

# Game Change in Colorado: Widespread Use Of Long-Acting Reversible Contraceptives and Rapid Decline in Births Among Young, Low-Income Women

**CONTEXT:** Long-acting reversible contraceptive (LARC) methods are recommended for young women, but access is limited by cost and lack of knowledge among providers and consumers. The Colorado Family Planning Initiative (CFPI) sought to address these barriers by training providers, financing LARC method provision at Title X–funded clinics and increasing patient caseload.

**METHODS:** Beginning in 2009, 28 Title X–funded agencies in Colorado received private funding to support CFPI. Caseloads and clients' LARC use were assessed over the following two years. Fertility rates among low-income women aged 15–24 were compared with expected trends. Abortion rates and births among high-risk women were tracked, and the numbers of infants receiving services through the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) were examined.

**RESULTS:** By 2011, caseloads had increased by 23%, and LARC use among 15–24-year-olds had grown from 5% to 19%. Cumulatively, one in 15 young, low-income women had received a LARC method, up from one in 170 in 2008. Compared with expected fertility rates in 2011, observed rates were 29% lower among low-income 15–19-year-olds and 14% lower among similar 20–24-year-olds. In CFPI counties, the proportion of births that were high-risk declined by 24% between 2009 and 2011; abortion rates fell 34% and 18%, respectively, among women aged 15–19 and 20–24. Statewide, infant enrollment in WIC declined 23% between 2010 and 2013.

**CONCLUSIONS:** Programs that increase LARC use among young, low-income women may contribute to declines in fertility rates, abortion rates and births among high-risk women.

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The acceptance of IUDs and contraceptive implants as appropriate for use by adolescents and young women, including those who have never given birth, is fundamentally changing the landscape of reproductive health. Colorado's experience since 2009 in increasing the accessibility of effective long-acting reversible contraceptive (LARC) methods highlights a promising approach to reducing unplanned pregnancy and mistimed birth among young, low-income women.

## BARRIERS TO LARC METHODS

LARC methods—implants and IUDs—have been shown to be effective in reducing rates of unintended pregnancy among adolescents, and their use in this population is endorsed by the American College of Obstetricians and Gynecologists, the American Academy of Pediatrics, the Centers for Disease Control and Prevention, and the World Health Organization.<sup>1,2</sup> Compared with the pill, patch and ring, LARC methods have low failure rates and a reduced likelihood of noncompliant use, which make them particularly suitable for adolescents. Increasing the use of these methods is a recommended strategy to reduce rates of unintended pregnancy.<sup>3</sup> Among all users of Title X–funded family planning clinics in 2011, however, the IUD and implant were used by only 2% of clients younger than 20.<sup>4</sup>

A number of barriers to LARC use among young women and others at high risk of unintended pregnancy have been described. Two barriers are the low level of awareness among consumers and providers of the availability, safety and appropriateness of LARC methods for both parous and nulliparous young women and the time required for counseling about these methods.<sup>5,6</sup> In addition, high initial costs pose a substantial barrier to greater utilization.<sup>7</sup> In the longitudinal Contraceptive CHOICE Project in St. Louis, 70% of women aged 14–20 chose LARC methods when cost was not a factor.<sup>8</sup> Between 2008 and 2010, the researchers observed declines in the abortion rate, the proportion of abortions that were repeat procedures and the teenage birthrate in the St. Louis area. Furthermore, these rates were lower than those in comparable areas without the study program.<sup>9</sup>

On the broader policy level, many states have adopted Medicaid expansions through waivers or state plan amendments to increase access to family planning services and ease barriers to LARC use. Colorado does not have a reproductive health Medicaid waiver or state plan amendment, despite efforts to enact such an expansion. Many Title X–funded family planning programs, including Colorado's, have adopted policies to make LARC methods more acceptable and accessible to young women, including

targeted outreach using social media, flexible hours and confidentiality provisions.<sup>10</sup>

### **COLORADO FAMILY PLANNING INITIATIVE**

In Colorado, 40% of all births in 2005 were reported to be unintended at the time of conception, and Pregnancy Risk Assessment Monitoring System data showed that the proportion was much higher (61%) for women aged 15–24, our primary group of interest.<sup>11</sup> Moreover, 77% of women who had been using a contraceptive method, and who were covered by Medicaid for the unintended birth that occurred, reported using low-cost methods with high failure rates, such as condoms, withdrawal or rhythm. Therefore, in 2009, the Colorado Department of Public Health and Environment implemented the Colorado Family Planning Initiative (CFPI), which used private funds from an anonymous foundation to provide long-acting, effective contraceptive methods at no cost through the state's Title X-funded family planning clinics. This population-based approach sought to increase the accessibility of LARC methods to women at high risk of unintended pregnancy.

