The Causes and Consequences of Disparities by Race/Ethnicity in Cesarean Section Rates

FINAL REPORT R40 MC 08720-01

Eugene Declercq, PhD
Community Health Sciences Department
Boston University School of Public Health
February 3, 2010
Introduction

A. Nature of the research problem

While there have been increases in the cesarean rate in the past, the current levels (31.8% in 2007)¹ are unprecedented for the U.S. and may have consequences, positive and negative, that are not yet understood. What has been less remarked upon has been a major shift in the demographics of cesarean birth with black non-Hispanic mothers, whose overall cesarean rate was 1.4 percentage points below that for white non-Hispanic mothers in 1989 having a rate 1.8 percentage points higher in 2007. This shift is a result of cesarean rates for black non-Hispanic mothers remaining consistent in the early 1990s when rates for mothers from other race/ethnicity groups declined so that by 1994 rates for black non-Hispanic mothers became the highest of any group. When rates began to rise in 1997, rates for black non-Hispanic mothers rose as quickly as those of any other grouping (see Figure 1). The research problem at the heart of this inquiry is whether or not the disparities seen in cesarean rates across these groupings are a result of different demographic and medical risk profiles or are there persistent underlying differences that cannot be accounted for in a multivariate analysis?

This analysis was particularly relevant to MCHB strategic research issues II and III. With respect to Strategic Research Issue II (elimination of disparities), our analysis examined the disparities in access to cesarean section across many population (race/ethnicity, linguistic, immigrant and underserved) dimensions. The primary analysis was stratified by race/ethnicity, payer source, and a variable that is uniquely available on the Massachusetts birth certificate, mother’s language preference. Our data system also enabled us to examine an issue relevant to Strategic Research Issue III on systems to assure quality of care – the pattern of cesarean births and outcomes and costs by hospital level and hospital type in Massachusetts. In fact we had a sufficient number of cases to include individual hospitals into the analysis to assess their contribution to eliminating or maintaining these disparities. We were also able to examine an increasingly important systems issue – medically elective cesarean births², which an earlier study by this research team found to vary substantially by race/ethnicity.

B. Purpose, scope, and methods of the investigation

The purpose of this research was to examine an issue of increasing importance – the record number of primary and repeat cesarean births in the U.S. and the disparities by race/ethnicity in cesarean rates.³ In Massachusetts, where this analysis was focused and where, unlike national data, birth certificate data allow us to stratify rates by race/ethnicity and payer source, these disparities have become even more pronounced with black non-Hispanic mothers with private insurance having a cesarean rate of 39.0% in 2007, almost three percentage points higher than the comparable rate for white non-Hispanic mothers on private insurance (36.2%). The rates among mothers on public insurance (31.1%) were comparable between the groups.⁴

The scope of the investigation involved virtually all (99.2%) births to a Massachusetts resident in a Massachusetts hospital from 1998-2006. These were drawn from the Pregnancy to Early Life Longitudinal (PELL) data system and included some 701,608 births. The primary method was the use of multivariate logistic regression to assess the differential impact of race/ethnicity on the
likelihood of having a cesarean and the outcomes associated with method of delivery. These methods are described in further detail below.

**Figure 1  Total cesarean rates by race/ethnicity, U.S. 1989-2007**

![Graph showing cesarean rates by race/ethnicity from 1989 to 2007.](image)

*Source: National Center for Health Statistics Annual Birth Reports*

**C. Nature of the findings**

The research, as this is written, is being prepared for submission to journals so this report will provide an overview of findings. After very careful examination, described in more detail below in Sections IV and V, we found a persistent difference in cesarean rates by race/ethnicity even after controlling for demographic, medical risk, behavioral and institutional factors. We also studied maternal and infant outcomes to examine if method of delivery reduced existing differences in those outcomes and found little overall effect.

