ASSESSMENT OF A HEALTH PROGRAM DATABASE: THE BRITISH COLUMBIA PREGNANCY OUTREACH PROGRAM

by

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ABSTRACT

The mandate of the British Columbia Pregnancy Outreach Program (POP) is to provide education and support to high risk pregnant women. The purpose of the POP is to reduce the incidence of adverse birth outcomes.

The initial intent of this study was to use the 1994/95 POP database as a basis for an epidemiological investigation of the relationship between the identification of risk factors and actual birth outcomes. In the course of the initial analyses, it was discovered, however, that significant data quality issues precluded any undertaking of the proposed research. The focus of the research was redirected to a methodical assessment of the database, using a conceptual framework outlining criteria for assessing such databases. In order to establish the database's utility within these areas, a review of each variable of the database was made in terms of record completion rates, verification of internal consistency, and assessment of coding errors.

The findings of this investigation revealed that completion of data for each variable was consistently low. In addition, measurements of internal consistency indicated inaccuracies. In the process of the analysis of the database it was clear that definitions of variables required clarification and methods to reduce coding errors within the database needed to be introduced.

Currently, stakeholders of the POP are reviewing the evaluation of the Program and its corresponding database. This thesis has documented fully the problems encountered in the database with respect to every variable that is entered. Ideally, the next phase of the development of this database would address the data quality issues identified in this investigation in order that the resulting information could be analyzed with confidence.

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The support and encouragement from family and friends helped me tremendously to complete this project and for this I am eternally grateful. Heartfelt gratitude must be extended to Scott Miles for helping me see this project through to its completion.

DEDICATION

I would like to dedicate this thesis to my "second mom" and aunt, Doris Brown (April 12, 1922 to November 13, 1996).

Chapter 1

INTRODUCTION

A number of high risk prenatal counselling programs in both Canada and the U.S. aim to prevent low birth weights. In the United States, Women Infant and Children Programs (WIC) are available nation-wide and their main purpose is to provide nutritional assistance to mothers and their children. In British Columbia (BC), the Healthiest Babies Possible Program, funded by the City of Vancouver, was initiated in 1975 and was the model used for the development of the provincially funded Pregnancy Outreach Program in 1988. The Pregnancy Outreach Program (POP) is one component of the Government of British Columbia's effort toward the prevention of low birth weight and Fetal Alcohol Syndrome infants. These adverse pregnancy outcomes are considered to be among the most pressing issues in prenatal care in Canada since resource requirements for these infants in terms of neonatal intensive care and continuing health problems are considerable (Cohen & MacWilliam, 1995).

The Pregnancy Outreach Program Of BC

The Pregnancy Outreach Program of BC (POP) provides health counselling and peer support to high risk pregnant women who do not typically access traditional prenatal health services. Funding for POP is provided primarily by the Ministry of Health and awarded by contract to sponsoring community agencies. Each site is staffed by nurses, nutritionists, outreach workers, dental hygienist consultants and volunteers. A health professional (either a registered nurse or a registered dietitian-nutritionist) coordinates the Program, while peer counsellors are the primary service providers.

The POP began in 1988 in BC with the funding of eight community pilot sites: Cranbrook, Duncan, Nanaimo, Port Alberni, Prince George, Surrey, Terrace, and Williams Lake. In 1991/92, based on the success of the eight pilot sites, the Program was introduced in Campbell River, Kamloops, Quesnel, Smithers and Victoria (Esquimalt). One year later, the Ministry of Health allocated monies from the provincial budget to enhance funding to the fourteen existing sites and to expand the program to eight new sites which included Burnaby, Delta, Fernie, Mission, Nelson, Prince Rupert, Salmon Arm, and Ucluelet. Three of the POP sites (Fernie, Nelson and Ucluelet) which were funded in 1992 had fewer than 250 births per year. These communities were selected specifically to demonstrate that the program could be provided on a smaller scale. Since 1992, enhancement funds have been provided to individual sites based on submitted proposals and some sites utilized these monies to create satellite services from their main site. Currently, there are twenty-one communities actively offering the POP in BC.

The location and names of the individual sites of POP as well as the sponsoring agencies are shown in Table 1 on the following page.

Figure 1 (p. 4) illustrates the geographical location of the individual sites of the POP in BC.

Table 1
Location, Name And Sponsoring Agency Of The Individual Sites Of The POP, 1997

Site location	Site Name	Sponsoring agency
Burnaby	Pregnancy Outreach Program	Burnaby Family Life Institute
Campbell River	Babies Best Chance	Campbell River Family Services
Cranbrook	Better Babies	Cranbrook Home Support Services
Delta	Healthiest Babies Possible	Surrey Community Resources Society
Duncan	Cowichan Valley Healthiest Babies Possible	Cowichan Valley Native Friendship Centre
Esquimalt	Best Babies	Esquimalt Neighbourhood House
Fernie	Pregnancy Outreach Program	Fernie Women's Resource Centre and Drop-in
Kamloops	Baby's HeadStart	Kamloops Home Support Services Association
Mission	Pregnancy Outreach Program	Mission Community Services Society
Nanaimo	Building Better Babies	Tillicum Haus Native Friendship Centre
Nelson	Pregnancy Outreach Program	Nelson and District Home Support Services Society
Port Alberni	Building Healthier Babies	Family Health Centre, Health Outreach for Parents and Infants Association
Prince George	Healthiest Babies Possible	Northern Family Health Society
Prince Rupert	Pregnancy Outreach Program	Friendship House Association of Prince Rupert
Quesnel	Pregnancy Outreach Program	Quesnel and District Child Development Centre
Salmon Arm	Pregnancy Outreach Program	Shuswap Home Support Services Society
Smithers	Baby Project	DZE L K'ANT Friendship Centre
Surrey	Healthiest Babies Possible	Surrey Community Resources Society
Terrace	Building Healthy Babies	Terrace Child Development Centre
Ucluelet	Healthy Baby Program	Nuu-chah-nulth Health Board
Williams Lake	Prenatal Outreach Program	Cariboo Friendship Society

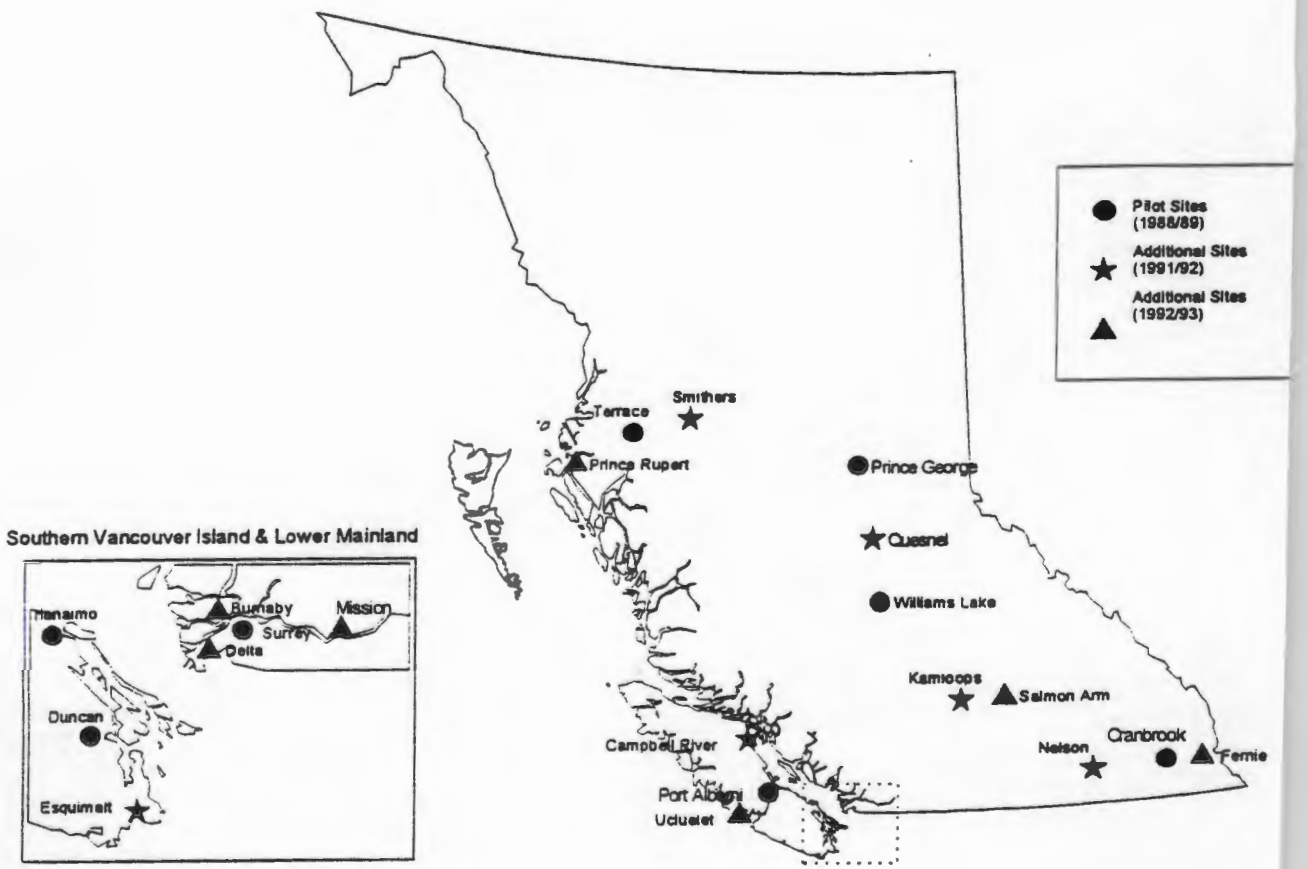

Figure 1. Geographical Location of the Individual Sites of the POP

POP Goals And Objectives

The overall goal of the POP is to promote positive health practices that contribute to the health of mothers and their infants. The strategies used to achieve this goal are outreach, education, and support to clients of the program. The nine specific objectives of the POP and how they are measured are described in the following:

1. Improve Nutrition

- To encourage an appropriate weight gain for pregnancy using standards for underweight, average, and overweight women.
- To increase the number of servings from each food group to the minimum recommended in the "*BC Food Guide for Pregnancy.*"
- To encourage an adequate intake of foods rich in protein, iron, calcium and folic acid, nutrients important to fetal development.
- To encourage the development of a well-balanced meal pattern for the client and her family.
- To improve food security by providing food supplements, meals or snacks at drop-ins, and/or referral to community resources as required.

2. Decrease Smoking

- To eliminate or at least decrease the number of cigarettes smoked by those clients who smoke, and to maintain this behaviour throughout the pregnancy.
- To reduce exposure to second-hand smoke during pregnancy.

3. Decrease Alcohol Use And Drug Misuse

- To decrease the number of alcoholic drinks consumed by the client who drinks, decrease the incidence of binge drinking, and to maintain the decrease throughout the pregnancy as well as to encourage and support abstinence.
- To reduce drug use to only those drugs approved by a physician.

- To identify women at risk for alcohol and drug abuse by using the T-ACE questionnaire and taking a history of personal and family alcohol and drug use for all clients.

- For clients with identified risk for substance abuse, to ensure referral to appropriate counselling and intervention in conjunction with the local Alcohol and Drug Program.

4. Raise Self-esteem

This measure is under development.

5. Encourage Breastfeeding

- To encourage breastfeeding during program contact in order that clients are breastfeeding on hospital discharge and continue for at least six weeks.

6. Promote Dental Health

- To identify women in need of dental care by using the dental screening questions.

- For clients with identified urgent dental need, to ensure referral to appropriate treatment in consultation with the Health Unit dental hygienist.

7. Encourage Physical Activity

- To increase participation in some form of physical activity such as walking or swimming, to at least three times per week.

8. Encourage Early Physician Care

- To encourage the client to seek physician care, prior to her second visit to the program.

- To encourage the client to attend follow-up prenatal visits with a physician.

- To ensure referral to a physician for treatment and intervention to any client with an emergent medical concern.

9. Promote Social/Community Support

- To encourage the participation of the client's family and friends in the program.

- To encourage the client to access applicable services available in their community during pregnancy and after birth of the baby.

These represent the general objectives of POP. For each client of the program, the specific objectives are identified by a staff member in consultation with the client.

POP Service Delivery Model

The service model for the POP is illustrated in Figure 2 (p. 8). It begins with referral from sources such as community agencies or physicians. During initial contacts, the staff member determines the client's specific risk factors using the Individual Prenatal Risk Identification Tool (see Appendix A). In addition to client risk measurement, the T-ACE Questionnaire (Sokol, 1988) is also administered. The T-ACE (see Appendix B) consists of four questions related to identification of risk drinking. The acronym "T-ACE" is based on the questions which evaluate tolerance to alcohol, annoyance that the client's drinking may create, whether the client feels she needs to cut-down her alcohol intake and whether the client feels she needs to have alcohol in the morning as an eye-opener (Sokol, 1988). Eligibility for entry to the program is based on the existence of one or more risk factors indicated on the Individual Prenatal Risk Identification Tool (IPRIT): that is, only women who are identified as having one or more risk factors for adverse pregnancy are eligible for enrolment in the program.

Consultation between the client and program staff results in the development of a care plan. One staff member is selected as the key worker for each client, although the program functions on a team approach to the provision of services. The four essential components of the POP are:

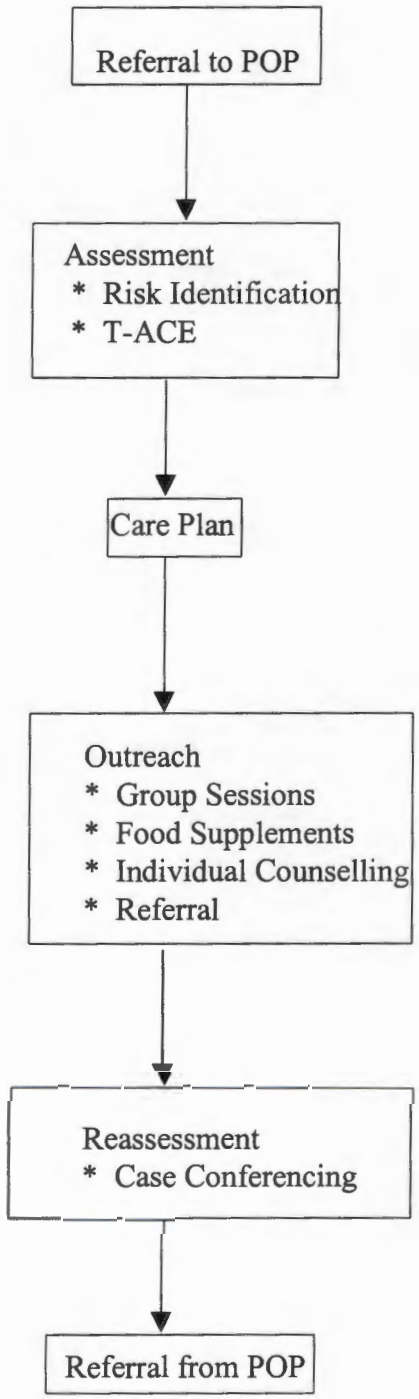

Figure 2. Service Delivery Model For The POP

- Group Sessions. The individual sites are required to have drop-in sessions. These are held at least once every two weeks. Healthy foods are served and, typically, there is a presentation on client-selected topics.
- Food supplements. Food supplements are a required component of the program and are provided for clients who are in financial need. Milk and juice are the most commonly offered supplements.
- Individual Counselling. In keeping with the 'outreach' nature of the program, individual counselling sessions may be provided at the program site, in the client's home, or wherever the client is most comfortable.
- Referral. The POP staff refers clients depending on their needs to various community resources. These include the Health Unit, Friendship Centres, YM/YWCA, La Leche League and other breastfeeding support groups, Homemakers, Food Banks, Twin Clubs, the Salvation Army, Alcohol and Drug Programs, parenting programs, the local Mental Health Centre, as well as the Ministry of Child and Family Services and Ministry of Human Resources.

Each POP site follows the described service delivery model, although sites may choose to allocate their budget and resources in different ways in order to respond to the particular needs of the target populations.

POP Administration

The Prevention and Health Promotion Division of the BC Ministry of Health has overall provincial responsibility for the POP. The Nutrition Branch of this Division coordinates the overall planning and forecasting for the Program.

During the history of POP (1988-97), responsibilities for individual programs have been shared at many and varied levels. In general, however, the roles and responsibilities of the key partners in most of the sites can be described as follows:

1. Sponsoring Agency

A sponsoring agency provides the POP under contract from the Ministry of Health. The sponsoring agency is selected on the basis of its acceptability to the high-risk target group and its stability within the community. The sponsoring agency may provide the POP service as its only mandate or it may integrate the service with other services within its organization. The sponsoring agency for each of the twenty-one POP sites in British Columbia was shown in Table 1 (p. 3).

2. Local Advisory Committee

The local advisory committee to the individual POP site has a mandate to address issues raised by that particular program. Membership of local advisory committees may include representatives from the local health departments, Ministry for Children and Families, alcohol and drug programs, sponsoring agencies, physicians, and hospital staff.

3. Local Health Department and Alcohol and Drug Programs

The Health Unit/Department, specifically public health nurses, nutritionists, and dental hygienists, provide a supportive role to the local POP. The Provincial Alcohol and Drug Programs offer a variety of direct and supportive services to the individual sites of the POP.

4. Provincial Advisory Committee

The Provincial Advisory Committee is responsible for ensuring the continuity and integrity of the Program. The membership of the committee reflects the provincial

interagency commitment to the program and includes prenatal policy and program experts from: Alcohol and Drug Programs, Ministry of Health; British Columbia Fetal Alcohol Syndrome Resource Group; Family and Children's Services, Ministry of Social Services; Family Health, Ministry of Health; Healthiest Babies Possible Program, Vancouver Health Department; and Native Health, Ministry of Health.

The Concept Of Comprehensive Prenatal Care

Pregnancy outreach is an example of a service that addresses health issues in ways that go beyond the traditional medical management approach to prenatal care. Since the mid 1970's, there has been an emphasis on prenatal programs that address social and behavioural as well as medical issues. Such programs have been described by the Department of Health and Human Services Low Birth Weight Prevention Work Group's Expert Panel on Prenatal Care (1986) as:

> consisting of health promotion, risk assessment, and intervention linked to the risks uncovered...requiring the cooperative and coordinated efforts for the woman, her family and her prenatal care providers...beginning when conception is first considered and continuing until labour begins...with objectives relating to outcomes through the first year following birth (Mortimer et al., pg. 783).

Comprehensive prenatal programs are considered to be multidimensional with foci on pregnancy and labour education, lifestyle behaviour modification, nutrition education and psychosocial support, in addition to traditional medical care.

Thesis Focus

Systematic evaluation of the POP is central to the maintenance and continued funding by the provincial government. In order to evaluate the program, each site collects data on client characteristics, risk factors, obstetric history, and birth outcomes.

The data is reported in a systematic format, using an electronic database. It was intended initially that this thesis would use the provincial database to investigate whether there was a relationship between the identification of risk factors and the actual birth outcomes. Before developing the epidemiological model that would test these relationships, however, preliminary analyses of the database were undertaken to determine the feasibility of doing such an analysis.

In the course of the preliminary analysis, it was found that, not only was the data difficult to access but that missing values, incomplete records, and various inconsistencies in recording, precluded undertaking the proposed epidemiological analysis. It was clear that such an analysis of the database would not reflect the experience of the population of the clients in the program within a specified time period and that there were limitations to the way in which the variables were measured. Thus, the proposed analysis that was to be undertaken would not contribute to an understanding of the relationship between the various predictors and the outcomes with reliability and validity.

It was agreed, therefore, that since the feasibility study had placed the database under close scrutiny, the focus of the thesis would be on evaluating the database itself. The thesis would identify the problems that were occurring in the recording of the data on individual clients at the local program level. The problems that were occurring in the transference of the data in the various client records to the electronic database would also be addressed. It was considered that such an evaluation could contribute to enhancing the way in which data is collected and recorded in electronic form, thus making it accessible and useful for systematic evaluation and epidemiological analyses.

Therefore, this thesis is concerned with the evaluation of the POP database that is derived from the client charts at the individual sites. In Chapter Two, a detailed description of the evaluation of the POP is given. Chapters Three and Four provide a literature review of risk identification and issues related to health program evaluation. Chapter Five describes the methodology used for this study, while Chapters Six and Seven provide the study results. Chapter Eight summarizes the conclusions and recommendations of this study.

Chapter 2

THE PROVINCIAL EVALUATION OF THE PREGNANCY OUTREACH PROGRAM

Evidence of the success of the BC Pregnancy Outreach Program (POP) is required to justify its services and continuing support. The provincial evaluation of this program is intended to assess the impact of the interventions on the clients and to address the challenges that arise among the individual sites due to program variation between the sites and differences in client characteristics. It is also intended to address the issue of the difficulty in measuring the impact of the program on pregnancy and birth outcomes.

The evaluation of the POP was planned by the Provincial Advisory Committee at its inception and involves reporting of data collected by each program. The evaluation has been concerned primarily with three areas: implementation, effectiveness, and with acceptance and satisfaction by the clients.

The implementation questions that have been addressed in the evaluation process include:

- Are the individual sites reaching their target groups?
- Are the programs reaching clients early in pregnancy and retaining them long enough to have an impact on pregnancy outcome?
- Are programs being integrated with existing services in the community?

The effectiveness of the program is intended to be evaluated by assessing changes in the reported health behaviour of clients. Information about health behaviours is collected

and recorded about the client at intake and at the last visit prior to the delivery of their baby. The forms used to collect the information are the Individual Prenatal Risk Identification Tool (IPRIT) and T-ACE Questionnaire. Both of these forms are used as a basis for determining eligibility for enrolment. In addition, a client tracking form (CTF) (Appendix C) is completed while the client is with the program. Information from each CTF is entered into an electronic version that was developed using a standard software program (Appendix D).

An evaluation of the acceptance and satisfaction with the POP was undertaken in the Spring of 1990 and culminated in the Qualitative Evaluation Report (BC Ministry of Health, 1993). Other studies of the POP have been conducted in addition to the provincial evaluation. These have included a case-control study conducted in 1995, a study that was planned to measure the impact of POP on maternal and infant outcomes. Individual sites of the POP used for this study included those located within the Central and North Vancouver Island Health Regions (Martin & Armstrong, 1995). In addition, a process evaluation in 1995 was undertaken to investigate the nutrition component of the POP (Code, 1995).

Organizational Principles Of The POP Database

In 1992/93, a contractor was hired by the POP to revise the evaluation forms and data collection systems to improve the ease of generating statistical reports. Using Epi Info Software (Dean et al., 1990), the contractor developed a data entry program that could be used by each site to input its own data and generate the required reports in a standardized format across the province.

