

Declining Cesarean Section Rates: A Continuing Trend?

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Abstract

Since the mid-1980s, cesarean section rates in Canada have declined. By 1993, 18 of every 100 deliveries were by cesarean section, compared with close to 20 per 100 in 1987. As well, in 1993, 9 of every 100 deliveries were primary cesareans, down from a high of almost 11 per 100 in the mid-1980s. And the repeat cesarean section rate fell from 39 per 100 cesareans in the mid-1980s to 34 in 1993.

A major factor in the downturn of cesarean section rates has been a steady increase in vaginal births after cesarean section (VBACs). From 1979 to 1993, the rate rose more than tenfold from 3 to 33 per 100 women who previously had a cesarean section. This trend toward VBAC deliveries was apparent among women in all age groups.

Within Canada, there are large provincial differences in cesarean section and VBAC rates. In 1993, cesarean rates ranged from 15 per 100 deliveries in Manitoba to 22 in New Brunswick. VBAC rates ranged from 16 per 100 previous cesarean sections in New Brunswick and Newfoundland to 42 in Alberta.

This article traces trends in cesarean section and VBAC rates in Canada and the provinces from 1979 to 1993. The data are based on individual patient admission/separation records of general and allied hospitals, that are submitted to Statistics Canada.

Keywords: cesarean section, repeat cesarean section, vaginal birth after cesarean, pregnancy complications

Introduction

A major increase in cesarean deliveries in a number of industrialized countries in the 1970s and early 1980s sparked debate among women's groups, health economists, and the medical profession about justification for the procedure. In Canada, by the mid-1980s, national and provincial conferences had recommended guidelines aimed at reducing unnecessary surgical intervention and promoting the safest forms of birth for women and their babies.^{1,2} (See *The 1986 National Consensus Conference on Aspects of Cesarean Birth*.) Shortly thereafter, the annual number and rate of cesarean sections began to decline.

This article traces trends in cesarean deliveries, repeat cesarean sections, vaginal delivery after cesarean section, and cesarean indications for Canada and the provinces from 1979 to 1993.

Cesarean sections declining

From 1979 to 1989, the annual number of cesarean sections performed in Canada rose from almost 53,800 to just over 75,500 (see *Methods*). After 1989, numbers declined steadily, dropping to 68,000 in 1993 (Table 1).

The cesarean section rate followed a similar trend, rising from 15 cesareans per 100 hospital deliveries in 1979 to almost 20 per 100 in the late 1980s, and then falling below 18 per 100 by 1993.

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The 1986 National Consensus Conference on Aspects of Cesarean Birth

In response to concern that Canada's cesarean section rate was about two times those in comparable European countries, a Canadian consensus process was started in 1985 to establish appropriate clinical guidelines for the choice of cesarean birth.¹ The next year, the National Consensus Conference on Aspects of Cesarean Birth, a ten-member panel of representatives from across the country, issued guidelines aimed at reducing unnecessary surgical intervention while promoting safe birth. The panel's recommendations were based on a review of all relevant literature published since 1960.

The 1986 guidelines addressed rising cesarean rates in three areas: breech presentation, previous cesarean, and prolonged or difficult labour (dystocia). In each area, if there was compelling evidence that one method of birth was safer than another, that method was *recommended*; if the evidence was less compelling, but favoured one method over another, that method was to be *offered*.

According to the document, a planned vaginal birth should be recommended given a **breech presentation** at 36 or more weeks' gestation and/or estimated birth weight of 2,500 to 4,000 grams, and offered for breech presentation at 31 to 35 weeks' gestation and/or estimated birth weight of 1,500 to 2,500 grams. Cesarean section should be offered for breech presentation at 30 weeks' gestation or less and estimated birth weight under 1,500 grams.

The guidelines also encouraged consideration of vaginal birth for mothers **with previous cesarean section**, recommending "trial of labour" for women who had one low segment transverse cesarean section, singleton vertex presentation, and no absolute contraindication (such as placenta previa). Suspected birth weight of 4,000 grams or more did not in itself preclude trial of labour. However, previous classic, low vertical or unknown uterine incision was considered to be a contraindication.

