Medicaid Savings from the Contraceptive CHOICE Project: a Cost Savings Analysis

Tessa MADDEN, MD, MPH[a], **Abigail R. BARKER, PhD**[b], **Ms. Kelsey HUNTZBERRY, MPH**[b], **Gina M. SECURA, PhD, MPH**[a], **Jeffrey F. PEIPERT, MD, PhD**[c], **Timothy D. MCBRIDE, PhD**[b]

[a]Divisions of Family Planning and Clinical Research, Department of Obstetrics & Gynecology, Washington University School of Medicine, St. Louis, MO

[b]Brown School, Washington University in St. Louis, St. Louis, MO

[c]Department of Obstetrics & Gynecology, Indiana University, Indiana, IL

Abstract

Background: Forty-five percent of U.S. births are unintended, and the costs of unintended pregnancy and birth are substantial. Clinical and policy interventions that increase access to the most effective reversible contraceptive methods, intrauterine devices and contraceptive implants, have potential to generate significant cost savings. Evidence of cost savings for these interventions is needed.

Objective: To conduct a cost savings analysis of the Contraceptive CHOICE Project, which provided counseling and no-cost conception, to demonstrate the value of investment in enhanced contraceptive care to the Missouri Medicaid program.

Study Design: The CHOICE Project was a prospective cohort study of 9,256 reproductive-age women, enrolled between 2007 and 2011 and followed until October 2013. This analysis includes 5,061 CHOICE Project participants who were current Missouri Medicaid beneficiaries or uninsured and reported household incomes less than 201% of the federal poverty line. We created a simulated comparison group of women receiving care through the Missouri Title X program and modeled the contraception and pregnancy outcomes that would have occurred in the absence of the CHOICE Project. Data about contraceptive use for the comparison group (N=5,061) were obtained from the Missouri Title X program and adjusted based on age, race, ethnicity, and income. To make an accurate comparison accounting for difference in the two populations, we used our simulation model to estimate total CHOICE Project costs and total comparison group costs. We reported all costs in $2013 to account for inflation.

Corresponding author: Tessa Madden, MD, MPH, Department of Obstetrics and Gynecology, Washington University in St. Louis School of Medicine, 4901 Forest Park Ave., Mailstop: 8064-37-1005, St. Louis, Missouri 63110, Tele: 314-747-6495 (business), Fax: 314-747-4019, maddent@wustl.edu.

Condensation: A program providing counseling and no-cost contraception yields substantial cost savings due to increased uptake of highly effective contraception and averted unintended pregnancy and birth.

Results: Among the CHOICE Project participants included, the uptake of intrauterine devices and implants was 76.1% compared to 4.8% among the comparison group. The estimated contraceptive cost for the simulated CHOICE Project group was $4.0 million versus $2.3 million for the comparison group. The estimated numbers of unintended pregnancies and births averted among the simulated CHOICE Project group compared to the comparison group were 927 and 483 respectively, representing a savings in pregnancy and maternity care of $6.7 million. We estimated that the total cost savings for the state of Missouri attributable to the CHOICE Project was $5.0 million (40.7%) over the project duration.

Conclusions: A program providing counseling and no-cost contraception yields substantial cost savings due to increased uptake of highly effective contraception and consequent averted unintended pregnancy and birth.

Introduction

Unintended pregnancy carries significant public health costs including reduced maternal quality of life, adverse maternal behaviors, and poorer infant outcomes.[1,2] Societal costs are also large, including reduced educational attainment, employment opportunities, and economic stability as well as greater dependence on public assistance.[3] The economic costs of unintended pregnancy and birth are substantial, and U.S. taxpayers pay roughly $11 billion each year in costs associated with unintended pregnancy.[4]