The overall intent of the development of the POP database was to measure program goals and objectives. The following principles also governed the establishment of the POP electronic database system:

- it is based on the POP client population.
- it records the risk factors of the clients that are used to determine eligibility for POP enrollment.
- it describes intensity of use and differential use across individual sites.
- it is relevant to program staff and stakeholders.
- it has the ability to create location and annual profiles.
- it can provide for program-related research.
- it can be used for administrative purposes including the assignment of funds to individual programs, to support requests for funding from legislatures and other granting agencies, and for the planning of services.

The information system is designed to assess the health status of the client population using a variety of indicators, as well as to assess risk characteristics that form the basis for program intervention. The system can track POP use by clients across the province. The information system is organized around issues relevant to policy-making, program evaluation, program administration, and research at both the local and provincial level.

Management Of Client Data For The Provincial Evaluation

An overview of the data collection, data entry and analysis processes for the provincial evaluation as it operates at the individual sites of POP is illustrated in Figure 3 on the following page. Since eligibility for the program is determined by risk factors, all

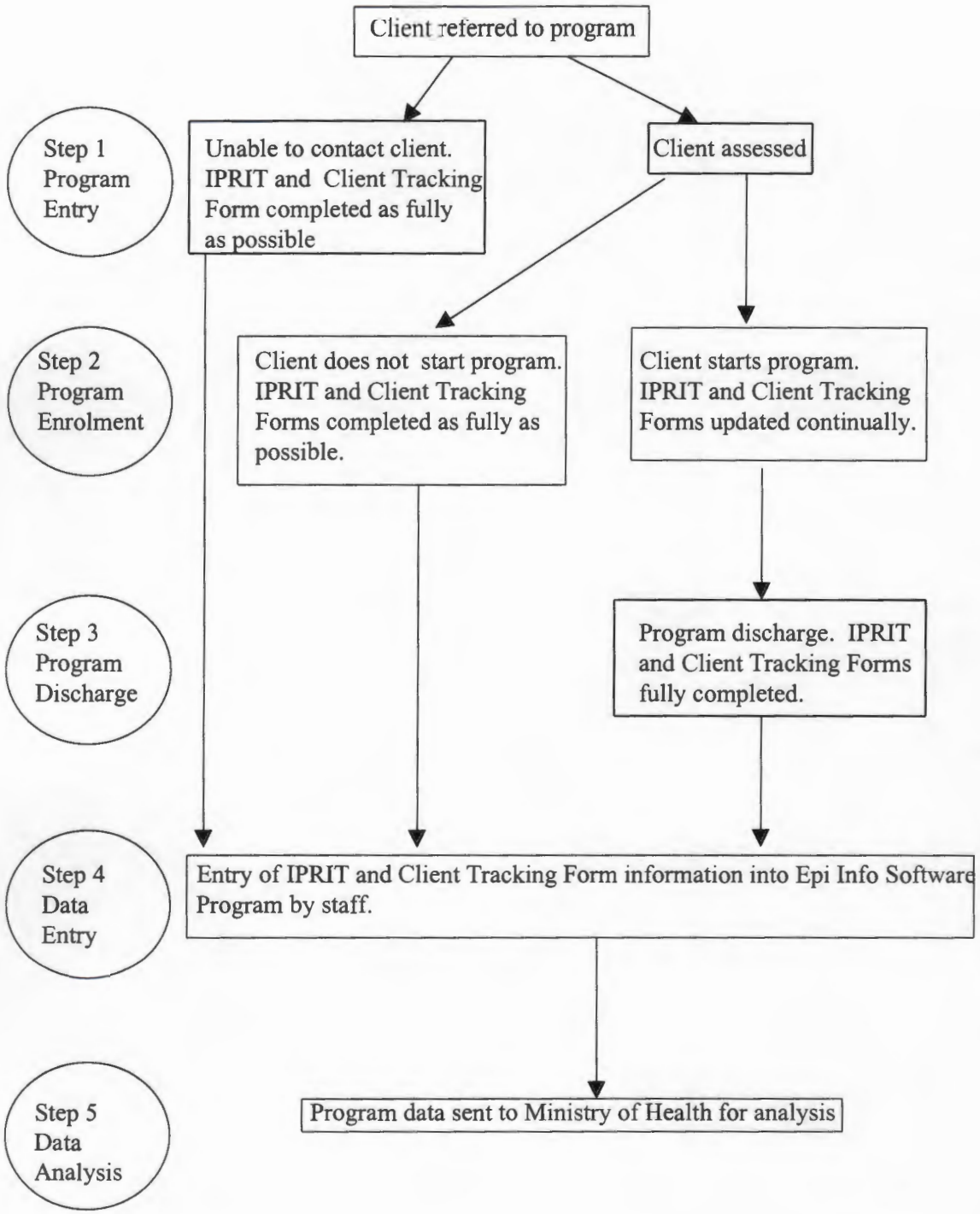

Figure 3. POP Operations And Its Evaluation

clients of the program are assumed to be at-risk for having a low birth weight (LBW) baby or other adverse pregnancy outcomes. The risk factors are measured by the IPRIT, an instrument that is based on areas that include physical, socio-economic, emotional and substance abuse factors. It is recommended that participants be no more than twenty-eight weeks pregnant at intake, to allow sufficient time for intervention to be effective. However, clients who are identified as being at-risk for substance abuse as measured by the T-ACE Questionnaire can be admitted at any time in their pregnancy. Local advisory committees have the discretion to set local criteria to determine whether women over twenty-eight weeks gestation who do not have an alcohol or drug risk can be admitted to the program.

Each program develops its own system for collecting the required client information for the provincial database. Client data derived from the charts is subsequently recorded on both the IPRIT and CTF (BC Ministry of Health and Ministry Responsible for Seniors, 1995). This information is then either entered in the electronic database at the site or the forms are submitted to the Ministry of Health and entered into the provincial electronic database there.

The data are submitted for every woman who is referred to the program and whose due date falls during the fiscal year reporting period (e.g. April 1, 1994 to March 31, 1995). The data submitted to the Ministry of Health include women who were:

- referred to the POP but were not assessed. This may occur because the client could not be located to be encouraged to enrol in the program.

- assessed by program staff but not enrolled. A client who is not at risk or does not wish to access POP services would not be enrolled.
- enrolled into the program but did not stay in the program to delivery or end of pregnancy. A client may have moved or decided to discontinue accessing services of POP once enrolled.
- enrolled into the program but did not have five or more program contacts. Provincial standards of the POP indicate that a pregnant woman must have had at least five contacts with program staff in order to be considered a client who completed the program.
- completed the program. To complete the program, a client must stay in the program to delivery or end of pregnancy, and have greater than or equal to five program contacts with staff members.

Information on all forms is to be completed by program staff, given the extent of a woman's involvement with the program as outlined above. If information for a particular item on the computerized questionnaire is not available the field is to be filled with "9's" (e.g., 999999 would be entered for a six character field).

Epi Info Version 5 Software Program

Epi Info Version 5.0 was the software program selected for the POP evaluation. The Epi Info Program was developed for epidemiological investigation, but databases can be formatted in this software to audit other related topics (Hollyer, 1991).

There are three levels in Epi Info for processing data derived from questionnaires and other structured formats. At the first level, the data gathering form can be formatted for

computer-assisted data entry. For the POP database, the IPRIT and CTF are available in Epi Info in this format.

The next level of this software program includes the shaping of data entry and analysis. This includes producing lists, frequencies, and cross tabulations. Records may be selected or sorted based on defined variables, "if" statements, and mathematical and logical operations carried out. Graphing, formatting of reports, generation of new data sets, and a programming language are included. Databases can be linked and analyzed.

The third level of Epi Info refers to the establishment of a permanent database system. This includes programming the data entry process, specifying the format of reports in customized tables, entering data into more than one file during the same session, and linking different types of files. The data entry process was pre-programmed for the POP in Epi Info and has been developed to provide a permanent and ongoing database.

The POP database provides the basis for evaluation at both provincial and local program levels. The purpose of the database program at each individual site is to allow individual sites to compile, store, and generate reports on their own client population (Fairburn & Dhanani, 1993).

Status Reports

The POP prepares an annual status report based on the data collected each year. The report is intended to focus on implementation issues as well as the impact of program intervention on the clients. Table 2 provides an overview of the content of previous Quantitative and Qualitative Status Reports produced since the POP began.

Table 2
Comparisons Of Annual Evaluation Reports Of The POP

Fiscal year	Type of evaluation	Information reported
1989 to 1990	Quantitative Evaluation Report	1. Implementation Indicators: Characteristics of participants, risk factors, timing of intervention, client retention, intensity of service, referral sources, program referrals 2. Outcome Assessment: Nutrition, smoking, alcohol use, drug use, emotional support, encourage breastfeeding
1991 to 1992	Status Report	1. Service Delivery Indicators: Client retention, referral sources, characteristics of clients, client risk factors, timing of intervention, intensity of service, referrals from the program 2. Client Outcome Indicators: Nutrition, smoking, alcohol use, drug use, social support, encourage breastfeeding, birth outcomes 3. Three Year Comparisons: Client load, client retention, sources of referral, service delivery, nutrition, smoking, alcohol use, birth outcomes
1992 to 1993	Status Report	1. Service Delivery Indicators: Client retention, referral sources, client characteristics, client risk factors, timing of intervention, intensity of service and program referrals 2. Client Outcome Indicators: Nutrition, smoking, alcohol use, drug use, social support, encourage breastfeeding, birth outcomes 3. Four Yearly Comparisons: Client load, client retention, referral sources, service delivery, nutrition, smoking, alcohol use, birth outcomes 4. Comparisons of Client Characteristics 1992/93: Characteristics of those clients who completed the program as compared to those who enrolled but did not complete, service and intervention, comparative characteristics of clients by completion of program, completion rates in relation to client risk factor, completion rates in relation to sources of referral, nutritional comparisons
1993	Qualitative Evaluation	Information collected by client interviews to assess the impact of the program on clients and their families and friends
1993 to 1994	Status Report	1. Service Delivery Indicators: Client retention, sources of referral, characteristics of clients, client risk factors, timing of intervention, intensity of service, referrals from the program 2. Client Outcome Indicators: Nutrition, smoking, alcohol use, drug use, social support, encourage breastfeeding, birth outcomes 3. Yearly Comparisons: Client load, client retention, sources of referral, service delivery, nutrition, smoking, alcohol use, birth outcomes
1994 to 1995	1994/95 Annual Report	1. Program Goals: Nutrition, smoking, alcohol and drug use, encourage breastfeeding 2. Birth Outcomes

Summary

Evaluations have become the norm for most publicly funded social programs in the 1970's and such mandates remain a strong impetus for current health program evaluation work (Stecher & Davis, 1987). POP has evaluated its program since its inception and this has been continued on an annual basis.

Against the background description of the POP database that has been presented in this chapter, the next chapter reviews selected literature related to prenatal intervention programs. It first reviews the literature related to prenatal scoring systems in order that the criteria used by the POP and recorded in the database can be related to a broader experience. The literature related to the evaluation of prenatal programs is then reviewed in order to place the potential of the POP database in a wider context.

Chapter 3

LITERATURE REVIEW - RISK FACTORS AND RISK SCREENING

In this chapter, the literature related to risk assessment in pregnancy is reviewed. This chapter is subdivided into three sections.

The first section reviews literature relevant to risk scoring systems. A majority of the current systems of risk assignment in pregnancy discussed in the literature relate to hospital and physician records. The POP uses a risk scoring tool, the Individual Prenatal Risk Identification Tool (IPRIT) to determine client eligibility instead of using it in a clinical context to assess risk of preterm labour and adverse birth outcomes. Although the POP has a somewhat different focus for the use of risk scoring, it was decided that in order to critically examine the data collected by the IPRIT, a review of other scoring systems and the literature related to them was warranted.

The next section reviews the literature related to risk factors for adverse pregnancy outcomes. Most risk scoring systems share risk factors in common with other risk factors being included or excluded depending on the primary purpose of the risk scoring.

The final section discusses risk scoring systems as they relate to prediction of pregnancy outcomes.

Risk Scoring Systems

Risk assessment refers to the identification of clients who are more likely to have adverse birth outcomes. Risk assessment is typically conducted at the first visit and continues during each prenatal encounter. A variety of systems of assessment are used, with each system covering factors that are both obvious and subtle in their relationship to

birth outcome (Morrison, 1990). Women deemed to be "at risk" are those who have an increased chance of adverse birth outcome above the baseline of the 4-6% noted in "normal pregnancies" (Morrison, 1990).

Risk factors are attributes statistically associated with the risk of a given adverse outcome. Risk factors may be related to the characteristics of the individual woman, her environment or her treatment. The adverse outcomes include maternal and child mortality, morbidity, and functional impairment. A risk factor for a given outcome may be a causal determinant of that outcome or it may merely be a predictive "marker" that a negative outcome is more likely (Backett, 1984). Studies have shown that risk assessment improves risk detection (Essex & Everett, 1977; Dissevelt, 1976) and that it is a valuable tool for the health care provider who is responsible for those at risk (Wilson & Schifrin, 1989; Lesinski, 1975; Goodwin et al., 1969).

Risk-scoring systems have been criticized as being characterized by low specificity and low sensitivity and some reviews have suggested that they have generally shown little benefit (Goldenberg et al., 1990; Heins et al., 1990; Maine et al., 1989; Konte et al., 1988; Herron et al., 1982). Hueston (1992) pointed out that the high risk scoring system tends to identify clients who are at high risk for medically indicated iatrogenic preterm delivery or premature rupture of membranes but that the scoring system has poor positive predictive value when used in lower risk populations. Others (Maine et al., 1989) have indicated that risk scoring systems vary in predictive value since they may increase the chance of unwarranted health intervention in pregnancy. They also carry the inherent disadvantage of stigma and anxiety associated with "high risk" labeling (Creasy, 1993; Maine et al., 1989).

Although risk scoring has been reported to correlate with perinatal outcome, the validity of these correlations is questionable when subjected to strict epidemiological analysis (Health and Welfare Canada, 1981). It has been suggested that rigorously designed studies have yet to be published that test the hypothesis that risk scoring alone modifies perinatal outcome. Most of the systems give, at best, a positive predictive value of only 20-35% and a sensitivity of 40-70% (Creasy et al., 1990). In fact, several studies have found that information collected during a single antenatal visit on variables such as age, parity and obstetric history, together with measurements of height and weight was sufficient to identify the majority of risk factors (Shah & Shah, 1981; Lennox, 1981; Shah, 1978; Hart, 1977; Essex, 1977; Dissevelt, 1976).

Investigations of risk scoring systems have revealed that there are difficulties associated with the use of prenatal risk forms for accurate data collection. These difficulties include completion compliance and validity of recorded data. For example, a survey of over 2000 prenatal records (Canadian Task Force on the Periodic Health Examination, 1979) showed a wide variation on an item-per-item basis as far as completion rates. Some items had a completion rate of greater than 80%, others less than 50%. Any data with this much variation produces inaccuracies.

With respect to the validity and reliability of the data recorded, the risk identification forms often ask for information that is inadequate for predictive purposes. For example, risk assessments often require information on smoking in the form of a 'yes' or 'no' answer. This question should include the type of cigarette, the amount of nicotine contained in this brand, the number of cigarettes smoked, the period of gestation during which smoking continued and if and when the client stopped smoking during pregnancy.

Risk Factors

Although many risk scoring systems are comprehensive, the inclusion of some risk factors and the exclusion of others is frequently questioned. Factors that are questioned include employment, weight gain, genetic factors and diet. For example, some risk score sheets include employment during pregnancy as a risk, whereas others do not because the literature reflects evidence of both the harmful and beneficial effects of work on pregnancy outcome.

The literature supporting risk identification in pregnancy reflects inconsistencies and controversial views. For example, a summary of the Women, Infant and Children Program (U.S. Institute of Medicine, National Academy of Sciences, 1992) indicated that inadequate nutrition encompassed more than just the consumption of foods consistent with the U.S. food guide and should include factors such as food security.

The research literature relating to the risks associated with weight gain in pregnancy reflects inconsistent predictive values. In particular, the criteria related to timing of weight gain necessary to prevent fetal problems is controversial (The Institute of Child Health, 1993). Further, weight gain in pregnancy seems to vary among different ethnic groups (Worthington-Roberts & Klerman, 1990) and this needs to be taken into account.

Many risk scoring systems include established genetic diseases as risk factors. Whether this should be included on risk score sheets that are non-medically based remains controversial. For example, programs such as POP highlight lifestyle risk factors and the identification of medical factors may be beyond the scope of the program. Such programs, however, may provide support and education to the expectant mother who would be experiencing stress as a result of genetic or medical risk factors.

It is apparent that there is a need for more research to fully understand predictive values of the risk factors that are currently used. Given that the understanding of the pathophysiology of adverse birth outcomes is incomplete (Creasy et al., 1990), it is not surprising that risk scoring systems with an acceptable degree of predictive discrimination have not been developed.

Pregnancy Outcome

Risk factors may be specific to the pregnancy outcome to which they relate. Although overlap may occur, attributes associated with a higher risk of one outcome may not be associated with a higher risk of other outcomes and may even confer protection against them (WHO, 1994). Attributes such as young or advanced maternal age, primiparity, high multiparity, short stature, low pregnancy weight-for-height, poor gestational weight gain, close spacing of pregnancies, history of adverse outcome in previous pregnancies, severe anaemia, and cigarette smoking are often discussed as if they represent "universal" risk factors, in the sense of being associated with all, or at least most, adverse outcomes of pregnancy. However, research findings to date do not generally support this notion (WHO, 1994). For example, a woman who smokes appears to be somewhat protected from developing pre-eclampsia but her fetus is at increased risk of both growth retardation and preterm birth.

According to Creasy et al. (1993), a proportion of all pregnant women, probably less than 25%, have an increased risk that require(s) them to be managed differently from the remainder. Women's pregnancies have been more appropriately managed and their perinatal death and morbidity rates reduced as a result of application of a wide spectrum of interventions by health care teams. It has been increasingly difficult to ascertain

whether improved pregnancy outcomes have been due to improvements in the health care system or the development of risk scoring systems.

Nonetheless, risk detection in pregnancy is considered a valuable concept, although, its applicability may be limited to certain settings. Traditionally, such systems were used in acute health settings to identify prospectively those women most likely to deliver before 37 weeks gestation. Such risk scoring systems conduct the assessment during the first trimester and at 26 to 28 weeks gestation (Creasy et al., 1980). Studies have shown that risk assessment in the first trimester will typically identify one-third of the general population as being high risk (Main et al., 1985). Rescreening later in pregnancy may identify an additional group of women likely to be delivered before 37 weeks gestation (Main et al., 1985). However, it is questionable whether further screening would be of additional benefit especially since the more advanced the pregnancy the less the time to improve outcome by modifying lifestyle risk factors.

The function of risk identification forms must be clearly defined. These forms are typically used both as a working guide for staff in their management of the pregnancy and as a form designed for accurate data collection about a program. Attempts to design a risk assessment form that achieves both of these goals often result in forms that do not satisfy fully either objective.

It is apparent that, although there are many factors which have risks related to adverse outcomes in pregnancy, there is urgent need for further research to determine the predictive values of these risks and the values of the interventions that are intended to reduce the risks.

Summary

This chapter has provided an overview of risk scoring systems, the factors that make up these systems and their predictive value. The following chapter discusses the literature related to the evaluation of intervention programs for pregnant women.

Chapter 4

LITERATURE REVIEW – PROGRAM EVALUATION

This chapter is concerned with the health program evaluation process. The Pregnancy Outreach Program (POP) requires that data be collected and entered into an electronic database in order to provide a basis of evaluation for the POP. A review of selected literature relevant to health program evaluation places the POP evaluation process in a broader context.

Evaluations Of Outreach Programs For High Risk Pregnant Women

Although studies suggest that programs targeted at reducing adverse birth outcomes are well accepted by clients (Hueston, 1995; Creasy, 1993; Papiernik et al., 1986), evidence demonstrating the effectiveness of these programs has been inconsistent. Early studies of preterm-birth prevention educational programs generated enthusiasm for this low-cost procedure since studies using historical controls demonstrated reductions in low birth weight (LBW) and preterm delivery in clients who were provided with education programs throughout the third trimester of pregnancy. However, a meta-analysis of studies describing the effectiveness of these programs concluded that preterm-birth prevention educational programs appeared to have little benefit in reducing preterm birth (Hueston et al., 1995).

The delivery of specific interventions for high risk pregnant women has been studied primarily with smoking cessation and diabetes management. Less documentation exists regarding the efficacy of risk interventions designed to improve outcome such as LBW. While strategies for the management of high risk pregnancy interventions exist, there is

no definitive evaluation of the role and effectiveness of risk scoring in pregnancy in determining outcomes.

Research has also shown that prenatal outreach programs or free prenatal care reduce perinatal morbidity (Moore et al., 1986), improved access to prenatal care and birth outcomes (Schlesinger & Kronebusch, 1990; Corman & Grossman, 1985; Norris & Williams, 1984), and were cost effective (Moore et al., 1986; Institute of Medicine, 1985). Although the exact mechanisms(s) through which these programs impact on infant health is not known, studies suggest that improved nutrition, preterm delivery education and screening of risk factors that arise during pregnancy (Institute of Medicine, 1988) are avenues through which prenatal care for low income women improve infant outcomes.

Variability in the outcomes of these programs is due to many reasons. Differences in the interventions, application of the program to different client populations, samples being limited to high-risk clients who often deliver prematurely, and varying methodologies have all contributed to the confusion. Many studies have used small sample sizes, limiting their power to detect small but important differences between intervention and control groups. Also, some studies have focused on intermediate outcomes, such as cervical dilation and potentially preventable preterm birth, which are not clearly linked to outcomes of LBW, preterm delivery, or neonatal survival. Because such programs are inexpensive and low risk, and because of the disproportionate increase in morbidity and mortality, and the high costs associated with preterm birth (Gold et al., 1987), a small effect may be noteworthy.

Assessment Of Health Program Databases

A database is a collection of data that has been aggregated and can be organized to provide useful information that can readily be extracted from the database (Ferri et al., 1993; Wiederhold, 1981). The concept of a database encompasses the data itself, the hardware used to store the data, and the software used to manipulate the data.

The development of health program computer databases began in the 1960's. University and government administration had databases that were used in the areas of health care delivery, evaluation of clinical interventions and more recently in areas of public health. Databases may be subdivided into macro and microdata components. Macrodata refers to the entire dataset and has many applications that include health-care management, program planning and evaluation, health policy development and health research. Microdata describes events at a local or elementary level and are generally used by health managers (Ferri et al., 1993; Wong, 1984). In the context of the present study, the POP database program is an example of microdata that is intended to provide the program coordinator with information about the client population. The corresponding macrodata is the provincial database that can provide information on different variables for the entire POP clientele.

Data that is required to carry out the functions of health services evaluation comes from a variety of sources and in a diversity of forms, but the data must meet standards of validity and reliability if the evaluation is to be of value (Feinleib, 1993). The following reviews the basis for the evaluation and assessment of health program databases. It groups the criteria under four headings: utility for program evaluation, utility for decision

making and policy development, utility for health research and selection of information system.

