

Pregnancy-related hospital use

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Abstract

Objectives

This article describes provincial variations in women's hospital use during pregnancy, childbirth and the postnatal period.

Data source

The data were extracted from the Person-Oriented Information Data Base, maintained by Health Statistics Division at Statistics Canada. This data base is comprised of hospital admission data submitted by general and allied hospitals to provincial and territorial governments and is considered complete for each jurisdiction. Data were not available for the Yukon Territory.

Analytical techniques

A group of 57,627 women who gave birth during October and November 1993 was identified from hospital admission records using selected ICD-9 and CCP codes. These records were then linked to other hospital admissions that occurred in the six months before and the four months after childbirth.

Main results

Approximately 15% of women who gave birth in October and November 1993 were admitted to hospital at least once during the six months before childbirth. Only 4% were re-admitted during the four months after the birth.

Key words

re-admission rate, length of stay, health care policy, childbirth, episiotomy, cesarean

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Hospitals are commonly thought of as places for the ill and the injured. However, a major function of many hospitals is to provide care related to childbirth. In fiscal year 1993/94, one in four hospital admissions among women was to give birth.

Although each pregnancy and delivery is unique, the experiences of Canadian women are shaped, in part, by the health care that they receive. Many factors influence pregnancy-related hospital use, for example, the availability of hospital resources, distance to hospital, physician practice patterns, hospital policies and the availability of outpatient services. And because health care is under provincial and territorial jurisdiction, pregnancy-related hospital use may also vary regionally.

This article examines the pregnancy-related hospital use of 57,627 women who were admitted to hospital to give birth during October and November, 1993 and is based on data from Health Statistics Division's Person-Oriented Information Data Base. It analyzes provincial variations in women's hospital use during pregnancy, childbirth, and the postnatal period (see *Methods*).

Unlike “traditional” hospital admission data bases, in the Person-Oriented Information Data Base, records that pertain to the same individual can be linked by the health insurance number reported at the time of admission. This linkage enables an analysis based on people as opposed to events (hospital admissions).

For two provinces, Quebec and Nova Scotia, it was only possible to link hospital admission records that occurred within a single fiscal year.

Consequently, women who gave birth in hospital during October and November were chosen for analysis. This allowed an examination of all hospital admissions of these women during the six months before childbirth and the four months afterward.

Most new mothers in hospital for delivery only

Of the women in the study group, 81% were admitted to hospital only once during fiscal year

Methods

Data source

The data in this analysis were extracted from the Person-Oriented Information Data Base, maintained by Health Statistics Division at Statistics Canada. The data base is comprised of hospital admission data submitted by general and allied hospitals to provincial and territorial governments, and is considered complete for each jurisdiction. Data were not available for the Yukon Territory.

Each hospital admission record contains information on the patient’s characteristics (such as sex and age), diagnoses, surgical procedures performed, length of stay, hospital location, and other related information. The data undergo several checks to ensure their general integrity and suitability for analytical purposes.

Analytical techniques

Because no single diagnosis or procedure code can be used to unambiguously signal the occurrence of a birth during a hospital stay, a woman was considered to have given birth if one of the following codes appeared on her hospital record:^{1,2}

- Delivery in a completely normal case: ICD-9 code 650
- Complications in labour and delivery: ICD-9 codes 660 to 669
- Outcome of delivery: ICD-9 codes V27.0 to V27.7
- Induction, instrumental, cesarean delivery: CCP codes 84.0 to 86.2
- Other and unspecified cesarean: CCP codes 86.8 to 86.9
- Birth not elsewhere classified or specified: CCP code 87.98

Minor changes in these selection criteria did not result in major changes in the size of the study population or its composition, as most women were identifiable by more than one of the above codes. Under the selection criteria, women having stillbirths were included in this analysis, which serves to make the sample more complete. However, it was not possible to identify which births were stillbirths. Other procedures, such as repair of hernia (CCP codes 650-659) were not used as selection criteria because these codes do not unambiguously signal a birth.

This selection method yielded a study population of 57,627 women. During the same period, 61,243 births were registered across the country (live and stillbirths combined). After adjusting for multiple births, birth registrations yield an estimate of 59,915 women. This suggests that the population examined in this article accounts for approximately 96% of all women who gave birth during that period.

Limitations

The data analyzed in this article pertain only to hospital admissions. While the vast majority of Canadian women give birth in hospitals, many health-care services rendered before and after childbirth are provided in physicians’ offices or on an outpatient basis at a hospital. Information on the services performed during these visits is not discussed here.

