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ABSTRACT

This study compared some of the survey data collected by the Pregnancy Risk Assessment Monitoring System (PRAMS) to information from vital records and administrative records in the First Steps Database (FSDB) for a group of women who gave birth in 1993. PRAMS is an ongoing survey of Washington women who have given birth. The FSDB contains birth certificate information for all Washington residents who have given birth since 1988, and additional information from the Department of Social and Health Services on those women who received publicly-funded medical care (Medicaid). Most women who responded to the PRAMS survey also had information about their pregnancies in the FSDB. Major findings were: (1) both PRAMS and FSDB are good sources of information for clearly-stated questions pertaining to salient events including due date, dates of birth for mother and child, lengths of delivery stay, and other live births; (2) PRAMS appears superior to the FSDB as a source of information on socially or medically disapproved maternal behavior; (3) Medicaid information in the FSDB appears to better answer questions on Medicaid coverage and medical services than PRAMS; and (4) birth certificate information from the FSDB appears to be a better source than PRAMS for questions about narrowly defined pregnancy events that usually occur early in pregnancy. (WJC)

REPORT

MATCHED COMPARISON OF THE

PREGNANCY RISK ASSESSMENT MONITORING SYSTEM

AND THE

FIRST STEPS DATABASE

Washington State
Department of
Social and Health Services
Planning, Research &
Development
Office of Research &
Data Analysis

MATCHED COMPARISON

OF

PRAMS

AND THE

FIRST STEPS DATABASE

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June 1995

First Steps Database
Office of Research and Data Analysis
Planning, Research and Development
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EXECUTIVE SUMMARY

This report compares some of the survey data collected by means of the Pregnancy Risk Assessment Monitoring System (PRAMS) to information from vital records and administrative data in the First Steps Database (FSDB) for a group of women who gave birth in 1993. Most women who responded to the PRAMS survey also had information about their pregnancies in the FSDB. Data collected on the same women in these two separate data systems are analyzed in this report.

PRAMS is an ongoing survey sent by the Washington State Department of Health (DOH) to a sample of Washington women who have given birth. A total of 2,207 women who gave birth in 1993 were sent the PRAMS survey; 1,334 responded (a 60.4% response rate). The FSDB contains birth certificate information collected by the DOH for all Washington residents who have given birth since 1988, and additional information from the Department of Social and Health Services on those women who received publicly-funded medical care (Medicaid).

Major Findings

- Both PRAMS and the FSDB are good sources of information for clearly stated questions pertaining to salient events. Such items include: due date, dates of birth for the mother and the child, lengths of delivery stay for mother and child, and other children born alive.

- PRAMS appears superior to the FSDB as a source of information on socially or medically disapproved maternal behavior. Women seem more willing to admit drinking alcohol during pregnancy on an anonymous questionnaire than on their official birth certificate. Expanding the scope of PRAMS questions pertaining to risky maternal behaviors should be considered.

- Medicaid information in the FSDB appears to better answer questions on Medicaid coverage and medical services than PRAMS. Many of these questions are complex, such as "When you were sure you were pregnant, were you on Medicaid?," or may involve medical distinctions unfamiliar to PRAMS respondents, such as what constitutes NICU services.

- Birth certificate information from the FSDB appears to be a better source than PRAMS for questions about narrowly defined pregnancy events that usually occur early in pregnancy. For example, initiation of prenatal care is better answered using the birth certificate than PRAMS.

PRAMS is a relatively new and promising surveillance tool developed by the Centers for Disease Control and Prevention for use by the states. In Washington PRAMS seems to be particularly adept at gathering information on socially stigmatized behaviors and pregnancy perceptions. Answers to the factual questions which are more complex or technical, however, seem better obtained from the FSDB. Future collaborative opportunities which capitalize on the strengths of these valuable resources will certainly contribute meaningfully to the national dialogue on pregnancy behaviors, perceptions, and outcomes.

SUMMARY TABLE OF MATCHED COMPARISON OF PRAMS TO FIRST STEPS DATABASE

BASELINE DATA

Question Number	Subject	FSDB Comparison Source	Measure Used	Degree of Association	Preferred Data Source
1	Babies born alive	birth certificate	Cramer's V	0.929	either
52	Mother's date of birth	birth certificate	Within 0 days	0.954	either
		Medicaid	Within 0 days	0.924	either
53	Due date	birth certificate	Within 15 days	0.820	either
54	Baby's date of birth	birth certificate	Within 0 days	0.953	either
		Medicaid	Within 0 days	0.937	either

PRENATAL CARE

Question Number	Subject	FSDB Comparison Source	Measure Used	Degree of Association	Preferred Data Source
8	Month prenatal care began	birth certificate	Within 1 month	0.784	birth certificate
		Medicaid	Within 1 month	0.678	Medicaid
11	Number of PNC visits	birth certificate	Within 3 visits	0.648	neither is clearly better

PUBLIC ASSISTANCE

Question Number	Subject	FSDB Comparison Source	Measure Used	Degree of Association	Preferred Data Source
6	Medicaid status at pregnancy	eligibility file	Cramer's V	0.364	eligibility file
		Medicaid	Cramer's V	0.295	Medicaid
21	Payment for PNC: Medicaid	birth certificate	Cramer's V	0.771	PRAMS
		Medicaid	Cramer's V	0.856	Medicaid
	Personal Income	birth certificate	Cramer's V	0.091	PRAMS
	Insurance/HMO	birth certificate	Cramer's V	0.739	PRAMS
		Medicaid	Cramer's V	0.042	PRAMS
37	Payment for delivery: Medicaid	Medicaid	Cramer's V	0.831	Medicaid
50	Source of income: Public aid	Medicaid	Cramer's V	0.655	PRAMS

RISKY MATERNAL BEHAVIOR

Question Number	Subject	FSDB Comparison Source	Measure Used	Degree of Association	Preferred Data Source
29	Smoking behavior - last tri.	birth certificate	Cramer's V	0.739	PRAMS
			Within 1/2 pack	0.898	PRAMS
32	Drinking behavior - last tri.	birth certificate	Cramer's V	0.176	PRAMS
		Medicaid	Cramer's V	0.198	PRAMS

HOSPITALIZATION

Question Number	Subject	FSDB Comparison Source	Measure Used	Degree of Association	Preferred Data Source
26	Overnight stay in hospital	Medicaid	Cramer's V	0.395	neither is clearly better
34	Length of delivery stay	Medicaid	Within 1 night	0.931	either
35	Baby's length of stay	Medicaid	Within 1 night	0.908	either
36	Intensive care unit stay	Medicaid	Cramer's V	0.497	Medicaid

INTRODUCTION

BACKGROUND

The Pregnancy Risk Assessment Monitoring System (PRAMS) is an ongoing, population-based surveillance system sponsored by the Centers for Disease Control and Prevention (CDC) and implemented in Washington by the State Department of Health (DOH). PRAMS is designed to supplement vital records data and to generate state-specific data for planning and assessing perinatal health programs. The self- or telephone interviewer-administered questionnaire includes questions on a number of topics related to risk factors during pregnancy and infancy as well as access to prenatal and pediatric health care.

The First Steps Database (maintained by the Department of Social and Health Services (DSHS), Office of Research and Data Analysis) links measures of pregnancy outcomes to descriptions of maternity care services and background information on the mother's health and sociodemographic status. The database was brought into existence in 1989, with the creation of the First Steps Program, by the Washington State Legislature. In its sixth year of existence, the First Steps Database currently consists of data on births that occurred from July 1988 to December 1993.

In this project, survey data from PRAMS for 1993 births was linked to the FSDB for the purpose of comparison. This means that for **each linkable woman** who filled out a PRAMS survey, information on her from the other data sources available via the FSDB was juxtaposed with the data collected via PRAMS.

Many of the factual questions on PRAMS either duplicate fields on the birth certificate or can be approximated using Medicaid data. Washington's First Steps Database provides a unique opportunity among the states administering PRAMS -- a chance to assess the surveillance tool via systematic external comparison. The following PRAMS questions were chosen for this analysis: 1, 6, 8, 11, 14, 21, 26, 29, 32, 34, 35, 36, 37, 50, 52, 53, 54 and 59. Questions not analyzed in this report fall into two categories. First, there are factual questions which the FSDB is poorly suited to address, and second, there are questions pertaining to women's perceptions and feelings throughout the pregnancy period.

DATA SOURCES

PRAMS data were collected using a randomized racial and ethnic stratification sampling technique within which the birth certificate number served as a unique survey identifier. Data found in the FSDB are gathered from two sources: the Medical Assistance Administration (MAA), DSHS, for data obtained from the Medicaid Management Information System, and the Center for Health Statistics, DOH, for data derived from birth and death certificates (see Cawthon

1992, for more detail). A copy of the Washington State Certificate of Live Birth is provided for reference in Appendix A.

METHODOLOGY

Data from PRAMS were matched to the FSDB using birth certificate numbers. With the exception of the seven cases in which the child's birth certificate number could not be found in the FSDB, birth certificate information was available for the entire 1993 PRAMS cohort of 1,334 women. (The 1,327 matched women are hereafter referred to as the full cohort.) Medicaid data, however, was only available for women defined as Medicaid cases in the FSDB. These are women for whom either prenatal care and/or delivery was paid by Medicaid according to the First Steps Database.

When a PRAMS question specifically pertained to a woman's *perception* of her Medicaid eligibility (#6, 21 and 37) or her eligibility for income assistance (#50), the full cohort of women was analyzed, using only Medicaid data for validation. Conversely, when a PRAMS question did not pertain to a woman's perception of her eligibility for medical or income assistance, yet Medicaid data could be used for comparison to her answer, the cohort was comprised only of women identified as Medicaid cases in the FSDB (689 women). Finally, when birth certificate data was used for validating PRAMS answers, the full cohort was considered.

In order to perform these comparisons, appropriate information from the FSDB database was adapted to closely approximate the questions posed in PRAMS. In this way, FSDB information was used to corroborate or contrast with the data collected from PRAMS surveys.

For several of the comparisons using gestational age was necessary to accurately match FSDB information to PRAMS questions regarding a specific time frame. Gestational age can be calculated in one of three ways from the FSDB, and the standard hierarchy of preferred calculation methods was adhered to throughout this project. In order from most to least preferred, the methods of determining gestational age are: calculating from last menstrual period, using clinical estimate of gestational age, and interpolation from gender and birth weight. Insufficient data was the only reason a less preferable calculation methods was employed.

DATA PRESENTATION

This report focuses on two distinct types of quantifiable variables: binary and continuous. Binary variables are those which can take on one of two values, the most common of which would be either "yes" or "no". Continuous variables are those which can take on any of a number of values within any observed range, such as a date or a number.

Charts

The charts comparing binary FSDB and PRAMS variables are at least 3 x 3 (three rows by three columns), and can be as large as 4 x 4 if both sources have missing values. In the narrative of this report, individual cells are referred to by their shared row-column value, i.e., the Y-N cell represents the number of women for whom the variable takes the value "yes" in the FSDB and "no" in PRAMS. The chart beneath depicts what each cell's contents represent.

