

**Racial/Ethnic Differences in Long-Acting Reversible Contraception Use Following the
Affordable Care Act's Contraceptive Coverage Mandate**

Alyssa Bosold

A thesis

submitted in partial fulfillment of the
requirements for the degree of

Master of Public Health

University of Washington

2018

Committee:

Anne Turner

Lisa Callegari

Lyndsey Benson

Program Authorized to Offer Degree:

Health Services

©Copyright 2018

Alyssa Bosold

University of Washington

Abstract

Racial/Ethnic Differences in Long-Acting Reversible Contraception Use Following the Affordable Care Act's Contraceptive Coverage Mandate

Alyssa Bosold

Chair of the Supervisory Committee:

Anne Turner

Health Services

Women of color in the US experience disproportionately high rates of unintended pregnancy. Increasing access to long-acting reversible contraception (LARC) (implants and IUDs) is an effective strategy for reducing unintended pregnancy. We examine the impact on LARC use by race/ethnicity of the Contraceptive Coverage Mandate, which expanded access to contraception in 2012 by requiring all new private insurance plans to cover contraceptive methods, including LARC, without cost-sharing. We compared data from the 2006-2010 and 2013-2015 National Survey of Family Growth, examining associations between race/ethnicity and LARC use in 2006-2010 and 2013-2015 using logistic regression. We examined associations between race/ethnicity and LARC use by method type using multinomial logistic regression. We qualitatively compared results from 2006-2010 and 2013-2015. LARC use increased across racial/ethnic groups over time. Non-Hispanic black women were less likely than non-Hispanic white women to use LARC prior to the mandate, OR=0.56 (95% CI 0.34-0.91), but not after. Non-Hispanic black women were less likely than non-Hispanic white women to use the IUD prior to the mandate, RRR=0.59 (95% CI 0.38-0.92). There were no significant differences in use by method type following the mandate. The mandate may have contributed to a decline in LARC use disparities. Research should examine reasons for changing patterns in LARC use over time, and for racial/ethnic differences in method choice.

Introduction

Women of color in the United States experience disproportionately high rates of unintended pregnancy,¹ which is associated with adverse maternal and perinatal outcomes.²⁻⁶ Evidence suggests that increasing access to long-acting reversible contraception (LARC)—implants and intra-uterine devices (IUDs)—is one of the most effective strategies for reducing unintended pregnancy.⁷⁻⁹ Despite some conflicting results,¹⁰ studies conducted prior to the Affordable Care Act (ACA) have generally demonstrated that women of color in the US were less likely to use LARC when compared to non-Hispanic white women.¹¹⁻¹³ Literature also suggests that this relationship varies by method type, with some women of color being less likely to use the IUD in particular.¹⁰ To date, no studies examine the impact on LARC use by race/ethnicity of ACA's Contraceptive Coverage Mandate in 2012, which expanded access to contraceptive care by requiring all new private insurance plans to cover Food and Drug Administration (FDA) approved contraceptive methods, including LARC, without cost-sharing.¹⁴

ACA Implementation and the Contraception Coverage Mandate

An article published in 2010, after the passage of the ACA, noted that women of color and women with low incomes are disproportionately uninsured in the US. It also explained that uninsured women are 30 percent less likely to use prescription contraception.¹⁵ Research has shown that the implementation of the ACA as a whole has had an impact on reducing persistent racial disparities in access to health care.^{16,17} Specifically, after the ACA, there was a larger reduction in uninsured rates and a higher increase in likelihood of visiting any physician among black and Latino populations than among non-Hispanic white populations.¹⁶ A 2015 study looking at women of reproductive age (15-44), found that overall uninsured rates dropped by 36 percent, and found larger drops in uninsured rates among non-Hispanic black and Hispanic women than among non-Hispanic white women.¹⁷

Prior to the Contraceptive Coverage Mandate, many women had access to some form of contraception through both public and private insurance.¹⁸ However, the Contraceptive Coverage Mandate expanded the range of options available to women with no out of pocket cost, and research shows that fewer women have been paying out of pocket for contraception since the mandate's implementation.¹⁸

As the ACA has helped to reduce existing racial/ethnic disparities in health care generally, the Contraceptive Coverage Mandate could potentially have a similar impact on access to contraception, by giving women equal access to a wider variety of contraceptive methods at no cost. Hence, we hypothesize that racial/ethnic differences in use of LARC seen prior to the Contraceptive Coverage Mandate, will be diminished following the mandate's implementation. Considering racial/ethnic differences in the use of IUDs relative to implants prior to the ACA,¹⁰ we also hypothesize that changing patterns in LARC use may be different when dividing LARC by method type, and comparing differences in implant and IUD use separately over time.