Hospital admissions that occurred outside the province where the woman usually resided were excluded. Out-of-province hospital admissions accounted for approximately 3% of hospital stays in 1993/94. Conversely, women who moved to another province and were subsequently admitted to hospital were identified on the data base as two different people. The result is a slight upward bias of approximately 1% in the total number of patients at the national level (based on current annual inter-provincial migration rates).

The Person-Oriented Information Data Base does not contain data on newborns. They are often given the same health insurance number as their mother, with a unique number assigned some days after the birth. Consequently, records relating to services provided to newborns immediately after delivery and during subsequent hospital admissions cannot be easily linked. Birth-related admissions data do not contain information on parity. Thus, it is not possible to examine the relationship between parity and length of stay, readmission rates, and procedures used at birth.

1993/94, and that was to give birth (Table 1). Approximately 15% were hospitalized at least once during the six months before childbirth, a finding consistent with research in the United States.^{3,4} Only 4% of the women were re-admitted during the four months after the birth.

Prenatal admissions

Hospital admission rates during the six months before childbirth varied considerably across the country. British Columbia, Ontario, Alberta and Quebec had rates at or below the national average. The remaining provinces (including the Northwest Territories) had above-average rates, with Manitoba and Newfoundland recording the highest.

The leading diagnoses among the women who were hospitalized during the six months before childbirth were threatened labour, other complications of pregnancy not elsewhere classified (such as minor infections of the genitourinary tract, liver disorders, and gestational edema), and other complications classifiable elsewhere but complicating pregnancy (such as diabetes mellitus, anemia, and cardiovascular diseases). Together, these causes accounted for over half of all prenatal admissions (Table 2).

Table 1
Pregnancy-related hospital admission rates, by province/territory, October-November, 1993

	Women who gave birth	Prenatal admission rate	Postnatal admission rate	Admission for birth only
	Number		%	
Canada	57,627	14.9	3.8	81.3
Nfld.	1,004	20.5	5.1	74.4
P.E.I.	238	19.3	5.5	75.2
N.S.	1,704	17.2	5.8	77.1
N.B.	1,413	15.7	5.2	79.1
Que.	13,444	14.9	3.0	82.2
Ont.	22,943	13.7	3.1	83.2
Man.	2,228	21.9	4.9	73.2
Sask.	2,075	19.9	7.5	72.7
Alta.	5,460	14.6	5.6	79.8
B.C.	6,937	13.6	4.1	82.4
N.W.T.	181	19.3	7.2	73.5

Data source: Person-Oriented Information Data Base, Health Statistics Division

Length of hospital stay varies provincially

Using administrative data on hospital admission and separation dates for birth-related stays, it is possible to produce consistent estimates of the average length of stay by province or territory. At the national level, the average hospital stay for giving birth was 3.6 days (Table 3). However, women in Ontario and western Canada experienced shorter average stays than did their counterparts in the east. The shortest average stays were in the Northwest Territories, Alberta, and Ontario. Unlike most other jurisdictions, the comparatively brief length of stay in the Northwest Territories (2.8 days) may be influenced by the practice of transporting women with high-risk pregnancies to larger, more specialized medical facilities in neighbouring provinces.

Table 2
Leading diagnoses at prenatal hospitalization, Canada, October-November, 1993

Diagnosis (ICD-9 code)	Number	Percent of prenatal admissions†	Percent of all births
		%	
Threatened labour (644)	3,917	33	6.8
Other complications of pregnancy not elsewhere classified (646)	1,199	10	2.1
Other complications classifiable elsewhere but complicating pregnancy (648)	1,089	9	1.9
Antepartum hemorrhage, abruptio placentae, and placenta praevia (641)	844	7	1.5
Hypertension complicating pregnancy, childbirth and the puerperium (642)	831	7	1.4
Excessive vomiting (643)	669	6	1.2
Other problems associated with amniotic cavity and membranes (658)	405	3	0.7
Hemorrhage in early pregnancy (640)	317	3	0.6
Abnormality of organs and soft tissues of pelvis (654)	241	2	0.4
Other fetal and placental problems affecting management of mother (656)	229	2	0.4

Data source: Person-Oriented Information Data Base, Health Statistics Division

† Rate is based on 11,807 prenatal hospital admissions and includes multiple admissions of the same person (15% of admissions).

The average length of stay figures reported in this article are comparable to those in Health Canada's *Survey of Routine Maternity Care and Practices in Canadian Hospitals*.⁵ Differences may be attributable to the units of analysis. The figures in this article are based on birth-related hospital stays and are population-weighted. In Health Canada's report, the hospital/obstetrics ward is the unit of analysis and each unit is given equal weight.

