
EFFECTS OF POVERTY ON HEALTH STATUS*

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JUST THREE YEARS AGO, the Annual Health Conference of the New York Academy of Medicine was devoted to the topic of Child Health: One Hundred Years of Progress and Today's Challenges. It was my challenge at that meeting to summarize what was known about Child Health Care and Social Factors: Poverty, Class, and Race. Today we revisit the topic of Children at Risk: Poverty and Health. Not much progress has been made during these three years, and all of the challenges remain.

Not much more is to be added to evidence presented three years ago. Poverty has a pervasive impact on the health of children. Poor children are more likely to become ill, and when they do become ill they get sicker and die at higher rates than do nonpoor children.

Recent British studies have added to the literature by showing that low parental social class is associated with shorter adult stature in offspring.^{2,3} Several modifiable factors, including birth order, number of surviving younger siblings, overcrowding, and maternal education are independent and significant predictors of adult height, even after adjusting for the powerful effects of parental height and birthweight, but social class has a persistent *independent* effect. Thus, improvements in social and environmental factors, such as housing and education, might reduce the adverse impact of social class on height, but they would not eliminate it.

One American study examined the relationship between family income and dental caries and found that children in low-income families had higher dental disease rates, higher percentages of unmet dental need, and significantly lower utilization rates for dental care services.⁴ A Finnish study added elegance to study of the relationship between social class and dental caries by

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also examining the effect of other factors, such as age and sex, reported frequency of tooth brushing, consumption of sugar, and use of fluoride tablets. The research found that the excess of dental caries among low income children could not be explained by differences in these factors.⁵

Thus, evidence continues to accumulate concerning the impact of social class on health, and it is not necessary to go over old ground once again.

It is now important to work in earnest on the mechanisms by which poverty operates. In the long run, it is to society's advantage to eliminate poverty. In the short run, interrupting the chain of events from poverty to ill health is a useful goal in and of itself.

The chain of events is complex. Predisposing factors involve environmental conditions, social conditions, and genetic risk factors. Some of these operate directly (such as housing with lead-based paint), and some operate indirectly through mediating factors involving induced behaviors, stress, social isolation, and decreased access to medical care. All risks interact in unknown ways in their effect on health.⁸ We know that improvements in some environmental conditions and improvements in medical services can reduce the disadvantages of poverty.^{6,7} Little is known about the possibility of altering other links in the chain by intervening to achieve better health.

Demonstrating the effectiveness of these interventions on health status is itself a challenge. So far, assessments of the impact of poverty on health and of interventions to reduce the effects of poverty have approached the challenge disease by disease, condition by condition, disorder by disorder. It has not been possible to generalize from research results to a coherent strategy that does more than, perhaps, change the frequency of one condition. We need measures of health that characterize people, not their medical diagnoses. There must be measures of physical and emotional feelings; impairments, handicaps, and disabilities; and manifestations of altered resistance to illness. The health of a child should be viewed as a composite, or a profile, of these different attributes.

Low birthweight is the point of departure for a discussion of mechanisms. Birthweight is both an important health outcome and a determinant of subsequent health.⁸ It is a mechanism for the intergenerational transfer of disadvantage in health because socially deprived women are much more likely to bear low birthweight infants than are other women. Many studies have shown that race is an important determinant of low birthweight. Unanswered questions concern the extent to which this racial effect is a result of a social class effect and the extent to which the effects of race and social class can be explained by other factors, particularly those that are modifiable.

One useful source of information about child health is the National Health Interview Survey, especially its Child Health Supplements conducted in 1981

and again in 1988. Since its inception, the survey has collected information on family income and family size as well as race and other important socio-demographic characteristics.

McGauhey and colleagues⁹ assessed the influence of the social environment and of social stressors on various aspects of health in low birth weight and normal birthweight infants using data from the 1981 supplement. Health characteristics available from the survey were: activity restricted days, school-loss days, bed days, a behavior problems score, school failure, low academic rank, and mother's rating of the child's health.

The six components of an adverse social environment that were available for study were: low family income, family with mother as the only adult, maternal education less than high school graduate, maternal self-perception of her health as fair or poor, five or more children in the family, and crowding in the home, defined as the highest quartile of individuals per room. Each of the components was divided into low risk state (with a value of 1) moderate risk (value of 2) and high risk state (value of 3). The values were summed to obtain a social conditions score for each child. Values of 12–18, which represent high risk for at least four of the characteristics, were considered to place the child in a high risk state; about one quarter of children were so classified. One half, with scores of 9–11, were classified as moderate, and one quarter, with scores of 6–8, were classified as low risk.