Contribution to the Literature

Researchers have recognized the importance of understanding patterns and changes in LARC use in a political context, and the need for additional research on LARC use in years following the implementation of the ACA.¹⁰ While studies have examined health disparities and the ACA's impact generally, additional research is necessary to examine the specific impacts of the Contraceptive Coverage Mandate on women's contraceptive use, with a particular focus on LARC use among women of color. While a recent study suggests that patterns in contraceptive use have remained relatively unchanged since the implementation of the ACA, this study compared data from 2012 and 2017, as opposed to making comparisons before and after the Contraceptive Coverage Mandate, and does not examine the impact of racial/ethnic identity on differences in contraceptive use patterns.¹⁹

Our study will help us to elucidate the potential association of expanded access to contraceptive methods through the Contraceptive Coverage Mandate with racial/ethnic differences in contraceptive use, independent of increased insurance coverage in general. It will also take a detailed look at racial/ethnic differences in LARC use by method type before and after the mandate.

Ultimately, this research seeks to address gaps in the literature by comparing patterns in LARC use by race-ethnicity before and after implementation of the Contraceptive Coverage Mandate. It also aims to develop understanding of contraceptive use among women of color in the context of changing health policy, and set the stage for continued research that focuses on equity in reproductive health.

Objectives

Using a large, nationally representative dataset, the National Survey of Family Growth (NSFG), this study aims to answer the following research questions:

Aim 1: What is the association between self-reported race/ethnicity and LARC use before (2006-2010) and after (2013-2015) the implementation of the ACA's Contraceptive Coverage Mandate?

Hypothesis: Women of color will be less likely to use LARC compared to non-Hispanic white women before (2006-2010) but not after (2013-2015) the implementation of the Contraceptive Coverage Mandate in qualitative comparisons between the two time periods.

Aim 2: What is the association between self-reported race/ethnicity and LARC use, when LARC is separated by method type (e.g. comparing IUD use, implant use, and referent non-use of LARC) before and after implementation of the Contraceptive Coverage Mandate?

Hypothesis: Women of color will be less likely to use IUDs in particular when compared to non-Hispanic white women before (2006-2010) but not after the implementation of the Contraceptive Coverage Mandate (2013-2015).

Methods

Study Design and Population

This study is a secondary analysis of the NSFG, a publicly available, cross-sectional survey addressing topics related to family and relationships, contraception, and sexual and reproductive health.²⁰

NSFG uses a multi-stage, probability-based, nationally representative sample of the US household population, including men and women ages 15-49, and collects data through in-person and computer-based questionnaires.²¹ The NSFG over-samples Hispanic, non-Hispanic black, and adolescent populations, and the estimated response rate to recent surveys is approximately 73%.²⁰

The NSFG is conducted in cycles. Data for this study came from the 2006-2010 and 2013-2015 cycles. In the 2013-2015 cycle, there were 5,699 respondents who identified as female and 4,506 respondents who identified as male.²¹ In the 2006-2010 cycle, there were 12,279 respondents who identified as female and 10,403 who identified as male.²²

For the purposes of this study, survey data came from respondents who identify as female, who were specifically asked about contraceptive method history and current use. Women included in the study are those at risk for unintended pregnancy, as based on a definition provided by Dehlendorf et al. in an earlier analysis of contraceptive method use in the NSFG.¹³ In our study, women at risk for unintended pregnancy are those who have had sex with a man in the past three months, and did not report being pregnant, maybe pregnant, or trying to get pregnant at the time of the interview. Women who were infertile, surgically sterilized, whose partners were surgically sterilized, or were not sexually active in the last three months, were excluded from the analysis.

This study examines associations between self-reported race and ethnicity and LARC use, comparing these associations before (2006-2010) and after (2013-2015) the implementation of the Contraceptive Coverage Mandate. LARC was added to the list of covered services under the ACA in 2011. However, the federal mandate that all new insurance plans in the US cover LARC was not implemented until 2012. The 2011-2013 NSFG cycle is therefore omitted from this analysis given the changing policy during that timeframe. Due to limitations in the survey data, and the lack of a continuous NSFG data collection from 2006 through 2015, it was not possible to merge data across these years. Therefore, separate analyses were conducted for the 2006-2010 and 2011-2013 datasets and qualitative comparisons were made.