The guidelines suggested criteria for a diagnosis of **prolonged or difficult labour** (dystocia), another leading cesarean indication. Before such a label is considered, the woman must be in the active phase of labour. In the latent phase of labour, such a diagnosis is not appropriate, nor is a cesarean section, which should be considered much later, and then only after satisfactory augmentation of uterine action has failed to secure progress after reasonable time. The document stipulated that slow progress in labour is not itself a problem, and dystocia was considered to be a valid diagnosis only if there is lack of cervical dilation (less than 0.5 cm/hour) over 4 hours.

In all categories—breech presentation, previous cesarean, or prolonged/difficult labour—the guidelines specified that the experience of the attending physician and the informed decision of the woman were crucial. This meant that there should be a careful review with the woman of identifiable risks and benefits to herself and her child associated with the choice of delivery method.

In 1991, the guidelines were further revised to support trial of labour after two previous cesarean sections.³

Methods

Data source

Canadian cesarean section data are based on individual patient admission/separation records submitted by general and allied hospitals to their provincial governments. The provinces forward annual abstracts relating to an individual's hospital stay and separation (discharge or death) to Statistics Canada. The abstracts contain demographic and medical information such as age and sex, diagnoses, surgical procedures, length of stay, place of residence, and location and type of institution. The data are edited at Statistics Canada for completeness and consistency. Internal validity tests are carried out to ensure compatibility between age, sex, diagnosis, and surgical procedure. The annual figures pertain to April to March fiscal years.

For each year from 1979 to 1993, data on cesarean rates were extracted from data on total deliveries. Hospital separation records may contain information on one or more diagnoses, and one or more surgical procedures. A hierarchical coding method was used to identify indications for cesareans.⁴ Records were analyzed if cesarean section codes appeared in any of the first three procedures identified.

Classification of cesarean section deliveries, by type of procedure

Diagnosis	Classification codes
Cesarean section	CCP (86.0-86.2, 86.8, 86.9) [†]
Previous cesarean	ICD-9 (654.2) [‡]
Repeat cesarean and operation code	ICD-9 (654.2) [‡] ; CCP (86.0, 86.1, 86.2, 86.8, 86.9) [†]
Vaginal birth after cesarean section (VBAC)	ICD-9 (654.2) [‡] and operation codes not equal to cesarean section

[†] Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures

[‡] International Classification of Diseases, 9th revision

Limitations

The hospital morbidity database at Statistics Canada does not have information that might clarify the factors associated with cesarean sections, such as gestational age, parity, and birth weight of the infant. Another limitation is that ICD classification codes do not distinguish between cases in which repeat cesarean was elective as opposed to medically indicated.⁵ As well, the data refer to births in hospital and exclude those that occur outside hospital (birthing centres, home, day care/surgery, etc.), but such exclusions account for less than one percent of all deliveries.

Definitions

The *cesarean section rate* is the number of cesarean sections per 100 deliveries. The *repeat cesarean section rate* is the number of repeat cesareans per 100 cesarean deliveries. The *vaginal birth after cesarean section rate (VBAC)* is the number of such events per 100 deliveries among women who had a previous cesarean section.

While provincial cesarean rates generally followed the same pattern, there were differences. In all provinces, cesarean section rates were higher in 1993 than in 1979 (Table 2). However, in every province except New Brunswick, the 1993 rate was down from an earlier peak. Manitoba was unique in that its rate was relatively stable, with no pronounced increase in the mid- to late-1980s. In 1993, Manitoba had the lowest cesarean section rate in the country, and New Brunswick, Newfoundland, and British Columbia, the highest.

The older the mother, the more likely she is to have a cesarean section. The 1993 rate for women aged 35 and over was 24 cesarean sections per 100 hospital deliveries. By contrast, for women younger than 20, the rate was 12 per 100 hospital deliveries (Chart 1). However, since the mid-1980s, cesarean section rates for women of all ages have decreased.