**I. Review of the Literature**

The above mentioned shifts in the cesarean rate are at the heart of the debate over the medicalization of birth and have drawn the attention of the provider, research, and policy communities as well as considerable media attention. Of particular interest are the health concerns associated with the growing number of cesarean deliveries on both maternal and infant health. In the case of mothers, research has identified higher rates of maternal mortality, rehospitalization related to complications of surgery and infection and longer hospital stays and longer and more painful recovery. The very low rate of vaginal birth after cesareans (9.2% in 2004) also means an initial cesarean will generally result in repeat cesareans, which in turn have added risks, most specifically related to placental difficulties, specifically placenta previa, placenta abruption, placenta accreta, bowel injury, ICU admission, hysterectomy. Infant health problems include higher rates of stillbirths in pregnancies subsequent to a cesarean, double the rate of neonatal mortality in cases of cesareans to low risk mothers, as well as problems associated with iatrogenic prematurity related to elective cesareans. There is also a public health concern with the diversion of limited resources to more costly cesarean deliveries.
II. Study Design and Method

A. Study design

We developed three studies in this project. To minimize confusion, most of the discussion of design will be based on the first study noted here on explaining potential causes of disparities in primary cesarean rates. We will note the other two studies and, where appropriate, special features of those studies relevant to the specific sections of this report. The three studies are: 1. Bases of disparities in the primary cesarean rate. Can the differences in the cesarean rates by race/ethnicity be explained by medical risk factors and/or demographic characteristics? 2. Maternal Morbidities. Controlling for medical risks, demographic and institutional factors, what are the differences in postpartum maternal health in the first six months after birth for mothers by race/ethnicity and are these differences decreased or increased by method of delivery? 3. Infant Morbidities. Controlling for medical risks, demographic and institutional factors, what are the differences in postpartum infant health in the first year after birth for infants by race/ethnicity and are these differences decreased or increased by method of delivery? The approach to design in each study was as follows: (1) to examine disparities we identified baseline differences in odds ratios for a primary cesarean by race/ethnicity and then, using multivariate logistic regression, we added in four groups of variables: demographic, behavioral, medical risk and institutional variables to assess what difference each addition to the equation made in the baseline differences. A similar design was used in the case of maternal morbidities and infant mortality – after establishing differences in outcomes by race ethnicity overall and then following adjustment by the variables described above, we examined whether method of delivery had any additional effect on race/ethnicity disparities in outcome.

B/C. Population studied & Sample selection

As noted this was a population based study of all births from 1998-2006 to Massachusetts residents in Massachusetts hospitals. The breakdowns by race/ethnicity are in the “detailed findings.”

D/E. Instruments used & Statistical techniques employed.

The measures used were either drawn from the PELL developed measures (e.g. payer source; gestational age) or created for this study (e.g. diabetes and hypertension) and are described below. The variables included Medical Risks (anemia, cardiac disease, acute or chronic lung disease, diabetes, genital herpes, hydramnios/oligohydramnios, hemoglobinopathy, chronic hypertension, pregnancy associated hypertension, eclampsia, incompetent cervix, previous infant with birth defects, previous infant 4000+ grams, previous preterm or small for gestational age infant, renal disease, Rhesus sensitization, uterine bleeding; placenta previa); Labor & Delivery Complications (febrile, meconium, premature rupture of membranes, abruptio placenta, other excessive bleeding, seizures, precipitous labor, prolonged labor, dysfunctional labor, cephalopelvic disproportion, cord prolapse, anesthetic complication, fetal distress); Plurality (singleton; 2+); Gestational Age (≤36 weeks; 37-39; 40; 41+); Prenatal Hospitalizations (0; 1; 2+); Parity (1;2;3+); Obstetric History (Prior cesarean yes/no) The primary statistical modeling relied on multivariate logistic regression and the primary comparison was between primary cesarean rates for white non-Hispanic mothers and the other three race/ethnicity combinations studied.
IV. Detailed Findings

Racial and Ethnic Disparities in Primary Cesarean Rates

1. Preliminary Analysis

The total of 706,608 mothers who met the inclusion criteria (Massachusetts resident giving birth in a Massachusetts hospital) were broken down by race/ethnicity as follows: white non-Hispanic 504,351; black non-Hispanic 52,813; Hispanic 85,491; Asian Pacific Islander 43,726; and Other 14,510. After an initial review of the data several decisions were made. First it was decided to focus the first study on disparities in the rates of primary rather than overall cesarean section. Given the high rates of repeat cesareans there might be much less discretion in clinical decision making related to repeat cesareans. Second a series of subanalyses were done that revealed an unusual feature of the Massachusetts black non-Hispanic birthing population (see Figure 2).