The Contraceptive CHOICE Project was a prospective study of 9,256 reproductive-age women that provided comprehensive contraceptive counseling, no-cost contraception, and reduced barriers to reversible contraception. These barriers included provider misconceptions,[5] high out-of-pocket cost,[6] and multiple visits requirements for initiation of long-acting reversible contraception (LARC; intrauterine devices (IUDs) and implants).[7,8] CHOICE participants had a high uptake of LARC and subsequent reductions in unintended and teen pregnancy.[9,10] Multiple studies have demonstrated that provision of contraception, including LARC, results in economic savings.[11,12] One cost effectiveness analysis found that although LARC is associated with higher upfront costs, these methods generate cost savings after approximately two years of use.[13]

The objective of this analysis was to estimate the cost savings the CHOICE Project contributed to the Missouri Medicaid program over the study period. Our secondary objective was to estimate potential public cost savings if the CHOICE Project model were scaled up to Missouri Medicaid beneficiaries statewide.

Materials and Methods

Model design and population

Participants in the Contraceptive CHOICE Project were enrolled between 2007 and 2011 and followed for two or three years through October 2013.[14] Inclusion criteria for the CHOICE Project included age 14–45 years, not currently using a reversible contraceptive method or willing to start a new method, did not desire pregnancy for the next 12 months, sexually active with a male partner, and resided in the St. Louis area. We limited inclusion in this analysis to women who reported receipt of Medicaid or had incomes less than 201% of the federal poverty level (FPL), which is the income eligibility threshold for Missouri's family planning waiver program, the Women's Health Services Program (MO-WHSP), as well as pregnancy-related Medicaid. The time horizon for the analysis was 45 months which included the 36-month study period plus an additional 9 months to account for any births resulting from conception that occurred during the study period.

To create a comparison group for the analysis, we estimated the contraceptive method distribution that women would have selected in the absence of the CHOICE Project. We used data regarding the contraceptive method chosen by women receiving care at Missouri health centers participating in the Title X program between 2008 and 2012. Women who were currently pregnant, seeking pregnancy, or had a prior sterilization were excluded, as they were from the CHOICE Project. Given the demographic differences between the CHOICE cohort and the Title X program participants (shown in Table 1), we used multinomial logistic regression to obtain probabilities that a CHOICE participant, in the absence of the study intervention, would have selected each method. Contraceptive outcomes were categorized as follows: (1) IUD or implant; (2) injectable contraception; (3) oral contraceptive pills (OCPs), contraceptive patch, or vaginal ring; (4) condoms, other barriers methods, withdrawal, or fertility awareness; and (5) no method. Adjustment was limited to four demographic characteristics due to the available MO Title X data: age (19 years and under, 20–29, and 30 and above), race (white, black, and other race), Hispanic identity (non-Hispanic and Hispanic), and federal poverty level (less than 101% of the FPL and 101–200% of the FPL). This group formed the basis for a counterfactual simulation of the actual CHOICE participants' experience in the absence of the CHOICE Project, thereby creating a comparison group with the CHOICE participant demographics but whose contraceptive choices were based upon the MO Title X population.

For each woman in the comparison group, we conducted a Monte Carol simulation of outcomes and associated costs by executing 1,000 draws from the contraceptive distribution given by evaluating the multinomial logistic regression equation using the CHOICE participant's specific demographic profile. For each draw, we simulated the month-to-month occurrence of pregnancy as well as all possible outcomes (using assumptions discussed in detail below) and tallied associated costs, averaged over 1,000 draws to smooth cost estimates. This generated two sets of simulated results: (1) those for the CHOICE population as predicted by our simulation, and (2) those for the comparison group. The simulated results for the CHOICE Project helped to test the accuracy and reasonableness of the

assumptions entered into the simulation. All analyses were performed in SAS 9.4 (SAS Institute, Cary, NC) and STATA 14 (StataCorp, College Station, TX).

