

## Variability and Consistency of Rates of Primary and Repeat Cesarean Sections Among Hospitals in Two States

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### Synopsis .....

*Hospitals in New York and Illinois have wide variations in their primary and repeat cesarean section rates. A number of factors account for these differences. To investigate whether hospitals with higher or lower rates tend to continue these*

*patterns over time, their rates in 1988 were compared with those in 1983.*

*It was found that a hospital's cesarean section rate was consistent, but some regression to the mean process did occur. By 1988, teaching hospitals had lower rates than nonteaching hospitals; this difference is likely due to the greater response to calls for increasing trials of vaginal birth after a previous cesarean section by teaching hospitals. Over time this should contribute to further moderating of the rates. Data were from the Illinois and New York State Departments of Health.*

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**R**ECENT EVIDENCE suggests that the rising cesarean section rate has leveled off. There was no statistically significant change between 1986 and 1989 (1). However, nationwide averages aggregate the experience of individual hospitals and physicians. In terms of future trends, understanding how these may change over time is essential. In addition, hospitals are concerned when their rates are noticeably different from the averages. If this deviation occurs, the issue of whether this is a one-time aberration or a clear trend is of interest.

In this paper, I compare cesarean section rates (broken into primary and repeat) in individual Illinois and New York hospitals for 1983 and 1988. These States were chosen due to the availability of data. I will explore whether hospitals experiencing higher (or lower) rates in 1983 are the same ones with higher (or lower) rates in 1988, or whether regression to the mean occurs. Experience in teaching hospitals, which would be a leading indicator of future trends, will be noted.

### Methods

Included in the samples are all hospitals with at least 100 deliveries in both 1983 and 1988 for Illinois and for New York State—outside of New York City. These samples accounted for more than 96 percent of all hospital births in each State.

Hospitals with fewer deliveries were excluded since their rates would be much more variable. Unpublished data on births and method of delivery in individual hospitals were obtained from the Illinois Department of Public Health for both years along with statewide totals (2,3). New York State Department of Health provided similar figures by hospital for 1983 (4) and unpublished data for 1988. Information on VBAC (vaginal births after previous cesarean) rates were not available.

### Results

As shown in table 1, both States had increases in primary and repeat cesareans from 1983 to 1988. This paralleled national trends for the same period, when the primary rate increased from 14.3 to 17.5 percent; repeat rates rose from 6.0 to 7.2 percent (1,5). The figures for individual hospitals were quite varied. Differences in primary and repeat cesarean rates between individual hospitals of up to 30 percent are evident.

For table 2, hospitals in each State were rank ordered based on their 1983 primary cesarean section rates. Based on the rank, hospitals were divided into three equal sized groups (lowest, middle, and highest rates). While the one-third with the lowest rates had fewer deliveries, there was no clear size relationship for the higher rate groups.

The one-third with the lowest primary rates in 1983 had the lowest repeat rates in 1983; they also had the lowest 1988 primary or repeat rates. The middle and highest one-third groupings in 1983 kept their respective positions in 1988 as well.

Using a hospital's numerical rank (1 for the lowest rate) based on its cesarean section rate in 1983 and again in 1988, the average rank for each group was calculated. By this measure, some narrowing of the differences between each group was evident. For example, the average rank for the one-third of hospitals with the lowest primary cesarean section rate in 1983 rose from 27 in

Table 1. Cesarean section rates (percent) in Illinois and New York hospitals, 1983 and 1988

Year	Statewide cesarean section rate		Range of rates among hospitals <sup>1</sup>	
	Primary	Repeat	Primary	Repeat
<i>Illinois</i>				
1983	11.2	7.6	1.5-23.6	1.0-16.7
1988	14.1	9.2	6.8-23.3	3.6-18.8
<i>New York</i>				
1983	12.9	8.5	4.3-30.7	1.7-18.1
1988	15.6	10.8	3.8-33.3	4.9-23.7

<sup>1</sup> For hospitals with at least 100 deliveries in 1983 and 1988 (N = 159 in Illinois, N = 129 in New York).

