

Maternal Morbidity and Mortality:

Exploring Racial/Ethnic Differences using New Data from Birth and Death Certificates

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Introduction: Rates of severe maternal morbidity have increased recently as more women enter pregnancy with underlying health issues—increased obesity, diabetes, and hypertension (1,2). During relatively the same period, maternal mortality has also increased although changes in measurement partly explain the rise (3). Postpartum hemorrhage is the most common maternal morbidity worldwide that can result in maternal death (4). In the United States, postpartum hemorrhage is also one of the leading causes of maternal death, although recently declining as other causes emerge (1,4). Persistent racial/ethnic disparities in both maternal morbidity and mortality are evident (i.e. greater rates among Non-Hispanic black women) and involve the complex interplay of social factors, underlying maternal health, as well as differences in access and quality of healthcare (5).

With the 2003 revisions of the Standard Certificate of Live Birth and Standard Certificate of Death, new checkbox items were added to each to collect information on maternal morbidity and mortality. Four of the morbidities added to the birth certificate (maternal transfusion, ruptured uterus, unplanned hysterectomy, and ICU admission) are often associated with maternal postpartum hemorrhage, its causes and/or treatments, as well as other serious life-threatening morbidities (4).

For death certificates, a checkbox was added for female decedents to collect information on whether the decedent was pregnant within the past year, and the timing of her death relative to the pregnancy: still pregnant at death, death within 42 days of an ended pregnancy, or death 43 days to a year of an ended pregnancy. Prior to the addition of this checkbox, maternal mortality was tracked and enumerated according to a group of underlying cause-of-death codes and concepts (6). The addition of this checkbox aids in identifying maternal deaths and also allows for the computation of time-specific maternal mortality rates.

This paper will present findings for the new maternal morbidity and mortality data for the most recent reporting areas of this information. In particular, the racial/ethnic differences in maternal morbidity and mortality will be explored using these new data for the following groups of women: Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Asian, and Hispanic. Maternal mortality rates for

the three time periods will be compared for racial/ethnic groups as well the underlying cause when timing of maternal death is considered. A strength of birth and death certificate data is that they are based on 100 percent of records filed in the United States and can be used to examine rates for smaller subgroups and rarer events.

Methods: The most recent maternal morbidity data from birth certificates were for 2012; the reporting area includes 38 states and the District of Columbia, representing 86 percent of all US births. For the maternal mortality checkbox on the death certificate, 2011 was the most recent data year, with 41 states and the District of Columbia collecting this information. This reporting area represented 65 percent of all US deaths. These data will be updated for the final paper as they become available (2013 birth data and 2012 death data). While still subnational, additional states will be included and thus the percent of U.S. birth and deaths included in the reporting areas will be higher (90 percent for births; 75 percent for deaths).

Rates of maternal morbidity and mortality (per 100,000 live births) will be presented for non-Hispanic white, non-Hispanic black, non-Hispanic Asian, and Hispanic women. The morbidity data will include the following four categories—maternal transfusion, ruptured uterus, unplanned hysterectomy, and ICU admission. Rates of total maternal mortality (according to the traditional ICD-10 definition) will be presented as well as rates for the three time periods—woman pregnant at death, not pregnant but pregnant within 42 days of death, and not pregnant but pregnant 43 days to 1 year before death. Where sufficient cases are available, maternal morbidity and mortality rates will be examined by age and educational attainment within the racial/ethnic groups. Additionally, maternal morbidity rates will be presented by payment source of the delivery (private insurance, Medicaid, uninsured) to examine the extent to which racial/ethnic differences persist after accounting for health insurance coverage.

For maternal morbidity, multivariate models (logistic regression) which control for maternal sociodemographic characteristics (maternal age, maternal educational attainment, nativity status, and parity), clinical/behavioral characteristics (vaginal or cesarean delivery, previous cesarean delivery, hypertension, diabetes, smoking), and healthcare coverage (Medicaid, private insurance, uninsured) will be explored to examine whether racial/ethnic disparities persist net of these characteristics. A parallel analysis will be conducted for maternal mortality, although only demographic variables (in particular, age, race/ethnicity, and educational attainment) are available for these data.

