Disparities in the Prevalence of Disability Between Black and White Children

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Objectives: To examine disparities in the prevalence of the limitation of activity caused by chronic conditions or disability for black and white non-Hispanic children and to examine trends over time in the prevalence of disability.

Design: We analyzed data on 419,843 children (22,758 with a disability) younger than 18 years included in 14 annual editions of the National Health Interview Survey spanning the period 1979-2000.

Setting: Noninstitutionalized population in the United States.

Interventions: None.

Main Outcome Measure: Prevalence of disability.

Results: The prevalence of disability increased markedly for both black and white children between 1979 and 2000. Bivariate analysis demonstrated racial differences that fluctuated through time, but persisted through 2000, with black children experiencing a higher prevalence of disability than white children. Multivariate analyses conducted on the 1999-2000 data indicated that the black-white difference in disability prevalence could be explained entirely by differences in poverty status.

Conclusion: Black children have higher rates of disability primarily owing to their increased exposure to poverty.

Arch Pediatr Adolesc Med. 2003;157:244-248

Racial disparities in health outcomes have been widely documented for adults. Death rates for 13 of 15 leading causes of death are higher and life expectancies are lower for African Americans than for the white population in the United States. These discrepancies have remained essentially the same for 40 years. Studies vary substantially in the degree to which the racial differences are eliminated when income is controlled. One review suggests that when racial and socioeconomic conditions are examined together, “socioeconomic conditions are a powerful, although not necessarily exclusive, explanatory variable for racial disparities in health.” Clarifying the relative contribution of race and income has important implications for policy in terms of understanding the causes and potential mechanisms for eliminating these disparities.

Although there is evidence that black adults are more likely to report poor health and limitation of activity than white adults, less is known about racial disparities in children. Evidence has begun to accumulate showing substantial differences by race-ethnicity in the health of children. In general, death rates are higher for black than white children throughout most of childhood and particularly in adolescence. Life expectancy continues to be higher for white than for African American infants and children. Specific health conditions also demonstrate racial differences. For example, asthma prevalence rates are higher in African American children than in white children. African American children are more likely to be born prematurely, be born at a lower birth weight, and die in infancy. In some cases, these findings persist when adjusted for family income. The marked variations in birth weight profiles found among the races persist even when analyses are limited to low-risk mothers. Some hypothesize that, as in adults, the underlying reason for the black-white disparities in children is differences in poverty rates. Montgomery et al using data from the National Health Interview Survey (NHIS) found that black children, and those whose family incomes were less than 150% of the federal poverty level, have higher rates of restricted activity due to health problems.
poverty level, were more likely to be in fair or poor health, but they concluded that poverty had a stronger effect than race on child health.

As the incidence of acute illness decreases, especially among children, the public health community has turned more attention to chronic conditions and their influence on limiting usual activities among children. We analyzed the NHIS accumulated data over the past 2 decades to assess whether racial differences exist in the prevalence of disability or in the limitation of activity owing to chronic conditions, and to the extent differences are present, whether they can be explained by underlying differences in income or other factors.

### METHODS

#### DATA SOURCE

Our data were derived from the NHIS, a continuing cross-sectional survey of some 40,000 households annually including approximately 30,000 children conducted by the US Census Bureau for the National Center for Health Statistics. The NHIS is designed to collect information on the demographic characteristics, health status, and health care use patterns of the sample population. Advantages of using the NHIS include the following: (1) the sampling plan is designed to be representative of the US civilian noninstitutional population, making possible nationwide estimates of the prevalence of activity limitation and (2) the NHIS was initiated in 1957 and has been conducted continuously since then, permitting the analysis of trends in activity limitation over time.

#### VARIABLE CONSTRUCTION

Limitation of activity due to a physical, mental, or emotional health problem is a broad measure of health status. In the NHIS, limitation of activity refers to a long-term reduction in a person's capacity to perform the amount or kind of activities associated with his or her age group owing to a chronic condition. Limitation of activity is assessed by asking a series of questions about the ability to perform activities typical for an individual's age group because of a physical, mental, or emotional health problem. If a limitation is reported, follow-up questions are used to determine if the limitation is due to a chronic condition; limitations attributable to acute conditions are excluded. In the case of children, these questions are answered by parents or other adult household members knowledgeable about the sample child. We use the terms “limitation of activity,” “activity limitation,” and “disability” interchangeably in this article.