Utilization of contraceptive methods

For CHOICE participants, the assigned contraceptive method was the method chosen by the participant at study enrollment. For the comparison group, the method was assigned probabilistically using the MO Title X health center data described above. Methods were grouped into five the same contraceptive categories described above. To account for contraceptive discontinuation among women who chose an IUD or implant at baseline, we used published CHOICE Project continuation rates at one year and two years using a linear trend to estimate monthly continuation rates.[15] In case of discontinuation, we assumed the same contraceptive distribution as the comparison group at baseline.

Costs of contraceptive methods

To estimate the contraceptive costs across both the CHOICE and comparison populations, we used Missouri Medicaid reimbursement rates for IUDs, implants, and injectable contraception, and the retail acquisition costs for OCPs, patch, and ring for years 2007 through 2011. These method-specific costs were incorporated into the simulation each time a particular method was drawn. Sensitivity of our results to these values was assessed by running the simulation using annual averaged contraceptive costs estimated by Laliberte *et al* which used Medicaid claims data for 11 million women across multiple states (including Missouri) between 2004 and 2010.[16] Using the averaged contraceptive costs showed minimal difference in the estimated cost savings. See Supplementary Materials for sensitivity analysis results.

Cost of contraceptive initiation

Because the CHOICE Project involved additional programmatic costs due primarily to provision of evidence-based, comprehensive contraceptive counseling by trained non-clinician counselors, we computed the cost of contraceptive initiation using actual costs from the CHOICE Project. Annual salaries and fringe benefits for a full-time nurse practitioner, a half-time registered nurse, and a full-time contraceptive counselor were averaged over the number of CHOICE participants to approximate cost depending on enrollment year. We added 30% to the cost of salaries to account for overhead costs such as rent, utilities, and supplies.[17] Since approximately twice the clinician time is required for LARC insertion, the per-participant nurse practitioner cost was calculated as a weighted average, with visits including LARC insertion weighted twice as much as those for non-LARC methods. For IUDs and implants, method and initiation costs were assumed to occur in year 1 only as the maximum duration of study participation was 3 years, therefore, no method replacement due to expiration was necessary.

Contraceptive initiation costs for the comparison group were estimated using Missouri Medicaid reimbursement rates. The estimated cost of initiation of OCPs, patch, ring, and injectable methods was the reimbursement amount for a new patient Level III office visit with a clinician. For initiation costs of IUDs and implant, the reimbursement for a new patient Level III and the method insertion were summed with the weighted by the percent of

individuals who chose each type of IUD or the implant. We also calculated CHOICE Project costs using these rates within our simulation in order to capture the likely cost of a large-scale version of the project. See Supplementary Materials Tables 1A–3A for a summary of costs and supporting data sources.

Costs of unintended pregnancy-related events

In order to determine the number of unintended pregnancies, we incorporated previously published "typical use" contraceptive failure rates into the simulation model.[18] The simulated CHOICE Project unintended pregnancy and birth outcomes were calibrated to exactly match the actual number of unintended pregnancies and births observed in the CHOICE Project. This calibration occurred within the bounds of parameter ranges suggested by the literature and was chosen deliberately to ensure that the cost calculations would be accurate for the actual CHOICE Project.

Five possible outcomes for unintended pregnancy were considered: live birth, induced abortion covered by Medicaid, induced abortion not covered by Medicaid, miscarriage, and ectopic pregnancy. We used a combination of CHOICE Project data as well as 2010 estimates for the percentages of unintended pregnancies that result in live birth, miscarriage, or abortion in Missouri.[19] Additional detail is provided in the Supplementary Materials. The percent of pregnancies ending in an ectopic pregnancy was assumed using methods described by Trussell *et al* and subtracted from the miscarriage rate.[13] The majority of induced abortions were assumed to have zero cost to the state, as Missouri Medicaid does not cover abortion except in cases of maternal life endangerment, rape, and incest. We estimated these to account for approximately one percent of induced abortions.[20] Based upon this fact, we separated induced abortions into two categories: abortions covered by Missouri Medicaid and abortions not covered by Missouri Medicaid.