Table 1**Deliveries and cesarean sections, Canada, 1979-1993**

	Total deliveries	Cesarean sections			
		Number	Cesarean section rate	Primary cesarean section rate	Repeat cesarean section rate
1979	366,394	53,759	14.7	10.1	30.4
1980	365,643	58,527	16.0	10.6	32.2
1981	369,877	60,956	16.5	10.1	36.9
1982	369,759	63,684	17.2	10.4	37.5
1983	371,926	66,314	17.8	10.5	38.5
1984	369,428	69,645	18.9	10.9	39.0
1985	368,318	70,379	19.1	10.9	39.1
1986	366,078	70,115	19.2	10.6	39.3
1987	362,955	71,133	19.6	10.9	38.3
1988	371,073	72,591	19.6	10.7	38.2
1989	388,269	75,531	19.5	10.5	37.1
1990	392,065	74,802	19.1	9.8	37.1
1991	388,144	72,336	18.6	9.0	37.1
1992	394,176	69,839	17.7	8.6	35.3
1993	386,309	67,952	17.6	8.5	34.3

Source: Health Statistics Division

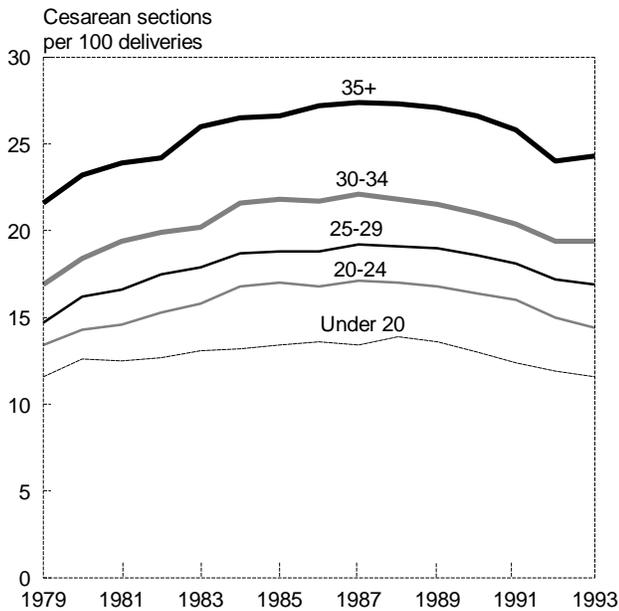
Table 2**Cesarean section rates, by province, Canada, 1979-1993**

	Canada	Nfld	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta	B.C.
	Cesarean sections per 100 deliveries										
1979	14.7	18.3	15.5	15.5	14.6	12.9	16.0	14.4	11.8	13.2	16.6
1980	16.0	19.5	14.6	16.3	14.8	15.6	17.1	14.2	11.4	13.8	17.9
1981	16.5	18.8	17.0	17.0	16.8	16.1	17.5	14.7	12.3	14.1	18.8
1982	17.2	19.0	15.6	17.6	17.2	16.5	18.5	15.0	13.5	15.2	19.0
1983	17.8	20.1	14.5	18.2	18.8	17.2	19.0	14.9	14.0	15.6	20.0
1984	18.9	20.4	17.0	19.0	19.2	18.5	19.9	15.1	15.3	16.7	21.1
1985	19.1	21.9	17.0	18.9	18.9	19.0	20.4	13.9	15.5	16.7	21.0
1986	19.2	21.5	18.1	19.2	18.7	18.8	20.4	14.9	15.4	16.7	21.6
1987	19.6	22.4	17.2	19.8	21.0	19.3	20.3	15.6	16.3	17.6	21.9
1988	19.6	23.3	18.1	19.9	20.8	19.0	20.3	15.5	17.4	17.1	22.2
1989	19.5	21.9	16.4	20.2	21.3	18.3	20.1	15.6	17.3	16.8	23.5
1990	19.1	23.8	16.4	19.0	21.1	17.8	19.6	15.0	17.5	16.2	23.8
1991	18.6	23.6	18.3	19.5	22.3	17.5	18.6	14.5	17.8	16.6	23.0
1992	17.7	21.4	20.2	19.1	22.0	16.4	17.7	14.8	16.8	15.7	21.6
1993	17.6	21.2	19.3	19.3	22.3	16.3	17.6	15.1	16.4	15.5	21.2

