Is the High Ischemic Heart Disease Mortality Rate in New York State Just an Urban Effect?

LOUISE-ANNE McNUTT, PhD
DAVID S. STROGATZ, PhD
F. BRUCE COLES, DO
LAURA J. FEHRS, MD

Dr. McNutt was assigned to the Bureau of Adult and Gerontological Health, New York State Department of Health, Albany, by the Division of Field Epidemiology, Epidemiology Program Office, Centers for Disease Control and Prevention, Atlanta, GA. Dr. Strogatz is also with Bureau of Adult and Gerontological Health as well as the Department of Epidemiology, School of Public Health, State University of New York at Albany. Dr. Coles is with the Bureau of Communicable Disease Control, State Department of Health and the Department of Epidemiology, School of Public Health, State University of New York. Dr. Fehrs is with the Division of Field Epidemiology, Centers for Disease Control and Prevention.

Tearsheet requests to Dr. Laura J. Fehrs, Divsion of Field Epidemiology, Epidemiology Program Office, Mail Stop C08, Centers for Disease Control and Prevention, Atlanta, GA 30333; tel. 404-639-2226.

Synopsis

To determine whether New York State's high ischemic heart disease mortality rate was due primarily to an urban effect, rates for regions in the State were compared with each other and with national data.

New York State mortality rates for the period 1980–87 were highest for New York City (344.5 per 100,000 residents), followed by upstate urban and rural areas (267.1-285.1), and New York City suburbs (272.5). However, the overall 1986 age-adjusted rate for the New York State region with the lowest mortality rate (265.7) exceeded that of 42 States.

New York State's number one ischemic heart disease mortality ranking reflects the need for statewide intervention programs, because even regions with relatively low mortality rates are high when they are compared with national rates.

BECAUSE NEW YORK STATE has the highest reported State-specific mortality rate from ischemic heart disease (IHD) (*1–8*), IHD prevention has become a State public health priority. The State health department uses various methods to target prevention programs, including comparison of mortality rates by geographic regions.

Previous national studies of the geographic distribution of IHD mortality have shown that urban centers have the highest rates in most regions (*9*). Because approximately half the population of New York State resides in New York City, it is not clear whether the State's high IHD mortality rate is due simply to the effect of this large urban area or if residents across New York State are at excess risk for IHD mortality.

To evaluate this problem, we classified geographic areas in New York State by urban status and computed IHD mortality rates. We also compared regional IHD mortality rates within New York State with national data for States.

Methods

New York State's IHD mortality data were drawn from computerized death records provided by the National Center for Health Statistics of the Public Health Service (*10*). Mortality due to IHD was defined as the death of any New York State resident from 1980 through 1987 with an underlying cause listed as codes 410-414 and 429.2 of the International Classification of Disease, 9th edition, Clinical Modification (ICD-9-CM) (*11*). The IHD mortality data were aggregated by county of residence. A standard set of intercensal population estimates, by county, was used (*12*).

The 62 New York State counties were divided into seven urbanization levels, a surrogate for population

Table 1. Levels of urbanization in New York State, based on the place with largest population in the county and percentage of persons who commute to work outside the county

Level	Population	Commute	Number of counties
New York City	>200,000	...	5
New York City suburbs	>200,000	...	4
Upstate urban	>200,000	...	9
Rural 1: Extensive urban influence	≥10,000	≥20 percent	11
Rural 2: Considerable urban influence	≥10,000	≥20 percent	12
Rural 3: Moderate urban influence	<10,000	≥20 percent	14
Rural 4: Limited urban influence	<10,000	<20 percent	7

Figure 1. New York State age-adjusted rates of ischemic heart disease (ICD–9 codes 410–414, 429.2) by urbanization level of the population ages 35–74 years, combined for 1980-87

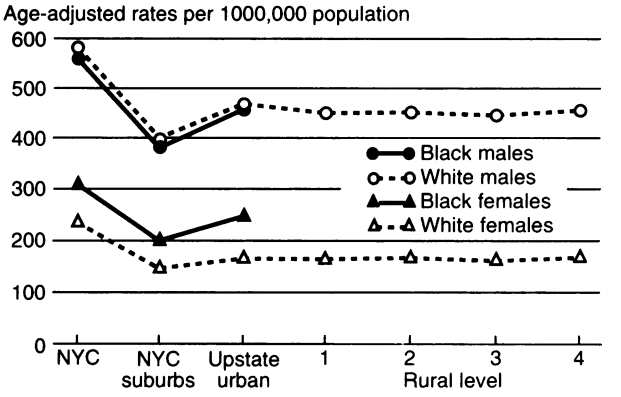


Table 2. Age-adjusted mortality rates per 100,000 population adjusted to estimated 1986 population for ischemic heart disease (ICD-9 codes 410-414,429.2) in selected States and regions of New York State, 1986

