Socioeconomic Differentials in Selected Causes of Death

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Abstract: The areal approach utilized in mortality analysis for cities in the past is argued to be fruitful for suburban mortality analysis as well. Through factor analysis of four Census Tract indicators, weighted scores were computed and socioeconomic groups were constructed for each central city and each suburban area for three selected metropolitan areas: Birmingham, AL, Buffalo, NY, and Indianapolis, IN. Mortality rates from Heart Diseases, Malignant Neoplasms, and All Other Causes of death were found to be inversely associated with socioeconomic status in both the central cities and the suburban communities of these selected metropolitan areas. Evidence points to increasing socioeconomic differentials between 1960 and 1970 especially for males for the central cities and for suburban rings in spite of reductions in mortality during this period. (Am. J. Public Health 68:342–351, 1978)

This paper reports selected findings of a research project dealing with contrasts between urban and suburban mortality differentials in three Standard Metropolitan Statistical Areas (SMSAs). The main theme of the project centers around the impact on mortality of the increasing socioeconomic differences betweeen central cities and their suburban zones on the basis of various socioeconomic indicators.[1]

An additional area of inquiry was focused on the hypothesis of the urbanization of suburbs as cogently developed by Masotti.[2] This hypothesis was based on findings of different studies which have shown that suburban communities are becoming more heterogeneous as a result of the emergence in the suburbs of blue-collar residential areas[3] and of the residential relocation of non-whites from central cities to the suburbs.[4] Since a large number of studies have reported significant socioeconomic differences in mortality for a large number of cities in the USA as summarized by Yeracaris,[5] we reasoned that there should exist similar differences in the suburbs and that such differences should have increased between 1960 and 1970. Although Kitagawa and Hauser, have, in effect, demonstrated that socioeconomic (based on education) variations in mortality do exist in central cities and that the overall mortality of the suburban communities is lower than that in the central cities,[6] they failed to explore socioeconomic variability within the suburban zones.

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Procedures

In this paper we will attempt to single out the effect that socioeconomic status has on mortality rates by an analysis of three selected causes of death in three metropolitan areas: Birmingham, AL, Buffalo, NY, and Indianapolis, IN.

Indicators of Socioeconomic (SE) Status

To determine SE status we chose the areal approach by using four measurements of socioeconomic status for each Census Tract. These were: per cent of professionals in the labor force, median family income, median years of schooling completed, and median monthly rent. Through factor analysis we developed index weights on the basis of which each Census Tract was given an SE score. The index weights were determined separately for each central city and each suburban ring for 1960 and 1970. Five socioeconomic groups were constructed for each area. The cutting points of the SE scores were determined by population size approximating that utilized by Hauser[7] and Yeracaris.[8]

There were three main reasons for choosing the Census Tract data. In the first place there is, presently, in death certificates only one indicator of SE status: occupation. Its shortcomings and its degree of reliability have been explored in the literature.[5] The more sophisticated approach of matching death records with census information, utilized by Kitagawa and Hauser, requires time and rather large expenditures. Secondly, the specific goal of our study was to test the

validity of the hypothesis of the urbanization of suburbs. In this respect, we felt it was appropriate to utilize the same methodology used to establish socioeconomic area groups in central cities by a large number of studies. Finally, the overall validity of this ecological approach has been amply demonstrated by Duncan[9] and others.

Measurement of Differentials

In addition to age standardized rates, the overall effect of socioeconomic status differences on mortality was measured by two Indexes of Differential Mortality as developed by Yeracaris.[10] The *general index of a given cause of death* (S_k) measures the excess of deaths between those observed and those expected in all SE groups from that cause of death, the latter computed on the basis of the observed mortality schedules of the highest SE group. The formula for this index is given below.

$$S_k = \left(1 - \frac{\sum_{i=1}^{n} \sum_{j=1}^{5} m_{ijl} p_{ij}}{\sum_{i=1}^{n} \sum_{j=1}^{5} m_{ijl} p_{ij}} \right) 100.0$$

Where:

- i: age category, i = 1 . . . .n
- j: socioeconomic status, j = 1 (highest) . . . .5 (lowest)
- k: specific cause of death, k = 1 (heart diseases) . . . . 1 (all other causes)
- p: population
- m: mortality rates

The *proportional index of differential mortality* for a specific cause (P_s) measures the contribution of socioeconomic differentials in a given cause of death to the *total* socioeconomic mortality differentials.

$$P_s = \left(\frac{\sum_{i=1}^{n} \sum_{j=1}^{5} m_{ijl} p_{ij} - \sum_{i=1}^{n} \sum_{j=1}^{5} m_{ijl} p_{ij}}{\sum_{i=1}^{n} \sum_{j=1}^{5} \sum_{k=1}^{3} m_{ijk} p_{ij}} \right) 1000.0$$

The following causes of death were selected with appropriate codes given by the 7th and 8th Revisions of the International Classification of Diseases Adapted for Use in the U.S.: Diseases of Heart, Malignant Neoplasms, Cerebrovascular Diseases, Accidents (motor vehicle, all other), Influenza and Pneumonia, Diabetes Mellitus, Tuberculosis, and "All Other" Causes. In this paper we are presenting detailed analysis for the first two and the last leading causes of death* due to difficulties in establishing stable age specific death rates for the other specific causes which have been kept out of the last category. For the same reason, the presentation of our findings is limited to whites only.