Multivariate analyses done separately for black and white children showed that low birth weight children in high risk social environments, but not low birth weight children in moderate or low risk social environments, were at increased risk for poor health outcomes as compared with comparable normal birth weight children, regardless of whether they were preschool or school age. That is, in the presence of adverse social conditions, low birth weight children do very poorly. This disadvantage is not outgrown since it is just as prominent in older children as in younger children. Although white children are less likely to live in a high risk social environment, they are as disadvantaged from living in such an environment as are black children. Specific social risks differ for children of the two races.

Low family income is a social risk for white children across all indicators. Poverty by itself is not a direct risk factor for black children. Rather, the correlates of poverty, especially low maternal education, overcrowding, and poor maternal health are highly correlated to poor health among black children. Thus, the pathway from low social class to poor health differs in different groups of children, at least for poor black and poor white children.

Reductions in the frequency of low birth weight is a high national priority because of its impact on infant mortality and on child health. This country lags behind at least 17 industrialized nations in the percentage of babies born

at low birth weight; even for white infants, we lag behind 11 other industrialized nations.¹⁰ Unfortunately, the cause of the excess low birth weight is not known. However, a recent study has provided some clues about the relative impact of race and social class on the occurrence of low birth weight in offspring of a national cohort of women.¹¹ Investigators identified women who were part of the National Longitudinal Survey of Youth that began in 1979 with identification of a random sample of individuals aged 14–21; women and their offspring born since 1979 have been followed yearly ever since. The sample was enriched by blacks and also by whites of low social class, which permits researchers to have a sample large enough for analyses by race and social class. This particular study characterized social class in three different ways: poverty status during the year before intake to the study, poverty pattern across the 10 years thereafter, and poverty during the year pregnancy began. Multivariate analyses were done separately for black births and for white births, and controlled for variables known to be related to low birth weight, such as age and parity of mother, maternal education, marital status, and maternal smoking. The findings were of considerable interest. Poverty is a risk factor, but so is being black, being unmarried, smoking, and low maternal education. These are not new findings. What is a new finding, at least for studies using the individual as the unit of analysis, is the apparent interaction between race and poverty. Although the overall risk of low birth weight for black infants is more than twice that of whites, the risk of low birth weight among poor white women is the same as that of poor black women. The increased risk of black infants among the nonpoor is also likely to be related to their lower social class since nonpoor black mothers are much more likely to have lower incomes and, in fact, to be congregated at just above the poverty line than is the case for white mothers.

Additional evidence demonstrates the long-term effects of poverty, and derives from a pilot analysis of the influences of poverty on subsequent births to women in this cohort.

When one birth is of low birth weight and the mother is poor, the likelihood of the next infant being of low birth weight exceeds 40%. If the mother was not poor at the time of the prior birth the chance of repeating low birth weight in the subsequent pregnancy is about 20%. Thus, the risk of repeating low birth weight in a subsequent pregnancy among mothers who are poor is double that of mothers who are not poor. If the prior birth was of normal birth weight, the likelihood of the next birth having low birth weight is almost 5% in the case of poor women as compared with 3.5% in the case of women not poor, a relative risk of 1.33. This relationship between likelihood of subse-

quent low birth weight and prior poverty is present for both black and white women, and the effects do not result from such other factors as maternal age or smoking. Although findings are preliminary because they derive from a study with relatively small numbers of individuals, they indicate that both family poverty and prior low birth weight, itself highly related to poverty, place an infant at double jeopardy regardless of race.

These are important findings for a consideration of the impact of poverty on a health outcome. If the magnitude of the disadvantage is consistent across races, then the range of mechanisms narrows at least by reducing the likelihood of a genetic effect and the range of possibilities for intervention widens. The disadvantage suffered by poor whites becomes an important area of study along with the disadvantage suffered by poor blacks.

The second imperative in the search for solutions to the problem of poverty and ill health is the development of measures of health and illness in childhood. Illness is difficult to characterize and health defies definition in terms that can be measured. The most traditional and easily obtained measures are low birth weight and rates and causes of death, but data sources containing these types of information do not usually measure social class. Even if they did, findings using these measures do not necessarily generalize to other and more common aspects of health.

Counting individual diseases is the other conventional method of assessing health. But the counting of individual diseases has limitations in studies of the linkages between poverty and ill health. Since the biological aspect of the pathogenesis of one disease differs from others, and since the prevalence of most specific diseases in children is low, it will be difficult to develop a coherent research strategy to study the impact of poverty when approached disease by disease.

Health examination surveys to assess overall health and physical limitations are another source of information on health, but conventional physical examinations generally produce little useful information about health status. Vision and hearing are two exceptions. Selected testing, as for anemia and elevated blood lead levels, also are examples of health problems discoverable by examination that can be and have been related to social class. A major limitation of health examinations is the reliability of the assessment; when it is a physical examination conducted by a physician, agreement between two physicians examining the same child is so low as to be useless as a source of information about whether the child has a health problem.

