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Medicaid Family Planning Waivers in 3 States: Did They Reduce Unwanted Births?

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Abstract

Effects of Medicaid family planning waivers on unintended births and contraceptive use postpartum were examined in Illinois, New York, and Oregon using the Pregnancy Risk Assessment Monitoring System. Estimates for women who would be Medicaid eligible "if" pregnant in the waiver states and states without expansions were derived using a difference-in-differences approach. Waivers in New York and Illinois were associated with almost a 5.0 percentage point reduction in unwanted births among adults and with a 7 to 8.0 percentage point reduction, among youth less than 21 years of age. Oregon's waiver was associated with an almost 13 percentage point reduction in unintended, mostly mistimed, births. No statistically significant effects were found on contraceptive use.

Keywords

Medicaid, section 1115 waivers, family planning, unwanted births, costs

Introduction

Access to and consistent use of effective contraceptive services among women at risk of unintended pregnancy are critical to meeting the Healthy People 2020 goal to increase the proportion of pregnancies that are intended by 10%.[1] Approximately half the pregnancies in the United States are reported to be either unwanted or earlier than desired,[2] higher than the 41% seen internationally.[3] Adverse consequences of unintended pregnancy likely include later entry into prenatal care, maternal smoking, and other poor outcomes,[4-6] all of which can increase the costs of state Medicaid programs that paid for an estimated 48% of all births in 2010.[7] While US policies expanded insurance coverage and access to prenatal care for low-income pregnant women over the 1980s-1990s, infant mortality rates and disparities in birth outcomes remain high compared with other industrialized countries.[8,9] An important insight from prior US policy was that expansion of Medicaid eligibility for women "only when" pregnant led to improvements in prenatal care but not necessarily birth outcomes.[10] As policy evolved, states began to use section 1115 Medicaid family planning waivers to expand access to contraceptive services/supplies to these same low-income women before and between pregnancies.

With evidence from national studies that showed the waivers reduced births,[11,12] a provision of the Affordable Care Act (ACA) of 2010 allowed states to use a State Plan Amendment (SPA) to expand family planning coverage to women not otherwise Medicaid eligible. As of 2015, 28 states have federal approval to extend Medicaid eligibility for family planning to individuals who would not otherwise be eligible; 15 will extend via section 1115 waivers and 13 via SPAs.[13] These options are of particular importance to states choosing not to expand Medicaid under the ACA. Yet, there is little information on the effect these waivers have had on unintended births paid by Medicaid to guide state decisions regarding future policies. Using data from prior states' expansions, we test whether these waivers:

- reduced the percentage of births reported as unintended or unwanted among women targeted by the waiver;
- increased the use of contraceptives in the postpartum period among these women; and
- exhibited effects that were stronger for youth.

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We use a quasi-experimental design and the experiences of comparison groups in control states to assess the impacts of the expansion of family planning services in the late 1990s and early 2000s. We use data from the Pregnancy Risk Assessment Monitoring System (PRAMS) in Illinois, New York, and Oregon, 3 states that expanded eligibility to family planning services, and Colorado, Michigan, North Carolina, Maine, West Virginia, Ohio, Alaska, and New Mexico—states chosen as controls for the waiver states.

State family planning waivers have been evaluated in terms of their impact on sexual activity, abortion, and birth rates, as well as family planning and primary care service utilization. Two national studies found an approximately 2% decline in birth rates for all adult women related to the implementation of income-based family planning waivers[11,12]; one found a greater effect among teens estimated at approximately a 4% decline.[11] This latter study also documented an increase in the use of contraception among those newly eligible under the waiver and found no association between the implementation of the waivers and abortion rates. Two newer studies examined the effects of family planning waivers on receipt of preventive health care. In the first, waivers were found to increase the receipt of Pap tests and clinical breast exams in a national analysis,[14] whereas a study of the California waiver found an increase in the proportion of women with receipt of routine check-ups within the past year and the proportion who reported talking to their provider about contraception.[15]

Given the wide variation in states' Medicaid policies and the possibility that Medicaid family planning waivers exhibit state-specific effects, this article builds on the earlier national studies by analyzing effects on births that are paid for by Medicaid—the key group benefiting from the family planning waivers—in several states.[11,12] The PRAMS data are unique in that they can be used to categorize births as to whether the women report that the pregnancy leading to that birth was intended or not; the data also include insurance status. To our knowledge, this is the first study of the effects of waivers on births from unintended pregnancies paid specifically by Medicaid.

Methods

We proceed from an economic perspective; the consumption of health care services is based on the prices of available services, the health risks of individuals, and their insurance status. Although the demand for health care may be inelastic for some groups and services, entering the system is price sensitive and there may be differential responses among the poorest groups that could affect their health.[16,17] The introduction of the family planning waivers in the study states essentially provided insurance for family planning and related primary care services for women in certain income groups. In this section, we discuss (1) the study states' waiver expansions, (2) groups affected (treatment) and not affected (control) by these waivers, (3) the difference-in-differences (DID) methodology, (4) the PRAMS data, and (5) outcome measures and control variables used in the analysis.