The Utility Of The Database For Program Evaluation. In reviewing the literature, eight dimensions relevant to the assessment of health program evaluation have been described and are discussed in the following.

i) Relevancy and Specificity. Can one obtain the data that are needed? Will surrogate measures or already existing data serve to make current decisions? Conversely, are scarce resources being expended on collecting data that are no longer relevant to the issues? Could collection of the data be discontinued with little loss to the advancement of knowledge?

ii) Coverage. Can one gather adequate data for the population subgroups of interest? Data for local areas, small demographic subgroups, and special constituents may be costly or impossible to collect.

iii) Quality. How does one determine whether the quality of a database is good or bad? The goal is to obtain the best data possible but when compromises must be made, to what extent can quality be sacrificed? Agencies that collect data must constantly judge the trade-offs between quality, costs and timeliness.

Data must be of sufficiently high quality to add to the body of knowledge and have direct applicability to the decisions being made. It is not infrequent that researchers find data presented in a form that does not allow for comparability or easy use for the studies under consideration.

iv) Acceptability, Collection and Dissemination. Are the data collection methods acceptable in terms of design and costs? Are the intended respondents or providers of

data (individuals, institutions, government agencies) able and willing to provide the information? Ethical considerations, confidentiality concerns, respondent burdens, and conflicting priorities may hamper the ability to collect the data. Will the results be accepted by users as valid and credible?

There are numerous examples in which poor decisions were made because the available data were inadequate in these respects. The effectiveness of databases is derived from the fact that from one single, comprehensive database much of the information relevant to a variety of organizational purposes may be obtained (Weiderhold, 1981).

v) Timeliness. How recent do the data have to be? How long do time series have to be to disclose temporal patterns and progress toward objectives? The time frame for responding to specific planning problems is often lengthy. Software programs have been developed for processing this data but specific problems often arise which cannot be handled through standard processing. Mechanisms and processing strategies for responding in a timely manner to such problems need to be devised. The relevance and importance of data to health program planning is a function of time. In many cases, data is out of date before it has been analysed.

vi) Confidentiality. With the renewed public interest and involvement in the issue of data privacy, restrictions in accessing data files have become more specific and limiting in some instances while making data more accessible in others. More clarification of what constitutes private, confidential or public data needs to be forthcoming in order to alleviate the difficulties involved in accessing data for health planning purposes.

vii) Cost-Effectiveness. Cost-effectiveness is a central dimension for program evaluation and it is one that is not often accounted for. It considers information on the amount and complexity of the inputs, expressed in monetary units, and the outcome expressed in some composite measure. The cost of the evaluation will be determined by the complexity of the interventions and the efficiency of the resources.

viii) Appropriateness of Evaluation Paradigm. Databases developed for the intent of health program assessment must be based on a specific evaluation paradigm. The evaluation process can be conceptualized as consisting of three main steps: setting the evaluation agenda; formulating and implementing the research; and termination, dissemination and use of results. Various models of evaluation have been proposed by a number of theorists or practitioners. Those models differ in their conceptions as to what evaluation is, what the relationship with the primary client and other stakeholders should be, who should be making the relevant value judgments regarding the program, and the criteria for judging the evaluation study itself. According to Bobadilla (1992), there are over eighty approaches available to evaluate maternal health programs. The three main paradigms governing evaluators and evaluation models (Hamilton, 1993; Ross, 1991; Smith & Glass, 1987; Cronbach, 1982) form the focus of the present discussion.

The first paradigm considers evaluation to be synonymous with applied research. Rigorously designed comparative studies, true field experiments, randomized clinical trials, quasi-experiments and experiments are the methods sought. Methodological rigour, particularly internal validity, is seen as important for discerning causality. The evaluation is primarily summative, comparative and quantitative. One of the most important assumptions of this paradigm is that the experimentally controlled comparison

provides the most valid evidence that the program produced results. Program goals must be few in number, non-problematic and clearly specified. The evaluation is targeted at one primary official policy maker who presumably acts rationally when provided with experimental data.

The second paradigm conceives of evaluation as part of systems management, aiding managers in their administration of the program. The organization is seen as a system of inputs, process, and outputs. The evaluator describes these and relates them to each other. The manager can then make decisions to regulate and improve the functions of the system. Research methods tend to be surveys of decision makers to determine program goals and their information needs, client satisfaction surveys, cost analysis and, sometimes, monitoring of program processes. The evaluator is interested in level of attainment on performance indicators of the given goals, and in discrepancies between the stated objectives and performance. Some authors refer to this model as an objectives-based or goal attainment paradigm.

The final program evaluation paradigm emphasizes that valuation and politics are inextricably mixed. Evaluation research studies are not directed just at one all-powerful decision-maker, but should consider all major stakeholders who may play a role in maintaining, modifying or eliminating the program. These stakeholders in turn should be appropriately informed of the results of the evaluation.

The paradigms, derived from the various writings of evaluation theorists, illustrate the scope and variety of ideas about what program evaluation is. The common dilemma for program evaluators is that it is not possible in one study to maximize comprehensiveness,

relevance and scientific rigour. A series of related studies gives greater flexibility, and lends itself readily to evaluation of health action.

Utility For Decision-Making And Policy Development. Alkin (1969) described program evaluation as a process of ascertaining areas of concern and selecting appropriate information in order to report summary data useful to decision makers. In order to answer the questions of stakeholders, certain criteria must be considered.

i) Accessibility. Are the data available to those who need them? Despite the wealth of information that can be potentially available relationships are such that the information is often not accessible. Data tends to be collected in an unstandardized manner, is closely guarded by interest groups, and is often lost in the myriad of agencies involved in the collection process since there is no central repository or communication mechanism.

ii) Types of Decision Making. The literature describes four types of decision-making in evaluation: metamorphic, homeostatic, incremental and neomobilistic (Cronbach, 1982). Metamorphic decision-making is intended to produce a complete change in a system. Homeostatic decision-making is a common occurrence and aims to maintain the normal balance in a system. These changes are usually small and remedial and are used to correct deviations found at the time of evaluation. Incremental decision-making involves shifting the program to a new normal balance based on small serial improvements. Neomobilistic decision-making involves innovative solutions for significant problems. The evaluative process selected will be the basis of the type of decisions to be made.

Selection Of Information System. The literature review indicated three key areas relevant to the assessment of the information system selected as the avenue for

documenting the information with a health program database. These are summarized in the following.

i) Usability. Are the data in a usable format? Are they accompanied by appropriate software in order that the user can generate summaries, tabulations, graphs, and other analyses appropriate to the user's needs? Often, varying units of aggregation or analysis are employed in the assembly of data. In many cases, it is difficult if not impossible to convert data from one of these aggregations to another.

Traditionally, secondary data is not uniform either cross-sectionally or historically. Secondary data sources are also very uneven in validity and reliability due to methodologies employed in collection and processing of data.

Secondary data, particularly that related to specific organizations and institutions, may only be made available in the aggregate. These data may be useful in uncovering trends and the possible generation of hypotheses, yet too general for testing those hypotheses. Thus, descriptive results may emerge which lack the specificity necessary to contribute to further knowledge about a particular subject.

One of the key issues in assessing usability of an information system is looking at the approach of processing. Data can be processed by distributed and centralized means and this is dependent on the type of information and resources available.

ii) Coordination with Existing Database Systems. Provincial and federal levels of government have identified the collection and analysis of data as a major responsibility which includes data concerning the status (and its determinants) of the health of the Canadian population as well as health care delivery systems, the effect the area's health care delivery system has on the health of the population, the number, type, and location of

Canadian health resources, including health services, manpower, and facilities as well as the patterns of utilization of health resources in various areas.

The BC Ministry of Health has taken many initiatives to develop record keeping and linkage systems. The BC Royal Commission on Health Care (Province of BC, 1991) recommended that information must be as simple as possible to collect, using standardized forms; be stored centrally; allow a patient/client to be followed through the health care system; allow measurement of the effect of health care services and allow for the measurement of the population's health.

Health care workers and managers must be involved in deciding what information is needed to ensure that it is useful. Health care researchers must also be involved to ensure that the data collected are sound. Furthermore, the provincial and federal ministries of health should agree on a consistent set of data to be collected and that the information be coordinated.

iii) Cost-Effectiveness. As is the case for determining utility of a health program database for program evaluation, cost-effectiveness is central to the assessment of information system selection.

Utility For Health Research. Three key areas are addressed in the research literature pertaining to the utility of a database for health research.

i) Using Health Program Databases for Health Services Research. Health services research has been described as:

> ...an interdisciplinary activity, directly relevant to health and intended to further the understanding of the many factors influencing the delivery of health care with the ultimate objective of improving the provision of health services and making more efficient use of resources. It encompasses a wide spectrum of activities ranging from fundamental

> research, the collection of statistical information, applied research, development, testing and evaluation, to policy analysis and long range planning. Its substantive concerns are equally broad and include the planning, organization, financing, management, use and effectiveness of health services (Institute of Medicine, 1978).

In Canada, the development of health program evaluation and research in the future will likely be at the provincial rather than the national level. Nevertheless, since the provincial issues are, in most cases, the national issues, future national policy may well be developed based on the experimental programs and research findings from the provinces. Can the current provincial database systems appropriately assess the impact of health programs and be a basis for national policy decision making?

ii) Research Methods. A statistical format is required to evaluate most interventions for several reasons. The evaluation methodology must be sufficiently sensitive to isolate the effects of the program.

The amount of control that can be exercised by the researcher depends on the method that is selected (e.g. descriptive, correlational, quasi-experimental or experimental design). In evaluation, the evaluator needs to be sure that changes in measured behaviour can be attributed solely to the program. Thus, the use of experimental and quasi-experimental designs are ideal. In reality, however, such designs are difficult to implement in the context of health program delivery.

iii) Validity and Reliability. A key problem in using secondary data is the recurrent question of reliability and validity of the data. When data is collected for one particular purpose, there is no assurance that those data will be appropriate to the particular research interest. Typically, the original researcher may have asked a question that "comes close" to measuring what one was interested in. One needs to ascertain whether the question

that was asked provides a valid measure of the variable that is to be analyzed within the context of the proposed evaluation.

A Conceptual Framework

The POP database was described in detail in Chapter Two. Using the evaluative criteria discussed in the literature review in this chapter, a conceptual framework has been developed. This is outlined in Figure 4 located on the following page.

This conceptual framework focuses on assessment of an electronic database intended for health program evaluation. The first step of the assessment involves describing each variable of the database and reviewing it in terms of its utility as a unit of measure. The detailed review is the basis of the next step that involves assessing the database in terms of four inter-related criteria (inter-relation is depicted by two-way arrows): utility for program evaluation, utility for decision-making and policy development, utility for health research and selection of information system.

This conceptual framework is intended to form the basis of evaluating the POP database.

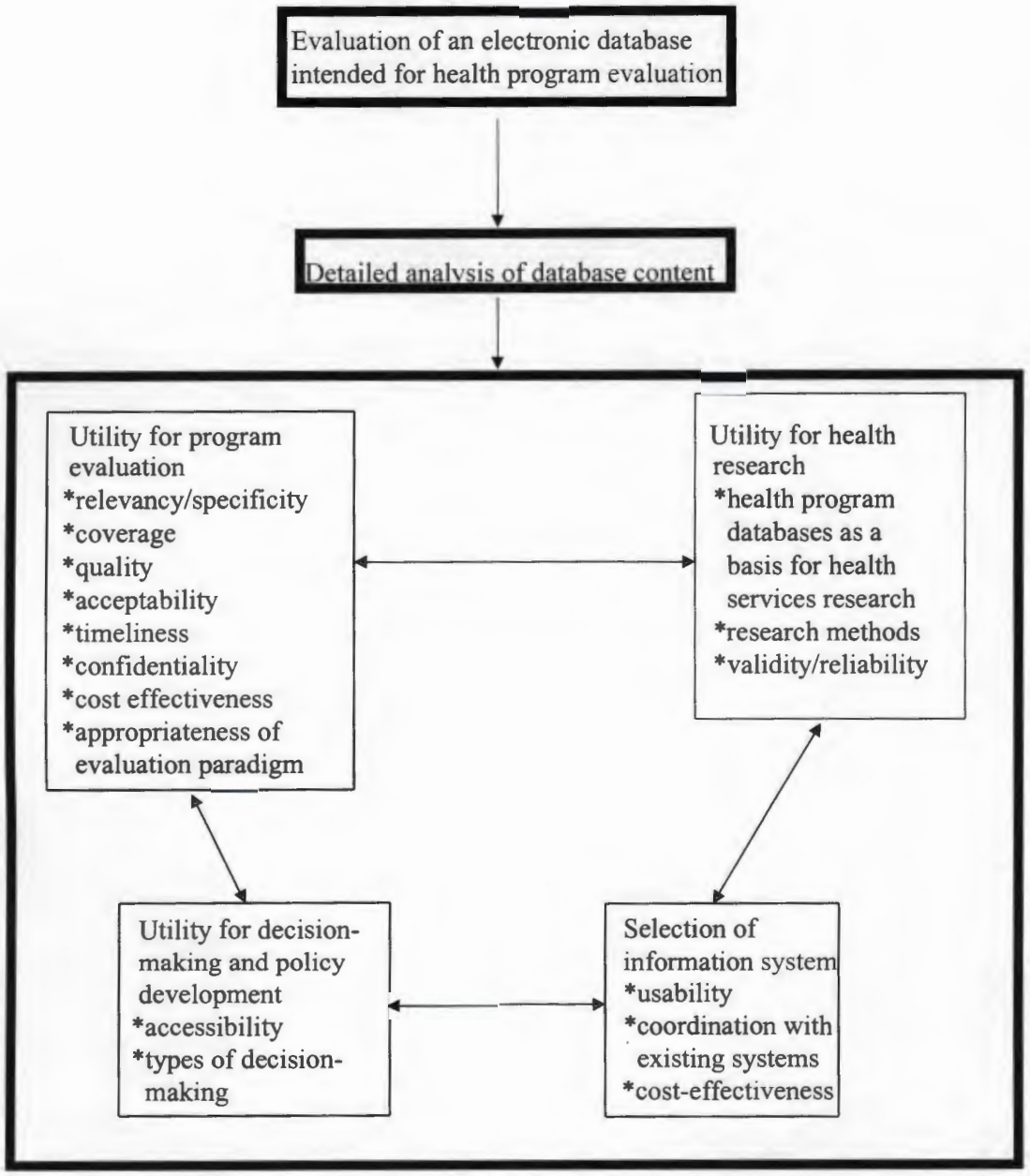

Figure 4. Framework For Reviewing An Electronic Database Intended For Health Program Evaluation

Chapter 5

METHODOLOGY

This chapter outlines the process that was undertaken to evaluate the quality and integrity of the Pregnancy Outreach Program (POP) evaluation data.

Data Selection

To assess the electronic information of the POP database, all variables of the database were reviewed. The focus of this review is to illustrate the problems that may be encountered by analysts who use the database for research and evaluation and to guide further development of the database.

At the time of study, the POP database that was available included data from the years of 1992/93, 1993/94 and 1994/95. It was decided to review the data collected between April 1, 1994 to March 31, 1995. This year was selected as it was the most recent time frame available at the time of study and it included all twenty-one POP sites in BC.

Formatting Of Data

The formatting of the data as made available presented technical difficulties which required considerable time to resolve. The data set for 1994/95 was made available on two computer disks. Attempts were made to merge the data on both disks through the merge function of the Epi Info Version 5.0 Software Program. This was unsuccessful because a "runtime" error precluded reading portions of the data from the file. This error also made it impossible to open the file in Epi Info to ascertain the source of the error.

To resolve this problem, the data was exported to Unix, a networking software program. The "runtime" error was identified and corrected. The files were then merged in Unix and reformatted in Epi Info.

Since Epi Info has limitations with respect to analytical capabilities, it was necessary for the purposes of this review that the data be exported to other software programs. Epi Info Version 5 allows for information to be transferred to SPSS, Lotus, DBASE and SAS. An attempt was made to directly transfer the 1994/95 file to DBASE but was unsuccessful as much of the data specific to each variable merged into single columns. In order to transfer the file within the available system capabilities, the following steps had to be taken:

1. The file from Epi Info Version 5.0 was transferred to Lotus 1-2-3.
2. From Lotus 1-2-3, the file was transferred to Microsoft Excel.
3. From Microsoft Excel, the file was transferred to DBASE Version 5.0.

The total number of records that appeared in Lotus 1-2-3, Microsoft Excel and DBASE files was 1741 which differed from the 1738 open records indicated in the Epi Info Version 5.0 Database File.

Data Analysis

Analysis of the data was conducted using both Microsoft Excel and DBASE 5.0 Software Programs. The database consisted of both qualitative and quantitative information. A total of 130 numerical and nominal variables existed in the database which were categorized based on their origin as follows:

1. Individual Prenatal Risk Identification Tool (IPRIT)

Consists of thirty dichotomous variables subdivided into four groups: physical (twelve variables), substance abuse (four variables), socio-economic (eight variables) and emotional (six variables) factors.

2. Client Tracking Form (CTF)

This is subdivided into sections that included: Initial Intake Information (four variables), Referral Data (three variables), Intake Data (six variables), Client Characteristics (twelve variables), Past Pregnancy Data (ten variables), Client Monitoring Data (fifty-two variables), Project Contact Data (seven variables), Referrals (one variable), Program Outcome (fourteen variables), Alcohol Data (fourteen variables) and Smoking Data (ten variables). Quantitative variables are dichotomous, continuous and categorical. Qualitative information derived from open-ended questions is also collected in this section of the database.

3. T-ACE Questionnaire

The T-ACE Questionnaire has four questions that are significant identifiers of risk drinking. The scores on this range from zero to five with a score of two or greater being an indicator for risk drinking in pregnancy. The value of each answer to the four questions is totalled to determine the final T-ACE Score. For the POP, the T-ACE is completed at intake and the cut-off for risk drinking for the program is a score of two or greater. T-ACE Scores are also part of the CTF.

Tabulations Of Each Variable

The following are the criteria used to assess each variable:

Frequency Distributions. The frequency distribution of each variable provided a base to characterize the "quality" and reliability of the data recording. A complete record for a variable was defined as a record that contained a valid code. An incomplete record for a variable was defined as a record in which the field was left blank. A don't know was defined as a variable which had "9's" entered as the answer.

Record Completion Rates. Record completion rates provided in the frequency tables were based on the number of completed records for that variable or the number of completes plus the number of specified "don't knows" divided by the total number of clients who stayed in the program until completion. Record completion rates will subsequently be referred to as "completion rates".

Internal Consistency. For a number of variables, the reliability of the recorded responses for the IPRIT can be assessed by cross-tabulating the risk factors to the responses to questions in the CTF. For example, the risk factor PF12 defined as a client whose age is less than 17 or older than 36 can be compared to age of client data in the CTF.

The total for most variables was based on the 1102 clients who completed the program. Some variables consisted of a subset of the client population (ie. alcohol follow-up information is based on clients with the risk factor of alcohol use indicated) and, where warranted, these are indicated as the totals for that particular variable.

Information Selection

As indicated in Chapter Two, revision of the CTF and the IPRIT occurred in 1992 and the revised forms were distributed to all sites in the 1993/94 fiscal year. The database at this time, however, was not changed to reflect the new forms. The 1994/95 database selected, reflected the information and format of the old IPRIT and CTF and these were used as the basis of reporting the results.

Chapters Six and Seven show the results of the analysis of the POP database. Chapter Six reviews the content of the IPRIT section of the database and Chapter Seven describes data from the CTF section of the database.

Chapter 6

RESULTS - INDIVIDUAL PRENATAL RISK IDENTIFICATION TOOL

This chapter describes and evaluates the data of the Individual Prenatal Risk Identification Tool (IPRIT) as recorded in the individual client forms.

Determining The Number Of Completed Files

The first step of the database analysis was a count of the number of records in the computer file. A total of 2261 individual client records were identified. This number included all clients who had been referred to the program since the computerized database was initiated in 1992. In this database, the number of open records that met the definition of expected due dates between April 1, 1994 to March 31 1995 was found to be 1738.

The 1738 eligible records in the data set for 1994/95 included 1102 clients who had remained with the Pregnancy Outreach Program (POP) until delivery of their baby. The remaining records in the data set included clients who were referred but did not complete the program because they were not high risk, were not interested in the program, moved, or discontinued the program. Since these records were necessarily incomplete they would not be eligible for inclusion in this investigation. The 1102 clients who completed the program represent the base for analysis in this evaluation.

The Individual Prenatal Risk Identification Tool - Description

The purposes of the IPRIT are to identify major factors that influence the outcome of the pregnancy and to record the risk factors specific to the individual client. The risk factors are subdivided into four categories. These include physical, substance abuse, socio-economic and emotional factors.

Each factor is defined in the IPRIT guide and these definitions are utilized as the basis for POP staff to record the risk information that applies to their clients. This guide, combined with experience, knowledge and intuition on the part of program staff is used as the basis for completing the IPRIT for each client.

The following frequency tables presenting 1994/95 data from the IPRIT are subdivided into the four sections of the risk score sheet. Record completion rates for each variable (hereafter referred to as "completion rates") are based on the number of files recording "yes" and "no" for a particular variable divided by the 1102 clients who completed the program.

IPRIT - Section One: Physical Factors

Table 3.1 presents data from the first section of the IPRIT, physical risk factors. Physical risk factors refer to medical and physical conditions, as well as the obstetric history, which can influence the outcome of the current pregnancy.

Table 3.1
IPRIT - Physical Factors

Risk factor	Description	Yes	No	Number of complete records	Completion rate	Total
PF1	Previous pregnancy loss	313	169	482	43.7%	1102
PF2	Illness/Condition with impact on pregnancy	194	175	369	33.5%	1102
PF3	Pre-pregnancy weight (BMI <19.8 or > 29)	369	132	501	45.5%	1102
PF4	Rate of weight gain	225	174	399	36.2%	1102
PF5	Inadequate nutrition	583	98	681	61.8%	1102
PF6	Previous child with anomaly or disorder	27	225	252	22.9%	1102
PF7	Previous high risk infant	44	219	263	23.9%	1102
PF8	Multiple pregnancy	21	225	246	22.3%	1102
PF9	Birth interval (less than 2 years)	146	208	354	32.1%	1102
PF10	Grand multipara (fifth pregnancy or more)	70	219	289	26.2%	1102
PF11	Established genetic risk	33	224	257	23.3%	1102
PF12	Age 17 and under/age 36 and over at time of delivery	248	182	430	39.0%	1102

Completion rates for the risk factors in this section ranged from 22.3% for PF8 to 61.8% for PF5. It is believed the low rate of completion for this and subsequent sections of the IPRIT occurs because the fields of the questionnaire have been left blank rather than recording a specific "n" (i.e. representing "no").