Source: Health Statistics Division

Chart 1

Cesarean section rates, by age of mother, Canada, 1979-1993



Source: Health Statistics Division

Primary and repeat cesarean sections

Some of the overall decline in the cesarean section rate is attributable to a decrease in primary procedures. Primary cesarean sections fell from 11 per 100 deliveries in the mid-1980s to less than 9 per 100 in 1993.

Repeat cesarean section rates also decreased in recent years. The rate fell from 39 repeat cesareans per 100 cesarean deliveries in the mid-1980s to 34 in 1993. Nonetheless, the 1993 figure was above the 1979 level (30). This pattern prevailed in most provinces, although rates varied (Table 3).

Repeat cesarean sections are particularly common among older mothers (Chart 2). In 1993, 42% of all cesarean section deliveries to women over age 35 were repeat cesareans; the corresponding figure for women aged 30 to 34 was 41%. However, the 1993 repeat cesarean rates for women in all age groups were down from highs that had occurred in the 1980s.

Table 3

Repeat cesarean section rates, by province, Canada, 1979-1993

	Canada	Nfld	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta	B.C.
	Repeat cesarean sections per 100 cesareans										
1979	30.4	33.5	1.6	24.2	13.8	28.9	31.1	31.6	27.9	33.8	35.5
1980	32.2	36.0	2.4	31.5	17.2	29.6	32.2	37.0	31.7	36.0	37.2
1981	36.9	39.2	31.5	36.2	28.2	35.9	38.0	38.2	31.8	39.4	36.4
1982	37.5	38.7	29.8	34.1	32.5	36.6	38.4	40.9	30.6	38.7	38.8
1983	38.5	41.0	34.1	36.5	34.8	37.4	39.0	39.0	33.7	39.7	39.9
1984	39.0	39.1	27.6	36.8	37.7	36.8	39.3	41.3	34.3	40.5	40.1
1985	39.1	40.2	36.2	38.6	39.1	34.7	39.9	38.3	38.3	40.8	40.8
1986	39.3	40.2	43.3	38.6	39.7	36.5	40.2	38.6	37.3	41.1	40.2
1987	38.3	36.0	38.1	37.7	37.7	34.9	40.2	37.1	36.2	39.2	39.6
1988	38.2	31.5	34.1	35.1	37.5	37.1	39.3	34.9	38.6	38.3	39.6
1989	37.1	32.7	40.9	34.9	33.3	36.7	38.1	34.9	38.1	36.8	37.4
1990	37.1	33.6	39.5	34.6	36.8	35.4	38.3	34.6	37.7	39.0	37.0
1991	37.1	36.4	35.3	36.8	37.3	35.0	37.8	33.5	40.1	37.0	38.8
1992	35.3	36.9	33.6	33.7	35.9	33.7	36.1	30.1	39.7	34.0	37.0
1993	34.3	34.3	34.4	33.0	36.3	32.7	34.2	33.6	39.0	33.4	36.4

Source: Health Statistics Division

Vaginal births after cesarean sections (VBAC)