One in three women giving birth undergo an episiotomy

One of the most common procedures performed during childbirth is a routine episiotomy (CCP code 85.7) (Table 4). When episiotomies performed in conjunction with forceps or vacuum extractions are included (codes 84.1 and 84.71), 31% of births involved some kind of episiotomy. (By comparison, a total episiotomy rate of approximately 55% was estimated in the Health Canada study.⁵ Again, this difference may reflect the unit of analysis.)

A similar proportion of women experienced a repair of other obstetric lacerations (36%), with some of the lacerations resulting from an episiotomy. Despite the widespread application of episiotomy, some researchers suggest that there is little evidence to support its routine use and that health outcomes can be improved with a reduction in the episiotomy rate.^{6,7}

One in seven labours induced

Some labours that begin naturally cease following admission to hospital and are then re-initiated medically. In other cases, labour is induced from the start, often because the pregnancy has extended past the anticipated date of childbirth. In the study group, about one in seven deliveries were medically induced, and one in three women experienced an artificial rupture of membranes.

When labour is induced, it can be scheduled during traditional work hours when the attending physician and hospital staff are readily available. Hospital admissions of women giving birth were approximately 10% above average during the work-week and 20% below average on weekends and holidays.

Cesarean section

In total, 18% of all births were delivered by cervical cesarean section, a procedure that is performed more often on older women and women who have previously undergone a cesarean.^{8,9} This figure is consistent with estimates reported elsewhere. However, some recent research suggests that the cesarean rate can be reduced to 9% without adversely affecting maternal or infant health outcomes.^{5,10}

Table 3
Average length of hospital stay for childbirth, by province/territory, October-November, 1993

	Total hospital days			Women admitted to hospital			Average length of stay		
	Total	Cesarean	Non-Cesarean	Total	Cesarean	Non-Cesarean	Total	Cesarean	Non-Cesarean
	Days			Number			Days		
Canada	209,325	61,780	147,545	57,627	10,484	47,143	3.6	5.9	3.1
Newfoundland	4,302	1,257	3,045	1,004	204	800	4.3	6.2	3.8
Prince Edward Island	1,114	375	739	238	48	190	4.7	7.8	3.9
Nova Scotia	7,354	2,063	5,291	1,704	330	1,374	4.3	6.3	3.9
New Brunswick	6,365	2,105	4,260	1,413	301	1,112	4.5	7.0	3.8
Quebec	56,197	15,191	41,006	13,444	2,292	11,152	4.2	6.6	3.7
Ontario	75,629	23,345	52,284	22,943	4,160	18,783	3.3	5.6	2.8
Manitoba	7,782	2,614	5,168	2,228	395	1,833	3.5	6.6	2.8
Saskatchewan	7,943	2,036	5,907	2,075	347	1,728	3.8	5.9	3.4
Alberta	17,257	4,654	12,603	5,460	895	4,565	3.2	5.2	2.8
British Columbia	24,882	8,095	16,787	6,937	1,502	5,435	3.6	5.4	3.1
Northwest Territories	500	45	455	181	10	171	2.8	4.5	2.7

Data source: Person-Oriented Information Data Base, Health Statistics Division

There is a higher rate of maternal and neonatal morbidity associated with cesarean section compared with vaginal deliveries.¹¹ Understandably, this procedure generally involves longer hospital stays (Table 3). However, some recent American studies maintain that health outcomes can be improved and costs significantly reduced when post-cesarean early discharge programs are coupled with home follow-up.^{12,13} In Canada, approximately 25% of hospitals report some type of formalised early discharge program.⁵

Fetal surveillance

There was substantial regional variation in fetal surveillance during childbirth (CCP code 87.5), with the principal techniques including needlescopy, fetal EKG, and blood sampling. In Nova Scotia and New Brunswick, fetal surveillance was used in fewer than 5% of births. In Quebec, Ontario, Manitoba, Saskatchewan and British Columbia, 15% to 18% of births were monitored in this fashion. In Newfoundland, it was done during one-third of all births, and in Alberta, over half were monitored this way. Other research indicates that a majority of Canadian hospitals have policies that support the use of initial electronic fetal monitoring, but only a minority support the use of continuous electronic

fetal heart rate monitoring.⁵

While some type of assistance is rendered during most births, there appears to be considerable variation in practice across the country. These differences suggest that the choice of procedure may be influenced to some extent by regional convention. However, because these estimates are based on a two-month period only, they should be interpreted with caution. Some of the variation may be due to the relatively brief period to which the rates refer or to provincial variations in coding practices.

The variation in the frequency of “other obstetric operations” is most likely due to coding conventions in each jurisdiction. This code is used as a catch-all for births where no clear procedure was performed and may be unevenly applied.

Short hospital stays lead to high re-admission rates?