*For the remaining six specific causes, data are available on request to the senior author.

Findings

Central City Differentials

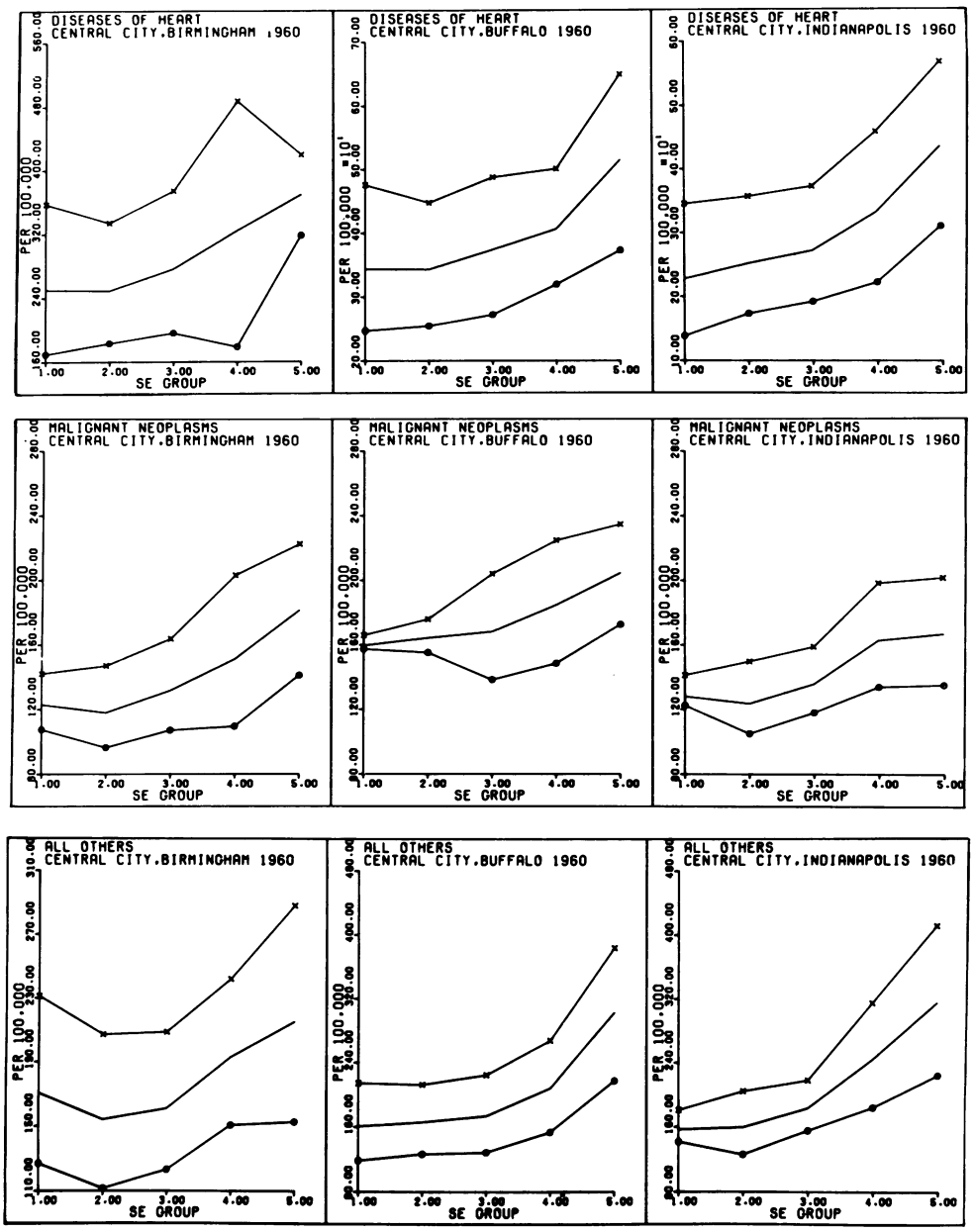
Heart Diseases: 1960. In all three central cities white mortality rates from Heart Diseases, the leading cause of death, were inversely associated with SE groups but to varying degrees (Figure 1). Male rates were consistently higher than female rates in all SE groups. The inverse relationship among white females was more linear than for males netting differentials which were greater for females than for males (Table 1). The total per cent of white deaths from this cause that could have been saved if all SE groups had the same age mortality schedules as the highest SE group in 1960 for each city was as follows: Birmingham, 5.7; Buffalo, 6.9; and Indianapolis, 19.9.

Heart Diseases: 1970. Following the national trends, mortality from Heart Diseases showed improvements in two of the central cities (Birmingham and Indianapolis) and a slight increase in Buffalo (1.6 per cent). The overall per cent reduction was 5.1 for Indianpolis and 23.1 for Birmingham (Table 2). Reductions varied by area and by SE groups; in general they favored mostly females over males, thus resulting in greater differences between male and female rates (Table 3). In Birmingham reductions tended to concentrate in lower than in higher SE groups. The result was a net differential which was negative, i.e., if the female mortality schedule of the highest SE group was applied to all SE groups there would have been an increase of deaths by almost 2 per cent. Reductions among males also tended to concentrate in lower SE groups and the total male differential was reduced from 5.3 to 3.4. The net effect was that by 1970 a little less than 2 per cent (General Index) of all deaths from this cause would have been saved under the assumption of the more favorable SE group 1 mortality schedule, as compared to 5.7 per cent in 1960.

