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Michele Miller Bever Date

REPRODUCTIVE HEALTH IN NEBRASKA WOMEN: THE EFFECT OF INSURANCE STATUS ON PREGNANCY INTENDEDNESS AND INTERPREGNANCY INTERVALS

By

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Degree to be awarded: M.P.H.
Career MPH

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M.P.H., Emory University, 2011
Ph.D., Purdue University, 1990
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An abstract of
A Thesis submitted to the Faculty of the
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Abstract

REPRODUCTIVE HEALTH IN NEBRASKA WOMEN:
THE EFFECT OF INSURANCE STATUS
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BY
Michele Miller Bever

Publicly-subsidized reproductive health services, including contraception, prenatal care, delivery and postpartum care are important for assisting low-income women in adequately spacing their pregnancies, reducing unintended pregnancies and delivering healthier babies.

The goal of this study was to better understand the current status of women's access to reproductive health services in Nebraska and to determine how additional subsidized services might impact access and state costs. Binary and multiple logistic regression on weighted data from the Nebraska Pregnancy Risk Assessment Monitoring System (PRAMS), 2005-2008, indicated that women with unintended pregnancies were more likely to have no insurance (crude OR=2.3; 95% CI: 1.93, 2.75) and that short interpregnancy intervals were associated with unintended pregnancy (adjusted OR=2.14; 95% CI: 1.76, 2.60). Interpregnancy interval was not associated with insurance status among women with unintended pregnancy. A review of trends in Nebraska Title X clinic usage based on administrative data from Nebraska Family Planning Annual Reports (FPARs), 1995-2007, indicated an expanding population of clinic users with incomes less than 101% of poverty and greater reliance on Medicaid for payment for services revenue. Estimated costs/savings of implementing an income-based Medicaid family planning waiver in Nebraska range from millions to tens of millions of dollars in savings.

To reduce public costs and improve the health of Nebraska women and their babies, Nebraska should consider an income-based Medicaid family planning waiver or state plan amendment to expand Medicaid eligibility for family planning services.

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CHAPTER 1: INTRODUCTION

Introduction and Rationale

Reproductive health services, including contraception, prenatal care, delivery, and post-partum care are key to helping low-income women reduce unintended and unwanted pregnancies, adequately space their pregnancies, and ultimately ensure healthier babies (1, 2), while at the same time reducing public costs that would be associated with these pregnancies, deliveries, and poor infant outcomes (3, 4). Nebraska's Medicaid Reform Act was passed by the legislature in 2005 in response to the State's concern about Medicaid expenditure growth outpacing General Fund revenue growth and concern about whether the Medicaid system would be available for future generations of Nebraskans. The plan suggested various strategies to help address this problem, including application for additional Medicaid waivers from the federal government. Although a Medicaid Family Planning waiver was not one of the 28 specific recommendations in the plan, this type of waiver has been implemented in 27 states in the past 17 years. The purpose of the Medicaid family planning waivers has been to expand eligibility for reproductive health services in an effort to reduce unintended and unwanted pregnancies and lengthen interpregnancy intervals. There is a large and growing body of evidence to support the effectiveness of these waivers in both cost savings and improved health outcomes. In most Medicaid Family Planning Demonstrations, expansion has been accomplished using one of two basic forms: extension of coverage for pregnant women beyond the usual 60-day postpartum period, and/or relaxation of federal poverty level eligibility criteria to include women who

would not have been covered by the standard criteria (5). Furthermore, with the recent passage of the Affordable Care Act, states will have the option of using a state plan amendment to expand Medicaid eligibility (6) rather than applying and waiting for a waiver to be approved. This study addresses whether insurance status is associated with unintended pregnancy in Nebraska women of reproductive age. Results may help inform the decision on an application from Nebraska to expand Medicaid eligibility for family planning services.

Problem Statement

In March 2006 a report (7) by the Alan Guttmacher Institute (AGI) ranked Nebraska 51st among the 50 states and the District of Columbia on efforts to assist women to "obtain contraceptive services and supplies, and to use them consistently and correctly over time" (7). This grim conclusion was based, first, on how well Nebraska meets the need for subsidized contraceptive services (ranked 51st by AGI); second, whether Nebraska's laws and policies facilitate access to contraceptive services (ranked 34th by AGI); and, third, how well Nebraska utilizes state and federal funds to support delivery of subsidized services (ranked 49th by AGI) (7).

In Nebraska, low income women are assisted in accessing reproductive health services primarily through Medicaid (combination of state and federal) or Title X (federal) funding. Nebraska's Medicaid Medical Assistance Program covers pregnant women up to 185% of federal poverty level (higher than the 133% FPL federally required), adults with dependent children up to 75% of FPL (higher than the 22% FPL required), and children up to 300% FPL (higher than the 100% FPL required). Nebraska

Medicaid includes coverage for family planning services such as exams, counseling and prescribed supplies and drugs (8). While co-payments of $1-3 are now required for most Medicaid services in Nebraska, all family planning services, including supplies and drugs, are exempt from co-payments (8). Nebraska also has expanded covered services or eligibility under five Medicaid waivers (8), but none of these are related to family planning services.

In 2005, the Nebraska legislature passed LB 709, the Medicaid Reform Act[1], which called for "substantive recodification" of the Medicaid statutes in an attempt to moderate Medicaid spending growth, establish priorities for allocation of medical assistance benefits, ensure sustainability of the medical assistance program, and provide alternatives to Medicaid eligibility. The Act included two important legislative findings related to family planning: (1) that Medicaid is the "largest single purchaser of maternity care and pays for over one-third of the births in the United States each year," and (2) that in Nebraska, "low-income children and their parents comprise 76.7% of the Medicaid population and 32.8% of the Medicaid expenditures." Of note, approximately 41% of pregnancies in Nebraska are unintended (9). Together, these findings provide support for implementing interventions aimed at reducing unintended pregnancies in order to reduce Medicaid costs in Nebraska.

The Nebraska Medicaid Reform Plan serves as an alert to the State's concern about Medicaid expenditure growth outpacing General Fund revenue growth, and concern about whether the Medicaid system will be available for future generations of

[1] Retrieved 12/16/2007 from http://www.legislature.ne.gov/FloorDocs/99/PDF/Final/LB709.pdf .

Nebraskans. The report concludes that the system as it currently exists is not "fiscally sustainable" and that reform is necessary to reduce the expenditure growth and ensure that medical services can continue to be provided to low-income residents (10, 11). The plan recommends various strategies, including additional waivers to address this problem. While the Medicaid family planning waiver was not one of the 28 specific recommendations in the plan, investigating the family planning waiver was suggested by *Family Planning of Nebraska and Council Bluffs* and was included in the Plan's Appendix A (Appendix A: Written Recommendations Received from External Organizations) (10). In addition, the plan suggests a long-term strategy of examining the reform approaches in other states – essentially looking for effective practices that might be appropriate in Nebraska (10). In summary, the fiscal and political climate in Nebraska has been ripe for exploring ways to reduce the state costs of Medicaid, although family planning has not been a top priority in this discussion.

Another important source of federal funding that subsidizes family planning services is the Population Research and Voluntary Family Planning Program (Title X). Under Title X of the Public Health Service Act [42 CFR Part 59, Subpart A], grants are available to support family planning projects with the mission of providing "individuals with the information and means to exercise personal choice in determining the number and spacing of their children" (12). Specifically, the projects must "provide a broad range of acceptable and effective medically-approved family planning methods (including natural family planning methods) and services (including infertility services and services for adolescents)" [42 CFR § 59.5]. The Nebraska Department of Health and

Human Services (DHHS) serves as a grantee for this program and administers contracts with 11 delegates in Nebraska, supporting a total of 32 family planning service sites. The 32 family planning clinics in Nebraska provide services for reproductive health and pregnancy-related care (13).

The Title X clinics are assisted by federal funds to provide preventative health services, including reproductive health services, to all people (14), i.e., the clinics are not allowed to turn away anyone. Those with incomes at or below 100% FPL are to be given priority and will not be charged. Those with incomes less than 250% of the federal poverty level can access these services on a sliding fee scale [49 CFR §§ 59.2, 59.5(a)(6-8)]. Sources of payment for services at Title X clinics include self pay, private insurance, Medicaid, and other public funds. Of note, during fiscal year 2006, 58% of family planning users at Title X clinics were uninsured, according to the Nebraska Title X Family Planning Annual Report (J. Reno, Director Nebraska Reproductive Health Program, DHHS, personal communication, 2008). Medicaid provided 30% of the clinic revenue, while 13% came from private insurance, 3% was derived from other public insurance, and 54% was self-pay (ibid). This evidence suggests a need to expand eligibility for Medicaid to support access to family planning services.

A standard measure of unmet need with respect to reproductive health services is the need for contraception to space or limit births by at least 2 years in women who are married or in consensual union, fecund, and not practicing modern or traditional methods of contraception (15). The Alan Guttmacher Institute (AGI) further defines unmet need for contraceptive services in the U.S. by focusing on women of reproductive

age (13-44 years), who have ever had sexual intercourse, who are able to become pregnant but who do not wish to, and whose income is below 250% of the federal poverty level or who are younger than 20 years of age (16). The AGI estimates for Nebraska suggest that between 2000 and 2004 there was an increase of 9% in the number of women in need of publicly funded contraceptive services and supplies. Unfortunately, the rising cost of oral contraceptives has forced Title X clinics in Nebraska to cut back on the number of contraceptives they can offer and some forms of contraception are cost-prohibitive to supply to clients (J. Reno, personal communication). In addition, lack of access to contraceptive services may lead to more abortions. In Nebraska, as high as 99% of women seeking abortions during 2005-2009 indicated socioeconomic reasons and up to 56% of women seeking abortions indicated they did not use contraception [Nebraska Statistical Report of Abortions, Table 4 in individual reports for years 2005 through 2009, (17-21)].

The aforementioned 2006 AGI report that scored Nebraska at the very bottom on efforts to assist women with contraceptive services provided a snapshot look at one component of reproductive health services for Nebraska women. In order to convince policymakers of the value of expanding Medicaid eligibility as a strategy to both reduce State expenses and improve the health of Nebraska women, evidence needs to be gathered to support the existence of a "need" for expanded publicly-funded reproductive health services in Nebraska. This evidence should include state-level trends in the use of publicly-funded services along with baseline data on any association between lack of coverage and health outcomes such as unintended pregnancy and short

interpregnancy intervals. And finally, estimates of the impact of an expansion in Nebraska would be important for policymakers, including numbers of potential new participants and potential costs or savings based on results from other demonstration states.

Theoretical Framework

Figure 1 shows a conceptual diagram for the relationship between insurance or Medicaid status for reproductive health services and ultimate public costs. In this framework, insurance or Medicaid coverage provides access to family planning services and health care providers, which in turn influence interpregnancy intervals and pregnancy intendedness. Both birth outcomes and maternal health outcomes are associated with interpregnancy intervals and pregnancy intendedness, and the quality of these health outcomes affects the costs borne by the public. The public costs are net costs, considering both the upstream costs of providing family planning services and the downstream costs associated with the deliveries of unintended pregnancies and costs of poor birth outcomes, such as pre-term birth and low birth weight. In addition to the costs of health care at the time of delivery and after (potentially extending into adult years), the public costs could include costs of educational, governmental, social and community services. At the front end, access to insurance, health care resources and health care providers is complicated by other factors, such as socio-economic status, maternal age, education, marital status, and race/ethnicity.

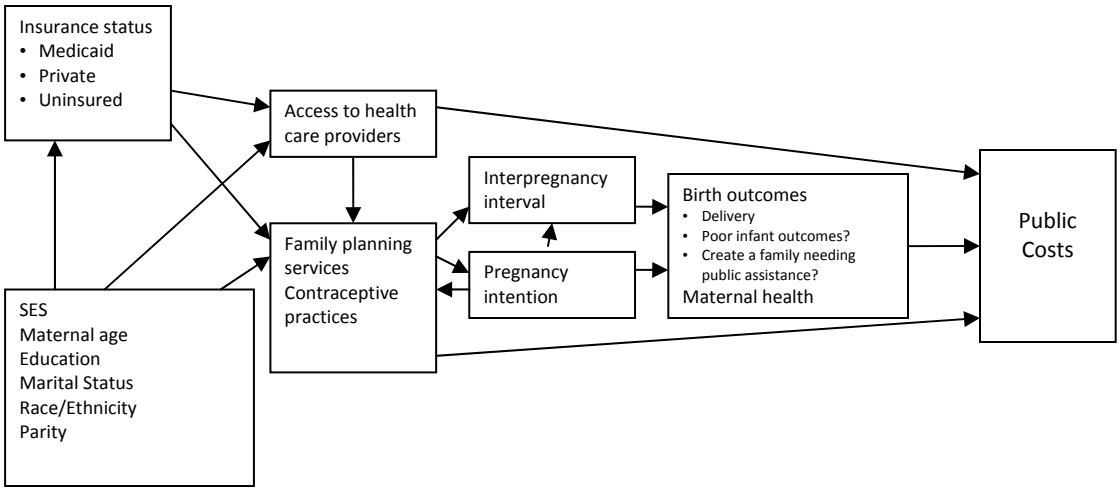


Figure 1. Conceptual diagram for the relationship between health care coverage for reproductive health services, birth outcomes, and public costs.

Purpose Statement

In order to reach more women who are in need of publicly-supported reproductive health services and to save the state money by reducing Medicaid expenditures, this study will address whether Nebraska should consider a policy change that would expand Medicaid eligibility for family planning services. The purpose of this project is to begin to evaluate the nature and extent of the need for publicly-supported reproductive health services in Nebraska.

Research Questions

The overriding question for this project is whether there is a need for Nebraska to expand Medicaid-funded reproductive health services in order to reduce state costs and improve the health of mothers and their children.

This project will evaluate the effect of insurance status on pregnancy intendedness and interpregnancy intervals in Nebraska women. The hypothesis is that

pregnancy intendedness and interpregnancy intervals will correlate with insurance status, such that uninsured and underinsured individuals will be more likely to experience unintended pregnancies and shorter interpregnancy intervals than women who have adequate insurance coverage for reproductive health services. In addition, the study will review the trends in the users of publicly-funded reproductive health (Title X) clinics in Nebraska and the potential change in eligible users that could occur with a Medicaid family planning expansion. Finally, the study will estimate the cost savings to the State of Nebraska under a Medicaid family planning expansion.

The following specific questions will be addressed:

1. Is pregnancy intendedness associated with pre-conception insurance status?
2. Is interpregnancy interval for intended versus unintended pregnancy different?
3. Among women with an unintended pregnancy, is there a difference in interpregnancy interval by insurance status?
4. What are the trends in Title X family planning clinic usage in Nebraska?
5. What is the change in annual number and percentage of Nebraska women who would qualify under a Medicaid family planning waiver by changing eligibility to include women up to 200% FPL?
6. What are the additional and net costs to Nebraska of implementing a Medicaid family planning waiver?

Significance Statement

Is there a need for Nebraska to expand Medicaid-funded reproductive health services? There is an absence of Nebraska-focused data analysis, the results of which

could assist legislators and others considering policy change. This study intends to assess the need in Nebraska for expanding publicly-funded reproductive health services with the result of informing policy and programs that are anticipated to address reduction of unintended pregnancies and improved health status of mothers and newborns. Results of this work could be used to inform discussions regarding application by Nebraska for a Medicaid family planning waiver or for development of a state plan amendment. Therefore, a summary of the results from this study will be disseminated in a policy brief to stakeholders such as the Nebraska Association of Local Health Directors (NALHD), Friends of Public Health (advocacy organization for local health departments), the State Medicaid Director, and/or members of the Nebraska Unicameral's Health and Human Services Committee.

Definition of Terms

AGI – Alan Guttmacher Institute
AI – American Indian
AN – Alaska Native
aOR – Adjusted Odds Ratio
Averted Births – Difference between the number of births expected for a population and the number of births that occurred in that population.
Birth Interval – Time elapsed between delivery of a live birth and delivery of a subsequent live birth
Birth Rate – (annual) number of live births occurring per thousand occurring in a given population
BRFSS – Behavioral Risk Factor Surveillance System, a telephone health survey system conducted annually in each state to collect information on health conditions and risk behaviors (http://www.cdc.gov/BRFSS)
CI – Confidence Interval
CMS - Centers for Medicare and Medicaid Services
DataFerrett – Federated Electronic Research, Review, Extraction, and Tabulation Tool; an opensource interface for data analysis and extraction that customizes federal, state, and local data (http://dataferrett.census.gov)
Demonstration Project for Family Planning – see Medicaid family planning waiver
NDHHS – Nebraska Department of Health and Human Services

Fertility Rate – combined number of live births, miscarriages, still births, and abortions per thousand occurring in a given population.

FPAR – Family Planning Annual Report

FMAP – Federal Medical Assistance Percentage

FPL - Federal Poverty Level

Friends of Public Health – Lobbyist for NALHD

Insurance Status – Public or private coverage for reproductive health services

Interpregnancy interval (IPI) – the time elapsed between two successive pregnancies; period between the delivery of a live birth and the conception of a subsequent live birth

Interpartum interval – see interpregnancy interval (intrapartum is inappropriately used, in some cases of the literature)

Kid's Connection – Nebraska S-CHIP program

LR – Legislative Resolution

LB – Legislative Bill

LBW – Low birth weight (<2500 gram)

MAP – Medical Assistance Program (Nebraska Medicaid)

Medicaid Family Planning Waiver – with permission from CMS, allows a state to provide family planning services to women who would not otherwise be eligible. Must meet a budget neutrality requirement.

NALHD – Nebraska Association of Local Health Directors

NFPRHA – National Family Planning & Reproductive Health Association

NHPI – Native Hawaiian / Pacific Islander

OR – Odds Ratio

PRAMS – Pregnancy Risk Assessment Monitoring System; an annual, state-based surveillance system that describes maternal characteristics, behaviors and experience before, during and after pregnancy among women who have had a live birth.

Preterm birth - Birth before 37 weeks gestation

Publicly-supported – funded by federal and state funds such as Title X or Medicaid Reproductive Health Services

SCHIP - State Children's Health Insurance Program

SGA - Small for gestational age, usually defined as birth weight below the 10^{th} percentile

SFY – State Fiscal Year

SPA – State Plan Amendment; mechanism of expanded eligibility provided in the health reform act which would allow states to cover women and men in need of family planning services, without having to obtain a waiver from CMS.

Title X – the United States family planning program administered within the Department of Health and Human Services' Office of Public Health and Science, Office of Population Affairs (OPA) by the Office of Family Planning

Unicameral – the single legislative body for the State of Nebraska

Unintended pregnancy – a pregnancy that is mistimed (woman wanted to be pregnant later) or unwanted (woman did not ever want to be pregnant)

Unk / NR – Unknown / Not Reported

Unmet need – number of women in need of contraceptive services and supplies to space or limit births; the population of women who are exposed to risk of pregnancy but not using contraception

Very low birth weight – Infants born weighing less than 1,500 grams

Very preterm birth – Birth before 32 weeks gestation

CHAPTER II: REVIEW OF THE LITERATURE

The Social Security Act provides for state flexibility in Medicaid programs by authorizing waivers and demonstrations for particular purposes (22). Section 1115 Research and Demonstration Projects "provides the Secretary of Health and Human Services broad authority to approve projects that test policy innovations likely to further the objectives of the Medicaid program." The first Medicaid 1115 waivers for family planning were initiated by the states of South Carolina and Rhode Island in 1994. Each state used a waiver to extend Medicaid coverage specifically for family planning services to women who otherwise would have lost coverage after 60 days postpartum. Since then, a total of 27 states have been granted waivers for family planning demonstrations, with several models applied, including: 1) extending coverage to women who otherwise would lose coverage at 60 days postpartum (length of expanded coverage varies by state but ranges up to 5 years post partum), 2) extending coverage to persons who would lose Medicaid coverage for any reason, or 3) extending coverage to all persons under a prescribed income level (23, 24). With cost-saving goals in mind, these demonstration waivers were implemented by states on the basis that providing family planning services in the short-term would save dollars in the long-run by reducing unintended pregnancies and increasing interpregnancy intervals. Both unintended pregnancies and non-optimal interpregnancy intervals are associated with poor birth outcomes, including low birth weight and pre-term birth, which are in turn associated with higher costs, including health care, education, social services, and other societal costs (25).

This Chapter will review the literature regarding the effect of pregnancy intervals and pregnancy intendedness on maternal and child health outcomes, paying special attention to definition of variables and their measurement. It will also explore the role of insurance status on pregnancy intervals and pregnancy intendedness, as well as the effectiveness of Medicaid expansions for family planning with respect to maternal and child health outcomes and state health care costs.

Interpregnancy Interval

Numerous studies, extending back at least 90 years, have implicated short interpregnancy interval in adverse perinatal outcomes such as low birth weight, small for gestational age, and preterm birth. In the past decade, several studies have refined our understanding of the effect of interpregnancy interval on birth outcomes, with a heightened focus on controlling confounding factors (26-31). Study designs have included retrospective cohort, cross-sectional, systematic review, and meta-analysis approaches and results have come to the fore in editorials emphasizing the public health implications of the newest evidence (32-34).

Zhu and colleagues, in a series of three studies in Utah and Michigan, examined the relationship between interpregnancy interval and adverse birth outcomes (35-37), with each successive study addressing limitations of the previous. Study designs included both cross-sectional and retrospective cohort and involved separate populations with various strengths and limitations. In a review that unified these studies (31), Zhu concluded that regardless of the study population or design there is an underlying J-shaped relationship between interpregnancy interval (IPI) and adverse birth

outcomes such that risk is highest for an IPI of 0 and 6 months, with risk declining sharply as IPI lengthens to 18 months. An IPI of 18-23 months has the lowest risk of adverse birth outcomes, and then as IPI continues to increase beyond 23 months, the risk gradually increases in concert[2]. Zhu advocated for increasing education on optimal birth interval to decrease the risk for adverse birth outcomes.

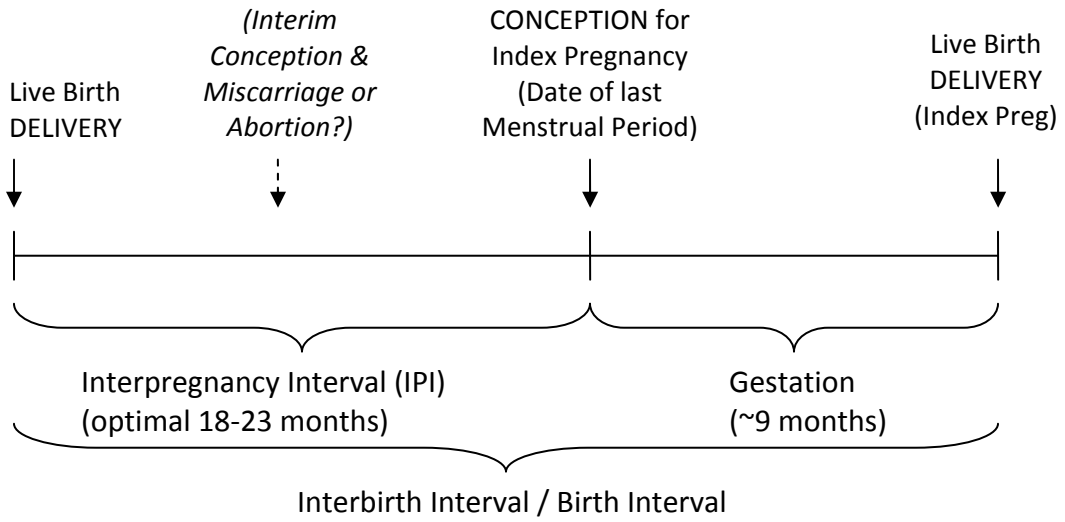


Figure 2. Interpregnancy Interval (IPI) versus Birth Interval.

