Assessing the impact of using maternal race in vital records to measure racial and ethnic disparities in birth outcomes and maternal risk factors in Michigan
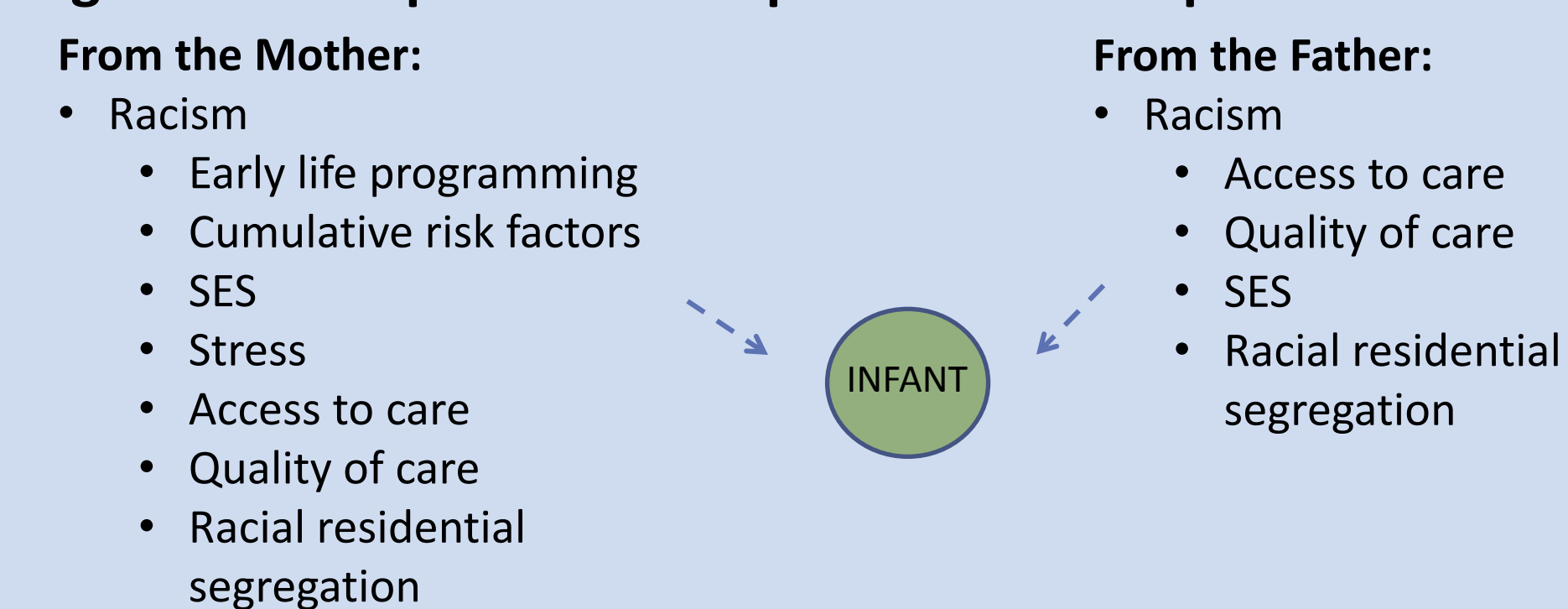
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Introduction

- The Michigan Department of Community Health is currently implementing the PRIME Project to understand and reduce disparities in African American and American Indian infant mortality in Michigan.
- Birth records are a key source of data for understanding risk factors for infant mortality.
- How race is classified in the birth records may change estimates of risk factors for African Americans and American Indians.

Classification of race in birth records

- Race is a social construct, defined and classified by society[1].
- How race is classified in birth records has changed over time[2,3].
- Current National Center for Health Statistics practice is to use the race of the mother alone and not assign the infant its own race[2,3].
- This ignores the impact a father's race has on the infant's in utero exposures and health outcomes (Figure 1).
- Infants are assigned their own race on death certificates, which may not match the mother's race on the birth certificate[4].
- It is not known to what extent including the father's race would change estimates of infant health outcomes or associated disparities.

Figure 1: Examples of how a parent's race impacts infant health

From the Mother:
- Racism
  - Early life programming
  - Cumulative risk factors
  - SES
  - Stress
  - Access to care
  - Quality of care
  - Racial residential segregation

From the Father:
- Racism
  - Access to care
  - Quality of care
  - SES
 - Racial residential segregation

INFANT

Purpose

1) To assess the impact of including the father's race when estimating health outcomes in the birth records.
2) To assess the impact of including the father's race when measuring disparities in the birth records.