Beginning in 2009, funding was provided to 28 Title X-funded agencies in 37 of Colorado's 64 counties, which contained 95% of the state's total population, including 95% of the low-income population (defined as individuals with incomes at or below 150% of the federal poverty level).<sup>\*</sup> The funding supported the provision of IUDs and implants to women visiting Title X-funded clinics; training for providers and staff regarding the provision of LARC methods, counseling strategies and managing side effects; and technical assistance (e.g., regarding coding and billing issues, pharmacy rules and clinic management) to Title X agencies related to increasing the utilization of these methods. In addition, the funding paid for contraceptive rings, vasectomies and tubal ligations, and offered general support to expand the capacity of the state's family planning clinics.

All Title X-funded clinics in Colorado offer a broad range of contraceptives, including LARC methods, the pill, the injectable, the patch and barrier methods. These clinics receive federal, state and local funding to support family planning efforts, including contraceptive purchases. The private CFPI funding was designated to pay for IUDs and implants, which, even with special pricing, can cost clinics \$300–500. Clinics had historically struggled to meet the demand for these two methods within their limited budgets and sliding-fee requirements, and many offered only limited numbers of LARC insertions. CFPI activities and the distribution of funding were coordinated through the Family Planning Program at the Department of Public Health and Environment.

Through CFPI, all LARC methods and the contraceptive ring were offered to clients at Title X-funded clinics at no cost, while all other methods were offered on a sliding-fee

scale. However, clients at or below 100% of the federal poverty level pay nothing, according to the Title X guidelines, regardless of their chosen method.<sup>12</sup> Furthermore, no client is denied services or her method of choice because of an inability to pay.

CFPI funding for methods was distributed at the beginning of 2009. Clinics began purchasing LARC methods right away, and significant increases in the number of insertions at clinics occurred immediately. Sixteen agencies began offering the implant for the first time, 12 added the Mirena IUD and eight added the ParaGard IUD. By 2010, all but one agency offered implants, and all offered both types of IUD.

The initiative's efforts intensified over its first year and a half, when more than 150 Title X-funded staff were trained in insertion and counseling techniques, outreach efforts increased, and word of mouth about the availability and acceptability of the methods spread. Funding for clinic expansion was also distributed in early 2009, and agency directors reported opening seven new clinics, increasing clinic hours in 13 agencies, and increasing staffing and outreach in 20 agencies. The number of women served at Title X-funded clinics peaked in 2010 and 2011.<sup>12</sup>

This study assesses the effectiveness of the CFPI by analyzing the uptake of LARC methods and the effect of increased support for their use on fertility rates. In particular, removal of the cost barrier was expected to result in greater adoption of LARC methods among clients receiving Title X-funded services. We also anticipated that abortion rates and births among young women who were not married and had little education would fall. Finally, infant data from the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) were analyzed to determine if the demand for services declined.

## **METHODS**

### **Study Population**

The effectiveness of the CFPI was assessed on both the program and the population levels. First, we analyzed changes in the total number of clients served and the number and proportion of clients using LARC methods. Data on the number and characteristics of patients receiving Title X-funded services were collected by the Family Planning Program as required for federal funding; this information was obtained from the program's database of family planning patients, as were annual unduplicated counts by age, race, ethnicity and poverty status, and data on contraceptive method use.<sup>12</sup> Breakdowns of method use were available only by age. Differences in method use between years were analyzed using z tests for proportional differences.

At the population level, we then conducted an ecological analysis of birthrates among the high-risk populations served by Title X-funded services over time and in comparison with expected trends. In addition, we examined state-level abortion rates, births to young unmarried women with less than a high school education and rates of enrollment in the WIC program.

<sup>\*</sup>These counties included both rural and urban areas. The remaining counties were rural and geographically large, covering 37% of the state's land area; 23 of them had populations of fewer than 20,000.