Waivers and Treatment/Control Groups

To understand how these waivers alter the institutional characteristics of Medicaid as it pertains to women of reproductive age and in particular, new mothers, we note that in the absence of a family planning waiver, all state Medicaid programs make women in a selected income range (above welfare income levels and generally <185% of the Federal Poverty Level (FPL) across all states eligible for Medicaid *only when pregnant.* Most states use presumptive eligibility to get pregnant women in early but all states end eligibility for these women 60 days postpartum. If the state implements a family planning waiver, women just delivering are then eligible for family planning and related primary care services; nulliparous women are newly eligible as well. Many states that implement these waivers set the income range to match their pregnancy eligibility level since in the absence of the waiver, unintended pregnancies would likely be covered under Medicaid for both the pregnancy and the delivery.

We include in Table 1 the specific income groups targeted by section 1115 and other waivers in each study state, the date the family planning waiver was implemented, and the pre/post-waiver period we analyze. Illinois implemented a section 1115 family planning waiver (Illinois Healthy Women) in April of 2004 to uninsured women below 200% FPL who were not otherwise eligible for Medicaid. As Illinois had previously expanded full Medicaid benefits to parents between 38% and 90% FPL (Health Insurance Flexibility and Accountability (HIFA) waiver in late 2002), the family planning waiver effectively expanded eligibility to parents between 90% and 200% FPL and nulliparous women below 200% FPL. For Illinois (and New York) where the family planning waiver was superseded by the other waivers, we evaluated specifications that included 2 post periods: one after the first waiver but before the second family planning waiver and the other covering the period after the family planning waiver was implemented. We found that HIFA waiver alone did not have a meaningful effect and therefore present results based on the pre and post-waiver period relative to the family planning waiver. To the extent that the HIFA waiver had lagged effects, it is possible that our estimates are picking up the combined effects of the family planning and HIFA waivers. In Illinois, as in our other study states, teens were deemed eligible on only their "own" income effectively making almost *all* female teens eligible.

Like Illinois, New York expanded full Medicaid benefits to parents above 80% FPL up to 133% FPL and also to childless adults up to 100% FPL under a section 1115 waiver in late 2001—1 year before its family planning waiver. Under its Family Planning Benefit Program (FPBP), New York expanded family planning coverage to 200% FPL

Table 1. Summary of Study State Section 1115 Waivers, Pre/Post Study Periods and List of Comparison States

Illinois		
Groups Affected by HIFA[c] and Family Planning Waiver	**Implementation Date of Family Planning Waiver (Illinois Healthy Women)**	**Pre Post Period Used for Analysis of PRAMS Data**
Parents > 38% FPL , < 200% FPL; Childless women < 200% FPL; Teens/Youth < 21	April 2004	**Unintended Pregnancy**:[a] Pre: Jan 2002- Dec 2004 Post: Jan 2005-Dec 2006 **Post-Partum Birth Control**:[b] Pre: Jan 2002- June 2004 Post: July 2004-Dec 2006
Comparison States for Illinois: CO, MI		
New York		
Groups Affected by Section 1115[c] and Family Planning Waiver	**Implementation Date of Family Planning Waiver (Family Planning Benefit Program)**	**Pre Post Period Used for Analysis of PRAMS Data**
Parents > 80% FPL, < 200% FPL Childless adults < 200% FPL; Teens/Youth < 21	October 2002	**Unintended Pregnancy**:[a] Pre: Jan 2000- June 2003 Post: July 2003-Dec 2005 **Post-Partum Birth Control**:[b] Pre: Jan 2000- Dec 2002 Post: Jan 2003-Dec 2005
Comparison States for New York: ME, NC, OH, WV		
Oregon		
Groups Affected by Family Planning Waiver	**Implementation Date of Family Planning Waiver (Oregon Contraceptive Care)**	**Pre Post Period Used for Analysis of PRAMS Data**
Parents and Childless Adults > 100% FPL, < 185% FPL; Teens/Youth < 21	January 1999	**Unintended Pregnancy**:[a] Pre: Jan 1998- Oct 1999 Post: Nov 1999-Dec 2001 **Post-Partum Birth Control**:[b] Pre: Jan 1998- March 1999 Post: April 1999-Dec 2001
Comparison States for Oregon: AK, CO, NM		

