Policy Brief Series

#138: LOW BIRTH WEIGHT RATES IN THE RURAL UNITED STATES, 2005

#139: LOW BIRTH WEIGHT RATES AMONG RACIAL AND ETHNIC GROUPS IN THE RURAL UNITED STATES, 2005

#140: INADEQUATE PRENATAL CARE IN THE RURAL UNITED STATES, 2005

#141: INADEQUATE PRENATAL CARE AMONG RACIAL AND ETHNIC GROUPS IN THE RURAL UNITED STATES, 2005

These briefs cover the issue of perinatal outcomes in rural areas across the United States in 2005. Low birth weight, a key indicator of the health of the U.S. population, and adequacy of prenatal care, a critical indicator of access and quality of health care, are explored to discover how they are related to rural or urban location, race, and ethnicity.

Key findings of this brief are:

- In most states, rural minority racial/ethnic groups had levels of inadequate prenatal care (less than 50% of expected visits) in the “worst” or “worse than mid-range” categories.

- Texas, New Mexico, and Hawaii had levels of inadequate prenatal care in the “worst” or “worse than mid-range” categories both for rural minority racial/ethnic groups and for non-Hispanic whites.

- A few states achieved levels of inadequate prenatal care in the “mid-range” or “better than mid-range” categories for some rural minority racial/ethnic groups.

Laura-Mae Baldwin, MD MPH
Meredith A. Fordyce, PhD
C. Holly A. Andrilla, MS
Mark P. Doescher, MD MSPH
WWAMI Rural Health Research Center
University of Washington
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Series design by Alessandro Leveque and Martha Reeves.

University of Washington
Department of Family Medicine, Box 354982
Seattle, WA 98195-4982
Phone 206-685-0402
http://depts.washington.edu/uwrhrc/
BACKGROUND
Recent research by the WWAMI Rural Health Research Center has shown that rural low birth weight (LBW) rates vary substantially both by race/ethnicity and by state and region across the United States. However, there are no recent data on whether another important measure of perinatal care for rural women—the inadequate prenatal care rate—varies by race/ethnicity and geography. Nationally, women from most racial and ethnic minority groups have been less likely to obtain timely and adequate prenatal care services than non-Hispanic white women. Given the barriers to health care receipt overall in rural areas, these disparities in prenatal care receipt among women from racial and ethnic minority groups could be exacerbated in rural areas.

STUDY AIM
To describe the 2005 inadequate prenatal care rates among rural women of different races and ethnicities in each U.S. state.

STUDY DESIGN
This is a national, cross-sectional analysis of the 3,998,753 singleton U.S. births using a special version of the 2005 Period National Linked Birth/Infant Death Database that included county identifiers. Urban Influence Codes identified births to mothers residing in rural (i.e., non-metropolitan) counties. Inadequate prenatal care was calculated by the National Center for Health Statistics using Kotelchuck’s Adequacy of Prenatal Care Index. This index calculates an expected number of prenatal visits based on the number of weeks of pregnancy, and defines inadequate prenatal care as receipt of less than 50% of expected visits. In 2005, 38 states, including the District of Columbia, used the 1989 version of the birth certificate and 11 states used the 2003 version. Vermont switched from the 1989 to the 2003 birth certificate version on July 1, 2005; New York State used the 2003 version, New York City the 1989 version. Information regarding prenatal care was recorded differently on the two birth certificate versions (e.g., when prenatal care began; see Variation in Data Collection Between the 1989 and 2003 Birth Certificate Versions section in Appendix 1), so inadequate prenatal care rates cannot be compared directly between states using the different birth certificates. To solve this problem, we created a standardized inadequate prenatal care score (Z-score) for each birth (see Appendix 1: Technical Documentation). With this standardization method, states’ levels of rural inadequate prenatal care can be compared and displayed in categories from “best” to “worst” on the same map.

The Linked Birth/Infant Death Data Set reports maternal Hispanic origin and race separately. Using these variables, we defined infant race/ethnicity as Hispanic, non-Hispanic white, non-Hispanic black or African American, non-Hispanic Asian/Pacific Islander, or non-Hispanic American Indian/Alaska Native. We did not report results in states with low numbers of individuals in rural minority racial/ethnic groups (see Appendix 1: Technical Documentation).

FINDINGS
• In most states, rural minority racial/ethnic groups, particularly black, Hispanic, and American Indian/Alaska Native groups, had levels of inadequate prenatal care in the “worst” or “worse than mid-range” categories. Rural non-Hispanic whites, on the other hand, rarely had levels of inadequate prenatal care in the “worst” or “worse than mid-range” categories. (See Figures 1-5; see Appendix 2 for actual rates.)

• Texas, New Mexico, and Hawaii, however, had levels of inadequate prenatal care in the “worst” or “worse than mid-range” categories both for rural minority racial/ethnic groups and for non-Hispanic whites.