**TABLE 1. Percentage distribution of all female clients of Title X–funded clinics, by selected characteristics, Colorado, 2008 and 2011**

Characteristic	2008 (N=46,348)	2011 (N=54,762)
<b>Age</b>		
<15	1.4	1.9
15–19	25.0	24.0
20–24	28.9	27.9
25–29	19.7	18.9
30–34	11.4	12.1
≥35	13.6	15.2
<b>% of federal poverty level</b>		
≤100	69.3	80.1
101–150	14.1	11.6
≥151	9.5	8.3
Unknown	7.1	0.0
<b>Race</b>		
White	76.7	70.0
Black	4.4	6.0
Asian/Pacific Islander	1.3	1.5
American Indian/Native Alaskan	0.9	0.8
Other	1.0	11.3
Unknown	15.7	10.4
<b>Ethnicity</b>		
Hispanic	40.1	42.1
Non-Hispanic	55.3	53.1
Unknown	4.6	4.8
Total	100.0	100.0

### Outcome Indicators

•**Fertility rates.** To assess fertility rates, birth certificate data collected by the Department of Public Health and Environment were obtained from the Health Statistics Section. Data were available by age, education, marital status and Medicaid coverage status for residents of each county. Fertility rates for low-income women in each age-group (15–19 and 20–24) were calculated using births covered by Medicaid as numerators, and estimates of the number of women at or below 150% of the federal poverty level (the state eligibility level to receive Medicaid coverage for a birth) as denominators. Estimates of the number of women living at this income level were made by the Epidemiology, Planning and Evaluation Branch of the state health department, using population data from the State Demography Office in the Department of Local Affairs,<sup>13</sup> and sex- and age-specific poverty data from the Public Use Microdata Sample of the American Community Survey.<sup>14</sup> Fertility rates for all women by age were calculated using birth certificate data and population estimates.

Results were categorized by whether the county had a Title X–funded clinic and therefore received CFPI funding; 37 counties were in the CFPI group, and 27 were in the non-CFPI group. Expected fertility rates for 2010 and 2011 were calculated from linear trend lines based on fertility rates for women aged 15–19 or 20–24 in 2007, 2008 and 2009. Differences in fertility rates among low-income women were analyzed using z tests for proportional differences.

•**High-risk births.** Births to women with three social risk factors—being unmarried, being younger than 25 and

having less than a high school education—were defined as high-risk. These women and their children are at particular risk of economic insecurity and poor health, educational and developmental outcomes throughout their lives.<sup>15</sup> The proportion of total births identified as high-risk was calculated for CFPI and non-CFPI counties using birth certificate data. Comparisons between 2009 and 2011 for CFPI and non-CFPI counties were assessed using z tests.

•**Abortion rates.** Abortion data from the state health department were used to calculate abortion rates per 1,000 women by age-group and county type for 2008 and 2011.<sup>16</sup> The year 2008 was used as the baseline because the majority of abortions in that year would affect the number of births in 2009. Data were not available according to income status, so rates could not be calculated for low-income women. We used z tests to assess differences in abortion rates over time and by county type.

•**WIC infant caseload.** Using data from the Colorado WIC program, we compiled a time series of the monthly caseload of infants receiving WIC services between 2007 and early 2013.<sup>17</sup> Infant caseload data, however, could not be assessed at the county level. Nonetheless, they serve as leading indicators of low-income births because they are available well before birth certificate data are finalized.

## RESULTS

### Patient Characteristics

A total of 52,645 clients (46,348 women and 6,297 men) received services in Title X–funded clinics in 2008, before the initiative began; this number increased 23% to 64,938 in 2011 (54,762 women and 10,176 men), the third year of the initiative. (The large jump in the number of men can be explained by a one-year supplemental funding effort designed specifically to increase the number of male clients, coupled with a CFPI-funded expansion at a large STD clinic with a disproportionately male clientele.)

