DOCUMENT RESUME

ED 372 136 UD 029 971

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TITLE Geographic Concentration of Poverty and Risk to Children in Urban Neighborhoods.
INSTITUTION Case Western Reserve Univ., Cleveland, OH. Center for Urban Poverty and Social Change.
SPONS AGENCY Cleveland Foundation, Ohio.; Rockefeller Foundation, New York, N.Y.
PUB DATE Sep 91
NOTE 41p.; Paper presented at the Armington Program's Conference on Poverty and Children (September, 1991).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *At Risk Persons; *Children; Demography; Ecological Factors; Economic Factors; *Geographic Location; Human Geography; Intervention; Low Income Groups; *Neighborhoods; Place of Residence; *Poverty; Prevention; Social Problems; *Urban Areas; Urban Problems
IDENTIFIERS Concentration; *Ohio (Cleveland)

ABSTRACT

It is argued that the geographic concentration of the poor often serves to concentrate other negative social and physical conditions. From this ecological perspective, the growth of concentrated poverty is examined in Cleveland (Ohio). The investigation uses a database developed for Cleveland and its suburbs with information on social, economic, demographic, and physical characteristics, as well as the incidence of selected social problems. The area covered by poverty conditions in Cleveland has grown geometrically since 1970. Poor areas now cover more than one-third of the city. Six indicators of the well being of children demonstrate that children in the high-poverty areas are at greater risk than those in the low-poverty areas, even though the impact of the concentration of poverty is not uniform for all indicators and is mediated by other factors. Demographic factors are interrelated with social conditions as well. Knowledge of what accounts for the differential effects of poor neighborhoods on children can lead to preventive interventions at the neighborhood level. Five tables present study findings. (Contains 25 references.) (SLD)

Center for Urban Poverty and Social Change

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GEOGRAPHIC CONCENTRATION

OF POVERTY

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IN URBAN NEIGHBORHOODS

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September, 1991

Presented to the Armington Program's Conference on Poverty and Children. This analysis was supported in part by grants from the Rockefeller and Cleveland Foundations. However, the opinions expressed are those of the authors.

GEOGRAPHIC CONCENTRATION OF POVERTY AND RISK TO CHILDREN IN URBAN NEIGHBORHOODS

The notable increase in the geographic concentration of poverty in northern industrial cities has raised concern about the social isolation of the poor and the potential development of a permanent underclass. In this paper we argue that the concentration of the poor often serves to concentrate other negative social and physical conditions. This combination of conditions produces environments that place children and adolescents at particularly high risk for problems in health and development.

Using this ecological perspective, we examine the growth of concentrated poverty in one city, Cleveland, Ohio, for which we have detailed and recent data on economic, social, and physical conditions and health and developmental outcomes by census tract. We demonstrate that concentrated poverty is a risk factor for children and adolescents. We also present evidence that the effects of poverty are mediated through the concentration of other adverse social conditions. We conclude that the apparent growth of the underclass may reflect extreme changes in the social ecology of some urban neighborhoods.

The geographic concentration of the urban poor is a phenomenon of the 1980s and has occurred most visibly in northern, industrial cities. Today a growing number of people live in areas that are extreme in their economic deprivation and areas of intense poverty are covering a sizable portion of the

urban landscape. The increase in concentrated poverty has been brought about by a variety of forces that differ somewhat from one city to the next, including changing labor markets, relocation of companies, suburban growth and historical patterns of transportation and racial segregation. There is concern that concentration of the poor in central portions of the city may serve to further their isolation from opportunity and mainstream ways of life and expose them to high levels of adverse social and physical conditions that compound their economic difficulties. The impact of these circumstances on children and youth may be particularly harmful.

Published research on the geographic distribution of poverty has been based primarily on national census data from 1970 or 1980. Because income estimates are for 1979, these data do not reflect the impact of the recession that began in the third quarter of 1979 and continued into the early 80s. Therefore, the current concentration of poverty is likely to be underestimated. The restriction to census measures also has limited the ability of these studies to link the distribution of poverty to changes in neighborhood physical and social conditions or to the health of the residents.

Many of the above limitations can be overcome by focusing on selected, urban areas so that neighborhoods can be traced over time and more recent and complete, locally available data can be used. In this analysis we examine recent trends in the concentration of poverty for one geographic location, Cleveland,

Ohio. The relative risk to children's health and development in areas with concentrated poverty is examined. Finally, an analysis of physical and social conditions that seem to mediate between poverty concentrations and child outcomes is presented.

Although the study of one urban area places limits on the generalizability of the findings, it is the only practical way to investigate the trends and patterns in-depth, especially in mid-decade. Moreover, we believe that this analysis can be replicated elsewhere and similarities and differences noted across contexts.

