

August 2008

## Cesarean Sections in Washington State: Trends and Geographic Variations

Cesarean sections (C-sections) can be crucial in protecting the health and well-being of a mother or her baby, and should be available to every woman in need. However, there has been a growing concern nationally over the use of this procedure.<sup>1</sup>

Part of that concern is about the risks: Women having C-sections face higher risks of infections, infertility, and problems with future pregnancies; and, their babies face higher risks of respiratory problems and asthma.<sup>2</sup> Part of the concern is about costs: For the US in general, a C-section costs about \$5,000 more than a vaginal delivery.<sup>3</sup>

Adding to these concerns is the increasing rate with which women are having C-sections in lieu of vaginal deliveries. From 1996 to 2003, C-sections increased by a third among those US women deemed as "low risk" for needing this procedure.<sup>3</sup>

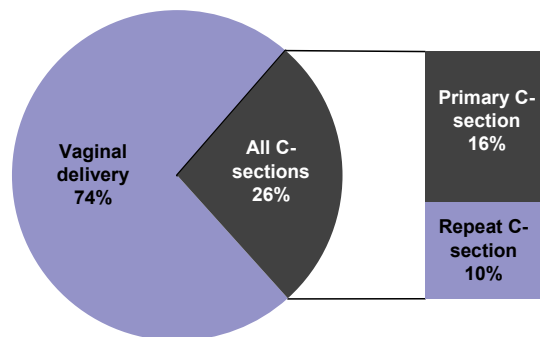
These concerns and trends have prompted us to look into what's happening in Washington.

Using birth certificate and inpatient hospitalization data collected by the Center for Health Statistics, this issue of *Data Findings* provides a brief overview of C-sections statewide, describes the trends among low-risk women, assesses known risk factors, and identifies geographic variations within the state.

### STATEWIDE OVERVIEW

Each year around 21,800 Washington women deliver via C-section. This is approximately a fourth (26 percent) of all the births in the state. About 13,300 of these deliveries are first time or primary C-sections, and about 8,500 are repeat C-sections. (See Figure 1)

Figure 1: Washington births by method of delivery, 2003-2005 combined



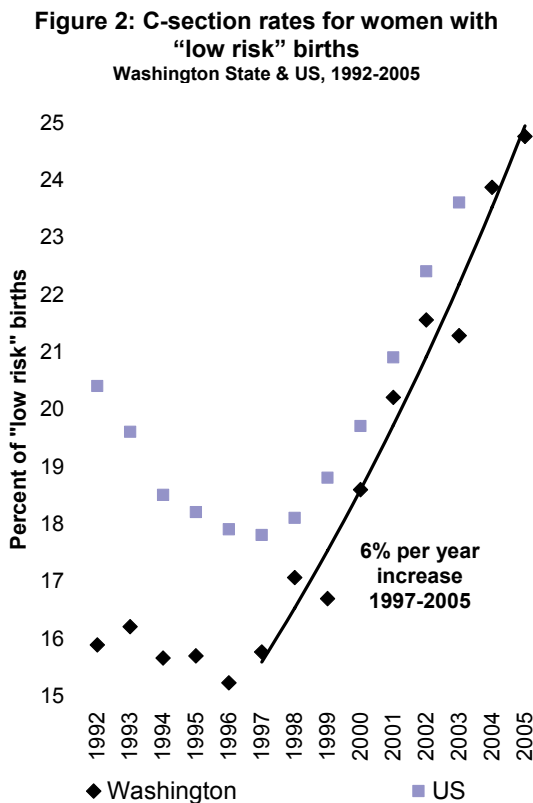
Because of medical and legal concerns, a woman who has had a C-section is more likely to have another C-section for any subsequent birth. In 2005, for instance, more than 85 percent of pregnant women in Washington who had had a C-section in the past delivered via C-section again. Minimizing the number of nonessential primary C-sections would help to limit the number of repeat C-sections.

## TRENDS OVER TIME

The U.S. Department of Health and Human Services has set a number of public health objectives for the nation in the report, *Healthy People 2010* (HP2010), including one for C-sections.

