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The Cost of Unintended Pregnancy in Iowa: A Benefit-Cost Analysis of Public Funded Family Planning Services

Belinda Udeh
University of Iowa

Mary Losch
University of Northern Iowa

Erica Spies
University of Iowa

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Belinda Udeh, MPH, PhD
Assistant Research Scientist
Public Policy Center
University of Iowa

Mary Losch, PhD
Center for Social & Behavioral Research
Department of Psychology
University of Northern Iowa

Erica Spies, MS
Graduate Research Assistant
University of Iowa

For further information, contact:
Belinda Udeh, Public Policy Center, University of Iowa
217 South Quad, IA 52242
319-384-2852 belinda-udeh@uiowa.edu

PublicPolicy Center

University of Northern Iowa

THE IOWA INITIATIVE to Reduce Unintended Pregnancies

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Preface

Benefit-cost analyses of family planning services in Iowa were conducted in 1988 and in 1992. Much has changed since 1992, however, making an updated analysis important. As the demands on available resources for healthcare continue to increase, this report provides valuable information to policy makers in determining priority areas when formulating public policy.

Overall, the results do not differ greatly from those of the previous studies. Family planning services remain cost-effective from a public perspective. This suggests that the costs of supporting family planning services in Iowa are less than the costs that would be incurred by taxpayers in the absence of such services. The ratios reported here, while still cost-effective, are lower than those reported in 1992. There are a number of reasons for this.

First, there are many more methods available today for family planning. While several of these methods are more costly, they are also more effective. In addition, their costs are often seen on the front end, especially when considering implant and intrauterine devices. When we consider only one year of family planning cost data, the long-term benefits of these initially more costly methods are not evident. To overcome this limitation, a more robust sensitivity analysis was conducted. This analysis used the most recent and Iowa-specific data available, and was conducted assuming a number of different scenarios.

Second, a different approach was taken in determining the cost per client per year for family planning services. In previous reports, the per patient cost was calculated by dividing public funding expenditures by the number of patients served below 150% of the poverty level. This methodology has the potential to underestimate the true of cost of providing services, as it assumes that all public funding is being spent only on clients below 150% of poverty. It also does not account for the continual enrollment and disenrollment of clients, thereby artificially inflating the number of clients served when annual costs are considered.

To overcome these methodological limitations, the cost data for this analysis were determined from women enrolled in the Family Planning Waiver Program. An average cost per member per month was calculated and then converted to an annual cost. This allowed us to account for the fact that enrollment is not static, to account for all public funding, and to account for women being enrolled in the program for a 12-month period.

In the 1992 report, no incremental WIC value could be determined. This value was determined for this report, however, and was included in the calculations for households already eligible for assistance.

Finally, the previous studies reported a different rate when discounting future benefits in the five-year benefit-cost ratios. Discount rates reflect the opportunity cost of money, and are generally derived from financial markets. The basic premise suggests that more people would value $1 today than $2 in the future. With health care

interventions, a lower discount rate has been used on the assumption that society has a different preference for health care than for other goods on the market (Haddix, Teutsch, Corso 2003). Evaluations in the past have commonly used 5% (as did the 1992 report). However 3% has since been recommended by the U.S. Panel on Cost-Effectiveness in Health and Medicine as most appropriate in reflecting the lower trends in interest rates (Drummond, Jefferson 1996). By using a lower discount rate in this analysis, the expected benefits were not discounted to the same level as in previous studies.

Executive Summary

Unintended pregnancies continue to be a public health concern in the United States. An analysis of publicly funded family planning services was conducted for the state of Iowa in order to determine the benefit of averting unplanned pregnancies with the voluntary use of such services. The benefits are reported via a benefit-cost ratio with the benefit representing the potential avoided public expenditures for every dollar spent on family planning.

Iowa data were used for this analysis to ensure the values reported were representative of the state. The base year reported is 2009, with the scope of the study limited to women being served by publicly funded family planning clinics. An overall public perspective was adopted for the analysis wherein only avoided public expenditures were included.

For this study, the accepted measure of benefits generated is expenditures avoided. These expenditures include all the public funds not spent if an unintended pregnancy is avoided or postponed. Public funds avoided include welfare assistance such as Family Investment Program; Food Assistance; Women, Infants and Children Program; and Child Care Assistance. Avoided public funds also include medical assistance such as Prenatal and Delivery Reimbursements; Pediatric Reimbursements; Maternal Health Reimbursements; and Vaccines for Children. As this study only includes a public perspective, the individual benefits of averting or delaying a pregnancy, including improved earning power, changes in health risk, and emotional benefits, are not included.

The majority of women receiving publicly funded family planning services either currently receives public assistance or would become eligible for assistance with the increase in family size through the birth of a child. The expected savings are dependent upon the mothers' eligibility for assistance at the time of the birth. For example, for a mother who is currently eligible for assistance, a birth would increase the amount of that assistance. It is only the increase that is used in calculating the expected savings (benefits). In contrast, for a woman who becomes newly eligible for assistance due to a birth, the full sum of welfare assistance and medical assistance for which she has become eligible is included in the expected savings (benefits). The expected savings are also dependent on the timeline for which the expected savings are forecast. To overcome these dependencies, calculations were determined for different assistance eligibility criteria and for two time horizons—one year and five years. Households were also only assumed to be a household of two with the birth of a child, and hence this analysis may result in an underestimation of the expected benefits.

The total cost savings as discussed above were adjusted by the probability of averting a birth with the use of family planning services. A set of age-related probabilities was used that were estimated from a survey of nationwide family planning clinics (Chamie, Henshaw et.al. 1981). Sensitivity analysis was performed around the probability of

averting a birth variable to address the limitations of available data and to test the robustness of the results to changes within this probability.

The cost in the denominator of the benefit-cost ratios is the annual cost per client receiving publicly funded family planning services. This cost was calculated based on the average cost per month for a woman enrolled in the family planning waiver program.

The following general formula was used in calculating the benefit-cost ratios based on eligibility criteria—already eligible for assistance, newly eligible (prenatal and delivery reimbursements not included), and newly eligible (prenatal and delivery reimbursement included)—and for a one-year and five-year time horizon.

1. Total cost savings derived from a single birth multiplied by the probability of averting a birth as a result of family planning services, to obtain adjusted savings

2. Adjusted savings divided by the average one-year family planning expenditure to obtain a ratio of the number of dollars saved for every dollar spent.

The limitations surrounding the data choices and in the results are discussed in the main report. A summary of the benefit-cost ratios is provided in the tables below. All benefits are in relation to a cost denominator of 1 dollar.

Weighted Average Benefit-Cost Ratios by Eligibility Criteria

Time Period	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
I year	3.40	2.92	3.78
5 years	10.84	14.30	15.12

One-Year Benefit-Cost Ratios by Eligibility Category

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14-19	3.97	3.37	4.34
20-24	3.40	2.87	3.74
25-29	3.66	3.25	4.14
30-34	1.64	1.48	1.88
35-44	0.93	0.90	1.13

Five-Year Benefit-Cost Ratios by Eligibility Category

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14-19	12.71	16.30	17.23
20-24	11.24	14.65	15.52
25-29	12.26	16.56	17.45
30-34	5.46	7.57	7.98
35-44	3.10	4.68	4.92

Results show that although costs of methods have increased, the potential avoidable cost has also increased and family planning services remain cost-effective from a public perspective.

Using weighted averages across age categories for a woman newly eligible for public services, including prenatal and delivery reimbursement, the ratio of benefit to cost for a 1-year time period is 3.78 – that is, for every dollar spent on family planning $3.78 is saved in averted costs. Analyzing a 5-year time frame, the ration of benefit to cost increases to $15.12. Within age categories, the greatest cost savings appear among teen mothers (newly eligible and including prenatal and delivery reimbursement) wherein $4.34 is averted for every dollar invested in family planning. The one-year analysis demonstrates cost savings for every age group when prenatal and delivery reimbursement are included in the costs considered. Extending the analysis to five years, the cost savings range from $4.92 for women 35-44 to $17.23 for those 14-19 when prenatal care and delivery reimbursement are included.

The overall implication of these findings suggests that in Iowa, the costs associated with providing publicly funded family planning services to eligible women is less than the potential public expenditures that can be averted through the avoidance or postponement of an unintended pregnancy.

Introduction

Unintended pregnancies continue to be a serious public health concern in the United States. Nationally, 43% of births to 18-44 year olds can be classified as unintentional (Ahluwalia, Whitehead, & Bensyl, 2007). In Iowa, approximately 50% of pregnancies are unintended (Losch, 2007). Access to and use of family planning services is an integral part of reducing the number of unintended pregnancies.

Public funding for family planning services can not only help women maintain their reproductive health and achieve their childbearing goals, but can also save state and federal governments' dollars. In 2002, the total direct medical costs of unintended pregnancy in the United states was $5 billion, with births resulting from unintended pregnancies accounting for more than 75% of the direct medical costs (Trussell, 2007). This estimates that the average direct medical cost of an unplanned pregnancy is approximately $1,600.

Research has shown that preventing unintended pregnancy is cost-effective (Amaral, Foster, Biggs, Jasik, Judd, & Brindis, 2007; Forrest, & Samara, 1996; Forrest & Singh, 1990; Frost, Finer, & Tapales, 2008; Trussell, 2007). Past research suggests that contraceptive use alone saves approximately $19 billion in direct medical costs each year (Trussell, 2007). In a national study of U.S. publicly funded family planning clinics conducted by Frost and colleagues (2008), prevention of unintended pregnancies led to a total public sector savings of $4.3 billion dollars. The study further suggested that states save approximately $4 for every $1 spent on family planning services.

In the U.S., public family planning services are intended to allow poor and low-income women to attain their childbearing goals and to avoid unintended pregnancy. Such services provide numerous benefits to low-income women, including better birth spacing (Conde-Agudelo, Rosas-Bermudez, & Kafury-Goeta, 2006), along with the economic benefits that accrue to families and society due to personal and public cost savings associated with fewer unintended pregnancies (The Alan Guttmacher Institute, 2000). Generally, family planning clinics offer services to the general public using public funds to provide free or reduced-fee services to clients (Fowler, Gable, & Wang, 2008). Services offered through public funded family planning clinics include contraceptive services, screening for sexually transmitted infections, and referrals to other health and social services (Lindberg, Frost, Sten, & Dailard, 2006). In terms of contraceptive services, oral contraceptives are the only method provided by all family planning clinics; however, more than 90% of centers offer male condoms and Depo-Provera, 80% offer emergency contraceptive pills, and approximately 30% offer tubal sterilization and vasectomy (Lindberg et al., 2006). Family planning clinics are operated by a diverse range of provider agencies, including public health departments, Planned Parenthood affiliates, hospitals, and community health centers.

State programs that provide subsidized family planning services include Title X of the Public Health Service Act, the Maternal and Child Health and social services block grants, and Medicaid (The Contraception Report, 1998). The programs serve women at high risk for unintended pregnancy and health complications, and include women

who are economically disadvantaged, young (ages 15-19), and unmarried. Title X of the Public Health Services Act is the only federal program in the United States dedicated to supporting family planning services. This federal program requires funded clinics to offer free family planning services to women with incomes less than 100% of the federal poverty line (FPL) and services at reduced fees for women with incomes between 100% and 250% of the FPL. Medicaid reimburses providers for contraceptive services they provide to women enrolled in the program. Health departments and Planned Parenthood clinics serve the largest percentage of women who receive contraceptive services through public funding.