BACKGROUND

There is general agreement that living in a homogeneously poor neighborhood may have a deleterious impact on individual residents and that the existence of large numbers of poor neighborhoods may have negative effects on a city (see, for example, Gephart, 1989). There is evidence, for example, that some extreme poverty areas have excessive rates of death (McCord and Freeman, 1990), low birth weight (O'Regan and Wiseman, 1989), and child abuse (Garbarino and Sherman, 1980). However, the nature of these consequences or the processes through which they occur have been studied only recently and pose extraordinary methodological and conceptual complexities.

Research on underclass areas has shown that some, but not the majority, of high poverty areas have reached extreme levels on indicators of marginality such as welfare dependency, female-

headed households, male non-participation in the labor force and high school dropout rates (Ricketts and Sawhill, 1988). However, the coexistence of high rates of these conditions and economic deprivation can be explained in several ways: persons with these predilections may select particular locations to live; institutions, resources and conditions in some high poverty areas may be conducive to or not prevent these behaviors; the concentration of these conditions and behaviors may present a set of stressors or expectations and demands that influence the individuals living there. Studies have yet to determine if any of these or alternative explanations are powerful.

In a review of research on the effects of poor neighborhoods on children and adolescents, Mayer and Jencks (1989) conclude that the evidence is quite mixed. When family and individual characteristics are controlled, neighborhood economic status often has weak effects. However, the studies they reviewed and some currently underway are often plagued by difficulty in accurately representing important characteristics of the environment. Proxies for neighborhood conditions are often used, such as average income of neighborhood residents or average characteristics of the children in each school. However, our own research indicates that neighborhoods quite similar in economic deprivation at a given point in time can differ markedly in their social and physical conditions, their history, and their spacial relationship to the wider community (Coulton, et al., 1990).

Existing studies have seldom taken into account the fact that economic deprivation is often, but not always, accompanied by physical and social conditions that may have a more potent influence on children and adolescents than levels of income per se.

Another related debate concerns whether the term underclass applies to places or to people. Analysts who postulate structural causes see them operating through neighborhoods and local networks that become isolated from the mainstream and expose residents to negative conditions (Wilson, 1987). Writers with a behavioral focus emphasize that individuals themselves differ from the norm in their values, aspirations and expectations and that their value systems become self-perpetuating (Auletta, 1981). In this view, neighborhoods become troubled when they contain many of these individuals.

THE ECOLOGY OF POVERTY AND RISK IN AN URBAN AREA: AN ANALYSIS OF CLEVELAND'S NEIGHBORHOODS

We became convinced of the need to draw some distinctions among economically disadvantaged areas when our analysis of poor neighborhoods in Cleveland suggested that patterns of social problems varied widely across high poverty areas (Coulton, et al, 1990). This suggested that the ecology of the areas differed markedly and that this might have consequences for residents, children in particular. We also wanted to develop a method that would allow the identification of specific locations that seemed to place children at risk for adverse health and developmental outcomes.

Our investigation uses a data base that we developed for the City of Cleveland and its surrounding suburbs within Cuyahoga County. The data base contains information on social, economic, demographic, and physical characteristics of each census tract as well as the incidence of selected social problems, health conditions and educational outcomes. A unique feature of this data base is that it contains indicators that are available at points throughout the decade. Most existing analyses of poor neighborhoods rely on 1970 or 1980 census data. We will demonstrate that the conditions in Cleveland have changed markedly since then.

We use the census tract as the unit of analysis because it is the smallest geographic area for which data are readily available.[1] Census tracts have been drawn with some attention to natural boundaries and are of a size that could reasonably constitute a "neighborhood." However, the geographic area that actually makes up the neighborhood for any given individual depends on their perceptions.

Geographic concentration of poverty

Our first step in characterizing the environment is to examine the geographic distribution of poverty in the Cleveland area and how it has changed over time.[2] We find that the decade of the 80s produced an important shift in the degree to which low-income tracts have become economically homogeneous. We define a high poverty area as a census tract where more than 40

percent of the population is classified as living in a household below the poverty threshold.

The poor today are more than twice as likely to live in conditions of concentrated poverty than they were in 1970 -- 21 percent of Cleveland's poor lived in high poverty areas in 1970 but this had risen to nearly 50 percent by 1988. The trend toward geographic concentration of the poor in Cleveland is similar to that reported in other northern industrial cities. There is much less concentration of poverty in urban areas in the south and west due to lower levels of racial segregation and greater accessibility of the geographic locations of employment (Hughes, 1989; Massey, Eggers and Denton, 1989).

The development of high poverty areas over the last two decades has been fueled by declining labor force participation among residents of central parts of Cleveland and by out-migration from the City of the non-poor.[3] The area of Cleveland covered by poverty conditions has grown geometrically since 1970 and poor areas now cover more than one-third of the City.

