

## **The Educational Impact of Expanded Contraceptive Access**

Amanda Jean Stevenson, Katie R. Genadek, Sara Yeatman, Stefanie Mollborn, Jane Menken

Abstract: There is limited rigorous evidence on how control over one's fertility affects the life course of women in the contemporary United States. Lack of adequate data and challenges in research design limit the ability to isolate the impact. This study focuses on impacts of fertility control on education by taking advantage of a natural experiment in the state of Colorado to estimate the population-level effect of expanded access to contraception on female high school graduation or postsecondary educational enrollment. Preliminary analyses show that increases in access to contraception through the Colorado Family Planning Initiative increased the likelihood of high school graduation.

Disclaimer: Any views expressed are those of the authors and not necessarily those of the U.S. Census Bureau.

## **Introduction**

Over the last 50 years, women's access to fertility control has increased dramatically. Nonetheless, there is limited rigorous evidence on how control over one's fertility affects the life course of women in the contemporary United States. Lack of adequate data and challenges in research design limit the ability to isolate the impact. This study focuses on impacts of fertility control on education, which is well-known to be critical to women's life course trajectories, such as lifetime earnings (Tamborini, Kim, & Sakamoto, 2015) and mortality (Lawrence, Rogers, & Zajacova, 2016). Yet there is little empirical evidence about the impact of fertility control on educational attainment beyond the effect of the initial expansion of access to oral contraceptives and the expansion of Title X in the 1970s (Bailey & Lindo, 2017; Hicks-Courant & Schwartz, 2016; Bailey, 2013; Goldin & Katz, 2002).

In this study, we take advantage of a natural experiment to estimate the population-level effect of expanded access to contraception on female high school graduation or postsecondary educational enrollment. The natural experiment consisted of a statewide initiative to improve access to the full range of contraceptive methods at all Colorado Title X family planning clinics in 2009, and we are able to estimate the effect of this program using individual-level, longitudinally-linked data from the full 2010 Census and the 2010-2015 American Community Surveys (ACS). We anticipate that these analyses will advance academic and policy debates regarding the impact of family planning on women overall and the relative impact on women from different racial and ethnic groups.

## **Background**

Beginning in November 2009, The Colorado Family Planning Initiative (CFPI) provided funding, training, and support to ensure that all Title X clients in Colorado could choose any FDA-approved method of contraception, regardless of cost. A large component of the Initiative was the provision of free or dramatically reduced-cost long-acting reversible contraceptive (LARC) devices and provider training on LARC insertion to all Title X family planning clinics in Colorado (Philliber Research Associates & Bixby Center for Global Reproductive Health, 2010; Ricketts, Klingler, & Schwalberg, 2014). No comparable program was implemented in any U.S. state at that time. In the six years following the implementation of CFPI, both fertility and abortion rates in Colorado fell substantially compared to prevailing trends and compared to other states (Bailey & Lindo, 2017; Ricketts et al., 2014). CFPI thus offers a natural experiment

through which to assess the educational impacts of expanded access to the means of controlling fertility.

It is only now possible to study the effect of CFPI because of the availability of population-based samples longitudinally linked by the U.S. Census Bureau and the timing of CFPI. We use restricted data from the 2010 Census and the ACS data from Colorado and other states. Using these data, we construct longitudinal information on women inside and outside of Colorado, allowing us to compare educational outcomes of cohorts women with improved access to highly-effective contraception through CFPI and cohorts with no change in contraception access. All analyses are conducted in the Rocky Mountain Research Data Center.

**Methods and materials**

Taking an intent-to-treat approach and employing a difference-in-differences framework, we follow young women from the time of the 2010 Census (April 1, 2010), which occurred roughly four months after the implementation of CFPI. The intervention cohort includes young women who were high school aged at CFPI’s onset in Colorado. These women represent the first cohort whose high school graduation might have been impacted by CFPI. Our control cohort includes young women who were just beyond usual high school age at the onset of CFPI in Colorado. We then compare the difference between the intervention cohort and the non-intervention cohort in Colorado to the differences across these cohorts in three sets of comparison states. See Table 1 below for an illustration of our design.

Cohort	Age at Census 2010	Age in ACS survey year					
		2010	2011	2012	2013	2014	2015
Intervention	15-17					19-21	20-22
Comparison	19-21	19-21	20-22				

Table 1. Cohort design.

While our intervention area is all of Colorado (since the intervention was statewide), we conduct three sets of analyses using three different comparison areas: Colorado compared with surrounding states, Colorado compared with states with similar trajectories in female high school graduation rates prior to 2009, and Colorado compared with all other US states.

We merge individuals in each cohort from the 2010 Census, which is the full population of the United States, to all ACS respondents from the years 2010-2015. The ACS is a nationally-representative survey that includes approximately 1.5% of the population in each year. The ACS captures educational attainment for all individuals in the sample, allowing us to observe this outcome for a population-representative sample of young women in each cohort and from all states, regardless of whether they moved. The 2010 Census data and ACS were linked with the Census Bureau-provided Protected Identification Key (PIK).