The state of Iowa has a Family Planning Waiver program (Iowa Family Planning Fact Sheet, 2006). This waiver enables the state to cover family planning services for women enrolled in Medicaid who would lose coverage postpartum, and women ages 12-44 with incomes at or below 200% of the FPL. Women enrolled in the Iowa Family Planning Waiver program are not required to pay premiums or co-payments for services. Services covered by the waiver include medically necessary services and supplies related to birth control, pregnancy prevention and preventive services, including contraceptive management, patient education, counseling, and referral as needed to other services (contraceptive counseling and information, contraceptive supplies, office visits, voluntary sterilization, and laboratory examinations and tests).

Over the past decade, new contraceptive methods have been developed and made available to women (Mosher, Martinez, Chandra, Abma, & Wilson, 2004). Since the mid-1990s, Title X family planning clients have been utilizing different methods; the proportion of women using oral contraceptives has decreased, and the proportion using condoms and injectables has increased (Frost & Frohwirth, 2005). Generally, the most common birth control method used among women ages 18-24 and 25-34 are oral contraceptives (Bensyl, Iuliano, Carter, Santelli, & Gilbert, 2005). For women between the ages of 35 and 44, tubal ligation and vasectomy of their partner are the most common birth control methods (Bensyl, 2005).

The implant and the intrauterine device (IUD) have been found to be the most cost-effective contraceptive methods (Foster, Rostovtseva, Brindis, Briggs, Hulett, & Darney, 2009; Trussell et al., 1995). For every $1 spent for services and supplies associated with these two methods, $7 was saved (Foster et al., 2009). The least cost-effective contraceptive methods were determined to be barrier methods (i.e. condoms) and emergency contraceptives.

Two studies have examined the cost of unintended pregnancy in Iowa (Hilsenrath & Uden-Holman, 1992; Levey, Nyman, & Haugaard, 1988). The 1988 study calculated the benefit-cost ratios for providing family planning services to low- and marginal-income (eligible for benefits with the birth of a child) women in Iowa. For women already receiving income assistance, food stamps, and Medicaid, the benefits for providing family planning services was greater than the cost for 14-19 year olds and 20-25 year olds for one year, but not for 30-34 year olds and 35-44 year olds. The benefits were greater than the costs for all age groups for five years. For marginal-income/newly eligible women, the benefits exceeded the cost of family planning service provision for all age groups for one and five years. The benefits of family

planning in Iowa outweigh the costs, especially when family planning services are provided for teenagers and women with marginal incomes.

Similarly, the 1992 report completed at the Center for Health Services Research at the University of Iowa, the benefits of providing publicly funded family planning services exceeded the costs. Benefits were found to be higher during a five-year period compared to a one-year period for those who would become newly eligible for public assistance programs and for teenagers. Additionally, this study showed providing publicly funded family planning programs to women who are already receiving public assistance and are Medicaid-eligible is cost-effective. In the state of Iowa, providing publicly funded family planning services has produced savings in public assistance expenditures.

The Title X family planning program in the United States faces many financial, political, structural, and technological challenges (Dailard, 2001). Currently, Title X family planning clinics must manage the rising costs of contraceptives, new medical technology, and an increase in uninsured clients. Furthermore, clinics are expected to broaden their services to men and women who are the most difficult and expensive to reach, and to serve them on inadequate funding. In addition to financial difficulties, The Title X program and clinics must contend with political opponents who argue that Title X services encourage teenage sexual activity, sexual promiscuity, and abortion.

Use of Benefit-Cost Analysis Techniques

Overview

A benefit-cost analysis is an approach that aims to maximize welfare rather than health benefits. Benefit-cost analysis techniques are commonly used in the public sector to ensure that available resources are used in such a way that costs do not exceed value.

Benefit-cost analysis can also be thought of as a special form of cost-effectiveness analysis where both the costs and benefits (units of effect) are expressed in a monetary unit. The monetary units are adjusted for the time value of money to account for the costs and benefits that may occur at different points in time. The costs and benefits are further adjusted to a common basis in terms of their present value, and weighed against each other to produce a benefit-cost ratio. This form of analysis can be applied to the evaluation and comparison of entire interventions or to marginal changes in an intervention or program. An intervention where the benefits exceed the costs (net benefit) would be undertaken, whereas an intervention where costs exceed benefits would likely not be undertaken except under special circumstances.

Benefit-cost analysis can be approached in two ways. A human-capital approach is based on an individual's productivity. The benefits of an intervention are measured based on the expected future productivity that would have been forgone by ill health. The disadvantage of this approach is the ethical issue entailed in placing a monetary value on human life and the exclusion of the non-working population. The second approach involves determining a person's observed or stated preferences. This can be achieved in different ways. One technique is to use 'scaling risks,' where individual behavior toward risk is observed and valued. Another approach is to determine a person's willingness to pay for a particular health outcome through either a questionnaire or interview. While this approach is powerful and comprehensive, its use has been limited to date.

Application

For this study, all relevant costs and benefits to the State were considered. The overriding benefit of the family planning services was measured as the expenditures avoided as a result of avoiding or postponing an unintended pregnancy. The avoided expenditures included in the benefit are only those public expenditures that would have been spent had the pregnancy and birth occurred. In addition to a birth, possible outcomes of a pregnancy may include a miscarriage, voluntary abortion or adoption. For this study, we assume that all avoided pregnancies would have resulted in a birth only, and the benefits considered are only those that can be measured in a dollar value.

The public expenditures that would occur as a result of a pregnancy and birth can be classified into two categories: medical costs and welfare costs. Medical costs include

all those that would apply to the client as a result of the pregnancy and birth, such as the costs for prenatal care, delivery, and pediatric care. As the target population is those that are currently or will be likely to receive public assistance, these medical costs would most likely be covered by Medicaid in Iowa. Furthermore, the birth of a child may change a mother's eligibility for public assistance. As a result, future medical care for the mother and other family members may be included. As this study considers costs avoided not only in the first year but for the subsequent 5 years after a birth, health care costs for the mother and child may be forecast during this period and included.

Welfare costs, which initially may look small when compared to the original healthcare expenditures, can become substantial when forecast over a longer time horizon. The eligibility of many welfare programs is based on family size and income relevant to family size. A birth can affect the eligibility of a family by both increasing its size and decreasing its earning potential, especially in families headed by single mothers. For families that were already eligible for welfare, an additional birth may lead to an increase in welfare payments. This increase can thus be attributed to the birth. For those families just above the eligibility line, an added birth may cause them to fall below the line. All the welfare costs that this larger family is now eligible for are attributable to the birth. As this study takes a multi-year approach, the eligibility status of the household in each successive year after the birth had to be determined. Such detailed data is difficult to obtain, so it was assumed that the eligibility status of the families remained constant after the birth. The welfare payments were adjusted for inflation and then discounted to a present value.

By summing the medical and welfare costs, an estimate of the public expenditures that result from a pregnancy and birth can be estimated. The resulting costs—considered either at the aggregate level for the State of Iowa or on a case by case basis—are those that can be avoided when a pregnancy is prevented through family planning services aimed at the target population. As such, these avoided costs can be thought of as the benefits for this analysis.

The denominator of the benefit-cost ratio describes the costs of achieving the above benefits. The costs represent the direct outlay of subsidized family planning clinics for the provision of family planning services. While the benefits accrue over a period of time and are discounted, the costs are assumed to incur only in the initial 12-month period and not to recur. The average cost per client per member month was used and converted to an annual cost. It was assumed that all clients were receiving services for a 12-month period, and that the average costs include all visits and services during the year.

Issues

The issues for this research revolve around the limitations associated with the comprehensiveness of the benefits included and the perspective from which the analysis was conducted.

First, the benefits reported in this research reflect only those regarded as selected publicly funded welfare and health care cost savings. These cost savings do not encapsulate the many other benefits that may result from avoiding an unintended pregnancy or delaying a pregnancy. Such benefits may include improved earning power, changes in health risks, as well as a number of emotional benefits.

Second, this research considers only the public funding or taxpayer perspective. Neither costs nor benefits are included if they are not attributable to a public funding source. For example, the costs considered are only those borne by a clinic in providing family planning services to a client. There are many other costs associated with receiving those services, such as time to receive the services, transportation to the clinic, and personal effort in seeking the services in the clinic setting, but because these costs are all borne privately by the client, they are not included in this analysis.

Although the perspective of this research is narrow and this limits the costs and benefits included, the unmeasured benefits and costs of a wider perspective have not been dismissed. As all visits to a family planning clinic and the subsequent use of any birth control methods are voluntary, it can be inferred that the benefit-cost ratio to the individual client must be positive, with a ratio of at least equal to if not greater than one. If we aggregate this inference over a population, there must be positive aggregate net benefits that if measured, would only increase the size of the benefit-cost ratios measured in this study. Furthermore, there is a strong link between publicly funded family planning services and the use of public assistance programs. While this analysis focuses on a narrow range of costs and benefits, it addresses many of the predominant costs and benefits for our target population from the chosen perspective. While it would be nearly impossible to address all the real costs and benefits, taking a public funding perspective is a good alternative.

Overview of Iowa's Family Planning and Welfare Systems

There are a number of welfare and public assistance programs in Iowa that are of relevance to family planning clients. A brief summary of these programs in the context of this analysis is provided below.

Publicly Funded Family Planning Services

For women in Iowa, publicly funded or subsidized family planning services are available from private physicians and a collection of clinics that are part of the Iowa Family Planning network. Medicaid provides coverage of reproductive health services based on eligibility, and reimbursement is available for users of clinics and private physicians. The Section 1115(a) Family Planning Waiver allows women who would lose their Medicaid eligibility after the postpartum period or who are between 13 and 44 years of age and under 200% of FPL to receive fully subsidized family planning services. Many Family Planning Waiver clients are seen within Title X clinics. In Iowa, Title X is administered by the Family Planning Council of Iowa and the Iowa Department of Public Health.

In Iowa, the programs that assist women and men in paying for reproductive health care cover the following services: medically necessary services and supplies related to birth control, pregnancy prevention, and preventive services such as patient education, counseling, and referral to other services, contraceptive counseling and information, contraceptive supplies, devices, implants, and prescriptions, office visits, laboratory examinations and tests, voluntary sterilization, and HIV blood screenings/STI testing. Iowa has two special Medicaid programs that cover the costs of family planning services for women between the ages of 13 and 44 and with incomes at or below 200% FPL. The Iowa Family Planning Network is for women with no health insurance, and the other state program is for women who have insurance that does not cover family planning services and who are able to become pregnant. Additionally, Medicaid clients in Iowa have their family planning services covered by Medicaid. Title X is a program that helps cover many family planning services for women and men at several family planning clinics throughout the state. Fees at Title X clinics depend on income. Title X clinics are open to all women, regardless of age, marital status, income, or health insurance status.

Two organizations administer federal funding for family planning services in Iowa, the Family Planning Council of Iowa (FPCI) and the Family Planning Program administered by the Iowa Department of Public Health (IDPH). The FPCI provides services to 54 Iowa counties. IDPH's Family Planning Program serves the remaining 45 of Iowa's 99 counties, with family planning services available in 33 of the counties served.

Public Assistance Programs

Two public assistance categories are relevant for this study: income assistance and health care. Income assistance programs include those that provide temporary cash assistance, such as the Family Investment Program (FIP) in Iowa, and food programs such as Food Assistance and the Special Supplemental Food for Women, Infants, and Children Nutrition program (WIC). Eligibility for these programs is based on need and is determined monthly. The payment level is dependent on family size and income criteria.