Sources: http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Waivers/Waivers.html; http://www.statehealthfacts.org/comparemaptable.jsp?ind=962&cat=17 Kaiser Family Foundation (KFF), Kaiser Commission on Medicaid and the Uninsured. October 2003. "Serving Low-Income Families through Premium Assistance: A Look at Recent State Activity," http://www.kff.org/medicaid/kcmu4143brief.cfm ; Broaddus, M. 2002. Expanding Family Coverage: States' Medicaid Eligibility Policies for Working Families in the Year 2000," Center on Budget and Policy Priorities (CBPP), Washington, DC. National Governor's Association (NGA). 2000. "Income Eligibility for Pregnant Women and Children," NGA, Washington DC. National Governor's Association (NGA). 2002. "MCH Update 2002: State Health Coverage for Low-Income Pregnant Women, Children, and Parents," NGA, Washington, DC. Oregon Department of Human Services (DHS), Health Services, Office of Medical Assistance. July 2006. "Oregon Health Plan: An Historical Overview," DHS, Salem, OR.; Silow-Carroll, S, EK Waldman, JA Meyer, Williams C, K Fox and JC Cantor. November 2002. "Assessing State Strategies for Health Coverage Expansion: Case Studies of Oregon, Rhode Island, New Jersey, and Georgia," Economic and Social Research Institute and the Center for State Health Policy at Rutgers University; Field Report available at ww.cmf.org; Kaiser Family Foundation (KFF), Kaiser Commission on Medicaid and the Uninsured, "Oregon Section 1115 Waiver," Fact Sheet; http://www.kff.org/medicaid/4101-index.cfm ; State Coverage Initiatives, http://www.statecoverage.org/coverage/oregon.

Notes: PRAMS = Pregnancy Risk Assessment Monitoring System.

[a]PRAMS data are based on live births. The 'post' period for analysis of unintended pregnancies ending in live births begins with births occurring 10 months or more after the family planning waiver implementation month. Pregnancies leading to births up to that point were begun prior to the waiver and hence, whether or not they were intended could not be affected.

[b]The 'post' period for analysis of post-partum birth control begins with the 3rd month after the family planning waiver implementation month. Without a waiver, Medicaid coverage for women delivering on Medicaid ends 60 days after delivery and hence, a waiver changes coverage in the 3rd month forward.

[c]Illinois implemented a HIFA waiver late in 2002 which provided full Medicaid benefits to parents above the welfare eligibility level (38% FPL) and below 90% FPL. New York used a section1115 waiver to expand to parents above their welfare eligibility level, 80% FPL, but under 133% FPL and to childless adults up to 100% FPL in late 2001.

that effectively made parents between 133% and 200% and childless adults (including men) between 100% and 200% FPL newly eligible for these services. Again, we use the pre/post waiver period for the family planning waiver in the results presented here. We note that the PRAMS surveyed sampled women in all areas of the state except New York City up until 2004; our sample for the 2000-2005 time periods is therefore representative of the urban and rural areas of "upstate" New York.

Oregon's family planning waiver, initially called the Family Planning Expansion Program (FPEP) and now, Oregon Contraceptive Care (CCare), expanded family planning services and supplies to women and *men* up to 185% FPL in January 1999. As parents and childless adults were eligible for Medicaid up to 100% FPL prior to this, Oregon's family planning expansion targeted those between 100% and 185% FPL. As in Illinois, teens in Oregon and New York were deemed on their own income, making virtually all teens (these states also included males) eligible for Medicaid-covered family planning services.

To analyze the effects of these waivers, we focused on two treatment groups: (1) women who had their deliveries paid by Medicaid but who would not be eligible unless pregnant and (2) teens/youth below the age of 21. To derive the first group, we used PRAMS data on insurance coverage and sources of income to identify women with Medicaid paid deliveries but who did not report that their only source of income was from some form of public assistance. Hence, the residual group is women with Medicaid paid births who did not have income low enough to qualify them for Medicaid unless they were pregnant; we refer to them as "Medicaid at delivery, non-welfare" in our tables. We identify the second group based on age. As noted, states used only the income reported by the teen applicant thereby making all young women newly eligible. States can use this policy up to age 21 under old waivers and can continue to do so under a SPA or an extended family planning waiver at state option. Using these broadly defined treatment groups had the advantages of larger sample sizes and consequently more precise estimates as well as not being subject to potential measurement error from using the PRAMS categorical income data.

As noted in Table 1, the "post"-waiver period for our analysis of births from unintended pregnancies starts with births occurring 10 months or more after the waiver implementation month as the pregnancies leading to the great majority of births prior to that month began before the waiver and hence could not have been affected by the policy. We set the "post" period for the analysis of postpartum birth control to the third month after the waiver implementation month since, without the waiver, Medicaid coverage for women delivering on Medicaid ends 60 days after delivery and hence the waiver would change coverage in the third month postpartum and forward.

We wanted control observations (Medicaid at delivery, non-welfare, <21) from states in reasonably close geographic proximity, with similar Medicaid eligibility levels that did not implement family waivers or other coverage expansions affecting women of reproductive age over the analysis period (In 2002, Colorado used the Children's Health Insurance Program (CHIP) to expand eligibility for women once pregnant, but froze enrollment in fiscal year 2003. Maine increased eligibility for parents in 2000 and for childless adults in 2002; these could affect women of reproductive age but both were in New York's pre-waiver period and did not lead to significantly different trends from those in New York when Maine was included as a control state. New Mexico had a family planning waiver throughout the study period for Oregon but made no changes in eligibility levels. The treatment and control states kept their pregnancy eligibility levels largely within the 150-200% FPL range over the study periods. Our key criteria for selecting our comparison states, however, was a formal test of equality in trends of outcome measures in our study and control states prior to the waiver implementation; if similar, they can serve as a counterfactual for the treatment states. Results are shown in Table 1 of the online appendix. Availability of the PRAMS data for years prior to the expansion and after its introduction was an additional constraint. (Although there are now more than 30 states participating in PRAMS, this has not been true historically; see http://www.cdc.gov/prams/States.htm.). Based on these criteria, Colorado and Michigan were used as comparison states for Illinois; Maine, North Carolina, Ohio, and West Virginia were used for upstate New York; and Alaska, Colorado, and New Mexico were used for Oregon (see Table 1).Women giving birth in the study and comparison states were generally similar in terms of socio-demographics in both the pre and post waiver periods (tables available from authors on request); an extensive set of demographic and socioeconomic variables were used to net out trends in the population.

