Cesarean Section Use and Source of Payment: An Analysis of California Hospital Discharge Abstracts

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Abstract: This study assessed the relation between payment source and cesarean section use by analyzing California data on hospital deliveries. Of 461,066 deliveries in 1986, cesarean sections were performed in 24.4 percent. Women with private insurance had the highest cesarean section rates (29.1 percent). Successively lower rates were observed for women covered by non-Kaiser health maintenance organizations (26.8 percent), Medi-Cal (22.9 percent), Kaiser (19.7 percent), self-pay (19.3 percent), and Indigent Services (15.6 percent). Vaginal birth after cesarean (VBAC) occurred more than twice as frequently in women covered by Kaiser (19.9 percent) and Indigent Services (24.8 percent), compared to those with private insurance (8.1 percent). Sizable, although less pronounced, associations between payment source and cesarean section use were noted for the indications of breech presentation, dystocia, and fetal distress. Accounting for maternal age and race/ethnicity did not alter these findings. Variations in the use of cesarean section have a substantial financial impact on health care payors. (*Am J Public Health* 1990; 80:313–315.)

Introduction

Medical care decisions are influenced by non-clinical factors, such as health care financing.[1–3] Cesarean section is the most common hospital surgical procedure in the United States,[4] accounting for 24.4 percent of all deliveries in 1987.* The quadrupling of US cesarean section rates in the past 15 years has led to concerns regarding maternal and perinatal outcome, as well as health care costs.[5]

Past studies suggest that women covered by private insurance have the highest cesarean section rates.[6–8] Women covered by Medicaid, those covered by health maintenance organizations (HMOs) and those without a source of payment (self-pay) have lower C-section rates. Lower C-section rates also are observed for teaching hospitals,[9] public hospitals,[6,8] and salaried physicians.[10] Unfortunately, past research has not controlled adequately for the population characteristics (case-mix) of different payors or organizational settings.

This report investigates the relationship between hospital payment source and the use of cesarean section by employing 1986 discharge abstract data from California hospital deliveries.

Methods

Hospital Discharge Data

The Office of Statewide Health Planning and Development collects information on every non-military hospital discharge in California;[11] data for 1986 included 461,066 hospital deliveries.

Cesarean section use was determined via ICD-9-CM procedure codes. Initial categories for expected source of payment for hospitalization were combined into seven distinct payment methods: Private Insurance (Blue Cross/Blue Shield and other private insurance), Kaiser Permanente, Other (non-Kaiser) HMOs, Medi-Cal (the California Medicaid program), Self-Pay, Medically Indigent Services, and Other Payors. Women with HMO coverage delivering in Kaiser Hospitals were assigned to Kaiser Permanente, all other HMO deliveries were assigned to Other HMOs.

Diagnostic information was available as ICD-9-CM codes. A standard and widely employed hierarchy of mutually exclusive diagnoses which accompany cesarean section was adopted for this study.[12,13] From highest to lowest priority, these were: previous cesarean section (ICD-9-CM 654.2), breech presentation (652.2 and 669.6), dystocia (653 and 660-662, except 661.3), fetal distress (656.3), and all other diagnoses (remaining codes in 642-663, and 669, except 669.1-669.5).[12,13] When more than one diagnosis was present for a delivery, the highest priority diagnoses was assigned regardless of its order on the discharge abstract. Maternal age was defined in five-year categories (<20, 20–24, 25–29, 30–34, 35+). Five race/ethnicity categories were employed: White, Black, Hispanic, Asian and Others/Unknown.

Statistical Methods

Cesarean section rates by payment source for individual primary indications were calculated. Confidence intervals were calculated for the cesarean section rates of each payor. Payors whose confidence intervals do not overlap can be considered different at a level of $p < 0.05$, after accounting for multiple comparisons between payors.[14]

To assess the constancy of the relation between payment source and cesarean section rates, the sample was simultaneously stratified by accompanying diagnoses, maternal age, and race/ethnicity. To further validate the findings derived from the above methods, logistic regression analysis was employed to simultaneously estimate the independent effects of payment source, accompanying diagnoses, maternal age, and race/ethnicity. The results of this analysis closely agreed with those from the tabular analysis (details available upon request to author).

Results

In 1986, 112,730 cesarean sections were performed in California hospitals, a cesarean section rate of 24.4 percent. Private Insurance (35 percent) and Medi-Cal (27 percent) were the dominant payors for hospital deliveries (Table 1).

Cesarean section rates varied widely by payment source. Women covered by Private Insurance had the highest cesarean section rates (29.1 percent) (Table 1). Indigent women had the lowest cesarean section rates, with only 15.6 percent being delivered abdominally.

