Giving Birth in Canada

The Costs

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Table of Contents

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It should be noted that the analyses and conclusions in this report do not necessarily reflect the opinions of the individual members of the Expert Advisory Panel or their affiliated organizations.

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About This Report

This report—*The Costs*—is the third in a series of *Giving Birth in Canada* reports. It explores the costs associated with delivering maternity and infant care in Canada, including provincial, national and international comparisons, where available.

The two other reports in the *Giving Birth in Canada* series are:

- ***Providers of Maternity and Infant Care* (2004)**—which focused on trends in birthing and maternal and infant care and examined the changing scopes of practice for care providers.
- ***A Regional Profile (2004)***—which provided select health care and health status indicators for Canada's mothers and infants. These indicators included new data presented at the regional level for regions with populations of 75,000 or more, and at the provincial level.

Please visit www.cihi.ca to order or download a copy of any of the reports from the *Giving Birth in Canada* series.

Each of these special reports presents a fact-based compilation of current research, historical trends and new data and findings. Their aim is to assist care-providers and decision-makers in planning health services for maternity and infant care. They also complement CIHI's ongoing reporting process and the initiatives of partners such as the Canadian Perinatal Surveillance System.

Canadian Perinatal Health Report, 2003

The Canadian Perinatal Surveillance System (CPSS) is part of Health Canada's initiative to strengthen national health surveillance capacity. The CPSS monitors and reports on perinatal health determinants and outcomes through an ongoing cycle of data collection and acquisition, expert analysis, interpretation and communication.

In 2003, the CPSS released its *Canadian Perinatal Health Report, 2003,* which includes information on 27 perinatal health indicators on determinants and outcomes of maternal, fetal and infant health. Statistics for each indicator consist mainly of temporal trends at the national level and provincial/territorial comparisons for the most recent year for which data are available. It can be downloaded free of charge from the following link: www.phac-aspc.gc.ca/ publicat/cphr-rspc03/index.html.

Highlights of This Report

- Total spending on health care for mothers and babies is significant, and these services account for about 1 in 10 dollars spent by hospitals on inpatient care. In 2002–2003, Canadian hospitals outside of Quebec and rural Manitoba spent an estimated $821 million on pregnancy and childbirth services for typical maternal inpatients (6% of total inpatient spending) and $361 million on care for typical newborns (4% of total inpatient spending). Added to this are the costs of services provided by physicians and other health care providers before, during and after birth; out-of-pocket spending by families; and other costs.
- Provincial and territorial health insurance plans generally cover medically necessary hospital and physician services related to childbirth. For example, in 2002–2003, health insurance plans in all provinces and the Yukon Territory paid fee-for-service physicians about $154 million for obstetrical services (excluding therapeutic abortions). This amounts to about 1.3% of all payments. The availability of, and public funding for, some other services—such as expanded screening for birth defects, midwifery care and fertility treatments—vary across the country.
- Most births are uncomplicated vaginal deliveries, but different types of deliveries have very different costs. For example, in 2002–2003, average inpatient hospital costs for patients who had a vaginal delivery with no complications were about $2,700. Patients who were admitted with a complicating diagnosis tended to have longer hospital stays and the average cost of their care was higher. The average cost of caesarean deliveries (about $4,600 per patient) was also higher than for vaginal deliveries.
- Likewise, hospital costs for newborns vary widely. In 2002–2003, average spending ranged from $795 for babies with a normal birth weight born by vaginal delivery to $117,806 for babies who weighed less than 750 grams at birth.
- Changes in maternal and infant care have the potential to affect spending. For example, the proportion of newborns who spend time in neonatal intensive care units (NICUs) is rising. NICUs care for newborns who need more monitoring or care than can be provided in regular maternity wards. In 2002–2003, the average hospital cost per baby admitted to the NICU was estimated at $9,700 (based on 27 hospitals submitting NICU cost information). Low–birth weight babies are more likely to need NICU care than those who weigh 2,500 grams or more at birth.
- Variations in birthing practices may also influence expenditures. For example, caesarean deliveries are much more common in some regions of Canada than in others. Lengths of stay in hospital may also differ. Overall, Canada has a lower average length of stay for maternity care than many countries of the Organisation for Economic Co-operation and Development (OECD)—two days for vaginal deliveries and about four days for caesarean deliveries in 2003–2004.
- Physicians continue to provide most obstetrical services in Canada. In 2002–2003, vaginal deliveries made up the largest proportion of obstetrical fee-for-service payments—78% for family physicians/general practitioners and 58% for obstetricians/gynecologists. Most caesarean sections are performed by obstetricians/gynecologists.
- Babies may need a variety of health services during their stay in hospital and after they go home. For example, fee-for-service physicians billed an average of $419 per capita for consultations and visits for children less than one year of age in 2002–2003. In addition, data from CIHI's National Ambulatory Care Reporting System show that in Ontario in 2003–2004, almost one in two infants under the age of one (48%) visited an emergency department (ED). Although the overall cost of ED visits has been a topic of research, little is known about hospital spending on neonatal visits to EDs or the costs of other health services provided to newborns.

How Much Does It Cost to Have a Baby?

For many people, deciding to become pregnant is a big step. It can invoke a great deal of emotion, including excitement and anxiety. In many ways, bringing new life into the world can be a wonderful life-changing experience to which no price tag can be attached.

Nonetheless, unlike the mythical delivery of an infant by a stork, health services linked to becoming pregnant and giving birth do come with a price tag. There are many health care providers and resources that are typically required for fertility, prenatal, labour and delivery and after-birth care. For example, a mother and baby may need the expertise of family physicians, obstetricians/gynecologists, nurses, midwives, pediatricians and others at specific stages in the course of care. Additionally, other resources such as laboratories, diagnostic equipment and neonatal intensive care units (NICUs) may be required. The cost of these services to parents and the health system prior to and immediately after birth can vary depending on the health needs of the mother and infant.

This report provides information on some of the physician, hospital and community costs associated with routine and non-routine maternal and infant care. It aims to uncover what we know and don't know about how much it costs to have a baby in Canada using CIHI data and other sources of information.

Where the Data Come From

The hospital-spending information presented in this report comes from the Discharge Abstract Database (DAD) and the Canadian MIS Database (CMDB), for fiscal year 2002–2003. The DAD contains administrative, clinical and demographic data that are received from acute care facilities across Canada, with the exception of Quebec and rural Manitoba. The CMDB contains financial and statistical information on hospitals and regional health authorities across Canada.

The patient groups in this report come from CIHI's Case Mix methodology, which is used to aggregate acute care inpatients with similar clinical and resource utilization characteristics into Case Mix Groups (CMGs). Hospital spending is assigned to these clinical groups using patient-specific Resource Intensity Weights (RIWs) and hospital-specific Cost per Weighted Case (CPWC) data.

Case Mix is an inpatient grouping methodology used in Canada to create discrete clusters of patients using clinical, administrative and resource consumption data. The result is groups of patients that are clinically similar and/or homogeneous with respect to hospital resources used. RIWs are relative values that describe the expected resource consumption of the "average" patient within a CMG, and often reflect differences in age and/or the presence of significant complications and/or comorbidities. The CPWC data provide a measure of the financial cost a facility incurs (on average) for a single inpatient weighted case. The financial data used to calculate CPWC are from the CMDB. Weighted cases are obtained from the DAD, grouped using CIHI's Case Mix Group and Complexity Overlay or CMG/Plx grouping methodology and include inpatient cases only.

Analyses based on the DAD and CMDB include only "typical patient" costs for those CMGs presented in this report (i.e. stillbirths, transfers, sign-outs, deaths and patients who stay longer than the expected length of stay are excluded). RIWs were used to calculate weighted cases, which in turn were instrumental in the CPWC calculation. RIWs were derived from case-costing data from hospitals in Alberta, Ontario and British Columbia.

Physician-payment data in this report are extracted from the National Physician Database (NPDB) for 2002–2003 and include reciprocal billing payments. The NPDB contains data on fee-for-service payments to doctors in Canada, paid by provincial and Yukon medical health care insurance plans. The database contains socio-demographic, payment and service utilization information used for physician resource and service utilization planning. Fee-for-service codes are grouped into National Grouping System (NGS) categories to facilitate comparison of similar fee codes across provinces and territories.

For more information, please refer to www.cihi.ca for DAD, CMDB, CPWC and NPDB documentation (*Hospital Financial Performance Indicators, 1999–2000 to 2002–2003* [CMDB and CPWC], *Average Payment per Physician Report, Canada, 2002–2003* [NPDB]). For CMG and RIW documentation, please see *DAD Resource Intensity Weights and Expected Length of Stay, 2005.*

Care Before Birth: The Costs of Pregnancy

"[Kim] was 31 years old...and had no health problems despite having had Type I diabetes for seven years. It seemed like the right time to have a baby...[b]ut...[she] worried whether the risks were too high. Having the support of [her] endocrinologist and husband, [she] felt ready to get pregnant. Once pregnant, [she] was conscious of the grams of carbohydrate [she] was eating, monitored [her] blood sugar levels seven times a day and adjusted [her] insulin regularly. When the third trimester arrived,... [t]he frequency of ultrasounds and visits to the obstetrician and endocrinologist increased significantly . . . [T]he end result was a healthy, beautiful baby girl. All had turned out better than expected; it truly was a miracle!"[1]

During the 20th century, Canada and other economically developed countries experienced many improvements in maternity care. Infant mortality rates declined, fertility treatment options increased and prenatal care improved.[2–4] For example, diabetic control and fetal surveillance techniques have made it possible for women with diabetes to deliver healthier newborns. Likewise, folic acid use has been linked to a lower incidence of neural tube defects.

Pre-conception and prenatal care allow health professionals to identify women at higher risk of developing complications so that they may receive additional monitoring and/or treatments. For example, some women may require more frequent pre-conception or prenatal visits, undergo additional screening and diagnostic procedures or require hospital care before birth. As a result, the cost of care before birth in Canada varies, depending on a variety of factors, including who provides the care as well as the range of services and tests that are performed.

This chapter explores what we know and don't know about the costs of fertility and prenatal care services, including assisted reproductive technology, physician and midwifery care and hospital care.

Routine Prenatal Visits

Throughout pregnancy, women typically receive regular prenatal examinations and tests to monitor their health and the growth and development of their babies. According to Statistics Canada, most women (97% of mothers with children aged 0–11 months in 2000–2001) receive prenatal care. The number, timing and content of these visits depends on the individual needs of each woman and baby. For those without identifiable

risks, the Society of Obstetricians and Gynaecologists of Canada recommends a prenatal visit every 4 to 6 weeks until 30 weeks' gestation; every 2 to 3 weeks until 36 weeks' gestation; and then every 1 to 2 weeks until delivery.[5]

During these visits, women may receive information on proper nutrition, weight gain, exercise, breastfeeding and genetic testing. Prenatal classes—offered by community agencies, hospitals, health regions or other sources—may also cover these topics, as well as other aspects of pregnancy, labour and early parenting. Attendees often pay for these costs out of pocket. However, community organizations (e.g. United Way) may also fund prenatal programs for vulnerable populations such as teen mothers.

FIGURE 1

What Is Routinely Tested?

Prenatal care is specific to the individual needs of each woman and her unborn baby. The figure below describes some routine tests and examinations that women may receive throughout their pregnancy. For example, the Society of Obstetricians and Gynaecologists of Canada states that there is fair evidence for offering prenatal ultrasound screening at 18–19 weeks' gestation as part of routine prenatal care. Depending on their circumstances, some women also receive additional tests or examinations.

Second Trimester

- Ultrasound scan: To check the age of the fetus and look for fetal abnormalities.