• There were a few states that achieved levels of inadequate prenatal care in the “mid-range” or “better than mid-range” categories both for rural minority racial/ethnic groups and for non-Hispanic whites. For example, in Mississippi, non-Hispanic blacks had a “better than mid-range” level of inadequate prenatal care (Figure 3).
LIMITATIONS
Small numbers of rural births to racial and ethnic minority groups limit the ability to examine inadequate prenatal care levels in some states. Because of differences in the way that prenatal care data were reported on the 1989 and the 2003 birth certificate versions, we have compared states using standardized levels of inadequate prenatal care rather than their actual percentages of inadequate prenatal care.

CONCLUSIONS
Across the United States in 2005 there were high levels of inadequate prenatal care among rural women from racial/ethnic minority groups, especially women from black, American Indian/Alaska Native, and Hispanic groups.

IMPLICATIONS FOR POLICY, DELIVERY, OR PRACTICE
Despite states’ efforts over more than two decades to increase access to prenatal care by expanding Medicaid insurance coverage, simplifying eligibility and enrollment processes, and developing outreach strategies to support these efforts, there are still high levels of inadequate prenatal care among black, American Indian/Alaska Native, and Hispanic groups living in rural areas. The Affordable Care Act expands insurance coverage for pregnancy care and supports access to prenatal care for all women. Insurance coverage for prenatal care may not be enough, however, if services are not available because of insufficient provider supply or if patients are unable to access services due to long distances to provider offices, language barriers, or other obstacles. Targeted strategies to improve use of prenatal care by rural minority racial and ethnic groups are needed.
Inadequate Prenatal Care Among Racial and Ethnic Groups in the Rural United States, 2005

Figure 2: Rural Inadequate Prenatal Care for Non-Hispanic Whites, 2005

Figure 3: Rural Inadequate Prenatal Care by State for Non-Hispanic Blacks, 2005
Figure 4: Rural Inadequate Prenatal Care by State for Non-Hispanic American Indians/Alaska Natives, 2005

Figure 5: Rural Inadequate Prenatal Care by State for Non-Hispanic Asians/Pacific Islanders, 2005
REFERENCES


Suggested Citation
APPENDIX 1:
Differences and Standardization of Inadequate Prenatal Care
Variables Using Z-Scores

DATA FILE
These studies used the 2005 Period Linked Birth/Infant
Death Data Set with county identifiers, obtained from
the U.S. Department of Health and Human Services,
Centers for Disease Control and Prevention, National
Center for Health Statistics (NCHS), Hyattsville,
Maryland.

CASE SELECTION
These studies included only the 3,998,753 singleton
births to mothers residing in the United States. This
represented 96.5% of the 4,145,883 total births in the
2005 Period Linked Birth/Infant Death Data Set.

BIRTH CERTIFICATE VERSIONS
In 2005, two versions of the birth certificate were
in use: the 1989 and 2003 revisions of the U.S.
Standard Live Birth Certificate. The 2003 revision
was phased in at the state level over a period of years.
As of 2005, 13 states were using the 2003 revision:
Pennsylvania, Washington, Florida, Idaho, Kentucky,
New Hampshire, South Carolina, Tennessee, Kansas,
Nebraska, Texas, New York State (except for New
York City), and Vermont (from July 1 through
December 31, 2005). New York City used the 1989
version throughout 2005, and Vermont used the 1989
version from January 1 through June 30, 2005. All
other states were using the 1989 version.

VARIATION IN DATA COLLECTION
BETWEEN THE 1989 AND 2003 BIRTH CERTIFICATE VERSIONS
The 1989 and 2003 versions of the birth certificate
gathered data on prenatal care use differently. In
the 2003 revision, “month prenatal care began” was
changed to “date of first prenatal visit.” Additionally,
the 2003 revision recommends that prenatal care
records or medical records serve as the source for
prenatal care information; the 1989 version makes
no recommendation. Because of these differences, the
values for the adequacy of prenatal care variable are
not comparable across the two birth certificate versions,
and require separate analysis.

HANDLING OF CASES WITH DIFFERING
BIRTH CERTIFICATE VERSIONS BETWEEN
BIRTH STATE AND MOTHER’S RESIDENCE
STATE
The mother’s state and county of residence were used to
define geography-based variables (i.e., state, adjacency
to urban county), not the state and county in which the
birth occurred. If the mother’s state of residence was
different than the state in which the birth occurred,
and those two states used different versions of the
birth certificate, the adequacy of prenatal care variable
from the birth certificate would not be compatible
with that from the mother’s residence state. Therefore,
for analyses including the adequacy of prenatal care
variable, we excluded those births in which the birth
state differed from the mother’s state of residence, and
these two states used different versions of the birth
certificate. This mismatch in birth certificate version
affected 46,651 births (1.2%). These exclusions did
not apply to analysis of variables that were consistent
between the two birth certificate versions, such as low
birth weight.

