MORTALITY IN HARTFORD, CONNECTICUT: A COMPARISON WITH THE SOUTH BRONX, NEW YORK

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ABSTRACT Very high mortality rates have been reported in large inner-city areas such as the South Bronx and Harlem in New York City, but also may occur in smaller US urban areas. Using published death rates for the South Bronx as the standard, the standardized mortality ratio was slightly lower than 1.00 for Hartford, Connecticut (population 139,739 in 1990), but more than 1.00 for three impoverished Hartford census tracts that contained public housing projects. Compared with the South Bronx, death rates in Hartford were lower for human immunodeficiency virus (HIV), injury-homicide, and alcohol-drugs, but higher for hypertension-stroke (in all three tracts) and cancer (in two of the three tracts). Variations in patterns of causes of death among impoverished US urban areas have implications for planning epidemiologic studies and targeting interventions.

KEY WORDS Causes of death, Death rates, Epidemiology, Mortality, Urban health.

Studies have shown very high mortality rates in areas of New York City, including Harlem^{1,2} and the South Bronx.³⁻⁶ Mortality patterns have been compared among several large, impoverished urban areas in the US, and such comparisons are important for planning public health interventions.² The South Bronx has been described as an "archetype of inner-city America."² Can smaller cities, or subareas within such cities, attain the very high mortality rates usually associated with larger urban areas? In 1990, Hartford, Connecticut (population 139,739 in 1990), had a poverty rate greater than 20% (the criterion for federal poverty areas) and large proportions of minorities (blacks and Hispanics). Also, like the South Bronx and Harlem,^{7,8} Hartford has public housing projects. This study compares death rates and causes of death in Hartford census tracts that contained the largest public housing projects in that city with published data for the South Bronx³;

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mortality data were not available for subareas of the South Bronx that included public housing projects.

MATERIALS AND METHODS

STUDY AREAS AND SOCIODEMOGRAPHICS

Hartford had an overall poverty rate in 1990 (27.5%) that was high enough for the city to be classified as a federal poverty area by the US Bureau of the Census, but lower than the 45.9% figure for the South Bronx (Table I). In Hartford in 1990, the proportion of blacks in the population (38.9%) was close to that for (non-Hispanic) blacks (38.4%) in the South Bronx,³ but the proportion of Hispanics was lower.

Subareas of Hartford initially selected for study were the four census tracts that contained at least one public housing project with at least 300 housing units. However, one tract was excluded from this study of impoverished areas because the poverty rate, or proportion of persons with incomes below the federal poverty threshold (defined by income in relation to the composition of the household or family), was only 18%. This is lower than the 20% figure used in the 1990 census to define poverty areas. The poverty rate in the other three tracts, including two contiguous tracts (5009 and 5010), was more than 50% (Table I).

TABLE I Selected Sociodemographic Characteristics of Hartford, Connecticut, and the South Bronx, New York* (1990 Census Data)

Variable	Hartford				South Bronx*
	Entire City	Census Tract			
		5009	5010	5046	
Population, number	139,739	2,111	3,291	4,060	470,703
Male sex, %	47.7	45.6	43.5	44.2	46.6
Income, %:					
Below poverty†	27.5	73.6	69.5	52.7	45.9
<50% poverty‡	12.8	41.3	38.2	12.9	25.9
Age, %:					
<35	62.5	75.5	76.8	77.2	65.4
35-64	27.7	20.7	18.9	20.0	28.3
65+	9.9	3.8	4.2	2.8	6.3
Black, %	38.9	50.3	77.7	30.6	38.4
Hispanic,§ %	31.6	52.4	40.5	67.6	57.3

*From Fang *et al.*³

†Income below federal poverty threshold (see text).

‡Income less than 50% of poverty threshold.

§Hispanics can be of any "race" in the US Census.

The proportion of the population that was black was slightly lower in tract 5046 (31%) than the citywide figure of 39%, but the proportion was higher for two other Hartford tracts (Table I). However, black-white differences in socioeconomic status (SES) explain part of the racial disparity in mortality.⁹ Hispanics comprised large proportions of the populations of the three Hartford tracts and the South Bronx. The proportion of younger residents was higher in the Hartford tracts than in the South Bronx (Table I), but age differences were taken into account in the mortality analyses. In the 1990 census, about 40–60% of residents of the three tracts reportedly had lived in the same house in 1985 (data not shown). The housing projects comprised virtually all housing units for census tract 5046 and an estimated 50% of units for each of the other two tracts.