This was not true for Buffalo. Reductions in this city favored the highest rather than the lowest SE groups for both males and females. Inverse patterns of mortality with SE status became more linear with a net overall index value of over 21 per cent which was over twice the size of the 1960 index. Thus, in spite of the small per cent increase in mortality from this cause in Buffalo, over 21 per cent of all deaths from Heart Diseases would have been saved under the assumption of the more favorable rates of SE group 1. Increases in the socioeconomic differentials were more dramatic among white males than among white females.

In Indianapolis the modest decline in mortality from this cause favored females rather than males in all SE groups. Such reductions favored the higher more than the lower SE groups and resulted in increased socioeconomic differentials. Among white females the overall SE differentials decreased by slightly over 25 per cent while among males they increased by almost 62 per cent. The overall general index of differential mortality increased by almost 11 per cent (from 19.9 to 22.3 per cent).

Malignant Neoplasms: 1960. Socioeconomic variability from this cause of death was highest in Indianapolis (9.6) and lowest in Birmingham (2.8). Inverse patterns within SE groups were more pronounced among males than females in



"All Other" Causes does not include: Cerebrovascular Diseases, Accidents, Influenza and Pneumonia, Diabetes Mellitus, and Tuberculosis.

FIGURE 1—Standardized Mortality Rates by Cause of Death, Sex, and Socioeconomic Group, Whites in Three Central Cities, 1960 and 1970

Birmingham and in Buffalo. The reverse was true in Indianapolis where almost 17 per cent of all white female deaths would have been saved under the assumption of the most favorable mortality schedule of the highest SE group as compared to only 1.4 per cent for males. In Birmingham the relationship for female rates was irregular with the result that there would have been an increase in the total white female deaths under the same assumption.

Malignant Neoplasms: 1970. In all three central cities there were large per cent increases in mortality rates from this cause: 9.1 per cent in Birmingham, 21.8 for Buffalo, and 18.1 for Indianapolis. Such increases were higher among males than females for two cities (Birmingham and Indianapolis) and among females than males for Buffalo. As in 1960, male rates in 1970 were higher than female rates although, as expected, the mortality sex ratios declined from 141 to 136 in Indianapolis and from 155 to 149 in Birmingham. In Buffalo, it increased from 133 to 147.

The irregular SE patterns of changes in mortality between 1960 and 1970 produced different results in the three cities: in Birmingham the inverse relationship of mortality with SE groups showed an overall increase in the index val-

