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Proposed Core Hypothesis/Question Justification
Social Environment Working Group
Socioeconomic Status

I. Proposed Core Hypothesis/Question

What social environmental factors account for the socioeconomic gradient in child health and development?

II. Workgroup: *Social Environment*

III. Contact persons for proposed core hypothesis/question

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IV. Public health significance

Children in the United States are on average in worse health if their parents are poor or are less well-educated. Mothers with low education levels are more likely to have low-birth-weight babies. Poorer children are more likely to develop a variety of serious chronic health problems, including heart conditions, vision and hearing disorders, and diabetes (Newacheck, 1994). Furthermore, among children with a given chronic health condition, poor children on average have worse health outcomes. For example, among children with asthma (and controlling for the child’s age), those in the lowest income quantile are more than twice as likely to experience a hospitalization episode than children in the highest income quintile (Case et. al., in press). Poorer children are also more likely to experience accidental injuries and accidental deaths; to develop obesity in adolescence; to develop emotional problems, such as depression; and to adopt “risky” behaviors, such as smoking and drug and alcohol use, in adolescence.

The strong association between family economic status, as measured by family income, and children’s health is illustrated in the following table for a selected set of health outcomes. Similar patterns are found if parental education rather than income is used to measure economic status:

Income quintile	Fraction in excellent or very good health	Average annual hospital episodes (ages 1-17)	Percent with asthma	Percent with heart condition	Percent with hearing problem	Percent with mental retardation	Percent 5.5 lbs or less at birth
1 (poorest)	0.66	0.048	7.2	2.3	2.1	2.2	9.6
2	0.77	0.039	5.9	2.3	1.9	1.4	7.8
3	0.84	0.034	5.6	1.9	1.8	0.9	6.5
4	0.87	0.032	6.0	2.0	1.6	0.9	5.4
5 (richest)	0.90	0.025	6.4	1.7	1.3	0.7	4.8

Notes: The first 6 columns are based on samples of children from the 1986-1995 NHIS. The children are aged 0-17 unless otherwise noted. The information on birth weight is from the 1988 Child Health supplement of the NHIS, which collected information on one child aged 0 to 17 in each household with children.

This table indicates that the association between income and child health is evident throughout the income range. It is not only children in poverty (roughly the lowest quintile) who have markedly worse average health: lower middle-class children fare worse than middle-class children, who in turn fare worse than upper-middle class children. Furthermore, for many health outcomes, the disparities in health status between richer and poorer children increase through childhood, so that poorer children enter adulthood doubly disadvantaged by poorer health.

Although the associations between socioeconomic status and children's health have been documented for many health conditions, the pathways through which socioeconomic status affects children's health are not well-understood. "Socioeconomic status" is likely to affect a wide variety of factors that affect children's health:

- More highly-educated parents may make better use of medical information that protects their children's health, or may be more able to follow medical protocols.
- Higher incomes may enable parents to choose less-hazardous living environments, to provide their children with better nutrition, or to purchase higher-quality medical care.
- Stress associated with low income, low job status, unemployment, and social inequality may undermine parenting behaviors that promote children's health and development.
- Higher socioeconomic status may facilitate access to social resources (e.g., diverse social networks, family stability, and "social capital") that provide access to health information and services, buffer stress, and improve material well-being.
- It is possible that socioeconomic status has no relationship to children's health. For example, the association between parents' socioeconomic status and children's health may arise because of common genetic influences on both generations. For example, Dohrenwend et. al. (1992) argues that schizophrenia results in downward economic mobility. It is also possible that poor health is the result of shared environmental factors that are correlated with but not caused by low SES.
- Part of the association between parents' economic status and children's health may arise from an effect of child health on family income (rather than the other way around). For example poor childhood health may adversely affect family economic status, if parents with sick children are less able to work.

Understanding the mechanisms through which socioeconomic status affects children's health is a prerequisite for devising appropriate policies and cost-effective interventions that improve the health of poor children. Although a variety of pathways have been proposed (e.g., Adler, et al, 1994; Baum et al, 1999), Link and Phelen (1995) caution that socioeconomic status is a "fundamental cause" of health and disease, one that embodies resources that may influence different health through different mechanisms depending on broader social conditions, health conditions, and health technologies.