Exposure, Outcome, and Covariates

Aim 1: The outcome variable is binary: LARC use during the month of the NSFG interview (yes or no). The exposure variable is self-reported race and ethnicity. In its publicly available dataset, the NSFG provides data on race/ethnicity in the categories of non-Hispanic black, non-Hispanic white, Hispanic, and other. The “other” category consists of those who identify as: American Indian/Alaska Native, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Other Asian, Native Hawaiian, Guamanian or Chamorro, Samoan,

or other Pacific Islander. Non-Hispanic white women are used as the reference group in this study. Based on review of related literature the following confounders were identified a.priori and added into the regression model: education, age, number of male sexual partners in the past 12 months, prior discontinuation of non-LARC hormonal methods, marital status, income, prior abortion, parity, and insurance status and type.^{10,13}

The ACA expanded both access to insurance coverage, and coverage of contraception with no co-pay (The Contraceptive Coverage Mandate). Insurance status was added as a covariate into the model to help isolate the influence of the Contraceptive Coverage Mandate from the influence of expanded insurance coverage generally.

Aim 2: The outcome variable includes the three categories of IUD, implant, and non-LARC methods or no method (referent group).The exposure variable is again self-reported race and ethnicity and the same a.priori confounders were included in the aim 2 model.

Data Analysis

Descriptive Statistics

For each NSFG cycle, the proportion of LARC users in each racial/ethnic group among women at risk of unintended pregnancy was calculated. LARC users and non-users of LARC in each NSFG cycle were also compared by different socio-economic characteristics and family planning-related variables. Proportions were compared using chi-square tests. However, Fisher's exact tests were used to compare proportions with small values, specifically race (2006-2010 only) and male sexual partners in the last 12 months (Table 1). For Aim 2, the percentage of implant users and IUD users among each racial/ethnic group was also determined.

Aim 1 Logistic Regression Analysis

Logistic regression was used to examine the association between race/ethnicity and LARC use in the 2006-2010 and 2013-2015 cycles. The following a.priori confounders were adjusted for in each analysis:

education, age, number of male sexual partners in the past 12 months, discontinuation of non-LARC hormonal methods, marital status, income, prior abortion, parity, and insurance status and type.

Odds ratios from the 2006-2010 data were qualitatively compared with those from the 2013-2015 data to see whether the associations between LARC use and race/ethnicity differ before and after the Contraceptive Coverage Mandate.

Aim 2 Multinomial Logistic Regression Analysis

Multinomial logistic regression was used to examine the association between race/ethnicity and use of LARC use by method type in the 2006-2010 and 2013-2015 cycle. The outcome variable is LARC use by type: IUD, implant, or referent non-use of LARC. The exposure variable is self-reported race/ethnicity. Non-Hispanic white women were used as the reference group. Adjustment was made for a priori selected confounders including: education, age, number of male sexual partners in the past 12 months, discontinuation of non-LARC hormonal methods, marital status, income, prior abortion, parity, and insurance status and type. Relative risk ratios from the 2006-2010 data were qualitatively compared with those from the 2013-2015 data to identify differences in associations over time, by method type.

Prevalence odds ratios and relative risk ratios are reported at the 5% significance level, with p-values and 95% confidence intervals. All data analysis was conducted using STATA 14. The “svy” command in STATA was used for all analyses to ensure correct estimates of variance given the NSFG's sampling design and weighting.

Results

Sample Characteristics

Table 1 compares demographic and socio-economic characteristics between LARC users and non-users of LARC among the women at risk of unintended pregnancy in each cycle year.

Table 1. Demographic characteristics of LARC users and non-users of LARC by cycle year

