Black-White Differences in Infant Mortality in 38 Standard Metropolitan Statistical Areas

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ABSTRACT

The Black–White difference in infant mortality rates for 1982 through 1986 in 38 large US standard metropolitan statistical areas (SMSAs) varied by a factor of almost seven. In multiple regression analyses the most important predictor of the Black–White difference in the 38 SMSAs was an index of Black–White residential dissimilarity (or "segregation index"), independent of Black–White differences in median family income and poverty prevalence. Certain SMSAs in California had relatively low segregation indexes and small Black–White differences in infant mortality, despite considerable Black–White differences in poverty prevalence. The explanations for the apparent effect of residential segregation should be explored. (*Am J Public Health.* 1991;81:1480–1482)

Introduction

The US Black–White difference in the infant mortality rate has persisted. Lower rates have been reported for Blacks in the West than in the other three US census regions.[1] This report examines the Black–White difference in infant mortality rate in 38 large standard metropolitan statistical areas (SMSAs), including several in California, in relation to socioeconomic status indicators and an index of residential segregation. Residential segregation may be associated with such factors as the availability and quality of prenatal and postnatal medical care, which may influence infant mortality independent of differences in socioeconomic status.

Methods

For each of 38 SMSAs with a total population of more than 1 million in 1980, 1980 census reports were used to obtain Black–White differences in poverty prevalence, median family income, and the percentage of families with a "female householder, no husband present."[2] One segregation index (an index of residential dissimilarity between Blacks and Whites in the SMSAs based on 1980 census data) measures the unevenness of residential distribution of a specific minority population across census tracts within an urban area. The formula is as follows:

$$0.5 \times \sum_{i=1}^{n} \mid (x_i/X) - (Y_i/Y) \mid ,$$

where x and y are the numbers of each race with a tract (i) and X and Y are the total populations of each race in the SMSA.[3] Numbers of deaths at less than 1 year of age for Blacks and Whites in each SMSA for 1982 through 1986 were used,[4] along with total live births in these years,[5] to obtain an average annual infant death rate (per 1000 live births) for Blacks and Whites in each of the 38 SMSAs.

Results

Infant mortality rates were higher for Blacks than for Whites in all of the 38 SMSAs. The mean Black–White difference was 8.63 per 1000 live births (SD = 3.27), ranging from 2.14 (95% confidence limits [CL] = −0.90 and 5.06) for Anaheim, Calif, to 14.63 (95% CL = 12.31 and 16.95) for Pittsburgh, Pa (see Appendix for detailed data).

The segregation index and the Black–White difference in poverty prevalence for the 38 SMSAs were significantly correlated (r = .573, P < .001), but this correlation does not indicate strong collinearity, and both variables were included in multiple regression analysis (Table 1). The segregation index was the only statistically significant independent predictor of the Black–White difference in infant mortality rate among the SMSAs, and the only independent variable selected in stepwise regression (not shown). Only for Blacks was the segregation index a statistically significant independent predictor of infant mortality rate in multiple regression analysis (data not shown).

Chicago had the highest segregation index (i.e., .878) and, a Black–White difference in poverty prevalence (i.e., 28.8%) that was higher than the average (i.e., 18.3%), the Black–White difference in infant mortality was also large (i.e., 13.38 per 1000; 95% CL = 12.39 and 14.17). The seven California SMSAs differed considerably in segregation index. Black–White differences in poverty prevalence ranged from 7.8% for San Jose to 16.6% for Sacramento and 17.4% for Riverside; all were

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below the average for all 38 SMSAs. Anaheim had the lowest segregation index and the smallest Black–White difference in infant mortality, whereas Los Angeles had the highest segregation index and the largest Black–White difference in infant mortality (Figure 1), despite the similarity in the Black–White difference in poverty prevalence in the two areas (i.e., 9.9% and 8.7%, respectively).