Results: For the four maternal morbidities included in this paper, Non-Hispanic black and non-Hispanic Asian women had among the highest rates (Table 1). Non-Hispanic black women had the highest rate of maternal transfusion (364.2 per 100,000 live births) and ICU admission (240.1). Non-Hispanic black and Non-Hispanic Asian women had the highest rates of ruptured uterus (39.5 and 35.6, respectively) while Non-Hispanic Asian women had the highest rate of unplanned hysterectomy (60.2). Hispanic women were generally intermediate in their rates although they had the lowest rate of ruptured uterus (20.7).

The maternal mortality rate for non-Hispanic black women (51.2 deaths per 100,000 live births) was 2 ½ times that of non-Hispanic white women (20.9) and more than 3 times that of Hispanic women (14.9). Maternal mortality rates were not computed non-Hispanic Asian women because there were two few cases (<20). For non-Hispanic white and black women, maternal mortality rates were about 50 percent higher during the period where the woman was still pregnant (27.2 and 10.9, respectively) than the period within 42 days of the end of the pregnancy (18.6 and 7.7, respectively). In contrast, the rate for Hispanic women was 23 percent higher during the second period (within 42 days of an ended pregnancy) than when the woman was still pregnant, 7.9 compared with 6.4. The racial/ethnic difference in maternal mortality rates was greatest during the period where the woman was still pregnant. Maternal mortality rates were essentially the same for non-Hispanic white and Hispanic women during the period within 42 days of an ended pregnancy whereas the rate for non-Hispanic black women was more than twice as high, 18.6. A further examination of the causes of death within each time period by race/ethnicity will be included in the final paper.

Conclusions: For maternal morbidity categories included in this paper, higher rates were evident for non-Hispanic black and Asian mothers compared with non-Hispanic white mothers. Hispanic mothers generally had among the lowest rates. The racial/ethnic differences in maternal mortality rates varied according to the timing of the maternal death with the largest difference for mortality while the woman was still pregnant.

For the most part, racial/ethnic differences were greater for maternal mortality than maternal morbidity. The maternal mortality rate for non-Hispanic black women was 2½ times that of non-Hispanic white women; the only morbidity with a similar difference between non-Hispanic black and white women was ICU admission, with the rate for the former about twice that of the latter. The maternal mortality rate for Non-Hispanic black women was more than 3 times that of Hispanic women; the largest morbidity difference between non-Hispanic black and Hispanic women was for ruptured

uterus, about twice as high for non-Hispanic black women. This greater difference for maternal mortality compared with morbidity needs further exploration and is suggestive of differences in healthcare quality and access when morbidities are present. However, it may reflect differential underreporting of the morbidities by racial/ethnic groups. These new birth and death certificate data will be an important resource in examining issues surrounding the persistent racial/ethnic disparities because of the large number of births and deaths in which to perform analyses. National data on both maternal morbidity and mortality are expected with the 2015 data year.

References

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Table 1. Maternal morbidity and mortality, by race and Hispanic origin of mother: Revised reporting area, 2012 for birth and 2011 for death

[Rates are number of live births or deaths within specified group per 100,000 live births in specified group]					
Maternal morbidity and mortality	All races	Non-Hispanic White	Non-Hispanic Black	Non-Hispanic Asian	Hispanic
MATERNAL MORBIDITY					
	Numbers				
Maternal transfusion	280.0	273.4	364.2	244.4	243.5
Ruptured uterus	28.2	27.3	39.5	35.6	20.7
Unplanned hysterectomy	41.1	36.9	47.0	60.2	40.7
Admission to intensive care unit	149.8	112.5	240.1	141.7	181.9
MATERNAL MORTALITY ¹					
All maternal deaths	22.7	20.9	51.2	*	14.9
Pregnant at time of death	11.6	10.9	27.2	*	6.4
Not pregnant, but pregnant within 42 days of death	8.9	7.7	18.6	*	7.9
Not pregnant, but pregnant 43 days to 1 year before death	2.2	2.3	5.4	*	*
* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.					
1 Maternal mortality contains deaths classified by ICD-10 codes (A34, O00-O95, O98-O99).					
NOTE: The revised reporting area for births in 2012 included 36 states and the District of Columbia and represented 86 percent of all U.S. births. The revised reporting area for deaths in 2011 included 41 states and the District of Columbia representing 65 percent of all U.S. deaths.					