Of note, Zhu methodically reviewed the limitations of previous research (31), emphasizing the importance of how pregnancy spacing is measured and differentiating between "birth interval," which is the period between two consecutive live births, and "interpregnancy interval," which is the period between the delivery of a live birth and the conception of the subsequent live birth (See Figure 2). Zhu encouraged the use of "interpregnancy interval" due to overestimation of adverse affects with short birth intervals. He also highlighted the importance of considering that the same maternal risk

[2] The increased risk at longer intervals may be related to infertility issues, but is not considered further in this study.

factors can be associated with both interpregnancy interval and adverse perinatal outcomes, hence he advocated for analyses that utilize stratification and multivariate approaches. Finally, Zhu cautioned against categorizing interpregnancy intervals into arbitrary "short" and "non-short" categories, because this practice could mask the risk associated with short intervals which might otherwise be apparent under a design that considers the range of pregnancy intervals (31).

This relationship between short interpregnancy intervals and adverse perinatal outcomes was confirmed by Conde-Agudelo, et al, in a study of over one million women in Latin America (26). Interpregnancy interval was defined as the period between a woman's last delivery and the date of the last menstrual period for the index pregnancy, and subdivided into six categories: under 6 months, 6-11 months, 12-17 months, 18-23 months, 24-59 months, and 60 months or more. Confounding factors considered were maternal age, parity, marital status, education, prenatal care and antenatal visits, cigarette smoking, maternal BMI, history of miscarriage, and previous low birth weight, fetal death or early neonatal death. Pregnancy intention was not included as a confounding factor. The resulting adjusted odds ratios for the outcomes of early neonatal death, fetal death, low birth weight, very low birth weight, preterm birth, very preterm birth, and small for gestational age, indicated higher risk for intervals less than 12 months or more than 59 months, compared with intervals of 18-23 months. These authors advocated for appropriate spacing of pregnancies as a low tech intervention to reduce adverse perinatal outcomes (26).

Conde-Agudelo and colleagues followed this study with a meta-analysis that further investigated the association between pregnancy spacing and adverse perinatal outcomes to explore a host of confounding factors. One of the six criteria required for inclusion in the analysis was that pregnancy interval be measured as an interpregnancy interval rather than a birth interval. Furthermore, only studies that controlled for at least 2 of the following 5 confounding factors were included: parity, outcome of most recent recognized pregnancy, access to prenatal care, breastfeeding, and maternal nutritional status. Ultimately, the 67 studies included in the analysis addressed a total of 19 confounders (pregnancy intention was not listed): maternal age, parity, education, marital status, ethnic group or race, factors related to socioeconomic status, previous pregnancy outcome, factors relating to prenatal care, medical risk factors, maternal nutritional status, region, smoking, alcohol use, illicit drug use, gestational age or birth weight, type of hospital, year of delivery, religion, and sex of the child. Like Zhu, the authors concluded from their meta-analysis that short and long interpregnancy intervals were associated with higher risk of adverse birth outcomes, when compared against intervals of 18-23 months. In this case, IPIs shorter than 17 months or longer than 56 months were associated with higher risks (pooled, adjusted ORs) of preterm birth, low birth weight, and SGA.

This body of work is relevant to the current study in that it: 1) provides refined definitions of interpregnancy interval versus birth interval (See Figure 2) ; 2) promotes standardization of calculations for each, reflecting on the importance of considering abortion or miscarriage status when determining IPI; 3) confirms the relationship

between IPI and adverse birth outcomes by controlling for confounding factors; 4) hones the optimal interpregnancy interval for reduced risk of adverse birth outcomes; and 5) defines limitations that remain unaddressed. Of note, none of these studies specifically examined whether interpregnancy interval was influenced by insurance status, although a proxy for insurance might be obtained from an appropriate combination of age, income level, education, and marital status (38).

Unintended Pregnancy

Other studies have examined the role of unintended pregnancy in poor birth outcomes. In 1995, the Institute of Medicine reported on the status of unintended pregnancy in the United States (39), highlighting limitations in the measurement of mistimed and unwanted pregnancies. The IOM encouraged caution in interpretation of study results by taking into consideration the effectiveness of various study approaches in capturing parental intentions. For example, retrospective measurement of intention at conception based on parent recall has the potential to introduce bias. Other factors can influence the view a parent has of the pregnancy compared to her intention at conception, and that perspective may change over time depending on the birth outcome and how long after that outcome the parent was queried. In addition, the IOM identified variation in the classification of "intendedness" from study to study as an issue to consider, especially when comparing studies or pooling results, because of differences in the wording of survey questions or failing to distinguish between "mistimed", "unwanted" and "unintended" pregnancy. According to the IOM, unintended pregnancy was typically defined to include both mistimed (i.e., wanted

later) and unwanted (i.e., did not want then or ever) pregnancies, but whether one or the other contributes differently to poor pregnancy outcomes could not be determined if they are lumped together (39). Hence, the report called for an awareness of the fundamental difference between "mistimed" and "unwanted" pregnancies and the overall implications of preventing each type of unintended pregnancy. The IOM report also cautioned that establishing whether pregnancy intention is associated with adverse birth outcomes such as low birth weight, infant mortality or poor child health, requires exploring the role of pregnancy intention in the initiation of prenatal care. Researchers should also account for other behavioral risks, such as use of alcohol or tobacco, as well as factors, such as maternal age, that are associated with poor birth outcomes (39) .

In a study reported in 1991, Linda Williams used three cycles (1973, 1982, 1988) of the National Survey of Family Growth to study trends in the determinants of unintended childbearing (40). In an effort to curtail recall bias, these authors only included data from pregnancies that had ended in live birth within five years of the survey date. Classification of wantedness was established through questions first about use of contraceptive methods and second about attitudes about pregnancy at time of conception. Unwanted births were those where the respondent reported not wanting a(nother) child at the time of conception or any time in the future. Those that were wanted but occurred sooner than desired were classified as mistimed. Maternal characteristics of age, marital status, economic status, race/ethnicity and education were evaluated for their association with unwanted and mistimed pregnancy rates. Focusing on unwanted conceptions for regression analysis, Williams found an

association between poverty level and unwanted pregnancy. For example, in 1988, women in households at or below 100% FPL were more likely (regression coefficient 0.534, $p<.01$) and those at or above 200% FPL were less likely to report unwanted childbearing (regression coefficient -0.308, $p<.10$) compared with the reference category of women in households at 100-199% FPL. Trends in unwanted pregnancy improved among black women above 200% FPL through the three survey cycles: the regression coefficient was -0.433 in 1973 ($p<.01$), -0.679 in 1982 ($p<.01$), and -0.703 in 1988 ($p<.01$). The fact that women at or below poverty level were more likely to report unwanted pregnancy would be consistent with the notion that these women have the least access to medical and reproductive health services.

Over a decade later, a study by Gaydos, et al., employed 2002 data from the National Survey of Family Growth (NSFG) to evaluate whether the definition of risk of unintended pregnancy could skew the prevalence of risk-takers (41). Specifically, this study addressed the denominator for the estimates, noting that the NSFG assessed the risk of unintended pregnancy due to lack of contraception by including all women that were contracepting, regardless of method. These authors recalculated the risk of unintended pregnancy after excluding women who used surgical contraception and, separately, women whose partners were sterile. They stated that surgical sterilization was equated with infertility since it essentially reduced the risk of unintended pregnancy to zero. With the value of the denominator reduced, this study found that risk of unintended pregnancy had been underestimated by the NSFG method for all age groups except teens. The largest difference was for women age 40-44, where the NSFG

denominator resulted in risk percentage of 8.9 and the recalculated risk percentage was 15.9. In addition, the previous methodology had substantially underestimated the risk of unintended pregnancy for formerly married women and non-Hispanic black women. This study highlighted the importance of the methodology in assessing risk of unintended pregnancy. It also pointed out, as did the IOM report discussed previously (39), that appropriate analysis of the risk of unintended pregnancy for various sociodemographic groups is important not only for revealing which groups could benefit from focused public health efforts, but also what efforts are likely to be most effective and relevant.

Lifflander et al., used a focus group approach to investigate why low income women in Georgia had high unintended pregnancy rates (42). Information was collected from 39 women in six focus groups discussing the circumstances and perceived advantages and disadvantages of planned and unplanned pregnancies. Of note, this work provides evidence of mothers' shifting attitudes about pregnancy over time, reinforcing the limitations of retrospective reporting on pregnancy intendedness. For example, one young mother reported she and her partner initially felt angry and scared about being pregnant again, as their family was already struggling financially. However, their attitudes had shifted to excitement and anticipation before the baby arrived. Others described guilt for their initial unhappiness at learning they were pregnant. Overall, the Lifflander study is relevant as a reminder of the difficulty in defining and assessing pregnancy intention; the circumstances of pregnancy may not fit

neatly into study variable classifications, i.e., intended, unwanted, mistimed, or ambivalent.

A number of studies have used data from PRAMS, a state-level perinatal monitoring system of postpartum women, to look at unintended pregnancy. Following are just three recent studies which served as methodological examples for this Nebraska study. Based on PRAMS data from 1993-2001, Keeton and Hayward tested whether intended pregnancy was associated with decreased risk of adverse birth outcomes (43). Pregnancy intention was captured via the PRAMS survey question: "Thinking back to just before you got pregnant, how did you feel about becoming pregnant?" and the answers "I didn't want to be pregnant then or at anytime in the future" (unwanted) or "I wanted to be pregnant later" (mistimed) were both classified as "unintended pregnancies", while "I wanted to be pregnant sooner" or "I wanted to be pregnant then" were classified as "intended pregnancies." The authors analyzed data on 47,956 live singleton births from ten states using multivariate analysis that adjusted for confounding factors, including age, marital status, tobacco/alcohol use, prenatal care, medical complications of pregnancy, Medicaid before and/or during pregnancy, birth history (parity/preterm/LBW), and residential crowding. After adjusting for confounders, and the interaction effects of age and intention, the results indicated that pregnancy intention was not associated with poor birth outcomes (very low birth weight or very preterm birth) among white women (relative risk 1.08, 95% CI: 0.92, 1.30). However, among black women, intended pregnancy was associated with a slightly elevated relative risk of VLBW/VPT (1.19, 1.02-1.38) (43). Stratified by age, the elevated relative

risk for VLBW/VPT births among black women intending pregnancy is consistent across age groups. In contrast, for white women intending pregnancy, the relative risk of poor birth outcomes is elevated and significantly higher in the two youngest age groups than it is for black women, but it is significantly lower than for black women in the four older age groups. Among several potential explanations for these results, the authors suggest that the "meaning of intention might differ by age and race."

In a study of the effect of pregnancy intention on birth and maternal outcomes, Mohllajee and colleagues analyzed data from 87,087 women who had completed PRAMS surveys in 18 states between 1996 and 1999 (44). Almost 50% of women reported an unintended pregnancy. Among these, women who were ambivalent about their pregnancies were more likely to have a low birth weight infant than women who reported intended pregnancies (adjusted OR=1.15, 95% CI: 1.02, 1.29) while women who reported mistimed pregnancies were less likely to have a low birth weight infant (adjusted OR 0.92, 95% CI: 0.86, 0.97); women with unwanted pregnancies had higher odds of preterm delivery (adjusted OR=1.16, 95% CI: 1.01, 1.33). Confounding factors included maternal age, race/ethnicity, education, marital status, parity, prenatal care, previous LBW infant or premature delivery, smoking during pregnancy, and drinking during pregnancy; insurance status or other financial barriers were not considered.

Cheng, et al., also used PRAMS data to assess the effects of unintended pregnancy on maternal behaviors before, during and following pregnancy (45) in Maryland women who delivered live births between 2001 and 2006. Mistimed and unwanted pregnancies were studied separately to determine if they had separate

effects on maternal behaviors. The authors found that unintended pregnancy was reported by over 40% of mothers, approximately 31% mistimed and 10% unwanted. Of note, mothers who were black, unmarried, had completed 12 or fewer years of school, and who were enrolled in Medicaid, were more likely to report mistimed and unwanted pregnancies (46). Furthermore, unwanted pregnancies were more likely than mistimed pregnancies to be associated with a higher prevalence of unhealthy maternal behaviors ($p<.01$), such as cigarette use pre- and/or post-partum, no or late initiation of prenatal care, failure to breastfeed, inappropriate infant sleep position and depression. Interestingly, women with unwanted pregnancies had a higher prevalence of postpartum contraceptive use ($p<.05$), but this difference disappeared after controlling for maternal socio-demographic factors, including age, race/ethnicity, Medicaid status, marital status, parity and education (adjusted OR = 1.33, 95% CI: 0.96, 1.84, reference = intended). Other maternal behaviors such as cigarette use pre- and/or post-partum, less than optimal use of folic acid, initiation of pre-natal care, and post-partum depression, remained significantly different in women with unwanted pregnancies compared to those with intended pregnancies. This study did not discuss coverage of reproductive health services or take into account health insurance status or poverty level, which also may impact healthy maternal behaviors.

Although 15 years have passed since the IOM report (39), and even though the last decade has included a Surgeon General's Healthy People 2010 goal to improve pregnancy planning and spacing and prevent unintended pregnancy (47), unintended

fertility continues to be high in the United States. Not surprisingly, the family planning goal for Healthy People 2020 continues to include these target areas.

Using 2002 NSFG survey data, Wildsmith, and colleagues studied repeat unintended childbearing (48). Births were categorized into unintended, unwanted and "seriously mistimed" and the proportions of each compared among two cohorts of women in their later reproductive years. One cohort (n=1209) included women who were age 40-44 in 2002 and the other (n=1311) included women who were 33-37 in 2002, but in both cases, analysis was limited to births that occurred by either 1995 for the older cohort or 2002 for the younger cohort. If women who reported that right before they got pregnant they did not want a(nother) baby at any time in the future, the birth was classified as unwanted. Intended births were those that occurred on time or too late, while births that were reported as "too early" were mistimed. Mistimed births were further classified as seriously mistimed if they occurred at least two years too early. The authors expected that this additional classification for the mistimed category would "better capture the heterogeneity in the meaning of intendedness." Results indicated that when reflecting on births that occurred by the time they were 33-37 years old, the younger cohort (i.e., women born in the mid to late 1960s) identified unintended births at a higher rate (36.8%) than did the older cohort (i.e., women born in the late 1950s-early 1960s; 33.5%, $p<.05$,). This difference was due to a difference in unwanted births (15.4% vs. 12.3%, $p<.05$), rather than seriously mistimed births (not statistically different). Furthermore, these authors found racial/ethnic disparities in rates of unintended birth, with rates highest among black women in the younger cohort

(56.9% unintended) compared with 45% among black women in the older cohort (difference=26.4%, p<.01). White women in both younger and older cohorts reported 31% unintended births, while Hispanic women reported 31.8% unintended births in the older cohort and 37.8% unintended births in the older cohort (p<.10). More than one third of women who had reported at least one unintended birth, reported a second unintended birth.

This body of work is relevant for reiterating the importance of the definition and measurement of childbearing intention and for highlighting factors that may impact a woman's view of her pregnancy. Recall bias on pregnancy intention must be considered in the analysis and interpretation of any retrospective study.

Role of Health Insurance Coverage

Other studies have looked at the factors that influence unintended pregnancy. One hypothesis is that health care coverage will reduce unintended pregnancy (and possibly improve infant outcomes) because women will have access to services and supplies that will help them to plan and time their pregnancies and to initiate early pre-natal care. This section will review studies that have included insurance status as a factor in prenatal care initiation, contraceptive use and, indirectly, unintended pregnancy.

In 1995, the Institute of Medicine reported on the status of unintended pregnancy in the United States (39), noting that the reduction in births from unintended pregnancy that occurred in the 1970s had been reversed during the 1980s so that, by 1988, 60% of all pregnancies were unintended; of mention, the increases were

disproportionately higher among poor women. Among the many factors explored in the IOM report was access to contraceptive services and supplies. The report indicated that access to contraceptive methods, per se, was not a problem, but access to *effective* contraceptive methods (i.e.., those requiring some contact with the healthcare system) continued to be an issue (39); cross-national comparisons emphasizing access opportunities in other countries correlated with higher rates of effective contraceptive use and lower rates of unintended pregnancy. The IOM report looked further at financial barriers to contraception, citing several studies that indicated an effect of insurance coverage on access to reproductive health services (39).

One of these studies specifically evaluated the effect of insurance status on access to family planning services among low income women in Arizona (49). Data for this study were obtained from telephone interviews conducted in 1984 and 1989 to explore the impact of a family planning policy change: family planning services (including oral contraceptives, intrauterine devices, sterilization and implants) were not included in the Medicaid managed care program in 1984, but were required by 1989. Rural areas were oversampled and other confounders such as race/ethnicity, education, age and employment were considered. Insurance status was categorized as uninsured, insured with Medicaid, or insured through employment. The results demonstrated an increase in the use of family planning services from 17.2% (1984) to 33.2% (1989, p=0.0001) and was most pronounced among women 18-20 years old (increased from 18.6% to 40.8%, p=0.0001). In multivariate analysis, family planning use increased during the survey period for women who were on Medicaid (OR=1.6, 95% CI 1.2, 2.3;

referent = uninsured) (49). These results fit within the theoretical framework presented in Chapter 1, i.e., insurance coverage improved access to and use of family planning services. However, it must be noted that health insurance, per se, was not a solution unless the insurance plan included coverage for family planning services: in this study, family planning use did not increase over the study period among women with employment-based insurance (49).

Because prenatal care has been associated with a reduced risk of poor birth outcomes, a body of research has focused on factors, including insurance status, which might influence the initiation of prenatal care. In a 1985 paper, J. Cooney evaluated 85,000 live births in New York City in 1981 for the effects of financial coverage, education, race, age, and marital status on initiation of prenatal care and concluded that the odds of late or no prenatal care are increased with less education or poor health insurance, i.e., Medicaid versus third party insurance (38). In a 1988 publication on prenatal care by the Institute of Medicine (50), the category of financial barriers, particularly insurance status, was implicated as a top barrier to care. The IOM reported that women who received insufficient or no prenatal care identified inadequate or no insurance and limited personal funds as the most important obstacles. Furthermore, in their review of studies that utilized multivariate analyses, they found that inadequate or no health insurance was a consistent predictor of insufficient care (50). While uninsured women have significant obstacles to care, the IOM found that public coverage did not eliminate all barriers, as women covered by Medicaid were less likely than women with private insurance to obtain early prenatal or complete prenatal visits. The IOM

Committee suggested that the time-consuming Medicaid enrollment process itself could be the barrier, or that Medicaid covered individuals still lacked access to services as a result of overburdened public clinics or insufficient number of private providers accepting Medicaid or, finally, that the demographic factors (marital status, education, age, maternal health) of the women on Medicaid were themselves important factors leading to insufficient prenatal care (50). In addition, the Committee's recommendations included promoting a commitment to incorporate family planning services into the effort to improve prenatal care precisely due to the high number of unplanned pregnancies in the United States and the evidence suggesting that women with unplanned pregnancies were more likely to delay entry into prenatal care activities.

In a small study of 149 women who had recently delivered live births at 6 hospitals in Minneapolis, Minnesota, Oberg and colleagues assessed prenatal care in three different insurance status groups: no health insurance, private health insurance, and Medicaid (51). These data indicated that a higher percentage (89%) of women who reported having private insurance at the end of pregnancy had obtained prenatal care, compared with 59 % of women who had no insurance and 50% of women on Medicaid. These authors also noted differences in psychosocial factors among the three insurance groups. Interestingly, higher percentages of Medicaid women than uninsured women reported ambivalence about having a baby; unplanned pregnancy; unhappiness or neutral response to learning they were pregnant; having considered abortion; fear in telling others about their pregnancy; and problems in securing food and shelter. While

this study reports on the relationship between insurance status and pregnancy intendedness, it did not control for confounding factors.

Following up on the IOM's recommendations for further study, Mayer (52) investigated the effect of unintended pregnancy, as well as the effect of knowledge and beliefs about importance of prenatal care, on the initiation of prenatal care. Mayer's study relied on survey instruments administered to a sample of 2032 women giving birth during a 3 month period in 154 hospitals in Texas (each hospital administered the survey to all women giving birth during any 7 day consecutive period during the 3 month study period). The survey requested information on insurance status, asking respondents to choose among private insurance, Medicaid, and no insurance. Mayer found that women on Medicaid or with no insurance were more likely to delay prenatal care (respective adjusted ORs: 2.08 (1.26, 3.44); 2.39 (1.57, 3.62)). After adjusting for maternal age, marital status, education, parity, race, and health insurance status, the author also found that mothers with unintended pregnancies were 1.6 times more likely to delay prenatal care and that mothers who believed that prenatal care was not important were 2.1 times more likely to delay care (52). Of note, this study questioned the effect of insurance status on prenatal care, but not on the upstream event of unintended pregnancy.

In order to investigate insurance status (as a dichotomous variable) and its relationship to access to care in adolescents 10 - 18 years of age, Newacheck and colleagues (53) utilized the 1995 National Health Interview Survey and found that uninsured adolescents were two times more likely to have no physician contact during a

12-month period, four times more likely to have unmet health needs, and five times more likely not to have a "usual source of care." Although the statistics were not presented, the authors stated that the associations were maintained after controlling for family income and race/ethnicity.

In a study using 2002 BRFSS data to test the association between health insurance and prescription contraceptive use, Culwell and Feinglass (54) found that uninsured women who were at risk for unintended pregnancy were more likely to use over-the-counter contraceptive methods or no contraceptive method as compared to women with any kind of public or private health care coverage. Using multivariate analysis to control for socioeconomic factors (age, race/ethnicity, education, employment status, household income, marital status, number of children) and self-reported health status, the authors determined that uninsured women were 30% less likely to use prescription contraceptive methods (RR = 0.7; 0.6 – 0.8) compared to the insured reference group. These results support the notion that insurance coverage leads to improved access to health care providers and to more effective contraceptive methods (54). Of note, this study was unable to distinguish differences among insurance coverage types (e.g., Medicaid vs. private insurance), due to the fact that the survey question on which these data were based resulted in a single dichotomous variable.

Using data from the National Survey of Family Growth, Culwell and Feinglass conducted another study of women at risk for unintended pregnancy to evaluate changes in contraception methods by insurance status in 1995 and 2002 (55). After

controlling for survey year, age, race/ethnicity, education, employment, and religion, the authors demonstrated that uninsured women were 20% less likely to report using prescription contraceptive use compared with privately insured women (RR=0.78, 95% CI: 0.67, 0.90), and publicly insured women were equally as likely as privately insured women to use prescription contraceptives (RR=1.08, 95% CI: 0.96, 1.22). These results support the notion that health care coverage, public or private, is an important factor in access to health care providers as well as access to more effective contraception methods.