Figure 2  % Foreign Born Mothers by Race/Ethnicity in Mass & U.S., 2006

While almost 13% of black non-Hispanic mothers in the U.S. as a whole are foreign born, fully 46% of Massachusetts black non-Hispanics are foreign born. The major groupings of foreign born black non-Hispanics were Haitian (17%), African (14%), Caribbean (9%) and Cape Verdean (4%). When we examined primary cesarean rates black non-Hispanics by nativity over time we found a pattern different for Massachusetts mothers compared to the general U.S. population. While in the U.S. black non-Hispanic mothers had higher primary cesarean rates than white non-Hispanic mothers regardless of nativity, in Massachusetts the relationships were different. From 1998-2006, the primary cesarean rates for white native born mothers (20.7%) were actually slightly higher than that of black non-Hispanic native born mothers (19.6%), while among foreign born mothers, the primary cesarean rate was notably higher for black (24.0%) compared to white (20.7%) mothers. The overall higher primary cesarean rates for black non-Hispanic mothers came entirely from the foreign born cohort. These distinctive findings led to an additional level of analysis in which we not only included nativity as a variable in our
multivariate analysis, but also did a series of separate runs in which we stratified results by nativity.

2. Results

Bivariate Analysis. On the whole, there were few differences in primary cesarean rates and patterns of change between white non-Hispanic and Asian Pacific Islander mothers so the major focus of the analysis compared white non-Hispanic with black non-Hispanic and Hispanic mothers. From 1998-2006, the primary cesarean rates for the three groups were 20.7% for white non-Hispanic mothers, 21.6% for black non-Hispanic and 16.2% for Hispanic mothers. Focusing first on black-white differences, the overall difference of less than 1% varied widely by subgroups including by gestational age where blacks actually had a lower primary cesarean rates for every age under 39 weeks and higher primary cesarean rates at 39, 41+ and especially at 40 weeks (19.6% to 16.2%). Black-white differences in primary cesarean rates were also larger among mothers 35-39 (BNH 28.1%; WNH 23.0%); College graduates (BNH 28.1%; WNH 21.9%); those with private insurance (BNH 25.9%; WNH 21.6%) and those with diabetes (BNH 34.9%; WNH 31.5%). Among the foreign born black non-Hispanic mothers, the highest primary cesarean rates were among the African born (25.6%) and Haitian born (24.6%) mothers.

In comparing white non-Hispanic mothers with Hispanic mothers, the overall 4.5 percentage point difference in primary cesarean rates (WNH 20.7%; Hispanic 16.2%) was greatest among the following subgroups: gestational age ≤ 32 weeks (WNH 57.3%; Hispanic 44.9%); birth in a Level III hospital (WNH 23.0%; Hispanic 16.5%) and two or more prenatal hospitalizations (WNH 25.4%; Hispanic 18.4%), though Hispanic mothers were much more likely to have experienced 2+ prenatal hospitalizations (WNH 8.8%; Hispanic 14.7%). Notably primary cesarean rates were higher for Hispanic mothers in two groups: mothers with a college education (Hispanic 25.3%; WNH 21.9%) and mothers 35-39 (Hispanic 24.6%; WNH 23.0%) and essentially even among mothers on private insurance.

