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RACIAL DISPARITIES IN STILLBIRTH RISK ACROSS GESTATION IN THE UNITED STATES

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Abstract

Objective—To determine factors associated with racial disparities in stillbirth risk.

Study Design—Stillbirth hazard was analyzed using 5,138,122 singleton gestations from National Center of Health Statistics perinatal mortality and birth files, 2001-2002.

Results—Black women have 2.2 fold increased risk of stillbirth compared to white women. The black/white disparity in stillbirth hazard at 20-23 weeks is 2.75, decreasing to 1.57 at 39-40 weeks. Higher education reduced the hazard for whites more than for blacks and Hispanics. Medical, pregnancy and labor complications accounted for 30% of the hazard in blacks and 20% in whites and Hispanics. Congenital anomalies and small for gestational age contributed more to preterm stillbirth risk among whites than blacks. Pregnancy and labor conditions contributed more to preterm stillbirth risk among blacks than whites.

Conclusions—The excess stillbirth risk for blacks was greatest at preterm gestations, and factors contributing to stillbirth risk vary by race and gestational age.

Keywords

Stillbirth; racial disparity

Introduction

Stillbirth affects 1 in 160 deliveries in the United States¹. The incidence of stillbirths, defined as fetal deaths at 20 or more weeks of gestation, is similar to the incidence of infant deaths in the United States. According to the National Center for Health Statistics (NCHS), there were 25,653 stillbirths, and 27,995 infant deaths in 2003.¹

In 2003, the stillbirth rate for the United States, expressed as the number stillbirths per 1000 live births plus stillbirths, was 4.94/1000 for non-Hispanic whites, 11.56/1000 for non-Hispanic blacks, and 5.45/1000 for Hispanics¹. The stillbirth rate declined by 29% from 1990

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While the hazard of stillbirth in the US remains significantly higher in non-Hispanic blacks, this paper reports that characteristics such as maternal education and small for gestational age differentially affect this disparity

to 2003, but the racial disparity in rates has not improved^{1,2}. While a great deal of information has been obtained on the racial and ethnic disparities in infant mortality, much less is known about stillbirth. Given the continuum of development from fetal life through the neonatal period and the survival of extremely premature infants through advanced medical intervention, it is important to include stillbirth as a critical indicator of racial disparity in health.

Studies that have examined rates of stillbirths or that have compared stillbirths to live births or deliveries systematically underestimate stillbirth risk as gestation advances. Thus, they do not provide a clinically relevant estimate of stillbirth risk by duration of gestation. In addition, prior studies of racial disparity in stillbirth risk have examined rates within gestational age intervals, adjusted for gestational age, or used models that make the assumption that relative risk remains constant throughout gestation³⁻⁵. These approaches do not consider the possibility that risk factors may contribute differently to hazard depending on gestational age. The purpose of this study is to examine the hazard of stillbirth, (i.e., stillbirth risk in ongoing pregnancies), by intervals of gestation in non-Hispanic whites, Hispanics and non-Hispanic blacks, and to determine the contribution of maternal and fetal characteristics to gestational age and racial differences in stillbirth hazard.

Methods

The sources of data were the NCHS Perinatal Mortality Data Files and the Birth Cohort Linked Birth/Infant Death Data Sets for 2001 and 2002 combined. We selected the following 36 states for analyses because they met the criteria of $\geq 80\%$ complete reporting for the specific data entry fields on Hispanic origin, method of delivery, and prenatal care history: Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, West Virginia, Wisconsin, and Wyoming. There were a total of 5,529,148 singleton gestations reported in 2001 and 2002 from the selected states. Analyses were conducted on singleton gestations delivered between 20 and 41 completed weeks ($N=5,138,122$). Of these, 2,960,141 (57.6%) were among non-Hispanic whites, 684,831 (13.3%) among non-Hispanic blacks, and 1,203,337 (23.4%) among Hispanics.