V. Justification for a large prospective, longitudinal study

A major impediment to understanding why poorer children have worse health outcomes is a lack of longitudinal data on large numbers of children, that collects detailed information on both health and socioeconomic status. There are several reasons why longitudinal data on a large sample of children are required to understand how socioeconomic status affects children's health:

- Longitudinal data are required because the effects of socioeconomic status are likely to be cumulative over the course of a child's life. And, the socioeconomic status of families is not static. Movements of parents into and out of employment, and fluctuations in the marital status and living arrangements of parents, can produce sharp changes in household incomes, in the environments in which children live, and in their access to medical care.
- It is likely that health at any point in time reflects the cumulative effect of the child's environment over his or her life. Cross-sectional data, that provides a snapshot of both socioeconomic status and health, is not useful for understanding how health is affected differently by "long run" socioeconomic status versus short-run fluctuations in socioeconomic status. Evidence from the Panel Study of Income Dynamics (Case, Lubotsky and Paxson, 2002) indicates that children's health (as assessed by parents) is strongly associated with long-run average income, and that low income in specific periods (for example, early childhood) has no especially deleterious effects. However, these results are based on a relatively small sample of children, with very crude measures of children's health.
- There is little evidence on whether socioeconomic status matters more at some developmental stages than others for specific health conditions. (Evidence from the National Longitudinal Study of Youth on cognitive outcomes and a small set of health outcomes is in Brooks-Gunn et. al. 1997 and Korenman, 1997.) The lack of evidence is attributable to the dearth of data sources that contain longitudinal information on both socioeconomic status and health in childhood. We know, for example, that socioeconomic differences in obesity do not appear until adolescence. However, with only cross-sectional data, it is not possible to determine whether this relationship is driven by the timing of economic status at different ages. For example, it could be that children who are impoverished at very young ages are more likely to develop obesity in adolescence, and that the level of income in adolescence is of only minor importance.
- As discussed further below, socioeconomic effects on child health are multidimensional, that is, not reducible to the effect of a single dimension of economic status. Different dimensions of socioeconomic status—indexed by the education, labor force status, source-specific incomes, and other attributes of one or both parents—may vary in the relative strength of their effects, both over time and across population subgroups. A large sample is essential to estimate these complex effects.
- Many of the health conditions that are associated with economic status in childhood are rare. Data from the National Health Interview Study indicate that epilepsy, diabetes, kidney

disease are all associated with low income, but affect only a very small fraction (1% or less) of children. It is impossible to study the connection of these diseases to economic status using existing longitudinal data sets, such as the NLSY. Studying the pathways through which socioeconomic status affects the likelihood that children develop these conditions requires very large samples of children. For example, one innovative use of these data, mentioned below in Section VII, is to study how the social environment interacts with genetic predispositions to affect the expression of specific diseases.

- Even relatively “common” conditions such as asthma and obesity affect small enough fractions of children that large samples are required for analyses that involve separating children into groups classified by race, region, or gender. In addition, the relationship between socioeconomic status and obesity may be complex enough to require a large sample size. For example Crawford (1999) finds that the usual link of decreasing obesity in young girls with increasing parental education and income does not hold true for African American girls. The reasons for this effect are quite complex, and may be related to the socioeconomic status of the child’s grandparents, wealth or factors from the child’s school peers and the neighborhood. For obesity and a variety of other less common health problems, this large longitudinal study will allow researchers to examine the impact of socioeconomic status at several ages and for different demographic groups. This knowledge will be of use in the design of interventions.
- Longitudinal data are necessary to tease out causal relationships between economic status and health. For example, the data can be used to examine whether poor health outcomes for children result in income declines for their families due to changes in employment, or whether adult health problems (that may be correlated with health problems in children) produce income declines.

VI. Scientific Merit

There is growing evidence that children who grow up in poor and stressful environments face greater physical and mental health risks as children and later in life, as adults. Research on this topic has focused on different pathways through which socioeconomic status may affect health outcomes.

One strand of literature, surveyed by Repetti, Taylor, and Seeman (2002), argues that poverty is linked to biological dysfunction that has adverse health impacts. Children from low SES backgrounds show “early signs of allostatic load, including elevated secretion of cortisol and epinephrine, and higher resting blood pressure.” These effects are linked to increased levels of family and neighborhood conflict that often accompany low economic status and unemployment. These authors stress that there may be an important interplay between genetic susceptibility to different health outcomes and the social and economic characteristics of households in which children grow up. They conclude that a “chief priority” for future research is longitudinal data collection, that will facilitate research that investigates how the social environment and genetic predispositions work through biological pathways to influence health outcomes over the life span.

