

A Response to the Bottineau Area Cancer Study



A recent study designed to examine the potential effects of air pollution compared death rates between a diverse Minneapolis area and an affluent suburb, leaving its results open to challenge

The Bottineau Neighborhood Association study, “A Census Tract-level Examination of Cancer in Two United States Cities,”ⁱ examined air pollution screening results and death rates in the Lowry Bridge Area in Minneapolis. The study reported that the pollutants for which screening was conducted in the Bottineau and McKinley neighborhoods were either non-detectable or found in levels well below the levels of concern for causing cancer even after long-term exposure. This finding is consistent with air quality screening conducted by the Minneapolis Health Department.

In the second phase of that study, death rates for a 19-year period were compared for two areas: the area surrounding the Lowry Bridge (selected census tractsⁱⁱ within Bottineau, Hawthorne, Marshall Terrace, and McKinley neighborhoods) and the city of Mound, a suburb of Hennepin County. According to the report, Mound was selected because it has a population size similar to the combined census tracts of interest and it is located away from most industrial pollution. The study abstract summarized the finding of this phase of the study as follows:

Results show that the age- and sex-adjusted cancer death rate from 1997 to 2015 was higher in the Lowry census tracts compared to the Mound census tracts. In addition, a consistent pattern of higher death rates was noticed for the combined asthma, leukemia, and bladder and lung cancer death rates in the Lowry area compared to Mound after adjusting for age, sex and race.

The study noted only one limitation—the inability to control for tobacco smoking rates. This is a critical shortcoming because smoking is a risk factor for lung cancer,ⁱⁱⁱ asthma deaths,^{iv} and the most common type of leukemia in adults.^v The study also failed to control for two population characteristics strongly associated with poor health and early death: income and race.^{vi}

Household income and race are significant predictors of health status and premature death. According to the 2011-2015 American Community Survey, medium household income was more than twice as high in Mound as in the Lowry area census tracts used in the study (\$72,184 versus \$34,182). Over the study period, incomes rose substantially in Mound, while declining substantially in the Bottineau and McKinley neighborhoods in Minneapolis,^{vii} another factor that may have affected health status differently between the comparison areas. Race differences were also profound. The proportion of residents who were people of color was more than ten times higher in the Lowry area census tracts than in Mound (70% versus 6%); the study notes that there were only 8 deaths among non-white Mound residents during the 19-year study period. So the study findings indicate only that the death rate was higher in a lower-income, more racially diverse area than in Mound.^{viii}

Higher premature death rates occur in areas of concentrated poverty and racial segregation so the implication in the Bottineau area study that higher death rates result from air pollution is not supported

Deaths that occur before age 65 are considered premature and preventable so they serve as a key marker for health inequity.^{ix} At the neighborhood level across Minneapolis, the proportions of residents of color and of those who live below 200% of poverty are both strongly correlated with the neighborhood premature death rate and are presented on the following table.^x The premature death rate per 1000 residents is color coded (bright green for 1.0 or lower; light green for 1.01-2; yellow for 2.01-3; light red for 3.01-4; and deep red for more than 4).^{xi} Hawthorne (4.8) and McKinley (3.9) are in the higher ranges, but both lower than Sumner Glenwood (5.5), further from the area of concern identified in the Bottineau Neighborhood Association study. Bottineau (2.6) and Marshall Terrace (2.2) are mid-range. This analysis is not intended to minimize community concerns related to environmental hazards. Addressing social and environmental determinants of health is a priority for the Minneapolis Health Department and we welcome community engagement and partnership to improve the health of all residents.

Minneapolis Neighborhoods (excluding industrial areas)	% Of Color ACS 2011-2015^x	%< 200% poverty ACS 2011-2015^x	Annual premature death rate per 1000 residents, 2006-2015
Armatage	17.3	15.6	1.3
Audubon Park	23.1	24.3	1.8
Bancroft	37.7	33.3	1.4
Beltrami	38.9	44.1	2.6
Bottineau	38.5	43.4	2.6
Bryant	69.5	49.5	2.1
Bryn - Mawr	17.0	10.8	1.0
CARAG	10.1	22.0	1.7
Cedar - Isles - Dean	11.9	11.9	0.4
Cedar Riverside	64.7	75.3	1.9
Central	75.1	60.2	2.1
Cleveland	48.5	50.9	2.5
Columbia Park	24.9	32.2	1.8
Como	36.9	65.5	1.9
Cooper	18.3	14.3	1.3
Corcoran	50.3	47.4	2.3
Diamond Lake	24.6	21.6	1.4
Downtown East	45.7	26.5	2.6
Downtown West	43.9	34.1	2.6
East Harriet	12.1	14.0	1.2
East Isles	10.1	15.7	1.0
East Phillips	84.7	69.9	3.6
ECCO	12.0	15.7	0.6
Elliot Park	42.9	58.5	3.0
Ericsson	11.9	17.1	1.8
Field	25.2	14.3	1.9
Folwell	71.5	53.0	3.4
Fulton	9.8	7.4	1.1
Hale	10.4	9.9	0.8
Harrison	69.0	57.5	3.0
Hawthorne	81.4	75.2	4.8
Hiawatha	16.4	24.0	2.0
Holland	52.8	60.1	3.3
Howe	21.1	26.1	2.1
Jordan	81.7	64.6	4.2
Keewaydin	18.3	11.7	1.4
Kenny	14.8	15.3	1.0
Kenwood	11.9	11.9	0.4
King Field	19.0	19.1	1.6
Lind - Bohanon	58.3	44.0	2.8
Linden Hills	15.5	13.8	1.1
Logan Park	30.9	41.6	3.5
Longfellow	37.0	37.8	2.9

