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The Effect of Using “Race of Child” Instead of “Race of Mother” on the Black-White Gap in Infant Mortality Due to Birth Defects

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S Y N O P S I S

Objective. For at least 20 years, birth defects have been the leading cause of infant mortality in the United States. Some studies have reported higher rates for black infants than white infants of mortality due to birth defects, while other studies have reported no black-white differences. The authors analyzed the effect on these rates of a change in the way the National Center for Health Statistics (NCHS) tabulates “race” for newborns.

Methods. The authors calculated infant mortality rates due to birth defects for 1980–1993 using two standard methods of assigning newborns to “racial” categories: a “race of child” algorithm and the “race of mother” approach currently used by NCHS.

Results. From 1980 through 1993, birth defect-specific infant mortality rates (BD-IMRs) were significantly higher for black infants than white infants 12 of the 14 years by “race of mother” and only 5 of 14 years by “race of child.” Calculation of BD-IMRs by “race of mother” reduced the rate for white infants and increased the rate for black infants in each of the 14 years. The choice of method for assigning newborns to “racial” categories had a progressively greater effect over time on the black-white gap in BD-IMRs.

Conclusions. Calculations of trends in “race”-specific BD-IMRs by may vary substantially by whether “race of mother” or “race of child” is used. Identifying the method of tabulation is imperative for appropriate comparisons and interpretations.

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Vital statistics published by the National Center for Health Statistics (NCHS) are critical to monitoring trends in important indicators of perinatal health. Beginning with 1989 data, NCHS changed its method for reporting data related to natality and fetal deaths from an NCHS-established "race of child" algorithm, based on the "race" of the mother and father, to coding based on the "race of mother" only.¹

Prior to 1989, NCHS used the following algorithm to classify newborns: If "race" was not reported for one parent, the child was assigned the "race" of the other parent. A child with one white and one non-white parent was assigned to the non-white parent's category. A child with two non-white parents was assigned the race of the father, with the following exception: if either parent was Hawaiian, the child was designated as Hawaiian.¹

According to NCHS, the factors influencing the decision to tabulate births by "race of mother" included: (a) the fact that the 1989 revision of the U.S. standard birth certificate contained more questions

related to medical risk factors for the mother than earlier versions; thus it was deemed appropriate that "race" should also be coded by mother for consistency with other variables; (b) a rise in the incidence of interracial parentage, which increased from 1.5% of births in 1973 to 4.1% in 1993; and (c) the growing proportion of births for which "race of father" was not recorded on the birth certificate, which increased from 9% in 1973 to 16% in 1993.²

This change from tabulating by the "race of child" algorithm to the "race of mother" approach has resulted in more *white* and fewer *black* and *other race* births and fetal deaths.¹ Consequently infant, fetal, perinatal, and maternal mortality rates are lower for white infants and higher for infants of other groups because the denominators for these rates (number of live births in each category) have changed.¹

Although the impact of the change in tabulating "race" has been studied for some key perinatal outcome variables such as infant mortality from all causes or fetal and perinatal mortality, its effect on "race"-specific rates for birth defects, the leading cause of infant mortality,

Table. Birth defect-specific infant mortality rates (BD-IMRs), United States, 1980-1993

| Year | Infant deaths due to birth defects | BD-IMR | By "race of child" | | | | By "race of mother" | | | |
|------|------------------------------------|--------|--------------------|--------------|---------------|-----------|---------------------|--------------|---------------|-----------|
| | | | White BD-IMR | Black BD-IMR | Relative risk | 95% CI | White BD-IMR | Black BD-IMR | Relative risk | 95% CI |
| 1980 | 9220 | 255.2 | 256.7 | 261.9 | 1.02 | 0.97,1.08 | 253.4 | 271.8 | 1.07 | 1.02,1.13 |
| 1981 | 8914 | 245.6 | 248.4 | 245.5 | 0.99 | 0.93,1.05 | 245.1 | 255.4 | 1.04 | 0.99,1.10 |
| 1982 | 9024 | 245.2 | 247.5 | 251.1 | 1.01 | 0.96,1.07 | 243.9 | 261.7 | 1.07 | 1.01,1.13 |
| 1983 | 8732 | 240.0 | 241.9 | 246.2 | 1.02 | 0.96,1.08 | 238.5 | 256.5 | 1.08 | 1.02,1.14 |
| 1984 | 8548 | 233.0 | 235.2 | 234.3 | 1.00 | 0.94,1.06 | 231.7 | 244.6 | 1.06 | 1.00,1.12 |
| 1985 | 8561 | 227.7 | 230.6 | 233.3 | 1.01 | 0.96,1.07 | 227.1 | 243.9 | 1.07 | 1.01,1.14 |
| 1986 | 8244 | 219.5 | 219.5 | 232.1 | 1.06 | 1.00,1.12 | 215.9 | 243.2 | 1.13 | 1.06,1.19 |
| 1987 | 7884 | 207.0 | 206.2 | 226.5 | 1.10 | 1.04,1.16 | 202.8 | 237.7 | 1.17 | 1.11,1.24 |
| 1988 | 8141 | 208.2 | 211.5 | 209.8 | 0.99 | 0.94,1.05 | 207.7 | 220.8 | 1.06 | 1.00,1.13 |
| 1989 | 8120 | 200.9 | 201.5 | 211.2 | 1.05 | 0.99,1.11 | 197.7 | 222.5 | 1.13 | 1.06,1.19 |
| 1990 | 8239 | 198.1 | 199.0 | 211.2 | 1.06 | 1.00,1.12 | 195.1 | 223.6 | 1.15 | 1.08,1.21 |
| 1991 | 7685 | 186.9 | 184.7 | 210.2 | 1.14 | 1.08,1.20 | 180.9 | 223.3 | 1.23 | 1.17,1.31 |
| 1992 | 7449 | 183.2 | 180.9 | 205.3 | 1.13 | 1.07,1.20 | 177.0 | 219.3 | 1.24 | 1.17,1.31 |
| 1993 | 7129 | 178.2 | 177.2 | 198.2 | 1.12 | 1.06,1.19 | 173.0 | 212.9 | 1.23 | 1.16,1.31 |