- Disparity defined as a statistically significant difference between estimate and the reference group
- Reference group = White, Non-Hispanic

Classification of race in this study

To assess the impact of including the father's race, this study compares two methods of classifying race:
- Mom alone of race/ethnicity (green circle)
- Mom and/or Dad of race/ethnicity (green and blue circles)

Figure 2: Methods to identify population of infants that are Race X

Mom is Race X | Dad is Race X

Mom and/or Dad is Race X
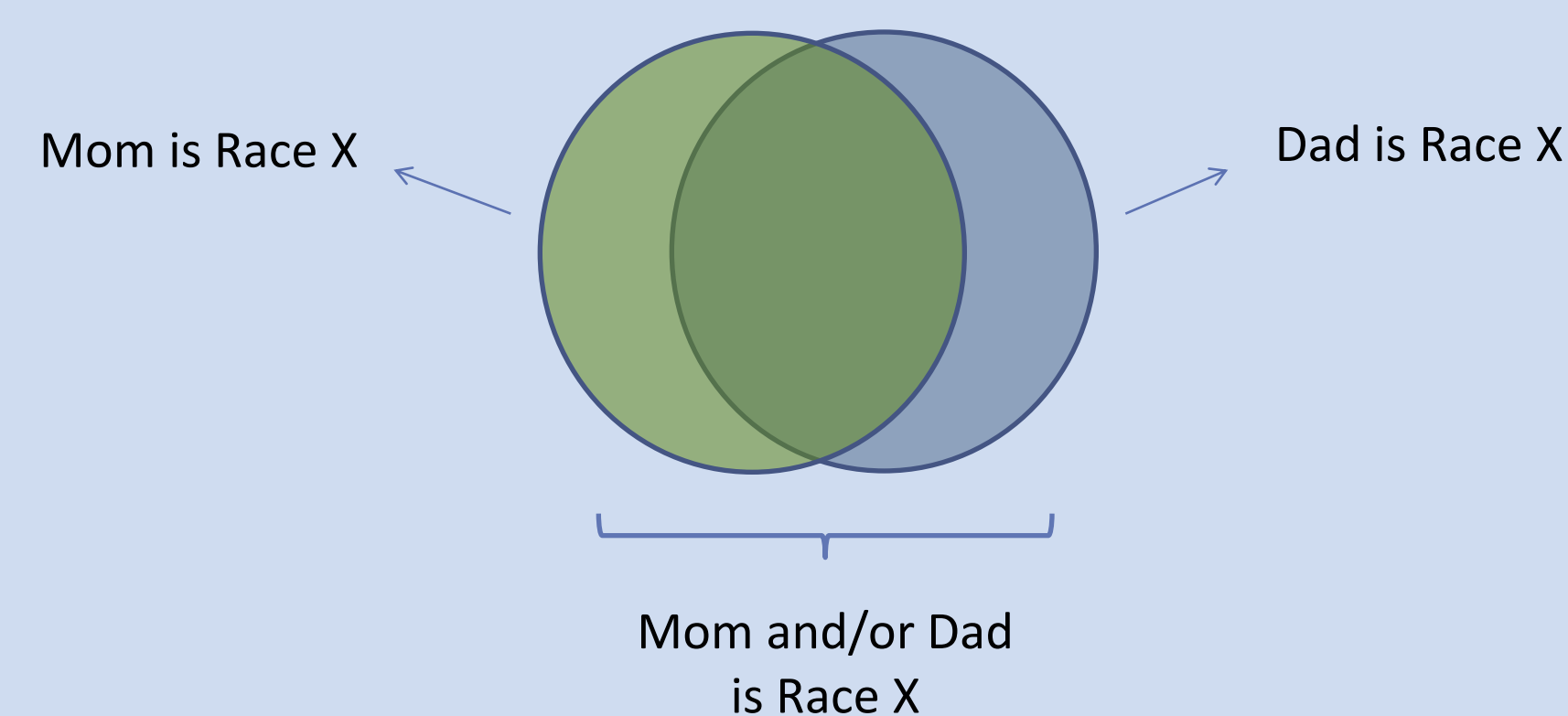
Data and Methods