Costs associated with birth outcomes were drawn from multiple sources. We used data for the cost of birth and first year of life to Missouri Medicaid for fiscal years 2009 through 2011 which was obtained from Missouri's Evaluations of the MO-WHSP from 2011 and 2012.[21,22] The costs for miscarriage, induced abortions covered by Medicaid, and ectopic pregnancy were estimated using statistics reported by Trussell *et al*.[13]

All costs were adjusted to 2013 dollars for the final estimates to account for inflation. We did not discount costs as the cost savings analysis was conducted from a state budgetary perspective and there were minimal changes in MO Medicaid reimbursement over the time period.

Scaling Up Cost Savings to Approximate Savings for the Missouri Medicaid Populations

To calculate the cost savings from a statewide "scale-up" of the program, we applied our CHOICE Project simulation model to individual data from the 2009–13 American Community Survey (ACS),[23] which we limited to all Missouri women aged 18 to 45 who reported receipt of Medicaid or whose household income and uninsured status made them eligible for the MO-WHSP. This approach provides an estimation of the outcomes in a different population (i.e. Missouri women) controlling for age, race, ethnicity, and income as described above. ACS survey weights were used to scale the savings of Missouri ACS

respondents to state population level savings. We used estimates of 20 to 40% LARC uptake to calculate a possible range of cost savings that might occur in a statewide scale-up.

Results

Estimated Contraceptive Mix for the CHOICE Project and Comparison Group

Table 2 shows the contraceptive distribution for both groups. Women in the CHOICE Project were more likely to choose an IUD or implant than women in the comparison group, even after adjusting for baseline demographic differences between the groups. Women in the comparison group were more likely to choose OCPs, injectable contraception, condoms, or no contraceptive method.

Estimated number of unintended pregnancies averted in the CHOICE Project

Table 3 shows the simulated unintended pregnancy and birth outcomes and cost savings for the CHOICE participants and comparison group. There were 475 unintended pregnancies among the CHOICE Project cohort and an estimated 1,402 unintended pregnancies in the comparison group for a total of 927 unintended pregnancies averted. There were 247 unintended births in the CHOICE Project and an estimated 730 unintended births in the comparison group for 483 unintended births averted. The simulated CHOICE outcome of 247 unintended births was calibrated slightly to match the actual CHOICE outcome of 247 unintended births.

Estimated Costs Savings Resulting from the CHOICE Project for Missouri Medicaid

Table 3 also shows the estimated cost savings to Missouri Medicaid due to the CHOICE Project. Not surprisingly, the CHOICE Project was associated with higher contraceptive costs compared to the comparison group, because more women in the CHOICE Project chose IUDs and implants. Most of these costs occurred early in the study period when most women were initiating IUDs and implants as shown in Figure 1. The pregnancy-related costs, however, are lower in the CHOICE Project than in the comparison group, both in absolute terms and the annual average, due to the higher number of pregnancies averted. Because of the timeline of the CHOICE Project, approximately half of women were observed for two rather than three years.[15] For this reason, Table 3 reports an overall sum of costs and savings as well as an annualized average that is adjusted to account for the variation in follow-up time. Thus, total costs in the comparison group are estimated to be $12.2 million compared to $7.3 million for the CHOICE Project group, which is a 40.7% reduction in costs related to contraception, unintended pregnancy, and birth.

Figure 1 compares monthly costs over time for the simulated CHOICE Project and comparison groups. Higher up-front costs due to the use of IUDs and implants a lead to lower costs occurring during the two to three-year study follow-up period; we extended the comparison nine months beyond the study end to account for pregnancies in which conception occurred during study participation but the outcome (i.e. birth) did not occur until after the study ended, since these costs are also attributable to the study period.