| | 2006-2010 Cycle N=5,312 | | | 2013-2015 Cycle N=2,457 | | |
|---|----------------------------|-------------------|---------|----------------------------|-------------------|---------|
| | LARC Users | Non-Users of LARC | p-value | LARC Users | Non-Users of LARC | p-value |
| Socio-Demographic Characteristic | | | | | | |
| Race | | | P=.001 | | | P=.35 |
| Non-Hispanic white | 227(5.2%) | 2458 (56.3%) | | 193 (9.5%) | 955 (46.8%) | |
| Non-Hispanic black | 62 (0.8%) | 936 (11.9%) | | 76 (2.3%) | 386 (10.34%) | |
| Hispanic | 133 (1.6%) | 1063 (15.1%) | | 117 (4.3%) | 474 (16.6%) | |
| Other | 34 (0.7%) | 403 (8.4%) | | 49 (1.7%) | 207 (8.5%) | |
| Age | | | P<.001 | | | P=.07 |
| 15-19 | 21 (4.2%) | 684 (12.2%) | | 23 (4.9%) | 253 (10.8%) | |
| 20-24 | 85 (15.6%) | 1191 (24.5%) | | 101 (24.0%) | 463 (22.8%) | |
| 25-29 | 127 (24.7%) | 1199 (22.6%) | | 103 (23.2%) | 478 (22.0%) | |
| 30-34 | 109 (20.7%) | 811 (15.5%) | | 109 (21.0%) | 381(18.1%) | |
| 35-39 | 75 (23.7%) | 588 (14.9%) | | 60 (18.1%) | 279 (14.6%) | |
| 40-44 | 39 (11.1%) | 387 (10.3%) | | 39 (8.8%) | 168 (11.8%) | |
| Marital Status | | | P<.001 | | | P=.04 |
| Married | 234 (66.7%) | 1608 (41.8%) | | 170 (45.6%) | 609 (39.0%) | |
| Cohabiting | 82 (14.6%) | 770 (15.3%) | | 98 (23.8%) | 379 (19.6%) | |
| Single | 140 (18.7%) | 2482 (42.9%) | | 167 (30.6%) | 1034 (41.4%) | |
| Income | | | P=.62 | | | P=.31 |
| >250% poverty level | 174 (47.1%) | 2074 (48.8%) | | 143 (41.7%) | 782 (46.7%) | |
| 100-249% poverty level | 171 (34.9%) | 1610 (31.9%) | | 141 (29.9%) | 623 (29.1%) | |
| <99% poverty level | 111 (18.0%) | 1176 (19.3%) | | 151 (28.5%) | 617 (24.1%) | |
| Education | | | P=.89 | | | P=.49 |
| Bachelor's Degree or more | 141 (38.5%) | 1600 (37.4%) | | 154 (37.4%) | 722 (42.3%) | |
| Some college | 100 (21.8%) | 1101 (23.1%) | | 112 (27.3%) | 506 (24.8%) | |
| High School Diploma or less | 215 (39.7%) | 2159 (39.5%) | | 169 (35.3%) | 794 (32.9%) | |
| Insurance Coverage | | | P<.001 | | | P=.07 |
| Private | 234 (56.0%) | 2955 (67.9%) | | 223 (57.7%) | 1148 (65.9%) | |
| Government Sponsored | 136 (23.7%) | 1126 (18.5%) | | 151 (56.7%) | 589 (28.9%) | |
| Uninsured | 81 (20.3%) | 718 (13.6%) | | 61 (13.4%) | 275 (11.6%) | |

| | | | | | | |
|---|-------------|---------------|--------|-------------|--------------|--------|
| Prior Abortion | | | P=.08 | | | P=.03 |
| Yes | 97 (18.8%) | 720 (13.9%) | | 84 (17.0%) | 284 (12.0%) | |
| No | 359 (81.2%) | 4140 (86.2%) | | 351 (83.0%) | 1738 (88.0%) | |
| Parity | | | P<.001 | | | P<.001 |
| No Children | 39 (6.1%) | 2362 (49.1%) | | 82 (20.2%) | 995 (51.2%) | |
| 1 or More Children | 417 (93.9%) | 24997 (50.9%) | | 353 (80.0%) | 1027 (48.8%) | |
| Number of Male Sex Partners in Last 12 Months | | | P=.01 | | | P=.28 |
| 2 or Fewer Partners | 433 (98.1%) | 4447 (92.9%) | | 399 (94.4%) | 1851 (92.8%) | |
| More than 2 Partners | 21 (1.9%) | 402 (7.1%) | | 36 (5.6%) | 169 (7.2%) | |
| Prior Discontinuation of Hormonal non-LARC Methods | | | P<.001 | | | P<.001 |
| Yes | 246 (51.8%) | 1779 (35.6%) | | 261 (50.0%) | 774 (32.2%) | |
| No | 210 (48.3%) | 3076 (64.4%) | | 174 (7.1%) | 1248 (10.6%) | |

LARC Use by Self-Reported Race/Ethnicity

Table 2 compares race/ethnicity among LARC users versus non-users of LARC in the two cycles. In the 2006-2010 cycle, 8.3% (n=456) women were LARC users. Descriptive statistics show that the proportion of LARC users about doubled, from 8.3% in the 2006-2010 cycle to 17.7% in the 2013-2015 cycle. The proportion of LARC users in each racial/ethnic group increased over time. However, increases in the proportion of LARC users were largest among non-Hispanic black women (increasing from 6.3% to 18.0%), and smallest among non-Hispanic white women (increasing from 8.5% to 16.9%).