DATA ANALYSIS

Mortality rates for the South Bronx have been published for 1988–1992.³ Data on deaths among Hartford residents also were available for 1988–1992, but data on census tract of residence had not been computerized for deaths in 1992. Age-specific total (all-cause) death rates in Hartford (as in the report for the South Bronx)³ were calculated for ages less than 35, 35–44, 45–54, 55–64, 65–74, and 75+ years. Data from the 1990 census for Hartford were used as estimates of the populations (by age and sex) in Hartford and each of the three census tracts for each year of the period. Age-specific death rates for selected major causes of death, as reported for the South Bronx,³ also were calculated for Hartford.

Because the numbers of deaths in each of the three Hartford census tracts were small, age-specific death rates by cause of death are not presented. Rather, the ratios of observed-to-expected numbers of deaths (standardized mortality ratio, SMR) were calculated. Expected numbers were obtained by multiplying the age-specific and sex-specific populations of each tract by the corresponding sex-, age-, and cause-specific death rates (1988–1992) published for the South Bronx.³ The SMRs involve indirect adjustment for age, which is more appropriate than direct adjustment when small numbers of deaths in each age group (as in this study) would result in statistically unreliable age-specific death rates.

Categories of underlying cause of death, coded to the International Classification of Diseases (ICD), ninth revision, available for the South Bronx³ were human immunodeficiency virus (HIV; ICD codes 042–044), neoplasms (140–239), coronary heart disease (CHD; 410–414), hypertensive heart disease and stroke (401–404, 430–438), and alcohol and drug abuse (291–292, 303–305, 571). The category “symptoms, signs and ill-defined conditions” (780–799), not reported for the

South Bronx,³ also was analyzed for Hartford as a potential indicator of poor access to primary medical care.¹⁰

Death rates were not calculated for blacks and Hispanics in Hartford because data on blacks were not published for the South Bronx,³ and rates for Hispanics in Connecticut are underestimated due to under-reporting of Hispanic ethnicity on death records.¹¹

For Hartford, 95% confidence intervals (CIs), based on either the Poisson or normal distribution,¹² were used to assess the statistical significance of SMRs and to calculate 95% confidence limits for age-specific death rates (not shown, but available on request).

RESULTS

Age-specific total death rates (all causes of death combined) were consistently lower in the city of Hartford than in the South Bronx (Table II). However, the difference was largest in the youngest age groups (especially for males) and smaller for ages 45–54 to 65–74 years; for ages 75+ years, rates were higher in Hartford than in the South Bronx.

TABLE II Age-specific Death Rates (per 100,000 per Year), All Causes of Death Combined, in Hartford, Connecticut, and the South Bronx, New York*

	Hartford			South Bronx 1988–1992*
	Entire City, 1988–1992	Census Tracts, 1988–1991		
		5009 and 5010	5046	
Age <35				
Males	251	261	424	377
Females	113	216	135	171
Age 35–44				
Males	740	1,176	1,408	1,505
Females	310	872	434	495
Age 45–54				
Males	1,360	2,752	2,055	1,626
Females	566	746	662	609
Age 55–64				
Males	2,002	3,125	2,273	2,436
Females	1,191	2,143	549	1,336
Age 65–74				
Males	3,346	9,545	7,292	4,739
Females	1,817	2,247	2,041	2,334
Age 75+				
Males	10,187	9,375	8,824	8,326
Females	8,417	8,824	10,870	6,885

*From Fang *et al.*³

Because total death rates (data not shown) were similar for the two contiguous Hartford tracts (5009 and 5010), these two tracts were combined (Table II). For ages 35–44 and older, death rates for both males and females in tracts 5009/5010 were (with a few exceptions) higher than those for the South Bronx. For tract 5046, with smaller numbers of deaths, total death rates in most age groups also were higher than those for the South Bronx.

Using cause-specific death rates for the South Bronx³ as the standard, the all-cause SMR for males and females was slightly less than 1.00 (*i.e.*, 0.91) for Hartford (Table III). The SMRs for Hartford were low for HIV, CHD, injury-homicide, and alcohol-drugs, but not for cancers and hypertension-stroke (Table III).