To take into account some of the historical and spacial differences among poverty areas we developed three categories. We label as "traditional poverty areas" those that were already high in poverty at the time of the 1970 census, the first census to measure poverty. These areas are close to the center of the City. The term "new poverty areas" is used for those that became high in poverty between 1970 and 1980, largely due to out-migration of the non-poor. They are in the middle rings of the

City. "Emerging poverty areas" became poor between 1980 and 1988 and reflect the dislocation of many blue-collar workers in the early part of the 1980s. They are largely on the outskirts of Cleveland and border more prosperous areas. We will use this typology in the analyses that follow.

Poverty areas and risk to children and adolescents

Even though areas with concentrated poverty differ considerably in their history, demographic characteristics and social conditions, we anticipated that children living in high poverty areas would be at greater risk for adverse health and developmental outcomes than those in non-poverty areas. We chose six available indicators of the well-being of children for this analysis[4]:

Low birth weight rate: The weighted average of infants born in 1984-86 who weighed less than 2500 grams per 1000 live births.[5]

Infant death rate: The weighted average for 1984-86 of infants under one year who died per 1000 live births.[6]

Teen birth rate: The weighted average of infants born to teenage mothers in 1984-86, per 1000 females ages 11-19.[7]

Juvenile delinquency rate: The weighted average of filings for juvenile delinquency in 1984-86 per 1000 population ages 9-19.[8]

High school dropout rate: The number of dropouts from grades 9-12 in 1987-88 divided by the number enrolled in the 9th grade.[9] These data at the census tract level are available only for the approximately 80,000 students enrolled in Cleveland Public Schools and do not represent the considerable number of residents enrolled in parochial and private schools.[10]

School reading performance: The average score on the standardized reading tests for students in the Cleveland Public Schools in grades 3 and 8 (1987-88).[11]

The mean rates of these outcomes by type of poverty area are presented in Table 1. It can be seen that children in all high poverty areas are at greater risk than children in low poverty areas, but there is considerable variability on birth outcomes and juvenile delinquency among the types of poverty areas. In other words, the impact of concentration of poverty is not uniform and seems to differ depending on how long an area has been extremely poor and its proximity to the center of the City.

Dropout rates are uniformly high throughout the City schools both in high and low poverty areas. Performance on standardized reading tests seldom exceeds the national midpoint which is 50.

A multivariate analysis of variance confirms that there are significant differences in child outcomes across poverty areas (multivariate $F=4.48$, $p<.01$). Univariate F tests reveal that these differences are not significant for dropout rates and reading performance at grade 8 but are significant for the other five outcomes.

Pairwise comparisons, with Bonferorni corrections, reveal that for low birth weight and infant death, the rates in the traditional poverty areas are significantly different from low poverty areas. Emerging poverty areas are not significantly different from low poverty areas in these outcomes. On low birth weight, there is a significant difference between traditional and emerging; new and emerging; and new and low poverty areas. On

Table 1: Means and standard deviations of child outcomes by type of poverty areas, City of Cleveland, 1984-86.

Variable names	Traditional poverty areas (n=17)		New poverty areas (n=18)		Emerging poverty areas (n=36)		Low poverty areas (n=116)		Overall city (n=187)	
	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
Low Birth Weight	158.68	35.86	154.90	49.05	113.82	22.47	95.50	40.38	110.49	44.48
Infant Deaths	26.04	12.93	19.03	13.90	15.55	15.50	15.73	13.18	16.95	13.92
Teen Births	67.30	19.31	118.98	156.24	58.64	26.46	41.31	59.87	54.48	71.70
Delinquency	60.90	29.88	65.11	41.77	55.11	17.54	40.55	24.04	47.57	27.19
Reading 3	44.92	3.93	42.54	6.30	45.23	6.28	49.78	8.13	47.77	7.77
Reading 8	39.33	5.11	39.35	11.80	43.56	6.40	43.98	10.54	43.03	9.72
Dropouts	46.97	14.14	51.91	27.78	40.12	20.12	44.73	27.97	44.73	25.63

juvenile delinquency and teen birth rates, new poverty areas are significantly higher than low poverty areas. Teen birth is also significantly different in new as compared to emerging poverty areas. Delinquency filings is significantly different in traditional and low, and emerging and low poverty areas. All high poverty areas are significantly higher than low poverty areas in these outcomes.

High poverty areas differ significantly from low poverty areas on third grade reading performance. But, as noted above, there are no differences across areas on eighth grade reading scores or dropout rates. Two factors must be taken into account in interpreting this finding. First, Cleveland children do not attend neighborhood schools. They are transported to schools outside their neighborhood to achieve racial balance. Thus, there are presumably no advantages conferred by differential schooling resources being available in higher income areas. Second, it should be noted that selection effects are operating here -- children in low poverty areas are more likely to attend parochial and private schools.[12] Furthermore, there may be important differences between public school students and those who do not attend public schools within both poverty areas and non-poverty areas.