Difference-in-Differences

We used the DID method to estimate the waiver effects. This approach simulates conditions of an experiment by defining treatment and control groups and deriving the impact estimates by differencing out changes in the outcomes for the control group between the period before and after the waiver was introduced from the changes observed in the treatment group. This method effectively "subtracts out" changes in outcomes due to trends that could affect both groups in the absence of the waiver. The DID method has been used extensively to examine impacts of policy changes in health services research and other areas.[18-23]

We modeled the effect of the waiver on the probability of a given outcome as a function of a "Treatment" indicator variable (whether the woman is in the treatment or comparison state), a "Post" waiver dummy (whether the record is drawn from the pre–family planning waiver or post–family planning waiver period), the interaction of those two terms (ie, the treatment and the post-waiver dummy variables), and a set of maternal characteristics. The coefficient on the

interaction term provided the DID impact estimate; our base model includes state and year fixed effects. Marginal effects averaged over the population (Average Treatment Effect (ATE)) were derived from probit models of the following general form:

$$O_{it} = \alpha + \xi \mathbf{X}_{it} + \lambda P_t + \sigma T_i + gP_t \times T_i + \gamma S_i + \upsilon Y_t,$$

where O_{it} = probability of outcome for the ith woman with birth in the tth year; $\mathbf{X}_{it}$ = vector of individual characteristics (age, race, education, etc), P_t = dummy variable to denote pre–family planning waiver/post–family planning waiver based on the month and year of birth, T_i = dummy variable to denote the ith woman in treatment or comparison state, $P_t \times T_i$ = interaction term, S_i = indicator for state of residence for the ith woman/birth, and Y_t = indicator for the year of birth.

The validity of the DID estimator requires similar trends in the pre-waiver period and as noted, we use controls only from states with similar trends. In addition, we tested "placebo" interventions in the pre-waiver period by changing the timing of the intervention to an earlier period and found no significant effects in New York and Illinois (see Tables 2 and 3 of the online appendix) suggesting that the timing of the change in outcomes targeted by the waivers is consistent with the policy change. In Oregon, we do not have an adequate pre-waiver period to complete this test. For each waiver/non-waiver state group, we re-evaluated the DID model using only one comparison state (results available from authors on request); as expected, there is a loss of significance using only one state as a control but generally, the direction and magnitude of the significant effects were robust.

In addition to sensitivity analysis related to the validation of the DID approach, we considered a number of alternate model specifications and error term structures and again found our impact estimates generally consistent in sign and significance. (To net out differences in racial distribution across treatment and control groups and the strong demographic trends, we re-ran models using only white, non-Hispanic women and found consistent effects with some differences in magnitude. For Illinois and New York where family planning was superseded by the other waivers, we evaluated specifications that included two post-waiver periods: one after the first waiver but before family planning and the other covering the period after the family planning waiver was implemented. We found that the initial waiver effects were insignificant in part due to targeting of a narrow income range and the short gap between the programs. The family planning estimates were consistent with those presented. The inclusion of a year time trend, and state-specific year trend produced very similar impact estimates and the same general patterns were found when we clustered on state. Results from these specifications as well as DID validation tests for each study state are given in Tables 2-4 of the online appendix.)

The regressions were evaluated using Stata 11 SE taking into account the complex survey design of the PRAMS data. Stata's *margins* command was used to obtain marginal effects and respective standard errors.[24]

Data

The PRAMS is a state-level, population-based surveillance system that assesses maternal behaviors, experiences, and insurance coverage before and during a woman's pregnancy and postpartum period.[25] A sample of women with a recent birth is drawn from states' birth certificate records with women at higher risk of poor birth outcomes sampled at a higher rate. Selected women are contacted with a mailed questionnaire and non-respondents are followed up by phone. The PRAMS data are made available only if the state achieves a 65% response rate (70% prior to 2007). The PRAMS data for New York State exclude New York City births; comparison states for the New York analysis were chosen keeping this in mind.

The PRAMS sample is unique in that it is representative of all live births in a state/year and, important to our hypotheses, provides data on insurance status at delivery. Yet, it is limited in that a change in the intent of pregnancy attributable to the waiver would only be observed in our sample for a fraction of women who were successful at delaying birth from the time of "treatment" until the desired timing, and the estimated effect is found only within the narrow window of the analysis frame. Hence, our estimates represent only a partial effect, omitting the proportion of women who successfully averted unintended births to the time outside of sample frame. The PRAMS sample is appropriate to assess use of birth control postpartum as the data are representative of all women giving birth within a state and the question regarding postpartum birth control has a high response rate; the average window of response to the PRAMS survey is 4 to 6 months postpartum.