		PRAMS			
		Yes	**No**	**Missing**	**Total**
FSDB	**Yes**	Y-Y (FSDB: Y) (PRAMS: Y)	Y-N (FSDB: Y) (PRAMS: N)	Y-Missing (FSDB: Y)	Total FSDB Yes values
	No	N-Y (FSDB: N) (PRAMS: Y)	N-N (FSDB: N) (PRAMS: N)	N-Missing (FSDB: N)	Total FSDB No values
	Missing	Missing-Y (PRAMS: Y)	Missing-N (PRAMS: N)	Missing-Missing	Total FSDB Missing
	Total	Total PRAMS Yes values	Total PRAMS No values	Total PRAMS Missing	Total FSDB-PRAMS cohort

The charts comparing continuous FSDB and PRAMS variables are quite different. Rather than representing association or lack of association between the two data sources, charts for continuous variables represent an overview of the extent to which differences exist between the data sources for PRAMS respondents. The chart beneath depicts what each cell's contents represent.

Absolute Difference	**Frequency**	**Percent**	**Cumulative Percent**
No difference	#	a %	a %
Within X units	#	b %	(a + b)%
Within X units	#	c %	(a + b + c)%
etc.	#	d %	(a + b + c + d) = 100.0%
Subtotal (n)	Σ #		
Frequency Missing	m		
Total	Σ# + m		

Other Fields

Several of the questions analyzed (#21, 37 and 50) gave the respondents a chance to fill in a field labeled "Other." For each of these questions, including those in Spanish, the contents of this field were inspected to determine whether the woman's written answer could be recategorized into one of the pre-existing options. The impact of the cases where the written response changed cell assignments was negligible. For the sake of brevity these charts are not included in this report. Appendix D, however, contains descriptive information on the Other fields.

Measures of Association

Two different measures are used in this report to represent the degree to which PRAMS and FSDB data were associated. Cramer's V, a statistical measure of association derived from the chi-square test, was used for binary variables. Taking on a value between +1 and -1, Cramer's V represents both the strength and direction of association between the two variables (SAS Institute Inc., 1990).

The closer Cramer's V is to +1, the better the agreement between the two data sources; thus, more observations fall in the Y-Y or N-N cells. As the association between the comparison variables lessens, Cramer's V approaches 0. Finally, a Cramer's V nearing -1 indicates an inverse association between the comparison variables. No Cramer's V presented in this report takes on a negative value.

Measuring association between continuous variables was handled differently than for binary variables. Because creating a chart analogous to the one for binary variables would be impractical (for dates of babies' births, such a chart could conceivably be 365 x 365), the arithmetic difference between the two data sources was calculated.

The measure of association chosen for the continuous variables was the level of agreement achieved between the two data sources at an interval deemed by the analysts to be a reasonable cutoff for that comparison. When considering dates of birth, the threshold chosen was "no difference;" for initiation of prenatal care, "within 1 month." This measure of association is much more subjective than that used for binary variables. Charts and explanatory text are included in this report from which the reader can draw his or her own conclusions.

Categorization of Associations

The following chart shows how the measures of association are referred to in narrative:

Measured Association	Narrative Reference
0.000 - 0.199	weak
0.200 - 0.399	moderately weak
0.400 - 0.599	moderate
0.600 - 0.799	moderately strong
0.800 - 0.999	strong

LIMITATIONS

Although the task of comparing the two data sources was often straightforward, determining which data source was "right" was not. Throughout this report, facts and observations are used to support assertions that one source is preferred to another when answering a particular PRAMS question. This is not to say, however, that the data source deemed better is a better source of data *in general*. This report only compares PRAMS data to the data sources represented in the First Steps Database; the relative preferability of other data sources cannot be ascertained from this analysis.

Assertions found in this report that one preferable is superior to another are just that -- assertions. There are no "gold standards" for the data found herein, and the best judgment of the authors was used in making these determinations.

Finally, Cramer's V and the measures of association for continuous variables were sometimes rank ordered against one another in this report. These analysts are aware that in the purest research sense these measures are not comparable. The ultimate purpose of this report, however, is to provide the reader with a sense that each data source has strengths and weaknesses, and one must be mindful of this when engaging in research. An effort was made to create the context for comparison within this report to underscore these points.

RESULTS OF

MATCHED COMPARISON

OF

PRAMS

AND THE

FIRST STEPS DATABASE

BASELINE FACTUAL QUESTIONS

Significance The questions grouped together in this section provide a framework within which the comparability of PRAMS and the FSDB is established. These are questions for which the likelihood of obtaining accurate answers on PRAMS seemed quite high, and for which the intent appeared unlikely to be misinterpreted.

Question 1) Not counting your most recent birth, did you have any other babies who were born alive? ___N __Y

FSDB Data Source Birth Certificate

Methodology A direct comparison was made for each woman between the PRAMS variable and a summation of two data elements collected on the Washington State birth certificate (prior children living at the time of current birth and those now dead who were born alive, data element #42).

		PRAMS			
		Y	N	Missing	Total
FSDB	Y	743 (56.0%)	28 (2.1%)	6 (0.5%)	777 (58.6%)
	N	16 (1.2%)	496 (37.4%)	25 (1.9%)	537 (40.5%)
	Missing	10 (0.8%)	3 (0.2%)	0 (0.0%)	13 (1.0%)
	Total	769 (58.0%)	527 (39.7%)	31 (2.3%)	n = 1327

Measure of Association Cramer's V = 0.929

Discussion Cramer's V indicates a strong association between PRAMS and the birth certificate regarding number of previous children born alive. This suggests that women tend to reflect the same information on the birth certificate as on the PRAMS survey regarding previous babies born alive.

Question 52) When were *you* born? m/d/y __/__/__

FSDB Data Source Birth Certificate

Methodology For each woman, the data element from PRAMS was compared to the mother's date of birth as collected on the birth certificate (data element #18).

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	1234	95.4	**95.4**
Within 1 day	2	0.2	95.6
Within 2 days	1	0.1	95.7
Within 3 days	3	0.2	95.9
Within 5 days	1	0.1	96.0
Within 10 days	7	0.6	96.5
Within 20 days	1	0.1	96.6
Within 30 days	6	0.5	97.1
Over 30 days	38	2.9	100.0
Subtotal (n)	1293		
Frequency Missing	34		
Total	1327		

Measure of Association 95.4 percent of the women for whom date of birth information was available from both sources reported the same date of birth on PRAMS as was determined from the birth certificate.

Discussion The extent of association between data sources regarding mother's date of birth is strong. This indicates that most women provide the same answers to this question on the birth certificate and on the PRAMS survey. It seems safe to infer that one's own date of birth, probably by virtue of rote repetition, is easily remembered and accurately conveyed.

Additional analysis indicated that most of the remaining 4.6% of women for whom the dates of birth were not exact matches could be accounted for by separately examining the day, month and year fields. The day field accounts for the difference for 1.9% of these women, the month field for 1.1%, and the year field for 1.4%. Only for 0.2% of the cohort can the discordance not be explained in this manner. This suggests that most of the observed discordance is probably attributable to a minor error in recording the date rather than a major discrepancy.

FSDB Data Source Medicaid

Methodology A portion of a Medicaid recipient's personal identifier code (PIC) contains the date of birth. This information was extracted and compared to each woman's PRAMS response.

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	618	92.4	**92.4**
Within 1 day	2	0.3	92.7
Within 2 days	1	0.1	92.8
Within 3 days	2	0.3	93.1
Within 5 days	1	0.1	93.3
Within 10 days	3	0.4	93.7
Within 20 days	3	0.4	94.2
Within 30 days	6	0.9	95.1
Over 30 days	33	4.9	100.0
Subtotal (n)	669		
Frequency Missing	20		
Total	689		

Measure of Association 92.4 percent of the women for whom date of birth information was available from both sources reported the same date of birth on PRAMS as was determined from the Medicaid PIC.

Discussion This method also indicates a strong level of association between data sources regarding mother's date of birth. The observations noted for the birth certificate comparison hold here too. Additional analysis indicated that most of the remaining 7.6% of women for whom the dates of birth were not exact matches could be accounted for by separately examining the day, month and year fields. The day field accounts for the difference for 2.8% of these women, the month field for 2.7%, and the year field for 1.2%. Only for 0.9% of the cohort can the discordance not be explained in this manner. This suggests that most of the observed discordance is probably attributable to a minor error in recording the date rather than a major discrepancy.

Question 53) What was your due date? m/d/y __/__/__

FSDB Data Source Birth Certificate

Methodology To arrive at due date using First Steps, the gestational age of each woman's child at the time of birth (in weeks) was subtracted from 40 weeks, and then that difference was added to the date of birth (data element #3).

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	57	4.9	4.9
Within 1 day	107	9.1	14.0
Within 2 days	101	8.6	22.6
Within 3 days	111	9.5	32.1
Within 4 days	73	6.2	38.3
Within 5 days	65	5.5	43.9
Within 6 days	71	6.1	49.9
Within 7 days	69	5.9	55.8
Within 10 days	156	13.3	69.1
Within 15 days	151	12.9	**82.0**
Within 20 days	56	4.8	86.8
Within 30 days	62	5.3	92.1
Over 30 days	93	7.9	100.0
Subtotal (n)	1172		
Frequency Missing	155		
Total	1327		

Measure of Association 82.0% of the women for whom due date information was available from both sources recorded a due date on PRAMS that fell within 15 days of the date ascertained from the birth certificate.

Discussion A strong but somewhat lower level of association is evidenced between the data sources regarding due date. One explanation for this decreased measure of association is the imprecision introduced by using weeks, rather than days, to represent gestational age in the calculation. Another factor could be the approximation introduced by virtue of estimating gestational age, particularly when the least precise method must be employed (interpolating using gender and birth weight). Finally, due date information on the birth certificate is usually derived from medical charts, which may indicate a date other than what a woman anticipates as her due date.

Question 54) When was your baby born? m/d/y __/__/__

FSDB Data Source Birth Certificate

Methodology For each woman, the data element from PRAMS was compared to the baby's date of birth as reported on the birth certificate (data element #3).

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	1248	95.3	**95.3**
Within 1 day	5	0.4	95.7
Within 2 days	1	0.1	95.8
Within 3 days	2	0.2	96.0
Within 5 days	3	0.2	96.2
Within 10 days	5	0.4	96.6
Within 30 days	4	0.3	96.9
Over 30 days	41	3.1	100.0
Subtotal (n)	1309		
Frequency Missing	18		
Total	1327		

Measure of Association 95.3 percent of the women for whom their child's date of birth was available from both sources reported the same date of birth on PRAMS as was determined from the birth certificate.

Discussion The extent of association between data sources regarding the child's date of birth is strong. Possibly due to the recency of the birth event, the child's date of birth seems to be easily remembered and consistently reported.

Additional analysis indicated that most of the remaining 4.7% of babies for whom the dates of birth were not exact matches could be accounted for by separately examining the day, month and year fields. The day field accounts for the difference for 2.1% of these babies, the month field for 0.4%, and the year field for 1.5%. Only for 0.6% of the cohort can the discordance not be explained in this manner. This suggests that most of the observed discordance is probably attributable to a minor error in recording the date rather than a major discrepancy.

Individuals working closely with administering the survey have suggested that the remaining unexplained portion may be due to women who become confused by question #1. This question reads "Not counting your most recent birth, did you have any other babies who were born alive?" Apparently women have become disoriented by this question in some of the telephone interviews, and seem to answer the remaining questions in reference to a previous birth.