First Visit

- **Pregnancy test**: to confirm pregnancy.
- **Medical history and exam**: including complete checkup of whole body and internal physical exam of reproductive organs and pelvis.
- **Height, weight and blood-pressure measurement**: to provide initial measurement to compare with later examinations.
- **Blood tests**: to determine blood type and Rh factor; to look for unusual antibodies; to check for anemia and infectious diseases (hepatitis B, HIV, syphilis); and to check for immunity to rubella.
- **Urine test**: to check sugar and protein levels in urine; to check for urinary tract infection.
- **Pap test**: to check for cancer of the cervix or conditions that may lead to cancer.

Follow-up Visits

- **Weight and examination**: to assess the growth of the fetus and to determine its position in the uterus.
- **Urine test**: to check sugar and protein levels; to check for gestational hypertension.
- **Blood pressure**: to check for gestational hypertension.
- **Blood tests (at some visits only)**: to look for anemia and, in combination with ultrasound scanning, to assess the risk of fetal abnormalities (e.g. Down's syndrome). A test to screen for diabetes mellitus may also be needed.

Sources:

N. Schuurmans and A. Lalonde, *Healthy Beginnings: Your Handbook for Pregnancy and Birth* (Ottawa: The Society of Obstetricians and Gynaecologists of Canada, 2000).

D. Kindersley, Canadian Medical Association, *Canadian Medical Association Complete Home Medical Guide* (London, England: Dorling Kindersley Limited, 2001).

Society of Obstetricians and Gynaecologists of Canada, "Guidelines for Ultrasound as Part of Routine Prenatal Care," *Journal of Obstetrics and Gynaecology Canada* 78 (1999): pp.1–6.

HIV Screening in Pregnancy

HIV (human immunodeficiency virus) screening is becoming a more common part of routine prenatal care in Canada. According to national estimates, the HIV infection rate among pregnant women is approximately 3–4 per 10,000 population.[6] The risk of mother-to-child transmission of HIV depends, among other things, on whether or not antiretroviral treatment is taken. Data from the Canadian Perinatal HIV Surveillance Program show that between 1984 and 2004, there have been 464 cases of infants with confirmed HIV. In the majority of these cases (94%), infants did not receive perinatal antiretroviral treatment.[7]

In 1994, results from a randomized controlled trial by the AIDS Clinical Trials Group showed that when the drug zidovudine was administered to HIV-infected women during pregnancy and to newborns during the first six weeks after birth, the mother-to-child transmission rate decreased by nearly 70%.[8] Since the release of these findings, provinces/territories have developed, refined and implemented policies on HIV testing during pregnancy.[9] Currently, all provinces/territories have set recommendations or guidelines to routinely offer HIV screening to women during their prenatal care.[6] The rate of testing depends on a woman's consent and on whether health care providers offer the test.[10, 11]

Although we do not know how much Canada spends in total on HIV screening programs, the government of Ontario reported spending $1.6 million on its HIV Prenatal Screening Program in 2002–2003.[12] Studies in Canada and abroad have shown that these programs can be cost-effective, even in low-prevalence settings.[13, 14] In British Columbia, for example, the reported net savings attributable to preventing infections among babies carried to term was $165,586, with a saving per prevented case of $75,266.[13]

Prenatal Care Providers

Women may receive prenatal care from a single provider or from a group of providers in shared care. Depending on who provides the care and the province/territory in which the expectant mother lives, prenatal services beyond medically necessary physician care may or may not be covered by provincial/territorial health insurance plans. Statistics Canada data show that, in 2000–2001, 88% of women with children aged 0–11 months received prenatal care from physicians. According to results from the 2004 National Physician Survey, many of these physicians are family doctors. Overall, nearly half (47%) of all family doctors reported that prenatal care is part of their practice.[15]

Some provincial/territorial fee-for-service physician payment schedules have unique fee codes for prenatal visits; while in other provinces/territories, fee codes for prenatal visits are identical to postnatal visits or general office visits. As such, it is difficult to determine national estimates and provincial/territorial comparisons on payments for prenatal care. Estimates are, however, available for some jurisdictions. In 2004–2005, for instance, British Columbia's Ministry of Health reported that follow-up prenatal visits ranked among the top 50 expenditure items among all fee-for-service claims. During that year, expenditures for follow-up prenatal visits reached $10 million. The average payment per follow-up visit was approximately $29.[16]

Midwives also provide prenatal care, as well as intrapartum and postpartum care up to six weeks after birth. In 2000–2001, about 3% of women with children aged 0–11 months

reported receiving prenatal care from midwives. The regulation and funding of midwifery care varies across the country (please see The Costs of Labour and Delivery chapter for more information).

When Complications Arise

Although most pregnancies progress smoothly and result in healthy full-term babies, some women experience difficulties along the way. These difficulties may arise before conception because of problems related to infertility. They may also arise during pregnancy due to medical conditions, maternal age, lifestyle factors, multiple pregnancy, previous complications in pregnancy, family history or other factors.[17] Women who have a higher-than-average risk of developing complications before birth may require more visits to their health care provider, additional screening and diagnostic tests or hospital care.

In the following section, we explore what we know and don't know about the costs of assisted reproductive technology, prenatal screening for birth defects and antepartum hospital care.

When Getting Pregnant Is Difficult

Not all couples are able to conceive immediately. When it takes longer than one year,* experts consider it infertility.[18] Little is known about how often infertility occurs.[19] Using three telephone surveys conducted in 1991 and 1992, the *Final Report of the Royal Commission on New Reproductive Technologies* estimated that 8.5% of couples† in Canada who had been cohabiting for at least one year had not become pregnant after one year of not using contraception.[19] Recent estimates by Health Canada suggest that up to one in eight (12.5%) Canadian couples experience infertility.[20] This compares to an estimated 7% of the reproductive-aged population in the United States[21] and 14% in the UK and Europe.[22] According to the National Institute for Clinical Excellence in the UK, approximately 84% of couples in the general population will conceive after one year of frequent unprotected intercourse.‡[22] Among those who do not conceive in the first year, about half will in the second year, bringing the "cumulative pregnancy" rate in the UK to 92%.[22]

The Cost of Treating Infertility

Provincial/territorial health insurance plans typically cover diagnostic evaluations for determining the cause of infertility. Some also cover diagnostic or restorative treatments for potential underlying fertility problems.[23] These include procedures such as semen analysis and/or surgical repair of varicoceles or fallopian tubes. Ontario, however, is the only province in which in vitro fertilization (IVF) is publicly funded for up to three treatment cycles in women with completely blocked fallopian tubes.[24, 25]

Assessing infertility typically involves an initial evaluation of an individual's medical history (e.g. menstrual cycle, history of sexually transmitted diseases, family health history), performing a physical examination, as well as blood work (e.g. hormone levels).[18, 26] Other tests and procedures may be done to try to diagnose factors that might be responsible for the underlying fertility issue. Fee-for-service payments for such procedures vary. For example, a semen analysis test may be less expensive than a surgical procedure, such as a salpingostomy (a fallopian tube procedure). Once the physician has determined the potential cause(s) of infertility—whether male or female—treatment options may then be explored.

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* After 12 or more months of unprotected intercourse.
† Respondents were women aged 18 to 44 who were part of a couple that had been cohabitating for at least one to two years.
‡ "Frequent" is defined as sexual intercourse every two to three days.

Three main types of treatment are available to treat infertility: medical (e.g. ovulation drugs), surgical (e.g. laparoscopy in treating endometriosis) or assisted reproduction.[22] Medical and/or surgical interventions are most often used in treatment.[33] However, pregnancy can also occur independent of treatment even among patients with long-standing infertility or varying diagnoses of infertility.[34] In pursuing treatment options, research suggests that cost may be a factor among infertile couples.[35]

FIGURE 2

Physician Fees for Diagnosing and Treating Infertility

In Canada, fees for routine diagnostic services vary depending on where an individual is treated. Within a jurisdiction, fees may also vary depending on physician specialty, as well as the nature of the service provided (e.g. laboratory/radiology, whether anesthesia is used, or if the procedure is billed in combination with another fee-for-service item). The table below provides an example of some of the procedures that may be used and their relative fees, based on British Columbia's 2005 Medical Services Plan physician fee-for-service schedule.

Service	Fee ($)
Semen Analysis (includes total count, motility count, pH and morphology)	42.07
Endometriosis Cauterization	43.97
Laparoscopy (Operation only)	153.90
Salpingostomy	
• Via laparoscope (unilateral)	109.94
• Via laparoscope (bilateral)	219.85
Micro Salpingostomy	
• Unilateral	455.11
• Bilateral	591.63
Hysteroscopy (Surgical)	
• Hysteroscopic division of intra-uterine adhesions (simple)	143.82
• Hysteroscopic division of intra-uterine adhesions (complicated)	241.43
Salpingolysis and removal of adhesions—loupes or microscope (unilateral or bilateral)	329.78

Notes: The items listed in the table above are not exhaustive and include only the physician fees per service as listed in the physician benefit schedule.
Source: Medical Services Commission Payment Schedule (Ministry of Health), Government of British Columbia.

Several types of costs can be considered in infertility treatments: direct medical costs, direct non-medical costs and indirect costs.[36] Direct medical costs include such things as hospital costs, drugs and physician fees. Direct non-medical costs may include food, lodging and transportation associated with accessing/seeking infertility treatment. Although harder to estimate, indirect costs such as lost working days and wages can also be considered in the overall cost of seeking treatment.[36, 37] Researchers suggest that factors that may influence the range in costs for infertility treatment other than technology include: the underlying infertility problem and how long it has existed; the estimated pregnancy success rate associated with the specific technology in question; the duration of treatment;[38] associated medical conditions; female age; and the number of previous attempts to conceive.[39]

Assisting Infertile Couples

The world's first "test tube baby" was born in July 1978.[27] Since that time, the range of available treatments for infertility has increased.[4] Because most assisted reproductive technologies (ARTs) are not covered by provincial/territorial health insurance plans, the costs of these services are often borne out of pocket. Common categories of ARTs include:[28]

- In vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI): a process whereby a woman's egg is retrieved, fertilized and transferred to her uterus. Couples may have to go through several cycles before achieving a successful pregnancy or deciding to discontinue further cycles.
- Artificial insemination: A procedure whereby sperm from a woman's partner or donor is placed in a woman's upper vagina during the period of time in which she has ovulated. A more technical procedure and a variation on artificial insemination, *intrauterine insemination,* is a fertility-enhancing procedure in which sperm are placed either in the cervix or high in the uterus using a catheter.[29]

The cause of infertility often determines which type of ART will be used, if at all.[29] In vitro fertilization and ICSI tend to be the most frequently utilized ARTs in Canada and abroad.[30–32] The Canadian Assisted Reproductive Technologies Register (CARTR)—a voluntary national registry that collects treatment-cycle data from Canadian fertility centres using ART—tracked activity at 19 of the 22 ART centres in Canada in 2001. They collected almost 8,000 ART cycles in those centres.[30]

FIGURE 3

Range in Fees for IVF/ICSI

Because of the complex nature of financing in vitro fertilization, comprehensive cost data are not available. To estimate the range of costs, information was collected on the Web sites of 27 IVF clinics identified by the Canadian Fertility and Andrology Society in 2005. Services that might be included (e.g. administrative fees, IVF and/or ICSI, storage fees) vary from clinic to clinic. The table below shows the range in fees for various aspects of treatment. However, this amount may vary, depending on patient characteristics such as age, weight, type of protocol chosen and how many treatment cycles have taken place.

Procedure	# of Clinics Reporting	Range (CA$)
Administration Fee	11	150–1000
Initial Visit	8	50–200
IVF/Treatment Cycle	21	4100–5900
ICSI/Treatment Cycle	20	800–1545
Sperm Functional Assessment/Survival Test	11	50–350
Semen Cryopreservation (Freezing)	8	125–500
Annual Storage Fee for Frozen Semen	11	100–250
Assisted Hatching	13	200–500
Frozen Embryo Transfer	17	100–1500
Microepididymal Sperm Aspiration (MESA)/ Percutaneous Epididymal Sperm Aspiration (PESA)	9	250–2200
Annual Storage Fee for Frozen Embryo	18	150–300

Note: Drug treatments for ovulation induction/stimulation are typically not included in clinic costs and are excluded from the table above.
Sources: Canadian Fertility and Andrology Society. Clinic fees compiled by CIHI.