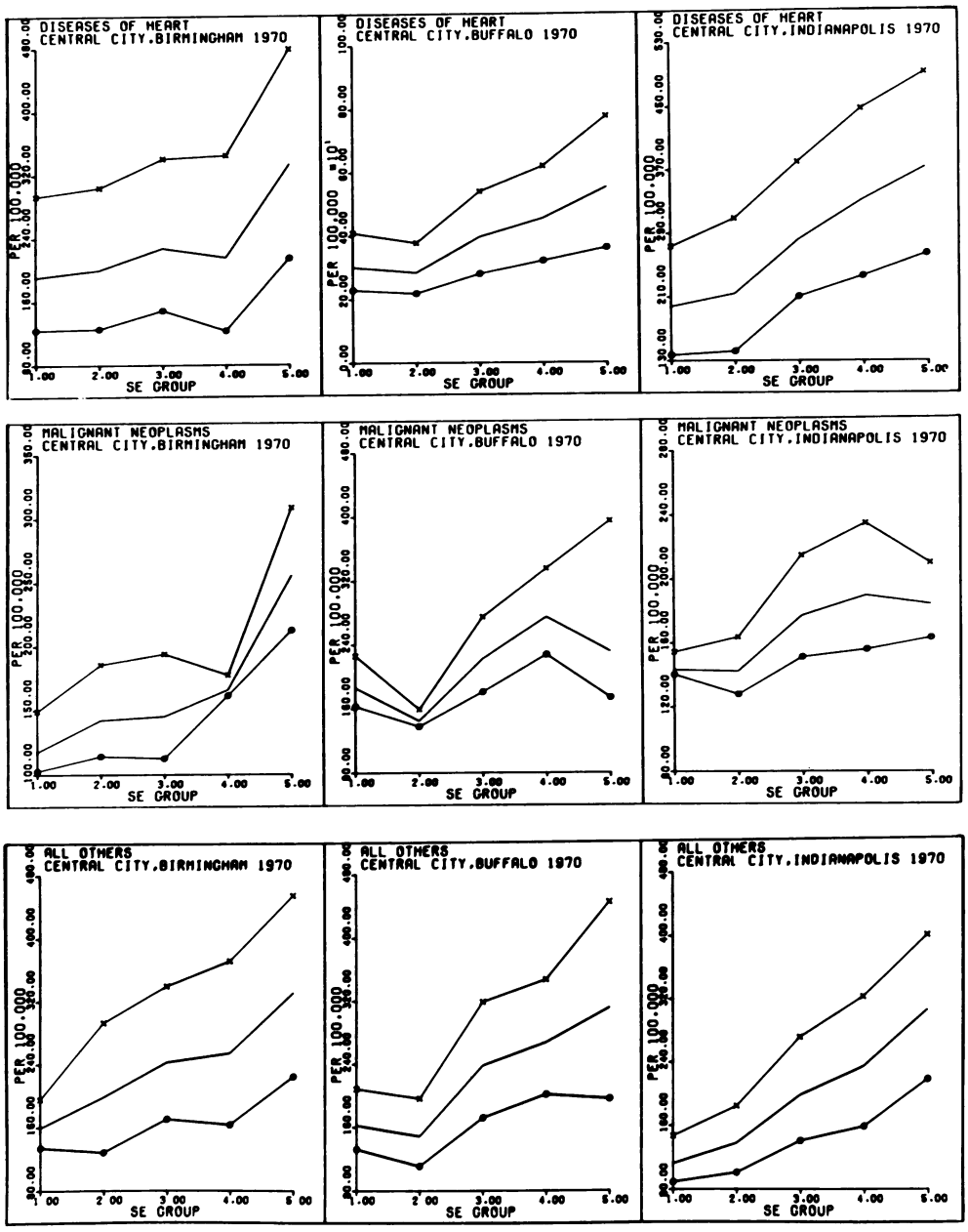


FIGURE 1 (*continued*)

ue (from 2.8 to 7.8) mostly accounted for by a more linear inverse pattern among females (from a negative value of 9.0 to a positive of 6.0). On the other hand, although the increases were more pronounced among the third and fourth lowest SE groups, actual reductions in the rates of the second highest SE group resulted in approximately the same overall index value for both males and females. A slight reduction was observed in the overall index of differential mortality in Buffalo (from 8.0 to 7.7). In Indianapolis increases of mortality rates were greater in the lower than in the higher SE groups. The result was an increased inverse relationship of mortality rates with SE groups and higher index values among males and lower among females.

"All Other" Causes of Death: 1960. In Buffalo and Birmingham there were clear inverse relationships between mortality rates and SE groups with male differentials greater than female. In Birmingham U-shaped patterns resulted in an overall positive association between mortality rates and SE groups for both sexes. For the other cities the index values were quite large (Table 1).

"All Other" Causes of Death: 1970. With the exception of Indianapolis where there was an overall 5 per cent de-

TABLE 1—General Indexes of Differential Mortality by Selected Causes of Death and Selected SMSAs, by Sex, White, 1960–1970 (per 100.0).

	Heart Diseases			Malignant Neoplasms			"All Other Causes" *		
Total	Male	Female	Total	Male	Female	Total	Male	Female	
Birmingham									
1960									
City	5.7	5.3	6.3	2.8	12.7	− 9.0	− 7.0	− 5.5	− 9.6
Suburbs	.8	7.5	− 9.5	4.2	19.3	−14.8	8.3	16.0	− 4.9
Both	3.6	6.2	.0	3.5	15.7	−11.6	− .1	4.5	− 7.4
1970									
City	1.7	3.4	− 1.6	7.8	9.6	6.0	15.1	28.4	− 2.9
Suburbs	18.4	16.5	21.4	4.6	6.7	1.9	32.8	34.7	29.8
Both	10.0	10.1	9.8	6.4	7.9	4.4	23.9	31.6	12.8
Buffalo									
1960									
City	6.9	4.9	10.6	8.0	17.2	9.2	9.9	12.1	6.5
Suburbs	8.8	10.2	6.8	− 3.9	− 3.0	−19.3	13.1	8.8	19.5
Both	7.6	6.3	9.2	− .3	13.8	− 9.7	11.2	10.8	12.0
1970									
City	21.4	21.2	18.2	7.7	10.2	4.5	20.5	26.5	11.9
Suburbs	17.0	14.2	20.8	9.9	6.5	14.2	8.7	8.9	6.8
Both	19.5	19.6	19.3	8.7	8.4	9.2	15.2	19.1	9.7
Indianapolis									
1960									
City	19.9	15.6	25.4	9.6	1.4	16.7	21.3	28.7	12.6
Suburbs	21.4	17.8	27.5	1.5	16.1	−12.8	18.1	29.0	4.0
Both	20.3	16.1	26.0	7.3	5.8	8.6	20.5	28.8	9.8
1970									
City	22.3	25.2	19.0	15.7	29.4	− 1.8	37.8	38.4	35.5
Suburb	4.5	7.5	.0	13.4	20.2	5.7	31.9	41.6	19.4
Both	16.3	10.0	13.2	14.9	26.5	.8	35.5	39.5	30.1

* Not included in this category were the following causes of death: Cerebrovascular Diseases, Accidents, Influenza and Pneumonia, Diabetes Mellitus, and Tuberculosis.

crease in mortality rates, mortality rates from "all other" causes in the other two areas increased in 1970 (26.6 per cent for Birmingham and 15.7 per cent for Buffalo). Such increases were greater for male than female rates and were more pronounced in lower than higher SE groups. In Indianapolis the reduction was more pronounced in the highest SE groups. The overall results for all three cities were substantial inverse relationships to SE groups, netting in 1970 higher index values than in 1970 for both females and males.

Suburban Differentials

Heart Diseases: 1960. In all three suburban areas white mortality rates from Heart Diseases were inversely associated with SE groups to varying degrees. The order from high-

TABLE 2—Per cent Changes of Standardized Mortality Rates by Selected Causes of Death, for Whites by Sex and Residence, Birmingham, Buffalo and Indianapolis, 1960–1970.