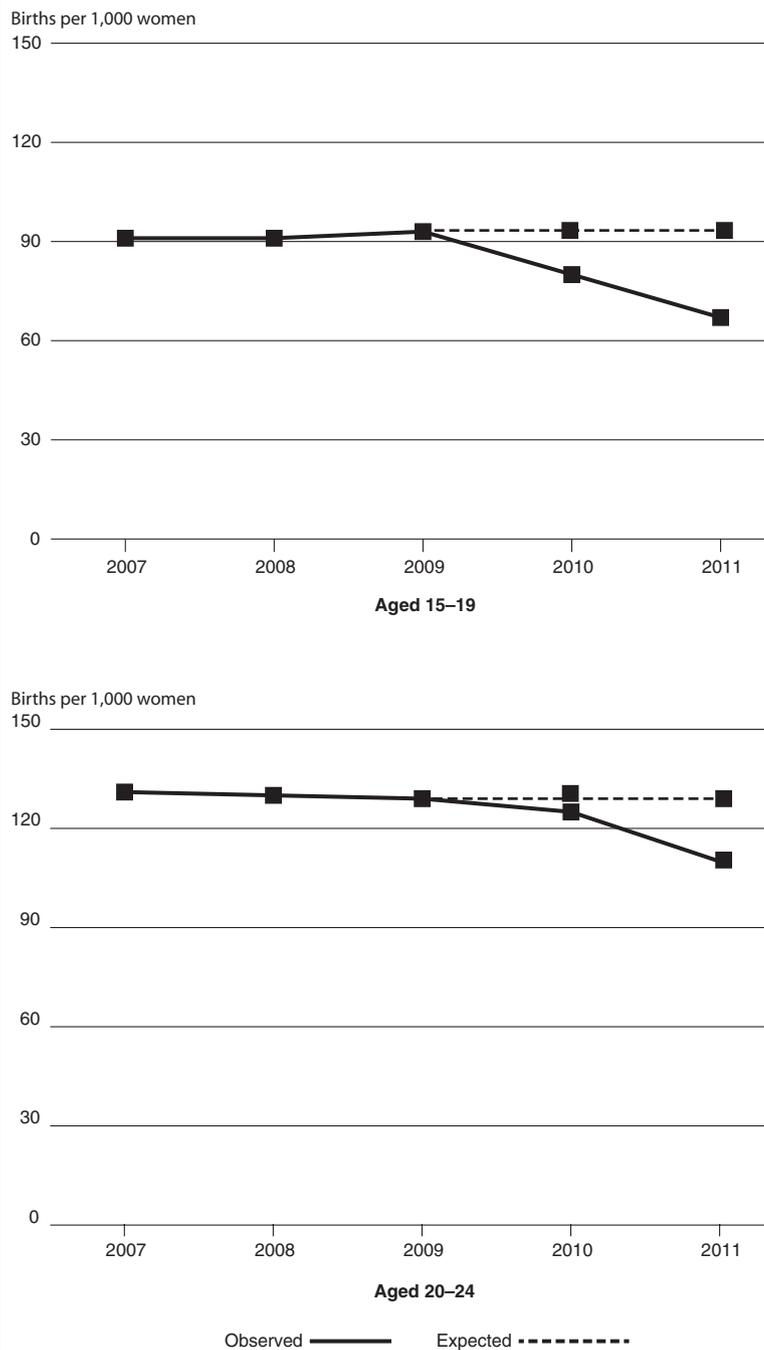
In both 2008 and 2011, more than half the female clients (55% and 54%, respectively) were younger than 25 (Table 1). A large majority in both years (69% and

**TABLE 2. Percentage distribution of 15–24-year-old female clients of Title X–funded clinics, by contraceptive method used, 2008 and 2011**

Method	2008 (N=22,410)	2011 (N=26,330)
LARC	4.5	19.4***
Implant	0.8	9.0***
IUD	3.7	10.4***
Hormonal	74.1	61.9***
Pill	49.3	36.4***
Injectable	15.4	15.4
Patch/ring	9.4	10.1**
Condom	9.0	9.5
Other	2.5	3.0***
None/unknown	9.9	6.1***
Total	100.0	100.0

\*\*p<.05. \*\*\*p<.001. Notes: Pregnant clients and those desiring pregnancy were excluded. Percentages may not add to 100.0 because of rounding. LARC=long-acting reversible contraceptive.

**FIGURE 1. Observed and expected age-specific fertility rates among low-income women in counties with clinics receiving Colorado Family Planning Initiative funding, 2007–2011**



80%) had incomes at or below 100% of the federal poverty level, and most (83% and 92%) had incomes at or below 150% of the poverty level. Reflecting Colorado's total population, most clients were white; however, race was unknown for 16% in 2008 and 10% in 2011. By contrast, four in 10 clients were Hispanic, twice the proportion among state residents overall.<sup>18</sup> The distributions by background characteristics remained remarkably similar between 2008 and 2011, despite the large growth in the number of clients.

