

Pregnancies and health expenditures from dispensing up to a one-year supply of hormonal contraception

Introduction:

Establishing the cost-effectiveness of contraceptive methods is important for healthcare financing and, prior to the Affordable Care Act, for justifying the inclusion of contraception in healthcare plans. To estimate the relative cost savings from specific methods of contraception, one needs data on the costs of contraceptive provision, the duration of contraceptive use and the timing, number and public cost of subsequent pregnancies. An early influential paper by Trussell et al,¹ showed the hypothetical cost of contraceptive provision and pregnancy care and estimated pregnancies based on published contraceptive failure rates, assuming one year or five years of contraceptive use. More recent papers have used actual program data on the cost of dispensing of contraceptive methods and the duration of method use using estimated rather than actual pregnancy rates and expenditures.²³⁴

In a recent paper in *Obstetrics and Gynecology*, we examined how the number of oral contraceptive pill packages dispensed affects subsequent pregnancy rates.⁵ For that analysis we linked 84,401 women who received oral contraceptives through Family PACT, the California family planning program in January 2006 to Medi-Cal pregnancy events and births conceived in that same year. We compared pregnancy rates for women who received a 1-year supply of oral contraceptive pills to those who received three packs or one pack. We found that women who received a 1-year supply were less likely to have a pregnancy (1.2% compared with 3.3% of women getting three cycles and 2.9% of women getting one cycle). Dispensing a 1-year supply was associated with a 30% reduction in the odds of conceiving an unplanned pregnancy compared with dispensing just one or three packs (confidence interval [CI] 0.57–0.87) and a 46% reduction in the odds of an abortion (95% CI 0.32–0.93), controlling for age, race or ethnicity, and previous pill use. The paper on pill packs and pregnancy examined the actual subsequent pregnancies resulting from dispensing oral contraceptives but did not evaluate the cost effectiveness of these dispensing patterns. The question remains whether the extra cost of dispensing a year supply is justified through reduced expenditures on pregnancy related care. In examining the cost effectiveness of oral contraceptive pill pack dispensing, we expanded our analysis of oral contraceptives to examine the relative cost savings of contraceptive patch and ring dispensing.

This current paper examines data on contraceptive provision, pregnancy rates and cost of pregnancy care all within California public healthcare programs. Family PACT is California's Medicaid waiver program for family planning services. Medi-Cal is California's Medicaid program and is one of few Medicaid programs which cover abortion as well as other pregnancy outcomes. Linking these two programs enables researchers to look at the cost of both prevention and treatment of unintended pregnancy.

Methods:

We match women receiving contraceptives within the Family PACT program to Medi-Cal claims to identify pregnancy events (miscarriage, abortion, ectopic pregnancy and birth) which occurred between 2009 and 2011. For each Family PACT visit in which a contraceptive method was dispensed, we assign a main method of contraception representing the most effective method dispensed in that visit. The duration of contraceptive coverage was calculated assuming immediate start and ending at the point the woman either ran out of supplies or switched to another method of contraception (i.e., had a contraceptive dispensing visit for a different contraceptive method). One ring, one pack of pills and 3 patches are each assumed to provide 1 month of contraceptive protection. We calculate the cost of providing contraceptives as the cost of the entire visit in which contraceptives were dispensed (including counseling, method cost and any reproductive health screening for pregnancy, cancer or sexually transmitted infections). The costs of subsequent visits are included in the cost of providing a specific contraceptive method until a new method is dispensed. For example, for a woman who receives three packs of pills and returns within 3 months for treatment for an STI, we would include the cost of the STI visit as a cost of providing oral contraceptives. Likewise, for a woman who received

rings and returned the next month for a pregnancy test, the cost of providing the contraceptive ring would include the cost of the return visit and pregnancy test.