The goal of Iowa's FIP is to facilitate self-sufficiency for needy families with children. FIP is administered by the Iowa Department of Human Services (IDHS) and funded in part through the Temporary Assistance for Needy Families federal program. The Iowa FIP is available to one-parent, two-parent, and relative-care-giving families, and covers children through their 18th birthday. Eligibility and is based on income and other financial resources or assets. To remain eligible for the program, adult recipients must work with PROMISE JOBS, a work and training program that helps program participants develop future plans to support their family. Additionally, the federal government limits lifetime participation in FIP to a total of 60 months, unless a "hardship" exemption is documented. The overall average monthly FIP grant for households in Iowa is $315.68 (as of July 2009). For a household of two, the maximum FIP grant is $361 per month. Only women with children are eligible for FIP; pregnant women do not receive benefits until their child is born.

Child Care Assistance (CCA), administered by the IDHS, helps income-eligible parents with the cost of child care. Parents must be absent for a portion of the day due to employment, academic or vocational training, or PROMISE JOBS activities to qualify for child care services. Child care providers must be approved by the IDHS to receive CCA payment. While the total benefit paid to the family's child care provider varies by the age of the child, the type of provider, the provider's rate, the number of units of care provided, and the proportion of care for which the family is responsible, the statewide average CCA benefit paid for an infant is $431.28. Pregnant women with no children do not qualify for CCA.

Food Assistance, also administered by the IDHS, is a program designed to promote the general welfare of low-income families in Iowa by raising their levels of nutrition to avoid hunger and malnutrition. Program eligibility and monthly amount received is determined by income and family size. Recipients of Food Assistance receive an EBT food assistance card and a notice each month of how much money was deposited in their food account. Individuals in Iowa do not have to be enrolled in FIP to qualify for Food Assistance. The amount of food assistance a family receives is based on household income and deductible expenses such as rent, utilities, child care, and child support. Unlike FIP, single women can receive assistance; the maximum food assistance benefit for a family of one is $200 per month. For a family of two, the maximum food assistance benefit is $367.

The WIC Program, administered by the Iowa Department of Public Health, provides health foods, nutrition education, and referrals to other social service and health care agencies to babies, children under the age of five, pregnant women, breastfeeding women, and women who have had a baby in the last six months. Program recipients receive checks for nutritional food purchases from local grocery stores or other approved vendors. The average monthly benefit is $55.43 per person (women, infants and children). If you adjust for formula fed infants, the average benefit per person per month is $36.58 (Personal Communication with Christine Hradek, MPH, Community Health Consultant, Bureau of Nutrition and Health Promotion, Iowa Department of Public Health).

A number of healthcare programs are relevant to the family planning population. The three main programs are ***hawk-i***, the Family Medical Assistance Program (FMAP), and the Iowa Vaccines for Children Program (VFC). As with the income assistance programs, eligibility is based on need, family size and income criteria.

hawk-i (Healthy and Well Kids in Iowa) is Iowa's medical insurance program that provides health care coverage for low-income children. Designed as a supplement for children whose family's income is above the Medicaid limit, ***hawk-i*** offers coverage to children who are under the age of 19, have no other health insurance, and are a qualified citizen or alien. Income must be greater than 133% of FPL and cannot exceed 200% of FPL for children ages 1-18. Children in this age range in households with incomes at 133% of FPL or less are covered by Medicaid, as are children younger than age 1 with incomes up to 200% of FPL. ***hawk-i*** coverage includes Wellmark Health Plan of Iowa or AmericChoice. Additionally, all children are covered under Delta Dental of Iowa for dental care. Children on ***hawk-i*** receive a variety of services, including doctor visits, outpatient hospital services, well-child visits, vaccines and shots, and emergency care (http://www.hawk-i.org/en_US/plans.html).

The FMAP is a Medicaid program that provides services for children and their caretakers. To be eligible, the income limit for a household of one is $183 and the income limit for a household of two is $361 (http://www.hrsa.gov/reimbursement/states/Iowa-Eligibility.htm).

The Iowa VFC is a federally mandated entitlement program. It was created as part of the President's Childhood Immunization Initiative to meet the vaccination needs of children from birth to 18 years of age. VFC provides vaccines free of charge to children who are enrolled in Medicaid, have no health insurance, are American Indian or Native Alaskan, or do not have insurance coverage for vaccines. The VFC obtains the vaccines at a discounted cost as compared to the market cost in the private sector (http://www.cdc.gov/vaccines/programs/vfc/cdc-vac-price-list.htm).

Methodology

As demonstrated in the earlier benefit-cost reports, a good way to present the methodology of this project is to discuss a hypothetical case. If one additional client is served by a publicly funded family planning clinic, there is a probability that if she had not received services, an unintended birth would have resulted. If the woman was already receiving public assistance, there is a high probability that the birth would result in a new pattern of public expenditures that would include an increase in the amount of public assistance she and her family received. If the mother was not receiving any public assistance but was near the eligibility level for these services, the birth could render her and her family eligible for public assistance. By combining the age, income distributions, and types of public expenditures of clients, these expected expenditures (those that could potentially be averted) can be calculated.

With a visit to a family planning clinic, there is a probability that in time, an unintended pregnancy will be averted. The probability of this pregnancy being prevented or delayed is combined with the expected expenditures that could be averted as an estimate of the expected benefits. These benefits are in the context of the expenditures avoided for providing family planning services to one additional client. The benefit to cost ratios are determined by weighing the expected benefits against the costs of providing family planning services to one additional client.

Expected Benefits

As previously discussed, the expected benefits are the expenditures avoided by averting an unintended pregnancy. The savings are not in the form of reduced current expenditures but represent future expenditures avoided. The expected benefits are a result of a client using the services of a family planning clinic.

The target population for this analysis is those who use publicly funded family planning services and are also likely to be eligible for public assistance programs. The target population can be broken into two groups: those who are currently eligible for public assistance and those who are close enough to eligibility that a birth could make the difference in the welfare benefits they receive. Owing to the complexity of different households, we assume that every household is a one-person family increasing to two with the birth of the child. This limitation has the most impact for newly eligible families, as the birth of a child may make eligible an entire family. As mentioned above, this limitation will result in an underestimation of the expected benefits.

Consider first the category of households and individuals that currently receive public assistance. For someone in this category, a pregnancy and birth will most likely lead to an increase in the amount of public assistance they receive. Such assistance would include:

1. Prenatal costs
2. Delivery costs
3. Pediatric costs

4. Increase in the amount received for medical assistance (VFC)
5. Increase in the amount received for welfare assistance (FIP, Food Assistance, WIC, CCA)

This analysis includes only expenditures that can be attributed to the pregnancy and birth of the child. Therefore, we do not include the base level of payment that the family would have been receiving prior to the birth, only the incremental payment that is received as a result of the family size increase.

There are some special circumstances that must be accounted for in this category. Most teens who are already receiving benefits are children in an already eligible household. If a teenager gives birth and remains in the home, the additional expenditures resulting from the added family member fit the scenario described above. However, had the birth not occurred, the teenager might have completed school, obtained employment, and moved off the welfare roll. As such, the full medical and welfare costs should be accounted for a mother who turns 19 during the 5-year period considered, as these expenditures could be attributed to the pregnancy and birth. Owing to these special circumstances, women aged 15-19 and already eligible for public assistance are considered separately from the main population calculations. Fourteen year olds are included in the main-population calculations as they will not turn 19 until the end of the five-year time horizon.

The second major category of the target population includes individuals and households that are close enough to eligibility that a pregnancy and birth will push them into the eligibility category, as well as those that are eligible but not enrolled in the programs they are eligible for. The birth will most likely lead to the following expenditures:

1. Prenatal costs (when eligibility criteria met prior to delivery)
2. Delivery costs (when eligibility criteria met prior to delivery)
3. Pediatric costs
4. Maternal health expenditures covered by Medicaid
5. Medical assistance (VFC)
6. Welfare assistance (FIP, Food Assistance, WIC, CCA)

For this category, the entire expenditure is attributable to the pregnancy and birth and therefore included. The expenditures attributable to the mother are also included because they are also considered a consequence of the birth, regardless of the age of the mother.

There are, however, also some special circumstances that need to be considered for this category. First, there are some individuals and households that are near eligibility whose participation in public assistance programs does not begin with the pregnancy. This may be due to these individuals and households choosing not to participate, or to their economic status or circumstances changing after the birth, resulting in eligibility and participation. For this group, prenatal and delivery costs would not be included.

As there is not a precise date to pinpoint the beginning of eligibility or participation, it is very difficult to determine how many households fall into this group. As a result, the benefit to cost ratios are considered separately for those that would have started receiving benefits prior to the birth and those that would receive benefits after the birth.

The second special circumstance that needs to be considered regards tracking the expected benefits over a five-year time period. The five-year time period was chosen for two reasons. First, at the end of the five years, most children will be entering school. Second, it is estimated that only 12% of cases are active beyond five years (Hilsenrath, Uden-Holman 1992). The expected benefits beyond this five-year period would therefore be small. It would be difficult to determine exactly how long households are eligible for public assistance after a birth. Because of this, an assumption has been made that all families will remain eligible for the entire five-year span. This limitation means that there is an overestimation of the expected benefits in the later part of the five-year time horizon. However, as the majority of the expected benefits are seen in the earlier years, the effect was expected to have only a limited impact on the benefit-cost ratios.

A summary of the target populations and expenditure calculations is presented in Appendix A.

Likelihood of Averting a Birth

Once the expected benefits are calculated, the likelihood of averting a birth is used to adjust these benefits and express them as an amount per client. The likelihood of averting a birth is expressed as a probability and adjusted for the age of the client and the relative impact of family planning services on preventing an unintended pregnancy. As estimating the probability of averting a birth is beyond the scope of this project, estimates were used as reported in the literature. Owing to the limited amount of literature available, sensitivity analysis was also conducted to test the robustness of the ratios to variations in the probabilities of averting a birth.

Expected Costs

To achieve the benefits and avoid the expenditures outlined above, the costs need to be determined. These costs are the direct outlay of subsidized family planning clinics and the provision of family planning services to the target population. The services provided by these clinics vary per client, and the cost per client is not equivalent each month. For example, prescriptions may only be provided every three months. In order to account for this variation, an average cost per client per month was used. It was assumed that all women would receive services for a full 12-month period, and that the potential to avert a pregnancy would only be included for the 12 months in which services would be received. Owing to the increased popularity of long-term contraceptive options, this is actually an overestimation of cost and underestimation of benefit. The overall effect on the benefit-cost ratios was thought to be limited, however.

Data

The following section lists all the values and data variables used in this analysis. The collection year for each data variable is listed, but all values were adjusted to a 2009 figure using inflation and medical consumer price indices (www.bls.gov). All data are Iowa-specific except for the inflation and CPI values, the discount rate and the probabilities of averting a birth; however, an Iowa-specific value was used in the sensitivity analysis.

Income Assistance Programs

There are four relevant income assistance programs: FIP, Food Assistance, CCA and WIC. For each program, an annual amount was determined for newly eligible households and for households with existing eligibility. For all newly eligible families, we assumed a household of two (mother and baby). For existing eligibility households, we assumed a one-person household becoming a household of two with the birth of the child. For FIP and CCA programs, a woman would be ineligible until the birth of a child. As such, the amount for a newly eligible and existing-eligible household is the same. The annual amounts of assistance in $2009 are reported in Table 1.

An average household size of just two members had to be assumed for feasibility reasons. If a newly eligible household had more than two members, the reported amount of assistance would be an underestimate. However, if an existing eligible household were already eligible for FIP and CCA because of other children, the amount reported for existing eligibility would be an overestimate. Furthermore, children would also be eligible for Healthy Start and Head Start programs before the age of five. We were unable to determine an accurate estimate per child for these programs. Based on the annual budgets of these programs, the number of children they serve, and the age at which children become eligible for them, the overall impact on the benefit-cost ratios was thought to be small.