FSDB Data Source Medicaid

Methodology A portion of a Medicaid recipient's PIC contains the date of birth. This information for each child was extracted and compared to each woman's PRAMS response.

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	596	93.7	**93.7**
Within 1 day	4	0.6	94.3
Within 2 days	1	0.2	94.5
Within 3 days	1	0.2	94.7
Within 5 days	3	0.5	95.2
Within 10 days	3	0.5	95.7
Within 30 days	28	4.4	100.0
Subtotal (n)	636		
Frequency Missing	53		
Total	689		

Measure of Association 93.7 percent of the women for whom their child's date of birth was available from both sources reported the same date on PRAMS as was determined from the Medicaid PIC.

Discussion Again, the extent of association between data sources regarding the child's date of birth is strong. Additional analysis indicated that most of the remaining 6.3% of babies for whom the dates of birth were not exact matches could be accounted for by separately examining the day, month and year fields. The day field accounts for the difference for 3.3% of these babies, the month field for 0.3%, and the year field for 1.9%. Only for 0.8% of the cohort can the discordance not be explained in this manner, some of which may be attributed to confusion from the survey's first question.

Conclusions The baseline questions demonstrate a strong degree of agreement between PRAMS and the FSDB data sources. All of the questions reviewed in this section inquire about salient, discrete events which require little reflection or mental calculation to answer. Additionally, the questions are phrased to leave little room for interpretation. Their meaning is probably clear and unambiguous to most respondents. Agreement between the data sources, therefore, is partially a function of these questions eliciting accurate responses. This agreement also speaks to the comparability of the two data sources. Either of the data sources will likely provide accurate answers to any of these questions.

Each birth certificate and Medicaid comparison made for questions #1, 52 and 54 exhibits a measure of association in excess of 0.900. The subjects covered in these questions (previous babies born alive and dates of birth) seem to be so fundamental that few women reported

discordant answers in the two data sets. Question #53 is the only one in this section for which the association dropped below the 0.900 level.

Several factors probably contribute to this comparison being slightly less concordant. First, imprecision is introduced into the question when weeks are the units, rather than days, in calculating gestational age. Moreover, the gestational age calculation itself can be a source of imprecision. Finally, due date is somewhat more ambiguous a concept than date of birth or previous babies born alive. What a woman records as her due date may not be the same as the one written in her medical records.

PRENATAL CARE QUESTIONS

Significance Prenatal care (PNC) is a fundamental component of improving and maintaining the public's health. Adequate PNC lessens the probability of fetal death and neonatal morbidity and mortality. These improved birth outcomes are positively correlated with better life-long health. Tracking prenatal care usage over time is crucial for the development of appropriate state-specific policies. The questions in this section focus on a woman's recollection of her PNC.

Question 8) How many weeks or months pregnant were you when you had your first visit for prenatal care? __Weeks or __Months __I did not go for prenatal care

FSDB Data Source Birth Certificate

Methodology A direct comparison was made for each woman between data collected on the Washington State birth certificate concerning the month prenatal care began (data element #48), and the PRAMS response variable.

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	428	36.7	36.7
Within 1 month	487	41.7	**78.4**
Within 2 months	160	13.7	92.1
Within 3 months	48	4.1	96.2
Within 4 months	16	1.4	97.6
Within 5 months	10	0.9	98.5
Within 6 months	7	0.6	99.1
Within 7 months	7	0.6	99.7
Within 8 months	3	0.3	99.9
Within 9 months	1	0.1	100.0
Subtotal (n)	1167		
Frequency Missing	160		
Total	1327		

Measure of Association 78.4 percent of the women for whom prenatal care information is available from both sources reported initiation of prenatal care on PRAMS within a month of that which the birth certificate indicated.

Discussion A moderately strong degree of association exists between the two data sources. Nonetheless, by a ratio of greater than two to one (2.1:1), the 739 women for whom there was not an exact match presented an earlier estimate of the month prenatal care began on PRAMS than the birth certificate indicated.

On the birth certificate, this data is supplied either by the woman's prenatal care provider via medical charts, or by the woman herself. As this analysis contrasts self-reported information with self- or provider-reported information gathered during an earlier time frame, it is evident that women may have idealized the month their prenatal care began on PRAMS, or were confused about the meaning of PNC.

Although a definition of prenatal care is included in the bolded explanatory text of the survey, there is no guarantee that it is read and comprehended by each survey-taker. Some women may be counting their first WIC visit after becoming aware of their pregnancy; others may be remembering a maternity support service (MSS) or maternity case management (MCM) visit; still others may record when they first *intended* to initiate prenatal care. Therefore the birth certificate seems to be the more reliable and accurate source from which to ascertain the initiation of prenatal care.

FSDB Data Source Medicaid

Methodology Evidence of the start of prenatal care was gathered by searching for the initial prenatal assessment procedure codes (5930M and 5931M) submitted by each woman's care provider to Medicaid. Global bills have too little detail to be a useful source of data here. Women for whom PNC was evidenced only in global bills were not considered in this analysis.

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	98	30.6	30.6
Within 1 month	119	37.2	**67.8**
Within 2 months	50	15.6	83.4
Within 3 months	21	6.6	90.0
Within 4 months	18	5.6	95.6
Within 5 months	7	2.2	97.8
Within 6 months	3	0.9	98.8
Within 7 months	2	0.6	99.4
Within 8 months	2	0.6	100.0
Subtotal (n)	320		
Frequency Missing	369		
Total	689		

Measure of Association 67.8 percent of the women for whom prenatal care information is available from both sources reported their initiation of prenatal care on PRAMS within a month of that which Medicaid indicated.

Discussion This comparison shows evidence of moderately strong association. By a ratio of greater than four to one (4.4:1), however, the 222 women for whom there was not an

exact match between the two data sources gave an answer on PRAMS that was earlier in the pregnancy than Medicaid records indicate.

Because this analysis contrasts self-reported information with provider billing records, it is apparent that many women either idealized the month their prenatal care began, were confused about the meaning of PNC, or initiated PNC prior to enrolling in Medicaid. All of the potential explanations detailed in the birth certificate analysis provide insight here too. In this case Medicaid seems to be the more reliable and accurate source from which to ascertain the initiation of prenatal care for women on Medicaid.

Question 11) How many visits for prenatal care did you have?
__Visits __I did not go for prenatal care

FSDB Data Source Birth Certificate

Methodology A direct comparison was made for each woman between data collected from the Washington State birth certificate concerning the number of prenatal care visits (data element #49), and the PRAMS variable.

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	129	12.2	12.2
Within 1 visit	225	21.2	33.4
Within 2 visits	203	19.2	52.6
Within 3 visits	129	12.2	**64.8**
Within 4 visits	104	9.8	74.6
Within 5 visits	71	6.7	81.3
Within 7 visits	92	8.7	90.0
Within 10 visits	53	5.0	95.0
Over 10 visits	53	5.0	100.0
Subtotal (n)	1059		
Frequency Missing	268		
Total	1327		

Measure of Association 64.8 percent of the women for whom prenatal care information is available from both sources reported their number of visits on PRAMS within three visits of that which the birth certificate indicated.

Discussion A moderately strong degree of association appears to exist between PRAMS and the birth certificate regarding number of prenatal care visits. Similar to the findings on timing of the initial prenatal care visit, the 930 women for whom a difference existed

tended to report more PNC visits. By a ratio of greater than 1.5 to 1, these women recorded a larger number on PRAMS than was supplied on the birth certificate either by their medical providers or by themselves.

On one hand, the number of PNC visits recorded from the birth certificate may underreport the number of visits a woman actually had: because birth certificate worksheets are sometimes filled out in the weeks preceding birth, PNC visits taking place after completion of this chronicle may not be tallied.

On the other hand, some respondents may not have followed a strict definition for prenatal care (see the discussion section of question #8 for details). They may have included MSS, MCM or WIC visits in their tally, or they may simply have counted any medical appointment during pregnancy toward PNC. Some women also may have a systematic bias toward rounding up or reporting a somewhat larger number of PNC visits due to societal expectations of maternal behavior.

Because no clear trend becomes evident upon consideration of these attributable differences, this analysis suggests that neither data source is preferred over the other for obtaining number of PNC visits.

Question 14) Where did you go *most of the time* for your prenatal visits? Don't include visits for WIC. *Check one answer.*

__Hospital clinic
__Health department clinic
__Community or Migrant Health Center
__Private doctor's office or HMO (like Group Health, KPS-Sound Care Plan, or Healthy Options)
__Military facilities
__Indian Health Service
__I did not go for prenatal care
__Other → Please tell us: _____

FSDB Data Source Medicaid

Methodology The complexity of this question proved to be too great for its analysis from Medicaid sources. One problem is that many prenatal care claims submitted to Medicaid are in the form of a global bill. Even when considering the remaining bills submitted, only a couple of the categories of provider types from Medicaid are concordant with those found in this question. When the categories do overlap, provider type data via Medicaid nets little useful information. Thus the data available from Medicaid pertaining to where a woman went *most of the time* for PNC is not adequate for drawing comparisons.

Conclusions In contrast to the baseline data section presented first, the questions addressed in this section provide clear examples of the relative strengths and weaknesses of the data sources under consideration. All of the prenatal care measures of association fall into the 'moderately strong' category.

The highest degree of association was found comparing the birth certificate to PRAMS for month prenatal care began (0.784); this same question, contrasted with Medicaid, has a lower association (0.678). The lowest degree of association was found for number of prenatal care visits compared to the birth certificate (0.648). A complex picture emerges upon consideration of the many factors contributing to these strengths of association.

When birth certificate data is used to compare to PRAMS regarding initiation of PNC, often the comparison is comprised of *self-reported* information from two different points in time. To the extent that a woman maintains consistency in her responses, this question should exhibit good concordance. Most likely because this protective factor was not present the measured association proved lower when Medicaid was the source of comparison data.

Whether the birth certificate or Medicaid is the data source, when women's answers are contrasted with data reported by *providers*, there is room for discordance. If the respondent was not using the generally accepted medical definition for PNC, if she felt compelled to report a more acceptable answer, or if she was simply guessing inaccurately, her answer did not mesh with the data extracted from the FSDB. On balance, the two data sources represented by the FSDB -- the birth certificate and Medicaid -- seem to provide better data regarding the initiation of PNC.

Although the same issues surrounding question #8 (regarding initiation of PNC) apply to question #11 (regarding number of PNC visits), an additional factor affects this analysis: here, there is reason to question the completeness of the birth certificate's number. As a result, neither data source is clearly preferable to the other when seeking number of prenatal care visits.

PUBLIC ASSISTANCE QUESTIONS

Significance Much media and public debate focuses on public assistance for pregnant women, mothers and children. Because this subject is so often at the center of policy discussions, accurate statistics must be available to inform these deliberations. This section covers questions related to publicly-funded medical and income assistance, and some of the other forms of payment for care. **NOTE:** MAA records are generated from bills submitted by all Washington State Medicaid providers, who have vested interests in completeness. Throughout this section, when applicable, Medicaid is presumed to provide better data than PRAMS for questions regarding Medicaid.

