Heights		Out-Oakland County ^c		Michigan	
Year of Diagnosis	Number of Cases ^a	Rate (95% CI) ^b	Number of Cases	Rate (95% CI)	Number of Cases	Rate (95% CI)
2003	150	467.7 (409.7, 525.7)	5,511	468.0 (458.4, 477.6)	45,165	443.1 (439.9, 446.3)
2004	154	468.8 (412.1, 525.5)	5,483	459.5 (449.9, 469.1)	44,473	431.0 (427.8, 434.2)
2005	143	447.9 (389.6, 506.2)	5,471	451.5 (442.1, 460.9)	45,014	431.4 (428.3, 434.5)
2006	143	450.3 (391.2, 509.4)	5,627	455.6 (446.2, 465.0)	45,722	432.9 (429.8, 436.0)
2007	134	403.2 (347.7, 458.7)	5,769	461.4 (452.0, 470.8)	47,745	446.2 (443.0, 449.4)
2008	133	401.7 (347.1, 456.3)	5,366	419.3 (410.3, 428.3)	45,851	423.5 (420.4, 426.6)
2009	137	411.1 (354.1, 468.1)	5,890	453.9 (444.7, 463.1)	46,420	423.6 (420.5, 426.7)
2010	153	466.1 (406.4, 525.8)	5,962	449.9 (440.9, 458.9)	47,276	426.5 (423.4, 429.6)
2011	151	454.9 (396.1, 513.7)	6,215	459.9 (450.8, 469.0)	48,063	428.3 (425.2, 431.4)
2012	146	436.6 (379.1, 494.1)	5,854	423.7 (415.1, 432.3)	46,246	406.6 (403.6, 409.6)
2013	158	475.7 (415.2, 536.2)	6,063	431.0 (422.5, 439.5)	45,901	398.4 (395.5, 401.3)
2014	167	506.0 (442.7, 569.3)	6,117	427.9 (419.4, 436.4)	46,037	394.4 (391.5, 397.3)
2015	159	479.5 (418.2, 540.8)	6,239	429.7 (421.3, 438.1)	47,307	400.0 (397.1, 402.9)
2016	126	380.1 (324.2, 436.0)	6,071	411.8 (403.5, 420.1)	48,890	409.2 (406.2, 412.2)
2017	121	360.7 (307.2, 414.2)	6,301	417.7 (409.5, 425.9)	48,085	397.0 (394.1, 399.9)
2018	148	450.4 (391.3, 509.5)	6,433	421.0 (412.7, 429.3)	48,619	396.1 (393.2, 399.0)
2019	140	419.0 (363.7, 474.3)	6,368	411.2 (403.0, 419.4)	48,475	389.5 (386.6, 392.4)
1985-2019	5,022	455.1 (445.3, 464.9)	184,012	445.9 (444.3, 447.5)	1,499,278	423.5 (423.0, 424.0)

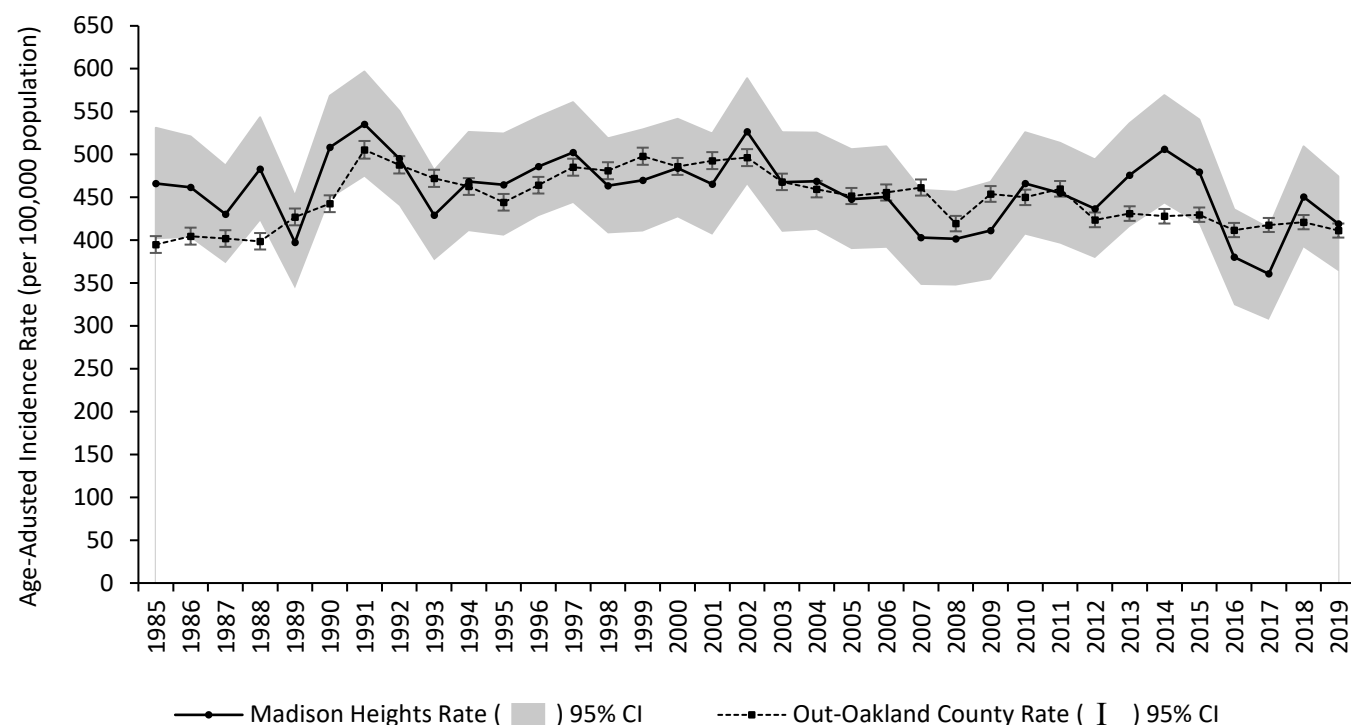
^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

^cOut-Oakland County represents the Oakland County population minus those residing within Madison Heights. Shading indicates a statistical difference between Madison Heights and the geographic area of comparison.