Table 1 - Annual Income Assistance for Newly Eligible and Households with Existing Eligibility (2009)

Assistance Program	Newly Eligible	Existing Eligibility
FIP	$4,332.00	$4,332.00
Food Assistance	$4,404.00	$2,004.00
CCA	$5,175.36	$5,175.36
WIC	$1,330.32	$438.96

Medical Services

Data for the relevant, public-funded medical services falls into four categories: reimbursements for prenatal care, delivery and post-partum care, general medical care of the mother, general medical care of the child, and well-child reimbursements. Reimbursements for prenatal care, delivery, post-partum care, and general medical care of the mother and child were sourced directly from actual Medicaid reimbursement data, as reported in a preliminary report for the Evaluation of the Family Planning Waiver Program (PPC). Data were obtained from as many relevant case files as possible and for the most recent period possible. The data for each of these categories are presented below. The expenditures for the VFC program were sourced from a personal communication with VFC, CDC and the AAP immunization schedule. Data for this category are summarized below.

Delivery Reimbursements

The Medicaid reimbursements detailed in Table 2 are from the women enrolled in the Family Medical Waiver Program who had a delivery between 6 October 2007 and 5 October 2008. Their age is that at December 31, 2007. The reimbursement includes all prenatal care costs, delivery costs and cost incurred in the six-week postpartum period. The reported 2008 values were inflated to 2009 values using an inflation factor for the final analysis. A further breakdown of these costs by period and cost category (medical, institutional, pharmaceutical) is presented in Appendix B, Table 15-17.

Table 2 - Medicaid Reimbursements for Prenatal, Delivery and Postpartum - Total Charges (2008)

Age	Number of Women Served	Total Reimbursements	Average Reimbursements
14	36	$191,211	$5,311
15	110	$673,734	$6,125
16	262	$1,511,048	$5,767
17	523	$2,948,219	$5,637
18	959	$5,839,775	$6,089
19	1,241	$7,990,994	$6,439
20	1,289	$8,379,866	$6,501
21	1,323	$8,347,945	$6,310
22	1,224	$7,770,257	$6,348
23	1,231	$8,017,611	$6,513
24	1,073	$6,765,598	$6,305
25	958	$5,709,827	$5,960
26	906	$5,524,874	$6,098
27	818	$5,035,574	$6,156
28	649	$3,904,355	$6,016
29	527	$2,966,330	$5,629
30	414	$2,625,579	$6,342
31	377	$2,273,376	$6,030
32	289	$1,699,691	$5,881
33	262	$1,583,180	$6,043
34	196	$1,248,327	$6,369
35	152	$921,977	$6,066
36	154	$858,274	$5,573
37	122	$749,325	$6,142
38	82	$440,353	$5,370
39	62	$372,509	$6,008
40	51	$384,340	$7,536
41	33	$249,451	$7,559
42	18	$119,378	$6,632
43	8	$64,128	$8,016
44	6	$27,884	$4,647
Total	15,355	$95,194,990	$6,200

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

General Health Care Reimbursements

The general health care reimbursements presented in Table 3 are from women enrolled in FMAP within the period 1 October 2007 to 30 September 2008. All women eligible for FMAP for at least one month in the 12-month period form the base. However, a woman was excluded if she was identified as having delivered a baby between October 5, 2007 and October 6, 2008, since the health care costs for these women were included in the delivery cost data.

The costs provided include only costs that were identified as FMAP-related in the claims database, and do not include costs incurred under another program code. The costs were reported on a per-month level and converted to an annual average. Age was calculated as of September 30, 2008 (the end of the measurement year). The reported 2008 values were inflated to 2009 values using an inflation factor for the final analysis. A further breakdown of these costs by cost category and time period is presented in Appendix B, Table 18.

Table 3 - Medicaid Reimbursements for Females - General Healthcare (2008)

Age	Number of Women Served	Total* Reimbursements	Average** Reimbursements
14	1,586	$1,801,174	$1,650.56
15	1,621	$2,200,219	$1,939.66
16	1,562	$2,287,552	$2,166.93
17	1,431	$2,104,389	$2,253.29
18	1,355	$1,541,595	$2,031.53
19	1,066	$1,926,788	$3,090.28
20	1,289	$1,850,415	$2,205.06
21	1,595	$2,742,730	$2,544.87
22	1,905	$3,390,638	$2,655.51
23	2,035	$3,726,989	$2,630.20
24	2,047	$3,745,717	$2,656.38
25	2,099	$4,151,701	$2,876.30
26	2,116	$4,383,612	$2,998.20
27	2,067	$5,180,239	$3,590.32
28	2,084	$4,454,736	$3,061.32
29	2,016	$4,896,847	$3,488.61
30	1,764	$4,642,316	$3,768.37
31	1,623	$4,087,877	$3,594.00
32	1,482	$3,741,208	$3,608.01
33	1,435	$3,678,843	$3,620.31
34	1,325	$3,788,930	$4,127.75
35	1,234	$3,812,665	$4,439.78
36	1,177	$3,459,577	$4,276.36
37	1,150	$3,545,079	$4,597.53
38	1,123	$3,629,251	$4,715.35
39	966	$3,556,181	$5,256.09
40	833	$3,044,875	$5,329.42
41	767	$3,115,181	$5,874.01
42	669	$2,213,193	$4,705.58
43	625	$2,570,354	$5,924.75
44	564	$3,247,556	$8,279.30
Total	44,611	$102,518,427	$3,366.89

* Total reimbursements include all women enrolled in FMAP even if enrolled for less than 12 months
** Average reimbursements are adjusted to reflect the average cost for a woman enrolled for a full 12-month period in FMAP
Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Child Health Care Reimbursements

In Table 4, the Medicaid reimbursements for child health care are presented. The case records were collated by age in 2007. The average annual reimbursement was calculated and converted to a 2009 value using an inflation factor. For the five-year ratios, future child health care costs were inflated for the relevant year, and then discounted to a present value in the final calculations. A further breakdown of these costs by category is presented in Appendix B, Table 19.

Table 4 - Medicaid Reimbursements for Child Health Care (2007)

Age	Number of Children Served	Total Reimbursements	Average Reimbursements
<1	15,206	$93,471,282	$6,147
2	9,745	$20,103,935	$2,063
3	8,483	$13,055,337	$1,539
4	7,341	$12,611,838	$1,718
5	6,528	$11,410,944	$1,748
Total	47,303	$150,653,336	$13,215

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

In Table 5, child vaccination costs are presented. Child vaccinations are provided by the VFC program free of charge to Medicaid providers; therefore, these costs are not included in the Medicaid reimbursements. An administration fee and an office visit fee, however, would be included in the Medicaid reimbursements in Table 4. The CDC cost for the vaccines was sourced through data available online (http://www.cdc.gov/vaccines/programs/vfc/cdc-vac-price-list.htm). These costs were merged with the immunization schedule from the American Academy of Pediatrics to determine the cost of vaccinations by age category (http://www.cispimmunize.org/). For the five-year ratios, future child health care costs were inflated for the relevant year and then discounted to a present value in the final calculations.

Table 5 - Annual Healthcare Benefit - Child Vaccinations (2009)

Vaccination year	Cost
Yr 1	$472.71
Yr 2	$162.66
Yr 3	$11.05
Yr 4	$126.13
Yr 5	$11.05
Total	$783.60

Probabilities of Averting Births

As previously mentioned, determining the probability of averting a birth with the use of family planning was beyond the scope of this study. Instead, probabilities were used as reported in the published literature. The base set of probabilities used were those reported by Chamie and Henshaw (1981). They are broken down by age category and presented in Table 6.

The estimates reported by Chamie and Henshaw (1981) apply to only a narrow population and are also not reflective of the change in family planning attitudes and methods of more recent times. A more recent study by Frost and Finer (2008) reported an overall probability of 0.09375. While this study did not break down the probability by age category, it did break it down by state. The reported values for the State of Iowa are far higher than those reported by Chamie. To overcome this limitation and variance in available data, Appendix D contains an analysis of the sensitivity of the results to changes in the probability of averting a birth.

Table 6 - Probabilities of Averting Births

Age	Probability	Reference
14-19	0.072	Chamie & Henshaw
20-29	0.050	Chamie & Henshaw
30-34	0.021	Chamie & Henshaw
35-44	0.014	Chamie & Henshaw

Costs

The cost of providing publicly funded family planning services forms the denominator of the benefit-cost ratio. These cost data were obtained from women enrolled in the Family Planning Waiver Program and are presented in Table 7. The costs were determined for the year 2008, as it was the most complete year of data available and did not include the great variation in enrollment seen in the startup year 2007. All women were included if they were enrolled for at least one month during 2008. The average cost per member month was then converted to an average 12-month cost, assuming a full 12 months of enrollment. While the average number of months enrolled was only around seven, this number is artificially lower, as enrollment is not static. Women are continuously enrolling and disenrolling from the program.

There are some limitations with this cost data that must be addressed. First, we include only public funding costs. As our costs are taken from Family Planning Waiver enrollees, we are assuming that there are no additional costs not covered through public funds. Second, the cost of family planning services is reported as an average cost per member. By using this cost, we are assuming that the overall goal of the analysis is general profitability (i.e., how much total benefit exceeds total cost assuming the current level of operation).

Table 7 - Cost of Family Planning Services (2008)

Age	Cost per member Month	Average number of months enrolled	Average 12 month cost
14	$48.97	5	$587.58
15	$40.16	6	$481.90
16	$38.55	7	$462.60
17	$34.60	7	$415.16
18	$32.24	8	$386.90
19	$32.13	7	$385.56
20	$32.25	8	$387.01
21	$30.99	8	$371.90
22	$31.07	8	$372.84
23	$30.03	7	$360.37
24	$28.90	7	$346.77
25	$27.27	7	$327.22
26	$27.69	7	$332.23
27	$27.74	7	$332.85
28	$28.62	7	$343.42
29	$28.32	7	$339.88
30	$26.77	7	$321.26
31	$26.08	7	$312.95
32	$24.32	7	$291.84
33	$25.53	7	$306.38
34	$29.78	7	$357.33
35	$31.73	7	$380.80
36	$25.95	7	$311.42
37	$27.91	7	$334.96
38	$32.34	7	$388.12
39	$28.56	8	$342.66
40	$33.65	8	$403.85
41	$28.58	7	$342.96
42	$36.61	8	$439.29
43	$39.38	8	$472.50
44	$30.38	7	$364.54
Total	$30.37	7	$364.40

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Results

The benefit-cost ratios are reported in this section in a number of different forms. First, an overall weighted average is presented. The average is weighted by the number of women enrolled in the Family Planning Waiver Program in 2008 for each age category. The average ratios are reported for two time frames, 1 year and 5 year and by the those households that would already be eligible for assistance and those that would be newly eligible for assistance.

Second, the ratios are reported by age category. These ratios are also reported for two time frames and by household eligibility status. These ratios are not weighted by the number of women enrolled in the Family Planning Waiver program for each age category. Within the newly eligible for assistance category, the ratios are further categorized by those women who would be eligible for assistance prior to delivery and those that would not become eligible until after the birth. The ratios are further broken down by age of women within the categories of 14-19, 20-24, 25-29, 30-34 and 35-44. The categories chosen allow for easier comparison of results with previous research. Finally, average ratios for each time period and assistance eligibility criteria are reported with the ratios weighted by the proportion of women in each age category from the prenatal and delivery target population.

For all the benefit-cost ratios reported, the denominator is set to one. The ratio is interpreted as the average return for every one dollar of expenditure on the program. As previously discussed, the additional expenditure reported is the average expenditure rather than the marginal expenditure.

Weighted Average Ratios

The previous results table reported the benefit-cost ratios by age category. In Table 8, the average benefit-cost ratios are reported by time period and by assistance eligibility criteria. The average ratios were weighted by the proportion of women in each age group enrolled in the Family Planning Waiver Program in 2008.