Another issue with the PRAMS sample is that trends in abortion rates and other factors affecting the Medicaid paid births, such as unemployment, change the sample composition. Nationally and in the study states, abortion rates were declining during the study periods but changes were small relative to changes over longer periods.[26] If increasing, we could overstate the effect of the waiver as fewer unintended pregnancies are brought to term; as they are decreasing, our estimates may underestimate effects. To further address these issues, we controlled for abortion and unemployment rates in our sensitivity analysis (see Tables 2-4 of the online appendix); results were robust.

Outcome Measures and Control Variables

Data from the PRAMS phases 3, 4, and 5 were consistently recoded for the study and comparison states. The outcome measures analyzed were (1) unintended birth and (2) contraceptive use postpartum. The intendedness of pregnancy is

Table 2. Descriptive Analysis: Means of Core Outcomes Pre/Post Waiver in Treatment and Comparison States.

	Illinois				New York				Oregon			
	Illinois		MI CO		New York		NC WV ME OH		Oregon		CO NM AK	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Medicaid at Delivery Non-Welfare												
Unintended Pregnancy[a]	0.605	0.572	0.592	0.573	0.572	0.55	0.624	0.595	**0.567**	**0.518**	**0.535**	**0.563**
	0.011	0.016	0.01	0.016	0.021	0.023	0.009	0.012	0.032	0.021	0.014	0.011
Didn't Want to be pregnant[a]	**0.149**	**0.117**	**0.137**	**0.153**	**0.123**	**0.089**	**0.15**	**0.154**	0.159	0.125	0.149	0.123
	0.008	0.011	0.007	0.012	0.014	0.013	0.007	0.009	0.025	0.014	0.01	0.007
Wanted to be pregnant later[a]	0.456	0.455	0.456	0.42	0.449	0.461	0.474	0.441	0.407	0.393	0.386	0.44
	0.011	0.016	0.01	0.016	0.021	0.023	0.009	0.012	0.033	0.021	0.013	0.011
Used Birth Control Post-partum[b]	**0.862**	**0.884**	**0.859**	**0.864**	0.862	0.825	0.872	0.857	0.794	0.811	0.821	0.835
	0.008	0.009	0.008	0.01	0.016	0.016	0.007	0.008	0.033	0.015	0.015	0.007
Teens Under 21												
Unintended Pregnancy[a]	0.757	0.732	0.736	0.672	0.741	0.728	0.728	0.728	0.615	0.653	0.683	0.695
	0.017	0.028	0.016	0.028	0.031	0.038	0.013	0.02	0.045	0.032	0.02	0.016
Didn't Want to be pregnant[a]	**0.16**	**0.099**	**0.097**	**0.117**	0.101	0.042	0.122	0.112	0.123	0.086	0.134	0.101
	0.015	0.02	0.011	0.019	0.022	0.016	0.01	0.015	0.031	0.019	0.014	0.01
Wanted to be pregnant later[a]	**0.597**	**0.632**	**0.639**	**0.555**	0.64	0.685	0.606	0.616	0.492	0.566	0.549	0.593
	0.02	0.031	0.018	0.029	0.034	0.04	0.015	0.022	0.046	0.034	0.021	0.017
Used Birth Control Post-partum[b]	0.866	0.833	0.893	0.856	0.87	0.82	0.871	0.861	0.789	0.795	0.784	0.812
	0.015	0.021	0.012	0.018	0.025	0.03	0.011	0.015	0.046	0.025	0.027	0.012

Source: PRAMS Phase 4-5; For Illinois analysis only data from 2002-2006 restricted to samples from Illinois, Colorado and Michigan were used; For New York analysis only data from 2000-2005 restricted to samples from New York (excluding New York city), North Carolina, Maine, West Virginia, and Ohio were used; Oregon analysis employed data from 1998-2001, restricted to samples from Oregon, Alaska, and New Mexico;

Notes. PRAMS = Pregnancy Risk Assessment Monitoring System. Where the raw differences-in-differences are significant at $p < .05$ they are highlighted in boldface print.

[a]Post period for Illinois analysis includes data from January 2005 through December 2006; Post period for New York analysis includes data from July 2003 through December 2005; Post period for Oregon analysis includes data from November 1999 through December 2001;

[b]Post period for "Used BC Post Partum" in Illinois spans July 2004 through December 2006; in New York-January 2003 through December 2005; in Oregon-April 1999 through December 2001. Where the raw differences-in-differences are statistically significant at $p \leq .05$ they are highlighted in boldface print.

captured in the PRAMS question: "Thinking back to *just before* you got pregnant, how did you feel about becoming pregnant?" The respondent then chooses from the following options: "I wanted to be pregnant sooner," "I wanted to be pregnant later," "I wanted to be pregnant then," "I didn't want to be pregnant then or at any time in the future," "I don't know." Although there are issues with the measurement of the intendedness of pregnancy, the evidence suggests that there might be differential health impacts depending on the type (unwanted or mistimed) and extent of mistiming (more than 24 months).[27,28] We therefore modeled births by pregnancy intent as (1) a dichotomized outcome, unintended (unwanted any time or wanted later) versus intended pregnancy (wanted then or sooner) using a probit model, and (2) a categorical outcome, unwanted (then or any time) versus intended, and wanted later versus intended using a multinomial probit model. We omit the "I don't know" responses from analysis; over the waiver state's study periods, these represented less than 5% of the full sample.