Estimated Cost Savings Scaled Up to Missouri Medicaid Statewide

ACS data show that 132,058 women of reproductive age received Missouri Medicaid annually. During 2011, the average enrollment in the Women's Health Services Program was 61,297.[27] A scale-up of the CHOICE Project could save an estimated $79.7 million if 20% of female, reproductive-age, Medicaid beneficiaries chose LARC, increasing to $156.8 million if 40% chose LARC. The cost savings for the MO-WHSP range from an estimated $29.3 to $75.3 million, respectively. Using ACS data, we also estimated that a total of 123,571 women were actually eligible for the MO-WHSP; if all these eligible women were to enroll, the estimated cost savings for this group would range from $59.0 to $151.9 million. These data are shown in Table 4.

Comment

In this analysis, we found the CHOICE Project generated a $5.0 million cost savings for Missouri Medicaid due to unintended births averted among women who had Medicaid or who would be eligible for expanded Medicaid in the case of a pregnancy, a 41% reduction in costs for the cohort over the time period. The cost savings in our analysis are consistent with those estimated by other studies. A statewide initiative in Colorado serving about 50,000 women annually found that increased provision of LARC resulted in an estimated cost savings of approximately $52 million to the state Medicaid program. [24,25] A national study of publicly supported family planning services to 8.9 million women found a $10.5 billion cost savings due to unintended pregnancies averted.[26] It is important to note that our cost savings analysis was conducted for a cohort of 5,000 women and estimated only the direct health costs of unintended pregnancies averted over the study period, not indirect economic and social costs affecting mothers and children.

Strengths of this study include use of a comparison group of Missouri women seeking care at Title X health centers to estimate the contraceptive distribution in absence of the CHOICE Project. We used the actual unintended pregnancy and birth rates from CHOICE to inform the simulation and estimate the number of pregnancies averted by the CHOICE Project. The Monte Carlo simulation approach also allowed us to demonstrate the robustness of our findings to a range of assumptions. Lastly, we were able to obtain Missouri Medicaid level data for the costs of birth and first year of life to create a more precise estimate of costs associated with unintended birth, which is the largest contributor to pregnancy-related costs.

There are some limitations to our study. First, women in both the CHOICE Project and the comparison group were presenting for contraceptive care and therefore may not reflect contraceptive use among the general population. Furthermore, women in the CHOICE Project may have self-selected into the study specifically because they desired LARC and, as result, may not be generalizable to other populations. However, a prior analysis comparing CHOICE participants' with National Survey of Family Growth and Missouri Behavioral Risk Factor Surveillance System respondents found that while demographic and contraceptive characteristics did differ, the absolute differences were small.[27] In addition, other programs have demonstrated LARC uptake substantially higher than the national estimates.[24,28,29] Therefore, it is unlikely that the difference in LARC use between CHOICE participants and MO Title X patients is attributable mainly to selection bias. In addition, due

to limited data for the MO Title X patients, we were only able to control for a small number of the demographic characteristics which may influence contraceptive preferences. Lastly, this analysis did not take into account contraceptive switching or discontinuation for any method other than IUDs and implants. Not capturing the costs associated with initiating a new method may underestimate contraceptive costs and overestimate the cost savings slightly. We also assumed that women who discontinued an IUD or implant, chose a new method based on the distribution of the comparison group. However, women in the CHOICE Project group may have been more likely to choose another IUD or implant which would underestimate cost savings.

Multiple barriers to LARC continue to exist, including requirements for preauthorization, multiple visits for initiation, insurance access, and cost.[30,31] Furthermore, the U.S. federal government is actively working to weaken the contraceptive guarantee and the Title X program.[32,33] However, there are also concerns that "promotion" of LARC may result in coercive practices.[34,35] We emphasize that any interventions to increase access to LARC be patient-centered, respect women's autonomy, and include the full range of contraceptive options, while also removing barriers to care.

