

Examining Chronic Disease Mortality Rates in Cleveland, Ohio through Geographic Information Systems (GIS) Mapping, 2008-2012

David Bruckman, MS, MT, Vinothini Sundaram, MPH, Jana Rush, MPH, MA
 Brent Styer, MPH, Mone' Whatley, MSHCA, REHS, RS
 Cleveland Department of Public Health



BACKGROUND

The Cleveland Department of Public Health (CDPH) recognizes the importance of chronic disease indicators for the City of Cleveland. In particular, CDPH has a strong focus on minority health due to the city's largely minority population. 53.3% of the population in Cleveland is Black/African-American (B/AA)¹. Based on 2005-2009 Cleveland-Cuyahoga County Behavioral Risk Factor Surveillance System (BRFSS) data for the City of Cleveland, the B/AA population had high prevalence rates of hypertension and obesity. Hypertension prevalence among B/AA was at 40.8%² and obesity prevalence was at 42.3%³; both rates were significantly higher when compared to rates among Whites. With hypertension and obesity being high risk factors for heart disease and stroke, CDPH did a closer examination of overall mortality, heart disease mortality and stroke mortality data at the neighborhood level in the City of Cleveland.

METHODS

The CDPH recently participated in the National Association of Chronic Disease Directors (NACDD) Geographic Information Systems (GIS) Training for Surveillance of Heart Disease, Stroke, and Other Chronic Diseases in Local Health Departments, supported by the University of Michigan and the Center for Disease Control and Prevention. Maps were created under the guidance of the training. Data were mapped across 34 statistical planning areas (neighborhoods) in Cleveland. Data was obtained from Ohio Department of Health and CDPH, Office of Biostatistics. SAS (SAS Institute, Cary, NC) and ArcGIS v.10.1 (Esri, Redlands, CA) software were used in calculating rates and mapping the data, respectively. The maps are based on average annual-age adjusted mortality rates over the five year period (2008-2012) in the City of Cleveland's statistical planning areas (SPA) as neighborhoods. Rates were age-adjusted to the 2000 U.S. standard population. Rates are per 100,000 population. Heart disease deaths were defined using the following ICD-10 codes: I00-I09, I11, I13, I20-I51. Stroke deaths were defined using the following ICD-10 codes: I60-69. The maps also include all hospitals in the City of Cleveland in order to provide heart disease and stroke mortality data as it relates to hospital locations.

RESULTS

The average annual rate of stroke mortality in Cleveland was 46.8 per 100,000. Among Whites, there were no neighborhoods with significantly higher stroke mortality rates than the city's average. However, among B/AA, non-adjacent neighborhoods of Edgewater, Union-Miles, and Glenville had stroke mortality rates that were significantly higher than the city's average. The average rate of heart disease mortality in Cleveland was 268.3 per 100,000, higher than state and national averages. Overall, nine neighborhoods had heart disease mortality rates that were significantly higher than the city's average; one was higher among White and B/AA, four for White only (three adjoining), and four others for B/AA populations (none-adjoining).

A key takeaway from the data is that neighborhoods that had relatively lower B/AA populations had among the highest rates of heart disease mortality among Blacks. These neighborhoods include Cudell (34%), Ohio City (35%), Goodrich-Kirtland Pk. (24%), and University (23%). Also, despite the neighborhood of Edgewater having only 21% of its population being B/AA, it also has among the highest rates of stroke mortality among B/AA (165.6). These neighborhoods are seeing a high burden of chronic disease among its B/AA population, and more prevention & education is needed in these communities.