Minneapolis Neighborhoods	% Of Color	%< 200% poverty	Annual premature death rate
Loring Park	30.3	44.6	2.5
Lowry Hill	14.4	14.7	1.5
Lowry Hill East	24.0	37.4	1.6
Lyndale	45.8	48.9	2.1
Lynnhurst	11.1	9.3	0.8
Marcy Holmes	26.5	67.2	1.6
Marshall Terrace	31.3	42.6	2.2
McKinley	78.0	55.8	3.9
Midtown Phillips	75.4	51.5	2.7
Minnehaha	21.2	21.3	1.6
Morris Park	23.1	27.9	2.0
Near - North	87.9	71.4	4.4
Nicollet Island-East Bank	21.8	12.0	1.8
North Loop	25.3	24.6	1.8
Northeast Park	38.9	44.1	4.6
Northrop	17.8	17.2	1.3
Page	11.9	7.6	0.6
Phillips West	80.1	80.6	3.5
Powderhorn Park	53.9	49.1	2.2
Prospect Park - East River Road	29.3	59.0	1.7
Regina	42.0	22.6	2.8
Seward	46.4	54.0	2.0
Sheridan	33.1	41.3	2.9
Shingle Creek	59.3	40.0	2.7
St. Anthony East	41.1	55.8	3.5
St. Anthony West	12.7	24.0	1.5
Standish	29.7	29.7	1.7
Steven's Square-Loring Heights	37.6	58.3	3.5
Sumner - Glenwood	91.3	78.5	5.5
Tangletown	17.8	12.0	0.8
University of Minnesota	33.1	87.5	0.3
Ventura Village	78.6	81.1	3.7
Victory	37.8	28.7	2.1
Waite Park	14.5	20.1	1.8
Webber - Camden	60.6	56.5	3.7
Wenonah	39.6	34.2	2.3
West Calhoun	14.6	16.8	1.0
Whittier	45.1	54.8	2.7
Willard - Hay	78.5	56.1	3.6
Windom	28.2	25.7	1.9
Windom Park	20.1	23.8	2.5
TOTAL (includes 3 deaths of unknown residence)	39.7	40.3	2.0

ⁱ Authors were not identified and a date of release was not provided in the copy of the report reviewed by the Minneapolis Health Department.

ⁱⁱ The Bottineau Neighborhood Association study defined the “Lowry Bridge area” as census tracts “17, 1005, 1009, and 1016” corresponding to Bottineau, Marshall Terrace, McKinley, and Hawthorne respectively.

ⁱⁱⁱ <http://www.mayoclinic.org/diseases-conditions/lung-cancer/basics/risk-factors/con-20025531>

^{iv} <http://thorax.bmj.com/content/54/4/301>

^v CDC. National Center for Health Statistics. CDC Wonder On-line Database. 1999-2009. 2012. Series 20. No. 20.

<http://wonder.cdc.gov/>

^{vi} Note: The only race-related analyses presented in the Bottineau Neighborhood Association study were comparisons of whites and non-whites *within* the Lowry Bridge area census tracts.

^{vii} <http://www.city-data.com/city/Mound-Minnesota.html>; (<http://www.mncompass.org/profiles/city/mound>;

<http://www.mncompass.org/profiles/neighborhoods/minneapolis/bottineau>;

<http://www.mncompass.org/profiles/neighborhoods/minneapolis/hawthorne>;

<http://www.mncompass.org/profiles/neighborhoods/minneapolis/marshall-terrace>;

<http://www.mncompass.org/profiles/neighborhoods/minneapolis/mckinley>)

^{viii} An additional limitation relates to attributing a cause of death to location of residence at death, especially when examining deaths over a 19-year period as in the Bottineau Neighborhood Association study. In Mound, 32% of the population had moved into their residence since 2010, in the Bottineau neighborhood 53%, in Hawthorne 51%, in Marshall Terrace 38%, and in McKinley, 53%.

(<http://www.mncompass.org/profiles/city/mound>; see endnote vii for neighborhood links.

^{ix} Because the Bottineau Neighborhood Association study also addressed lung cancer deaths, Health Department researchers also calculated all lung cancer deaths by neighborhood for the 10-year period from 2006-2015. The age adjusted annual rate of lung cancer deaths by neighborhood ranged from 0.1 to 1.1 per 1000 residents. This data table is available upon request.

^x Neighborhood race and poverty data are available at the links provided in endnote vii. Pearson’s correlation coefficient for the neighborhood-level premature death rate with race is 0.79 and for the premature death rate with the poverty measure 0.68.

^{xi} The Bottineau Neighborhood Association study calculated death rates as number of deaths per 100,000 residents. The comparison areas used for the Bottineau study had populations close to 10,000, or much smaller when further broken down by gender or race. Only two Minneapolis neighborhoods have populations that exceed 10,000 residents. Health Department researchers prefer to use the denominator of 1,000 since the resulting rates are more intuitive and do not magnify differences exponentially. A rate of 5 per 1000 is equivalent to a rate of 500 per 100,000.

This report was prepared by the Minneapolis Health Department, Research and Evaluation Division

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