Nearly a decade before the first states applied for Medicaid Family Planning waivers, Congress allowed income-related Medicaid expansions to cover poor pregnant and postpartum women and their infants. The first of these expansions was implemented in 1986 and by 1990 all pregnant women and newborns with family income below 133% of FPL were covered by Medicaid. In 2001, E.M. Howell (56) reviewed the impact of these Medicaid expansions to evaluate whether the policy changes were effective in the following: (1) increasing enrollment of uninsured pregnant women, (2) increasing use of prenatal care, (3) reducing low birth weight and prematurity, and (4) reducing infant mortality. In a synthesis of 14 published empirical studies, nine state-specific and five national level studies, Howell concluded that there was sufficient evidence to support the role of the expansions in increasing the number of deliveries covered by Medicaid (56). Howell also concluded that, while there were some conflicting results, the “weight of the evidence” supports that Medicaid expansion led to improvements in prenatal care. However, there was limited evidence that the

expansions improved rates of LBW and prematurity and there were mixed results for improvement in infant mortality rates. Howell concludes: "…the jury is still out about whether the large public investment in health insurance coverage for pregnant women has been cost-effective." (56)

More recently, Gavin and colleagues used PRAMS data to analyze changes in first trimester prenatal care initiation with the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), a welfare reform in 1996 which "restricted welfare tenure and imposed new work requirements and sanctions for noncompliance" (57). The authors compared prenatal care initiation in 13,714 (weighted 523,074) women in 1996, prior to PRWORA, and 12,067 (weighted 533,788) women in 1999, following PRWORA, in 8 states, testing three hypotheses: (1) Medicaid coverage before pregnancy is decreased among Medicaid eligibles after welfare reform, (2) insurance coverage (Medicaid or private) before pregnancy is associated with higher rate of initiation of PNC in the first trimester compared with uninsured women, (3) welfare-related eligible women face increased time and income barriers owing to the new work requirements and noncompliance sanctions of the welfare reform's TANF program. Using multivariate analysis, the authors found that among welfare-related Medicaid eligibles, welfare reform had a negative effect on Medicaid coverage before pregnancy (5.3 percentage point drop, $p<0.01$) and while Medicaid coverage before pregnancy improved initiation of PNC in the first trimester (9.7 higher probability, $p<0.01$), there was an overall drop in first trimester PNC owing to the reduction in Medicaid coverage of eligibles. The

evidence for increased time and income barriers with TANF was inconsistent by state and thought to be influenced in part by other state policy changes (57).

In a 2009 descriptive study, Adams, et al., investigated the costs of public services for young mothers following the welfare reform of 1996 (58). Using 2000 PRAMS data from ten states, the authors asked what services teenage mothers were using and at what costs and compared these to rates for women aged 20-24 years old. The authors determined that during the birth year, the costs for cash assistance, WIC, food stamps, and Medicaid coverage at delivery for teenage mothers outweighed by approximately $1500 the costs for mothers aged 20-24. The largest component was the Medicaid cost of delivery which was utilized by 73% of teens compared to 56% of the older mothers. According to the authors, if pregnancy were postponed in teens in the ten study states, the annual averted costs to the public sector would be a total of $75 million (58).

In a study using national (multi-state) PRAMS data from years 2000-2004, Ayoola, et al., examined the effect of the timing of pregnancy recognition on adverse birth outcomes such as prematurity, LBW, admission to neonatal intensive care unit, and infant mortality (59), while including insurance status as one of many potential confounders. Insurance status was defined as a tri-partite variable indicating no insurance, private insurance only or Medicaid sometime before or during pregnancy. Of note, Medicaid was more prevalent in late recognizers (more than 6 weeks gestation) than in early recognizers (59.7% vs. 32.7%, $p<.001$); private insurance was more prevalent in early recognizers than late recognizers (63% vs. 35%, $p<.001$) and having no

insurance was more prevalent in late recognizers than early recognizers (5.3% vs. 4.3%, p<.001) (59). Ayoola's study combined responses to several PRAMS questions producing a variable that generalized insurance status across all points before or during pregnancy. By comparison, the proposed study will plan to look only at insurance status just before pregnancy, in order to consider the association between insurance status and pregnancy intention or interpregnancy interval.

A study published in 2008 (60) reviews insurance status of poor women and how insurance status changes during a woman's reproductive time course. Using U.S. Census Survey of Income and Program Participation (SIPP) data, Simon and Handler reviewed insurance coverage post –welfare reform in women who were expected to be impacted by welfare reform (unmarried mothers with education completion of high school or less) compared to women who were not (married mothers with high school completion or less) in the period before conception, during pregnancy and after delivery. In addition to showing that welfare reform was associated with a concomitant decline in Medicaid coverage of women in the period surrounding pregnancy, their work demonstrated that pregnancy is associated with an increase in Medicaid coverage which declines again post-pregnancy: At 12 months before birth, 11.7% of women age 15-44 years reported Medicaid coverage, a steady increase in Medicaid coverage peaked at 1 month post birth (26.7%) and declined thereafter to 20.6% by 10 months post birth. Hence, Medicaid, while covering a large percentage of deliveries, has not been available to most poor women in the preconception or interconception periods. Amidst their discussion, Simon and Handler state: "the emphasis on coverage during pregnancy,

which has been the major public policy strategy for improving pregnancy outcomes over the last 2 decades, although necessary, has clearly not been sufficient." (60)

Frost and colleagues (61, 62) looked at factors affecting contraceptive behavior using data from telephone interviews with a nationally representative sample of 1,978 women aged 18-44 who were at risk of unintended pregnancy. Using multivariate analysis, the authors found among their results that women with private insurance were more likely to use the pill, while condom use was higher among women on Medicaid. Furthermore, women reporting condom use for contraceptive method were more likely than those using the pill or long-acting contraceptive methods to indicate they would change the method if cost were not an issue (odds ratio 2.18, $p<0.001$). The authors concluded that these differences could reflect both access/availability and cost issues of various contraceptive methods, and suggested use of methods that "typically have relatively high use-failure rates" are disparately associated with "women more likely to have unintended pregnancies" (62). Gaps in contraceptive coverage (i.e., unprotected risk) were less prevalent in uninsured (14.8%. $p<.05$) than Medicaid covered (23.9%) and more prevalent in Medicaid covered ($p<.05$) than in women with private insurance (12.4%). In multivariate analyses, Medicaid coverage was associated with "at risk gaps" (OR = 2.0, $p<.001$) compared to those with private insurance (61). This association between health insurance coverage and use of effective contraception was reiterated by Kramer and Hogue (46) in their systematic review of the literature regarding racial disparities and very preterm birth.

It is important to note that the topic of interest in this paper is whether insurance, including Medicaid coverage, can influence the upstream events leading to pregnancy, hence impacting pregnancy intendedness and birth intervals. The summaries provided above indicate growing evidence that insurance status can influence pregnancy intendedness or interpregnancy intervals via upstream behaviors such as contraceptive use. This literature also provides cautionary guidance with respect to measurement of insurance status and interpretation of results: insurance coverage, per se, does not necessarily equate with family planning coverage, or with effective contraceptive methods, or with access to or use of services that are covered.

Medicaid Family Planning Waivers

A perusal of evaluations on state family planning demonstration waivers indicates that, although results are mixed, there is a growing body of evidence that expanding Medicaid eligibility has resulted in fewer unintended pregnancies, longer interpregnancy intervals, and cost savings for states. Most of the evaluations are in the form of required reports to CMS by the demonstration project states. The evaluation methods for these reports are prescribed by CMS. A few peer-reviewed reports are also highlighted in the following summary.

CMS commissioned its own national evaluation of the family planning demonstration projects with a report issued in 2003 (63). The evaluation reviewed use of family planning services, rates of unintended pregnancies, interpregnancy intervals and cost savings in states that (a) had implemented Medicaid family planning waivers by 2002 and (b) were able to provide the required data. States included in all or part of the

analysis included Alabama, Arkansas, California, Florida, New Mexico, Oregon, South Carolina, Washington and West Virginia. In this evaluation, CMS tested the hypothesis that access to family planning services was associated with a reduction in unintended pregnancies among Medicaid-eligible individuals. The analysis used PRAMS data on pregnancy intendedness and interpartum intervals to compare measures pre- and post-implementation of a family planning demonstration in 13 states. Using this approach, the authors reported no clearly identifiable trends associated with the demonstrations. The evaluation also included a multivariate analysis for two sets of paired states (a state with demonstration versus a non-demonstration state) and controlled for age, race, marital status, family income, public aid, parity, smoking, pre-pregnancy insurance status, alcohol, number of stressors, and abuse. The resulting relative adjusted odds of unintended pregnancy among women eligible for Medicaid if pregnant was 0.73 in Florida (demonstration state) versus Washington (control state). The evaluation did not find statistically significant differences in pregnancy intendedness for South Carolina versus West Virginia or for interpartum interval in either pair of states. The authors noted that it would be difficult to observe an effect on this overall population of expansion-eligible women, since not all who were eligible were enrolled, especially if the demonstration only covers post-partum women rather than all low income women. This serves as an important caution regarding the choice of population that a state targets for its demonstration and the availability of data on that target population for evaluating the effects of the demonstration project.

Regarding cost effectiveness, the CMS evaluation studied six states: Alabama, Arkansas, California, New Mexico, Oregon, and South Carolina. Pre-waiver baseline birthrates adjusted for age and race/ethnicity were calculated by state and, due to year-to-year variability, were averaged from 3 years of data, when available. The denominator for these calculations was the number of women between 15 and 44 residing in households with incomes at the percentage of FPL that matched each state's eligibility criteria (from annual Current Population Survey). To estimate baseline birthrates of the new Medicaid eligibility groups under the waivers, the preferred method was to use state PRAMS data, if available, to estimate the annual number of births by income group. This rate was applied to the number of women in each age and race/ethnicity category in the target population during the expansion year to estimate expected births. From this, estimates of averted births could be calculated by determining the difference between expected and actual births in the target population, where actual births was equal to the number of deliveries covered by Medicaid. The target population of the family planning demonstration projects was defined as "the population of women of childbearing age who would be eligible for Medicaid maternity services if they became pregnant." The report discusses what population should be used to calculate averted births: Medicaid poverty-eligible, poverty–eligible entering Medicaid for maternity services, family planning demonstration enrollees, or family planning demonstration participants, i.e., those receiving services. The latter two were used to calculate averted births, with the report including a final recommendation to use the enrolled population rather than the participant population because it was more

representative of the general population of women of reproductive age. Using the enrollee population to calculate averted births, all states had cost-savings under the demonstration project, ranging from a low of $1.3 million in New Mexico to a high of $76 million in California.

The CMS Family Planning Waiver evaluation report included several key ideas that should be considered in the current study: (1) Factors that influence Medicaid expansion feasibility in a state will include state-specific costs of family planning expenditures, costs of maternal and child health expenditures, and the state-specific Federal Medical Assistance Percentage, which is used to calculate the federal share of the Medicaid expenditures. The authors conclude that "states with relatively high family planning expenditures but relatively low maternal and child health expenditures, along with states with relatively low FMAP rates, will find it more difficult to meet the target number of averted births" needed to reach budget neutrality. (2) Cost savings calculations can rely on average costs of maternity care and health care coverage over the first year of the child's life, as estimates of additional years prove difficult because of the uncertainty of the number of years a child might remain eligible for Medicaid. (3) In order to improve outcomes, it may be advantageous to target the expansion enrollment to more specific populations, i.e., those most likely to report unwanted pregnancies (in the case of this report teens, blacks, public aid recipients, and women with prior births).

There are a number of state-specific evaluations of family planning waivers that have been published since the CMS report. In California, the Family Planning, Access, Care and Treatment (Family PACT) program was initiated with state-only funding in

1997 (64), but transitioned into a Medicaid family planning demonstration in 1999 (65). The demonstration project goals included targeting services for women in underserved or rural areas, adolescents, and males and followed the model of expanding eligibility based on income. The PACT program covered all individuals in need of family planning services with income at or below 200% FPL and with no other source of family planning coverage (66). In addition, several other factors characterize the California approach including: the PACT program services can be offered through both public sector providers and private (for-profit) providers, with on-site eligibility determination and enrollment and pharmacies augmenting clinics as distribution sites for over-the-counter and prescription drugs (66). Brindis and colleagues (65, 67) at the University of California, San Francisco, performed a cost-benefit analysis for the California PACT demonstration project, which served over 2.4 million women, men and adolescents in calendar year 2002. These authors reported that for the study year, the provision of contraceptive services averted over 200,000 unintended pregnancies, which would have led to nearly 94,000 live births. For each averted pregnancy, they estimated a savings of $5,431 that would have been spent from the public sector on “medical, welfare, and other social service costs for a woman and child from conception up to two years after birth” (68). Overall cost savings to the public sector were estimated to be at least $2.76 for every $1 spent on the PACT program for the first 2 years after birth for a total of $1.1 billion. This savings was doubled by considering up to 5 years after birth. These authors predicted the cost savings based on modeling the number of unintended pregnancies that would have occurred in the absence of the program and also used actual budgetary

and participation data. The authors noted that their estimates were conservative compared with other models, but provided an adjustment that accounted for the assumption that the PACT program would support pregnancy delay as well as complete pregnancy prevention.

While the California PACT report focused on modeling pregnancies averted and subsequent estimated cost savings, Lindrooth and McCullough's work in 2007 (69) reviewed actual birth data for evidence of changes in birth rates in states that had implemented Medicaid family planning expansions compared to states with stable programs. Using births rates obtained from the National Vital Statistics Report, the authors compared birth rates for an 11-year period in 12 states that had implemented either post-partum or income-based eligibility expansions with regional birth rates in surrounding states that had not expanded eligibility. Implementation of Medicaid expansion for family planning lowered average annual birth rates; income-based expansions showed a significant rate reduction (-1.95 points, $p < 0.01$) after controlling for regional time trends, whereas postpartum-based expansion states, on average, did not show a significant change in average annual unplanned births. The authors also found a significant rate reduction in expansion states when they controlled for national time trends or state time trends (-1.97 points, $p< .05$ and -0.66 points, $p<.10$, respectively) (69).

Furthermore, Lindrooth and McClullough analyzed the cost savings in 5 income-based expansion states using actual state-reported program, Medicaid maternal and infant costs (69). Their results indicated savings in maternal and infant costs (costs

averted): $12.6 million in Arkansas (95% CI in $1000s: -21,304, -3858, p<.01); $135 million in California (95% CI in $1000s: -234,096, -37,005, p<.01); $7.9 million in New Mexico (95% CI in $1000s: -13,316, -2505, p<.01); $11.4 million in Oregon (95% CI in $1000s: -19,512, -3295, p<.01). Looking at the net program cost of the expansion to each of the states, the authors found that the expansions reduced state expenditures in three states: $2.53 million in Arkansas (95% CI in $1000s: -4818, -242, p<.05); $1.89 million in New Mexico (95% CI in $1000s: -3450, -331, p<.05); and $3.14 million in Oregon (95% CI in 1000s: -6257, -24, p<.05). The cost reductions were not statistically significant in California ($43 million; 95% CI in $1000s: -89,962, 8484) and South Carolina ($1.9 million; 95% CI in $1000s: -5546, 1831) (69). Of note, the methods used in this study did not take into account other public or social costs of unplanned pregnancies beyond prenatal services, delivery and infant medical costs, hence are likely conservative estimates of the savings to states.

A report issued in 2008 evaluated the Wisconsin family planning waiver for 2003-2007 (70). This income-based expansion targeted women of reproductive age who were at or below 185% FPL, were U.S. citizens or legal immigrants, and who were not enrolled or eligible for other Wisconsin Medicaid programs. Among the objectives of Wisconsin's expansion was a reduction in the rate of unintended births, a reduction in teen pregnancy rate, support for a birth interval of 24 months or more between first and second births, and a reduction of birth-related costs paid by Medicaid. The analysis was unable to find a decline in fertility rate in women 15-44 years of age with incomes at or below 185% of FPL following implementation of the waiver in Wisconsin (70). However,

teens ages 15-19 who participated in the family planning waiver program during 2003-2006 had a lower fertility rate (4.0 per 1000) than all low-income (<185% FPL) Wisconsin teens (115.1 per 1000) and compared to the fertility rate of all Wisconsin teens (33.8 pre-waiver 2000-2002, 30.5 per 1000 post-waiver 2003-2006). No confidence intervals were given for the annual fertility rates provided in the report [averages given above are M.M.B.'s calculations from the annual rates provided in the report].

The Wisconsin evaluation also was unable to find a difference in birth interval among women who participated in the family planning waiver compared with those who did not (70). With birth intervals grouped into ranges of less than 12 months, 12 – 24 months, or 24 – 36 months, there was no difference in the distribution of cases across the groups (chi square 0.28, 4df). There was also no difference in the average birth interval in family planning waiver (FPW) participants (584 days) compared with women with no FPW program involvement (577 days, t=0.91, 6546 df) or between FPW enrollee non-users (588 days) and women with no FPW program involvement (577 days, t=1.33, 6456 df) (70).

Using a CMS-required methodology, the Wisconsin family planning evaluation also determined whether waiver implementation reduced birth-related Medicaid costs. The estimated number of births averted due to the waiver was determined by first calculating expected births based on fertility rates (birth rate used as proxy) for low income women in a baseline year 2000. The resulting overall baseline fertility rate was 138.1. During the waiver years, the highest fertility rate for Medicaid family planning participants was 10.48 per 1000 in 2004 (n=54,778). The number of births averted (e.g.,

8899 births averted in 2004) was calculated by subtracting the actual number of Medicaid births to family planning participants (574 actual births in 2004) from the expected births based on baseline, age-adjusted fertility rate (9473 expected births in 2004). To determine the cost savings of the program, the number of averted births was multiplied times the birth and child costs (actual Medicaid pregnancy and delivery costs plus Medicaid infant/child costs during the first 5 years of life) for a cost-savings of $124 million in 2004. After subtracting the waiver program costs, the net savings to Wisconsin was over $112 million in 2004. For the 4 year period of 2003-2006, the family planning waiver program expenditures in Wisconsin totaled $48.2 million and the total net savings was over $487 million (70). The evaluators concluded that birth-related costs paid for by Medicaid were lower under the family planning waiver than what would have been expected in the absence of the waiver.

Cost effectiveness of family planning waivers was also supported in a report for Year 9 (2006-2007) of the Florida family planning demonstration project (71); as with Wisconsin, the cost effectiveness of the project was evaluated using the CMS-required methodology. The Florida evaluators used baseline fertility rates (birth rate used as proxy) calculated from pre-demonstration years, age-adjusted for the actual participants (n=13,955) during the study period, to determine expected births in the absence of the family planning waiver (71). Of interest, the overall baseline fertility rate of Medicaid eligible women in 1996-97 was 0.087, while the overall fertility rate for family planning waiver participants in Demonstration Year 9 (2006-7) was 0.0039; this difference was not discussed nor was it analyzed further to determine statistical significance. The

number of actual births to women enrolled in the Medicaid FP program who had received at least one family planning service during Year 9 was subtracted from the expected births in order to estimate births averted by the program. The calculations revealed an estimated 1650 births averted. Multiplying births averted times the birth costs (prenatal care, delivery, infant birth hospitalization and re-hospitalization during first year of life) provided an estimate of gross savings for the program during Year 9 of just over $16 million. Subtracting the costs of service delivery resulted in a net savings of over $13 million (71).

However, contrary to the results reported by Wisconsin, a preliminary study in Florida reported exceeding program goals for birth intervals under their Medicaid family planning waiver (72). In this evaluation, average interbirth intervals and percent repeat births were assessed in Medicaid women receiving family planning (Medicaid FP) services, Medicaid women who did not receive family planning services (Medicaid non-FP), and non-Medicaid Florida population with repeat births during each year of the 5-year study period, 2000-2004 (72). The repeat birth sample size for the entire study period totaled to 27,554 in the Medicaid FP population, 470,686 for the Medicaid non-FP population and 532,681 for the non-Medicaid population. The results of the evaluation indicated that while the percent of repeat births was consistently higher in the Medicaid FP population (e.g., in 2002: percent repeat births was 0.25 Medicaid FP vs. 0.20 in Medicaid non-FP vs. 0.21 non-Medicaid; no confidence intervals or statistical tests provided), the average birth interval for each year of the study was longer in the Medicaid FP group than either Medicaid non-FP group or non-Medicaid group (e.g., in

2002: average birth interval in months was 31.28 for Medicaid FP group, 28.24 for Medicaid non-FP group, and 29.67 in non-Medicaid group; again, no confidence intervals or statistical tests provided) (72). Within the Medicaid FP group, the evaluators calculated the percent of second births at optimal birth spacing (interbirth interval defined as equal to or greater than 24 months); this value was greater than 60% for each year during the study period (72). This study did not categorize optimal versus sub-optimal interbirth intervals for the Medicaid non-FP or non-Medicaid groups.

In summary, the Medicaid family planning demonstration evaluations to date have been unable to demonstrate unequivocal effects on unintended pregnancy rates or interpregnancy intervals. However, the evaluations have shown that the demonstrations are able to produce cost savings to states.

Summary of current status of the problem and study relevance

In this era of state budget crises, the growing burden of Medicaid expenditures is one area of concern. While recognizing the ongoing role of the state in assisting low-income Nebraskans with their health care needs, the 2010 Nebraska Medicaid Reform Biennial Report (73) bluntly states: “Nebraska must continue to address the rate of growth in expenditures of the Medicaid program. The program is unsustainable if expenditures regularly grow at a rate faster than General Fund revenues.” Based on 2010 projections, the gap between Nebraska Medicaid general fund expenditures and Medicaid appropriations would reach $189 million by 2025. The report discusses population trends in Medicaid eligibles during the 5 year period from 2005 to 2010, noting that the overall the number of Medicaid eligibles has increased at a faster rate

than was projected in 2005 and specifically that the Medicaid Children category has grown at the highest rate (rate not provided) (73). While the average monthly cost per eligible for Children ($248 in 2010) was only 15% of the cost for either Aged or Blind/Disabled categories, the overall costs to Nebraska could be lowered by reducing unintended births and promoting optimal interpregnancy intervals.

Twenty-seven states have implemented Medicaid family planning waivers in order to reduce state costs. The literature summarized above indicates mixed evidence that reduced unintended pregnancy rates and optimal interpregnancy intervals are positively associated with either insurance status or Medicaid family planning expansions. However, there appears to be growing evidence, regardless of mechanism, that states that have implemented Medicaid expansions for family planning are saving money (74).

This study asks whether intended pregnancy and optimal interpregnancy interval are positively associated with insurance coverage among Nebraska women and estimates potential cost-savings to Nebraska expanding Medicaid coverage by implementing a Medicaid family planning waiver or a state plan amendment.