This constitutes a major problem because while an analyst could impute a “no” to the incomplete field, there are two risks in so doing. First, the blank field may indicate that this particular question was either not asked by the staff member or secondly the mother was unable to provide a definitive answer. The risk of a false negative in these circumstances, however, is such that it would be inappropriate or indeed misleading to impute a “n” where a field is left blank. This issue of missing data for these physical risk factors is also relevant to the entire section of the IPRIT.

In each section of the IPRIT, the risk factors will be discussed and evaluated for quality and integrity of the data. The following discusses the physical factors section of the IPRIT.

PF1 - Previous Pregnancy Loss. PF1, previous pregnancy loss, had a completion rate of 43.7%. Previous pregnancy loss includes a client's past history of spontaneous abortion, neonatal or infant death. The data collected for this risk factor is derived directly from initial intake information collected for the CTF. To verify the reliability of the data recorded for this risk factor, a cross-tabulation with related variables located in section five of the CTF was done. The following table shows the results of this analysis.

Table 3.2
Previous Pregnancy Loss And Client History Of Spontaneous Abortion, Elective Abortion And Stillbirth

	PF1: Previous pregnancy loss (recorded in the IPRIT)			
Previous spontaneous abortion (AS), elective abortion (AE) or stillbirth (SB) (recorded in the CTF)	Yes	No	Incompletes	Total
Client had one or more AS, AE or SB indicated	295	19	83	397
Client had no previous AS, AE or SB indicated	10	123	183	316
Incompletes	8	26	354	388
Don't knows	0	1	0	1
Total	313	169	620	1102

As illustrated by the above table, there were discrepancies between risk factor PF1 and related data collected on the CTF about the client's obstetrical history. Eighteen records which had PF1 positively indicated, did not have any prior AS, AE or SB recorded in the CTF. Conversely, of the 169 records indicating "no" for PF1, 123 records matched AS, AE or SB information indicated in the CTF. Differences between the two

variables may partially be due to the lack of recording of data for infant deaths (up to 365 days of life) on the CTF. If this was the source of data discrepancy, however, it would be anticipated that the number of files indicating "yes" for the risk factor, PF1, would be greater than the total number of client files on the CTF with previous AS, AE or SB indicated.

PF2 - Illness/Condition With Impact On Pregnancy. This variable had a completion rate of 33.5%. The list in the guide is extensive but there are no clear criteria for inclusion or exclusion of the various illness conditions named. In addition, some criteria for PF2 was replicated in the IPRIT guide. For example, 'very rapid weight gain' appears both in PF2 and PF4, thus creating a problem of double counting if the risk was present.

PF3 - Pre-pregnancy Weight. Considerable emphasis has traditionally been placed on weight gain during pregnancy management, however, PF3, had a completion rate of only 45.5%. This risk factor is based on the body mass index (BMI) measurement that is a ratio of one's weight measured in kilograms to the square of one's height measured in metres. Discussion with program staff of the individual POP sites revealed that how the BMI is calculated is inconsistent. Some program staff calculate it based on the established formula provided in the IPRIT guide, whereas other staff members use resources such as The Canadian Dietetic Association's Body Mass Index Calculator. These different methods will provide answers within approximately 0.5 of one another.

To verify the reliability of the data recorded for this risk factor, cross-referencing was done with the BMI's provided in the CTF (refer to section six). The following table shows the results of the analysis.

Table 3.3
Pre-pregnancy Weight And Client's BMI

	PF3: Pre-pregnancy weight (recorded in the IPRIT)			
Client's Body Mass Index (BMI) (recorded in the CTF)	Yes	No	Incompletes	Total
Prepregnancy BMI less than or equal to 19.8 or greater than or equal to 29	289	14	69	372
BMI between 19.9 and 28.9	68	104	460	632
Incompletes	11	11	69	91
Inadmissible	0	1	0	1
Don't knows	1	2	3	6
Total	369	132	601	1102

As the above cross-tabulation indicates, there were discrepancies in the data that were collected. There were 68 records which had the risk factor PF3 assigned but the actual BMI data collected for these records in the CTF did not match the criteria of this risk factor. Conversely, of the 132 records that were indicated as "no" for PF3, 104 files matched actual BMI client data provided in the CTF. Differences in the figures for these two variables may be due to confusion about BMI cut-offs indicated in the IPRIT guide. The old IPRIT had different cut-off values for this risk factor compared to the new form. Each site of the POP has been designated to use the new forms but the database provided reflects the old IPRIT. Therefore, there is uncertainty as to which cut-offs the individual POP sites used for this risk factor.

PF4 - Rate Of Weight Gain. PF4, rate of weight gain, had a completion rate of 36.2%. The IPRIT guide defines specific values of appropriate weight gain within certain time periods of the pregnancy. Definitions of appropriate weight gain are also based on the client's BMI. The completion rate of this factor was quite low which may be due to

confusion about cut-off values provided in the IPRIT. Reasons for the confusion have been cited in the analysis of the previous variable.

Cross-tabulating this variable with weight data provided on the CTF would require complex calculations. The CTF provides due date information which could be used to determine the number of weeks gestation when the client's weight was assessed. Weight gain information is recorded in the CTF at pre-pregnancy, program intake and at last visit before delivery. Using the four variables, initial weight, intake weight and weight at last visit before delivery and comparing it with this risk factor would provide the cross-tabulation. The results, however, would be incomplete because weight data is only recorded in the CTF at specific time intervals.

PF5 - Inadequate Nutrition

PF5, inadequate nutrition, had the highest completion rate (62%) of this section and is based on the initial 24-hour diet recall recorded in each client's chart. The criteria used to assess nutrition are those of the BC Food Guide for Pregnancy and, where required, the registered dietitian-nutritionist at each site may assess specific situations not applicable to the criteria of the IPRIT provided.

Cross-tabulating this risk factor with data of the CTF would provide incomplete information. Within the CTF twenty-four hour diet recall information is recorded at program intake and last visit before delivery. In the client's chart, however, more diet recalls are recorded and used as a basis for assessing this risk factor. Therefore, the CTF information is not complete enough to compare with IPRIT data for this risk factor.

PF6 - Previous Child With Anomaly Or Disorder. PF6, previous child with anomaly, had a 22.9% completion rate. This may be due to the depth of the criteria

provided in the IPRIT guide. The current definition provided for this risk factor leaves the onus on the program staff member to question the client in depth about their previous children.

PF7 - Previous High Risk Infant. PF7, previous high risk infant, had a completion rate of 23.9% which was similar to the completion rate of PF6. Reasons for the low completion rate for this risk factor may be due to those previously cited for PF6.

The incidence of risk factors PF6 and PF7 are rare and this may account for the low completion rates indicated for them. It may be speculated that much of the incomplete data for these risk factors should have been indicated as "no."

PF8 - Multiple Pregnancy. PF8, multiple pregnancy, had a completion rate of 22.3%. Multiple pregnancy is defined as those clients expecting two or more infants.

Multiple births represent 2% of all births and 16% of the low birth weight population (The Institute of Child Health, 1993). Based on the figures within the database, the proportion of POP clients with multiple pregnancy was 1.2% that suggests that this risk factor may be under reported.

PF9 - Birth Interval. PF9, birth interval, had a completion rate of 32.1%. Timing between pregnancies is the basis for PF9 with the criterion being less than 2 years between pregnancies. The completion rate was 32.1% which may be due to the confusion about the basis of the two year time frame between births.

PF10 - Grand Multipara. PF10, grand multipara, had a completion rate of 26.2%. This risk factor refers to whether a client has had 5 or more pregnancies. PF10 was cross-tabulated with past pregnancy data recorded in the CTF. The following table shows the results of this analysis.

Table 3.4
Grand Multipara And Gravida

	PF10: Grand multipara (recorded in the IPRIT)			
Gravida (recorded in the CTF)	Yes	No	Incompletes	Total
5 or more pregnancies	47	2	15	64
Less than 5 pregnancies	22	216	743	981
Don't knows	0	1	0	1
Incompletes	1	0	55	56
Total	70	219	813	1102

As the above table illustrates there were discrepancies between the cross-referenced variables. Of the seventy files which had PF10 indicated, there were twenty-three client records that did not correspond to actual gravida information provided in the CTF. Conversely, of the 219 client files which had PF10 indicated as a "no," 216 records matched with actual gravida information provided in the CTF. The source of discrepancy is difficult to ascertain but it is of a sufficient level that causes concern about the quality of the data.

PF11 - Established Genetic Risk. PF11, established genetic risk, had a completion rate of 23.3%. This may be due to confusion about conditions that do and do not have clear genetic links between generations.

PF12 - Age 17 And Under/Age 36 And Over At Time of Delivery. The last risk factor of this section, PF12, had a completion rate of 39.0%. This variable is based on the age of the client at delivery. This variable was cross-tabulated with actual client ages recorded in the CTF. The following table shows the results of this analysis.

Table 3.5
Age 17 And Under/Age 36 And Over At Time Of Delivery And Client's Actual Age

	PF12: Age 17 and under/age 36 and over at time of delivery (recorded in the IPRIT)			
Client's age (recorded in the CTF)	Yes	No	Incompletes	Total
Age 17 or less and 35 or more	132	0	12	144
Age over 17 and less than 35	114	181	652	947
Inadmissible	0	1	2	3
Incompletes	2	0	6	8
Total	248	182	672	1102

The data provided for these two variables showed apparent discrepancies . Of the 248 client files that had PF12 indicated, 132 matched actual client ages indicated in the CTF. Conversely, of the 182 records that indicated "no" for PF12, 181 matched the information provided for client ages in the CTF. The discrepancy in the data may be due to time frames selected for recording the data. Risk factor information pertains to age at delivery whereas CTF information may or may not be the client's age when she gave birth (for example, it may be the age at program intake).

IPRIT - Section Two: Substance Abuse Risk Factors

Table 3.6 presents data from the substance abuse section of the IPRIT. Substance abuse risk factors include exposure to second-hand smoke as well as any cigarette, alcohol or drug use.

Table 3.6
IPRIT - Substance Abuse Factors

Risk factor	Description	Yes	No	Number of complete records	Completion rate	Total
SAF1	Smoking	560	118	678	61.5%	1102
SAF2	Alcohol use	337	148	485	44.0%	1102
SAF3	Inappropriate use of over the counter and treatment drugs	20	227	247	22.4%	1102
SAF4	Other drug use	140	198	338	30.7%	1102

Completion rates for this section ranged from 22.4% to 61.5% which may reflect the difficulties in collecting information in this highly sensitive area. The following discusses each substance abuse risk factor in greater detail with respect to data quality.

SAF1 - Smoking. SAF1, smoking, had a completion rate of 61.5%. This variable was cross-tabulated with the variable, number of cigarettes smoked pre-pregnancy located in the CTF. The following table shows the results of this analysis.

Table 3.7
Smoking And Number Of Cigarettes Smoked Pre-pregnancy

	SAF1: Smoking (recorded in the IPRIT)			
Prepregnancy smoking (recorded in the CTF)	Yes	No	Incompletes	Total
At least one cigarette per day	526	26	152	704
No cigarette smoking	23	90	239	352
Don't knows	2	0	3	5
Inadmissible	1	0	0	1
Incompletes	8	2	30	40
Total	560	118	424	1102

The data provided for SAF1 and pre-pregnancy smoking were inconsistent. Of the 560 client records which has SAF1 indicated, 526 records matched information provided

about cigarette use in the CTF. Of the 118 records which had SAF1 indicated as "no", 90 files corresponded. The discrepancy may be due to the fact that SAF1 criteria also included exposure to second-hand smoke. However, if this was the case it would be expected that there would be more clients indicated for SAF1, however, there were fewer than the number of clients which had prepregnancy cigarette use indicated in the CTF.

SAF2 - Alcohol Use. SAF2, alcohol use, had a completion rate of 44.0%. This variable was cross-tabulated with data from the CTF for pre-pregnancy alcohol intake. The following table shows the results of this analysis.

Table 3.8
Alcohol Use And Number Of Drinks Consumed Pre-pregnancy

	SAF2: Alcohol use (recorded in the IPRIT)			
Prepregnancy drinking (recorded in the CTF)	Yes	No	Incompletes	Total
At least one drink per week	243	43	182	468
No drinks	63	101	383	547
Don't knows	4	0	1	5
Incompletes	27	4	51	82
Total	337	148	617	1102

There were apparent discrepancies in the data for alcohol use between the IPRIT and the CTF as indicated by the above table. Of the 337 client records which had SAF2 indicated, 243 corresponded with prepregnancy drinking information provided in the CTF. Conversely, of the 148 records with "no" indicated for SAF2, 101 client files corresponded with CTF information. The discrepancy may be partially due to the time frame which client alcohol intake information was derived from. For example, alcohol use information from the CTF that was used as a basis for risk scoring could have been

taken from pre-pregnancy or program intake time periods. In addition, there may be confusion about whether the risk factor should be indicated if the T-ACE score measurement reveals potential risk of drinking.

SAF3 - Inappropriate Use Of Over The Counter And Treatment Drugs. SAF3, inappropriate use of over the counter and treatment drugs, had a completion rate of 22.4%. This risk factor refers also to herb use in pregnancy. The low completion rate for this risk factor may reflect the difficulties a staff member must encounter in assessing this variable. Investigations of what constitutes safe and unsafe herbs in pregnancy remain to be incomplete which can lead to discrepancies in how data is collected for this variable. The current IPRIT guide also does not include inhalant use that may also contribute to the accuracy of data collected for this risk factor.

SAF4 - Other Drug Use. SAF4, other drug use, had a completion rate of 30.7%. This variable combined with SAF3 was cross-tabulated with pre-pregnancy drug use information located in section six of the CTF. The following table shows the results of the analysis.

Table 3.9
Other Drug Use, Inappropriate Use Of Over The Counter And Treatment Drugs And Pre-pregnancy Drug Use

	SAF3: Inappropriate use of over the counter and treatment drugs and SA4: Other drug use (recorded in the IPRIT)			
Prepregnancy drug use (recorded in the CTF)	Yes	No	Incompletes	Total
Drug use at least once per week	122	24	102	248
No drug use	23	165	576	764
Don't knows	1	0	1	2
Incompletes	7	6	75	88
Total	153	195	754	1102

There were apparent discrepancies between these variables as illustrated by results in this table. Of the 140 to 160 client records which had either SAF3 or SAF4 indicated, there were 122 files that matched pre-pregnancy drug use information in the CTF. Conversely, 165 files specifying drug use within the CTF corresponded to negative responses to the risk factors SAF3 or SAF4. Discrepancies may be due to unclear definitions of what constitutes drug use. The number of records indicated for the risk factor SAF4 was approximately double the number of records indicating pre-pregnancy drug use.

IPRIT - Section Three: Socio-Economic Risk Factors

Table 3.10 presents data of the socio-economic section of the IPRIT. This section of the IPRIT addresses issues of the maternal social environment that are relevant to outcome of pregnancy.

Table 3.10
IPRIT - Socio-Economic Factors

Risk factor	Description	Yes	No	Number of complete records	Completion rate	Total
SEF1	Single parenthood	518	88	606	55.0%	1102
SEF2	Delayed access to prenatal care	104	194	298	27.0%	1102
SEF3	Refusal/resistance to appropriate services	45	225	270	24.5%	1102
SEF4	Isolation - ethnic, language and/or social	237	161	398	36.1%	1102
SEF5	Limited learning ability/illiterate	92	202	294	26.7%	1102
SEF6	Marital problems, unstable relationship	342	147	489	44.4%	1102
SEF7	Inadequate housing	254	148	402	36.5%	1102
SEF8	Financial problems	917	29	946	85.8%	1102

Completion rates ranged from 24.5% for SEF3 to 85.8% for SEF8. The following discusses each socio-economic risk factor in greater detail as it relates to issues of data quality.

SEF1 - Single Parenthood. SEF1, single parenthood, had a 55.0% completion rate. The IPRIT guide criteria indicates that this risk factor is marked positive for clients who are not married. SEF1 was cross-tabulated with marital status information provided in the CTF. The following table shows the results of the analysis.

Table 3.11
Single Parenthood And Marital Status

	SEF1: Single parenthood (recorded in the IPRIT)			
Marital status (recorded in the CTF)	Yes	No	Incompletes	Total
Single	355	4	36	395
Married, commonlaw or in relationship	160	84	455	699
Inadmissible	3	0	5	8
Total	518	88	496	1102

There were discrepancies between the figures derived from the IPRIT and CTF with respect to marital status. Of the 518 client files which has SEF1 indicated, 355 records matched marital status information provided from the CTF. Eighty-eight records had "no" indicated for SEF1 and of these 84 files matched marital status information provided in the CTF.

SEF2 - Delayed Access To Prenatal Care. SEF2, delayed access to prenatal care, had a completion rate of 27.0%. This may be due to confusion about how to assess this variable. The criteria in the IPRIT guide lists some factors to consider such as no medical care by 20 weeks and no attendance at prenatal classes in a primipara. To ensure consistency in data collection for this risk factor, more precise criteria may be required.

SEF3 - Refusal/Resistance To Appropriate Services. SEF3, refusal/resistance to appropriate services had a completion rate of 24.% which was the lowest of this section. This may reflect the difficulty in ascertaining whether this risk factor is present or not for a client. The criteria suggests refusal to services such as the Ministry of Human

Resources poses risk but does not provide greater detail than this. The onus remains with the program staff member working with the client to determine if the risk factor exists.

SEF4 - Isolation - Ethnic, Language And/Or Social. SEF4, isolation, had a completion rate of 36.1% which may reflect difficulties on behalf of the program staff member in assessing this risk factor. For example, a definition of the term "support" for SEF4 would be helpful to include in the criteria of this risk factor.

SEF5 - Limited Learning Ability/Illiterate. SEF5, limited learning ability/illiterate had a low completion rate (26.7%). As is the case with SEF4, this may be due to how the risk factor is defined and reflect the difficulties in assessing this. For example, definitions of "illiterate" and "limited learning ability" for SEF5 would help to ensure standardization of data collection for this particular risk factor.

SEF6 - Marital Problems Or Unstable Relationship Or Family Violence. SEF6, marital problems or unstable relationship, had a completion rate of 44.4% which may reflect the difficulties in assessing this variable. Because of the sensitive nature of this variable many clients may not disclose this information.

SEF7 - Inadequate Housing. SEF7, inadequate housing, had a completion rate of 36.5%. This variable would be difficult to assess unless the program staff member does a client home visit. The proportion of home visits for 1994/95 was 33.9%; thus accurate data could be completed for this proportion of clients only.

SEF8 - Financial Problems. The last variable of this section, financial problems, had the highest completion rate of this section (85.8%). The following table shows the cross-tabulation of this risk factor with client financial status information from the CTF.

Table 3.12
Financial Problems And Client's Financial Status

	SEF8: Financial problems (recorded in the IPRIT)			
Financial status (recorded in the CTF)	Yes	No	Incompletes	Total
Receiving income assistance or low/inadequate income	886	16	102	1004
Not low income	16	13	45	74
Inadmissible	15	0	9	24
Total	917	29	156	1102

As the above table indicates there were discrepancies between the two cross-referenced variables. Of the 917 records with SEF8 indicated, 886 corresponded to financial status information provided in the CTF. Of the 29 records that indicated "no" for SEF8, 13 records corresponded to data in the CTF section. Discrepancies in the data may be due to different income cut-offs being used. For example, some program sites may be using the low income cut-offs which are from 1985 and provided in the POP handbook while other sites may be using more updated cut-off values.

IPRIT - Section Four: Emotional Risk Factors

Table 3.13 presents data from the emotional risk factor section of the IPRIT. Emotional risk factors include the client's family history, mental health and self-esteem issues, as well as feelings the client has about their pregnancy.

Table 3.13
IPRIT - Emotional Factors

Risk factor	Description	Yes	No	Number of complete records	Completion rate	Total
EF1	Family history of abuse/neglect	61	141	202	18.3%	1102
EF2	Mental health problems	90	204	294	26.7%	1102
EF3	Low self-esteem	240	177	417	37.8%	1102
EF4	Inability to cope/anxiety regarding pregnancy and baby	184	189	373	33.8%	1102
EF5	Unrealistic expectations	116	213	329	29.9%	1102
EF6	Unwanted pregnancy	153	191	344	31.2%	1102

Completion rates for this section ranged from 18.3% for EF1 to 37.8% for EF3. The following provides more detail about each emotional risk factor with respect to data quality issues.

EF1 - Family History Of Abuse/Neglect. EF1, family history of abuse/neglect, had the lowest completion rate of the entire IPRIT section (18.3%). This may reflect the difficulties that the program staff member encounters when trying to assess this variable.

EF2 - Mental Health Problems. EF2, mental health problems, had a completion rate of 26.7%. This may reflect the difficulties in assessing these variables. Although the criteria in the IPRIT guide is extensive it may be excluding important information such as a history of post partum depression. Information provided for this risk criterion duplicates criteria outlined for other risk factors such as SEF4, EF1 and EF4.

EF3 - Low Self-esteem. EF3, low self-esteem, had a completion rate of 37.8%. Program staff may find this risk factor difficult to assess given the current criteria provided. For example, a definition of self-esteem for the risk factor EF3 would provide for improved data accuracy.

EF4 - Inability To Cope/Anxiety Regarding Pregnancy And Baby. EF4, inability to cope/anxiety regarding pregnancy and baby, had a completion rate of 33.8%. This may reflect the difficulty in assessing this variable as it involves subjective judgement on the part of the program staff member.

EF5 - Unrealistic Expectations. EF5, unrealistic expectations, had a completion rate of 29.9%. This low rate may be due to the fact that assessment of this factor involves subjective judgement on the part of the program staff member who works with the client.

EF6 - Unwanted Pregnancy. EF6, unwanted pregnancy, had a completion rate of 31.2%. This may reflect the difficulty in assessing this variable as it involves subjective judgement. It is difficult to ascertain whether this risk factor should be indicated or not for the clients who initially do not want the pregnancy and later decide to carry on with it and demonstrate healthy mother/infant bonding.

Summary

The IPRIT form includes a broad range of risk factors. The major data quality issues highlighted in this chapter included repetition in risk factor definitions, incomplete criteria provided in the IPRIT guide and discrepancies with corresponding information in the CTF.

There was a wide variation on item-per-item completion rates of the risk factors. The highest rate of completion was for the risk factor associated with financial problems. The large proportion of missing data for the various risk factors of the IPRIT can be attributed to the fact that data entry for this section has not been standardized. It can be speculated that those responsible for data entry left risk factors incomplete for reasons that include

uncertainty as to whether a specific risk factor existed or when a risk factor was absent. Every field of the computerized IPRIT should have a "yes" or "no" answer. If the computerized version of the IPRIT was programmed for error control there would have been less likelihood of missing data. Error control refers to the close control of the accuracy of the data at the input level, in storage, and input (Duncan, 1981).

On the IPRIT form there is a space allotted for the program staff member to enter comments, however, this is not available in the computerized version. To help verify the accuracy of the IPRIT data, it would be beneficial to include sections for comments on the IPRIT computerized form.

