EVALUATION OF THE HEALTHY BABY PROGRAM

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About the Manitoba Centre For Health Policy

The Manitoba Centre for Health Policy (MCHP) is located within the Department of Community Health Sciences, Faculty of Medicine, University of Manitoba. The mission of MCHP is to provide accurate and timely information to health care decision-makers, analysts and providers, so they can offer services which are effective and efficient in maintaining and improving the health of Manitobans. Our researchers rely upon the unique Population Health Research Data Repository (Repository) to describe and explain patterns of care and profiles of illness, and to explore other factors that influence health, including income, education, employment, and social status. This Repository is unique in terms of its comprehensiveness, degree of integration, and orientation around an anonymized population registry.

Members of MCHP consult extensively with government officials, health care administrators, and clinicians to develop a research agenda that is topical and relevant. This strength, along with its rigorous academic standards, enables MCHP to contribute to the health policy process. MCHP undertakes several major research projects, such as this one, every year under contract to Manitoba Health (MB Health). In addition, our researchers secure external funding by competing for research grants. We are widely published and internationally recognized. Further, our researchers collaborate with a number of highly respected scientists from Canada, the United States, Europe, and Australia.

We thank the University of Manitoba, Faculty of Medicine, Health Research Ethics Board for their review of this project. MCHP complies with all legislative acts and regulations governing the protection and use of sensitive information. We implement strict policies and procedures to protect the privacy and security of anonymized data used to produce this report and we keep the provincial Health Information Privacy Committee informed of all work undertaken for MB Health.

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Executive Summary

Introduction

In 2001, the Healthy Baby Program was introduced in Manitoba by the Healthy Child Manitoba Office. The goal of this program was to promote prenatal and perinatal health. The Healthy Baby program consists of two components:

- Prenatal Benefit, which is a targeted income supplement for low income women and
- Community Support Programs, which are educational and supportive groups available to all women from the prenatal period through to an infant's first birthday

The Manitoba Centre for Health Policy (MCHP) was asked by Manitoba Health and the Healthy Child Committee of Cabinet to evaluate the impact of the Manitoba Healthy Baby Program on prenatal, perinatal, and first year outcomes of mothers and their infants.

Some expectant mothers receive only the Prenatal Benefit, some only participate in the Community Support Programs, some women participate in both components of the Healthy Baby Program, and some pregnant women do not participate in the program at all. The goal of the current report was to determine whether participation in either or both components of the Health Baby Program was associated with better outcomes than no participation. The specific objectives were:

1. To determine the uptake of each of the components (Prenatal Benefit and Community Support Programs) of the Healthy Baby program, and how uptake differs across socioeconomic status and geographic region

2. To determine the impact of participation in the Healthy Baby program on prenatal care, birth outcomes, and infant outcomes.

3. To examine how the Prenatal Benefit and Community Support Program components of the Healthy Baby program work together. In other words, to determine whether the impact of participation in the Healthy Baby Program differs according to which components or combination of components a woman participates in.

Methods

This report involves a retrospective evaluation of the Healthy Baby Program. What this means is that the information used in the evaluation was collected prior to the start of the evaluation. With the exception of the Healthy Baby Program participation data provided by the Healthy Child Manitoba Office, the analyses for this report used administrative data contained in the Population Health Research Data Repository (Repository) which is housed at the Manitoba Centre for Health Policy (MCHP) at the University of Manitoba.

The Repository is a comprehensive collection of databases that contains de–identified records of all Manitobans' contacts with the health care system, including visits to physicians, hospitalizations, and pharmaceutical prescriptions dispensed. Along with health services databases, the Repository contains social service databases, including information about family receipt of income assistance, foster care, and child protection and support services. Program data from the Healthy Child Manitoba Office are also held in the Repository, which includes information about Manitoba Healthy Baby Prenatal

Benefit recipients, Manitoba Healthy Baby Community Support Program participants, and Families First Screening data (universal screening for biological and social risk factors at birth). All records in the Repository are anonymous, as prior to data transfer to MCHP, Manitoba Health processes the records to encrypt all personal identifiers and remove all names and addresses.

The Manitoba Healthy Baby Program began in 2001, and data collection for the Prenatal Benefit Program began in July 2001; however, data collection for Community Support Program participation did not begin until June of 2004. The evaluation period in this report is restricted to the time period when data were collected for both components of the Healthy Baby Program: 2004/2005 through 2007/2008. All births in Manitoba hospitals during that time period were linked to mothers in order to determine whether the mother participated in the Prenatal Benefit and/or Community Support Programs.

A total of 56,560 babies were born during the evaluation period. These infants and their mothers, or a subset of them depending on the analysis, were used as the evaluation population in this report.

Uptake of the Healthy Baby Program Components

Close to a third of all births (29%) were to women who received the Healthy Baby Prenatal Benefit during pregnancy, yet less than 13% of births were to women who participated in any Healthy Baby Community Support Programs. The Prenatal Benefit was received by over half of women living in lower income neighbourhoods and teen mothers and almost three–quarters of women receiving income assistance during pregnancy—potential target groups for the program. In contrast, just over one–fifth of women receiving income assistance during pregnancy and teens participated in any Community Support Programs, and over 80% of women living in the lowest income areas did not participate in the Community Support Programs. Participation in the prenatal Community Support Programs was particularly low, with only 5.9% of pregnant women in the province attending these programs.

Impact of the Healthy Baby Program

In order to determine the impact of the Healthy Baby Program on those participating, we used a combination of "matching" of program and comparison groups and "adjustment" for other important variables using regression modeling. To match program and comparison groups, we used two different populations of women and their babies:

Population 1:

Our first population included all women giving birth in 2004/2005 through 2007/2008 *who had applied for the Healthy Baby Prenatal Benefit during pregnancy and whose incomes were less than $40,000* (N=12,694). Thus, any woman giving birth but who did not put in an application for the Healthy Baby Prenatal Benefit Program was not included in this population. Our program groups were those who: 1) received the Prenatal Benefit AND participated in Community Support Programs, 2) participated in the Community Support Programs only, or 3) received the Prenatal Benefit only. Our comparison group was those women giving birth who neither received the Prenatal Benefit nor participated in Community Support Programs. Our rationale behind examining this population (those applying for the Benefit) was that the program and comparison groups would likely be women who felt the need for additional financial support during pregnancy.

Population 2:

Our second study population included all women giving birth in 2004/2005 through 2007/2008 *who received income assistance for at least one month during pregnancy* (N=7,398). Income assistance is a provincial program of last resort for people who need help to meet basic personal and family needs and is used as a measure of poverty. Our program groups thus consisted of all women receiving income assistance during pregnancy who: 1) received the Prenatal Benefit AND participated in Community Support Programs, 2) participated in Community Support Programs only, or 3) received the Prenatal Benefit only. Our comparison group consisted of all women who received income assistance during pregnancy, but who did not receive the Prenatal Benefit and did not participate in the Community Support Programs. Our rationale behind examining this population was that the program and comparison groups would likely all be women experiencing poverty severe enough to have to seek assistance to meet their basic needs.

We examined the same outcome measures for both Population 1 and 2. For each Population, three sets of analyses were run, corresponding to the following three types of outcomes:

1. Prenatal and birth outcomes—including adequate and inadequate prenatal care, low birth weight, small–for–gestational age, high birth weight, large–for–gestational age, preterm births, congenital anomalies, low 5–minute Apgar scores, and breastfeeding initiation.

2. Infant outcomes in first year—including mortality, hospitalizations, injury hospitalizations, continuity of physician care, and being taken into foster care.

3. Longer–term Outcomes—including up–to–date immunizations at two years of age and sibling spacing.

The selection of our two study populations was our attempt to "match" the program and comparison groups on income and increase the likelihood that any differences we observed in outcomes between program and comparison groups could be associated with the program. We know that there are many other factors besides income that may differ between the program and comparison groups and these factors may also have an influence on our outcome measures. For this reason, we "adjusted" for the potential influence of several factors using regression modeling. Regression modeling allowed us to account for the influence of other factors and focus on the association between participation in the Healthy Baby Program and our outcomes, *while taking the influence of these other factors into consideration.*

Our main predictor variable of interest was participation in the Healthy Baby Program. We looked at the effect of Prenatal Benefit compared to that of no Prenatal Benefit; and we looked at the effect of participation in Community Support Programs compared to that of no participation in Community Support Programs. We also looked to see whether there was an interaction between the two program components. In other words, did the effect of participation in the Community Support Programs differ according to whether the mom received the Prenatal Benefit? Likewise, did the effect of the Prenatal Benefit differ according to whether the mom participated in the Community Support Programs?

Besides the Healthy Baby Program components, the additional predictors entered into the regression models included mother's age at first birth, area–level socioeconomic status, region of residence, maternal education level, and maternal marital status. Because family income varied so greatly between those receiving and not receiving the Prenatal Benefit for Population 1, it was important to try to adjust for this in the Population 1 regression models. For this reason, family income was added to the regression models for Population 1. It was unnecessary to do so for Population 2 because the program

and comparison groups in Population 2 had similar incomes. For low birth weight, small–for–gestational age, and preterm births, we also entered information about maternal smoking during pregnancy and multiple births into the regression models. For high birth weight and large–for–gestational age, maternal diabetes was entered into the models, since maternal diabetes is associated with these outcomes.

Note that these regression models are only able to state that there is a relationship ('association') between the Healthy Baby Program components and the outcome variables. This is not necessarily a causal relationship and we cannot claim that one program component or the other causes the outcome. We can state whether the Healthy Baby Program components were associated with an increase or decrease in the outcomes (not that they caused the increase or decrease).

Key Findings

The findings from the regression analyses are summarized in Table E.1. In discussing our key findings, we have taken a conservative approach and focused on those indicators where results were significant for both populations.

- Participation in prenatal Community Support Programs appears to be associated with increases in adequate prenatal care and decreases in inadequate prenatal care.
- Receipt of the Prenatal Benefit was associated with a reduction in low birth weight births and preterm births.
- Both Healthy Baby Program components appear to be associated with an increase in breastfeeding initiation. For Population 1, the combination of Healthy Baby Program components (receipt of the Benefit plus participation in Community Support Programs) was associated with increased breastfeeding initiation. For Population 2, each of the separate components was associated with an increased likelihood of breastfeeding.
- Participation in Community Support Programs appears to be associated with a decrease in continuity of infant care in the first year of life.

Key Recommendations

- Given the association between receipt of the Prenatal Benefit and reductions in both low birth weight and preterm births rates, efforts should be made to ensure all low income women receive the income supplement.
- Given that we found over a quarter of women receiving income assistance during pregnancy did not receive the Prenatal Benefit and given that the Benefit appears to be associated with better prenatal and birth outcomes for those women on income assistance who do receive it during pregnancy—increased efforts should be made to ensure that all women receiving income assistance during pregnancy also receive the Prenatal Benefit. This is a particularly vulnerable group of women who may be difficult to reach.
- Given the relatively low participation rates in the Community Support Programs and the potential benefits of these programs, efforts to increase Community Support Program participation should be enhanced.

- The Healthy Baby Program shows an important and positive association with breastfeeding initiation. Given the significant role breastfeeding plays in healthy child development, it is important to track not only breastfeeding initiation but breastfeeding duration. This information will help to determine whether the Healthy Baby Program contributes to longer–term breastfeeding.
- Further study of the relationship between Community Support Program participation and decreases in continuity of care is necessary to determine what may be contributing to this association.

Table E.1: Summary of Results from Regression Analyses for Association Between Outcomes and Healthy Baby Program Components

Indicators	*Healthy Baby Program Components*			
	Prenatal Benefit		**Community Support**	
	Pop1	Pop2	Pop1	Pop2
Adequate Prenatal Care	ns	↑	↑	↑
Inadequate Prenatal Care	ns	Interaction	ns	Interaction
Low Birth Weight	↓	↓	ns	ns
Small for GA	ns	↓	ns	ns
High Birth Weight	Interaction	↑	Interaction	ns
Large for GA	ns	↑	↑	ns
Preterm Birth	↓	↓	ns	ns
Congenital Anomaly	ns	ns	ns	ns
5-minute Apgar	Interaction	ns	Interaction	ns
Breastfed at Discharge	Interaction	↑	Interaction	↑
Hospitalization	ns	ns	ns	ns
Injury Hospitalization	ns	ns	ns	ns
Continuity of Care	↑	ns	↓	↓
Child in Care	ns	↓	ns	ns
2-year immunization	ns	↑	ns	ns
Sibling spacing	ns	ns	ns	ns

Note: Interaction indicates a significant interaction between the Prenatal Benefit and the Community Support Programs ($p<0.10$)

Note: ↑ and ↓ indicate a significant increase or decrease of the event ($p<0.05$)

Bolded indicator names =Significant findings in both populations for one or both Healthy Baby Program components

Chapter 1: Introduction

The time extending from the prenatal period to a child's first birthday is a crucial one in terms of child development and life–long health (Barker, 2007; Irwin, Siddiqi, & Hertzman, 2007; Power, Hertzman, & Jefferis, 2002). Maternal factors including stressful life circumstances, low socioeconomic status, poor maternal nutrition and health, and smoking and alcohol/drug use during pregnancy can adversely influence birth outcomes and infant health (DiFranza, Aligne, & Weitzman, 2004; Finch, 2003; Kramer, 1987a; Kramer, Olivier, McLean, Willis, & Usher, 1990; Mick, Biederman, Faraone, Sayer, & Kleinman, 2002; Ramsay & Reynolds, 2000; Rasmussen, Horne, & Witol, 2006). For example, smoking during pregnancy has been demonstrated to have an adverse effect on birth weight and gestation (DiFranza, Aligne, & Weitzman, 2004; Kramer, 1987b; Kramer et al.,1990; Macmahon, Alpert, & Salber, 1965; Ramsay & Reynolds, 2000; Simpson, 1957) and alcohol use during pregnancy can influence fetal growth and brain development (Chudley et al., 2005). In turn, outcomes such as low birth weight, preterm births and intrauterine growth retardation have an impact on neonatal and infant morbidity and mortality (Mathews, Menacker, & MacDorman, 2003) as well as longer–term health, cognitive and behavioural problems (Breslau, Johnson, & Lucia, 2001; Hack, Klein, & Taylor, 1995; Huddy, Johnson, & Hope, 2001; Lahti et al., 2006; Lawlor, Batty, Morton, Macintyre, & Ronalds, 2005; Lawlor, Bor, O'Callaghan, Williams, & Najman, 2005; Nigg & Breslau, 2007; Power et al., 2002; Stein, Siegel, & Bauman, 2006). For example, low birth weight babies are at increased risk for developmental problems (Breslau et al., 2001; Kilbride, Thorstad, & Daily, 2004; Lawlor, Bor et al., 2005; Power et al., 2002).

Fortunately, a great deal is known regarding not only risk factors, but also some of the protective factors associated with outcomes for pregnancy, birth, and infant health. Good prenatal nutrition can have an impact on birth weight, gestation, and intrauterine growth (Kramer, 1987b) as well as on neurological development (Green, 2002; Kim, 2004; Scholl & Johnson, 2000). For example, adequate prenatal folic acid intake has resulted in a reduction in neural tube defects such as spina bifida (Green, 2002; Kim, 2004; Scholl & Johnson, 2000). Adequate prenatal care can also have a positive impact on pregnancy and birth outcomes through medical, nutritional, and educational interventions (Alexander & Korenbrot, 1995). There is also abundant evidence on the positive effects of breastfeeding on health in infancy and early childhood (Coulibaly, Seguin, Zunzunegui, & Gauvin, 2006; Ip et al., 2007). The type of parenting an infant receives also has a tremendous impact on health and development; warm and responsive parental care is a protective factor in infancy which leads to secure attachments with parents and healthy neurological and psychological development (Gunnar, 2003).

For these reasons, a number of prenatal and early childhood programs have been developed to improve birth and child outcomes. These programs can improve birth outcomes and infant health by advocating for prenatal care, encouraging cessation of smoking and alcohol use, providing supplemental incomes, promoting breastfeeding and positive parenting practices, and by decreasing stress through the provision of social and emotional support. Nutrition intervention programs and programs offering income supplements have both demonstrated positive effects on birth outcomes (Abu–Saad & Fraser, 2010; Cox & Phelan, 2008; Higgins, Moxley, Pencharz, Mikolainis, & Dubois, 1989; Kehrer & Wolin, 1979; Rodriguez–Bernal et al., 2010; Rush, 1981). There is also evidence that high–risk mothers and their infants, such as those experiencing a high degree of stress or living in low income situations, benefit from social support programs (Shaw, Levitt, Wong, & Kaczorowski, 2006).

In 2001, the **Healthy Baby Program**[1] was introduced in Manitoba by the **Healthy Child Manitoba Office**. The goal of this program was to promote prenatal and perinatal health. The Healthy Baby Program consists of two components: 1) a **Prenatal Benefit**, which is a targeted income supplement for low income women and 2) **Community Support Programs**, which are educational and supportive groups available to all women from the prenatal period through to an infant's first birthday. The Manitoba Centre for Health Policy (MCHP) was asked by Manitoba Health and the Healthy Child Committee of Cabinet to evaluate the impact of the Manitoba Healthy Baby Program on prenatal, perinatal, and longer–term outcomes of mothers and their infants.

This report describes that evaluation. In this first chapter, we provide a description of the Healthy Baby Program components and the specific objectives of this project. Chapter 2 outlines the general methods used in this research. Chapter 3 provides details about the women in the province of Manitoba who participated in the Health Baby Program. Chapter 4 explains the analyses used to explore the associations between the Healthy Baby Program and various outcomes and provides the results of those analyses. Finally in Chapter 5, we summarize the key findings and discuss recommendations for improving the Healthy Baby Program.

Healthy Baby Program Components

Prenatal Benefit

The Healthy Baby Prenatal Benefit consists of a monthly cheque provided during pregnancy (for those whose yearly income is less than $32,000), starting as early as 14 weeks, that is, in the second trimester. The money is intended to improve prenatal nutrition; however, no restrictions are placed on how the money is spent. The amount received per month is dependent on an expectant mothers' family income and ranges from $10.00 to $81.41 (please see Table 1.1); almost 90% of those receiving the Prenatal Benefit receive the maximum amount, reflecting an average annual income of less than $22,000 (Healthy Child Manitoba, 2010). Along with every cheque, information (in the form of inserts accompanying the cheque) is provided regarding the benefits of good prenatal nutrition; the consequences of smoking, drinking, and/or taking drugs during pregnancy; the importance of regular prenatal health care; the benefits of exercise and stress reduction; and information on the importance of early child development, including information on the benefits of breastfeeding. Information about Healthy Baby Community Support Programs is also provided.

Table 1.1: Healthy Baby Prenatal Benefit Amount According to Family Income

Family Income	Monthly Benefit
$18,000	$81.41 (Maximum amount)
21,744	81.41
24,000	63.50
26,000	47.63
28,000	31.72
30,000	15.88
31,999	10.00

Source: Manitoba Centre for Health Policy, 2010

1 Terms in **bold typeface** are defined in the Glossary at the end of this report.

Eligibility for the Prenatal Benefit is determined by completion of an application form (see Appendix Figure 1.1 for a copy of Healthy Baby Prenatal Benefit Application form). The application requests consent to release pregnancy information by the expectant woman's doctor or medical practitioner in order to obtain a confirmation of the pregnancy and the expected due date. The application form also requests information regarding family income by requiring consent to confirm receipt of **income assistance** by the provincial office or First Nation/Band office or consent to release family income information from the Canada Revenue Agency. Women receiving income assistance are eligible for the Prenatal Benefit as are women with annual net family incomes of less than $32,000, provided a completed application form is submitted. In order to receive the Manitoba Healthy Baby Prenatal Benefit, women must reside in Manitoba.

Community Support Programs

Approximately 70 prenatal and postnatal Community Support Programs exist across Manitoba, with the aims of encouraging early, regular prenatal care, as well as promoting healthy infant development. These programs are located in the community and provide information and support in a group setting on a regular basis. While all Community Support Programs have the same goals, the topics discussed and the types of support provided to the group of women differs across sites. Most Community Support Programs offer groups on a weekly basis; however in remote communities, they are sometimes only offered on a bi–weekly or monthly basis. The programs can include information on prenatal nutrition and health, as well as information on parenting and infant development. The programs offer social support, milk coupons (during pregnancy and up to six months postnatal), bus tickets (to attend programs), and on–site child care.

All expectant mothers and mothers of infants are eligible for the Community Support Programs, which are offered free of charge, regardless of family income. When a woman enters a program, she is asked to complete a short survey (copies of the prenatal and postnatal surveys can be found in Appendix Figure 1.2); a woman is allowed to participate in the program regardless of whether the survey is completed or not.

Objectives of Report

Some expectant mothers receive only the Prenatal Benefit, some only participate in the Community Support Programs, some women participate in both components of the Healthy Baby Program, and some pregnant women do not participate in the program at all. The goal of the current report was to determine whether participation in either or both components of the Healthy Baby Program was associated with better outcomes than no participation. The specific objectives were:

1. To determine the uptake of each of the components (Prenatal Benefit and Community Support Programs) of the Healthy Baby Program, and how uptake differs across socioeconomic status and geographic region
2. To determine the impact of participation in the Healthy Baby Program on prenatal care, birth outcomes, and infant outcomes.
3. To examine how the Prenatal Benefit and Community Support Program components of the Healthy Baby Program work together. In other words, to determine whether the impact of participation in the Healthy Baby Program differs according to which components or combination of components a woman participates in.

Chapter 2: General Methods

This chapter describes the databases and general methods used in this report. The specific methods used to determine the uptake of the components of the Healthy Baby Program are described in Chapter 3 and those used to evaluate the impact of participation in the Healthy Baby Program are described in Chapter 4.

This report involves a retrospective evaluation of the Healthy Baby Program. What this means is that the information used in the evaluation was collected prior to the start of the evaluation. With the exception of the Healthy Baby Program participation data provided by the Healthy Child Manitoba Office, the analyses for this report used administrative data contained in the **Population Health Research Data Repository** (Repository) which is housed at the Manitoba Centre for Health Policy (MCHP) at the University of Manitoba. We were not able to specify what information we would like collected, but fortunately, the data in the Repository provided us with ample useful information for this evaluation. The evaluation design and analyses were conducted based on data available.

The Repository is a comprehensive collection of databases that contains de–identified records of all Manitobans' contacts with the health care system, including visits to physicians, hospitalizations, and pharmaceutical prescriptions dispensed. Along with health services databases, the Repository also contains social service databases, including information about family receipt of income assistance, foster care, and child protection and support services. Program data from the Healthy Child Manitoba Office are also deposited in the Repository, including information about Manitoba Healthy Baby Prenatal Benefit applicants and Manitoba Healthy Baby Community Support Program participants, as well as Families First Screening data (universal screening for biological and social risk factors at birth). All records in the Repository are anonymous, as prior to data transfer to MCHP, Manitoba Health processes the records to encrypt all personal identifiers and remove all names and addresses.

Datasets Used in Report

1. Hospital Discharge Abstracts—this database contains records generated upon discharge from hospital. Diagnoses given and procedures performed during hospitalization are recorded. Also recorded is detailed information about the birth hospitalization, including birth weight, gestational age at birth, 1– and 5–minute **Apgar** scores, and whether breastfeeding was initiated.

2. Physician claims—this database records most encounters an individual has with a physician. This includes a three–digit ICD–9 diagnosis code and the tariff code for the visit. The tariff code can be used to determine the type of visit (e.g., complete prenatal assessment).

3. Population–based research registry—this registry includes information on all Manitobans registered to receive health care, which is almost everyone residing in the province. The Registry includes information on age, sex, and region of residence. It is used to calculate mother's age at the birth of her first child, as well as presence of and spacing between siblings.

4. Manitoba Immunization Monitoring System (MIMS)—this dataset contains information about who has received vaccinations and which specific vaccinations they have received. For this report we looked at second–year **immunizations**, assessing whether children were up–to–date with their vaccinations against diphtheria, pertussis, tetanus, and polio; Haemophilus influenza type b (Hib); measles, mumps, and rubella; pneumococcal conjugate; and influenza by their second birthday.

5. Vital Statistics—this dataset includes information on all deaths in the province. In this report, Vital Statistics data allowed us to identify the infants who died in their first year.

6. Social Assistance Management Information Network (SAMIN)—this database includes information on all provincial employment and income assistance recipients in Manitoba. Using this database we were able to determine which women received income assistance during pregnancy, as well as estimate their income during pregnancy.

7. Child and Family Services Information System (CFSIS)—this dataset contains information about children taken into foster care, including the date taken into care and duration of foster care.

8. Families First Screening Form—this dataset includes information from the Families First Screening Form on nearly all families with newborns in the province, which is completed by Public Health Nurses during a routine postnatal visit. The screening form contains 39 items related to biological and social risk factors, such as smoking and drinking during pregnancy, maternal education, maternal depression, and social isolation. The Families First measure of maternal education shows substantial agreement with data from Manitoba Education.[2]

9. Manitoba Healthy Baby Prenatal Benefit—this dataset includes information on all women who applied for the Healthy Baby Prenatal Benefit. The Prenatal Benefit is an income supplement provided to women with low incomes during pregnancy. It includes information on maternal education, marital status, and net family income. The dataset also indicates which applicants received the Prenatal Benefit and which did not.

10. Manitoba Healthy Baby Community Support Program Participation—this dataset includes information about women attending prenatal and postnatal Community Support Programs in over 70 locations throughout Manitoba. Information on which program was attended, type of attendance (e.g., in person, home visit, telephone contact), and number of times attended is included for the majority of participants.

11. Canada Census—this dataset includes area–level Census information, such as unemployment, education, and average household income on Manitoba residents. In this report, information on average household income from the 2001 Census[3] was applied to residents of Manitoba based on their postal codes. The Manitoba population was then sorted according to average household income, going from lowest to highest, and divided into five equal groups, or quintiles. Separate urban and rural **income quintiles** were developed, with urban quintiles each containing approximately 20% of the population of Winnipeg and Brandon, and rural quintiles each containing approximately 20% of the population in the rest of Manitoba. Mother–infant pairs examined in our study were placed into the appropriate quintile according to their residential postal code. In addition to the income quintiles, for some analyses a composite measure of socioeconomic status, based on average household income, education level, employment status, and single parent family status from the 2006 Census, was used to adjust for socioeconomic status (Martens, Frolich, Carriere, Derksen, & Brownell, 2002; Metge et al., 2009).

2 For this analysis, we looked at all the women in our study population who were born in Manitoba and attended high school in Manitoba (n=6599). From records from Manitoba Education, we were able to determine which of these women graduated from high school. These results were compared to the answer on the Families First form about completion of high school. For over 85% of the women, the response to whether they graduated from high school on the Families First form was in agreement with what was found using the Manitoba Education records. The Kappa coefficient, which is used to measure agreement, was 0.71, indicating substantial agreement between the two sources of information (Landis & Koch, 1977).

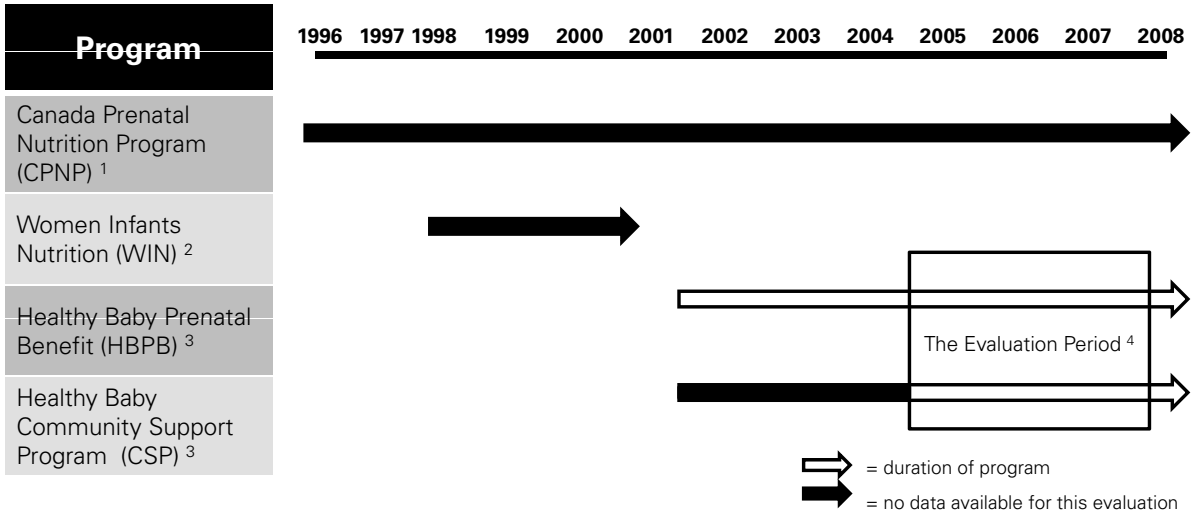
3 At the time these analyses were carried out, the most recent population income quintiles available were from the 2001 Census.

Evaluation Period and Population

The Manitoba Healthy Baby Program began in 2001, and data collection for the Prenatal Benefit Program began in July 2001; however, data collection for Community Support Program participation did not begin until June of 2004. Figure 2.1 provides information on different pre– and postnatal programs between 1997 and 2009 including the Healthy Baby Programs. The evaluation period in this report is restricted to the time period when data were collected for both components of the Healthy Baby Program: 2004/2005 through 2007/2008. All births in Manitoba hospitals during that time period were linked to their mothers to determine whether the mother participated in the Prenatal Benefit and/or Community Support Programs.

A total of 56,560 babies were born during the evaluation period. These infants and their mothers, or a subset of them depending on the analysis, were used as the evaluation population in this report.

Figure 2.1: Timelines for Pre- and Postnatal Health Programs in Manitoba



[1] CPNP funds support services only and does **not** provide monetary allowances to pregnant women/mothers

[2] WIN program provides up to $65/month for expectant mothers (up to 7 months during pregnancy) and new mothers (up to 1 year after birth); must participate in community programs

[3] HB program replaces WIN; expectant moms can receive up to $81 per month; not dependent on program participation; community program continued with slight change in program criteria.

[4] Data on Community Support Programs not collected until 2004. For most communities, CPNP and HB CSP are joint-funded so we have data on all. Where we have no data on CPNP participation, these communities are removed from CSP analysis

Source: Manitoba Centre for Health Policy, 2010

Chapter 3: Who Participates in the Manitoba Healthy Baby Program?

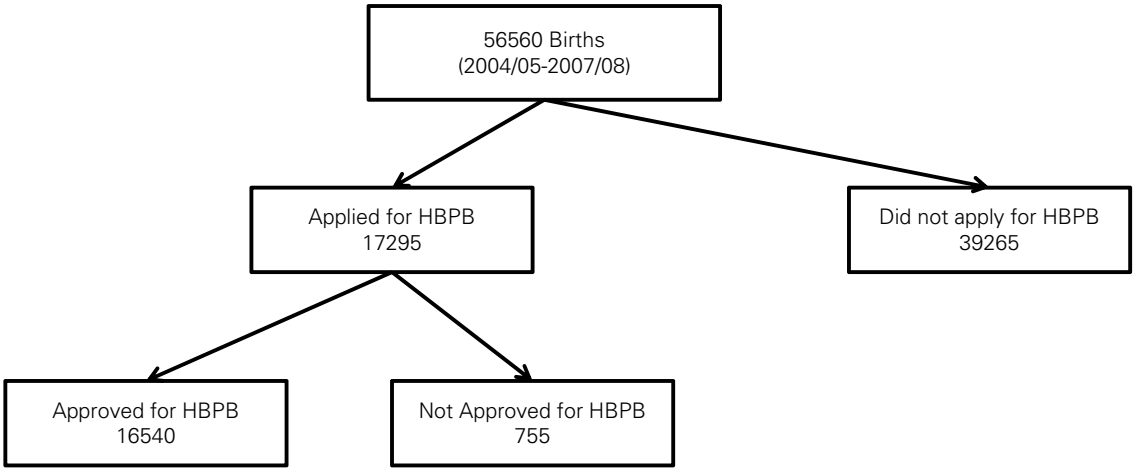
This chapter addresses the first objective of the report, that is, to determine the uptake of each of the components of the Healthy Baby Program and how uptake differs according to socioeconomic status and geographic region. Uptake for each of the components (the Prenatal Benefit and the Community Support Programs) is discussed separately. For each component, uptake is measured over time, across **Regional Health Authorities** (RHAs), by receipt of income assistance, by area–level income quintiles, and by mother's age at current birth and mother's age at birth of her first child.

The Manitoba Healthy Baby Prenatal Benefit Program

Each of the 56,560 infants born in the evaluation period, April 1, 2004 through March 31, 2008, (Figure 3.1) were grouped into one of three categories, depending on whether their mother:

1. did not apply for the Healthy Baby Prenatal Benefit (no application).
2. applied for the Healthy Baby Prenatal Benefit, but did not receive it (not approved).
3. applied for and received the Healthy Baby Prenatal Benefit (approved).

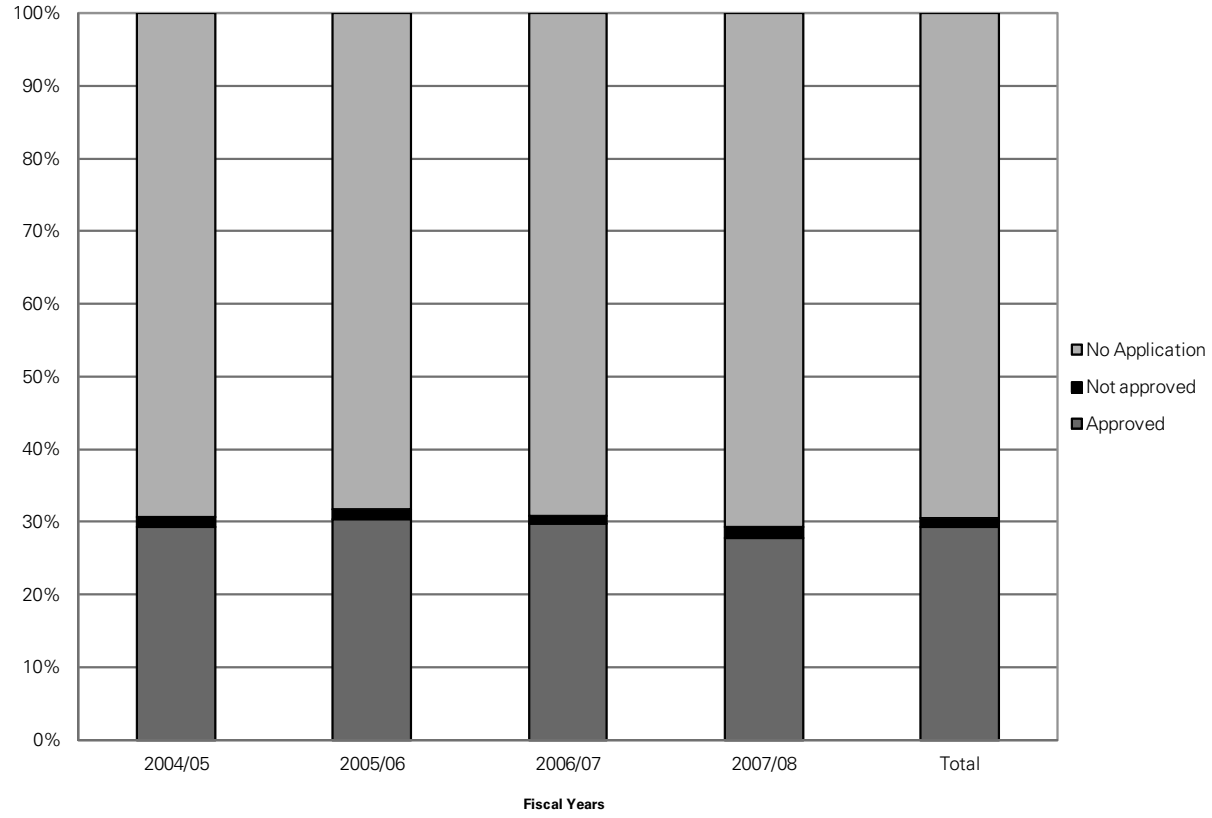
Figure 3.1: Flowchart of Evaluation Population by Healthy Baby Prenatal Benefit Application and Approval



Source: Manitoba Centre for Health Policy, 2010

Figure 3.2 shows the percent of births during the evaluation period by these three categories. There was minimal variation in these categories across the four **fiscal years** shown. The majority of births (69.4% or 39,265) were to women who did not apply for the Healthy Baby Prenatal Benefit. A further 29.2% (16,540) of births were to women who applied for and received the Healthy Baby Prenatal Benefit, with only 1.3% (755) of the births to women who applied for but did not receive the Benefit.

Figure 3.2: Percent of Births by Healthy Baby Prenatal Benefit Application Type by Fiscal Year, 2004/05 - 2007/08

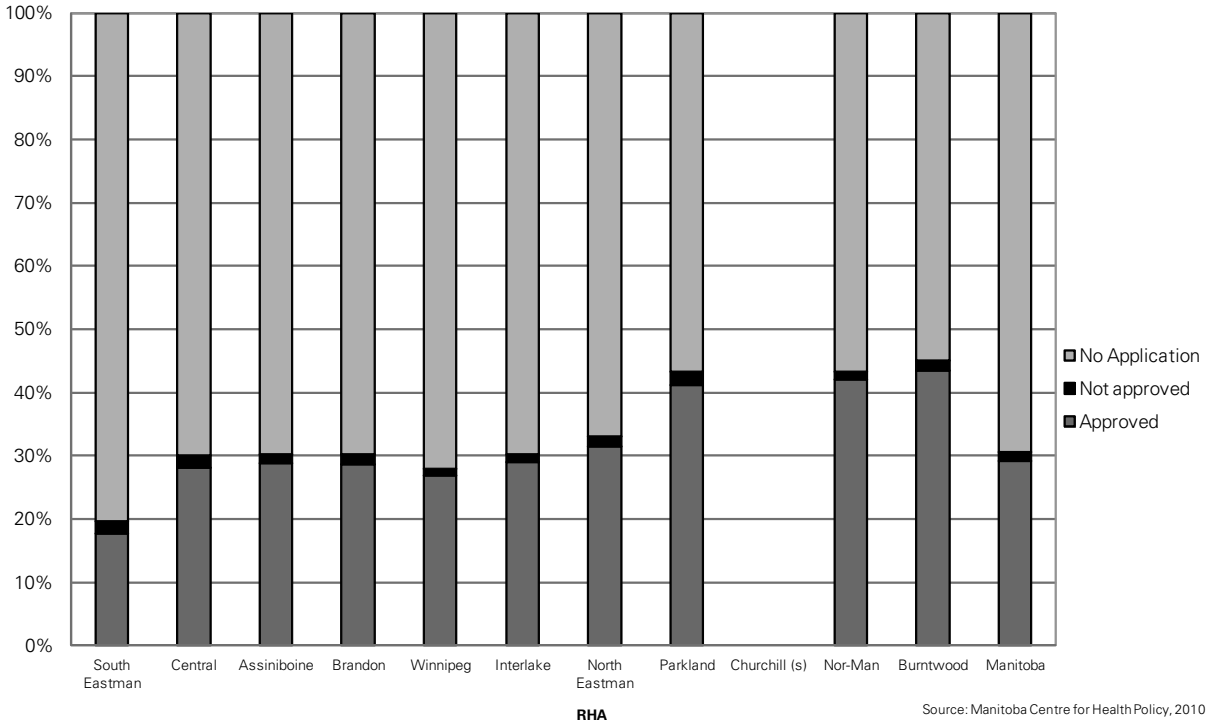


Source: Manitoba Centre for Health Policy, 2010

The receipt of the Healthy Baby Prenatal Benefit varied by Regional Health Authority (RHA), from a low of 17.8% in South Eastman RHA to a high of 43.4% in Burntwood (Figure 3.3). Figure 3.3 shows the percent of births according to Healthy Baby Prenatal Benefit application type, with the RHAs ordered from highest overall health status and socioeconomic status to lowest health and socioeconomic status. As would be expected, there was more Prenatal Benefit receipt in areas of lower compared to higher socioeconomic status. A comparable graph by Winnipeg Community Areas can be found in the Appendix (Appendix Figure 1.3).

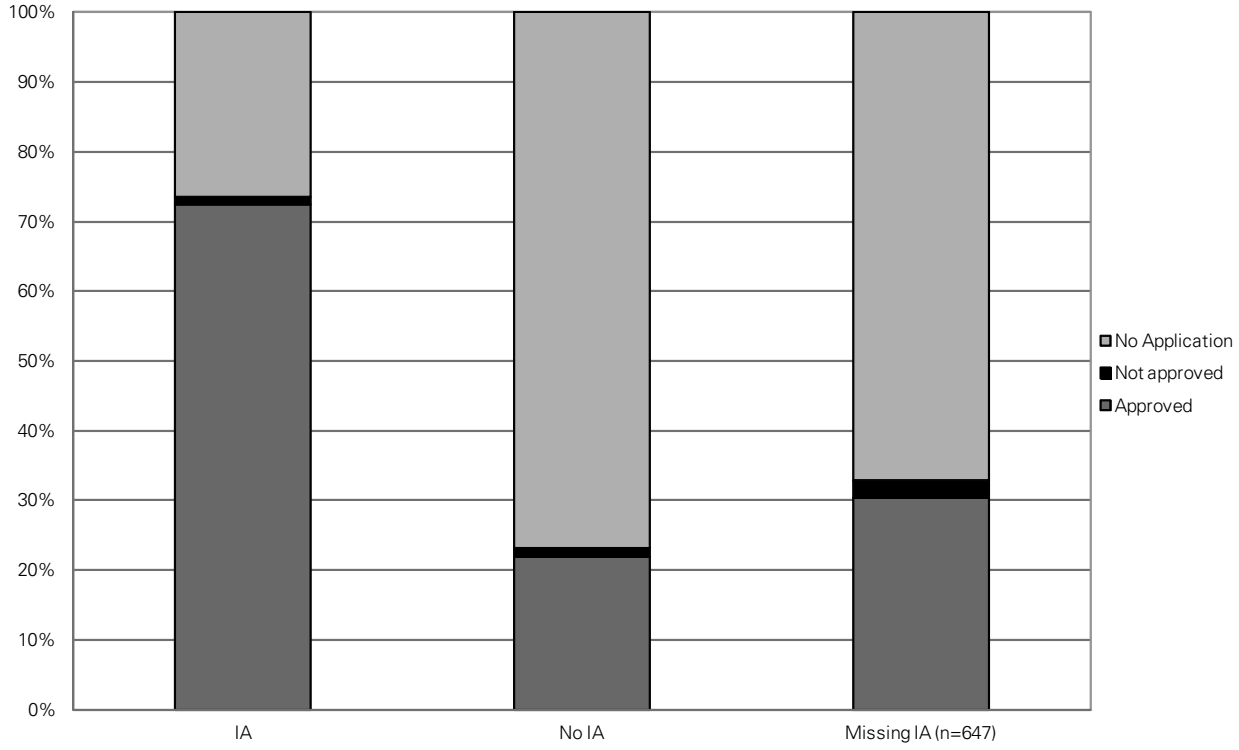
Figure 3.4 shows the percent of births according to the Prenatal Benefit application type by whether or not the mother received income assistance for at least one month during pregnancy. All women receiving income assistance during pregnancy should be eligible to receive the Prenatal Benefit. As shown in the figure, nearly three–quarters (72.4%) of the women receiving income assistance during pregnancy received the Prenatal Benefit.