Stillbirth was defined as fetal death occurring at 20 or greater weeks of gestation. The primary determinant of gestation in the NCHS data files is the interval between the first day of the last menstrual period (LMP) and date of delivery. NCHS uses the clinical estimate when there is no LMP or there is a gross discrepancy between the LMP-based gestational age and birthweight¹. Maternal race/ethnicity was classified according to race/ethnicity reported on the birth certificates or fetal death reports. Hazard of stillbirth by gestational age intervals was calculated for each maternal race/ethnicity groups (non-Hispanic whites, non-Hispanic blacks, and Hispanics) as the number of stillbirths occurring during the interval, divided by the number of ongoing pregnancies at the beginning of the interval minus half of the total live births in that gestation interval. The relative risk (RR) of stillbirth hazard was calculated as the hazard of stillbirth for other race groups divided by the hazard of stillbirth for non-Hispanic whites (reference group). The 95% confidence interval of RR for race group 1 vs. group 2 was calculated as $(RR \cdot \exp(-1.96\sqrt{v}), RR \cdot \exp(1.96\sqrt{v}))$ where $v = \text{variance of } (\log_e RR) = (1 - (\text{group 1 stillbirth risk}) / (\text{group 1 number of stillbirth}) + (1 - (\text{group 2 stillbirth risk}) / (\text{group 2 number of stillbirth}))$.

The race-specific hazard of stillbirth and RR for non-Hispanic blacks vs. non-Hispanic whites and Hispanics vs. non-Hispanic whites at gestation intervals were further stratified by maternal age (<35 or ≥ 35 years), maternal education (≤ 12 or >12 years), parity (1 or >1). Records with

missing values for education and parity were excluded from the stratified analyses. There were no records missing maternal age.

The race specific hazard of stillbirth for non-Hispanic blacks, non-Hispanic whites and Hispanics at gestation intervals were also further calculated excluding subjects with the following: maternal medical conditions (any report on fetal death report or certificate of live birth of medical diseases including anemia, diabetes, cardiac, lung or renal disease, or chronic hypertension); pregnancy condition (any report of pregnancy risk factors including incompetent cervix, premature rupture of membranes, uterine bleeding, pregnancy associated hypertension, or eclampsia); labor condition (any report of labor associated conditions including fever, abruption, cord abnormality, placenta previa or other bleeding); small for gestational age deliveries (SGA, defined as below the 5% percentile of birth weight for race/ethnicity/gender/parity matched liveborns in the same gestational age); or deliveries with any reported congenital anomalies. Pregnancies with missing values for maternal or fetal conditions were included with the pregnancies that reported “none” for specified maternal or fetal conditions. All data analyses were performed using the statistical software SAS version 9 (version 9, SAS Institute, Cary, NC).

Results

Cumulative hazard of stillbirth at a gestation interval estimates the probability of having a stillbirth while in that given interval of pregnancy. The cumulative hazard for stillbirth /1000 pregnancies from 20 through 41 weeks gestation was 22.07 for non-Hispanic blacks, 10.02 for non-Hispanic whites, and 10.58 for Hispanics. The stillbirth hazard was highest at 20-23 weeks and 39-41 weeks gestation (Figure 1). Increased hazard was observed at every gestation interval for blacks compared to the other racial/ethnic groups. The black/white disparity in cumulative hazard was highest at 20-23 weeks, (RR 2.75 [95% C. I. 2.62, 2.88]), and declined with increasing gestation, reaching the lowest value at 39-40 weeks, (RR 1.57, [95% C.I. 1.41, 1.75]) (Table 1) then rising slightly at 41 weeks of gestation. The hazard of stillbirth for Hispanics was similar to non-Hispanic whites throughout pregnancy.

The distributions of reported maternal demographic factors and maternal and fetal conditions among live births and stillbirths are listed in Table 2. Among all race/ethnicities, a higher proportion of stillbirths were to women 35 or older, or nulliparous women than the proportion of live births. In addition, maternal medical, pregnancy, and labor conditions were more frequently reported on fetal death certificates than birth certificates. A high proportion of stillborn fetuses among all race/ethnicities were small for gestational age: 25 to 29% of stillbirths, compared to 5 % of live births. The proportion of stillbirths with any reported congenital anomaly was higher than the proportion of live births with anomalies, with the highest proportion occurring among whites. The percent of missing records varied by race/ethnicity and outcome. For example, they ranged from 0.21 to 2.90 for parity, 0.82 to 11.36 percent for education, and 4.34 to 19.87 for any maternal condition (medical, pregnancy, or labor).

