





HealthGrades Quality Study



First-Time Preplanned and
"Patient Choice" Cesarean
Section Rates in the United
States



July 2003



HEALTHGRADES®
THE HEALTHCARE QUALITY EXPERTS®



First Time Preplanned and “Patient Choice” Cesarean Section Rates in the United States

**Study Released by Health Grades, Inc.
July 2003**

Introduction

Despite the fact that cesarean section is a major surgery that has its own immediate and long-term risk to the mother and fetus, the rate of this procedure has continued to rise and varies widely from hospital to hospital. Overall C-section rates dipped between 1985 and 1995, but have been increasing since. Since 1995, rates have increased by 25.4%, from a 1995 reported rate of 20.8% to 26.1% in 2002 (Centers for Disease Control and Prevention, National Center for Health Statistics: National Vital Statistics Systems). As part of this study, HealthGrades also examined the rate of “Patient Choice” C-sections, or C-sections that may have been performed without clinical indication. From 1999 to 2001, the rate increased by almost 20%—from 1.56% to 1.87% of all deliveries.

National interest in cesarean rates stem from a wide array of national organizations that monitor healthcare quality including the following:

- National Institutes of Health (NIH)
- Department of Health and Human Services (DHHS)
- National Committee for Quality Assurance (NCQA)
- American College of Obstetricians and Gynecologists (ACOG)
- Joint Commission on the Accreditation of Healthcare Organizations (JCAHO)

These organizations, policy makers and health care advocates are very concerned about the wide variation in cesarean delivery rates based on clinical and non-clinical factors. Third-party payers, health system accrediting bodies such as NCQA and JCAHO, and national medical organizations such as ACOG have been monitoring cesarean rates as a measure of hospital performance and as a measure of maternal health care quality.

This monitoring is controversial among some experts because it occurs without a consensus on the ideal cesarean section rate. Healthy People 2000 from DHHS proposed a benchmark overall cesarean rate of 15%. Due to severe criticism from experts who claimed that this rate inadequately addressed case mix or patient safety, DHHS revised Healthy People 2010 to focus on reducing the national rate of first time cesarean, low-risk patients (“low-risk” equals a low likelihood of requiring C-section, e.g. full-term, singleton, vertex position) to 15.5%. This revised focus suggests there may be a subgroup of patients for whom C-section may not be clinically indicated. Multiple studies have documented significant variation in C-section rates, and experts have hypothesized that much of the variation may be attributed, at least in part, to this subgroup of “soft call” or patient choice cesarean sections.

Despite the revision of the Healthy People 2010 C-section rate focus from overall to low-risk patients, much controversy still exists regarding the appropriate medical indications for unplanned C-sections. However, most experts agree on the appropriate clinical indications for preplanned, first time C-sections. Because likely consensus could occur, in contrast to other C-section groups, some experts recommend initially focusing on this preplanned, first time C-section group to define normative benchmark rates and to identify C-sections that may not have been medically necessary.

Gregory and Korst (*Health Services Research* October 2002), two leading experts on this subject, designed a retrospective population-based study. They used 1995 California state data from the Office of Statewide Health Planning and Development (OSHPD) to assess normative rates and potentially unnecessary C-sections in the preplanned, first time C-section patients. They were able to identify 12 clinical indications that predicted for appropriate cesarean section in this group. Of all first time cesarean sections performed in California in 1995, Gregory and Korst determined the rate of preplanned first time cesarean sections was 4.27%.

In the Gregory et al. study, approximately 7% of all preplanned first time C-section patients (7% of the 4.27%) had none of the 12 clinical indicators that predicted appropriate C-section. The study authors hypothesized that this group represents a growing group of patient choice cesarean sections that may not have any medical indication.

Summary of Findings

A preplanned first time cesarean section is a C-section performed on a woman who has not labored and has no prior history of C-section. HealthGrades studied the rate of women who underwent a preplanned first time cesarean section at 1,920 hospitals in 18 states.

We developed a risk-adjustment model for preplanned first time cesarean section based on Gregory et al.'s methodology presented in *Health Services Research* October 2002. For each of the 1,920 hospitals, HealthGrades compared the actual number of patients who underwent a preplanned first time cesarean section with the expected number of patients who had clinically appropriate indications for a cesarean section. The difference between the two numbers at each hospital was tested for statistical significance using a 95% confidence interval. Nearly 47% of hospitals performed the expected number of clinically appropriate preplanned first time cesarean sections while 24% of hospitals performed more preplanned first time cesarean sections than expected and 29% of hospitals performed fewer than expected.