Although the conceptual basis for the questions on limitation of activity has remained unchanged, the questionnaire items have been revised twice over the past 20 years—in 1982 and 1997. Respondents may be greatly influenced by changes in the wording or ordering of questions. Thus, direct comparisons between the periods before and after changes were incorporated in the survey instruments must be made with caution. Questionnaire items on the topic of limitation of activity as used in the 1979 through 2000 NHIS are given in Table 1. Prior to 1997, children were classified into the following 4 categories of activity limitation based on responses to the questionnaire: (1) unable to carry on their major activity, (2) limited in the amount or kind of major activity performed, (3) limited in other activities, and (4) not limited in activities. Major activity refers to play or school, depending on the child's age. For study years prior to 1997, we defined children from the first 3 categories as having a disability or limitation of activity. Beginning in 1997, the questionnaire redesign precluded making comparable categorizations of limitation by level or severity. As a consequence, our analysis is restricted to comparisons of the presence or absence of activity limitation, independent of level or severity.

Race is self-identified by survey respondents (parents in the case of children). In 1997, the federal Office of Management and Budget revised the standards for classifying race and ethnicity in federally sponsored surveys. The new standards permit respondents to choose more than 1 racial or ethnic category on federally sponsored survey questionnaires. In addition, more comprehensive racial and ethnic labels are used. For example, the former “black” category has been changed to “black or African American.” These changes became effective in late 1997 and are reflected in surveys developed after that date. The questionnaires for the most recent years of our data series, 1999 and 2000, reflect these changes. The National Center for Health Statistics reported racial data using both the new and old formats for 1999 and 2000. For the sake of consistency and because the new format is unavailable for previous years, we used the pre-1997 format for all data points. We restricted our analyses to black and white non-Hispanic children.

### RESULTS

Our data analysis were conducted in 2 parts. First, we conducted a trend analysis of limitation of activity from 1979 through 2000 by race. Since the number of children with reported activity limitations is small (about 1000-2000 sample children each year), we combined 2 years of survey data to yield more precise point estimates. In the Figure, results are presented for the following data points: 1979-1980 (N=62729 sample children; 2512 with disability), 1982-1983 (N=59448; 3015 with disability), 1985-1986 (N=43218; 2275 with disability), 1988-1989 (N=66302; 3538 with disability), 1991-1992 (N=70209; 4138 with disability), 1994-1995 (N=62171; 4058 with disability), and 1999-2000 (N=35766; 3202 with disability).

Second, we conducted multivariate analyses to examine the independent effect of race on the prevalence of activity limitation using the combined 1999 and 2000 data—the most recent NHIS data available. To study the extent to which the racial disparities in activity limitation may be explained by socioeconomic status, we used a hierarchical entry of variables approach and estimated 7 logistic regression models. Model A shows the unadjusted odds ratio for race and presence of activity limitation. Age of the child was added to model B, sex of the child was added to model C, and family size to model D. Region of residence was included in model E and population density of the area of residence was included in model F. Family income, expressed in terms of poverty thresholds, was added to the final regression model (model G). Point estimates and regression coefficients along with their respective SEs were estimated using the statistical software program SUDAAN® that considers the complex sample design of the NHIS.
had reversed direction with black children being 13% more likely than white children to have a reported activity limitation (67.1/1000 vs 59.7/1000; P<.05).

Although the observed difference in prevalence of activity limitation between black and white children in 1999-2000 could be purely a racial effect, the difference may also be attributable to other factors associated with race, such as family income. To test for the presence of such confounding, we conducted a multivariate analysis. The results of this hierarchical logistic regression are given in Table 2. As demographic variables are added to the model, the racial effect initially becomes more robust, with the odds ratio for the race variable increasing slightly. This changes, however, when family income (as measured by poverty status) is added to the model. The racial effect disappears entirely once income is added to the equation, suggesting that the observed unadjusted racial effect is largely attributable to underlying differences in income.