The cumulative hazard of stillbirth through 41 weeks was examined according to race/ethnicity and maternal characteristics. The influence of education varied by race/ethnicity, with higher education benefiting white and Hispanic women more than black women (Table 3). The stillbirth hazard for white women with >12 years of education was 30 percent lower than the hazard for white women with ≤12 years of education (RR= 0.70 [95% C.I. 0.67,0.72]). The influence of higher educational level on reducing cumulative hazard of stillbirth was much less for blacks (RR=0.91 [95% C.I. 0.86,0.95]) and not significant for Hispanics (RR=0.96 [95% C.I. 0.90, 1.02]). This led to an increased black/white disparity in stillbirth hazard among women with more than 12 years of education compared to women with ≤12 years of education,

with the disparity declining with advancing gestation (Table 4). The black/white disparity in hazard for women with >12 years of education was highest at 20-27 weeks, RR=2.98 (95% C.I. 2.79, 3.18). The Hispanic/white disparity in cumulative hazard was also significantly higher for those with more than 12 years of education, RR=1.22 (1.15, 1.30, 95% C.I.) when compared to those with 12 years or less, RR=0.89 (0.86, 0.92, 95% C.I.).

The hazard for women ≥ 35 years old was higher than for women under 35 (Table 3). The relative risk (RR) of stillbirth hazard for advanced maternal age was highest for Hispanic women (RR=1.66 [95% C.I. 1.55, 1.78]), followed by black women (RR=1.51 [95% C.I. 1.41, 1.61]), and white women, (RR=1.38 [95% C.I. 1.33, 1.44]). The magnitude of the black/white and Hispanic/white disparities in stillbirth hazard for women ≥ 35 years of age was greatest at 28-36 weeks of gestation (Table 4).

The relative risk for multiparous women was 60% or more lower than nulliparous women (Table 3). There was a 20-30% increased disparity in stillbirth risk for Hispanic multiparous women compared to white multiparous women, which was not observed among nulliparous women (Table 4.). The black/white disparity in risk was similarly increased for multiparous and nulliparous women at each gestational interval.

To examine the contribution of maternal and fetal conditions to the hazard of stillbirth across gestation, we determined the hazard in the population of women without the condition. (Table 5). The contribution of reported maternal medical conditions to cumulative hazard through 41 weeks ranged from 2.56-5.35%. The contribution of medical conditions increased with gestational age. The contribution of any pregnancy condition (incompetent cervix, premature rupture of membranes, uterine bleeding, pregnancy associated hypertension or eclampsia) to hazard of stillbirth was greater: 7.96, 14.92, and 9.63 percent for whites, blacks, and Hispanics respectively. The greatest contribution of pregnancy conditions to stillbirth hazard occurred at less than 27 weeks of gestation. The contribution of reported labor related conditions (febrile, abruption, cord abnormalities, placenta previa or other bleeding) to cumulative hazard of stillbirth was 13.67, 17.49, and 10.87 percent for whites, blacks, and Hispanics, respectively. The contribution of any maternal condition (reported medical, pregnancy, and labor conditions combined) to stillbirth hazard was 19.56% for non-Hispanic whites, 19.28% for Hispanics and 30.09% for blacks.

Small for gestational age (SGA) fetuses, defined as below the 5% percentile of birth weight for race/gender/parity matched liveborns in the same gestational age, accounted for 20 to 25% of the stillbirth hazard. The contribution of any reported congenital anomalies to stillbirth hazard decreased as gestation progressed. The contribution of congenital anomalies to stillbirth hazard was 19.66% for whites, 10.60% for blacks, and 15.69% for Hispanics. The contribution of SGA and congenital anomalies to stillbirth hazard was greater for whites compared to blacks at preterm gestations, especially between 20-27 weeks, but equal at 37-41 weeks.

Comment

This study examines the hazard of stillbirth using ongoing pregnancies as the comparison group, which provides a clinically relevant estimate of stillbirth risk at intervals in gestation⁶. The risk of stillbirth is greatest at the beginning (20-23 weeks) and at the end of gestation (39-41 weeks) regardless of race/ethnicity, as has been previously described⁷. Non-Hispanic black women have 2.2 fold increased risk of stillbirth compared to non-Hispanic white women. We found that the black/white disparity in hazard for stillbirth is highest at 20-23 weeks with a 2.8 fold increased risk and declines with increasing gestation, reaching the lowest value at 39-40 weeks, with a 1.6 fold increased relative risk. The ongoing risk of stillbirth in

pregnancy among Hispanics is close to that of non-Hispanic whites and is consistent with a study comparing rates of singleton stillbirth between the two groups⁸.