Stratification by Nativity. As noted above, preliminary analysis suggested the need to examine the results by nativity given the high proportion of foreign born black non-Hispanic mothers. In Massachusetts, the birth certificate data includes an item on self identified ethnicity and Table 1 presents the results from an analysis of the combination of race, ethnicity and nativity across the three major comparison groups. Among black non-Hispanics, self identified Haitian, African and West Indian mothers were overwhelmingly foreign born. Among Asian PI mothers, all the ethnic groups identified by mothers were largely foreign born, especially Vietnamese and Asian Indians (both 97%). Among Hispanic mothers, the picture that emerges is more complex, with more than half of self identified Puerto Rican and about one-fourth of “Other Hispanic” mothers being U.S. born.

Table 2 presents the distribution and primary cesarean rates of our major comparison group, black non-Hispanic mothers, by nativity. In terms of the distribution by nativity, foreign born black non-Hispanic mothers in Massachusetts were far less likely to be teens (7.4% vs. 36% for U.S. born). Among those 25 years or older, U.S. born black mothers in Massachusetts were
Table 1: Nativity, Race and Ethnicity and among Birthing Mothers, Massachusetts, 1998-2005

<table>
<thead>
<tr>
<th>Nativity Status</th>
<th>U.S. Born</th>
<th>Non-Native Born</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haitian</td>
<td>5.2</td>
<td>94.8</td>
<td>8,263</td>
</tr>
<tr>
<td>African American</td>
<td>94.6</td>
<td>5.4</td>
<td>21,593</td>
</tr>
<tr>
<td>African</td>
<td>2.8</td>
<td>97.3</td>
<td>6,403</td>
</tr>
<tr>
<td>West Indian</td>
<td>10.6</td>
<td>89.5</td>
<td>4,418</td>
</tr>
<tr>
<td>Cape Verdean</td>
<td>38.2</td>
<td>61.8</td>
<td>1,764</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>52.3</strong></td>
<td><strong>47.8</strong></td>
<td><strong>42,441</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asian Pacific Isl. Only</th>
<th>U.S. Born</th>
<th>Non-Native Born</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td>10.7</td>
<td>89.3</td>
<td>10,351</td>
</tr>
<tr>
<td>Vietnamese</td>
<td>2.9</td>
<td>97.1</td>
<td>6,030</td>
</tr>
<tr>
<td>Cambodian</td>
<td>11.4</td>
<td>88.6</td>
<td>4,331</td>
</tr>
<tr>
<td>Asian Indian</td>
<td>3.2</td>
<td>96.8</td>
<td>7,452</td>
</tr>
<tr>
<td>Other API</td>
<td>12.9</td>
<td>87.1</td>
<td>9,187</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>8.6</strong></td>
<td><strong>91.4</strong></td>
<td><strong>37,351</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hispanic Only</th>
<th>U.S. Born</th>
<th>Non-Native Born</th>
<th>Puerto Rico</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puerto Rican</td>
<td>52.0</td>
<td>2.0</td>
<td>46.0</td>
<td>35,275</td>
</tr>
<tr>
<td>Dominican</td>
<td>14.6</td>
<td>84.6</td>
<td>0.8</td>
<td>13,421</td>
</tr>
<tr>
<td>Salvadoran</td>
<td>3.1</td>
<td>96.8</td>
<td>0.1</td>
<td>6,387</td>
</tr>
<tr>
<td>Other Central Amer.</td>
<td>7.1</td>
<td>92.9</td>
<td>0.0</td>
<td>6,990</td>
</tr>
<tr>
<td>Other Hispanic</td>
<td>24.7</td>
<td>75.0</td>
<td>0.4</td>
<td>12,771</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>32.3</strong></td>
<td><strong>45.8</strong></td>
<td><strong>21.9</strong></td>
<td><strong>74,844</strong></td>
</tr>
</tbody>
</table>

Table 2: Demographic Profile and Primary Cesarean rates of Black non-Hispanic First Time Mothers by Nativity Status, Massachusetts, 1998-2005