Question 6) When you were sure you were pregnant, were you on Medicaid? __N __Y
(Use also #4, "How many weeks or months pregnant were you when you were *sure* you were pregnant?" __Weeks or __Months __I don't remember)

FSDB Data Source Eligibility File

Methodology For each woman, the gestational age of her child at the time of birth was subtracted from the date of birth, and then the number of days pregnant the woman was sure she was pregnant (from PRAMS question #4) was added. The answer, in the form of a date, was then compared to the same date in her eligibility file (if one existed) to ascertain her eligibility status at that point in time. Eligibility for a program which included Medical Assistance was used to indicate "on Medicaid."

		PRAMS			
		Y	N	Missing	Total
FSDB	Y	135 (10.2%)	204 (15.4%)	11 (0.8%)	350 (26.4%)
	N	79 (6.0%)	809 (61.0%)	16 (1.2%)	904 (68.1%)
	SURE_WKS Missing from PRAMS	19 (1.4%)	50 (3.8%)	4 (0.3%)	73 (5.5%)
	Total	233 (17.6%)	1063 (80.1%)	31 (2.3%)	n = 1327

Measure of Association Cramer's V = 0.364

Discussion Cramer's V indicates a moderately weak degree of association due to the relatively large number of discordant pairs of observations in the Y-N and N-Y cells. Investigation into these observations, however, proved quite revealing.

There were 204 women who stated they were *not* on Medicaid when they were sure they were pregnant, but the eligibility file indicated that they were. Of these women, 118 (57.8%) had an eligibility span that either began or ended in the same month and year as the date on which their eligibility status was determined. The imprecision of the units used in calculation (months from PRAMS often had to be converted to days and gestational age in the FSDB sometimes had to be estimated) affected the comparability of information obtained from PRAMS and the FSDB. It is likely that many of the women in the Y-N cell answered this question literally, and were not eligible for Medicaid on that day but either lost eligibility very shortly before, or became eligible very soon thereafter. The remaining 86 women (of the 204) may have been reluctant to admit their receipt of Medicaid, unable to recall the requested information, or confused by the complexity of the question.

There were 79 women in the N-Y cell who reported in PRAMS they *were* on Medicaid at the time they were sure they were pregnant, but eligibility data from First Steps indicated differently. Most of these women (96.2%) were eligible for Medicaid within *six months past* the date on which they indicated that they were sure they were pregnant. In other words, these women seem to have misinterpreted this question to be "Were you on Medicaid at some point during your pregnancy?"

On balance, the preferred data source for determining the answer to this question is the eligibility file (when analyzed with the proper level of precision, i.e., for the month and year that the woman knew she was pregnant, *not* the day, month and year).

Data Source Medicaid

Methodology The date calculation is exactly the same as used in the eligibility file comparison. Any Medicaid service for a woman occurring within three weeks of that date indicated that she was on Medicaid.

		PRAMS			
		Y	N	Missing	Total
FSDB	Y	102 (7.7%)	160 (12.1%)	9 (0.7%)	271 (20.4%)
	N	112 (8.4%)	853 (64.3%)	18 (1.4%)	983 (74.1%)
	SURE_WKS Missing from PRAMS	19 (1.4%)	50 (3.8%)	4 (0.3%)	73 (5.5%)
	Total	233 (17.6%)	1063 (80.1%)	31 (2.3%)	n = 1327

Measure of Association Cramer's V = 0.295

Discussion Cramer's V indicates a moderately weak degree of association between PRAMS and Medicaid. Many of the same problems enumerated in the eligibility file comparison affect this comparison too. Medicaid records, moreover, exist only for women who received Medicaid services. Undoubtedly even fewer women received services (Medicaid records) than were eligible for services (eligibility files) during any given time frame, which may help account for this comparison's somewhat lower measure of association relative to the preceding comparison. As with that analysis, Medicaid is the preferred source for answering this question.

Question 21) How was your prenatal care paid for? *Check all that apply.*

__**Medicaid, Welfare, First Steps*** (a)
__**Personal income (cash, check or credit card)*** (b)
__**Insurance or HMO (like Group Health, KPS-Sound Care Plan, or Healthy Options)*** (c)
__**Military facility or Champus**
__**Indian Health Service**
__**Health department**
__**I still owe**
__**Other → Please tell us:** _____

* Only these options can be analyzed using FSDB data

FSDB Data Source Birth Certificate

Methodology For each woman a direct comparison was made between a data element collected on the Washington State birth certificate (#50) and the PRAMS variable.

a. MEDICAID, WELFARE, FIRST STEPS

		PRAMS			
		Y	N	Skipped	Total
FSDB	Y	533 (40.2%)	60 (4.5%)	17 (1.3%)	610 (46.0%)
	N	89 (6.7%)	619 (46.7%)	9 (0.7%)	717 (54.0%)
	Total	622 (46.9%)	679 (51.2%)	26 (2.0%)	n = 1327

Measure of Association Cramer's V = 0.771

b. PERSONAL INCOME

		PRAMS			
		Y	N	Skipped	Total
FSDB	Y	7 (0.5%)	11 (0.8%)	2 (0.2%)	20 (1.5%)
	N	163 (12.3%)	1120 (84.4%)	24 (1.8%)	1307 (98.5%)
	Total	170 (12.8%)	1131 (85.2%)	26 (2.0%)	n = 1327

Measure of Association Cramer's V = 0.091

C. INSURANCE OR HMO

		PRAMS			
		Y	N	Skipped	Total
FSDB	Y	415 (31.3%)	36 (2.7%)	6 (0.5%)	457 (34.4%)
	N	131 (9.9%)	719 (54.2%)	20 (1.5%)	870 (65.6%)
	Total	546 (41.2%)	755 (56.9%)	26 (2.0%)	n = 1327

Measure of Association Cramer's V = 0.739

Discussion Cramer's V indicates a moderately strong association between PRAMS and the birth certificate for the Medicaid and Insurance/HMO options, but a weak association for the Personal Income option. The way in which this information is requested on the birth certificate, however, sheds light on this anomaly: women are instructed to check their *principal source* (emphasis added) of payment for prenatal care.

As each woman can only choose one answer, and the majority of women in Washington State have either private or public insurance, it make sense that relatively few women select "Self Pay" on the birth certificate. Because PRAMS allows women to select as many answers as apply to her situation, PRAMS is better than the birth certificate **to assess the array of payment mechanisms** used to obtain PNC.

FSDB Data Source Medicaid

Methodology Evidence of a woman's Medicaid paid prenatal care was derived from Medicaid service records in the FSDB. In order to determine whether a woman had insurance or HMO covered prenatal care, Medicaid payment indicators were checked.

a. MEDICAID, WELFARE, FIRST STEPS

		PRAMS			
		Y	N	Skipped	Total
FSDB	Y	594 (44.8%)	67 (5.1%)	18 (1.4%)	679 (51.2%)
	N	28 (2.1%)	612 (46.1%)	8 (0.6%)	648 (48.8%)
	Total	622 (46.9%)	679 (51.2%)	26 (2.0%)	n = 1327

Measure of Association Cramer's V = 0.856

b. PERSONAL INCOME (CASH, CHECK OR CREDIT CARD)

No women were identified as having paid for their prenatal care with personal income using Medicaid service records. Because the chart is not very informative, it has not been included here.

C. INSURANCE OR HMO

		PRAMS			
		Y	N	Missing	Total
FSDB	Y	6 (0.5%)	3 (0.2%)	2 (0.2%)	11 (0.8%)
	N	540 (40.7%)	752 (56.7%)	24 (1.8%)	1316 (99.2%)
	Total	546 (41.2%)	755 (56.9%)	26 (2.0%)	n = 1327

Measure of Association Cramer's V = 0.042

Discussion Cramer's V suggests a strong association between PRAMS and Medicaid regarding the payment of prenatal care by Medicaid, but a weak association for payment by Insurance/HMO. These findings are in keeping with the fact that few women on Medicaid also have private insurance. It is also likely that there is some confusion among survey respondents because Healthy Options (included in the Insurance or HMO option) is actually a Medicaid-funded program.

In this comparison Medicaid is the better source to ascertain whether a woman had Medicaid funded PNC, while PRAMS is the better source for data pertaining to insurance/HMO coverage of PNC (Healthy Options has subsequently been removed from the examples listed in parentheses following this option).

Question 37) Including the hospital costs, how was your delivery paid for? *Check all that apply.*

__Medicaid, Welfare, First Steps*
__Personal income (cash, check, or credit card)
__Insurance or HMO (like Group Health, KPS-Sound Care Plan, or Healthy Options)
__Military facility or Champus
__Indian Health Service
__Health department
__I still owe
__Other → Please tell us: _____

* Only this option can be analyzed using the First Steps database.

FSDB Data Source Medicaid

Methodology Evidence of a woman's Medicaid paid delivery was derived from Medicaid service records in the FSDB.

a. MEDICAID, WELFARE, FIRST STEPS

		PRAMS		
		Y	N	Total
FSDB	Y	596 (44.9%)	49 (3.7%)	645 (48.6%)
	N	63 (4.8%)	619 (46.7%)	682 (51.4%)
	Total	659 (49.7%)	668 (50.3%)	n = 1327

Measure of Association Cramer's V = 0.831

Discussion Cramer's V suggests a strong association between PRAMS and Medicaid regarding the payment of delivery services by Medicaid. Medicaid is the preferable source for determining Medicaid coverage of delivery costs for the reasons noted at the beginning of this section.

Question 50) What were the sources of your family income during the past 12 months? ***Check all that apply.***

__Wages or pay from a job
__Aid such as AFDC, Welfare, Public Assistance, General Assistance, Food Stamps, or SSI*
__Unemployment benefits
__Child support or alimony
__Fees, rental income, commissions, interest, dividends, or income from business or farm
__Social Security, Workers' Compensation, Veterans benefits, or pensions
__Other → Please tell us: _____

* Only this option can be analyzed from the First Steps database

FSDB Data Source Medicaid

Methodology Each woman's eligibility to receive cash grants during calendar year 1993 (as indicated by match codes 1, 2, or U) was compared to the answer that she supplied on PRAMS.

AFDC, WELFARE, PUBLIC ASSISTANCE, GENERAL ASSISTANCE, FOOD STAMPS, OR SSI

		PRAMS			
		Y	N	Missing	Total
FSDB	Y	318 (24.0%)	95 (7.2%)	2 (0.2%)	415 (31.3%)
	N	102 (7.7%)	809 (61.0%)	1 (0.1%)	912 (68.7%)
	Total	420 (31.7%)	904 (68.1%)	3 (0.2%)	n = 1327

Measure of Association Cramer's V = 0.655

Discussion Cramer's V suggests a moderately strong association between the two data sources being considered. The strength of the association is undoubtedly diminished by

the fact that there is no accurate way to capture the Food Stamps recipient population using the First Steps database.

Eligibility for Food Stamps includes families with incomes up to 200% of the Federal Poverty Level (FPL). The other public assistance programs listed (AFDC, welfare, public assistance, general assistance and SSI) usually include families with incomes up to approximately 60% of the FPL. Searching for evidence of cash grants therefore does not reflect the Food Stamps eligible population. An alternate method of capturing this population is to use Medicaid eligibility (up to 185% FPL) as a proxy. Using this method, however, the measured association proved even worse.

The Y-N cell value of 7.2% (representing 95 women) shows that a substantial group of respondents whose receipt of public assistance was documented failed to report that information. It seems unlikely that women would misinterpret this question; however, respondents may be reluctant to reveal their receipt of this type of help even on an anonymous mailed survey.