Figure 3.3: Percent of Births by Healthy Baby Prenatal Benefit Application Type by RHA, 2004/05 - 2007/08



Source: Manitoba Centre for Health Policy, 2010

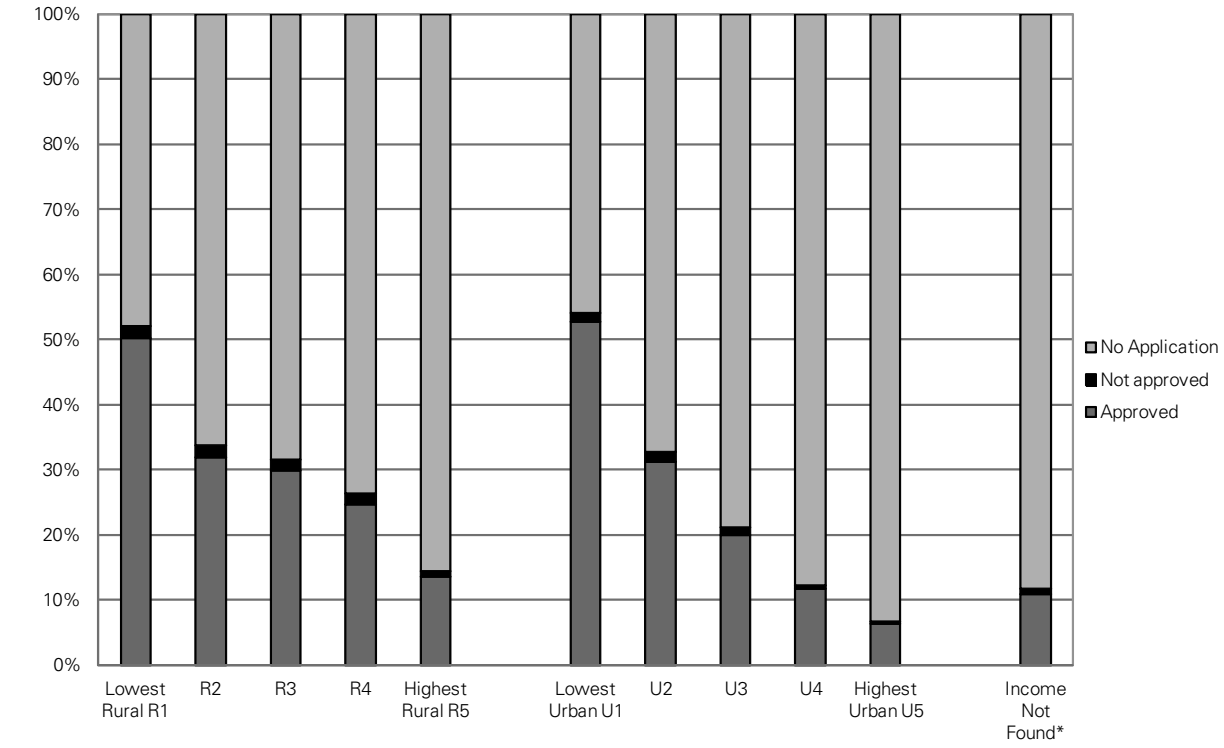
Figure 3.4: Percent of Births by Healthy Baby Prenatal Benefit Application Type by Receipt of Income Assistance (IA), 2004/05 - 2007/08



Source: Manitoba Centre for Health Policy, 2010

We also looked at receipt of Healthy Baby Prenatal Benefit by area–level income, using average household income taken from the 2001 Canada Census and applied to the rural and urban populations, divided into equal fifths, or quintiles. Figure 3.5 shows the five rural income quintiles on the left, going from lowest to highest average household income, and the five urban income quintiles on the right, also going from lowest to highest income. People who live in an area whose household income could not be determined were placed together in the category "income not found" (far right of the graph). As expected, receipt of the Healthy Baby Prenatal Benefit is highest in the areas with the lowest income, and receipt decreases with each increase in area–level income.

Figure 3.5: Percent of Births by Healthy Baby Prenatal Benefit Application Type by Rural and Urban Income Quintile, 2004/05 - 2007/08

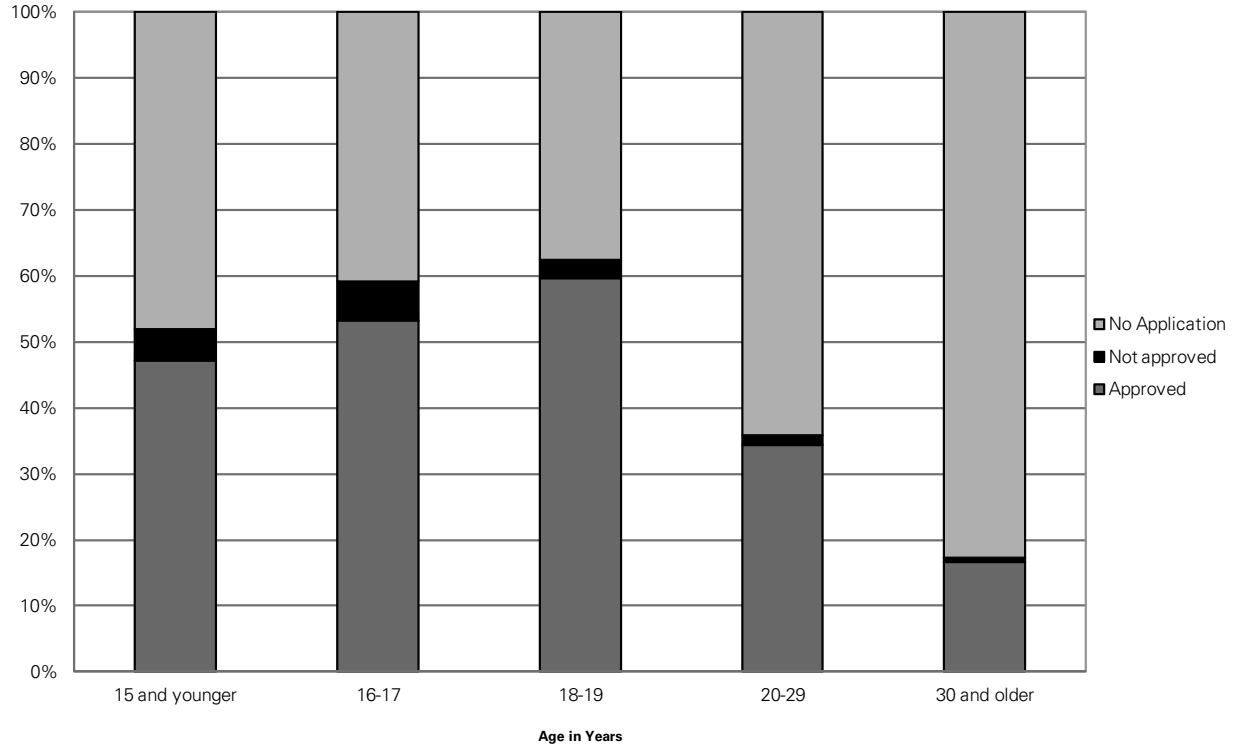


* Infant lives in an area where income cannot be calculated or address corresponds to a Public Trustee or Child and Family Services

Source: Manitoba Centre for Health Policy, 2010

We also examined receipt of the Healthy Baby Prenatal Benefit by the age of mother at the birth of her baby. Pregnant teens generally have fewer financial resources than older expectant mothers. Expectant teens were more likely to receive the Prenatal Benefit compared to 20– to 29–year–old and 30–year–old and older women (see Figure 3.6). Receipt of Healthy Baby Prenatal Benefit was highest for women 18 to 19 years of age, where almost 60% were recipients. The younger expectant teens (15 years and younger, 16 to 17 years) were somewhat less likely than the older teens to receive the Prenatal Benefit (just slightly under and over 50% respectively). The percent of expectant teens who applied for the Prenatal Benefit but did not receive it was higher than for expectant mothers in their 20s and 30s. For example, 4.7% of expectant teens 15 years or younger and 6% of teens 16 to 17 years submitted an application for the Benefit, but their application was not approved.[4]

Figure 3.6: Percent of Births by Healthy Baby Prenatal Benefit Application Type by Age of Mother at Current Birth, 2004/05 - 2007/08



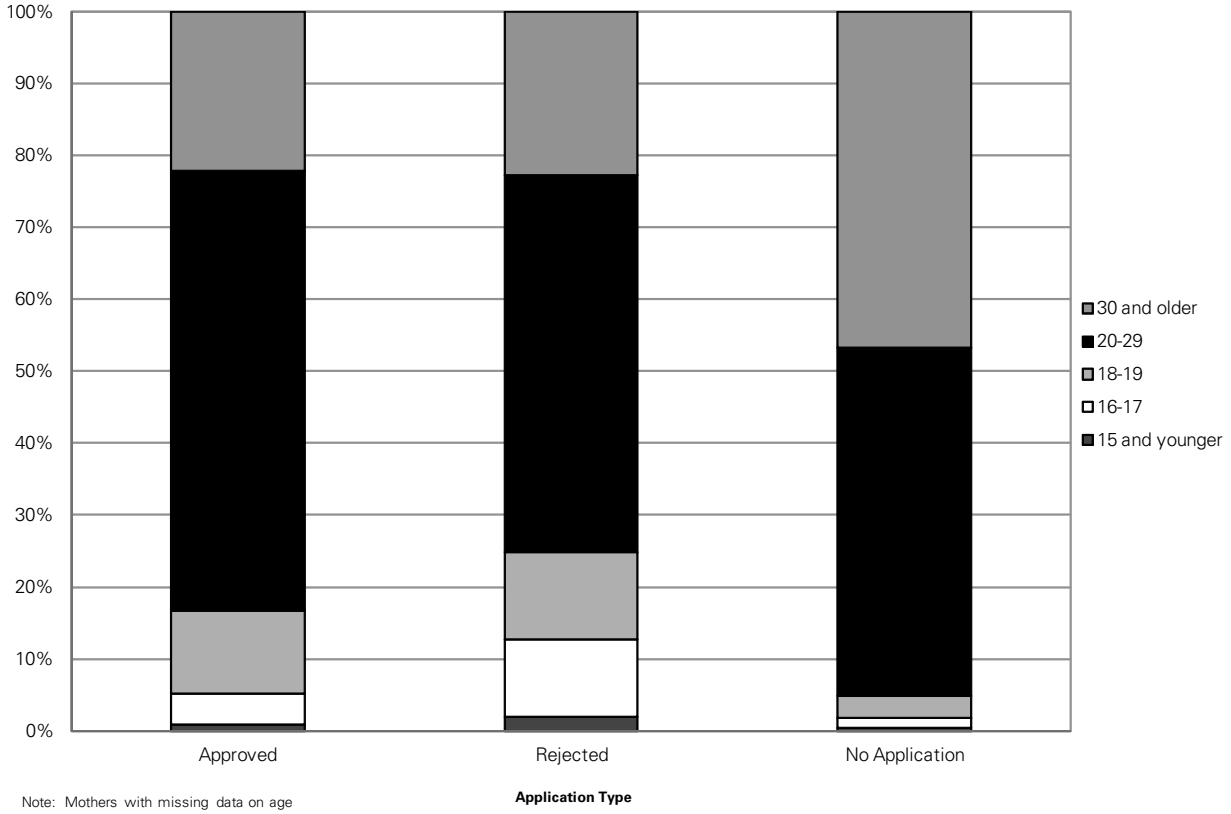
Note: Mothers with missing data on age were removed from analyses

Source: Manitoba Centre for Health Policy, 2010

4 Even if these younger teens were still living with their parents, only the teen's income is considered when assessing eligibility for the Prenatal Benefit. For those teens without income information (that is, they have not filed an income tax return), a Declaration of Income form is required. According to the Healthy Baby Prenatal Benefit Program, many teens do not send these forms in to the Prenatal Benefit office. After three months their file is closed and they don't end up receiving any benefits. More recently, attempts have been made to make the forms more available, by sending them to agencies that work with teens and putting them on the Healthy Child Manitoba website.

Although over half of expectant **teen mothers** receive the Healthy Baby Prenatal Benefit, this does not necessarily mean that the majority of Prenatal Benefit recipients are teenagers. In fact, because most births occur to women who are not in their teen years, a relatively small percent of Benefit recipients are teens. Just under 9% (8.6%) of the births in the study period were to teen moms. Figure 3.7 shows for each category of Healthy Baby Prenatal Benefit, approved/not approved/no application, the percent of teen and older women. As can be seen, teens accounted for 16.7% of all Benefit recipients, 24.9% of all those not approved for the Benefit, and 4.8% of those who did not apply for the Benefit.

Figure 3.7: Percent of Births by Age of Mother at Current Birth, by Healthy Baby Prenatal Benefit Application Type, 2004/05 - 2007/08

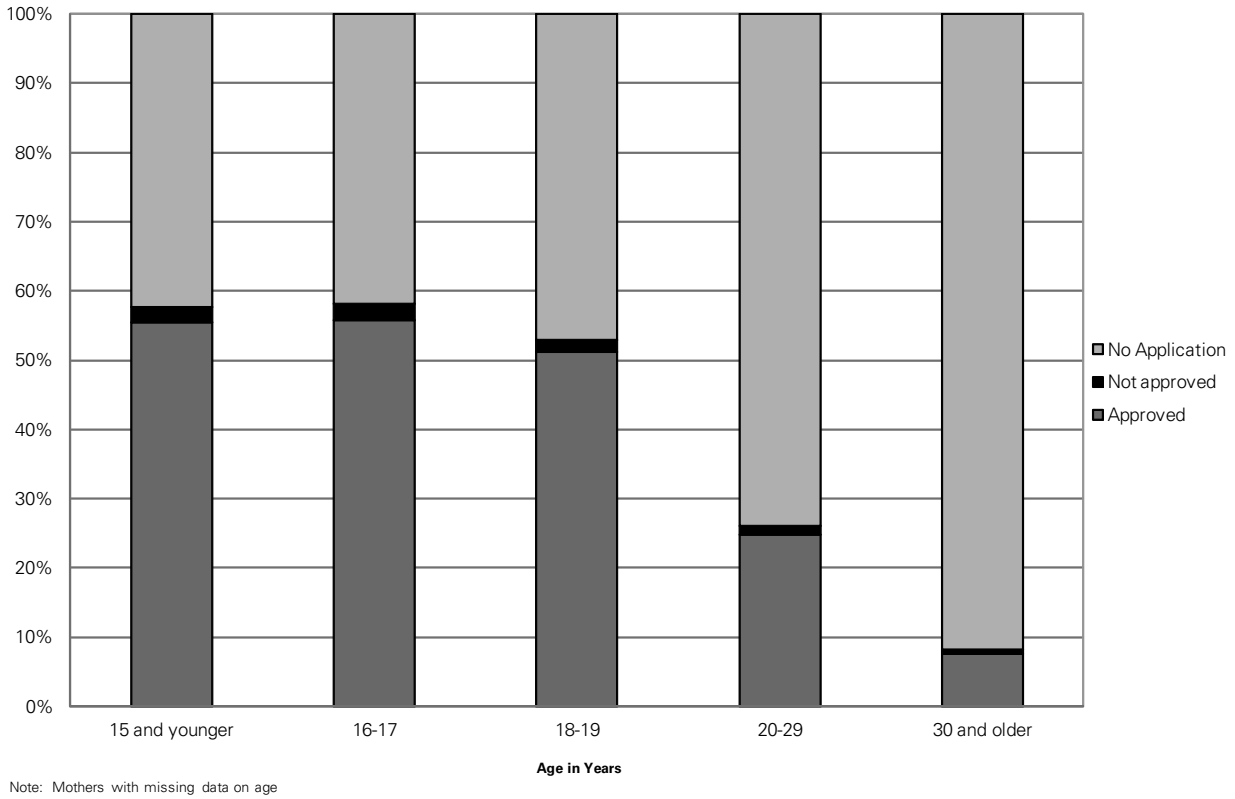


Note: Mothers with missing data on age were removed from analyses

Source: Manitoba Centre for Health Policy, 2010

We know that teen motherhood has enduring implications for financial security, so we also looked at receipt of the Healthy Baby Prenatal Benefit by the age of mother at the birth of her first child. That is, even if the woman was 25 or 30 when she gave birth to the child in our evaluation period, if she was a teen when she started having children she was included as a teen mother in Figure 3.8. The figure shows that as mother's age at first birth increases, the percent of expectant moms receiving the Healthy Baby Prenatal Benefit decreases. The figure shows that almost 56% of the expectant mothers who were 15 or younger or 16 to 17 when they had their first baby received the Prenatal Benefit during this current pregnancy, compared to 7.6% of moms who were 30 or older when they had their first child.

Figure 3.8: Percent of Births by Healthy Baby Prenatal Benefit Application Type by Mother's Age at First Birth, 2004/05 - 2007/08

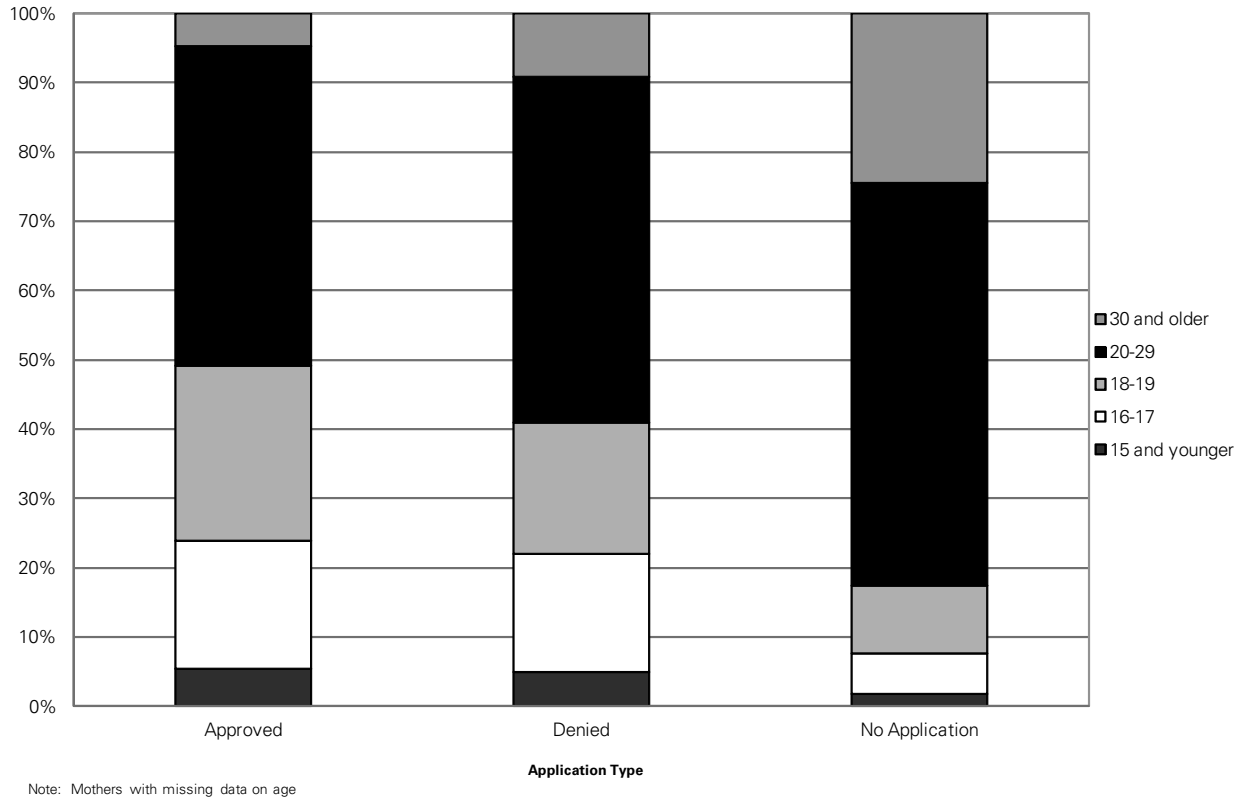


Note: Mothers with missing data on age were removed from analyses

Source: Manitoba Centre for Health Policy, 2010

Once again, although over half of the women who were less than 18 when they had their first child received the Benefit, this does not necessarily mean that the majority of Prenatal Benefit recipients were teens at first birth. About 27% of all the births in the study period were to women who were teens when they had their first baby. As shown in Figure 3.9, these moms account for almost 50% of the expectant mothers who received the Benefit during the study period and 40% of those who applied for but did not receive the Benefit. Only 17% of those who did not apply for the Benefit were teen moms when they had their first baby. To sum up, although a relatively small percentage of Healthy Baby Prenatal Benefit recipients are teens (16.7% as shown in Figure 3.7), those who had their first babies as teens make up a substantial portion (49.2% as shown in Figure 3.9) of women receiving the Benefit.

Figure 3.9: Percent of Births by Mother's Age at First Birth, by Healthy Baby Prenatal Benefit Application Type, 2004/05 - 2007/08



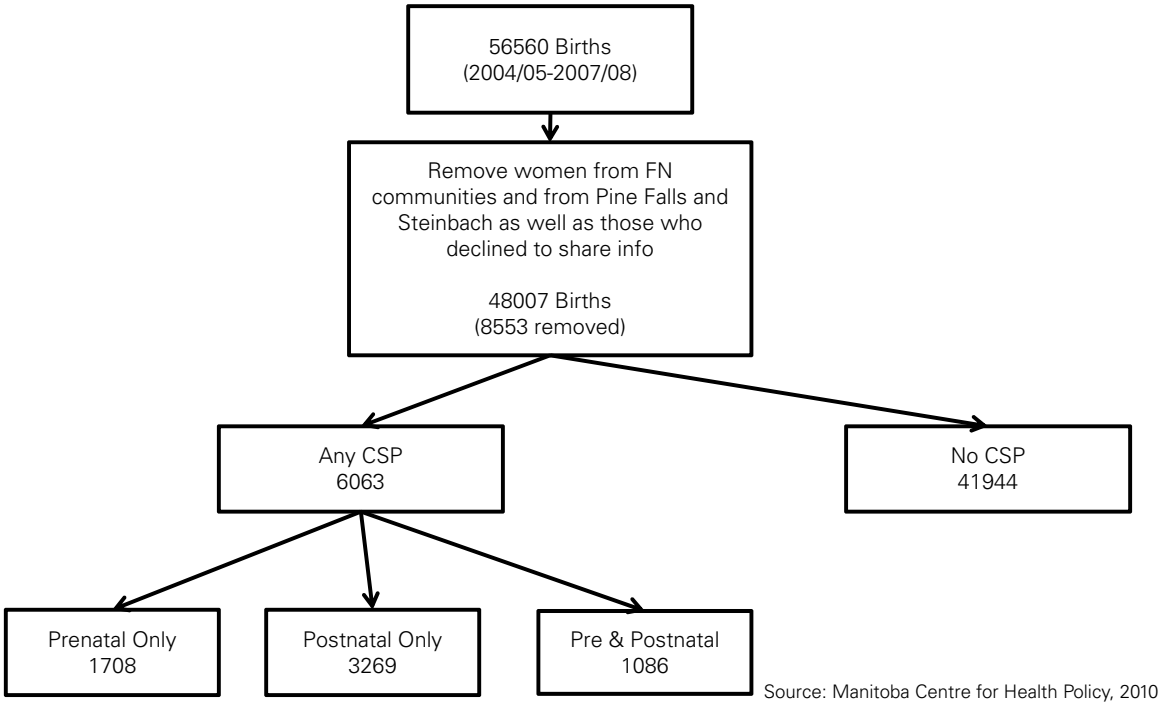
Note: Mothers with missing data on age were removed from analyses

Source: Manitoba Centre for Health Policy, 2010

Manitoba Healthy Baby Community Support Programs

To describe program participation in the Manitoba Healthy Baby Community Support Program, we started with the 56,560 births during the evaluation time period. Some of these births were excluded from the analyses because of unavailable data (described below) and because permission to use the data was not granted from some of the women participating in the program. Figure 3.10 shows the number of births utilized in these descriptive analyses.

Figure 3.10: Flowchart of Evaluation Population by Community Support Program Participation



Source: Manitoba Centre for Health Policy, 2010

Community support programs throughout Manitoba are run not only by the Healthy Baby Program, but also by the Canada Prenatal Nutrition Program (CPNP). Some sites are jointly operated and share program participation information with the Healthy Baby Program. The community support programs in First Nations communities,[5] Pine Falls, Steinbach, and at the Adolescent Parent Centre/Adult Education Centre in Point Douglas are run exclusively by CPNP and data from these programs are not shared with the Healthy Baby Program. Because we would not know about program participation for women attending these programs, it was decided that women living in First Nations communities, in Pine Falls and in Steinbach would be removed from the analyses of Community Support Program participation. It is possible that women from various areas in Winnipeg attended the Point Douglas program and it is also possible that women living near the Point Douglas program attended other support programs in their area. For these reasons, we did not attempt to exclude any Winnipeg women from the Community Support Program analyses; it should be noted that a small percent of Winnipeg women may be mis–classified because of this. One further exclusion from Community Support Program analyses took place: women who indicated on the program participant survey that they did not want

5 CPNP run on–reserve is operated by First Nations and Inuit Health of Health Canada; CPNP off–reserve is run by the Public Health Agency of Canada.

to share their information (n=546, or 8.3% of all Community Support Program participants) were not included in analyses. Due to the exclusions listed above, 8,553 (or 15.1%) of births in the study period were excluded, leaving 48,007 (84.9% of total) births for the analyses of Community Support Program participation.

For each of the 48,007 births, Community Support Program participation was determined and divided into the following four categories:

1) no participation in Manitoba Healthy Baby Community Support Programs

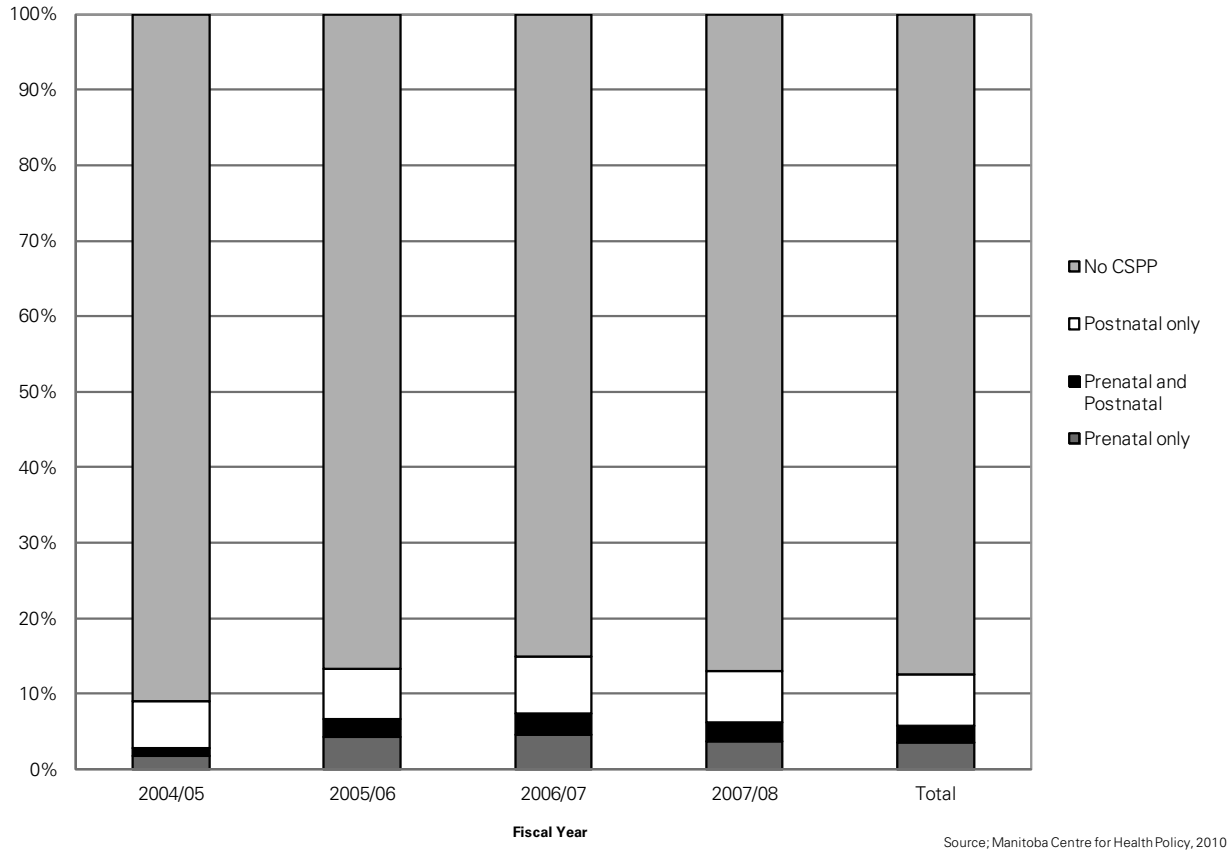
2) participation in prenatal Community Support Programs only

3) participation in postnatal Community Support Programs only

4) participation in both pre and postnatal Community Support Programs

Figure 3.11 shows the percent of births during the study period by these four categories. The patterns of participation were similar across fiscal years; lower participation rates shown in 2004/2005 are likely due to data not being available for the first two months of that fiscal year. The figure indicates that Community Support Program participation was generally low. The majority of births (87.4%) were to women who did not participate in the Community Support Programs. Across all four study years, participation was highest for postnatal Community Support Programs (6.8%), then prenatal programs (3.6%), and lowest for participation in both types of Community Support Programs (2.3%).

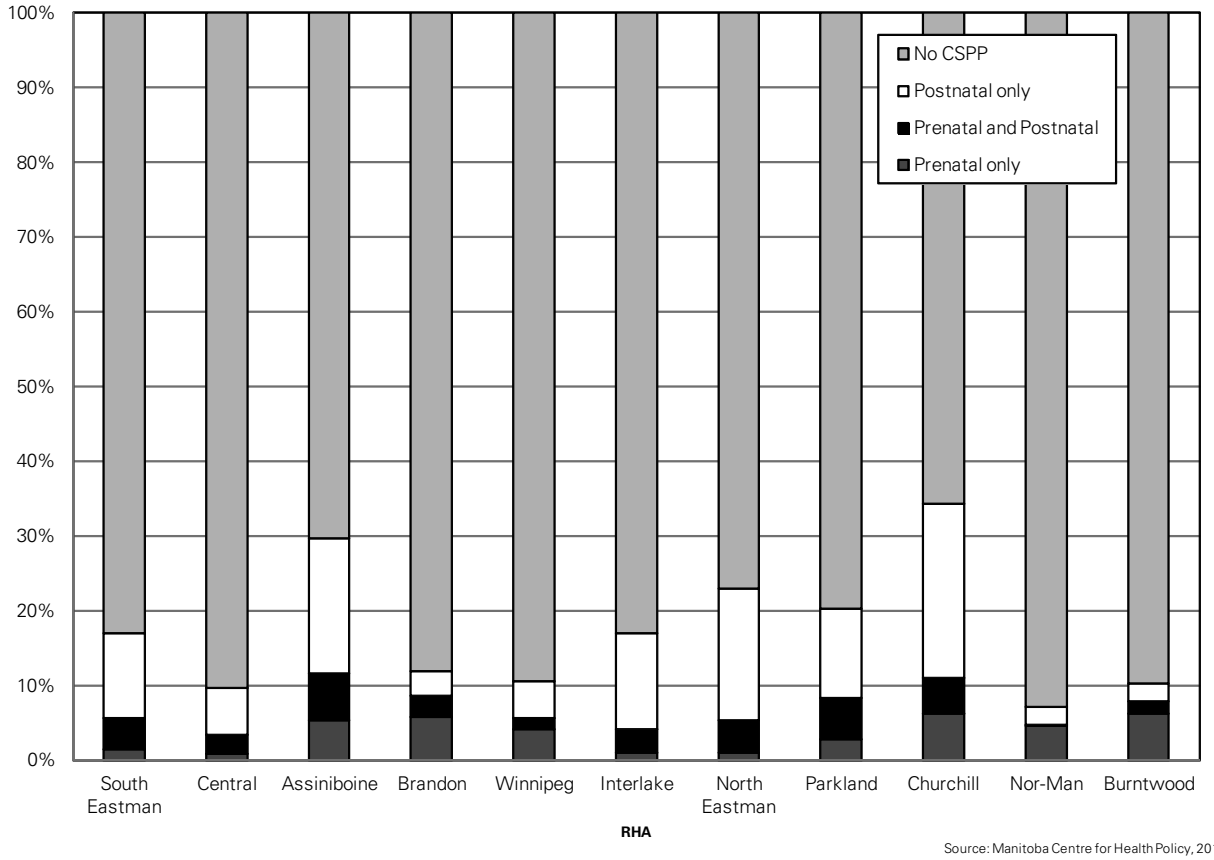
Figure 3.11: Percent of Births by Community Support Program Participation by Fiscal Year, 2004/05 - 2007/08



Source; Manitoba Centre for Health Policy, 2010

Community Support Program participation varied across RHAs, with lows of participation in any program from 7.1% in Nor–Man and 9.6% in Central to highs of 34.4% in Churchill and 29.7% in Assiniboine (Figure 3.12). Once again, the ordering of RHAs in Figure 3.12 is from highest overall health status and socioeconomic status on the left to lowest health and socioeconomic status on the right. Unlike the pattern for the Prenatal Benefit receipt, there does not appear to be an association between Community Support Program participation and RHA socioeconomic status. A comparable graph by Winnipeg Community Areas can be found in the Appendix (Appendix Figure 1.3b).

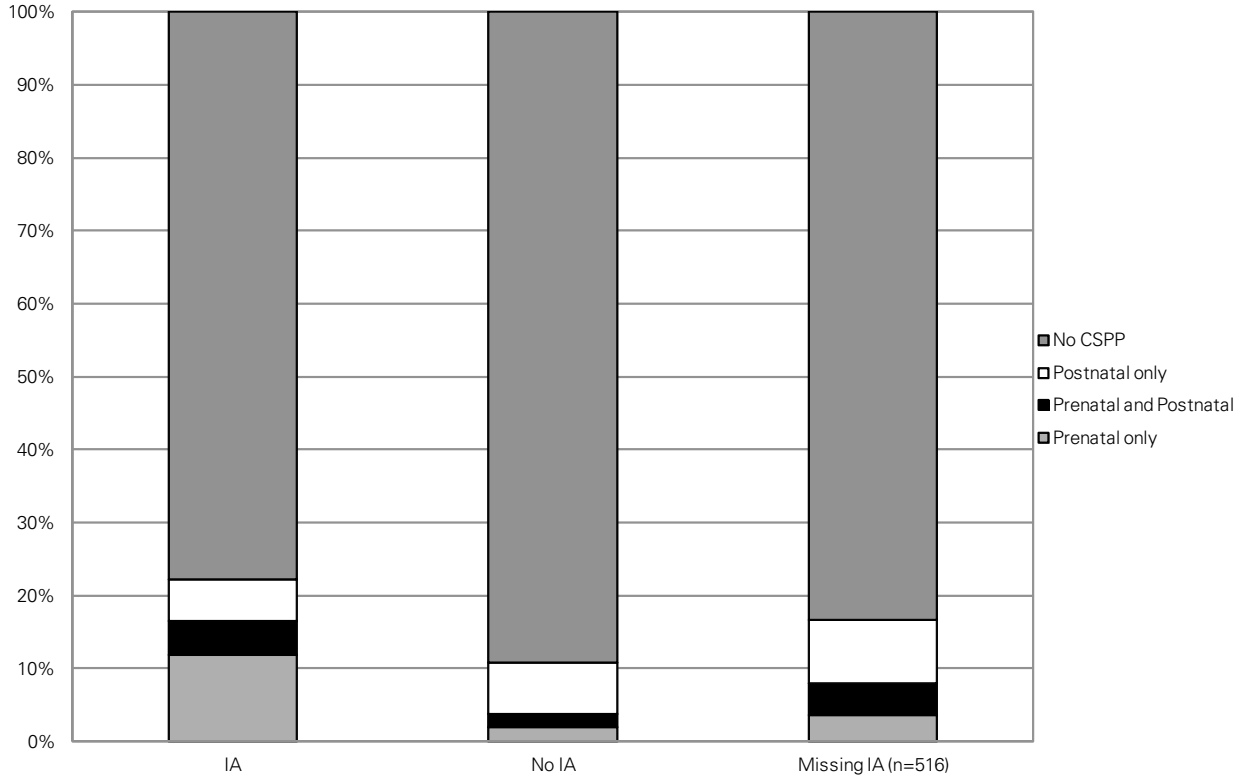
Figure 3.12: Percent of Births by Community Support Program Participation by RHA, 2004/05 - 2007/08



Source: Manitoba Centre for Health Policy, 2010

Figure 3.13 shows the percent of births according to participation in Community Support Programs by whether or not the women received income assistance during pregnancy. As shown in the figure, 22.2% of women receiving income assistance during pregnancy also participated in some form of Community Support Program. The majority of the women who received income assistance during pregnancy and who participated in Community Support Programs participated in the prenatal Community Support Programs (74.8% prenatal compared to 44.6% postnatal, with some overlap between these groups).

Figure 3.13: Percent of Births by Community Support Program Participation, by Receipt of Income Assistance (IA), 2004/05 - 2007/08



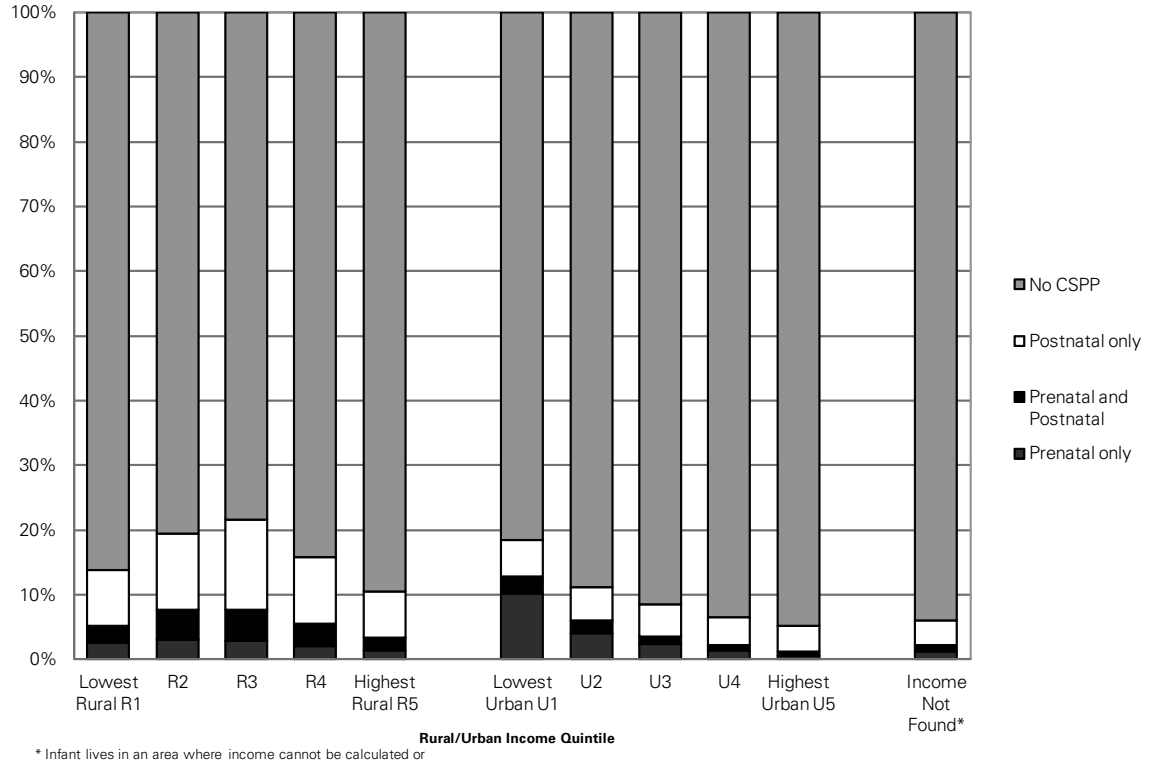
Note: First Nations communities, Pine Falls and Steinbach are excluded from analyses

Source: Manitoba Centre for Health Policy, 2010

Figure 3.14 shows Community Support Program participation by rural and urban income quintiles. In urban areas, the pattern of Community Support Program participation is as expected. Higher participation rates are associated with lower area–level income—18.5% of those living in the lowest urban income areas participated in any Community Support Program compared to 5.1% in the highest income areas. In rural areas, this expected pattern was not found. Instead, the highest participation rates were found for the middle income areas, with 21.6% of those in the middle rural income areas (R3) participating compared to 13.9% in the lowest income areas and 10.5% in the highest income areas.

Figure 3.15 shows Community Support Program participation by mother's age at current birth. Younger mothers are more likely to participate in Community Support Programs; however, their participation rate is still fairly low: just over 20% of teen moms participated in Community Support Programs. Unlike the total population of participants, expectant teen mothers were more likely to participate in prenatal Community Support Programs than the postnatal programs. Once again, even though teen mothers are more likely to participate in Community Support Programs than older mothers, because most births are to women 20 years of age and older, these older mothers make up the majority of Community Support Program participants.