All-cause SMRs were more than 1.00 for tracts 5009/5010 (1.20, $p < .05$) and 5046 (1.06) due to higher death rates than in the entire city of Hartford for some of the cause categories examined (*i.e.*, HIV, hypertension-stroke, injury, and alcohol-drugs). The SMRs were more than 1.00 for cancer ($p < .05$) and hypertension-stroke (but not CHD) in tracts 5009/5010, and slightly more than 1.00 for hypertension-stroke in tract 5046. Numbers of deaths were small, but higher death rates for cancer in tracts 5009/5010 than in the South Bronx were found in all age groups (data not shown).

For ill-defined causes of death (data not shown), using Hartford rates as the standard, numbers of deaths were higher than expected in tracts 5009/5010 (10 deaths, SMR = 1.93, 95% CI = 0.92–3.53) and tract 5046 (10 deaths, SMR = 2.76, 95% CI = 1.32–5.08).

TABLE III Standardized Mortality Ratios (SMRs) for Census Tracts in Hartford, Connecticut, with Public Housing Projects, Both Sexes Combined, Using Death Rates for the South Bronx, New York,* as the Standard

Cause†	Hartford: Entire City		Tracts 5009 and 5010‡		Tract 5046‡	
	Deaths	SMR	Deaths	SMR	Deaths	SMR
HIV	257	0.37§	13	0.53	8	0.60
Neoplasms	1,334	1.18§	33	1.88§	10	0.91
CHD	1,112	0.71§	13	0.64	13	1.11
Hypertension	460	1.11§	9	1.70	5	1.24
Injury	499	0.71§	17	0.85	10	0.66
Alcohol, drugs	115	0.37§	4	0.59	3	0.59
All causes	6,490	0.91§	157	1.20§	94	1.06

*From Fang *et al.*³

†HIV = human immunodeficiency virus; CHD = coronary heart disease; hypertension includes stroke; injury includes homicide (see text for cause-of-death codes included).

‡Data for census tracts in Hartford are for 1988–1991 (see text).

§SMR significantly ($p < .05$) different from 1.00 based on 95% confidence limits (not shown).

DISCUSSION

These data show that Hartford (with a population of <150,000), with a lower poverty rate than the South Bronx, had total mortality rates slightly lower than those for the South Bronx, although detailed comparisons are needed of death rates for both Hispanics and blacks in the two cities. Analyses for the three Hartford census tracts that contained public housing projects were based on small numbers of deaths, with wide confidence limits (not shown) in death rates. Nevertheless, these areas within Hartford had total death rates higher than in the South Bronx (Tables II and III). These higher rates could reflect (at least in part) poverty rates even higher than that for the South Bronx (Table I). High death rates among blacks may be related to concentration of blacks in high-poverty areas due to black-white residential segregation,¹³ but race-specific analyses of mortality are needed. Of course, subareas within the South Bronx (*e.g.*, those with public housing projects) could have had even higher death rates, but data were not available to examine this issue.

The impact of HIV, injuries-homicides, and substance abuse on total mortality, especially in young adult males, is great in many inner cities.^{2,3} These causes were more prominent in the South Bronx than in Hartford, but numbers of deaths in the three Hartford tracts studied more closely approached those expected on the basis of death rates for the South Bronx. These causes of death are strongly associated with health-related behaviors (sexual practices and use of alcohol and drugs) reflecting more-fundamental social problems.

Compared to the South Bronx, death rates for hypertension-stroke were higher in Hartford, especially in the three census tracts studied. Cancer death rates also were higher in Hartford, and they were especially high in tracts 5009/5010 (Table III) compared with the South Bronx. High death rates for hypertension could indicate lack of access to primary care and proper treatment.^{14,15} The risk of cancer is related strongly to smoking and dietary habits, which could differ between the two regions. However, cancer death rates also depend on survival rates, which are affected by stage at diagnosis and (to a lesser degree) quality of cancer treatment.