On the balance, PRAMS seems to provide better data regarding receipt of public aid. Researchers should be mindful, however, that some percentage of the PRAMS population is probably receiving public aid but not admitting so on the survey.

Question 59) When you found out that you were pregnant, what was your family's total *monthly* income before taxes? *Please count wages, child support, unemployment or welfare checks, and money support from relatives or friends.*

__Under $1,000
__$1,000-$1,199
__$1,200-$1,399
__$1,400-$1,799
__$1,800-$2,199
__$2,220-$2,599
__$2,600-$2,999
__$3,000 or more

FSDB Data Source FSDB-created variable (case/control) based on Medicaid funding for prenatal care or delivery.

Methodology Rather than trying to measure the extent of association between PRAMS and the FSDB for this question, income information as reported on PRAMS was used to determine where a woman fell relative to 185% of Federal Poverty Level for 1993. This level was chosen for analysis because one of the main criteria for Medicaid eligibility is income equal to or less than 185% of the FPL.

After adjusting for number of family members (using question #49 on PRAMS), income reported on PRAMS was compared to the 1993 income levels for 185% of the FPL. The incomes reported on PRAMS that did not clearly fall above or below 185% of the FPL were categorized together as approximately equal to 185% FPL. This comparison was performed separately for women designated as Non-Medicaid and those designated as Medicaid, based on the definition of a Medicaid case used in the FSDB.

This analysis has an *a priori* incompatibility because of the use of the case/control variable from the FSDB. While the PRAMS question asks about the time when the woman found out she was pregnant, the case/control flag can be triggered at any time after that up to and including the delivery period.

		PRAMS			
		Income < 185% FPL	Income ≈ 185% FPL	Income > 185% FPL	Total
FSDB	Non-Medicaid	177 (28.6%)	60 (9.7%)	382 (61.7%)	619 (100.0%)
	Medicaid	558 (87.1%)	37 (5.8%)	46 (7.2%)	641 (100.0%)

Discussion The majority of non-Medicaid women reporting an income greater than 185% of the FPL (61.7%) did not receive Medicaid funding for prenatal care or delivery. Similarly, the majority of Medicaid women (87.1%) reported incomes below 185% FPL.

Due to the time frame incompatibility, no single explanation can be offered for the 177 non-Medicaid women who reported incomes below 185% of the FPL. The circumstances of some of these women may have changed after finding out about pregnancy. These women could have gotten married, moved in with friends or family, or found a way to augment their income. Other respondents who had the same income throughout their pregnancy period may have had medical insurance through a different source. Undoubtedly a portion of this group also represents women potentially in need of Medicaid coverage.

Similarly, no single scenario for the 46 Medicaid women who reported incomes greater than 185% FPL could describe all of their circumstances. Many of these women probably went through income-affecting changes upon learning of their pregnancy; some may have had to discontinue working, and others may have been in relationships that dissolved with parenthood pending. Those respondents whose financial situations did not change during

pregnancy may have had additional financial issues which made them eligible for Medicaid not captured by PRAMS.

Conclusions Questions in this section focus on eligibility for and receipt of public aid. Although PRAMS proved a better source of information for some of these comparisons, there are compelling reasons to expect that Medicaid records are preferable for determining receipt of publicly-funded medical care.

One reason is that these Medicaid records are generated from bills submitted by all Washington State Medicaid providers. Because the Medicaid reimbursement process commences only upon submission of a bill to the Medicaid Assistance Administration, providers rarely fail to bill for an encounter with a patient. To minimize inaccurate billing, audits are built into the MAA system.

Women responding to the PRAMS questions, however, are not motivated by the possibility of reimbursement. Indeed, respondents may not understand the question, may check fewer options than apply, or may be reluctant to admit receipt of public aid. It therefore seems reasonable that the MAA provides better data than PRAMS for questions regarding Medicaid (questions #6, #21: Medicaid option and #37).

Medicaid records do not provide enough data to identify receipt of any other types of public assistance (question #50). In spite of attempts to use a proxy measure in the FSDB, PRAMS resulted in better information on income assistance. Medicaid records also fail to provide adequate data to identify any *other* payment sources for care (question #21: Insurance/HMO option). This is because Medicaid is the insurance of last resort; most of its clients have no other payment options. Therefore the preferable source of data for question #21 (Insurance/HMO option) is PRAMS.

When the birth certificate is compared to PRAMS for question #21 (Personal Income option), it also proves the less preferable source of data. When women are instructed to check as many options as apply on PRAMS, they generally select more than one option. Therefore even if a fraction of their prenatal care was paid out of pocket, there is a chance that PRAMS will reflect "personal income" as a payment mechanism. The birth certificate, however, instructs women to select the *primary source of payment* (emphasis added) for prenatal care, which leads to only the predominant method of payment, usually insurance or Medicaid, being reflected.

Considering this, the information PRAMS obtains for question #21 (in its entirety) has more breadth, while the information collected from the birth certificate has more depth. To provide the most comprehensive description of how women fund their prenatal care it is important to continue collecting data from both of these sources. In order to obtain the information desired in PRAMS, however, the PRAMS answers to question #21 are preferable to the birth certificate.

RISKY MATERNAL BEHAVIOR QUESTIONS

Significance Research shows that poor maternal health behavior during pregnancy can have a profound, life-long effect on the unborn child. Topping the list of concerns for medical personnel and public health policy makers are drinking and smoking. Each of these substances can cause significant damage if used at the wrong time or rate during pregnancy. Fetal Alcohol Syndrome is characterized by growth deficiencies, craniofacial abnormalities and possible retardation. Maternal smoking is related to prematurity.

Some of these health effects could be prevented if women using licit drugs were identified and appropriate intervention techniques were employed. Unfortunately the stigma of smoking during pregnancy, and to a larger degree, drinking, is well-entrenched. There is widespread agreement that any data available understates the magnitudes of drinking and smoking behavior during pregnancy. The questions in this section focus on the PRAMS survey's attempt to add to this knowledge base.

Question 29) In the *last three months* of your pregnancy, how many cigarettes did you smoke on an average day? A pack has 20 cigarettes.

__Cigarettes or __packs
__Less than 1 cigarette a day
__I didn't smoke
__I don't know

FSDB Data Source Birth Certificate

Methodology The Washington State birth certificate (data element #52) inquires first whether a woman smoked during pregnancy, and then requests the average number of cigarettes per day. Because of the way this question is asked on PRAMS, versus the way it is asked on the birth certificate, it is most informative to break this analysis into two parts which echo the birth certificate's approach.

Unfortunately the meaning of "less than 1 cigarette a day" does not correspond to a category on the birth certificate, so this PRAMS response was counted as not smoking. One fundamental incompatibility between the two data sources cannot be adjusted for: the birth certificate queries women about *any* smoking behavior during pregnancy, while PRAMS focuses upon the last trimester.

		PRAMS			
		Y	N	DK/Blank	Total
FSDB	Y	119 (9.0%)	36 (2.7%)	13 (1.0%)	168 (12.7%)
	N	35 (2.6%)	1105 (83.3%)	19 (1.4%)	1159 (87.3%)
	Total	154 (11.6%)	1141 (86.0%)	32 (2.4%)	n = 1327

Measure of Association Cramer's V = 0.739

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	38	25.9	25.9
Within 1 cigarette	20	13.6	39.5
Within 2 cigarettes	15	10.2	49.7
Within 3 cigarettes	10	6.8	56.5
Within 4 cigarettes	4	2.7	59.2
Within 5 cigarettes	23	15.6	74.8
Within 10 cigarettes	22	15.0	**89.8**
Within 15 cigarettes	4	2.7	92.5
Within 20 cigarettes	7	4.8	97.3
Within 25 cigarettes	1	0.7	98.0
Within 30 cigarettes	3	2.0	100.0
Subtotal (n)	147		
Frequency Missing	1180		
Total	1327		

Measure of Association 89.8% of the women for whom smoking information was available from both data sources reported an amount within 1/2 pack or less difference per day in the quantity they reported smoking to the two data sources.

Discussion Although an adjustment for the timing of smoking behavior cannot be made between the two data sources, a moderately strong degree of association exists between PRAMS and the FSDB regarding the presence of smoking behavior during pregnancy, and a strong degree of association exists relative to quantity. A possible explanation is that

recall bias on the birth certificate favors the time period specified on PRAMS (recall bias is the prejudice in answers resulting from respondents recalling certain events better than others due to some aspect of the events, in this case, recency). Another potential explanation is that smoking behavior is relatively resistant to change; it is likely that the amount a woman smoked at any time during her pregnancy is the same amount that she smoked during the last trimester.

Question 32) In the *last 3 months* of your pregnancy, how many alcoholic drinks did you have in an average week?

__Number of drinks a week
__Less than 1 drink a week
__I didn't drink.
__I don't know

FSDB Data Source Birth Certificate

Methodology As with the previous question, it is most informative to first contrast the two data sources regarding the existence of drinking behavior. Again, the meaning of "less than 1 drink a week" could not be quantified, so this PRAMS response was counted as not drinking. The same caveat regarding timing applies here: the birth certificate queries women about *any* drinking behavior during pregnancy, and then requests the average number of drinks per week, rather than focusing upon the last trimester (BC data element #60).

		PRAMS			
		Y	N	DK/Blank	Total
FSDB	Y	13 (1.0%)	17 (1.3%)	1 (0.1%)	31 (2.3%)
	N	111 (8.4%)	1141 (86.0%)	44 (3.3%)	1296 (97.7%)
	Total	124 (9.3%)	1158 (87.3%)	45 (3.4%)	n = 1327

Measure of Association Cramer's V = 0.176

Discussion Cramer's V points to a weak association between PRAMS and the birth certificate regarding drinking behavior. Many more women admit to drinking during the last trimester of pregnancy on PRAMS than are identified using the birth certificate. That this difference is due to discordant time frames seems counterintuitive: drinking during the last trimester arguably carries an even larger social stigma than drinking when pregnancy is not visibly evident. If time frame is the predominant issue, it seems PRAMS should have identified even fewer drinking women than the birth certificate.

It is more likely that the difference between the data sources is driven by the relative anonymity of the PRAMS survey. While the birth certificate is filled out by a representative of the medical care establishment on behalf of the woman (usually in a face-to-face interview), PRAMS has no potentially judgmental intermediary when it is filled out by the woman (although this is less true when the PRAMS survey is administered by an interviewer via telephone). This suggests that obtaining accurate information related to stigmatized behaviors is better achieved by PRAMS.

Because Cramer's V evidenced so little relationship between the two data sources, further quantification of drinking behavior was not pursued. PRAMS data, however, was investigated for the 111 women who stated on PRAMS that they drank but for whom the birth certificate had no analogous data (the N-Y cell). Of these 111 "admitters," ninety-seven (87.4%) recorded that they drank one drink per week. Only five (4.5%) recorded drinking ten or more drinks per week. The remaining nine (8.1%) claimed to drink two to six drinks per week during the last trimester of pregnancy.

FSDB Data Source Medicaid

Methodology Indication of drinking during pregnancy was obtained by searching for alcohol abuse ICD-9 codes submitted on Medicaid claim forms. As with birth certificate sources described above, the time frame specified in PRAMS cannot be duplicated from FSDB sources.