Vermont and New York posed special problems in
this regard. For Vermont, which used the 1989 birth
certificate revision from January through June 2005
and the 2003 revision from July through December
2005, assignment to mismatch status for the purposes
of the inadequate or late prenatal care analysis was
based on the version of the birth certificate in use
at the time of birth. We handled the assignment of
mismatch status for New York State and New York
City in the same way. If a New York City resident
gave birth elsewhere in New York State or outside
New York State, and the birth certificate in use at the
birth location was the 2003 birth certificate revision,
this birth was considered to have a birth certificate
mismatch, because New York City was using the 1989
revision. Likewise, if a New York State resident gave
birth in New York City or in another state that used the
1989 birth certificate version, this birth was considered
to have a birth certificate mismatch, because New York State was using the 2003 version. These Vermont and New York birth certificate mismatches are included in the total 46,651 births noted above.

**STANDARDIZING VARIABLES FROM DIFFERENT BIRTH CERTIFICATE VERSIONS FOR COMPARABILITY**

Because of differences in the definition of prenatal care utilization between the 1989 and 2003 birth certificate versions (see Variation in Data Collection Between the 1989 and 2003 Birth Certificate Versions section above), we conducted the inadequate prenatal care analyses separately for states using the two different birth certificate versions. However, we wanted to rank the levels of inadequate care across all U.S. states on the same map. To do so, we used the following method to standardize each state’s rate of inadequate prenatal care to a Z-score that was comparable across all states. A Z-score is the number of standard deviations that an observation is above or below the population mean. This unitless measure is calculated by subtracting the population mean from each observation and dividing the result by the standard deviation.

We first calculated the standard deviation (SD) for the percent of inadequate prenatal care by state, based on the 1989 and 2003 birth certificate versions separately. We removed from the analysis those outlier states whose rates of inadequate prenatal care were more than 3 SDs from the mean inadequate prenatal care rates, and recalculated the SDs and mean rates. We calculated Z-scores for each state and used the following groupings to map the Z-scores:

- **Best**: Less than or equal to -1.51
- **Better than mid-range**: -1.50 to -0.49
- **Mid-range**: -0.50 to +0.50
- **Worse than mid-range**: +0.51 to +1.50
- **Worst**: Greater than or equal to +1.51

For the maps representing inadequate prenatal care for racial and ethnic subgroups, we calculated Z-scores using the mean rates and SDs for all births nationally to ensure comparability across all subgroups.

For Vermont, which used the 1989 birth certificate version in the first half of 2005 and the 2003 birth certificate version in the second half of 2005, we were either unable to standardize across the entire year or had insufficient data to report, and therefore we were unable to map these results. Thus, we opted to leave Vermont results out of the prenatal care maps. Results for the individual six-month data periods for Vermont are available in Appendix 2, if sufficient data support reporting.

**RELIABILITY OF ESTIMATES**

We have suppressed the results for any state if they did not meet criteria for ensuring their reliability (see Figures 1-5 and Appendix 2). First, we calculated relative standard errors (RSEs) and suppressed the results for states with an RSE of greater than 30%. Second, we suppressed the results for states with less than 30 observations (e.g., a total of 19 rural births within a state) or a numerator of less than 5 (e.g., a total of 3 rural births with inadequate prenatal care within a state).

**DESIGNATION OF INADEQUATE PRENATAL CARE**

NCHS calculates the inadequate prenatal care variable based on the Adequacy of Prenatal Care Utilization Index (APNCU), and includes the calculated variable* in the data file. This index accounts for the month prenatal care began, the number of prenatal visits, and gestational age at birth as reported on the birth certificate.

**DESIGNATION OF RURAL COUNTIES**

We used the 2003 Urban Influence Codes (UIC) developed at the Economic Research Service, USDA,† to identify non-metropolitan (referred to as rural) counties (UIC = 3-12). Rhode Island, New Jersey, and the District of Columbia had no rural counties and therefore have no data represented on the maps.

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## APPENDIX 2: Rural Inadequate Prenatal Care Rates by Race/Ethnicity and State, 2005

<table>
<thead>
<tr>
<th>State</th>
<th>Hispanic Total Rural Births</th>
<th>Hispanic % Inadequate Prenatal Care</th>
<th>% Rural Inadequate Prenatal Care</th>
<th>Non-Hispanic White Total Rural Births</th>
<th>Non-Hispanic Black Total Rural Births</th>
<th>Non-Hispanic AI/AN Total Rural Births</th>
<th>Non-Hispanic Asian/PI Total Rural Births</th>
<th>% Rural Inadequate Prenatal Care</th>
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States using 2003 birth certificate version:

- = insufficient data.

† = Vermont used the 1989 revision of the birth certificate from January 1 through June 30, 2005, and the 2003 revision from July 1 through December 31, 2005.

N/A = not applicable because of no rural births.

Geographic location is based on mother's state of residence.