TABLE 1—Prediction of the Black–White Difference in Infant Mortality Rates (1982–1986) in 38 SMSAs

	Regression Coefficient	*t*	*P* Values
Female householder[a]	−.0672	−.263	.794
Poverty prevalence[b]	.2503	1.524	.137
Median family income[c]	−.1918	−1.054	.299
Segregation index[d]	.7469	4.033	<.001

Note. SMSA = standard metropolitan statistical area.
[a]Black–White difference in proportion of families with "female householder, no husband present" based on 1980 US census reports.
[b]Black–White difference in proportion of persons below the poverty level in 1979, based on 1980 US census reports.
[c]Black–White difference in median family income, based on 1980 US census reports.
[d]Black–White residential segregation index for each SMSA, as reported by Massey and Denton.[3]

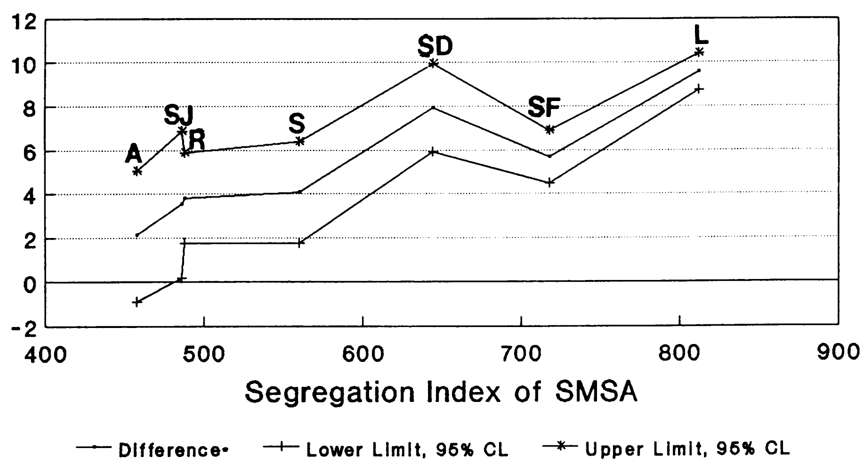

FIGURE 1—Infant mortality difference in California standard metropolitan statistical areas (SMSAs). (A = Anaheim; L = Los Angeles; R = Riverside; S = Sacramento; SD = San Diego; SF = San Francisco; SJ = San Jose.)

Discussion

The almost sevenfold variation among the 38 SMSAs in the Black–White difference in infant mortality rate and the association with the segregation index (apparently independent of variation in the Black–White difference in poverty prevalence) require explanation. Socioeconomic status may not have been adequately controlled for in the analysis of the effect of the segregation index on the Black–White difference in infant mortality; areas with high segregation indexes may include subareas (in inner cities) of extreme poverty and high cost of living. Potential inaccuracies in infant death rates by SMSA due to differential rates (among the SMSAs) of migration of mothers (with their infants) after birth should be examined by separate analysis of neonatal and postneonatal death rates (both of which are higher in US Blacks than Whites). Neonatal death rates would be little affected by migration, because migration during this period is unlikely. Linked live birth–infant death files also would be useful.

Despite considerable Black–White differences in poverty prevalence, two SMSAs in California (i.e., Riverside and Sacramento) with low indexes of segregation had small Black–White differences in infant mortality (Figure 1). The explanation for low Black infant mortality rates in Anaheim, with both a small Black–White difference in poverty prevalence and a low segregation index, also should be explored. Birth weight distributions, birth weight–specific death rates, and both neonatal and postneonatal death rates should be examined. Binkin et al.[6] suggested that the smaller difference in Black–White neonatal death rates within normal weight births in California than in Georgia could reflect better quality and availability of prenatal, intrapartum, and postnatal care in California Blacks. The need for studies of the quality vs the quantity of prenatal care in Blacks has been recognized,[7] and the same holds for postnatal care. SMSAs with high levels of segregation are mainly large, older industrial cities with Black ghettos.[3] Among the many potential explanations for higher infant mortality rates in these segregated areas, availability (or accessibility) and use of diagnostic/treatment procedures, level of training and attitudes or recommendations of providers, and patient (i.e., maternal) decision making should be examined, as suggested for explaining racial inequalities in use of diagnostic/treatment procedures for cardiovascular disease.[8] □

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APPENDIX—Segregation Index, Prevalence of Poverty, and Infant Mortality Rates for 38 SMSAs