This chapter presented and discussed the data from the IPRIT section of the 1994/95 database and a number of key issues were discovered in relation to data quality. The following chapter presents data from the CTF section of the 1994/95 database.

Chapter 7

RESULTS - CLIENT TRACKING FORMS

This chapter evaluates data that was recorded in the Client Tracking Forms (CTF) of the 1994/95 POP database. The CTF is subdivided into eleven sections: program information, referral source to program, intake, client characteristics, past pregnancy data, client monitoring, project contact, referrals from program, project outcomes, alcohol and smoking data.

Data recorded in the CTF is shown in the following tables. Comments are made with respect to the completion rates, to the accuracy and validity of the recording as well as possible difficulties encountered by staff in completing the form. Completion rates were calculated based on the number of completes including specific "don't know" responses divided by the total number of client records who were indicated to have stayed in the program until completion. Variables in which the total numbers were not 1102 records are indicated with an asterisk and explanations provided following the table. Qualitative data collected on the form are presented in separate tables and where appropriate the information was categorized.

Client Tracking Form - Section One: Program Information

Table 4 presents the data from the program information section of the CTF. This section of the CTF is intended to assign a numerical identification for each client referred to the POP, a code that defines the client that started the program. The variable project location, is intended to identify the client with a particular POP site. Client provincial

medical service plan numbers are collected in order that clients can be tracked in their access to other government services.

Table 4
CTF - Section One: Program Information

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Client ID numbers	1100	2	0	99.8%	1102
Client began program	1102 [yes=1098, no=4]	-	-	100.0%	1102
Project location	1102	-	-	100.0%	1102
Client care card number	335	606	161	30.4%	1102

The data shows inconsistencies in the assignment of client numbers. Some code numbers were two letters followed by two digits (e.g. SD66) whereas others included combinations of digits and characters. Some sites had entered only two digits to represent the year in which the client's expected due date (EDD) occurs which created difficulty in interpreting which fiscal year this should be reported in. For example, if 94 was entered as part of the ID number, this could mean that the client's due date occurred either in 1993/94 or 1994/95.

Within the ID number, the year in which the client's EDD is usually incorporated. For example, a code number may read as 949501 with the first four digits being the fiscal year (between April 1, 1994 to March 31, 1995) in which that client is expected to deliver her baby.

The last variable of this section, client provincial medical service plan numbers, had only a 30.4% completion rate. This is an important variable for this database since it is the focus of tracking identification for the client in her contacts with the system. This

variable may be poorly recorded due to a perception that collection of this information may interfere with the client's right to privacy.

Client Tracking Form - Section Two: Referral Data

Table 5 presents the data relevant to the source of the referral made for a client to the POP.

Table 5
CTF - Section Two: Referral Data

Variable	Completes	Incompletes	Inadmissible	Completion rate	Total
Source of referral	1102	-	-	100.0%	1102
Referral date	1033	61	8	93.7%	1102
Weeks gestation at referral	1102	-	-	100.0%	1102

The completion rates for this section were 100%, 93.7% and 100% for source of referral, referral date and weeks gestation at referral respectively.

The variable, referral date, had 8 inadmissible records and 61 incomplete records. Inadmissible records included coding errors in dates.

Client Tracking Form - Section Three: Intake Data

Table 6 presents data from the CTF that is related to the intake of the client to the POP.

Table 6
CTF - Section Three: Intake Data

Variable	Completes	Inadmissible	Don't knows	Completion rate	Total
Intake assessment date	1096	4	2	99.6%	1102
Due date	1096	6	-	99.5%	1102
Did client begin program?	1102 [yes=1102, no=636]		-	100.0%	1738
If No, "why not?"	290 [not at risk=11, refused/not interested=107, other=172]	-	-	45.6%	636*
If "other", give reason why the client did not begin program?	13 [No pregnancy/Client died=2, Miscarriage/Abortion=11]	-	-	7.6%	172**

* represents number of clients that did not begin the program
**represents number of clients who did not begin the program and had reasons cited as "other"

The first variable of this section, intake assessment date, had a completion rate of 99.6% with four records which had inadmissible dates. The variable, client's due date, also had a 99.5% completion rate with only six inadmissible dates being indicated. The variable, "did client begin program?", had 100% completion.

There was a discrepancy in the reasons recorded for not beginning the program. Eleven did not begin because they were not high risk, 107 did not begin because they were not interested and 172 did not begin for reasons cited as "other". Only thirteen records, however, had specific reasons cited for not beginning the program.

Client Tracking Forms - Section Four: Client Characteristics

Table 7.1 presents data related to demographic information about POP clients.

Table 7.1
CTF - Section Four: Client Characteristics

Variable	Completes	Don't knows	Completion rate	Total
Age	1093	9	100.0%	1102
Marital status	1094 [married=191, commonlaw =347, single=395, relationship =161]	8	100.0%	1102
First language	1094 [english=1045, other (specify) =49]	8	100.0%	1102

As shown in Table 7.1, the completion rates for this section were all 100%.

Table 7.2 presents data related to specific languages spoken by the client. Data in this table summarized the other languages that were indicated in the previous question.

Table 7.2
Other language

Variable	Total
African	4
Asian	9
East Indian	8
European	22
Middle East	2
First Nations	2
Incompletes	2
Total	49

As shown in Table 7.2, only two records were incomplete.

Table 7.3 presents additional demographic data about the POP clientele.

Table 7.3
CTF - Section Four: Client Characteristics

Variable	Completes	Incompletes	Inadmissible	Don't knows	Completion rate	Total
Ethnic background	1098 [caucasion=752, native Indian=321, indo-canadian=4, chinese =3, vietnamese=4, latin american=6, other=8]	-	-	4	100.0%	1102
If ethnic background is Native Indian, state client's status eg. Metis	325	-	2	-	101.2%	321*
Education	1074	25		3	97.5%	1102
Employment status	1093	9	-	-	99.2%	1102

*total represents number of responses that indicated Native Status

The completion rates for this section included 100.0%, 101.2%, 97.5% and 99.2% for ethnic background, native status, education background and employment status respectively. There are only minor discrepancies in the number of records completed in this section. For example, the first question of this section asks about the client's ethnic background of the number of responses indicating native indian was 321. The following question asks if the ethnic background is native indian please indicate what the client's status is. For the latter question there were four more answers than the responses indicating that the client was native status. Why this difference occurred is unknown.

Table 7.4 presents data related to the occupation of clients who have indicated that they were employed.

Table 7.4
CTF - Section Four: Client Occupation Information

Variable	Total
Factory worker/Deckhand	7
Para-professional/Professional	17
Works in service industry	90
Inadmissible	17
Total	131

For Table 7.4, related occupations were categorized together. Inadmissible information included answers which were numbers, answers that indicated the client was on medical leave, was a student, or specified only part-time or volunteer status and probably should have been classified as not employed.

Table 7.5 presents information about the client's financial situation. In addition, this section of the CTF included the individual client's T-ACE scores.

Table 7.5
CTF - Section Four: Financial Information And T-ACE Scores

Variable	Completes	Incompletes	Inadmissible	Completion rate	Total
Financial situation	1078 [income assistance=702, low/inadequate income=302, not low income=74]	22	2	97.9%	1102
Partner's financial situation	1054 [income assistance=310, low/inadequate income=240, not low income=82, N/A=422]	47	1	95.7%	1102
T-ACE Score	1063	39	-	96.5%	1102

Completion rates for client financial situation and partner financial situation were 97.9% and 95.7% respectively. Reasons for this may include the lack of clear criteria for low income cut-off values.

Client Tracking Forms - Section Five: Past Pregnancy Data

Table 8 presents data about the obstetrical history of the client.

Table 8
CTF - Section Five: Past Pregnancy Data

Variable	Completes	Incompletes	Inadmissible	Don't know	Completion rate	Total
Number of pregnancies	1046	56	-	-	94.9%	1102
Number of deliveries	708	394	-	-	64.2%	1102
Number of term deliveries	716	386	-	-	65.0%	1102
Number of elective abortions	685	416	-	1	62.2%	1102
Number of spontaneous abortions	692	410	-	-	62.8%	1102
Number of living children	710	392	-	-	64.4%	1102
Number of stillbirths	665	437	-	-	60.3%	1102
Number of low birth weight	671	431	-	-	60.9%	1102
Attended prenatal classes during a previous pregnancy	1087	12	3	-	98.6%	1102
Has client ever previously been a POP client	1089	10	3	-	98.8%	1102

Completion rates for this section ranged from 60.3% for number of stillbirths to 98.8% for the question asking if the client has ever previously been a POP client. Missing data for this section can likely be attributed to the fact that where a figure of zero or not applicable should be indicated for past pregnancy data, it was left blank. In addition, the lack of definitions for terms such as spontaneous abortion, stillbirth and term delivery may contribute to the high number of incomplete records for these questions.

The lack of specific definitions means that data may be inconsistently recorded since definitions vary depending on the source used. For example, Health and Welfare Canada defines spontaneous abortions as the complete expulsion or extraction from its mother of a fetus or embryo weighing less than 500 g irrespective of gestational age. The World

Health Organization (1994) defines abortion as the expulsion of products of conception up to 28 weeks gestation. Others describe spontaneous abortions as the complete expulsion or extraction from its mother of a fetus or embryo at twenty weeks gestation or less.

The question "Attended prenatal classes during a previous pregnancy?" was completely answered for 98.5% of the records. The question does not, however, specify the type of prenatal classes attended or the regularity of attendance. For example, prenatal classes are typically subdivided into two groups with the first set of classes being early bird classes which are typically attended in the first trimester of pregnancy and labour and delivery classes attended in the third trimester. This question does not specify if previous attendance in prenatal classes includes attending all class types and/or implies full attendance.

For clients who are pregnant for the first time, the question "has client previously been a POP client?" does not apply to them. It is also unclear as to whether prior participation in related programs such as those funded by the Canada Prenatal Nutrition Project (outreach programs for high risk pregnant women that are funded by the federal government) should be included or excluded which may account for the ten records which were incomplete.

Client Tracking Forms - Section Six: Client Monitoring

Table 9.1 presents data about the client's last assessment with the program.

Table 9.1
CTF - Section Six: Date Of Assessment

Variable	Completes	Incompletes	Coding errors	Don't knows	Completion rate	Total
Date of assessment (last visit before delivery)	1068	38	-	-	96.9%	1102

As Table 9.1 shows 96.9% of the records had assessment dates indicated for the client's last visit before they delivered their baby.

Table 9.2 presents data relevant to the monitoring of the weight of the client.

Table 9.2
CTF - Section Six: Client Weight Monitoring

Variable	Completes	Incompletes	Coding errors	Don't knows	Completion rate	Total
Date of assessment (last visit before delivery)	1068	38	-	-	96.9%	1102
Pre-pregnancy weight	441	652		9	40.8%	1102
Program intake weight	446	654	-	2	40.7%	1102
Weight (last visit before delivery)	450	643	4	5	41.3%	1102
Body Mass Index (BMI) - pre-pregnancy	670	432	-	-	60.8%	1102

The variables of this section had low completion rates. The pre-pregnancy weight was recorded in 40.8% of the records. This might be attributed to the fact that many clients did not remember what their weight was before they became pregnant. Nevertheless, pre-pregnancy weight is used as the basis for calculating the body mass index (BMI) which appears as the last variable in this section. Two-hundred and twenty-nine additional records to those files which had pre-pregnancy weight completed had a

BMI indicated which suggests that the records have failed to assess the pre-pregnancy weight that was in fact available.

The BMI is an assessment of body weight appropriateness based on a weight to height ratio calculation. It is noted, however, that height information is not collected on the CTF and there is no way of verifying the accuracy of the data calculated for the BMI.

Table 9.3 presents client monitoring data related to food intake. It includes information about meals and snacks consumed.

Table 9.3
CTF - Section Six: Food Intake (number of servings per day based on 24 hour recall)

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Number of meals/day at intake (meal includes 3-4 food groups)	948	153	1	86.1%	1102
Number of meals/day at last visit before delivery	839	240	23	78.2%	1102
Number of snacks/day at intake (1-2 food groups)	819	277	6	74.9%	1102
Number of snacks/day at last visit	739	341	22	69.1%	1102

Information collected about meals and snacks is based on food groups consumed in accordance with the BC Food Guide for Pregnancy. Completion rates varied from 69.1% for number of snacks/day at last visit to 86.1% for number of meals at intake which is inconsistent with the variable indicating that 96.9% of client records had assessments completed.

Table 9.4 provides client monitoring data related to the individual food groups of the BC Food Guide for Pregnancy that were consumed by clients based on their food intake in a twenty-four hour time period.

Table 9.4
CTF - Section Six: Food Intake (Number of servings of each food group)

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Number of grain products/day at program intake	1030	57	15	94.8%	1102
Number of grain products/day at last visit before delivery	937	139	26	87.4%	1102
Number of vegetables and fruits/day at program intake	1001	88	13	92.0%	1102
Number of vegetables and fruits/day at last visit before delivery	922	156	24	85.8%	1102
Number of milk and milk products/day at program intake	908	181	13	83.6%	1102
Number of milk and milk products/day at last visit before delivery	881	197	24	82.1%	1102
Number of meat and alternatives/day at program intake	993	96	13	91.3%	1102
Number of meat and alternatives/day at last visit before delivery	931	146	25	86.8%	1102

Dietary intake is based on a recollection of foods consumed by the client within the last twenty-four hours. Completion rates for this section varied from 82.1% for milk and milk products consumed per day at last visit to 94.8% for grain products consumed at program intake. Although the completion rates were relatively high for this section, they were inconsistent with the completion rates provided for intake of snacks and meals in the previous table and inconsistent with the number of records which were indicated to have assessments completed (n=1068).

Table 9.5 presents client monitoring data related to beverages consumed. The information includes intake of beverages containing caffeine, sweetened drinks and water consumed in a twenty-four hour time period.

Table 9.5
CTF - Section Six: Food Intake (caffeine, sweetened drinks and water)

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Number of coffee (percolated, drip, caffeinated)/day at program intake	303	790	9	28.3%	1102
Number of coffee (percolated, drip, caffeinated)/day at last visit before delivery	211	867	24	21.3%	1102
Number of coffee (instant, caffeinated)/day at intake	35	1059	8	3.9%	1102
Number of coffee (instant, caffeinated)/day at last visit before delivery	43	1039	20	5.7%	1102
Number of tea servings (caffeinated)/day at program intake	287	806	9	26.9%	1102
Number of tea servings (caffeinated)/day at last visit before delivery	192	890	20	19.2%	1102
Number of colas (caffeinated)/day at program intake	250	844	8	23.4%	1102
Number of colas (caffeinated)/day at last visit before delivery	137	944	21	14.3%	1102
Number of other fluids: pops and sweetened fruit drinks/day at program intake	388	705	9	36.0%	1102
Number of other fluids: pops and sweetened fruit drinks/day at last visit before delivery	244	838	20	24.0%	1102
Number of water servings/day at program intake	595	487	20	55.8%	1102
Number of water servings/day at last visit before delivery	496	568	38	48.5%	1102

Completion rates for this section varied from 3.9% for number of cups of coffee (instant, caffeinated) consumed at program intake to 55.8% for number of water servings at program intake. The low completion rates for this section could be attributed to the fact that where a figure of zero should have been indicated, the field was left blank. While it is not clear why there is variation in the response rates for the individual items,

the overall low completion rate does not allow for any data analysis with respect to the intake of these food items.

Table 9.6 shows the data regarding intake of iron and folate. Criteria used to define good and other sources of iron and folate are located in Appendix E.

Table 9.6
CTF - Section Six: Food Intake (Iron and Folate Sources)

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Iron rich foods/day at program intake	264	824	14	25.2%	1102
Iron rich foods/day at last visit before delivery	241	842	19	23.6%	1102
Excellent sources of iron/day at program intake	382	708	12	35.8%	1102
Excellent sources of iron/day at last visit before delivery	433	646	23	41.4%	1102
Other sources of iron/day at program intake	759	331	12	70.0%	1102
Other sources of iron/day at last visit before delivery	717	362	23	67.2%	1102
Folate rich foods/day at program intake	252	835	15	24.2%	1102
Folate rich foods/day at last visit before delivery	231	852	19	22.7%	1102
Excellent sources of folate/day at program intake	536	554	12	49.7%	1102
Excellent sources of folate/day at last visit before delivery	550	529	23	52.0%	1102
Other sources of folate/day at program intake	721	369	12	66.5%	1102
Other sources of folate/day at last visit before delivery	700	378	24	65.7%	1102

Completion rates for this section varied from 22.7% for folate rich foods consumed at last visit before delivery to 70.0% for other food sources of iron consumed at program intake.

Table 9.7 shows the information collected about cigarettes smoked at time intervals that included pre-pregnancy, program intake and last visit before delivery.

Table 9.7
CTF - Section Six: Cigarette Smoking

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Number of cigarettes smoked/day (pre-pregnancy)	710	387	5	64.9%	1102
Number of cigarettes smoked/day (program intake)	502	597	3	45.8%	1102
Number of cigarettes smoked/day (last visit before delivery)	374	714	14	35.2%	1102

Completion rates varied from 35.2% for number of cigarettes smoked per day at last visit before delivery to 64.9% for number of cigarettes smoked per day at program intake. Completion rates declined at each stage the data was collected during pregnancy. In addition, the completion rates did not correspond to the number of records indicating that the assessment was completed for this section of the CTF. This may be partly due to the fact that where a figure of zero should have been indicated, it was left blank. It is not clear whether the decline in the completion rate is due to a real reduction in the incidence and amount of cigarette smoking.

Table 9.8 presents data related to alcohol use and the intent of this section is to assess the program's impact on being able to reduce the use of alcohol.

Table 9.8
CTF - Section Six: Alcohol Use

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Number of drinks/week (pre-pregnancy)	474	628	0	43.0%	1102
Number of drinks/week (program intake)	71	1028	3	6.7%	1102
Number of drinks/week (last visit before delivery)	30	1064	8	3.4%	1102

As was the case with cigarette smoking information, completion rates declined at each stage in the pregnancy the data was collected. Completion rates decline from 43.0% pre-pregnancy to 3.4% at the last visit. If, in fact, the incompletes mean the client was not drinking anything at the last visit before delivery, then the reduction in drinking is dramatic but the analyst can have little confidence in interpreting a blank field as a zero.

Table 9.9 provides data about illicit drug use at each stage of pregnancy.

Table 9.9
CTF - Section Six: Illicit Drug Use

Variable	Completes	Incompletes	Don't knows	Completion rate	Total
Number of drugs used/week (pre-pregnancy)	78	1024	0	7.1%	1102
Number of drugs used/week (program intake)	47	1052	3	4.5%	1102
Number of drugs used/week (last visit before delivery)	275	819	8	25.7%	1102

Unlike the previous two variables for smoking and alcohol use, completion rates were variable with the highest rate being indicated for data collected at the last visit before delivery (25.7%). The lowest rate of completion for this section was 4.5% for

number of drugs used per week at program intake. The low number of completed records for this section may be attributed to the fact that where a zero should have been indicated for no drug use, the field was left blank. The low rate of completion may also reflect the highly sensitive nature of this variable and the difficulties in collecting this information from the client.

Table 9.10 present data about the types of drugs used.

Table 9.10
CTF - Section Six: Type Of Drugs Used-Qualitative Data

Variable	Total
Illicit drugs (acid, mushrooms, pot, hash, cocaine, LSD, oil, street drugs)	139
Illicit and over the counter drug combinations	2
Prescription and over the counter drugs (Adavan, Amoxicellin, Diclectin, antibiotics, antinausea, mipramine, prozac, psychiatric meds, insulin, ventolin, clorazapam)	22
Alcohol	64
Alcohol and hard drug combinations	42
Alcohol and prescription drugs or alcohol and over the counter drugs	2
Over the counter drugs	8
Quit drinking and drugs 1 year ago	1
No response	15
Don't know	3
Total	**301**

This qualitative variable generated responses that included over the counter and illicit drugs. In addition, it included information about alcohol use that is not relevant to this question. The high number of inadmissible responses for this question may be attributed to the fact that it is not clear whether the type of drug specified was to include illicit or non-illicit types.

Client Tracking Forms - Section Seven: Project Contact

Table 10.1 presents data relevant to evaluating intensity of service provision.

Table 10.1
CTF - Section Seven: Counselling Contacts

	Completes	Incompletes	Completion rate	Total
Program staff and visit type	404	698	36.7%	1102
Home visits with health professional	210	892	19.1%	1102
Site visits with health professional	102	1000	9.3%	1102
Phone visits with health professional	384	718	34.8%	1102
Other visit types with health professional	796	306	72.2%	1102
Home visits with outreach worker	673	429	61.1%	1102
Site visits with outreach worker	326	776	29.6%	1102
Phone visits with outreach worker	122	980	11.1%	1102
Other visit type with outreach worker	275	827	25.0%	1102

Completion rates for this section varied from 9.3% to 72.2%. The variable completion rates for this section could be attributed to the fact that where a figure of zero should have been indicated, the field was left blank.

Table 10.2 presents data about the utilization of POP services.

Table 10.2
CTF - Section Seven: Other Contacts

Variable	Completes	Incompletes	Completion rate	Total
Number of attendances at drop-ins (number of clients who attended drop-ins at least once)	669	433	60.7%	1102
Number of clients who canceled at least one appointment and includes not home, no show, and other attempts made	203	899	18.4%	1102
Receiving food supplements	1087 [yes=998, no=89]	14	98.6%	1102

The completion rates for this section ranged from 18.4% to 98.6%. The variable completion rates for this section could be attributed to the fact that where a figure of zero should have been indicated, the field was left blank.

The variable "receiving food supplements" had a completion rate of 98.6%. A survey of POP coordinators (Code, 1995) revealed that all sites provide food supplements although the type and amount varies across sites. Hence, it is difficult to assess the extent of supplementation provided and it is also difficult to ascertain whether the supplement was actually consumed by the client.

Table 10.3 present data about physician contacts made by the client.

Table 10.3
CTF - Section Seven: Physician Contact Information

Variable	Completes	Incompletes	Completion rate	Total
Seeing a physician for prenatal care?	1088 [yes=1080, no=8]	14	98.7%	1102
Date of first physician contact	835	267	75.8%	1102

Completion rates were 98.7% for whether the client was seeking prenatal care from a physician and 75.8% for date of first physician contact. The low completion rate for the last question may be attributed to the fact that the client may not recall the exact date they first saw their physician.

Client Tracking Forms - Section Eight: Referrals

Table 11 presents data about types of referrals made by POP staff.