CHAPTER III: METHODOLOGY

Introduction

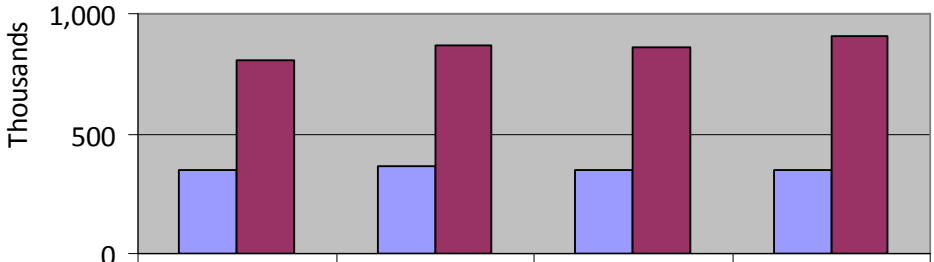
The overarching goal of this study was to better understand the current status of women's access to reproductive health services in Nebraska and to determine how additional subsidized services might impact access and state costs. While this study is globally interested in Nebraska women of reproductive age (15-44 years), it focused more narrowly on two subsets: women of reproductive age who access health services through publicly funded planning clinics and new mothers whose infants were issued Nebraska birth certificates in the particular study years. Two state-specific primary sources of data on Nebraska women and their access to reproductive health services were available to address the study questions. Data obtained from Nebraska Family Planning Annual Reports (FPARs) are required for the Title X grants to Nebraska and summarize information on Title X clinic users and usage. Data from the Nebraska Pregnancy Risk Assessment Monitoring System (PRAMS) are linked to birth certificates and provide surveillance information on maternal behaviors just before conception through early infancy of the child. Other supporting data were obtained from the U.S. Census Bureau, Nebraska Vital Statistics Reports, the Nebraska Behavioral Risk Factor Surveillance System (BRFSS) and the National Center for Health Statistics (NCHS).

Since the study involved a secondary data analysis of publicly available datasets, it did not meet the federal regulations definition of "Human Subjects" research and therefore did not require Institutional Review Board review through Emory University.

SAS 9.2 was used to conduct all analyses on the PRAMS dataset. Weighted analysis was performed to adjust for the complex survey design.

Description of Population and Sample

Based on the U.S. Census Bureau decennial census and interim estimates, there were approximately 800,000 women in Nebraska in 1990 and an estimate of nearly 900,000 by 2009. The number of Nebraska women of reproductive age (15 – 44 years) increased from nearly 353,000 in 1990 to over 365,000 in 2000 but, based on estimates had declined to approximately 347,000 in 2005 and 353,000 in 2009 (Figure 3).



	1990 Census	2000 Census	2005 Estimate	2009 Estimate
Females, 15-44 years	352,524	365,145	346,963	352,708
Females, Total	808,946	867,912	862,077	904,967

Figure 3. Number of Nebraska Females by Year, U.S. Census Bureau.

The Nebraska FPAR data were based on the population of clients who accessed services through all publicly-funded (Title X) family planning clinics located across Nebraska for the years 1995 through 2009; hence, estimates from these data will only be applicable to this population. In Nebraska, the number of family planning service sites supported by the Title X grant has averaged 33, with a low of 25 sites in 2006 and a high of 38 sites in 2002. In 2008, there were 12 delegates with 32 clinic sites within Nebraska (Figure 4). Six of these clinics were located in the greater Omaha area, where

43% of the state's population resides, and another 3 clinics were located in Lincoln, the 2nd largest city. In mid 2008, Planned Parenthood of Nebraska and Council Bluffs declined Title X funds, resulting in a loss of two Title X-funded clinics in Lincoln and another two in Omaha. The average number of female clients seen annually at Title X clinics for the period of 1995 - 2007 was 33,852 (range 28,563 – 38,128). Due to the loss of four clinics from the Title X program, the number of clients seen annually in 2008 and 2009 dropped to 22,281 and 20,026, respectively. Focusing only on females of reproductive age, the average number of females aged 15-44 seen annually at Title X clinics for the period of 1995-2009 was 31,012.

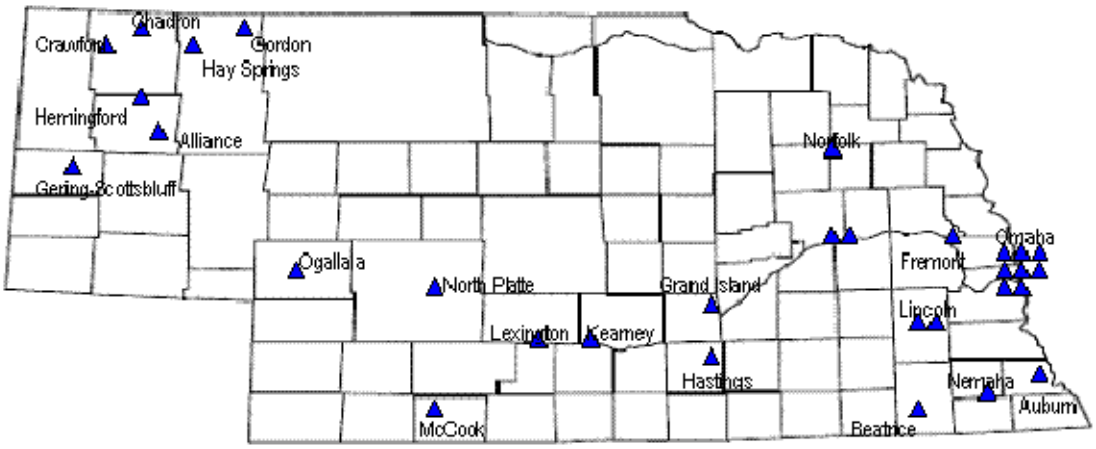


Figure 4. Location of Title X Family Planning Clinics in Nebraska, 2008 (mapped by author)

The Nebraska Pregnancy Risk Assessment Monitoring System (PRAMS) data come from a stratified sample of Nebraska resident women who had a live birth in the years of 2005-2008 and whose infants were registered with Nebraska Vital Records (Nebraska PRAMS methods described in Nebraska Trend Report (75). The original

dataset included a total of 6758 respondents for the 4-year period. These data were weighted by the Centers for Disease Control and Prevention so that they were able to represent the entire population of women who had live births in the State of Nebraska for those years (75). Therefore, the PRAMS sample provides information on only a subset of Nebraska women of reproductive age, i.e., those who have had a live birth during the indicated reporting period. In the years 2005 through 2008, there were 26,142; 26,723; 26,935; and 26,992 live births, respectively, to Nebraska resident women (76). This equates to a PRAMS sample of approximately 6.3% of the live births for the four year period and approximately 0.5% of the cohort of women of reproductive age for each year (denominator from American Community Survey, 1-Year Estimates for years 2005-2008).

Research Design

The research design for the first three study questions was a retrospective cross-sectional study, analyzed as in a cohort, with calculation of prevalence ratios. Exposure (insurance status) was determined within a defined cohort (Nebraska women aged 15-44 surveyed via PRAMS in 2005-2008) and the exposed were followed for the occurrence of health outcomes (pregnancy intendedness or interpregnancy interval). From this, the prevalence of unintended pregnancy and shortened interpregnancy interval was calculated, taking into consideration confounding factors such as age, race/ethnicity, SES (education, public assistance), and parity. The results were interpreted as the prevalence of the health outcome (e.g., unintended pregnancy) among the insured compared with the uninsured.

Pre-conception insurance status was "measured" by PRAMS survey questions (Q1) "*Just before* you got pregnant, did you have health insurance? Do not count Medicaid (No/Yes)" and (Q2) "*Just before* you got pregnant, were you on Medicaid? (No/Yes)." The insurance status variable was created from the 4 responses and was coded into three categories: Medicaid, private insurance, and uninsured.

Pregnancy intendedness was "measured" by PRAMS survey questions (Q10) "Thinking back to *just before* you got pregnant with your new baby, how did you feel about becoming pregnant? Check one answer (I wanted to be pregnant sooner / I wanted to be pregnant later / I wanted to be pregnant then / I didn't want to be pregnant then or at any time in the future)." The dichotomous pregnancy intention outcome variable was created by merging the responses "now" and "sooner" to represent intended pregnancy and the responses "later" and "not now or ever" to represent unintended pregnancy.

Interpregnancy interval was calculated as the number of months between the date that the last pregnancy ended and the date of the last menstrual period using date of last live birth and date of last menstrual period. The variables for these calculations came from the linked birth certificates and included: day of last menstrual period (DD_LMP), month of last menstrual period (MM_LMP), year of last menstrual period (YY_LMP), month of last live birth (MM_LLB), year of last live birth (YY_LLB). After cleaning the data to remove unrealistic responses for the month and year variables, then designating the number of days in each month (29, 30 or 31) and imputing day to 15 if the day was invalid or missing, the individual day, month and year variables for last

menstrual period were combined using MDY function to create a single SAS date for last menstrual period. Since the dataset did not contain a variable for day of last live birth, the month and year variables for last live birth were combined using MDY function and imputing 15 for the day variable. The new SAS dates for last live birth and last menstrual period and the new variable for interpregnancy interval were checked against mother's age and mother's age at last live birth, baby's date of birth (all of these variables were derived from birth certificate data), and against a new gestation variable (date of birth minus date of last menstrual period) to cross-check for inappropriate dates. Observations were excluded from further analysis if date of last live birth was equal to date of birth for current baby, or if interpregnancy interval was less than or equal to zero. The variable interpregnancy interval was coded into three categories: 0-18 months, 18-23 months, and greater than 23 months.

Potential confounders were coded as follows. Maternal age (from the linked birth certificate) was initially coded into 5 categories: 14-19 years, 20-24 years, 25-29 years, 30-34 years, and 35-44 years. Race and ethnicity variables were combined into a single race/ethnicity variable with 4 categories: White, Black, Hispanic, and other. Parity was coded into three categories: 0 prior births, 1 prior birth, and 2 or more prior births. Education was initially coded into 4 categories: less than high school, high school, some college, and college or higher. The public assistance variable was already a dichotomous yes/no variable.

Summary trends were developed for the Nebraska Title X administrative data from the Family Planning Annual Reports (FPARs) to examine changes in the characteristics of Title X clinic users for a recent 15-year period. Specifically, characteristics including income as a percent of poverty guidelines, principal health insurance covering primary care, and number of family planning users by age and race were compared for reporting years 1995 – 2009 to determine changes in the need for publicly-funded services. Among the variables collected in the FPAR, the following were of interest to this study: age, race/ethnicity, federal poverty level, health insurance status, payment for services from revenue, and number of service sites.

Descriptive statistics were used for research question #4. Women are currently eligible for sixty days of post-partum care if they are eligible for Medicaid themselves or if they are ineligible but their unborn/newborn is eligible (77). The number and percent of women who qualify for post-partum care was determined from the number of women who reported coverage by Medicaid/Medicaid Managed Care for delivery. Women who are enrolled in Medicaid/Medicaid Managed Care at delivery was obtained from PRAMS questions (Q21) "How was your delivery paid for? (Medicaid, personal income, health insurance or HMO, Medicaid Managed Care, Indian Health Service/Tribal Clinic, Other)." Historic trend data for this variable were obtained from CPONDER. Nebraska eligibility allows coverage for mothers of unborn children whose family income is equal to or less than 185% FPL, including prenatal, delivery and sixty-day postpartum period (*ibid.*). The change in number and percent of women who would be eligible under a Medicaid family planning FPL expansion was calculated from the

difference in the number and percent that were eligible based on Medicaid-covered deliveries compared to the number that would be eligible under an income-based expansion to 200% FPL. These data were obtained from the annual Current Population Survey (CPS) population counts, using the open source DataFerrett tool on the U.S. Census Bureau website (http://dataferrett.census.gov).

In order to inform policy change efforts, it was important to produce an estimation of additional and net costs of implementing a Medicaid family planning expansion in Nebraska. An estimation of financial benefit was accomplished by reviewing the cost-saving estimates from states that have already implemented Medicaid family planning waivers. Simple financial estimates for Nebraska were based on expected eligibles with and without an income-based Medicaid expansion for family planning, the average Nebraska Medicaid expenditure per pregnancy, the average Nebraska Medicaid expenditure per year for family planning services, and the baseline and expected birth rates of the Medicaid eligible population with and without a Medicaid income-based expansion. Average 4-year baseline birthrates were calculated from PRAMS 2005-2008 survey data on Medicaid-paid deliveries stratified by age and race/ethnicity to determine the proportion of Medicaid births in each stratum. This weighted fraction of PRAMS surveyed Medicaid deliveries was applied to the total number of births in Nebraska in 2008 (Nebraska Vital Statistics), resulting in an estimate of the actual number of Medicaid deliveries for 2008 (birthrate numerator). For the birthrate denominator, the population of Medicaid-eligible (<185% FPL) women aged 15-44 years was estimated from the Current Population Survey (CPS) population counts

by poverty level. CPS data was obtained from the U.S. Census Bureau; Current Population Survey, 2008 Public Use Microdata File; generated by the author using DataFerrett (http//dataferrett.census.gov/); (16 February 2011). It was necessary to impute for 185% FPL. The Medicaid costs for family planning services, birth/delivery, and first year infant costs were obtained from the Nebraska Division of Medicaid Services.

Procedures

Nebraska FPAR data were requested verbally from Nebraska DHHS Reproductive Health Program and provided by Julie Reno, Director. Hard copies of the FPARs for program years 1985 – 2006 were provided initially, with years 2007 – 2009 added as they were completed. Due to changes in the contents of FPAR reports over time, additional review of original and supporting documentation was necessary to clarify values of some variables in some years. Ms. Reno allowed access to these documents at the state office and provided verbal clarification for some data and trends.

FPAR variable data of interest were manually entered into Microsoft Excel spreadsheets and checked for accuracy using Excel formulae to calculate totals and ensure they matched the totals on the original FPAR reports. Summary charts were generated using Microsoft Excel.

Nebraska PRAMS data were requested from Nebraska DHHS through submission of the DHHS PRAM Data Request Form and indicating requested variables by reviewing and highlighting a PROC CONTENTS file provided by Brenda Coufal, PRAMS Project Coordinator. Weighted PRAMS data in a SAS7bdat file were received by e-mail from Ms.

Coufal for years 2005-2008. Data were imported into SAS 9.2 (SAS Institute, Inc., Cary, North Carolina) for analysis.

Instruments

The Nebraska Pregnancy Risk Assessment Monitoring System (PRAMS) was developed at the Centers for Disease Prevention and Control and is an ongoing, state-based surveillance system that describes maternal characteristics, behaviors and experiences before, during and after pregnancy among women who have had a live birth (78). Nebraska was one of 32 states formally participating in the PRAMS initiative during survey years 2005 and 2006. The Nebraska data for 2005 through 2008 were gathered from a random stratified sample of Nebraska resident women who had a live birth in period of 2005-2008. The selected women were mailed an introductory letter between two to six months post-partum, with the mailed questionnaire following a few days later (79). Non-respondents were mailed a second and, if necessary, a third survey, with follow up phone calls extended to those who had not responded to survey mailings (79). The Nebraska PRAMS Phase V survey used for 2005-2008 contained 83 questions, including 52 PRAMS core questions and 31 state-specific questions. In addition to responses from the survey questions, the PRAMS database includes information from the birth certificates. Responses from women who completed the questionnaire were combined for each survey year and weighted by CDC to be representative of all women who had a live-born infant in Nebraska during the survey years.

The Family Planning Annual Report is a requirement of federal grantees receiving Title X funds. In Nebraska the Title X Family Planning Program is administered by the

Nebraska Reproductive Health program, Lifespan Health Services Unit, Department of Health and Human Services. The FPAR is a standardized form that collects aggregate data from each grantee site which was summarized from reports submitted by each delegate. Relevant to this study, the Nebraska FPAR reports included: number of delegates, number of service sites, unduplicated number of family planning users by age and gender, unduplicated number of female family planning users by ethnicity and race, unduplicated number of family planning users by income level (income as percent of the HHS poverty guidelines), unduplicated number of family planning users by principal health insurance coverage status (public, private, uninsured, unknown/not reported), and revenue report (Medicaid, Medicare, State Children's Health Insurance Program (S-CHIP), other public health insurance, private health insurance).

Data Analysis

Bivariate analyses were performed to compare factors determined *a priori* to be involved in pregnancy intention or interpregnancy interval (refer to Figure 1). Logistic regression models were developed for research questions #1-#3 and the relevant crude prevalence odds ratios (e.g., odds of unintended pregnancy among the insured versus uninsured) calculated along with 95% confidence intervals. Models were adjusted for age, race/ethnicity, public assistance, education, insurance status, and parity. Effect modification was evaluated using backward elimination. The number of survey respondents was sufficient to carry out stratified analysis.

For research question #4 descriptive trends in variables collected by Family Planning Annual Reports (FPARS) were summarized from the Nebraska Title X FPARs for

years 1995-2009. These data were only available in summary form, so analysis consisted of extracting the particular variable of interest (user age, income or federal poverty level, insurance status or method of payment for services) and constructing charts and tables to compare the variables over a 15-year period from 1995-2009.

Research questions #5-6 were addressed with descriptive statistics gathered from multiple sources, including personal communication with DHHS Division of Medicaid and U.S. Census Current Population Survey. Two-way tables were constructed in SAS 9.2 to stratify Medicaid-paid births (PRAMS variable: MEDIC_BIRTH) by age. Weighted frequencies, percents and 95% confidence intervals were obtained for calculating baseline birthrates. The Current Population Survey was used to determine poverty status for women age 15-44 by age. For 185% poverty level, the following steps were used to impute the values: (1) Calculate the difference between the population at less than 175% poverty level and the population at less than 200% poverty level; (2) multiply the variance by 0.40 (185 is 40% of the difference between 175 and 200); (3) add the result from step 2 to the value for the population less than 175% poverty level.

Limitations and Delimitations

Nebraska FPARs for years 1995 – 2009 were utilized for trend data on family planning clinic usage. Since the FPAR form has changed over the years, there were some limitations on which variables could be compared for consecutive years. While the number of users by age and race/ethnicity, user income level, and payment for services collections (e.g., self-pay, Medicaid, Medicare, other public insurance, private insurance) were available for the past 15 years, many of these data were summarized

from the entire population of clinic users and could not be narrowed to women of reproductive age only (i.e., the reports included females less than 15 years of age and greater than 44 years of age, as well as males).

Nebraska PRAMS datasets from 2005 through 2008 were the most current weighted data available at the time this project was initiated. PRAMS data could only be generalized to resident women of reproductive age who had a live birth in a given year, not of all women of reproductive age or of all women becoming pregnant in a given year. In terms of evaluating unintended pregnancy, these data are retrospective self-reports and could suffer from recall bias, with pregnancy "intention" potentially being influenced by experiences during and after pregnancy. In addition, the measurement of unintended pregnancy from the PRAMS data set, which surveys women who have had a live birth, does not include any unintended pregnancies resulting in miscarriage or abortion and, therefore, the results likely underestimate the prevalence of unintended pregnancy in Nebraska.

The Nebraska cost calculations relied on a number of assumptions and there were limitations that should be recognized. The calculations for the Nebraska estimates did not include administrative, outreach, provider training, or other costs that might be required to implement an expansion. Nor did the calculations include ongoing social, educational or healthcare costs beyond the infant's first year. Baseline birthrates were age-adjusted, but not race/ethnicity-adjusted, which may have resulted in over- or under-estimation, and these rates were applied to the expansion population to determine an expected birthrate under the assumption that the characteristics and

demographics of these two populations were similar. Although the baseline birthrates were calculated from a 4-year period of data, birthrates can vary with economic cycles and may be limited in their ability to accurately predict expected birthrates (69).

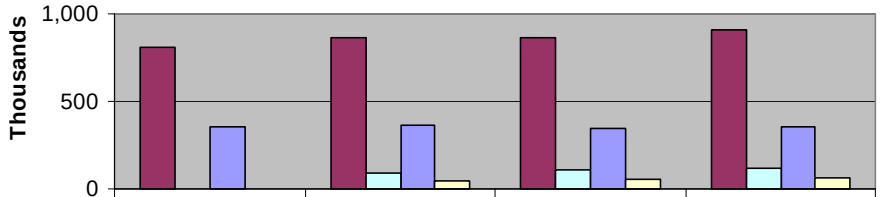
CHAPTER IV: RESULTS

Introduction

In this section, results for each of the six research questions are presented. For research questions 1-5, two primary data sources were used: data from the Nebraska Pregnancy Risk Assessment Monitoring System (PRAMS) for the period of 2005 through 2009 (Questions 1-3) and Nebraska Family Planning Annual Reports from 1995 through 2009 (Question 4).

Findings

Based on the U.S. Census Bureau decennial census and interim estimates, the total number of women in Nebraska has increased from approximately 800,000 to 900,000 over the course of the last 2 decades. The number of Nebraska women of reproductive age (15 – 44 years) increased from nearly 353,000 in 1990 to over 365,000 but estimates indicated a decline to 347,000 women of reproductive age for 2005 and nearly 353,000 in 2009 (Figure 5). During the last decade, the number of women in poverty (<100% FPL) increased from 90,000 to 121,000. For those of reproductive age, the last decade saw an increase in percent in poverty from 12% in 2000 to 18% in 2009 (Figure 5). In 2000, the percent of women of reproductive age living in poverty varied by race and ethnicity (Table 1). Twenty-seven percent of black women aged 15-44 were living in poverty compared with 22% of Hispanic women and 10% of white women. Based on 2009 Census estimates, these percentages increased to 37%, 27% and 16% respectively.



	1990 Census	2000 Census	2005 Estimate	2009 Estimate
Females, Total	808,946	867,912	862,077	904,967
Females, <100% FPL		90,289	106,384	121,209
Females,15-44 years	352,524	365,145	346,963	352,708
Females,15-44 yrs, <100%		44,118	50,418	64,032

Figure 5. Number of Nebraska Females by Year and Poverty Status, U.S. Census Bureau

Table 1. Number and Percent of Nebraska Women of Reproductive Age in Poverty

Characteristic	2000 Census	2005 Estimate	2009 Estimate
White (15-44) Total	322,579	305,763	305,799
Number <100% FPL	33,631	36,312	48,872
Percent <100% FPL	10.4%	11.9%	16.0%
Black (15-44) Total	16,263	16,489	17,495
Number <100% FPL	4,413	7,734	6,488
Percent <100% FPL	27.1%	46.9%	37.1%
Hispanic (15-44) Total	21,440	26,313	32,608
Number <100% FPL	4,734	6,707	8,718
Percent <100% FPL	22.1%	25.5%	26.7%

The Nebraska PRAMS survey had 6,758 respondents in 4 years of surveys from 2005-2008. After the data were weighted by CDC, this corresponded to a weighted total of 102,140 new mothers. After limiting observations to women aged 15-44 years, the final PRAMS dataset used for analysis included 6,740 Nebraska women. This equated to a weighted population of 101,894 for the 4-year period, or approximately 8% of the total population of Nebraska women aged 15-44 years.

Research Question 1: Is pregnancy intendedness associated with pre-conception insurance status? When mothers were asked about their feelings about being pregnant just before they became pregnant, 43.0% (weighted percent) said they wanted to be pregnant then, 17% said they wanted to be pregnant sooner, 31.6% said they wanted to be pregnant later, and 8.4% said they did not want to be pregnant then or any time in the future (Table 2). Unintended pregnancy in this cohort was determined by combining the mistimed ("wanted later") and the unwanted ("did not want to be pregnant") responses. Therefore, the prevalence of unintended pregnancy was 40%.