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TABLE 1—Cesarean Section Rates by Payment Source, Hospital Deliveries, California, 1986

Payment Source	Total Deliveries	Percentage of all Deliveries	C-Section Rate (95% CI)
Private Insurance*	161,847	35.1	29.1 (28.8, 29.4)
Other HMOs	46,034	10.0	26.8 (26.3, 27.4)
Medi-Cal	122,792	26.6	22.9 (22.6, 23.2)
Kaiser Permanente	51,589	11.1	19.7 (19.2, 20.1)
Self-Pay	49,292	10.7	19.3 (18.8, 19.8)
Indigent Services	10,322	2.2	15.6 (14.6, 16.5)
Other Payors**	19,190	4.2	20.2 (19.5, 21.0)
Total	461,066	100.0	24.4 (24.3, 24.6)

*Includes Blue Cross/Blue Shield and Other Private Insurance.
**Includes Medicare (658 deliveries), Workers' Compensation (104), Title V (208), Other Governmental Payors (13,220), Other Non-governmental Payors (3,709), and No Charge (1,292).

Repeat cesarean sections accounted for 36 percent of all cesareans (Table 2). Large payor differences were observed in women with previous cesarean sections, with an ordering of payors similar to that for all indications (Table 3). Repeat cesarean section rates varied from 91.9 percent for Private Insurance to 75.2 percent for Indigent Services, the rate of vaginal birth after cesarean (VBAC) in indigent women (24.8 percent) was three times that in women with Private Insurance (8.1 percent).

Cesarean section for breech presentation exhibited a distinct pattern by payor. Kaiser had a relatively high breech cesarean rate (88.3 percent); indigent women the lowest (78.5 percent) (Table 4).

Cesareans for dystocia accounted for 32 percent of all cesareans. For this accompanying diagnosis, relatively high cesarean rates were experienced by Private Insurance (65.9 percent, 65.1–66.7), Other HMOs (65.3 percent, 63.7–67.0), Medi-Cal (64.6 percent, 63.5–65.7), and Self-Pay (61.4 percent, 59.7–63.1). Women covered by Indigent Services (56.9 percent, 52.3–61.5) and Kaiser (58.8 percent, 55.4–62.3) had significantly lower rates.

Deliveries with the diagnosis of fetal distress showed a pattern similar to that for all deliveries. Other HMOs (33.0 percent, 30.9–35.0) and Private Insurance (31.5 percent, 30.4–32.6) had the highest rates, while indigent women had the lowest (21.6 percent, 18.4–24.9).

TABLE 2—Cesarean Section Rates by Primary Accompanying Diagnosis, Hospital Deliveries, California, 1986

Primary Accompanying Diagnosis	Deliveries	Percentage of all Deliveries	Cesarean Sections	Percentage of all Cesareans	Cesarean Section Rate
Previous Cesarean	45,188	9.8	40,274	35.7	89.1
Breech	13,926	3.0	12,112	10.7	87.0
Dystocia	55,895	12.1	35,896	31.9	64.2
Fetal Distress	39,058	8.5	11,134	9.9	28.5
Other Diagnoses*	111,156	24.1	12,926	11.5	11.6
None**	195,843	42.5	388	0.3	0.2
Total	461,066	100.0	112,730	100.0	24.4

*Includes the following diagnoses occurring without previous cesarean section, breech presentation, fetal distress, or dystocia: antepartum hemorrhage, hypertension, excessive vomiting, pre-term labor, prolonged pregnancy, other pregnancy complications, maternal infections, other medical conditions in pregnancy, multiple gestation, other malpresentation, anatomical abnormalities of pelvis, fetal abnormalities, placental problems, polyhydramnios, other amniotic complications, other indications for care, umbilical cord complications, and other complications of labor and delivery.
**Includes deliveries lacking any diagnosis classifiable to any of the above categories.

TABLE 3—Cesarean Section Rates for Women with Previous C-Sections, by Payment Source, Hospital Deliveries, California, 1986

Payment Source	Total Deliveries	Percentage of Payor's Deliveries	C-Section Rate (95% CI)
Private Insurance	18,837	11.6	91.9 (91.4, 92.4)
Other HMOs	5,064	11.0	91.7 (90.6, 92.7)
Medi-Cal	11,444	9.3	90.6 (89.9, 91.4)
Kaiser Permanente	4,385	8.5	80.1 (78.5, 81.7)
Self-Pay	3,353	6.8	81.9 (80.1, 83.7)
Indigent Services	660	6.4	75.2 (70.7, 79.6)
Other Payors	1,445	7.5	82.9 (80.3, 89.5)
Total	45,188	9.8	89.1 (88.7, 89.5)