High risk areas

We next examine the geographic distribution of areas that have high rates of poor infant outcomes and teen childbearing and delinquency (because of the uniformity of educational outcomes,

we will not use these to classify tracts). For illustrative purposes, we classify tracts into those that are extreme on all four indicators (i.e., low birth weight, infant death, teen childbearing, and delinquency) (labeled high infant and adolescent risk), those that are extreme on poor infant outcomes and teen childbearing but not delinquency (labeled high infant and teen childbearing risk), those that are extreme on delinquency and on teen childbearing but not on poor infant outcomes (labeled high adolescent risk), and those that are only extreme on delinquency (labeled high delinquency risk). We use as our definition of extreme tracts those with a rate of two times the median for the entire County on each indicator. Although this cutoff point is arbitrary, such demarcation of statistically deviant tracts is the approach used in most research on the underclass (Hughes, 1989). Experimentation with other cutoff points such as one and one-half times the median, does not change the general clustering of these areas geographically.

Of the 204 census tracts in Cleveland, three are extreme on both infant and adolescent outcomes. All of these are located in a traditional poverty area which has the majority of Cleveland's publicly operated housing projects. It is the only part of the City that has experienced concentrated poverty since the 1940s. Seven more tracts are high on poor infant outcomes and teen mothers but not on delinquency. These are in the new poverty areas, most of which became concentrated poverty areas during the

decade of the 60s or 70s and have experienced considerable out-migration of the middle class during these periods. Eleven tracts are high on delinquency and teen mothers but not on poor infant outcomes. Some of these are long-term poverty areas while a few have only recently reached high levels of economic deprivation. The four areas that are high on delinquency, but none of the other adverse outcomes, have not yet reached our concentrated poverty threshold of 40 percent.

Thus, extreme high risk for infants is largely confined to areas that have been poor for extended periods of time (i.e., traditional poverty areas according to our typology). Delinquency, on the other hand, has reached extremes in many parts of the City including areas that have only recently reached concentrated poverty conditions (i.e., emerging poverty areas).

Factors affecting risk

We have seen that the economic deprivation of an area is not synonymous with posing risk for children and that some areas of extreme risk for adolescents do not reach extremes on risk to infants and vice versa. The next step is to explore some of the neighborhood conditions that have the potential to raise or lower the risk to children.

To examine this question, we return to our earlier discussion of underclass areas and our proposition that these may be proxies for social processes and resources present in the community that impinge on the health and development of residents. We examine the following model:

RISK = f (SOCIAL CONDITIONS + ECONOMIC DEPRIVATION +

TO DEMOGRAPHIC CHARACTERISTICS)

CHILDREN

This suggests that risk to children is more than just a function of poverty and economic deprivation but also a function of social processes and resources in an area. We assume that demographic characteristics may affect risk directly, but more importantly through their influence on social conditions and economic deprivation. Part of the effect of concentrated poverty on children is indirect, through social conditions.

We include the following indicators of social conditions[13] in our analysis:

Births to unmarried mothers: This is the weighted average of births to unmarried mothers, 1984-86, per 1000 live births. We include this indicator, in part, because the departure from the traditional linkage of marriage and childbearing has been included in almost all conceptions of the underclass. It is also a proxy for female-headed families with children.[14] We assume that the degree to which the female-headed family is predominant in a neighborhood constitutes a risk factor for children even though we recognize that the processes through which the risk does or does not occur is complex and not well understood (e.g., Stack, 1974; Garfinkel and McLanahan, 1986).

Crime: This is the total number of FBI index crimes reported to the police and confirmed as valid reports per 1000 population. Eight crimes are included: homicide, rape, robbery, assault and aggregated assault, burglary, larceny, and auto theft. Since crimes are more likely to go unreported in high crime areas, this measure will provide a conservative estimate of the effect of crime on childhood risk. We consider crime a proxy for lack of social control as well as a measure of the fear and violence that may be associated with an environment.

Public Housing: This is the percentage of an area's total housing units that were operated by the Cuyahoga Metropolitan Housing Authority in 1986. The majority of

these units are in large estates, relatively isolated from the surrounding community, in extremely deteriorated condition and almost exclusively inhabited by poor families and individuals who are unemployed. We consider this a proxy for the social isolation of the poor from the surrounding community, physical deterioration, crowded conditions and geographic concentration of the long-term poor.

Substandard Housing: This is the percentage of each tract's 1-4 unit structures that were substandard in 1985. This is an indicator of the physical condition of the housing and may be a proxy for community investment and resources, since these substandard homes are in violation of building codes and have not been rehabilitated.

Poverty rates: Poverty rates are also included in the analysis. We use a weighted average of the poverty estimates for 1984-86. The estimates are derived from a predictive model that uses public assistance data to estimate poverty rates that reproduce census-based estimates (Paglin, 1990).

The following demographic factors[15] are also included in the analysis:

Percent Non-white: These are estimates of the percent non-white population based on a prediction model that uses race-specific births and deaths to estimate non-white population (Cuyahoga Plan, 1986). This is included because blacks are at higher risk than whites for living in poverty areas and for unmarried and teen childbearing, low birth weight and infant death (Kleinman, 1990).