Place	Deaths	Rate
Selected States[1]:		
New York (1)	58,473	302.8
North Carolina (10)	15,207	258.4
Wisconsin (20)	13,014	245.8
Connecticut (30)	8,027	228.8
Texas (40)	27,396	203.0
Hawaii (51)	1,403	166.2
Regions of New York:		
New York City	27,537	344.4
New York City suburbs	10,306	272.5
Upstate urban	11,114	278.1
Rural level 1	3,222	276.2
Rural level 2	3,410	276.7
Rural level 3	1,790	265.7
Rural level 4	1,094	285.1

[1]Reproduced in part from reference *15*. Number in parentheses is ranking of that State for IHD mortality.

density, according to an algorithm discussed in detail elsewhere (*13*). In brief, the 18 counties with more than 200,000 residents were placed into one of three urban groups—New York City, suburban counties surrounding New York City, and upstate urban counties. The remaining 44 counties were defined as rural and divided into four groups according to (*a*) size of the largest place in the county (10,000 or more, or less than 10,000) and (*b*) percentage of the work force that commuted outside the county of residence for employment (20 percent or more, or less than 20 percent) (table 1).

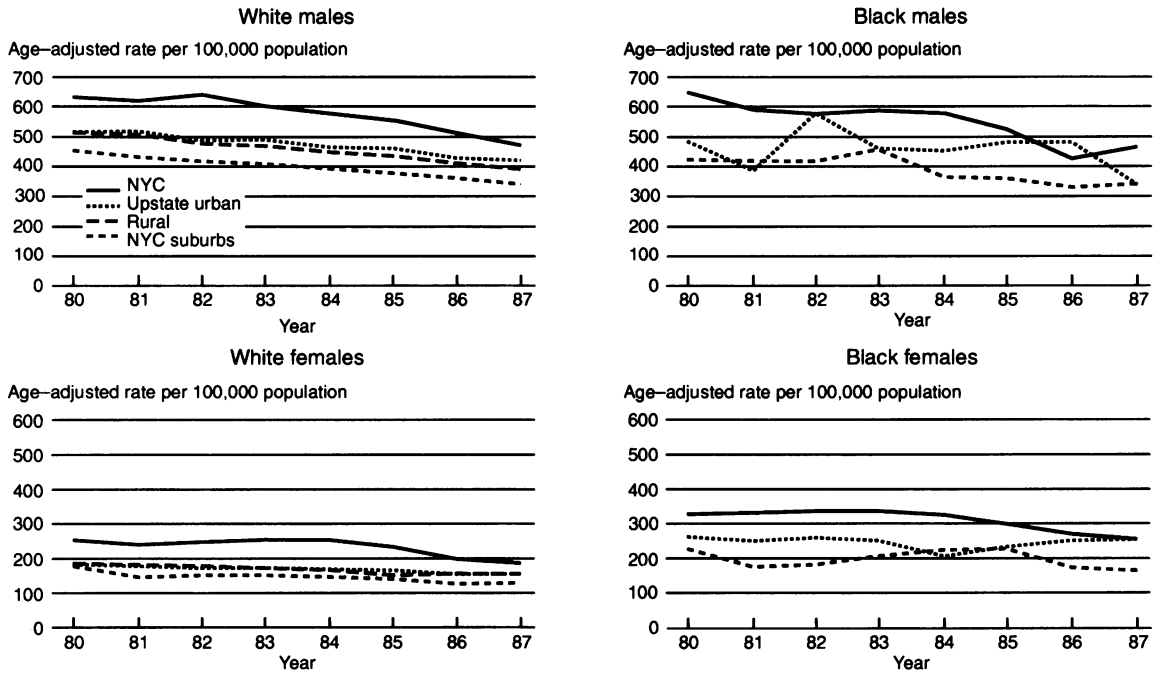
Using direct standardization, we calculated age-adjusted, sex- and race-specific IHD mortality rates for persons ages 35–74 years for each of the seven levels of urbanization (*14*). Adjusted rates were calculated for each year from 1980 to 1987 and for the period 1980–87 combined, standardized to the 1970 United States population by 5-year age intervals (that is, 35–39, 40–44, and so forth). Sex- and race-specific analyses were limited to white and black persons. For blacks, analyses were limited to the three urban levels, since few blacks in New York live in rural areas.