Table 8 - Weighted Average Benefit-Cost Ratios by Eligibility Category

Time Period	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
I year	3.40	2.92	3.78
5 years	10.84	14.30	15.12

One-Year Ratios

The one-year ratios presented below are based on benefits that are expected to accrue for one year from the time of birth. In Table 9, the ratio estimates are for those already receiving assistance. The benefits for these ratios include prenatal and delivery reimbursement, pediatric care, FIP, CCA, VFC and the incremental benefit from Food Assistance and WIC. The general health care costs for the mother are not included, as they are not considered a result of the birth.

Table 9 - Benefit-Cost Ratios Based on One-Year Cost Savings for Individuals Already Receiving Assistance

Age	Ratios
14-19	3.97
20-24	3.40
25-29	3.66
30-34	1.64
35-44	0.93

In Tables 10 and 11, the one-year benefit-cost ratios are presented for individuals newly eligible for assistance. These ratios include the same benefits as for the individuals already receiving assistance except the entire expenditure for Food Assistance and WIC needs to be accounted for instead of just the incremental amount. For newly eligible individuals, the ratios are further broken down by the time at which they would have become eligible for assistance. In Table 10, prenatal and delivery reimbursements are excluded. For this group, the birth of the child may have lead to eligibility and participation in assistance programs only after the birth therefore the prenatal and delivery reimbursements are not included. In Table 11, because of the imminent birth of a child, individuals would meet the eligibility criteria for assistance in a timeframe that would make them eligible for their prenatal and delivery reimbursements to be covered. For this group, the prenatal and delivery reimbursements are included in the ratio calculation.

Table 10 - Benefit-Cost Ratios Based on One-Years Cost Savings for Individuals Newly Eligible for Assistance (Prenatal and Delivery Reimbursements Excluded)

Age	Ratios
14-19	3.37
20-24	2.87
25-29	3.25
30-34	1.48
35-44	0.90

Table 11 - Benefit-Cost Ratios Based on One-Year Cost Savings for Individuals Newly Eligible for Assistance (Prenatal and Delivery Reimbursements Included)

Age	Ratios
14-19	4.34
20-24	3.74
25-29	4.14
30-34	1.88
35-44	1.13

Five-Year Ratios

The benefit-cost ratios were calculated based on a prospective five-year benefit forecast. This extended view was taken because of the understanding that many of the public assistance programs that are a consequence of a birth would not expire after the first year. The five-year time horizon was chosen as this takes most children up until the time they would normally start school and was based on previous studies on enrolment behavior. This ratio calculates the benefits over the five years subsequent to the birth. Inflation adjustments were made to the benefits addressing medical care costs and assistance costs separately due to their different rates of inflation. The future inflated benefits were then discounted to readjust the future benefits back to a present value. The costs of providing family planning services (the denominator) were neither inflated nor discounted because the ratios measure benefits accruing over a five-year period as a result of costs incurred in the present period.

The five-year benefit-cost ratios for individuals receiving assistance are presented in Table 12. The same benefit categories were included as in the one-year benefit-cost ratios except FIP, Food Assistance, pediatric care reimbursements, WIC, CCA and VFC were forecast over a five-year time horizon.

Table 12 - Benefit-Cost Ratios Based on Five-Year Cost Savings for Individuals Already Receiving Assistance

Age	Ratios
14-19	12.71
20-24	11.24
25-29	12.26
30-34	5.46
35-44	3.10

In Tables 13 and 14, the five-year benefit-cost ratios are presented for individuals newly eligible for assistance broken down by the inclusion and exclusion of the prenatal and delivery reimbursements. As with the one-year ratios, the same benefit categories were included with FIP, Food Assistance, pediatric care reimbursements, mothers general health care reimbursements, WIC, CCA and VFC forecast over a five-year time horizon.

Table 13 - Benefit-Cost Ratios Based on Five-Year Cost Savings for Individuals Newly Eligible for Assistance (Prenatal and Delivery Reimbursements Excluded)

Age	Ratios
14-19	16.30
20-24	14.65
25-29	16.56
30-34	7.57
35-44	4.68

Table 14 - Benefit-Cost Ratios Based on Five-Year Cost Savings for Individuals Newly Eligible for Assistance (Prenatal and Delivery Reimbursements Included)

Age	Ratios
14-19	17.23
20-24	15.52
25-29	17.45
30-34	7.98
35-44	4.92

Limitations

As discussed in the methodology section, there are some limitations to the benefit-cost ratios that have been reported. First, for all ratios, we assumed a household of one becoming a household of two with the birth of a child. For households of a larger size, the ratios reported may underestimate the benefits, especially in households newly eligible for assistance. The birth of a child may not just make the mother eligible but the entire household. Second, teenagers who give birth before the age of 19 who are already receiving benefits are most likely a part of a household receiving benefits. The incremental benefits would therefore be included in the calculation. However, if the teenager turned 19 within the 5-year time horizon, she would be considered independent and would be considered newly eligible for assistance with the entire assistance amount attributable to the birth of her child. Therefore the benefit-cost ratios underestimate the benefits for teenagers giving birth who fall into this category. Third, in the benefit-cost ratios, we assume that all households are enrolled for either a full year or full five years in the assistance programs. As circumstances change, there would be some families who would lose their eligibility, especially towards the end of the five-year time horizon. This limitation means that there is an overestimation of the expected benefits in the later part of the five-year time horizon. However, as the majority of the expected benefits are seen in the earlier years, the effect on the benefit-cost ratios was thought to be limited.

There are other limitations around the data that was used. As discussed earlier, only public funded costs and benefits were included in the ratio calculations. If a broader perspective were taken, the ratios would be more reflective of the societal impact of unintended pregnancies. Another limitation is that we only account for the benefits resulting from avoiding an unintended birth. The public sector savings from averted miscarriages are not included. Finally, the results were limited by the available data on the probability of averting an unintended pregnancy. The probabilities used as reported by Chamie and Henshaw (1981) are still the most comprehensive available today, but they are considered low when the change in family planning methods is considered. The probabilities reported by Chamie and Henshaw (1981) also do not address the differences in probabilities accounting for variances in race, ethnicity, income status or marriage status. To overcome this limitation, sensitivity analysis was conducted on the probability of averting a birth. An Iowan-specific probability reported by Frost and Finer was used, together with testing the robustness of the results under a number of different scenarios. The results are reported in Appendix D.

Conclusion

With the prevention of an unintended pregnancy, a significant amount of future public funding expenditure can be avoided. The avoided expenditures include prenatal and delivery costs, pediatric costs, mothers general medical costs, medical assistance costs (VFC) and welfare assistance costs (FIP, Food Assistance, WIC, CCA). The avoided expenditures were used to calculate the potential cost savings for women in two categories: those already receiving benefits and those who would become eligible for benefits with the birth of a child. Within these categories, the benefit-cost ratio was determined by weighing the expenditures avoided (benefits) against the costs of providing family planning services to a client.

The results show that publicly funded family planning services are cost-effective for women who would use Medicaid and other public assistance programs if they gave birth. The results remain cost-effective for all age groups below 34 when avoided expenditures are forecast for one year, and cost-effective for all age groups when avoided expenditures were forecast for five years.

Publicly funded family planning is most cost-effective for women under the age of 30. When considering forecasting the avoided expenditures for just one year, over $3 could be saved for every $1 spent on family planning services. In fact, the probability of averting a pregnancy need only be 2% for this age category for family planning services to be considered cost-effective. Publicly funded family planning is also most cost-effective for those women either currently eligible for public assistance programs or who would be newly eligible for assistance and would qualify for the assistance at time of delivery. This is due to the high cost of prenatal care and delivery that would be avoided with the prevention of a pregnancy and birth for persons qualifying for these categories.

The reported benefit-cost ratios have broad implications for health planners and for society as a whole. Publicly funded family planning is not only cost-effective, but has the potential to be cost saving in both one-year and five-year time horizons. As the resources available for healthcare continue to be stretched, this analysis can help prioritize the efficient and effective use of the resources available.

Appendices

Appendix A

General Benefit-Cost Formulas by Eligibility Criteria and Time Horizon

One-Year – Women Already Eligible for Assistance

	Prenatal Care Reimbursement
Plus	Delivery/Post-partum Care Reimbursement
Plus	FIP
Plus	Food Assistance Increment
Plus	Pediatric Care Reimbursements
Plus	WIC Increment
Plus	CCA
Plus	VFC
Equals	Total Cost Savings
Times	Probability of Averting Birth
Equals	Adjusted Savings
Divided by	Average One-Year Family Planning Expenditure
Equals	Benefit-Cost Ratio

One-Year – Women Newly Eligible for Assistance

	FIP
Plus	Food Assistance
Plus	Pediatric Care Reimbursements
Plus	Mother's Health Care Reimbursement
Plus	WIC
Plus	CCA
Plus	VFC
Equals	Total Cost Savings
Times	Probability of Averting Birth
Equals	Adjusted Savings
Divided by	Average One-Year Family Planning Expenditure
Equals	Benefit-Cost Ratio

Note: Does not include prenatal and delivery reimbursements. Newly eligible may or may not be eligible for prenatal and delivery expenditure reimbursement. The above calculation assumes eligibility only after infant delivery

Five-Year – Women Already Eligible for Assistance Ages 14 and 19-44*

	Prenatal Care Reimbursement+
Plus	Delivery/Post-partum Care Reimbursement+
Plus	FIP +#
Plus	Food Assistance Increment+#
Plus	Pediatric Care Reimbursements+ #
Plus	WIC Increment+#
Plus	CCA+#
Plus	VFC+#
Equals	Total Cost Savings
Times	Probability of Averting Birth
Equals	Adjusted Savings
Divided by	Average First-Year Family Planning Expenditure
Equals	Benefit-Cost Ratio

* Ages 15-18 are considered separately. Most teens receiving benefits are children in an eligible household. At the age of 19, these women would otherwise be dropped from eligibility. Fourteen year olds however would move through the 5 year time horizon before losing eligibility

Costs are summed for a 5-year total with values adjusted for inflation accordingly
+ Costs are discounted over the five-year horizon to a present value

Five-Year – Women Already Eligible for Assistance Ages 15-18

	Prenatal Care Reimbursement+
Plus	Delivery/Post-partum Care Reimbursement+
Plus	FIP +#
Plus	Food Assistance Increment+#
Plus	Pediatric Care Reimbursements+ #
Plus	WIC Increment+#
Plus	CCA+#
Plus	VFC+#

The above calculated only until their 19th birthday then:

	FIP+#
Plus	Food Assistance +#
Plus	Pediatric Care Reimbursements+#
Plus	Mother's Health Care Reimbursement+#
Plus	WIC+#
Plus	CCA+#
Plus	VFC+#

Calculated from their 19th birthday

Equals	Total Cost Savings
Times	Probability of Averting Birth
Equals	Adjusted Savings
Divided by	Average First-Year Family Planning Expenditure
Equals	Benefit-Cost Ratio

Costs are summed for a 5-year total with values adjusted for inflation accordingly
+ Costs are discounted over the five-year horizon to a present value

Five-Year – Women Newly Eligible for Assistance

	FIP +#
Plus	Food Assistance+#
Plus	Pediatric Care Reimbursements+ #
Plus	Mother's Health Care Reimbursement+#
Plus	WIC +#
Plus	CCA+#
Plus	VFC+#
Equals	Total Cost Savings
Times	Probability of Averting Birth
Equals	Adjusted Savings
Divided by	Average First-Year Family Planning Expenditure
Equals	Benefit-Cost Ratio

Note: Does not include prenatal and delivery reimbursements. Newly eligible may or may not be eligible for prenatal and delivery expenditure reimbursement. The above calculation assumes eligibility only after infant delivery

Appendix B

Reimbursements by Age and Cost Category

In this section, the medical reimbursements used in the benefit-cost ratio calculations are presented by single age category and by time and type of reimbursement category.