<table>
<thead>
<tr>
<th>Distribution</th>
<th>Primary Cesarean Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/Overall Rate</td>
<td><strong>10,090</strong></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td><strong>Native Born</strong></td>
</tr>
<tr>
<td>&lt;20</td>
<td>36.0</td>
</tr>
<tr>
<td>20-24</td>
<td>32.7</td>
</tr>
<tr>
<td>25-29</td>
<td>15.1</td>
</tr>
<tr>
<td>30-34</td>
<td>9.9</td>
</tr>
<tr>
<td>35-39</td>
<td>5.0</td>
</tr>
<tr>
<td>40+</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Education Mothers 25y.o.+</strong></td>
<td></td>
</tr>
<tr>
<td>No H.S. Degree</td>
<td>2.3</td>
</tr>
<tr>
<td>H.S. or GED</td>
<td>20.8</td>
</tr>
<tr>
<td>Some College</td>
<td>34.0</td>
</tr>
<tr>
<td>College Degree or Greater</td>
<td>42.9</td>
</tr>
<tr>
<td><strong>Language Preference</strong></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>99.4</td>
</tr>
<tr>
<td>Spanish</td>
<td>0.1</td>
</tr>
<tr>
<td>Other</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Hospital Size (Ave. annual # Births)</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;1000 annual deliv.</td>
<td>6.8</td>
</tr>
<tr>
<td>1000-1999</td>
<td>35.9</td>
</tr>
<tr>
<td>2000+</td>
<td>57.3</td>
</tr>
</tbody>
</table>

-- Less than 20 cases
much more likely to be college graduates and give birth in a large hospital. About one in five foreign born black mothers spoke a language other than English. In terms of primary cesarean rates, it is important to first note the overall higher cesarean rates for primiparous mothers (26.7% for U.S. born and 32.4% for foreign born). In examining the rates by age, the impact of the different age distribution becomes clear. Foreign born black mothers had lower primary cesarean rates at every age grouping, except 30-34 and there the rate was higher by only 0.5 percentage points. The overall higher cesarean rate for foreign born mothers is a function of the much larger proportion of births in age older age groups at higher risk for a cesarean (36% of foreign born mothers 30+ compared to 16.2% for U.S. born black non-Hispanic mothers). Limiting the analysis of education to mothers 25 and older results in higher cesarean rates than the overall average, with the largest difference among the relatively small number of mothers with no high school degree. Overall the analysis by nativity subgroups revealed substantially different patterns and supported the value of not only including nativity in the multivariate analysis but stratifying the analysis by nativity as well.

**Multivariate Analysis.** We organized the multivariate analysis into a series of stages with an initial calculation of an unadjusted odds ratio for the likelihood of a primary cesarean for black non-Hispanic, Hispanic and Asian PI mothers when compared to white non-Hispanic mothers. The unadjusted ratios were 1.056 (95% CI. 1.031, 1.081) for black non-Hispanic mothers, 0.740 (95% C.I. 0.725, 0.756) for Hispanic mothers and 0.902 (95% C.I. 0.879, 0.926) for Asian PI mothers. We then added in groups of variables by categories, specifically demographic variables (mothers’ age, education, parity, marital status, behavioral variables, payer source, language preference) behavioral measures (prenatal care, smoking), medical risk variables (see p. 3 for a list of these) and finally, our large sample size allowed us individual hospitals as a variable. The result was that after the addition of the demographic variables the now adjusted odds ratios for primary cesarean became higher for black non-Hispanic mothers and became greater than 1 for Hispanic mothers. The adjusted odds ratio for Asian PI mothers changed little with the addition of the demographic or any other variables to the model. The addition of the behavioral variables had little impact on the AORs for black and Hispanic mothers while the white-black differences and the white-Hispanic differences were reduced when the medical risk variables were added. The addition of the hospital had little effect. In a subanalysis looking at lower risk mothers (singleton, vertex 37-41 gestation) only the same patterns emerged only the differences were more pronounced. When limited to foreign born lower risk mothers, once again the same pattern of change occurred, but the differences in the likelihood of a primary cesarean were much greater for black non-Hispanic mothers compared to white non-Hispanic mothers.