This study is the first to report on factors contributing to racial disparities in the risk of stillbirth at different times in gestation. When we analyzed the racial disparity in the risk of stillbirth according to sociodemographic characteristics, a new picture emerged. Prior studies have shown that advanced maternal age and nulliparity are associated with increased rate and hazard of stillbirth^{1,9-11}. In our study of singleton stillbirths, there was an increased risk of stillbirth for Hispanic s compared to whites among older, multiparous, or higher educated women. Since it is likely that these women are not recent immigrants, their increased risk may be related to acculturation. While more favorable birth outcomes are typically observed among Hispanics compared to blacks and whites^{5,8,12}, native born Hispanics do not have the same reproductive advantage of foreign born immigrant Hispanics¹³⁻¹⁵.

In general, a higher educational level (> 12 years) was associated with a substantial reduction in stillbirth risk for white women (30%) but only a small reduction for black women. Strikingly, there was a larger black/white disparity in stillbirth risk among higher educated women than lower educated women especially at 20-27 weeks. Several studies have shown that higher rates of preterm birth, low birthweight, and infant mortality cannot be accounted for by educational status¹⁶. One study of North Carolina vital statistics from 1988-1993, documented that increased educational level widened the disparity for infant mortality, as higher education conferred more protection for whites than blacks¹⁷. Our study of stillbirth emphasizes the need to pursue research on the biological mechanisms that may contribute to an adverse intrauterine environment in the face of environmental stressors.

Maternal medical, pregnancy and labor related complications contributed to 30% of the stillbirth hazard in black women and about 20% in white and Hispanic women. The contribution of pregnancy- related complications to hazard of stillbirth was greatest at 20-27 weeks' gestation across all race/ethnicity groups. Therefore, incompetent cervix, premature rupture of membranes, uterine bleeding, pregnancy associated hypertension, or eclampsia may contribute to the peak in risk of stillbirth between 20 and 27 weeks.

At preterm gestations, congenital anomalies and sga contributed more to the stillbirth risk among white women than black, whereas pregnancy and labor-related conditions contributed more to the stillbirth risk among black women than among white women. Therefore improvements in pre-conception and early pregnancy health for black women have the potential to reduce the disparity in stillbirth risk.

Underlying medical risk has the greatest contribution at term gestations among all race ethnicities and likely contributes to the rise in stillbirth risk at term. In addition, advanced maternal age has been shown to contribute to the increased risk of stillbirth at term¹¹. One possibility that remains to be explored is that the increased risk among black women compared to white women late in gestation may be due to the fact that black women are less likely to undergo induction. For all deliveries in 2002, the induction rate was 246.4/1000 live births for non Hispanic whites, 174.7/1000 live births for non- Hispanic blacks and 206.2/1000 live births for Hispanics¹⁸. Murphy and colleagues analyzed term deliveries in Illinois and showed that the rate of term inductions from 1991-2003, was higher for whites than African Americans. In addition the mean induction rate rose more significantly for white women over this time period compared to African American women when medical risks were taken into account¹⁹.

Prior studies have shown that sga fetuses, defined as less than the tenth percentile have a higher rate of stillbirth and that sga is associated with an increased risk of stillbirth compared to live birth²⁰⁻²². In this study, sga, defined as less than the fifth percentile, contributed to 25% of the stillbirth risk at all intervals of gestation and racial/ethnic groups examined. This may be

an underestimate of the contribution of growth restriction to stillbirth hazard because live births were the source to calculate the fifth percentile for each gestational age. Observed birthweights at preterm gestations are lower than intrauterine weights derived from ultrasound^{23,24}. The improved ability to detect fetal growth restriction and appropriately manage these pregnancies has the potential to make a significant impact on decreasing the incidence of stillbirth in the U.S. While timely delivery may reduce the risk of stillbirth, there will likely be an increase in the number of preterm deliveries with an associated increase in neonatal mortality and morbidity.