		PRAMS			
		Y	N	DK/Blank	Total
FSDB	Y	6 (0.9%)	6 (0.9%)	2 (0.3%)	14 (2.0%)
	N	52 (7.6%)	591 (85.8%)	32 (4.6%)	675 (98.0%)
	Total	58 (8.4%)	597 (86.7%)	34 (4.9%)	n = 689

Measure of Association Cramer's V = 0.198

Discussion Cramer's V only demonstrates a weak association between PRAMS and Medicaid regarding drinking behavior. For the same reasons expounded above, this difference is unlikely to be attributed to time frame discrepancies. In this case, the use of Medicaid alcohol abuse codes means that only women with provider-identified, severe drinking behaviors will achieve a "yes" designation from the FSDB; unfortunately, there is no good way to identify women drinking at less than abuse levels using Medicaid data. Therefore PRAMS seems to provide the best data regarding the presence of any drinking during pregnancy when compared to Medicaid.

Conclusions The two risky maternal behaviors explored in this section have quite different levels of association with FSDB data sources due to a complex interplay of factors. For the smoking questions, the levels of association between the two data sources fell into the moderately strong and strong categories. This could be interpreted that women readily admitted to smoking during pregnancy regardless of anonymity.

Alternatively, it could mean that women maintain consistency in their reporting to dichotomous data sources: only if a woman has admitted smoking to her care provider or other birth certificate data gatherer is her smoking history accurately reflected on her child's birth certificate. In either case, PRAMS is the preferred data source for this question. Only PRAMS has data available for

such a specific time period. Moreover, for this type of question it seems best to err on the side of the data collection method which requires less human interaction.

The measures of association for the drinking questions, using both the birth certificate and Medicaid, depicted only weak associations between the comparison data sources. Undoubtedly, the weak associations were in part due to the inability of the FSDB sources to identify drinking behavior. They could also indicate that women are reluctant to admit to drinking during pregnancy unless they are responding anonymously. Comparison was also confounded by the time frame incompatibility. PRAMS seems to provide the best data available to date -- from both an accuracy and a comprehensiveness standpoint -- on the presence of any drinking behavior during pregnancy.

HOSPITALIZATION QUESTIONS

Significance Hospitalization during pregnancy unrelated to the delivery hospitalization, and lengths of stay for mothers and children after delivery, are important outcome measures for the efficacy of prenatal care. Maternal and neonatal morbidity contribute substantially to the cost of pregnancy-related care. They also can be predictive of life-long morbidity for the neonate. Both from an economic and a chronic-disease tracking stance, these data need to be available to health planners and analysts. The questions in this section focus on the women's perceptions of hospitalization during pregnancy.

Question 26) Not counting your hospital stay for delivery, did you have to stay overnight in a hospital for any kind of problem during your pregnancy?
__No __Yes, I stayed ___ nights

FSDB Data Source Medicaid

Methodology Evidence of pre-delivery hospitalization was found by searching Medicaid inpatient services records for maternal stays not primarily initiated for delivery.

		PRAMS			
		Y	N	Missing	Total
FSDB	Y	33 (4.8%)	6 (0.9%)	0 (0.0%)	39 (5.7%)
	N	104 (15.1%)	524 (76.1%)	22 (3.2%)	650 (94.3%)
	Total	137 (19.9%)	530 (76.9%)	22 (3.2%)	n = 689

Measure of Association Cramer's V = 0.395

Discussion Cramer's V indicates a moderately weak degree of association due to the relatively large number of discordant pairs in the N-Y cell (15.1% of the sample). Some of the 104 respondents were probably confused by the question's phrasing and multiple modifiers. Even these analysts had difficulty agreeing on one interpretation for this question.

Of equal concern is Medicaid's ability to identify pre-delivery hospitalizations accurately. Although the women in this analysis were considered Medicaid cases in the FSDB, some of their hospitalizations could have taken place prior to having Medicaid coverage. Moreover, claims for pre-delivery hospitalizations in the Medicaid management information system for Medicaid women enrolled in managed care plans are relatively rare, as these episodes are generally covered under capitated fees and not separately submitted. Additionally, records for women with only overnight emergency stays may not reflect those episodes in a manner conducive to identifying them as hospitalizations.

For these reasons, sufficient caution ought to be exercised when using either data source separately to calculate rates of pre-delivery maternal morbidity; from this comparison it is clear that neither data source is manifestly preferable to the other.

26b) What was the date during your pregnancy when you went into the hospital? m/d/y __/__/__

Because the comparison between the two data sources for #26a displayed such lack of concordance, it was decided not to pursue analysis for this question for the thirty-three women that fell into the Y-Y cell.

26c) Why did you stay in the hospital? Check all that apply.

__Vaginal bleeding or placenta problems
__Diabetes (high blood sugar)
__High blood pressure or toxemia
__Kidney infection
__Nausea, vomiting, or dehydration
__Premature labor or contractions > 3 wks before my due date
__Other → Please tell us:

Some analysis of this question was performed for the thirty-three women who fell into the Y-Y cell. Although it was postulated that agreement between the data sources for this group would be strong by virtue of its composition (only those women who answered "yes" to PRAMS and were also found to have had a pre-delivery hospitalization in Medicaid), in fact, little agreement was evidenced. The conditions which were not identified at all for these women in the Medicaid records were diabetes and kidney infection; those best identified were high blood pressure/toxemia and premature labor. This suggests that the reasons women believe they are in the hospital do not coincide with the diagnoses their care providers record for the same episodes.

Question 34) When you went in the hospital to have your baby, how many nights did you stay?

__Nights
__I did not stay in a hospital

FSDB Data Source Medicaid

Methodology Delivery and length of stay information was obtained from Medicaid service records in the FSDB.

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	417	68.6	68.6
Within 1 night	149	24.5	**93.1**
Within 2 nights	28	4.6	97.7
Within 3 nights	7	1.2	98.8
Within 4 nights	3	0.5	99.3
Within 5 nights	1	0.2	99.5
Within 7 nights	1	0.2	99.7
Within 10 nights	2	0.3	100.0
Subtotal (n)	608		
Frequency Missing	81		
Total	689		

Measure of Association 93.1 percent of the women for whom delivery length of stay information was available from both data sources reported an overnight stay on PRAMS within one night of the length of stay First Steps indicated.

Discussion A strong association exists between PRAMS and Medicaid regarding mothers' lengths of stay for delivery. This finding seems reasonable when the timing of the questionnaire is considered -- in most cases, women filled out the survey within three or four months of delivery. Moreover, queries regarding length of hospital stay following a delivery seem to be common and frequent in American culture. Many new mothers had probably had this same question posed many times before answering it on the PRAMS survey. Either source of data seems appropriate to answer this question.

Question 35) When your baby was born, how many nights did he or she stay in the hospital?

__Nights
__My baby did not stay in a hospital
__I don't know

FSDB Data Source Medicaid

Methodology As for mothers, infants' lengths of stay information was obtained from Medicaid service records in the FSDB.

Absolute Difference	Frequency	Percent	Cumulative Percent
No difference	407	66.8	66.8
Within 1 night	146	24.0	**90.8**
Within 2 nights	23	3.8	94.6
Within 3 nights	9	1.5	96.1
Within 4 nights	7	1.1	97.2
Within 5 nights	5	0.8	98.0
Within 6 nights	1	0.2	98.2
Within 2 weeks	3	0.5	98.7
Within 3 weeks	3	0.5	99.2
More than 3 weeks	5	0.8	100.0
Subtotal (n)	609		
Frequency Missing	80		
Total	689		

Measure of Association 90.8 percent of the women for whom information regarding their child's length of stay was available from both data sources reported an overnight stay for their baby on PRAMS that was within one night of that indicated in First Steps.

Discussion Again, a strong degree of association exists between PRAMS and Medicaid regarding the babies' lengths of stay. This can most likely be attributed to the same factors discussed in the analysis of mother's length of stay data: survey timing and familiarity with the question being asked. Either source of data should provide an answer to this question as well as the other.

Question 36) When your baby was born, was he or she put in an intensive care unit or premature nursery?

__No
__Yes
__I don't know

FSDB Data Source Medicaid

Methodology Information pertaining to neonatal intensive care unit (NICU) services was obtained from Medicaid service records in the FSDB using both the moms' and kids' identification codes.

		PRAMS			
		Y	N	DK/Blank	Total
FSDB	Y	30 (4.4%)	9 (1.3%)	2 (0.3%)	41 (6.0%)
	N	50 (7.3%)	561 (81.4%)	37 (5.4%)	648 (94.1%)
	Total	80 (11.6%)	570 (82.7%)	39 (5.7%)	n = 689

Measure of Association Cramer's V = 0.497

Discussion Cramer's V indicates a moderate association between PRAMS and Medicaid regarding infant inpatient NICU services. This seems to be due to the relatively large number of discordant pairs of observations for women who responded in the affirmative to PRAMS: out of the eighty (80) women who answered "yes," only thirty (37.5%) had infants for whom there was evidence of an NICU stay in the FSDB.

This comparison seems straightforward, yet the two data sources have captured dissimilar populations. Data contained in the FSDB services records are based upon Medicaid billing information. PRAMS data, however, are based upon the aggregation of many individuals' interpretations of the question. Evidently what many women thought of as "an intensive care unit or premature nursery" was not considered an NICU within Medicaid's billing system. For reasons expounded upon in the Public Assistance section of this report, Medicaid is the preferred source of data for this question.

Conclusions The measures of association calculated for the hospitalization questions show great variability. Although both of the questions related to length of delivery hospitalization have measures of association in excess of 0.900, for the NICU question the measure falls to 0.497, and for pre-delivery hospitalizations, 0.395.

Respondents seemed to answer the more straightforward of the hospitalization questions without difficulty. Length of delivery stay, whether related to the mother or baby, is an unambiguous concept. The only portion of these questions which might be cause for confusion is requesting number of *nights* rather than number of *days* in the stay. Nonetheless, few women seem thwarted by that distinction, as evidenced by the robust association between PRAMS and Medicaid data. Either data source seems satisfactory for obtaining this information.

The concept of "an intensive care unit or premature nursery," however, seemed to present difficulties for survey respondents. Neonatal intensive care unit stays are among the most costly of hospital events, so it is unlikely that Medicaid record-keeping is inaccurate. Usually care facilities make every effort to bill Medicaid quickly for these services. Even should Medicaid reject some of these claims, it seems unlikely that fifty out of the eighty respondent-identified NICU events went unpaid by Medicaid. More likely is that the definitions women were using for this question were less stringent than the one Medicaid employs in its billing system for NICU events. To capture data pertaining to NICU stays as commonly defined by the medical system, Medicaid is the preferable source.

The query pertaining to pre-delivery hospitalizations had the poorest measure of association of this group. More than likely this is due to the existence of several confounding factors. First, the question itself is in the form of a compound, multiply-modified sentence. Possibly some women simply answered a different question than the one asked. The use of the FSDB case/control variable also undoubtedly contributed to this lack of concordance. Although women are statically designated as Medicaid cases or controls in the FSDB, in reality a woman's Medicaid status is dynamic through time. Therefore, some of the women identified as Medicaid cases in the FSDB may not have actually been Medicaid cases at the point of hospitalization. Finally, the Medicaid information system itself is probably a contributor to the dissimilarities found. Overnight stays in emergency rooms or other short stay wards probably were not satisfactorily captured using Medicaid data, likewise for women whose Medicaid care is delivered via a managed care model. In this case, neither data source seems particularly well-suited to answering this question.