HP2010 defines “low risk” births as first time mothers having a single child that’s positioned head down in the womb. It sets as a goal that no more than 15 percent of these “low risk” births should be C-section deliveries.<sup>1</sup>

From 1990 to 2005, the lowest C-section rate among “low risk” births in Washington was in 1996 (17 percent). In 1997, the rate of “low risk” C-section births began increasing by 6 percent per year. In 2005, nearly 25 percent of Washington’s “low risk” births were C-sections — a 60 percent increase in nine years and about 2,600 more “low risk” C-sections than the HP2010 goal.

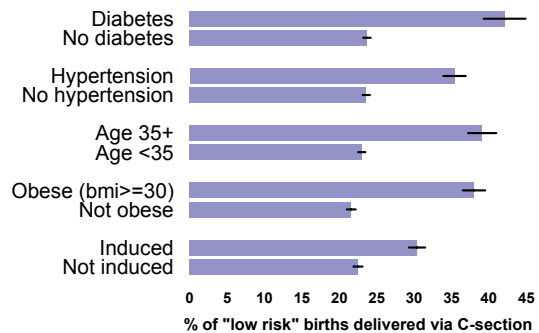


## RISK FACTORS

Multiple births or breech presentations are, of course, most likely to be C-section deliveries; however, we found that “low risk” mothers who are older, obese, have hypertension, diabetes, and/or induced labor are also more apt to have C-sections.

In 2005, the C-section rate for “low risk” women with diabetes was 42 percent; for those without diabetes it was 24 percent. In other categories, those with hypertension, 35%; without, 24%. Age 35 or older, 39%; less than 35, 23%. Obese, 38%; not obese, 22%. Induced, 30%; not induced, 22%. For each factor, the differences were statistically significant. (See Figure 3)

**Figure 3: C-section rates by characteristics of women with “low-risk” births**  
Washington State, 2005



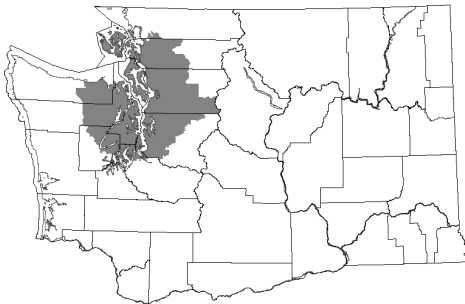
## GEOGRAPHIC VARIATIONS

We identified regions with higher than expected C-section rates using the ZIP code of the mother’s residence – *not the location of the hospital*.

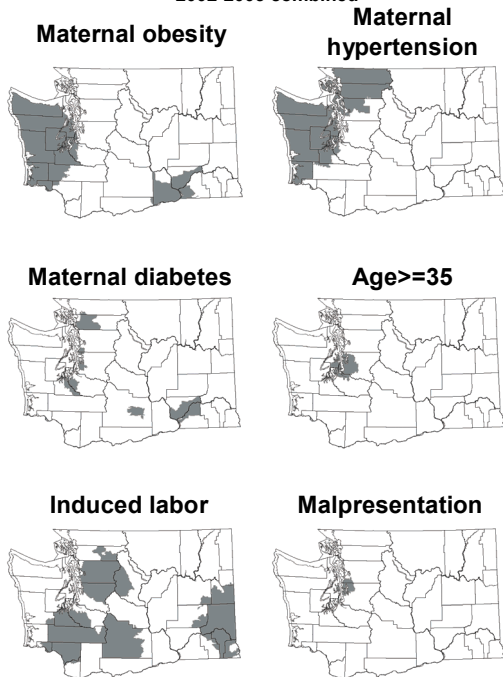
To identify these areas, we used disease cluster identification software<sup>4</sup> with hospital discharge data from all Washington community hospitals, Madigan Army Medical Center, Bremerton Navy Hospital, and all community hospitals in Oregon. By using these data sets, we accounted for nearly all hospital-based births by Washington residents.