Variation in Funding for Reproductive Technologies

Debate has focused on the cost, proof of effectiveness, safety and ethical implications of assisted reproductive technologies.[24] Many countries around the world offer certain fertility services through public funds, but coverage for IVF may be limited or unavailable.[24] Despite the increase in demand, provincial/territorial ministries of health do not publicly insure most ART procedures and so costs are often borne privately.

There is active debate about whether to fund assisted reproductive technologies. A number of arguments have been put forward as to why certain reproductive technologies should not be publicly funded. One argument is grounded in the idea that reproductive technology is not medically necessary because infertility is not considered a "disease." As such, this argument posits that the underlying fertility issue will not be "cured" by the technology in question.[43, 52] Other arguments include the fact that other options exist to treat the underlying infertility problem and other means exist to become parents (e.g. adoption). These concerns invariably raise questions about reproductive rights and the ethics of external fertilization.[53] However, proponents of public funding for reproductive technology[54] have argued that there is sufficient evidence demonstrating that assisted reproductive technologies (particularly IVF), are useful for women with damaged fallopian tubes, unexplained fertility and other etiologies, and that decisions made by provinces to de-list IVF were based on data that were outdated. Some researchers[24] have also suggested that the arguments/concerns used to not publicly fund IVF are not unique and that some health services that are currently publicly funded are also susceptible to the same criticisms.

Multiple Pregnancy and Assisted Conception

Couples who use assisted reproductive technologies are more likely to have multiple births.[31, 40] These mothers and babies face greater health risks compared to singleton pregnancies[40–44] due largely to conditions associated with preterm birth and low birth weight.[40, 43, 45] Rising rates of multiple births in Canada and abroad have raised questions about the potentially higher costs of prenatal, delivery (e.g. potential increases in caesarean delivery) and neonatal care (e.g. intensive care, drug therapy, inhalation therapy and imaging or other diagnostic procedures).[43] In addition, very-low and low–birth weight babies are more likely to have chronic health problems, which may also lead to long-term needs for costly health services.[28]

Because of the higher risk of multiple births—as well as their costs—associated with the use of assisted reproductive technologies,[46] some suggest limiting the number of embryos transferred (depending on the woman's age and clinical situation), particularly during IVF, in order to reduce the multiple birth rate while still optimizing the pregnancy rate.[47, 48] Some researchers have shown a reduction in the multiple birth rates when there was a reduction in the number of embryos transferred during an IVF cycle.[49–51] However, other factors, such as how well the embryo implants itself and the quality of embryo implanted, may also play a role in the risk of multiple births during an IVF cycle.[46, 48]

Charter Challenges and Infertility

"Restricted access" to assisted reproductive technologies—specifically IVF and ICSI—resulted in Charter challenges in Nova Scotia and Ontario during the late 1990s. In both provinces, the issue centred on whether infertility services should be part of the public health insurance plans.[52, 53] The courts (both trial and appellate) stated that the province of Nova Scotia had the right to limit coverage of certain procedures on the basis of medical necessity, expense and effectiveness.[25, 52] The appeal judge also noted that the Nova Scotia government did not deny funding for all procedures for infertility, but only for the select two (IVF and ICSI). Coverage of ICSI was also denied in Ontario, even though IVF was (and is still) covered on a limited basis (i.e. three treatment cycles for women with bilateral blocked fallopian tubes).[53]

Birth Defects

Of the approximately 330,000 children born in Canada each year, about 2%–3% are born with a serious birth defect, which can result in physical or mental disability, or can be fatal.[55, 56] Although there are only limited data on the costs of detecting and managing birth defects in Canada, pockets of information are available. The cost of birth defects was estimated at $706 million in 1998, according to Health Canada's *Economic Burden of Illness in Canada* report. Indirect costs made up the largest share (75%) of these costs and include the value of economic output lost due to long-term disability and mortality. Direct costs made up a smaller share (25%) of the total cost and include hospital, physician and drug expenditures.[57] Some of these direct costs can be attributed to screening and diagnostic testing, ultrasounds, laboratory costs and provider fees and salaries.

Screening for Birth Defects

Birth defects may be detected in the pre-conception or prenatal stage. Carrier screening for some inherited disorders—such as cystic fibrosis, sickle-cell anemia, Tay-Sachs disease and thalassemias—can be performed before conception. During pregnancy, the risk of chromosomal abnormalities, such as Down's syndrome, can be identified through procedures such as maternal serum screening or nuchal translucency.

Maternal serum screening (MSS) is a program that is evolving in Canada. The availability and funding of MSS varies across the country and by the type of test. Depending on the number of markers that are examined, women may receive a single, double or triple screen test. The single screen test is publicly funded in all provinces and territories. Double and triple screen tests, however, are not universally covered. In 2001, the Society of Obstetricians and Gynaecologists of Canada estimated that they could cost approximately $40 and $80, respectively, when patients pay out of pocket for the service.[55] Currently, British Columbia, Saskatchewan, Manitoba, Ontario and Newfoundland and Labrador cover the triple screen test through provincial health plans.

Diagnostic Testing for Chromosomal Abnormalities

Screening tests identify a woman's risk of having a baby with a birth defect. Diagnostic tests, such as amniocentesis and chorionic villus sampling, can be used to provide more definitive answers. However, these tests come with their own risks, such as miscarriage.[55] Because the likelihood of chromosomal abnormalities increases with age, amniocentesis and chorionic villus sampling are covered by provincial and territorial health plans for

women who are 35 years of age or older on their due date. These tests are also covered for individuals who have a history of birth defects or are identified as high-risk from their ultrasound or MSS results.[55]

Physician-billing information provides limited information on the cost of some diagnostic tests. In 2002–2003, for example, physicians billed fee-for-service payment plans approximately $5 million for obstetrical services unrelated to delivery. Payments for these types of services include amniocentesis,* among many other types of procedures, such as fetoscopy and stress tests.

Canada Prenatal Nutrition Program

Each year, approximately 10% of births are at risk due to poor health and malnutrition of the mother.[58] Poor nutrition is a risk factor for low birth weight.[58] The Canada Prenatal Nutrition Program (CPNP) is a comprehensive nutrition program that aims to reduce the incidence of unhealthy birth weights, improve the health of infants and mothers and promote breastfeeding through a community development approach. The program targets at-risk women such as teens, Aboriginal women, immigrants, women living in poverty or violence, women who abuse alcohol or drugs and women who have poor access to services.[59]

Federal, provincial and territorial governments jointly fund the CPNP. In 2002–2003, $31 million was allocated to the CPNP from the federal budget. CPNP projects are tailored to meet the needs of the clients in the community and may include services such as food supplements, vitamin supplements, one-on-one nutrition counselling and breastfeeding support.[59] Data collected across 350 CPNP projects between 1996 and 2002 showed that 79% of participants started breastfeeding. Health Canada indicates that although estimates from surveys are not directly comparable, CPNP breastfeeding rates appear to be higher than for similar at-risk groups in the general population. Similar programs may also be funded through other organizations, but the total costs are not known.

Hospitalization Before Birth

Sometimes complications occur that may require hospitalization before childbirth. Ectopic pregnancy, for example, is the leading cause of maternal deaths[2] and is sometimes seen in Canadian emergency departments in the early stages of pregnancy.[60] Preterm labour is another potentially serious complication and occurs when labour begins before completion of the 37th week of gestation.[2]

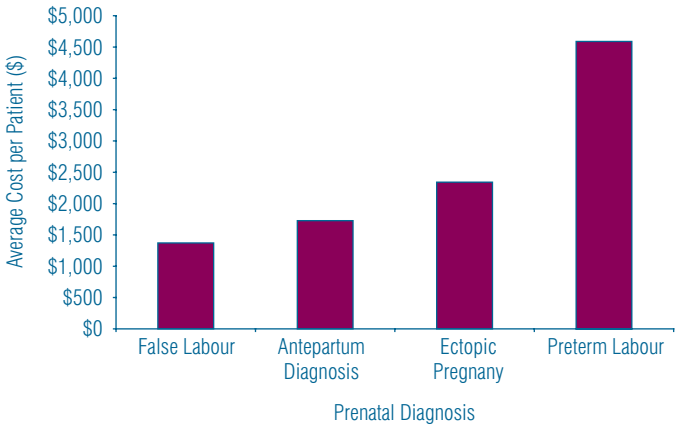
In 2002–2003, acute care hospitals outside of Quebec and rural Manitoba spent approximately $47 million on typical inpatient services provided before birth, including antepartum care, preterm labour, false labour and ectopic pregnancies. This accounted for approximately 6% of total pregnancy and childbirth inpatient costs. The hospital

* Data include only the cost of performing amniocentesis and not the associated laboratory costs. The data are limited to payments to physicians who bill fee-for-service and do not include physicians who are remunerated through alternative payment plans.

FIGURE 4

Hospital Costs per Patient

Before childbirth, pregnant women may receive hospital care for antepartum diagnoses or for preterm labour, false labour and ectopic pregnancy. The cost of caring for these patients varies and depends on the hospital and staff resources needed. In 2002–2003, the total average cost per patient admitted to an acute care hospital for false labour was $1,400, whereas a preterm labour admission cost an average of $4,600.



Note: Data do not include Quebec and rural Manitoba. Only typical patients in acute care facilities were included (i.e. patients who received a course of treatment in a single institution and were discharged; excludes stillbirths, transfers, deaths, sign-outs and patients who stayed longer than the expected length of stay). Patient categories are based on CIHI's Case Mix Group methodology.

Sources: Discharge Abstract Database, CIHI; Canadian MIS Database, CIHI.

resources needed to provide these services can include nursing care, other personnel salaries, drugs, laboratory work, equipment and supplies. Antepartum care accounted for $25 million, representing over half (55%) of total inpatient costs of services provided before birth. Average costs were greater for antepartum care patients who were admitted with a complicating diagnosis such as excessive vomiting, placenta previa with hemorrhaging, gestational hypertension or cervical incompetence. When there are no complicating diagnoses, the average cost per antepartum care patient admitted to hospital in 2002–2003 was $1,400 and the average length of stay was 1.6 days. However, when there was a complicating diagnosis, the typical cost increased to $2,100 and the average length of stay was 2.6 days.

The Costs of Labour and Delivery

"Thirty-seven-year-old Annice received a bit of a surprise when she went to the doctor complaining of severe menstrual cramps. After examining her, the doctor informed her she was actually 23 to 24 weeks pregnant. Three hours later, she delivered her 1lb, 4oz baby girl prematurely. Jimice was born with her umbilical cord wrapped around her neck and needed to spend the next four months in the hospital during which time she spent a month on a ventilator. The little girl now weighs 5lbs, 2oz and [was] finally able to go home."[61]

Every labour and delivery is unique. While many deliveries occur without complications, others require the use of a variety of interventions to minimize the risks to the mother and/or child or address complications that arise. This chapter looks at the costs of interventions during labour and delivery for both less and more complicated maternal cases.

For centuries, most births took place in the home, with the help of local midwives, friends and/or family. Over time, patterns of delivery have changed in Canada and around the world. Today, most Canadian women give birth in a hospital. In 2002–2003, according to Statistics Canada data, only 1% of children were born in other settings, such as at home or in birthing centres. Over that same period, Canadian hospitals spent an estimated $821 million (6% of total inpatient spending) on inpatient pregnancy and childbirth services for typical maternal patients.