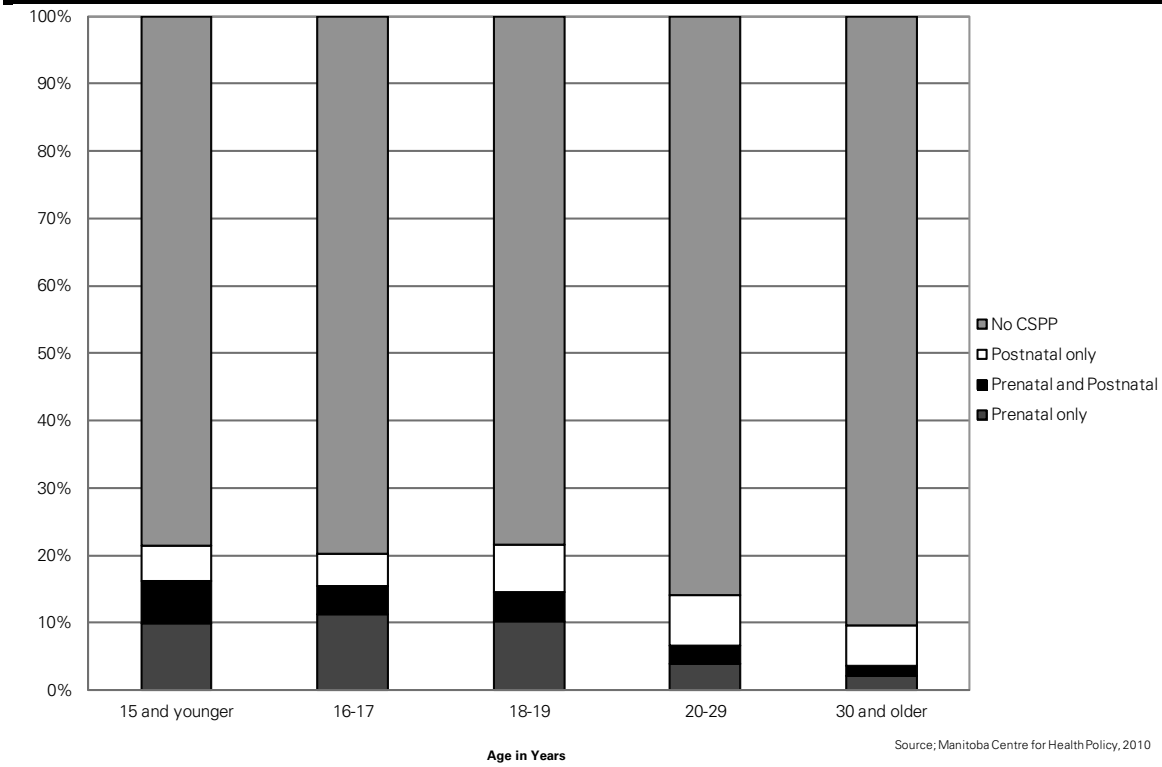
Figure 3.14: Percent of Births by Community Support Program Participation, by Rural and Urban Income Quintile, 2004/05 - 2007/08



* Infant lives in an area where income cannot be calculated or address corresponds to a Public Trustee or Child and Family Services

Source: Manitoba Centre for Health Policy, 2010

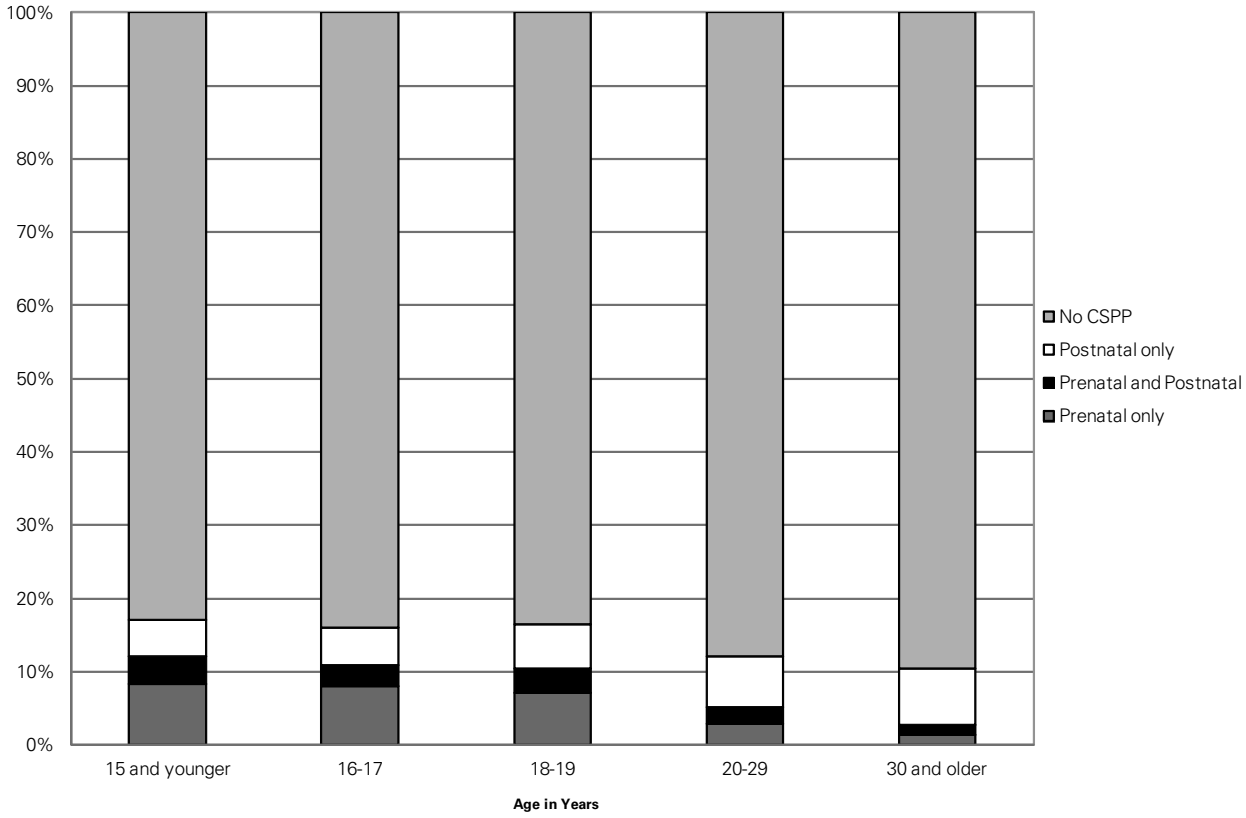
Figure 3.15: Percent of Births by Community Support Program Participation by Mother's Age at Current Birth, 2004/05 - 2007/08



Source; Manitoba Centre for Health Policy, 2010

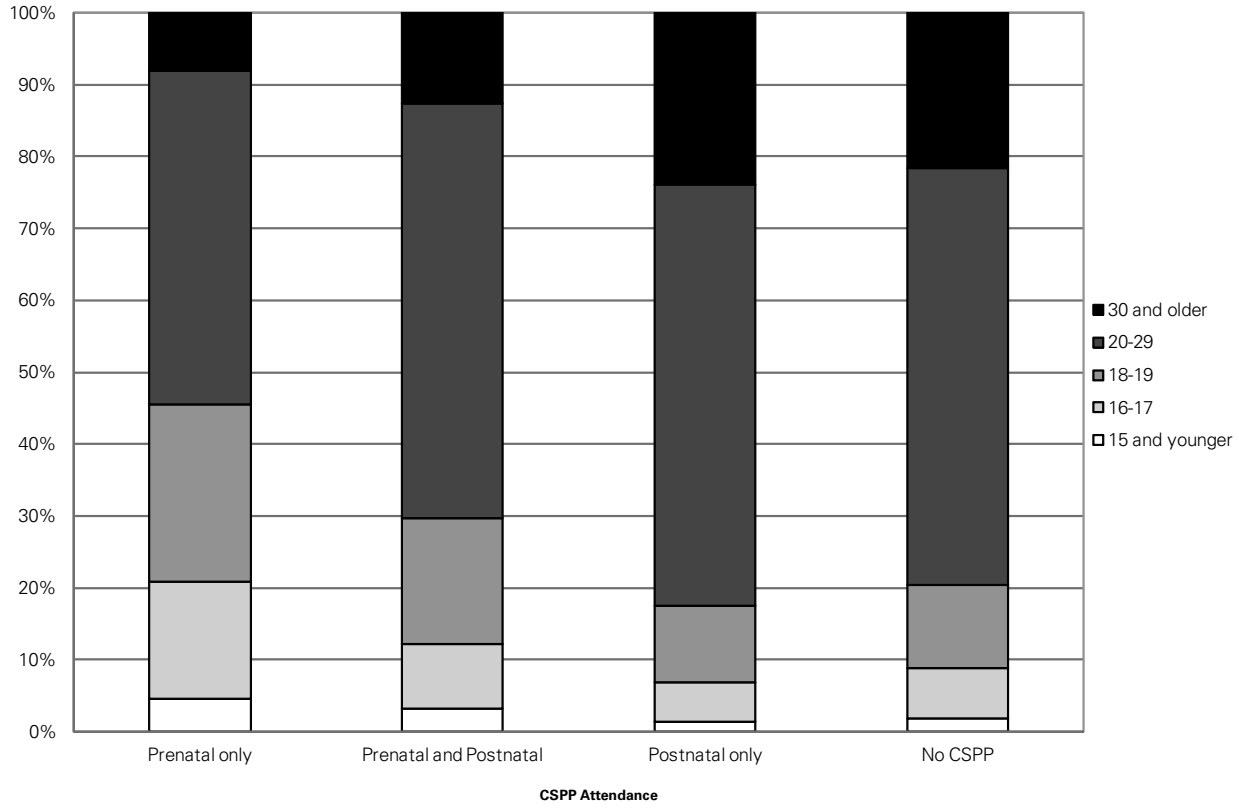
Figure 3.16 shows that mothers who were teens when they had their first birth were somewhat more likely to participate in Community Support Programs compared to mothers who were 20 years or older when they had their first child. Just over 16% of moms who had their first birth as a teen participated in Community Support Programs, compared to almost 12% of moms who were 20 years or older at first birth. Mothers who were teens at first birth were more likely to participate in prenatal compared to postnatal Community Support Programs. Indeed, those who were teens at first birth made up 45.5% of those participating in prenatal Community Support Programs only; but they made up 29.7% of participants in pre– and postnatal programs and 17.5% of those participating only in postnatal programs (Figure 3.17).

Figure 3.16: Percent of Births by Community Support Program Participation by Mother's Age at First Birth, 2004/05 - 2007/08



Source; Manitoba Centre for Health Policy, 2010

Figure 3.17: Percent of Births by Mother's Age at First Birth, by Community Support Program Participation, 2004/05 - 2007/08



Source; Manitoba Centre for Health Policy, 2010

Summary

Close to a third of all births (29%) are to women who received the Healthy Baby Prenatal Benefit during pregnancy, yet less than 13% of all births are to women who participated in any Healthy Baby Community Support Programs. The Prenatal Benefit was received by over half of women living in lower income neighbourhoods and teen mothers and almost three–quarters of women receiving income assistance during pregnancy—potential target groups for the program. In contrast, just over one–fifth of women receiving income assistance during pregnancy and just over one–fifth of teens participated in any Community Support Programs, and less than 20% of women living in the lowest income areas participated in the Community Support Programs. A table summarizing regression analyses that examined factors associated with receipt of the Prenatal Benefit and participation in the Community Support Programs can be found in the Appendix (Table 1.0).

Chapter 4: Is the Healthy Baby Program Associated with Positive Outcomes?

As stated in Chapter 1, the goal of this report was to determine whether participation in either or both components of the Health Baby Program was associated with better outcomes compared with no participation. In this chapter, we focus on objectives 2 and 3:

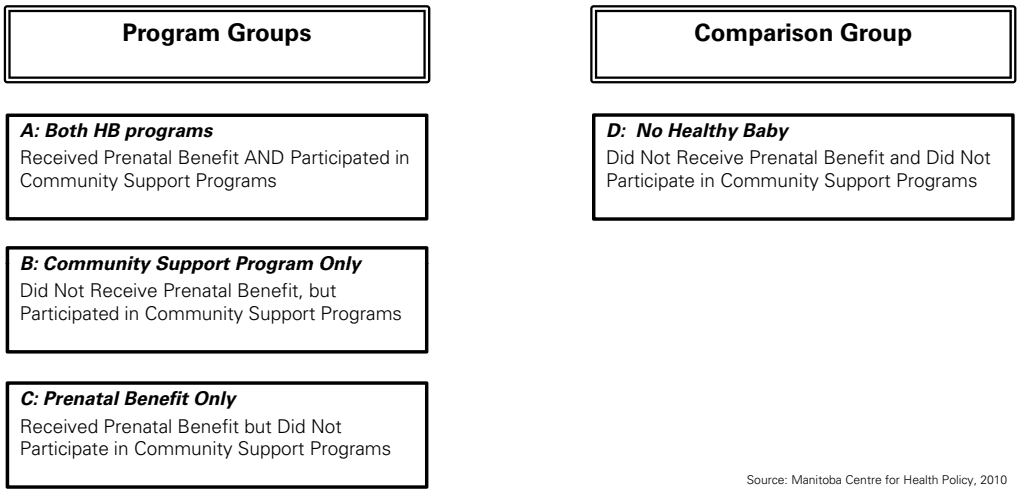
- To determine the impact of participation in the Healthy Baby Program on prenatal care, birth outcomes, and infant outcomes.
- To examine how the Prenatal Benefit and Community Support Program components of the Healthy Baby Program work together. In other words, to determine whether the impact of participation in the Healthy Baby Program differs according to which components or combination of components a woman participates in.

Considerations in Choosing a Comparison Group

A comparison group is necessary to determine whether the Healthy Baby Program was associated with better outcomes. Program participants must be compared to some group that did not participate in the program. The selection of a comparison group has important implications for the interpretation of the study results. One approach would be to simply compare all those participating in the Healthy Baby Program with those not participating. This approach would give biased results, however, because Healthy Baby Program participants are expected to have poorer outcomes. Indeed, this is why the Healthy Baby Program was developed in the first place: to improve nutrition and health from pregnancy through infancy for low income women and infants who may be at higher risk for such outcomes as inadequate prenatal care, low birth weight, and poor care through infancy. This approach, therefore, would give an unfair advantage to the group of women not participating in the program.

So, who then, is the best comparison group? In an ideal situation, a group of women eligible for the Healthy Baby Program would be randomly assigned to either the program group (sometimes known as the "treatment" group) or to the comparison group (sometimes known as the "control" group). The comparison group would not receive any components of the Healthy Baby Program. The program group in this case would probably be further divided into three groups: those receiving only the Prenatal Benefit, those receiving only Community Support Programs, and those receiving both components. Figure 4.1 shows these groups (the three program groups and the comparison group). By randomly assigning women to program and comparison groups (rather than choosing particular women for each group), we could be confident that any differences in outcomes observed between these groups were due to the program rather than any pre–existing differences between the women in these groups. However ideal from a research perspective, random assignment is not often used when implementing programs, since it involves withholding potentially beneficial services from a group of eligible (in this case low income) women. As well, evaluations such as this one are very often designed after the program has already been implemented, when it is too late to consider random assignment.

Figure 4.1: Program and Comparison Groups for Evaluation of the Healthy Baby Program



Source: Manitoba Centre for Health Policy, 2010

In the absence of random assignment, there are other methods for ensuring that the comparison group closely resembles the program group; however, concluding that the program "caused" the outcome being studied becomes less certain. One method for constructing a comparison group that is similar to the program group involves comparing the same group of women during different time periods. For example, we could look at all women participating in the Healthy Baby Program in our study period, find out which of these women also gave birth prior to the start of the Healthy Baby Program, and determine whether there were differences in outcomes for these women and their babies in the Healthy Baby period compared to the pre–Healthy Baby period. Unfortunately, because information on Community Support Program participation did not begin until 2004, our study period (2004/2005–2007/2008) is several years past the "pre–Healthy Baby" period (2000/2001 and earlier). As well, in the pre–Healthy Baby period, a similar program to Healthy Baby, called Women and Infant Nutrition (WIN) was in operation (see Figure 2.1). Thus, in order to have a true pre–Healthy Baby period, we would have to study pregnancies and births occurring prior to the fall of 1998, when the WIN program began. Furthermore, another nutritional program has been available throughout all of these time periods and before the WIN program began. This program is called the Canada Prenatal Nutrition Program (CPNP). CPNP has been operating since 1996 and offers community support programs to women who are pregnant or have new babies. Without information about participation in these other programs which offer programming similar to Healthy Baby, we would have to use information prior to 1996, or at least 10 years prior to our study period, to establish a real pre–Healthy Baby period. Such a long period of time between comparison periods is problematic, not only because the women involved would have matured over the period, but many intervening factors (e.g., change in economy, other social programs, and/or the woman's social situation) may have had an impact on the study outcomes.

Another method used to construct a comparison group similar to the program group is to match the groups on factors that have important influences on the outcomes. For example, if we know that income is an important determinant of prenatal care and birth outcomes, we could then try to match women participating in the Health Baby Program with women not participating in the Health Baby Program but with equivalent incomes. The drawback of this approach is that there may be many factors that influence the outcomes besides those used for matching, which are either unknown or for which information is not available.

We can also use statistical methods to try to make our program and comparison groups comparable. To do this, we identify other key variables that are related to the outcomes and control for their effects by adding them into the regression models (see Section below). This method, sometimes referred to as "adjustment" allows us to see relationships between the program and maternal/infant outcomes, *while taking into account possible influences from other factors*. For example, if we know that mother's level of education is associated with adequacy of prenatal care and we also know that our program and comparison groups differ in mother's level of education, we can adjust for or account for those education differences in our comparison.

In the current study, we used a combination of "matching" of program and comparison groups and "adjustment" for other important variables using regression modeling. To match program and comparison groups, we used two different populations[6] of women and their babies, described below.

Populations and Program and Comparison Groups Used in This Evaluation

Population 1

Our first population included all women giving birth in 2004/2005 through 2007/2008 *who had applied for the Healthy Baby Prenatal Benefit during pregnancy and whose incomes were less than $40,000* (N=12,694).[7] Thus, any woman giving birth but who did not put in an application for the Healthy Baby Prenatal Benefit Program was not included in this population. Our program groups (see Figures 4.1 and 4.2) consisted of all the women who applied for the Prenatal Benefit and who:

A) received the Benefit AND participated in Community Support Programs (n=2,612).

B) participated in Community Support Programs only (n=82).

C) received the Benefit only (n=9,619).

Our comparison group consisted of all women who applied for the Prenatal Benefit, but who:

D) were not approved for the Prenatal Benefit and did not participate in the Community Support Programs (n=381).

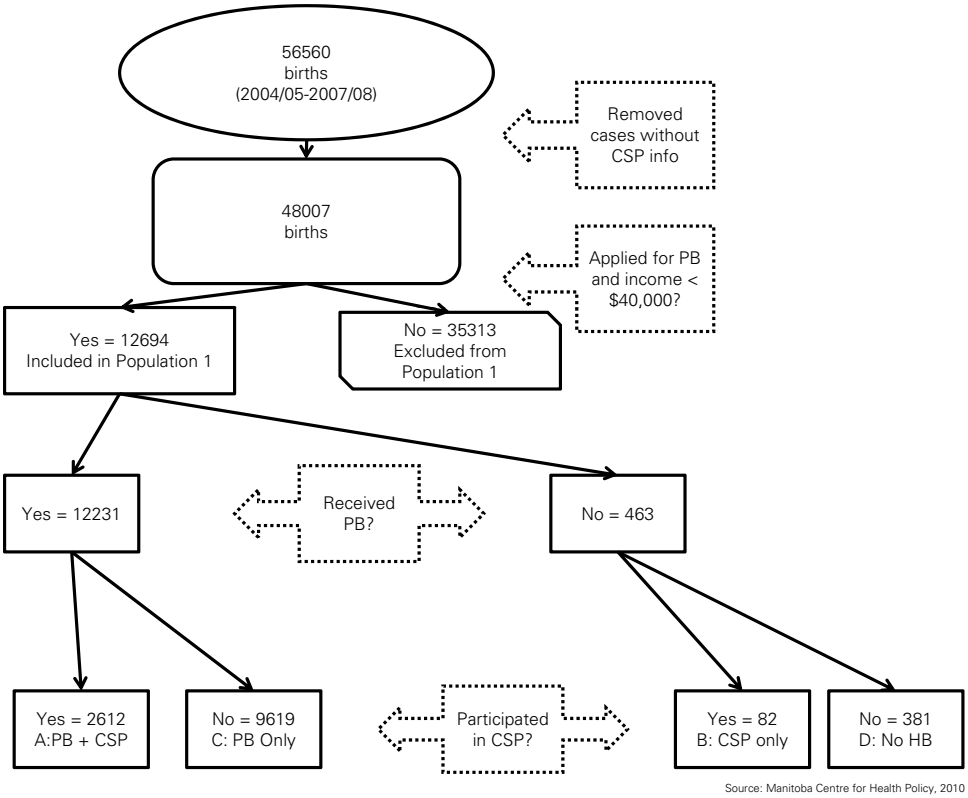
Our rationale behind this comparison group was that all women applying for the program likely felt the need for additional financial support during pregnancy. Recall that the income cut–off for receipt of the prenatal benefit was $32,000. When we looked at the distribution of incomes for all Healthy Baby Prenatal Benefit applicants, we found that the majority of those who applied for but were not approved for the Benefit had incomes that were above the $32,000 cut–off, though most (73.7%) did not have incomes above $40,000. To make the groups more equivalent, we included only those applicants whose incomes were less than $40,000.[8] Of course, the fact that those approved for the Prenatal Benefit had lower incomes than those who were not approved means that our Prenatal Benefit program groups (A

6 Please note that the two populations of women described below are not mutually exclusive. There are some women who are included in both populations.

7 Births to women living in First Nations communities, births to women living in Pine Falls and Steinbach, as well as births to women who did not consent to share Community Support Program information were excluded due to missing Community Support Program participation information.

8 For 159 of the women who applied for but were denied the Healthy Baby Prenatal Benefit, we had no income information. Since the majority of the women who applied for the benefit had incomes below $40,000, we decided to include these women with missing income information in our study population. We sensitivity tested this decision by re–running several of the regression models described below excluding these 159 women. The patterns of results were the same as when they were included, however statistical power (our ability to detect differences between groups if they were actually present) was diminished.

Figure 4.2: Flowchart for Population 1: All Women Who Applied for HBPB



and C from Figures 4.1 and 4.2) are more disadvantaged financially, but by choosing for comparison only those with moderately higher income levels, we hoped to reduce the discrepancies between the groups.

Population 2

Our second study population included all women giving birth in 2004/2005 through 2007/2008 *who received income assistance for at least one month during pregnancy* (N=7,398).[9] Income assistance is a provincial program for people who need help to meet basic personal and family needs, so is used as an indicator of poverty. Our program groups (see Figures 4.1 and 4.3) thus consisted of all women receiving income assistance during pregnancy who:

A) received the Benefit AND participated in Community Support Programs (n=1,403).

B) participated in Community Support Programs only (n=236).

C) received the Benefit only (n=4,018).

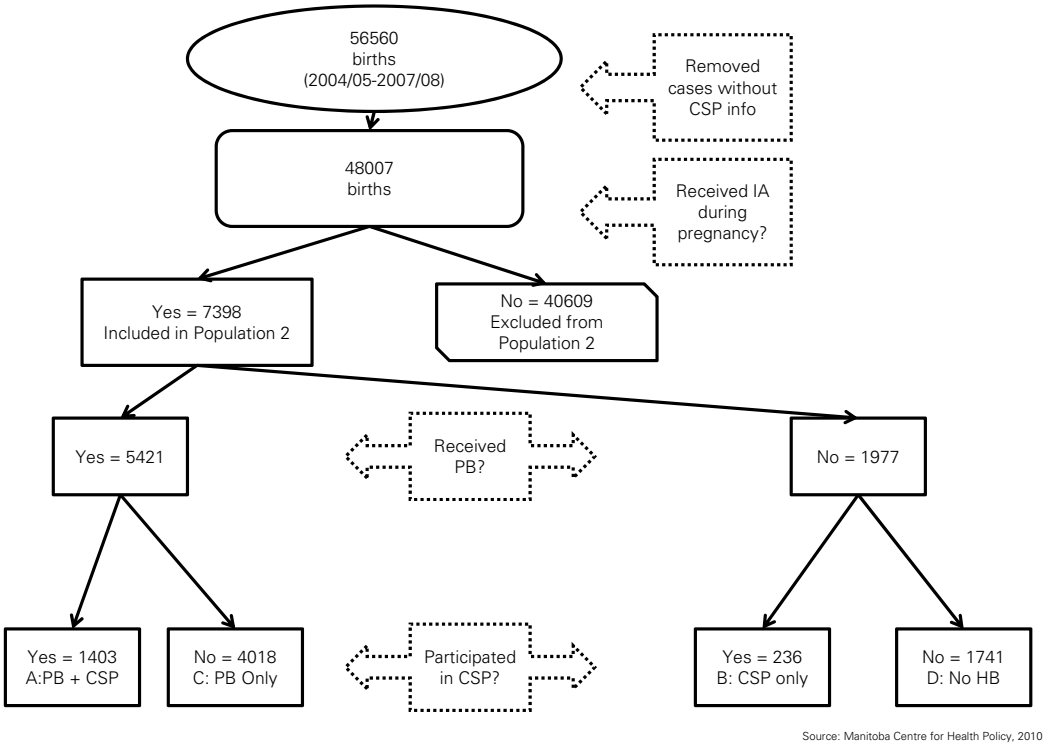
Our comparison group consisted of all women who received income assistance during pregnancy, but who:

D) did not receive the Prenatal Benefit and did not participate in the Community Support Programs (n=1,741).

9 As was done with Population 1, for Population 2 births to women living in First Nations communities, births to women living in Pine Falls and Steinbach, as well as births to women who did not consent to share Community Support Program information were excluded due to missing Community Support Program participation information.

Our rationale behind examining this population was that the program and comparison groups would likely all be women experiencing poverty severe enough to have to seek assistance to meet their basic needs. For groups B and D (those not receiving the Prenatal Benefit), we do not know why these women did not receive the Prenatal Benefit because women receiving income assistance are all eligible for the Benefit. It could be that they only began income assistance late in their pregnancy after they originally applied for, and perhaps were not approved for, the Benefit. Or it could be that for some reason they did not fill out an application for the Benefit. This second evaluation population has the advantage of providing a large sample of women who participated in Community Support Programs, which will improve the power of our analyses. In other words, we would be more likely to detect a difference between program and comparison groups if that difference actually exists.

Figure 4.3: Flowchart for Population 2: All Women Who Received IA During Pregnancy



Source: Manitoba Centre for Health Policy, 2010

Outcome Measures

We examined the same outcome measures for both Population 1 and 2. For each Population, three sets of analyses were run, corresponding to the following three types of outcomes:

1. prenatal and birth outcomes
2. infant outcomes in first year
3. longer–term outcomes

Prenatal and Birth Outcomes

Prenatal and birth outcomes (described in detail below) included: adequate and inadequate prenatal care, low and **high birth weight**, **small–** and **large–for–gestational age**, preterm birth, **congenital anomalies**, Apgar scores, and breastfeeding. For each of the prenatal outcomes, we used physician visit and hospital data during the prenatal period for infants born in 2004/2005 through 2007/2008. For each of the birth outcomes, we used birth hospitalization data for infants born from 2004/2005 through 2007/2008. Recall that both prenatal and postnatal Community Support Programs are available. Only information on prenatal Community Support Program participation was included in analyses, since postnatal program participation would not have an impact on prenatal care or birth outcomes. Flowcharts of the numbers in each group for these outcomes for Populations 1 and 2 can be found in the Appendix.

1. A prenatal outcome of great interest to this evaluation was the **adequacy of prenatal care** received by pregnant women. To measure adequacy of prenatal care, it is important to take into consideration the timing and frequency of care, as well as the gestational age at delivery (Alexander & Kotelchuck, 1996). To measure prenatal care, we used an index developed by Alexander and Koltelchuck (1996) called the **R–GINDEX** (Revised–Graduated Prenatal Care Utilization Index). It accounts for gestational age at birth, when prenatal care was initiated, and the number of prenatal care visits. The R–GINDEX divides prenatal care into six categories of adequacy: missing, no care, inadequate, intermediate, adequate, and intensive. In our analyses, we focused on whether women received **adequate care** (compared to all other categories[10]) or **inadequate care** (combination of inadequate and no care categories compared to all other categories).

2. **Low birth weight** was considered any birth weight less than 2,500 grams[11] and taken from the hospital birth record.

3. **Small–for–gestational age** was defined based on birth weight, gestational age and sex (all taken from the hospital birth record), and grouped according to growth percentiles (Kramer et al., 2001).

4. **High birth weight** was considered any birth weight greater than 4,000 grams[12] and taken from the hospital birth record.

5. **Large–for–gestational age** was defined based on birth weight, gestational age and sex (all taken from the hospital birth record), and grouped according to growth percentiles (Kramer et al., 2001a).

6. **Preterm birth** was defined as a birth occurring before 37 weeks gestation. Because some premature

10 "Intensive" care was NOT included with "adequate". "Intensive" indicates women had substantially more visits than expected, possibly due to morbidity or complications (Alexander & Kotelchuck, 1996). Interestingly, we found intensive care was associated with area–level income—mothers in higher income areas were more likely to be categorized as intensive.

11 Birth weights less than 500 grams were set to "missing" and were not considered in the less than 2,500 gram classification of low birth weight.

12 Birth weights greater than 9,000 grams were set to "missing" and were not considered in the more than 4,000 gram classification of high birth weight.

births may be induced due to fetal or maternal complications in order to avoid stillbirth or neonatal mortality (Joseph, Nette, Scott, & Vincer, 2009), we ran analyses of this outcome two different ways. In the first set of analyses, all premature births were included as the outcome. In the second set of analyses, induced premature births were excluded. Gestational age is taken from the hospital record and is based on menstrual or ultrasound dates where available or clinical impression after delivery if dramatically different from dates provided.

7. **Congenital anomalies** are sometimes identified at birth or prenatally; however, some are not recognized until much later. Only those identified at the birth hospitalization and recorded in the hospital birth record or identified in hospital or physician visit records up to the first birthday were included in this analysis. The congenital anomalies included in this analysis are listed in Appendix Table 1.1.

8. **Five–minute Apgar scores** range from 0 to 10 and are available on the hospital record. For this analysis, Apgar scores of 8 or greater were considered a good outcome, and all others were considered a low Apgar score.

9. **Breastfeeding initiation** was determined by including newborn hospital records that indicated exclusive or partial breastfeeding at hospital discharge.

Infant Outcomes in First Year of Life

We examined health and social outcomes for infants in their first year of life. For these analyses we used physician visits, hospital records, vital statistics, and information on children taken into care by Child and Family Services. All infants included in these analyses were registered with Manitoba Health during the entire year or until death, if they died during their first year. Infants who moved away from Manitoba before their first birthday were excluded. Analyses were thus conducted on infants born from 2004/2005 through 2006/2007. Participation in either prenatal or postnatal (or both) Community Support Programs was included in analyses. Flowcharts of the numbers in each group for these outcomes for Populations 1 and 2 can be found in the Appendix.

1. Vital Statistics data were used to determine which live–born infants died prior to their first birthday. Fortunately, **infant mortality** is a relatively rare event in Manitoba (Brownell et al., 2008). In our Populations 1 and 2, only 62 (0.7%) and 51 infants (1.0%) died, respectively, over our follow–up period. Analysis of infant mortality data resulted in too much suppression because of small cell sizes, so we dropped this outcome from our analyses.

2. **Hospitalizations** in the first year for any reason, other than the birth hospitalization, were analysed. In this analysis, we were interested in whether infants were hospitalized at least once in their first year of life. Only inpatient hospitalizations were included, and transfers between hospitals were counted as one hospitalization.

3. **Injury hospitalizations** included an inpatient hospitalization where an external cause of injury code was entered on the hospital record.[13]

4. **Continuity of care** was measured by taking all infants with at least three visits to physicians in their first year, then determining what percent of their care was obtained from the same physician. Care was considered "continuous" if 50% or more of the visits were to the same provider.

5. **Children in care** are children who are removed from their families of origin and placed in the care of another adult(s) due to concerns about the proper provision of care in the family of origin. Information on children in care comes from the Child and Family Services Information System.

13 Injuries resulting from misadventures during surgical or medical care and adverse drug effects were excluded from this analysis.

Longer–Term Outcomes

For longer–term outcomes, we followed families for up to two years after the birth of the child. Analyses were thus conducted on infants born from 2004/2005 through 2005/2006. We were interested in determining whether participation in the Healthy Baby Program had an impact on complete immunization schedule at two years of age and spacing between the birth of the current child and a subsequent sibling. Each of these outcomes used the Population Research Registry data and included all infants and their families who were registered with Manitoba Health during the follow–up period. Participation in either prenatal or postnatal (or both) Community Support Programs was included in the analyses. Flowcharts of the numbers in each group for these outcomes for Populations 1 and 2 can be found in the Appendix.

1. Information on complete **immunization** schedule by the child's second birthday came from the Manitoba Immunization Monitoring System (MIMS). Only two years of births (2004/2005 and 2005/2006) were used in this analysis. A listing of vaccinations recommended by aged two years can be found in Appendix Table 1.2.

2. **Sibling spacing** is the length of time between the birth of the target infant and a subsequent sibling. For this analysis, we looked at all births with at least 24 months[14] of follow up data to determine whether subsequent siblings were born in that time period and the number of months between the target child and subsequent sibling.

Regression Analyses

As described in the section above, the selection of our two study populations (Population 1: all those women applying for Healthy Baby Prenatal Benefit whose annual incomes were below $40,000, Population 2: all those women who received income assistance during pregnancy) was our attempt to "match" the program and comparison groups on income, and to increase the likelihood that any differences in outcomes between program and comparison groups could be associated with the program. We know that there are many other factors besides income that may differ between the program and comparison groups. These factors may also have an influence on our outcome measures. For this reason, we "adjusted" for the potential influence of several factors using regression modeling. Regression modeling allowed us to focus on the association between participation in the Healthy Baby Program and our outcomes, *while taking the influence of these other factors into consideration*. For example, we may suspect that mother's level of education differs across our program and comparison groups and it also has an influence on preterm birth. By including mother's education level in our regression models, we can adjust for its influence on preterm birth. By putting several key additional factors (called predictors) into the regression models, we were able to control for variations in these predictors and focus on the associations between the Healthy Baby Program components and the outcomes. The predictor variables added to the regression models are described below.

14 The follow–up period for children born in 2005/2006 was 24 months; the follow–up period for children born in 2004/2005 was 36 months.

Predictor Variables

Our main predictor variable of interest was participation in the Healthy Baby Program. Ideally we would compare the outcomes for Prenatal Benefit recipients only, to Community Support Program participants only, to Prenatal Benefit recipients + Community Support Program participants (and compare each of these to "no Healthy Baby"). However, the number of cases in the "Community Support Program participants only" group was very small, regardless of which outcome we examined or which Population we used. Appendix Figures 1.4 through 1.15 illustrate the number of infants in each of the program and comparison groups for each of the sets of outcomes. Because some of our outcomes affect only a small percent of the population, the numbers in the separate groups (particularly comparison group B: Community Support Program only) were too small to produce stable regression estimates. For this reason we decided to look at each of the Healthy Baby Program components separately. That is, we looked at the effect of the Prenatal Benefit (groups A and C from Figure 4.1) and compared that to no Prenatal Benefit (groups B and D in Figure 4.1); and we looked at the effect of participation in Community Support Programs (groups A and B in Figure 4.1) and compared that to no participation in Community Support Programs (groups C and D in Figure 4.1). We also looked to see whether there was an interaction between the two program components. In other words, did the effect of participation in the Community Support Programs differ according to whether the mom received the Prenatal Benefit? Likewise, did the effect of the Prenatal Benefit differ according to whether the mom participated in the Community Support Programs?

Besides the Healthy Baby Program components, the additional predictors entered into the regression models were mother's age at first birth, area–level socioeconomic status, region of residence, maternal education level, and maternal marital status at the birth. Mother's age at first birth comes from the Population Registry data and was categorized into two groups: less than 20 years old at first birth and 20 years or older at first birth.[15] Research demonstrates that for children whose mothers were less than 20 years old at first birth, their outcomes tend to be poorer (Jutte et al., 2010). Area–level socioeconomic status was defined using a composite measure of Census variables, known as the **Socioeconomic Factor Index**, or SEFI, based on average household income, percent of adults employed, adult education levels and percent of lone–parent families (Martens et al., 2002; Metge et al., 2009). Area–level socioeconomic status provides a reasonable approximation for individual level socioeconomic status measures (Mustard, Derksen, Berthelot, & Wolfson, 1999). Region of residence, taken from the hospital birth record, was used to account not only for urban and rural differences in perinatal outcomes but also differences in maternal and child health status observed between northern and southern regions of Manitoba (Brownell et al., 2008). Mother's education level was taken from the Prenatal Benefit application form; for those without a Prenatal Benefit application, information on mother's education was taken from the Families First screening form; if this form was unavailable, the information was taken from the "We're Glad You're Here" form for Community Support Program participants. Maternal education is a powerful predictor of child outcomes (Dubow, Boxer, & Huesmann, 2009; Haveman & Wolfe, 1995; Magnuson, Sexton, Davis–Kean, & Huston, 2009). For this study, maternal education was divided into two groups: those who completed high school and those who did not. Marital status was also taken from the Prenatal Benefit application form. For some women in Population 2, this form was unavailable, so three other data sources were used to obtain marital status: the Families First screening

15 For some of the birth outcomes, particularly size for gestational age, birth weight, and preterm birth, mother's age at *current* birth may be an important predictor. Mother's age at current birth is highly correlated with mother's age at first birth, so both could not be included in the same model. For these outcomes, we tried each measure of mother's age separately in the model to see if results differed. Only for preterm births was mother's age at current birth significant and mother's age at first birth not. So for preterm births, mother's age at current birth is used instead of mother's age at first birth, in the regression models.

form, the "We're Glad You're Here" form, and finally from the Population Research Registry. Mothers were described as either married or not married. Being a single parent is also predictive of poor childhood outcomes (Lipman, Boyle, Dooley, & Offord, 2002; Spencer, 2005).

Because family income varied so greatly between those receiving and not receiving the Prenatal Benefit for Population 1, it was important to try to adjust for this in the Population 1 regression models. For this reason, family income was added to the regression models for Population 1. It was unnecessary to do so for Population 2 because the program and comparison groups in Population 2 had similar low incomes. Family income information was taken from the Healthy Baby Prenatal Benefit application form.

After presentation of preliminary results to our Advisory Group, three more predictor variables were suggested for specific outcomes. For low birth weight, small–for–gestational age, and preterm births, we also entered information about maternal smoking during pregnancy and multiple births into the regression models. Maternal smoking during pregnancy has been demonstrated to have an impact on these outcomes (DiFranza et al., 2004; Kramer, 1987b; Kramer et al., 1990; Macmahon et al., 1965; Ramsay & Reynolds, 2000; Simpson, 1957). Information on smoking was taken from the Families First screening form; this information was missing for 19.0% of the women in Study Population 1 and for 22.5% of women in Study Population 2. Women with missing smoking information were retained in the regression analysis, thus creating a three–level variable: smoked during pregnancy, did not smoke during pregnancy and missing smoking information. Multiple births are associated with higher rates of low birth weight, small–for–gestational age births, and preterm deliveries (Blondel & Kaminski, 2002; Garite, Clark, Elliott, & Thorp, 2004). Information on multiple births came from the hospital record. For high birth weight and large–for–gestational age, maternal diabetes was entered into the models, since maternal diabetes is associated with these outcomes (Higgins & Mc Auliffe, 2010; Weindling, 2009). Information on maternal diabetes came from hospital and physician records, and was entered as present or absent.

Analyses

Note that the sizes of the different program and comparison groups are different depending on the outcome examined (see Appendix Figures 1.4 through 1.15). This is because the follow–up period differed depending on the outcome. For birth outcomes, we could use the entire population for Populations 1 and 2, that is, all births in 2004/2005 through 2007/2008. For prenatal visits, we excluded women who were missing the R–GINDEX score.[16] For first year outcomes, we required at least one year of follow–up data for each birth; that is, to determine whether an infant was hospitalized in his/her first year, we had to have a full year of data after his/her birth to examine. So for first year outcomes, we were only able to use births in 2004/2005 through 2006/2007. For longer–term outcomes, we needed at least two years of follow up information on each infant, so we only used births from 2004/2005 through 2005/2006.

The sizes of the different program and comparison groups also differed according to whether both prenatal and postnatal Community Support Program participation were included (Appendix Figures 1.4 through 1.15). For the prenatal and birth outcomes, we included only those women who participated in prenatal programs as Community Support Program participants (groups A and B in Figure 4.1) in the regression models, because we would not expect participation in postnatal programs to have any

16 R–GINDEX scores were not calculated for women for the following reasons (Heaman et al., 2008): 1. Mom did not have complete Manitoba Health coverage during gestation period; 2. Infant has missing or out of range gestation (i.e., less than 18 weeks or greater than 45 weeks); 3. Maternal age is less than 12 years; 4. Multiple birth; 5. Birth weight is less than 400 grams but gestational age greater than 22 weeks.

impact on prenatal visits or birth outcomes. Those participating in postnatal programs only were put into groups C and D. For first year and longer–term outcomes, we included as participants women who participated in prenatal and/or postnatal programs.

The degree of participation in Community Support Programs could also differ across women. That is, some women might attend a program only once whereas others might attend several times. We had attendance information for 84.3%% of the women who participated in prenatal and 77.6% of the women who participated in postnatal Community Support Programs available to us. We ran a set of preliminary regression analyses to determine whether the number of times a woman attended a program was associated with any of the outcomes we were examining. Out of 32 regression models (16 for each of the study Populations) only four demonstrated a significant effect of the level of attendance. For this reason we decided not to categorize Community Support Program participation according to attendance.

The amount of Prenatal Benefit received could also differ across women approved for the Benefit. Our own analyses confirmed what Healthy Child Manitoba (2010) reports on benefits received by Prenatal Benefit recipients, that is, that nearly 90% of those receiving the benefit received the maximum amount ($81.41 per month) for Population 1 and over 99% of the women in Study Population 2 received the maximum amount; for this reason, we did not control for amount of benefit received in our analyses.

Because family income information was missing for over 36% of the women in Population 1 who did not receive the Prenatal Benefit, these women had to be dropped from regression analyses that included family income as a predictor variable. Dropping over a third of the women not receiving the Prenatal Benefit from Population 1 resulted in lowering the power of the analyses. What this means is that a lower number of women in the comparison group reduced our likelihood of finding statistically significant differences between the groups, even if they existed. For this reason, we ran a set of preliminary regressions on Population 1 to determine the indicators where family income was a significant predictor of the outcome. For those outcomes where family income was not statistically significant, this predictor variable was dropped from the regression models, in order to be able to include those women with missing family income information (and thus increase our statistical power) in the analyses.

The outcomes were analysed as categorical variables (e.g., for low birth weight, births were divided into two categories: low birth weight and not low birth weight; for immunizations, children were divided into two categories: had complete immunization schedule at two years of age and did not). For categorical outcomes, **logistic regression** models are used. These models generate **Odds Ratios** (OR). An OR of greater than 1 means that there is a higher likelihood of the outcome related to the particular variable, an OR of less than 1 means a lower likelihood, and an OR around 1 means that this variable has no association with the outcome. Only the ORs for the Healthy Baby Prenatal Benefit and the Community Support Program effects (or the interaction between these) are shown in the tables in the Results section below. ORs for the remaining variables can be found in Appendix Tables 1.3 through 1.36.

For each OR generated, we conducted statistical testing to determine how much confidence could be put in the results. In other words, if we say that the difference between our program and comparison groups is "statistically significant" it means that the difference is large enough that we are confident that it is not just due to chance. A significance level of $p<0.05$ means that the probability of finding

a difference this large by chance alone is less than 5%. We used the traditional significance level of $p<0.05$ for determining main effects; for interaction effects we used $p<0.10$ as the significance level, to compensate for low statistical power.

Note that these regression models are only able to state that there is a relationship ('association') between the Healthy Baby Program components and the outcome variables. This is not necessarily a causal relationship and we cannot claim that one program component or the other causes the outcome. We can state whether the Healthy Baby Program components were associated with an increase or decrease in the outcomes (not that they caused the increase or decrease).

For analysis of sibling spacing, a different type of regression analysis was used, called **survival analysis**. In survival analysis, the time to an event (in this case the birth of a subsequent sibling) is modeled. We account for all moms that have not yet had a subsequent child but are still at risk for having one. As with logistic regressions, in survival analysis, key predictor variables (in this case Healthy Baby Programs) are entered into the model, and additional predictor variables can be added to account for differences between groups. Unlike logistic regressions, ORs are not produced in survival analysis. Instead Hazard Ratios (HR) are produced. An HR above 1.0 tells us that there is an increased risk of a subsequent sibling being born in the follow–up period and that the time between siblings is shorter.

After the description of each of the regression results, for those indicators where the Healthy Baby Program was associated with a statistically significant improvement in the outcome in both populations, we calculated the potential benefit of the program to each of our populations. To do this we calculated the **population attributable risk** percent (PAR%), which in this case told us what the "benefit" (rather than risk) might have been in each of the populations, had all women participated in the Healthy Baby Program.