Data

- Michigan live birth records, 2006-2009[5] (n=491249)

- Seven new variables created, each dichotomized as yes/no:
  - Mother and/or father is African American, Non-Hispanic
  - Mother and/or father is American Indian, Non-Hispanic
  - Mother and/or father is Arab American, Non-Hispanic
  - Mother and/or father is Asian American, Non-Hispanic
  - Mother and/or father is Hispanic/Latino
  - Mother and/or father is Multiracial/Other, Non-Hispanic
  - Mother and/or father is White, Non-Hispanic

- Six outcomes of interest:
  - Tobacco use during pregnancy
  - Low birth weight (<2500 grams)
  - Preterm birth (<37 weeks)
  - Mother's education <12 years
  - Inadequate prenatal care (Kotelchuck=Inadequate)
  - Medicaid used to pay for delivery

Hypotheses

For each outcome of interest, two hypotheses were tested:
- Hypothesis one: prevalence using mother's race alone is the same as the prevalence using mother and/or father's race
- Hypothesis two: using mother's race alone will not identify different disparities than using mother and/or father's race
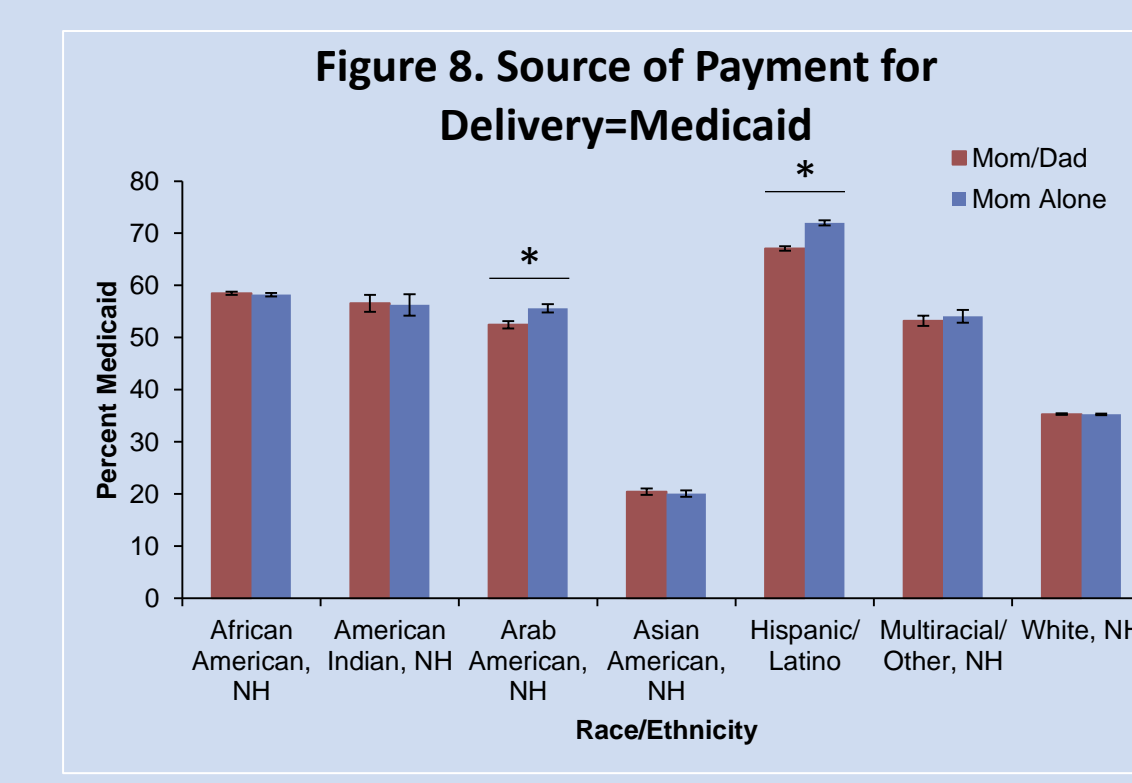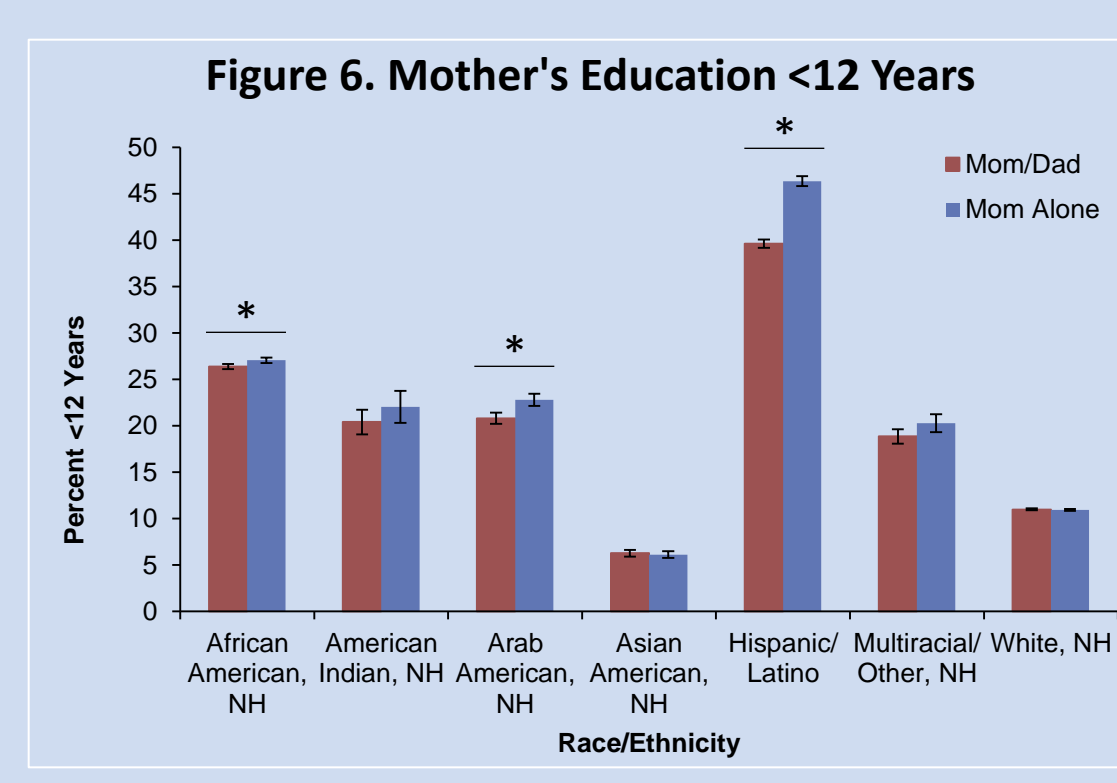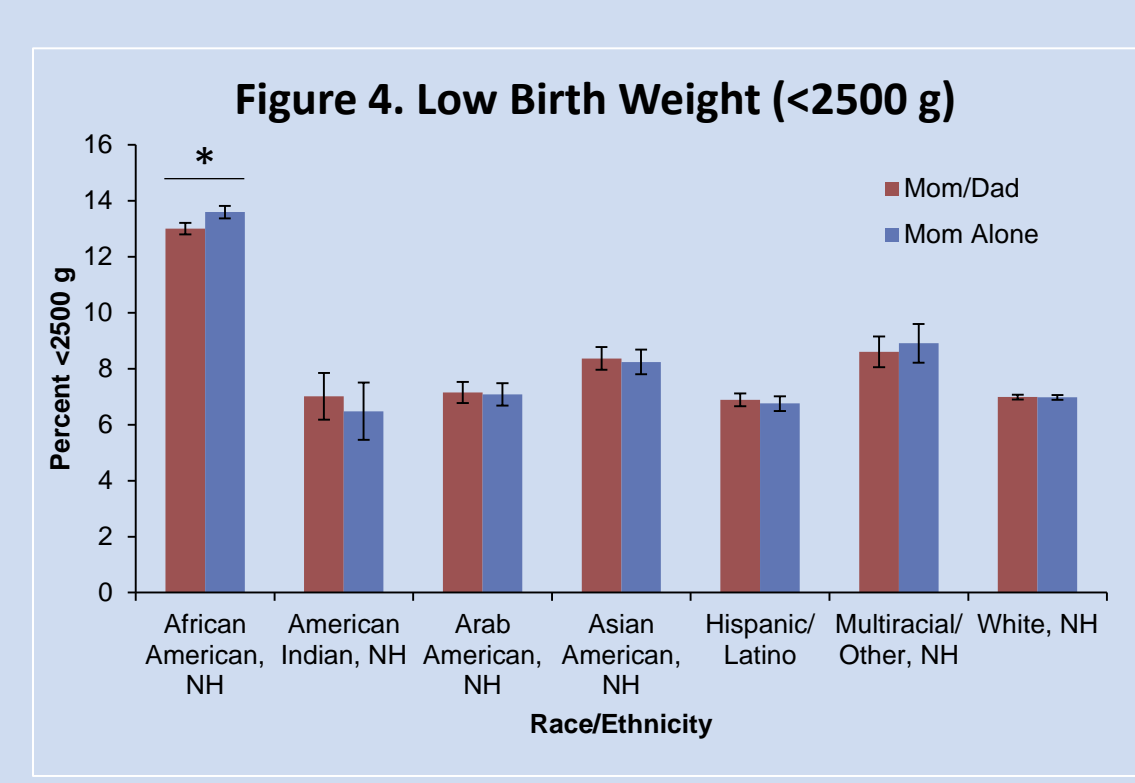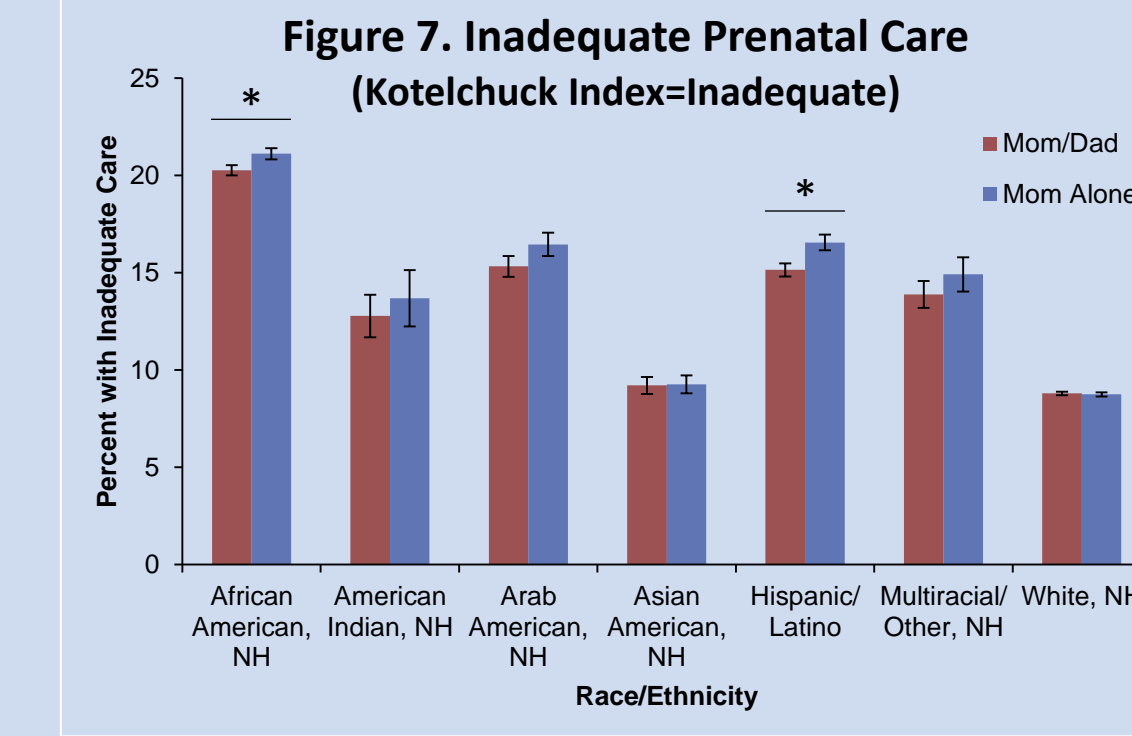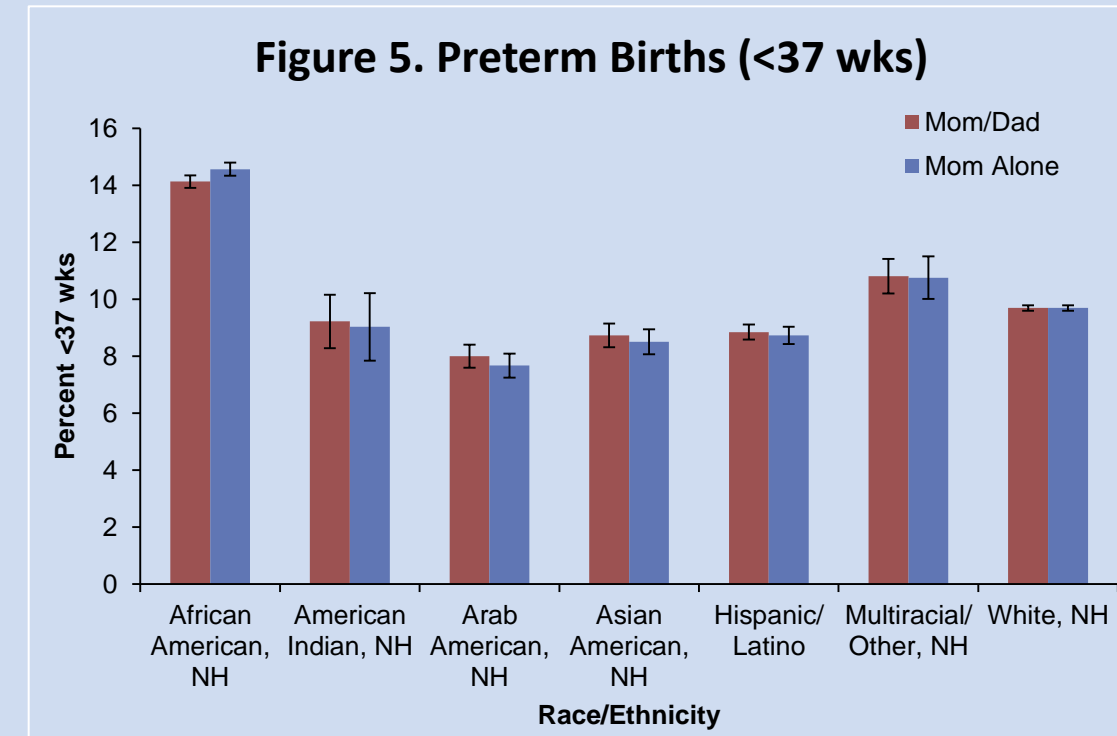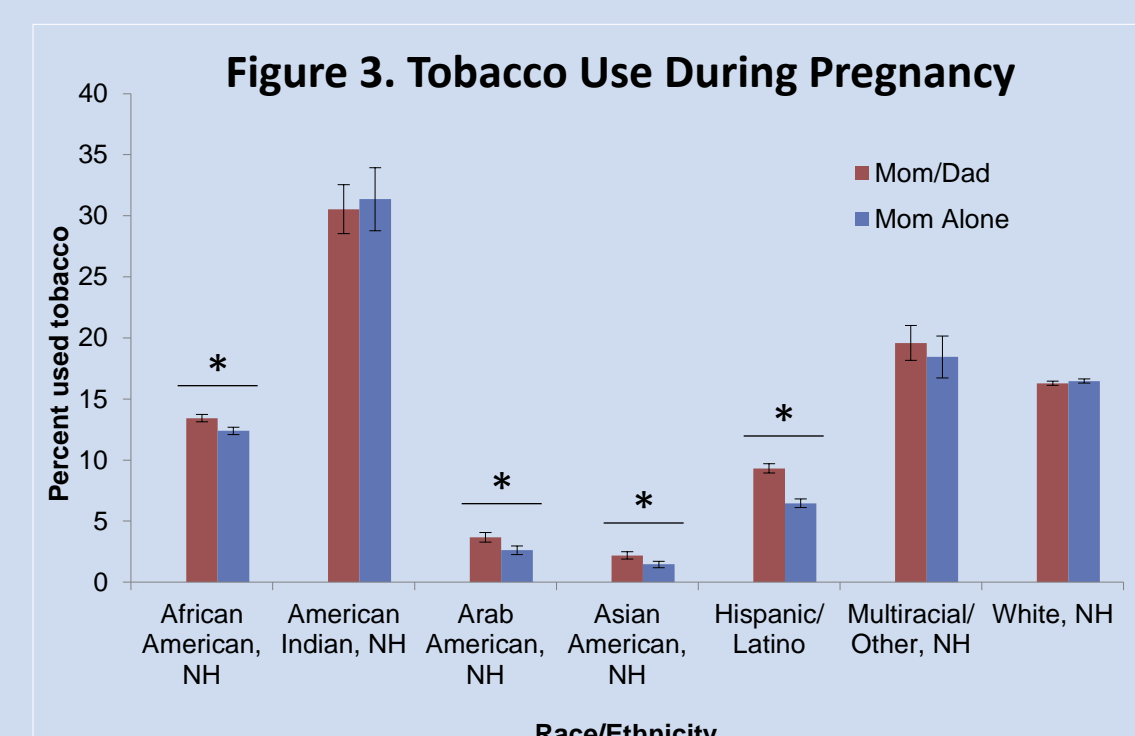
Methods