**TABLE 3. Selected measures related to LARC insertions among 15–24-year-old female clients of Title X–funded clinics, by year**

Measure	2008	2009	2010	2011
Annual no. of insertions	620	2,125	2,531	3,159
Cumulative no. of insertions	620	2,745	5,276	8,435
No. of low-income women in CFPI counties	105,100	105,500	105,600	123,400
Ratio of cumulative insertions to low-income women	1:170	1:38	1:20	1:15

Notes: LARC=long-acting reversible contraceptive. CFPI=Colorado Family Planning Initiative.

Before the initiative began, use of LARC methods was limited to fewer than 5% of women in the targeted age-group, but by 2011 it had quadrupled to 19%, a statistically significant increase (Table 2). This increase was almost matched by a decrease in pill use (from 49% to 36%). Implant use was more than 10 times as great in 2011 as in 2008, and IUD use was nearly tripled. These changes were also statistically significant.

In 2008, prior to the CFPI rollout, 620 young, low-income patients at Title X–funded clinics received a LARC method (Table 3). By 2011, a cumulative 8,435 had received one. While an estimated one in 170 women among the young, low-income population of the CFPI counties had received a LARC method in 2008, this ratio had increased to one in 15 by 2011.

**Fertility Rates**

In 2007, two years before CFPI began, the fertility rate among low-income residents of counties that would later receive CFPI funding was 91 births per 1,000 women aged 15–19 and 131 births per 1,000 aged 20–24 (Figure 1). (These rates were, respectively, six times and twice as high as those for similar-age women with greater income.) Between 2007 and 2009, fertility rates among these low-income age-groups varied only slightly, and a projection of trends yielded expected 2011 rates of 95 births per 1,000 teenagers and 128 births per 1,000 women aged 20–24.

Observed fertility rates for low-income 15–19-year-olds in 2010 and 2011 were lower than expected: 80 and 67 births per 1,000, instead of 94 and 95 per 1,000. These observed differences of 15% and 29% were statistically significant. Furthermore, compared with the actual 2009 rate, the observed 2010 and 2011 rates were 14% and 28% lower, respectively.

For low-income women aged 20–24, the observed 2010 and 2011 fertility rates were, respectively, 125 and 110 births per 1,000, instead of the expected 129 and 128. These differences—3% and 14%, respectively—were statistically significant.

In 2010, the number of births among low-income women aged 15–24 in CFPI counties was 7% lower than expected (11,255 vs. 12,075). The observed difference was even greater in 2011, when an estimated 19% fewer births than expected occurred among this subgroup (10,230 vs. 12,687).

**TABLE 4. Number of high-risk births, and high-risk births as a percentage of all births, 2009 and 2011; and percentage change in the percentage of births that were high-risk—all by county type**

County type	2009		2011		% change in % that were high-risk
	No.	As % of all births	No.	As % of all births	
CFPI	4,052	6.3	2,940	4.8	-24**
Non-CFPI	272	7.1	233	6.7	-6

\*\*p<.01. Notes: High-risk births are defined as those to unmarried women who are younger than 25 and have less than a high school education. The total births used in the calculations excluded a small number for which mother's age, marital status or education was unknown. CFPI=Colorado Family Planning Initiative.

Between 2009 and 2011, the fertility rate for all Colorado women aged 15–19 declined 26%, from 37 to 28 births per 1,000. In the same period, the fertility rate among all women aged 20–24 declined 12%, from 89 to 78 births per 1,000. An estimated 77% and 74% of the decline among these age-groups, respectively, can be attributed to the decline in births among low-income women in the CFPI counties.

### High-Risk Births

In 2009, prior to any anticipated impact of the initiative, 4,052 births in the CFPI counties—more than 6% of all births in these counties—were high-risk (Table 4). In 2011, the number had dropped to 2,940, representing less than 5% of all births. The two-year decline in the proportion of births that were high-risk was 24% (a statistically significant decrease), and the decline in the number of such births was 27% (not shown).

In the non-CFPI counties, the number of high-risk births declined from 272 to 233 between 2009 and 2011. The proportion of all births in these counties that were high-risk was 7% in both years.