To identify pregnancy events among Family PACT clients, this study linked Family PACT client eligibility records with the Medi-Cal eligibility and claims data. A probabilistic linking algorithm was used because unique identifiers such as social security numbers are not available in many records. Consequently, approximately half of the Medi-Cal Eligibility Data System records and fewer than half of the Family PACT records contain a social security number. The probabilistic linking process linked individuals based on comparisons of birth date, name, gender, ethnicity, country of birth, language, county of residence, and postal code, as well as social security number, when available. We received approval from the University of California San Francisco Institutional Review Board to perform the claims data analysis and link to Medi-Cal records (University of California San Francisco Committee for Human Research). We linked women who received hormonal contraceptives in Family PACT in 2009 to women whose Medi-Cal funded pregnancy event (birth, miscarriage, abortion, or ectopic pregnancy) was conceived between January 2009 and December 2010. Exact dates of conception are not available in the Medi-Cal Claims Data System database. Pregnancies ending in birth were assumed to occur at 270 days after conception, medication abortions at five weeks, spontaneous abortions at 7 weeks after conception, first trimester aspiration abortions at eight weeks, and second trimester abortions at 15 weeks.

All Medi-Cal funded visits in both managed care and fee-for-service systems in 2009 through 2011 are included in this analysis, regardless of whether the services were specifically for pregnancy-related care. Most Family PACT clients would not be eligible for any Medi-Cal services if they were not pregnant. Hence, they are likely only able to access Medi-Cal services because they are pregnant. However, although Family PACT eligibility guidelines require that women not have another source of family planning services, there is an exception for women who may need to use a different mechanism to pay for care in order to assure the confidentiality of her services. For that reason, some women may have received Medi-Cal services prior to pregnancy. All women in Family PACT would be eligible for Medi-Cal services during pregnancy and at least sixty days after a birth, until the end of the month in which the 60 day period ends. We tally the cost of all Medi-Cal visits in three time periods, before the date of likely conception, while the woman is pregnant up to the point at which pregnancy only coverage would expire, and after the end of Medical coverage, when a family may still qualify for medical care under income-based programs for residents with legal status in the state.

Results:

480,400 women were dispensed oral contraceptives, the contraceptive patch and/or the contraceptive ring through the California Family PACT Program in 2009. Three percent of these women conceived a pregnancy in a month when they had pregnancy protection through the contraceptive method they received through Family PACT. Nine percent conceived a pregnancy in the year after being dispensed one of these three hormonal contraceptive methods.

Table 1 shows the pregnancies to women by contraceptive method and number of months of protection dispensed for the period in which the woman should have been covered by contraceptives and up to a year after dispensing. Five important points can be made from these data:

1. The pregnancy rate for the period of contraceptive coverage does not decrease with greater number of months dispensed. If providers gave a one-year supply to the women they expected would be more effective users, we would expect to see a lower pregnancy rate per month of coverage among women who received a greater supply. We do not see evidence of this in the data; there is unlikely to be a selection effect of more effective users receiving a greater supply of contraceptives.
2. The percentage of pregnancies which end in birth is higher among women who received fewer months of protection compared to women who were dispensed a year's supply. This may indicate that women who are planning to become pregnant or are more ambivalent may receive fewer months of contraceptive protection.

3. The percentage of pregnancies which end in birth is slightly higher for pregnancies conceived while the woman was covered by contraceptives through Family PACT compared to within the first year. If the percentage ending in birth was higher for later pregnancies, this might indicate that later pregnancies were more likely to be intended. We do not observe this pattern and this indicates that very few of these women were intending to become pregnant within a year.
4. The pregnancy rate for the period in which the woman should have been protected from conception for the contraceptive patch (3.8%) is higher than that of the ring (2.1%) and oral contraceptives (2.7%). This pattern is also found in the pregnancy rates for the year following dispensing: patch (12.5%), ring (6.7%) and OCPs (7.1%). The one-year pregnancy rates for ring and OCPs are lower than published contraceptive failure rates for these methods (9% for all) and the observed pregnancy rate for the patch is higher than the published rate.
5. Women dispensed a greater supply of contraceptives experience a lower pregnancy rate over the course of the year following dispensing. This pattern is particularly evident for oral contraceptive clients for whom there is a larger range of quantity dispensed.