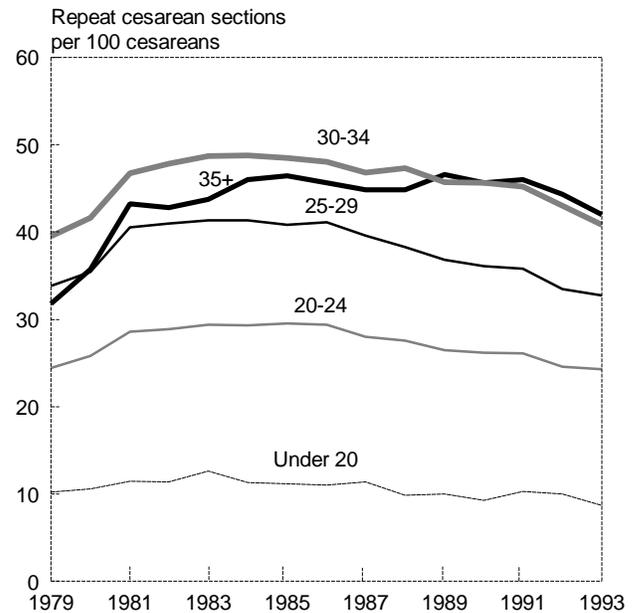
A cesarean section delivery does not necessarily mean that a woman must have the same procedure for all subsequent births. From 1979 to 1993, there was a sharp increase in vaginal births among women who had previously had a cesarean delivery. During this period, the absolute number of VBACs rose from 499 to 11,705, while the VBAC rate increased from 3 to 33 per 100 deliveries among women with a previous cesarean section (Chart 3).

Provincial differences in VBAC rates were substantial (Table 4). Alberta's and Manitoba's rates were highest at more than 40 VBACs per 100 previous cesarean sections. The lowest VBAC rates were in New Brunswick and Newfoundland.

VBACs were most common among younger women (Chart 4). The 1993 rate for women under age 20 was 43 per 100 previous cesareans, compared with 30 for mothers aged 35 and over. Since 1979, the VBAC rate has risen about tenfold for women in each age group.

Chart 2

Repeat cesarean section rates, by age of mother, Canada, 1979-1993



Source: Health Statistics Division

Table 4

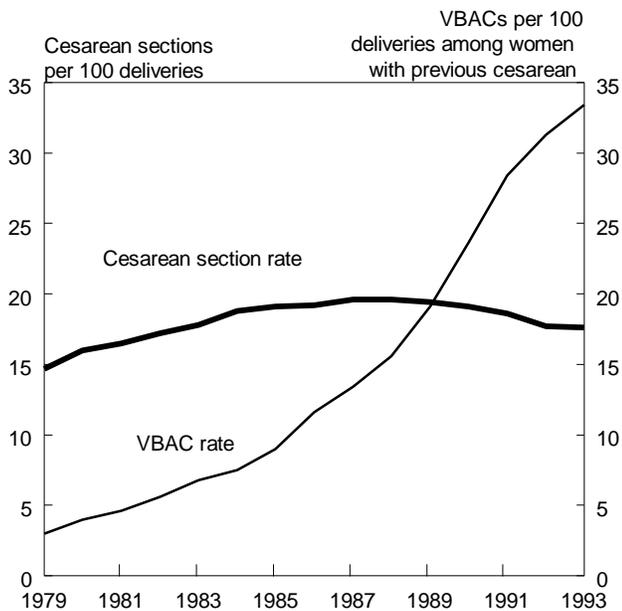
Vaginal birth after previous cesarean (VBAC) rates, by province, Canada, 1979-1993