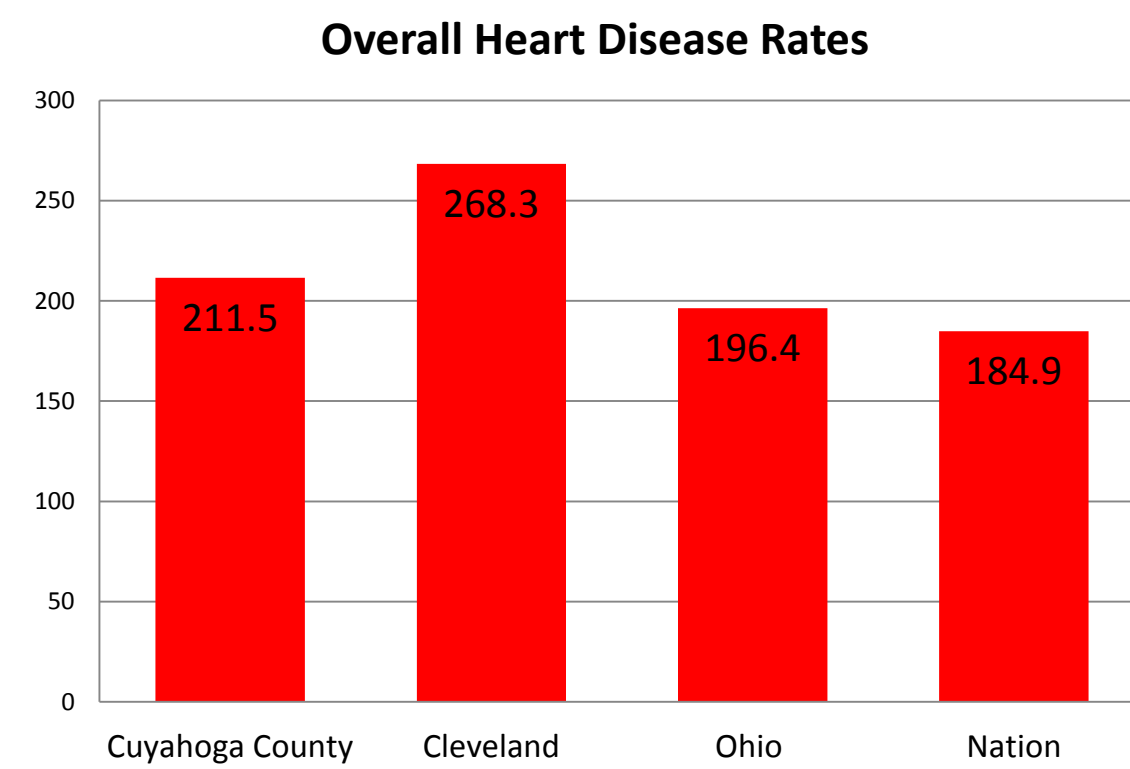
PUBLIC HEALTH ACTION

These findings are important in helping CDPH identify high priority neighborhoods for chronic disease interventions and education. The use of GIS mapping provides a visual presentation of the findings that appeal to the general public. Through the NACDD grant, CDPH will be working with the local chapter of the American Health Association, the Cuyahoga County Office of the Chief Executive, and Better Health Greater Cleveland at Metro Health Hospital System to create and disseminate culturally sensitive materials based on the maps. CDPH will also be working with its own Office of Minority Health to disseminate maps to the community through social media, flyers, and the Annual Minority Health Report for the City of Cleveland.