Percent Children: This is the children under 14 as a percent of the population in each tract. This allows for the fact that poverty rates are higher in families with young children (Garfinkel and McLanahan, 1986), and for the possibility that the ratio of adults to children in an area affects outcomes for children.

Population Loss: This is the percentage change in the population of the tract between 1970 and 1980 and between 1980 and 1985. This is a proxy for the abandonment of some high poverty areas by the working and middle class. Population losses between 1970 and 1980 were greatest in traditional and new poverty areas. These tracts remained more stable in population levels in the 80s while greater population loss was seen in the

emerging poverty areas. Population loss also is a proxy for disinvestment and isolation of the poor.

We performed hierarchical regression analyses of four child outcome indicators on these social, economic and demographic predictors (see Tables 2-5). In model 1, we entered the block of variables representing social conditions. In model 2 we added poverty rates to test the degree to which the observed correlation between child outcomes and poverty occurs through the impact of poverty on social conditions. In model 3 we added demographic variables to determine their direct effects on the child and adolescent outcomes after taking economic and social conditions into account. Finally, models 4 and 5 examined the direct and indirect effects of poverty and demographic factors after removing the endogenous variables.

Table 2 presents the regression coefficients for low birth weight rate. A comparison of model 1 and model 2 suggests that concentration of poverty is associated with risk of low birth weight largely through its association with births to unmarried mothers and crime. Models 4 and 5 suggest that the indirect effects of poverty, race and population decline are significant.

Infant death rate is examined in Table 3. It appears that substandard housing and public housing and rates of unmarried childbearing are predicators of the risk of infant death. The effect of poverty is not significant in any of the models when social conditions and demographic factors are controlled. For the teen mother rate (see Table 4), the rates of unmarried

Table 2: Regression coefficients (standardized coefficients) for social, economic and demographic factors affecting low birth weight rate, City of Cleveland, 1984-86.

Variable Names	Model 1	Model 2	Model 3	Model 4	Model 5
Illegitimate Births	.11** (.62)	.12** (.68)	.08* (.43)		
Crime	.11** (.17)	.11** (.18)	.10** (.16)		
Public Housing	.07 (.03)	.11 (.04)	.22 (.08)		
Substandard Housing	.13 (.07)	.20 (.11)	.15 (.08)		
Poverty		-.29 (-.11)	.10 (.04)	.98** (.37)	
% Children			-.50 (-.09)	-.71 (-.12)	.01 (.00)
Non-white Population			.20 (.20)	.46** (.44)	.59** (.57)
Population Change 70-80			.21 (.07)	.41* (.14)	.74** (.26)
Population Change 80-85			-.43 (-.04)	.04 (.00)	.84 (.08)
Constant	36.88**	37.87**	52.93**	67.38**	57.77**
Adjust R sq.	.56	.56	.57	.53	.48

*p<.05 **p<.01 N=187

Table 3: Regression coefficients (standardized coefficients) for social, economic and demographic factors affecting infant death rate, City of Cleveland, 1984-86.

Variable names	Model 1	Model 2	Model 3	Model 4	Model 5
Illegit. Births	.01** (.27)	.02** (.39)	.01 (.13)		
Crime	-.02 (-.11)	-.02 (-.09)	-.01 (-.06)		
Public Housing	.13* (.18)	.16** (.21)	.14* (.18)		
Substand. Housing	.08 (.16)	.13* (.24)	.15* (.29)		
Poverty		-.17 (-.23)	-.21 (-.29)	-.01 (-.02)	
% Children			.20 (.12)	.23 (.14)	.22 (.13)
Non-white Population			.06 (.22)	.08** (.28)	.08** (.28)
Pop. Chg. 70-80			-.00 (-.00)	.03 (.04)	.03 (.03)
Pop. Chg. 80-85			.24 (.08)	.35 (.11)	.33 (.10)
Constant	8.06**	8.63**	5.30	3.24	3.38
Adjust. R sq.	.17	.18	.17	.13	.14

*p<.05 **p<.01 N=184

Table 4: Regression coefficients (standardized coefficients) for social, economic and demographic factors affecting rate of births to teenage mothers, city of Cleveland, 1984-86.

Variable names	Model 1	Model 2	Model 3	Model 4	Model 5
Illegit. Births	.06** (.47)	.06** (.46)	.08** (.65)		
Crime	.10** (.21)	.10** (.21)	.07* (.15)		
Public Housing	-.17 (-.09)	-.18 (-.10)	-.10 (-.05)		
Substand. Housing	.35** (.27)	.34** (.26)	.24* (.19)		
Poverty		.05 (.03)	.32 (.17)	1.11** (.58)	
% Children			-.69* (-.17)	-.94** (-.23)	-.12 (-.03)
Non-white Population			-.12 (-.17)	.15** (.20)	.29** (.40)
Pop. Chg. 70-80			.07 (.03)	.44** (.21)	.79** (.37)
Pop. Chg. 80-85			-.80 (-.11)	-.42 (-.06)	.57 (.08)
Constant	-2.76	-2.94	10.04	24.41	14.08
Adjust. R sq.	.55	.55	.57	.49	.36

*p<.05 **p<.01 N=185

Table 5: Regression coefficients (standardized coefficients) for social, economic and demographic factors affecting delinquency filings rate, City of Cleveland, 1984-86.