### Abortion Rates

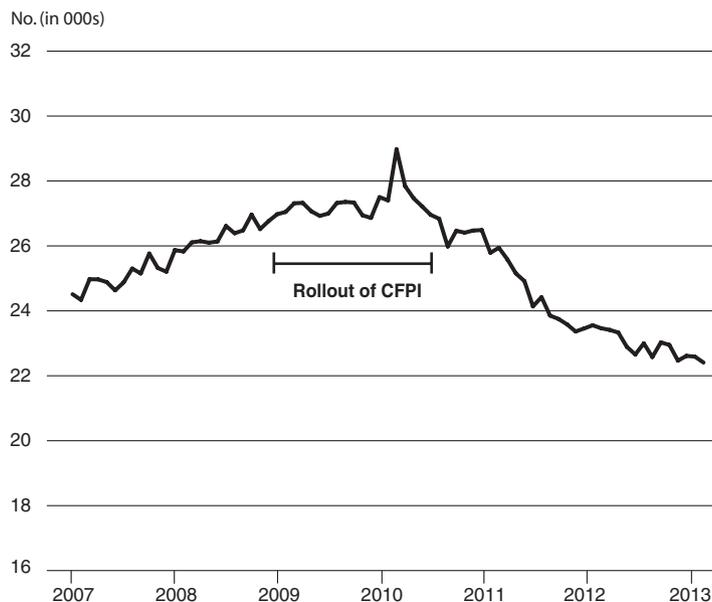
The abortion rate for 15–19-year-olds in the CFPI group was 11 abortions per 1,000 women in 2008, before the initiative began (Table 5). In 2011, the third year of the initiative, it had fallen to 7, a statistically significant decline of 34%. The comparable rates in the non-CFPI group were 14 and 10 abortions per 1,000 women, respectively, representing a significant decline of 29%.

**TABLE 5. Abortion rate per 1,000 women, by age-group and county type, 2008 and 2011; and percentage change between years**

Age-group and county type	2008	2011	% change
<b>15–19</b>			
CFPI	10.9	7.2	-34**
Non-CFPI	14.4	10.2	-29**
<b>20–24</b>			
CFPI	22.0	18.0	-18**
Non-CFPI	26.2	27.8	6

\*\*p<.01. Note: CFPI=Colorado Family Planning Initiative.

**FIGURE 2. Number of Colorado infants served in the Special Supplemental Nutrition Program for Women, Infants and Children, 2007–2013**



Note: CFPI=Colorado Family Planning Initiative.

The rates for women aged 20–24 in the CFPI group were 22 and 18 abortions per 1,000 in 2008 and 2011, respectively, representing a statistically significant decline of 18%. Rates for 20–24-year-olds in non-CFPI counties were essentially stable, at 26 and 28 abortions per 1,000 in 2008 and 2011.

### WIC Infant Caseload

Continuing a decades-long trend, the number of infants receiving WIC benefits grew steadily in the two years preceding the Colorado Family Planning Initiative, from 24,513 in January 2007 to 26,766 in December 2008 (Figure 2). In 2009, when CFPI began, the number leveled off; it ended the year at 26,862. Subsequently, the number rose to 28,978 in March 2010 and then dropped sharply; by March 2013, it had fallen to 22,407, a level well below that for any month since early 2005. The number of infants served by WIC, which had risen 18% between January 2007 and March 2010, fell 23% in the following three-year period.

### DISCUSSION

The Colorado Family Planning Initiative increased access to LARC methods among young, low-income women, and this improved access was immediately followed by a substantial reduction in the birthrate among this population. Unlike other studies, this one was an ecological analysis of a population-based intervention. Therefore, while it has the limitations of an ecological analysis, we were able to measure changes in population health. Program data confirm the increase in LARC use among clients receiving Title X-funded services, and the effectiveness of these methods appears to be borne out in the decline in fertility

rates, abortion rates, births to high-risk women and WIC enrollment in the period after program rollout. Nationally, widespread use of the pill and other hormonal methods has contributed to steady declines in fertility rates among young women in recent decades,<sup>19</sup> but our finding of a rapid increase in LARC use—followed by a marked drop in fertility that was especially large among teenagers—constitutes a new phenomenon. This finding is supported by research showing that young women's discontinuation rates for the pill, patch and ring are high and expose their users to unintended pregnancy,<sup>20–22</sup> while LARC methods effectively protect against unintended pregnancy over an extended period.