DISCUSSION

This report compares some of the survey data collected by means of the Pregnancy Risk Assessment Monitoring System to information from vital records and administrative data in the First Steps Database for a group of women who gave birth in 1993. Most women who responded to the PRAMS survey also had information about their pregnancies in the FSDB. Data collected on the same women in these two separate data systems is analyzed in this report.

PRAMS is an ongoing survey sent by the Washington State Department of Health to a sample of Washington women who have given birth. A total of 2,207 women who gave birth in 1993 were sent the PRAMS survey; 1,334 responded. The FSDB contains birth certificate information collected by the DOH for all Washington residents who have given birth since 1988, and additional information from the Department of Social and Health Services on those women who received publicly-funded medical care (Medicaid).

Many factors affect the response that a person makes to an item on a self- or telephone interviewer-administered questionnaire. The clearer the question and the more salient the requested information, the greater the congruence between independent queries for the same information. Questions such as "When were you born?" or "When your baby was born, how many nights did he or she stay in the hospital?" are clearly-stated questions about important events, and the association between PRAMS and the First Steps Database is high on such items.

The complexity of a question greatly reduces association even when an item may seem salient. "When you were sure you were pregnant, were you on Medicaid?" is difficult to answer because it requires a woman to recall both when she was sure she was pregnant, and her Medicaid eligibility at that time. It is likely that the date a woman was sure she was pregnant is quite salient, while Medicaid status for a date six or more months earlier is relatively unimportant. Agreement between the First Steps Database and PRAMS on this question is low.

For clearly stated questions pertaining to salient events, both PRAMS and the FSDB are good sources of information. Questions in this analysis which seem to meet these criteria cover the following subjects: due date, dates of birth for the mother and the child, lengths of delivery stay for mother and child, and other children born alive.

As a (primarily) self-administered questionnaire, PRAMS is superior to the FSDB as a source of information on socially or medically disapproved maternal behavior. Women appear more willing to admit to drinking alcohol during pregnancy on an anonymous questionnaire than on their official birth certificate. Expanding the scope of PRAMS questions pertaining to risky maternal behaviors should be considered.

The Medicaid information in the First Steps Database appears to better answer questions on Medicaid coverage and medical services than PRAMS. Many of these questions are complex, such as "When you were sure you were pregnant, were you on Medicaid?," or may involve medical distinctions unfamiliar to PRAMS respondents, such as what constitutes NICU services.

Birth certificate information from the FSDB appears to be a better source than PRAMS for questions about narrowly defined pregnancy events that usually occur early in pregnancy. Initiation of prenatal care is one such question better answered with birth certificate data.

In many cases the existence of more than one data source is to the researcher's advantage. For example, the birth certificate asks for a woman's primary method of paying for prenatal care, and PRAMS asks for all the ways a woman funded her prenatal care; together these two questions, each with a slightly different focus, provide a more complete picture of funding for prenatal care than either considered separately.

In a similar vein, a project which would contribute considerably to the knowledge gathered from PRAMS and the current PRAMS-FSDB comparison is a capture-recapture analysis (Crowe et al., 1985). This technique of using information from two (or more) independent sources of data on a population allows researchers to estimate the size of the population not captured by either (or any) of the sources. Such analysis would be particularly useful for obtaining more accurate estimates of risky maternal behaviors than any single source of data might provide.

The scope of this project was sufficient only to ascertain which data source *seemed* to be preferable to the other, when two sources together *seemed* better than one, or when neither source *seemed* to provide the data sought. Moreover, this analysis only explores the reliability of the data collected via PRAMS, not the validity (Fowler, 1988). In other words, a favorable comparison between PRAMS and the FSDB for any one question merely indicates that the two data sources provide consistent measures when comparably considered, but not necessarily that PRAMS respondents have understood each question as it was intended.

PRAMS contains much valuable information on items not contained in the First Steps Database. The FSDB consists of data on the entire population of women giving birth in Washington, while PRAMS data are based on a sample of women giving birth. Potential respondents were selected using a stratification system related to race and ethnicity. In addition, women in certain groups, especially lower education and lower socioeconomic status, are often less likely to respond to survey research efforts. This report has focused on comparison of survey responses for only the women who returned surveys and has not addressed issues of generalizability of the survey data to the statewide population.

With a response rate of 60.4% in this first year of PRAMS implementation in Washington, closer inspection of the sampling design and response rates is needed to assess the representativeness of the survey results for the statewide population. Caution may be appropriate when using PRAMS data, particularly for 1993 births, to make global estimates for all women giving birth in Washington. At the time of this report, PRAMS results were available only for 1993; improved response rates have been achieved recently and are likely to provide more readily generalizable results. Further studies using individual records linked across two or more data sources have the potential to improve our ability to assess health status and health needs with a variety of measures. Either data source may also be an appropriate source of information when used alone; examination of the study question, as demonstrated in this report, may indicate the preferability of one source to the other.

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APPENDICES

APPENDIX A

SAMPLE BIRTH CERTIFICATE

VITAL RECORDS USE ONLY

215102

LOCAL FILE NUMBER

Washington State Department of Health

CERTIFICATE OF LIVE BIRTH

146

STATE FILE NUMBER

A. DISTRICT

B. COPIES

C. HOSPITAL

D. OCCURRENCE

E. RESIDENCE

F.

G.

H. TRACT

I.

J.

K.

L.

M.

N

1. CHILD'S NAME First Middle LAST | 2. SEX (M / F) | 3. DATE OF BIRTH (MO, DAY, YR) | 4. TIME OF BIRTH

5. TYPE OF BIRTHPLACE (SPECIFY TYPE) ☐ 1 HOSPITAL ☐ 3 BIRTH CENTER ☐ 5 HOME ☐ 2 ENROUTE ☐ 4 CLINIC/DOCTOR'S OFF. ☐ 6 OTHER | 6. NAME OF FACILITY / IF NOT A FACILITY ENTER NAME OF PLACE AND ADDRESS | 7. CITY / TOWN / LOCATION | 8. COUNTY OF BIRTH

9. I CERTIFY THAT THIS CHILD WAS BORN ALIVE AT THE PLACE AND TIME AND ON THE DATE STATED. Signature X | 10. DATE SIGNED (MO, DAY, YR) | 11. ATTENDANT'S NAME AND TITLE (If other than certifier) (Type or Print)

12. CERTIFIER — NAME AND TITLE (Type or print) | 13. ATTENDANT'S MAILING ADDRESS (street / box no., city, state, ZIP code)

14. FATHER'S NAME First Middle Last | 15. DATE OF BIRTH (MO, DAY, YR) | 16. STATE OF BIRTH (If not USA give country)

17. MOTHER'S NAME First Middle MAIDEN | 18. DATE OF BIRTH (MO, DAY, YR) | 19. STATE OF BIRTH (If not USA give country)

20. MOTHER'S RESIDENCE (number and street) | 21. CITY / TOWN / LOCATION | 22. INSIDE CITY LIMITS Yes No | 23. COUNTY | 24. STATE / ZIP CODE

25. HOW LONG AT CURRENT RESIDENCE? Yrs. Mos. | 26. MOTHER'S MAILING ADDRESS (If different than residence)

27. NAME OF INFORMANT (Type or print) | 28. RELATION TO CHILD | 29. PARENT(S) REQUEST FOR SOCIAL SECURITY NUMBER ISSUANCE (allow up to 6 months) 1 ☐ Yes 2 ☐ No

30. REGISTRAR (signature) X | 31. DATE FILED BY LOCAL REGISTRAR

32. RECORD AMENDMENT (state registrar use only) ITEM | DOCUMENTARY EVIDENCE | REVIEWED BY | DATE

33. FATHER'S SOCIAL SECURITY NUMBER | 34. MOTHER'S SOCIAL SECURITY NUMBER

CONFIDENTIAL INFORMATION FOR MEDICAL AND HEALTH USE ONLY — DETACHED FROM CERTIFICATE BEFORE PERMANENT FILING

	35. OF HISPANIC ORIGIN OR DESCENT? If yes, specify: Mexican, Puerto Rican, Spanish, etc.	36. RACE (American Indian, White, Black, Asian/Pacific Islander (Specify subgroup), etc.)	37. OCCUPATION (Worked during last year) (registered nurse, personnel manager)	38. TYPE OF BUSINESS OR INDUSTRY (hospital, newspaper publishing)	39. EDUCATION (specify only highest grade completed) Elementary / HS (0-12) College (1-4 or 5+)
FATHER	35a. 1 ☐ Yes 2 ☐ No Specify:	36a.	37a.	38a.	39a
MOTHER	35b 1 ☐ Yes 2 ☐ No Specify:	36b	37b.	38b	39b
CHILD	PARENTAL IDENTIFICATION OF CHILD'S ETHNICITY AND RACE (Items 40 and 41)	40. OF HISPANIC ORIGIN OR DESCENT? If yes, specify, Mexican, Puerto Rican, Spanish, etc. 1 ☐ Yes 2 ☐ No Specify		41. RACE (American Indian, White, Black, Asian/Pacific Islander (Specify subgroup), etc)	

42. PRIOR LIVE BIRTHS (Do not include this birth) ☐ NONE NOW LIVING NOW DEAD NUMBER DATE LAST LIVE BIRTH (MO, YR)

43. OTHER TERMINATIONS (Not live births) ☐ NONE NUMBER SPONTANEOUS NUMBER INDUCED (Any gest., age) 20 WKS OR MORE LESS THAN 20 WKS DATE LAST SPONTANEOUS OUTCOME (MO, YR) DATE LAST INDUCED (MO, YR)

44. TOTAL PRIOR PREGNANCIES | 45. CLINICAL ESTIMATE OF GESTATION (WEEKS)

46. DATE LAST NORMAL MENSES BEGAN (MO, DAY, YR) | 47. IS MOTHER MARRIED? 1 ☐ YES 2 ☐ NO

48. MONTH OF PREGNANCY PRENATAL CARE BEGAN (1st, 2nd, 3rd, etc) | 49. TOTAL NUMBER OF PRENATAL VISITS (If none, enter 0)

50. PRINCIPAL SOURCE OF PAYMENT FOR PRENATAL CARE 1 ☐ Medicaid 3 ☐ Commercial Ins 5 ☐ HMO 2 ☐ Self pay 4 ☐ Charity care 6 ☐ Other

51. DURING PREGNANCY MOTHER PARTICIPATED IN (check all that apply) 1 ☐ WIC 2 ☐ First Steps 3 ☐ AFDC 4 ☐ Services from Local Health Dept

52. DID MOTHER SMOKE AT ANY TIME DURING PREGNANCY? 1 ☐ YES 2 ☐ NO Average no. cigarettes per day? _____

53. PLURALITY—Single, Twin, Triplet, etc (Specify)

54. IF NOT SINGLE BIRTH—born 1st, 2nd, 3rd, etc (Specify)

55. BIRTH WEIGHT lbs ozs. or grams

56. APGAR SCORE 1 Min 5 Min

57. INFANT TRANSFERRED TO ANOTHER FACILITY? 1 ☐ YES 2 ☐ NO 3 ☐ UNK

58. MOTHER TRANSFERRED AFTER ATTEMPTED DELIVERY 1 ☐ YES 2 ☐ NO If yes, from ☐ Birth Ctr ☐ Home ☐ Other

SAMPLE

SAMPLE BIRTH CERTIFICATE, CON'T.