	Heart Diseases			Malignant Neoplasms			"All Other" Causes *		
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes	Males	Females
Birmingham									
All Areas	−23.0	−16.4	−29.7	4.4	7.8	4.2	16.6	21.4	12.6
Central City	−23.1	−15.0	−29.9	9.1	9.6	13.4	26.9	35.3	18.4
Suburbs	−22.2	−16.1	−28.9	1.4	7.9	− 3.3	10.9	13.7	10.1
Buffalo									
All Areas	− 6.5	− .6	−12.4	9.1	15.9	3.7	− 1.7	1.5	− 3.0
Central City	1.6	7.8	− 3.2	21.8	28.9	17.0	15.7	20.5	13.0
Suburbs	− 8.9	− 2.8	−16.0	4.7	11.4	− 1.2	−10.0	− 7.7	−10.8
Indianapolis									
All Areas	− 5.1	− 6.9	− 1.4	14.1	16.5	12.6	− 6.4	− 2.9	−10.5
Central City	− 5.1	− 6.8	− 1.9	18.1	16.7	20.9	− 5.0	1.9	−14.4
Suburbs	3.4	− .2	10.0	15.4	27.2	5.1	2.3	2.0	4.8

* Not included in this category: Cerebrovascular Diseases, Accidents, Influenza and Pneumonia, Diabetes Mellitus, and Tuberculosis.

TABLE 3—Mortality Sex Ratios* by Residence, Selected Causes of Death, 1960–1970.

Causes of Death	Birmingham				Buffalo				Indianapolis			
	1960		1970		1960		1970		1960		1970	
	Central City	Suburb	Central City	Suburb	Central City	Suburb	Central City	Suburb	Central City	Suburb	Central City	Suburb
Heart Diseases	198	186	240	220	176	165	196	181	205	203	195	184
Malignant Neoplasms	155	140	149	156	133	130	147	146	141	111	136	134
Cerebrovascular Diseases	115	106	131	108	116	96	121	105	127	105	113	123
Accidents:												
Motor Vehicle	219	313	256	332	243	291	268	296	226	346	206	253
Other	194	253	195	186	157	170	211	209	164	166	230	228
Influenza and Pneumonia	132	129	150	143	175	174	157	119	224	162	194	127
Diabetes Mellitus	65	71	159	90	69	42	97	76	90	111	110	116
Tuberculosis	392	420	450	350	318	308	418	275	456	169	239	180
"All Other" Causes	176	185	201	192	176	159	187	165	161	155	191	151

* Age adjusted mortality rates.

est to lowest differentials was: Indianapolis, Buffalo, and Birmingham. They were greater for males than for females in Birmingham and in Buffalo and smaller in Indianapolis. The total per cent of white deaths from this cause that could have been saved if all SE groups had the same age mortality schedules as the highest SE group was: Indianapolis, 21.4; Buffalo, 8.8; and Birmingham, 0.8 (Table 1).

Heart Diseases: 1970. Mortality from this cause declined by 22.2 per cent in Birmingham, by 8.9 per cent in Buffalo, and increased by 3.4 per cent in Indianapolis. In the first two areas reductions favored females more than males. Females rates in Indianapolis showed an overall increase of 10 per cent as compared to no change for males. In Birmingham and in Buffalo the reductions favored the highest SE groups and as a consequence the index values increased considerably for both males and females (Table 1). In Indianapolis, reductions favored the lower SE groups for both males and females. Index values for both sexes showed significant reductions. The total per cent of deaths from this cause for suburban whites that could have been saved under the assumption of the most favorable mortality schedules of the highest SE groups was for Birmingham, 18.7 per cent (up from 0.8), for Buffalo, 17.0 per cent (up from 8.8) and for Indianapolis, 4.5 per cent (down from 21.4).