Thus, as suggested for the South Bronx,³ improvement in health status in these Hartford inner-city areas may require both behavioral changes, which may be very difficult without changing the neighborhood environment, and improved access to primary care. The effects of living in specific inner-city areas are difficult to delineate because of high population mobility and the importance of experiences in earlier life for many chronic diseases.¹⁶ However, certain causes of death (such as injuries-homicides) are influenced strongly by factors operating near

the time of death, and access to and quality of continuing medical care affects mortality from chronic diseases and ill-defined causes of death.¹⁰

These results provide further evidence that impoverished US urban areas differ in total and cause-specific mortality rates, with implications for targeting and tailoring public health interventions.² For example, cancer death rates were high in two predominantly black census tracts in Hartford (Table III). Cancers were also more prominent causes of death (1989–1991) for poor blacks in Harlem and the Watts area of Los Angeles, California, and poor black and white areas of Detroit, than in other areas compared.² Aside from degree of impoverishment, aspects of living conditions and quality of medical care could be examined in epidemiologic studies aimed at explaining the differences in cause-specific mortality patterns.

Finally, this study did not address the potential effects (independent of SES) on mortality of living in public housing projects. While crime rates in certain public housing projects have been emphasized,¹⁷ such rates (and the overall quality of life) vary among housing projects even in the same area (such as Harlem).⁸ Future studies of mortality should use smaller geopolitical units (*e.g.*, census block groups) in defining areas with housing projects and in adjusting for race and SES.¹⁸

REFERENCES

1. McCord C, Freeman HP. Excess mortality in Harlem. *N Engl J Med.* 1990;322:173–177.
2. Geronimus AT, Bound J, Waidman TA, Hillemeier MM, Burns PB. Excess mortality among blacks and whites in the United States. *N Engl J Med.* 1996;1552–1558.
3. Fang J, Bosworth W, Madhavan S, Cohen H, Alderman MH. Differential mortality in New York City (1988–1992). Part two: excess mortality in the South Bronx. *Bull NY Acad Med.* 1995;72:483–499.
4. Struening EL, Wallace R, Moore R. Housing conditions and the quality of children at birth. *Bull NY Acad Med.* 1990;66:463–478.
5. Wallace D. Roots of increased health care inequality in New York. *Soc Sci Med.* 1990;31:1219–1227.
6. Wallace R, Wallace D. Origins of public health collapse in New York City: the dynamics of planned shrinkage, contagious urban decay and social disintegration. *Bull NY Acad Med.* 1990;66:391–434.
7. Vergara CJ. *The New American Ghetto.* New Brunswick, NJ: Rutgers University Press; 1995.
8. Williams T, Kornblum W. Public housing projects as successful environments for adolescent development. *Ann NY Acad Sci.* 1995;749:153–177.
9. Sorlie PD, Backlund E, Keller JB. US mortality by economic, demographic, and social characteristics: the national Longitudinal Mortality Study. *Am J Public Health.* 1995;85:949–956.
10. Becker TM, Wiggins CL, Key CR, Samet JO. Symptoms, signs, and ill-defined conditions: a leading cause of death among minorities. *Am J Epidemiol.* 1990;131:664–668.
11. Polednak AP. Estimating mortality in the Hispanic population of Connecticut, 1990 to 1991. *Am J Public Health.* 1995;85:998–1001.

12. Haenszel W, Loveland DB, Sirken MG. Lung cancer mortality as related to residence and smoking status. Appendix C (table). *J Natl Cancer Inst.* 1962;28:1000-1001.
13. Polednak AP. *Segregation, Poverty, and Mortality in Urban African Americans*. New York: Oxford University Press; 1997.
14. Shea S, Misra D, Erhlich MH, Field L, Francis CK. Predisposing factors for severe, uncontrolled hypertension in an inner-city minority population. *N Engl J Med.* 1992; 327:776-781.
15. Shea S, Misra D, Erhlich MH, *et al.* Correlates of nonadherence to hypertension treatment in an inner-city minority population. *Am J Public Health.* 1992;82:1607-1612.
16. Baker D. Poverty and ischemic heart disease: the missing links. *Lancet.* 1994;343:496.
17. Wilson WJ. *The Truly Disadvantaged*. Chicago: University of Chicago Press; 1987.
18. Krieger N. Overcoming the absence of socioeconomic data in medical records: validation and application of census-based methodology. *Am J Public Health.* 1992;92:703-710.