Table 15 - Medicaid Reimbursements for Delivery by Category—Medical Reimbursement (2008)

Age	Number of Women Served	Prenatal	Delivery	Postpartum	Reimbursements	
					Total	Average
14	36	$33,148	$47,067	$7,581	$87,796	$2,439
15	110	$177,366	$128,328	$18,720	$324,414	$2,949
16	262	$288,670	$326,310	$61,312	$676,292	$2,581
17	523	$517,604	$656,236	$100,953	$1,274,793	$2,437
18	959	$939,478	$1,300,988	$209,347	$2,449,813	$2,555
19	1,241	$1,299,083	$1,774,680	$293,030	$3,366,793	$2,713
20	1,289	$1,365,480	$1,816,924	$312,141	$3,494,545	$2,711
21	1,323	$1,296,141	$1,829,013	$293,232	$3,418,386	$2,584
22	1,224	$1,169,644	$1,722,686	$257,712	$3,150,042	$2,574
23	1,231	$1,221,730	$1,747,214	$279,081	$3,248,025	$2,639
24	1,073	$1,007,895	$1,470,435	$228,393	$2,706,723	$2,523
25	958	$861,200	$1,274,215	$173,635	$2,309,050	$2,410
26	906	$771,370	$1,217,104	$185,637	$2,174,111	$2,400
27	818	$767,195	$1,095,600	$147,336	$2,010,131	$2,457
28	649	$543,957	$852,393	$118,075	$1,514,425	$2,333
29	527	$415,448	$663,255	$97,251	$1,175,954	$2,231
30	414	$381,387	$567,000	$71,759	$1,020,146	$2,464
31	377	$322,537	$472,789	$81,852	$877,178	$2,327
32	289	$217,078	$391,820	$41,722	$650,620	$2,251
33	262	$203,149	$348,708	$38,514	$590,371	$2,253
34	196	$180,749	$252,544	$35,988	$469,281	$2,394
35	152	$137,023	$203,800	$32,363	$373,186	$2,455
36	154	$105,525	$178,819	$30,055	$314,399	$2,042
37	122	$106,316	$146,903	$26,671	$279,890	$2,294
38	82	$64,606	$88,260	$9,537	$162,403	$1,981
39	62	$46,958	$81,191	$7,695	$135,844	$2,191
40	51	$53,724	$78,875	$9,300	$141,899	$2,782
41	33	$42,275	$46,707	$12,401	$101,383	$3,072
42	18	$13,614	$25,317	$2,274	$41,205	$2,289
43	8	$13,643	$13,384	$1,742	$28,769	$3,596
44	6	$3,384	$6,954	$306	$10,644	$1,774
Total	15,355	$14,567,377	$20,825,519	$3,185,615	$38,578,511	$2,512

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Table 16 - Medicaid Reimbursement for Delivery by Category—Institutional Reimbursement (2008)

Age	Number of Women Served	Prenatal	Delivery	Postpartum	Reimbursements	
					Total	Average
14	36	$15,368	$80,342	$3,072	$98,782	$2,744
15	110	$85,598	$232,820	$8,758	$327,176	$2,974
16	262	$197,398	$563,248	$37,557	$798,203	$3,047
17	523	$405,310	$1,141,180	$55,551	$1,602,041	$3,063
18	959	$802,624	$2,264,405	$169,827	$3,236,856	$3,375
19	1,241	$1,134,659	$2,992,147	$248,329	$4,375,135	$3,525
20	1,289	$1,251,186	$3,133,907	$261,841	$4,646,934	$3,605
21	1,323	$1,205,882	$3,269,831	$198,572	$4,674,285	$3,533
22	1,224	$1,050,457	$3,083,524	$237,407	$4,371,388	$3,571
23	1,231	$1,143,207	$3,055,488	$255,911	$4,454,606	$3,619
24	1,073	$1,009,025	$2,626,502	$212,051	$3,847,578	$3,586
25	958	$786,203	$2,211,754	$183,917	$3,181,874	$3,321
26	906	$757,589	$2,192,027	$180,744	$3,130,360	$3,455
27	818	$665,011	$2,000,597	$132,722	$2,798,330	$3,421
28	649	$573,697	$1,541,973	$123,880	$2,239,550	$3,451
29	527	$362,761	$1,231,344	$85,597	$1,679,702	$3,187
30	414	$379,022	$1,017,052	$87,683	$1,483,757	$3,584
31	377	$301,843	$918,744	$93,639	$1,314,226	$3,486
32	289	$205,101	$716,112	$37,779	$958,992	$3,318
33	262	$225,670	$655,334	$45,985	$926,989	$3,538
34	196	$173,936	$493,608	$68,541	$736,085	$3,756
35	152	$105,189	$348,095	$46,634	$499,918	$3,289
36	154	$106,388	$354,654	$49,292	$510,334	$3,314
37	122	$119,369	$291,306	$18,604	$429,279	$3,519
38	82	$63,632	$191,448	$6,942	$262,022	$3,195
39	62	$63,092	$161,293	$1,205	$225,590	$3,639
40	51	$59,473	$155,421	$10,989	$225,883	$4,429
41	33	$37,952	$90,574	$5,757	$134,283	$4,069
42	18	$17,098	$53,035	$3,355	$73,488	$4,083
43	8	$6,145	$27,891	$234	$34,270	$4,284
44	6	$2,966	$12,446	$928	$16,340	$2,723
Total	15,355	$13,312,851	$37,108,102	$2,873,303	$53,294,256	$3,471

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Table 17 - Medicaid Reimbursement for Delivery by Category—Pharmaceutical Reimbursement (2008)

Age	Number of Women Served	Prenatal	Delivery	Postpartum	Reimbursements	
					Total	Average
14	36	$3,209	$188	$1,236	$4,633	$129
15	110	$17,038	$619	$4,487	$22,144	$201
16	262	$26,562	$1,842	$8,149	$36,553	$140
17	523	$49,888	$3,679	$17,818	$71,385	$136
18	959	$103,720	$6,675	$42,711	$153,106	$160
19	1,241	$175,345	$11,201	$62,520	$249,066	$201
20	1,289	$170,642	$11,681	$56,064	$238,387	$185
21	1,323	$179,111	$10,258	$65,905	$255,274	$193
22	1,224	$177,389	$9,971	$61,467	$248,827	$203
23	1,231	$242,263	$11,419	$61,298	$314,980	$256
24	1,073	$158,434	$9,218	$43,645	$211,297	$197
25	958	$160,194	$8,022	$50,687	$218,903	$229
26	906	$166,516	$6,843	$47,044	$220,403	$243
27	818	$172,988	$7,348	$46,777	$227,113	$278
28	649	$107,494	$5,104	$37,782	$150,380	$232
29	527	$85,358	$3,020	$22,296	$110,674	$210
30	414	$85,928	$3,149	$32,599	$121,676	$294
31	377	$58,472	$3,012	$20,488	$81,972	$217
32	289	$64,663	$2,587	$22,829	$90,079	$312
33	262	$52,249	$1,509	$12,062	$65,820	$251
34	196	$33,777	$933	$8,251	$42,961	$219
35	152	$36,036	$1,051	$11,786	$48,873	$322
36	154	$23,963	$1,277	$8,301	$33,541	$218
37	122	$27,838	$1,313	$11,005	$40,156	$329
38	82	$11,998	$384	$3,546	$15,928	$194
39	62	$8,835	$552	$1,688	$11,075	$179
40	51	$12,616	$343	$3,599	$16,558	$325
41	33	$10,256	$280	$3,249	$13,785	$418
42	18	$3,439	$209	$1,037	$4,685	$260
43	8	$867	$15	$207	$1,089	$136
44	6	$794	$39	$67	$900	$150
Total	15,355	$2427,882	$123,741	$770,600	$3,322,223	$216

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Table 18 - Medicaid Reimbursement for Delivery by Category—Total Reimbursement (2008)

Age	Number of Women Served	Prenatal	Delivery	Postpartum	Reimbursements	
					Total	Average
14	36	$51,725	$127,597	$11,889	$191,211	$5,311
15	110	$280,002	$361,767	$31,965	$673,734	$6,125
16	262	$512,630	$891,400	$107,018	$1,511,048	$5,767
17	523	$972,802	$1,801,095	$174,322	$2,948,219	$5,637
18	959	$1,845,822	$3,572,068	$421,885	$5,839,775	$6,089
19	1,241	$2,609,087	$4,778,028	$603,879	$7,990,994	$6,439
20	1,289	$2,787,308	$4,962,512	$630,046	$8,379,866	$6,501
21	1,323	$2,681,134	$5,109,102	$557,709	$8,347,945	$6,310
22	1,224	$2,397,490	$4,816,181	$556,586	$7,770,257	$6,348
23	1,231	$2,607,200	$4,814,121	$596,290	$8,017,611	$6,513
24	1,073	$2,175,354	$4,106,155	$484,089	$6,765,598	$6,305
25	958	$1,807,597	$3,493,991	$408,239	$5,709,827	$5,960
26	906	$1,695,475	$3,415,974	$413,425	$5,524,874	$6,098
27	818	$1,605,194	$3,103,545	$326,835	$5,035,574	$6,156
28	649	$1,225,148	$2,399,470	$279,737	$3,904,355	$6,016
29	527	$863,567	$1,897,619	$205,144	$2,966,330	$5,629
30	414	$846,337	$1,587,201	$192,041	$2,625,579	$6,342
31	377	$682,852	$1,394,545	$195,979	$2,273,376	$6,030
32	289	$486,842	$1,110,519	$102,330	$1,699,691	$5,881
33	262	$481,068	$1,005,551	$96,561	$1,583,180	$6,043
34	196	$388,462	$747,085	$112,780	$1,248,327	$6,369
35	152	$278,248	$552,946	$90,783	$921,977	$6,066
36	154	$235,876	$534,750	$87,648	$858,274	$5,573
37	122	$253,523	$439,522	$56,280	$749,325	$6,142
38	82	$140,236	$280,092	$20,025	$440,353	$5,370
39	62	$118,885	$243,036	$10,588	$372,509	$6,008
40	51	$125,813	$234,639	$23,888	$384,340	$7,536
41	33	$90,483	$137,561	$21,407	$249,451	$7,559
42	18	$34,151	$78,561	$6,666	$119,378	$6,632
43	8	$20,655	$41,290	$2,183	$64,128	$8,016
44	6	$7,144	$19,439	$1,301	$27,884	$4,647
Total	15,355	$30,308,110	$58,057,362	$6,829,518	$95,194,990	$6,200

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Table 19 - Medicaid Reimbursement for General Medical Care by Category and by Month (2008)