The vector of independent variables in the base model included (1) maternal age (<21, 25-34, 34+ years), (2) race/ethnicity (black non-Hispanic, white non-Hispanic, Hispanic, other race), (3) maternal education (more than high school, high school graduate, some college, college graduate), (4) worker (yes/no), (5) smoker (yes/no, for birth control use postpartum, smoking status refers to smoking postpartum; in all other specifications, the smoking indicator is defined as smoking pre-pregnancy), and (6) number of "stressors" during the 12 months before the birth. Examples of stressors (up to 18 in PRAMS data) include job loss, death in family, and separation or divorce; we use a categorical variable on number of stressors reported (1-2, 3-5, 6-18) to differentiate between different levels of stress rather than any individual stressor.

Results

Descriptive Data

From 1995 to 2005, there was a steady decline in teen birth rates and a decline/stabilization of abortion rates in the 3 study states that mirrored trends occurring at the national level.[29,30] Waivers can "work" to reinforce these trends by

Table 3. Estimated Effects of Medicaid Waivers in Illinois, New York, and Oregon.

	Illinois		New York		Oregon	
	Medicaid at Delivery, Non-Welfare	Under 21	Medicaid at Delivery, Non-Welfare	Under 21	Medicaid at Delivery, Non-Welfare	Under 21
Unintended Birth/Pregnancy[a]	0.0020	0.0581	–0.0194	–0.0326	**–0.1264**	#
	(0.9389)	(0.1999)	(0.5448)	(0 .4913)	**(0.0022)**	
Wanted Later Birth/Pregnancy[a]	0.0491	**0.1296**	0.0300	0.0362	**–0.0872**	#
	(0.0566)	**(0.0083)**	(0.3677)	(0 .5092)	**(0.0299)**	
Unwanted Birth/Pregnancy[a]	**–0.0498**	**–0.0759**	**–0.0474**	**–0.0670**	–0.0359	#
	(0.0116)	**(0.0271)**	**(0.0364)**	**(0 .0486)**	(0.2120)	
Used Birth Control Post-Partum[b]	0.0186	0.0098	-0.0251	-0.0327	0.0094	#
	(0.2943)	(0.7549)	(0.3251)	(0.4737)	(0.8053)	
Sample for Pregnancy Outcomes	10,019	3,058	16,479	6,832	10,470	4,213
Population	702,490	208,856	802,238	280,260	170,881	73,427

Source: PRAMS Phase4-5; For Illinois analysis only data from 2002-2006 restricted to samples from Illinois, Colorado and Michigan were used; For New York analysis only data from 2000-2005 restricted to samples from New York(excluding New York city), North Carolina, Maine, West Virginia, and Ohio were used; Oregon analysis employed data from 1998-2001, restricted to samples from Oregon, Alaska, and New Mexico;

Notes: Estimates represent average treatment effect; P-values are given in parenthesis. Probit functions were evaluated for "Unintended Pregnancy" and "Used Birth Control Post-Partum" outcomes; multinomial probit was used for "Wanted Later Pregnancy" and "Didn't Want Pregnancy" outcomes. All models include controls for demographic and socioeconomic variables, state and year fixed effect.

[a]Post period for Illinois analysis includes data from January 2005 through December 2006; Post period for New York analysis includes data from July 2003 through December 2005; Post period for Oregon analysis includes data from November 1999 through December 2001;

[b]Post period for "Used BC Post Partum" in Illinois spans July 2004 through December 2006; in New York-January 2003 through December 2005; in Oregon-April 1999 through December 2001.

#The significant differences in trends for < 21 sample in OR and comparison states makes results for this group not valid and are not reported here.

both (1) enrolling women newly Medicaid eligible and (2) helping them access effective family planning services. Each study state's total Medicaid family planning beneficiaries and expenditures grew after waiver expansions but to varying degrees.[31] For example, the number of unique Medicaid family planning beneficiaries (both traditional Medicaid and waiver) grew 64% from around 95 000 in 2001 in Illinois to over 156 000 in 2006. The growth in New York beneficiaries from 2000 to 2006 was about 21%. In both of these states, Medicaid family planning spending per all women <150% FPL grew from around $10 to a little over $15. Oregon's growth in beneficiaries was almost 69% but reported Medicaid family spending per all women <150% remained low at $4.50 even by 2005.