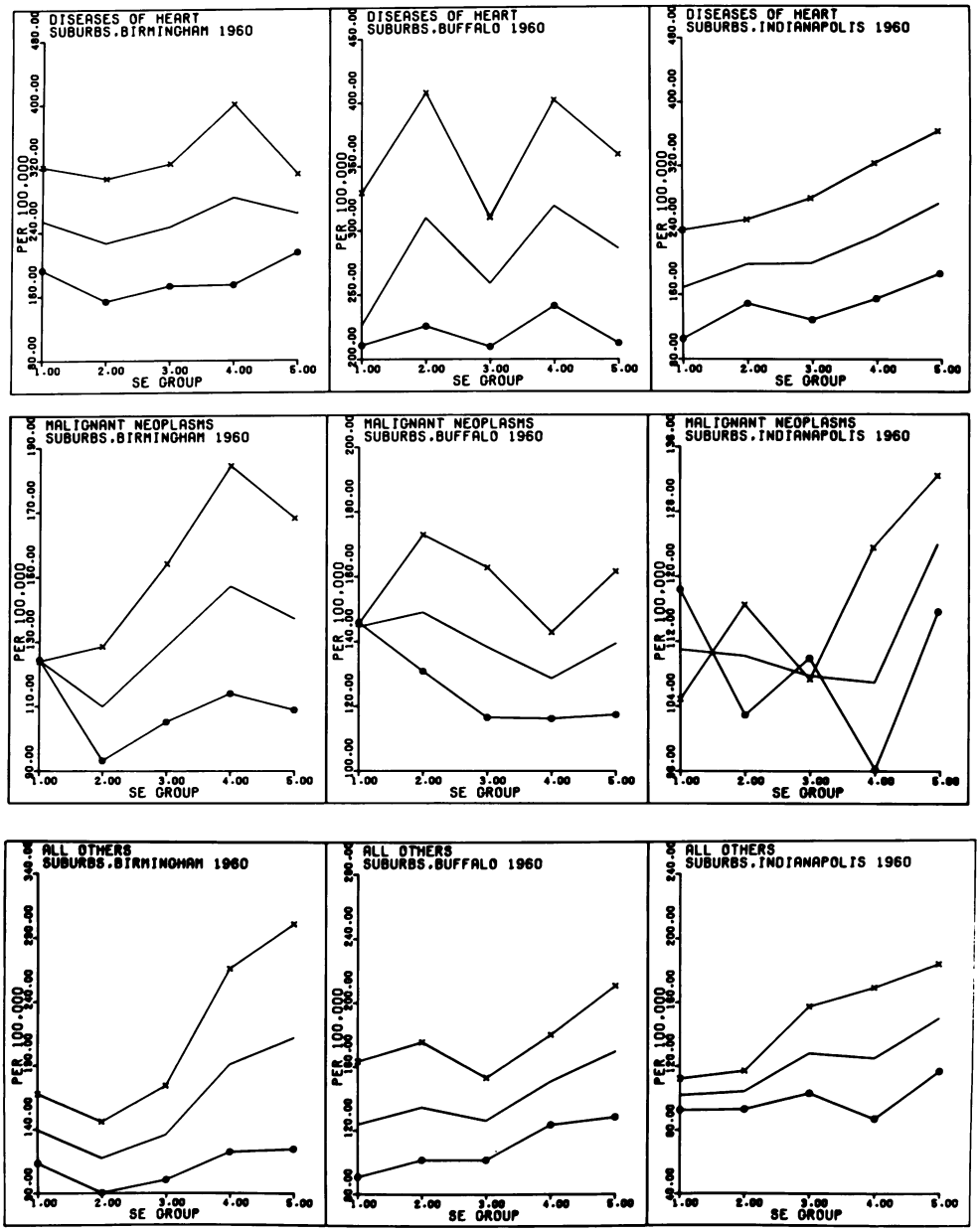
Malignant Neoplasms: 1960. Although the total index values suggest no appreciable socioeconomic differentials for mortality from this cause, in Birmingham and Indianapolis male mortality rates were inversely associated with SE groups with index values of 19.3 per cent and 16.1 per cent, respectively. Irregular SE patterns among females netted negative index values in all three areas.

Malignant Neoplasms: 1970. Increases in mortality rates from this cause of death between 1960 and 1970 varied by sex, SE group, and area. In all areas male mortality rates increased, with the highest increases occurring in the suburbs of Indianapolis (27.2 per cent). Female rates had somewhat declined in the other two suburban areas.

In all areas there were actual declines in the rates for the two top SE groups and increases in the lower groups. These declines resulted in pronounced inverse relationships of rates with SE groups with increased index values by 1970. Among males, inverse relationships were also observed with stronger SE differentials in 1970 than 1960 for Buffalo and Indianapolis. In all three areas female SE differentials also increased. Mortality "wastage" in all areas had increased in Birmingham from 1.5 to 13.4 per cent, in Buffalo from −3.9 to 9.9 per cent, and in Indianapolis from 4.2 to 4.6 per cent.

"All Other" Causes: 1960. In all areas suburban rates were inversely associated with SE groups. This was also true for males and females with the exception of female rates in Birmingham which showed a slight positive relationship. Male rates were higher than female rates and the socioeconomic differentials were higher among males than females in two areas (Birmingham and Indianapolis).

"All Other" Causes: 1970. Mortality rates from these causes had increased by 1970 in two areas and decreased in one (Buffalo). Such increases were greater among males in Birmingham and greater among females in Indianapolis. In Buffalo observed declines favored female rates. Such changes varied by SE groups. In Birmingham increases tended to be inversely associated with SE groups for both males and females, with resulting increased overall SE differentiation. The total deaths that could have been saved in the suburbs of Birmingham under the assumption of the most favorable mortality schedule had increased from 8.3 per cent to 32.8 per cent. Among males the index value (Table 1) had jumped from 16.0 per cent to 34.7 per cent and among females from a negative 4.9 per cent to a positive 29.8 per cent. In Buffalo reductions tended to favor low rather than high SE groups especially among females. In its suburbs that overall index had declined from 13.1 per cent to 8.7 per cent, wholly by the reductions in the female rates of the lower SE groups. In Indianapolis, on the other hand, reductions in the high SE groups and increases in low SE groups netted an



"All Other" Causes does not include: Cerebrovascular Diseases, Accidents, Influenza and Pneumonia, Diabetes Mellitus, and Tuberculosis.

FIGURE 2—Standardized Mortality Rates by Cause of Death, Sex, and Socioeconomic Group, Whites in Three Suburbs, 1960 and 1970

increase in the overall index value (a jump from 18.1 per cent to 31.9 per cent) with significant increases for both males (from 29.0 per cent to 41.6 per cent) and females (from 4.0 per cent to 19.4 per cent).

Summary and Conclusions

We propose here to summarize the main highlights of our findings.