Table 11
CTF - Section Eight: Referrals

Agency which POP staff referred client to	During program	Incompletes	Completion rate	At program discharge	Incompletes	Completion rate	Total
Mental Health	28	1074	2.5%	14	1088	1.3%	1102
Alcohol and Drug Programs	63	1039	5.7%	17	1085	1.5%	1102
Ministry of Social Services	182	920	16.5%	71	1031	6.4%	1102
Health Unit	496	606	45.0%	288	814	26.1%	1102
Physician	177	925	16.1%	66	1036	6.0%	1102
Nobody's Perfect	102	1000	9.3%	253	849	23.0%	1102
Other (specify)	354	748	32.1%	233	869	21.1%	1102

Completion rates varied from 1.3% for referrals made to Mental Health at program discharge to 45% for referrals made to the Health Unit during the program. The low completion rates for this section is likely due to not recording a zero if the client was not referred to that particular agency.

Client Tracking Forms - Section Nine: Program Outcome

Table 12.1 presents data about birth outcomes.

Table 12.1
CTF - Section Nine: Program Outcome

Variable	Completes	Incompletes	Inadmissible	Completion rate	Total
Outcome of pregnancy	1099 [single live birth=1006, multiple live birth=18, stillbirth=6, miscarriage=53, therapeutic abortion=16]	2	1	99.8%	1102
Weeks gestation	1064	38	-	96.6%	1102
Infant birthdate	1034	68	-	93.8%	1102
Birthweight	1014	88	-	92.0%	1102
Medical complications	429	673	-	38.9%	1102

Outcome, weeks gestation and birth data are virtually complete. For this section, there is no specification of where this information should be obtained from (i.e. medical records, etc). Therefore, the collection of this information may not standardized.

Birth outcome information had a high completion rate, however, the three variables subsequent to it (weeks gestation, infant birthdate and birthweight) as well as the variable "did client stay in program?", did not correspond as would be anticipated.

It is unclear whether the 673 records indicated as incomplete for medical complications represented no complications. As shown in Table 12.2, however, those with medical complications included 96 clients with no complications. Given this non-specificity of the categories little can be concluded about outcome in this area.

Table 12.2 presents data about medical complications recorded by POP staff.

Table 12.2
CTF - Section Nine: Medical Complications Information-Qualitative Data

Variable	Total
Medical condition during pregnancy	9
Baby outcome	25
Delivery complications	269
Pregnancy complications	30
Pre-existing medical condition	4
None	94
Total	435

Table 12.3 presents data about visits that the client made to their physician as well as breastfeeding information.

Table 12.3
CTF - Section Nine: Physician (MD) Visits

Variable	Completes	Incompletes	Inadmissible	Completion rate	Total
Did client attend MD visits this pregnancy?	429 [yes=429, no=0]	673	-	38.9%	1102
Breastfeeding at hospital discharge	1028 [yes=820, no=159, don't know=49]	74	-	93.3%	1102
Breastfeeding at one month contact	964 [yes=510, no=248, don't know=206]	138	1	87.5%	1102

Completion rates varied from 38.8% for physician (MD) visits during pregnancy to 93.3% for breastfeeding information collected at hospital discharge.

The breastfeeding follow-up data showed discrepancies. The reporting fiscal year for this particular database was April 1, 1994 to March 31, 1995 and the cut-off date for the individual sites of POP for data submission was April 30, 1995. Therefore, for clients

who delivered their babies near the end of the fiscal year, the question about client breastfeeding status at one month contact may not be accurate. A category of don't know is provided but there were ten files which also had 9's (i.e. don't knows) indicated. For clients who supplement infant formula with breastfeeding, it is unclear whether a positive response for breastfeeding should be indicated. Specific program objectives include that the client should breastfeed for a minimum of six weeks, however, the measurement of continued breastfeeding is only for four weeks.

If an answer of "no" to breastfeeding at hospital discharge was indicated, it also should be recorded as "no" for one month discharge, however, the variables did not correspond.

Table 12.4 provides reasons why a client discontinued breastfeeding.

Table 12.4
CTF - Section Nine: Reasons Why Breastfeeding Discontinued

Variable	Total
No response/Not applicable	97
Mother/infant separation (e.g. death, adoption, apprehension)	18
Infant complications	12
Concerns of adequate milk supply	2
Advice from health professional to discontinue breastfeeding	7
Body image issues/history of sexual abuse	2
Started supplementing with infant formula	4
Maternal complications (e.g. sore breasts, cracked nipples, medical complications)	22
Substance abuse issues	8
Mother's choice	68
Client identified lack of support	2
Difficulties with milk supply	10
Mother taking medications	6
Mother had mental challenges	2
Client contact discontinued/breastfeeding status unknown	7
Total	267

The number of responses that indicated reasons why breastfeeding was discontinued (n=267) was greater than the number of responses for the question that indicated breastfeeding had been discontinued in the previous (n=248).

Table 12.5 presents data about the completion of the alcohol and smoking follow-up sheets. Any client who was in the program and had the risk factors of smoking or alcohol use, should have the respective follow-up information completed.

Table 12.5
CTF – Section Nine: Alcohol Use And Smoking Follow-up

Variable	Yes	No	Incompletes	Completion rate	Total
Alcohol use follow-up sheet filled out	462	348	292	73.5%	1102
Smoking follow-up sheet filled out	544	230	328	70.2%	1102

Completion rates for alcohol and smoking follow-up were 73.5% and 70.2% respectively. Referring to the IPRIT, 337 clients had a risk factor of alcohol use indicated, however, 462 clients had an alcohol use follow-up sheet completed. Clients who had a risk factor of smoking indicated was 560, however, only 544 of these clients had a smoking follow-up sheet completed.

Client Tracking Forms - Section Ten: Alcohol Data

Table 13.1 provides data about the coping methods used to avoid drinking.

Table 13.1

CTF - Section Ten: Coping Methods - Qualitative Data

Variable	Total
Alcohol and drug treatment/programs or AA/Support Group	7
Attends cultural activities	1
Avoid situations (e.g. friends, family)	6
Changed lifestyle due to family deaths related to alcohol	1
Counselling/treatment centre	3
Cries/blows up at husband or scream in pillow/at dad	2
Drunk once per year/drank 1 week ago "weak one"	1
Eat more	1
Family support	3
Feels better not drinking	1
Feels drinking habits are fine or has no problem/desire	9
Keep busy/sports activities/studying	3
Nap/shower	1
Not worth it/too expensive/look stupid	1
Occasional/social drinking	6
Quit completely/cold turkey or quit due to pregnancy	34
Self healing/determination	1
Takes little sips/limits intake or reduce or trying to abstain	6
Travels	1
Very easy not to drink	1
Don't know	21
Inadmissible	16
Total	126

Total responses for this section did not correspond to the total of 462 positive responses indicated for completion of alcohol follow-up information. Inadmissible responses included answers that were numbers as well as responses indicating no coping method.

Table 13.2 presents data about number of drinks a client consumes.

Table 13.2
CTF - Section Ten: Number of Drinks

Variable	Total
0 - 5	83
>5 and <20	196
>20 and <57	52
99	12
Total	331

Total responses did not correspond to the number of positive responses indicating that the alcohol follow-up sheet was completed.

Table 13.3 presents data about the drinking patterns of the client and whether there is a past history of treatment for alcohol abuse.

Table 13.3
CTF - Section Ten: Alcohol Consumption

Variable	Completes	Incompletes	Completion rate	Total
Drinking patterns	296	168	100.0%	464
If daily, average number per day	45	417	100.0%	462
If binge, frequency of binging	236	226	100.0%	462
Past history of treatment	379 [yes = 68, no = 311]	83	82.0%	462

Completion rates ranged from 64.1% for drinking patterns to 82.0% for past history of treatment. The number of total responses did not match the number of records which were indicated to have alcohol follow-up information completed (n=462).

Table 13.4 presents data about dates when the client sought former treatment for alcohol use.

Table 13.4
CTF - Section Ten: Prior Treatment Times - Qualitative Data

Variable	Total
1987 to 1990	7
1991 to 1994	28
No response	35
Total	70

The total number of responses indicating prior treatment times (n=35) did not correspond to the total number of responses for past history of treatment indicated (n=68).

Table 13.5 presents data about treatment programs that the client had previsouly attended.

Table 13.5
CTF - Section Ten: Prior Treatment Places

Variable	Total
AA or AA and D&A	5
ACOA or Al-Anon	2
Abbotsford/Peadonville	2
Alcohol Foundation	1
Alcohol and Drug Counselling	1
Counselling	1
Alcohol and Drug Centre - Turning Point	1
Alberta	1
Calgary, Alberta – Sunrise	1
Res	1
Total	15

The total number of responses did not correspond to the number of responses for past history of treatment indicated (n=68) or prior treatment times (n=35).

Table 13.6 presents data about the client's personal goals with respect to alcohol use.

Table 13.6
CTF - Section Ten: Personal Goals

Variable	Completes	Incompletes	Completion rate	Total
Personal goals	392 [no change=47, reduce =33, abstain=317]	70	84.9%	462

The completion rate for this variable was 87.0% which does not correspond to the number records that were indicated to have alcohol follow-up information completed (n=462).

Client Tracking Forms - Section Eleven: Smoking Data

Table 14.1 presents data about the smoking habits of the clients as well as information about second-hand smoke exposure.

Table 14.1
CTF - Section Eleven: Smoking Information

Variable	Completes	Incompletes	Inadmissible	Completion rate	Total
Triggers for smoking	327	217	-	60.1%	544
Number of attempts at cessation	411	133	-	75.6%	544
Do other members of your household currently smoke	522	22	-	96.0%	544
Are you ever exposed to "second-hand" smoke	485	59	-	89.2%	544
Personal goal	586 [no change=129, reduce=203, quit=234]	0	4	107.7%	544

Completion rates varied from 60.1% for triggers for smoking to 96.0% for the question "do other members of your household currently smoke?". These did not correspond to the 544 records indicated to have had smoking follow-up information collected.

The last variable of this section had more responses than the total number of records (n=544) indicated to have had smoking follow-up information collected.

Table 14.2 provides qualitative information about methods the clients used to stop smoking currently and in the past.

Table 14.2
CTF - Section Ten: Methods of Cessation

Methods of cessation	Total
Avoid/abstain or doesn't want to	4
Chew on pencils	1
Cold turkey 6 hours only	1
Cold turkey/acupuncture	1
Cold turkey/cessation group or cold turkey/church support	3
Cold turkey/exercise or cold turkey/hypnotist	2
Cold turkey/marks number	1
Cold turkey/nicorettes/patch or cold turkey/gum	9
Cold turkey/sick or had flu	3
Cut down or weaning/reduce	25
Eating	1
Exercise and non-smoking tapes	1
Gross	1
Nicorettes	1
No money	4
On her own	1
Patches or patch/cold turkey	6
Quit at conception but smoking now or give away pack	2
Quit completely/cold turkey	158
Quit due to pregnancy	14
Stay with non-smoker/stay away from smokers or support of family	3
Taper down combined with cold turkey	26
Tried in past pregnancy - not successful	1
Walk/keep busy/slow wean or walks/reading	3
Willpower	2
Yoga, willpower, cold turkey	1
Don't know	9
Inadmissible	5
Total	297

The total number of responses did not correspond to the number of responses for attempts at cessation (n=411) as would be assumed. Inadmissible responses included answers that did not specify any method of cessation.

Summary

Issues relevant to the integrity of the CTF section data include incomplete data, internal inconsistencies between related variables, as well as lack of specificity of various questions of the CTF. These factors constitute a major problem for the analyst who is unable to derive any definitive conclusions.

Chapters Six and Seven provided results of the POP database from 1994/95. Each chapter addressed the two sections of the data; the IPRIT and CTF. The following chapter discusses the conclusions and recommendations of this study based on the results presented.

Chapter 8

CONCLUSIONS AND RECOMMENDATIONS

This review of the 1994/95 Pregnancy Outreach Program (POP) database is intended to assess the reliability and validity of the data and the potential of the database for accessibility and use for reliable reporting, program evaluation and systematic epidemiological analysis. In this chapter, the major findings of this review are summarized and recommendations are made. The two sections of the database, the Individual Prenatal Risk Identification Tool (IPRIT) and Client Tracking Form (CTF) are discussed within the context of data quality issues.

Individual Prenatal Risk Identification Tool (IPRIT)

The intent of the IPRIT is to determine eligibility for the client to be enrolled in POP as well as to provide a basis for developing the care plan of the client. Risk assignment is one of the most important tasks the staff of POP perform.

Coverage. Coverage is defined as the extent to which the database provides complete information about the population being studied. The issue of missing data constituted many problems in the assessment of this section of the database. Because of the lack of complete data for many of the risk factors, a complete and accurate description of the POP clientele in relation to physical, socio-economic, emotional and substance abuse factors cannot be established. Furthermore, any analysis of risks present in pregnancy, in relation to actual birth outcomes would be fraught with hazards because of the missing values. For example, the emotional risk factor section of the IPRIT had record completion rates which varied from 18.3% to 37.8% (refer to Table 3.13). At least

60% of the data was missing for all of the six variables measured in this section.

Similarly, alcohol, cigarette, and drug use variables had low completion rates ranging from 22.4% to 61.5% (refer to Table 3.6). This renders the data set unacceptable since these variables are regarded as key factors in the risk screening process and are believed to be significant contributors to unfavourable outcomes. Further, since a reduction in substance abuse risk factors is a specific and high priority of the POP, the impact of client participation in the program cannot be assessed in this database.

Physical risk factors had approximately the same completion rates as the substance abuse component of the IPRIT. These ranged from 22.3% to 61.8% (refer to Table 3.1) with the lowest completion rate being for PF8, multiple pregnancy. While it is true that the missing values may simply indicate that there were no medical or physical risk factors identified by the program staff, the variation in completion rates and the lack of definitive "none" or "zero" values gives little confidence that the medical and physical history of the client had been fully addressed.

Socio-economic risk factors had the widest variation in completion rates that ranged from 24.5% to 85.8%. The lowest response rate was for SEF3, refusal/resistance to appropriate services, a response rate that undoubtedly reflects a "nil" value since it is unlikely that many clients would refuse services that were offered. Nevertheless, it is difficult to have confidence in a data set concerned with the maternal social environmental impact on birth outcomes when it has to be assumed that a missing value means that there has NOT been delayed access to prenatal care, that the housing is deemed to be adequate, and that the mother is not experiencing financial problems. One simply cannot be sure that these questions have been addressed at all by the staff

member. As indicated in this discussion of the IPRIT variables, it would be tempting to assume that missing values in a field constitute a true "no" or "zero." Nevertheless, imputing a "no" or "zero" to the incomplete fields for such relevant and salient variables would not be acceptable by any standards of database management. The risk of false negatives and their impact on descriptive or inferential analyses would be far too great to accept.

Internal Consistency. As described in the methods section, recorded responses for the IPRIT were cross-tabulated to related variables in the CTF as measures of internal consistency. Many discrepancies were found in the recorded information provided. A notable example of this occurred in the comparison of risk factor SEF1, single parenthood, to marital status information provided in the CTF (refer to Table 3.11). Of the 518 client files that had SEF1 (i.e. single parenthood) indicated as a risk factor, only 355 matched the CTF marital status data.

Cross-referencing PF12, age 17 and under or age 36 and over at time of delivery, with actual client ages provided in the CTF section (refer to Table 3.5) also showed wide discrepancies. Of the 248 records with PF12 indicated, only 132 matched the age data. Reasons for this are unknown and it is difficult to understand why such discrepancies should occur in the recording of basic variables such as age and marital status. The presence of these discrepancies does reflect on the quality of the database as a whole.

Specificity of Risk Factor Definitions. An issue related to the reliability and validity of the recorded data arises from the definitions of the possible responses to a question contained in the IPRIT guide. Some definitions appear in two or more factors, leading to possible double counting in assessing risk. For example, some parts of the definition for

mental health problems (EF2) are duplicated in other risk factor criteria such as family history of abuse/neglect (EF1) and inability to cope regarding pregnancy and baby (EF4).

Another issue concerning definitions of responses relates to the specificity with which the responses are defined. For example, the history of physical/medical conditions that define risk factor PF2, illness/condition with impact on pregnancy, provides an extensive list of factors but no clear criteria are stated for the inclusion or exclusion of the various conditions named.

Client Tracking Forms (CTF)

The CTF includes information about referral to program and client intake, demographic information about the POP clientele, client monitoring information related to substance abuse and other relevant factors, as well as pregnancy outcome information. The CTF, in essence, was intended to be the basis for the POP evaluation.

Data quality issues relevant to this section of the database were similar to those identified in the IPRIT section. Missing values, incomplete records, and various inconsistencies in the recording of the data in this section precluded any analysis beyond the identification of problems in the inspection of the database. Problems encountered can be enumerated as follows.

Coverage. Item-per-item completion rates for each question of the CTF were variable. Completion rates varied from 1.3% for a question asking whether referral for the client was made to mental health services to 100% for demographic questions such as age and ethnic background. Such wide variation makes it difficult to assess the capacity for the database information to form the basis of a valid program evaluation. It also raises questions as to whether this was due to lack of assessment on the recorder's part or

inadequate knowledge about the client.

Section eight of the CTF had the lowest completion rates of this entire section of the database (refer to Table 11). It is speculated that this may be due to confusion on the recorder's part about how to complete this question if no referral was made for that client to a particular agency or community service. Ideally, if there was no referral made, then the answer should have been a figure of zero (i.e. "0") to indicate this and provide for complete data for this field.

The various sections of the data evaluating nutrition had variable response rates. Food intake information which evaluated the number of servings from each food group (refer to Table 9.4) had very good response rates ranging from 82.1% to 94.8%. In other sections, however, there were poorer response rates. In particular, Table 9.5, which presented the data related to intake of caffeine, sweetened drinks and water had wide variation in completion rates (5.7% to 55.8%). In addition, Table 9.6, which provided data related to intake of foods that were sources of folate and iron, had generally low response rates ranging from 22.7% to 70.0%. While it is uncertain why this section had such overall low rates of completion, it is evident that the data could not be analyzed with any confidence to evaluate the Program's contribution to client nutritional status in pregnancy and its relation to POP participation and birth outcome. Furthermore, the current information collected in this database to assess nutritional status needs to be critically examined as it provides little information about the client's personal goals in relation to nutrition and how these goals are achieved.

Internal Consistency. There were discrepancies for certain questions in the CTF that should have equivalent numbers of recorded responses. For example, questions asking

about illicit drug use (refer to Table 9.9) at program intake revealed that seventy-eight types of drugs were being used on a weekly basis by a sub-population of the total clients who completed the program. Table 9.10, however, shows 301 responses for the types of drugs used. Part of the reason for this discrepancy is that some of the responses were not specific drugs per se and included responses such as alcohol and prescribed medications. Ascertaining why this variation occurs is difficult but because there is such a wide discrepancy, the quality of the data in relation to evaluating illicit drug use as it relates to the Program clientele is questionable.

Another example of internal consistency which places the evaluation of substance abuse issues of this database into question relates to sections ten and eleven of the CTF (refer to Tables 12.5 to 14.2). In Table 12.5, it is indicated that alcohol use follow-up information is provided for 462 clients and that smoking follow-up data is provided for 544 clients. Responses to questions in sections ten and eleven of the CTF which provide the alcohol and smoking data respectively consistently do not add up to these figures.

Specificity Of Definitions Provided For The CTF. Unlike the IPRIT, the CTF did not include a guide that outlined criteria for the various questions of the document. This could prove problematic for some questions such as the one asking for the client's body mass index (BMI). This measurement of pre-pregnancy body weight appropriateness can be calculated by a commonly accepted formula. Alternatively, it could also be assessed by various tables that provide values rounded off to one decimal place. Each method provides answers that can vary as much as 0.5, a difference that may prove relevant when attempting to determine if this is a presenting risk factor.

Another key issue to address relates to how the information for the CTF is

collected. The current system of collecting information for the CTF is not standardized in the form of specific questions and reference categories. The CTF is based on locally developed client charts. Therefore, the information cannot be collected in a consistent manner.

Evaluating The Database For Evaluation And Research

As described in Chapter One, the original intent of this thesis was to use an existing database on the Pregnancy Outreach Program of BC (POP) to develop and test a model of program evaluation and to examine the relationship between the identification of risk factors and actual birth outcomes. Based on an extensive literature review, a conceptual framework was developed to assess the database in terms of utility of program evaluation, decision making and policy development, and for epidemiological type research. Inherent in this approach was the expectation that the database would be accessible, analysable and complete, and the variables would have been coded and entered into the electronic database in a consistent and reliable fashion.

At the time that development of the conceptual framework and exploration of the literature related to risk factors and birth outcomes was proceeding, work began on opening the database and preparing for the planned analyses. Technical differences were encountered in opening the database and in converting the software on which it was based to a software program that would more readily facilitate the type of analyses proposed. Once these difficulties had been overcome, and it was possible to run simple frequency tables, it became clear that there were inherent problems in the database itself including problems in defining the population of cases and establishing those cases that had a complete record (i.e. from program entry to birth outcomes and breastfeeding

practices). Further, and of even greater significance for the proposed analyses, all client records had a large number of variables for which a code or response in specified fields were missing. The percentage of missing responses has been fully documented in Chapters Six and Seven of this thesis and it is clear that, unless one takes the view that a "zero" or "nil" response can reliably be imputed to more than 50% of the cases, the results of any analyses, including descriptive analyses, cannot be accepted as providing a reliable and valid description of the population or of a relationship between any of the variables under study. Further, upon closer inspection and cross tabulation of variables, a lack of internal consistency in the recording of key variables was found. In addition, there was a lack of specificity both with respect to the definitions of the variables, the questions that elicited the responses, and the coding structures within the data collection forms.

Explaining The Problems And Issues Inherent In The Data Base

Chapter Four provided an extensive literature review of evaluating electronic databases intended for health program evaluation. Four key areas for reviewing such databases included examination of its utility for program evaluation, utility for health research, utility for decision-making and policy development as well as the selection of information system. Based on the literature review a conceptual framework was established and can be referred to in Figure 4 (refer to page 42). Attempts to apply this model to the assessment of the CTF section of the POP database were not attempted because of the issues of lack of completeness of data for the variables measured, internal inconsistencies within the database and lack of specificity of definitions of the questions asked within the database. For example, using the information available to determine the program's effectiveness in reducing adverse birth outcomes would involve numerous

unacceptable imputations of data and compromises that would result in a lack of confidence in the assessment provided. Further, when investigating the effectiveness of the database in providing adequate information coverage as outlined in the framework there were also shortcomings. For example, the database fails to provide sufficient data to evaluate the program's effectiveness in reaching subgroups of the POP clientele such as those who have been determined to be using alcohol or illicit drugs in pregnancy. These key variables are not measured or recorded in a valid or reliable form.

This thesis has documented fully the problems encountered in the database with respect to every variable that is entered. The question then arises as to why, given that this database is intended to be the basis for program reporting and aggregation at the provincial level, for program evaluation, and for policy and decision making, the data is not systematically recorded and cannot be used with confidence for the purposes for which it was intended.