Figure 1 shows the cost of providing contraceptive care as well as the cost of healthcare for subsequent pregnancies. The cost of providing a year's supply of hormonal contraceptives are larger than dispensing a one-month supply. However, the total cost for reproductive healthcare from dispensing a year supply of each of these methods of contraception is lower than that of a one month supply when the costs of pregnancy-related care are included. For oral contraceptive patients, a healthcare system would pay \$70 more for contraceptive provision to provide a year's supply but will save \$402 in pregnancy-related healthcare. The patterns for ring and patch are less evident, particularly because very few women receive more than 3 cycles of coverage in a visit. Costs for dispensing three cycles is higher than the cost of providing two or four months of protection for all of the methods under study. This is a consequence of dispensing patterns at pharmacies who typically dispense three cycles and who have higher product cost than clinics who dispense on-site.

Discussion

There are several limitations of the data to precisely measure the cost effectiveness of larger quantities of hormonal contraceptive dispensing. Most importantly, we cannot know exactly when women conceived based on Medi-Cal claims for births, abortions, miscarriage and ectopic pregnancy. We have performed a sensitivity analysis on our assumptions about the date of conception which indicate a 10% margin of error on our estimate of pregnancy rates.

The total cost of pregnancy related care may be underestimated in this study. Particularly, Medi-Cal data from clients enrolled in managed care plans are likely incomplete. We find more fee-for-service than managed care pregnancies indicating that managed care plans may not be reporting all their pregnancy events since reimbursement is not tied to this reporting. We also find that costs of a pregnancy are higher in fee for service compared to managed care Medi-Cal. Because the difference in pregnancy expenditures does not likely vary by what quantity of contraceptive supplies women receive, this undercounting of pregnancy and pregnancy expenditures will not affect the comparison by number of months of protection. However, the total public healthcare savings may be greater than we present here.

This analysis demonstrates that public healthcare programs that cover both the cost of contraception and the care for pregnancy will save money by providing a greater supply of contraception. The savings to women may be greater. In financial terms, many women pay out of pocket for abortion so these costs are not borne by public programs. The social and economic benefits to women of avoiding an unintended pregnancy are out of the scope of this study but are likely substantial.

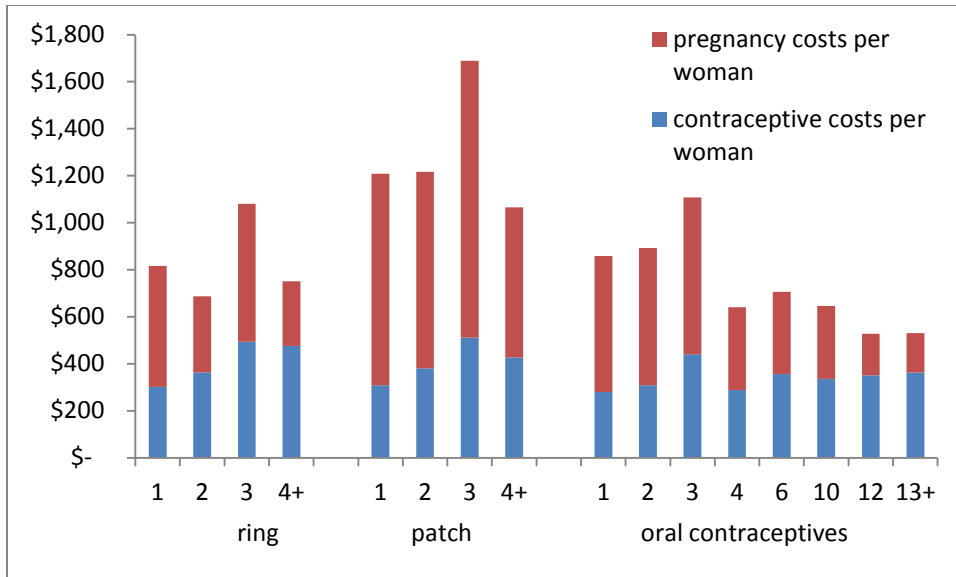
This study finds that users of the contraceptive patch users experience pregnancy at higher rate than pill and ring users. More research is needed to examine the causes of this elevated pregnancy rate – for example to determine whether a high prevalence of obesity in this population is resulting in higher than expected failure rates among patch users.