We began by identifying regions with higher than expected primary C-sections for singleton births from 2002 through 2005. For each year assessed, and for all years combined, women living in the central Puget Sound region had higher than expected primary C-section rates compared to the rest of the state. (See Figure 4a)

**Figure 4a:**  
**Region with higher than expected primary C-section rates**  
 2002-2005 combined



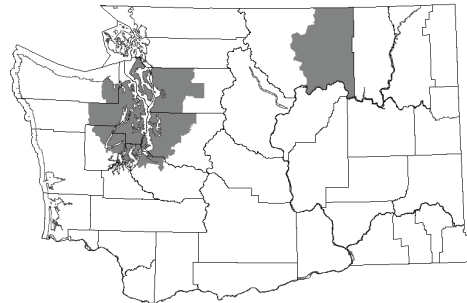
**Figure 4b:**  
**Regions with higher than expected risk factors for C-sections**  
 2002-2005 combined



Next, using all births (vaginal and C-sections combined) we identified regions with higher than expected risk factors for C-sections: obesity, hypertension, diabetes, age $\geq$ 35, induced labor, and malpresentation (e.g., breeched). (See Figure 4b)

Some regions had consistently higher than expected risk-factors: obesity in the southwest region; hypertension in western Snohomish, Skagit and Whatcom Counties; induced labor in portions of Thurston, Lewis, Cowlitz, King, and Snohomish Counties; and, malpresentation in the Lake Washington area.

**Figure 5:**  
**Regions with higher than expected primary C-section rates**  
*Excluding obesity, hypertension, diabetes, age $>$ 35, induced labor and malpresentation*  
 2002-2005 combined



We then excluded all cases in which the mother had any of these six risk factors, and re-ran the C-section cluster analysis with the remaining cases. As Figure 5 shows, the central Puget Sound region still had significantly more C-sections than expected (RR=1.1;  $p<0.001$ ).

More specifically, women living in this region, giving birth to a single child, having no prior C-sections and none of the six identified risk factors, had about **275 more C-sections per year** than would have been expected when compared to women with those same characteristics living outside this central Puget Sound region.

A region in north central Washington also had higher than expected rates after excluding those cases with any of the six risk factors. However, unlike the persistent pattern seen in the Puget Sound region, this region only showed elevated rates for 2003 and for 2002-2005 combined. On average, this region had about 12 more C-sections per year than would have been expected (RR=1.6; p<0.001).

### **LIMITATIONS**

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Like any study based on routinely collected administrative data – as opposed to studies using specially collected clinical data – there are limitations. The birth certificate may identify C-section deliveries but it does not collect all the information on why a C-section might be done. And the “method of delivery” in both birth and hospital discharge data relate only to the final

method of delivery, which may be quite different from the method initially chosen by the mother or her health care provider.

### **NEXT STEPS**

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Some of the rising C-section rates are likely related to the increasing incidence of conditions such as obesity and diabetes. However, even when assessing women without any of these conditions, certain areas of the state still have high rates.

Various advisory committees and state programs have reviewed and discussed these findings. In identifying these regions and the trends our intent is to give health care professionals, policy makers, and the public a population-based analysis that adds to the overall discussion on the potential causes and consequences of these practice patterns.

**Contacts: Pat Starzyk, PhD 360.236.4323**  
**Joe Campo, MPH 360.236.4321**

### **End notes**

- (1) Menacker F. Trends in Cesarean Rates for First Births and Repeat Cesarean Rates for Low-Risk Women: United States, 1990-2003. National vital statistics reports; vol 54 no 4. Hyattsville MD: National Center for Health Statistics, 2005.
- (2) Vaginal Birth and Cesarean Birth: How Do the Risks Compare? New York, NY: Maternity Center Association, 2004
- (3) US Agency for Healthcare Research and Quality, HCUPNet, Health Care Cost and Utilization Project, Rockville, MD. Available at [http://hcupnet.ahrq.gov/\[DRGs 370-373\]](http://hcupnet.ahrq.gov/[DRGs 370-373]).
- (4) Kulldorff M. and Information Management Services, Inc. SaTScan™ v5.1: Software for the spatial and space-time scan statistics. <http://www.satscan.org/>, 2004. Note: SaTScan™ is a trademark of Martin Kulldorff. The SaTScan™ software was developed under the joint auspices of Martin Kulldorff, of the National Cancer Institute and of Farzad Mostashari at the New York City Department of Health and Mental Hygiene