NOTE: "Race of child" refers to an algorithm used by the National Center for Health Statistics (NCHS) to assign newborns to "racial" categories. Since 1989, NCHS has designated newborns by "race of mother."

BD-IMR = birth defect-specific infant mortality rate (per 100,000 live births)

Relative risk = BD-IMR for black infants divided by BD-IMR for white infants

CI = confidence interval

“Assigning infants to ‘racial’ categories by the ‘race of mother’ approach instead of by the ‘race of child’ algorithm increased the reported gap [in birth defect-specific mortality rates] between black and white infants.”

has not been previously assessed.³

In order to develop effective solutions to health problems, disparities in health outcomes must be eliminated, including disparities between “racial”/ethnic groups. Most perinatal indicators, including infant mortality, have been found to vary by “race”/ethnicity. Despite a continuing decrease in the overall infant mortality rate (IMR) in the United States during the past few decades, the black-white gap has increased, with the IMR for black infants now twice as high as the rate for white infants.⁴

Since the late 1960s, birth defects have been the leading cause of infant mortality in the United States for all “races” combined. In 1993, birth defects accounted for 21.3% of all infant deaths, substantially higher than the percentage attributed to sudden infant death syndrome (SIDS), the second leading cause of infant mortality (14.0% in 1993).⁴ In 1993, birth defects were the leading cause of death for white infants (173 deaths per 100,000 live births) and the third leading cause of death for black infants (212.9 per 100,000 live births), preceded only by prematurity/low birthweight and SIDS.⁴

In recent years, the IMR for all causes for black infants has consistently been more than twice the rate for white infants. Studies examining birth defect-specific infant mortality rates (BD-IMRs) tabulated by “race of child” have concluded that there is no excess mortality among black infants.⁵⁻⁷ Other studies that analyzed BD-IMRs by “race of mother” have suggested higher rates for black than white infants, although none of these studies used tests of statistical significance.⁸⁻⁹ Therefore, we undertook a study to examine the impact of the change in the method of tabulating “race” on the black-white gap for the leading cause of infant mortality.

METHODS

We abstracted birth and infant death data from NCHS natality and infant mortality tables for the years 1980–1993. NCHS changed its method for tabulating race beginning with 1989 data. In 1994, NCHS published live births and IMRs by “race of mother” for 1980–1988, allowing the recalculation of BD-IMR rates for those years.²⁻⁹

We use the term “birth defects” to refer to conditions falling into the category “congenital anomalies,” codes 740–759, in the *International Classification of Diseases Ninth Revision (ICD-9)*.¹⁰

We calculated BD-IMRs by “race of child” and “race of mother” for the years 1980 through 1993 by dividing the number of infant deaths due to birth defects by the number of live births. We also calculated annual black-white ratios for infant mortality attributable to birth defects and 95% confidence intervals, using EpiInfo 6.01 software.¹¹

RESULTS

The Table shows BD-IMRs for 1980–1993 for all infants, white infants, and black infants, first with the “race of child” algorithm used to assign infants to “racial” categories and then using the “race of mother” method of tabulation.

BD-IMRs calculated by “race of child” were higher for black infants than white infants for 11 out of the 14 years and significantly higher for five years (1987 and 1990–1993). In contrast, BD-IMRs by “race of mother” were higher for black infants than white infants each of the 14 years and significantly higher for 12 of the 14 years.

We calculated a black-white ratio for each year for each method of tabulating "race" and then compared these ratios. For each year, the black-white ratio using "race of child" was lower than the black-white ratio based on "race of mother." The Figure shows a graph of the differences between the black-white ratios (relative risks) calculated using the two methods of assigning newborns to "racial" categories. The progressive increase between 1980 and 1993 in the difference between relative risks shows that the choice of method for assigning newborns to "racial" categories had a progressively greater effect over time on the black-white gap in BD-IMRs.