		Prevalence of Poverty (%)			Infant Mortality Rate per 1000 Live Births (1982–1986)			
SMSA	Segregation Index[a]	Black	White	Difference	Black Rate	White Rate	Black–White Difference	95% CI[b]
Anaheim, Calif	.458	15.84	5.99	9.85	10.59	8.45	2.14	−0.90, 5.06
Atlanta, Ga	.785	26.02	10.96	15.06	17.36	9.32	8.04	6.85, 9.23
Baltimore, Md	.747	27.02	6.99	20.03	18.50	9.19	9.31	8.05, 10.57
Boston, Mass	.776	25.86	8.81	17.05	18.45	8.45	10.00	8.21, 11.79
Buffalo, NY	.794	33.09	7.20	25.89	17.70	8.70	9.00	6.52, 11.48
Chicago, Ill	.878	34.46	5.71	28.75	23.03	9.65	13.38	12.59, 14.17
Cincinnati, Ohio	.723	32.78	6.79	25.99	18.40	9.53	8.87	6.89, 10.85
Cleveland, Ohio	.875	28.65	6.33	22.32	19.25	8.83	10.41	8.85, 11.97
Columbus, Ohio	.714	23.52	8.46	15.06	15.74	10.52	5.21	3.08, 7.34
Dallas, Tex	.771	25.13	6.38	18.75	17.39	9.35	8.05	6.90, 9.20
Denver, Colo	.684	18.36	6.90	11.46	15.42	9.39	6.03	3.54, 8.52
Detroit, Mich	.867	28.97	6.93	22.04	23.38	9.42	14.41	13.28, 15.56
Ft Lauderdale, Fla	.816	29.32	6.20	23.12	21.05	7.99	13.06	10.88, 15.24
Houston, Tex	.695	22.44	6.20	16.24	15.34	9.24	6.09	5.07, 7.11
Indianapolis, Ind	.762	28.50	6.80	21.70	23.81	10.52	13.29	10.89, 15.69
Kansas City, Kan-Mo	.789	25.19	6.27	18.92	17.13	9.68	7.45	5.57, 9.33
Los Angeles, Calif	.811	18.06	9.36	8.70	18.71	9.14	9.57	8.72, 10.42
Miami, Fla	.778	30.64	10.29	20.35	17.32	7.75	9.57	8.27, 10.87
Milwaukee, Wis	.839	35.34	5.47	29.87	17.97	8.41	9.57	7.72, 11.42
Minneapolis, Minn	.683	26.50	5.33	21.17	16.80	8.73	8.07	5.36, 10.78
Nassau-Suffolk, NY	.755	16.98	4.65	12.33	22.19	7.88	14.31	12.01, 16.61
New Orleans, La	.683	37.67	9.30	28.37	18.61	9.37	9.24	7.80, 10.68
New York, NY	.820	28.62	10.79	17.83	16.22	10.88	5.34	4.73, 5.95
Newark, NJ	.816	29.02	6.45	22.57	19.60	8.21	11.39	9.92, 12.86
Philadelphia, Pa	.788	30.19	7.06	23.13	20.60	9.44	11.16	10.16, 12.16
Phoenix, Ariz	.594	18.39	8.26	10.13	14.51	9.07	5.44	2.81, 8.07
Pittsburgh, Pa	.727	27.39	6.34	21.05	24.07	9.43	14.63	12.31, 16.95
Portland, Ore	.685	22.86	7.76	15.10	14.19	9.54	4.66	1.15, 8.17
Riverside, Calif	.488	26.69	9.34	17.35	14.45	10.63	3.82	1.76, 5.88
Sacramento, Calif	.559	26.14	9.59	16.55	12.85	8.78	4.07	1.75, 6.39
Saint Louis, Mo	.813	29.69	6.23	23.46	19.66	8.58	11.08	9.74, 12.42
San Antonio, Tex	.636	29.08	16.27	12.81	16.45	10.54	5.90	3.05, 8.75
San Diego, Calif	.643	18.10	9.44	8.66	16.75	8.82	7.93	5.92, 9.94
San Francisco, Calif	.717	17.63	7.13	10.50	14.41	8.73	5.68	4.47, 6.89
San Jose, Calif	.487	14.45	6.62	7.83	12.21	8.69	3.53	0.19, 6.87
Seattle, Wash	.682	20.57	6.66	13.91	16.68	9.40	7.28	4.34, 10.22
Tampa, Fla	.726	35.06	9.37	25.69	20.12	10.45	9.66	7.58, 11.74
Washington, DC	.701	17.11	4.52	12.59	20.08	8.91	11.17	10.12, 12.22

Note. SMSA = standard metropolitan statistical area.
[a]From Massey and Denton.[3]
[b]Confidence interval (CI) on the difference in rates.