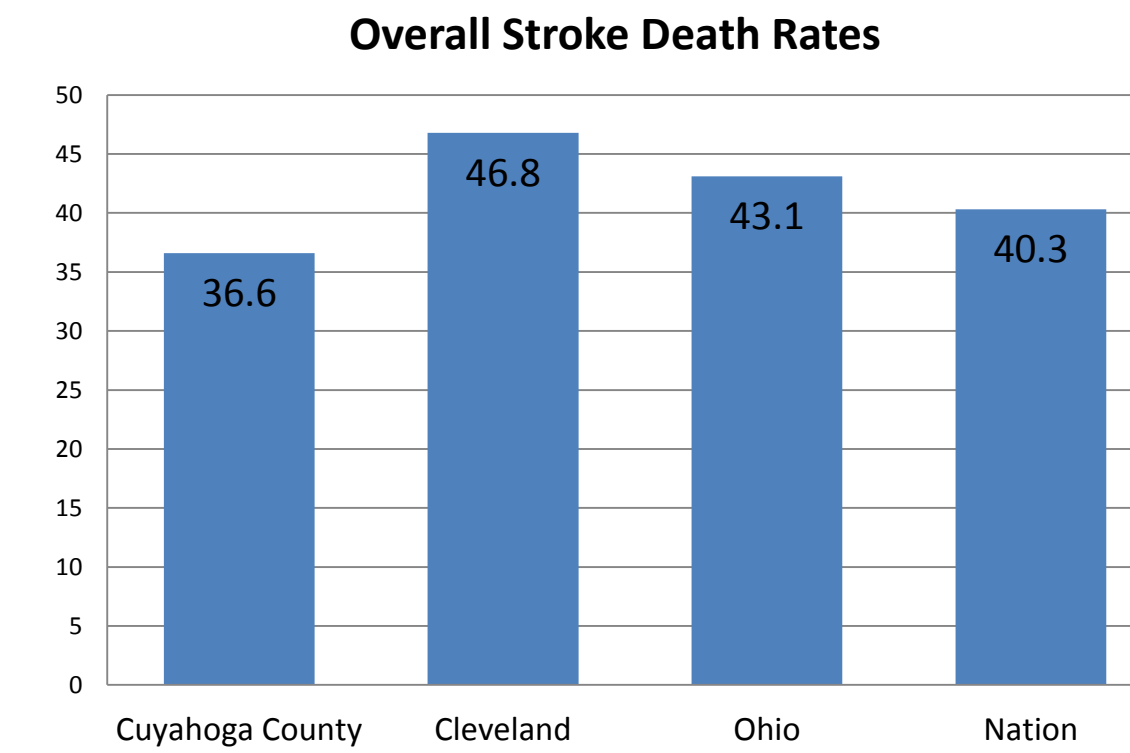
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¹United States Census Bureau. (2010). Profile of General Population and Housing Characteristics: Cleveland City. Retrieved from American Fact Finder : <http://factfinder.census.gov/>
²Bruckman D, Jewett-Tennant J & Borawski E. (February 2012). Data Brief: Adult Hypertension in Cleveland Neighborhoods, (2005-2009). Cleveland, OH: Prevention Research Center for (United States Census Bureau, 2010)Healthy Neighborhoods at Case Western Reserve University.
³Bruckman D, Jewett-Tennant J & Borawski E. (February 2012). Data Brief: Adult Obesity in Cleveland Neighborhoods, (2005-2009). Cleveland, OH: Prevention Research Center for Healthy Neighborhoods at Case Western Reserve University.
⁴Neighborhood Level Population Data was provided by Cleveland City Planning Commission. Data from United States Census Bureau 2010 Decennial Census & American Community Survey 2006 to 2010 5-Year Estimates.

HEART DISEASE MORTALITY RATES



STROKE MORTALITY RATES



OVERALL POPULATION, BY NEIGHBORHOOD*

Neighborhood	Total Pop	Whites Pop (% total pop)	Blacks Pop (% total pop)	Neighborhood	Total Pop	Whites Pop (% total pop)	Blacks Pop (% total pop)
Bellaire-Puritas	13365	8153 (61)	3475 (26)	Hopkins	283	176 (62)	68 (24)
Broadway-Slavic Village	22432	9198 (41)	11665 (52)	Hough	11475	230 (2)	11016 (96)
Brooklyn Centre	8954	5104 (57)	1881 (21)	Jefferson	16548	11584 (70)	2814 (17)
Buckeye-Shaker Square	12470	1622 (13)	10101 (81)	Kamm's	25170	20388 (81)	2769 (11)
Buckeye-Woodhill	6657	134 (2)	6391 (96)	Kinsman	6987	70 (1)	6778 (97)
Central	12306	493 (4)	11568 (94)	Lee-Harvard	10326	104 (1)	10017 (97)
Clark-Fulton	8548	4360 (51)	1625 (19)	Lee-Seville	4496	45 (1)	4362 (97)
Collinwood-Nottingham	11542	1155 (10)	10042 (87)	Mount Pleasant	17320	174 (1)	16974 (98)
Cudell	9288	4459 (48)	3158 (34)	North Shore Collinwood	15768	4888 (31)	10407 (66)
Cuyahoga Valley	969	582 (60)	349 (36)	Ohio City	8736	4456 (51)	3058 (35)
Detroit Shoreway	11567	6594 (57)	2429 (21)	Old Brooklyn	32009	26248 (82)	2561 (8)
Downtown	9464	4165 (44)	4165 (44)	St.Clair-Superior	6876	1101 (16)	5432 (79)
Edgewater	5850	4095 (70)	1229 (21)	Stockyards	10372	5809 (56)	1971 (19)
Euclid-Green	5533	332 (6)	5091 (92)	Tremont	7948	4769 (60)	1828 (23)
Fairfax	6239	125 (2)	5927 (95)	Union-Miles	19004	190 (1)	18434 (97)
Glenville	27268	273 (1)	26450 (97)	University	7920	4356 (55)	1822 (23)
Goodrich-Kirtland Pk.	4238	1653 (39)	1018 (24)	West Boulevard	18888	10955 (58)	3967 (21)