The HealthGrades study also found that 22.15% of first time preplanned C-sections (22.15% of 7.7%) had none of the 12 clinical indicators identified by Gregory et al. that predicted appropriate C-section. This represents a total of 1.72% of all deliveries in women with no history of C-section during 1999-2001, or approximately 61,667 patient choice C-sections nationwide.

Data Acquisition

HealthGrades purchased the initial patient level data from each individual state. The data represent three years of discharges. These data were chosen because they represent all discharges for the associated states. The 18 states were as follows:

Arizona	New Jersey
California	New York
Iowa	Pennsylvania
Florida	Texas
Massachusetts	Utah
Maine	Virginia
Maryland	Vermont
North Carolina	Washington
Nevada	Wisconsin

Data Analysis

A preplanned first time cesarean section was defined as a woman who received a cesarean section with no labor prior to delivery and who had never had a previous cesarean section. Women with both single and multiple live-born deliveries were considered.

Identifying the actual number of patients as a preplanned first time cesarean section took place in three steps:

- (1) All patients with cesarean section as a procedure were identified
- (2) Patients who had a previous cesarean section were removed
- (3) Patients who had labored were removed

Preplanned first time cesarean section was risk-adjusted using a model based on Gregory et al.'s methodology presented in *Health Services Research* October 2002. Gregory et al. concluded that normative rates could be calculated for specific indications of cesarean delivery.

The risk-adjustment methodology used by HealthGrades utilized 12 clinical conditions as predictors for cesarean section delivery. These indicators were:

- Malpresentation
- Antepartum bleed
- Herpes
- Severe hypertension
- Other uterine scar
- Multiple gestation
- Macrosomia
- Unengaged fetal head

- Maternal soft tissue disorder
- Hypertension, other
- Preterm gestation
- Fetal congenital anomaly

Analyzing the preplanned first time cesarean section outcomes involved three steps. First, the expected value was obtained by calculating the number of first time cesarean section patients who had any of the predictors for a preplanned cesarean section. Second, the expected value was compared to the actual (observed) number of first time cesarean section patients. Third, a test was conducted to determine whether the difference between the expected and the actual value was statistically significant at 95%. This test was performed to ensure that differences were very unlikely to be caused by chance alone.

Hospitals with less than 30 obstetric cases (vaginal and cesarean section deliveries) for the three-year period were excluded from the analysis. Patients with stillborn deliveries were also excluded.

Findings

The HealthGrades preplanned first time cesarean section rate for all 18 states was 7.71%, compared to Gregory et al.'s findings of 4.27%. We believe that the HealthGrades' rate is higher because it was determined by:

- 1) Evaluating 18 states' data, rather than one (California's OSHPD) in which there was and still is a high level of managed care/HMO's that has been correlated with lower cesarean rates
- 2) Evaluating more current data (1999-2001). This time period likely represents declining managed care pressures across the country possibly resulting in more "soft-call" indications for preplanned first time cesareans

The c-statistic (area under the ROC curve) for the risk adjustment model was .8393. A c-statistic above .8 indicates a risk adjustment model that is "very good" at explaining the variation between hospitals. The 12 clinically appropriate indicators or predictors for appropriate preplanned first time cesarean section had a similar odds ratio with Gregory et al.'s study.

The testing of the statistical significance (95% confidence interval) between the actual number of first time cesarean sections and the expected number of first time cesarean section yielded the following results:

- 46.61% of the hospitals performed as expected
- 24.32% of the hospitals performed more than expected
- 29.06% of the hospitals performed less than expected

To quantify patient choice C-sections, HealthGrades identified deliveries in which the woman had no previous history of C-section and did not labor (preplanned first time C-section) and in which none of the 12 clinical indicators identified by Gregory et al. were

present. The study found 1.72% of all deliveries in women with no history of C-section, or 22.15% of first time preplanned C-sections (22.15% of 7.7%), may be patient choice C-sections. This represents approximately 61,667 patient choice C-sections nationwide from 1999-2001.

The HealthGrades study found that the rate of patient choice C-sections is rising, from 1.57% in 1999 to 1.87% in 2001. There is also substantial variation in the rate of patient choice C-sections by state. See Appendix A for data by state. At the individual hospital level, the rate of patient choice C-sections ranges from 0% to 7.75

Interpretation of Results

There has been significant attention in the United States to the idea that too many C-sections are being performed in this country. Many health care quality organizations have a goal to reduce the number of C-sections nationwide. We found that 24.32% of the hospitals studied are doing more preplanned first time C-sections that would be expected given the clinical characteristics of their patients. This may represent a growing demand for patient choice cesareans, where there is no medical indication for the cesarean, and validates Gregory et al.'s findings in California's OSHPD 1995 database. Until now, no organization to date has identified a national patient choice rate.