Our outcome is educational attainment at ages 19-22, operationalized as a binary indicator of attaining high school graduation or continuation to college, with 1 for reported attainments of high school graduation and/or college attendance or graduation (referred to as more education) and a 0 for those who dropped out of high school or obtained a general equivalency diploma (GED) (less education). We elect to include those who have received a general equivalency diploma (GED) and not continued to college as “less education”, because of evidence that their life outcomes are more similar to those of individuals who did not graduate from high school than those who did (Heckman & LaFontaine, 2006; Tyler, 2003; Zajacova, 2012). Attainments are based on reported highest educational attainment in the ACS. Rather than capturing lifetime educational attainment, this outcome considers whether women have reached a baseline level of educational attainment while still in young adulthood.

In order to measure educational attainment at the same ages for our intervention and control cohorts, we observe attainment based on individuals included in ACS years when cohort members were ages 19-22. As shown in Table 1, for the intervention cohort, this includes ACS years 2014-2015, and for the comparison cohort this includes ACS years 2010-2011. Covariates include race and ethnicity and family structure at the time of the 2010 Census. Additional covariates will be added at later stages.

We begin by examining proportions who attained high school graduation or continuation to college in each cohort in each place by race/ethnicity. Then, separately for each of the three comparisons, we fit individual-level logistic and OLS regression models of attaining a high school diploma or continuation to college at follow up. Models include binary indicators of Colorado residence at 2010 Census and membership in the intervention cohort, as well as an interaction of the two (our difference-in-difference estimator). We interpret the coefficient of the interaction term as the estimated effect of CFPI on high school graduation. Models are fit in

Stata 15.1 using clustered standard errors at the state level. We also fit log-linear Poisson models for tables reflecting the number in each group who attained or did not attain at least high school graduation in the intervention and control cohorts in Colorado and comparison states.

## **Results**

At this time, we cannot provide precise numerical descriptions of sample sizes and effect sizes from our analysis because they have not gone through formal disclosure review by the Census Bureau. The results from our analyses will be available for public release before the Population Association of America meetings.

In both individual regression models and in log-linear models, we find that in Colorado, the increase in the likelihood of high school graduation in the intervention cohort compared to the comparison cohort was greater than in comparison states. The results persist in models with and without individual-level covariates and are robust to a variety of comparison areas. Stratifying by race and ethnicity, we find effects for non-Hispanic Whites and no effect for Hispanics. The cohort framework we employ here does not generate large enough samples of other race/ethnic groups to generalize our findings for those groups.

## **Extensions**

We are extending this analysis, including incorporating more ACS years to increase power in order to estimate the effect of CFPI for race/ethnic groups beyond Whites and Hispanics. Using multinomial models, we are also investigating the role of GEDs in shaping between-group differences. Finally, we will use census tract poverty indicators as covariates and for stratification in order to assess the role of disadvantage at baseline in shaping the impact of access to the full range of contraceptive methods.

## **Conclusion**

Decades of scholarship have demonstrated an association between fertility and subsequent life course outcomes, but the causal relationships between access to the means of controlling fertility and the subsequent life course have been extremely difficult to identify. These relationships are important because many public programs are designed to improve access to the means of controlling fertility and are justified on the basis of their long-term benefits. The natural experiment upon which we base our study design, coupled with our access to

longitudinally-linked restricted data, have allowed us to begin to address these important questions.

### **Works Cited**

- Bailey, M. J. (2013). *Fifty years of family planning: new evidence on the long-run effects of increasing access to contraception*. National Bureau of Economic Research.
- Bailey, M. J., & Lindo, J. M. (2017). *Access and Use of Contraception and Its Effects on Women's Outcomes in the US*. National Bureau of Economic Research.
- Goldin, C., & Katz, L. F. (2002). The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions. *Journal of Political Economy*, 110(4), 730–770.  
<https://doi.org/10.1086/340778>
- Heckman, J. J., & LaFontaine, P. A. (2006). Bias-corrected estimates of GED returns. *Journal of Labor Economics*, 24(3), 661–700.
- Hicks-Courant, K., & Schwartz, A. L. (2016). Local access to family planning services and female high school dropout rates. *Obstetrics & Gynecology*, 127(4), 699–705.
- Lawrence, E. M., Rogers, R. G., & Zajacova, A. (2016). Educational attainment and mortality in the United States: Effects of degrees, years of schooling, and certification. *Population Research and Policy Review*, 35(4), 501–525.
- Philliber Research Associates, & Bixby Center for Global Reproductive Health. (2010). *Evaluating the Colorado initiative to reduce unintended pregnancies*. New York: Philliber Research Associates. Retrieved from [http://bixbycenter.ucsf.edu/publications/files/Brief\\_2\\_Colorado%28Feb2010%29.pdf](http://bixbycenter.ucsf.edu/publications/files/Brief_2_Colorado%28Feb2010%29.pdf)
- Ricketts, S., Klingler, G., & Schwalberg, R. (2014). Game change in Colorado: widespread use of long-acting reversible contraceptives and rapid decline in births among young, low-

income women. *Perspectives on Sexual and Reproductive Health*, 46(3), 125–132.

<https://doi.org/10.1363/46e1714>

Tamborini, C. R., Kim, C., & Sakamoto, A. (2015). Education and lifetime earnings in the United States. *Demography*, 52(4), 1383–1407.

Tyler, J. H. (2003). Economic benefits of the GED: Lessons from recent research. *Review of Educational Research*, 73(3), 369–403.

Zajacova, A. (2012). Health in working-aged Americans: adults with high school equivalency diploma are similar to dropouts, not high school graduates. *American Journal of Public Health*, 102(S2), S284–S290.