Variable names	Model 1	Model 2	Model 3	Model 4	Model 5
Illegit. Births	.03** (.26)	.03** (.27)	.06** (.59)		
Crime	.05* (.14)	.05* (.14)	.03 (.08)		
Public Housing	.04 (.02)	.04 (.02)	.06 (.04)		
Substand. Housing	.37** (.34)	.37** (.34)	.35** (.32)		
Poverty		-.02 (-.01)	.26 (.16)	1.02** (.63)	
% Children			-.80** (-.23)	-.94** (-.27)	-.18 (-.05)
Non-white Population			-.18 (-.28)	.03 (.05)	.17** (.27)
Pop Chg. 70-80			-.19 (-.11)	.13 (.07)	.48** (.27)
Pop chg. 80-85			-.78 (-.13)	-.51 (-.08)	.33 (.05)
Constant	15.88**	15.96**	32.71**	40.40**	30.36**
Adjust. R sq.	.35	.35	.39	.31	.16

*p<.05 **p<.01 N=187

childbearing, crime and substandard housing in an area are important predictors, with the effects of poverty, race and population decline being largely indirect through the rates of these other factors. The pattern of effects for delinquency (Table 5) is similar.

DISCUSSION

The indicators of social conditions had significant effects as a whole on most of the outcome measures with the exception of schooling. After controlling for these proxies for social processes and resources, poverty had no effect on low birth weight but did display a direct effect on infant death and delinquency. Demographic factors added little to the explained variance.

It is difficult to interpret the unique effects of each of the indicators on the outcomes due to the considerable multicolinearity, the complex nature of the direct and indirect effects and the possibility of reciprocal effects. Multicolinearity results in unstable coefficients and specification error can result in coefficients that are upwardly or downwardly biased.

Nevertheless, it is interesting to note that public housing seems to be an important factor in infant death and that when this and illegitimacy are controlled, the effect of poverty is not significant. The explanation for the lack of an effect of poverty could have to do with the fact that many poverty areas

are well served by prenatal outreach programs but that many persons in low- to moderate-income areas now lack adequate health insurance (Braverman, et al, 1989). Thus, after housing conditions and family structure are taken into account the poor are not at much higher risk of infant death than the non-poor. Conclusions await the gathering of data on services and the testing of longitudinal models that can take into account these more complex effects.

An additional interesting finding is the importance of crime rate as a predictor of the low birth weight rate in a neighborhood. A possibility that should be explored is that drug trafficking and drug use are responsible for higher crime rates and low birth weight in these areas.

The finding that the effects of neighborhood conditions on school performance is extremely weak could be interpreted to suggest that school effects and individual effects are much stronger than neighborhood effects. In this ecological analysis we were able to control for neither. However, another explanation is possible. The test score and dropout data presented here were only available for the Cleveland Public School System. It is estimated that approximately 30 percent of eligible children do not attend the public schools, and attend private or parochial schools instead. It is widely believed that enrollment in non-public schools is not randomly distributed across neighborhoods or across families. If we assume that it is the lower-income families in both poor and non-poor neighborhoods

that send their children to public schools, this selection bias would depress any neighborhood effects on schooling. Testing of this hypothesis awaits our obtaining data from non-public schools serving Cleveland residents.

The single variable that was the strongest predictor of child and adolescent risk across the board was the rate of births to unmarried mothers. As we indicated earlier, this is highly correlated with the predominance of the female-headed household as a family form. In many of the neighborhoods with highest risk for children, more than three-quarters of the families are of this type. The adult male population is small relative to the adult female population and these areas tend to have a lower proportion of elderly, especially elderly males, in the population. While family structure has been moderately correlated with many child outcomes at an individual level, this neighborhood analysis raises the possibility that the predominance of this family form and the accompanying demographic patterns may be associated with a particular ecology in which children and adolescents do not thrive.

This analysis has identified geographic areas that pose high risk for children and adolescents. We have also described these areas in terms of a set of interrelated social and physical conditions. One of the most distinguishing characteristics of these areas is the fact that the vast majority of children are born to unmarried females and females are the official heads of the majority of households. Males, especially those with jobs,

are in short supply in these areas according to the official census estimates. High crime rates and the concentration of public housing and substandard market housing also characterize most of these areas. Although most of these areas have been extreme poverty areas for several decades, some have only recently become poor. Moreover, the majority of high poverty areas in the City do not seem to pose these extreme levels of risk for children and adolescents suggesting that other aspects of the social and physical environment are important.