Based on the PRAMS data (see Table 2) for Illinois, births from an unwanted pregnancy declined for both the Medicaid and teen groups in the post-waiver period whereas they increased in the comparison states. Rates of postpartum birth control increased from 86% to 88% among those with Medicaid paid births in the state, but there was only a marginal increase in this outcome among women in the comparison group. In New York, there were statistically significant declines in the share of unwanted births (from around 12% to 9%) for those covered by Medicaid at delivery, non-welfare; this share was stable for women in the comparison states. Contrary to expectation, the share of mistimed pregnancies (ie, wanted later) was higher among teens in the post period in Illinois whereas the reverse was true in the comparison states.

In Oregon (see Table 2), births from unintended pregnancies declined among the Medicaid, non-welfare group from around 57% to 52% while increasing slightly in the comparison states. There was a corresponding decrease in the percent unwanted in Oregon whereas it was relatively stable in the comparison states' sample. As in New York, there were no significant changes in the use of contraceptives postpartum among adults or teens/youth in Oregon compared with the usage in the comparison states.

Multivariate Results

The results in Table 3 show the DID estimates for Illinois, New York, and Oregon. (Many independent variables were significant and largely in expected directions. Full results are available on request.) Consistent with the descriptive trends, we find that expanded access to family planning services through Medicaid waivers was associated with reductions in the proportion of births from unwanted pregnancies in Illinois and New York. In Illinois, there were statistically significant reductions in unwanted births among Medicaid paid births to non-welfare eligible women; the average marginal effect indicates a decline of 4.9 percentage points. The

impact of the expanded access to family planning services for teens in Illinois was mixed—fewer teens/youth (7.6 percentage points) reported not wanting the birth, but a higher percentage (~13 points) reported wanting the birth later. Combining these effects meant that there was no overall effect on unintended births among teens/youth in Illinois. There were no statistically significant effects on contraceptive birth control usage found in Illinois.

In New York, the waivers combined to reduce the prevalence of births from unwanted pregnancies among the Medicaid paid at delivery, non-welfare group by almost 5 percentage points as in Illinois. The effect on unwanted births reported by teens/youth in New York was a reduction of 6.7 percentage points. Again, no effects were found for postpartum contraception among either treatment group.

The introduction of the family planning waiver in Oregon was found to have a significant and large estimated effect—an almost 13 percentage point reduction—on unintended births among the Medicaid paid at delivery, non-welfare group. This effect among the target group of women with a Medicaid paid birth appeared to be largely driven by a reduction in births reported as mistimed; the effect was a reduction of 8.7 percentage points. As in the other study states, there was no statistically significant association with changes in postpartum birth control use in Oregon.

Limitations

Although this study sheds new light on the effects of Medicaid waivers in three states, there are several methodological limitations of note. First, we were limited in the states we could analyze as treatment states because of a lack of PRAMS data availability for the pre/post waiver periods of all states implementing family planning waivers. In addition, as we only observe births and not pregnancies, we may not capture the full impact of these expansions on all Medicaid cost savings (eg, miscarriages). Rather, our analysis measures the share of total Medicaid *paid births* that are the result of an unintended pregnancy. Regardless of the size of the total birth cohort, this ratio will decline only when a fall in the number of unintended births is greater than the decline in the number of intended births. In our study states, the size of the birth cohort remained stable or declined slightly after the waivers, so where our findings indicate that the share of unintended births fell, the number of unintended births declined, thereby saving Medicaid costs and perhaps improving maternal and infant outcomes.

Because PRAMS data are only on those pregnancies brought to term, we may overstate the effect of the waivers when abortion rates are increasing as fewer unintended pregnancies are brought to term; as they are decreasing, our estimates may be understating the effect of the waivers. In all three study states as in the nation, abortion rates were declining during the pre-waiver and post-waiver periods, but changes were small relative to changes over longer periods.[26,30] As noted, we control for abortion rates in our sensitivity analysis and results were robust. We also note that Kearney and Levine found no significant association of family planning waivers with abortion rates.[11]

Another limitation to note is that our comparison group of women in states that did not adopt a waiver may have different views on contraception and pregnancy that are not captured by the observed characteristics for which we control. (We find "similar women" for comparison groups by restricting to Medicaid coverage, non-welfare as well as including numerous socioeconomic controls. Although there are still innate cultural differences that could affect fertility decisions for which we cannot control, this would only matter if views change over time as we are otherwise differencing these out.) We also note that, although New York state data include many urbanized areas, the waiver may have had different effects on low-income women in New York City. Both Illinois and New York state analyses relied only on 2 years of data in the post-waiver period that may not fully capture the effects of the waiver. Analysis for Oregon was hampered by a smaller than desired sample size in the baseline period, resulting in reduced power and broad confidence intervals for the estimated effects.

Finally, serial correlation is a common issue in the DID estimation and failure to account and efficiently control for it can result in understated standard errors.[32] We have followed the literature to address the potential bias introduced into our estimates by implementing wild bootstrap for a small cluster size.[33-35] When we bootstrap the standard errors to account for this potential bias the effects were consistent in sign but less significant after bootstrapping. This methodology may not be appropriate, however, for our sample due to few clusters (3-5 states depending on the policy evaluated) and an unbalanced and short panel. In the absence of a robust methodology appropriate for the data structure at hand, we recognize the potential bias in our estimated errors and consider the evidence we produced in this analysis as less than definitive. We urge further investigations to support these findings.