The analysis of vital statistics is of value because of the large number of records that are representative of the United States, and the ability to examine subpopulations²⁵. However there are limitations to using vital statistics data. It is likely that stillbirths are underreported and the degree of underreporting may vary by race/ethnicity^{8,26}. Variation in state reporting systems may also lead to underreporting of stillbirths at early gestations²⁷. Therefore, the stillbirth hazards reported in this study are likely underestimated. In addition, this report likely underestimates the contribution of maternal conditions and fetal conditions such as congenital anomalies to the hazard of stillbirth since we assessed their contribution by excluding those records where the condition was reported and records with missing fields remained. The extent of missing data also varies by race. For example, a significant proportion of Hispanic birth certificates and fetal death reports have no field marked, including “none” for maternal conditions. This may reflect lack of information on pregnancy conditions due to late entry into prenatal care and/or inadequate recording of pregnancy information on the birth certificates and fetal death reports. Therefore, the differential in missing data by race, may lead to further underestimate the contribution of maternal conditions to racial disparity in stillbirth risk.

In studies where vital records with no missing data fields are compared to medical records, there is still underreporting of maternal medical conditions and complications of pregnancy, labor and delivery on birth certificates and fetal death reports^{28,29}. The degree of discrepancy varies by individual maternal conditions or complications. This study analyzed the contribution of categories of maternal medical conditions or complications of labor and delivery to stillbirth hazard to provide a broad picture that would stimulate further research and is not meant to quantify the role of individual maternal medical conditions or complications.

At all gestations, advanced maternal age, nulliparity, maternal conditions, growth restriction and congenital anomalies contribute to the hazard of stillbirth. However, more research is needed to understand how these factors alone and in combination contribute to stillbirth risk at specific intervals in gestation. This study demonstrates that preterm gestation is a period associated with increased vulnerability for stillbirth among black pregnancies compared to whites. This is in contrast to the higher rate of survival of black liveborns at preterm gestations compared to whites³⁰. More research is needed to understand the biological threats to the fetus at preterm gestations. More research is also needed to probe the cultural and social determinants of racial disparities in risk among blacks and Hispanics as higher educational status appears to widen rather reduce these disparities. With this knowledge in hand we stand a better chance of designing interventions that will improve the health of vulnerable populations and reduce their risk of stillbirth.

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Figure 1.
Hazard of stillbirth for singleton pregnancies by gestational age and race/ethnicity, 2001-2002

Table 1
Cumulative Hazard of Stillbirth At Intervals of Gestation According to Maternal Race/ethnicity

Gestational age (weeks)	Number of Stillbirths (%)			Hazard/1000 ongoing pregnancies					Relative Risk of Stillbirth Hazard to Whites (95% C.I.)	
	White	Black	Hispanic	White	Black	Hispanic	Black	Hispanic	Black	Hispanic
20-23	4312 (29.3)	2737 (35.8)	1845 (28.8)	1.46	4.01	1.53	2.75 (2.62, 2.88)			1.05 (1.00, 1.11)
24-27	2412 (16.2)	1358 (17.8)	1003 (15.7)	0.82	2.01	0.84	2.46 (2.30, 2.63)			1.02 (0.95, 1.10)
28-31	1818 (12.2)	1097 (14.4)	798 (12.5)	0.62	1.66	0.67	2.67 (2.48, 2.88)			1.08 (1.00, 1.18)
32-33	983 (6.6)	514 (6.7)	477 (7.5)	0.34	0.80	0.41	2.35 (2.11, 2.61)			1.20 (1.08, 1.34)
34-36	2020 (13.6)	805 (10.5)	836 (13.1)	0.73	1.35	0.75	1.84 (1.70, 2.00)			1.03 (0.95, 1.12)
37-38	1582 (10.6)	587 (7.7)	671 (10.5)	0.74	1.27	0.75	1.72 (1.57, 1.89)			1.01 (0.93, 1.11)
39-40	1374 (9.2)	430 (5.6)	609 (9.5)	1.28	2.01	1.40	1.57 (1.41, 1.75)			1.09 (0.99, 1.20)
41	335 (2.4)	114 (1.5)	159 (2.5)	2.03	3.52	0.93	1.73 (1.40, 2.14)			0.46 (0.38, 1.55)
20-41	14906 (100)	7642 (100)	6398 (100)	10.02	22.07	10.58	2.20 (2.14, 2.26)			1.06 (1.03, 1.09)