Table 2. Pregnancy Intention in Nebraska Women Ages 14-44, Nebraska PRAMS, 2005-2008

	Wanted Then	Wanted Sooner	Wanted Later	Did Not Want	Unintended
Frequency	2640	1090	2221	687	2908
Weighted Freq	43,249	17,102	31,795	8,428	40,223
Weighted %	42.9	17.0	31.6	8.4	40.0
(95% C.I.)	(41.5, 44.5)	(15.9, 18.1)	(30.2, 33.0)	(7.6, 9.2)	(38.6, 41.4)

Unintended pregnancy was examined by characteristics of age, race-ethnicity, insurance status, socioeconomic status (education, public assistance) and parity, as shown in Table 3. Younger women were more likely than older women to report unintended pregnancy. Seventy-three percent (weighted percent) of women aged 15-19 and 56% of women aged 20-24 reported unintended pregnancy compared with 34% of women aged 25-29 and 28% of women aged 30 or older. Higher proportions of unintended pregnancy were reported by black women and women on public assistance. Sixty-one percent of women on Medicaid and 53% of uninsured women reported unintended pregnancy. Unintended pregnancy was less prevalent in college-educated

women, women with private insurance, and women with fewer than 2 prior births (Table 3).

Table 3. Pregnancy Intendedness in Nebraska women age 15-44 according to selected characteristics, PRAMS 2005-2008

Characteristic	Unintended	Intended	Total
	% (95% C.I.)	% (95% C.I.)	
Pregnancy Intention	40.0 (38.6, 41.4)	60.0 (58.6, 61.4)	100
Frequency (n; N)	2,908; 40,224	3,730; 60,337	6,638; 100,561
Age (Years)			
15-19	72.8 (68.5, 77.2)	27.2 (22.8, 31.5)	100
20-24	55.6 (52.7, 58.5)	44.4 (41.5, 47.3)	100
25-29	33.8 (31.3, 36.2)	66.2 (63.8, 68.7)	100
30-34	27.9 (25.3, 30.6)	72.1 (69.4, 74.7)	100
35-44	27.7 (23.7, 31.6)	72.3 (68.4, 76.3)	100
Race/Ethnicity			
White, Non Hisp	36.7 (34.9, 38.6)	63.3 (61.4, 65.1)	100
Black, Non Hisp	64.7 (62.1, 67.4)	35.3 (32.6, 37.9)	100
Hispanic	43.4 (40.8, 46.1)	56.6 (53.9, 59.2)	100
Other	43.2 (39.5, 46.9)	56.8 (53.1, 60.5)	100
Insurance Status			
Medicaid	60.6 (56.1, 65.2)	39.4 (34.8, 43.9)	100
Private Insurance	30.7 (29.0, 32.5)	69.3 (67.5, 71.0)	100
No Insurance	53.3 (50.6, 56.0)	46.7 (44.0, 49.4)	100
Public Assistance			
Yes	57.1 (54.0, 60.2)	42.9 (39.7, 46.0)	100
No	35.9 (34.3, 37.5)	64.1 (62.5, 65.7)	100
Education			
< High School	49.3 (46.1, 52.5)	50.7 (47.5, 53.9)	100
High School	52.8 (49.4, 56.1)	47.2 (43.9, 50.6)	100
Some College	44.2 (41.6, 46.8)	55.8 (53.2, 58.4)	100
College or Higher	23.1 (20.9, 25.4)	76.9 (74.6, 79.1)	100
Parity			
0 Prior Births	41.3 (39.0, 43.7)	58.7 (56.3, 61.0)	100
1 Prior Birth	32.0 (29.6, 34.4)	68.0 (65.6, 70.4)	100
2 or More Prior Births	47.3 (44.6, 50.0)	52.7 (50.0, 55.4)	100

Bivariate analysis was employed to explore the relationship between selected characteristics and unintended pregnancy. The weighted crude odds ratios presented in Table 4 indicate that the odds of unintended pregnancy were higher in women with no insurance (OR = 2.18; 95% CI: 1.91, 2.49) compared with women who were insured (includes Medicaid and private insurance). The odds of unintended pregnancy were also significantly higher in young women ages 15-29 compared with women ages 30-44. The odds of unintended pregnancy were highest in 15-19 year olds (OR = 6.95; 95% CI: 5.43, 8.89). Unintended pregnancy was also higher in non-Hispanic black women, women who had less than a college education and women receiving public assistance. Women with 2 or more previous births were also more likely to report an unintended pregnancy compared than were women with no previous births.

After controlling for possible confounding variables including maternal age, race/ethnicity, education, parity, and socioeconomic status (public assistance), the odds of unintended pregnancy were still significantly higher in women with no insurance (not shown) than in women with insurance. However, when the potential confounders and effect modifiers of age, race/ethnicity, public assistance, education and parity, were tested for interaction with insurance status, only race/ethnicity was not significant at the 0.05 level. Following backward elimination of the insurance status*race/ethnicity interaction term, the remaining interaction terms were still significant at the 0.05 cutoff. Hence, the multivariate analysis involved numerous interactions that made its interpretation difficult.

Table 4. Table. Weighted Crude Odds of Unintended Pregnancy in Nebraska Women Aged 15-44 Years According to Selected Characteristics, Nebraska PRAMS, 2005-2008

Characteristic	Crude Weighted Odds Ratio (95% C.I.)
Insurance Status	
Insured (MCD/Private Ins)	1.00
No Insurance	2.18 (1.91, 2.49)
Age	
15-19	6.95 (5.43, 8.89)
20-24	3.25 (2.76, 3.82)
25-29	1.32 (1.13. 1.54)
30-44	1.00
Race/Ethnicity	
White, Non Hisp	1.00
Black, Non Hisp	3.16 (2.74, 3.65)
Hispanic	1.32 (1.16, 1.51)
Other	1.31 (1.10, 1.56)
Public Assistance	
Yes	2.38 (2.06, 2.76)
No	1.00
Education	
< High School	3.24 (2.70, 3.87)
High School	3.72 (3.09, 4.47)
Some College	2.63 (2.23, 3.10)
College or Higher	1.00
Parity	
0 Prior Births	1.00
1 Prior Birth	0.67 (0.58, 0.77)
2 or More Prior Births	1.27 (1.10, 1.47)

Research Question 2: Is interpregnancy interval for intended versus unintended pregnancy different? Interpregnancy interval was calculated for women aged 15-44 who had a previous live birth. For the period of 2005-2008, the interpregnancy interval

was less than 18 months for 31.6% (weighted percent), optimal (18-23 months) for 10.5% of women and greater than 23 months for 57.8% of women (Table 5).

Table 5. Interpregnancy Interval in Nebraska Women aged 15-44, PRAMS 2005-2008

	<18 mo	18-23 mo	>23 mo
Frequency	1,167	379	2,224
Weighted Freq	18,117	6,037	33,101
Weighted %	31.6	10.5	57.8
(95% C.I.)	(29.8, 33.5)	(9.3, 11.7)	(55.9, 59.8)

Table 6 shows that pregnancy intention for the subset of women aged 15-44 with a previous live birth was similar to pregnancy intention for all women aged 15-44 with the exception that fewer women with previous live birth reported they wanted to be pregnant later (28% compared to 31%) and more reported that they did not want to be pregnant (10.8% compared to 8.4%). Combining these two categories, the overall prevalence of unintended pregnancy was not significantly different in women with previous live birth compared with all women aged 15-44 (Table 6).

Table 6. Pregnancy Intention in Women with Previous Live Birth, Nebraska PRAMS 2005-2008

	Wanted Then	Wanted Sooner	Wanted Later	Did Not Want	Unintended
All Women, 15-44					
Frequency	2642	1090	2226	691	2917
Weighted Freq	43,249	17,102	31,873	8,482	40,355
Weighted %	42.9	17.0	31.6	8.4	40.1
(95% C.I.)	(41.5, 44.4)	(15.9, 18.1)	(30.3, 33.0)	(7.6, 9.2)	(38.6, 41.5)
Previous Live Birth					
Frequency	1586	527	1097	505	1602
Weighted Freq	26,103	8,554	15,847	6,138	40,355
Weighted %	46.1	15.1	28.0	10.8	38.8
(95% C.I.)	(44.1, 48.1)	(13.7, 16.5)	(26.2, 29.8)	(9.7, 12.0)	(36.9, 40.7)

Interpregnancy interval differed for intended versus unintended pregnancy (Table 7). Forty-three percent of women with unintended pregnancies had short interpregnancy intervals compared with 24.6% of women with intended pregnancies. Unintended pregnancy also correlated with long interpregnancy interval (>23 months), but was less common for optimum interpregnancy intervals (18-23 months).

Table 7. Percent of Women Age 15-44 with Short, Optimal or Long Interpregnancy Intervals by Pregnancy Intention, Nebraska PRAMS, 2005-2008

Characteristic	<18 mo (95% C.I.)	18-23 mo (95% C.I.)	>23 mo (95% C.I.)	Total
IPI	31.6 (29.8, 33.5)	10.5 (9.3, 11.7)	57.8 (55.9, 59.8)	100
Frequency (n; N)	1,167; 18,117	379; 6,037	2,224; 33,101	3,770; 57,254
Pregnancy Intention				
Unintended	43.0 (39.8, 46.1)	9.7 (7.9, 11.6)	47.3 (44.2, 50.5)	100
Intended	24.6 (22.4, 26.9)	11.2 (9.6, 12.8)	64.2 (61.7, 66.7)	100

The association between pregnancy intention and interpregnancy interval was evaluated further using bivariate analysis after dichotomizing interpregnancy interval to short IPI (≤18 months) and optimal/long IPI (>18 months). Short interpregnancy interval (IPI) was 2.3 times higher in women with unintended pregnancy (unadjusted OR = 2.3, 95% CI: 1.9, 2.7) compared with intended pregnancy (Table 8). Compared with women who were age 30-44 years, short IPI was 4.4 times more likely in women age 15-19 years, 2.4 times more likely in women age 20-24 years and 1.5 times more likely in women age 25-29 years. After dichotomizing the variables for age (<20 years vs. ≥ 20 years) and education (< high school vs. high school or more), women less than 20 years old were more likely than women age 20 or higher to have a short IPI (OR = 3.18, 95% CI: 1.88, 5.39) (Table 8, Columns B). The odds of short IPI for women on Medicaid were

1.5 times higher than women on private insurance and women with only 1 prior birth were 1.3 times more likely to have short IPI than women who had had 2 or more prior births. Hispanic women had slightly lower odds of a short IPI than white women.

After controlling for possible confounding variables, including age, race/ethnicity, insurance status, socioeconomic status (public assistance), level of education and parity, the odds of short interpregnancy interval were significantly higher among women who reported unintended pregnancy (adjusted OR = 2.2; 95% Cl: 1.84-2.69) (Table 8). Interaction between pregnancy intention and potential confounder or effect modifiers of age, public assistance, insurance status, race/ethnicity, educational level and parity was assessed. In this model, none of the interaction terms were significant at the 0.05 level and no interaction was identified through backward elimination.

Table 8. Unadjusted and Adjusted Odds of Short Interpregnancy Interval in Nebraska Women Aged 15-44 Years According to Selected Characteristics, PRAMS, 2005-2008

	A	A	B	B
	Crude Odds Ratio (95% C.I.)	Adjusted Odds Ratio (95% C.I.)	Crude Odds Ratio (95% C.I.), Dichotomized Age and Edu	Adjusted Odds Ratio (95% C.I.)
Pregnancy Intention				
Unintended	2.30 (1.93, 2.75)	2.14 (1.76, 2.60)	2.30 (1.93, 2.75)	2.22 (1.84, 2.69)
Intended	ref	ref	ref	ref
Age				
15-19	4.44 (2.59, 7.61)	7.04 (3.55, 13.94)	3.18 (1.88, 5.39)	2.90 (1.52, 5.52)
20-24	2.39 (1.91, 3.00)	3.33 (2.48, 4.47)	ref	ref
25-29	1.54 (1.26, 1.88)	1.90 (1.51, 2.38)	ref	ref
30-44	ref	ref	ref	ref
Race/Ethnicity				
White, NH	ref	ref	ref	ref
Black, NH	0.93 (0.76, 1.14)	0.55 (0.42, 0.73)	0.93 (0.76, 1.14)	0.54 (0.41, 0.70)
Hispanic	0.76 (0.63, 0.92)	0.68 (0.51, 0.90)	0.76 (0.63, 0.92)	0.60 (0.46, 0.80)
Other	0.99 (0.78, 1.25)	0.92 (0.70, 1.21)	0.99 (0.78, 1.25)	0.84 (0.65, 1.10)
Insurance Status				
Medicaid	1.54 (1.17, 2.02)	0.90 (0.62, 1.31)	1.54 (1.17, 2.02)	1.02 (0.71, 1.40)
Private Ins	ref	ref	ref	ref
No Insurance	1.13 (0.93, 1.37)	0.90 (0.67, 1.15)	1.13 (0.93, 1.37)	0.92 (0.72, 1.18)
Public Assistance				
Yes	1.53 (1.26, 1.85)	1.43 (1.10, 1.85)	1.53 (1.26, 1.85)	1.50 (1.16, 1.94)
No	ref	ref	ref	ref
Education				
< High School	0.91 (0.72, 1.16)	0.48 (0.32, 0.72)	1.00 (0.82, 1.22)	1.02 (0.75, 1.38)
High School	0.92 (0.72, 1.18)	0.45 (0.32, 0.62)	ref	ref
Some College	0.83 (0.67, 1.03)	0.51 (0.40, 0.66)	ref	ref
College or more	ref	ref	ref	ref
Parity				
1 Prior Birth	1.3 (1.09, 1.54)	1.58 (1.29, 1.94)	1.3 (1.09, 1.54)	1.20 (1.0, 1.45)
≥ 2 Prior Births	ref	ref	ref	ref

Research Question 3: Among women with an unintended pregnancy, is there a difference in interpregnancy interval by insurance status? The results presented in Table 8 indicate that interpregnancy interval does not differ by insurance status. In assessing for interaction of pregnancy intention with other variables, the interaction term for pregnancy intention and insurance status was included in the model. This interaction term was not significant at the 0.05 level (p=0.5324) and backward elimination did not improve the significance level, indicating that there was no statistical interaction between insurance status and pregnancy intention with regards to interpregnancy interval.

Research Question 4: Trends in Title X family planning clinic usage in Nebraska. Trends in Nebraska Title X clinic usage, client demographics, and revenue sources were reviewed for the 15-year period of 1995 through 2009.

Title X clinics in Nebraska. The number of Title X-supported family planning clinic sites in Nebraska was obtained from the annual Nebraska FPAR, in which the state indicates the number of family planning service sites supported by the Title X grant. This number has remained fairly constant over the past 12 years at about 33 to 36 (Figure 6). There was a high of thirty-eight clinics reported in 2002 and a low of 25 clinics in 2006. The variation in clinic numbers resulted from changes in the Title X subcontractors in Nebraska and changes in the number of clinic sites each supported. For example, the drop in service sites in 2008-2009 reflects the loss of one subcontractor (Planned Parenthood of Nebraska – Council Bluffs, which coordinated clinics in Omaha and Lincoln).

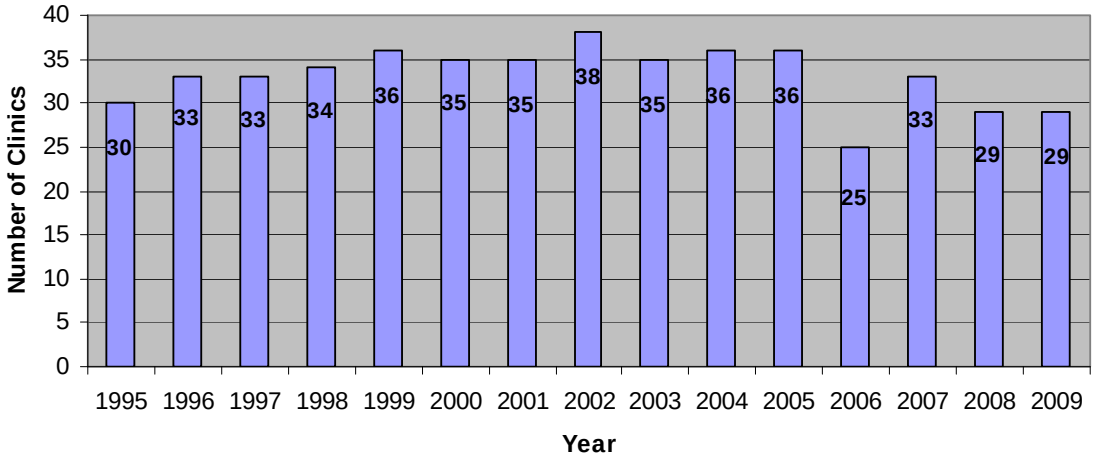


Figure 6. Number of Family Planning Service Sites Supported by the Title X Grant by Year, Nebraska 1995-2009.

Number of Title X clinic users by gender, race, ethnicity and age. The total number of persons accessing services at Title X clinics has increased from approximately 29,000 in 1995 to over 40,000 in 2006 (Table 9 and Figure 7). Of these, the percentage of males remained small, gradually increasing from 0.4% in 1995 to 8% in 2009. The abrupt reduction in users in 2008 and 2009 was due to opt-out in April of 2008 of a Title X subcontractor and, concomitantly, the urban clinic sites it served in Omaha and Lincoln. Because of the impact this temporary loss of service sites had on the total number of users during those years, 2008 and 2009 are not comparable to the previous years. Hence, the trends described in the remainder of this section focus only on years 1995 through 2007.

Table 9. Total Number of Title X Clinic Users by Gender, Nebraska, 1995-2009.

Year	Total Clinic Users	Females	% Female	Males	% Male
1995	29291	29176	99.6%	115	0.4%
1996	28742	28563	99.4%	179	0.6%
1997	29652	29370	99.0%	282	1.0%
1998	31144	30663	98.5%	481	1.5%
1999	33349	32395	97.1%	954	2.9%
2000	35825	34462	96.2%	1363	3.8%
2001	35359	34427	97.4%	932	2.6%
2002	36138	34817	96.3%	1321	3.7%
2003	38560	37110	96.2%	1450	3.8%
2004	39921	38128	95.5%	1793	4.5%
2005	39707	37354	94.1%	2353	5.9%
2006	40045	37454	93.5%	2591	6.5%
2007	39000	36160	92.7%	2840	7.3%
2008	24158	22281	92.2%	1877	7.8%
2009	21776	20026	92.0%	1750	8.0%

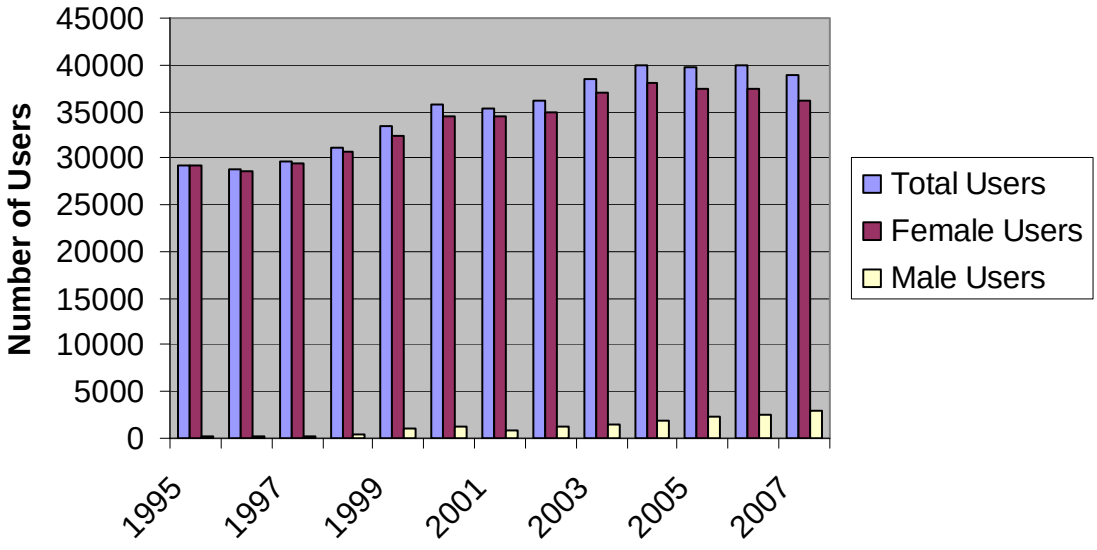


Figure 7. Title X Clinic Users by Year and Gender, Nebraska, 1995-2007

The trends in self-reported race of female clinic users by year are illustrated in Figure 8 and Table 10. The overwhelming majority of female users has been white, with percentages above 85% and as high as 93% from 1995-2005, but decreasing to 80% by

2007. In 1995, the percentage of black female clients was 5.5%, remaining within about 1-1.5 percentage points below this level through 2007 (4.6%). The percentage of female American Indian clinic users increased from 0.4% in 1995 to 1.8% in 2007, while the percentage of female Asian clinic users remained at about 1% for the period. Of note, the number of female clinic clients not reporting or with unknown race increased from 0.5% in 1995 to 7% in 2006, which may account for the decreases seen in other categories.

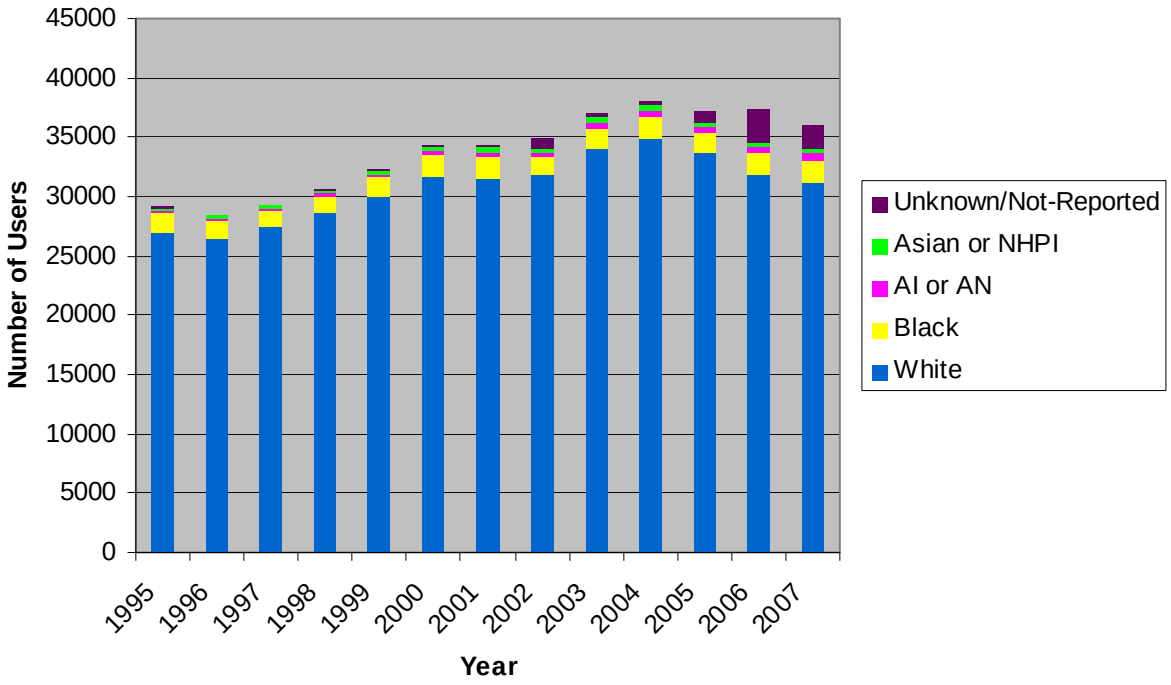


Figure 8. Unduplicated Number of Female Title X Clinic Users by Race, Nebraska, 1995-2007.

Table 10. Number and Percent* of Unduplicated Title X Female Clinic Users by Race, Nebraska 1995-2007.