Discussion

Our findings indicate that income-based Medicaid family planning and related waivers in the 3 study states decreased the percentage of births that were from unwanted or mistimed pregnancies among women who had their deliveries paid by Medicaid but who would not have been eligible unless pregnant. Earlier studies found associations of income-based family planning waivers with reductions in the *total* birth rate of about 2% for non-teens and 4% for teens.[11,12] These studies can be seen as a type of "intent to treat" (ITT) analysis as they use the full population of births. The analysis presented here is also an ITT analysis since while we can more clearly identify women made newly eligible for Medicaid paid family planning services, we do not observe those actually enrolling in the program. Our results

for Oregon are consistent in magnitude with those found in Kearney and Levine as we find a 13% reduction in unintended births compared with the 9% reduction that they report for non-teen births when "scaled" up to reflect women newly eligible. However, our point estimates are lower for New York and Illinois. Our results highlight that effects of these waivers could vary markedly across states, including the age groups affected. As Medicaid policies are driven by state-level decisions, state-specific analyses are important.

We note that, presumably, a change in the intendedness of pregnancy attributable to these family planning waivers would only be observed in our sample for a fraction of women who were successful at delaying birth from the time of "treatment" until the desired timing and only if it falls within the narrow window (~2 years post-waiver) of the analysis frames used in each state. Our estimates therefore represent only a partial effect of these family planning waivers, omitting a potentially significant proportion of women who successfully averted unintended births to the time outside of the frame of our analysis; as such they are not captured in our sample of observed births in the 3 study states. Nevertheless, these results from the PRAMS survey provide evidence on the impact of the program specifically on births reported as being unintended among Medicaid insured women and build on findings from vital records at the national level that do not contain data on intent or insurance coverage.

It is hard to explain the finding in Illinois that the waivers increased teens/youth reporting a higher share of births as "mistimed." This may indicate that as waivers gave teens more access to family planning/counseling, they may have (1) increased their sexual activity, (2) altered their thinking about the desired timing of first pregnancies/births, or (3) begun to use new contraceptives that they did not use effectively. Kearney and Levine find a surprising, negative effect of income-based waivers on teen sexual activity but note that large standard errors and lack of within-state controls make it hard to draw conclusions. We point to the effect of the waivers and other policies on teens specifically as an area in need of further research.

A priori we anticipated stronger effects in Illinois and New York due to their combined family planning and comprehensive expansions. However, we find a larger effect on unintended pregnancy in Oregon in the analysis presented here. The larger impact found in Oregon is consistent with a study of early family planning waivers that notes that of the 6 states studied, Oregon had the second highest enrollment rate and the highest use rate.[36] It is also consistent with data from our direct calls to the study states that found low enrollment rates (~3%-5% of eligible women) in New York and Illinois but much higher rates in Oregon (~25%-36%) in our post-waiver years.

As the effects on unwanted or mistimed (both components of unintended) are only strong enough in Oregon to result in an overall effect on unintended pregnancies, we only estimate state-specific budget savings for this state. Using costs per birth of $6825 estimated by the Alan Guttmacher Institute (AGI) for the 3094 "averted births," we estimate 1-year state savings of approximately $4 million in Oregon.[37] To derive this number, we use our results (−0.1264) times an estimated 28 480 non-welfare Medicaid births to estimate the 3094 births that were "averted" and that would have been paid by Oregon Medicaid in a year. These births would have cost $6825 at delivery, and for the first year of life a total of about $21 million.[37] Based on user counts (from state contacts) in Oregon of 65 358 in 2000 and per user costs of $259 from AIG, we estimate waiver expenses of approximately $17 million.[37]

The Institute of Medicine's (IOM) recommendation that the full range of Food and Drug Administration–approved contraceptives and methods and patient education and counseling for all women with reproductive capacity be covered as a preventive service under ACA should make family planning a part of the standard insurance packages to be marketed in the insurance exchanges and increase access.[38] Yet, legal challenges to this provision continue. In addition, if Medicaid were expanded under the ACA by all states, access to family planning services could markedly increase for women below 138% FPL as more would be Medicaid eligible regardless of pregnancy status. Many uninsured women above this income level will be eligible for subsidized health insurance that covers a broad range of reproductive health care with no cost sharing—however, a pending Supreme Court decision could limit the availability of subsidies to women who live in states that have a state-based exchange. There are currently 21 states that still have not expanded Medicaid,[39] making this a fluid, state-specific policy issue. Even in participating states, eligible women will not always take up Medicaid or subsidized coverage either for the full year or part of a year.

These issues, combined with restricted access for immigrant women, may moderate the potential of ACA to move the nation toward a lower rate of unintended pregnancies among all women of reproductive age and highlight the importance of states' policies regarding SPAs or waivers for extended family planning coverage. Even with such policies in place, their success requires that both providers and women understand which services are covered by these programs, how to enroll and access services, and that the use of effective family planning services among those enrolled is adequate to reduce unintended outcomes.

Declaration of Conflicting Interests

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