With the reduction in the length of hospital stays,^{14,15} concern has been growing about whether the health of new mothers or their children is compromised. Hospital re-admission rates have been used in an attempt to gauge change in health outcomes, but such information can be misleading—since re-admission rates may say more about the availability of health services and how they are delivered in each

Table 4
Prevalence rates of most common birth-related procedures, by province/territory, October-November, 1993

Procedure (CCP code)	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	N.W.T.
	%											
Repair of other obstetric lacerations (87.8)	36	29	17	36	15	38	34	35	37	40	39	44
Artificial rupture of membranes (85.0)	35	36	53	41	12	44	32	32	26	36	33	40
Episiotomy (85.7)	21	24	34	24	17	29	20	23	17	18	15	15
Other operations on fetus and amnion (87.5)	20	33	-	4	1	17	16	17	15	57	18	7
Cervical cesarean (86.1)	18	20	23	19	21	17	17	20	17	16	22	6
Manually assisted delivery (85.6)	16	15	-	16	12	12	22	1	16	12	14	21
Other obstetric operations (87.9)	15	8	-	-	-	24	19	-	10	-	6	1
Medical induction of labour (85.5)†	14	16	19	17	9	13	14	20	11	14	14	8
Vacuum extraction (84.71)	7	5	2	3	3	8	6	3	11	9	6	10
Low forceps delivery with episiotomy (84.1)	4	4	3	4	4	4	4	6	3	3	3	1

Data source: Person-Oriented Information Data Base, Health Statistics Division

Note: Rate is based on 56,967 women having at least one procedure performed during childbirth.

† Includes manual rotation of fetal head, assisted spontaneous delivery, Credé manoeuvre, and other procedures.

- Nil or zero

province than about health outcomes.¹⁶ For example, in Nova Scotia, the average length of stay for childbirth was a full day longer than in Ontario, yet Nova Scotia's hospital admission rates for the period before and after childbirth were both measurably higher than in Ontario.

Postnatal admissions

Only 4% of women in the study group were re-admitted during the four months after the birth of their child (Table 1). Other research corroborates this finding and also reports that only a small proportion of women who experience postnatal complications are hospitalized.^{11,17} Among those hospitalized, the leading diagnoses were cholelithiasis (gall stones), postpartum hemorrhage, postpartum care and examination, and major puerperal infection (Table 5). For this group, an average of 45 days elapsed between the date of discharge and their first re-admission.

There was some provincial variation in admission

Table 5
Leading diagnoses at postnatal hospitalization, Canada, October-November, 1993

Diagnosis (ICD-9 code)	Number	Percent of postnatal admissions [†]	Percent of of all births
		%	
Cholelithiasis (574) [‡]	392	15	0.7
Postpartum hemorrhage (666)	248	10	0.4
Postpartum care and examination (V24)	228	9	0.4
Major puerperal infection (670)	166	6	0.3
Contraceptive management (V25)	91	4	0.2
Other and unspecified complications of the puerperium (674) [‡]	80	3	0.1
Other symptoms involving abdomen and pelvis (789)	52	2	0.1
Persons seeking consultation without complaint or sickness (V65) [‡]	52	2	0.1
Infection of the breast and nipple associated with childbirth (675)	51	2	0.1
Other complications of pregnancy not elsewhere classified (646)	42	2	0.1

Data source: *Person-Oriented Information Data Base, Health Statistics Division*

[†] Rate is based on 2,598 postpartum hospital admissions and includes multiple admissions of the same person (15% of admissions).

[‡] It is unknown whether admissions for these diagnoses are pregnancy-related.

rates after childbirth. Only Quebec and Ontario had rates below the national average. Saskatchewan and the Northwest Territories posted the highest. Admission rates in Prince Edward Island and the Northwest Territories must be interpreted with caution, as they are based on small numbers.

Summary

The use of hospital resources during pregnancy, childbirth, and the postnatal period varies considerably across the country. In the Atlantic provinces, a larger percentage of women were hospitalized before and after childbirth than elsewhere in Canada, and their average length of hospital stay when giving birth was also the longest. By contrast, women in Ontario, British Columbia and Alberta had comparatively short stays for childbirth and generally low rates of hospitalization before and after childbirth.

The situation was mixed in other provinces. Quebec women experienced relatively long hospital stays but had low admission rates during the prenatal and postnatal periods. Conversely, in Manitoba, Saskatchewan and the Northwest Territories, hospital stays were short but admission rates before and after delivery were relatively high.

The findings in this article reflect birth-related hospital use during 1993/94, the most recent period for which linked hospital admissions data are available. Since then, there have been changes in pregnancy-related hospital use including more specific hospital policies on length of stay for an uncomplicated birth, greater access to midwifery services, and steady growth in the availability of prenatal and postnatal care programs offered outside hospital settings.

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