We compared age-adjusted IHD mortality rates for different urban levels in New York State to the overall age-adjusted rates for the other 49 States. Nationally published data for IHD mortality (ICD-9-CM codes 410-414, 429.2) were available for 1986 (*15*). These published data were directly standardized to the 1986 estimated United States population (*12*). The 1986 New York State IHD (ICD-9-CM 410-414, 429.2) mortality rates were recreated using the same methods so that unbiased comparisons could be made.

Results

New York State's overall IHD mortality rate for the period 1980–87 combined was 335 per 100,000. New York City had the highest age-adjusted IHD mortality rates for all sex-race combinations (fig. 1). IHD mortality rates were lowest for New York City suburbs. For regions other than New York City and its suburbs, no pronounced differences were noted between urban and rural regions (fig. 1). IHD mortality rates in urban areas were similar for black men and white men but higher for black women than white women. Plotting the age-adjusted, sex- and race-specific IHD mortality rates for each year

Figure 2. New York State age–adjusted rates of ischemic heart disease (ICD–9 codes 410–414, 429.2) for persons ages 35–74 by race, sex, year, and urbanization level



(1980–87), with all rural areas combined into one category, showed that the pattern of mortality by level of urbanization was fairly consistent over time (fig. 2).

IHD mortality rates and rankings for 1986 were compared with all States (table 2). New York State had an overall IHD age-adjusted mortality rate of 302.8, the highest of all States; North Carolina was tenth, with a rate of 258.4, and Hawaii was lowest, with a rate of 166.2. The lowest regional IHD mortality rate in New York State (265.7) would be in the top quintile of rates for States in 1986.

Discussion

New York State has lead the nation in IHD mortality throughout the 1980s (*1–8*). Studies of white males ages 35–74 years have shown that IHD mortality in the Northeast is highest in urban centers and lowest in the suburbs of these centers, with little variation between differing levels of urbanization for rural areas (*9*). Results in this study for New York City, its suburbs, and upstate rural areas are consistent with previous studies on the association between IHD mortality and urbanization level. However, New York State's high ranking for IHD mortality is *not* due solely to the effect of mortality in New York City; the New York region with the lowest IHD mortality rate in 1986 was surpassed in mortality by only eight States.

'New York State's high ranking for IHD mortality is not *due solely to the effect of mortality in New York City; the New York region with the lowest IHD mortality rate in 1986 was surpassed in mortality by only eight States.'*

The reasons for high IHD mortality in New York City (relative to other regions) and New York State (relative to other States) are not clear. One potential explanation, geographic variation in the level and management of risk factors, is not supported by recent State and national data.

Within New York State, a telephone survey of risk factors and preventive behaviors did not reveal clear differences between white adults living in New York City versus those in rural upstate communities (*16*). The Behavioral Risk Factor Surveillance System disclosed that New York State ranked first among 33 States in sedentary lifestyle of its residents, but 22nd for obesity and 26th for smoking (*17,18*). Others have reported that adjustments for standard cardiovascular risk factors did not account for the geographic variation in IHD mortality observed in the United States (*19*). The data on risk factors do not include

measures of access to medical services for clinically manifested heart disease; regional differences in access to these services could contribute to geographic variation in IHD.

A final explanation for the observed variation in IHD mortality could be differences in coding practices rather than mortality per se. The incorporation of ICD-9 code 429.2 (that is, unspecified cardiovascular disease) in the definition of IHD mortality for this analysis probably reduces the impact of information bias on these results (*9*).

It is important to target disease intervention programs toward groups with the greatest need. Determining which groups may benefit from such programs is affected by study design and choice of comparisons. In the case of IHD in New York State, a study focused solely on State data might discount the risk of IHD mortality for communities in areas other than the major urban center. Yet when compared with other States, communities in all areas of New York State have a substantially increased risk of death due to IHD, which merits intervention efforts and further investigation.

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