Other literature focuses on the impact that low economic status has on the ability to provide a child with appropriate medical care, or for pregnant women to receive prenatal care. Family income and employment status are critical determinants of whether a child is covered by health insurance. Children from low-income “working-poor” families are least likely to be insured. The importance of medical insurance in prenatal care and birth outcomes is highlighted in work by Currie and Gruber (1996a). Income and education may also be important factors that influence whether families take up insurance for which they are eligible (Currie and Gruber, 1996b), or the ability of families to comply with and adhere to medical protocols. For example, socioeconomic status has been implicated as a determinant of adherence to and compliance with treatments for childhood epilepsy (S.R. Snodgrass et al. 2001) and diabetes (S. J. Thompson et al. 2001, Catherine L. Davis et al. 2001).

Both of these two strands of literature indicate that economic status, through its effects on biological pathways and on medical care, may influence a broad range of health outcomes in childhood and adulthood. We anticipate that information on economic status will be useful for studying a wide variety of health outcomes for which this study collects data. In what follows, we briefly discuss the different domains of socioeconomic status on which data should be collected, and provide justification based on existing literature for their inclusion in this study.

Income and assets: Family income is correlated with a variety of children’s outcomes. Young children from poor families are more likely to have low birth weight (Meara, 1999), to have a variety of health problems ranging from asthma to mental impairments (for example, Halfon and Newacheck, 1993, 1999, Newacheck, 1994), to develop more behavioral problems (Duncan, Brooks-Gunn, and Klebanov, 1994), and to be reported to their state’s child protective service agencies for maltreatment (Hampton and Newburger, 1985; Lindsey, 1994; Zellman, 1992.) These poor outcomes in early childhood carry over into later childhood and young adulthood, with low-income children being more likely to engage in delinquent and risky behaviors (Lowry et. al., 1996), more likely to bear children while in their teens, and less likely to complete high school and attend college (see literature reviewed in Haveman and Wolfe, 1995.)

Most studies examine the impact of total family income on children’s health. However, for many families, income is composed of different components—earnings of the child’s mother, father (if present), and other adult family members; government transfers including TANF payments and social security income; child support and alimony payments; and asset income. Families may also receive in-kind transfers in the form of housing assistance, food-stamps, and WIC supplements, the value of which should be included in total family resources.

These different forms of income have different properties: some are more regular, and others are more subject to fluctuations due to unemployment or other changes in economic conditions. There is growing evidence that how income is spent depends on which adult members control resources, so that (for example) income received by a child’s mother may have a different impact on a child than income received by a father or step-father. (e.g., Lundberg, Pollak, and Wales 1997; Phipps and Burton 1995). Furthermore, the *reason* why income is low may affect parenting. For example, a two-parent family that has low income due to recent unemployment may have financial resources, living conditions, future prospects and stress levels that are very different from those of a chronically poor single-parent family. For these reasons, it is important

that measures of income break out the different components of income, and collect sufficient information so that the source of income fluctuations can be understood.

Education: Because the education of child's parents is closely related to income, it will affect health outcomes in the ways discussed above. However, education may also affect parenting in ways that influence children's health. More educated parents may be better able to buffer their children from stress; to follow medical protocols (Snodgrass et al. 2001, Thompson et al. 2001, and Davis et al. 2001); and to take advantage of new health technologies. More highly educated adults smoke less, reducing the exposure of their children to second-hand smoke. Adults with more education have lower rates of obesity (Nayga, 2001) which may affect their children's obesity rates. Preschool children whose mothers have more nutrition knowledge have healthier diets (Blaylock, Variyam, and Lin, 1999).

Employment and Job Characteristics: Employment status, like education, is a major determinant of income levels. In addition, changes in employment status are closely associated with fluctuations in both income levels and insurance coverage. For these reasons alone, it is important to collect information on employment. However, employment, unemployment, and the characteristics of jobs held may have effects on children over and above their effects on income. For example, job loss and unemployment has been implicated as a source of adult depression (Goldsmith, Veum and Darity, 1996), and the descent into poverty that follows unemployment may precipitate family conflict and harsher parenting (McLoyd, 1998.) The degree of stress and lack of control that parents feel in their jobs has been shown to influence their own health (Link et.al, 1993, and Lundberg, 1999) and may also affect parenting.