V. Discussion and Interpretation of Findings

A. **Conclusions to be drawn from findings.**

Overall comparisons of primary cesarean rates by race/ethnicity can be misleading. Hispanic mothers have a lower overall rate and non-Hispanic black mothers only a slightly higher rate than non-Hispanic white mothers. However once demographic characteristics are added to the equation, non-Hispanic black mothers risk of a primary cesarean relative to white mothers increases and Hispanic mothers odds ratio shifts from a lower to a higher risk. The pattern for
Asian mothers closely parallels that for non-Hispanic white mothers initially and after the
multivariate analysis. When the population is limited to mothers with a pregnancy of 37-41
weeks and a singleton, vertex presentation, the differences become more pronounced. These
mothers would likely approach labor as unlikely candidates for a primary cesarean and the cause
of the larger is unclear. For native born lower risk mothers the inter-racial differences are
generally smaller, while for the foreign born lower risk mothers the differences are most
pronounced. We also found wide differences across hospitals in the likelihood of a mother
receiving a primary cesarean even after controlling for demographic, behavioral and medical risk
factors.

There appears to be factors beyond the multiple variables measured here that contribute to racial
and ethnic disparities in primary cesarean rates. We did not have a means by which we could
measure individual physician characteristics so we cannot determine if they might have played a
role in these disparities; individual hospital level data did not.

B. Explanation of study limitations

This research is subject to several limitations. We are using a combination of vital statistics (birth
certificate) and administrative (hospital discharge) data that is not as precise as an examination of
medical records. One study looking at birth certificate and hospital discharge data found
limitations in the use of birth certificate alone, but we address that by linking birth certificate and
hospital discharge datasets and using variables based on both sources for key measurements. We
also do not have a measure that may explain some of these differences – prepregnancy BMI to
identify mothers who may be obese and hence at higher risk for a cesarean. We did carefully
identify two health outcomes associated with obesity – diabetes and hypertension – and included
them in our analysis and overall and in the final multivariate models for all mothers and for each
subgroup mothers with these conditions were more likely to receive a primary cesarean than
mothers without these conditions.

C. Comparison with findings of other studies

Prior research results have been inconsistent in determining whether the race/ethnicity
differences persist when controlling for other factors. This may be the result of the diverse
settings, populations and time periods in which the studies were done. Thom (England, 1976,
hospital data), Braveman and colleagues (California, 1991, hospital discharges), Aron (Ohio, 1993-95, abstracted hospital records) and Getahun (S. California, Kaiser Permanente
records, 1991-2008) found higher cesarean rates for black mothers even after adjustment. Aron
et al. found a comparable overall cesarean rate for whites and blacks, but after adjusting for
clinical factors and insurance, found blacks to have a significantly higher cesarean rate.
Getahun found consistently higher primary cesarean rates for black mothers across the period
of 1991-2008 controlling for maternal age, education, prenatal care, smoking during pregnancy
and medical indications. However, Butcher (Louisiana, 1991-1993, Medicaid data) and
Gould (Los Angeles County, 1982-1983, birth certificate data) found higher rates for white
mothers. Some studies have also found hospital characteristics to be related to cesarean
rates. Gregory (California, 1995, hospital discharges) and colleagues examined variation in
primary cesarean rates by both patient and hospital factors and found different patient risk
profiles explaining much of the variation in cesarean rates. Most importantly, all of the above
studies except Getahun involved data from a period when the cesarean rate was substantially
lower than at present.

D. Possible application of findings to actual MCH health care delivery situations

The findings on the persistence of differences in cesarean rates by race/ethnicity suggest the need
for the MCH community to examine less measurable factors that may influence the nature of
clinical decision making related to cesarean section. In the MCH community we are typically
concerned with people from minority communities having more difficult and limited access to
care. This is one instance where the findings reveal greater access to surgery for black non-
Hispanic mothers and, to a lesser extent, Hispanic mothers. The findings also serve as a reminder
to the MCH epidemiology community to examine not only overall rates but to continually
explore what’s behind those rates. The case of Hispanic mothers having a lower overall rate may
suggest they are at less risk, but after some simple controls for demographic characteristics, we
found Hispanics to be at greater risk for a primary cesarean.