	Canada	Nfld	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta	B.C.
VBACs per 100 deliveries among women with a previous cesarean section											
1979	3.0	0.7	-	2.0	0.4	3.3	2.8	6.5	1.6	4.9	1.7
1980	4.0	1.6	-	4.0	0.4	7.7	2.1	5.9	0.9	6.0	2.7
1981	4.6	2.1	2.9	11.2	3.0	3.4	4.9	7.6	0.8	7.1	2.7
1982	5.6	0.7	4.5	11.5	3.0	4.8	5.8	10.8	0.5	7.4	4.3
1983	6.8	1.7	4.3	12.7	3.4	5.2	6.3	13.8	1.3	7.8	9.6
1984	7.5	1.4	4.3	13.6	4.5	5.6	6.1	18.7	7.0	9.2	9.8
1985	9.1	0.5	5.4	10.0	4.6	5.7	7.4	25.2	14.5	11.1	12.7
1986	11.6	1.3	14.9	12.0	10.2	8.3	9.2	26.7	16.7	16.6	14.8
1987	13.4	2.3	13.5	17.2	11.0	10.4	10.6	25.6	15.8	19.1	17.7
1988	15.6	2.4	9.2	20.2	11.3	12.9	13.5	26.9	20.6	22.5	17.0
1989	19.1	1.8	16.0	22.2	16.1	18.8	15.6	33.9	21.4	28.4	19.2
1990	23.5	5.7	9.5	27.8	16.3	25.1	20.2	36.6	26.7	32.1	22.0
1991	28.4	5.8	16.2	29.0	12.3	30.3	26.6	39.7	30.4	36.4	26.6
1992	31.3	8.3	15.1	34.5	15.4	34.3	29.8	42.8	33.5	39.6	26.3
1993	33.4	16.2	23.4	36.2	15.5	35.9	32.1	40.4	34.6	41.9	29.7

Source: Health Statistics Division

Chart 3

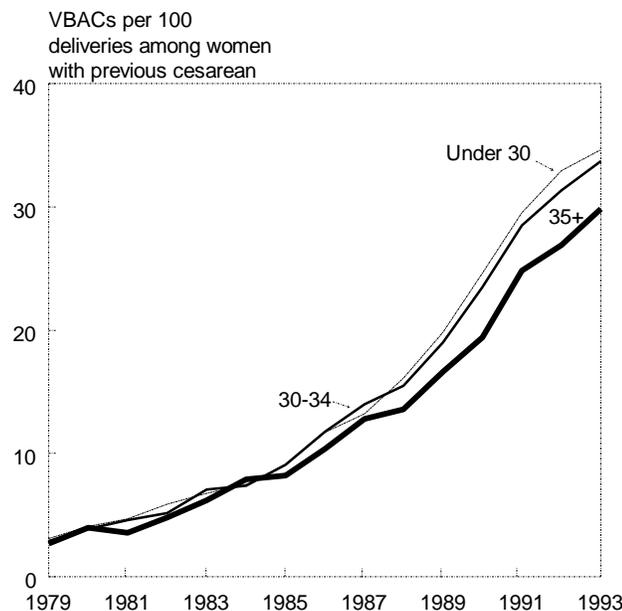
Cesarean section rates and VBAC rates, Canada, 1979-1993



Source: Health Statistics Division

Chart 4

VBAC rates, by age of mother, Canada, 1979-1993



Source: Health Statistics Division

Medical indications for cesarean section

The upturn in the VBAC rate notwithstanding, throughout the period, the leading medical indication for cesarean section was previous cesarean birth (Table 5). In 1993, a previous cesarean was cited as the reason for 34% of all cesarean deliveries; this was down from 39% in the mid-1980s, but higher than the 1979 figure (30%).

At the same time, the proportion of cesareans performed because of breech presentation rose from 5% to 11%, and the proportion for fetal distress increased from 3% to 10%. The latter could be related to greater use of electronic fetal heart monitoring, although the data do not indicate whether electronic monitoring was used. A recent survey of routine maternity care practices in Canadian hospitals suggests that about 65% of hospitals had a policy that specified that all women were to have a 20- to 30-minute initial fetal heart rate strip done on admission; 3% of hospitals had a policy of routine continuous electronic fetal heart rate monitoring.⁶