In Canada, physicians attend the vast majority of births. Although many other health care providers, such as midwives, are also involved in labour and delivery, there are only limited data available on the cost of their services. However, estimated costs for physician care can be derived from fee-for-service payments for vaginal deliveries, caesarean sections and other obstetrical services. For example, in 2002–2003, payments to fee-for-service physicians providing obstetrical services totalled about $154 million (excluding therapeutic abortions). These fee-for-service payments amounted to an average of approximately $470 per live birth in Canada. Obstetrical services performed by physicians include vaginal and caesarean deliveries, as well as other services that are provided during pregnancy and childbirth (e.g. fetoscopy, stress tests and amniocentesis). In terms of payments for all obstetrical services (excluding therapeutic abortions), physicians received the largest amount for less complicated vaginal deliveries. In 2002–2003, this amounted to $98 million, or 64% of total obstetrical service payments to physicians (family physicians/general practitioners and obstetricians/gynecologists).

The Costs of Vaginal Deliveries

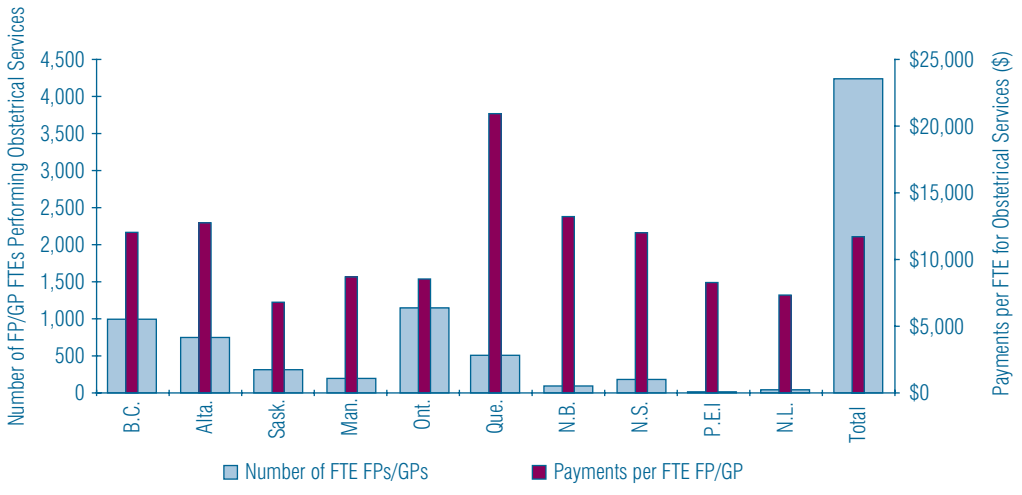
For most expectant mothers, labour begins spontaneously at about 40 weeks into the pregnancy, signalled by increasingly frequent contractions of the uterus, dilation of the cervix and eventually the breaking of the water. In many cases (43% of all deliveries in Canada in 2002–2003), babies are born vaginally and without complication. Induced vaginal deliveries have become more common in recent years. They accounted for 21% of all hospital-based deliveries in 2003–2004.

Individually, vaginal deliveries (excluding vaginal births after caesarean [VBACs]) are typically the least expensive method of giving birth. However, because most babies are born this way, total hospital inpatient spending for vaginal deliveries is greater than the combined spending for all other modes of delivery. The same is true for fee-for-service payments to physicians.

FIGURE 5

Fee-for-Service Payments to FPs/GPs for Obstetrical Services

The number of family physicians/general practitioners (FPs/GPs) performing obstetrical services, and the fee-for-service (FFS) payments they receive vary across the country. Variation in obstetrical payments per physician can be attributed to such factors as provincial differences in fee schedules, the number of physicians practising obstetrical care and the number and range of obstetrical services performed by FPs/GPs. As well, some provinces (such as Newfoundland and Labrador) pay many FPs/GPs fully or partially through alternative payment plans (APP), which are not included in the graph below. Since the factors that underlie provincial/territorial physician cost data are so varied, caution is needed when making jurisdictional comparisons simply by looking at fee-for-service payment data alone.



Note: Fee-for-service payments include data from the provinces only. Physician full-time equivalent (FTE) numbers are for full-time and part-time physicians receiving FFS payments for obstetrical services (excluding therapeutic abortions) in 2002–2003. For the purposes of payment calculations, FTE FPs/GPs are used. For more information, see CIHI's *Average Payment per Physician Report* or *Full-Time Equivalent Physicians Report*. Payments to physicians include reciprocal billing.

Source: National Physician Database, CIHI.

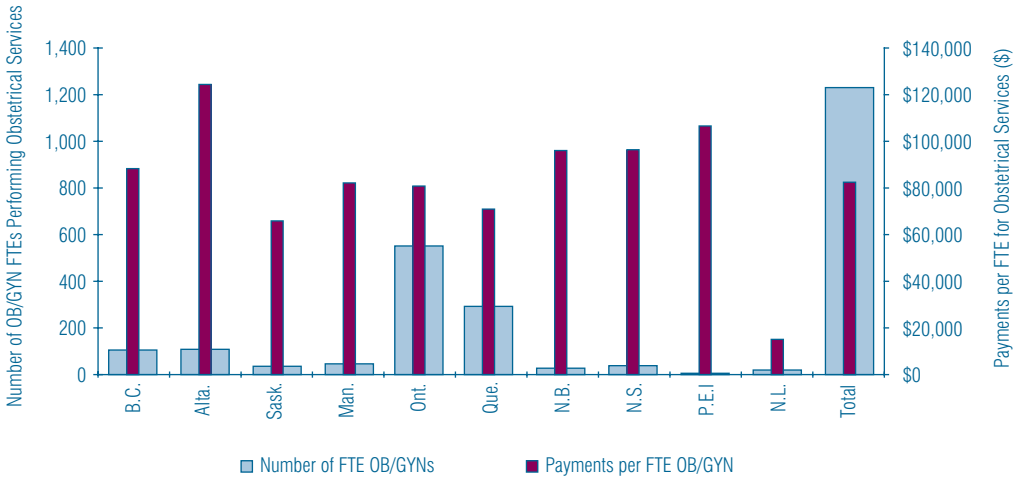
Attending Vaginal Deliveries

Several different types of health care providers can be involved in intrapartum care (attending births). These include physicians, nurses, nurse practitioners and midwives. However, it is physicians—family physicians/general practitioners (FPs/GPs) and obstetricians/gynecologists (OB/GYNs)—who deliver most babies in Canada.

FIGURE 6

Fee-for-Service Payments to OB/GYNs for Obstetrical Services

Although the number of OB/GYNs is smaller than the number of FPs/GPs performing obstetrical care in Canada, payments to OB/GYNs for these services are proportionately higher than those to FPs/GPs. Fee-for-service payments for OB/GYNs differ across the provinces. Provincial fee schedules can vary due to factors such as: the type of alternative payment arrangements provinces may have with physicians; the number of physicians practising in each province; and the number and range of obstetrical services performed by OB/GYNs. Note that in Newfoundland and Labrador, some physician payments are in the form of alternative (non-FFS) payments—about 42% of clinical payments to all physicians were alternative payments in 2002–2003.



Note: Fee-for-service payments include data from the provinces only. Physician FTE numbers are for full-time and part-time physicians receiving FFS payments for obstetrical services (excluding therapeutic abortions) in 2002–2003. For the purposes of payment calculations, FTE OB/GYNs are used. For more information, see CIHI's *Average Payment per Physician Report* or *Full-Time Equivalent Physicians Report*. Payments to physicians include reciprocal billing.

Source: National Physician Database, CIHI.

Fee-for-service payments that physicians receive for vaginal deliveries are mostly divided between OB/GYNs and FPs/GPs. Of the $98 million in FFS payments to physicians for vaginal deliveries in 2002–2003, about 60% went to OB/GYNs and 40% went to FPs/GPs. These amounts accounted for 58% of total obstetrical payments to OB/GYNs and 78% of total obstetrical payments to FPs/GPs. In terms of average payment per physician performing obstetrical services, these proportions for vaginal delivery payments amounted to about $82,000 per full-time OB/GYN and $12,000 per full-time FP/GP in Canada.

Differences in these FFS physician payments can be attributed to the range of obstetrical services offered by different physician types, as well as the number of deliveries attended. In 2002–2003, about half of total payments for procedures (excluding payments for consultations and visits) made to OB/GYNs were for obstetrical services, including therapeutic abortions. By comparison, roughly one-tenth of total payments for procedures made to FPs/GPs were for obstetrical services.

Although family physicians provide some maternity care, fewer are delivering babies than in the past. For example, although FPs/GPs received 33% of all payments to physicians for obstetrical services in 2002–2003, this represents a decline in the proportion of births attended by family physicians. In 2001, only 16% of FPs/GPs provided intrapartum care, down from 28% in 1992. The 2004 National Physician Survey indicates that about 13% of FPs/GPs now provide intrapartum care. Research has shown that this decline may reflect a choice of new FPs/GPs not to provide intrapartum care. A 2002 Ontario study found that the factors associated with the decisions of new medical graduates not to deliver babies included concerns about the impact on their personal lives, their confidence with obstetrical skills, current fee structures and the perceived threat of malpractice suits.[62]

Midwives

In low-risk pregnancies, midwives may also deliver babies and provide a range of services during pregnancy, labour, birth and after birth. However, expectant mothers must decide whether they will receive their care from a midwife or a physician (FP/GP or OB/GYN), since having more than one care provider is considered to be a duplication of health care services in some provinces/territories*—except in the case where a transfer of care to a physician is required. Some provinces/territories fund midwifery services through their provincial/territorial health insurance plans. Other jurisdictions may regulate midwifery but do not actually fund these services. Where this occurs, patients must pay for services out of pocket. In Manitoba, Ontario and British Columbia—where midwifery services are covered under public health insurance plans—midwives attended about 2%, 4% and 5%, respectively, of all hospital births in 2001–2002. Although jurisdictions differ in the settings in which they allow midwifery to be practised, in general, midwives practise in hospitals, clinics, birth centres and a woman's place of residence.

Fees for midwifery services vary across the country. However, it is difficult to find information on payments for midwife deliveries, due in part to the fact that the regulatory environment for midwives has changed considerably in recent years. Some provinces/territories now fund midwifery services and have adopted standard fee schedules set by provincial/territorial ministries.

* Only for provinces/territories that fund midwifery care.

FIGURE 7

Uneven Regulation and Funding of Midwifery Care

Midwifery is evolving differently across the provinces/territories—some jurisdictions have regulated and publicly fund midwifery while others have not. In provinces/territories where midwifery services are not publicly funded, these services must be paid for out of pocket.

Province/ Territory	Regulation (Year)	Funding
B.C.*	Yes (1998)	Yes
Alta.*	Yes (1998)	No
Sask.*	Yes (1999) Act not yet proclaimed	No
Man.*	Yes (2000)	Yes (in some regional health authorities only)
Ont.*	Yes (1994)	Yes
Que.†	Yes (1999)	Yes
N.B.*	No	No
N.S.*	No	No
P.E.I.*	No	No
N.L.*	No	No
Y.T.*	No	No
N.W.T.‡	Yes (2005)	Yes
Nun.§	No	Yes

Sources:

* Canadian Association of Midwives, *Across Canada,* [online], cited January 16, 2006, from <http://www.canadianmidwives.org/across_canada.htm>.

† S. Hawkins and M. Knox. *The Midwifery Option: A Canadian Guide to the Birth Experience* (Toronto: HarperCollins Publishers, 2003).

‡ Northwest Territories Health and Social Services, *Midwifery*, last modified September 30, 2005, [online], cited January 16, 2006, from <http://www.hlthss.gov.nt.ca/Careers/midwifery/midwifery.asp>.

§ Email communication with Norman Hatlevik, Executive Director, Nunavut Health and Social Services, Kiwaliq Region, January 16, 2006.