Table 2

Distribution of Reported Maternal and Fetal Characteristics

	Non-Hispanic White		Non-Hispanic Black		Hispanic	
	Births %	Fetal Deaths %	Births %	Fetal Deaths %	Births %	Fetal Deaths %
Maternal Demographics						
Age, years						
<35	85.30	80.72	91.00	86.89	90.51	85.09
>=35	14.701	19.28	9.00	13.11	9.49	14.91
Education, years						
<=12	41.78	47.22	63.93	59.53	78.71	75.09
>12	56.40	45.04	34.61	29.12	19.59	17.85
Not Stated	0.82	7.74	1.46	11.36	1.70	7.06
Parity						
Nulliparous	40.82	66.98	37.54	63.50	36.09	58.80
Multiparous	58.97	30.97	62.18	33.59	63.57	39.42
Not stated	0.21	2.05	0.28	2.90	0.33	1.78
Maternal Conditions						
Medical ^d						
Reported Present	6.94	9.41	9.42	14.37	6.59	9.00
Not Stated	0.63	4.96	0.42	5.10	0.40	7.13
Pregnancy ^b						
Reported Present	7.13	14.28	7.77	21.71	4.67	13.91
Not Stated	4.71	13.02	5.57	12.76	13.18	25.52
Labor ^c						
Reported Present	2.93	16.36	3.07	20.33	2.91	13.57
Not Stated	0.54	4.64	0.27	4.76	0.09	3.49
Any of the above a or b or c						
Reported Present	15.44	32.09	18.25	43.23	12.76	29.71
Not Stated	4.34	10.61	4.97	9.57	11.85	19.87
Fetal Condition						
SGA ^e						
Yes	4.83	29.06	4.79	24.61	4.88	29.09
Unknown	0.21	6.06	0.28	6.40	0.33	6.74
Congenital anomaly ^f						
Reported	1.31	20.85	1.39	12.06	0.86	16.54
Not Stated	1.14	6.22	0.55	5.76	2.26	4.56

^dNulliparous pregnant women

^a Any of the following: Anemia, diabetes, cardiac, lung or renal disease, or chronic hypertension

^b Any of the following: Incompetent cervix, PROM, Uterine bleeding, PAH, or eclampsia

^c Any of the following: Febrile, abruption, cord abnormalities, placenta previa or other bleeding

^e SGA deliveries

^f Deliveries with any reported congenital anomalies

Table 3

Cumulative Hazard of Stillbirth Between 20 and 41 weeks According to Maternal Characteristics

	SB/1000 pregnancies		RR (95% C.I.)		SB/1000 pregnancies		RR (95% C.I.)		SB/1000 pregnancies		RR (95% C.I.)	
	<35	≥35	Maternal age (y)	≥35 vs. <35	≤12	>12	Education (y)	>12 vs. ≤12	0	≥1	Parity	≥1 vs. 0
Whites	9.49	13.10		1.38 (1.33, 1.44)	11.31	7.88		0.70 (0.67, 0.72)	16.34	5.29		0.32 (0.31, 0.34)
Blacks	21.09	31.85		1.51 (1.41, 1.61)	20.58	18.64		0.91 (0.86, 0.95)	36.77	12.05		0.33 (0.31, 0.34)
Hispanic	9.95	16.52		1.66 (1.55, 1.78)	10.10	9.65		0.96 (0.90, 1.02)	17.12	6.58		0.38 (0.37, 0.40)

Table 4

Disparity in Risk At Intervals in Gestation According to Maternal Characteristics