***A striking shift toward use of the most effective... methods was... jump-started by [funding that] removed the cost barrier.***

The annual counts of clients receiving LARC insertions reflect demand in a given year; young women increasingly used Title X–funded clinics and chose the IUD or implant as their method. But these annual numbers do not indicate how many women were using LARC methods over time, since implants are effective for at least three years and IUDs for at least five. The dramatic growth in the cumulative number of young, low-income women protected by long-acting contraceptives suggests again that this played an important role in the large drop in their fertility rates. In fact, the number of low-income women in the population overstates the number at risk of unintended pregnancy, since many adolescents, as well as at least one-quarter of youth aged 18–24 in Colorado, are not sexually active.<sup>23</sup> Consequently, the finding that CFPI served one of every 15 women in the low-income population masks the true extent of LARC use among women in need. Data from the Colorado Behavioral Risk Factor Surveillance System for 2011–2012 support the finding of substantial LARC use, as they indicate LARC adoption by one in seven women aged 18–24 from all income levels.<sup>24</sup> In addition, Pregnancy Risk Assessment Monitoring System data for 2009–2010 reveal that 50% of Colorado women younger than 20 report postpartum LARC use, the highest proportion among 15 states and reporting areas in the sample.<sup>25</sup>

The decline in fertility rates for all women aged 15–19 or 20–24 was driven by a decline in fertility among low-income women in the CFPI counties. This is surprising, given that trends prior to the initiative indicated that small increases in fertility in the low-income group were expected in 2010 and 2011. In addition, the decline in the fertility rate among 20–24-year-olds was influenced by IUD and implant insertions among 18- and 19-year-olds in 2009 and 19-year-olds in 2010. These women moved into the 20–24-year-old cohort in 2011, and undoubtedly contributed to the reduction in births for the older age-group as

\*The total state population increased nearly 5% between 2007 and 2010, and rose another 4% between 2010 and 2013; the proportion of the population living at or below the federal poverty level rose 12% between 2007 and 2010, and another 2% from 2010 to 2012 (source: U.S. Bureau of the Census, American Community Survey, Percent of people below poverty level in the past 12 months (for whom poverty status is determined), 2012, Table 1701, <<http://factfinder2.census.gov>>, accessed Sept. 20, 2013).

their long-acting methods, received when they were adolescents, continued to protect them from pregnancy.

Abortion rate declines for both age-groups in CFPI counties appear to be a result of increased use of LARC methods among low-income women, who were more likely than those with higher incomes to become pregnant, regardless of age. The decline in non-CFPI counties among 15–19-year-olds suggests a similar increased use of effective methods. Some young women living in these counties sought care in CFPI counties and received LARC methods. Although the numbers served were small, they greatly exceeded the drop in abortions in non-CFPI counties.

Colorado's WIC program has always been able to serve all who qualify on the basis of income. Budget constraints have not affected client caseload, and the program has never had waiting lists for services. The fact that infant WIC enrollment fell rapidly beginning some nine months after the middle of 2009—the year LARC methods became widely available in Title X–funded clinics—suggests that the target population may have been increasingly able to avoid pregnancy. The continuation of a decline even as the state population grew and the proportion in poverty increased\* buttresses the argument that the initiative reached the population most at risk of unintended pregnancy. The enrollment declines in 2012 and 2013 suggest that fertility rates for low-income women continued to drop, although data to calculate rates for these years are not yet available.

A striking shift toward use of the most effective contraceptive methods was clearly jump-started by the large infusion of private foundation funding into the Colorado Family Planning Program, which removed the cost barrier that had previously prevented young, low-income women from adopting LARC methods. Prior to the initiative, fertility rates for low-income adolescents and young women had been generally stable; once the initiative began, these rates declined significantly within just two years, suggesting that increases in patient caseload and changes in methods played important roles.

### **Limitations**

Additional information would have been useful to fully understand the impact of CFPI on various populations. For example, the Family Planning Program data system does not routinely report contraceptive use by characteristics other than age. Breakdowns by race and ethnicity would provide information that could prove useful in understanding method choice and potential differences among groups. The lack of data on race for more than 10% of clients in both 2008 and 2011 is also a limitation.

Medicaid payment status data did not become available until 2007, when this item was included on Colorado's birth certificate for the first time. Estimates of the expected numbers and rates of low-income and Medicaid births in 2010 and 2011, if no initiative had taken place, are therefore based on 2007–2009 data; a longer period preceding the start of the initiative would have yielded more robust trends.