We find that it is highly cost effective to dispense a year's supply of oral contraceptives. Health plans can save a significant amount of money by offering women more months of contraceptive protection. The findings for the contraceptive rings and patch are less certain, in part because women do not frequently receive a year's supply of these methods. Because the underlying dynamics which may result in lower pregnancy rates with a greater supply of contraceptive dispensing -- reducing the need for resupply visits, raising the expectations of contraceptive continuation and preventing gaps in supply are the same across the three methods, it is likely that women and publicly funded reproductive health plans would benefit from a greater supply for users of all three methods.

Table 1: Number of women dispensed hormonal methods and pregnancies in the period of coverage and for up to a year after dispensing, by method and months of contraceptive protection.

		during period of contraceptive coverage			for up to one year after initial dispensing		
Women dispensed the ring		Number of pregnancies	Pregnancy rate	Percentage of pregnancies ending in birth	Number of pregnancies	Pregnancy rate	Percentage of pregnancies ending in birth
1	8,402	115	1.4%	68%	662	7.9%	60%
2	2,265	28	1.2%	86%	123	5.4%	71%
3	36,302	939	2.6%	69%	3,096	8.5%	65%
4+	37,043	710	1.9%	61%	1,730	4.7%	58%
total	84,012	1,792	2.1%	66%	5,611	6.7%	62%
Women dispensed the patch		Number of pregnancies	Pregnancy rate	Percentage of pregnancies ending in birth	Number of pregnancies	Pregnancy rate	Percentage of pregnancies ending in birth
1	10,047	212	2.1%	70%	1,268	12.6%	67%
2	1,698	45	2.7%	71%	192	11.3%	63%
3	29,325	1,344	4.6%	75%	4,352	14.8%	72%
4+	19,579	723	3.7%	66%	1,766	9.0%	64%
total	60,649	2,324	3.8%	72%	7,578	12.5%	69%
Women dispensed oral contraceptives		Number of pregnancies	Pregnancy rate	Percentage of pregnancies ending in birth	Number of pregnancies	Pregnancy rate	Percentage of pregnancies ending in birth
1	62,198	892	1.4%	69%	5,361	8.6%	66%
2	12,421	259	2.1%	69%	1,019	8.2%	64%
3	286,767	8,223	2.9%	73%	25,744	9.0%	69%
4	21,313	436	2.0%	65%	1,051	4.9%	61%
5-6	22,086	594	2.7%	65%	1,090	4.9%	64%
7-10	22,785	780	3.4%	69%	1,004	4.4%	68%
11-12	21,221	645	3.0%	61%	664	3.1%	61%
>12	87,725	2,537	2.9%	61%	2,374	2.7%	62%
total	536,516	14,366	2.7%	69%	38,307	7.1%	68%

Figure 1: Costs of providing contraceptive care and subsequent healthcare, one year after dispensing per woman dispensed short term hormonal contraceptives in Family PACT 2009



¹ J Trussell, J A Leveque, J D Koenig, R London, S Borden, J Henneberry, K D LaGuardia, F Stewart, T G Wilson, and S Wysocki. The economic value of contraception: a comparison of 15 methods. *American Journal of Public Health* April 1995: Vol. 85, No. 4, pp. 494-503.

² Amaral G, Foster DG, Biggs MA, Jasik CB, Judd S, Brindis CD. Public savings from the prevention of unintended pregnancy: a cost analysis of family planning services in California. *Health Serv Res.* 2007 Oct;42(5):1960-80.

³ Rodriguez MI, Caughey AB, Edelman A, Darney PD, Foster DG. Cost-benefit analysis of state- and hospital-funded postpartum intrauterine contraception at a university hospital for recent immigrants to the United States. *Contraception.* 2010 Apr;81(4):304-8

⁴ Foster DG, Biggs MA, Rostovtseva D, de Bocanegra HT, Darney PD, Brindis CD. Estimating the fertility effect of expansions of publicly funded family planning services in California. *Womens Health Issues.* 2011 Nov-Dec;21(6):418-24.

⁵ Foster DG, Hulett D, Bradsberry M, Darney P, Policar M. Number of oral contraceptive pill packages dispensed and subsequent unintended pregnancies. *Obstet Gynecol.* 2011 Mar;117(3):566-72.