In some of these jurisdictions, midwives are paid according to fee schedules for specific courses of care. In British Columbia, for example, there are two fee-schedule payments for services associated with labour and delivery: at first contact with the client prior to 34 weeks ($860), and at first contact with the client after 34 weeks ($430). In addition, certain jurisdictions limit the number of clients that a midwife can serve in a given period. In British Columbia, for example, midwives only receive payment for up to 40 courses of care per year.[63] In Alberta, where midwifery services are regulated, but not covered under public health plans, families pay about $2,500 out of pocket per course of care.[64]

Different types of health professionals are trained to deliver different types of obstetric care. Some research suggests that the care that a midwife provides might reduce costs for uncomplicated vaginal deliveries because fewer resources are needed during labour and delivery.[65] Also, fewer interventions may be required, which may result in earlier discharge.[66] Similar cost savings associated with midwife-attended low-risk pregnancies have been found in the United States and the United Kingdom.[67, 68]

Hospital Costs of Vaginal Deliveries

Although less complicated vaginal deliveries (spontaneous or induced) account for the largest proportion of *total* spending in Canadian hospitals on pregnancy and childbirth, they are the least costly method of delivery on a cost-per-patient basis. For example, a Nova Scotia study examining data between 1985 and 2002 found that the cost of spontaneous vaginal delivery was significantly lower than that of assisted vaginal delivery or caesarean delivery with labour.[69]

In 2002–2003, vaginal deliveries (including VBAC) amounted to 65% of all pregnancy and childbirth patients in hospital. Uncomplicated vaginal deliveries made up two thirds of this amount, or 43% of all pregnancy and childbirth patients. The relative percentages are similar when vaginal deliveries as a proportion of total pregnancy and childbirth spending are considered. In-hospital vaginal deliveries comprised about 61% of total spending on pregnancy and childbirth patients, with uncomplicated vaginal deliveries accounting for 38% of total in-hospital pregnancy and childbirth spending. The average cost per patient of an uncomplicated vaginal delivery in a Canadian hospital was $2,700—for a complicated delivery it was about $3,200 per patient. For all vaginal births combined, the average cost per patient was $2,800.

Other Delivery Costs

Sometimes medical intervention is required during delivery. In fact, some services, such as epidurals and inductions, are becoming increasingly common for complicated as well as uncomplicated deliveries. This may have implications for the costs of obstetrical care.

When labour does not begin spontaneously, clinicians may recommend that it be induced artificially. This may happen for several reasons, such as when babies are overdue or if the mother or the fetus has medical issues.[70] Labour can be induced with drugs (medical induction) or special tools to artificially break the water (surgical induction).[71, 72]

Induction of labour has become more common in recent years. According to Health Canada, rates of medical and surgical inductions rose from 12.9% in 1991–1992 to 19.7% in 1999–2000 (a 53% increase).[2] Rates of induction of labour have continued to rise, reaching 21.3% of all deliveries in 2003–2004. Studies have shown that induced vaginal deliveries tend to be more costly than spontaneous vaginal deliveries.[69, 73] For example, physician fees in Ontario are about $68 per medical induction using oxytocin, and approximately $59 for cervical ripening using topical or mechanical agents. As well, researchers have found that the type of drug administered during a medical induction may have an impact on hospital spending on births. For example, a Canadian study conducted between 1992 and 1995 found that medical induction of labour using oxytocin was less expensive than induction with prostaglandin.[74]

Epidural analgesia, which provides pain relief for the lower half of the body, is another procedure used during labour and delivery. In 2003–2004, the Canadian rate for epidurals was 45.5% of all deliveries. In some provinces/territories, physicians are paid separately for the administration and maintenance of epidurals. For example, in Alberta, physicians bill $100 for epidural set-up and initial injection, and about $14 for every five minutes of monitoring and/or top-up and adjustment as necessary. Differences in payments to FPs/GPs and specialists for this procedure exist in some other provinces. For example, in Saskatchewan, the fee for an epidural performed by a specialist is $225 for initial set-up and subsequent maintenance—the fee is $203 for FPs/GPs. Research shows that costs of epidural analgesia may be related to a variety of other factors as well, including the need for a trained specialist to perform the procedure; nursing staff knowledgeable about this course of care; variation in drug costs; and clinical complications.[75]

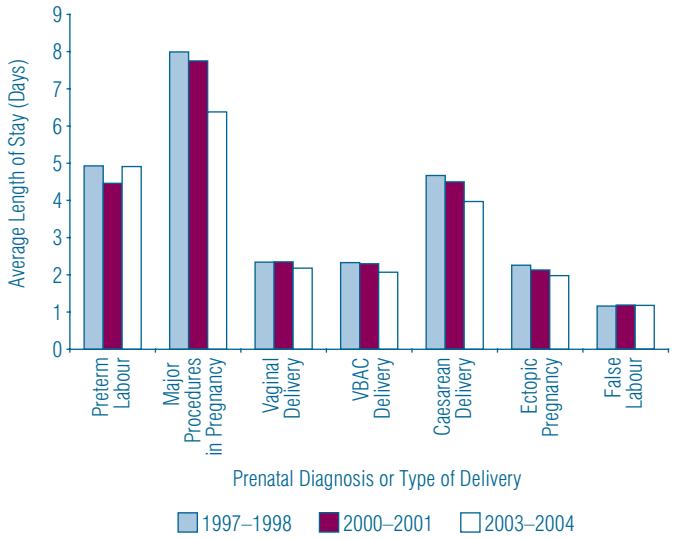
Mothers' Length of Stay in Hospital

The average length of hospital stay for pregnancy and childbirth patients in Canada began to decrease more than 20 years ago. Between 1984–1985 and 1994–1995, the mean length of stay for all deliveries fell from about five days to three days—a drop of 44%. This trend towards earlier discharge from hospital of healthy mothers and babies is partly a consequence of efforts by hospitals to contain or reduce the costs associated with obstetrical care.[2, 76]

FIGURE 8

Mothers' Length of Stay in a Canadian Hospital

Vaginal-delivery patients, whether they have previously given birth by caesarean section or not, have the shortest typical average length of stay for deliveries in Canada. Other pregnancy and childbirth patient groups, such as "major procedures in pregnancies," on average, have significantly longer stays in hospital. This clinical group includes patients who have undergone additional procedures, which may include hysterectomies, occlusions and surgical postpartum repair.



Note: Data do not include Quebec and rural Manitoba. Only typical patients in acute care facilities were included (i.e. patients who received a course of treatment in a single institution and were discharged; excludes stillbirths, transfers, deaths, sign-outs and patients who stayed longer than the expected length of stay). Patient categories are based on CIHI's Case Mix Group methodology.

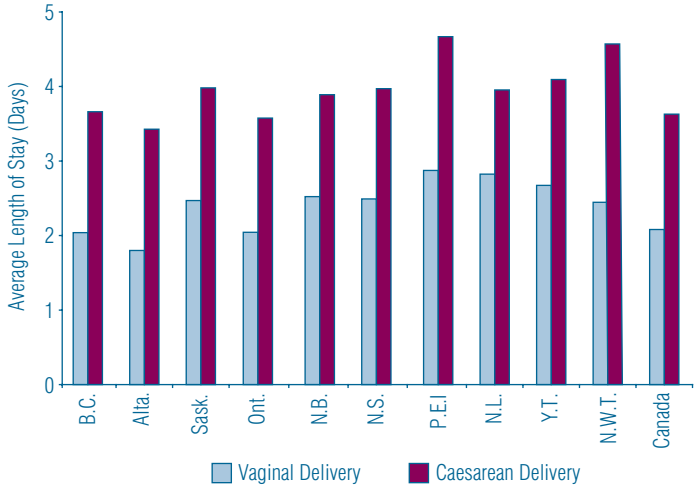
Source: Discharge Abstract Database, CIHI.

This decrease in length of stay is particularly pronounced for certain methods of delivery and related maternal obstetrical services. Although the average length of stay for all vaginal deliveries remained constant at about two days between 1997–1998 and 2003–2004, over the same period, the average length of stay for caesarean-section patients fell 15%—from close to five days in 1997–1998 to four days in 2003–2004. The decline in the average length of stay for major procedures related to pregnancy is even more significant. Rates fell from eight days in 1997–1998 to just over six days in 2003–2004—a drop of 20%.

FIGURE 9

Length of Stay for Vaginal and Caesarean Deliveries Varies in Canada

The average length of stay for typical patients varies across Canada. In 2003–2004, for vaginal deliveries, Alberta had the shortest average length of stay (1.8 days) and Prince Edward Island had the longest (2.9 days). Similarly for caesarean deliveries, the average length of stay varied from over three days in Alberta, to close to five days in Prince Edward Island and the Northwest Territories. The Canadian averages were about two days for vaginal deliveries and almost four days for caesarean deliveries.



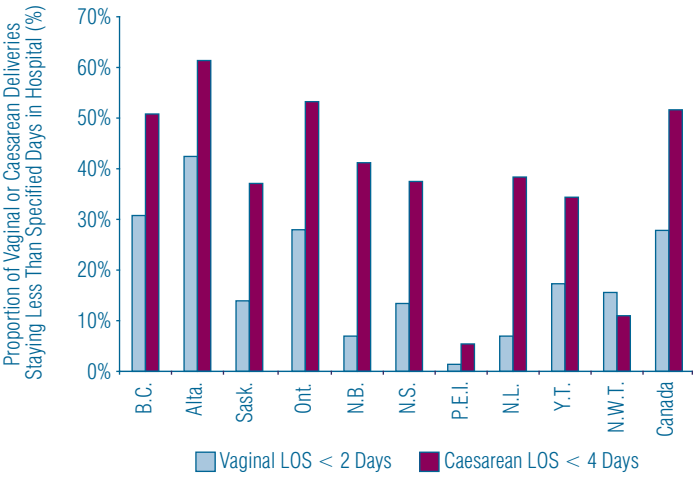
Note: Data do not include Nunavut, Quebec and Manitoba. Only typical patients in acute care facilities were included (i.e. patients who received a course of treatment in a single institution and were discharged; excludes stillbirths, transfers, deaths, sign-outs and patients who stayed longer than the expected length of stay). Patient categories are based on CIHI's Case Mix Group methodology.

Source: Discharge Abstract Database, CIHI.

FIGURE 10

Shorter Stays Across Canada

According to Health Canada, between 1991–1992 and 2000–2001, there was an increase in the proportion of mothers who stayed less than two days in hospital for vaginal deliveries and less than four days for caesarean-section deliveries. This trend of mothers having shorter stays in hospital for childbirth continued through 2002–2003, when 28% of mothers stayed less than two days for vaginal deliveries, and 52% of mothers stayed less than four days for caesarean sections. However, there is significant variation across the country. For example, for vaginal deliveries, 42% of mothers stayed less than two days in Alberta compared to only 1% of mothers in Prince Edward Island. Similarly, for caesarean sections, 61% of mothers stayed less than four days in Alberta compared to 5% of mothers in Prince Edward Island.



Note: Data do not include Nunavut, Quebec and Manitoba. Only typical patients in acute care facilities were included (i.e. patients who received a course of treatment in a single institution and were discharged; excludes stillbirths, transfers, deaths, sign-outs and patients who stayed longer than the expected length of stay). Patient categories are based on CIHI's Case Mix Group methodology.

Source: Discharge Abstract Database, CIHI.

In general, the trend toward shorter lengths of hospital stay is evident not only in Canada, but in other countries as well. Recently, the Organisation for Economic Co-operation and Development (OECD) reported that the average length of stay for normal vaginal deliveries fell substantially between 1997 and 2002 in the UK (down 17%), Germany (down 14%), Australia (down 10%) and France (down 9%), where length of stay was approximately three to five days at the start of this period. In the U.S. and Canada, the average length of stay remained at approximately two days over the same period.