Age	Medical	Institutional	Pharmacy	Total	Number of Women	Total Member Months	Cost per month
14	$1,106,636	$319,507	$375,031	$1,801,174	1,586	13,095	$137.55
15	$1,277,771	$470,434	$452,014	$2,200,219	1,621	13,612	$161.64
16	$1,088,859	$671,412	$527,281	$2,287,552	1,562	12,668	$180.58
17	$1,082,335	$596,372	$425,682	$2,104,389	1,431	11,207	$187.77
18	$774,504	$464,218	$302,873	$1,541,595	1,355	9,106	$169.29
19	$652,258	$1,065,001	$209,529	$1,926,788	1,066	7,482	$257.52
20	$906,682	$638,321	$305,412	$1,850,415	1,289	10,070	$183.76
21	$1,218,865	$1,125,865	$398,000	$2,742,730	1,595	12,933	$212.07
22	$1,487,064	$1,373,142	$530,432	$3,390,638	1,905	15,322	$221.29
23	$1,583,824	$1,449,361	$693,804	$3,726,989	2,035	17,004	$219.18
24	$1,633,298	$1,414,722	$697,697	$3,745,717	2,047	16,921	$221.36
25	$1,740,415	$1,621,781	$789,505	$4,151,701	2,099	17,321	$239.69
26	$1,747,484	$1,772,182	$863,946	$4,383,612	2,116	17,545	$249.85
27	$1,725,766	$2,484,550	$969,923	$5,180,239	2,067	17,314	$299.19
28	$1,756,906	$1,673,635	$1,024,195	$4,454,736	2,084	17,462	$255.11
29	$1,765,310	$2,034,735	$1,096,802	$4,896,847	2,016	16,844	$290.72
30	$1,644,100	$1,887,803	$1,110,413	$4,642,316	1,764	14,783	$314.03
31	$1,421,891	$1,508,498	$1,157,488	$4,087,877	1,623	13,649	$299.50
32	$1,277,399	$1,562,039	$901,770	$3,741,208	1,482	12,443	$300.67
33	$1,276,064	$1,263,796	$1,138,983	$3,678,843	1,435	12,194	$301.69
34	$1,330,663	$1,476,073	$982,194	$3,788,930	1,325	11,015	$343.98
35	$1,160,084	$1,598,672	$1,053,909	$3,812,665	1,234	10,305	$369.98
36	$1,141,025	$1,343,297	$975,255	$3,459,577	1,177	9,708	$356.36
37	$1,143,066	$1,412,636	$989,377	$3,545,079	1,150	9,253	$383.13
38	$1,135,127	$1,391,172	$1,102,952	$3,629,251	1,123	9,236	$392.95
39	$1,129,880	$1,443,460	$982,841	$3,556,181	966	8,119	$438.01
40	$907,074	$1,284,043	$853,758	$3,044,875	833	6,856	$444.12
41	$901,909	$1,384,170	$829,102	$3,115,181	767	6,364	$489.50
42	$711,371	$869,859	$631,963	$2,213,193	669	5,644	$392.13
43	$745,359	$1,139,113	$685,882	$2,570,354	625	5,206	$493.73
44	$798,190	$1,787,456	$661,910	$3,247,556	564	4,707	$689.94
Total	$38,271,179	$40,527,325	$23,719,923	$102,518,427	44,611	365,388	$280.57

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Table 20 - Medicaid Reimbursements for Child Health Care by Cost Category (2007)

Age	Medical Costs	Institutional Costs	Pharmacy Costs	Total Costs
<1	$1,868	$3,818	$461	6,147
2	$903	$836	$324	2,063
3	$677	$629	$233	1,539
4	$817	$692	$209	1,718
5	$918	$599	$231	1,748
Total	$5,183	$6,574	$1,458	13,215

Source – Preliminary report – Family Planning Waiver Evaluation (PPC)

Appendix C

Benefit-Cost Ratios by Age and Type of Reimbursement

Within this section, the benefit-cost ratios are presented by single age category for each eligibility criterion and time horizon. Total cost savings are also presented along with adjusted savings (total cost savings multiplied by probability of averting a birth).

Table 21 - One-Year Expected Savings and Benefit-Cost Ratio by Age (Already receiving Assistance)

Age	Total Cost Savings	Adjusted Savings	Ratio
14	$24,488.40	$1,763.16	2.92
15	$25,322.99	$1,823.26	3.69
16	$24,956.20	$1,796.85	3.79
17	$24,822.58	$1,787.23	4.20
18	$25,286.65	$1,820.64	4.59
19	$25,645.46	$1,846.47	4.67
20	$25,708.97	$1,285.45	3.24
21	$25,512.80	$1,275.64	3.34
22	$25,552.19	$1,277.61	3.34
23	$25,721.31	$1,286.07	3.48
24	$25,508.13	$1,275.41	3.58
25	$25,154.00	$1,257.70	3.75
26	$25,295.53	$1,264.78	3.71
27	$25,354.90	$1,267.74	3.71
28	$25,211.26	$1,260.56	3.58
29	$24,813.94	$1,240.70	3.56
30	$25,545.76	$536.46	1.63
31	$25,225.85	$529.74	1.65
32	$25,073.08	$526.53	1.76
33	$25,238.67	$530.01	1.69
34	$25,573.50	$537.04	1.46
35	$25,262.23	$353.67	0.91
36	$24,757.00	$346.60	1.08
37	$25,340.59	$354.77	1.03
38	$24,548.67	$343.68	0.86
39	$25,203.31	$352.85	1.00
40	$26,770.90	$374.79	0.90
41	$26,794.54	$375.12	1.07
42	$25,843.43	$361.81	0.80
43	$27,263.30	$381.69	0.79
44	$23,807.05	$333.30	0.89

Table 22 - One-Year Expected Savings and Benefit-Cost Ratio by Age (Newly eligible—prenatal and delivery reimbursement not included)

Age	Total Cost Savings	Adjusted Savings	Ratio
14	$20,732.36	$1,492.73	2.48
15	$21,028.98	$1,514.09	3.06
16	$21,262.15	$1,530.88	3.23
17	$21,350.77	$1,537.26	3.61
18	$21,123.24	$1,520.87	3.83
19	$22,209.51	$1,599.08	4.04
20	$21,301.28	$1,065.06	2.68
21	$21,649.92	$1,082.50	2.84
22	$21,763.43	$1,088.17	2.84
23	$21,737.47	$1,086.87	2.94
24	$21,764.33	$1,088.22	3.06
25	$21,989.97	$1,099.50	3.27
26	$22,115.04	$1,105.75	3.24
27	$22,722.56	$1,136.13	3.33
28	$22,179.80	$1,108.99	3.15
29	$22,618.20	$1,130.91	3.24
30	$22,905.23	$481.01	1.46
31	$22,726.33	$477.25	1.49
32	$22,740.71	$477.55	1.59
33	$22,753.33	$477.82	1.52
34	$23,273.96	$488.75	1.33
35	$23,594.11	$330.32	0.85
36	$23,426.43	$327.97	1.03
37	$23,755.95	$332.58	0.97
38	$23,876.84	$334.28	0.84
39	$24,431.63	$342.04	0.97
40	$24,506.87	$343.10	0.83
41	$25,065.62	$350.92	1.00
42	$23,866.82	$334.14	0.74
43	$25,117.68	$351.65	0.73
44	$27,533.45	$385.47	1.03

Table 23 - One-Year Expected Savings and Benefit-Cost Ratio by Age (Newly eligible—Prenatal and Delivery Reimbursement included)

Age	Total Cost Savings	Adjusted Savings	Ratio
14	$26,181.87	$1,885.09	3.13
15	$27,313.08	$1,966.54	3.98
16	$27,179.46	$1,956.92	4.12
17	$27,134.46	$1,953.68	4.59
18	$27,371.01	$1,970.71	4.96
19	$28,816.09	$2,074.76	5.24
20	$27,971.37	$1,398.57	3.52
21	$28,123.84	$1,406.19	3.69
22	$28,276.74	$1,413.84	3.70
23	$28,419.90	$1,420.99	3.84
24	$28,233.58	$1,411.68	3.97
25	$28,105.09	$1,405.25	4.19
26	$28,371.68	$1,418.58	4.16
27	$29,038.57	$1,451.93	4.25
28	$28,352.17	$1,417.61	4.02
29	$28,393.26	$1,419.66	4.07
30	$29,412.10	$617.65	1.87
31	$28,913.29	$607.18	1.89
32	$28,774.90	$604.27	2.02
33	$28,953.11	$608.02	1.93
34	$29,808.57	$625.98	1.71
35	$29,817.45	$417.44	1.07
36	$29,144.55	$408.02	1.28
37	$30,057.65	$420.81	1.22
38	$29,386.62	$411.41	1.03
39	$30,596.05	$428.34	1.22
40	$32,238.89	$451.34	1.09
41	$32,821.27	$459.50	1.31
42	$30,671.36	$429.40	0.95
43	$33,342.10	$466.79	0.96
44	$32,301.61	$452.22	1.21

Table 24 - Five-Year Expected Savings and Benefit-Cost Ratio by Age (Already receiving assistance)

Age	Total Cost Savings	Adjusted Savings	Ratio
14	$83,630.57	$6,021.40	9.99
15	$84,787.63	$6,104.71	15.43
16	$84,851.14	$4,242.56	10.68
17	$84,654.97	$4,232.75	11.09
18	$84,694.36	$4,234.72	11.07
19	$84,863.48	$4,243.17	11.48
20	$84,650.30	$4,232.52	11.90
21	$84,296.17	$4,214.81	12.55
22	$84,437.70	$4,221.89	12.39
23	$84,497.07	$4,224.85	12.37
24	$84,353.43	$4,217.67	11.97
25	$83,956.11	$4,197.81	12.04
26	$84,687.92	$1,778.45	5.40
27	$84,368.01	$1,771.73	5.52
28	$84,215.25	$1,768.52	5.91
29	$84,380.84	$1,772.00	5.64
30	$84,715.66	$1,779.03	4.85
31	$84,404.40	$1,181.66	3.02
32	$83,899.17	$1,174.59	3.68
33	$84,482.76	$1,182.76	3.44
34	$83,690.84	$1,171.67	2.94
35	$84,345.48	$1,180.84	3.36
36	$85,913.07	$1,202.78	2.90
37	$85,936.71	$1,203.11	3.42
38	$84,985.60	$1,189.80	2.64
39	$86,405.47	$1,209.68	2.50
40	$82,949.22	$1,161.29	3.10
41	$83,630.57	$6,021.40	9.99
42	$84,787.63	$6,104.71	15.43
43	$84,851.14	$4,242.56	10.68
44	$84,654.97	$4,232.75	11.09

Table 25 - Five-Year Expected Savings and Benefit-Cost Ratio by Age (Newly Eligible—Prenatal and Delivery Reimbursements Excluded)

Age	Total Cost Savings	Adjusted Savings	Ratio
14	$106,166.15	$7,643.96	12.68
15	$109,475.14	$7,882.21	19.93
16	$109,009.58	$5,450.48	13.73
17	$109,729.81	$5,486.49	14.38
18	$110,216.22	$5,510.81	14.41
19	$111,219.26	$5,560.96	15.04
20	$111,681.84	$5,584.09	15.70
21	$112,574.81	$5,628.74	16.77
22	$113,531.98	$5,676.60	16.65
23	$114,171.26	$5,708.56	16.72
24	$114,190.24	$5,709.51	16.20
25	$114,790.03	$5,739.50	16.46
26	$115,475.81	$2,424.99	7.36
27	$116,196.22	$2,440.12	7.60
28	$116,928.38	$2,455.50	8.20
29	$117,990.11	$2,477.79	7.88
30	$119,165.06	$2,502.47	6.83
31	$120,375.74	$1,685.26	4.31
32	$121,330.30	$1,698.62	5.32
33	$123,044.53	$1,722.62	5.01
34	$123,160.47	$1,724.25	4.33
35	$124,458.12	$1,742.41	4.96
36	$127,701.96	$1,787.83	4.31
37	$130,867.12	$1,832.14	5.21
38	$133,447.94	$1,868.27	4.15
39	$137,282.46	$1,921.95	3.96
40	$139,808.84	$1,957.32	5.23
41	$106,166.15	$7,643.96	12.68
42	$109,475.14	$7,882.21	19.93
43	$109,009.58	$5,450.48	13.73
44	$109,729.81	$5,486.49	14.38

Table 26 - Five-Year Expected Savings and Benefit-Cost Ratio by Age (Newly eligible—Prenatal and Delivery Reimbursement included)