E. Policy implications

States have been reluctant to engage with the question of high cesarean rates in general terms let
alone with policy initiatives. When the U.S. experienced a decline in cesarean rates in the early
1990s it was the result of actions from private insurers (e.g. through the leveling of physician
payments for a delivery) and medical societies, such as recommendations from the American
College of Obstetricians and Gynecologists encouraging VBACs. There was little in the way of
public policy initiatives to address the issue.

F. Suggestions for further research

There is a need for qualitative research examining maternal and provider attitudes toward
cesarean sections. This study found that primary cesarean rates for the lowest risk mothers we
could identify in our data set were low (2%) overall but almost twice as high for black non-
Hispanic mothers than for white non-Hispanic mothers. The reasons why mothers might be
interested in major surgery when there’s not an identifiable medical indication or why providers
might be willing to perform or even encourage such surgery needs to be explored through
techniques more sensitive than those available in secondary data sets.

VI. List of products

- Eugene Declercq1, PhD, Mary Barger2, CNM, MPH, Howard Cabral1, PhD, Judith
  Weiss1, ScD, Milton Kotelchuck1, MPH, PhD, & Mark McLaughlin3
  Annual Maternal and Child Health Epidemiology meeting, Tampa Florida, December 10,
  2009. 1 BUSPH 2 UCSF 3 M2 Computing.

- Eugene Declercq1, PhD, Mary Barger2, CNM, MPH, Howard Cabral1, PhD, Judith
  Weiss1, ScD, Milton Kotelchuck1, MPH, PhD, & Mark McLaughlin3

- Eugene Declercq¹ PhD, Mary Barger² PhD, Candice Belanoff³ PhD, Howard Cabral¹, PhD, Hafsatou Diop³, MD, MPH, Milton Kotelchuck¹, MPH, PhD, Mark McLaughlin⁴, Judith Weiss¹, ScD, Linda Heffner⁵, MD, MPH. ¹Boston University School of Public Health; ²University of California, San Francisco; ³Massachusetts Department of Public Health; ⁴M² Computing; ⁵Boston University School of Medicine. The Persistence of Racial and Ethnic Differences in Primary Cesarean Rates, Massachusetts, 1998-2006. Paper in final preparation for submission to Obstetrics and Gynecology.

- Eugene Declercq¹ PhD, Mary Barger² PhD, Candice Belanoff³ PhD, Howard Cabral¹, PhD, Hafsatou Diop³, MD, MPH, Milton Kotelchuck¹, MPH, PhD, Mark McLaughlin⁴, Judith Weiss¹, ScD, Linda Heffner⁵, MD, MPH. ¹Boston University School of Public Health; ²University of California, San Francisco; ³Massachusetts Department of Public Health; ⁴M² Computing; ⁵Boston University School of Medicine. The Role of Method of Delivery in Reducing Disparities in Maternal Morbidities. Paper being prepared for submission to the American Journal of Public Health.

- Eugene Declercq¹ PhD, Milton Kotelchuck¹ MPH, PhD, Hafsatou Diop³, MD, MPH, Mary Barger² PhD, Candice Belanoff³ PhD, Howard Cabral¹, PhD, Mark McLaughlin⁴, Judith Weiss¹, ScD, Linda Heffner⁵, MD, MPH. ¹Boston University School of Public Health; ²University of California, San Francisco; ³Massachusetts Department of Public Health; ⁴M² Computing; ⁵Boston University School of Medicine. Racial and Ethnic Disparities in Infant Outcomes: Does Hospital and Method of Delivery Matter? Paper being prepared for submission to the Maternal and Child Health Journal.
References