Table 2. Hospital cesarean section rates (percent) and ranks based on 1983 primary rates

Group	1983 Mean births	1983 Primary rate	1983 Repeat rate	1988 Primary rate	1988 Repeat rate	Average rank	
						1983 Primary	1988 Primary
<i>Illinois (N = 159)</i>							
Lowest third	861	8.0	6.7	11.9	8.2	27	52
Middle third	1,187	10.6	7.5	13.6	8.6	80	85
Highest third	1,095	14.4	8.4	16.2	10.5	133	103
<i>New York (N = 129)</i>							
Lowest third	763	8.6	6.2	12.9	8.6	22	43
Middle third	1,040	12.1	8.4	15.6	10.5	65	71
Highest third	1,298	16.1	10.0	17.2	12.2	108	81

Table 3. Teaching and nonteaching hospital cesarean section rates (percent) and ranks

State and type	1988 Mean births	1983 Primary rate	1988 Primary rate	1983 Repeat rate	1988 Repeat rate	Average rank			
						1983 Primary	1988 Primary	1983 Repeat	1988 Repeat
19 Illinois teaching hospitals	2,792	11.2	13.1	7.3	7.8	86	67	89	55
140 Illinois nonteaching hospitals	867	11.2	14.5	7.7	9.8	79	82	79	83
12 New York teaching hospitals	2,924	13.6	14.3	9.0	9.4	78	54	82	50
117 New York nonteaching hospitals	940	12.7	16.1	8.4	11.3	64	66	63	67

Illinois (22 in New York) to 52 (43 in New York) in 1988. The average rank for the one-third of hospitals with the highest primary cesarean section rate in 1983 fell from 133 in Illinois (108 in New York) to 103 (81 in New York) in 1988. Similar results occurred if the rankings were based on the 1983 repeat cesarean section rate.

Whether teaching hospitals' cesarean section rates differed from nonteaching ones was also investigated. Nineteen Illinois and 12 New York hospitals in the sample were members of the

Council of Teaching Hospitals of the Association of American Medical Colleges (6). The results are presented in table 3. In Illinois, the 1983 cesarean rates were similar for the two groups; by 1988, the primary and repeat rates in teaching hospitals were noticeably lower than in nonteaching hospitals. This difference is also reflected in the decrease in average rank for teaching hospitals on both measures (primary, repeat) from 1983 to 1988. Teaching hospitals in New York State had slightly higher cesarean rates in 1983 than non-

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teaching hospitals, but much lower rates and average ranks by 1988.

## Discussion

The variability in cesarean section rates among hospitals is due to a number of factors. Circumstances surrounding the method of birth in each individual case are idiosyncratic. At an aggregate level, a number of variables that have been offered to explain the rise in cesarean section rates through the late-1980s would also explain rate differences among hospitals (1). These include differences in mothers presenting (age, complications), hospital and physician protocol (policy regarding VBAC, use of electronic fetal monitors, fear of malpractice suits, or practice of defensive medicine), and economic (hospital ownership, patient payment source).

Hospitals with higher primary or repeat cesarean section rates in 1983 also tended to have higher rates in 1988. The equivalent observation holds true for those with lower or middle rates in 1983. However, some regression to the mean has occurred. That is, the difference in rates between the higher and lower rate hospitals has narrowed.

Hospitals with fewer deliveries had lower cesarean section rates. This may reflect the transferring of more complicated cases that would be more likely to involve a cesarean section to larger hospitals.

By 1988, teaching hospitals had noticeably lower primary and repeat cesarean section rates. The diffusion of new technology, procedures, and practice would start here and takes time. This augers well for future direction of cesarean section rates. It may also explain the still high levels of repeat

cesareans (more than 35 percent of total cesareans in 1989) despite calls by the American College of Obstetricians and Gynecologists for the use of trial of vaginal birth after a previous cesarean section in 1982, 1985, and again in 1988 (1).

## References.....

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