Figure 6: Age-Adjusted Incidence Rates^{a,b} (per 100,000 Population) by Year for All Cancer Sites Minus Lung and Bronchus, Comparing Madison Heights to out-Oakland County^c, 1985-2019



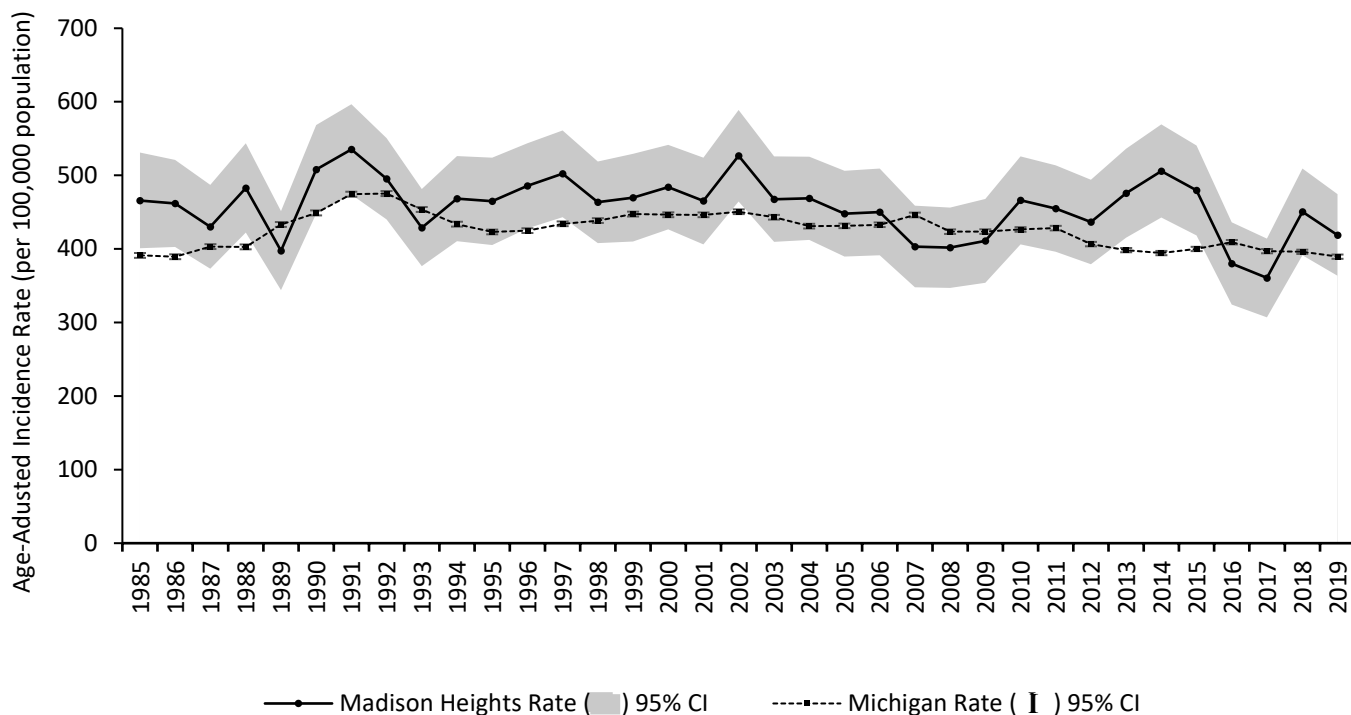
^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

^cOut-Oakland County represents the Oakland County population minus those residing within Madison Heights.

Figure 7: Age-Adjusted Incidence Rates^{a,b} (per 100,000 Population) by Year for All Cancer Sites Minus Lung and Bronchus, Comparing Madison Heights to Michigan, 1985-2019



^aSource: Michigan Resident Cancer Incidence File. Includes cases diagnosed in 1985 to 2019 and processed by the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics by November 30, 2021.

https://www.michigan.gov/mdhhs/0,5885,7-339-73970_2944_5325---,00.html

^bAge-adjusted rates were computed by the direct method using the 2000 U.S. Standard Population. For ZIP code 48071, we used the following as the population denominators for rate calculations: individual year populations were used for 1985-1988, the 1990 population for 1989-1992, the 1994 population for 1993-1998, the 2000 population for 1999-2006, and the 2010 population for 2007-2019. For out-Oakland County and Michigan, individual year populations were used for 1985-2019. Rates are per 100,000 population in the specified group.

The Michigan Department of Health and Human Services (MDHHS) does not discriminate against any individual or group on the basis of race, national origin, color, sex, disability, religion, age, height, weight, familial status, partisan considerations, or genetic information. Sex-based discrimination includes, but is not limited to, discrimination based on sexual orientation, gender identity, gender expression, sex characteristics, and pregnancy.