While these observations are intriguing, they do not reveal the mechanisms through which these conditions lead to poor outcomes for children and adolescents. What is it about being a female-headed family with children, living amidst other female-headed families, largely in substandard housing surrounded by crime that affects the health and behavior of children? It is not merely material deprivation because we see equally economically deprived areas with much lower risk to children. Racial or ethnic differences lack power as explanations because while most of the residents of the high risk areas are African American, the majority of blacks live in areas that are not high risk. Race, in fact, is shown to be statistically insignificant when other neighborhood characteristics are taken into account.

Several possible explanations can be offered, each of which is complex and requires further investigation. A "social impoverishment" hypothesis suggests that the female-headed families who cluster together in the poorest housing are all so

depleted of resources that they have little to give to one another while much is demanded of them. Although studies of the ecology of child abuse seem to support this hypothesis (Garbarino and Sherman, 1980), ethnographic studies suggest that there is actually considerable exchange among these types of families (Stack, 1974). Granovetter's (1982), observation that the networks of the poor are characterized by closely-knit, strong-tie networks may shed light on this apparent paradox. "The heavy concentration of social energy in strong ties has the impact of fragmenting communities of the poor into encapsulated networks with poor connections between these units... This may be one more factor which makes poverty self-perpetuating." (p. 116). While intensive interaction with intimate groupings may bring sources of security and emotional support, they may not provide access to the range of information and resources that enhance health and development of children.

A selection-migration hypothesis may add further to the explanation. The female-headed families who reside in public housing and areas where housing conditions are extremely poor may differ from others in their abilities to access resources. They may be more cut off from family, friends and institutions. Poor families with greater resources may tend to migrate out of these high risk areas.

A third, quite different, hypothesis builds on a contagion model (Crane, 1988). Adverse parenting behaviors may be transmitted throughout a neighborhood when they reach a certain

prevalence in the population. Once a threshold is reached, the behaviors become more influential, more people adopt them. Crane (1989) presents evidence that is consistent with a contagion model for patterns of teen childbearing and school dropout behavior. Specifically, the characteristics of childrens' neighborhoods had little effect on their chances of dropping out in the majority of neighborhoods. However, neighborhood effects were strong for children living in areas with extreme concentrations of these behaviors and other negative social conditions.

A final hypothesis has to do with the impact of uncertainty and insecurity on human behavior and development. The importance of predictability for human functioning has been demonstrated in theoretical areas as diverse as economic decision making (e.g., Hirshleifer and Riley, 1979) and human attachment (Levine, 1980). A study with mother-infant pairs of monkeys demonstrated that environments with sparse resources did not harm attachment and caretaking but environments with variable resources were disruptive to the mother-infant relationship. Infants raised in the uncertain environments suffered developmental and health consequences (Rosenblum and Paully, 1984). Our research finds that not all poor areas display high risk for children, only those with substantial numbers of crimes, female-headed households, or substandard dwellings. Mothers living in such environments may face high levels of uncertainty due to their lack of control over resources and events. These conditions may

produce high levels of uncertainty and insecurity about food, shelter, and safety, and this may, in turn, affect parenting behaviors.

CONCLUSIONS

This analysis was stimulated by the observation that areas of high poverty in Cleveland, while all suffering economic deprivation, differed markedly in the incidence of other social problems and indicators of social disruption. We initially noticed that this seemed related, in part, to how long an area had been poor; but even within areas of long-term poverty, there were sizeable differences. The concept of the underclass served to recognize that there might be differences among poor persons and poor neighborhoods but it lacked explanatory and predictive power.

Based on the preceding analysis it seems to us useful to work backwards from a concept of risk. We note that geographic areas differ in the incidence of low birth weight, infant death, teen pregnancy, delinquency, and poor reading scores in primary grades. While areas with high poverty rates have a higher incidence of these conditions, poor areas are not homogeneous; the effects of poverty tend to be mediated by other social conditions. Demographic factors are interrelated with social conditions as well.

In large part these relationships between economic and social conditions and demographic patterns may be due to

selection effects, with social conditions in an area affecting who can and will live there and the balance of in- and out-migration. These cannot be teased out using the cross-sectional, aggregate type of data presented here. However, processes of selective movement of the population do affect and are affected by the ecology. Thus, although selection effects are typically considered as a source of bias, here they are a topic of interest. Future research is needed to trace the economic and social conditions that may be responsible for changing the level of risk in particular areas over time.

From a practical point of view, it is clear that a growing proportion of urban residents now live in high poverty areas, and that these present a risk for children. However, many poor areas do not demonstrate extremely high risk at least on some of the gross indicators that we were able to examine here. There seem to be important differences among poor neighborhoods that protect children from the worst outcomes in some places. Our analysis suggests that social conditions such as the predominance of the female-headed family and substandard housing are important but only explain a portion of the difference. Programs, history, institutions and population processes are potentially important additional factors to be explored. Knowledge of what accounts for the differential effects of poor neighborhoods on children can lead to preventive interventions at the neighborhood level.