Urban-Suburban Differences

We were able to demonstrate that socioeconomic variations in mortality present in the central cities are also present in the suburbs of the three Metropolitan Areas we studied. For the three causes of death which yielded more stable rates by SE groups (in the order of Heart Disease, "All Other" Causes, and Malignant Neoplasms), SE differences as measured by the general index of cause specific differentials showed eight increases out of a total of nine groups (sex, total by three causes) in the central cities and in seven out of

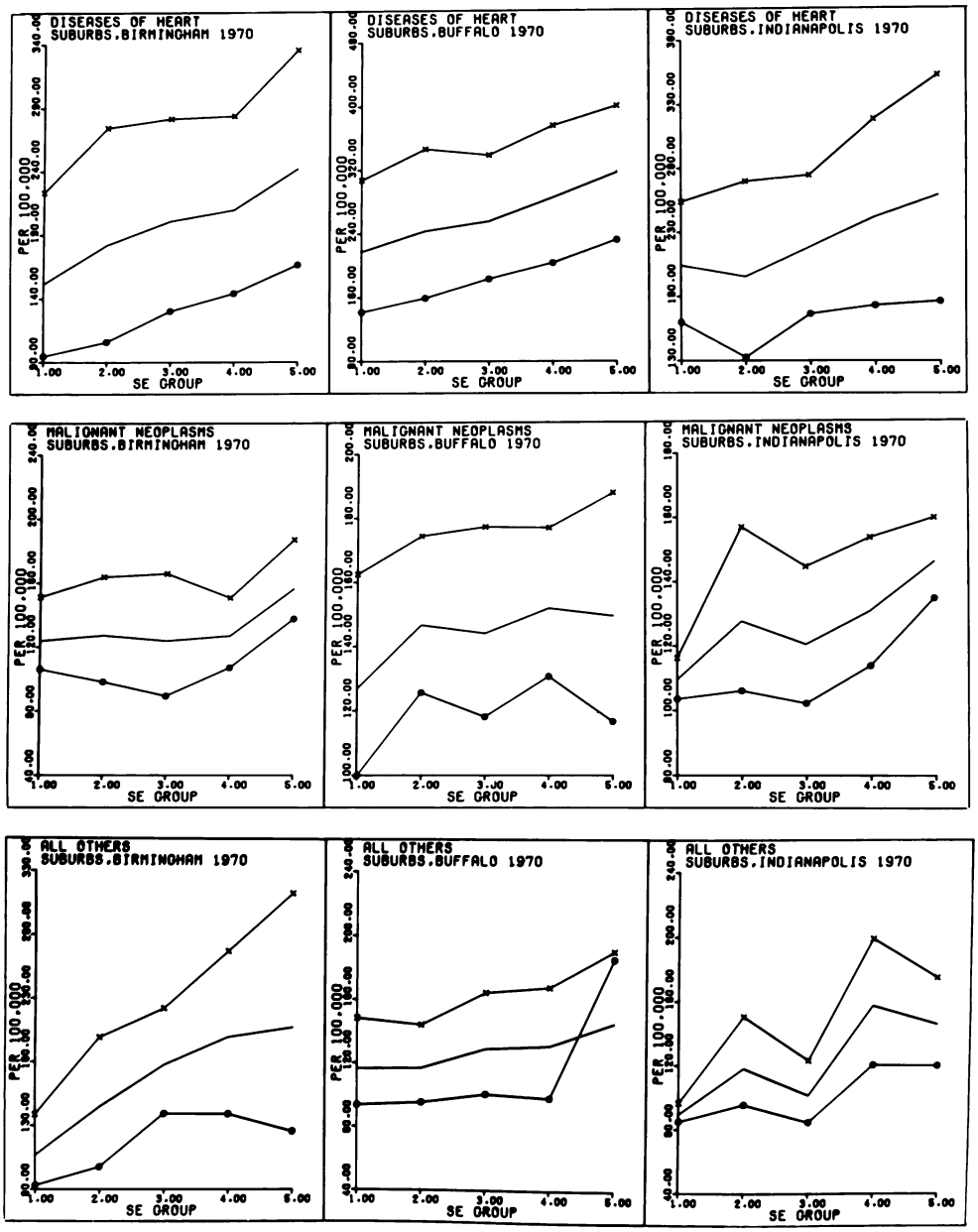


FIGURE 2 (*continued*)

nine in the suburbs. Overall increases in mortality from Malignant Neoplasms were associated with increases in SE differentials in all three areas and in the suburbs as well as in the central cities. Socioeconomic differentials from all other causes also increased in the central cities of all areas and in the suburbs in all but Buffalo. The reductions observed in mortality rates from Heart Diseases showed decreased SE differentials only in the central city of Birmingham and in the suburbs of Indianapolis.

Male SE differentials were greater than female SE differentials in all three areas and in the majority of cases of the three selected causes of death. No such differences were observed from this pattern between central cities and suburbs. In terms of the hypothesis of the urbanization of the suburbs and in the light of both sex differences and of the overall socioeconomic variations, the two sectors of our metropolises exhibit at an increasing rate striking similarities in mortality differentials.

One dimension of differences in mortality must be briefly referred to—namely, the significant differences that exist in mortality rates between central cities and suburbs. Standardized mortality rates by SE groups were higher in the cen-

tral cities than in the suburbs. The highest rates from the three selected causes of death were found in the lowest SE groups in the cities and the lowest rates in the two highest SE groups in the suburbs.

Socioeconomic Differences in Mortality

As a way of summarizing the contributions of socioeconomic variations in the overall mortality of the three Metropolitan Areas we computed the values for the Proportional Indexes of Differential Mortality (Table 4).