Age	Total Cost Savings	Adjusted Savings	Ratio
14	$111,615.67	$8,036.33	13.33
15	$116,081.72	$8,357.88	21.13
16	$115,679.67	$5,783.98	14.57
17	$116,203.72	$5,810.19	15.23
18	$116,729.52	$5,836.48	15.26
19	$117,901.68	$5,895.08	15.94
20	$118,151.09	$5,907.55	16.60
21	$118,689.93	$5,934.50	17.68
22	$119,788.62	$5,989.43	17.57
23	$120,487.28	$6,024.36	17.64
24	$120,362.61	$6,018.13	17.08
25	$120,565.08	$6,028.25	17.29
26	$121,982.68	$2,561.64	7.77
27	$122,383.18	$2,570.05	8.00
28	$122,962.57	$2,582.21	8.62
29	$124,189.89	$2,607.99	8.30
30	$125,699.67	$2,639.69	7.20
31	$126,599.08	$1,772.39	4.54
32	$127,048.41	$1,778.68	5.57
33	$129,346.23	$1,810.85	5.27
34	$128,670.25	$1,801.38	4.52
35	$130,622.55	$1,828.72	5.20
36	$135,433.98	$1,896.08	4.58
37	$138,622.77	$1,940.72	5.52
38	$140,252.49	$1,963.53	4.36
39	$145,506.87	$2,037.10	4.20
40	$144,577.00	$2,024.08	5.41
41	$111,615.67	$8,036.33	13.33
42	$116,081.72	$8,357.88	21.13
43	$115,679.67	$5,783.98	14.57
44	$116,203.72	$5,810.19	15.23

Appendix D

Sensitivity Analysis: Sensitivity of Benefit-Cost Ratios to Different Probabilities of Averting Births

The benefit-cost ratios are highly sensitive to changes in the probabilities of averting births. To test the robustness of the results to changes within this variable, sensitivity analysis was performed. This was completed by analyzing the data using different probabilities and different sets of assumptions. The results reported by Chamie and Henshaw (1981) were used in the base case analysis and reported in the original study. The data used in the sensitivity analyses were developed from data reported by the Alan Guttmacher Institute and other sources. This data showed the probability of averting a birth by geographical region, by different age groups, by distribution of method across a population, proportion of pregnancies leading to a birth, and the relative effectiveness of family planning compared to the use no services. The ratios are reported by age and by eligibility category for a time horizon of one year as was reported in the original study.

Table 27 - One-Year Benefit-Cost Ratios: Iowa-Specific Data

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14	3.85	3.22	4.11
15	4.86	3.99	5.24
16	4.99	4.20	5.43
17	5.53	4.70	6.03
18	6.04	4.99	6.54
19	6.15	5.26	6.91
20	6.15	5.03	6.68
21	6.35	5.32	6.99
22	6.34	5.33	7.01
23	6.60	5.51	7.29
24	6.81	5.73	7.52
25	7.11	6.14	7.93
26	7.04	6.08	7.89
27	7.05	6.24	8.06
28	6.79	5.90	7.62
29	6.75	6.08	7.71
30	7.36	6.51	8.46
31	7.45	6.64	8.53
32	7.94	7.12	9.10
33	7.62	6.79	8.73
34	6.62	5.95	7.70
35	6.13	5.66	7.23
36	7.35	6.87	8.63
37	7.00	6.48	8.28
38	5.84	5.62	6.98
39	6.80	6.51	8.24
40	6.14	5.54	7.38
41	7.24	6.68	8.85
42	5.44	4.96	6.45
43	5.35	4.86	6.53
44	6.03	6.90	8.16

Based on the probabilities reported by Frost, Finer and Tapales (2008). Data is Iowa-specific but is not broken down by age category. For all ages, probability = 0.094

Table 28 - One Year Benefit-Cost Ratios—Overall Effectiveness of Family Planning

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14	14.62	12.38	15.63
15	18.44	15.31	19.89
16	18.93	16.13	20.62
17	20.98	18.04	22.93
18	22.93	19.16	24.82
19	23.34	20.21	26.22
20	25.25	20.92	27.47
21	26.08	22.13	28.75
22	26.05	22.19	28.83
23	27.13	22.93	29.98
24	27.96	23.86	30.95
25	29.22	25.54	32.65
26	28.94	25.30	32.46
27	28.96	25.95	33.16
28	27.90	24.55	31.38
29	27.75	25.30	31.75
30	31.78	28.49	36.59
31	32.21	29.02	36.92
32	34.33	31.14	39.40
33	32.92	29.68	37.76
34	28.60	26.03	33.34
35	16.81	15.70	19.84
36	20.15	19.06	23.72
37	19.17	17.97	22.74
38	16.03	15.59	19.19
39	18.64	18.07	22.63
40	16.80	15.38	20.23
41	19.80	18.52	24.25
42	14.91	13.77	17.69
43	14.62	13.47	17.88
44	16.55	19.14	22.45

Based on probabilities calculated from Forrest and Singh (1990) and Kost, Forrest and Harlap (1991). Represents the best possible effectiveness of family planning services. Age-specific probabilities 14-19: 0.36, 20-29: 0.39, 30-34: 0.41, 35-44: 0.26

Table 29 - One-Year Benefit-Cost Ratios—Net Probabilities Using Assumption I

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14	2.84	2.41	3.04
15	3.59	2.98	3.87
16	3.68	3.14	4.01
17	4.08	3.51	4.46
18	4.46	3.72	4.83
19	4.54	3.93	5.10
20	5.18	4.29	5.64
21	5.35	4.54	5.90
22	5.34	4.55	5.91
23	5.57	4.70	6.15
24	5.74	4.89	6.35
25	5.99	5.24	6.70
26	5.94	5.19	6.66
27	5.94	5.32	6.80
28	5.72	5.04	6.44
29	5.69	5.19	6.51
30	6.20	5.56	7.14
31	6.29	5.66	7.20
32	6.70	6.08	7.69
33	6.42	5.79	7.37
34	5.58	5.08	6.50
35	2.59	2.42	3.05
36	3.10	2.93	3.65
37	2.95	2.76	3.50
38	2.47	2.40	2.95
39	2.87	2.78	3.48
40	2.58	2.37	3.11
41	3.05	2.85	3.73
42	2.29	2.12	2.72
43	2.25	2.07	2.75
44	2.55	2.94	3.45

Assumption I – Based on contraceptive behavior of women at risk of unintended pregnancy but not using family planning services (Forrest and Singh 1990). Argues if publicly funded family planning services were not available, 56% women would continue current method, 11% would switch to condoms, 12% would switch to another nonprescription method, 21% would use no method. Ratios based on net probability of averting birth based on the difference between the probabilities in Table 27 and under assumption I. Net probabilities by age 15-19: 0.07, 20-29: 0.08, 30-34: 0.08, 35-44: 0.04

Table 30 - One-Year Benefit-Cost Ratios—Net Probabilities Using Assumption II

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14	4.06	3.44	4.34
15	5.12	4.25	5.52
16	5.26	4.48	5.73
17	5.83	5.01	6.37
18	6.37	5.32	6.90
19	6.48	5.61	7.28
20	8.09	6.71	8.81
21	8.36	7.09	9.21
22	8.35	7.11	9.24
23	8.70	7.35	9.61
24	8.96	7.65	9.92
25	9.37	8.19	10.46
26	9.28	8.11	10.40
27	9.28	8.32	10.63
28	8.94	7.87	10.06
29	8.89	8.11	10.18
30	9.30	8.34	10.71
31	9.43	8.49	10.81
32	10.05	9.11	11.53
33	9.63	8.69	11.05
34	8.37	7.62	9.76
35	3.88	3.62	4.58
36	4.65	4.40	5.47
37	4.42	4.15	5.25
38	3.70	3.60	4.43
39	4.30	4.17	5.22
40	3.88	3.55	4.67
41	4.57	4.27	5.60
42	3.44	3.18	4.08
43	3.37	3.11	4.13
44	3.82	4.42	5.18

Assumption II – Based on age-specific behavior Patterson of all NSFG respondents who stopped using the pill between 1979 and 1982. Argues if funded clinics not available, 28% would use no method, 24% would switch to condoms, 28% would switch to other nonprescription methods, 20% not at risk because not sexually active. Ratios based on net probability of averting birth based on the difference between the probabilities in Table 27 and under Assumption II. Net probabilities by age 15-19: 0.10, 20-29: 0.125, 30-34: 0.12, 35-44: 0.06

Table 31 - One-Year Benefit-Cost Ratios—Net Probabilities Using Assumption III

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14	4.93	4.13	5.26
15	6.22	5.10	6.70
16	6.38	5.38	6.95
17	7.07	6.01	7.72
18	7.74	6.39	8.37
19	7.88	6.74	8.84
20	8.85	7.24	9.62
21	9.14	7.66	10.06
22	9.13	7.68	10.09
23	9.51	7.94	10.50
24	9.80	8.26	10.83
25	10.24	8.84	11.42
26	10.14	8.76	11.36
27	10.15	8.98	11.60
28	9.78	8.50	10.98
29	9.72	8.76	11.10
30	10.20	9.03	11.73
31	10.34	9.20	11.83
32	11.01	9.87	12.62
33	10.56	9.41	12.10
34	9.18	8.25	10.68
35	4.91	4.53	5.78
36	5.88	5.50	6.91
37	5.60	5.18	6.63
38	4.67	4.50	5.59
39	5.44	5.21	6.59
40	4.91	4.44	5.90
41	5.79	5.34	7.08
42	4.36	3.97	5.16
43	4.28	3.89	5.22
44	4.82	5.52	6.52

Assumption III – Based on information about the contraceptive methods used by new family planning clinic patients before their first visit. Argues if funded clinics not available,45% would continue using current method (with 38% using prescription methods and 7% using nonprescription methods), with 55% using no method but remaining sexually active. Ratios based on net probability of averting birth based on the difference between the probabilities in Table 27 and under Assumption III. Net probabilities by age 15-19: 0.12, 20-29: 0.135, 30-34: 0.13, 35-44: 0.075

Table 32 - One-Year Benefit-Cost Ratios—Net Probabilities Using Assumption IV

Age	Already Receiving	Newly Eligible (Prenatal and Delivery Reimbursement not incl.)	Newly Eligible (Prenatal and Delivery Reimbursement incl.)
14	13.00	11.00	13.90
15	16.39	13.61	17.68
16	16.83	14.34	18.32
17	18.65	16.04	20.38
18	20.38	17.03	22.06
19	20.75	17.97	23.31
20	23.31	19.31	25.36
21	24.07	20.43	26.53
22	24.05	20.48	26.61
23	25.04	21.16	27.67
24	25.81	22.02	28.57
25	26.97	23.58	30.14
26	26.72	23.36	29.96
27	26.73	23.95	30.61
28	25.76	22.66	28.97
29	25.62	23.35	29.31
30	26.35	23.63	30.34
31	26.71	24.06	30.62
32	28.47	25.82	32.67
33	27.30	24.61	31.32
34	23.72	21.58	27.64
35	12.61	11.78	14.88
36	15.11	14.30	17.79
37	14.38	13.48	17.05
38	12.02	11.69	14.39
39	13.98	13.55	16.97
40	12.60	11.53	15.17
41	14.85	13.89	18.19
42	11.18	10.33	13.27
43	10.97	10.10	13.41
44	12.41	14.35	16.84

Assumption IV – Argues that if funded clinics not available, 100% of the women would use no method of contraception but remain sexually active. Assumes that some births are still averted. Ratios based on net probability of averting birth based on the difference between the probabilities in Table 27 and under Assumption IV. Net probabilities by age 14-19: 0.32, 20-29: 0.36, 30-34: 0.34, 35-44: 0.195

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