DISCUSSION

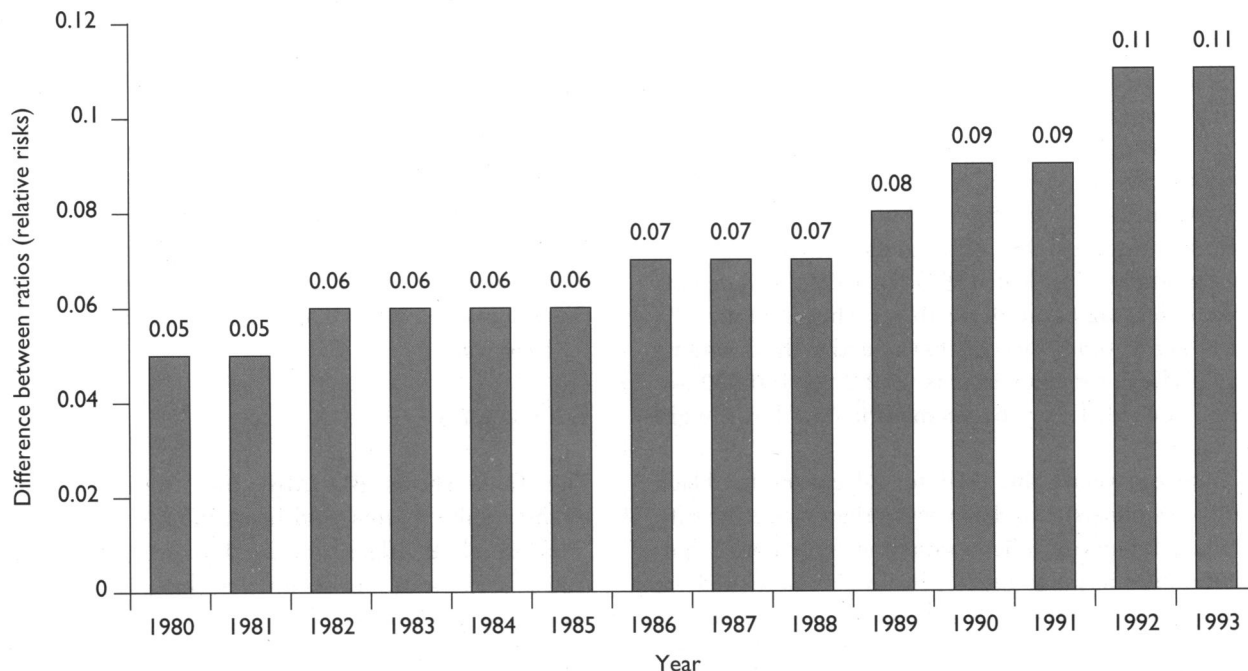
The importance of clearly stating the basis of "racial" designations is underscored by these analyses. For each

year between 1980 and 1993, the black-white BD-IMR ratio was higher by "race of mother" than by "race of child." In other words, assigning infants to "racial" categories by the "race of mother" approach instead of by the "race of child" algorithm increased the reported gap in BD-IMRs between black and white infants. Furthermore, the effect of the difference between the two methods steadily increased over the 14-year period.

Previous conflicting reports of the differences in BD-IMRs between black and white infants might be explained, at least in part, by different methods of tabulating "race."

Interpretation of these analyses would be enhanced with information about how "race" is measured and the quality of resulting data.¹² The categorization of "race" has recently come under scrutiny with the examination of the Office of Management and Budget's "Race and Ethnic Standards for Federal Statistics and Administra-

Figure. Difference in black-white ratios for birth defect-specific infant mortality rates, by method of tabulating "race"



NOTE: For each year, the graph shows the difference between (a) the black-white ratio in birth defect-specific infant mortality calculated for infants assigned by "race of mother" and (b) the black-white ratio in birth defect-specific infant mortality calculated for infants assigned by "race of child."

“Conflicting reports of the differences in birth defect-specific infant mortality rates between black and white infants might be explained, at least in part, by different methods of tabulating ‘race.’”

tive Reporting,” contained in Statistical Policy Directive No. 15.^{13,14} The standards in Directive 15 have been used for two decades throughout the Federal government for recordkeeping and the collection and presentation of data by “race” and Hispanic origin.¹⁵ Some recent criticism has been based on the belief that the minimum categories set forth in Directive 15 do not reflect the increasing diversity of the nation’s population.¹⁵ Others have criticized Directive 15 by pointing out that its classification system is not based on scientific principles and that racial classification systems do

not meet scientific standards and are not clearly defined or consistently used.^{16,17}

The current study expands on these findings by evaluating the impact of these changes on the widening black-white gap for the leading cause of infant mortality. Similar analyses of other leading causes of infant mortality are also needed. Additional research addressing the relationships among “race,” socioeconomic status, and health is needed to refine strategies aimed at reducing the black-white gap for infant deaths, including those due to birth defects.

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