The answer seems to lie in the fact that the POP database is an example of secondary data, a term defined by Glaser (1963) as "existing data which were originally gathered for other purposes." In the present case, the data were derived from records that were part of an ongoing service program and that formed the basis for the identification of risk factors for individual clients and for planning interventions and that documented the individual client's progress and outcomes.

The variables, questions, responses, coding structures were all aimed at providing the service provider with information that was needed for the management of the individual client and for the implementation of the program for that client. In this sense, it appears that the step of adapting the information and the responses that were gathered

in the service context to creating an aggregated database that would meet the goals that were set for it were not taken when the electronic database format was adopted.

In retrospect, it is perhaps not surprising that the database was developed from service provider records without the rigorous review of the variables and their coding structures that would be required for the purpose of program evaluation or epidemiological research. The need for such a review is not readily identified by program planners, policy makers, and service providers, especially if the set of questions that might be addressed from the database has not been fully specified and developed. Further, it is only in recent years, that health service providers have moved, and slowly at that, to electronic data based client or patient record keeping.

Recommendations

Faced with the decision to focus the thesis on the quality of the data in the database, recommendations made in this chapter tend to be global in nature. The problems inherent in the database are so profound that using the database for reporting, policy making, and reporting is fraught with risks. Further, it seems questionable whether the costs and efforts involved in taking the records from the individual program sites and translating them into a provincial database is cost effective, whether at the program level or at the regional level. Finally, the task of developing a database that meets the objectives that were set for it would require a major commitment of time and resources to review the variables, the coding structures, and the methods by which the information is translated into an electronic base that can be used at all levels of the program and by researchers and planners. Brief comments are, however, made on some of the specific areas in order to focus the attention of those charged with the

responsibility for providing and evaluating this program.

The Reliability And Validity Of Reports Based On Database. The results of this review suggest that reports based on this database must be viewed with appropriate caution. For example, the 1994/95 provincial report released in 1996 suggests that program outcomes were favourable, however, it does not provide comparison of outcomes for those who did and did not complete the program. It is clear from this review of the data that such reports could provide, at best, only a broad picture as to the number of clients served and a limited number of characteristics, whether demographic, obstetric or medical. The broad picture reflected by the number of clients who are seen by the program is certainly a useful index of program activity and the fact that a record, imperfect as it may be, does exist gives some indication of the activity of the program.

Nevertheless, the demographic data are incomplete and would not provide an accurate description of the population being reached. Similarly, all risk factors as recorded in the database have serious defects and it would not be appropriate to use the risk factors as record to reach any conclusions about the extent to which the needs of a high risk population are being met. One can certainly conclude that since the mothers have met the criteria for inclusion in the program, they are indeed at risk of unfavourable outcomes, but the degree and patterning of the risks cannot be easily documented.

Demographic And Client Identifiers. In its current form, the database provides an overall documentation of the program. If, however, it is to meet the goals that have been set for it, then there are a number of substantive issues that need to be addressed. First, it is questionable whether the present records that form the basis for the derivation of the variables (i.e. the IPRIT and the CTF) can, or even should be, changed or adapted. They

are currently the forms and questions with which the program workers are familiar and one would not question whether they fulfill the needs of those dealing with clients on a day to day basis.

It is apparent, therefore, that considerable thought needs to be given to each and every variable that belongs in a program and provincial database in order to meet the overall goals, beyond those of the individual client and program worker. For example, in order to make the database consistent with other social and health databases, standard definitions of variables such as derived from Statistics Canada (e.g. the census in the case of demographic variables) should be adopted together with a common coding framework. This will allow comparison of the population of clients served with the general population and with other specific populations as well as permitting consistent comparison between programs in the province.

While recognizing that there are problems of confidentiality, common record identifiers should be used in order that the database can be linked to other data files such as provincial vital statistics, and medical and hospital records.

The Recording Of Risk Factors. It is beyond the scope of this thesis to comment on the appropriateness of the selection of the risk factors and medical and obstetric factors that should be entered into a database. It is apparent that IPRIT and other instruments are largely oriented towards "clinical" assessment rather than for rigorous program evaluation or epidemiological research. Indeed, the review of the literature suggests that there is a lack of agreement as to which risk factors impact definitively on birth outcomes and how these risk factors can be measured. For example, patterns of smoking, alcohol, and drug use are notoriously difficult to capture and, while some

improvement can be made in the current forms used in the POP, it is by no means clear that valid information can be elicited from this population.

Similarly, the gathering of obstetric and medical data, even given specific guidelines and categories, is difficult to do in a "clinical" practice context and it may be that only very specific data that elicits the presence or absence of salient medical and obstetric conditions should be incorporated into a province wide database.

Notwithstanding these caveats, however, there is clearly a need for the systematic gathering of such data to better understand the relationship between the risks factors and birth outcomes. Whether the POP is the setting in which the answers may be provided is a question in itself. It may be that such queries are better addressed by "gold standard" clinical trials or in specific studies that may build on the POP clientele base.

Recording And Entering The Data. In reviewing the electronic database, one must understand that "front line" workers engaged in providing a complex and demanding program are being asked to add another task to their job duties which, for the most part, they have not been prepared or trained. Even if the questions and coding structures were clearly specified, the task of transferring these to electronic format may be better left to those with special training and skills in this process. It is possible that the current forms that are being used could be adapted for direct computer assisted entry but this is hardly to be recommended given the need to completely review the variables contained within the forms.

Ideally, in the next phase of database development of POP, consideration would be given to using a computer assisted data entry system, one that can be easily adopted by health care workers in the field.

Computer Software. The selection of appropriate software for database management and analysis is a controversial subject that cannot be addressed within the scope of this thesis. Indeed, any recommendations that were made would be outdated long before any new system was considered or put in place. As in the case of the variables in the database, the software should be such that it is compatible with other applications with which the database might link or at least be readily transformed to other software when linking is required or complex analyses have to be undertaken. The health care data systems industry is moving rapidly and it is hoped that the next iteration of the POP database will take advantage of the new developments.

Summary And Conclusion

This thesis began with the proposal to utilize an existing database of a provincial program, the Pregnancy Outreach Program (POP), to develop and implement a model of program evaluation and to examine the relationship between identified risk factors and outcomes.

On opening the files, however, it was found that the number of incomplete data fields, inconsistencies within the database itself, and non specificity of responses precluded any attempt at analysis, even at the descriptive level. It was concluded, therefore, that it would be valuable to fully document the shortcomings in the quality of the data contained in the files since "feed back" on this central issue in program and evaluation could be central to modifying or even continuing the accumulation of data on the program.

In this event, the result sections (Chapters Six and Seven) examined each variable that is contained in the database in detail. It is concluded that, for the most part, the

quality of the database does not permit it to be used for program description, evaluation, nor for outcome analysis.

It is suggested that the reason for the problems inherent in the database lies in the fact that forms and instruments that are largely used for service staff working with individual clients are the source of the variables that are coded and entered. As a result, it is suggested that the database should be accepted as a record of service and clinical contacts but that its limitations should be clearly recognized in terms of providing a picture of POP at the local, let alone the regional or provincial level. It is suggested that consideration be given, if program evaluation and outcome research is to be undertaken on POP to develop a database separately that is oriented towards the evaluation and research functions.

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APPENDIX A

Province of British Columbia
Ministry of Health **Individual Prenatal Risk Identification**
Date: _____ **Location** _____ **Client ID#** _____

Code	Description	Yes	Explanation
Physical Factors			
PF1	Previous Pregnancy Loss	☐	_____
PF2	Illness/Condition with Impact on Pregnancy	☐	_____
PF3	Pre-pregnancy Weight (BMI)	☐	_____
PF4	Rate of Weight Gain	☐	_____
PF5	Inadequate Nutrition	☐	_____
PF6	Previous Child With Anomaly	☐	_____
PF7	Previous Child Requiring Neonatal Intensive Care	☐	_____
PF8	Multiple Pregnancy	☐	_____
PF9	Birth Interval	☐	_____
PF10	Grand Multipara - 5 or more pregnancies	☐	_____
PF11	Established Genetic Risk	☐	_____
PF12	Age Under 18/Over 35	☐	_____
Socio-Economic Factors			
SEF1	Single Parenthood	☐	_____
SEF2	Delayed Access to Prenatal Care	☐	_____
SEF3	Refusal of/Resistance to Appropriate Services	☐	_____
SEF4	Isolation - Ethnic, Language and/or Social	☐	_____
SEF5	Limited Learning Ability/Illiterate	☐	_____
SEF6	Unstable Relationship	☐	_____
SEF7	Inadequate Housing	☐	_____
SEF8	Financial Problems	☐	_____
Substance Abuse			
SA1	Cigarette Smoking	☐	_____
SA2	Alcohol Use	☐	_____
SA3	Inappropriate Use of Over The Counter or Prescription Drugs	☐	_____
SA4	Illegal Drugs	☐	_____
Emotional Factors			
EF1	Family History of Abuse/Neglect	☐	_____
EF2	Mental Health Problems	☐	_____
EF3	Low Self-Esteem	☐	_____
EF4	Inability to Cope/Anxiety Regarding Pregnancy and Baby	☐	_____
EF5	Unrealistic Expectations	☐	_____
EF6	Unwanted Pregnancy	☐	_____

White copy - headquarters Yellow copy - coordinator

A guide for the use of Individual Prenatal Risk Identification

Purpose

The purpose of this guide is to simplify the process of identifying pregnant women for preventive service intervention. It is intended to complement the assessment of the physician by highlighting lifestyle factors in particular.

The guide is not meant to be an all inclusive source of information of risks in families and pregnancies. It compiles in a single document basic information to assist professionals in the early identification of risks with the ultimate goal of reducing perinatal morbidity and mortality.

Personal experience, knowledge and intuition on the part of the professionals are as important, if not more, than whatever guide or form is used. The guide should be used with the knowledge and understanding of risks, situations and their effect on health to arrive at a decision for appropriate intervention.

The comprehensive multidisciplinary approach to care should be a sound principle to adopt. It will ensure that all points of intervention are covered and appropriate preventive measures are taken through community outreach and other family health programs of the health agency.

The lists of risk factors noted on the forms are not meant to be all inclusive. They are intended to cover the most frequent problems producing risk.

DEFINITIONS

In general, the risk factors that will increase the chances of morbidity and mortality are of a physical, nutritional, mental/emotional, socio-economic or occupational nature. For the purpose of this guide, the following definitions have been adopted:

risk:	an increased probability of adverse outcomes
high risk groups:	groups with increased probability of adverse outcomes
high risk families:	families whose circumstances indicate high risk factors which may interfere with optimum family life and functioning
high risk pregnancy:	a pregnancy in which the mother and/or the fetus has an increased probability of maternal and fetal morbidity or mortality prenatally and intranatally
high risk infant:	newborn or infant with familial, maternal and perinatal factors that may lead to an increased morbidity and subsequent disabilities

Physical Factors

Previous pregnancy loss	☐
Illness/condition with impact on pregnancy	☐
Pre-pregnancy weight-body mass index (BMI)	☐
Rate of weight gain	☐
Inadequate nutrition	☐
Previous child with anomaly	☐
Previous child requiring neonatal intensive care	☐
Multiple pregnancy	☐
Birth interval	☐
Grand multipara - 5 or more pregnancies	☐
Established genetic risk	☐
Age under 18/over 35	☐

Previous pregnancy loss

Previous pregnancy loss; habitual abortion, stillbirth, neonatal and infant death, such as SIDS are significant indicators. Depending on the cause of such loss the same conditions may be either present or occur again for another reproductive loss. The level of risk depends on the causative factor.

Illness/condition with impact on pregnancy

Many conditions may lead to premature labour, congenital anomalies, intrauterine growth retardation, and other associated morbidities. These include infections (rubella, STD, toxoplasmosis, genital herpes), abnormal presentation, surgical procedures during pregnancy, uterine and associated malformations, toxemia, anemia, bleeding, diabetes, hypertension, obesity, renal disease, isoimmunization etc. The risk and its effects are related to the severity of the condition.

Other conditions such as blindness, deafness and physical handicaps can affect the mother in pregnancy. Depending on the individual's abilities, compensating mechanisms, support structure these conditions may be described as major, minor or no problems.

Pre-pregnancy weight

- major - B.M.I. 18 and under or 29 and over
  $$BMI = \frac{wt\ (kg)}{ht(m^2)}$$
- minor - BMI 18.1 to 20 or 27 -28.9

Pre-pregnancy weight: The underweight woman has a BMI 18 or under. A BMI of 29 or over indicates obesity.

A woman's nutritional status prior to and during pregnancy are important factors that influence the health of the fetus and the baby. The mother's pre-pregnancy weight and weight gain during pregnancy are two factors which affect the infant's birth weight and thus the infant's health.

Rate of weight gain

- if weight gain is 1 kg or less per month in 2nd and 3rd trimester
  if weight gain is less than 4 kg before 20 weeks
  if weight gain is greater than or equal to 3 kg/month after 12 weeks (sustained gain)

Rate of weight gain: (For women beginning pregnancy at an acceptable BMI ie. 20.1 to 26.9). Either excessive weight gain (3 kg or more per month after 12 weeks) or inadequate weight gain (1 kg or less per month in second or third trimester or less than 4 kg before 20 weeks) are all significant factors. Inappropriate rate of weight gain may lead to low birthweight infants and related problems.

Inadequate Nutrition

- major - Consistently missing one or more food groups.
- minor - Consistently less than 50% of the recommended servings of one or more food groups. The 50% levels are:
  3 servings of Breads and Cereals
  3 servings of Fruits and Vegetables
  1.5 servings of Milk and Milk Products
  1 serving of Meat, Fish, Poultry and Alternates

Inadequate Nutrition: The B.C. Food Guide for Pregnancy (see Baby's Best Chance pp. 22-26) outlines the appropriate numbers of food groups servings for adequate calories and nutrients. A deficiency can present a serious risk to the development of the fetus and to the mother's health.

Previous child with anomaly

- major - significant impact on development of the child eg. cyanotic heart disease, neural tube defects, cleft palate
- minor - little impact on child's growth or development (readily corrected or only minor functional impairment) eg. minor orthopedic abnormalities, uncomplicated pyloric stenosis, vent-septal defects with spontaneous closure

Previous infant with an anomaly or disorder: cerebral palsy, mental retardation, congenital anomalies…if the same perinatal conditions still exist, they may lead to the same risk in the present pregnancy.

Previous child requiring neonatal intensive care

- major - premature/postmature infant; low birthweight (1500 grams)
- minor - resolveable problems with no long range implications. N.B. Do not include previous child with may have been in care for 24 to 48 hours for supervision only.

Multiple Pregnancy

- major - pregnancies with more than one fetus

Multiple Pregnancy: Prenatal mortality resulting from twin births is as high as 14%, the greatest mortality resulting from premature birth. There is conflicting evidence as to whether multiple

gestation increases the nutrient and energy requirements above singleton pregnancies or whether the body utilizes nutrients more efficiently. Regardless of these conflicts to promote a normal pregnancy outcome, each diagnosis of multiple gestation is important and will need special nutrition intervention.

Birth Interval

- minor - less than 2 years.

Although the optimum birth interval has not been defined, the incidence of fetal growth retardation and prematurity is consistently high when the birth interval is less than two years. Spacing allows time for the mother's body to recover and to be in optimal health before becoming pregnancy again.

Grand multipara

- fifth pregnancy or over

Grand multipara: Parity alone combined with maternal age is significant. Higher risk of morrbidity occurs at the first pregnancy and at the fifth pregnancy or over.

Established genetic risk

- minor - previous pregnancy or present history

Established genetic risk either from previous pregnancies or from a familial history ie. muscular dystrophy, cystic fibrosis, etc. is significant.

Age under 18 over 35

Age - Under 18 years risk low birth weight. Over 35 risk chromosomal abnormalities.

<u>Socio-Economic Factors</u>

Single parenthood	☐
Delayed access to prenatal care	☐
Isolation - ethnic, language and social	☐
Limited learning ability/illiterate	☐
Unstable relationship	☐
Inadequate housing	☐
Financial problems	☐

Social Environment: According to Knuppel and Drukker, the effects of maternal social environment on the outcome of pregnancy are recognized to be both multiple and profound. "Social environment" itself is described as the summation of numerous factors, including the family's standards of health and hygiene, housing and financial status, emotional and social support and so on. The effects may be direct or indirect and may be difficult to separate within the context of socio-economic status. It is the inter-relationship of these factors, rather than any single factor, that works to affect the outcome of the pregnancy.

Single Parenthood

- major - when associated with multiple social problems
- minor - when financial and emotional support present

Single parenthood. The frequency of cases of low birth weight infants and the perinatal mortality rates of infants born to unmarried mothers is double those of the children of married women, according to Knuppel and Drukker. Marital status alone is not necessarily an indicator of potential risk for mother and fetus so much as it is an indicator of an unwanted/unplanned pregnancy. These pregnant women, especially if unwed or teenagers, tend to neglect antenatal care and leave advice unheeded. Statistically, pregnancy complications occur more frequently in unmarried than in married women.

Delayed access to prenatal care

- major - no care by 30 weeks
- minor - no care by 20 weeks

Early access to medical care and return follow-up visits are essential for risk identification and monitoring. Some of the factors to consider are no medical care by 20 weeks, frequent missed appointments, no follow-up on medical advice and no attendance at prenatal classes in a primipara.

Refusal of/resistance to appropriate services

- major - refusal of appropriate professional services eg. MSSH social worker, etc.
- minor - resistance to appropriate services, accepts services with reluctance, may not heed advice
- Refusal of/resistance to appropriate services poses obvious threats to the client's receiving appropriate medical care and support for the mother and the fetus.

Isolation - Ethnic, language and/or social

- major - total or severe isolation
- minor - isolated but with some support services in place

Ethnic or language isolation can tend to deprive mothers of available information and resources.

Social isolation ie. lack of supports, possibly new to area, can create a void in resources either classes or physicians which can put a mother at risk of not being assessed early and receiving adequate care and attention. Social isolation can create stress in the pregnancy.

Limited learning ability/illiterate

- major - severe communicative disability
- minor - limited ability to understand

Limited learning ability/illiterate especially if associated with other risks is significant. These people may not have access to information nor an understanding of the importance of education re. pregnancy and childbirth and child care.

Marital problems, unstable relationship

- minor - lack of support or discord

Marital problems, unstable partnership: Marital discord, lack of partner support, lack of extended family support may lead to a higher incidence of reproductive loss, low birth weight (preterm, small for dates) nutritional problems, absence of maternal child bonding, neglect and abuse resulting in developmental delays and other associated morbidities.

Inadequate housing

- minor - lack of facilities, space, hazardous living condition, etc.

Financial problems

- minor - low income, unemployed, on assistance

Unemployment, very low income, receiving social assistance may lead to a higher incidence of reproductive loss, low birth weight, nutritional problems, neglect and abusing resulting in developmental delays and other associated morbidities.

Substance Abuse

Cigarette smoking	☐
Alcohol use	☐
Inappropriate use of over the counter and Rx drugs	☐
Illegal drugs	☐

Smoking

- major -more than 10 cigarettes/day
- minor - less than 10 cigarettes/day, daily secondhand smoke

Cigarette smoking has been shown to decrease infant birthweight and increase the risks of perinatal morbidity and mortality. The growth-retarding effect of cigarette smoking and higher incidence of spontaneous abortions, stillbirths and placental complications among women who smoke during pregnancy may be due to several factors including direct toxicity of carbon monoxide, nicotine and/or other constituents of tobacco, reducing blood flow to the uterus affecting transfer of nutrients to the fetus, or suboptimal maternal food intake. Passive smoking may also be a cause of concern during pregnancy due to the oxygen-depleting effect of carbon monoxide.

Alcohol use

- major - 4 or more drinks/day or binge drinking
- minor - 1-3 drinks/day

Alcohol use: there is no known safe level of alcohol consumption for pregnancy women. It is not possible at this time to say what is the minimum level of alcohol consumption that may endanger the fetus. Chronic alcohol abuse (maternal alcoholism and malnutrition) may lead to the fetal alcohol syndrome; mental retardation, facial congenital anomalies, developmental delays, hyperactivity, etc. Cigarette smoking and heaving drinking (3 or more drinks per day) can independently increase the risk of spontaneous abortion and low birth weight infants. When both habits are combined, fetal risk is greatly decreased.

Inappropriate use of over the counter and Rx drugs

- major - constitutes a hazard to pregnancy. Drug has mutagenic or tetratogenic effect
- minor - other drugs/herb use

Illegal drugs

- major - any parenteral drug use; daily use of "soft" street drugs
- minor - regular use of "soft" drugs eg. marijuana

Drugs may affect the intake, absorption, metabolism and/or utilization of nutrients in the body, thereby influencing maternal nutrition status. The effect that a drug has on the fetus depends on many factors including the type of drug, the amount taken by the mother, the stage of pregnancy at which it is taken and the frequency and duration of its use. Some drugs are known to have or strongly suspected of having an embryotoxic effect in humans (thalidomide, androgenic hormones, alcohol, anticonvulsants, isotretinoin, oral hypoglycemics). Others may possibly be embryotoxic in humans (female sex hormones, lithium, tranquilizers, anti-malarials, salicylates).

Emotional Factors

Family history of abuse/neglect	☐
Mental health problems	☐
Low self-esteem	☐
Inability to cope/anxiety regarding pregnancy and baby	☐
Unrealistic expectations	☐
Unwanted pregnancy/denial of pregnancy	☐

Family history of abuse/neglect

- classify as major if risk is severe: ie. recent enough to still affect emotional or physical health: or if possibility of repetition during pregnancy or shortly thereafter

Family history of abuse/neglect (emotional or physical) tends to repeat itself from generation to generation and where there is abuse present in the home, the new baby is in high risk of being abused and neglected

Mental Health Problems

- major - present psychiatric or mental health problems
- minor - history of psychiatric or mental health problems

Mental health problems may shed light on ones family background, coping mechanisms, self-esteem and reactions to loss or crisis. As the pregnant woman strives to develop a degree of comfort with the many changes in social context of psychologic equilibrium, there often occurs a surfacing of conflicts that were never adequately resolved in earlier developmental periods. For example, pregnancy patients may experience conflicts of autonomy with their mothers, renewed rivalry with siblings, or active uncertainty about sexuality and disturbing fantasies about past relationships, each of which has been adequately deal with prior to pregnancy but which now result in troubling family interactions or marital discord. Manifest problems in adjustment prior to pregnancy, such as marital discord, economic difficulties, poor self-concept, and neuroticism may be exacerbated by pregnancy. Anxiety allowed to go unallayed may lead to maladaptive mother-child interaction.

Low self-esteem

- minor - lack of self-worth and motivation, depressed, uncaring, etc.

Low self-esteem can manifest itself in a pregnancy woman having no confidence in herself, her body, her decision making choices. She may even choose to be in an abusive relationship or refuse to avail herself of advice and information.

Inability to cope - anxiety

- minor - exhibits extreme fear, stress, irrational behaviour, etc.