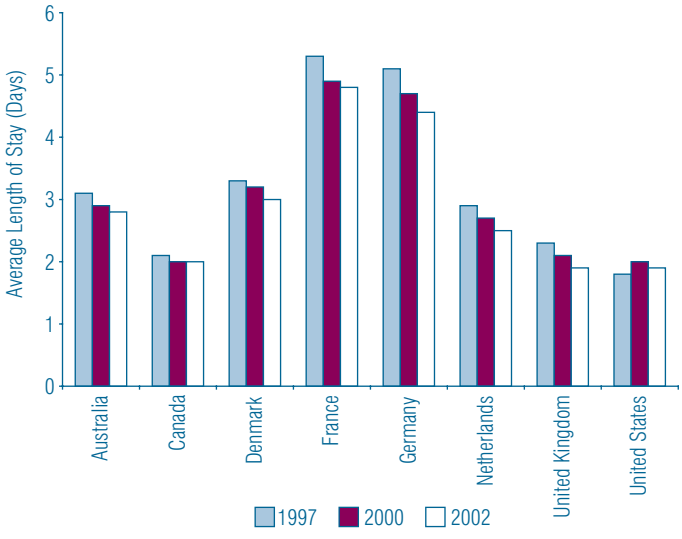
In Canada, the average cost per patient for in-hospital obstetrical care in 2002–2003 was approximately $3,000, ranging from roughly $2,700 for vaginal deliveries without complicating diagnoses, to $4,600 for caesarean sections, and $7,700 for major procedures in pregnancy, such as hysterectomies and surgical postpartum repair. Reductions in length of stay for certain patient groups may lead to substantial savings for hospitals over time. However, while the pros and cons of shorter length of stay in hospital have received considerable attention,[77–84] studies suggest[85–87] that there is insufficient evidence to link early discharge from hospital to clinical outcomes for the mother or child.

While average lengths of stay for particular types of deliveries have fallen over time, the mix of services provided can also affect total resource use. For example, although length of stay for caesarean-section patients has fallen, the rate of caesarean sections has risen steadily since 1979–1980. Most recently, it has increased to approximately 24% in 2002–2003—up from 17% in 1992–1993. However, it is not clear what effect these two trends may have on hospital spending for maternal and obstetrical care.

FIGURE 11

Maternal Length of Stay Varies by Country

According to the OECD, lengths of stay for mothers undergoing normal vaginal deliveries vary from country to country. In 1997, the average length of stay in France and Germany was close to five days, compared to approximately two days for Canada and the U.S. Between 1997 and 2002, the average length of stay decreased by about 0.5 days for France and Germany. However, the length of stay remained the same (about two days) for Canada and the U.S. Please note, however, that these length of stays are reported for uncomplicated vaginal deliveries only.



Note: "Normal vaginal delivery" in this comparison is defined as an ICD-10 diagnosis code of O80 (Z37.0 in Canada), or an ICD-9 code of 650.

Source: OECD Health Data 2005, OECD.

When Expectant Mothers Need More Assistance

Although many women deliver babies vaginally with minor or no difficulties, some have a higher-than-average risk of experiencing complications. This may result from pre-existing conditions or ones that only arise during labour and delivery. To help manage these complications, expectant mothers may be offered certain interventions, such as a caesarean section. This section explores some of the costs of caring for women who need extra help during their labour and childbirth experience.

Complications in the Labour and Delivery Room

Women with pre-existing risk factors or those who develop problems during labour and delivery ("complicating diagnoses") require more hospital resources than those provided during uncomplicated vaginal deliveries. For example, they may require longer stays in hospital or specialized birthing techniques. They may also require additional medical or surgical interventions, ultrasounds or other monitoring.[69, 88–90] The use of these additional resources may affect hospital spending on obstetrical patient care.

In 2002–2003, 32% of women who had a vaginal delivery (excluding VBACs) had a complicating diagnosis that arose before or during their delivery. According to CIHI data, commonly occurring conditions include diabetes, hypertension and other fetal/placental problems. The cost of caring for these women accounted for 35% of total vaginal delivery costs (excluding VBAC), averaging about $3,200 per patient. The average cost per patient of an uncomplicated vaginal delivery was lower (about $2,700).

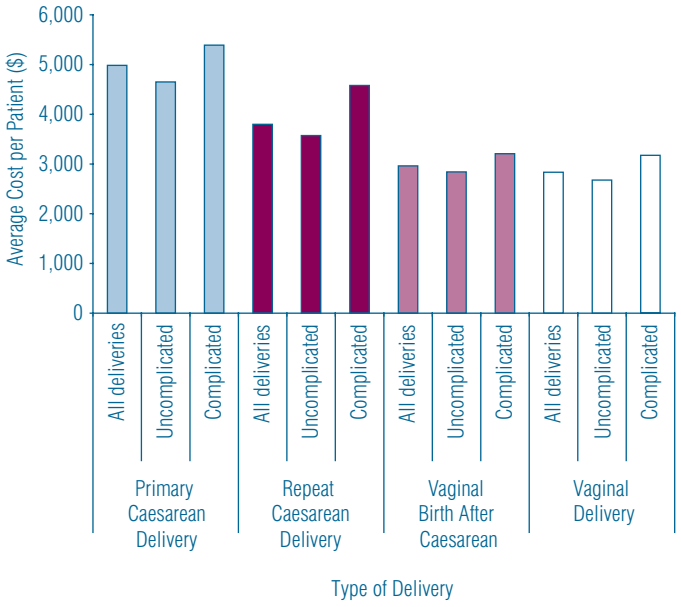
When vaginal deliveries do not proceed smoothly, additional interventions may be used, such as the use of forceps and/or vacuum extraction, or caesarean-section surgery. More women are having caesarean sections for the first time and fewer women are delivering vaginally following a previous caesarean-section birth.[91] In 2002–2003, the caesarean-section rate reached a high of 23.7% in Canadian hospitals, with regional rates varying from 15% to 33%. Some expectant mothers, such as those who are older or who are having multiple births, have a greater risk of complications and of delivering by caesarean section.[88]

Although the average cost per patient is higher than for vaginal deliveries, caesarean sections account for a smaller percentage of total pregnancy and childbirth-related hospital costs (31%) than vaginal deliveries (59%), since they are performed less frequently. In 2002–2003, the average cost of all caesarean sections was $4,600 per patient. Most of these procedures (63%) occurred for uncomplicated cases, with costs averaging $4,200. Of all caesarean section deliveries, 37% of mothers had an additional complicating diagnosis. The most frequently occurring conditions were fetal distress, obstructed labour and malposition and malpresentation of the fetus. In 2002–2003, the average cost per patient was about $5,200 for a caesarean delivery with a complicating diagnosis. The relatively high costs of caesarean sections in comparison to vaginal deliveries are due to a greater use of hospital resources, including local or general anesthesia, longer hospital stays, nursing care and medical and surgical supplies.[69, 88–90]

FIGURE 12

Hospital Costs for Different Types of Delivery

Average costs per patient for caesarean sections can vary for various reasons, such as additional complicating diagnoses as well as whether the caesarean section was the first one (primary) or a repeat. Repeat caesarean sections typically cost less than primary ones, partly due to the fact that repeat caesarean sections are usually planned surgeries. In 2002–2003, VBACs were less expensive, on average, than repeat caesarean sections—$3,000 per patient for VBACs versus $3,800 per patient for repeat caesarean sections.



Note: Data do not include Nunavut, Quebec and rural Manitoba. Only typical patients in acute care facilities were included (i.e. patients who received a course of treatment in a single institution and were discharged; excludes stillbirths, transfers, deaths, sign-outs and patients who stayed longer than the expected length of stay). Patient categories are based on CIHI's Case Mix Group methodology.

Sources: Canadian MIS Database, CIHI; Discharge Abstract Database, CIHI.

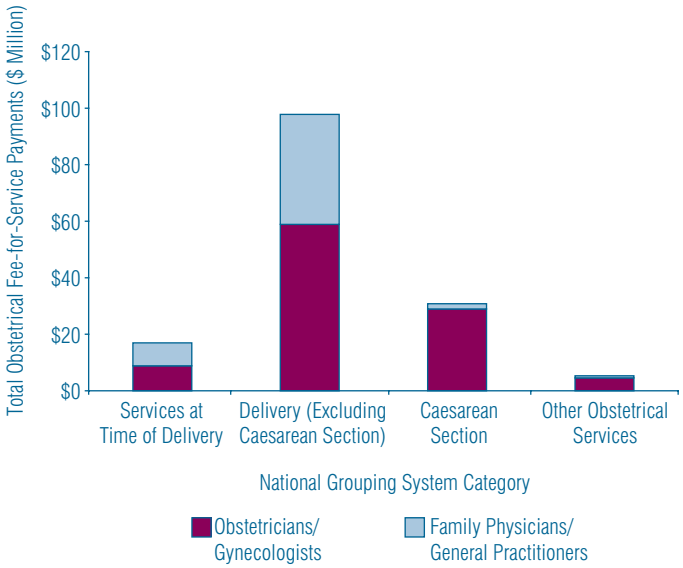
Care for Mothers With Complicating Diagnoses

In addition to performing more vaginal deliveries, obstetricians/gynecologists also receive the greatest share of more complicated deliveries, such as caesarean sections and multiple births. In 2002–2003, fee-for-service payments for caesarean sections amounted to $31 million—94% of these payments went to OB/GYNs. Obstetricians/gynecologists also receive the majority of payments for vaginal deliveries, but the proportion is much smaller than that for caesarean sections—they received 60% of fee-for-service payments for vaginal deliveries in 2002–2003.

FIGURE 13

Payments to Physicians by Specialty

In every category of obstetrical care, OB/GYNs receive the largest proportion of fee-for-service payments (66% in 2002–2003). Payments to FPs/GPs for obstetrical services at time of delivery, including obstetrical services for all types of delivery (attendance at vaginal delivery or caesarean section, repair of perineal tear, fetal monitoring, induction of labour), make up most of the rest (48% in 2002–2003). The balance between payments to OB/GYNs and FPs/GPs varies by type of obstetrical care.



Note: Data for the Northwest Territories and Nunavut are excluded. Therapeutic abortions are excluded. Payments to physicians include reciprocal billing. "Other obstetrical services" includes fetoscopy, stress test, hypertension, fetal transfusion, amniocentesis and non-therapeutic abortions (missed, threatened, without dilations and curettage, incomplete, menstrual extraction and spontaneous).
Source: National Physician Database, CIHI.

Costs Associated With Neonatal Care

"It's hard to imagine a chest retractor for a baby as small as Zachary. He was born at the end of September... nearly four months pre(term). Now, at the end of October, he still weighs only 900 grams, less than a man's dress shoe. He still can't breathe on his own... Ten years ago, Zachary... would have died at birth... Today, instead... he is having an operation to save his life. It's still four months before he was supposed to be born."[92]

Having a baby is a life-changing event. Most women have healthy pregnancies and babies are born without the need for extensive medical intervention. However, some newborns are born preterm or with low birth weight and may require specialized hospital care, such as that available in neonatal intensive care units. As well, there may be additional costs associated with providing specialized care for these infants outside of the hospital setting. This chapter aims to provide a snapshot of the costs associated with routine and more complicated neonatal care at the hospital, physician and community levels.

Costs of Routine Care for Newborns/Neonates

The transition from the womb to the external environment is a critical time. Checking that the baby's respiration, heart rate, perfusion and colour are normal is part of the routine assessment and monitoring of the baby's adaptation to the extra-uterine environment.[93] Shortly after birth, a newborn will also be weighed and measured. Afterward, newborns typically receive an injection of Vitamin K to protect against bleeding disorders and an antibiotic ointment for protection against eye infection and blindness.[94] Other investigative tests (occurring between one and seven days of age) will often be performed to screen for congenital abnormalities such as congenital hypothyroidism (a hormone deficiency) and phenylketonuria (an enzyme deficiency).[95, 96]

Hospital Costs

Based on CIHI data, in 2002–2003, hospitals in Canada (excluding those in Quebec and rural Manitoba) spent roughly $295 million on newborns. Research has shown that as birth weight increases, average hospitalization costs decrease.[97, 98] However, hospital costs associated with caring for newborns may vary even among babies born at normal birth weight (i.e. 2,500 grams or greater), depending on the mode of delivery. For example, according to CIHI's Canadian MIS Database and Discharge Abstract Database, in 2002–2003, the average hospital cost for the care of a baby delivered vaginally with a normal birth weight and no clinical problems was about $800. In comparison, the average hospital cost for a baby born with a normal birth weight but by caesarean delivery was just over $1,400.