A general observation: mortality from all causes in all three areas showed dramatic increases in socioeconomic inequalities. In Birmingham the total per cent of deaths "wasted" due to such inequalities in 1970 was over 10 per cent (10.3)—up from 5.7 per cent in 1960; in Buffalo over 15 per cent, up from 8.5 per cent in 1960; in Indianapolis almost 23 per cent—up from 19.5 per cent in 1960.

In 1960 socioeconomic differentials in mortality from Heart Diseases were the leading contribution to the overall amount of wasted deaths for all areas. The next in rank was mortality from Influenza and Pneumonia with mortality for Malignant Neoplasms and all other causes showing the next highest contributions. By 1970 some shifts took place in the causes of death in this respect: socioeconomic differentials in mortality from "All Other" Causes showed the highest overall rank in terms of their contribution to the general index with Heart Diseases and Malignant Neoplasms next in rank.

Two further observations worth mentioning point to a disturbing aspect of the health of our nation: a) When mortality declines are reported, socioeconomic differentials tend to increase for mortality from Heart Diseases and "All Other" Causes. Similarly when mortality rates from Malignant Neoplasms increase, they tend to result in higher SE differentials. In other words, improvements in the health of our nation seem to benefit the higher SE groups and health deterioration to tax the lower SE groups in both the central cities and in the "exclusive" suburban communities; b) Male mortality in most instances seems to be more susceptible to the above observations than female mortality. Although it may be easy to speculate on the factors accounting for the former observations it is still unclear as to what lies behind the latter.

Significance of our Findings

Kitagawa and Hauser reported the continued existence of socioeconomic differentials in mortality in the USA as well as in Chicago.[6] Our study, utilizing a different approach, confirms their findings for the period 1960–1970 and for the three selected metropolitan areas.

In the use of Census Tract data for this study one factor which might have accounted for the overall increases in differentials, namely migratory shifts of the population, was not considered. Since SE groups were based on different values of tract indicators for different periods and separately for central cities and suburbs, it is not clear how this variable would have operated. At best it could be argued that the population shifts within the metropolitan areas had been selective so that high mortality groups moved into low socioeconomic areas and vice versa. To our knowledge, no study has supported this. The closest to this point is an earlier study in which it was found that the city of Buffalo between 1950 and 1960 lost population numbers in an inverse ratio to SE status.[10] This in no way, however, supports the selective migration contention.

In connection with the use of large categories of causes of death, it is difficult to single out the specific causes of death which may account for the reported socioeconomic differentials. These findings are limited in this respect. For example, the bundle of Malignant Neoplasms consists of a large number of different types for some of which major breakthroughs have been made.

Finally, the significance of this study is two-fold: a) from a purely methodological point of view it not only reaffirms the utility of the areal approach in mortality analysis in the central cities but, for the first time, it shows the areal approach is operative also in suburban rings of metropolitan areas; and b) from the point of view of the health of our na-

TABLE 4—General Indexes and Proportional Indexes of Differential Mortality by Selected Causes of Death for Whites, Selected SMSAs, 1960, 1970 (per 1,000).

Causes of Death	Birmingham		Buffalo		Indianapolis	
	1960	1970	1960	1970	1960	1970
Heart Diseases	17.5	31.9	33.5	81.2	76.8	60.0
Malignant Neoplasms	6.1	12.2	5.8	17.1	12.8	31.4
Cerebrovascular Diseases *	6.4	−19.5	− .3	6.0	15.5	16.9
Accidents						
Motor Vehicles *	5.5	7.0	3.6	2.1	9.2	9.0
Other *	4.8	.5	1.7	3.8	10.7	12.7
Influenza and Pneumonia *	9.4	2.4	9.9	5.2	16.4	14.5
Diabetes Mellitus *	1.8	5.9	5.7	7.6	6.1	2.9
Tuberculosis *	5.2	.3	3.7	.7	.8	3.1
"All Other" Causes	.0	61.9	21.4	29.1	46.6	76.8
General Index	56.7	102.6	85.0	152.8	194.9	227.3

* Unstable rates.

tion this study presents an additional warning: socioeconomic inequities in our society continue to contribute wasted lives—a social by-product a democratic and humane society can no longer afford.

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ASTM Symposium on Wildlife Toxicology

A call for papers is issued for an ASTM Symposium on Avian and Mammalian Wildlife Toxicology to be held October 17–18, 1978, in New Orleans, LA. The symposium is sponsored by Committee E-35 on Pesticides and its subcommittee E35.21 on Safety to Man and Environment of the American Society for Testing and Materials (ASTM).

The purpose of the symposium is to provide a forum for interested persons to present and discuss data, concepts, and methods in both applied and basic avian and mammalian wildlife toxicology. Papers will be given on means of assessing the effects of pesticides, metals, and other toxicants, acutely and chronically. Test methods which help in the hazard evaluation of chemicals, new indicator test methods used in the laboratory or field, toxicology data which have concurrent chemical residue data in the organism and surrounding environment, and toxicology studies which include matching information on bioconcentration and fate of chemicals in the environment are being sought.

Authors are invited to submit the title and a 400-word abstract of their paper, along with an ASTM paper offer form, by May 1, 1978 to Eugene Kenaga, Health and Environmental Research, Dow Chemical USA, P.O. Box 1706, Midland, MI 48640. ASTM paper offer forms may be obtained from Mr. Kenaga.