There is much debate and controversy in the obstetrics literature regarding the appropriateness, risks vs. benefits, and ethics of patient choice cesareans. Some obstetricians see C-section deliveries as a treatment choice and support giving women the right to choose a C-section delivery or a vaginal delivery. In general, C-section deliveries have more risk to the mother and fetus (e.g., fetal respiratory distress syndrome, post-operative hemorrhage or infection, complications from anesthesia, maternal death, and direct injury to fetus) than vaginal deliveries. There is, however, mixed evidence that the long-term risk of vaginal deliveries, such as urinary and fecal incontinence, is greater than that of C-sections. A C-section delivery (including care for both mother and baby) is generally 2.5 times more expensive than a vaginal delivery. More research is required to do an adequate benefit-risk analysis and to compare the short and long term cost effectiveness of C-section versus vaginal delivery.

Our finding that 29% of hospitals are doing fewer preplanned first time C-sections than expected based on the clinical characteristics of their patients may be surprising. This change may be reflective of the pressures placed on the hospital by the aforementioned national organizations that are advocating for reducing cesarean rates. Unfortunately, HealthGrades identified an association with higher vaginal complication rates in those hospitals that did fewer than expected preplanned cesarean sections:

Performance	Vaginal Complication Rate
As expected	13.06%
Less than expected	13.83%
More than expected	10.91%

Differences are statistically significant.

This finding is suggestive of, but not definitive of, inappropriate under-utilization of preplanned first time C-sections in those hospitals. This initial finding is significant, especially if it is correlated with pressure from national organizations to reduce C-section rates. Under-utilization of medically indicated C-sections may be related to poorer maternal outcome and thus hospital quality, which is counterproductive to the goals of a lowered national primary cesarean rate. Further studies will be needed to validate a correlation between under utilization and higher complication rates.

Appendix A – Patient Choice C-Section Rates

State	Year	Patient Choice C-Section Rate By Year	Patient Choice C-Section Rate (1999-2001)	1999-2001 Change
AZ	1999	1.24%	1.15%	26.61%
AZ	2000	0.64%		
AZ	2001	1.57%		
CA	1999	1.40%	1.49%	12.86%
CA	2000	1.49%		
CA	2001	1.58%		
FL	1999	1.84%	2.04%	20.11%
FL	2000	2.06%		
FL	2001	2.21%		
IA	1999	1.37%	1.47%	13.87%
IA	2000	1.47%		
IA	2001	1.56%		
MA	1999	1.55%	1.73%	20.00%
MA	2000	1.78%		
MA	2001	1.86%		
MD	1999	1.80%	1.74%	-2.22%
MD	2000	1.66%		
MD	2001	1.76%		
ME	1999	1.55%	1.45%	-9.68%
ME	2000	1.39%		
ME	2001	1.40%		
NC	1999	1.56%	1.76%	21.15%
NC	2000	1.83%		
NC	2001	1.89%		
NJ	1999	1.74%	2.00%	22.99%
NJ	2000	2.11%		
NJ	2001	2.14%		
NV	1999	1.85%	1.88%	4.86%
NV	2000	1.86%		
NV	2001	1.94%		
NY	1999	1.91%	2.24%	29.32%
NY	2000	2.32%		
NY	2001	2.47%		
PA	1999	1.38%	1.60%	31.16%
PA	2000	1.62%		
PA	2001	1.81%		
TX	1999	1.85%	2.03%	16.76%
TX	2000	2.08%		
TX	2001	2.16%		
UT	1999	0.75%	0.88%	40.00%
UT	2000	0.85%		
UT	2001	1.05%		

State	Year	Patient Choice C-Section Rate – By Year	Patient Choice C-Section Rate (1999-2001)	1999-2001 Change
VA	1999	1.59%	1.79%	24.53%
VA	2000	1.81%		
VA	2001	1.98%		
VT	1999	0.91%	0.98%	35.16%
VT	2000	0.80%		
VT	2001	1.23%		
WA	1999	0.96%	1.08%	19.79%
WA	2000	1.14%		
WA	2001	1.15%		
WI	1999	1.00%	1.02%	4.00%
WI	2000	1.02%		
WI	2001	1.04%		

State	Patient Choice C-Section Rate (1999-2001) Rank Order
NY	2.24%
FL	2.04%
TX	2.03%
NJ	2.00%
NV	1.88%
VA	1.79%
NC	1.76%
MD	1.74%
MA	1.73%
PA	1.60%
CA	1.49%
IA	1.47%
ME	1.45%
AZ	1.15%
WA	1.08%
WI	1.02%
VT	0.98%
UT	0.88%