TABLE 4—Cesarean Section Rates for Breech Presentation, by Payment Source, Hospital Deliveries, California, 1986

Payment Source	Total Deliveries	Percentage of Payor's Deliveries	C-Section Rate (95% CI)
Private Insurance	5,510	3.4	89.7 (88.6, 90.8)
Other HMOs	1,381	3.0	89.9 (87.7, 92.1)
Medi-Cal	3,400	2.7	83.9 (82.2, 85.6)
Kaiser Permanente	1,424	2.8	88.3 (86.0, 90.6)
Self-Pay	1,416	2.9	81.6 (78.8, 84.4)
Indigent Services	247	2.4	78.5 (71.4, 85.6)
Other Payors	548	2.9	85.0 (80.9, 89.1)
Total	13,926	3.0	87.0 (86.2, 87.8)

For deliveries with other accompanying diagnoses, women with Private Insurance had cesarean section rates (14.4 percent, 13.9–14.9) nearly double those of indigent women (7.7 percent, 6.3–9.1).

Of the 125 subpopulations formed from all combinations of age-group (five categories), race/ethnicity (five categories), and accompanying diagnoses (five categories), 105 had three or more payors with more than 20 deliveries. Among these subpopulations, Private Insurance had the highest cesarean rates in 42 percent and non-Kaiser HMOs in 30 percent. Medi-Cal (8 percent), Other Payors (8 percent), Self-Pay (6 percent), Kaiser (6 percent), and Indigent Services (1 percent) had the highest cesarean rates less frequently (detailed tables available on request to author).

Discussion

This study indicates that cesarean section use is strongly associated with the source of payment for obstetrical care, after stratifying for available patient characteristics. Differences between payors were particularly large for women with previous cesarean sections, currently a controversial area of obstetrical practice.[15,16]

Because payment source is not randomly assigned to women, stratification by patient characteristics is an important aspect of this study. Two potential limitations in this process must be noted. First, hospital discharge abstracts have a limited number of data elements available, and do not include information on parity, gravidity, and birthweight. Second, potential problems in data accuracy and completeness may diminish the discharge data's ability to reflect

clinical differences between patients. In particular, dystocia and fetal distress may be subject to biased recording and are more likely to be recorded if a cesarean section is performed.

Direct or indirect financial incentives, as well as additional factors such as access to technology,[8] physician work schedules,[17] hospital teaching status,[8] hospital ownership status,[6,9] patient socioeconomic status,[18] and medical malpractice concerns may contribute to the observed payor differences. In addition, it is possible that the underlying delivery preferences of women or their physicians may vary systematically by source of hospital payment.

The high cesarean rate for Private Insurance is consistent with the financial incentives of fee-for-service practice that favor higher cesarean section rates. The existence of incentives does not necessarily imply that physicians consciously seek greater income. Such incentives may function via implicit clinical standards.

The moderate Medi-Cal cesarean rates are consistent with incentives to perform cesarean section that may be tempered by the reduced physician and hospital reimbursements provided by Medi-Cal.[19] Women with Medi-Cal also tend to deliver in hospitals where there may be other constraints on cesarean section use.

While HMOs have been shown to have lower cesarean section rates than private insurance,[7,20] the current findings suggest this is the case only in large, hospital-based HMOs. The data indicate that the cesarean section experience of HMOs other than Kaiser closely resembles that of private insurance. Besides Kaiser's incentive to avoid excessive cesarean section use, the prominence of peer review and fixed work schedules also may contribute to the lower Kaiser cesarean rates.

The desire of Self-Pay women to avoid the higher cost of cesarean section may discourage cesarean section use. In addition, Self-Pay women make disproportionate use of public hospitals, where additional institutional constraints may reduce cesarean use.

The low rates of cesarean section in women covered by Indigent Services is consistent with the economic constraints of the county hospitals where these women deliver. At the same time, many of these hospitals have teaching programs which, like Kaiser, are more likely to have fixed work schedules and emphasize peer review.

The potential costs savings to payors of fewer cesarean sections may be gauged using 1986 estimates of physician and hospital costs, and Kaiser's moderate cesarean section rate of 19.7 percent. Insurance claims data for the western US indicate that in 1986 cesarean sections were 84 percent more costly than vaginal deliveries ($5,000 versus $2,720).[21] Based on these figures, if the cesarean section patterns of Kaiser were adopted, private insurance plans, non-Kaiser HMOs and Medi-Cal potentially would save $51 million annually by avoiding 22,500 cesarean sections. This may be an underestimate of cost savings, however, because Kaiser's rate is nearly twice that suggested as an optimal cesarean section rate.[22,23]

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