Table 5

Selected medical indications for cesarean section, Canada, 1979-1993

	Total cesarean sections	Indication for cesarean section			
		Previous cesarean	Dystocia	Breech	Fetal distress
		%			
1979	53,759	30.4	24.0	5.3	3.4
1980	58,527	32.2	17.0	7.1	4.0
1981	60,956	36.9	17.0	7.8	4.7
1982	63,684	37.5	16.6	7.7	5.2
1983	66,314	38.5	14.6	8.6	5.7
1984	69,645	39.0	14.8	8.2	5.9
1985	70,379	39.1	14.1	8.2	6.5
1986	70,115	39.2	14.4	8.3	6.9
1987	71,133	38.3	14.7	8.4	7.7
1988	72,591	38.2	15.2	8.7	8.6
1989	75,531	37.1	16.2	9.3	9.0
1990	74,802	37.1	16.8	9.7	8.9
1991	72,336	36.3	17.3	9.9	9.3
1992	69,839	35.3	17.7	10.4	9.9
1993	67,952	34.3	17.5	11.0	10.0

Source: Health Statistics Division

The proportion of cesarean sections in which the medical indication was difficult or slow labour (dystocia) rose from around 14% in the mid-1980s to 18% in 1993. This does not necessarily mean that the incidence of dystocia changed. The Statistics Canada hospital morbidity database contains no information relating specifically to the management of dystocia. Moreover, the diagnosis of dystocia lacks specificity and precision.^a

Will the trend continue?

The 1986 guidelines on cesarean delivery were endorsed by the Society of Obstetricians and Gynecologists of Canada and were widely distributed. Although the issuance of guidelines regarding obstetric practice may represent the consensus of the parties involved, the impact may not have been immediate.⁷ However, since the late 1980s, at the national level, cesarean section rates have fallen. The VBAC rate, which until then had been rising slowly, more than doubled.

Provincial disparities in cesarean section and VBAC rates are striking. This may reflect provincial differences in the establishment and implementation of delivery policies/guidelines or in the peer group process surrounding obstetric care. The slow response of physicians to national guidelines has been observed in other contexts.⁸ Individual physician practices, hospital policy, type of hospital, hospital resources, patient education, and patient demands could all influence the number of cesareans that are performed.^{3, 4, 9-12}

As well, concern about litigation may affect cesarean rates. An increasing proportion of Canadian clinicians state that fear of litigation influences their decision to do cesarean sections.¹³ Yet although cesarean section has been regarded as a means of reducing perinatal mortality, evidence indicates that it is possible to lower the cesarean section rate without increasing risk to newborns.^{14,15}

In addition, research on the effect of cesarean sections on birth outcome in very low birth weight infants suggests that after accounting for certain maternal and fetal factors, cesarean delivery is not associated with a lower risk of either mortality or other major complications.¹⁶

Further decreases in cesarean section rates could be slowed by changing fertility patterns. The high cesarean rates at older ages suggest that maternal age is an important risk factor for the procedure.¹⁷ And the number and rate of births to women in their thirties are increasing substantially.¹⁸ (See **Pregnancy Outcomes** in this issue.) By 1992, 38% of births were to women aged 30 or over, and of these births, 25% were first births. Rates of multiple birth have also increased, especially among women aged 30 and over.¹⁹ Since the age of the mother and multiple births are associated with higher cesarean rates, both trends could attenuate further cesarean rate decreases.

In summary, there have been reductions in Canada's cesarean section rate, accompanied by an increase in the VBAC rate. Stabilization or a decrease in cesarean rates has also been noted in other industrialized countries.^{14,15} But although Canada has made progress in reducing cesarean sections, the 1993 rate was still almost as high as in the United States, and several times higher than those in England and Wales, Norway, Sweden, and Scotland.^{14,15,20}

Some researchers contend that the number of cesarean deliveries will not continue to decline unless adequate studies to assess the effectiveness of new technologies are performed, and unless medical education instills patterns of practice that have known benefits to obstetric outcomes.²¹ Recent assessments of the methods by which cesarean rates will be lowered have stressed the need for multiple strategies. Continuing medical education, formal hospital-initiated programs, external review of services, modification of malpractice laws, and consumer education have been cited as possible approaches.^{2,22}

^a While previous cesarean, breech presentation, fetal distress, and difficult labour are the four most common medical indications for cesarean section, more than one indication could have been cited in a delivery. Breech presentation and previous cesarean are dichotomous variables, whereas fetal distress and difficult labour are more subjective.

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