CHECK ALL BOX(ES) IN EACH COLUMN THAT APPLY

59. MEDICAL RISK FACTORS FOR THIS PREGNANCY

- ☐ 1. Anemia (Hct.<30 / Hgh.<10)
- ☐ 2 Cardiac disease
- ☐ 3. Acute or chronic lung disease
- ☐ 4. Diabetes, Gest. ☐ Estab. ☐
- ☐ 5 Genital herpes—active ☐ HX ☐
- ☐ 6. Polyhydramnios
- ☐ 7. Oligohydramnios
- ☐ 8 Hemoglobinopathy
- ☐ 9. Hypertension, chronic
- ☐ 10. Hypertension, pregnancy-associated
- ☐ 11. Eclampsia
- ☐ 12. Incompetent cervix
- ☐ 13. Previous infant 4000 + grams
- ☐ 14. Previous preterm or small-for-gestational-age infant
- ☐ 15. Renal disease
- ☐ 16. Rh sensitization
- ☐ 17. Uterine bleeding - trimester [1] [2] [3]
- ☐ 18. Hepatitis B - HBsAg Positive
- ☐ 19. Syphilis
- ☐ **20. None**
- ☐ 21. Other (specify) _____

60. OTHER RISK FACTORS FOR THIS PREGNANCY

1. Alcohol use during pregnancy?
   ☐ Yes ☐ No Av. No. drinks per wk? ____
2. Weight gained during pregnancy _____ lbs.
3. Weight before pregnancy _____ lbs.

61. OBSTETRIC PROCEDURES

- ☐ 1. Amniocentesis—If yes, specify trimesters [1] [2] [3]
- ☐ 2. Electronic fetal monitoring
- ☐ 3. Induction of labor
- ☐ 4. Stimulation of labor
- ☐ 5 Tocolysis
- ☐ 6. Ultrasound
- ☐ **7. None**
- ☐ 8. Other (specify) _____

62. METHOD OF DELIVERY

- ☐ 1. Vaginal
- ☐ 2. Vaginal birth after previous C-section
- ☐ 3. Primary C-section
- ☐ 4. Repeat C-section with ☐ labor ☐ no labor
- ☐ 6. Forceps
- ☐ 7. Vacuum extraction
- ☐ 9. Other (specify) _____

63. COMPLICATIONS OF LABOR AND/OR DELIVERY

- ☐ 1. Febrile (>100°F or 38°C)
- ☐ 2. Meconium, moderate / heavy
- ☐ 3. Premature rupture of membranes (>12 hrs)
- ☐ 4. Abruptio placenta
- ☐ 5. Placenta previa
- ☐ 6. Other excessive bleeding
- ☐ 7. Seizures during labor
- ☐ 8. Precipitous labor (<3 hrs)
- ☐ 9. Prolonged labor (>20 hrs)
- ☐ 10. Dysfunctional labor
- ☐ 11. Breech / Malpresentation
- ☐ 12. Cephalopelvic disproportion
- ☐ 13. Cord prolapse
- ☐ 14. Anesthetic complications
- ☐ 15. Fetal distress
- ☐ 16. Nuchal cord
- ☐ **17. None**
- ☐ 18. Other (specify) _____

64. ABNORMAL CONDITIONS OF THE NEWBORN

- ☐ 1. Anemia (Hct<39 / Hgb.<13)
- ☐ 2. Birth injury
- ☐ 3. Fetal alcohol syndrome
- ☐ 4. Hyaline membrane disease/RDS
- ☐ 5. Meconium aspiration syndrome
- ☐ 6. Drug withdrawal syndrome in newborn
- ☐ 7. Assisted ventilation < 30 min
- ☐ 8. Assisted ventilation ≥ 30 min
- ☐ 9. Seizures
- ☐ **10. None**
- ☐ 11. Other (specify) _____

65. CONGENITAL ANOMALIES OF CHILD

- ☐ 1. Anencephalus
- ☐ 2. Spina bifida / Meningocele
- ☐ 3. Hydrocephalus
- ☐ 4. Microcephalus
- ☐ 5. Other central nervous system anomalies (specify) _____
- ☐ 6. Heart malformations
- ☐ 7. Other circulatory / respiratory anomalies (specify) _____
- ☐ 8. Rectal atresia / stenosis
- ☐ 9. Tracheo-esophageal fistula / Esophageal atresia
- ☐ 10. Omphalocele / Gastroschisis
- ☐ 11. Other gastrointestinal anomalies (specify) _____
- ☐ 12. Malformed genitalia
- ☐ 13. Renal agenesis
- ☐ 14. Other urogenital anomalies (specify) _____
- ☐ 15. Cleft lip / palate
- ☐ 16. Polydactyly / Syndactyly / Adactyly
- ☐ 17. Club foot
- ☐ 18. Diaphragmatic hernia
- ☐ 19. Other musculoskeletal / integumental anomalies (specify) _____
- ☐ 20. Down's syndrome
- ☐ 21. Other chromosomal anomalies (specify)
- ☐ **22. None**
- ☐ 23 Other anomalies (specify) _____

(CONTINUED NEXT COLUMN)

(CONTINUED NEXT COLUMN)

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FOR SPECIFIC ITEM INSTRUCTIONS SEE HANDBOOK

APPENDIX B

SUMMARY TABLES OF WEIGHTED PRAMS ANSWERS

WEIGHTED PRAMS ANSWERS (BINARY VARIABLES) N = 1327

Question Number	Subject	Yes	No	Missing
1	Previous babies born alive	56.3	42.7	1.0
6	Medicaid status at pregnancy	12.5	84.4	3.1
21	Medicaid payment for prenatal care	32.1	65.9	2.0
	Personal income payment for prenatal care	19.6	78.4	2.0
	Insurance payment for PNC prenatal care	61.0	37.0	2.0
26a	Pre-delivery overnight hospital stay	18.0	77.8	4.2
29	Smoking behavior last 3 months of pregnancy	14.3	83.7	2.0
32	Drinking behavior last 3 months of pregnancy	14.4	82.9	2.7
36	Neonatal intensive care unit stay	6.4	91.2	2.4
37	Medicaid payment for delivery	34.6	65.4	0.0
50	Source of income for past 12 months was public aid	21.9	78.0	0.1

WEIGHTED PRAMS ANSWERS (CONTINUOUS VARIABLES)

Question Number	Subject	Values	Percentage of cohort	n
8	Month prenatal care began	1st month	33.2	1234
		2nd month	40.5	
		3rd month	18.6	
		4th month	3.5	
		5th month	2.7	
		6th month	0.8	
		7th month	0.5	
		8th month	0.1	
11	Number of prenatal care visits	0 visits	2.2	1159
		1-5 visits	2.3	
		6-9 visits	12.2	
		10 visits	13.2	
		11 visits	10.1	
		12 visits	21.4	
		13 visits	9.4	
		14 visits	6.6	
		15 visits	10.3	
		16-40 visits	12.3	
26a	Number of nights in pre-delivery hospital stay	1 night	52.9	130
		2 nights	16.6	
		3 nights	14.6	
		4 nights	5.8	
		5 nights	5.1	
		6 nights	1.9	
		7-14 nights	1.4	
		15+ nights	1.7	
26c	Cause of pre-delivery hospitalization	Vag Bleeding	7.9	74
		Diabetes	11.7	
		Toxemia	23.1	
		Kidney	6.7	
		Infection	4.8	
		Nausea	46.0	
		Premature labor		
29	Quantity of cigarettes smoked last 3 months	1-4 cigs	16.0	154
		5 cigs	25.2	
		6-9 cigs	4.1	
		10 cigs	14.6	
		11-19 cigs	9.9	
		20 cigs	25.5	
		21+ cigs	4.8	

WEIGHTED PRAMS ANSWERS (CONTINUOUS VARIABLES), CON'T.

Question Number	Subject	Values	Percentage of cohort	n
32	Quantity of alcoholic drinks last 3 months	1 drink	89.7	1203
		2 drinks	7.9	
		3 drinks	1.4	
		4 + drinks	1.0	
34	Length of delivery stay	0 nights	3.4	25
		1 night	43.5	
		2 nights	31.4	
		3 nights	11.7	
		4 nights	6.9	
		5 nights	1.9	
		6 + nights	1.0	
35	Baby's length of stay	0 nights	4.7	34
		1 night	49.8	
		2 nights	26.3	
		3 nights	9.2	
		4 nights	5.3	
		5+ nights	4.4	
59	Monthly income when found out pregnant	< $1000	21.1	1260
		$1000-1199	6.2	
		$1200-1399	8.7	
		$1400-1799	9.8	
		$1800-2199	5.6	
		$2200-2599	8.0	
		$2600-2999	7.6	
		> $3000	32.8	

APPENDIX C

"OTHER" CATEGORIES

Question 21

Twenty-six women in the PRAMS sample recorded comments in the "Other" field. Of these, only five answers did not fit into the pre-existing categories: my sister, ops [*sic*], gratis (free), mail handlers, and Medicare. Eleven were comments that expanded upon the other responses checked. The remaining ten comments seemed to represent answers that fit into one of the pre-existing categories, although that category had not been chosen.

Question 37

Twenty-eight women in the PRAMS sample recorded comments in the "Other" field. Of these, ten answers did not fit into the pre-existing categories: family helped, hospital grant, state prison, ops [*sic*], delivered at home, don't know, financial aid through hospital, they didn't pay for well-baby care, my girl's hospital costs are still unpaid, and Medicare. The remaining ten comments were split between those that expanded upon the other responses checked and those that seemed to represent answers that fit into one of the pre-existing categories.

Question 50

Seventy-five women in the PRAMS sample recorded comments in the "Other" field. Of those, forty-four answers did not fit into pre-existing categories. These answers could be grouped into the following sources of income: family (14), disability and insurance payments (10), student loans and fellowships (7), don't know or none (6), savings (2), spouse/boyfriend (with no further detail) (2), nonsensical answers (2), prison (1). Fourteen were comments that expanded upon the other responses checked. The remaining seventeen comments seemed to represent answers that fit into one of the pre-existing categories, although that category had not been chosen.

APPENDIX D

DICTIONARY OF SELECTED ABBREVIATIONS & ACRONYMS

CDC	-- Centers for Disease Control and Prevention
DOH	-- Washington State Department of Health
DSHS	-- Washington State Department of Social and Health Services
FPL	-- Federal Poverty Level
FSDB	-- First Steps Database
HMO	-- Health maintenance organization
ICD-9-CM	-- International Classification of Diseases, 9th revision, Clinical Modification
LIST	-- Language Interpreter Services and Translations
MAA	-- DSHS Medicaid Assistance Administration
MCM	-- Maternity Case Management
MSS	-- Maternal Support Services
NICU	-- Neonatal intensive care unit
PIC	-- Personal Identifier Code
PNC	-- Prenatal care
PRAMS	-- Pregnancy Risk Assessment Monitoring System
WIC	-- Special Supplemental Food Program for Women, Infants, and Children

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