

# COMPLICATIONS OF PREGNANCY AND CHILDBIRTH

ORANGE COUNTY HEALTH CARE AGENCY  
PLANNING & RESEARCH



We examined the characteristics of maternal prenatal comorbidity and complications associated with childbirth from 2006-2008. Fully 16% of pregnant women in Orange County (OC) experienced a serious prenatal comorbidity which could have consequences on the method and subsequent complications of labor and delivery. Research has shown that increasing rates of major complications of labor and delivery are occurring in parallel with the increasing rate of cesarean delivery - which has reached 1 in 3 deliveries in OC. The present study found that mothers who had a cesarean delivery were four times more likely to have presented with or developed a major complication compared to women who had a vaginal delivery.

## PRENATAL COMORBIDITY

Sixteen percent of all pregnant women (n=23,265 of 144,584) had or developed a serious prenatal comorbidity such as gestational diabetes, early onset of labor, or preeclampsia. Gestational diabetes, the most common prenatal condition, is often due to the mother being obese. An estimated 18.5% of adult females in OC are obese with a body mass index (BMI) greater than 30. The risk of developing gestational diabetes, hypertension or other cardiovascular problems increases with BMI.

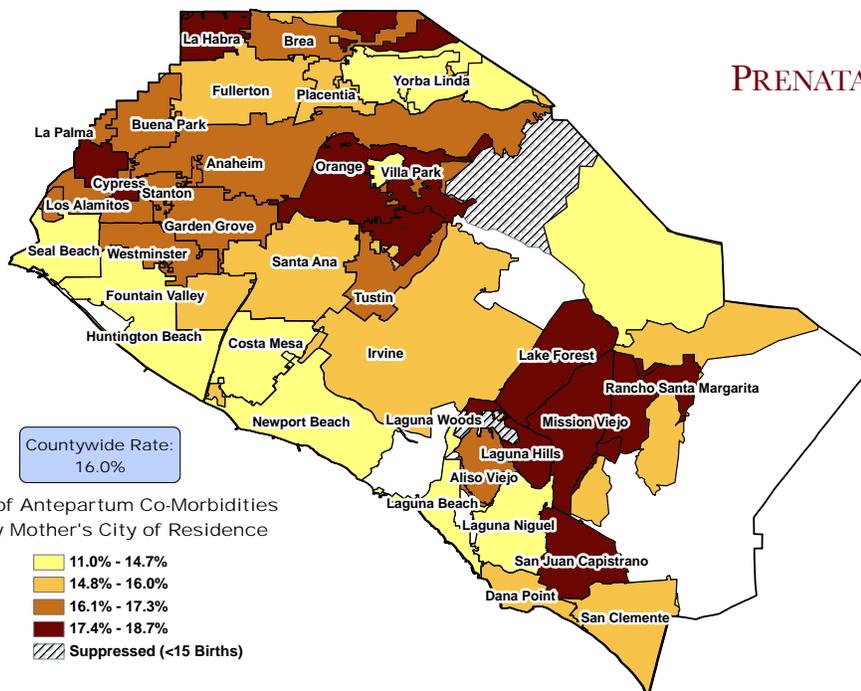
Mothers presenting with at least one prenatal comorbidity more than doubled their likelihood of having a cesarean delivery.

RISK FACTOR	N	%
Gestational Diabetes	9,321	6.4%
Early Onset of Labor	8,689	6.0%
Preeclampsia	3,321	2.3%
Pregnancy-Induced Hypertension	2,718	1.9%
Pre-Gestational Diabetes	1,064	0.7%
<b>WOMEN WITH ONE OR MORE COMORBIDITY</b>	<b>23,265</b>	<b>16%</b>

## PRENATAL COMORBIDITY BY MOTHER'S CITY OF RESIDENCE

As shown in the map at left, the lowest rates of prenatal comorbidities were found in coastal cities stretching from Seal Beach in the north to Laguna Niguel in the south.

As described in the full report, cities with lower percentages of women with prenatal comorbidities tended to have lower percentages of major complications associated with a resulting cesarean delivery ( $r^2=0.57$ ,  $p<0.01$ ).



## MAJOR COMPLICATIONS OF L&D

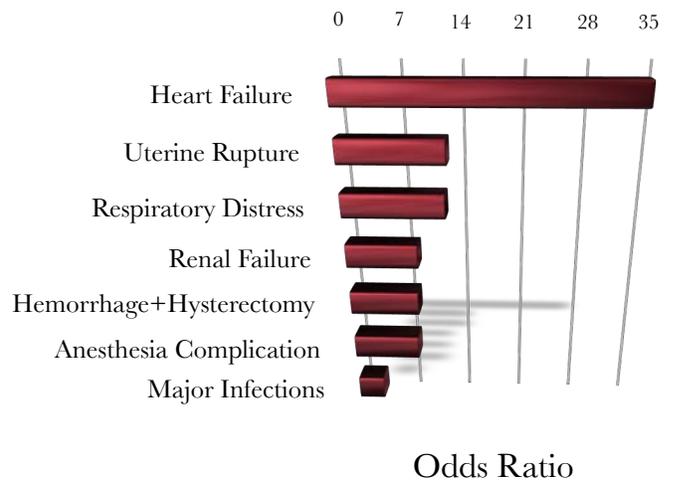
While relatively rare (1.3% or n=1,818 of 144,584 births), major complications of labor and delivery (L&D) place the health of both the mother and her baby at risk. Such cases also result in much longer hospitalizations and significantly higher charges.

An uncomplicated vaginal delivery averaged a two-day stay and \$10,980 in hospital charges. At the other extreme, a cesarean with complications averaged 5.6 days and \$40,599 in hospitalization charges. While cesarean deliveries accounted for 33.3% of births, they resulted in nearly half (48%) of all birth-related hospital charges or almost \$324 million per year in Orange County.

The most common severe complications associated with labor and delivery were major infections (0.6%, n=801), hemorrhage resulting in blood transfusion (0.3%, n=391), heart failure (0.2%, n=341), disseminated intravascular coagulation (0.1%, n=187), and hemorrhage resulting in hysterectomy (<0.1%, n=98).

Of the women who had a cesarean, 2.5% (n=1,213) presented with or developed a major complication, compared to 0.6% of mothers (n=605) who delivered vaginally. Overall, severe complications were 4.1 times more likely to be associated with a cesarean compared to a vaginal delivery.

## ODDS RATIOS OF MAJOR COMPLICATIONS



The probability of a mother presenting with or developing a major complication in cesareans was compared to vaginal deliveries. Major complications such as heart failure were 34 and uterine rupture 12 times more likely to be associated with cesarean. Renal failure was 8.6 times, and hemorrhage resulting in hysterectomy 8.4 times more often associated with cesarean compared to vaginal deliveries.

## CESAREANS BY MOTHER'S CITY OF RESIDENCE

As shown in the map, the highest percentages of cesarean deliveries were found in the coastal areas running from Seal Beach in the north to Laguna Beach in the south, and inland to Irvine and Tustin.

Importantly, despite having relatively high rates of cesarean deliveries, the coastal cities had lower rates of prenatal comorbidities and subsequent major complications associated with a cesarean. The lack of medical indicators identified in this study suggests that other non-medical factors may be responsible for the higher incidence of cesarean deliveries in these cities.

Nationally, researchers have estimated that up to 28% of all cesareans are elective and not medically indicated. Efforts to reduce prenatal comorbidities that can lead to a cesarean, as well as a reduction in elective cesareans can help improve birth outcomes, reduce the risk of maternal morbidity, and reduce costs.