Results

Descriptive Results

Table 4.1 shows social and demographic characteristics of mothers in our Population 1, according to whether they received or did not receive the Healthy Baby Prenatal Benefit and whether they participated or did not participate in Healthy Baby Community Support Programs. Focusing first on the first three columns of the table comparing women who received the Prenatal Benefit to women who applied for but did not receive the Prenatal Benefit, it is not surprising that the mean income differs significantly across these two groups, given that the women who did not receive the Prenatal Benefit in all likelihood did not receive it because their incomes were above the $32,000 cut–off. The mean income for those receiving the Prenatal Benefit was $11,204 compared to $33,729 for those not receiving the Benefit. Note, however, that for 36% of the women who did not receive the Prenatal Benefit, income information is missing. There are other notable and significant differences between the two groups of women. Although mother's age at current birth did not differ between the two groups, women receiving the Prenatal Benefit tended to be younger at the birth of their first child (21.1 years) compared to mothers not receiving the Prenatal Benefit (22.4 years). The socioeconomic status of the areas where mothers who received the Prenatal Benefit lived tended to be lower (indicated by a higher composite "SEFI" score) than the socioeconomic status of areas where mothers who did not receive the benefit lived. Mothers who received the Prenatal Benefit were also more likely to live in Winnipeg and not live in the rural South, compared to mothers who did not receive the Benefit during pregnancy. Compared to mothers not receiving the benefit, mothers receiving the benefit were more likely to smoke during

Table 4.1: Characteristics of Women in Study Population 1 by Healthy Baby Program

Variable	*Total Study Population (N=12,694) by HBPB receipt*			*Total Study Population (N=12,694) by CSP Participation*		
	HBPB-Received (n=12,231)	HBPB-Not Receive (n=463)	p-value *	CSP – Participated (n=1,869)	CSP – Did Not Participate (n=10,825)	p-value *
Median income and range (% missing income)	$11,204 ($0-39,705) (3.11%)	$33,729 ($0-39,976) (36.29%)	p<0.0001	$10,285 ($0-38,711) (2.73%)	$11,508 ($0-39,976) (4.59%)	p<0.0001
Mean mom age current birth	25.2 years	24.9 years	NS	24.78 years	25.3 years	p<0.001
Mean mom age first birth	21.1 years	22.4 years	p<0.0001	20.7 years	21.2 years	p<0.0005
Mean SEFI (higher=lower SES) (% missing)	0.57 (0.17%)	0.41 (s)	p<0.0005	0.73 (s)	0.53 (0.19%)	p<0.0001
Winnipeg resident	62.68%	48.38%	p<0.0001	67.95%	61.16%	p<0.0001
South rural resident	17.78%	26.78%	p<0.0001	11.02%	19.33%	p<0.0001
North resident	4.68%	6.48%	NS	3.80%	4.91%	p<0.05
High school completion	47.22%	50.54%	NS	42.80%	48.13%	p<0.0005
Married	36.73%	70.84%	p<0.0001	31.51%	39.09%	p<0.0001
Multiple births	2.37%	2.81%	NS	2.68%	2.34%	NS
Smoked during pregnancy (% missing)	38.62% (18.69%)	24.59% (20.95%)	p<.0001	42.64% (15.68%)	37.31% (19.31%)	p<0.0001
Used alcohol during pregnancy (% missing)	21.80% (20.60%)	17.45% (22.03%)	p<0.05	27.05% (18.30)	20.68% (21.06)	p<0.0001
Used drugs during pregnancy (% missing)	10.51% (21.29%)	7.52% (22.46%)	p<0.05	15.59% (18.67%)	9.47% (21.79%)	p<0.0001
Lacked social support (% missing)	8.59% (23.47%)	10.77% (23.76%)	NS	13.77% (20.76%)	7.75% (23.95%)	p<0.0001
Experienced relationship distress (% missing)	14.20% (30.80%)	5.44% (28.51%)	p<.0001	20.67% (28.04%)	12.64% (31.18%)	p<0.0001
Experienced depression (% missing)	19.55% (22.54%)	13.88% (23.76%)	p<.005	26.47% (19.74%)	18.06% (23.08%)	p<0.0001
History of child abuse (% missing)	15.88% (41.78%)	11.00% (37.15%)	p<.01	24.27% (38.04%)	14.10% (42.23%)	p<0.0001

* p-value tests whether difference between percentages are statistically significant

Note: The percents listed for these variables do not include the cases with missing values (i.e., those who were not surveyed, or did not respond to survey question) in the denominator.

A table with missing values included in the denominator is available in the Appendix (Appendix Table 1.37). Where applicable, proportion of sample with missing information is reported in brackets.

s=suppressed value

Source: Manitoba Centre for Health Policy, 2010

pregnancy (38.6% compared to 24.6%), use alcohol during pregnancy (21.8% compared to 17.5%), use drugs during pregnancy (10.5% compared to 7.5%), experience relationship distress (14.2% compared to 5.4%), experience depression (19.6% compared to 13.9%), and have a history of child abuse (15.9% compared to 11%). Note that some of the variables have a high percent of missing responses. Mothers receiving the Benefit were less likely to be married compared to mothers not receiving the Benefit (36.7% compared to 70.8%). There were no statistically significant differences between the groups with respect to living in the North, high school completion, multiple births, or social support.

The right half of Table 4.1 (last three columns) shows comparisons for Population 1 of women who participated or did not participate in Community Support Programs. Women who participated in these programs were more likely to have lower income, be younger at both current and first birth, have lower SES, live in Winnipeg, have smoked, used alcohol, and used drugs during pregnancy, lack social support, experience relationship distress, experience depression, and have a history of child abuse compared to women not participating in these programs. Participants were also less likely to have completed high school, be residents of the Rural South and the North, or be married than non–participants. These differences are not surprising considering the Community Support Programs are targeted at higher risk women. The only comparison that was not significantly different between those participating in Community Support Programs and those not participating was multiple births. The comparisons shown in Table 4.1 remind us that despite our efforts at matching, women participating in either of the Healthy Baby Program components have higher risks on a number of measures compared to women not participating, and this verifies the need to adjust for additional risk factors in our analyses.

Table 4.2 shows social and demographic characteristics of mothers in Population 2, according to whether they received or did not receive the Healthy Baby Prenatal Benefit and whether they participated or did not participate in Healthy Baby Community Support Programs. Focusing first on the first three columns of the table comparing women on Income Assistance who received the Prenatal Benefit to those who did not receive the Prenatal Benefit, the median income between these two groups did not differ significantly, with both groups having a median income just under $10,000. There were also no differences between mothers receiving income assistance who received the Benefit versus those not receiving the Benefit on multiple births, use of alcohol and drugs during pregnancy, social support, or experience with relationship distress. On other variables there are notable and significant differences between the two groups of women. Although mother's age at first birth did not differ between the two groups, women receiving the Prenatal Benefit tended to be slightly older (24.55 years) at current birth compared to mothers not receiving the Prenatal Benefit (24.2 years). The socioeconomic status of the areas where mothers who received the Prenatal Benefit lived tended to be lower (indicated by a higher composite "SEFI" score) than the socioeconomic status of areas where mothers who did not receive the Benefit lived. Mothers who received the Prenatal Benefit were also more likely to live in Winnipeg, not live in the rural South, and not live in the North than mothers who did not receive the Benefit during pregnancy. Mothers receiving the Benefit were more likely to have completed high school (29.8% compared to 24.4%), experience depression (26.7% compared to 22.5%), and have a history of child abuse (28.5% compared to 24.4%). Note for these last two variables, the percent of women with missing information is quite high (e.g., close to half of women had missing information on history of child abuse). Compared to mothers not receiving the Benefit, mothers receiving the Benefit were less likely to be married (15.3% compared to 40.2%) and smoke during pregnancy (59.8% compared to 64.6%).

Table 4.2: Characteristics of Women in Study Population 2 by Healthy Baby Program

Variable	*Total Study Population (N=7,398) by HBPB receipt*			*Total Study Population (N=7,398) by CSP Participation*		
	HBPB-Received (n=5,421)	HBPB-Not Receive (n=1,977)	p-value *	CSP – Participated (n=1,226)	CSP – Did Not Participate (n=6,172)	p-value *
Median income and range (% missing income)	$9,941 ($0-35,689)	$9,972 ($0-39,517)	NS	$10,015 ($0-30,584)	$9,942 ($0-39,517)	NS
Mean mom age current birth	24.55 years	24.24 years	p<0.05	24.47 years	24.47 years	NS
Mean mom age first birth	19.26 years	19.15 years	NS	19.49 years	19.18 years	p<0.005
Mean SEFI (higher=lower SES)	0.93 (s)	0.78 (s)	p<0.0001	0.98 (s)	0.87 (0.15%)	p<0.001
Winnipeg resident	73.71%	60.90%	p<0.0001	72.76%	69.80%	p<0.05
South rural resident	7.53%	9.36%	p<0.05	6.04%	8.41%	p<0.005
North resident	6.20%	15.83%	p<0.0001	5.80%	9.37%	p<0.0001
High school completion	29.79%	24.43%	p<0.0001	31.32%	27.77%	p<0.05
Married	15.29%	40.16%	p<0.0001	21.70%	21.99%	NS
Multiple births	2.66%	2.33%	NS	2.86%	2.51%	NS
Smoked during pregnancy (% missing)	59.80% (20.66%)	64.58% (26.45%)	p<.005	56.31% (18.60%)	61.99% (22.93%)	p<0.001
Used alcohol during pregnancy (% missing)	29.35% (23.94%)	29.64% (29.69%)	NS	32.00% (22.27%)	28.88% (26.12%)	NS
Used drugs during pregnancy (% missing)	18.53% (24.55%)	18.40% (31.01%)	NS	21.29% (21.86%)	17.91% (27.16%)	p<0.05
Lacked social support (% missing)	8.88% (27.50%)	9.96% (32.98%)	NS	12.65% (24.56%)	8.41% (29.84%)	<0.0005
Experienced relationship distress (% missing)	23.49% (35.46%)	20.96% (40.16%)	NS	28.66% (32.55%)	21.61% (37.54%)	<0.0001
Experienced depression (% missing)	26.67% (25.49%)	22.48% (30.70%)	p<.005	31.50% (22.84%)	24.36% (27.69%)	<0.0001
History of child abuse (% missing)	28.48% (45.27%)	24.39% (48.56%)	p<.01	33.24% (41.11%)	26.15% (47.15%)	<0.0005

* p-value tests whether difference between percentages are statistically significant

Note: The percents listed for these variables do not include the cases with missing values (i.e., those who were not surveyed, or did not respond to survey question) in the denominator.

A table with missing values included in the denominator is available in the Appendix (Appendix Table 1.38. Where applicable, proportion of sample with missing information is reported in brackets.

s=suppressed value

Source: Manitoba Centre for Health Policy, 2010

The right half of Table 4.2 (last three columns) shows comparisons for Population 2 between women who participated or did not participate in Community Support Programs. There were no significant differences in median income between those participating and not participating in Community Support Programs. There were also no significant differences in the percent married, multiple births, or using alcohol during pregnancy between these two groups. Although mother's age at current birth did not differ between participants and non–participants, women who participated in Community Support Programs were slightly older at first birth compared to women who did not participate (19.5 years and 19.2 years respectively). Women who participated in Community Support Programs were more likely to live in a lower SES area (indicated by higher SEFI score), live in Winnipeg, have completed high school (31.3% versus 27.8%), have used drugs during pregnancy (21.3% compared to 17.9%), lack social support (12.7% compared to 8.4%), have experienced relationship distress (28.7% compared to 21.6%), be depressed (31.5% compared to 24.4%), and have a history of child abuse (33.2% compared to 26.2%). Participants were less likely to live in the Rural South and North and have smoked during pregnancy (56.3% compared to 62%). The comparisons shown in Table 4.2 remind us that despite our efforts at matching, those women participating in either of the Healthy Baby program components have different risks on a number of measures compared to those women not participating, and this verifies the need to adjust for additional risk factors in our analyses.

Regression Results

The regression results for each of the three sets of outcomes are presented below.

1) Prenatal and Birth Outcomes

Table 4.3 shows the results for each of the prenatal and birth outcomes for Population 1, and Table 4.4 provides this information for Population 2. In both of these tables, the first set of four columns shows a comparison between those receiving and not receiving the Prenatal Benefit. The next set of four columns shows a comparison between those participating and not participating in the Community Support Programs. For outcomes where there was an interaction between Prenatal Benefit receipt and Community Support Program participation, Tables 4.3a and 4.4a display these results. To provide a sense of context for the prenatal and birth outcomes, Table 4.5 gathers information on most of these outcomes for all Manitoba from existing Manitoba reports and studies. For these sources, the years may be different than those used in this study, but the table is provided to give a general estimate of the overall population rates to compare to rates of these outcomes for Populations 1 and 2.

Table 4.3: Association of Healthy Baby Program with Prenatal and Birth Outcomes: Adjusted Odds Ratios for Population 1

Outcome	Prenatal Benefit				Community Support Programs			
	Unadjusted %		Adjusted OR	p value	Unadjusted %		Adjusted OR	p value
	PB	no PB			CSP	no CSP		
Adequate Prenatal Care	25.7%	25.7%	1.27 (0.94, 1.71)	0.1133	28.6%	25.2%	**1.24 (1.10, 1.40)**	**0.0004**
Inadequate Prenatal Care	22.7%	23.2%	0.74 (0.54, 1.01)	0.0556	22.9%	22.6%	0.91 (0.80, 1.03)	0.1284
Low Birth Weight	5.5%	7.6%	**0.63 (0.43, 0.93)**	**0.0191**	5.4%	5.6%	0.92 (0.73, 1.15)	0.4451
Small for Gestational Age	8.5%	8.1%	0.83 (0.53, 1.29)	0.4073	7.6%	8.6%	0.86 (0.71, 1.03)	0.1064
High Birth Weight	15.3%	13.6%	**PB*CSP, see Table 4.3a**		16.3%	15.0%	**PB*CSP, see Table 4.3a**	
Large for Gestational Age	13.8%	12.1%	1.12 (0.84, 1.49)	0.4404	15.0%	13.5%	**1.15 (1.00, 1.33)**	**0.0477**
Preterm Birth (excluding induced)	8.5%	9.4%	0.82 (0.57, 1.16)	0.2584	7.9%	8.6%	0.87 (0.72, 1.06)	0.1593
Preterm Birth (including induced)	8.4%	9.2%	**0.52 (0.29, 0.95)**	**0.0323**	8.0%	8.5%	0.88 (0.73, 1.07)	0.2024
Congenital Anomaly	1.4%	2.7%	0.58 (0.29, 1.16)	0.1248	1.0%	1.6%	0.64 (0.37, 1.12)	0.116
Low 5-Minute Apgar Score	4.1%	7.5%	**PB*CSP, see Table 4.3a**		4.0%	4.2%	**PB*CSP, see Table 4.3a**	
Breastfed at Discharge	75.8%	74.2%	**PB*CSP, see Table 4.3a**		77.7%	75.4%	**PB*CSP, see Table 4.3a**	

Note: p<0.05 considered significant for non-interaction models

Source: Manitoba Centre for Health Policy, 2010

Table 4.3a: Adjusted Odds Ratios for Interactions for Prenatal and Birth Outcomes, Population 1

Outcome	Adjusted OR	p value
High Birth Weight		
no PB (CSP vs no CSP)	**2.40 (1.16, 4.94)**	**0.0179**
PB (CSP vs no CSP)	1.09 (0.95, 1.25)	0.2353
no CSP (PB vs no PB)	1.25 (0.93, 1.70)	0.1407
CSP (PB vs no PB)	0.57 (0.29, 1.11)	0.1005
Low 5-Minute Apgar Score		
no PB (CSP vs no CSP)	**3.29 (1.08, 9.98)**	**0.036**
PB (CSP vs no CSP)	0.90 (0.69, 1.18)	0.453
no CSP (PB vs no PB)	0.53 (0.24, 1.19)	0.1239
CSP (PB vs no PB)	**0.15 (0.05, 0.45)**	**0.0007**
Breastfed at Discharge		
no PB (CSP vs no CSP)	**0.46 (0.19, 1.12)**	**0.0862**
PB (CSP vs no CSP)	**1.36 (1.20, 1.55)**	**<0.0001**
no CSP (PB vs no PB)	1.25 (0.80, 1.93)	0.3267
CSP (PB vs no PB)	**3.69 (1.54, 8.83)**	**0.0034**

Note: p<0.10 considered significant for interaction models

Source: Manitoba Centre for Health Policy, 2010

Table 4.4: Association of Healthy Baby Program with Prenatal and Birth Outcomes: Adjusted Odds Ratios for Population 2

Outcome	Prenatal Benefit				Community Support Programs			
	Unadjusted %		Adjusted OR	p value	Unadjusted %		Adjusted OR	p value
	PB	no PB			CSP	no CSP		
Adequate Prenatal Care	19.8%	12.4%	**1.69 (1.43, 1.99)**	**<0.0001**	22.5%	16.9%	**1.28 (1.09, 1.50)**	**0.0024**
Inadequate Prenatal Care	31.5%	46.2%	**PB*CSP, see Table 4.4a**		28.3%	36.8%	**PB*CSP, see Table 4.4a**	
Low Birth Weight	6.2%	8.6%	**0.72 (0.58, 0.90)**	**0.0032**	5.4%	7.2%	0.81 (0.61, 1.07)	0.1329
Small for Gestational Age	8.3%	10.3%	**0.77 (0.64, 0.93)**	**0.0056**	7.2%	9.1%	0.83 (0.66, 1.06)	0.1366
High Birth Weight	16.0%	13.3%	**1.27 (1.08, 1.49)**	**0.0037**	16.5%	15.0%	1.07 (0.91, 1.27)	0.4157
Large for Gestational Age	15.5%	12.8%	**1.30 (1.10, 1.53)**	**0.0017**	15.6%	14.6%	1.04 (0.88, 1.24)	0.6481
Preterm Birth (excluding induced)	10.1%	12.5%	**0.79 (0.66, 0.95)**	**0.0114**	9.1%	11.1%	0.85 (0.68, 1.07)	0.1603
Preterm Birth (including induced)	9.9%	12.2%	**0.78 (0.65, 0.93)**	**0.0068**	9.1%	10.8%	0.89 (0.71, 1.11)	0.2848
Congenital Anomaly	1.4%	1.6%	0.98 (0.59, 1.64)	0.9347	1.0%	1.5%	0.73 (0.37, 1.43)	0.3557
Low 5-Minute Apgar Score	3.9%	4.1%	0.88 (0.67, 1.16)	0.374	4.0%	4.0%	1.01 (0.73, 1.39)	0.9641
Breastfed at Discharge	64.3%	58.7%	**1.31 (1.17, 1.47)**	**<0.0001**	70.8%	61.2%	**1.47 (1.28, 1.69)**	**<0.0001**

Note: p<0.05 considered significant for non-interaction models

Source: Manitoba Centre for Health Policy, 2010

Table 4.4a: Adjusted Odds Ratios for Interactions for Prenatal and Birth Outcomes, Population 2

Outcome	Adjusted OR	p value
Inadequate Prenatal Care		
no PB (CSP vs no CSP)	**0.48 (0.32, 0.71)**	**0.0002**
PB (CSP vs no CSP)	**0.83 (0.71, 0.97)**	**0.017**
no CSP (PB vs no PB)	**0.50 (0.44, 0.57)**	**<0.0001**
CSP (PB vs no PB)	0.87 (0.58, 1.30)	0.489

Note: p<0.10 considered significant for interaction models

Source: Manitoba Centre for Health Policy, 2010

Table 4.5: Prenatal and Birth Outcomes for Manitoba Population, Various Sources

Outcomes	Percentage	Source	Year of Study
Adequate Prenatal Care	41.30%	Heaman,M. 2008 *	1991-2000
Inadequate Prenatal Care	8.90%	Heaman,M. 2008 *	1991-2000
Low Birth Weight (LBW)	5.10%	Brownell,M. 2004**	1997-2001
High Birth Weight (HBW)	15.90%	Brownell,M. 2004**	1997-2001
Small Gestational Age (SGA)	7.50%	Brownell,M. 2008***	2001/02-2005/06
Large Gestational Age (LGA)	14.60%	Brownell,M. 2008***	2001/02-2005/06
Preterm Birth	7.70%	Brownell,M. 2008***	2001/02-2005/06
Breastfed	81.60%	Brownell,M. 2008***	2001/02-2005/06

*Heaman MI, Newburn-Cook CV, Green CG, Elliott LJ, Helewa ME. Inadequate prenatal care and its association with adverse pregnancy outcomes: a comparison of indices. BMC Pregnancy Childbirth. 2008;8:15.
**Brownell M, Roos N, Fransoo R, et al. Manitoba Child Health Atlas 2004. Manitoba Centre for Health Policy. http://mchp-appserv.cpe.umanitoba.ca/reports/child_inequalities/index.shtml. Accessed September 1, 2010. Last edited July, 2005.
*** Brownell M, De Coster C, Penfold R, et al. Manitoba child health atlas update. Manitoba Centre for Health Policy. http://mchp-appserv.cpe.umanitoba.ca/reference/Child_Health_Atlas_Update_Final.pdf. Accessed August 9, 2010. Last edited November, 2008.

Source: Manitoba Centre for Health Policy, 2010

Adequate Prenatal Care: Prenatal care has long been recognized as a means of identifying and potentially reducing health problems and risk factors that may increase the likelihood of a premature delivery, low birth weight, or other adverse infant outcomes through medical, nutritional, and educational interventions (Alexander & Korenbrot, 1995; Jaipaul, Newburn–Cook, O'Brien, & Demianczuk, 2009). The Prenatal Benefit facilitates initiation of prenatal care by requiring that women contact a physician for a pregnancy test. Recall that in measuring the adequacy of prenatal care, the timing and frequency of care as well as the gestational age at delivery are considered (Alexander & Kotelchuck, 1996). Women categorized as receiving adequate care would have initiated care in the first trimester and received regular visits with their care provider throughout the rest of their pregnancy.

Table 4.3 shows the percent of women who received adequate prenatal care for Population 1. When comparing women who received the Prenatal Benefit to those who did not, the percent of women who received adequate prenatal care was 25.7% for both groups. These percents were calculated prior to any adjustments for additional factors that may have an impact on prenatal care, such as mother's age at first birth and marital status. The adjusted Odds Ratio (OR) given in Table 4.3 indicates that the difference between those who received the Benefit and those who did not is not statistically significant, even after adjusting for other factors that differ between the groups.

When comparing women who participated in prenatal Community Support Programs to those who did not participate in these programs, Table 4.3 shows that 28.6% of the women participating received adequate prenatal care compared to 25.2% of those who did not participate. The adjusted OR indicates that the difference between these two groups of women is statistically significant. That is, Community Support Program participation was associated with greater likelihood of having received adequate prenatal care (indicated by an OR of greater than 1.0). It is important to remember that a statistically significant OR can only tell us that there is a significant relationship between Community Support Program participation and receiving adequate prenatal care, not that one *caused* the other.

Table 4.4 shows the same set of results for Population 2. Here we find that 19.8% of the women receiving the Prenatal Benefit received adequate prenatal care, compared to only 12.4% for those not receiving the Prenatal Benefit. The adjusted OR indicates that there was a statistically significant relationship between receipt of the Benefit and adequate prenatal care, with those receiving the Benefit having a

higher likelihood of receiving adequate care during pregnancy. The association was significant even after adjusting for other factors that differ between the two groups of women. Table 4.4 also shows that 22.5% of the Community Support Program participants received adequate prenatal care, compared to 16.9% of women who did not participate in Community Support Programs. The difference between these two groups is also statistically significant, with a higher likelihood of adequate prenatal care for those participating in the programs than those not participating.

What these findings mean: Receipt of the Prenatal Benefit was associated with an increased likelihood of receiving adequate prenatal care for Population 2 but not for Population 1. The direction of the relationship in Population 1 is positive but did not achieve statistical significance (p=0.1133).

For both Populations 1 and 2, participation in the Community Support Program was associated with an increased likelihood of the mother receiving adequate prenatal care. The Population Attributable Risk Percent (PAR%) estimates that Community Support Program participation was associated with an increase in adequate prenatal care of 3.97% for Population 1 and an increase of 5.66% for Population 2.

Inadequate Prenatal Care: Receiving inadequate prenatal care has been linked to a number of adverse birth outcomes, particularly small–for–gestational age (Heaman, Newburn–Cook, Green, Elliott, & Helewa, 2008). Close to a quarter of the women in Population 1 received inadequate care during pregnancy. This means they initiated care late, did not receive regular care during pregnancy, or did not receive any prenatal care. As can be seen in Table 4.3, 22.7% of women receiving the Prenatal Benefit were classified as having inadequate care during pregnancy, compared to 23.2% for those women who did not receive the Benefit. The difference between these two groups with respect to inadequate care, once adjustments for other factors was made, was not statistically significant although the result approached significance (p=0.0556), which suggests a reduction in inadequate care associated with receipt of the Benefit (i.e., an OR less than 1.0). Comparing Community Support Program participants to non–participants, 22.9% of those participating in these programs were categorized as receiving inadequate care, compared to 22.6% for those not participating in Community Support Programs. This difference was not statistically significant.

Table 4.4 shows the results for inadequate prenatal care for Population 2. For this population, 31.5% of the women receiving the Prenatal Benefit had inadequate prenatal care compared to 46.2% of women not receiving the Benefit. And 28.3% of women participating in prenatal Community Support Programs received inadequate prenatal care compared to 36.8% of those not participating in these programs. In the regression analyses, these two Healthy Baby Program components—the Prenatal Benefit and Community Support Programs—showed a significant interaction, meaning that the association between one of these program components differed according to the association with the other program component. Table 4.4a shows that for those women not receiving the Prenatal Benefit, participation in Community Support Programs was associated with a decreased likelihood of receiving inadequate prenatal care. Similarly, for those women receiving the Prenatal Benefit, participation in the Community Support Programs was associated with a decreased likelihood of receiving inadequate prenatal care. And for those women who did not participate in Community Support Programs, receiving the Prenatal Benefit was associated with a decreased likelihood of receiving inadequate prenatal care.

What these findings mean: For Population 2, the combination of Healthy Baby program components was associated with a reduction in inadequate prenatal care. Community Support Program participation was associated with a decreased likelihood that a woman would receive inadequate care, for both those women receiving and not receiving the Prenatal Benefit; and for women not participating in Community Support

Programs, receipt of the Benefit was also associated with decreased inadequate care. For Population 1, the association between receipt of the Prenatal Benefit and inadequate care was borderline, meaning that it was almost significant (p=0.0556) and in the same direction (i.e., receipt of the Benefit associated with a reduction in inadequate prenatal care). The PAR% calculation estimates that receipt of the Prenatal Benefit was associated with a decrease in inadequate prenatal care of only 0.05% for Population 1, but with a decrease of 11.0% for Population 2.

Low Birth Weight: Low birth weight (defined in this report as having a birth weight between 500 and 2,499 grams) is highly associated with neonatal mortality (Kramer, 1987b) and may be related to several diseases in adulthood, including ischemic heart disease (Frankel, Elwood, Sweetnam, Yarnell, & Smith, 1996; Leon et al., 1998), diabetes (Forsen et al., 2000), and cancer (McCormack, dos Santos Silva, Koupil, Leon, & Lithell, 2005). Factors thought to effect low birth weight (apart from genetic and pre–existing factors) are maternal smoking and poor nutrition during pregnancy (Kramer, 1987b). The prenatal Healthy Baby Program may help to advance healthier birth weights by encouraging the cessation of smoking and healthy maternal nutrition. Table 4.3 shows that 5.5% of the births to women in Population 1 who received the Prenatal Benefit were low birth weight, compared to 7.6% of births to women who did not receive the Benefit. The adjusted OR indicates that the difference between these groups was statistically significant; receipt of the Prenatal Benefit was associated with a lower likelihood of a low birth weight. There was very little difference in the percent of low birth weight births between women participating and not participating in Community Support Programs: 5.4% and 5.6% respectively. The difference between these groups was not statistically significant.

Table 4.4 shows the results for low birth weight for Population 2. For this population, 6.2% of the infants born to mothers receiving the Prenatal Benefit were low birth weight, compared to 8.6% of infants born to mothers not receiving the Benefit. The adjusted OR shows that the difference between these groups was significant, with receipt of the Prenatal Benefit associated with reduced risk of low birth weight. Table 4.4 also shows that 5.4% of births to women participating in the Community Support Programs were low birth weight, compared to 7.2% for those not participating in the programs. The difference between these groups was not statistically significant.

What these findings mean: For both Populations 1 and 2, receipt of the Prenatal Benefit was associated with a decrease in low birth weight. According to the PAR% calculation, receipt of the Prenatal Benefit was associated with a 1.36% reduction in low birth weight births for Population 1 and a 9.0% reduction for Population 2.

Small–for–Gestational Age: Small–for–gestational age (SGA) is considered an indicator of fetal growth restriction and a marker for increased fetal and infant mortality and morbidity risk (Health Canada, 2000; Health Canada, 2003). Better nutrition and care during the prenatal period can reduce the risk for small–for–gestational age births (Knudsen, Orozova–Bekkevold, Mikkelsen, Wolff, & Olsen, 2008).

Table 4.3 shows that the percent of SGA babies born to women receiving the Prenatal Benefit (8.5%) was similar to the percent of SGA babies born to women not receiving the Benefit (8.1%) for Population 1. Even once important factors that differed across these groups of women were adjusted, the difference between these groups was still not statistically significant. The percent of SGA babies born to women participating in Community Support Programs (7.6%) was somewhat lower than the percent born to women not participating in these programs (8.6%), but after adjustments for other factors contributing to SGA and differing between participants and non–participants, this difference was also not statistically significant (p=0.1064).

Table 4.4 shows the results for Population 2. The percent of SGA infants born to women receiving the Prenatal Benefit was 8.3%, compared to 10.3% for those not receiving the Benefit. The adjusted difference between these two groups of women was statistically significant, indicating that the Prenatal Benefit was associated with a reduction in SGA births. The percent of SGA babies born to women participating in Community Support Programs was 7.2% compared to 9.1% for women not participating. The difference between these groups after adjustments was not statistically significant.

What these findings mean: The Prenatal Benefit program was associated with a reduction in SGA births for Population 2 but not for Population 1. The reason for the different results for the two populations could be due to: 1) in Population 1, the women receiving the Prenatal Benefit are a higher risk group and despite adjusting for a number of risk factors, not all the risks for SGA could be controlled; 2) in Population 2, the women not receiving the Prenatal Benefit are in many ways a higher risk group and despite adjusting for a number of risk factors, not all risks for SGA could be controlled.

High Birth Weight: High birth weight has been related to increased risk of neonatal death or injury at birth (Boulet, Salihu, & Alexander, 2004; Zhang, Decker, Platt, & Kramer, 2008). Factors associated with the development of a high birth weight baby are increased maternal pregnancy weight gain and gestational diabetes mellitus (Cheng et al., 2008; Hutcheon, Platt, Meltzer, & Egeland, 2006).

Table 4.3 shows that 15.3% of the births to women who received the Prenatal Benefit in Population 1 were high birth weight, compared to 13.6% for women who did not receive the Benefit. And 16.3% of the births to women who participated in Community Support Programs were high birth weight compared to 15.0% for women who did not participate. In the regression analyses, these two Healthy Baby Program components—the Prenatal Benefit and Community Support Programs showed a significant interaction, meaning that the association between one of these program components differed according to the association with the other program component. Table 4.3a shows that for those women participating in Community Support Programs, there was a borderline significant ($p=0.1005$)[17] association between receiving the Prenatal Benefit and a decreased likelihood of having a high birth weight baby compared to those not receiving the Benefit. But for those women not receiving the Prenatal Benefit, participation in the Community Support Programs was associated with an increased likelihood of having a high birth weight baby compared to women not participating.

The high birth weight results for Population 2 are shown in Table 4.4. More babies born to mothers receiving the Prenatal Benefit were high birth weight (16.0%) compared to those born to mothers not receiving the Benefit (13.3%). The difference between these groups was statistically significant and confirmed that the receipt of the Prenatal Benefit was associated with an increased likelihood of a high birth weight baby. 16.5% of the babies born to women participating in Community Support Programs were high birth weight, compared to 15.0% of the babies born to women not participating. The difference between these two groups was not significant for high birth weight.

What these findings mean: For Population 1, the combination of Healthy Baby program components was important: reductions in High Birth Weight were associated with Community Support Program participants who received the Prenatal Benefit. For those not receiving the Prenatal Benefit who participated in Support Programs, the effect was in the opposite direction (more High Birth Weight births). These associations were not found for Population 2, where Prenatal Benefit receipt was associated with more High Birth Weight births. Such different results for the two populations are difficult to interpret and may be due to other unmeasured factors operating in these populations.

17 For interaction effects, we used a significance level of $p<0.10$.

Large–for–Gestational Age: Large–for–gestational age (LGA) is considered an index of accelerated fetal growth and a marker for increased risk of birth complications and infant morbidity (Health Canada, 2000; Health Canada, 2003). Proper prenatal nutrition as well as monitoring of weight gain during the prenatal period and good management of gestational diabetes, which is done as part of prenatal care visits, can reduce the risk of LGA births (Henriksen, 2008). Table 4.3 shows that 13.8% of the births to women in Population 1 who received the Prenatal Benefit were LGA, compared to 12.1% of births to women who did not receive the Benefit. This difference between the groups was not statistically significant after adjusting for other factors. The percent of LGA babies born to women participating in Community Support Programs (15%) was higher than the percent of LGA babies born to women not participating (13.5%), and the regression analysis controlling for potentially confounding variables found that the difference between these two groups of women was statistically significant. Women participating in the Community Support Programs had a greater likelihood of having an LGA baby than women not participating.

Table 4.4 shows that for Population 2, 15.5% of the births to women who received the Prenatal Benefit were LGA, compared to 12.8% of births to women who did not receive the Benefit. The adjusted OR indicates that this difference was statistically significant, with the Prenatal Benefit associated with increased likelihood of an LGA birth. The percent of LGA babies born to women participating in Community Support Programs was 15.6% and the percent of LGA babies born to women not participating was 14.6%. The regression analysis found that the difference between these two groups was not statistically significant.

What these findings mean: For both Population 1 and 2, Healthy Baby program components were associated with more LGA births, but the components that were significant were different in each population. In Population 1, Community Support Program participation was associated with more LGA births, whereas in Population 2, Prenatal Benefit receipt was associated with more LGA births. These are similar to the results for high birth weight, and once again could be reflecting unmeasured differences between the groups of women receiving different components of the Healthy Baby program.

Preterm Births: Preterm birth is the most important determinant of fetal and infant mortality (Health Canada, 2000; Health Canada, 2003; Mathews et al., 2003), and is a major cause of neurodevelopmental problems in infants (Goldenberg, 2002). Factors that can reduce the risk for preterm births include progesterone supplementation, screening and management of infections, interventions for impaired placental blood flow, better care of multifetal pregnancies, and reducing environmental variables such as smoking, exposure to other toxic agents, and stress (Green, Damus, & Simpson, 2005). The Healthy Baby Prenatal Benefit and prenatal Community Support Programs may help to reduce the risk of preterm births by advocating prenatal medical care, encouraging cessation of smoking, and reducing stress by providing supplemental income, informational pamphlets, and emotional support.

Recall that we ran analysis of preterm births two different ways: first with all preterm births included and second with induced preterm births excluded. Regression results with all preterm birth included are presented here; regression results for both sets can be found in the Appendix (Appendix Tables 1.9, 1.10, 1.20, and 1.21).

Table 4.3 shows that 8.4% of births to women in Population 1 receiving the Prenatal Benefit were preterm, compared to 9.2% for women not receiving the Benefit. The adjusted OR indicates that the difference between these two groups was statistically significant, suggesting that the Prenatal Benefit

was associated with a decreased likelihood of preterm birth. Table 4.3 also shows that 8.0% of births to women participating in Community Support Programs were preterm, compared to 8.5% to women not participating. The difference between these groups was not statistically significant.

Table 4.4 shows that for Population 2, 9.9% of births to women receiving the Prenatal Benefit were preterm, compared to 12.2% for women not receiving the Benefit.[18] The adjusted OR indicates that the difference between these two groups was statistically significant, which suggests that the Prenatal Benefit was associated with a decreased likelihood of preterm birth. Table 4.4 also shows that 9.1% of births to women participating in Community Support Programs were preterm, compared to 10.8% to women not participating. The difference between these groups was not statistically significant.

What these findings mean: For both Population 1 and 2, the Prenatal Benefit was associated with a reduction in preterm births. The PAR% calculation suggests that the receipt of the Prenatal Benefit is associated with a 0.36% reduction in preterm births for Population 1 and a 6.0% reduction for Population 2.

Congenital Anomalies: Congenital anomalies can be the result of genetic or environmental factors, or both, and often the cause is unknown. Some congenital anomalies are more common in lower income areas (Brownell et al., 2008) suggesting the possibility of modifiable environmental influences.

Only 1.4% (n=147) of babies in our Population 1 had a congenital anomaly identified at birth; the small number available for analyses reduces the likelihood of finding a statistically significant association if one exists. Table 4.3 shows that 1.4% of babies born to women receiving the Prenatal Benefit had a congenital anomaly indentified at birth, compared to 2.7% of babies born to women not receiving the Benefit. The regression analysis found that there was no statistically significant association between the Prenatal Benefit and congenital anomalies. Table 4.3 also shows that 1.0% of babies born to women participating in Community Support Programs had congenital anomalies, compared to 1.6% of babies born to women not participating. The regression analysis showed no significant relationship between Community Support Program participation and congenital anomalies.

Table 4.4 shows that for Population 2, 1.4% of babies born to women receiving the Prenatal Benefit had a congenital anomaly indentified at birth, compared to 1.6% of babies born to women not receiving the Benefit. The regressions analysis found that there was no statistically significant association between the Prenatal Benefit and congenital anomalies. Table 4.4 also shows that 1.0% of babies born to women participating in Community Support Programs had congenital anomalies, compared to 1.5% of babies born to women not participating. The regression analysis showed no significant relationship between Community Support Program participation and congenital anomalies.

What these findings mean: The rate of congenital anomalies is very low, and it is not surprising that no statistically significant differences were found in either population.

Low 5–Minute Apgar Score: The Apgar score is an assessment of five aspects of the newborn's appearance and activity: heart rate, respiratory effort, muscle tone, reflex irritability, and skin colour. Five–minute Apgar scores are predictive of neonatal and infant mortality and severe neurological diagnoses (Apgar, 1953; Drage, Kennedy, Berendes, Schwarz, & Weiss, 1966; Drage, Kennedy, & Schwarz, 1964; Moster, Lie, & Markestad, 2001). Factors thought to influence Apgar scores include hypoxia in utero from a number of possible causes, but also prematurity, abnormalities of the muscles or the central nervous system, cardiac and respiratory problems, infections, and drugs (Freeman & Nelson, 1988). Many of these factors may be prevented with the adequate prenatal care advocated for by the Healthy Baby Program.

18 It should be noted that the preterm birth rates for Population 2 are much higher than the overall rate for Manitoba, which was 7.7% in 2001/02–2005/06 (Brownell et al., 2008). See Table 4.5.

Table 4.3 shows that 4.1% of babies born to women in Population 1 receiving the Prenatal Benefit had low 5–minute Apgar scores, compared to 7.5% of babies born to women not receiving the Benefit. Comparing babies born to women participating and not participating in the Community Support Programs, unadjusted percents were similar for both groups (4.0 and 4.2% respectively). As indicated in Table 4.3, the regression analysis found a significant interaction between Prenatal Benefit and Community Support Programs. This interaction, shown in Table 4.3a, suggests that for women not receiving the Prenatal Benefit, participation in the Community Support Programs was associated with an increased risk of the baby having a low Apgar score. However, for women participating in Community Support Programs, receipt of the Prenatal Benefit was associated with a reduction in low Apgar scores.

Table 4.4 shows that for Population 2, 3.9% of babies born to women receiving the Prenatal Benefit had low 5–minute Apgar scores at birth, compared to 4.1% of babies born to women not receiving the Benefit. The regression analysis found that there was no statistically significant association between the Prenatal Benefit and low Apgar scores for this Population. Table 4.4 also shows that 4.0% of babies born to women participating in Community Support Programs and those not participating had low Apgar scores. The regression analysis showed no significant relationship between Community Support Program participation and low Apgar scores.

What these findings mean: The interaction for Population 1 suggests that the Prenatal Benefit was associated with a reduction in low Apgar scores for women participating in Community Support Programs, however if a woman did not receive the Benefit, participation in Support Programs was associated with an unexpected increase in low Apgar scores. These findings were not replicated in Population 2.

Breastfeeding Initiation at Hospital Discharge: There is an overwhelming abundance of evidence supporting the positive effects of breastfeeding on infant and early childhood health, including reductions in ear infections, atopic dermatitis, gastrointestinal infections, lower respiratory tract infections, the development of asthma, and leukemia (Ip et al., 2007; Kramer et al., 2003) as well as decreased infant hospitalizations independent of family income level (Coulibaly et al., 2006). Breastfeeding is also related to better cognitive development in early childhood, especially in the area of verbal IQ (Kramer et al., 2008). The Healthy Baby Prenatal Benefit and Community Support Programs educate pregnant women about the benefits of breastfeeding and encourage them to breastfeed their babies.

Table 4.3 shows that for Population 1, 75.8% of women receiving the Prenatal Benefit breastfed their babies compared to 74.2% of women who did not receive the Benefit. Table 4.3 also shows that 77.7% of the women participating in Community Support Programs breastfed their babies compared to 75.4% of women who did not participate in the Community Support Programs. The regression analysis adjusting for other factors that differ across the groups indicated that there was a statistically significant interaction between the Healthy Baby Program components. The adjusted ORs from the interaction (Table 4.3a) indicate that for those women not receiving the Prenatal Benefit, participation in Community Support Programs was associated with a reduction in breastfeeding. However, for those women receiving the Prenatal Benefit, participation in Community Support Programs was associated with an increase in breastfeeding. Likewise, for those women participating in Community Support Programs, receipt of the Prenatal Benefit was associated with an increase in breastfeeding at hospital discharge.

Table 4.4 shows that for Population 2, 64.3% of women receiving the Prenatal Benefit breastfed their babies compared to 58.7% of women not receiving the Benefit. The regression analysis indicated that the difference between these groups was statistically significant, with the Prenatal Benefit associated with an increased likelihood of breastfeeding. Table 4.4 also shows that 70.8% of the women participating in Community Support Programs breastfed their babies compared to 61.2% of women who did not participate in the Community Support Programs. The adjusted OR from the regression analysis indicates that participating in the Community Support Programs was associated with an increased likelihood of breastfeeding, compared to not participating.

What these findings mean: For Population 1, the combination of Healthy Baby Program components (receipt of Benefit + Community Support Program participation) was associated with an increase in breastfeeding initiation. For Population 2, although the interaction of Healthy Baby program components was not significant, each of the separate components was associated with an increase in breastfeeding. The PAR% calculation estimates that participation in both Prenatal Benefit and Community Support Programs is associated with a 9.9% increase in breastfeeding initiation for Population 1 and a 20.7% increase for Population 2.

2) Infant Outcomes in the First Year of Life

Table 4.6 shows the results for each of the infant outcomes in the first year of life for Population 1, and Table 4.7 provides this information for Population 2. Once again, in both of these tables, the first set of four columns shows a comparison between those receiving and not receiving the Prenatal Benefit, and the next set of four columns shows a comparison between those participating and not participating in the Community Support Programs. There were no significant interactions between the Prenatal Benefit and Community Support Programs for any of the infant outcomes.