Other important characteristics of jobs include their provision of family health benefits, health insurance, and paid sick leave. Parents of ill children who are without paid sick leave and inadequate social supports may have to choose missing work (and possibly risking job loss), sending the child to school or childcare while ill, or leaving the child home alone. Data collected between 1985 and 1990 found that only 55 percent of single parents had paid sick leave, while 80 percent of two parent families had at least one parent with paid leave. (Heymann, and Earle, 1997)

Employment status is important not only because it affects income and parenting, but also because it may be affected by children's health. There is mixed evidence on this issue. Some research suggests that the mothers children who become sick are more likely to leave employment, whereas evidence from Case, Lubotksy and Paxson (in press) finds that previously working women who give birth to premature infants are not less likely to leave the workforce. The links between employment and health insurance may be an important part of this story: parents of sick children may be "locked in" to jobs to maintain their insurance status. There is a sizeable literature on "job lock" that examines it in relation to adult health (reviewed in Gruber and Madrian, 2000), but less research on children' health.

VII. Potential for innovative research

We expect the economic factors discussed in this proposal to be of use in the study of a wide variety of child health outcomes. However, there are several specific topics where there is exceptional promise of innovative research:

- Gene-environment interactions: As discussed above, we know little about how the expression of specific diseases, including diabetes, depression, [any others], is influenced by interactions between characteristics of the child's economic environment and genetic predispositions. Studies of gene-environment interactions are hindered by the fact that expression of a disease may take place years after the relevant environmental exposures. Because this study is longitudinal and large-scale, it is well-suited to the study of why some children with genetic predispositions to conditions develop health problems whereas others do not, and can be used to examine whether low income and poverty heighten susceptibility. Possible cite? Recent research shows that genetic influence on adolescents' scores on a test of verbal intelligence are moderated by the level of parental education. Heredity contributed more heavily, and environmental influences less heavily in highly educated families than in less well educated families. (Rowe et al, 1999).
- Economic status, stress, and health in childhood. A growing literature has documented links between economic status (income and education) and health of adults (see, for example, Adler 2001 and Marmot 2001.) This research, based primarily on longitudinal studies of adults, highlights the role that low income has in increasing stress and susceptibility to disease. Much less is known about the mechanisms that link economic status, stress (of both parents and children), and health in childhood and on into adulthood. The existence of a study that collects longitudinal information on biological markers for stress as well as the economic characteristics of households will facilitate new research in this area.
- Adaptation of existing methods for assessing pre-disease pathways (New Horizons in Health) in children?

VIII. Feasibility

This section will focus on issues that relate to the measurement of socioeconomic status; we assume that the health conditions of interest will be covered by other working groups.

A. Sampling needs

Research on the relationship between socioeconomic status and health requires a large stratified random sample of U.S. children. Because issues of health among the poorest children are of special priority, it may make sense to over-sample children from demographic groups that have lower socioeconomic status---including, possibly, African American families, and/or children born to unmarried parents. We also need information on children whose biological mothers did not present for prenatal care. However it will also be important to have sufficient sample cases throughout the socioeconomic distribution, because health differences occur at all points along the distribution. Although concerns may be justifiably focused among the most disadvantaged, a complete understanding of the impact of SES may be distorted unless the full distribution is considered.

B. Timing of data collection

Some aspects of economic status change over time; others are relatively static. The timing and frequency of data collection should vary across different measures. We recommend that, at “baseline”, the study administer a comprehensive socioeconomic module that includes information on:

1. Household income in the previous year, broken out by source (earnings, public transfers, private transfers) and by recipient (mother’s income, father’s income, other family members incomes);
2. Household expenditure on food (e.g. the Panel Study on Income Dynamics (PSID) food expenditure module), which provides a useful measure of the household’s standard of living and a cross-check on the income data.
3. Occupation, industry, and employment status information for the mother and father;
4. Educational attainment for the mother and father;
5. Values for selected assets, including equity in an owner-occupied home, major household durable goods (cars, trucks), and financial assets.
6. Payment of insurance premiums, co-payments, as well as other expenses not covered by insurance/Medicaid/Champus.

The family should be asked about items 1, 2, 3, and 6 at annual frequencies. New education information can be collected only for new members, or for those members who indicate that they have attended school in the past year. Asset information can be collected at lower frequencies, e.g. every 5 years.

This plan calls for annual contact with family members. However, all items can be collected from a telephone survey of approximately 30-45 minutes, reducing collection costs and reducing respondent burden. Annual phone contact with the respondents has the benefit of helping the study track families over time. There are no ethical considerations provided that respondents are given standard assurances of confidentiality.

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