Black/White Relative Risk of Stillbirth Hazard at Intervals in Gestation				
	RR (95% C.I.)			
	20-27 weeks	28-36 weeks	37-41 weeks	20-41 weeks
Maternal Age				
<35 years	2.70 (2.59, 2.81)	2.25 (2.13, 2.37)	1.63 (1.51, 1.75)	2.22 (2.16, 2.29)
>=35 years	2.79 (2.53, 3.09)	2.89 (2.55, 3.27)	1.71 (1.43, 2.05)	2.43 (2.26, 2.61)
Maternal Education				
<=12 years	2.16 (2.05, 2.28)	1.89 (1.78, 2.02)	1.35 (1.23, 1.47)	1.82 (1.75, 1.89)
>12 years	2.98 (2.79, 3.18)	2.29 (2.10, 2.51)	1.57 (1.39, 1.78)	2.36 (2.26, 2.48)
Parity				
0	2.77 (2.64, 2.90)	2.25 (2.12, 2.40)	1.60 (1.47, 1.75)	2.25 (2.18, 2.33)
>=1	2.65 (2.47, 2.84)	2.48 (2.28, 2.69)	1.74 (1.55, 1.94)	2.28 (2.17, 2.39)
Hispanic/White Relative Risk of Stillbirth Hazard at Intervals in Gestation				
	RR (95% C.I.)			
	20-27 weeks	28-36 weeks	37-41 weeks	20-41 weeks
Maternal Age				
<35 years	1.05 (1.00, 1.10)	1.06 (1.00, 1.12)	1.07 (1.00, 1.14)	1.05 (1.02, 1.08)
>=35 years	1.18 (1.05, 1.31)	1.44 (1.27, 1.64)	1.29 (1.10, 1.50)	1.26 (1.17, 1.36)
Maternal Education				
<=12 years	0.87 (0.83, 0.92)	0.89 (0.83, 0.94)	0.94 (0.87, 1.01)	0.89 (0.86, 0.92)
>12 years	1.34 (1.22, 1.46)	1.20 (1.07, 1.34)	1.07 (0.93, 1.23)	1.22 (1.15, 1.30)
Parity				
0	1.05 (1.00, 1.11)	1.06 (0.99, 1.13)	1.05 (0.97, 1.13)	1.05 (1.01, 1.09)
>=1	1.20 (1.12, 1.30)	1.30 (1.20, 1.41)	1.30 (1.17, 1.43)	1.25 (1.19, 1.31)

Table 5

Cumulative Hazard of Stillbirth at Intervals of Gestation in the Absence of Specified Maternal or Fetal Conditions

	Total	Hazard/ 1000 Ongoing Pregnancies										Excluding deliveries with congenital anomalies ^e			
		Excluding women with any medical risk ^a		Excluding women with any pregnancy risk ^b		Excluding women with any labor risk ^c		Excluding women with a,b,or c		Excluding SGA deliveries ^d					
		Hazard	% reduction	Hazard	% reduction	Hazard	% reduction	Hazard	% reduction	Hazard	% reduction	Hazard	% reduction	Hazard	% reduction
White															
20-27	2.28	2.26	0.88	1.95	14.48	1.93	15.35	1.73	24.12	1.75	23.25	1.72	24.56		
28-36	1.72	1.65	4.07	1.64	4.66	1.48	13.95	1.39	19.19	1.22	29.07	1.39	19.19		
37-41	2.53	2.40	5.14	2.49	1.59	2.26	10.67	2.16	14.62	1.92	24.21	2.23	11.86		
20-41	10.02	9.76	2.60	9.25	7.96	8.65	13.67	8.06	19.56	7.49	25.25	8.05	19.66		
Black															
20-27	6.03	5.86	2.82	4.71	21.89	5.01	16.92	4.04	33.00	5.06	16.09	5.42	20.12		
28-36	3.92	3.60	8.17	3.47	11.48	3.11	20.66	2.70	31.12	2.88	26.53	3.44	12.15		
37-41	4.04	3.66	9.41	3.93	2.73	3.41	15.59	3.03	25.00	3.04	24.75	3.62	10.40		
20-41	22.07	20.89	5.35	18.80	14.92	18.21	17.49	15.43	30.09	17.55	20.48	19.73	10.60		
Hispanic															
20-27	2.37	2.38	-	2.01	15.19	2.10	11.39	1.85	21.94	1.86	21.85	1.93	18.67		
28-36	1.87	1.78	4.28	1.73	7.49	1.65	11.76	1.50	19.79	1.29	31.02	1.59	14.97		
37-41	2.71	2.56	5.54	2.62	3.32	2.47	8.86	2.29	15.50	2.05	24.35	2.40	12.44		
20-41	10.58	10.31	2.56	9.56	9.63	9.43	10.87	8.54	19.28	7.91	25.24	8.92	15.69		

^a Any of the following: Anemia, diabetes, cardiac, lung or renal disease, or chronic hypertension, 6.89% of whites; 9.42% of blacks; 6.57% of Hispanics

^b Any of the following: Incompetent cervix, PROM, Uterine bleeding, PAH, or eclampsia, 7.01% of whites; 7.73% of blacks; 4.62% of Hispanics

^c Any of the following: Febrile, abruptio, cord abnormalities, placenta previa or other bleeding, 2.98% of whites; 3.23% of blacks; 2.97% of Hispanics

^d SGA deliveries, 5% of pregnancies

^e Deliveries with any reported congenital anomalies, 1.39% of whites; 1.49% of blacks; 0.93% of Hispanics