Table 4.6: Association of Healthy Baby Program with Infant and Child Outcomes: Adjusted Odds Ratios for Population 1

Outcome	Prenatal Benefit				Community Support Programs			
	Unadjusted %		Adjusted OR	p value	Unadjusted %		Adjusted OR	p value
	PB	no PB			CSP	no CSP		
Hospital Episodes	13.0%	8.7%	1.43 (0.96, 2.15)	0.0821	13.5%	12.6%	1.04 (0.89, 1.20)	0.6378
Injury Hospitalization	0.5%	0.0%	N/A*	N/A	0.7%	0.5%	1.35 (0.72, 2.53)	0.3451
Continuity of Care	56.4%	58.5%	**2.03 (1.20, 3.46)**	**0.0088**	52.4%	57.6%	**0.81 (0.72, 0.90)**	**0.0001**
Child In Care	5.1%	2.4%	1.12 (0.41, 3.06)	0.8253	5.6%	4.8%	1.05 (0.83, 1.31)	0.707
Immunization at Age 2	49.6%	51.3%	0.95 (0.73, 1.24)	0.7064	49.5%	49.6%	1.01 (0.89, 1.14)	0.9141
Short Child Spacing **	34.9%	33.1%	0.92 (0.69, 1.22)	0.5514	32.6%	35.4%	1.00 (0.89, 1.12)	0.9487

* no events for participants in a group

** for this outcome, Hazard Ratios (HRs) rather than Odds Ratios (ORs) are shown

Source: Manitoba Centre for Health Policy, 2010

Table 4.7: Association of Healthy Baby Program with Infant and Child Outcomes: Adjusted Odds Ratios for Population 2

Outcome	Prenatal Benefit				Community Support Programs			
	Unadjusted %		Adjusted OR	p value	Unadjusted %		Adjusted OR	p value
	PB	no PB			CSP	no CSP		
Hospital Episodes	16.2%	16.1%	1.04 (0.87, 1.24)	0.686	16.3%	16.1%	1.02 (0.85, 1.21)	0.8438
Injury Hospitalization	0.4%	1.5%	1.20 (0.51, 2.84)	0.6776	2.3%	0.2%	1.14 (0.53, 2.45)	0.7443
Continuity of Care	44.5%	46.8%	0.90 (0.79, 1.04)	0.1527	43.4%	45.6%	**0.87 (0.76, 0.99)**	**0.0394**
Child In Care	9.8%	11.3%	**0.74 (0.60, 0.92)**	**0.0053**	9.5%	10.4%	0.99 (0.80, 1.24)	0.9635
Immunization at Age 2	45.1%	38.3%	**1.37 (1.16, 1.60)**	**0.0001**	46.0%	42.7%	1.09 (0.93, 1.28)	0.2775
Short Child Spacing *	38.0%	38.0%	1.03 (0.90, 1.17)	0.7064	37.5%	38.1%	1.08 (0.94, 1.24)	0.2453

* for this outcome, Hazard Ratios (HRs) rather than Odds Ratios (ORs) are shown

Source: Manitoba Centre for Health Policy, 2010

Hospitalizations: A hospitalization indicates that a child has required extensive or emergency medical assistance. Factors that are associated with hospitalization for young children include low birth weight, child sex, maternal smoking, marital status, and number of children in the home (Golding, Haslum, & Carswell, 1986). The Healthy Baby Program encourages optimal health for the mother and her infant by providing education on how to stay healthy, including the impact of smoking on the baby's health and the importance of proper nutrition for mother and baby. In this analysis, only inpatient hospitalizations were included.

Table 4.6 shows the percent of infants in Population 1 hospitalized according to whether their mothers received the Prenatal Benefit (13.0%) or did not receive the Benefit (8.7%). These percentages were calculated prior to any adjustments for additional factors that may have an impact on hospitalization, such as mother's education level and socioeconomic status. The adjusted OR given in Table 4.6 indicates that the difference between those who received the Benefit and those who did not is not statistically significant. When comparing infant hospitalizations according to Community Support Program participation, Table 4.6 shows that 13.5% of infants whose mothers participated in Community Support Programs were hospitalized compared to 12.6% of infants whose mothers did not participate. The adjusted OR indicates that the difference between these two groups of infants was not statistically significant.

Table 4.7 shows the same set of results for Population 2. Here we find that the percent of infants hospitalized is similar across all groups of infants: 16.2% for those whose mothers received the Prenatal Benefit, 16.1% for infants whose mothers did not receive the Benefit, 16.3% for infants whose mothers participated in Community Support Programs, and 16.1% for infants whose mothers did not participate in Community Support Programs. None of the differences in infant hospitalizations across groups was significant.

What these findings mean: Community Support Program participation was not associated with infant hospitalizations in the first year of life. Although the Prenatal Benefit appeared to be associated with hospitalization for Population 1 (the finding approached significance), this relationship was not found for Population 2.

Injury Hospitalizations: Injuries in infancy can be associated with neglect and/or abuse (McPhilips, Gallaher, & Koepsell, 2001). The Healthy Baby Prenatal Benefit and Community Support Programs stress positive parent–child interactions as well as providing education about safe environments for infants. Table 4.6 shows that for Population 1, infant injury hospitalizations were very low for all groups: 0.5% for infants whose mothers received the Prenatal Benefit, 0% for those whose mothers did not receive the Benefit, 0.7% for infants whose mothers participated in Community Support Programs, and 0.5% for infants whose mothers did not participate. The regression analyses indicated none of the differences between the groups was statistically significant.

Table 4.7 shows that for Population 2, infant injury hospitalizations were also very low for all groups: 0.4% for infants whose mothers received the Prenatal Benefit, 1.5% for those whose mothers did not receive the Benefit, 2.3% for infants whose mothers participated in Community Support Programs, and 0.2% for infants whose mothers did not participate. The regression analyses indicated none of the differences between the groups was statistically significant.

What these findings mean: Injury hospitalizations were relatively rare for infants in both of our study populations, so it is not surprising that no statistically significant differences between groups were observed.

Continuity of Care: Continuity of physician care allows a physician to know the history of the child and his/her family, allows the family to develop a level of comfort with the physician, and is thought to result in better care (Brousseau, Meurer, Isenberg, Kuhn, & Gorelick, 2004; Christakis, Mell, Koepsell, Zimmerman, & Connell, 2001; Christakis, Wright, Koepsell, Emerson, & Connell, 1999). Both the Healthy Baby Prenatal Benefit and Community Support Programs were expected to help connect pregnant women and new mothers with a regular health care provider. Continuity of care is indicated by at least 50% of the physician visits being made to the same physician.

For this analysis, only infants who had at least three visits to the doctor in their first year were included. Table 4.6 shows that for Population 1, 56.4% of the infants whose mothers received the Prenatal Benefit had continuity in their care, compared to 58.5% of the infants whose mothers did not receive the Benefit.[19] Once adjustments were made for existing differences between these groups of women, the OR shows that receipt of the Prenatal Benefit was associated with an increase in continuity of care. Table 4.6 also shows that 52.4% of the infants whose mothers participated in Community Support Programs had care continuity, compared to 57.6% of the infants whose moms did not participate. This difference was statistically significant, indicating that Community Support Program participation was associated with *decreased* continuity of care.

Table 4.7 shows the results for Population 2.[20] Comparing across Prenatal Benefit groups, 44.5% of the infants whose mothers received the Benefit had care continuity, compared to 46.8% of the infant whose mothers did not receive the Benefit. This difference was not statistically significant. Comparing across Community Support Program participation, 43.4% of infants whose mothers participated in these programs had care continuity, compared to 45.6% of infants whose mother did not participate. The regression indicated that the difference between these groups was statistically significant, with Community Support Program participation associated with a decrease in continuity of care.

What these findings mean: In both populations, Community Support Programs were associated with decreased continuity of care. It is difficult to determine what this finding means. It is possible that Community Support Program participation increases the awareness of the importance of timely care, and these mothers are choosing walk–in clinics rather than waiting for an appointment with their usual provider. This result, and the possible reasons for it, deserves further investigation.

Children in Care: Children in care are children who are removed from their families of origin and placed in the care of another adult(s) due to concerns about the proper provision of care in the family of origin. A child going into care is indicative of problems at home; he or she may have been abused or neglected or the parents may be unavailable due to illness or death. Alternatively, a child may go into care when his or her family is unable to function due to disability, emotional problems, or family conflict. These problems at home can be detrimental to the child's physical and emotional development. The Healthy Baby Program could potentially reduce the number of children in care by offering mothers support and educational tools that can enable them to give their children proper care.

Table 4.6 shows that for Population 1, 5.1% of the infants whose mothers received the Prenatal Benefit were taken into care, compared to 2.4% of infants whose mothers did not receive the Benefit. The difference between these two groups was not statistically significant. Table 4.6 also shows that 5.6% of

19 For Population 1, there were 534 (5.7%) infants who were excluded from this analysis because they had fewer than three physician visits.

20 For Population 2, there were 270 (4.9%) infants who were excluded from the analysis because they had fewer than three physician visits in the first year of life.

the infants whose mothers participated in Community Support Programs were taken into care in their first year, compared to 4.8% of infants whose mothers did not participate. The difference between these two groups was not statistically significant.

Table 4.7 shows that for Population 2, 9.8% of the infants whose mothers received the Prenatal Benefit were taken into care during their first year of life, compared to 11.3% of infants whose mothers did not receive the Benefit. The difference between these two groups was statistically significant, indicating an association between receipt of the Prenatal Benefit and decreased likelihood of infants being taken into care in their first year of life. Table 4.7 also shows that 9.5% of infants whose mothers participated in Community Support Programs were taken into care, compared to 10.4% of infants whose mothers did not participate. The difference between these two groups was not statistically significant.

What these findings mean: An association was found between the Prenatal Benefit and reduced likelihood of an infant being taken into care, but only for Population 2. Because the findings were not consistent across populations, it may be the case that those women who did not receive the Prenatal Benefit in Population 2 have some risk factor(s) for having their children taken into care that was not controlled for in the analysis.

3) Longer–Term Outcomes

Tables 4.6 and 4.7 also show the results for the two longer–term outcomes for Populations 1 and 2. There were no significant interactions between the Prenatal Benefit and Community Support Programs for either of these two outcomes.

Immunization: Up–to–date immunization schedule by the child's second birthday was used as an indication of connection to health services. The information for this variable came from the Manitoba Immunization Monitoring System (MIMS). Only two years of births (2004/2005 and 2005/2006) were used in this analysis. A listing of vaccinations recommended by age two years can be found in Appendix Table 1.2.

Table 4.6 shows that for Population 1, 49.6% of the infants whose mothers received the Prenatal Benefit had complete immunizations at two years of age, compared to 51.3% of infants whose mothers did not receive the Benefit. The difference between these two groups was not statistically significant. Table 4.6 also shows that 49.5% of the infants whose mothers participated in Community Support Programs had complete immunizations at age two years, compared to 49.6% of infants whose mothers did not participate. The difference between these two groups was not statistically significant.

Table 4.7 shows that for Population 2, 45.1% of the infants whose mothers received the Prenatal Benefit had complete immunizations by two years of age, compared to 38.3% of infants whose mothers did not receive the Benefit. The regression analysis adjusting for other potentially confounding factors found that the difference between these two groups was statistically significant. This finding indicates that receipt of the Prenatal Benefit was associated with an increased likelihood that a child would have a complete set of immunizations at age two. Table 4.7 also shows that 46.0% of infants whose mothers participated in Community Support Programs had complete immunizations at age two years, compared to 42.7% of infants whose mothers did not participate. The difference between these two groups was not statistically significant. These rates are much lower than the general population rate, which was 69.6% for children born from 2002 through 2004 (Brownell et al., 2008).

What these findings mean: An association was found between the Prenatal Benefit and increased likelihood of an infant having complete immunizations by the end of the second year, but only for Population 2. Because the findings were not consistent across populations, it may be the case that those women who did not receive the Prenatal Benefit in Population 2 have some risk factor(s) for not having their children immunized that was not controlled for in the analysis.

Sibling spacing: Sibling spacing refers to the length of time between the birth of the target infant and a subsequent sibling. Research suggests that large families with shorter spacing between children are associated with poorer outcomes for children (Chaffin, Kelleher, & Hollenberg, 1996; Zuravin, 1988). Longer spacing between pregnancies would therefore be seen as a potentially positive outcome. For this analysis we looked at all births with at least 24 months of follow up data to determine whether subsequent siblings were born in that time period, and the number of months between the target child and subsequent sibling. The regression results presented are Hazard Ratios (HR) rather than Odds Ratios, indicating not only the increased (or decreased) risk of having a subsequent sibling, but also taking into consideration the time until the subsequent sibling was born.

Table 4.6 shows that for Population 1, 34.9% of the infants whose mothers received the Prenatal Benefit had a sibling born during the follow up period, compared to 33.1% of infants whose mothers did not receive the Benefit. The difference between these two groups, and the number of months to the subsequent sibling, was not statistically significant. Table 4.6 also shows that 32.6% of the infants whose mothers participated in Community Support Programs had a sibling born in the follow–up period, compared to 35.4% of infants whose mothers did not participate. The difference between these two groups and number of months to the subsequent sibling were not statistically significant.

Table 4.7 shows that for Population 2, comparing infants whose mothers received the Prenatal Benefit to infants whose mothers did not receive the Benefit, the same percent had a sibling born in the follow–up period—38.0%. There was no significant difference between these two groups in the number of months to the subsequent sibling. Table 4.7 also shows that 37.5% of infants whose mothers participated in Community Support Programs had a sibling born within the follow–up period, compared to 38.1% of infants whose mothers did not participate. The difference between these two groups in the number of months to the subsequent sibling was not statistically significant.

What these findings mean: There appear to be no associations between the Healthy Baby Program components and sibling spacing.

Table 4.8 summarizes the significant findings for Populations 1 and 2, for all outcomes.

Table 4.8: Summary of Results from Regression Analyses for Association Between Outcomes and Healthy Baby Program Components

Indicators	*Healthy Baby Program Components*			
	Prenatal Benefit		**Community Support**	
	Pop1	Pop2	Pop1	Pop2
Adequate Prenatal Care	ns	↑	↑	↑
Inadequate Prenatal Care	ns	Interaction	ns	Interaction
Low Birth Weight	↓	↓	ns	ns
Small for GA	ns	↓	ns	ns
High Birth Weight	Interaction	↑	Interaction	ns
Large for GA	ns	↑	↑	ns
Preterm Birth	↓	↓	ns	ns
Congenital Anomaly	ns	ns	ns	ns
5-minute Apgar	Interaction	ns	Interaction	ns
Breastfed at Discharge	Interaction	↑	Interaction	↑
Hospitalization	ns	ns	ns	ns
Injury Hospitalization	ns	ns	ns	ns
Continuity of Care	↑	ns	↓	↓
Child in Care	ns	↓	ns	ns
2-year immunization	ns	↑	ns	ns
Sibling spacing	ns	ns	ns	ns

Note: Interaction indicates a significant interaction between the Prenatal Benefit and the Community Support Programs ($p<0.10$)
Note: ↑ and ↓ indicate a significant increase or decrease of the event ($p<0.05$)
Bolded indicator names =Significant findings in both populations for one or both Healthy Baby Program components

Source: Manitoba Centre for Health Policy, 2010

An assessment of the potential estimated cost savings for birth hospitalizations associated with the Healthy Baby Program can be found in Appendix Tables 1.39a and 1.39b.

Chapter 5: Conclusions and Recommendations

This report evaluated the Manitoba Healthy Baby Program for births occurring from 2004/2005 through 2007/2008. The Healthy Baby Program consists of two components: 1) the Healthy Baby Prenatal Benefit, an income supplement provided to low income pregnant women and 2) Community Support Programs, which are educational and supportive groups available to all women from the prenatal period through to an infant's first birthday. The goal of the Healthy Baby Program is to promote prenatal and perinatal health. In our evaluation of the Healthy Baby Program, we determined the uptake of each of the program components and how the uptake varied across socioeconomic status and geographic region. We also examined the association between the Healthy Baby Program and prenatal care, birth outcomes, and infant outcomes.

For our evaluation, we used two separate populations of women to determine the associations between the Healthy Baby Program and the outcomes. In discussing our key findings below, we have taken a conservative approach and focused on those indicators where results were significant for both populations.

Key Findings

1. Most vulnerable women receive the Healthy Baby Prenatal Benefit, but are not participating in Community Support Programs. The Prenatal Benefit was received by over half of women living in lower income neighbourhoods and teen mothers and almost three–quarters of women receiving income assistance during pregnancy—potential target groups for the program. In contrast, just over one–fifth of women receiving income assistance during pregnancy and teen mothers participated in any Community Support Programs, and less than 20% of women living in the lowest income areas participated in Community Support Programs. Participation in the prenatal Community Support Programs is particularly low, with only 5.9% of pregnant women in the province attending these programs. Participation by high–risk groups is also low.

2. Participation in prenatal Community Support Programs appears to be associated with increases in adequate prenatal care and decreases in inadequate prenatal care.

3. For both populations studied, Prenatal Benefit receipt was associated with a reduction in low birth weight births.

4. The pattern of findings for high birth weight births suggests that there may be some association between the Healthy Baby Program and this outcome; however, the results were not consistent across populations. Women from Population 1 who participated in Community Support Programs were at decreased risk of high birth weight if they received the Prenatal Benefit. In contrast, women who did not receive the Prenatal Benefit were at increased risk for a high birth weight birth if they participated in Community Support Programs compared to those not participating. Women from Population 2 were at increased risk of high birth weight births if they received the Prenatal Benefit. Interestingly, an evaluation of CPNP across Canada found an association between program participation and LGA births (Public Health Agency of Canada, 2009).

5. Receipt of the Prenatal Benefit was associated with reductions in preterm births for both populations.

6. Both Healthy Baby Program components appear to be associated with an increase in breastfeeding initiation. For Population 1, the combination of Healthy Baby Program components (receipt of the Benefit plus participation in Community Support Programs) was associated with increased breastfeeding initiation. For Population 2, each of the separate components was associated with an increased likelihood of breastfeeding.

7. Participation in Community Support Programs appears to be associated with an unexpected decrease in continuity of infant care in the first year of life.

Study Limitations

As with all research, there are limitations to this study that may affect the findings.

1. Some of the results differed between Populations 1 and 2. These inconsistencies may be due to differences between comparison and program groups in Populations 1 and 2. Below is a discussion of how the comparison groups differ and how this might influence the results found in each population:

    a. Population 1 included all women who applied for the Healthy Baby Prenatal Benefit and whose family income was below $40,000. We assumed that all these women felt that they needed financial assistance, and Table 4.1 shows that their incomes are relatively low. Table 4.1 also shows that the women who actually received the Benefit, compared to the women who did not receive the Benefit, had a higher percentage of risk factors. The comparison group for Population 1 is less vulnerable than the program groups (Prenatal Benefit and/or Community Support Programs) so that the evaluation using this population is a conservative one. There may be some effects that will not be detected because of this difference between the program and comparison groups; however, effects that are significant suggest compelling evidence for the effectiveness of the program. We also note that the sample size for the "no Healthy Baby" group is relatively smaller in Population 1 than Population 2 (n=415 versus n=1,839).

    b. Population 2 includes all the women on Income Assistance. Population 2 is a more vulnerable population than Population 1, consisting of more marginalized women. Tables 4.1 and 4.2 reveal that compared to Population 1, the women in Population 2 were younger (particularly at the birth of their first child); lived in poorer neighbourhoods; had lower levels of education; and were more likely to smoke, use alcohol and/or drugs, and experience relationship distress and depression. While all the women in Population 2 had high levels of risk factors, there are differences in Population 2 between the women who received Healthy Baby services and those who did not. Women who did not receive the Prenatal Benefit consistently had more missing data. This is an important consideration because the factors related to "being missing" could be related to vulnerability. Much of the information in Tables 4.1 and 4.2 comes from the Families First Screen, which is filled out by a Public Health Nurse (PHN) during a postnatal visit. It is more difficult to obtain information from a woman who may not trust a PHN, who has a chaotic lifestyle, or who will only allow the PHN limited time during the postnatal visit. Missing responses can also be due to the PHN's lack of comfort with asking sensitive questions. Of the information that is available for Population 2, the women in the comparison group who did not receive the Prenatal Benefit were more likely to smoke (65% vs 60%), less likely to have completed high school (24% vs 30%), and slightly younger at first birth (24.2 yrs vs 24.6 yrs). On the other hand, the women who did receive the Prenatal Benefit were more likely to live in neighbourhoods with lower socioeconomic status (SEFI 0.93 vs 0.78), less likely to be married (15% vs 40%), and slightly more likely to experience depression (27% vs 22%).

(Similar differences were found when comparing those in Population 2 who participated in Community Support Programs to those who did not participate.) Unlike Population 1, for Population 2 it is difficult to ascertain if those receiving services are definitely more vulnerable than those not receiving Healthy Baby Program components. Our main concern with utilizing a group of women who did not receive Healthy Baby services despite being eligible was that they may have been so marginalized and disconnected from society that they did not apply for the Prenatal Benefit or want to attend Community Support Programs. Because of this uncertainty about the differences between the comparison and program groups in Population 2, the evaluation is potentially less conservative than the evaluation using Population 1.

2. The power to detect significant interactions was limited because of the small number of women who participated in the Community Support Programs but did not participate in the Prenatal Benefit. To compensate for low statistical power, we set our significant level for interaction effects at $p<0.10$, rather than the more traditional $p<0.05$.

3. Although the data used in this study allowed us to determine which women received the Prenatal Benefit, there is no information on what the monthly income supplement was used for.

4. Due to the lack of available data on participation in Community Support Programs run exclusively by the Canada Prenatal Nutrition Program (CPNP), we had to exclude women living in areas where CPNP Community Support Programs are not offered in conjunction with Healthy Baby Community Support Programs. This meant that all women (and their infants) living in First Nations communities, as well as those from Pine Falls and Steinbach, were excluded from our analyses.

5. The Community Support Programs differ in content from site to site. Anecdotal reports suggest that there are differences in quality of programming between sites. This is important information to evaluate; however, it was beyond the scope of this project to gather and analyse data on the impact of particular program content.

6. The confidence intervals for this study were set at 95%, meaning that if 100 comparisons were examined, there would be five that would not have the true value within the confidence interval (i.e., a 5% chance of stating that a difference was statistically significant when it really was not). We ended up running 16 different regression models for each population, for a total of 32 regression models. The focus of the analyses was on comparing outcomes for those receiving the Prenatal Benefit to those not receiving the Prenatal Benefit and on comparing outcomes for those participating in Community Support Programs to those not participating in these programs. Thus, there were about 64 key comparisons used to evaluate the relationship between the Healthy Baby Program components and the outcomes of interest. There is a risk with multiple comparisons of increasing the likelihood of finding a statistically significant result simply by chance. In our case, with 64 key comparisons and confidence intervals set at 95%, we could expect that about three estimates out of the 64 tested could have their true value outside of the confidence interval (i.e., in three cases, we would state that the result was statistically significant, when in fact it was not). Statistical techniques developed to prevent this type of error from occurring generally require a more conservative level of certainty, for example setting the confidence interval at 99.92%.[21] Because the sample size for some of our comparisons was already very small (resulting in reduced power for detecting statistical significance if it exists), we did not choose to change our confidence intervals or p values. Instead, we took the conservative approach of requiring that any significant result be statistically significant for both study populations in order to include it in our discussion of key findings.

21 This confidence interval was calculated by taking the p value for 95% intervals (0.05) and dividing by the number of comparisons. 0.05/64 = 0.00078. The new p value would be 0.00078 and the confidence interval is calculated by 1 - 0.00078 = 99.92%.

Recommendations

Recommendation #1: Given the association between receipt of the Prenatal Benefit and reductions in both low birth weight and preterm birth rates, enhanced efforts should be made to ensure all low income women receive the income supplement (Key Findings 3 and 5). Women not accessing prenatal care may not be aware of the program and efforts to reach these women through other venues may be necessary. In addition, simplification of the application form (or assistance with completion) may encourage women with minimal literacy skills to complete the application, and translation of the form into other languages may encourage immigrant women whose first language is not English to apply for the program.

Recommendation #2: Given that we found over a quarter of women receiving income assistance during pregnancy did not receive the Prenatal Benefit and given that the Benefit appears to be associated with better prenatal and birth outcomes for those women on income assistance who did receive it during pregnancy, increased efforts should be made to ensure that all women receiving income assistance during pregnancy also receive the Prenatal Benefit. This is a particularly vulnerable group of women who may be difficult to reach. (Key Findings 1, 3, 5, and 6)

Recommendation #3: Given the relatively low participation rates in the Community Support Programs and the potential benefits of these programs, efforts to increase Community Support Program participation, particularly among vulnerable women, should be enhanced. (Key Finding 1)

Our study period ended prior to a referral process introduced in April 2008, whereby applicants to the Prenatal Benefit who consented on their application form to have their contact information shared were contacted by a Community Support Program Coordinator and encouraged to attend Community Support Programs. Future analyses should determine whether this referral process has increased Community Support Program participation among Prenatal Benefit recipients.

Future investigations could also explore factors that may impede Community Support Program participation. For example, is transportation to programs an issue for women in rural areas, where participation was particularly low for women in the lowest income areas? Is the low participation rate by teen moms due to the absence of teen–specific programming, or perhaps due to program schedules conflicting with high school? Is the low postnatal participation rate of women on income assistance due to access difficulties associated with having a baby? These are important questions to address in attempts to increase Community Support Program participation.

Recommendation #4: Given that not all low–income or high–risk women will apply for the Prenatal Benefit, efforts to increase Community Support Program participation should extend beyond Prenatal Benefit recipients. (Key Finding 1)

Recommendation #5: Given that uptake of *prenatal* Community Support Programs was particularly low, even among women obtaining the Prenatal Benefit, and given the potential effects of prenatal Community Support Program participation on prenatal care and birth outcomes, particular efforts should be made in promoting participation in the prenatal Community Support Programs. (Key Findings 1, 2, and 6)

Recommendation #6: Further study of the relationship between the Healthy Baby Program components and high birth weight births is necessary to determine whether something about the Healthy Baby program is contributing to increased birth weights or whether additional factors not measured in these analyses (for example aboriginal status) are responsible for the associations. The

opportunity for providing information about weight gain appropriate to mothers' pre–pregnancy body mass index (Crane, White, Murphy, Burrage, & Hutchens, 2009; Health Canada, 1999; Institute of Medicine, National Research Council, & Committee to Reexamine IOM Pregnancy Weight Guidelines, 2009) should be seized upon by both the Prenatal Benefit Program and the prenatal Community Support Programs. Strategies to increase physical activity among pregnant women participating in Healthy Baby Programs should also be considered (Evenson, Moos, Carrier, & Siega–Riz, 2009). (Key Finding 4)

Recommendation #7: The Healthy Baby Program shows an important and positive association with breastfeeding initiation. Given the significant role breastfeeding plays in healthy child development, it is important to track not only breastfeeding initiation but breastfeeding duration information as well, to determine whether the Healthy Baby Program contributes to longer–term breastfeeding. (Key Finding 6)

Recommendation #8: Further study of the relationship between Community Support Program participation and decreased continuity of care is necessary to determine what may be contributing to this association. (Key Finding 7)

Recommendation #9: A qualitative study on Prenatal Benefit recipients to determine how the monthly Benefit is spent and what kind of impact recipients think the $81.41 has on their health and nutritional needs in the prenatal period would be useful information for Healthy Baby Program planners (Limitation 3). Additionally, qualitative information on how information inserts sent with the monthly cheque are used and how recipients think these influenced their behaviour would be of value.

Recommendation #10: Discussions should be initiated with CPNP regarding data collection and sharing of information with the Healthy Baby Program for programs that are run exclusively by CPNP. This would provide a more accurate picture of the association of community support programs with outcomes for all Manitoba women and children. (Limitation 4)

Recommendation # 10: Information on program quality and content should be monitored and used to improve Community Support Programming. It is important for all programs to offer support groups relevant to the community in which they are situated and to ensure programs are providing up–to–date information on health and health promotion (e.g., smoking cessation, addictions counseling, nutrition information, etc.). (Limitation 5)

Glossary

Apgar Score
A measure of the physiological well–being of newborn babies recorded for virtually all births in hospital. A score of zero, one, or two is given for each of five vital signs that are assessed at one and five minutes after birth. These five scores are added up to give a total score between 0 and 10. The five vital signs are: appearance, pulse, reflex, muscle tone, and breathing pattern.

Breastfeeding Initiation
When a mother begins to feed her infant milk from her breast. In this report, breastfeeding initiation is identified as any live born newborn hospitalization (newborn hospitalizations are defined with ICD–9–CM codes V30 to V39) that indicates partial or exclusive breastfeeding initiation (information recorded on the hospital discharge abstract).

Children in Care
Children who are removed from their families of origin and placed in the care of another adult(s) due to concerns about the proper provision of care in the family of origin. Children are placed in foster care through voluntary placement, voluntary surrender of guardianship, apprehension, or order of guardianship. Children in care do not include children who remain with or are returned to a parent or guardian under an order of supervision.

Community Support Programs
A set of programs available to all women from the prenatal period through to an infant's first birthday. Led by the Province of Manitoba Healthy Baby Program, community support programs offer social support and informal learning opportunities to encourage early, regular prenatal care and promote healthy infant development. These programs aim to build women's confidence and awareness of health and parenting choices, foster awareness of babies' nurturing needs, offer and encourage healthy eating through cooking and nutrition activities (Healthy Child Manitoba, 2010).

Congenital Anomaly
An abnormality of structure, function or body metabolism that is present at birth (even if not diagnosed until later in life) and results in physical or mental disability, or is fatal (March of Dimes Foundation, 1998). ICD–9–CM and ICD–10–CA codes used to identify a congenital anomaly in this report can be found in the Appendix (Appendix Table 1.1).

Continuity of Care
The extent to which individuals see a given health care provider (versus one or more other providers) over a specified period of time. A provider may be defined either as an individual physician, a physician group practice, or a clinic. In this report, continuity of care was observed when at least half of the child's physician visits were to the same provider over the one–year period. Children with less than three physician visits during this time period were removed from the analysis.

Fiscal Year
For most Canadian government agencies and health care institutions, the fiscal year is defined as starting April 1 and ending the following year at March 31. For example, the 2004/05 fiscal year would be April 1, 2004 to March 31, 2005, inclusive.

Healthy Baby Program—see Manitoba Healthy Baby Program

Healthy Child Manitoba Office (HCMO)

The Government of Manitoba's long–term, cross–departmental prevention strategy for children and families. Led by the Healthy Child Committee of Cabinet, Healthy Child Manitoba bridges departments and governments and, together with the community, works to improve the well–being of Manitoba's children and youth. HCMO focuses on child–centred public policy through the integration of financial and community–based family supports. HCMO researches best practices and models and adapts these to Manitoba's unique situation. It works to strengthen provincial policies and programs for healthy child and adolescent development, from the prenatal period to adulthood. HCMO evaluates programs and services in an attempt to find the most effective ways to achieve positive outcomes for Manitoba children, families, and communities (Healthy Child Manitoba, 2010).

High Birth Weight

Any infant who weighs between 4,001 and 9,000 grams as recorded at birth.

Immunization

An intervention to initiate or increase resistance against infectious disease. The Public Health Agency of Canada recommends that each individual receives all vaccinations to complete the appropriate schedule for their current age. For this report we studied second–year immunizations, assessing whether children were up–to–date with their vaccinations against diphtheria, pertussis, tetanus, and polio; Haemophilus influenza type b (Hib); measles, mumps, and rubella; pneumococcal conjugate; and influenza by their second birthday.

Income Assistance

A provincial program of last resort for people who need help to meet basic personal and family needs. Wherever possible, the program is aimed at helping people find a job or get back to work. Eligibility for income assistance is determined by a test of need. The total financial resources of the household are compared to the total cost of basic necessities as defined in the Employment and Income Assistance Act and Regulation. Applicants must be in financial need for the monthly cost of: basic needs such as food, clothing, personal needs and household supplies; some medical costs; and housing (rent) and utilities; and some special costs for adults with disabilities. In this report, a mother is identified as having been on income assistance if she received at least one month of income assistance during her pregnancy.

Income Quintile

A method to measure the average (mean) household income of residents, ranking them from poorest to wealthiest, and then grouping them into 5 income quintiles (1 being poorest and 5 being wealthiest), each quintile containing approximately 20% of the population. The income quintile measure is derived from Statistics Canada Census data by aggregating household income to the dissemination area (as of 2001 Census data, dissemination area replaces enumeration area as a basic unit for dissemination) and then ranking neighbourhoods by income quintile. Income quintiles are available for both urban and rural populations. Income quintiles are often used as a proxy measure of socioeconomic status.

Injury Hospitalization

Hospitalizations lasting one day or longer that resulted from an injury as indicated by the presence of one of the ICD–9–CM E–Codes or ICD–10–CA V, W, X, Y–Codes listed on the hospital discharge abstract. Injury codes for newborn birth hospitalizations and brain deaths are excluded from analyses.

Large–for–Gestational Age

Infants that are at or above the 90th percentile in birth weight from an infant population of the same sex and gestational age.

Logistic Regression

The regression technique used when the outcome is a binary, or dichotomous, variable. Logistic regression models the probability of an event as a function of other factors.

Low Birth Weight Baby

Any infant who weighs between 500 and 2,499 grams as recorded at birth.

Manitoba Healthy Baby Program

A program run by the Province of Manitoba that offers financial help through prenatal benefits (monthly cheques) and offers social and educational support through programs in the community, throughout Manitoba.

Odds Ratio (OR)

The ratio of the odds of an event occurring in one group to the odds of it occurring in another group, or to a data–based estimate of that ratio. These groups might be men and women, an experimental group and a control group, or any other dichotomous classification.

Population Attributable Risk

Population Attributable Risk Percent (PAR %) is used to report:

The proportion of cases in the population that is attributable to the exposure.

The proportion of cases in the population that could be prevented if the risk factor was eliminated.

	Outcome (i.e., lung cancer)		
Exposed to Risk Factor (i.e., smoking)	Yes	No	
Yes	a	b	a+b
No	c	d	c+d
	a+c	b+d	a+b+c+d

PAR% = [(Px*(RR–1))/(1+(Px*(RR–1))]*100

Where RR = relative risk

= incidence of the exposed / incidence of the unexposed

= (a/a+b)/(c/c+d)

Px = population exposure

= (a+c)/(a+b+c+)

Population Health Research Data Repository

A comprehensive collection of administrative, registry, survey, and other databases primarily comprising residents of Manitoba. This repository is housed at the Manitoba Centre for Health Policy (MCHP). It was developed to describe and explain patterns of health care and profiles of health and illness, facilitating inter–sectoral research in areas such as health care, education, and social services. The administrative health database, for example, holds records for virtually all contacts with the provincial health care system, the Manitoba Health Services Insurance Plan (including physicians, hospitals, personal care homes, home care, and pharmaceutical prescriptions), of all registered individuals. MCHP acts as a steward of the information in the Repository for agencies such as Manitoba Health.

Postnatal Care

A series of regular contacts following childbirth between a health care provider and both mother and infant.

Prenatal Benefit Program

A program run by the Province of Manitoba Healthy Baby Program that offers income supplement for pregnant women who live in Manitoba and have a net family income of less than $32,000. Benefits start in the second trimester of pregnancy and end in the month the baby is due. A sliding scale, based on income, is used to calculate the monthly benefits. It ranges from $10.00 to $81.41 per month (Healthy Child Manitoba, 2010).

Prenatal Care

A series of regular contacts between a health care provider, typically a physician, and a pregnant woman, which take place at scheduled intervals between the confirmation of pregnancy and the initiation of labour. The primary function of this care is to monitor the progress of pregnancy, to identify complications, to provide information to the women on beneficial practices, and to co–ordinate the involvement of other providers in the mother's labour and the delivery of the newborn.

Preterm Birth

A live birth where the gestational age of the infant is less than 37 weeks.

Regional Health Authority

Regional governance structure set up by the province to be responsible for the delivery and administration of health services in specified areas. In Manitoba, as of July 1, 2002, there are 11 RHAs: Winnipeg, Brandon, South Eastman, Assiniboine, Central, Parkland, North Eastman, Interlake, Burntwood, NOR–MAN, and Churchill.

Revised–Graduated Prenatal Care Utilization Index (R–GINDEX)

A measure of the adequacy of prenatal care by a healthcare provider. Knowledge of three birth–related outcomes are required to calculate R–GINDEX: a) the gestational age of the infant (date of pregnancy and birth); b) the trimester during which prenatal care began; and c) the total number of prenatal visits during pregnancy.

In this report, there are six major categories of prenatal care:

1. Inadequate prenatal care utilization
2. Intermediate prenatal care utilization
3. Adequate prenatal care utilization
4. Intensive care
5. No care
6. Missing information on prenatal care

Sibling Spacing

Time elapsed (measured in days) between the birth of a child and the birth of his or her sibling from the mother's next pregnancy. For example, siblings may be born between nine months and several years apart from one another.

Size for Gestational Age

Size for gestational age is a measure of fetal growth. Small–for–gestational age is considered an indicator of fetal growth restriction and a marker for increased fetal and infant mortality and morbidity risk. Large–for–gestational age is considered an indicator of accelerated fetal growth and a marker for increased risk of birth complications and infant morbidity (Health Canada, 2000; Health Canada, 2003).

Small–for–Gestational Age

Infants that are at or below the 10th percentile in birth weight from an infant population of the same sex and gestational age.

Socioeconomic Factor Index (SEFI)

A factor score based on Census data that reflects non–medical social determinants of health and includes the following variables:

- average household income
- percent of single parent households
- unemployment rate
- high school education rate

SEFI is calculated at the geographic level of the dissemination area and is then assigned to residents based on their postal codes. SEFI scores less than zero indicate more favourable socioeconomic conditions, whereas scores greater than zero indicate less ideal socioeconomic conditions.

Socioeconomic Status (SES)

Characteristics of economic, social, and physical environments in which individuals live and work, as well as, their demographic and genetic characteristics.

Survival Analysis

Analysis of data that deals with time until the occurrence of any well–defined event (e.g., time until death). A hazard ratio is obtained in this analysis.

Teen (Mother) at First Birth

Any female that has given birth to her first child at age 19 or younger. Because the age at which a given female first gives birth can never change thereafter, these females are considered to be teens at first birth irrespective of their current age.

Teen Mother

Any female that gives birth at age 19 or younger.

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Appendix

Appendix Figure 1.1: Healthy Baby Prenatal Benefit Application Form

Healthy Baby Prenatal Benefit Application

Part 1 - Information About You

File number:_____ (for office use only)

1. Last name _____ First name _____ Other initials _____
   Last name at birth (if different from above) _____

2. Apt. # _____ Street number and name _____
   Box # _____ City/town _____ Postal Code _____

3. Home telephone number _____ Other number _____

4. What is your date of birth? (Month/Day/Year) _____

5. We require your Manitoba Health information to confirm that you live in Manitoba.
   Registration Number (6 digits) ___ ___ ___ ___ ___ ___
   PHIN (9 digits) ___ ___ ___ ___ ___ ___ ___ ___ ___

6. Are you now ❑ single ❑ separated/divorced ❑ married ❑ living with a partner
   partner/spouse last name _____ first name _____

7. Do you have a Social Insurance Number? ❑ Yes ❑ No
   If yes, please provide your number: ___ ___ ___ ___ ___ ___ ___ ___ ___

8. What is your baby's due date? (Month/Day/Year) _____
   NOTE: You need to attach an original signed note (not a photocopy) from your doctor (or other health care provider such as nursing station nurse, midwife, etc.) that confirms your pregnancy and due date.

9. Is this your first pregnancy? ❑ Yes ❑ No

Healthy Baby hopes to reach many women in Manitoba. The following information will help us better understand who receives the benefit and determine if we are meeting this goal.

10. Do you have a regular health care provider (doctor, midwife, public or community health nurse, etc.)? ❑ Yes ❑ No

11. Did you complete high school? ❑ Yes ❑ No
    a. If no, ❑ Less than Grade 9 ❑ Grade 9 to 11 ❑ Still in school
    b. Formal education after high school ❑ Yes ❑ No

Healthy Child Manitoba
Putting children and families first

Manitoba

For help filling out this form, call 1-888-848-0140.

12. Are you Aboriginal? ❑ Yes ❑ No (If no, continue to Question 13)

a. If Aboriginal, are you ❑ Metis ❑ Inuit ❑ Non-Status Indian ❑ Status Indian

Treaty status number (10 digits) ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

b. If you live in a First Nation community, Band Name _____

13. Are you a newcomer to Canada within the past twelve months? ❑ Yes ❑ No

If yes, date of arrival in Canada (Month/Day/Year) _____

A. CONSENT TO RELEASE PREGNANCY INFORMATION BY DOCTOR OR MEDICAL PRACTITIONER

All applicants must complete this consent to be eligible for the Manitoba Prenatal Benefit Program

I consent to my doctor or medical practitioner giving confirmation about my pregnancy status and my baby's due date to the Healthy Baby staff of Healthy Child Manitoba Office at their request at any time prior to my baby's due date.

I agree that this Consent to Release and the information in this box can be provided to my doctor or medical practitioner so that Healthy Child Manitoba Office can obtain the information it requires.

The Healthy Baby staff of Healthy Child Manitoba Office will use the information obtained from my doctor or medical practitioner solely to verify my continuing eligibility in the Manitoba Prenatal Benefit, and for the general administration and enforcement of the program. Any other use, or any disclosure, of this information by Healthy Child Manitoba Office must be authorized by me or authorized under The Personal Health Information Act of Manitoba.

Name of Applicant (please print) _____

Signature of Applicant _____ Date _____
Month/Day/Year

B. CONSENT TO RELEASE THE FOLLOWING INFORMATION

Signing this consent is your choice and will not affect eligibility for the Manitoba Prenatal Benefit.

I consent to have Healthy Child Manitoba Office connect me to health and family services in my area by giving the following information to one or both of the following

❑ Your local Healthy Baby Program Coordinator or Canada Prenatal Nutrition Program Coordinator (CPNP)

❑ Public/Community Health Provider

I would like to receive these services in English ❑ French ❑

I understand that the purpose of this (these) referral(s) is to support me during pregnancy and that I am not required to participate in any programs offered by these health and family resources.

Any other use or disclosure of this information by Healthy Child Manitoba Office must be authorized by me or authorized under *The Freedom of Information and Protection of Privacy Act or The Personal Health Information Act of Manitoba.*

Name of Applicant (please print) _____ Date of Birth _____
Month/Day/Year

Address _____ Phone Number _____

My baby's due date is _____
Month/Day/Year

Signature of Applicant _____ Date _____
Month/Day/Year

Part 2 - Income Information

Income information is required to assess your eligibility for benefits and if you are approved, how much your monthly benefit will be. **If you receive Income Assistance, please complete Section A. If not, please continue to Section B.**

A. CONSENT TO CONFIRM THAT YOU RECEIVE INCOME ASSISTANCE

The person who is applying for the prenatal benefit must be the person who signs this release, even if the income assistance is in the name of your spouse or parent.