Year	Total	White		Black		AI or AN		Asian or NHPI		Unk / NR	
	Users*	#	%*	#	%	#	%	#	%	#	%
1995	29291	27012	92.2%	1620	5.5%	117	0.4%	278	0.9%	149	0.5%
1996	28742	26512	92.2%	1483	5.2%	176	0.6%	285	1.0%	107	0.4%
1997	29652	27411	92.4%	1428	4.8%	141	0.5%	283	1.0%	107	0.4%
1998	31144	28578	91.8%	1494	4.8%	182	0.6%	328	1.1%	81	0.3%
1999	33349	29974	89.9%	1649	4.9%	261	0.8%	380	1.1%	131	0.4%
2000	35825	31674	88.4%	1864	5.2%	346	1.0%	381	1.1%	197	0.5%
2001	35359	31483	89.0%	1835	5.2%	469	1.3%	377	1.1%	263	0.7%
2002	36138	31786	88.0%	1519	4.2%	373	1.0%	387	1.1%	752	2.1%
2003	38560	34073	88.4%	1696	4.4%	533	1.4%	460	1.2%	348	0.9%
2004	39921	34959	87.6%	1757	4.4%	518	1.3%	573	1.4%	321	0.8%
2005	39707	33777	85.1%	1657	4.2%	436	1.1%	402	1.0%	1049	2.6%
2006	40045	31823	79.5%	1812	4.5%	571	1.4%	403	1.0%	2769	6.9%
2007	39000	31208	80.0%	1788	4.6%	688	1.8%	387	1.0%	2008	5.1%

*Total Users = female + male; Percent based on the total users

Clinic use by males has been gradually increasing for all races (Table 11). In 1995, 0.3% of users were white males, 0.1% were black males, and there were no American Indian or Asian male users. By 2007, 5.8% of clinic users were white males, 0.8% were black males, 0.1% were American Indian and 0.08% were Asian males.

Table 11. Number and Percent* of Male Clinic Users by Race, Nebraska, 1995-2007

Year	Total	White		Black		AI or AN		Asian or NHPI		Unk / NR	
	Users*	#	%*	#	%	#	%	#	%	#	%
1995	29291	90	0.3%	20	0.1%	0	0.0%	0	0.00%	5	<0.1%
1996	28742	144	0.5%	21	0.1%	4	<0.1%	9	0.03%	1	<0.1%
1997	29652	229	0.8%	34	0.1%	8	<0.1%	10	0.03%	1	<0.1%
1998	31144	395	1.3%	70	0.2%	4	<0.1%	11	0.04%	1	<0.1%
1999	33349	826	2.5%	92	0.3%	11	<0.1%	18	0.05%	7	<0.1%
2000	35825	1118	3.1%	157	0.4%	47	0.1%	34	0.09%	7	<0.1%
2001	35359	792	2.2%	88	0.2%	35	0.1%	6	0.02%	11	<0.1%
2002	36138	1129	3.1%	111	0.3%	47	0.1%	8	0.02%	26	0.1%
2003	38560	1270	3.3%	116	0.3%	30	0.1%	12	0.03%	22	0.1%
2004	39921	1576	3.9%	128	0.3%	52	0.1%	17	0.04%	20	0.1%
2005	39707	2025	5.1%	189	0.5%	59	0.1%	14	0.04%	62	0.2%
2006	40045	2096	5.2%	247	0.6%	70	0.2%	17	0.04%	157	0.4%
2007	39000	2268	5.8%	326	0.8%	37	0.1%	31	0.08%	173	0.4%

*Total Users = female + male; Percent based on the total users

The ethnicity of female clinic users during the period from 1995 to 2007 is shown in Table 12 and Figure 9. The number of female Hispanic/Latino clinic users increased dramatically from 1,365 (4.7%) in 1995 to 7,704 (19.3%) in 2004 and has remained fairly steady through 2007 (20.2%, n = 7886). The number of male Hispanic/Latino users increased from 0.1% in 1995 to 1.6% in 2005 (Table 12).

Table 12. Number and Percent of Unduplicated Clinic Users by Gender and Ethnicity, Nebraska, 1995-2007.

	Total	Female						Male					
Year	Clinic	Hsp/Lat		Not Hsp/Lat		Unk / NR		Hsp/Lat		Not Hsp/Lat		Unk / NR	
	Users	#	%	#	%	#	%	#	%	#	%	#	%
1995	29291	1365	4.7%	27298	93.2%	513	1.8%	18	0.1%	87	0.3%	10	<0.1%
1996	28742	1742	6.1%	26680	92.8%	141	0.5%	37	0.1%	117	0.4%	25	0.1%
1997	29652	3139	10.6%	25859	87.2%	372	1.3%	37	0.1%	216	0.7%	29	0.1%
1998	31144	3433	11.0%	27180	87.3%	50	0.2%	67	0.2%	407	1.3%	7	<0.1%
1999	33349	2765	8.3%	29459	88.3%	171	0.5%	150	0.4%	767	2.3%	37	0.1%
2000	35825	4293	12.0%	29996	83.7%	173	0.5%	257	0.7%	1103	3.1%	3	<0.1%
2001	35359	5811	16.4%	28395	80.3%	221	0.6%	202	0.6%	720	2.0%	10	<0.1%
2002	36138	6854	19.0%	27317	75.6%	646	1.8%	246	0.7%	1054	2.9%	21	0.1%
2003	38560	6669	17.3%	30093	78.0%	348	0.9%	270	0.7%	1158	3.0%	22	0.1%
2004	39921	7704	19.3%	30103	75.4%	321	0.8%	476	1.2%	1297	3.2%	20	0.1%
2005	39707	6936	17.5%	29820	75.1%	598	1.5%	621	1.6%	1691	4.3%	41	0.1%
2006	40045	7654	19.1%	29389	73.4%	411	1.0%	590	1.5%	1981	4.9%	20	0.0%
2007	39000	7886	20.2%	26750	68.6%	1524	3.9%	578	1.5%	2142	5.5%	120	0.3%

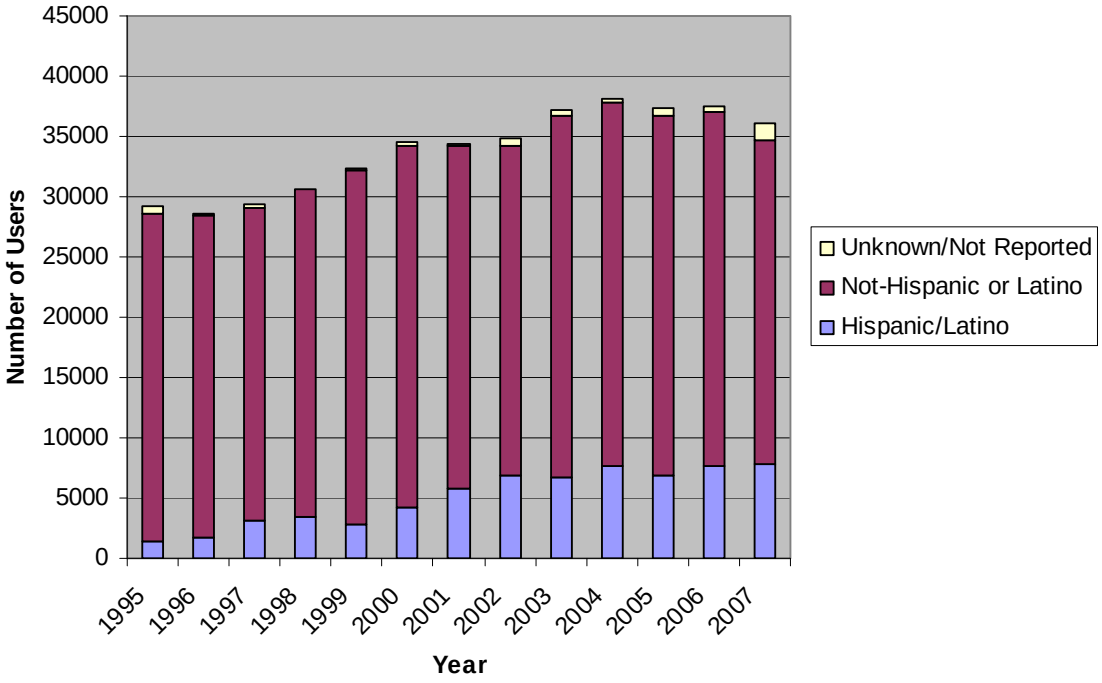


Figure 9. Unduplicated number of Female Title X Clinic Users by Ethnicity, Nebraska 1995-2007.

The age distribution of Title X clinic users is shown in Figures 10 and 11. The annual use by females overall ranged from just over 28,500 in 1996 to a high of 38,128 in 2004 (refer to Table 9). Women aged 20-24 made up the largest percentage of female users every year, averaging 37% and ranging from 35% to 39% annually. In general, females aged 15-19 were the second highest female user age group (average 24%), followed by age 25-29 (19%), 30-34 (17%), age >44 (2%) and age <15 (1%). Over the period from 1995-2009, the proportion of female users aged 30-44 years increased from 14-15% up to 20% in 2007. At the same time, the proportion of female users aged 18-19 years was decreasing from highs of 16-18% (1998-2001) to a low of 12% in 2007.

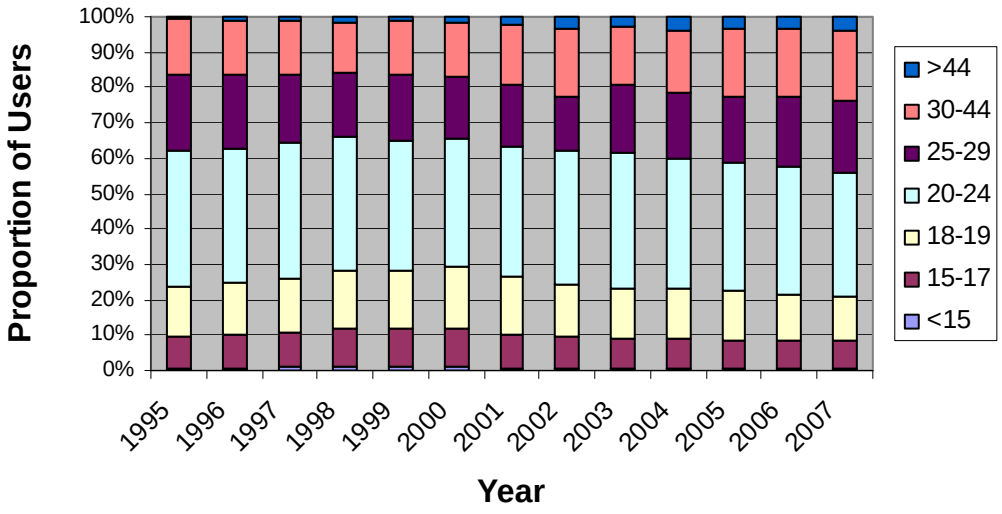
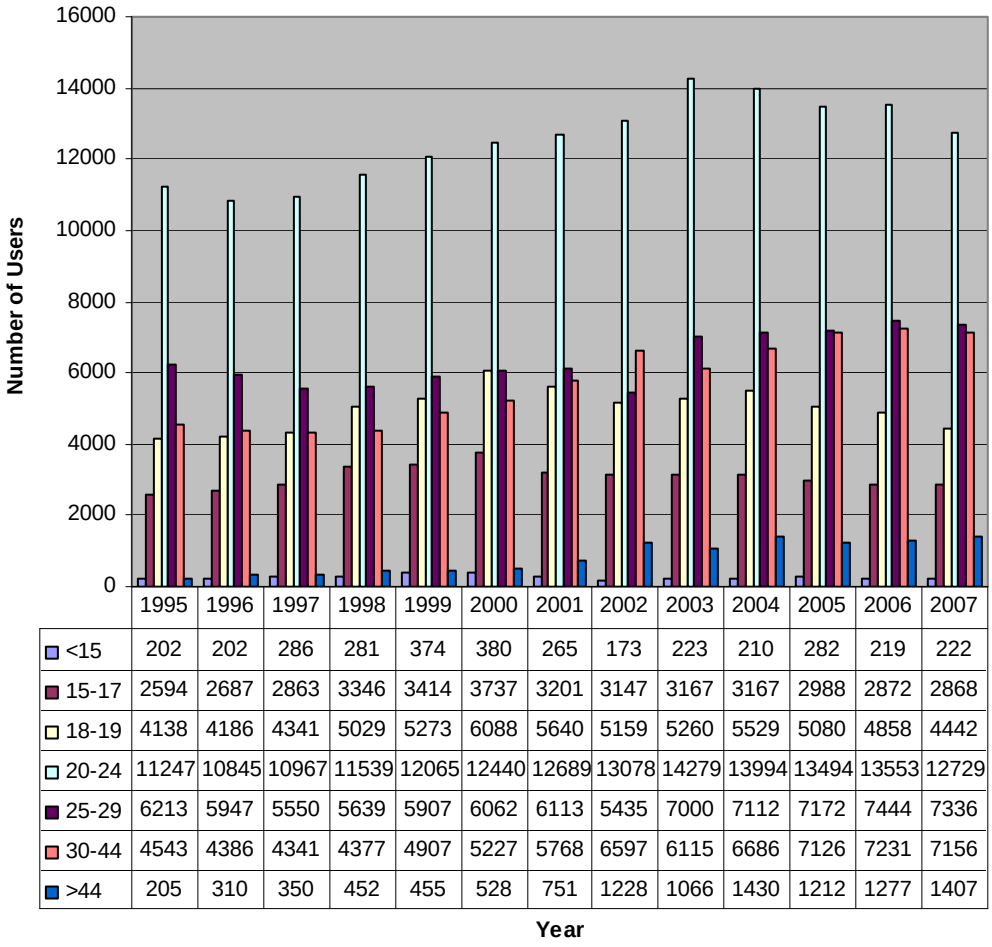


Figure 10. Proportion of Unduplicated Female Title X Clinic Users by Age Group and Year, Nebraska 1995-2007.

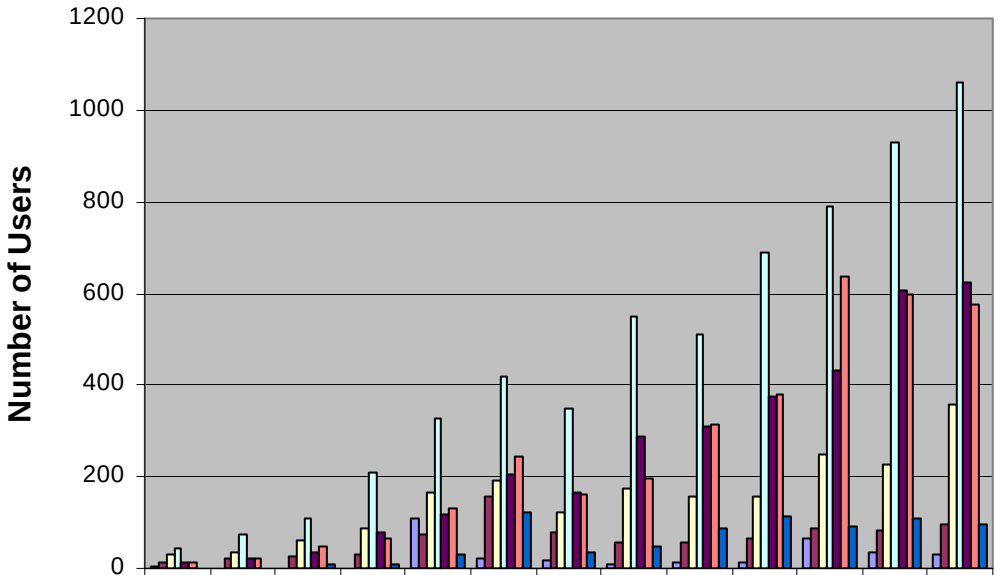


	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	202	202	286	281	374	380	265	173	223	210	282	219	222
15-17	2594	2687	2863	3346	3414	3737	3201	3147	3167	3167	2988	2872	2868
18-19	4138	4186	4341	5029	5273	6088	5640	5159	5260	5529	5080	4858	4442
20-24	11247	10845	10967	11539	12065	12440	12689	13078	14279	13994	13494	13553	12729
25-29	6213	5947	5550	5639	5907	6062	6113	5435	7000	7112	7172	7444	7336
30-44	4543	4386	4341	4377	4907	5227	5768	6597	6115	6686	7126	7231	7156
>44	205	310	350	452	455	528	751	1228	1066	1430	1212	1277	1407

Figure 11. Unduplicated Female Title X Clinic Users by Age, Nebraska, 1995-2007.

In some states, Medicaid expansions for family planning services include coverage for male users, providing services such as condom distribution, sterilization, STD screening/treatment and education. Male use of Title X clinics in Nebraska has steadily increased from 115 users in 1995 to 2840 users in 2007 (Figures 12 and 13). As with females, the largest proportion of male users was aged 20-24 years, ranging from 31% to 43% (average 37%), followed by ages 15-19 (average 22%, range 12% - 36%), 30-44 (average 18%, range 11% - 27%), 25-29 (average 17%, range 10% - 23%), > 44

(average 4%, range 1% - 9%), and < 15 years (average 2%, range 0% - 11%). Over the period from 1995-2007, the proportion of male users aged 18-19 years decreased from 26% in 1995 to 9% in 2004, remaining at 9-12% through 2007. At the same time, the proportion of male users aged 25-29 years was increasing from a low of 10% in 1995 to a high of 23% in 2006. Male users age 30-44 also increased over time from 11% in 1995 to a high of 27% in 2005.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	3	0	0	2	107	24	19	10	15	12	66	34	32
15-17	11	22	25	31	74	157	78	56	56	64	86	83	96
18-19	30	36	61	88	165	190	123	176	158	156	248	227	356
20-24	42	76	107	208	329	417	351	550	510	689	792	931	1061
25-29	12	22	36	78	116	207	166	287	309	376	431	606	625
30-44	13	21	46	64	130	245	161	196	315	381	638	599	575
>44	2	2	7	10	32	123	34	46	87	115	92	111	95

Figure 12. Unduplicated Number of Male Title X Clinic Users by Age Group and Year, Nebraska, 1995-2007.

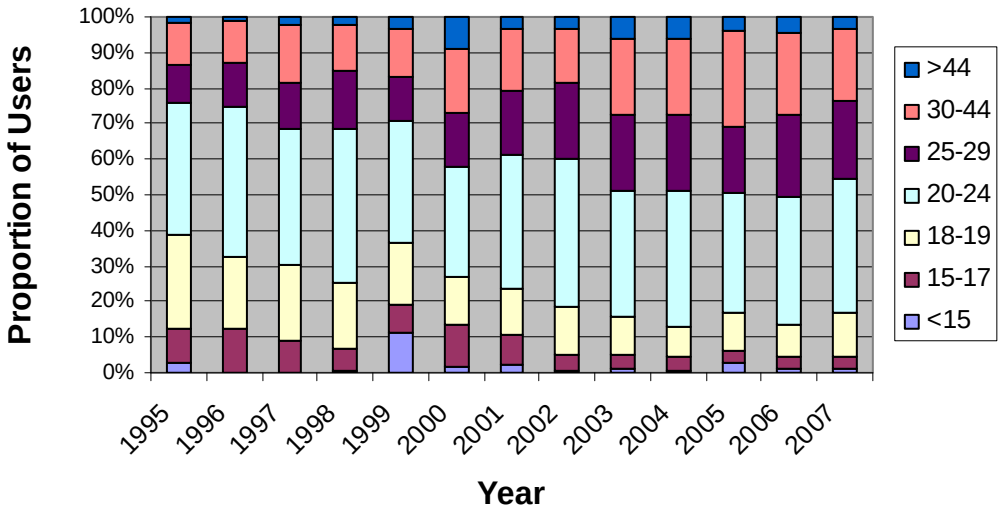


Figure 13. Proportion of Male Title X Clinic Users by Age Group and Year, Nebraska, 1995-2007

Table 13. Title X Clinic Users by Federal Poverty Level, Nebraska, 1995-2007.

	Total	< 101%		101-150%		151-200%		>200%		Unk
Year	Clinic Users	#	%	#	%	#	%	#	%	#
1995	29291	5668	19.4%	16968	57.9%	3055	10.4%	3532	12.1%	68
1996	28742	5738	20.0%	15860	55.2%	2906	10.1%	3938	13.7%	300
1997	29652	6845	23.1%	14194	47.9%	3373	11.4%	4864	16.4%	376
1998	31144	7461	24.0%	10668	34.3%	5664	18.2%	7243	23.3%	108
1999	33349	8665	26.0%	10895	32.7%	5872	17.6%	7562	22.7%	355
2000	35825	9986	27.9%	13234	36.9%	4779	13.3%	7531	21.0%	295
2001	35359	11501	32.5%	10115	28.6%	3242	9.2%	9295	26.3%	1206
2002	36138	11892	32.9%	9698	26.8%	6466	17.9%	6727	18.6%	1355
2003	38560	12835	33.3%	9972	25.9%	4416	11.5%	10880	28.2%	457
2004	39921	15457	38.7%	9139	22.9%	3096	7.8%	10405	26.1%	1824
2005	39707	14638	36.9%	9225	23.2%	2984	7.5%	11233	28.3%	1627
2006	40045	16657	41.6%	8155	20.4%	2774	6.9%	11496	28.7%	963
2007	39000	16973	43.5%	7053	18.1%	3201	8.2%	11398	29.2%	375

Based on Federal Poverty Level, the socioeconomic status of Title X clinic users has also changed over the years (Table 13 and Figure 14). In 1995, individuals falling

between 101% and 150% of FPL made up the largest proportion of clinic users (58%). By 2007, the proportion of individuals in this FPL category served by Title X clinics was reduced to 18%. Concomitantly, the number and proportion of individuals at less than 101% FPL increased over the time period from 19% in 1995 to 44% in 2009. The proportion of individuals at greater than 200% FPL also increased from 12% in 1995 to 30% in 2007.

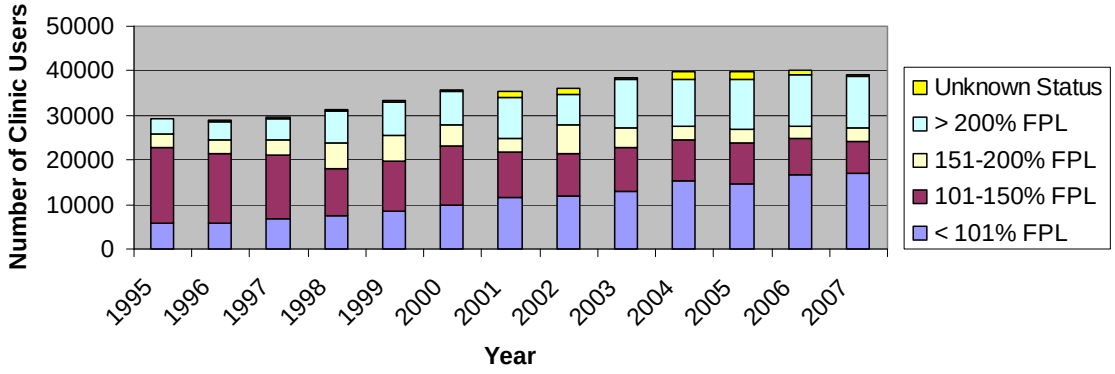


Figure 14. Title X Clinic Users by Federal Poverty Level, Nebraska, 1995-2007.