There are several reasons why care for a newborn delivered by caesarean section, on average, will cost more than a newborn delivered vaginally. One reason is that a caesarean delivery is a surgical intervention and generally involves more nursing care than a vaginal birth.[69] Secondly, there may be reasons related to the unborn baby's condition. These reasons include: fetal compromise (e.g. fetal asphyxia); deterioration in the baby's health potentially resulting in a preterm delivery;[99] or in the case of a twin pregnancy, a caesarean delivery may have to be performed (e.g. non-cephalic position, monamniotic/conjoined twin).[100, 101] Based on our analyses, a higher percentage of normal–birth weight babies born by caesarean section were twins or preterm compared to babies born vaginally (2.1% vs. 0.6%). Some research has suggested that multiple pregnancies and preterm births are associated with higher rates of morbidity,[40, 102, 103] leading to higher hospital costs.[97] Complications common to preterm babies, necessitating extra in-hospital care, include respiratory/breathing difficulties, problems regulating temperature (due to the brain not having matured) and other factors.[104] Researchers suggest that these complications also affect twin pregnancies, since the increased risk of morbidity among twin births is related to preterm delivery.[102] Lastly, our analyses showed that, on average, normal–birth weight babies delivered by caesarean section remained longer in hospital than those delivered vaginally (3.2 days versus 1.7 days). It is important to note that the increased length of stay for those babies delivered by caesarean section may be attributed to the mother's length of stay in hospital due to surgery. Since babies typically remain in the hospital until their mothers can be discharged, the increased maternal length of stay may in turn lead to increased hospital costs for these babies.

Physician Costs

The first few days and weeks after the birth of a baby is a time of many physiological and social adjustments for the baby and the new parents. During this time, the parents may need support in learning parenting skills and breastfeeding, and may also require medical advice and/or treatment for the baby. Developmentally, the newborn is experiencing many new things. Distinct facial expressions, muscle development, response to loud noises and visually focusing on objects at a distance are a few of many "milestones" experienced by the newborn.

Providing that a newborn is born full-term and has had an uncomplicated hospital stay, discharge often occurs between 24 and 48 hours after delivery. In this case, babies will typically need to visit a health provider shortly after hospital discharge to have a checkup.[105] During this visit, the health care provider will monitor how well the infant is feeding, gaining weight, breathing and urinating.

Based on fee-for-service data from CIHI's National Physician Database in 2002–2003, physicians billed, on average, approximately $419 per capita for consultations and visits for children less than one year of age. Average per capita costs for boys, on average, were 9% higher than for girls.* However, the relative difference between males and females may reflect differences in health status among boys compared to their female counterparts.[106, 107] This is consistent with the finding that infant mortality rates are higher for male babies than for females. In 2001, Canada's infant mortality rate was 5.8 and 4.6 per live birth, respectively, for males and females.[108]

* The average per capita costs are likely underestimated because alternative payment plans and some procedures and diagnostic tests are not included.

Costs Outside the Health Care System: From Hospital to Community

Although a proportion of neonatal health care costs can be quantified using hospital and physician data, other research has focused on the cost of health and social services utilized by mothers and their infants soon after discharge from hospital,[109] particularly in the context of mothers and their "healthy" newborns who are discharged within 48 hours or less with follow-up (e.g. community nurse visit).[105] Consequently, integration between hospital and community health services and their potential impact on health care costs has been a topic of study.[87, 109–111]

Some authors[112] suggest shifting from using more costly resources (hospital services) to less costly ones (community resources) to facilitate earlier discharge of mothers and babies. Researchers have investigated the costs of community-based health and social services in the context of shortened hospital stays for mothers and their babies. A study of mothers, of which the majority (85%) had a postpartum hospital stay of 48 hours or less and delivered a singleton birth vaginally, from five select hospital sites in Ontario in 1999,[109] showed that the average costs of care for mother and infant in the first four weeks after hospital discharge ranged between $200 and almost $700, depending on whether or not the infant was readmitted to hospital. Included in these costs were physician visits, other health care provider visits or consultations, medical supplies, hospital visits and laboratory testing. Community-based nursing costs—which included visits and phone consultations by public health nurses, clinic nurses and community visiting nurses—averaged $86 per mother/infant pair over the four weeks. For infants specifically, costs varied by type of nurse visit. For example, average costs for a public health nurse visit and a public health nurse phone consultation were $13.31 and $4.95, respectively (the average cost per infant). Nurse visits and phone consultations (not including public health nurses) were $23 and $3, respectively. Total medical costs per mother/infant pair averaged $129. However, this amount did not include the regularly scheduled six-week physician follow-up for mothers post-delivery, since data were collected at four weeks post-discharge.

Telephone Triage Calls

When health problems are not emergencies, or when parents have questions about their child's health, telephone triage services may be a place they can turn to for help. These services are generally available 24 hours a day, 7 days a week. Data from the Canadian Community Health Survey (CCHS) estimated that in 2003, almost 10% of Canadians aged 15 and older reported having contact with a telephone health line in the past 12 months. These programs are generally staffed by trained nurses (and sometimes physicians) who work with computer-assisted tools and help callers decide on the level and urgency of care required (e.g. a visit to the emergency department or to a family physician). Based on past research,[113, 114] women tend to be more frequent users of this type of service than men. Two of the more common reasons why parents used a telephone triage service were to inquire about their child's rashes and fevers. However, a systematic Canadian review[115] suggests that although teletriage might reduce the number of immediate visits to doctors without causing adverse outcomes such as visits to the emergency department, hospitalizations or death, little is known about the economic impact of teletriage in Canada.

Other researchers in Ontario[111] have also compared health care costs for mothers who received either a home visit by a public health nurse or a telephone screening call. Two different hospital sites were studied and the sample included mothers who delivered singleton babies vaginally and were discharged within two days of delivering their babies. Total direct and indirect health costs per one hundred infants were higher for the home-visit group than for the telephone-screening group (e.g. telephone screening ranged from $11,783 to $18,748 compared to $22,257 to $26,420 for the home-visit program). Since costs varied within each program, it was suggested that differences in how the programs were implemented, access to care (such as breastfeeding clinics, which were included as part of the overall health care costs), as well as demographic differences in the population may have influenced the reported ranges.

Parental and Family Leaves in Canada and Abroad

The existence of policies and programs to ensure families have adequate financial support recognizes the potential effects of income and income inequality on child development.[116] Maternal and parental leave policies have existed over the last century and were originally put in place to protect the physical well-being of working women and their babies after childbirth.[117] Such policies currently exist in over 120 nations.[118] The birth of a new child brings with it many stresses and transitions for parents. Experts suggest adjusting to the world of "parenthood" may be made smoother, however, when parents can take time off work to stay home with their babies.[118] However, some parents may feel inhibited from staying home for longer periods of time due to financial and job-security issues.[119]

In Canada, federal maternity benefits are payable to the birth mother or surrogate mother for a maximum of 15 weeks. Parental benefits are paid to the biological or adoptive parents for up to a maximum of 35 weeks and can be claimed by one parent or shared. To qualify for maternal and parental leave benefits in Canada, parents must have worked for 600 hours in the past 52 weeks or since the last previous employment insurance claim. The rate of this taxable benefit is 55% of a person's average insured earnings, up to a maximum of $413 per week.[120] Self-employed individuals are not eligible.

Internationally, leave policies vary according to eligibility criteria, duration, benefit level and usage.[117] Parents in Sweden, for example, are entitled to a maximum of 480 days (almost 69 weeks), of which 390 of these days are covered at 80% of the previous salary, up to a maximum amount. These days can be used from the child's birth until his or her eighth birthday.[121]

Costs of Newborn and Neonatal Care With Complications/Risks

The first few years of life are important to long-term health and well-being.[116] In addition to life expectancy, two key health indicators—the proportion of low–birth weight babies (as a proportion of total births) and infant mortality (the number of babies that die during the first year of life)—are common measures used to assess a population's overall health status.[2, 122] The preterm birth rate—an infant health outcome measure—has been suggested as an important contributor to perinatal mortality and morbidity in industrialized countries.[2, 123] Why do these measures matter? Babies born with low birth weight (i.e. < 2,500 grams) are more likely to die during the first year of life and are at increased risk of learning disabilities, developmental disabilities, as well as visual and respiratory problems.[124, 125] Research indicates that preterm babies are also at increased risk for mortality.[2, 45]

In addition, children who have a healthy start are more likely to grow into healthy adults. For example, researchers from Manitoba[126] have shown correlations between premature mortality and various child health variables (e.g. low–birth weight rates and breastfeeding-initiation rates) among Manitoba children.

Preterm babies, as well as those with low birth weight or other health problems, may also require special care in the first days and weeks of their lives. For example, advances in neonatal care such as the introduction of surfactant therapy (a medication used to reduce the risk/treat respiratory distress syndrome) and assisted ventilation, along with the technological ability to detect and deliver a compromised fetus (in some cases earlier than the expected due date), are suggested as a cornerstone of modern obstetrics.[2]

Hospital Costs—Low–Birth Weight and Preterm Babies

Major improvements in neonatal intensive care have emerged over time, contributing to improved survival for babies born either preterm or with low birth weight (i.e. < 2,500 grams). However, these conditions lead to significant health care costs.[97, 127, 128] For example, research indicates that preterm (i.e. babies born at less than 37 completed weeks of gestation) and low–birth weight babies (particularly babies born <1,500 grams, considered very-low birth weight) are a high-risk group since they have higher mortality and morbidity rates and an increased likelihood of being re-hospitalized. They also have more acute care visits during the first year of life compared to full-term, normal–birth weight infants.[97, 98] Given the preterm birth rate in Canada and abroad (the most current estimate in Canada is 7.5 per 100 live births),[2] some researchers have suggested that countries should recognize its economic impact on health services planning.[103, 129]

FIGURE 14

Average and Total Hospital Costs for Newborns, 2002–2003

Babies born with low birth weight tend to use more hospital resources. The table below shows that average hospital costs per newborn in 2002–2003 ranged from $1,084 for babies who weighed between 2000 and 2499 grams to over $117,000 for babies who weighed less than 750 grams. Costs for babies born at a normal birth weight with no health problem and delivered either vaginally or by caesarean have been included for comparison purposes. In general, average hospital costs decreased as birth weight increased and/or level of severity for a relative health problem improved.

Birth Weight (g)	Health Problem or Type of Delivery	Number of Newborns	Average Length of Hospital Stay (Days)	Average Cost per Newborn (CA$)	Total Cost ($ Millions)
< 750	All	69	113	117, 806	8.1
750–999	All	134	90	89, 751	12.0
1000–1499	Catastrophic Diagnosis	9	59	42, 143	0.4
	No Catastrophic Diagnosis	590	43	42, 133	24.9
1500–1999	Catastrophic Diagnosis	7	29	44, 885	0.3
	Major Problem	358	31	29, 151	10.4
	Moderate, Minimum or No Problem	1,512	18	12, 693	19.1
2000–2499	Catastrophic Diagnosis	6	19	15, 709	0.09
	Major Problem	437	16	16, 766	7.3
	Moderate Problem	1,078	11	8, 160	8.8
	Minor Problem	5,224	6	3, 592	18.8
	No Problem	1,088	2	1, 084	1.2
≥ 2500	Caesarean Delivery	47,497	3	1, 432	68.0
(Normal Birth Weight)	Normal Newborn (vaginal delivery)	145,279	2	795	115.5
Total Cost					**$ 295.0**

Note: Data do not include Quebec and rural Manitoba. Only typical patients in acute care facilities were included (i.e. patients who received a course of treatment in a single institution and were discharged; excludes stillbirths, transfers, deaths, signouts and patients who stayed longer than the expected length of stay). Patient categories are based on CIHI's Case Mix Group methodology. Total costs (as reported in this table) are underestimated since not all CMGs belonging to the normal–birth weight category (≥ 2,500 grams) are included. Total costs per CMG were calculated by multiplying the number of babies per CMG by the average cost per baby in that CMG.