I consent to Healthy Child Manitoba Office confirming that I receive income assistance with the provincial office or First Nation/Band from which I receive assistance. I agree that this consent and the information in this box can be provided to the provincial office or First Nation/Band, so that Healthy Child Manitoba Office can obtain the confirmation it requires. Healthy Child Manitoba Office will use this information to determine and verify my eligibility for the Manitoba prenatal benefit program, and for the general administration and enforcement of the program. Any other use or any disclosure of this information by Healthy Child Manitoba Office must be authorized by me or authorized under *The Freedom of Information and Protection of Privacy Act of Manitoba.*

Name of Applicant (please print your FULL NAME) _____

Who provides your assistance: ❑ Provincial Case number _____

❑ Government of Canada /First Nation – which Band _____

Date of birth _____
Month/Day/Year

Signature of Applicant _____ Date _____
Month/Day/Year

B. CONSENT TO RELEASE INCOME TAX INFORMATION

Complete this section **only if you have filed income tax**. **If you have not filed income tax, please call our office for further instructions.**

I, and my spouse or common-law partner (if any), consent to the Canada Revenue Agency (CRA) releasing to Healthy Child Manitoba Office information from my/our tax returns and other taxpayer information for the applicable base taxation year. The base taxation year is the tax year to be used to determine my eligibility for benefits under the Healthy Baby: Manitoba Prenatal Benefit program as set out in the Manitoba Prenatal Benefit Regulation under *The Social Services Administration Act of Manitoba*. This authorization is valid for either of the two taxation years preceding the year in which I have signed it.

I agree that this Consent to Release and the information in this box can be provided to the CRA, so that Healthy Baby can obtain the income information it requires. Healthy Child Manitoba Office will use the information obtained from the CRA to determine and verify my eligibility for benefits under the Manitoba Prenatal Benefit program, and for the general administration and enforcement of the program. Any other use, and any disclosure, of this information by Healthy Child Manitoba Office must be authorized by me or authorized under *The Freedom of Information and Protection of Privacy Act of Manitoba.*

Applicant

Date of birth _____ Social Insurance Number (9 digits) ___ ___ ___ ___ ___ ___ ___ ___ ___
Month/Day/Year

Print your FULL NAME (last, first, initial) _____

Your Signature _____ Date _____
Month/Day/Year

Spouse / partner

Date of birth _____ Social Insurance Number (9 digits) ___ ___ ___ ___ ___ ___ ___ ___ ___
Month/Day/Year

Print FULL NAME (last, first, initial) _____

Signature of Spouse / partner _____ Date _____
Month/Day/Year

Part 3 - Protection of your Personal Information

About my personal information, I understand that:

1. The personal information and personal health information on this application is collected by Healthy Child Manitoba Office under the authority of the *Manitoba Prenatal Benefit Regulation* made under *The Social Services Administration Act of Manitoba.*

2. Healthy Child Manitoba Office will use this information to determine and verify my application and my eligibility under the Manitoba Prenatal Benefit program; to calculate benefit levels; to prevent and detect fraud; and to administer the program. If the consent to release name and contact information has been signed by me, Healthy Child Manitoba Office will provide my contact information to either the Coordinator of a Healthy Baby Community Support Program or the Public/Community Health provider near my home, or both, according to my consent, so that I will be linked to health and family resources available in my community.

3. Healthy Child Manitoba Office will use this information for program planning, research and evaluation purposes to see how children and families in the Healthy Baby program are doing over time.

4. Healthy Child Manitoba Office may need to provide information about my application and about benefits paid to me under the Manitoba Prenatal Benefit program to Manitoba Family Services and Housing, Indian and Northern Affairs Canada, or with the relevant First Nation/Band, for the purposes of administering and enforcing the program.

5. My personal information and personal health information is protected by *The Freedom of Information and Protection of Privacy Act of Manitoba* and *The Personal Health Information Act of Manitoba*. Any use or any disclosure of this information, for purposes other than those outlined above, must be authorized by me or authorized under these acts. For questions about the collection of this information, please call the Manager of Healthy Baby in Winnipeg at 945-1301 or toll free at 1-888-848-0140.

Part 4 - Signatures and Declaration - IMPORTANT for a complete application

You (and your spouse or partner, if you have one) must sign this section in order to receive the Manitoba Prenatal Benefit.

Note: prenatal benefits will not be paid to a person who is in custody in a penitentiary, provincial correctional institution or youth custody facility. Does this statement apply to you? ❑ yes ❑ no

I, and my spouse or common-law partner, declare that the information on this form and the information given in support of my application for prenatal benefits is true, complete and correct.

- I understand that I am applying for a prenatal benefit, and that I am eligible only while I am pregnant. **If my pregnancy ends prematurely, I agree to call or write to Healthy Baby as soon as possible.**
- If I move, I will also call or write to tell Healthy Baby as soon as possible.
- I understand that the Government of Manitoba may recover from me the amount of any benefit which is paid as a result of a false statement or misrepresentation made by me or by my spouse or common-law partner.

Applicant's signature _____ Date _____
Month/Day/Year

Signature of spouse / partner _____ Date _____
Month/Day/Year

Mail your application in the envelope provided to:
Healthy Baby: Manitoba Prenatal Benefit
Healthy Child Manitoba
3rd floor - 332 Bannatyne Avenue
Winnipeg, MB R3A 0E2

revised October 2008

Appendix Figure 1.2: Healthy Baby Prenatal and Postnatal Surveys

53131

PR Prenatal

IDENTIFICATION NUMBER

Healthy Baby

We're Glad You Are Here!

Prenatal Participant Information Sheet

Please print numbers neatly within squares without touching the lines, and fill in circles completely, using INK.

First Name (Program Use Only)

Last Name (Program Use Only)

Address (Program Use Only)

Home Phone Number (Program Use Only)

Date Completed Day Month Year

Program Code

Postal Code

1. Manitoba Health PHIN (9 digit number):

2. When is your baby due?

Day Month Year

3. When were you born?

Day Month Year

4. Have you applied for, or, do you receive financial assistance through the Healthy Baby Prenatal Benefit Program?

O Yes O No

If No, do you know about the Prenatal Benefit Program?

O Yes O No

5. Did you graduate from high school(or equivalent such as GED)?

O Yes O No O Still in School

6. Are you: (Please fill-in all that apply)

O Single (never married) O Divorced

O In a relationship with a partner O Separated

O Married O Widowed

7. Who do you live with? (Please fill-in all that apply)

O Alone O Family (parents, siblings, grandparents, etc.)

O Children (dependents) O Friends

O Husband O Other (indicate): _____

O Partner

8. Do you receive income assistance?

O Yes O No O Unsure

9. Are you Aboriginal?

O Yes O No

If yes, are you:

O Treaty O Inuit

O Non-treaty O Metis

10. Have you lived in Canada for less than 10 years?

O Yes O No O Don't know

11. Do you have a regular health care provider?

O Yes O No O Don't know

12. Are you comfortable receiving services in English?

O Yes O No

If No, what is your language of preference?

THANK YOU AND ENJOY THE PROGRAM!

Confidential when complete.

Please fax teleform to 204.948.3768

Program Use Only: O D

Please note that you do not have to answer any of these questions in order to participate in our program. However, this information will help in program planning and evaluation. Information in "program use only" fields is not submitted to Healthy Child Manitoba and is collected at the discretion of each program.

42696

PO Postnatal

IDENTIFICATION NUMBER

Healthy Baby

We're Glad You Are Here!

Postnatal Participant Information Sheet

Please print numbers neatly within squares without touching the lines, and fill in circles completely, using INK

First Name (Program Use Only)

Last Name (Program Use Only)

Address (Program Use Only)

Home Phone Number (Program Use Only)

Date Completed ☐☐ ☐☐ ☐☐☐☐ (Day Month Year)

Program Code ☐☐☐☐

Postal Code ☐☐☐ ☐☐☐

Program Use Only: O

1. Manitoba PHIN (9 digit number)

MOM ☐☐☐☐☐☐☐☐☐

BABY ☐☐☐☐☐☐☐☐☐

2. When was your baby born?

☐☐ ☐☐ ☐☐☐☐ (Day Month Year)

3. How much did your baby weigh?

☐☐☐☐ grams OR ☐☐ pounds ☐☐ ounces

4. When were you born?

☐☐ ☐☐ ☐☐☐☐ (Day Month Year)

5. During your pregnancy, did you receive financial assistance through the Healthy Baby Prenatal Benefit Program?

O Yes O No

If No, did you know about the Prenatal Benefit Program?

O Yes O No

6. Did you graduate from high school (or equivalent such as GED)?

O Yes O No O Still in School

7. Are you: (Please fill-in all that apply)

O Single (never married)
O In a relationship with a partner
O Married
O Divorced
O Separated
O Widowed

8. Who do you live with? (Please fill-in all that apply)

O Alone
O Children (dependents)
O Husband
O Partner
O Family (parents, siblings, grandparents, etc.)
O Friends
O Other (indicate): _____

9. Do you receive income assistance?

O Yes O No O Unsure

10. Are you Aboriginal?

O Yes O No

If yes, are you:

O Treaty
O Non-treaty
O Inuit
O Metis

11. Have you lived in Canada for less than 10 years?

O Yes O No O Don't know

12. Do you have a regular health care provider?

O Yes O No O Don't know

13. Are you comfortable receiving services in English?

O Yes O No

If No, what is your language of preference?

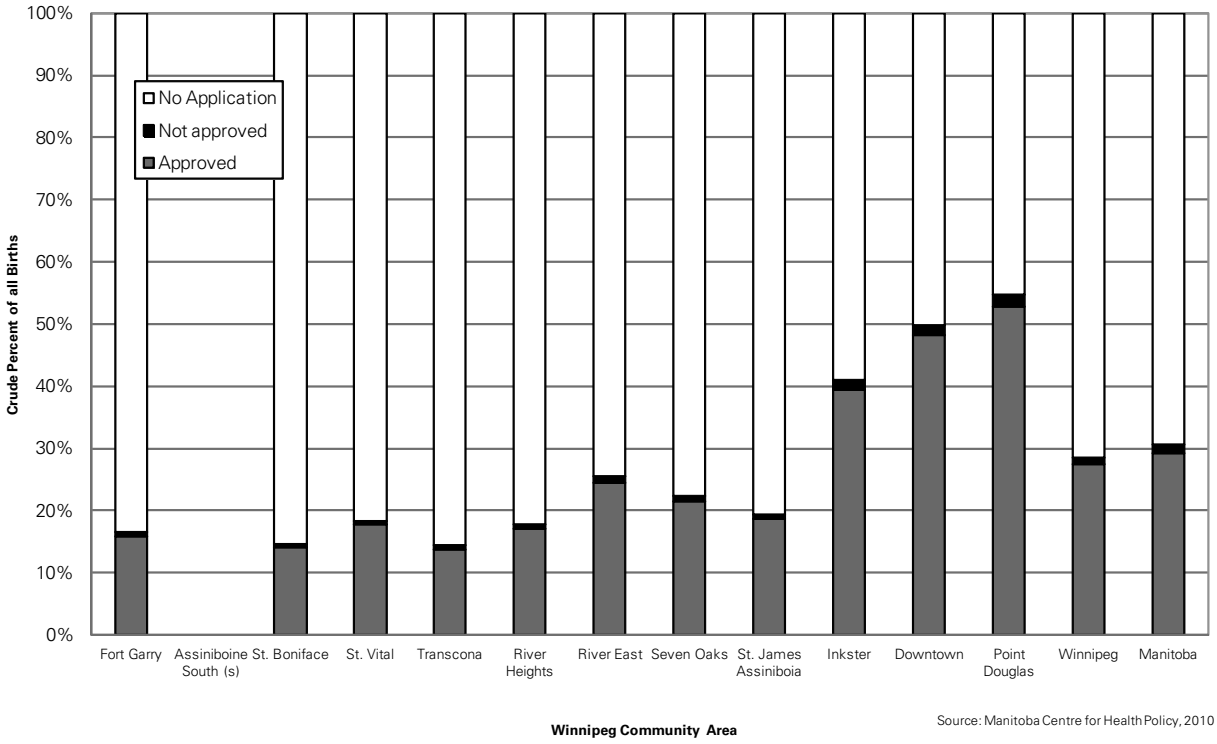
_____

THANK YOU AND ENJOY THE PROGRAM!

Confidential when complete.
Please fax Teleform to 204.948.3768

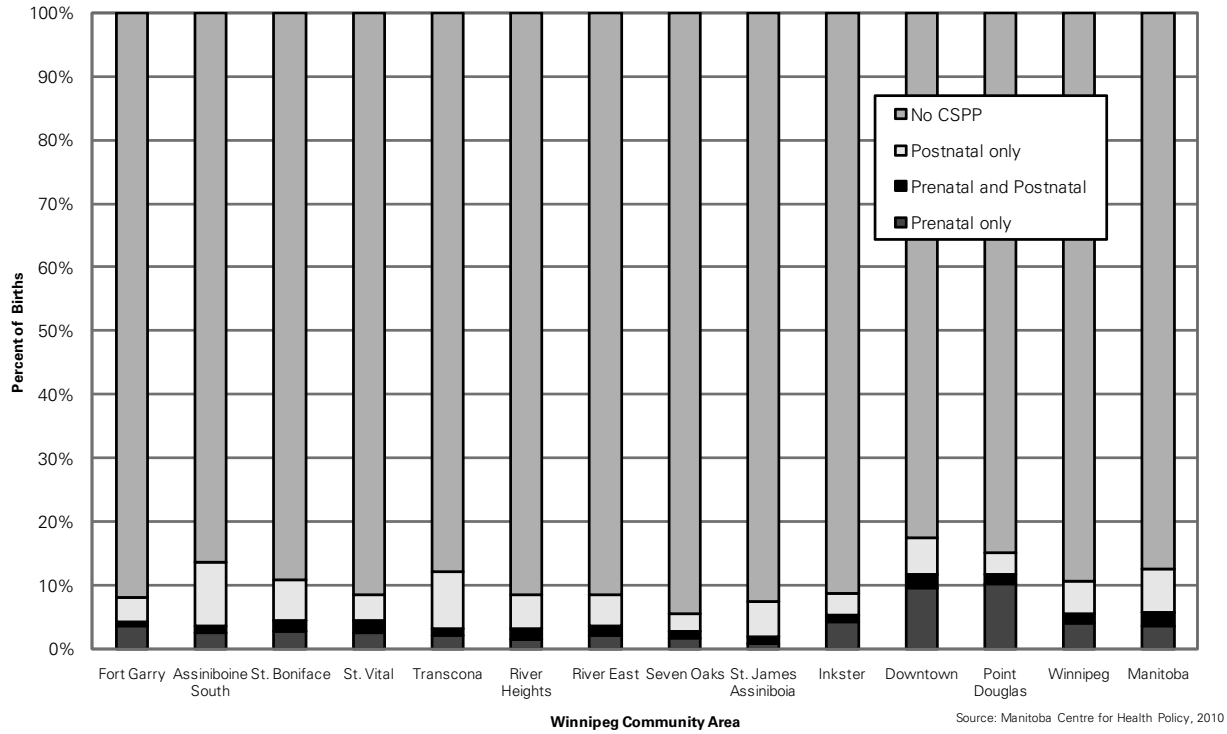
Please note that you do not have to answer any of these questions in order to participate in our program. However, this information will help in program planning and evaluation. Information in "program use only" fields is not submitted to Healthy Child Manitoba and is collected at the discretion of each program.

Appendix Figure 1.3a: Percent of Births by Healthy Baby Prenatal Benefit Application Type by Winnipeg Community Area, 2004/05 - 2007/08



Source: Manitoba Centre for Health Policy, 2010

Appendix Figure 1.3b: Percent of Births by Community Support Program Participation by Winnipeg Community Area, 2004/05 - 2007/08



Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.0: Factors Associated with Receipt of Prenatal Benefit and Participation in Community Support Programs, all Women Giving Birth in Study Period, Population 1 and Population 2

Variable	All Women Giving Birth in Study Period		Population 1		Population 2	
	HBPB OR (95% CI)	CSP OR (95% CI)	HBPB OR (95% CI)	CSP OR (95% CI)	HBPB OR (95% CI)	CSP OR (95% CI)
Mother's Age (<20 vs 20+)	**1.40 (1.26,1.55)**	**1.18 (1.06,1.32)**	**0.52 (0.39,0.69)**	**1.15 (1.01,1.32)**	**0.73 (0.62,0.87)**	0.96 (0.81,1.14)
Parity (0 vs 3+ children)	**0.59 (0.54,0.64)**	**2.04 (1.84,2.26)**	**0.35 (0.24,0.52)**	**1.46 (1.27,1.68)**	0.97 (0.81,1.17)	**1.44 (1.21,1.72)**
Parity (1 vs 3+ children)	**0.52 (0.47,0.57)**	**1.14 (1.02,1.27)**	**0.43 (0.29,0.63)**	0.97 (0.84,1.12)	0.87 (0.74,1.02)	0.90 (0.77,1.06)
Parity (2 vs 3+ children)	**0.67 (0.61,0.74)**	0.97 (0.86,1.09)	**0.47 (0.31,0.71)**	0.88 (0.75,1.03)	0.9 (0.76,1.06)	**0.79 (0.66,0.94)**
Prenatal Care (Adequate vs Inadequate)	1.04 (0.98,1.10)	**1.18 (1.11,1.26)**	1.25 (1.00,1.57)	**1.26 (1.14,1.39)**	**1.68 (1.43,1.96)**	**1.27 (1.11,1.46)**
Region (North vs Wpg/Brandon)	**0.53 (0.47,0.61)**	**0.85 (0.73,0.998)**	**0.49 (0.32,0.74)**	**0.67 (0.53,0.84)**	**0.37 (0.31,0.45)**	**0.77 (0.61.0.98)**
Region (South/Mid vs Wpg/Brandon)	**1.15 (1.08,1.22)**	**2.16 (2.03,2.29)**	0.86 (0.70,1.07)	1.1 (0.99,1.22)	**0.73 (0.63,0.86)**	**1.29 (1.11,1.51)**
SES (SEFI - higher=lower SES)	**1.53 (1.48,1.58)**	**1.24 (1.20,1.29)**	0.98 (0.87,1.10)	**1.11 (1.06,1.17)**	**1.11 (1.05,1.18)**	**1.15 (1.08,1.22)**
Income Assistance during pregnancy	**3.16 (2.93,3.41)**	**2.29 (2.09,2.51)**	**2.12 (1.60,2.82)**	**1.82 (1.63,2.02)**	n/a	n/a
Marital status (married vs not)	**0.12 (0.11,0.13)**	**1.09 (1.00,1.19)**	**0.23 (0.18,0.30)**	1.00 (0.90,1.11)	**0.23 (0.21,0.27)**	**1.27 (1.10,1.47)**
High School Completion	1.02 (0.96,1.09)	**1.81 (1.68,1.95)**	1.24 (1.00,1.54)	**1.21 (1.09,1.33)**	**1.48 (1.27,1.66)**	1.11 (0.98,1.27)
Maternal Depression	**1.14** (1.04,1.25)	**1.49 (1.38,1.62)**	1.07 (0.77,1.47)	**1.47 (1.31,1.65)**	**1.19 (1.02,1.40)**	**1.39 (1.21,1.60)**
Healthy Baby Prenatal Benefit	n/a	**2.10 (1.95,2.26)**	n/a	1.08 (0.84,1.40)	n/a	**2.56 (2.19,3.00)**
Community Support Program	**4.72 (4.12,5.41)**	n/a	1.47 (0.97,2.21)	n/a	**3.42 (2.71,4.32)**	n/a

Bolded values indicate statistical significance at p<0.05

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.1: Congenital Anomalies Entered in Analyses

Codes for Down Syndrome

ICD9-CM	label	ICD10-CA	label
7580	7580 DOWN''S SYNDROME	Q900	Q90.0 : Trisomy 21, meiotic nondisjunction
7580	7580 DOWN''S SYNDROME	Q901	Q90.1 : Trisomy 21, mosaicism (mitotic nondisjunction)
7580	7580 DOWN''S SYNDROME	Q902	Q90.2 : Trisomy 21, translocation
7580	7580 DOWN''S SYNDROME	Q909	Q90.9 : Downs syndrome, unspecified

Codes for Neural Tube Defects

ICD9-CM	label	ICD10-CA	label
7400	7400 ANENCEPHALUS	Q000	Q00.0 : Anencephaly
7401	7401 CRANIORACHISCHISIS	Q001	Q00.1 : Craniorachischisis
7402	7402 INIENCEPHALY	Q002	Q00.2 : Iniencephaly
7420	7420 ENCEPHALOCELE	Q010	Q01.0 : Frontal encephalocele
7420	7420 ENCEPHALOCELE	Q011	Q01.1 : Nasofrontal encephalocele
7420	7420 ENCEPHALOCELE	Q012	Q01.2 : Occipital encephalocele
7420	7420 ENCEPHALOCELE	Q018	Q01.8 : Encephalocele of other sites
7420	7420 ENCEPHALOCELE	Q019	Q01.9 : Encephalocele, unspecified
74101	7410 SPINA BIFIDA W HYDROCEPHALUS	Q050	Q05.0 : Cervical spina bifida with hydrocephalus
74102	7410 SPINA BIFIDA W HYDROCEPHALUS	Q051	Q05.1 : Thoracic spina bifida with hydrocephalus
74103	7410 SPINA BIFIDA W HYDROCEPHALUS	Q052	Q05.2 : Lumbar spina bifida with hydrocephalus
74100	7410 SPINA BIFIDA W HYDROCEPHALUS	Q053	Q05.3 : Sacral spina bifida with hydrocephalus
74100	7410 SPINA BIFIDA W HYDROCEPHALUS	Q054	Q05.4 : Unspecified spina bifida with hydrocephalus
74191	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q055	Q05.5 : Cervical spina bifida without hydrocephalus
74192	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q056	Q05.6 : Thoracic spina bifida without hydrocephalus
74193	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q057	Q05.7 : Lumbar spina bifida without hydrocephalus
74190	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q058	Q05.8 : Sacral spina bifida without hydrocephalus
74190	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q059	Q05.9 : Spina bifida, unspecified
74100	7410 SPINA BIFIDA W HYDROCEPHALUS	Q070	Q07.0 : Arnold-Chiari syndrome

Codes for Anencephaly and Similar Anomalies

ICD9-CM	label	ICD10-CA	label
7400	7400 ANENCEPHALUS	Q000	Q00.0 : Anencephaly
7401	7401 CRANIORACHISCHISIS	Q001	Q00.1 : Craniorachischisis
7402	7402 INIENCEPHALY	Q002	Q00.2 : Iniencephaly

Codes for Spina Bifida

ICD9-CM	label	ICD10-CA	label
74101	7410 SPINA BIFIDA W HYDROCEPHALUS	Q050	Q05.0 : Cervical spina bifida with hydrocephalus
74102	7410 SPINA BIFIDA W HYDROCEPHALUS	Q051	Q05.1 : Thoracic spina bifida with hydrocephalus
74103	7410 SPINA BIFIDA W HYDROCEPHALUS	Q052	Q05.2 : Lumbar spina bifida with hydrocephalus
74100	7410 SPINA BIFIDA W HYDROCEPHALUS	Q053	Q05.3 : Sacral spina bifida with hydrocephalus
74100	7410 SPINA BIFIDA W HYDROCEPHALUS	Q054	Q05.4 : Unspecified spina bifida with hydrocephalus
74191	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q055	Q05.5 : Cervical spina bifida without hydrocephalus
74192	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q056	Q05.6 : Thoracic spina bifida without hydrocephalus
74193	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q057	Q05.7 : Lumbar spina bifida without hydrocephalus
74190	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q058	Q05.8 : Sacral spina bifida without hydrocephalus
74190	7419 SPINA BIFIDA W/O HYDROCEPHALUS	Q059	Q05.9 : Spina bifida, unspecified
74100	7410 SPINA BIFIDA W HYDROCEPHALUS	Q070	Q07.0 : Arnold-Chiari syndrome

Codes for Congenital Heart Defects

ICD9-CM	label	ICD10-CA	label
7450	7450 COMMON TRUNCUS	Q200	Q20.0 : Common arterial trunk
74511	7451 TRANSPOSITION OF GREAT VESSELS	Q201	Q20.1 : Double outlet right ventricle
74519	7451 TRANSPOSITION OF GREAT VESSELS	Q202	Q20.2 : Double outlet left ventricle
74511	7451 TRANSPOSITION OF GREAT VESSELS	Q2030	Q20.30 : Dextratransposition of aorta
74510	7451 TRANSPOSITION OF GREAT VESSELS	Q2031	Q20.31 : Complete transposition of great vessels
74512	7451 TRANSPOSITION OF GREAT VESSELS	Q2032	Q20.32 : Congenitally corrected transposition of great vessels
74519	7451 TRANSPOSITION OF GREAT VESSELS	Q2038	Q20.38 : Other transposition of great vessels NEC
7453	7453 COMMON VENTRICLE	Q204	Q20.4 : Double inlet ventricle
74512	7451 TRANSPOSITION OF GREAT VESSELS	Q2050	Q20.50 : Discordant atrioventricular connection with corrected transposition
74519	7451 TRANSPOSITION OF GREAT VESSELS	Q2058	Q20.58 : Discordant atrioventricular connection NEC
74689	7468 OTH SPEC ANOMALIES OF HEART	Q208	Q20.8 : Other congenital malformations of cardiac chambers and connections
74689	7468 OTH SPEC ANOMALIES OF HEART	Q209	Q20.9 : Congenital malformation of cardiac chambers and connections, unspecified
7454	7454 VENTRICULAR SEPTAL DEFECT	Q210	Q21.0 : Ventricular septal defect
7455	7455 OSTIUM SECUND TYP ATRIL SEP DEFECT	Q211	Q21.1 : Atrial septal defect
74569	7456 ENDOCARDIAL CUSHION DEFECTS	Q212	Q21.2 : Atrioventricular septal defect
7452	7452 TETRALOGY OF FALLOT	Q213	Q21.3 : Tetralogy of Fallot
7450	7450 COMMON TRUNCUS	Q214	Q21.4 : Aortopulmonary septal defect
7459	7459 UNSPEC DEFECT OF SEPTAL CLOSURE	Q219	Q21.9 : Congenital malformation of cardiac septum, unspecified
74601	7460 ANOMALIES OF PULMONARY VALVE	Q220	Q22.0 : Pulmonary valve atresia
74602	7460 ANOMALIES OF PULMONARY VALVE	Q221	Q22.1 : Congenital pulmonary valve stenosis
74609	7460 ANOMALIES OF PULMONARY VALVE	Q222	Q22.2 : Congenital pulmonary valve insufficiency
74609	7460 ANOMALIES OF PULMONARY VALVE	Q223	Q22.3 : Other congenital malformations of pulmonary valve
7461	7461 TRICUSPD ATRESIA,STENOSIS-CONGENIT	Q224	Q22.4 : Congenital tricuspid atresia
7462	7462 EBSTEIN''S ANOMALY	Q225	Q22.5 : Ebsteins anomaly

74689	7468 OTH SPEC ANOMALIES OF HEART	Q228	Q22.8 : Other congenital malformations of tricuspid valve
7469	7469 UNSPECIFIED ANOMALY OF HEART	Q229	Q22.9 : Congenital malformation of tricuspid valve, unspecified
7463	7463 CONGENITAL STENOSIS AORTIC VALVE	Q230	Q23.0 : Congenital stenosis of aortic valve
7464	7464 CONGENITAL INSUFFIC AORTIC VALVE	Q231	Q23.1 : Congenital insufficiency of aortic valve
7465	7465 CONGENITAL MITRAL STENOSIS	Q232	Q23.2 : Congenital mitral stenosis
7466	7466 CONGENITAL MITRAL INSUFFICIENCY	Q233	Q23.3 : Congenital mitral insufficiency
7467	7467 HYPOPLASTIC LEFT HEART SYNDROME	Q234	Q23.4 : Hypoplastic left heart syndrome
74689	7468 OTH SPEC ANOMALIES OF HEART	Q238	Q23.8 : Other congenital malformations of aortic and mitral valves
7469	7469 UNSPECIFIED ANOMALY OF HEART	Q239	Q23.9 : Congenital malformation of aortic and mitral valves, unspecified
74687	7468 OTH SPEC ANOMALIES OF HEART	Q240	Q24.0 : Dextrocardia
74687	7468 OTH SPEC ANOMALIES OF HEART	Q241	Q24.1 : Laevocardia
74682	7468 OTH SPEC ANOMALIES OF HEART	Q242	Q24.2 : Cor triatriatum
74683	7468 OTH SPEC ANOMALIES OF HEART	Q243	Q24.3 : Pulmonary infundibular stenosis
74681	7468 OTH SPEC ANOMALIES OF HEART	Q244	Q24.4 : Congenital subaortic stenosis
74685	7468 OTH SPEC ANOMALIES OF HEART	Q245	Q24.5 : Malformation of coronary vessels
74686	7468 OTH SPEC ANOMALIES OF HEART	Q246	Q24.6 : Congenital heart block
74689	7468 OTH SPEC ANOMALIES OF HEART	Q248	Q24.8 : Other specified congenital malformations of heart
7469	7469 UNSPECIFIED ANOMALY OF HEART	Q249	Q24.9 : Congenital malformation of heart, unspecified
7473	7473 ANOMALIES OF PULMONARY ARTERY	Q255	Q25.5 : Atresia of pulmonary artery
7457	745.7 Cor biloculare		

Codes for Hypoplastic Left Heart Syndrome

ICD9-CM	label	ICD10-CA	label
7467	7467 HYPOPLASTIC LEFT HEART SYNDROME	Q234 order=6	Q23.4 : Hypoplastic left heart syndrome

Codes for Cleft Palate or Cleft lip With or Without Cleft Palate

ICD9	ICD9_label	ICD10	ICD10_label
74900	7490 CLEFT PALATE	Q351	Q35.1 : Cleft hard palate
74900	7490 CLEFT PALATE	Q353	Q35.3 : Cleft soft palate
74900	7490 CLEFT PALATE	Q355	Q35.5 : Cleft hard palate with cleft soft palate
74902	7490 CLEFT PALATE	Q357	Q35.7 : Cleft uvula
74900	7490 CLEFT PALATE	Q359	Q35.9 : Cleft palate, unspecified
74910	7491 CLEFT LIP	Q36	Q36 : Cleft lip
74900	7490 CLEFT PALATE	Q37	Q37 : Cleft palate with cleft lip

Codes for Limb Reductions

ICD9-CM	label	ICD10-CA	label
75521	7552 REDUCTION DEFORMITIES OF UPR LIMB	Q710	Q71.0 : Congenital complete absence of upper limb(s)
75521	7552 REDUCTION DEFORMITIES OF UPR LIMB	Q711	Q71.1 : Congenital absence of upper arm and forearm with hand present

75521	7552	REDUCTION DEFORMITIES OF UPR LIMB	Q712	Q71.2 : Congenital absence of both forearm and hand
75521	7552	REDUCTION DEFORMITIES OF UPR LIMB	Q713	Q71.3 : Congenital absence of hand and finger(s)
75526	7552	REDUCTION DEFORMITIES OF UPR LIMB	Q714	Q71.4 : Longitudinal reduction defect of radius
75527	7552	REDUCTION DEFORMITIES OF UPR LIMB	Q715	Q71.5 : Longitudinal reduction defect of ulna
75520	7552	REDUCTION DEFORMITIES OF UPR LIMB	Q718	Q71.8 : Other reduction defects of upper limb(s)
75520	7552	REDUCTION DEFORMITIES OF UPR LIMB	Q719	Q71.9 : Reduction defect of upper limb, unspecified
75531	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q720	Q72.0 : Congenital complete absence of lower limb(s)
75531	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q721	Q72.1 : Congenital absence of thigh and lower leg with foot present
75531	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q722	Q72.2 : Congenital absence of both lower leg and foot
75531	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q723	Q72.3 : Congenital absence of foot and toe(s)
75534	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q724	Q72.4 : Longitudinal reduction defect of femur
75536	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q725	Q72.5 : Longitudinal reduction defect of tibia
75537	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q726	Q72.6 : Longitudinal reduction defect of fibula
75530	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q727	Q72.7 : Split foot
75530	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q728	Q72.8 : Other reduction defects of lower limb(s)
75530	7553	REDUCTION DEFORMITIES OF LWR LIMB	Q729	Q72.9 : Reduction defect of lower limb, unspecified
7554	7554	REDUCTION DEFORMITIES, UNSPC LIMB	Q730	Q73.0 : Congenital absence of unspecified limb(s)
7554	7554	REDUCTION DEFORMITIES, UNSPC LIMB	Q731	Q73.1 : Phocomelia, unspecified limb(s)
7554	7554	REDUCTION DEFORMITIES, UNSPC LIMB	Q738	Q73.8 : Other reduction defects of unspecified limb(s)

Codes for Hydrocephalus

ICD9-CM	label	ICD10-CA	label
7423	7423 CONGENITAL HYDROCEPHALUS	Q030	Q03.0 : Malformations of aqueduct of Sylvius
7423	7423 CONGENITAL HYDROCEPHALUS	Q031	Q03.1 : Atresia of foramina of Magendie and Luschka
7423	7423 CONGENITAL HYDROCEPHALUS	Q038	Q03.8 : Other congenital hydrocephalus
7423	7423 CONGENITAL HYDROCEPHALUS	Q039	Q03.9 : Congenital hydrocephalus, unspecified

Codes for Oesophageal Atresia/Stenoisis

ICD9-CM	label	ICD10-CA	label
7503	7503 TRACHEOESOPHAGEAL FIST,ATRES,STENC	Q390	Q39.0 : Atresia of oesophagus without fistula
7503	7503 TRACHEOESOPHAGEAL FIST,ATRES,STENC	Q391	Q39.1 : Atresia of oesophagus with tracheo-oesophageal fistula
7503	7503 TRACHEOESOPHAGEAL FIST,ATRES,STENC	Q392	Q39.2 : Congenital tracheo-oesophageal fistula without atresia
7503	7503 TRACHEOESOPHAGEAL FIST,ATRES,STENC	Q393	Q39.3 : Congenital stenosis and stricture of oesophagus
7503	7503 TRACHEOESOPHAGEAL FIST,ATRES,STENC	Q394	Q39.4 : Oesophageal web

Codes for Anorectal and Large Intestine Atresia/Stenoisis

ICD9-CM	label	ICD10-CA	label
7512	7512 ATRES,STEN LRG INTEST,RECTM,ANAL C	Q420	Q42.0 : Congenital absence, atresia and stenosis of rectum with fistula
7512	7512 ATRES,STEN LRG INTEST,RECTM,ANAL C	Q421	Q42.1 : Congenital absence, atresia and stenosis of rectum without fistula
7512	7512 ATRES,STEN LRG INTEST,RECTM,ANAL C	Q422	Q42.2 : Congenital absence, atresia and stenosis of anus with fistula
7512	7512 ATRES,STEN LRG INTEST,RECTM,ANAL C	Q428	Q42.8 : Congenital absence, atresia and stenosis of other parts of large intestine
7512	7512 ATRES,STEN LRG INTEST,RECTM,ANAL C	Q429	Q42.9 : Congenital absence, atresia and stenosis of large intestine, part unspecified

Codes for Hypospadias and Epispadia

ICD9-CM	label	ICD10-CA	label
75261	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q540	Q54.0 : Hypospadias, balanic
75261	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q541	Q54.1 : Hypospadias, penile
75261	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q542	Q54.2 : Hypospadias, penoscrotal
75261	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q543	Q54.3 : Hypospadias, perineal
75263	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q544	Q54.4 : Congenital chordee
75261	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q548	Q54.8 : Other hypospadias
75261	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q549	Q54.9 : Hypospadias, unspecified
75269	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q5560	Q55.60 : Hypoplasia of penis
75269	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q5568	Q55.68 : Other congenital malformations of penis
75262	752.6 *HYPOSPADIAS & EPISPADIAS & OTH PEN ANOM	Q640	Q64.0 : Epispadias

Codes for Gastroschisis

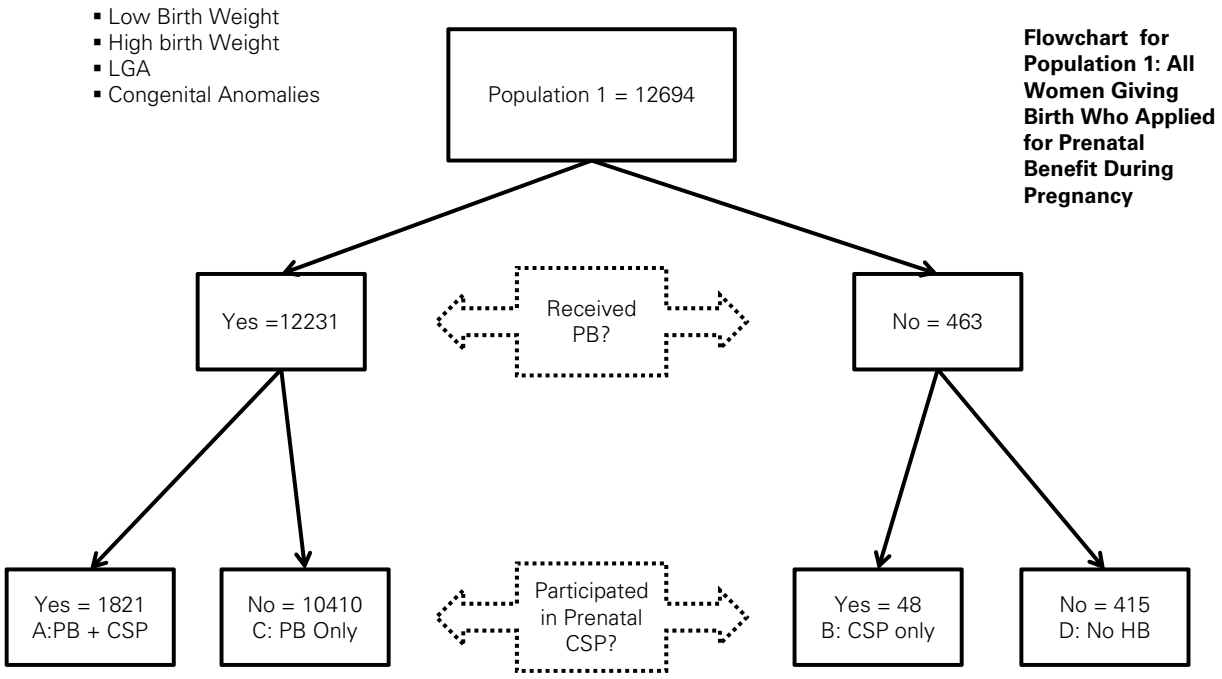
ICD9-CM	label	ICD10-CA	label
75679	7567 ANOMALIES OF ABDOMINAL WALL	Q792	Q79.2 : Exomphalos
75679	7567 ANOMALIES OF ABDOMINAL WALL	Q793	Q79.3 : Gastroschisis
75679	7567 ANOMALIES OF ABDOMINAL WALL	Q795	Q79.5 : Other congenital malformations of abdominal wall

Codes for Renal Agenesis/Hypoplasia

ICD9-CM	label	ICD10-CA	label
7530	7530 RENAL AGENESIS AND DYSGENESIS	Q600	Q60.0 : Renal agenesis, unilateral
7530	7530 RENAL AGENESIS AND DYSGENESIS	Q601	Q60.1 : Renal agenesis, bilateral
7530	7530 RENAL AGENESIS AND DYSGENESIS	Q602	Q60.2 : Renal agenesis, unspecified
7530	7530 RENAL AGENESIS AND DYSGENESIS	Q603	Q60.3 : Renal hypoplasia, unilateral
7530	7530 RENAL AGENESIS AND DYSGENESIS	Q604	Q60.4 : Renal hypoplasia, bilateral
7530	7530 RENAL AGENESIS AND DYSGENESIS	Q605	Q60.5 : Renal hypoplasia, unspecified
7530	7530 RENAL AGENESIS AND DYSGENESIS	Q606	Q60.6 : Potters syndrome

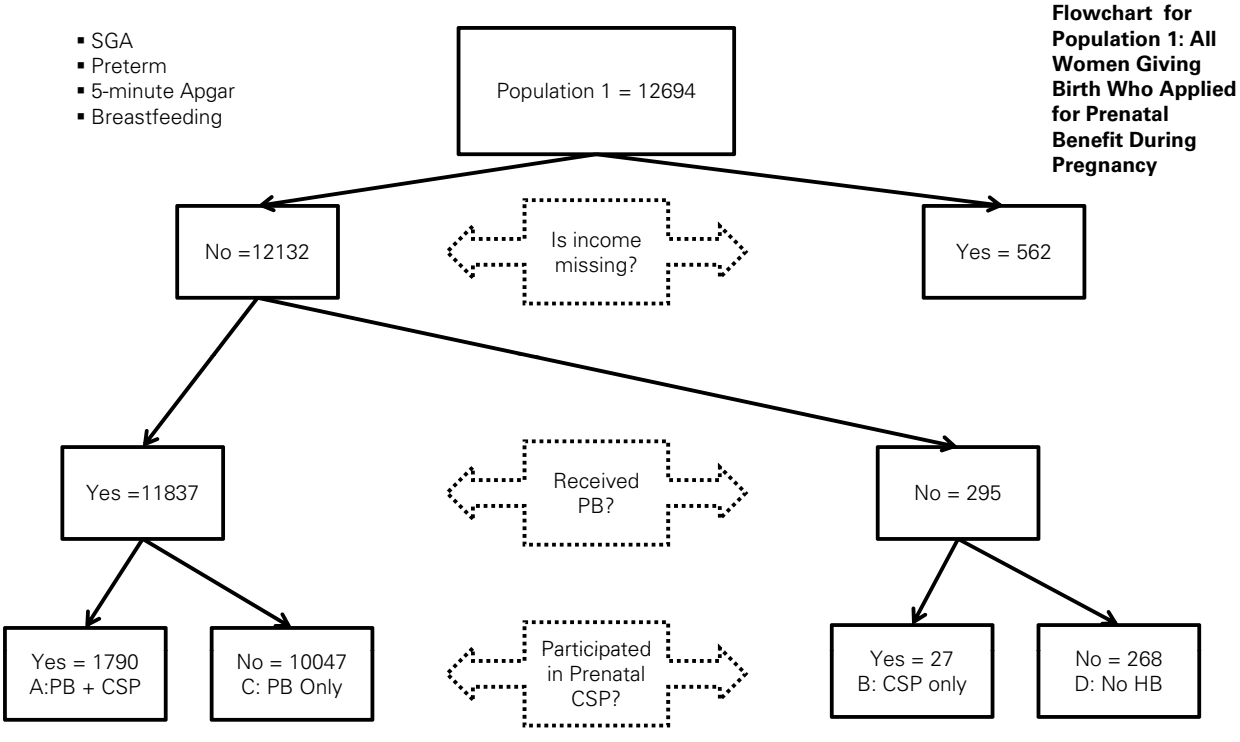
Source: Manitoba Centre for Health Policy, 2010