Clinical information systems that catalog the occurrence of all illnesses over time in individuals are a generally untapped source of information about

diagnosed health problems. Claim forms from insurance records, including Medicaid information systems, can be used creatively to characterize children's as well as adults' health as reflected in diagnosed illness. It is now possible to take information on individual illnesses and combine them into one characteristic that represents the burden of morbidity experienced in a year. The following data come from a study in four different health maintenance organizations across the country and one state's Medicaid population.¹² In this study, information is obtained from computerized encounter forms or claim forms. The basis for categorization of morbidity is the presence of various types of diagnoses in a year's time. Diagnoses in the International Classification of Diseases have been categorized primarily by their likelihood of persistence into one of 32 groups. Computer algorithms have determined the most commonly occurring combinations of these groupings and the result is what we call Ambulatory Care Groups. Each condition is counted only once, no matter how many times the diagnosis was given in the year. Thus, neither the number nor the frequency of diagnoses are being captured but, rather, the variety of types of morbidity. The burden of diagnosed morbidity during each year can be determined for each individual in a population as long as information from all medical encounters is available. Our findings showed that poor children—those enrolled in Medicaid—have higher burdens of morbidity than children in the health maintenance organizations.

Other types of information also add to a characterization of health, among them disability or limitations of activity. Responses to questions on the National Health Interview Survey about limitation of activity due to a long-standing health problem show an excess of limitation among lower income children in the country as a whole. Unfortunately, rates of limitation as ascertained in the National Health Interview Survey are low in childhood—less than 5%—and it is not possible to study the impact of social class controlling for other important factors in surveys of relatively limited sample size.

Several groups of investigators are working on the development of better and more sensitive measures of child health. All are based on interviews of adolescents or children, or parents of children. We already know that health surveys are a good source of information on how respondents perceive their health status; their judgments have been found to predict subsequent health as determined by more objective measures. All current efforts to develop health status measures for children go far beyond what has been conventionally regarded as evidence of poor or good health, that is, mortality and the occurrence of individual disease. Disease is how physicians characterize health;

absence of disease is, by definition, health in the physician's terms. But health and illness have a different meaning for people. Ill health means symptoms, disabilities, and handicaps. Ill health is not only a biological phenomenon (as it is for physicians); it is a constellation of feelings and impairments, all of which occur in a social context. That is why all the efforts to develop health status measures attempt to characterize the activities of children at different ages to use interference with normal activities as a measure of health. All seek measures with more variability across the population so that it is possible to describe a spectrum of limitations rather than just severe limitations. All the efforts are developing standard ways to ascertain symptoms, both emotional as well as physical, because many health problems in childhood cannot be represented by a standard medical diagnosis. All of them are developing measures to assess some measure of social functioning within the context of school, family, and peers. Some attempts even include concepts that extend beyond morbidity and functioning, such as characteristics that represent threats to subsequent health. These seem quite justified in childhood, where so much medical attention should properly be devoted to prevention.

In our work on developing the CHIP (Child Health & Illness Profile) this domain is called the resilience domain, because it contains characteristics such as health altering behaviors, which determine whether the child or adolescent will be able to avert the threats to health that are pervasive in modern society. CHIP has five other domains, each of which has at least two subdomains. The other domains are Activity, Comfort, Physical & Mental Symptoms, Satisfaction with ones health, Disorders (Diagnoses), and Achievement of expected social roles. The scoring of each subdomain and the overall domain has been developed using data from a large pretest sample of adolescents and employing psychometric principles and methods for all domains except the Disorder domain. For this domain we will use the ACG system to determine the individual's burden of morbidity.

Within a year or two, with data from more extensive testing of the CHIP, we should have much more information on the nature and extent of differences in health between poor and nonpoor adolescents (ages 11–17) across the range of characteristics that represent health and illness. Later work will repeat the process for younger children (ages 5–10).

Since the New York Academy of Medicine Conference in 1988, studies of poverty and health of children have moved from primarily descriptive studies of relationships to more analytic studies of mechanisms. The field has also moved to a broader conceptualization of health and illness—a conceptualiza-

tion that includes a much wider variety of characteristics related to how children function, what they feel, what they are able to achieve, and how well they will be able to withstand subsequent threats to their health. Understanding how social factors operate and assessing the impact of interventions will require such a conceptualization.

SUMMARY

Two major points derive from this paper. First, the search for mechanisms of action of poverty is likely to be facilitated by a focus on the poor and lower classes and on poor white children as well as on poor minority children. Second, new ways to characterize illness and health are needed to clarify the nature and extent of the impact of poverty on children and to assess the effectiveness of strategies to reduce the disadvantage that derives from it.

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