Sources: Canadian MIS Database, Discharge Abstract Database, CIHI.

Contribution of Emergency Visits to Costs

Millions of people are seen and cared for each year in Canada's emergency departments (EDs). Data from CIHI's National Ambulatory Care Reporting System (NACRS) show that almost one in two infants (48%) under the age of one visited an ED in Ontario in 2003–2004. This is a higher rate than any other age group.[130] Common reasons babies visit EDs include: gastrointestinal problems (such as feeding problems and gastrointestinal reflux); minor infections;[131] and breathing problems.[132] Some of the most common reasons babies are admitted to hospital, after presenting to an ED, include neonatal jaundice or serious bacterial infection (i.e. sepsis).[131] Although the cost of ED visits (overall) has been a focus of research,[133, 134] less is known about the costs of neonatal visits to EDs.

Hospital Costs—NICU Admissions

Newborns who need more monitoring or care than regular maternity wards can provide may be admitted to neonatal intensive care units (NICUs). A variety of health personnel—from physicians and nurses to respiratory therapists and pharmacists, as well as other highly trained specialists—may form the neonatal health care team. Research indicates that NICUs have the potential to improve survival for some newborns born prematurely or with low birth weight. However, they are a relatively expensive resource.[140–142]

According to CIHI data, in 2003–2004, 13.6% of newborns (excluding those from Quebec and rural Manitoba) spent time in a NICU, up from 12.6% in 1994–1995. Admission rates were generally higher for low–birth weight babies compared to babies with birth weights of 2,500 grams or more. Fortunately, nearly all newborns (99.9%) admitted to a Canadian NICU survive until discharge, even the smallest ones. In 2003–2004, 92% of very low–birth weight babies (less than 1,500 grams) admitted to a NICU survived until discharge.

According to CIHI data, the average NICU cost per baby admitted to these units in 2002–2003 was just over $9,700. This represented about 4% of total hospital costs among the 27 hospitals submitting NICU cost information. Neonatal intensive care units in larger hospitals (i.e. hospitals having 400 or more beds), on average, spent more per baby admitted to NICUs ($10,942 per baby) compared to smaller hospitals ($7,553 per baby). This may partly reflect different types of babies that they cared for.

Factors cited as contributing to the higher costs of NICU care (over typical neonatal care) include: medical technology such as respirators, monitors, intravenous pumps and kidney dialysis equipment;[142, 143] health personnel;[142] as well as the baby's birth weight (cost increases with lower birth weights). Also contributing to the overall costs of NICU services are items such as surfactant, radiological investigations, blood-product transfusions, surgery and echocardiography.[144] However, differences in patient characteristics (e.g. distribution of congenital anomalies from one NICU to another, gestational age or birth weight) may affect the resources required to care for such infants,[97, 98, 127, 140, 141] thereby potentially affecting overall NICU costs.

The Costs of Postnatal Hospital Admissions

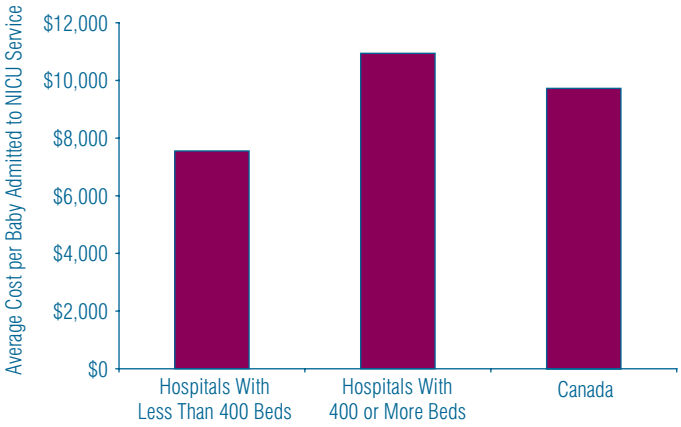
Most babies go home shortly after birth. However, some require additional care, which may necessitate a return to hospital. Common reasons why babies return to hospital include jaundice, feeding problems, sepsis and dehydration.[2, 116] In Canada in 2000–2001, almost 4 in 100 babies were admitted to hospital within 28 days of their birth. The rate of postnatal hospital admissions has generally increased in Canada since 1991–1992,[2] although rates vary across jurisdictions. Possible explanations for differences in postnatal admission rates may include initial length of hospital stay,[83, 135, 136] quality of care before and after discharge,[137] patterns of practice and services available after discharge,[138] among other factors.[139]

The potential cost implications of an early postnatal hospital discharge policy on pregnancy and postnatal care for healthy mothers and term infants was studied in a systematic review.[87] Authors from this review suggest that when making cost comparisons associated with a policy of early postnatal discharge (compared to standard care) a variety of factors should be considered. These factors include hospital costs, primary care support for women and infants following discharge from hospital (such as home visits and telephone follow-up), and the costs to women and families for practical support required in the days immediately following the birth. At this point, however, they suggest that current evidence remains inconclusive as to the potential cost savings associated with early postnatal discharge.

FIGURE 15

Treating Babies in Neonatal Intensive Care Units (NICUs), 2002–2003

In 2002–2003, on average, just over $9,700 was spent by NICUs per baby admitted to the service. The cost of neonatal intensive care represented about 4% of total hospital costs among the 27 hospitals that submitted NICU cost information. Hospitals having 400 or more beds spent, on average, $3,300 more per baby admitted to their NICUs, compared to hospitals with fewer than 400 beds, potentially reflecting differences in the types of babies treated and the level of NICU available.



Notes: The analyses are based on 27 hospitals that submitted NICU functional centre costs. Includes all babies admitted to neonatal intensive care. Data do not include Quebec and rural Manitoba. Only typical patients in acute care facilities were included (i.e. patients who received a course of treatment in a single institution and were discharged; excludes stillbirths, transfers, deaths, sign-outs and patients who stayed longer than the expected length of stay).

Sources: Canadian MIS Database, Discharge Abstract Database, CIHI.

Physician Costs—NICU Services

In addition to the hospital costs for babies treated in the NICU, during 2002–2003, over $12 million was billed by fee-for-service physicians in Canada for care provided for neonatal intensive care services. Many physicians working in this environment would also be paid through alternative payment plans and so are not included in these totals. Nevertheless, of note is that per capita fee-for-service NICU billings for male babies less than one year of age were almost 18% higher than for their female counterparts. Consistent with other research,[106] the relative difference in costs between males and females may be explained by health differences. For example, experts suggest that females are more likely to have a survival advantage due to biological factors such as a favourable "hormonal milieu" and lower rates of morbidities such as chronic lung disease and severe intraventricular hemorrhage.[145]

The Costs of Bringing New Life Into the World—Conclusion

Every pregnancy, labour and delivery is unique. This is true not just for the mother and baby, but for all those—from family physicians and obstetricians to nursing staff, midwives and other health care providers—who help to bring new life into the world. At the same time, many stages of the process—from specific types of care provided to expectant mothers, to how long they stay in hospital after giving birth—are similar among most mothers and their babies.

As this report illustrates, spending on pregnancy and childbirth has changed over the years. Some of these changes in spending patterns are due to shifts in technology, differences in the management of care and the age at which women give birth. For example, the relatively recent introduction of assisted reproductive technology (ART) has provided more options for women, but also involves direct and indirect costs. As well, women who use ART are more likely to have multiple births, which may result in higher spending on prenatal care, delivery and neonatal care. As these and other technologies continue to develop, their use may continue to have cost implications for the delivery of maternal and neonatal care.

Most babies in Canada are born in hospitals, and most births result from uncomplicated vaginal deliveries. These deliveries account for the largest proportion of hospital spending on obstetrical patients, due to the sheer volume of these types of deliveries. Vaginal deliveries (complicated and uncomplicated) also make up the largest proportion of payments to physicians who perform obstetrical services: 78% for family physicians/general practitioners and 58% for obstetricians/gynecologists. Over time, certain procedures are being used more often in both complicated and uncomplicated vaginal deliveries, and some of them, such as the administration and maintenance of epidural analgesia, can result in higher delivery costs.

Other changes in practice patterns may also have cost implications. Although most babies are delivered vaginally, the rates of caesarean deliveries have been increasing over time. As highlighted in The Cost of Labour and Delivery chapter, the higher costs associated with these deliveries can be attributed, in part, to the greater use of hospital resources, including longer lengths of stay. In Canada, the average length of stay for all pregnancy and childbirth patients decreased steadily from just over five days in 1984 to just over two days in 2002, but average lengths of stay for mothers who have caesarean sections are twice as long as for those who have vaginal deliveries.

The average hospital costs for healthy normal-weight newborns ranged from about $800 for vaginal deliveries to just over $1,400 for caesarean deliveries. Babies who need extra care or monitoring may be admitted to neonatal wards, or neonatal intensive care units (NICUs), which are equipped with highly specialized technology and staff. In 2002–2003, based on data from 27 hospitals, the average cost per baby admitted for care to the NICU was estimated at $9,700.

This report is the third of a series called *Giving Birth in Canada*. By presenting data on the costs associated with pregnancy and childbirth, it adds an important dimension to the emerging picture of maternal and infant care across the country. It also helps to identify specific gaps in what we know and don't know about spending on these particular kinds of care. As is true with so many other areas of the health system, maternal and infant care are evolving. Issues of cost and spending reflect changes in obstetrical needs and services, technology, practice patterns and many other factors.

What We Know

- The proportion of pregnant women who receive prenatal care and the providers of such care.
- The variation in regulation and funding of midwifery care across Canada.
- The types of diagnostic and screening tests performed during pregnancy and some out-of-pocket and provincial spending on these services.
- Hospital costs for care before birth, labour and delivery, and newborn care as well as how costs vary for complicated versus uncomplicated cases.
- Payments for physicians through fee-for-service provincial/territorial insurance plans for select obstetrical services.
- The proportion of babies in Canada that are born preterm or with low birth weight and the impact of their care on health care costs.
- International comparisons of maternal and/or parental leave policies.

What We Don't Know

- How much are physicians paid for prenatal services? How do costs for midwives, doulas and other providers compare across the country?
- What are the provider and laboratory costs of genetic and other tests, such as amniocentesis and chorionic villus sampling? How do these costs vary across Canada?
- How much are Canadians paying out of pocket for non-insured maternal and infant health services, such as midwifery and doula care? How much are Canadians spending on newborn care needs, such as diapers, baby formula and medications?
- How much do prenatal, antenatal and neonatal visits contribute to the annual costs of Canadian emergency department visits?
- How will the increasing multiple-birth rate affect short-term and long-term health system costs? What are the long-term care costs of babies born preterm or with low birth weight? How much do babies born by assisted reproductive technologies contribute to the costs of neonatal intensive care unit (NICU) care in terms of multiple or preterm births?
- What are the cost implications of changing technology, practice patterns and mix of providers for obstetrical services in Canada?

What's Happening

- In the fall of 2006, Statistics Canada, on behalf of the Canadian Perinatal Surveillance System of the Public Health Agency of Canada, will be conducting the Maternity Experiences Survey. This national survey will collect data from approximately 6,500 pregnant women and mothers on such issues as their pregnancy, labour, birth and postpartum experiences; their level of stress and the support they receive; and the type of information they obtain about issues during pregnancy, childbirth and the postpartum period.
- The Assisted Human Reproduction Agency of Canada will be established in January 2006. The Agency is part of the *Assisted Human Reproduction Act*, which became law in 2004 and will play a role in both regulation and ethics. Its responsibilities will include: the licensing of persons undertaking activities such as in vitro fertilization and research involving the *in vitro* human embryo, inspection of clinics and research laboratories, collection and analysis of health reporting information and provision of advice to the minister on assisted human reproduction–related issues.

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