Our results demonstrate that increased provision of IUDs and implants can reduce public healthcare spending. The potential cost savings of scaling up a model of care similar to the CHOICE Project are large; thus state Medicaid programs looking at budget priorities should focus on removal of barriers to all contraceptive methods.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

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AJOG at a Glance:

A. We conducted this cost savings analysis to estimate the cost savings to Missouri Medicaid due to the high uptake of intrauterine devices and implants in the Contraceptive CHOICE Project and subsequent unintended pregnancies averted.

B. In this cost savings analysis of 5,061 reproductive-age women provided with no-cost contraception, Missouri Medicaid saved an estimated $5.0 million due to 483 unintended births averted.

C. These results provide important data about the public cost savings that may result from the increased uptake of intrauterine devices and implants. These data have implications for broader policies aimed at reducing unintended pregnancies as well as healthcare costs.
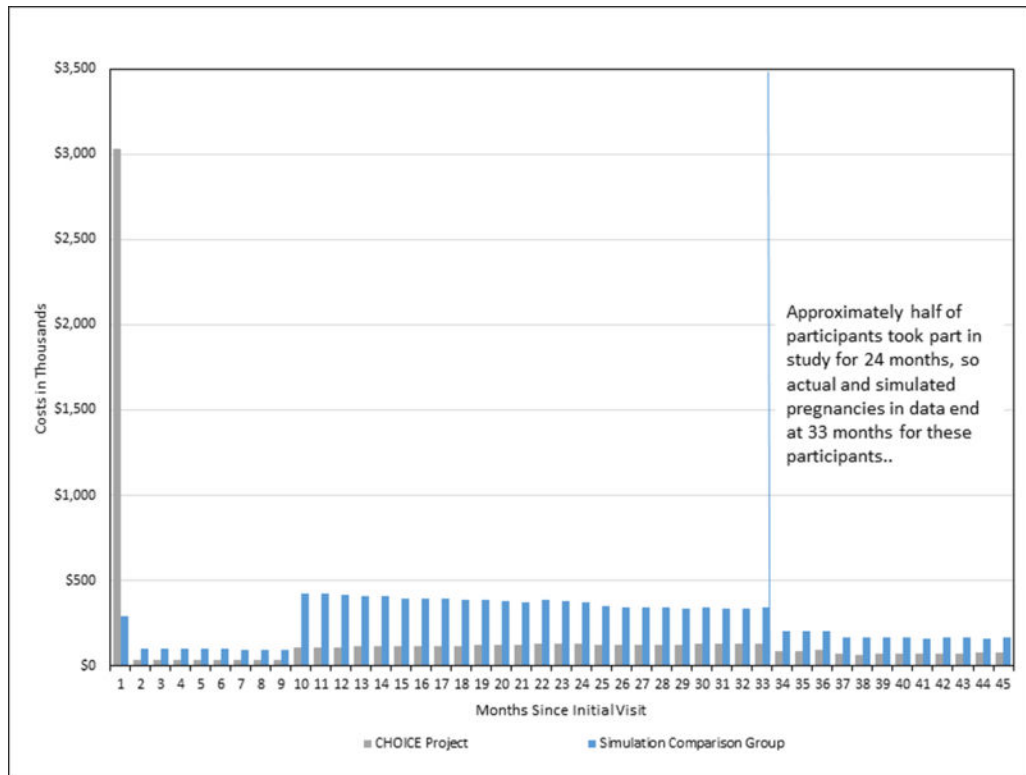
Figure 1:
Monthly Cost Expenditure over Contraceptive CHOICE Project Period.

Table 1.

Demographic Characteristics of the Contraceptive CHOICE Project Participants and Missouri Title X Family Planning Patients.