The impact of the national and state recessions on estimates of poverty in 2009 and 2010 may be understated, as only two years of data reflecting lower incomes (2009 and 2010) are included in the five-year period (2006–2010) used for the estimates. The poverty estimates for 2011—based on the 2007–2011 period—also understate the impact of the recession, as they include two years of income data (2007 and 2008) that reflect higher income levels. However, understating the number of women in poverty yields a smaller estimate of the number of women classified as low-income and results in an overestimation of the actual fertility rate for this group. Therefore, the actual level of fertility in the low-income population may be even lower than what our results indicate.

Another limitation is that the abortion data used to calculate abortion rates may yield underestimations because of incomplete reporting. While the completeness of reporting has varied since abortion was legalized in Colorado in 1967, consistent reporting in recent years suggests no noteworthy reductions or changes in patterns of reporting from providers.<sup>26</sup>

Birthrates among high-risk women cannot be calculated because denominators are not available for the number of women who meet the risk criteria in the CFPI and non-CFPI counties. We were therefore unable to measure changes in the fertility rates of this group, and were limited to examining what proportion of all births fell into this category.

Estimates of LARC use among young, low-income women are necessarily crude. The cumulative number of insertions in 2009 included women who were 24 in 2008, but who turned 25 the next year. Similarly, the cumulative numbers in later years included some women who were no longer in the 15–24-year-old cohort. However, the numbers excluded women who had received a LARC method when they were younger than 15. In addition, LARC continuation rates year to year are not known for this population. Colorado program data show that 85% of women who arrive at a family planning clinic using a LARC method leave the clinic with the same or another LARC method.<sup>12</sup> But many LARC users do not return to a clinic on a yearly basis, even for a routine exam. Consequently, while the cumulative number of LARC insertions overstates actual LARC use in any given year because some removals occur, the degree of overstatement is unknown.

Some additional private funding between 2009 and 2011 supported other family planning efforts in the greater Denver area. Denver Health, University Hospital and Boulder Valley Women's Health each received funding from the same foundation that supported CFPI to increase LARC use. In 2009, Denver Health received an expansion grant through Title X that increased capacity and the number of clients. Funding was also provided to Denver school-based health centers and the Colorado Association of School-Based Health Centers to expand contraceptive access. It is not possible to track the impact of these funding sources separately from that of the foundation funding that the

state health department distributed to the Title X–funded clinics, but the additional expenditures may have played a role in the fertility decline observed in CFPI counties.

Alternative explanations of the drop in fertility rates below expected levels in Colorado's young, low-income population could include a decline in sexual activity, in intended births or in the proportion of the population represented by a subgroup that typically had high fertility rates. However, Colorado Youth Risk Behavior Survey data show no significant change between 2009 and 2011 in sexual activity among high school students,<sup>27</sup> and state Behavioral Risk Factor Surveillance System data similarly show no significant change in sexual behavior among women aged 18–24 in the same time period.<sup>23</sup> Regarding a decline in intended births, this would suggest a genuine drop in fertility desires. Such a decline could well have occurred because of the economic recession, when a pregnancy could have become less desirable for some women or couples suffering a job loss, thereby increasing overall demand for effective contraception. Finally, U.S. Census Bureau estimates reveal that between 2007–2009 and 2010–2012, the proportion of the population aged 15–24 who were Hispanic and the proportion who were black increased.<sup>28</sup> These two groups have historically experienced high fertility rates, and increases in their relative size would have led to increases, not decreases, in overall fertility rates. Thus, these alternative explanations for the widespread decline in fertility among young, low-income women are not supported by the available evidence.

### Conclusions

The Colorado Family Planning Initiative produced a radical game change in the state: The LARC methods it promoted and paid for appeared to contribute to a large decline in fertility among the young, low-income patient population and to a decline in the overall fertility rate among women younger than 25. At the same time, measurable declines occurred in abortion rates, births to young unmarried women with limited education and numbers of infants receiving WIC services.

Women's ability to avoid unplanned pregnancy through the widespread use of the most effective methods can provide a level of well-being unimagined even a decade ago, as young women may be better able to continue and complete their education and enter the labor force without having to care for young children at the same time. Furthermore, the Affordable Care Act has the potential to replicate the success of the Colorado experience across the nation. As access to affordable health insurance increases through Medicaid expansion, insurance subsidies and preventive service coverage requirements, more women will have better coverage for contraceptives and other family planning services. The availability of reproductive health care without cost barriers will increasingly enable all women to select the most effective methods throughout their reproductive years. This fundamental

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change should help to alleviate the burden of unplanned pregnancy and its associated personal, economic and social costs.

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