- Hypotheses were tested by comparing 95% confidence intervals.
- Prevalences were calculated using SAS v. 9.2 and confidence intervals were calculated and compared by hand.
- Because the two methods of classifying race/ethnicity resulted in populations that were not independent, further statistical analyses to compare differences between the two populations were not possible.

Results

- In all cases, using the mother and/or father to classify race resulted in a larger sample size than using the mother's race alone (Table 1).
  - Smallest two populations increased the most (American Indian, NH and Multiracial/Other, NH).
  - Decreased number of cases missing race/ethnicity for both mother and father.
- For all outcomes except preterm birth, estimates using mother and/or father were different from estimates using mother alone for some, but not all, race/ethnicities. Significant differences were seen as follows (Figures 3-8):
  - Tobacco use: African American, NH; Arab American,NH; Hispanic/Latino; White, NH
  - Low Birth Weight: African American
  - Mother's Education: African American, NH; Arab American, NH; Hispanic/Latino
  - Inadequate Prenatal Care: African American, NH; Hispanic/Latino
  - Medicaid: Arab American, NH; Hispanic/Latino
- In no cases did changing the method to classify race change the detection of disparities (in all cases disparities were significant for both methods or significant for neither).

Table 1. Effect of different race/ethnicity classification methods on sample sizes, by race/ethnicity

Race/Ethnicity	Mom Alone	Mom and/or Dad	Percent Change
African American, NH	87610	98128	12.0%
American Indian, NH	2242	3628	61.8%
Arab American, NH	15422	17944	16.4%
Asian American, NH	15690	17541	11.8%
Hispanic/Latino	34190	45121	32.0%
Multiracial/Other, NH	6605	10138	53.5%
White, NH	326558	343265	5.1%
Missing	2932	2749	-6.2%

Figure 3. Tobacco Use During Pregnancy

Figure 4. Low Birth Weight (<2500 g)

Figure 5. Preterm Births (<37 wks)

Figure 6. Mother's Education <12 Years

Figure 7. Inadequate Prenatal Care (Kotelchuck Index=Inadequate)

Figure 8. Source of Payment for Delivery=Medicaid

Discussion

- Using the mother and/or father's race results in larger sample sizes, a smaller proportion of infants missing race/ethnicity, and smaller confidence intervals for some indicators in some populations.
- Using the mother alone to approximate the race/ethnicity of her infant results in estimates of health outcomes that in some cases are statistically different from estimates that use the mother/and or father to approximate her race.
- In the six outcomes investigated in this study, the effect size was small and did not result in different identifications of disparities.
- Future studies should assess how different classifications of race/ethnicity affect the strength of associations between risk factors and infant health outcomes.

Limitations:

- As with all studies using birth record data, this study is subject to misclassification of race and measurement error of health outcomes[6,7].
- The two populations being compared (mom's race alone vs. mother and/or father's race) are not independent, limiting statistical comparisons.
- A high percentage of fathers are missing race/ethnicity (17.03%, compared to 0.60% for mothers).
- The classification of infants using mother and/or father's race puts some infants in two categories.
- Both methods are externally imposed assignments of race/ethnicity and may differ from how the parents would identify their infant's race/ethnicity.

Recommendations:

- The best way to assess an infant's race is to add a field on the birth certificate for infant's race and ask the parents to identify the infant's race at birth.
- Studies using the race/ethnicity data currently available from the birth records should address the impact of excluding the father's race/ethnicity when measuring racial/ethnic disparities in infant health.

References

1. 1
2. Tolson GC, Barnes JM, Gay GA, Kowaleski JL. The 1989 revision of the U.S. standard certificates and reports. National Center for Health Statistics. Vital Health Stat 4(28). 1991.
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5. Michigan Live Birth Records, 2006-2009.
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Acknowledgments