Characteristic	Contraceptive CHOICE Project (n=5,061)	MO Title X Family Planning Clinics, (n=404,352)	P value
Age Category			<0.0001
15–19 years	15.0%	1.4%	
20–29 years	65.7%	55.0%	
30–45 years	19.3%	43.7%	
Race			<0.0001
Black	60.7%	29.3%	
White	31.5%	68.3%	
Other	7.7%	2.5%	
Ethnicity			
Hispanic	6.4%	5.6%	0.015
Non-Hispanic	93.6%	94.4%	
Current Insurance			
Uninsured (or unknown coverage)	71.5%	72.8%	0.033
Public insurance or family planning waiver program	28.5%	27.2%	
Income			<0.0001
At or below 100% FPL	83.7%	70.0%	
101%−200% of FPL	16.3%	30.0%	

Abbreviations: FPL, Federal Poverty Level

Percentages may not add to 100% due to rounding.

Table 2.

Contraceptive Distribution for the Contraceptive CHOICE Project and Comparison Group.

Contraceptive Method	Contraceptive CHOICE Project (n=5,061)	Comparison Group [a] (n=5,061)	Percentage Point Difference
	N (%)	N (%)	
Intrauterine device	2831(55.9)	182 (3.6)	+ 52.3%
Implant	1036 (20.5)	61 (1.2)	+ 19.3%
Injectable	439 (8.7)	1731 (34.2)	− 25.5%
Oral contraceptive pills	406 (8.0)	2059 (40.7)	− 32.7%
Contraceptive patch	102 (2.0)	76 (1.5)	+ 0.5%
Vaginal ring	246 (4.9)	142 (2.8)	+ 2.1%
Natural family planning	0.0	10 (0.2)	− 0.2%
Male condom	0.0	577 (11.4)	− 11.4%
No method	0.0	172 (3.4)	− 3.4%
Other method	0.0	51 (1.0)	− 1.0%
Total	100	100	100

[a]The contraceptive distribution for the simulated comparison group is based on MO Title X Family Planning Health Center data adjusted for age, race, ethnicity and income.

Percentages may not add to 100% due to rounding.

Table 3.

Comparison of Pregnancy and Cost Outcomes Between CHOICE Project and Simulated Comparison Group.

	Simulated CHOICE Project (1)	Simulated Comparison Group (2)	Difference (1–2)
Number of Unintended Pregnancies	474.8	1401.7	−926.9
Unintended Pregnancy Rate (per 1,000 reproductive age women)	37.7	116.1	
Number of Unintended Births	246.9	729.6	−482.7
Unintended Birth Rate (per 1,000 reproductive age women)	19.6	60.4	
Total Cost	$7,261,838	$12,246,296	−$4,984,458
Contraceptive Costs	$4,019,056	$2,343,820	$1,675,236
Pregnancy-Related Costs	$3,242,782	$9,902,476	−$6,659,694
Annualized Cost	$2,858,991	$4,821,376	−$1,962,385

Table 4.

Estimated Cost Savings Associated with Statewide Scale Up of the Contraceptive CHOICE Project Model.

	Percent Using a LARC Method		
	20%	**30%**	**40%**
Women aged 18–45 who are current MO Medicaid beneficiaries (n=132,058)[a]			
Unintended pregnancies avoided	10,431	16,250	19,978
Unintended births avoided	6,903	10,695	13,518
Estimated cost savings, 2013$	$79,712,958	$123,788,762	$156,769,168
Women enrolled in MO Women's Health Services Program in 2011(n=61,297)			
Unintended pregnancies avoided	4,199	6,813	9,833
Unintended births avoided	2,653	4,536	6,469
Estimated cost savings, 2013$	$29,289,520	$52,563,031	$75,339,232
Women aged 18–45 eligible for MO Women's Health Services Program in 2011 (n=123,571)[a]			
Unintended pregnancies avoided	8,466	13,375	19,823
Unintended births avoided	5,348	9,145	13,040
Estimated cost savings, $2013	$59,045,880	$105,963,854	$151,879,280

LARC, Long-Acting Reversible Contraceptive

[a]Estimated using data from the 2009–13 Annual Community Survey