Inability to cope and anxiety regarding the pregnancy and baby. According to Kemp and Page, coping potential is the ability of the individual and family to adapt to the stress. When individuals experience stress, they may use a variety of methods to cope. With an intense perception of threat, defense mechanisms such as denial, projection, rationalization, displacement and intellectualization may occur. The prolong denial of the high-risk status of the pregnancy may result in failure to comply with therapeutic regimes. Anxiety regarding the pregnancy and baby may manifest itself in many expressed irrational fears and distortions. According to Kuppel and Drukker, women who are having difficulty accepting pregnancy and developing a relationship with the growing fetus may present with extreme anxiety about the condition of the baby and will be hypervigilant in looking for signs that "something is wrong" with the pregnancy.

Unrealistic expectations

- minor - lack of awareness of normal requirements for pregnancy and birth

Unrealistic expectations of roles of mother and or father, baby and significant others can lead to frustration, stress, neglect and abuse. Another psychosocial maladaptation of pregnancy is failure to make adequate, concrete plans for postnatal care of the baby. The absence of family members or friends to help care for the baby or, at the other extreme, passivity and over reliance on family members are signs of difficulty in adapting to pregnancy, as is unrealistic planning or inadequate preparation for managing the baby at home.

Unwanted pregnancy - denial of pregnancy

- minor - unaccepting of pregnancy

Pregnant women who have an unwanted pregnancy or unplanned pregnancy and/or who deny the pregnancy can tend to neglect antenatal care and leave advice unheeded. The stresses in these women are very high.

Acknowledgements to:
Ottawa Health Department and Ontario Ministry of Health, FORM 5070 REV88 OCTOBER NA-RISK2.CH

APPENDIX B

T-ACE Measurement

T-ACE is a measurement tool of four questions that are significant identifiers of risk drinking (i.e., alcohol intake sufficient to potentially dame the embryo/fetus).

For the Pregnancy Outreach Program the T-ACE is completed at intake. The T-ACE score has a range of 0-5. The value of each answer to the four questions is totalled to determine the final T-ACE score.

1. How many drinks does it take to make you feel high? 0 less than or equal to 2 drinks 1 more than 2 drinks	**T** olerance
2. Have people annoyed you by criticizing your drinking? 0 no 1 yes	**A** nnoyance
3. Have you felt you ought to cut down on your drinking? 0 no 1 yes	**C** ut Down
4. Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover? 0 no 1 yes	**E** ye Opener

Source: Sokol, Robert J., "Finding the Risk Drinker in Your Clinical Practice" in *Alcohol and Child/Family Health: Proceedings of a Conference with Particular Reference to the Prevention of Alcohol-Related Birth Defects*, edited by Robinson, G. and Armstrong R., Vancouver, B.C., December 1988.

Note: For the purposes of the Pregnancy Outreach Program Evaluation - a client is at risk for alcohol use if she has a positive T-ACE (a score of 2 or greater).

APPENDIX C

CLIENT DATA SHEET

TO BE COMPLETED IN CONJUNCTION WITH INDIVIDUAL RISK IDENTIFICATION TOOL

PROGRAM LOCATION

CLIENT ID NUMBER

CARE CARD NUMBER

REFERRAL DATA

SOURCE OF REFERRAL

- ☐ (1) HEALTH UNIT
- ☐ (2) PHYSICIAN
- ☐ (3) SOCIAL SERVICES
- ☐ (4) ALCOHOL & DRUG
- ☐ (5) COMMUNITY GROUP
- ☐ (6) SELF
- ☐ (7) OTHER

REFERAL DATE (DD/MM/YY)

WEEKS GESTATION

INTAKE DATA

INTAKE ASSESSMENT DATE

DUE DATE (DD/MM/YY)

CLIENT BEGAN PROGRAM ☐ YES ☐ NO

IF NO, WHY DID CLIENT NOT BEGIN PROGRAM?

- ☐ (1) NOT HIGH RISK
- ☐ (2) REFUSED/NOT INTERESTED
- ☐ (3) OTHER

IF (3) OTHER, WHY DID CLIENT NOT BEGIN PROGRAM?

COMMENTS

CLIENT CHARACTERISTICS

AGE

MARITAL STATUS

- ☐ (1) MARRIED
- ☐ (2) COMMONLAW
- ☐ (3) SINGLE
- ☐ (4) RELATIONSHIP

FIRST LANGUAGE

- ☐ (1) ENGLISH
- ☐ (2) OTHER (SPECIFY)

ETHNIC BACKGROUD

- ☐ (1) CAUCASIAN (Not Identifiable)
- ☐ (2) NATIVE INDIAN
- ☐ (3) INDO-CANADIAN
- ☐ (4) CHINESE
- ☐ (5) VIETNAMESE
- ☐ (6) LATIN AMERICAN
- ☐ (7) OTHER

IF ETHNIC BACKGROUND IS 2 (NATIVE INDIAN), STATE CLIENT'S STATUS

- ☐ (1) STATUS INDIAN ON RESERVE
- ☐ (2) STATUS INDIAN OFF RESERVE
- ☐ (3) METIS
- ☐ (4) NON-STATUS
- ☐ (5) UNKNOWN

EDUCATION

- ☐ (1) GRADE 8 OR LESS
- ☐ (2) GRADE 9 - 11
- ☐ (3) COMPLETED GRADE 12
- ☐ (4) SOME POST-SECONDARY
- ☐ (5) UNIVERSITY GRADUATE

EMPLOYMENT STATUS

- ☐ (1) EMPLOYED - OCCUPATION _____
- ☐ (2) STUDENT
- ☐ (3) HOMEMAKER
- ☐ (4) UNEMPLOYED

FINANCIAL SITUATION

- ☐ (1) RECEIVING INCOME ASSISTANCE
- ☐ (2) LOW/INADEQATE INCOME BUT NO SOCIAL ASSISTANCE
- ☐ (3) NOT LOW INCOME

SPOUSE'S/PARTNER'S FINANCIAL SITUATION

- ☐ (1) RECEIVING INCOME ASSISTANCE
- ☐ (2) LOW/INADEQATE INCOME BUT NO SOCIAL ASSISTANCE
- ☐ (3) NOT LOW INCOME
- ☐ (4) NOT APPLICABLE

T-ACE SCORE 0 1 2 3 4 5

CLIENT ID NUMBER:

PAST PREGANCY DATA:

NUMBER OF

PREGNANCIES (G)	_____	DELIVERIES (P)	_____
TERM DELIVERIES (T)	_____	ELECTIVE ABORTIONS (A/E)	_____
SPONTANEOUS ABORTIONS (A/S)	_____	LIVING CHILDREN (L)	_____
STILLBIRTHS (S)	_____	LOW BIRTH WEIGHT (LBW)	_____

ATTENDED PRENATAL CLASSES DURING A PREVIOUS PREGNANCY?

☐ (1) YES ☐ (2) NO ☐ (3) DON'T KNOW/UNDECIDED ☐ (4) NOT APPLICABLE

HAS CLIENT EVER PREVIOUSLY BEEN A POP CLIENT?

☐ (1) YES ☐ (2) NO ☐ (3) DON'T KNOW

CLIENT MONITORING:

	PRE-PREGNANCY	PROGRAM INTAKE	LAST VISIT BEFORE DELIVERY
DATE OF ASSESSMENT (DD/MM/YY)	___/___/___	___/___/___	___/___/___
WEIGHT	_____	_____	_____
BODY MASS INDEX (BMI)	_____	_____	_____
MEAL PATTERN			
NUMBER OF MEALS PER DAY		_____	_____
NUMBER OF SNACKS PER DAY *(NB: A meal includes foods from 3 to 4 food groups; a snack includes foods from 1 to 2 food groups)*		_____	_____
FOOD INTAKE *(number of servings per day based on 24 hour recall)*			
GRAIN PRODUCTS		_____	_____
VEGETABLES AND FRUIT		_____	_____
MILK PRODUCTS		_____	_____
MEAT AND ALTERNATIVES		_____	_____
FLUIDS *(number of 250 mL (8 oz) cups per day)*			
COFFEE *(perc or drip, caffeinated)*		_____	_____
COFFEE *(instant, caffeinated)*		_____	_____
TEA *(caffeinated)*		_____	_____
COLAS *(caffeinated)*		_____	_____
OTHER: POPS AND SWEETENED FRUIT DRINKS (EG. KOOLAID, TANG) EXCLUDING FRUIT JUICES		_____	_____
WATER		_____	_____
KEY NUTRIENTS *(number of servings per day based on 24 hours recall)*			
IRON RICH FOODS		_____	_____
EXCELLENT SOURCES		_____	_____
OTHER SOURCES		_____	_____
FOLATE RICH FOODS		_____	_____
GOOD SOURCES		_____	_____
OTHER SOURCES		_____	_____

CLIENT ID NUMBER:

CLIENT MONITORING *continued*

SUBSTANCE USE	PRE-PREGNANCY	PROGRAM INTAKE	LAST VISIT BEFORE DELIVER
CIGARETTES PER DAY			
DRINKS PER WEEK			
DRUGS USED PER WEEK			

TYPE(S) OF DRUGS USED (INCLUDING ALCOHOL) _____

PROGRAM CONTACT

NUMBER OF COUNSELLING CONTACTS:	CLIENT'S HOME	PROGRAM SITE	PHONE CALLS	OTHER
HEALTH PROFESSIONALS				
OUTREACH WORKERS				

NUMBER OF ATTENDANCES AT DROP-IN	NUMBER OF APPOINTMENTS CANCELLED BY CLIENT *(includes not home, no show, and other attempts made)*	
RECEIVING PROGRAM FOOD SUPPLEMENTS? ☐ YES ☐ NO	IF NO, WHY NOT?	
SEEING A PHYSICIAN FOR PRENATAL CARE? ☐ YES ☐ NO	DATE OF FIRST PHYSICIAN CONTACT (DD/MM/YY) (APPROX. IF NECESSARY)	TOTAL NUMBER OF CONTACTS WITH PHYSICIAN BY LAST VISIT BEFORE DELIVERY

COMMENTS

REFERRALS:

	DURING PROGRAM	AT DISCHARGE
MENTAL HEALTH		
ALCOHOL & DRUG PROGRAMS		
SOCIAL SERVICES		
HEALTH UNIT		
PHYSICIAN		
NOBODY'S PERFECT		
OTHER (SPECIFY)		

SMOKING DATA.

TRIGGERS

☐ (1) SOCIAL ACTIVITIES ☐ (2) STRESS ☐ (3) TIME OF DAY *(ie, after meal)* ☐ (4) BOREDOM ☐ (5) EMOTIONAL FACTORS

☐ (6) OTHER

NUMBER ATTEMPTS AT CESSATION	METHODS

DO OTHER MEMBERS OF YOUR HOUSEHOLD CURRENTLY SMOKE?	ARE YOU EVER EXPOSED TO "SECOND-HAND" SMOKE?
☐ YES ☐ NO	☐ YES ☐ NO

IF YES TO SECOND HAND SMOKE, WHEN EXPOSED?	WHERE?

PERSONAL GOALS

☐ (1) NO CHANGE ☐ (2) REDUCE ☐ (3) QUIT

COMMENTS

CLIENT ID NUMBER:

ALCOHOL DATA

HX. OF USE BY
☐ (1) SIBLINGS ☐ (2) PARENTS ☐ (3) SPOUSE/PARTNER

TRIGGERS
☐ (1) SOCIAL ☐ (2) STRESS/SADNESS ☐ (3) OTHER

AGE STARTED	COPING METHODS

HOW MANY DRINKS DOES IT TAKE YOU TO FEEL THE EFFECTS OF ALCOHOL?	HOW MANY DRINKS CAN YOU HOLD?

DRINKING PATTERNS
☐ DAILY ☐ BINGE *(= 5 or more alcohol drinks on any one occasion)*

IF DAILY, AVERAGE NUMBER PER DAY

IF BINGLE, FREQUENCY OF BINGING

	NUMBER OF DRINKS/BINGE		NUMBER OF DRINKS/BINGE
☐ (1) 1/MONTH	_____	☐ (4) 2/WEEK	_____
☐ (2) 2/MONTH	_____	☐ (5) >= 3/WEEK	_____
☐ (3) 1/WEEK	_____		

PAST HX OF TREATMENT ☐ YES ☐ NO	IF YES, WHEN? (DD/MM/YY)	WHERE?

PERSONAL GOALS
☐ (1) NO CHANGE ☐ (2) REDUCE ☐ (3) ABSTAIN

COMMENTS

CLIENT ID NUMBER:

PROGRAM OUTCOME:

OUTCOME OF PRESENT PREGNANCY

☐ (1) SINGLE LIVE BIRTH ☐ (3) STILLBIRTH ☐ (5) THERAPEUTIC ABORTION

☐ (2) MULTIPLE LIVE BIRTH ☐ (4) SPONTANEOUS ABORTION (MISCARRIAGE)

WEEKS GESTATION	INFANT BIRTHDATE (DD/MM/YY)	BIRTHWEIGHT (GRAMS)	TWIN WEIGHT (GRAMS)

MEDICAL COMPLICATIONS

DID CLIENT STAY IN PROGRAM TO DELIVERY/END OF PREGNANCY?	IF NO, WHY NOT?
☐ YES ☐ NO	

BREASTFEEDING?

AT HOSPITAL DISCHARGE: ☐ (1) YES ☐ (2) NO ☐ (3) DON'T KNOW

AT ONE MONTH CONTACT: ☐ (1) YES ☐ (2) NO ☐ (3) DON'T KNOW

IF NO TO EITHER BREASTFEEDING MEASURE, WHY NOT?

ALCOHOL USE FOLLOW-UP SHEET FILLED OUT?	SMOKING USE FOLLOW-UP SHEET FILLED OUT?	
☐ YES ☐ NO	☐ YES ☐ NO	

COMMENTS

APPENDIX D

INDIVIDUAL PRENATAL RISK IDENTIFICATION TOOL

Client ID Number: _____
Risk ID Form Completed?: _

Physical Factors

PF1 : _	PF2 : _	PF3 : _	PF4 : _
PF5 : _	PF6 : _	PF7 : _	PF8 : _
PF9 : _	PF10: _	PF11: _	PF12: _

Socio-Economic Factors

SF1 : _	SF2 : _	SF3 : _	SF4 :_
SF5 : _	SF6 : _	SF7 : _	SF8 :_

Substance Abuse

SA1 :_	SA2 :_	SA3 :_	SA4 :_

Emotional Factors

EF1 :_	EF2 :_	EF3 :_	EF4 :_
EF5 :_	EF6 :_		

PREGNANCY OUTREACH PROJECT CLIENT DATABASE

Project Location: ____
CareCard Number: _____

Source of Referral: __

Referral Date: _____ Weeks Gestation: _____

INTAKE DATA

Intake Assessment Date: _____

Due Date: _____

Client Began Program: ___ If No, Why Not: __

Comments: _____

CLIENT CHARACTERISTICS

Age: __ Marital Status: __

First Language: _ If Other than English, specify: _____
Ethnic Background: _ If 2, Native Indian, status: _
Education: _
Employment: _ Occupation: _____
Client's Financial Situation: _
Spouse's/Partner's Situation: _

T-ACE Score: _

PAST PREGNANCY DATA

Number of
Pregnancies G: _ Deliveries P: _
Term Deliveries T: _ Elective Abortions A/e: _
Spontaneous Abortions A/s: _ Living Children L: _
Stillbirths S: _ Low Birthweights LBW: _

Attended Prenatal Classes During Previous Pregnancy?: _
Has Client Ever Previously Been a POP Client?: _

CLIENT MONITORING

Date of Last Assessment: _____

Prepregnancy Weight: _____ Intake Weight: ____ Last Visit Weight: _____
BMI: ____

MEAL PATTERN	PROGRAM INTAKE	LAST VISIT
Num. Meals/Day:	_____	_____
Num. Snack/Day:	_____	_____
FOOD INTAKE		
Grain Products:	_____	_____
Vegetables & Fruit:	_____	_____
Milk Products:	_____	_____
Meat & Alternatives:	_____	_____
FLUIDS		
Coffee (perc/caffeinated):	_____	_____
Coffee (instant/caffeinated):	_____	_____
Tea:	_____	_____
Colas:	_____	_____
Other:	_____	_____

KEY NUTRIENTS

Iron Rich Foods:	_____	_____
Excellent Sources:	_____	_____
Other Sources:	_____	_____
Folate Rich Foods:	_____	_____
Good Sources:	_____	_____
Other Sources:	_____	_____

SUBSTANCE USE

Cigarettes/Day	___	___	___
Drinks/Week	___	___	___
Drugs Used/Week	___	___	___

Type(s) of Drugs Used: _____

PROJECT CONTACT

	Home	Office	Phone	Other
HEALTH PROFESSIONALS	__	__	__	__
LAY COUNSELLORS	__	__	__	__

No. of Attendances at Drop In: __ No. of Cancelled Appointments: __

Receiving Food Supplements?: _ If No, Why Not?: _____
Seeing a Physician for Prenatal Care?: __
Time of First Physician Contact: _____

REFERRALS

	DURING PROGRAM	AT DISCHARGE
Mental Health	__	__
Alcohol & Drug Program	__	__
Social Services	__	__
Health Unit/Dept.	__	__
Physician	__	__
Nobody's Perfect	__	__
Other	__	__

PROJECT OUTCOME

Outcome of Present Pregnancy: __

Weeks Gestation: __ Infant Birthdate: _____
Birthweight: _____ (grams) Twinweight: ____ (grams)
Medical Complications: _____

Did Client Stay In Project to Delivery/End of Pregnancy?: __
If No, Why Not?: _____

Did Client Attend MD Visits this Pregnancy?: __

Breastfeeding? At Hospital Discharge: __
At 1 Month Contact: __
If No, Why Not?: _____

Alcohol Use Follow-up Sheet Attached?: AlcFol: __

ALCOHOL DATA

History of Use: __
Triggers: __
Age Started: __
Coping Methods: _____

How Many Drinks Does It Take
To Feel the Effects of Alcohol?: __

How Many Drinks Can You Hold?: __

Drinking Patterns: __ If 1, Daily, Average No. per Day: __
If 2, Binge, Frequency of Binging: __

Past Hx of Treatment: __ Where?: _____
If Yes, When?: _____

Personal Goals: __

Smoking Follow-up Sheet Attached?: SmokFol _

SMOKING DATA

Smoking Triggers: _
No. of Attempts
at Cessation __ Methods: _____
Reasons Methods Didn't Work: _____
Do Other Members of Household Smoke?: _
If Yes, Are You Subject to
Their "Second Hand" Smoke?: __

Personal Goal: _

APPENDIX E

FOLATE RICH FOODS

During pregnancy, women should have 0.4 milligrams or 400 micrograms (mcg) of folate daily.

Excellent Sources of Folate ≥ 33 mcg/serving		
Food	**Serving Size**	**mcg Folate**
Asparagus, beets, broccoli, brussels sprouts, cauliflower, corn, peas, parsnips, Romaine lettuce	125 mL (1/2 cup)	34 - 93
Spinach	125 mL (1/2 cup)	139
Avocado, pureed	75 mL (1/4 cup)	37
Orange	1	40
Orange juice, frozen concentrate, diluted	125 mL (1/2 cup)	58
Baked beans	125 - 250 mL (1/2 - 1 cup)	30 - 60
Beef liver	50 - 100g	110 - 220
Chicken livers	50 - 100g	335 - 770
Egg	1 large	33
Lentils, cooked, drained	125 - 250 mL (1/2 - 1 cup)	189 - 378
Kidney beans	125 - 250 mL (1/2 - 1 cup)	121 - 242
Peanuts	75 mL (1/4 cup)	40

Other Food Sources of Folate: 11-32 mcg/serving		
Beet greens, cabbage, carrots, green beans, lettuce, mushrooms, mixed frozen vegetables, onion, potato, squash, sweet potato, tomato, tomato juice, turnip, zucchini	125 mL (1/2 cup)	11 - 30
Banana	1	22
Berries: blackberries, raspberries, strawberries	125 mL (1/2 cup)	13 - 26
Grapefruit	1/2	12
Melons: cantaloupe, honeydew	125 mL (1/2 cup)	14 - 27
Pear	1	12
Breakfast cereals enriched with folate	30g	12
Bread: whole wheat or white	1 slice	12
Peanut butter, sesame seeds	30 mL (2 Tbsp)	19 - 26
Tofu	100g (1/3 cup)	15
Milk	250 mL (1 cup)	13
Yogurt	175g (3/4 cup)	18

Reference:
(1) Action Towards Healthy Eating, Technical Report, Health & Welfare, Canada, 1990.
(2) Nutrient Value of Some Common Foods, Health & Welfare, Canada, 1988.
(3) Food Values of Portions Commonly Used, Penningtom, J., Harper and Row, 1989.

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IRON RICH FOODS

During pregnancy, women should have 18 mg (2nd trimester) to 23 mg (3rd trimester) of iron daily.

Excellent Sources of Iron ≥ 3.3 mg/serving		
Food	**Serving Size**	**mg Iron**
Cream of wheat, cooked	175 mL (3/4 cup)	12
Enriched dry cereals (e.g., Bran Flakes, Cherrios, Corn Flakes, Rice Krispies)	30g	4
Spinach, cooked	125 mL (1/2 cup)	3.4
Liver, beef or chicken, beef kidney or heart	50 - 100g	3.8 - 7.5
Canned pork & beans	125 - 250 mL (1/2 - 1 cup)	4.4 - 8.8
Lentils or cooked legumes (e.g., kidney or white beans)	125 - 250 mL 1/2 - 1 cup	2.8 - 7
Tofu	100g	5.4

Other Food Sources of Iron: 0.7 - 3.2 mg/serving		
Bran muffin	1 medium	1.4
Oatmeal, cooked	175 mL (3/4 cup)	1.3
Bread or rolls, whole wheat or enriched	1 slice or 1 small roll	0.8
Pasta, enriched (e.g., macaroni, spaghetti noodles)	250 mL (cup)	0.8
Brown rice	250 mL (1 cup)	0.9
Dark green vegetables (e.g., beet greens, broccoli, bok choy, peas, swiss chard)	125 mL (1/2 cup)	0.9 - 2.0
Frozen, mixed vegetables	125 mL (1/2 cup)	0.8
Potato, baked and eaten with skin	1 medium	1.4
Dried prunes or raisins	5 or 75 mL (1/4 cup)	0.9 - 1.0
Red meats (e.g., beef, pork, dark turkey meat)	50-100g	0.7 - 2.9
Eggs	1 - 2	1 - 2
Fish (e.g., salmon, canned sardines)	50 - 100 g	0.7 - 3
Peanuts	125 mL (1/2 cup)	1.7

Reference:
(1) Action Towards Healthy Eating, Technical Report, Health & Welfare, Canada, 1990.
(2) Nutrient Value of Some Common Foods, Health & Welfare, Canada, 1988.
(3) Food Values of Portions Commonly Used, Penningtom, J., Harper and Row, 1989.

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