Beginning in 2005, the Title X Family Planning Annual Reports required reporting on the insurance status of clinic users. The Nebraska summary for the period of 2005-2009 is shown in Table 14 and Figure 15. Each year, the majority of users was uninsured, ranging from 57% in 2005 to 74% in 2007. Approximately 7% of Title X clinic clients had public insurance and 11% to 15% had private insurance. Of note, for approximately one-quarter of clients, insurance status was unknown in 2005 and 2006, which could account for differences in the distribution of insurance status in these years compared with later years.

Table 14. Number and Proportion of Title X Clinic Users by Health Coverage Status, Nebraska, 2005-2007

Year	Total Users	Public		Private		Uninsured		Unknown	
		#	%	#	%	#	%	#	%
2005	39707	2608	6.6%	5661	14.3%	22677	57.1%	8761	22.1%
2006	40045	2628	6.6%	4540	11.3%	23240	58.0%	9637	24.1%
2007	39000	2790	7.2%	5829	14.9%	28706	73.6%	1675	4.3%

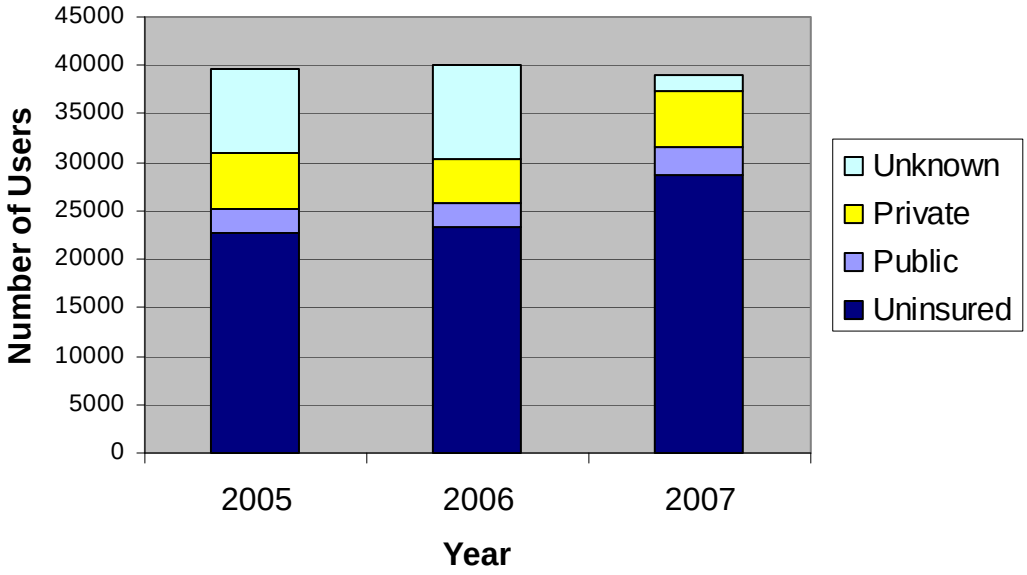


Figure 15. Number of Title X Clinic Users by Health Coverage Status, Nebraska, 2005-2007

Trends in the Nebraska Title X program's payment for services by payment type are shown in Figures 16 and 17. Payment was primarily self-pay, but the percent of self-pay declined over the 15-year period from 93% in 1995 to as low as 51% in 2007. The percentage of pay by private insurance steadily increased from less than 0.1% in 1995 to 17 in 2007, while the percent of pay by Medicaid increased from 7% in 1995 to as high

as 30% in 2006 and 2007. The latter equated to $116,000 in 1995 and over $1.9 million in 2006.

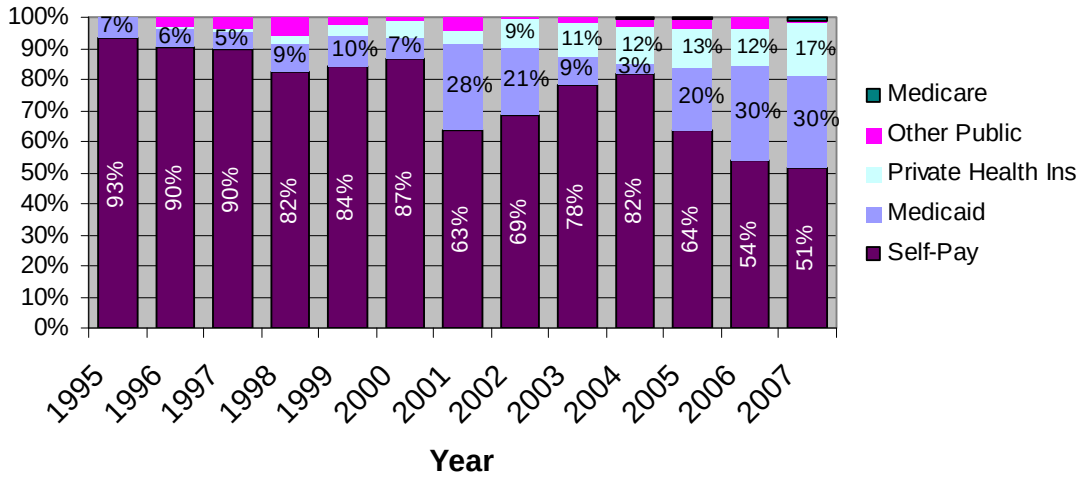


Figure 16. Percentage of Payment for Service Revenue by Payment Type, Nebraska Title X Clinics, 1995-2007

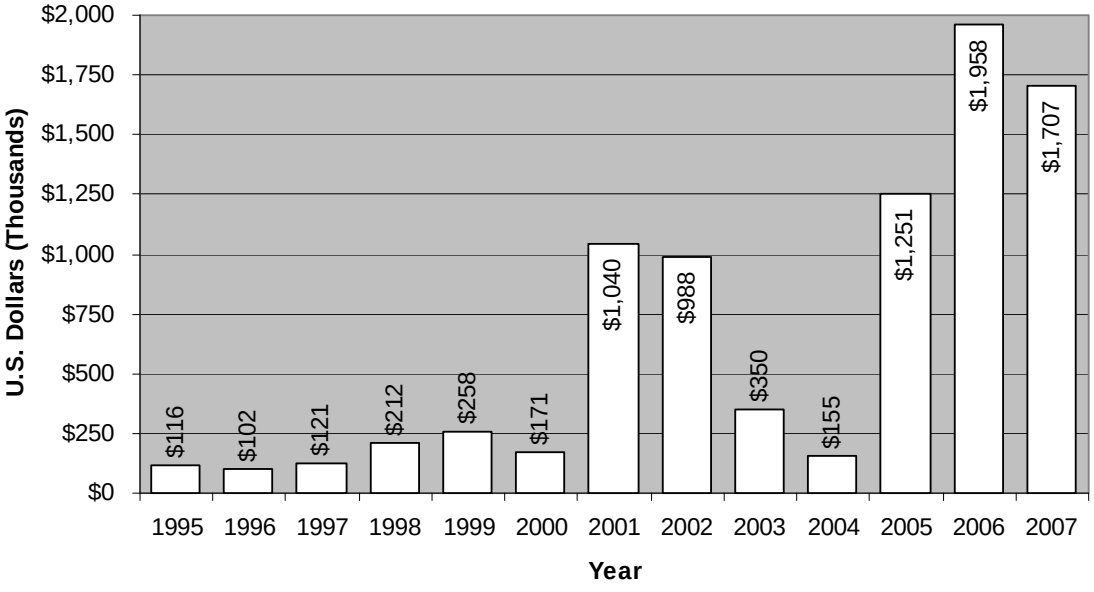


Figure 17. Dollars of Medicaid Payment for Services at Title X Clinics in Nebraska, 1995-2007

Research Question 5: Effect of expanding eligibility to include women up to 200% FPL.

The Nebraska women who currently qualify for Medicaid family planning services are within 60 days post-partum if they are eligible for Medicaid themselves (185% FPL) or if they are ineligible but their unborn/newborn is eligible. The number of women who reported coverage by Medicaid for delivery is shown in Figure 18 for years 2000 to 2008 (weighted percentages, PRAMS: CPONDER). In 2008, the percentage of all deliveries paid by Medicaid was 42.3% (C.I. 39.5-45.2). The number of births in 2008 was 26,992 (Nebraska Vital Statistics). Therefore, the number of Medicaid covered births, hence number of women eligible for post-partum family planning services in 2008 was approximately 11,418 (weighted estimate).

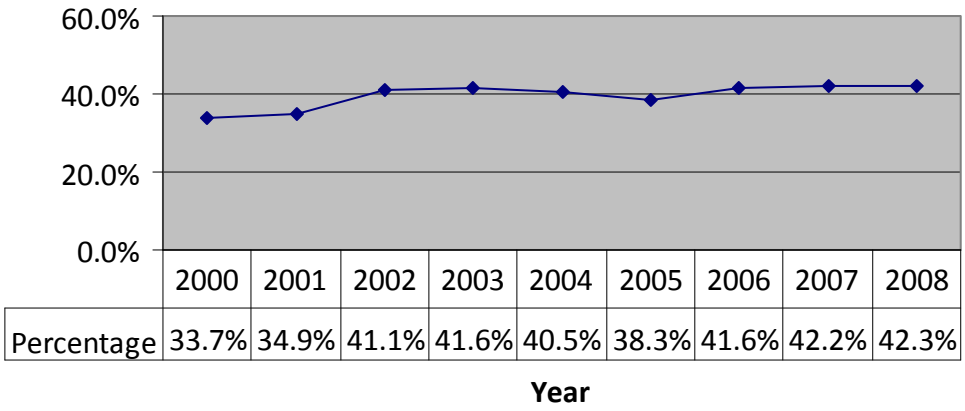


Figure 18. Percentage of Deliveries Paid by Medicaid, Nebraska, 2000-2008.

The number of women who would qualify under an income-based (200% FPL) family planning expansion would be all the low income women of childbearing age (15-44 years) whose household income puts them at less than 200% of the federal poverty level. Based on the Current Population Survey (DataFerrett tool, U.S. Census Bureau),

there were 100,404 women age 15-44 below the 200% FPL in 2008 (Table 15). Most of these additional eligibles would be derived from the expansion to *all* women under 185% FPL; only 4939 additional women (5%) would be eligible due to poverty status at or greater than 185% and less than 200% FPL.

Table 15. Nebraska Women by Age Group and Poverty Status, 2008

Age Group	Total	Poverty Status (FPL)						
		< 100%	100-174%	<185% (i)	175-199%	<200%	200-249%	>250%
15-44	343,862	38,576	53,596	95,465	8,232	100,404	32,734	210,724
15-19	55,413	3,816	5,559	9,375	0	9,375	3,677	42,361
20-24	62,093	11,543	12,442	25,175	2,976	26,961	5,609	29,524
25-29	64,535	8,770	13,166	22,955	2,547	24,483	5,960	34,092
30-34	45,186	7,074	7,247	14,668	867	15,188	6,683	23,315
35-39	50,643	2,464	6,239	9,078	938	9,641	5,093	35,908
40-44	65,992	4,910	8,942	14,214	904	14,756	5,712	45,524

(i) imputed values

Therefore, based on data from 2008, the number of Nebraska women who would qualify for family planning services under a Medicaid family planning waiver based on income eligibility at the 200% FPL limit would increase to 101,404, an increase of 89,986 women (Table 16). With no change, only 3% of women age 15-44 would be eligible for family planning services, compared to 30% under an income based expansion.

Table 16. Impact of Medicaid Expansion for Family Planning on the Number of Eligible Women, Nebraska, 2008

	Eligibles	
	Number	Percent*
No Change (185% FPL, 60 days Post-Partum)	11,418	3.3%
With Income-Based Expansion to 200% FPL	100,404	29.5%
Increase	89,986	26.2%

*Percent of all women age 15-44, n=343,862

Research Question 6: Potential savings or net costs to Nebraska of implementing a Medicaid family planning expansion. Estimation of costs for implementing a Medicaid expansion for family planning required identification of the following cost components and variables: (1) average Nebraska Medicaid expenditure per pregnancy, (2) baseline birthrates for the Medicaid-eligible population (with and without an income-based expansion), (3) expected number of births in the expansion population, and (4) estimated actual births in the expansion population.

Based on Nebraska Medicaid claims data for SFY08 (July 1, 2007 through June 30, 2008), the average Nebraska Medicaid expenditure per pregnancy was $11,519 (Table 17). This includes $9,360 for prenatal care and delivery and $1,975 for medical services for the infant for up to one year (totaling $11,335), plus $184 for family planning services for the recipient (Heidi Burklund, DHHS program analyst, personal communication).

Table 17. Average Nebraska Medicaid Expenditure per Pregnancy

Services	Cost
Prenatal Care / Delivery	$9,360
Medical Services for Infant up to One Year	$1,975
Total Medicaid Cost per Pregnancy	$11,335
Family Planning Services per Recipient	$184
Total Pregnancy & Family Planning Cost per Recipient	$11,519

The total 4-year average (unadjusted) baseline birthrate and the age-adjusted baseline birthrates for the Medicaid-eligible population are shown in Table 18. Overall, 42% (weighted percent) of women with deliveries reported having Medicaid coverage for delivery. Stratifying for age revealed that the prevalence of Medicaid-paid deliveries

was highest in women 20-24 years old (16%; CI: 14.9, 17.0), followed by women 25-29 years (11%; CI: 10.3, 12.1). The prevalence of Medicaid-paid deliveries was lowest among women aged 35-44 years (<3%; CI: 2.2, 3.0).

Table 18. Medicaid Paid Deliveries by Age, Nebraska PRAMS 2005-2008, and Calculated Baseline Unadjusted and Age-Adjusted Birthrates, 2008

A	B	C	D	E	F	G
Age Group	Freq (n)	WT Freq (N)	Weighted Fraction of Births Reported to be Paid by Medicaid (PRAMS) (1)	Estimated # Medicaid Deliveries in 2008: Numerator for Birth Rate (2)	Est. Population of Medicaid-eligible (185% FPL): Denominator for Birth Rate (3)	Births per 1,000; Baseline Birth Rate, 2008 (4)
Total (15-44)	2763	41644	0.41079	11,088	95,465	116.1
15-19	565	6459	0.06371	1,720	9,375	183.4
20-24	1244	16191	0.15972	4,311	25,175	171.2
25-29	853	11338	0.11184	3,019	22,955	131.5
30-34	447	5011	0.04943	1,334	14,668	91.0
35-44	219	2645	0.02609	704	23,292	30.2

(1) Four-year weighted percent of deliveries reported to be paid by Medicaid, PRAMS, 2005-2008

(2) Weighted Fraction X Actual number of births in 2008, NE Vital Statistics (D*26,992)

(3) Current Population Survey, 2008, imputed for 185% FPL

(4) Birth Rate = (E/F)*1000 = (Est. # Medicaid-paid births) / (# of Medicaid-eligible women age 15-44 by age group) X 1000

The total estimated number of Medicaid deliveries in 2008 was 11,088 and was calculated from the weighted percent x actual number of births in Nebraska in 2008 (Table 18). The unadjusted base-line birthrate, calculated from the estimated number of Medicaid deliveries (numerator) and the estimated population of Medicaid-eligible women aged 15-44 years (denominator), was 116.1 births per 1000 population. Stratifying by age allowed for calculation of the fraction of Medicaid-paid births in each age group. The coinciding estimated baseline birthrates varied by mother's age, ranging

from 30.2 births per 1000 population in 35-44 year olds to 183.4 births per 1000 population in women aged 15-19 years old (Table 18).

Table 19. Expected Births by Age Among the Eligible Population for Income-Based Medicaid Expansion for Family Planning, Nebraska 2008

	A	B	C
Age Group	Baseline Birth Rate (per 1,000), 2008 (1)	Est. Population of Medicaid-eligible (200% FPL) 15-44 yrs (2)	Expected Births in Medicaid Expansion Population (3)
Total (Unadjusted)	116.1	100,404	11,662
15-19	183.4	9,375	1,720
20-24	171.2	26,961	4,617
25-29	131.5	24,483	3,220
30-34	91.0	15,188	1,382
35-44	30.2	24,397	738
Total (Adjusted)		100,404	11,676

(1) From Table 18

(2) Current Population Survey

(3) Expected Births = (A*B)/1000

Table 19 displays the results of calculations for expected births in the Medicaid-eligibility expansion groups (based on expansion to 200% FPL), using four-year average baseline birthrates from the current Medicaid-eligible population. The total expected births in a Medicaid expansion population would have been 11,662 in 2008. Using the age- adjusted birthrates, the total expected births would have been 11,676.

In states with ongoing Medicaid family planning expansion projects, the actual births in the enrollees do not match the expected births and have ranged from a low of 16% to a high of 66% of the expected births (63) (Table 20). In South Carolina, actual births were just 16% of expected births during year one of demonstration while in New Mexico, actual births were 66% of expected births during year one of demonstration

(63). Low and high values for "actual" births in Nebraska were estimated by applying these percentages to the expected number of births calculated for Nebraska. If the percent "actual births" were to be 16% of the expected, then the estimated actual births would be 1,868. If the percent "actual births" were to be 66% of the expected, then the estimated actual births would be 7,706. If the actual births were to equal the expected births, there would be 587 more deliveries expected in 2008 with the expansion to 200% FPL. However, the variance in number of births would be 9,220 fewer births with the income-based Medicaid expansion (at the 16% level "actual of expected") compared with 3,383 fewer births at the 66% level "actual of expected").

Table 20. Estimated Actual Births in an Income-Based (<200% FPL) Medicaid Expansion Population and Variance from Births in the 2008 Pre-Expansion Medicaid-Eligible Population, Nebraska

			E: Range of "Percent Actual Births of Expected Births" (1)	
			16%	66%
A:	Estimated # Medicaid-Paid Deliveries in 2008	11,088		
B:	Expected Births in Medicaid-Eligible Expansion Population (age adjusted)	11,675		
C:	Estimated Actual Births in Expansion Population of Enrollees (= B*E)		1,868	7,706
D:	# Births Variance (Expansion vs. No Expansion) (= C - A)	587	-9,220	-3,383

(1) Based on lowest/highest rates among demonstration enrollees as identified in 6 demonstration states (Table 1.2.5a in Edwards, et al, 2003)

The projected additional and net costs to Nebraska of implementing a Medicaid family planning waiver are shown in Table 21. Costs were calculated for three birth activity levels. If the actual births equal the expected births based on baseline

birthrates, then state Medicaid costs could be $3 million. However, if actual births are less than the expected births, as has been experienced by other Medicaid family planning demonstration sites, then Nebraska has the potential for $15 - 40 million dollars in cost savings.

Table 21. Projected Net Costs for Income-Based Family Planning Expansion for Three Levels of Birth Activity (Ratio Actual: Expected Births), Nebraska, 2008

		Ratio of Actual: Expected Births under Medicaid Expansion		
		1.00	0.16	0.66
A	# Medicaid Births Pre-Expansion	11,088	11,088	11,088
B	# Medicaid Births w/ Expansion	11,675	1,868	7,706
C	Projected Birth Variance (Expansion vs. Pre-Expansion)	587	-9,220	-3,382
D	Medicaid Cost per Pregnancy (NE)	$11,335	$11,335	$11,335
E	Medicaid Pregnancy Costs (C x D)	$6,653,645	-$104,508,700	-$38,334,970
F	Federal Share of Medicaid Pregnancy Costs (FMAP = 58.44)	$3,888,390	-$61,074,884	-$22,402,956
G	State Share of Pregnancy Costs (E - F)	$2,765,255	-$43,433,816	-$15,932,014
H	Expected Income Eligible Enrollees (100,404 x 26%)(1,2)	32,129	32,129	32,129
I	Medicaid Cost for FP Services ($184/participant x H) (3)	$5,911,736	$5,911,736	$5,911,736
J	Federal Share FP Services (90%)	$5,320,562	$5,320,562	$5,320,562
K	State Share of FP Services (10%)	$591,174	$591,174	$591,174
L	Net Cost/Savings for Expansion (F + J)	$12,565,381	-$98,596,964	-$32,423,234
M	Federal Share of Net Cost/Savings	9,208,953	-55,754,322	-17,082,394
N	State Share of Net Cost/Savings (G + K)	3,356,428	-42,842,642	-15,340,840

(1) 32% is based on average portion of low income women enrolled in the first year of income-based Medicaid Family Planning Demonstration Programs in six states (range: 10% - 61%; Table 2.2.2a in Edwards, et al, 2003)

(2) N=100,404 (CPS population of Nebraska women 15-44 years, <200% FPL)

(3) Assumes 100% of enrollees are participants (use services); in other states, participants average around 50% of enrollees (Table 2.2.2b, Edwards, et al 2003)

Summary

Using Nebraska PRAMS data from 2005-2008, the first analysis tested the null hypothesis that insurance status is not associated with pregnancy intention in Nebraska

women age 15–44. Findings indicated that 40% of pregnancies were unintended, including 31.6% that were mistimed (wanted to be pregnant later) and 8.4% that were unwanted (did not want to be pregnant then or later). Unintended pregnancies were reported more frequently than intended pregnancies in teens age 15-19 (72.8%), young women age 20-24 (55.6%), non-Hispanic black women (64.7%), women on Medicaid (60.6%) and women receiving public assistance (57.1%). Bivariate analysis for the association between insurance status (Medicaid or private insurance) just before becoming pregnant and pregnancy intention indicated that the odds of unintended pregnancy were higher among women with no insurance (OR=2.18; 95% CI: 1.91, 2.49) compared with women who were insured. Multivariate analysis indicated multiple interactions, making interpretation difficult.

The second analysis tested the null hypothesis that interpregnancy interval (IPI) would not differ by pregnancy intendedness. This analysis also used 2005-2008 Nebraska PRAMS data, but focused on the subset of women age 15-44 that had had at least one previous live birth. Findings indicated that 31.6% of women had short IPIs of less than 18 months, 10.5% had optimal (18-23 months) IPI and the remainder (57.8%) had IPIs greater than 23 months. The association between IPI and insurance status was examined with bivariate analysis after dichotomizing IPI into short ($\leq$18 months) and long (>18 months) variables. This analysis indicated that IPI differed for intended versus unintended pregnancy in that short IPI was 2.3 times higher in women with unintended pregnancy (crude OR =2.3, 95% CI: 1.9, 2.7) compared with intended pregnancy. Short IPI was also more likely in women less than 20 years old, with only one prior birth,

receiving public assistance or on Medicaid before conception. The association remained significant after controlling for all potential confounding variables (aOR=2.2; 95% CI: 1.84, 2.69).

The third analysis tested the null hypothesis that among women with an unintended pregnancy there is no difference in interpregnancy interval by insurance status. Findings indicated that the null hypothesis could not be rejected: among women with unintended pregnancy, IPI did not differ by insurance status.

The fourth analysis reviewed trends in Nebraska Title X Clinic usage, client demographics and revenue sources using Family Planning Annual Reports covering a 15-year period beginning in 1995. Findings included an overall expansion of the number of clinic users as well as changes in the relative proportions of users based on age, gender, race/ethnicity, poverty status, health coverage, and type of payment for service.