Appendix Figure 1.4: Prenatal and Birth Outcomes Population 1



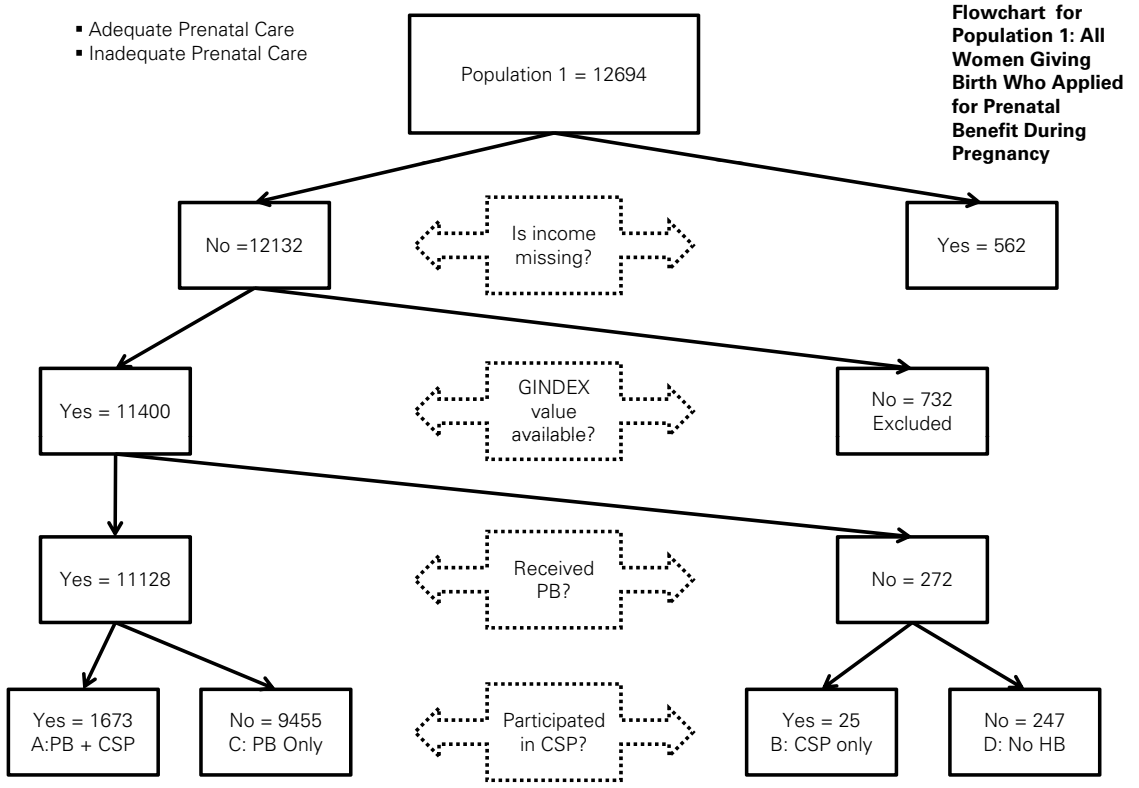
Source: Manitoba Centre for Health Policy, 2010

Appendix Figure 1.5: Prenatal and Birth Outcomes Population 1



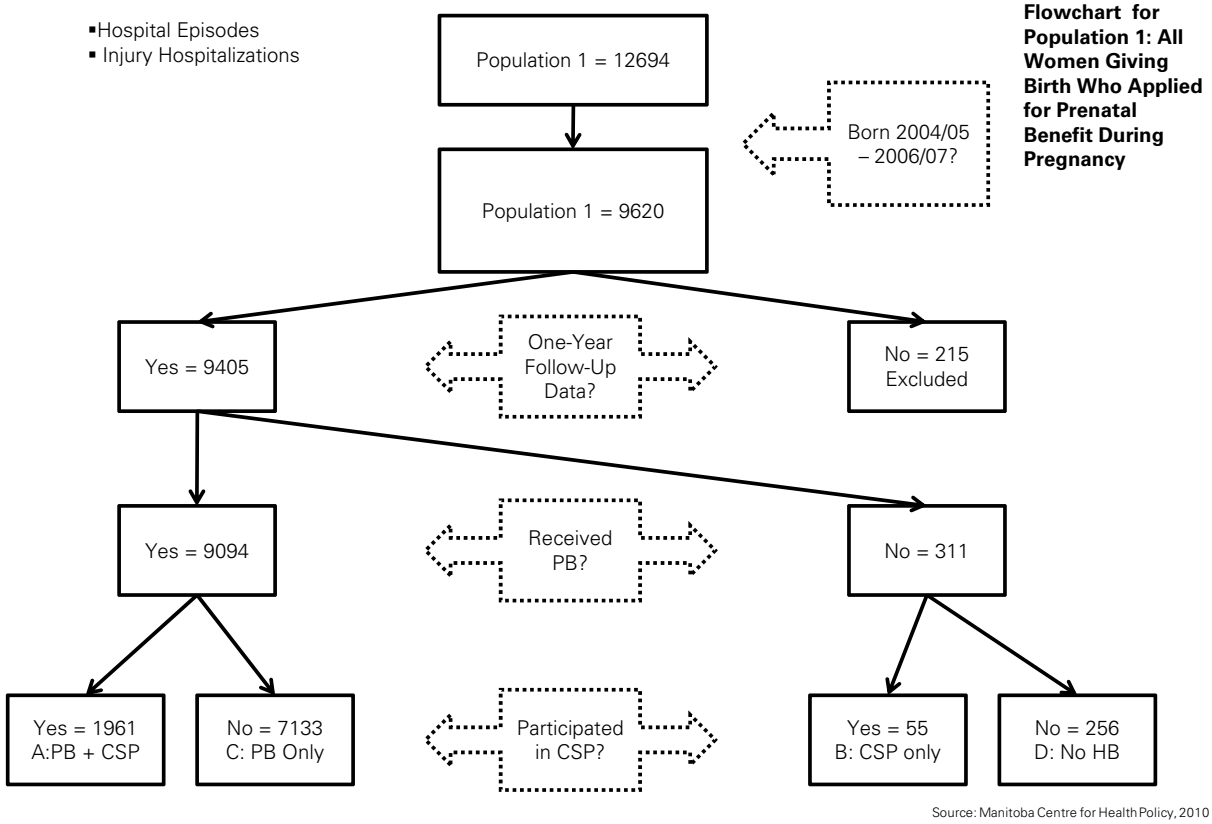
Source: Manitoba Centre for Health Policy, 2010

Appendix Figure 1.6: Prenatal and Birth Outcomes Population 1



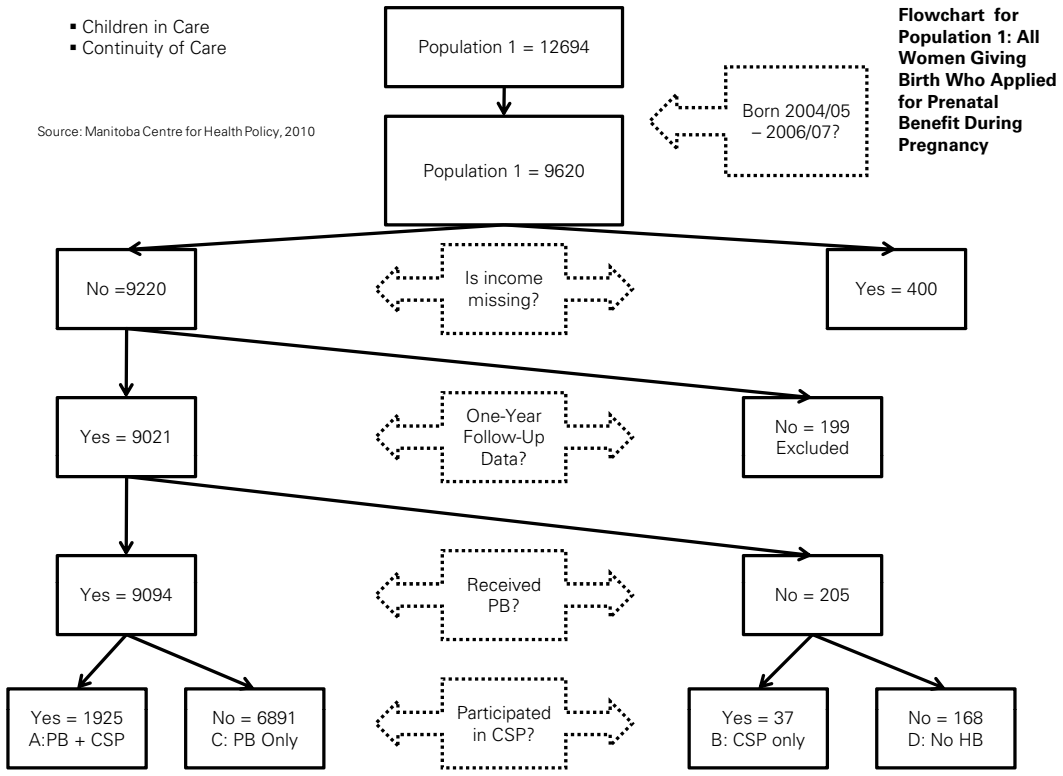
Source: Manitoba Centre for Health Policy, 2010

Appendix Figure 1.7: First Year Outcomes Population 1

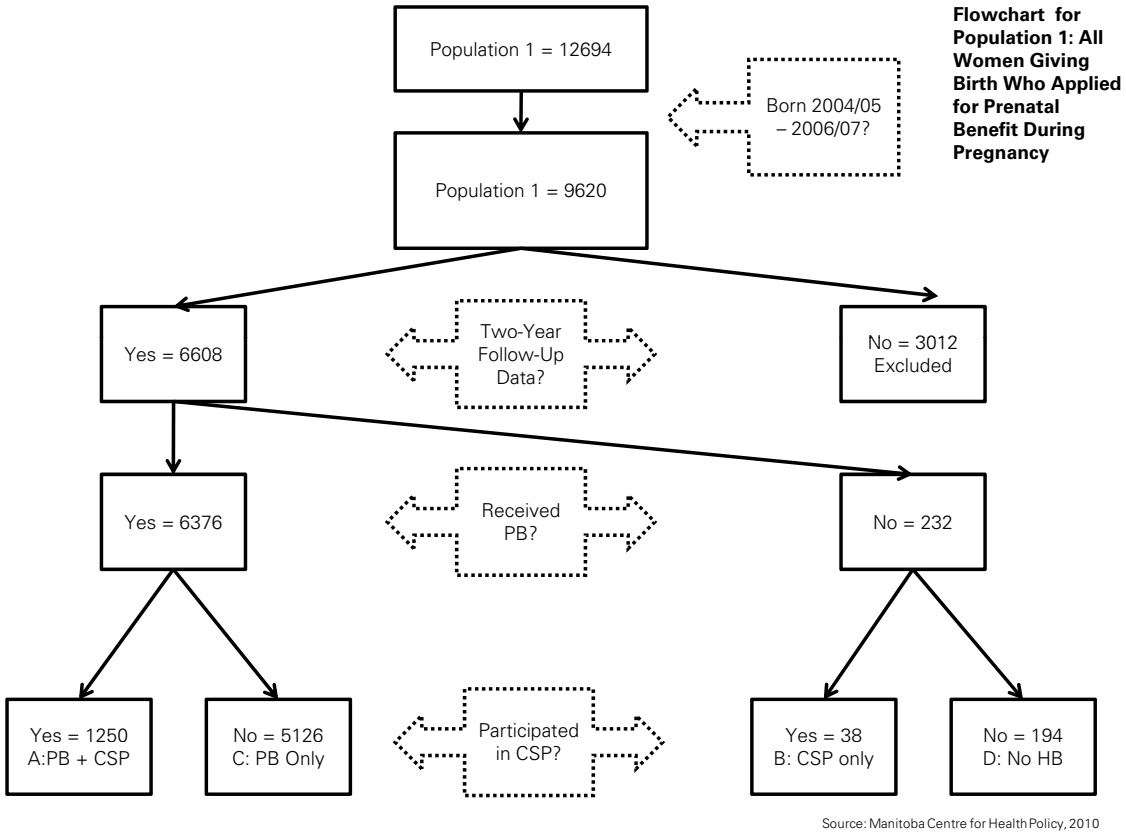


Source: Manitoba Centre for Health Policy, 2010

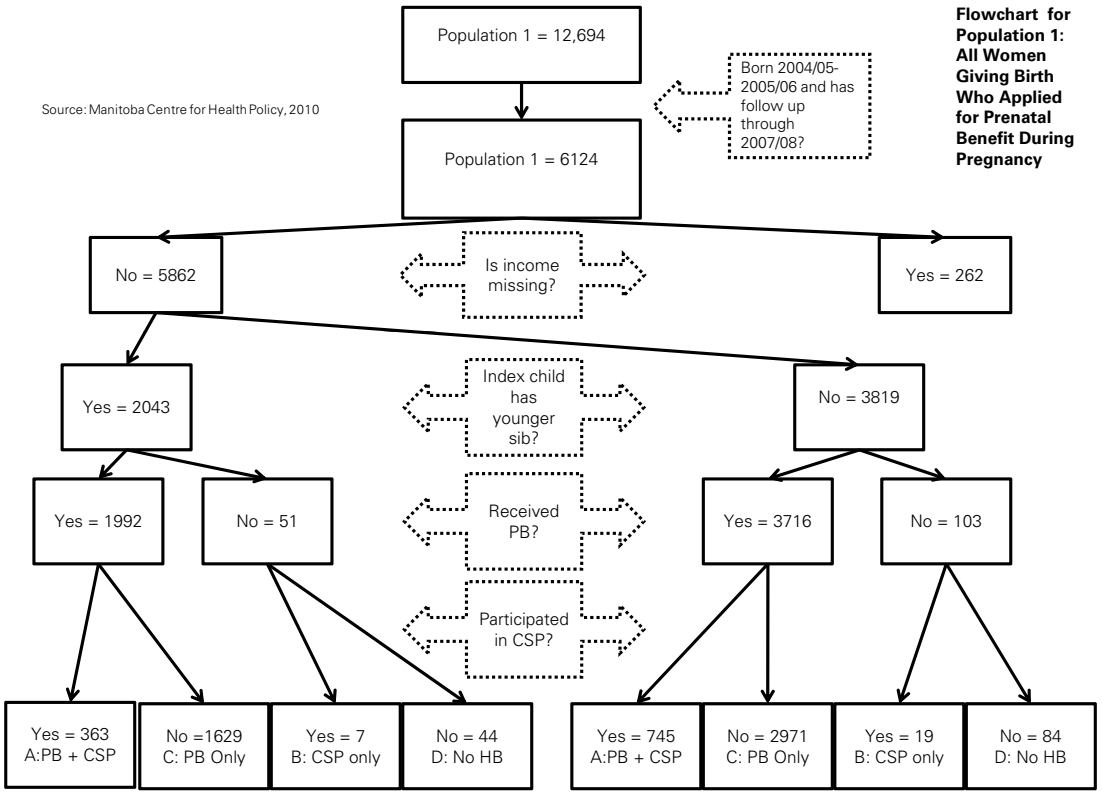
Appendix Figure 1.8: First Year Outcomes Population 1



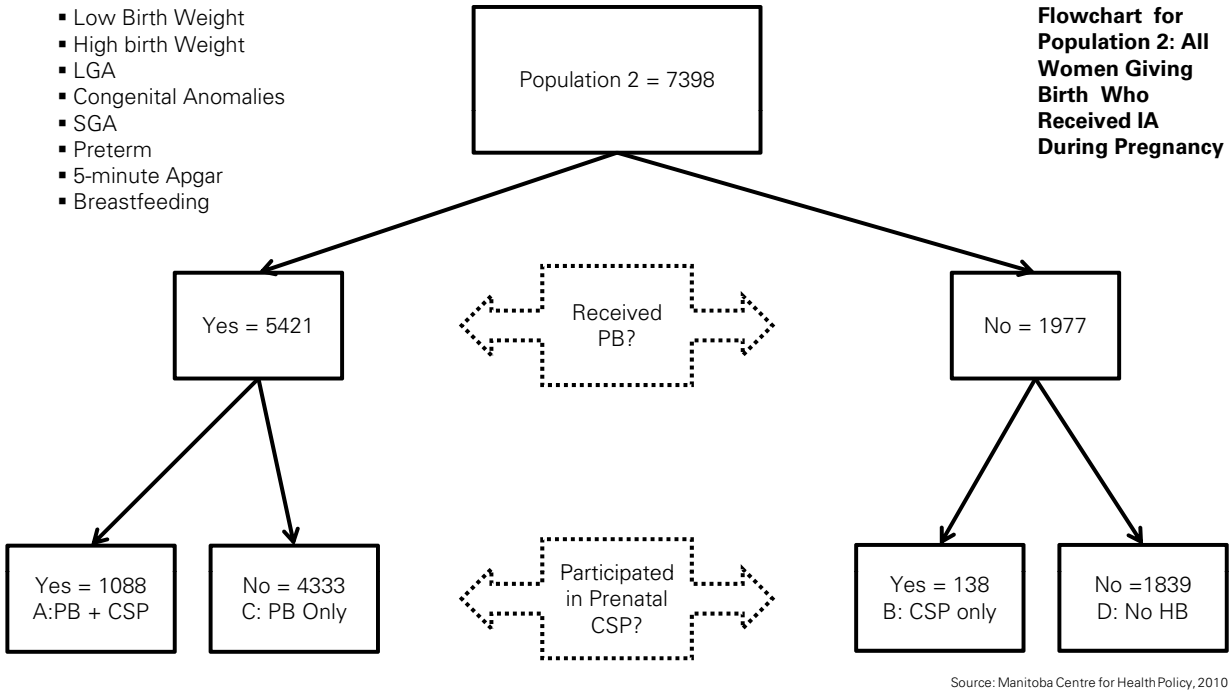
Appendix Figure 1.9: Immunization Population 1



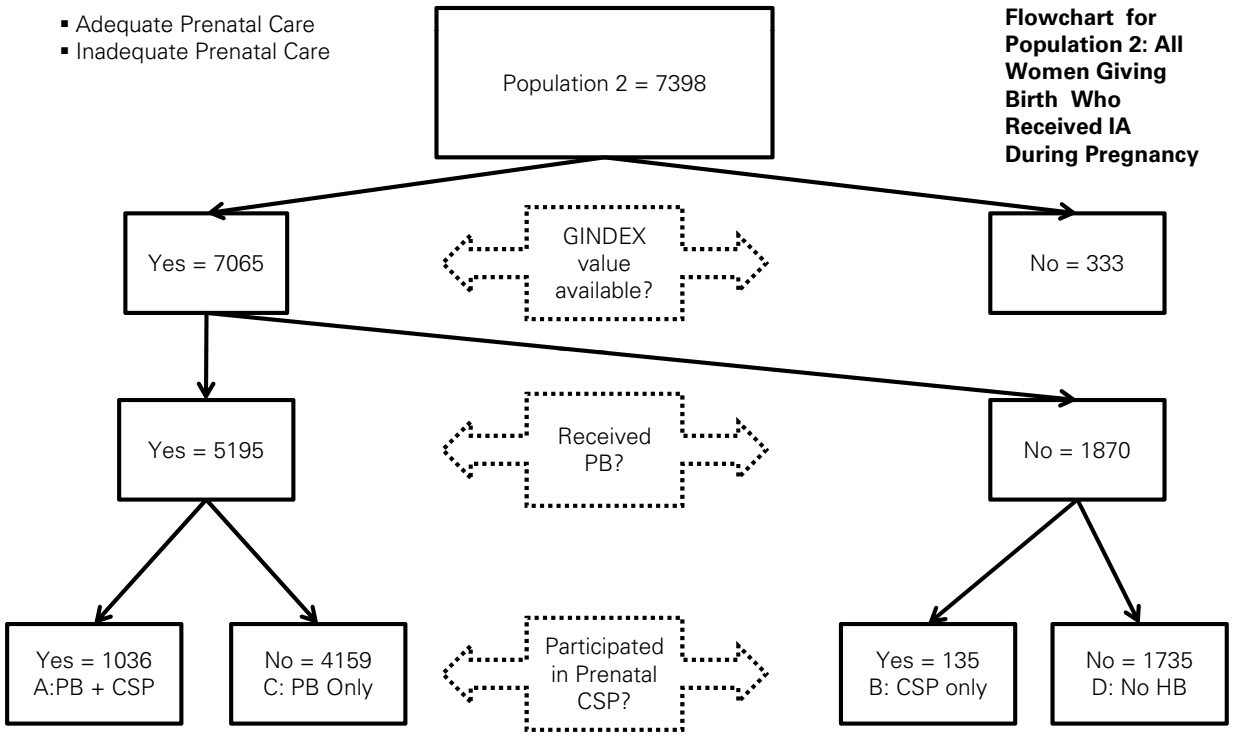
Appendix Figure 1.10: Sibling Analysis Population 1



Appendix Figure 1.11: Prenatal and Birth Outcomes Population 2

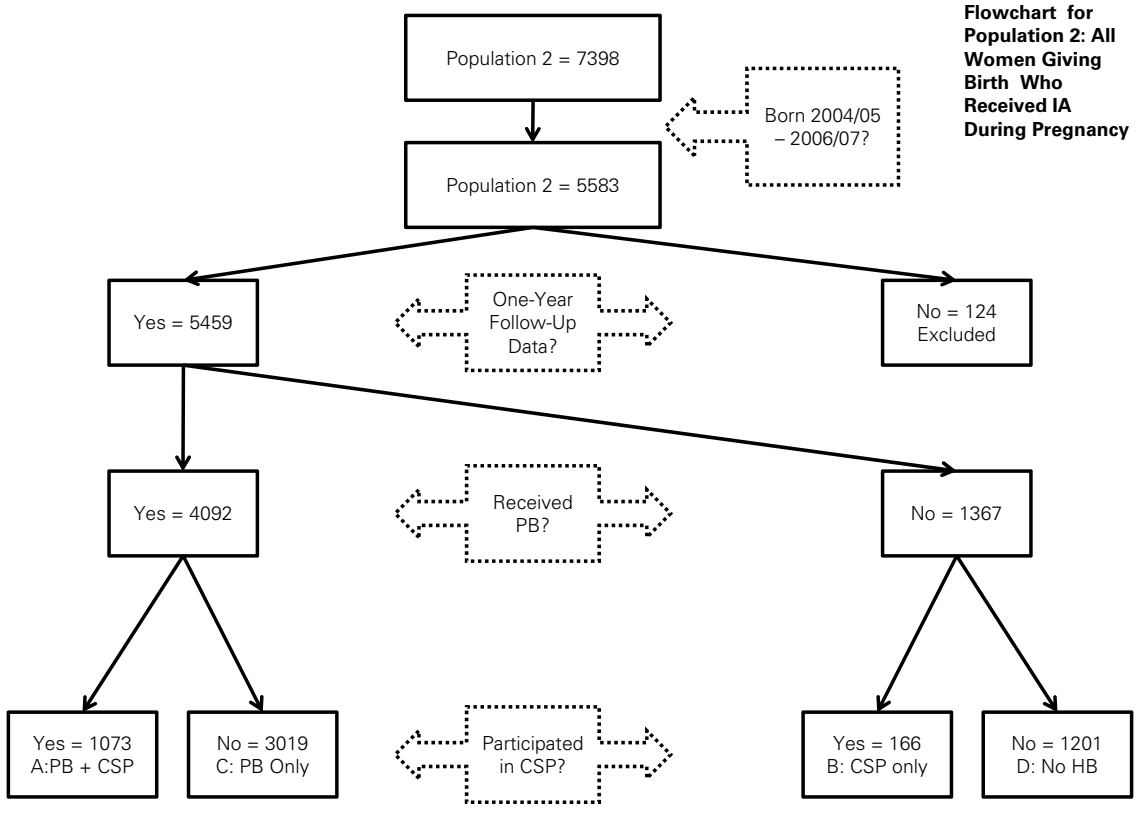


Appendix Figure 1.12: Prenatal and Birth Outcomes Population 2



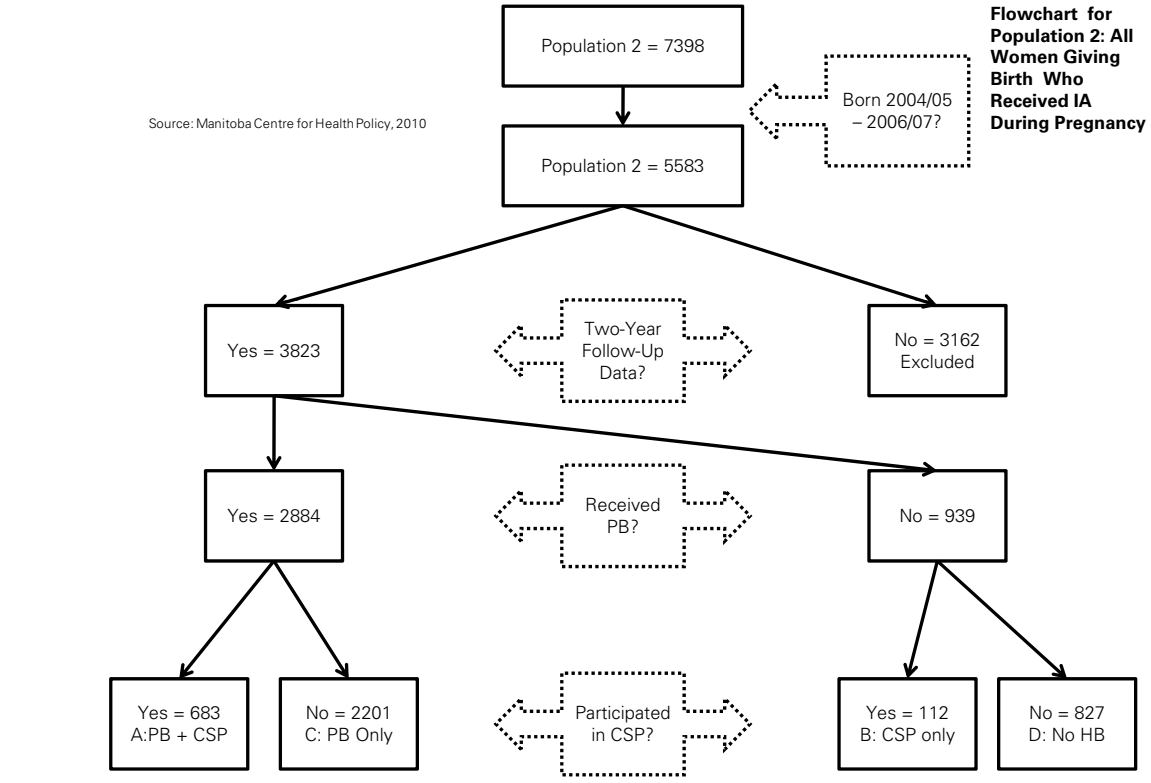
Source: Manitoba Centre for Health Policy, 2010

Appendix Figure 1.13: First Year Outcomes Population 2



Source: Manitoba Centre for Health Policy, 2010

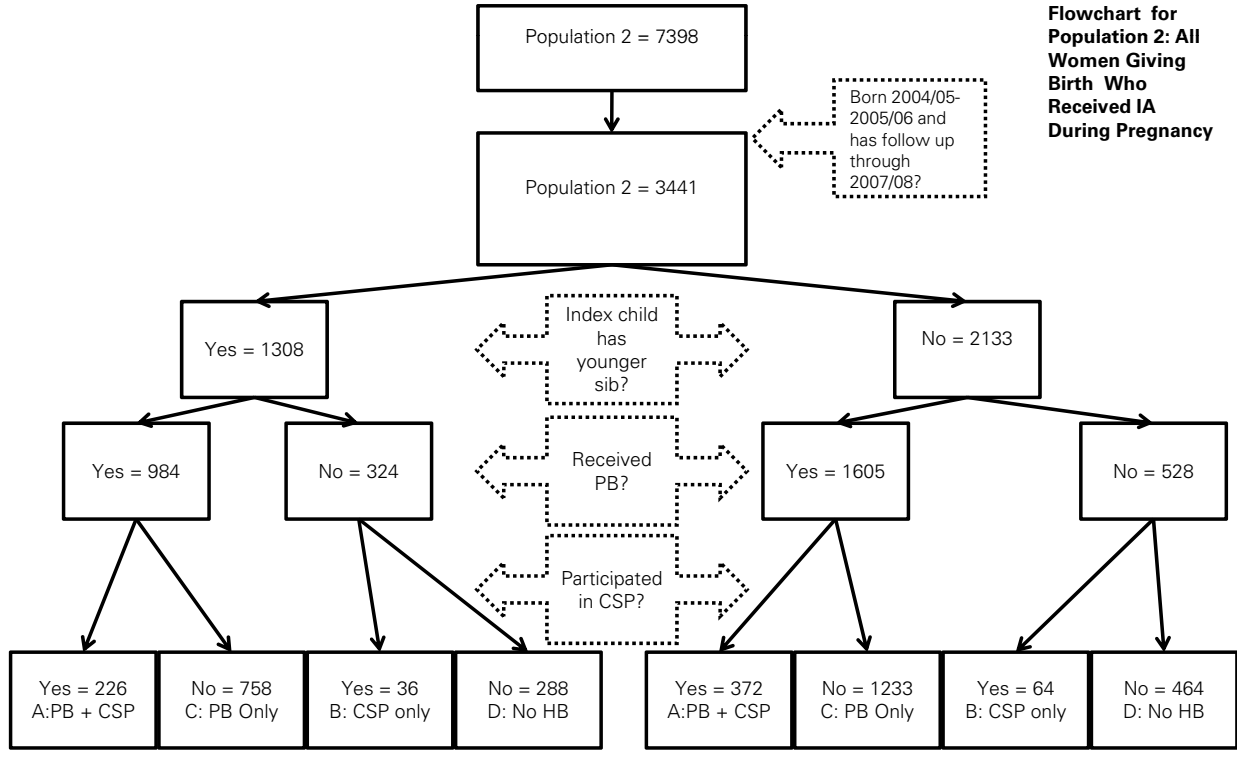
Appendix Figure 1.14: Immunization Population 2



Source: Manitoba Centre for Health Policy, 2010

Flowchart for Population 2: All Women Giving Birth Who Received IA During Pregnancy

Appendix Figure 1.15: Sibling Analysis Population 2



Source: Manitoba Centre for Health Policy, 2010

Flowchart for Population 2: All Women Giving Birth Who Received IA During Pregnancy

Appendix Table 1.2: Manitoba Childhood Immunization Schedule

Age	DaPTP*	Hib	MMR**	HBV	Tdap	PCV7	PPV23	MC	MP	V	Flu****
2 months	X	X				X					
4 months	X	X				X					
6 months	X	X				X					X***
12 months			X							X	
18 months	X	X				X					
4 to 6 years	X		X							X	
10 years				XXX				X		X	
14-16 years					X						
High-risk individuals only						X***	X***	X***	X***	X***	X*** yearly

DaPTP* Diphtheria, acellular Pertussis, Tenanus, Polio (given as "one needle" with Hib)
Hib Haemophilus Influenzae B
MMR** Measles, Mumps, Rubella (given as "one needle" on or after the first birthday)
HBV Hepatitis B (3-dose series)
Tdap Tetanus, diphtheria, acellular pertussis (given as "one needle")
PCV7 Pneumococcal conjugate 7 valent (introduced to the schedule in 2004)
PPV23 Pneumococcal polysaccharide 23 valent
MC Meningococcal conjugate
MP Meningococcal polysaccharide A,C,Y,W-135
V Varicella (introduced to the schedule in 2004)
Flu Influenza Note: Flu vaccinations were NOT included in this study's analyses
*** More than one dose may be required depending on age.
**** Given to healthy children (six to 23 months of age) starting fall 2004.

High-risk individuals are those who are at risk of infection or complications.

For more information, speak with your doctor or public health nurse.

Note: Flu vaccinations were not included in the study's analyses.

Source: Manitoba Health, Public Health Division, Communicable Disease Control (CDC) Branch, July 15, 2008

Appendix Table 1.3: Regression Results for Predictor Variables and their Association with Adequate Prenatal Care in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-1.43	0.17	69.26	<.0001	0.24	0.17	0.34
CSPP (yes vs no)	1	0.22	0.06	12.66	0.0004	1.24	1.10	1.40
HBPB (yes vs no)	1	0.24	0.15	2.51	0.1133	1.27	0.94	1.71
Mom age <20 at first birth (vs 20+)	1	-0.32	0.05	40.67	<.0001	0.73	0.66	0.80
SEFI score (continuous variable)	1	-0.13	0.03	24.69	<.0001	0.88	0.84	0.93
Brandon residency (vs Wpg)	1	0.62	0.08	55.34	<.0001	1.87	1.58	2.20
Mid residency (vs Wpg)	1	-0.24	0.08	8.17	0.0043	0.79	0.67	0.93
North residency (vs Wpg)	1	-0.59	0.13	21.86	<.0001	0.55	0.43	0.71
South residency (vs Wpg)	1	-0.12	0.06	4.03	0.0447	0.88	0.78	1.00
Completed high school (yes vs no)	1	0.36	0.05	55.94	<.0001	1.43	1.30	1.57
Mother is married (yes vs no)	1	0.00	0.05	0.00	0.9748	1.00	0.90	1.11
Income per $10,000	1	0.10	0.03	9.82	0.0017	1.10	1.04	1.17

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.4: Regression Results for Predictor Variables and their Association with Inadequate Prenatal Care in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-1.04	0.18	34.23	<.0001	0.35	0.25	0.50
CSPP (yes vs no)	1	-0.10	0.07	2.31	0.1284	0.91	0.80	1.03
HBPB (yes vs no)	1	-0.30	0.16	3.66	0.0556	0.74	0.54	1.01
Mom age <20 at first birth (vs 20+)	1	0.53	0.05	106.52	<.0001	1.70	1.53	1.87
SEFI score (continuous variable)	1	0.25	0.03	99.02	<.0001	1.29	1.22	1.35
Brandon residency (vs Wpg)	1	-0.29	0.11	6.59	0.0103	0.75	0.60	0.93
Mid residency (vs Wpg)	1	-0.23	0.09	6.32	0.0119	0.80	0.67	0.95
North residency (vs Wpg)	1	0.71	0.10	52.71	<.0001	2.03	1.68	2.46
South residency (vs Wpg)	1	-0.04	0.07	0.36	0.549	0.96	0.84	1.10
Completed high school (yes vs no)	1	-0.42	0.05	64.83	<.0001	0.66	0.60	0.73
Mother is married (yes vs no)	1	0.00	0.06	0.00	0.9904	1.00	0.89	1.12
Income per $10,000	1	-0.10	0.03	7.89	0.005	0.91	0.85	0.97

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.5: Regression Results for Predictor Variables and their Association with Low Birth Weight in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.63	0.22	139.22	<.0001	0.07	0.05	0.11
CSPP (yes vs no)	1	-0.09	0.12	0.58	0.4451	0.91	0.73	1.15
HBPB (yes vs no)	1	-0.46	0.20	5.49	0.0191	0.63	0.43	0.93
Mom age <20 at first birth (vs 20+)	1	-0.07	0.09	0.66	0.4169	0.93	0.78	1.11
SEFI score (continuous variable)	1	-0.04	0.05	0.85	0.3563	0.96	0.88	1.05
Brandon residency (vs Wpg)	1	-0.47	0.19	5.88	0.0153	0.63	0.43	0.91
Mid residency (vs Wpg)	1	-0.54	0.17	9.75	0.0018	0.58	0.42	0.82
North residency (vs Wpg)	1	-0.12	0.18	0.45	0.5039	0.88	0.62	1.27
South residency (vs Wpg)	1	-0.47	0.13	13.52	0.0002	0.63	0.49	0.80
Completed high school (yes vs no)	1	-0.17	0.09	3.41	0.0647	0.84	0.71	1.01
Mother is married (yes vs no)	1	-0.05	0.10	0.31	0.5762	0.95	0.79	1.14
Smoking (missing vs no)	1	0.61	0.11	29.66	<.0001	1.84	1.48	2.28
Smoking (yes vs no)	1	0.62	0.10	36.91	<.0001	1.85	1.52	2.26
Multiple birth	1	3.01	0.13	558.73	<.0001	20.37	15.87	26.15

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.6: Regression Results for Predictor Variables and their Association with Small for Gestational Age in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.00	0.26	59.42	<.0001	0.14	0.08	0.23
CSPP (yes vs no)	1	-0.16	0.10	2.61	0.1064	0.86	0.71	1.03
HBPB (yes vs no)	1	-0.19	0.23	0.69	0.4073	0.83	0.53	1.29
Mom age <20 at first birth (vs 20+)	1	-0.25	0.07	11.17	0.0008	0.78	0.67	0.90
SEFI score (continuous variable)	1	-0.07	0.04	3.83	0.0503	0.93	0.86	1.00
Brandon residency (vs Wpg)	1	-0.33	0.15	4.85	0.0277	0.72	0.53	0.96
Mid residency (vs Wpg)	1	-0.32	0.13	6.01	0.0142	0.72	0.56	0.94
North residency (vs Wpg)	1	-0.37	0.18	4.38	0.0364	0.69	0.49	0.98
South residency (vs Wpg)	1	-0.14	0.09	2.08	0.1492	0.87	0.72	1.05
Completed high school (yes vs no)	1	-0.03	0.07	0.19	0.6614	0.97	0.84	1.12
Mother is married (yes vs no)	1	0.05	0.08	0.38	0.5392	1.05	0.90	1.23
Smoking (missing vs no)	1	0.19	0.10	3.92	0.0477	1.21	1.00	1.46
Smoking (yes vs no)	1	0.43	0.08	28.86	<.0001	1.53	1.31	1.79
Income per $10,000	1	-0.14	0.05	8.68	0.0032	0.87	0.79	0.95
Multiple birth	1	1.0894	0.149	53.43	<.0001	2.97	2.22	3.98

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.7: Regression Results for Predictor Variables and their Association with High Birth Weight in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.25	0.16	187.92	<.0001	0.10	0.08	0.14
CSPP (yes vs no)	1	0.87	0.37	5.61	0.0179	2.40	1.16	4.94
HBPB (yes vs no)	1	0.23	0.15	2.17	0.1407	1.25	0.93	1.70
Mom age <20 at first birth (vs 20+)	1	0.21	0.06	14.49	0.0001	1.24	1.11	1.38
SEFI score (continuous variable)	1	0.05	0.03	3.68	0.055	1.05	1.00	1.11
Brandon residency (vs Wpg)	1	0.19	0.10	3.16	0.0757	1.20	0.98	1.48
Mid residency (vs Wpg)	1	0.25	0.09	7.99	0.0047	1.28	1.08	1.52
North residency (vs Wpg)	1	0.49	0.11	21.24	<.0001	1.63	1.32	2.01
South residency (vs Wpg)	1	0.25	0.07	13.25	0.0003	1.28	1.12	1.47
Completed high school (yes vs no)	1	0.13	0.05	5.51	0.0189	1.14	1.02	1.26
Mother is married (yes vs no)	1	0.01	0.06	0.04	0.8445	1.01	0.91	1.13
Gestational diabetes (yes vs no)	1	0.56	0.14	15.58	<.0001	1.74	1.32	2.30
CSPP by HBPB interaction	1	-0.79	0.38	4.43	0.0352	0.45	0.22	0.95

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.8: Regression Results for Predictor Variables and their Association with Large for Gestational Age in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.30	0.16	205.64	<.0001	0.10	0.07	0.14
CSPP (yes vs no)	1	0.14	0.07	3.92	0.0477	1.15	1.00	1.33
HBPB (yes vs no)	1	0.11	0.15	0.60	0.4404	1.12	0.84	1.50
Mom age <20 at first birth (vs 20+)	1	0.19	0.06	10.43	0.0012	1.21	1.08	1.36
SEFI score (continuous variable)	1	0.07	0.03	5.81	0.016	1.07	1.01	1.14
Brandon residency (vs Wpg)	1	0.15	0.11	1.78	0.1816	1.16	0.93	1.44
Mid residency (vs Wpg)	1	0.24	0.09	6.61	0.0101	1.27	1.06	1.52
North residency (vs Wpg)	1	0.43	0.11	14.99	0.0001	1.54	1.24	1.92
South residency (vs Wpg)	1	0.15	0.07	4.40	0.0359	1.17	1.01	1.34
Completed high school (yes vs no)	1	0.10	0.06	3.22	0.0725	1.11	0.99	1.24
Mother is married (yes vs no)	1	0.08	0.06	1.74	0.1878	1.08	0.96	1.21
Gestational diabetes (yes vs no)	1	1.47	0.12	141.62	<.0001	4.35	3.41	5.54

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.9: Regression Results for Predictor Variables and their Association with Preterm Birth (Excluding Induced) in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.33	0.20	137.05	<.0001	0.10	0.07	0.14
CSPP (yes vs no)	1	-0.14	0.10	1.98	0.1593	0.87	0.72	1.06
HBPB (yes vs no)	1	-0.20	0.18	1.28	0.2584	0.82	0.57	1.16
Mom age <20 at current birth (vs 20+)	1	-0.33	0.10	10.31	0.0013	0.72	0.59	0.88
SEFI score (continuous variable)	1	0.05	0.04	2.15	0.143	1.06	0.98	1.14
Brandon residency (vs Wpg)	1	-0.02	0.15	0.02	0.8879	0.98	0.73	1.32
Mid residency (vs Wpg)	1	-0.19	0.13	2.25	0.1333	0.82	0.64	1.06
North residency (vs Wpg)	1	-0.22	0.17	1.65	0.1993	0.81	0.58	1.12
South residency (vs Wpg)	1	-0.31	0.10	8.73	0.0031	0.73	0.60	0.90
Completed high school (yes vs no)	1	-0.24	0.08	10.24	0.0014	0.79	0.68	0.91
Mother is married (yes vs no)	1	-0.03	0.08	0.17	0.6818	0.97	0.83	1.13
Smoking (missing vs no)	1	0.58	0.09	41.14	<.0001	1.79	1.50	2.14
Smoking (yes vs no)	1	0.34	0.09	15.71	<.0001	1.40	1.19	1.66
Multiple births	1	2.78	0.13	474.65	<.0001	16.15	12.57	20.74

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.10: Regression Results for Predictor Variables and their Association with Preterm Birth (Including Induced) in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.71	0.30	80.00	<.0001	0.07	0.04	0.12
CSPP (yes vs no)	1	-0.12	0.10	1.62	0.2024	0.88	0.73	1.07
HBPB (yes vs no)	1	-0.65	0.31	4.58	0.0323	0.52	0.29	0.95
Mom age <20 at current birth (vs 20+)	1	-0.39	0.11	12.39	0.0004	0.68	0.55	0.84
SEFI score (continuous variable)	1	0.04	0.04	1.10	0.2953	1.04	0.97	1.12
Brandon residency (vs Wpg)	1	0.02	0.15	0.02	0.8916	1.02	0.77	1.36
Mid residency (vs Wpg)	1	-0.22	0.13	2.67	0.1019	0.80	0.62	1.04
North residency (vs Wpg)	1	-0.34	0.18	3.60	0.0578	0.71	0.50	1.01
South residency (vs Wpg)	1	-0.30	0.11	8.21	0.0042	0.74	0.60	0.91
Completed high school (yes vs no)	1	-0.19	0.07	6.67	0.0098	0.82	0.71	0.95
Mother is married (yes vs no)	1	-0.05	0.08	0.34	0.5571	0.95	0.81	1.12
Smoking (missing vs no)	1	0.59	0.09	41.05	<.0001	1.80	1.50	2.16
Smoking (yes vs no)	1	0.33	0.08	15.10	0.0001	1.39	1.18	1.64
No income (vs $32,000-<$40,000)	1	1.09	0.45	5.89	0.0152	2.96	1.23	7.13
Income $1- $9,999 (vs $32,000-<$40,000)	1	0.78	0.40	3.77	0.0521	2.17	0.99	4.75
Income $10,000-19,999 (vs $32,000-<$40,000)	1	0.90	0.40	5.12	0.0237	2.45	1.13	5.34
Income $20,000-$29,999 (vs $32,000-<$40,000)	1	0.75	0.40	3.52	0.0607	2.13	0.97	4.67
Income $30,000-$31,999 (vs $32,000-<$40,000)	1	0.66	0.51	1.69	0.1934	1.93	0.72	5.21
Multiple births	1	2.7541	0.1256	480.74	<.0001	15.71	12.28	20.09