### Table 1. National Health Interview Survey Questions for Determining Limitation of Activity for Children Younger Than 18 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Questions</th>
<th>White Children</th>
<th>Black Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979-1981</td>
<td>Age &lt;1 y, is ___ limited in any way because of his or her health?</td>
<td>4.99%</td>
<td>5.97%</td>
</tr>
<tr>
<td>1982-1996</td>
<td>Age 1-5 y, is ___ able to take part at all in ordinary play with other children?</td>
<td>5.41%</td>
<td>6.71%</td>
</tr>
<tr>
<td>1997-2000</td>
<td>Age 6-16 y, does (would) ___ have to go to a certain type of school because of his or her health?</td>
<td>6.58%</td>
<td>7.15%</td>
</tr>
<tr>
<td>1999-2000</td>
<td>Age &gt;18 y, does ___ receive Special Educational or Early Intervention Services?</td>
<td>6.15%</td>
<td>7.03%</td>
</tr>
</tbody>
</table>

Trend data on the prevalence of activity limitation among children younger than 18 years are shown for the period spanning 1979-2000.

Past studies have reported racial differences in the prevalence of chronic health conditions. Generally speaking, white children were reported to have higher rates of mild chronic conditions, while black children experience higher rates of more severe chronic conditions. In this study...
we examined racial differences in disability due to chronic conditions, and based on the findings of past research, we expected to find that black children had higher rates of disability from chronic conditions than white children. Our data do demonstrate a higher prevalence of disability for black children compared with white children. However, after adjustment for confounding variables, our results do not support the conclusion that race is independently associated with the prevalence of disability.

We also found that over a 20-year period culminating in 2000, the prevalence of disability due to chronic conditions has increased markedly for both black and white non-Hispanic children. Bivariate analysis demonstrated racial differences that fluctuated through time, but persisted through 2000. Multivariate analyses conducted on the 1999-2000 data indicated that the black-white difference in disability prevalence could be explained entirely by differences in poverty status. That is, black children appear to have higher rates of disability owing to their increased exposure to a different risk factor—poverty. There are many possible mechanisms that might explain why black rather than white children are more likely to be poor. These include racial discrimination and lack of access to educational and social opportunity, which can only be rectified through policy and political initiatives.

Similarly, the potential mechanisms through which economic disadvantage exerts an influence on disability in children are numerous. They include, but are not limited to, restricted access to care, increased exposure to environmental causes of disability, poor nutrition, and low-quality health care services, which affect the consequences of illness or injury. These potential mechanisms and others need to be addressed if the nation is to be successful in reducing disparities in disability in children due to poverty.
There is much interest in understanding racial disparities in health. This article examines and quantifies the disparities in the prevalence of disability over time between black and white children. Heretofore, little work has been focused on black-white differences in disability prevalence among children. Our analysis demonstrates that while differences in prevalence exist, they seem to be largely explained by underlying differences in socioeconomic status.

Our analysis was limited to self- and proxy reports of disability by survey respondents. It is possible that perceptions of disability or limitation may vary by race. Were a less subjective measure of disability available, the results and our conclusions might have differed.

Finally, although not the main focus of our research, these data presented from the NHIS indicate that the prevalence of disability has increased substantially over time for both black and white children. The upward trend documented herein is consistent with earlier trend data from the NHIS demonstrating a progressive rise in the prevalence of childhood disability dating back to 1957 when the survey was implemented. The reasons for this rise in prevalence are not well understood. Some part of the upward trend may be the result of an increase in disease prevalence and severity, but some of the increase may also be attributable to changes in awareness of health problems, better detection and ascertainment of health conditions by health professionals and educators, shifts in attitudes and beliefs about health limitations, and other factors. Clearly, more research is needed to understand the contribution of these factors.

Accepted for publication September 10, 2002.

This study was supported in part by grant U93MC00180 from the Maternal and Child Health Bureau, Washington, DC (Dr Newacheck, principal investigator).

We appreciate the helpful comments on an earlier version of the manuscript from our colleagues at The Research Consortium on Children With Chronic Conditions. We also appreciate the assistance of Lena Libatique in preparing the manuscript.

The conclusions presented herein do not necessarily reflect the views of the Maternal and Child Health Bureau.

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REFERENCES