The fifth analysis provided estimations of the change in number and percentage of Nebraska women who would qualify under an income-based Medicaid family planning expansion (200% Federal Poverty Level) compared with the current pregnancy care eligibility criteria. Under the current Medicaid system, approximately 11,500 Nebraska women qualify for family planning services (3.3% of women aged 15-44). Under an expansion to 200% FPL, over 101,000 women would be eligible for family planning services (nearly 30% of women aged 15-44).

The final analysis provided estimations of net costs or savings to Nebraska that might be expected upon implementation of a Medicaid family planning expansion. Using data from Nebraska PRAMS, Nebraska Vital Statistics, Nebraska Medicaid program

and the Current Population Survey, estimations of the expected number of Medicaid-paid births, number of income-eligible enrollees, Medicaid costs for pregnancy and for family planning services, overall nest costs of an expansion and the state and federal shares of the net costs were calculated. Findings indicated that, depending on the assumptions, an income-based Medicaid expansion for family planning could result in state costs in the millions of dollars or it could range as high as 10s of millions of dollars in savings to Nebraska.

CHAPTER V: CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

This chapter includes a summary of the study, highlights of the findings for each research question, a discussion on the conclusions, and a review of implications and recommendations for next steps.

Summary of Study

Publicly-subsidized reproductive health services, including contraception, prenatal care, delivery and postpartum care are important for assisting low-income women in adequately spacing their pregnancies, reducing unwanted or unintended pregnancies and delivering healthier babies. There are also public costs for unintended pregnancies, poor birth outcomes, and short-spaced pregnancies, such as costs of high-risk deliveries, ongoing social costs of poor birth outcomes, and costs that occur when a pregnancy/birth creates a family in need of public assistance.

This study asked whether preconception insurance status is associated with pregnancy intention and whether pregnancy intention is associated with optimal interpregnancy interval among Nebraska women. It also reviewed trends in Title X clinic usage and estimated potential net costs or savings to Nebraska that could result from expanding Medicaid coverage for family planning through an income-based Medicaid waiver or a state plan amendment.

There were six research questions addressed in this study. Several of the study questions relied on secondary data analysis of the Nebraska Pregnancy Risk Assessment

Monitoring System (PRAMS) data for survey years 2005-2008. These data are derived from a stratified sample of Nebraska resident women who had a live birth during the survey year and whose infants were registered with Nebraska Vital Records. This is an annual, cross-sectional, population-based survey and data was analyzed as in a retrospective cohort. These data were imported into SAS 9.2 for analysis, which included descriptive statistics as well as binary and multiple logistic analyses. Analysis of administrative data from the Nebraska Title X program Family Planning Annual Reports allowed examination of changes in the characteristics of Title X clinic users for the 13-year period from 1995 to 2007. Net costs or savings estimations relied on data from Nebraska PRAMS, Nebraska Vital Statistics, Current Population Survey and Nebraska Medicaid. Simple cost estimates for Nebraska were based on expected eligibles with and without an income-based Medicaid expansion for family planning, the average Nebraska Medicaid expenditure per pregnancy, the average Nebraska Medicaid expenditure per year for family planning services, and the baseline and expected birth rates of the Medicaid eligible population with and without a Medicaid income-based expansion.

The first analysis attempted to determine whether preconception insurance status was a predictor for pregnancy intention. The results from binary analysis suggested that the odds of unintended pregnancy were higher among women with no insurance (crude OR=2.18; 95% CI: 1.91, 2.49). The second analysis examined the association between pregnancy intention and interpregnancy interval. The results from this analysis supported an alternative hypothesis that unintended pregnancy is

associated with short interpregnancy interval (crude OR= 2.3; 95% CI: 1.93, 2.75). This association remained significant after controlling for confounders of age, race/ethnicity, insurance status, public assistance, education and parity (aOR = 2.14; 95% CI: 1.76, 2.60). Further analysis indicated that interpregnancy interval was not associated with insurance status among women with unintended pregnancy.

Results from the review of Title X clinic FPAR reports demonstrated changing trends in the demographics of clinic users over the period from 1995 to 2007. There were increases in the total number of clinic users and changes in the proportions of users based on demographic characteristics, including an expanding population of Hispanic users, women aged 30-34, and males. The change in the poverty status of clinic users indicates an increasingly needy population, as the proportion of users below 101% FPL increased from 19.4% in 2005 to 43.5% in 2007. In addition, the majority of clinic users (at least 57% and as high as 74%) were uninsured during 2005-2007, while users with public insurance remained steady at about 7%. Payment for service revenue for Title X clinics continues to be primarily self-pay, but this proportion has been steadily decreasing from 93% in 1995 to about 50% in 2007. On the other hand, the proportion of revenue from Medicaid has increased from only 7% in 1995 to 30% in 2007. Revenue from private insurance has also been increasing from less than 0.1% in 1995 to 17% of the payment for service revenue in 2007.

This study also evaluated the impact of an income-based Medicaid expansion for family planning on the number of Nebraska women who would be eligible for covered services and provided estimated net costs or savings of implementing the program.

Under the current criteria for coverage (60-day post-partum care, 185% FPL), the number of eligibles based on 2008 data was 11,418. In that same year, an income-based (200% FPL) Medicaid expansion would have increased the number of eligibles to 100,404, or a change from 3.3% to 29.5% of the women of reproductive age (15-44 years) in Nebraska. Cost estimates for implementing an income-based Medicaid expansion for family planning in Nebraska indicated that, depending on the assumptions, state costs could be on the order of millions of dollars or could range upwards to tens of millions of dollars in savings.

Conclusions

Research Question 1. This analysis tested the null hypothesis that preconception insurance status is not associated with pregnancy intention among Nebraska women age 15-44 whose recent pregnancy resulted in a live birth. The prevalence of unintended pregnancies (40%) in the sample of Nebraska women who had a live birth in 2005-2008 is similar to other states for this same period (state-specific percentages ranged from 30.9%-59.5%) (80). Similar to other studies (45, 63, 81, 82), in the Nebraska cohort there were more women with unintended pregnancies who were under 24 years of age or non-Hispanic black. As in this study, others have reported higher proportions of women with unintended pregnancy who were on Medicaid (43, 45, 83).

Although there is a body of evidence linking insurance status with receipt of health care (39, 50, 84), an unequivocal association between insurance status and unintended pregnancy has not been documented and there are mixed reports from

evaluations of Medicaid family planning demonstrations (63, 69, 70). In this study, the resulting crude odds ratio supports the alternative hypothesis that women with no insurance coverage at the time of conception are twice as likely to have unintended pregnancies (i.e., mistimed plus unwanted) compared to women who are insured (i.e., private insurance/Medicaid combined). Medicaid was combined with other types of insurance following the framework presented in Figure 1, where the association between insurance status and pregnancy intention is expected to be mediated through access to contraceptive services. A similar approach of collapsing Medicaid and other insurance was utilized in an investigation of insurance status and access to care (53). That study reported that uninsured adolescents were more likely than insured adolescents to lack several measures of access to care.

Other studies have reported a relationship between gaps in contraception and insurance status, such that gaps in contraceptive coverage were higher in Medicaid-covered women than in either uninsured or insured (61, 62). However, a previous study testing the association between insurance status and use of family planning services found that while Medicaid-covered women were more likely to receive services than those who were uninsured, this was not true for employment-based insurance or for a combined insurance status category (i.e., Medicaid plus employment-based) (49). The Nebraska descriptive statistics presented here are most similar to the former pattern, such that the prevalence of unintended pregnancy in the study population is highest among women with preconception Medicaid (60.6%) and in the uninsured (53.3%), while women with private insurance had a higher prevalence of intended pregnancy

(69.3%). Other PRAMS-based studies also report a high prevalence of unintended pregnancy among Medicaid-enrolled women (45) and among women with Medicaid-paid prenatal care (83). These results seem especially counterintuitive in light of the fact that Medicaid programs are required by law to cover contraceptive services, while many private insurance plans do not routinely cover reversible contraceptive methods (39). In seeking to understand these differences between Medicaid, insured, and uninsured with respect to unintended pregnancy, or access to services in general, it is important to keep in mind that health coverage by itself does not necessarily equate with coverage for family planning services nor does it assure access to providers of those services (39, 50, 62, 84).

In conclusion, the analysis presented in this study suggests that there is a crude association between insurance status (Medicaid plus private insurance) and pregnancy intention. However, the interaction between insurance status and confounders (age, race/ethnicity, education, public assistance, parity) is complicating the interpretation of the association between insurance status and unintended pregnancy. While it was beyond the scope of this work to untangle these relationships, future analysis should address these potential effect modifications, as well as investigate separately the relationship between Medicaid status and unintended pregnancy compared with private insurance and unintended pregnancy.

Research Questions 2 and 3. This analysis tested the null hypothesis that interpregnancy interval does not differ by pregnancy intendedness. A follow up hypothesis evaluated whether there is a difference in interpregnancy interval by

insurance status among women with an unintended pregnancy. In the Nebraska study population, short interpregnancy interval (<18 months) was more common in mothers who were Medicaid-recipients, under 25 years of age, or receiving public aid. Other studies have reported these same maternal characteristics related to short interpregnancy interval (63, 85). The results reported here for Nebraska also showed a high proportion of unintended pregnancies with long (>23 months) interpregnancy interval. This would be consistent with the notion that older women may stop contracepting because they no longer believe they are at risk for pregnancy (41).

After dichotomizing interpregnancy interval and controlling for other covariates, pregnancy intention remained a predictor for short interpregnancy interval. As in other reports, maternal age was inversely correlated to short interpregnancy interval and women receiving public assistance were more likely to have short IPI (63, 85).

The results presented here also indicate that among women with unintended pregnancy, interpregnancy interval was not associated with insurance status. In paired state comparisons, the CMS evaluation also did not find a significant change in the percentage of women with short interpregnancy intervals (<18 months) after implementation of a Medicaid expansion in one of each pair of states studied (63). However, there is some evidence that insurance status can affect interpregnancy interval. In Rhode Island, for example, the prevalence of very short interpregnancy intervals (under 9 months) was 20% before implementing RIte Care, a Medicaid family planning expansion, and by four years after implementation the prevalence had dropped to 11% (3). In addition, before Rhode Island's expansion, interpregnancy

interval differed by insurance status: women with Medicaid-funded births were more likely (42%) than women on private insurance (31%) to have short interpregnancy intervals (<18 months). This disparity was eliminated within two years after Rite Care was implemented (3).

These mixed results for the effect of insurance status on interpregnancy interval are consistent with the idea that extending coverage, alone, is not a sufficient intervention for addressing interpregnancy intervals or unintended pregnancy. The influence of a combination of other factors (social, financial, knowledge, provider base, bureaucracy) should also be considered (39, 83).

Research Question 4. This analysis reviewed Nebraska Title X Clinic usage, client demographics and service revenue sources then presented the historical trends. In addition to an expansion in the number of clients served annually over the 15-year period of review, there have been changes in the relative proportions of users based on age, gender, race/ethnicity, poverty status, health coverage, and type of payment for service. The highest proportion of female users across all years has been women aged 20-24 years. The Nebraska trends also show increasing numbers of female clinic users who are 30-44 years old as well as increasing numbers of male clients and Hispanic clients. These trends are similar across the country (86). Nationally, half of the 2007 Title X clinic users were in their 20s, approximately 25% were less than 20 years and about one quarter (24%) were 30 years or older. In Nebraska, 55% of users were in their 20s, 21% were less than 20 years and 24% were 30 years or older. Nationally, the number of male users more than doubled from 1999 to 2007, while in Nebraska the

number of male users tripled during the same time period. Nebraska also reflected national trends with respect to ethnicity. In Nebraska, the percentage of female Title X clinic users reporting Hispanic/Latino ethnicity increased from 8% in 1995 and 20% in 2007. Nationally, the percentage of clinic users reporting Hispanic/Latino ethnicity increased from 17% in 1999 to 26% in 2007 (combines male and female Hispanic/Latino users).

Of note, the trends for Nebraska indicate that the increase in clients served comes primarily from increased numbers of individuals with incomes above 200% FPL. Below this level, the number of users has not changed substantially over time, but the proportion of clinic users with incomes less than 101% FPL has increased dramatically in 13 years, from 19% to 44%. Title X requires priority be given to individuals with documented incomes at or below 100% FPL and these clients may not be charged for services (86). Hence, this trend indicates a growing financial burden on Nebraska Title X clinics. While this trend is concerning, Nebraska has fared better than most states. Nationally, the proportion of Title X users with incomes below the poverty level was 69% in 2007 (86). Only two states or territories had lower proportions than Nebraska of users with incomes at or below 100% FPL: Connecticut (25%) and Vermont (34%). Louisiana and Puerto Rico had the highest proportions at 90% and 93%, respectively. As in Nebraska, the national trend for poverty status in clinic users demonstrated an increase over the time period from 1999 to 2007, growing 4 percentage points from 65% in 1999 (86).

Also of note, the payment for service revenue payer mix has changed over time, with self-pay making up 93% of the service revenue in 1995 and only 51% of the service revenue in 2007. This trend has been offset by an increasing proportion of payment for service revenue from Medicaid (30% in 2007 up from 7% in 1995). Similar trends were seen nationally, with decreasing client collections between 1999 and 2007 and an increasing proportion of revenue from Medicaid (actual proportions are not comparable, because the national FPAR reported these based on a denominator of total revenue and this study used a denominator of total payment for services revenue) (86).

Research Questions 5 and 6. This study evaluated the impact of an income-based Medicaid expansion for family planning services with regard to the number of women who would be eligible for covered services and the potential net costs or savings related to implementation of the program. In Nebraska, a Medicaid expansion from the current 185% FPL, pregnancy care based, 60-day post partum eligibility to an income-based eligibility up to 200% FPL would provide nearly 90,000 more women with access to family planning services. Calculations of the expected costs to cover an expanded population of eligibles balanced against the estimated savings from the potential reduction in unintended pregnancies provided an overall State savings estimation ranging from $15 - $40 million dollars. Overall net savings were estimated to range from $32 million to nearly $99 million. In states with family planning demonstrations that were evaluated by CMS (63), state shares of the net savings ranged from a low of $650,000 in New Mexico to $64 million in California. In each of three states (Arkansas, New Mexico, and South Carolina) in another study, which had multiple years of data

included in the evaluation, the state share of the savings increased in each successive year of the demonstration, such that Arkansas had increased savings from $5 million in the first year to nearly 9.5 million in the second year, New Mexico saved over $2.6 million by the third year and South Carolina jumped from $4 million to $7.4 million of savings in three years. A separate study of the family planning demonstration in Wisconsin reported a net savings of $124 million during one year of the project and averaged over $120 million per year for a 4-year period. The estimated net savings calculated for Nebraska are not unreasonable based on the net savings reported for other states that have already implemented family planning demonstrations.

Recently, the Guttmacher Institute provided state-specific estimates on savings from the state plan amendment (SPA) for family planning provision that was allowed in the 2010 health reform legislation (87). The estimates included (1) the number of likely participants in the family planning expansion to 200% FPL, (2) the number of family planning service users, (3) the change in contraceptive use and method type, (4) the number of averted unintended pregnancies, abortions, births, (5) total costs for averted births, (6) cost of the expansion, and (7) overall net costs/savings and state costs/savings. The cost calculations accounted for administrative, outreach, transportation and other implementation costs. First year start up as well as mature year cost estimates were calculated. To determine Medicaid family planning user rates for states like Nebraska that did not yet have expansion programs, program usage rates from 17 expansion states were averaged (average usage rates = 30% for year one, 50% for mature years – 3 or more years later) and these were applied to the likely number of

participants in each state. Estimates for Nebraska included 19,500 newly eligible participants and approximately $400,000 in state savings in year one of program implementation, growing to approximately $8 M state savings in a mature year. While the Guttmacher estimates were based on a more sophisticated method than was possible in this study, both results indicated that Nebraska could benefit from a Medicaid expansion for family planning.

Implications and Recommendations

The goal of expanding Medicaid coverage for family planning services is to reduce public costs by providing access to reproductive health services for low income women. This approach relies on the following reasoning: providing coverage for family planning services in the short-term will save dollars in the long run by reducing unintended pregnancy and increasing interpregnancy intervals. Birth outcomes are associated with interpregnancy intervals and pregnancy intention; the quality of these health outcomes affects the costs borne by the public. Therefore, reducing the potential for unintended pregnancy and non-optimal interpregnancy interval should reduce public costs, including health care, education, social services, and other societal costs.

In Nebraska, many of the public costs of unintended pregnancy are borne by the Medicaid system which, according to the findings of the Medicaid Reform Act of 2005, was not “fiscally sustainable” and required reform to reduce the expenditure grown and ensure that medical services could continue to be provided to low-income residents. Medicaid is the largest purchaser of maternity care in the United States and low income

children and parents make up 33% of the Medicaid costs in Nebraska. Furthermore, a 2006 report by the Alan Guttmacher Institute indicated that Nebraska ranked lowest in the nation on efforts to assist women with contraceptive services and also did poorly on leveraging state and federal funds to support delivery of subsidized services.

Policymakers in Nebraska are considering expanding Medicaid eligibility for family planning as one a strategy to reduced state expenses. However, there is a gap in state-specific evidence on trends in publicly subsidized family planning services. There are also questions about the success in other states of Medicaid expansions for family planning and whether or not Nebraska would find implementation to be cost-effective.

This study set out to determine whether there is an evidence base for the association of insurance coverage with unintended pregnancy among Nebraska women and whether optimal interpregnancy interval is associated with pregnancy intendedness. This work also reviewed Title X clinic trends and calculated simple estimates for the net costs of a Medicaid expansion in order to determine whether expanding coverage is an approach that should be pursued in Nebraska.

Insurance status and unintended pregnancy. The results of this study suggest an association between insurance status and pregnancy intention. These results are consistent with the underlying rationale of a Medicaid family planning demonstration is to provide coverage for family planning services to low-income women such that their use of the services will "decrease their likelihood of having unintended or untimely pregnancies" (63). It follows that if coverage in Nebraska is associated with reduced unintended pregnancy, then expanding coverage to women in need of contraceptive

services should decrease the rate of unintended pregnancies (and, ultimately, public costs). While there is growing evidence that this approach can be successful and cost-effective (63, 69, 70), there has not been a robust or consistent reduction in rates of unintended pregnancy in states with Medicaid family planning demonstrations and in some states these rates have even increased (63). Additional information could be helpful in determining the potential for success of reducing unintended pregnancy in an individual state. For example, this study evaluated the role of insurance in unintended pregnancy among Nebraska women who delivered live births. However, it would be helpful to determine whether unintended pregnancy is different among a more focused population: Medicaid-covered versus Medicaid-eligible but uninsured women, as this is the actual target population for an expansion. An analysis of this type would require a data set containing a variable for poverty status, which cannot be specifically calculated from PRAMS data, since the PRAMS income variable is categorical. Knowledge of the rate of unintended pregnancy in the expansion target population would help to clarify the potential net costs and would help in planning strategies for recruiting and outreach to the target population.

In addition, it would be valuable to stratify unintended pregnancy, drilling down to ask whether there is a relationship between Medicaid status and unwanted versus mistimed (wanted later) pregnancy. This study determined that 31.6% of Nebraska women aged 15-44 having a live birth reported a mistimed (wanted later) pregnancy and only 8.4% reported an unwanted pregnancy. If the two are affected differently by insurance status, the baseline relative proportions of unwanted and mistimed

pregnancies in the eligible population could influence the effectiveness of a Medicaid expansion. Again, depending on the typical characteristics of the women with mistimed versus unwanted pregnancies, participant recruitment and outreach might require different strategies for these subpopulations. In addition, the intervention (i.e., providing Medicaid coverage) for these two populations may have different effects on the magnitude of the potential savings for downstream medical, social and economic costs (39).

Unintended pregnancy and interpregnancy interval. The results of this study provide evidence for an association between unintended pregnancy and interpregnancy interval. Previous reports have documented that short interpregnancy intervals are associated with adverse perinatal outcomes such as LBW, SGA, and preterm birth (26-31). Unintended pregnancy has also been implicated in poor birth outcomes (39, 43-45). These poor birth outcomes are associated with higher costs, including health care, education, social services, and other societal costs. In Nebraska, women currently lose coverage for family planning services at 60 days postpartum, or 16 months short of the optimal interpregnancy interval. This absence of coverage increases opportunities for unintended pregnancy and a short interpregnancy interval. Therefore, these two risk factors offer targets for intervention that could lead to a reduction in Medicaid costs in Nebraska.

Although there is good evidence for cost-effectiveness, the Medicaid family planning demonstrations have not provided strong, consistent evidence of reductions in unintended pregnancy and interpregnancy interval in the eligible populations of

demonstration states (3, 63, 70, 72). The CMS evaluation suggests that states focus on eligibility structure and enrollment efforts in order to improve the effectiveness of their efforts (63). It would be helpful to states that are considering Medicaid family planning waivers or state plan amendments, to have access to comparisons among demonstration states of these attributes, plus the demographic characteristics of target populations, cost structures, administrative processes, outreach efforts, program quality improvement efforts and lessons learned in order to gauge the potential for success under their circumstances. The first Medicaid family planning demonstrations began 18 years ago and, to date, 27 states have experience that could be shared with the 23 states for which the option is under consideration.

Title X trends. Knowledge of the trends in the demographic, social and economic profiles of Nebraska Title X clinic users, as well as the trends in Title X program payment for services revenue, is important baseline information for informing future policy and program decisions. Such decisions will need to consider the changing demographics of clinic users, including the increasing proportion of clients living in poverty, and the trends in payer mix, including an increasing demand on Medicaid as payment for services revenue. These trends are also necessary as baselines from which to measure success of future program initiatives, potentially to include a state plan amendment or Medicaid waiver for family planning services. For example, an evaluation of Alabama's Medicaid family planning demonstration program included trends in demographic profiles of Title X clients before and after program implementation (88) and a CMS evaluation of several demonstration states compared the composition of funding

through Title X providers in pre and post demonstration periods (63). Evaluations such as these require an understanding of the underlying trends in the variables of interest in order to assess the magnitude of the impact of the demonstration project. The results presented here provide a first step in understanding the baseline trends in use of reproductive health services by low income women in Nebraska.

Costs of an Expansion through Medicaid Waiver or SPA. To date, twenty-seven states have implemented Medicaid family planning eligibility expansions, demonstrating considerable cost savings along with progress on health goals. Cost estimations calculated for Nebraska in this work and by others (87) indicate that Nebraska has the potential to save millions of dollars by implementing an income-based state plan amendment that would expand eligibility to 200% FPL.

There are additional Nebraska-specific factors that might be researched and evaluated in anticipation of an expansion; this additional analysis could help inform policymaker actions as well as assist in the strategic planning for, and evaluation of, a Medicaid expansion. These factors include: demographics of target expansion population; rates (and trends in rates) of interpregnancy interval, unintended pregnancy and the underlying ratio of unwanted to mistimed pregnancies among the current and proposed eligible population; provider capacity, readiness, and distribution relative to location of target expansion population; minimum goals for participation and service use that would be necessary for success; potential outreach and program participation recruiting efforts and the related costs. In addition, Nebraska should evaluate the cost relationships for family planning expenditures versus maternal child health

expenditures, taking into account the Federal Medical Assistance Percentage (federal matching shares for Medicaid) in order to determine the ease for meeting goals for averted births (63).

Summary Recommendation

To reduce public costs and improve the health of Nebraska women and their babies, Nebraska should consider an income-based Medicaid family planning waiver or state plan amendment to expand eligibility for family planning services.

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