NOTES

1. There are presently 204 census tracts in the City of Cleveland and 175 in the remainder of Cuyahoga County. We have eliminated from our analysis all tracts in the downtown area, tracts with less than 30 population in 1980 or 1985, and the tracts in which the welfare department and juvenile court are located. In some analyses the number of cases is slightly smaller due to missing data on one or more variables.

2. We use the official census definition of poverty which was $12,100 for a family of four in 1989. There are many well-known problems with this measure: it is based only on money income and does not include assets, fringe benefits or in-kind welfare benefits; it is based on a formula of household expenditures that was developed in the 1950s when housing consumed much less of the typical family budget; it is indexed to the CPI which may be overly inflated. Nevertheless, it is the only measure available for small areas such as census tracts. For the years 1970 and 1980 we use official census poverty estimates. For 1981-88 we use estimates provided by the Center for Regional Economic Issues (Paglin, 1990).

3. During the 1970s the North Central region of the United States experienced overall population loss of both the poor and non-poor. The City of Cleveland also lost a disproportionate number of middle and lower-middle income residents to the surrounding suburbs. Bier et al., 1988, suggests that this is largely due to excess construction of housing at the outer fringes of the SMSA which results in a "domino" effect. Demand weakens for City houses, prices fall, successive groups move outward, housing in the center is demolished. The outward movement is also pushed by dissatisfaction with conditions in the City, especially crime and public schools.

4. Data on low birth weight, teen births and infant deaths were obtained from the Division of Vital Statistics, Department of Public Health and Welfare, City of Cleveland. Data on delinquency was obtained from the Cuyahoga County Juvenile Court and prepared by the Federation for Community Planning. Data on school performance was obtained from the Research and Analysis Department, Cleveland Public Schools.

5. We use the weighted average for three years whenever possible because this yields a more stable indicator. Many of these phenomena are very variable from one year to the next.

6. It should be noted that this is not the infant mortality rate which involves matching birth and death certificates, but the number of deaths of infants under one year of age divided by the number of births.

7. The number of females ages 11-19 in each census tract is an estimate. We began with the 1980 census and added six years to each age cohort. This estimate assumes no migration. Since the population has probably declined in the City of Cleveland, these estimates are positively biased. Thus, the estimate of the teen childbearing rate is conservative. The true rate may be somewhat higher than that reported here.

8. There are two problems with the measurement of delinquency. First, we rely on official reports of delinquency which are subject to reporting bias. Secondly, the denominator is estimated from the 1980 census and assumes no migration. Since the population of Cleveland is estimated to have declined, these are conservative estimates of delinquency rates.

9. This is an estimate of the number of students who begin 9th grade but will drop out before completion. It is based on the assumption that the probability of dropping out at each grade level in 1987-88 is a reasonable estimate of the probability today.

10. Approximately 30 percent of the children in Cleveland are not enrolled in Cleveland Public Schools. The rates of non-enrollment are higher in areas that are primarily white and/or middle income.

11. We examined both math and reading performance at all grade levels. We present the results for 3rd and 8th grade reading only because the conclusions do not change across grade levels or type of test.

12. We estimated the percentage of an areas' children, ages 5-13, who were attending grades 1-8 of the Cleveland public schools. Population estimates by age were provided by The Urban Center (1986). Counts of children attending by grade and census tract were compiled by the authors from data provided by the Cleveland Public Schools. We estimate that fewer than 50 percent of the eligible children in low poverty areas of Cleveland attend Public Schools. In high poverty areas, enrollment represents approximately 80 percent of the eligible population. These estimates should be interpreted cautiously because there is the potential for considerable error in the population estimates for small geographic areas.

13. Data on births to unmarried mothers and total live births were obtained from the Division of Vital Statistics, Department of Public Health and Welfare, City of Cleveland. Data on crime were obtained from the Cleveland Police Department. Data on Public housing were obtained from the Cuyahoga Metropolitan Housing Authority. The total housing units count is provided by

The Urban Center, Cleveland State University, and the 1980 Census. Data on substandard housing is obtained from the City of Cleveland. Poverty rates are obtained from The Center for Regional Economic Issues, Case Western Reserve University.

14. The female-headed families with children in each census tract can only be ascertained by the decennial census. In 1980, the correlation between the rate of female-headed households with children and the illegitimate birth rate for the City of Cleveland was .86.

15. Number of children is obtained from the 1980 Census and children born after 1980 are estimated from data obtained from the Division of Vital Statistics, Department of Public Health and Welfare, City of Cleveland. Population for 1970 and 1980 is obtained from the Bureau of the Census, 1972 and 1982 respectively. Population for 1985 is estimated by The Urban Center, Cleveland State University. Population for 1981 to 1984 and 1986 are estimated by the authors.

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