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.11: Regression Results for Predictor Variables and their Association with Congenital Anomaly in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-3.42	0.40	72.96	<.0001	0.03	0.01	0.07
CSPP (yes vs no)	1	-0.45	0.28	2.47	0.116	0.64	0.37	1.12
HBPB (yes vs no)	1	-0.54	0.35	2.36	0.1248	0.58	0.29	1.16
Mom age <20 at first birth (vs 20+)	1	0.09	0.19	0.22	0.6376	1.09	0.76	1.58
SEFI score (continuous variable)	1	-0.13	0.10	1.98	0.159	0.87	0.72	1.05
Brandon residency (vs Wpg)	1	-0.84	0.52	2.61	0.1059	0.43	0.16	1.19
Mid residency (vs Wpg)	1	-0.18	0.31	0.34	0.5597	0.83	0.45	1.53
North residency (vs Wpg)	1	-0.09	0.40	0.05	0.8299	0.92	0.42	2.00
South residency (vs Wpg)	1	-0.01	0.22	0.00	0.9626	0.99	0.64	1.52
Completed high school (yes vs no)	1	-0.65	0.19	11.42	0.0007	0.52	0.36	0.76
Mother is married (yes vs no)	1	0.34	0.19	3.39	0.0658	1.41	0.98	2.02

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.12: Regression Results for Predictor Variables and their Association with Low 5-Minute Apgar Score in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.55	0.31	68.43	<.0001	0.08	0.04	0.14
CSPP (yes vs no)	1	1.19	0.57	4.40	0.036	3.28	1.08	9.98
HBPB (yes vs no)	1	-0.64	0.41	2.37	0.1239	0.53	0.23	1.19
Mom age <20 at first birth (vs 20+)	1	-0.14	0.10	1.90	0.1676	0.87	0.70	1.06
SEFI score (continuous variable)	1	-0.02	0.05	0.15	0.6975	0.98	0.89	1.08
Brandon residency (vs Wpg)	1	0.20	0.18	1.22	0.2696	1.22	0.86	1.75
Mid residency (vs Wpg)	1	0.57	0.14	17.45	<.0001	1.77	1.35	2.32
North residency (vs Wpg)	1	-0.66	0.30	4.92	0.0266	0.51	0.29	0.93
South residency (vs Wpg)	1	-0.09	0.14	0.41	0.5238	0.92	0.70	1.20
Completed high school (yes vs no)	1	0.12	0.10	1.50	0.2214	1.13	0.93	1.38
Mother is married (yes vs no)	1	-0.29	0.11	6.75	0.0094	0.75	0.60	0.93
CSPP by HBPB interaction	1	-1.29	0.58	4.90	0.0268	0.28	0.09	0.86
No income (vs $32,000-<$40,000)	1	0.29	0.52	0.31	0.5757	1.34	0.48	3.68
Income $1- $9,999 (vs $32,000-<$40,000)	1	-0.03	0.45	0.00	0.9514	0.97	0.40	2.34
Income $10,000-19,999 (vs $32,000-<$40,000)	1	0.29	0.44	0.42	0.519	1.33	0.56	3.18
Income $20,000-$29,999 (vs $32,000-<$40,000)	1	-0.03	0.45	0.00	0.9534	0.97	0.40	2.37
Income $30,000-$31,999 (vs $32,000-<$40,000)	1	0.26	0.57	0.21	0.6506	1.29	0.43	3.92

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.13: Regression Results for Predictor Variables and their Association with Breastfed at Discharge in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	0	1.00	0.70	1.08	12.77	0.00	2.01	1.37
CSPP (yes vs no)	0	1.00	-0.78	0.11	2.94	0.09	0.46	0.19
HBPB (yes vs no)	0	1.00	0.22	0.66	0.96	0.33	1.25	0.80
Mom age <20 at first birth (vs 20+)	0	1.00	-0.31	-0.21	39.46	<.0001	0.73	0.67
SEFI score (continuous variable)	0	1.00	-0.25	-0.21	108.59	<.0001	0.78	0.74
Brandon residency (vs Wpg)	0	1.00	0.09	0.29	0.83	0.36	1.10	0.90
Mid residency (vs Wpg)	0	1.00	-0.11	0.05	1.89	0.17	0.90	0.77
North residency (vs Wpg)	0	1.00	-0.11	0.09	1.07	0.30	0.90	0.74
South residency (vs Wpg)	0	1.00	0.36	0.50	26.54	<.0001	1.44	1.25
Completed high school (yes vs no)	0	1.00	0.57	0.67	130.4	<.0001	1.77	1.60
Mother is married (yes vs no)	0	1.00	0.55	0.66	92.64	<.0001	1.73	1.55
No income (vs $32,000-<$40,000)	1	0.39	0.29	1.81	0.1786	1.48	0.84	2.62
Income $1- $9,999 (vs $32,000-<$40,000)	1	0.11	0.26	0.17	0.6819	1.11	0.67	1.85
Income $10,000-19,999 (vs $32,000-<$40,000)	1	-0.04	0.26	0.03	0.8672	0.96	0.58	1.59
Income $20,000-$29,999 (vs $32,000-<$40,000)	1	0.10	0.26	0.14	0.7102	1.10	0.66	1.85
Income $30,000-$31,999 (vs $32,000-<$40,000)	1	0.09	0.34	0.07	0.7848	1.10	0.56	2.14
CSPP by HBPB interaction	1	1.09	0.46	5.65	0.0174	2.96	1.21	7.26

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.14: Regression Results for Predictor Variables and their Association with Adequate Prenatal Care in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-1.84	0.10	321.87	<.0001	0.16	0.13	0.19
CSPP (yes vs no)	1	0.25	0.08	9.22	0.0024	1.28	1.09	1.50
HBPB (yes vs no)	1	0.52	0.08	38.30	<.0001	1.69	1.43	1.99
Mom age <20 at first birth (vs 20+)	1	-0.34	0.07	26.29	<.0001	0.71	0.62	0.81
SEFI score (continuous variable)	1	-0.13	0.04	13.57	0.0002	0.88	0.82	0.94
Brandon residency (vs Wpg)	1	0.64	0.12	27.93	<.0001	1.90	1.50	2.41
Mid residency (vs Wpg)	1	-0.43	0.14	9.91	0.0016	0.65	0.50	0.85
North residency (vs Wpg)	1	-0.49	0.14	12.89	0.0003	0.61	0.47	0.80
South residency (vs Wpg)	1	0.29	0.11	7.11	0.0077	1.34	1.08	1.67
Completed high school (yes vs no)	1	0.41	0.07	35.04	<.0001	1.51	1.31	1.72
Mother is married (yes vs no)	1	0.22	0.08	7.98	0.0047	1.25	1.07	1.46

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.15: Regression Results for Predictor Variables and their Association with Inadequate Prenatal Care in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-0.21	0.08	7.41	0.0065	0.81	0.69	0.94
CSPP (yes vs no)	1	-0.73	0.20	13.45	0.0002	0.48	0.32	0.71
HBPB (yes vs no)	1	-0.69	0.06	119.18	<.0001	0.50	0.44	0.57
Mom age <20 at first birth (vs 20+)	1	0.34	0.06	34.97	<.0001	1.40	1.25	1.56
SEFI score (continuous variable)	1	0.19	0.03	42.95	<.0001	1.20	1.14	1.27
Brandon residency (vs Wpg)	1	-0.45	0.13	11.58	0.0007	0.64	0.49	0.83
Mid residency (vs Wpg)	1	-0.26	0.10	6.73	0.0095	0.77	0.63	0.94
North residency (vs Wpg)	1	0.43	0.09	22.04	<.0001	1.53	1.28	1.83
South residency (vs Wpg)	1	-0.39	0.10	13.91	0.0002	0.68	0.55	0.83
Completed high school (yes vs no)	1	-0.61	0.06	92.43	<.0001	0.54	0.48	0.62
Mother is married (yes vs no)	1	-0.27	0.07	16.47	<.0001	0.76	0.67	0.87
CSPP by HBPB interaction	1	0.55	0.21	6.46	0.011	1.73	1.13	2.63

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.16: Regression Results for Predictor Variables and their Association with Low Birth Weight in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.68	0.17	243.03	<.0001	0.07	0.05	0.10
CSPP (yes vs no)	1	-0.22	0.14	2.26	0.1329	0.81	0.61	1.07
HBPB (yes vs no)	1	-0.32	0.11	8.71	0.0032	0.72	0.58	0.90
Mom age <20 at first birth (vs 20+)	1	-0.17	0.10	2.80	0.0941	0.84	0.69	1.03
SEFI score (continuous variable)	1	-0.07	0.05	1.50	0.22	0.94	0.84	1.04
Brandon residency (vs Wpg)	1	-0.32	0.25	1.72	0.1899	0.72	0.45	1.17
Mid residency (vs Wpg)	1	-0.44	0.21	4.19	0.0407	0.64	0.42	0.98
North residency (vs Wpg)	1	-0.24	0.18	1.84	0.1744	0.79	0.55	1.11
South residency (vs Wpg)	1	-0.44	0.20	4.60	0.032	0.65	0.43	0.96
Completed high school (yes vs no)	1	-0.31	0.12	6.50	0.0108	0.73	0.58	0.93
Mother is married (yes vs no)	1	0.08	0.12	0.38	0.5384	1.08	0.85	1.37
Smoking (missing vs no)	1	0.72	0.14	24.85	<.0001	2.05	1.55	2.72
Smoking (yes vs no)	1	0.56	0.13	18.60	<.0001	1.74	1.35	2.24
Multiple Births	1	2.8573	0.16	318.76	<.0001	17.42	12.73	23.83

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.17: Regression Results for Predictor Variables and their Association with Small for Gestational Age in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.23	0.15	227.51	<.0001	0.11	0.08	0.14
CSPP (yes vs no)	1	-0.18	0.12	2.22	0.1366	0.83	0.66	1.06
HBPB (yes vs no)	1	-0.27	0.10	7.66	0.0056	0.77	0.64	0.93
Mom age <20 at first birth (vs 20+)	1	-0.23	0.09	6.77	0.0093	0.80	0.67	0.95
SEFI score (continuous variable)	1	-0.11	0.05	5.46	0.0194	0.90	0.82	0.98
Brandon residency (vs Wpg)	1	-0.31	0.20	2.31	0.1289	0.73	0.49	1.09
Mid residency (vs Wpg)	1	-0.23	0.17	1.88	0.1701	0.80	0.57	1.10
North residency (vs Wpg)	1	-0.33	0.16	4.22	0.0399	0.72	0.53	0.98
South residency (vs Wpg)	1	-0.05	0.15	0.13	0.7237	0.95	0.70	1.28
Completed high school (yes vs no)	1	-0.11	0.10	1.23	0.2671	0.90	0.74	1.09
Mother is married (yes vs no)	1	-0.20	0.11	3.32	0.0684	0.82	0.66	1.02
Smoking (missing vs no)	1	0.42	0.13	10.78	0.001	1.53	1.19	1.97
Smoking (yes vs no)	1	0.67	0.11	37.84	<.0001	1.94	1.57	2.40
Multiple births	1	0.8986	0.1931	21.65	<.0001	2.46	1.68	3.59

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.18: Regression Results for Predictor Variables and their Association with High Birth Weight in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.14	0.10	422.21	<.0001	0.12	0.10	0.14
CSPP (yes vs no)	1	0.07	0.09	0.66	0.4157	1.07	0.91	1.27
HBPB (yes vs no)	1	0.24	0.08	8.41	0.0037	1.27	1.08	1.49
Mom age <20 at first birth (vs 20+)	1	0.14	0.07	3.98	0.0461	1.15	1.00	1.32
SEFI score (continuous variable)	1	0.04	0.04	1.21	0.2712	1.04	0.97	1.12
Brandon residency (vs Wpg)	1	0.16	0.14	1.26	0.2611	1.18	0.89	1.56
Mid residency (vs Wpg)	1	0.18	0.12	2.20	0.1378	1.20	0.94	1.51
North residency (vs Wpg)	1	0.32	0.11	8.20	0.0042	1.38	1.11	1.72
South residency (vs Wpg)	1	-0.18	0.13	1.76	0.1841	0.84	0.65	1.09
Completed high school (yes vs no)	1	0.15	0.07	4.18	0.041	1.16	1.01	1.34
Mother is married (yes vs no)	1	0.06	0.08	0.49	0.4832	1.06	0.90	1.24
Gestational diabetes (yes vs no)	1	0.65	0.17	15.06	0.0001	1.92	1.38	2.68

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.19: Regression Results for Predictor Variables and their Association with Large for Gestational Age in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.16	0.11	414.58	<.0001	0.12	0.09	0.14
CSPP (yes vs no)	1	0.04	0.09	0.21	0.6481	1.04	0.88	1.24
HBPB (yes vs no)	1	0.26	0.08	9.85	0.0017	1.30	1.10	1.53
Mom age <20 at first birth (vs 20+)	1	0.06	0.07	0.76	0.3825	1.06	0.92	1.23
SEFI score (continuous variable)	1	0.01	0.04	0.08	0.7718	1.01	0.94	1.09
Brandon residency (vs Wpg)	1	0.15	0.15	0.99	0.3198	1.16	0.87	1.54
Mid residency (vs Wpg)	1	0.24	0.12	4.04	0.0445	1.27	1.01	1.61
North residency (vs Wpg)	1	0.30	0.12	6.67	0.0098	1.35	1.07	1.69
South residency (vs Wpg)	1	-0.24	0.14	3.00	0.0835	0.79	0.60	1.03
Completed high school (yes vs no)	1	0.09	0.08	1.42	0.2335	1.09	0.94	1.27
Mother is married (yes vs no)	1	0.13	0.08	2.57	0.1089	1.14	0.97	1.34
Gestational diabetes (yes vs no)	1	1.53	0.15	103.84	<.0001	4.62	3.44	6.20

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.20: Regression Results for Predictor Variables and their Association with Preterm Birth (Excluding Induced) in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.02	0.13	237.10	<.0001	0.13	0.10	0.17
CSPP (yes vs no)	1	-0.16	0.12	1.97	0.1603	0.85	0.68	1.07
HBPB (yes vs no)	1	-0.23	0.09	6.40	0.0114	0.79	0.66	0.95
Mom age <20 at current birth (vs 20+)	1	-0.59	0.12	25.02	<.0001	0.55	0.44	0.70
SEFI score (continuous variable)	1	-0.01	0.04	0.09	0.7654	0.99	0.91	1.08
Brandon residency (vs Wpg)	1	-0.09	0.19	0.22	0.6399	0.91	0.62	1.34
Mid residency (vs Wpg)	1	-0.06	0.16	0.15	0.7005	0.94	0.69	1.28
North residency (vs Wpg)	1	-0.27	0.16	3.13	0.0767	0.76	0.56	1.03
South residency (vs Wpg)	1	-0.34	0.17	4.19	0.0407	0.71	0.51	0.99
Completed high school (yes vs no)	1	-0.35	0.10	12.57	0.0004	0.71	0.58	0.86
Mother is married (yes vs no)	1	0.07	0.10	0.53	0.4686	1.08	0.88	1.31
Smoking (missing vs no)	1	0.49	0.11	19.08	<.0001	1.64	1.31	2.05
Smoking (yes vs no)	1	0.17	0.10	2.75	0.0971	1.18	0.97	1.44
Multiple Births	1	2.4099	0.1563	237.59	<.0001	11.13	8.19	15.13

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.21: Regression Results for Predictor Variables and their Association with Preterm Birth (Including Induced) in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.06	0.13	255.74	<.0001	0.13	0.10	0.16
CSPP (yes vs no)	1	-0.12	0.11	1.14	0.2848	0.89	0.71	1.11
HBPB (yes vs no)	1	-0.25	0.09	7.32	0.0068	0.78	0.65	0.93
Mom age <20 at current birth (vs 20+)	1	-0.55	0.12	22.49	<.0001	0.58	0.46	0.73
SEFI score (continuous variable)	1	-0.01	0.04	0.04	0.8442	0.99	0.91	1.08
Brandon residency (vs Wpg)	1	-0.07	0.19	0.16	0.6896	0.93	0.64	1.34
Mid residency (vs Wpg)	1	-0.09	0.15	0.31	0.5785	0.92	0.68	1.24
North residency (vs Wpg)	1	-0.37	0.15	5.76	0.0164	0.69	0.51	0.93
South residency (vs Wpg)	1	-0.39	0.17	5.53	0.0187	0.68	0.49	0.94
Completed high school (yes vs no)	1	-0.34	0.10	12.57	0.0004	0.71	0.59	0.86
Mother is married (yes vs no)	1	0.06	0.10	0.36	0.5502	1.06	0.87	1.29
Smoking (missing vs no)	1	0.51	0.11	21.14	<.0001	1.67	1.34	2.07
Smoking (yes vs no)	1	0.20	0.10	4.26	0.039	1.23	1.01	1.49
Multiple Births	1	2.3791	0.1543	237.87	<.0001	10.80	7.98	14.61

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.22: Regression Results for Predictor Variables and their Association with Congenital Anomaly in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-3.95	0.34	136.09	<.0001	0.02	0.01	0.04
CSPP (yes vs no)	1	-0.32	0.34	0.85	0.3557	0.73	0.37	1.43
HBPB (yes vs no)	1	-0.02	0.26	0.01	0.9347	0.98	0.59	1.64
Mom age <20 at first birth (vs 20+)	1	0.40	0.26	2.32	0.1276	1.49	0.89	2.48
SEFI score (continuous variable)	1	-0.30	0.13	5.56	0.0184	0.74	0.58	0.95
Brandon residency (vs Wpg)	1	-0.58	0.60	0.93	0.3344	0.56	0.17	1.82
Mid residency (vs Wpg)	1	0.01	0.41	0.00	0.9889	1.01	0.45	2.23
North residency (vs Wpg)	1	-0.25	0.41	0.35	0.5516	0.78	0.35	1.75
South residency (vs Wpg)	1	-0.71	0.52	1.84	0.1749	0.49	0.18	1.37
Completed high school (yes vs no)	1	-0.91	0.33	7.41	0.0065	0.40	0.21	0.77
Mother is married (yes vs no)	1	0.08	0.28	0.08	0.7816	1.08	0.62	1.87

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.23: Regression Results for Predictor Variables and their Association with Low 5-Minute Apgar Score in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.81	0.17	262.77	<.0001	0.06	0.04	0.08
CSPP (yes vs no)	1	0.01	0.16	0.00	0.9641	1.01	0.73	1.39
HBPB (yes vs no)	1	-0.13	0.14	0.79	0.374	0.88	0.67	1.16
Mom age <20 at first birth (vs 20+)	1	-0.17	0.13	1.78	0.1825	0.85	0.66	1.08
SEFI score (continuous variable)	1	-0.09	0.07	2.04	0.1533	0.91	0.80	1.04
Brandon residency (vs Wpg)	1	-0.03	0.26	0.01	0.9081	0.97	0.59	1.61
Mid residency (vs Wpg)	1	-0.64	0.28	5.13	0.0235	0.53	0.31	0.92
North residency (vs Wpg)	1	-0.59	0.26	5.19	0.0227	0.55	0.33	0.92
South residency (vs Wpg)	1	-0.39	0.25	2.49	0.1148	0.68	0.42	1.10
Completed high school (yes vs no)	1	0.07	0.14	0.25	0.6158	1.07	0.82	1.40
Mother is married (yes vs no)	1	-0.03	0.15	0.04	0.8334	0.97	0.72	1.30

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.24: Regression Results for Predictor Variables and their Association with Breastfed at Discharge in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	0.26	0.07	12.85	0.0003	1.30	1.13	1.51
CSPP (yes vs no)	1	0.39	0.07	30.40	<.0001	1.47	1.28	1.69
HBPB (yes vs no)	1	0.27	0.06	21.19	<.0001	1.31	1.17	1.47
Mom age <20 at first birth (vs 20+)	1	-0.11	0.05	4.66	0.0309	0.89	0.80	0.99
SEFI score (continuous variable)	1	-0.15	0.03	32.34	<.0001	0.86	0.81	0.90
Brandon residency (vs Wpg)	1	0.29	0.12	5.52	0.0188	1.33	1.05	1.69
Mid residency (vs Wpg)	1	-0.08	0.09	0.68	0.4101	0.93	0.77	1.11
North residency (vs Wpg)	1	0.02	0.09	0.07	0.7869	1.02	0.86	1.22
South residency (vs Wpg)	1	0.13	0.09	1.96	0.162	1.14	0.95	1.38
Completed high school (yes vs no)	1	0.49	0.06	68.78	<.0001	1.63	1.45	1.83
Mother is married (yes vs no)	1	0.31	0.06	23.26	<.0001	1.36	1.20	1.54

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.25: Regression Results for Predictor Variables and their Association with Hospital Episodes in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-2.37	0.22	115.93	<.0001	0.09	0.06	0.14
CSPP (yes vs no)	1	0.04	0.08	0.22	0.6378	1.04	0.89	1.20
HBPB (yes vs no)	1	0.36	0.21	3.02	0.0821	1.43	0.96	2.15
Mom age <20 at first birth (vs 20+)	1	0.24	0.07	11.83	0.0006	1.27	1.11	1.45
SEFI score (continuous variable)	1	0.17	0.03	25.48	<.0001	1.19	1.11	1.27
Brandon residency (vs Wpg)	1	0.45	0.12	13.07	0.0003	1.57	1.23	2.00
Mid residency (vs Wpg)	1	0.19	0.11	2.89	0.0889	1.21	0.97	1.49
North residency (vs Wpg)	1	0.49	0.13	14.61	0.0001	1.64	1.27	2.11
South residency (vs Wpg)	1	0.11	0.09	1.56	0.2118	1.12	0.94	1.34
Completed high school (yes vs no)	1	-0.37	0.07	27.12	<.0001	0.69	0.60	0.80
Mother is married (yes vs no)	1	-0.22	0.07	8.79	0.003	0.81	0.70	0.93

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.26: Regression Results for Predictor Variables and their Association with Injury Hospitalization in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-27.51	0.39	5033.67	<.0001	0.00	0.00	0.00
CSPP (yes vs no)	1	0.30	0.32	0.89	0.3451	1.35	0.72	2.53
HBPB (yes vs no)	0	21.9455	0	.	.	N/A*	N/A*	N/A*
Mom age <20 at first birth (vs 20+)	1	0.56	0.33	2.86	0.0908	1.75	0.91	3.36
SEFI score (continuous variable)	1	0.25	0.16	2.55	0.1104	1.28	0.95	1.74
Brandon residency (vs Wpg)	1	0.82	0.47	3.13	0.0768	2.28	0.92	5.68
Mid residency (vs Wpg)	1	-1.51	1.02	2.21	0.1372	0.22	0.03	1.62
North residency (vs Wpg)	1	-0.89	1.02	0.77	0.3808	0.41	0.06	3.02
South residency (vs Wpg)	1	-0.10	0.44	0.05	0.8219	0.91	0.38	2.14
Completed high school (yes vs no)	1	-0.62	0.35	3.11	0.0777	0.54	0.27	1.07
Mother is married (yes vs no)	1	0.13	0.33	0.15	0.7019	1.14	0.59	2.19

*no events for participants in a group

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.27: Regression Results for Predictor Variables and their Association with Continuity of Care in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	0.82	0.20	17.11	<.0001	2.27	1.54	3.35
CSPP (yes vs no)	1	-0.22	0.06	15.04	0.0001	0.81	0.72	0.90
HBPB (yes vs no)	1	0.71	0.27	6.86	0.0088	2.03	1.20	3.46
Mom age <20 at first birth (vs 20+)	1	-0.52	0.05	101.21	<.0001	0.60	0.54	0.66
SEFI score (continuous variable)	1	-0.35	0.03	173.72	<.0001	0.70	0.67	0.74
Brandon residency (vs Wpg)	1	-1.11	0.10	130.67	<.0001	0.33	0.27	0.40
Mid residency (vs Wpg)	1	-0.25	0.09	8.72	0.0031	0.78	0.66	0.92
North residency (vs Wpg)	1	-0.51	0.12	18.78	<.0001	0.60	0.48	0.76
South residency (vs Wpg)	1	-0.57	0.07	73.29	<.0001	0.56	0.49	0.64
Completed high school (yes vs no)	1	0.46	0.05	80.88	<.0001	1.58	1.43	1.75
Mother is married (yes vs no)	1	0.31	0.06	29.49	<.0001	1.36	1.22	1.53
No income (vs $32,000-<$40,000)	1	-0.77	0.33	5.39	0.0202	0.46	0.24	0.89
Income $1- $9,999 (vs $32,000-<$40,000)	1	-0.76	0.30	6.50	0.0108	0.47	0.26	0.84
Income $10,000-19,999 (vs $32,000-<$40,000)	1	-0.76	0.30	6.47	0.011	0.47	0.26	0.84
Income $20,000-$29,999 (vs $32,000-<$40,000)	1	-0.71	0.30	5.50	5.5	0.49	0.27	0.89
Income $30,000-$31,999 (vs $32,000-<$40,000)	1	-0.61	0.35	2.92	0.0876	0.55	0.27	1.09

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.28: Regression Results for Predictor Variables and their Association with Children in Care in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-3.97	1.02	15.08	0.0001	0.02	0.00	0.14
CSPP (yes vs no)	1	0.04	0.12	0.14	0.707	1.05	0.83	1.31
HBPB (yes vs no)	1	0.11	0.51	0.05	0.8253	1.12	0.41	3.06
Mom age <20 at first birth (vs 20+)	1	0.46	0.12	15.72	<.0001	1.58	1.26	1.98
SEFI score (continuous variable)	1	0.31	0.05	34.76	<.0001	1.36	1.23	1.50
Brandon residency (vs Wpg)	1	-0.72	0.28	6.55	0.0105	0.48	0.28	0.84
Mid residency (vs Wpg)	1	-1.29	0.29	20.05	<.0001	0.28	0.16	0.48
North residency (vs Wpg)	1	-0.59	0.28	4.28	0.0386	0.56	0.32	0.97
South residency (vs Wpg)	1	-0.82	0.21	15.96	<.0001	0.44	0.29	0.66
Completed high school (yes vs no)	1	-1.19	0.14	70.07	<.0001	0.30	0.23	0.40
Mother is married (yes vs no)	1	-0.30	0.14	4.46	0.0347	0.74	0.56	0.98
No income (vs $32,000-<$40,000)	1	1.21	1.13	1.14	0.2846	3.34	0.37	30.42
Income $1- $9,999 (vs $32,000-<$40,000)	1	1.43	1.10	1.69	0.193	4.17	0.49	35.86
Income $10,000-19,999 (vs $32,000-<$40,000)	1	0.79	1.10	0.52	0.4722	2.20	0.26	18.94
Income $20,000-$29,999 (vs $32,000-<$40,000)	1	-0.50	1.15	0.19	0.6621	0.60	0.06	5.80
Income $30,000-$31,999 (vs $32,000-<$40,000)	1	-20.16	25635.22	0.00	0.9994	0.00	0.00	.

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.29: Regression Results for Predictor Variables and their Association with Immunization at Age 2 in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	0.16	0.15	1.14	0.2867	1.17	0.88	1.57
CSPP (yes vs no)	1	0.01	0.06	0.01	0.9141	1.01	0.89	1.14
HBPB (yes vs no)	1	-0.05	0.14	0.14	0.7064	0.95	0.73	1.24
Mom age <20 at first birth (vs 20+)	1	-0.31	0.06	29.88	<.0001	0.74	0.66	0.82
SEFI score (continuous variable)	1	-0.09	0.03	10.22	0.0014	0.91	0.87	0.97
Brandon residency (vs Wpg)	1	-0.10	0.11	0.94	0.3316	0.90	0.73	1.11
Mid residency (vs Wpg)	1	-0.04	0.09	0.20	0.6519	0.96	0.81	1.14
North residency (vs Wpg)	1	0.18	0.12	2.39	0.1221	1.20	0.95	1.52
South residency (vs Wpg)	1	-0.26	0.07	14.61	0.0001	0.77	0.67	0.88
Completed high school (yes vs no)	1	0.23	0.05	18.13	<.0001	1.26	1.13	1.40
Mother is married (yes vs no)	1	-0.01	0.06	0.01	0.9162	0.99	0.89	1.11

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.30: Regression Results for Predictor Variables and their Association with Short Child Spacing in Population 1

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Hazard Ratios	OR 95% CI	
							Lower	Upper
CSPP (yes vs no)	1	0.00	0.06	0.00	0.95	1.00	0.89	1.12
HBPB (yes vs no)	1	-0.09	0.15	0.35	0.55	0.92	0.69	1.22
Mom age <20 at first birth (vs 20+)	1	0.16	0.05	10.80	0.00	1.18	1.07	1.30
SEFI score (continuous variable)	1	0.10	0.02	18.20	<.0001	1.11	1.06	1.17
Brandon residency (vs Wpg)	1	0.10	0.10	1.01	0.32	1.10	0.91	1.34
Mid residency (vs Wpg)	1	-0.03	0.08	0.09	0.76	0.98	0.83	1.15
North residency (vs Wpg)	1	0.30	0.10	8.52	0.00	1.35	1.10	1.65
South residency (vs Wpg)	1	0.37	0.06	38.77	<.0001	1.44	1.28	1.62
Completed high school (yes vs no)	1	-0.33	0.05	43.38	<.0001	0.72	0.66	0.80
Mother is married (yes vs no)	1	0.15	0.05	7.32	0.01	1.16	1.04	1.29
Income per $10,000	1	-0.09	0.03	7.33	0.01	0.92	0.86	0.98

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.31: Regression Results for Predictor Variables and their Association with Hospital Episodes in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-1.86	0.12	257.83	<.0001	0.16	0.12	0.20
CSPP (yes vs no)	1	0.02	0.09	0.04	0.8438	1.02	0.85	1.21
HBPB (yes vs no)	1	0.04	0.09	0.16	0.686	1.04	0.87	1.24
Mom age <20 at first birth (vs 20+)	1	0.14	0.08	2.87	0.0902	1.15	0.98	1.35
SEFI score (continuous variable)	1	0.14	0.04	12.32	0.0004	1.15	1.07	1.25
Brandon residency (vs Wpg)	1	0.26	0.17	2.52	0.1124	1.30	0.94	1.81
Mid residency (vs Wpg)	1	0.20	0.14	2.08	0.1491	1.22	0.93	1.61
North residency (vs Wpg)	1	0.40	0.13	9.57	0.002	1.48	1.16	1.91
South residency (vs Wpg)	1	0.01	0.15	0.01	0.9432	1.01	0.76	1.35
Completed high school (yes vs no)	1	-0.41	0.09	19.50	<.0001	0.66	0.55	0.79
Mother is married (yes vs no)	1	-0.05	0.10	0.29	0.588	0.95	0.79	1.15

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.32: Regression Results for Predictor Variables and their Association with Injury Hospitalization in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-5.15	0.49	109.14	<.0001	0.01	0.00	0.02
CSPP (yes vs no)	1	0.13	0.39	0.11	0.7443	1.14	0.53	2.45
HBPB (yes vs no)	1	0.18	0.44	0.17	0.6776	1.20	0.51	2.83
Mom age <20 at first birth (vs 20+)	1	-0.16	0.43	0.14	0.7111	0.85	0.37	1.97
SEFI score (continuous variable)	1	0.28	0.18	2.31	0.1284	1.32	0.92	1.90
Brandon residency (vs Wpg)	1	0.19	0.76	0.06	0.8045	1.21	0.27	5.32
Mid residency (vs Wpg)	1	-23.40	70762.95	NA*	0.9997	NA*		.
North residency (vs Wpg)	1	-1.07	1.03	1.09	0.2963	0.34	0.05	2.56
South residency (vs Wpg)	1	0.10	0.62	0.02	0.8775	1.10	0.33	3.72
Completed high school (yes vs no)	1	-0.82	0.49	2.75	0.0975	0.44	0.17	1.16
Mother is married (yes vs no)	1	-0.10	0.46	0.05	0.8272	0.90	0.37	2.23

*no events for participants in a group

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.33: Regression Results for Predictor Variables and their Association with Continuity of Care in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	0.36	0.09	16.91	<.0001	1.43	1.21	1.70
CSPP (yes vs no)	1	-0.14	0.07	4.24	0.0394	0.87	0.76	0.99
HBPB (yes vs no)	1	-0.10	0.07	2.04	0.1527	0.90	0.79	1.04
Mom age <20 at first birth (vs 20+)	1	-0.28	0.06	20.60	<.0001	0.76	0.67	0.85
SEFI score (continuous variable)	1	-0.29	0.03	78.95	<.0001	0.75	0.71	0.80
Brandon residency (vs Wpg)	1	-1.02	0.14	53.93	<.0001	0.36	0.27	0.47
Mid residency (vs Wpg)	1	0.19	0.11	2.96	0.0855	1.21	0.97	1.51
North residency (vs Wpg)	1	-0.30	0.11	7.05	0.0079	0.74	0.60	0.93
South residency (vs Wpg)	1	-0.40	0.11	13.46	0.0002	0.67	0.54	0.83
Completed high school (yes vs no)	1	0.33	0.07	25.09	<.0001	1.40	1.22	1.59
Mother is married (yes vs no)	1	0.34	0.07	21.48	<.0001	1.41	1.22	1.62

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.34: Regression Results for Predictor Variables and their Association with Children in Care in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-1.69	0.13	160.38	<.0001	0.19	0.14	0.24
CSPP (yes vs no)	1	-0.01	0.11	0.00	0.9635	0.99	0.80	1.24
HBPB (yes vs no)	1	-0.30	0.11	7.76	0.0053	0.74	0.60	0.92
Mom age <20 at first birth (vs 20+)	1	0.09	0.10	0.74	0.3894	1.09	0.90	1.33
SEFI score (continuous variable)	1	0.13	0.05	6.64	0.01	1.14	1.03	1.25
Brandon residency (vs Wpg)	1	-0.63	0.26	5.80	0.016	0.53	0.32	0.89
Mid residency (vs Wpg)	1	-1.41	0.29	23.95	<.0001	0.24	0.14	0.43
North residency (vs Wpg)	1	-0.99	0.22	19.49	<.0001	0.37	0.24	0.58
South residency (vs Wpg)	1	-0.61	0.21	8.86	0.0029	0.54	0.36	0.81
Completed high school (yes vs no)	1	-1.01	0.14	52.57	<.0001	0.37	0.28	0.48
Mother is married (yes vs no)	1	-0.34	0.13	7.06	0.0079	0.71	0.55	0.91

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.35: Regression Results for Predictor Variables and their Association with Immunization at Age 2 in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Odds Ratios	OR 95% CI	
							Lower	Upper
Intercept	1	-0.32	0.10	9.54	0.002	0.73	0.59	0.89
CSPP (yes vs no)	1	0.09	0.08	1.18	0.2775	1.09	0.93	1.28
HBPB (yes vs no)	1	0.31	0.08	14.43	0.0001	1.37	1.16	1.60
Mom age <20 at first birth (vs 20+)	1	-0.30	0.07	18.60	<.0001	0.74	0.64	0.85
SEFI score (continuous variable)	1	-0.08	0.04	5.14	0.0234	0.92	0.86	0.99
Brandon residency (vs Wpg)	1	-0.20	0.15	1.82	0.1778	0.82	0.61	1.10
Mid residency (vs Wpg)	1	0.09	0.13	0.46	0.4962	1.09	0.85	1.39
North residency (vs Wpg)	1	0.05	0.12	0.13	0.7162	1.05	0.82	1.33
South residency (vs Wpg)	1	-0.06	0.13	0.26	0.6123	0.94	0.73	1.20
Completed high school (yes vs no)	1	0.13	0.08	2.81	0.0937	1.14	0.98	1.32
Mother is married (yes vs no)	1	0.17	0.08	3.93	0.0474	1.18	1.00	1.39

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.36: Regression Results for Predictor Variables and their Association with Short Child Spacing in Population 2

Variable	DF	Estimate	Standard Error	Chi-Square	Prob Chi-Square	Hazard Ratios	OR 95% CI	
							Lower	Upper
CSPP (yes vs no)	1	0.08	0.07	1.25	0.26	1.08	0.94	1.24
HBPB (yes vs no)	1	0.03	0.07	0.14	0.71	1.03	0.90	1.17
Mom age <20 at first birth (vs 20+)	1	0.23	0.06	13.64	0.00	1.26	1.11	1.42
SEFI score (continuous variable)	1	0.09	0.03	9.15	0.00	1.09	1.03	1.16
Brandon residency (vs Wpg)	1	0.13	0.13	0.93	0.33	1.13	0.88	1.46
Mid residency (vs Wpg)	1	-0.01	0.11	0.01	0.93	0.99	0.81	1.22
North residency (vs Wpg)	1	0.37	0.10	14.86	0.00	1.44	1.20	1.74
South residency (vs Wpg)	1	-0.04	0.11	0.12	0.73	0.96	0.78	1.19
Completed high school (yes vs no)	1	-0.38	0.07	28.91	<.0001	0.69	0.60	0.79
Mother is married (yes vs no)	1	-0.06	0.07	0.70	0.40	0.94	0.82	1.08

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.37: Characteristics of Women in Study Population 1 By Healthy Baby Program, With Missings Included in the Denominator

Variable	*Total Study Population (N=12,694) by HBPB receipt*			*Total Study Population (N=12,694) by CSP Participation*		
	HBPB-Received (n=12,231)	HBPB-Not Receive (n=463)	p-value *	CSP – Participated (n=1,869)	CSP – Did Not Participate (n=10,825)	p-value *
Smoked during pregnancy	36.82%	23.33%	p<.0001	40.60%	35.51%	p<0.0001
Used alcohol during pregnancy	19.79%	16.11%	NS	24.96%	18.62%	p<0.0001
Used drugs during pregnancy	9.68%	7.50%	NS	14.32%	8.68%	p<0.0001
Lacked social support	7.71%	10.00%	NS	12.33%	6.91%	p<0.0001
Experienced relationship distress	11.24%	4.17%	p<.0001	16.80%	9.86%	p<0.0001
Experienced depression	17.34%	12.22%	p<.005	23.99%	15.83%	p<0.0001
History of child abuse	10.55%	8.33%	NS	16.98%	9.20%	p<0.0001

* p-value tests whether difference between percentages are statistically significant

Note: The percents listed for these variables include the cases with missing values (i.e., those who were not surveyed, or did not respond to survey question) in the denominator.

Source: Manitoba Centre for Health Policy, 2010

Appendix Table 1.38: Characteristics of Women in Study Population 2 By Healthy Baby Program, With Missings Included in the Denominator

Variable	*Total Study Population (N=12,694) by HBPB receipt*			*Total Study Population (N=12,694) by CSP Participation*		
	HBPB-Received (n=12,231)	HBPB-Not Receive (n=463)	p-value *	CSP – Participated (n=1,869)	CSP – Did Not Participate (n=10,825)	p-value *
Smoked during pregnancy	55.68%	59.09%	p<.05	52.97%	57.35%	p<0.05
Used alcohol during pregnancy	26.02%	25.86%	NS	28.75%	25.37%	p<0.05
Used drugs during pregnancy	16.36%	15.32%	NS	19.23%	15.40%	p<0.005
Lacked social support	7.73%	8.02%	NS	11.03%	7.09%	p<0.0005
Experienced relationship distress	17.58%	15.32%	p<.05	22.34%	15.82%	p<0.0001
Experienced depression	23.10%	18.77%	p<.0005	28.09%	20.63%	p<0.0001
History of child abuse	18.09%	15.05%	p<.01	22.62%	16.13%	p<0.0001

* p-value tests whether difference between percentages are statistically significant

Note: The percents listed for these variables include the cases with missing values (i.e., those who were not surveyed, or did not respond to survey question) in the denominator.

Source: Manitoba Centre for Health Policy, 2010

Potential Cost Savings Associated with the Healthy Baby Program

This report found that the Healthy Baby Program was associated with some positive birth outcomes. Besides the Population Attribute Risk percents associated with these positive outcomes that are reported in Chapter 4, we estimated the cost savings associated with these outcomes, using two different methods. It should be kept in mind that these are associations only; we cannot say that the Healthy Baby Program *caused* these positive outcomes. It should also be kept in mind that these are estimates only, and focus exclusively on costs associated with birth hospitalizations and do not reflect any further follow-up care.

In the first method, we focused on potential savings associated with reductions in low birth weight births. This category of births was chosen for this analysis because cost information was available from another MCHP report on low birth weight births, and because our own analysis, described in Chapter 4, found that receipt of the Prenatal Benefit was associated with a reduction in low birth weight births. To estimate potential cost savings associated with a reduction in low birth weight births, we calculated the average cost of a low birth weight birth and the average cost of a non-low birth weight birth, using the costs per weighted case and number of cases for these births given in Table 4.1 in Finlayson, Reimer, Dahl, Stargardter & McGowan (2009). We excluded from our calculation of the average low birth weight births, *extremely* low birth weight births (<1000 g) and *very* low birth weight births (1000-1499 g) because it was unlikely that the Prenatal Benefit would be associated in any way with these types of low birth weight births. The findings from these calculations are shown in Table 1.39a.

Appendix Table 1.39a: Estimated Potential Costs Savings for Prevention of Low Birth Weight Births 2005/06

Average Weighted Cost for LBW	$5,660.65
Average Weighted Cost for non-LBW	$718.06
Potential Savings per infant for moving from LBW to non-LBW	$4,942.58

Source: Manitoba Centre for Health Policy, 2010

In the second method used to estimate potential cost savings, we ran regression models for both populations, modeling the cost for each birth in our study period (note this is different from the first method above which focuses on low birth weight births only, which are very costly). In this second method, costs per birth were calculated by taking the Resource Intensity Weight (RIW) associated with each birth, and provided on the hospital record at discharge, and multiplying that by the Manitoba average cost per weighted case for cases in Manitoba hospitals in 2005 (Finlayson et al., 2009) - $2,953.45. Applying the RIW and average cost per weighted case to all births, we found that the unadjusted costs per birth for Population 1 ranged from $315.13 to $279,223.89, with a mean cost per birth of $1525.93.

Unadjusted costs per birth for Population 2 had the same range as Population 1, with a mean cost per birth of $1662.72. Table 1.39b below presents the average cost savings per birth for those participating compared to those not participating in the Healthy Baby Program. Keep in mind that the costs savings shown have been "adjusted" for additional variables expected to influence the outcome of birth, measured in cost. Covariates adjusted for in the models included mother's age, area-level SES, region of residence, high school completion, marital status, smoking during pregnancy, multiple birth, maternal diabetes, and for Population 1, income. Regression models also included both Healthy Baby Program components, so the estimated savings for the Prenatal Benefit have been adjusted for Community Support Program participation, and the estimated savings for Community Support Programs have been adjusted for Prenatal Benefit receipt. The interaction term between the Prenatal Benefit and Community Support Programs was also tested and retained in the model if $p<0.10$.

Appendix Table 1.39b: Estimated Potential Cost Savings per Birth Compared to No Healthy Baby Program Participation

Healthy Baby Program Component	Population 1*	Population 2
PB only	$454.15	$174.05
CSP only	NS**	$237.34
PB + CSP	$637.99	Interaction was not significant

* The interaction between the Prenatal Benefit and Community Support Programs was significant in Population 1, so average cost savings are shown not only for the separate components but also according to the combination of these components, compared to neither of these components.

** NS indicates that there was no statistically difference in cost from the "No Healthy Baby" group

Source: Manitoba Centre for Health Policy, 2010

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