Table 2. Proportion of current LARC users by racial/ethnic group

| | 2006-2010 Cycle | | 2013-2015 Cycle | | % Change in LARC Use |
|--------------------|-----------------|-------------------|-----------------|-------------------|----------------------|
| | LARC Users | Non-Users of LARC | LARC Users | Non-Users of LARC | |
| Non-Hispanic White | 227 (8.5%) | 2458 (91.5%) | 193 (16.9%) | 955 (83.1%) | 8.4% |
| Non-Hispanic Black | 62 (6.3%) | 936 (93.7%) | 76 (18.0%) | 386 (82.0%) | 11.7% |
| Hispanic | 133 (9.6%) | 1063 (90.4%) | 117 (20.4%) | 474 (79.6%) | 10.8% |
| Other | 34 (7.4%) | 403 (92.7%) | 49 (16.6%) | 207 (83.4%) | 9.2% |
| Total | 456 (8.3%) | 4860 (92%) | 435 (17.7%) | 2022 (82.3%) | 9.4% |

LARC Use by Race/Ethnicity Before and After the Implementation of the Contraceptive Coverage Mandate

There was a significant difference in LARC use between non-Hispanic black women and non-Hispanic white women and a borderline significant difference in LARC use between Hispanic women and non-Hispanic white women in adjusted logistic regression analysis in the 2006-2010 NSFG. After adjusting for age, income, education, parity, history of abortion, number of male sexual partners in the last 12 months, discontinuation of hormonal non-LARC methods, insurance status and type, non-Hispanic black women were significantly less likely to be using LARC methods than non-Hispanic white women, OR=0.59 (95%CI 0.38-0.92), and Hispanic women were also less likely to be using LARC methods than non-Hispanic white women, OR=0.71 (95%CI 0.50-1.00). In the 2013-2015 data, there were no significant differences in LARC use between non-Hispanic white women and women of other self-reported racial categories, including non-Hispanic black women, OR=0.86 (95% CI 0.54-1.37). This held true in both adjusted and unadjusted analysis. Table 3 below displays the results of unadjusted and adjusted logistic regression analysis.

Table 3: Association between self-reported race/ethnicity and LARC use before and after the Contraceptive Coverage Mandate

| | 2006-2010 N=5,312 | 2013-2015 N=2,457 |
|---------------------------------|------------------------------|------------------------------|
| Non-Hispanic White | Ref | Ref |
| Non-Hispanic Black | | |
| Unadjusted OR (95% CI, p-value) | 0.72 (0.49-1.07, P=.11) | 1.08 (0.72-1.63, P=.70) |
| Adjusted OR (95% CI, p-value) | 0.59 (0.38-0.92, P=.02) | 0.86 (0.54-1.37, P=.53) |
| Hispanic | | |
| Unadjusted OR (95% CI, p-value) | 1.15 (0.87-1.52, P=.32) | 1.26 (0.88-1.82, P=.20) |
| Adjusted OR (95% CI, p-value) | 0.71 (0.50-1.00, P=.05) | 0.98 (0.64-1.50, P=.91) |
| Other | | |
| Unadjusted OR (95% CI, p-value) | 0.86 (0.62-1.53, P=.60) | 0.98 (0.62-1.54, P=.92) |
| Adjusted OR (95% CI, p-value) | 0.78 (0.43-1.42, P=.41) | 0.93 (0.53-1.62, P=.78) |

LARC Use by Method Type

The proportion of both implant and IUD users increased from the 2006-2010 cycle to the 2013-2015 cycle (Table 4). The highest increase in IUD use was among non-Hispanic black women (an increase from 5.7% to 14.5%), and the lowest increase in IUD use was among non-Hispanic white women (an increase from 8.2% to 14.2%). For implants, the highest increase in use was among Hispanic women (an increase from

0.3% to 3.9%), and lowest among women who identified with other racial groups (an increase from 2.0% to 3.1%).

Table 4: Proportion of LARC users by method type and racial/ethnic group

| | 2006-2010 Cycle Year | | | 2013-2015 Cycle Year | | | % Change in LARC use | |
|--------------------|----------------------|--------------|-----------------|----------------------|--------------|-----------------|----------------------|---------|
| | IUD | Implant | Non-LARC | IUD | Implant | Non-LARC | IUD | Implant |
| Non-Hispanic White | 215 (8.2%) | 12 (0.3%) | 2457 (91.5%) | 160 (14.2%) | 33 (2.7%) | 955 (83.1%) | 6% | 2.4% |
| Non-Hispanic Black | 56 (5.7%) | 6 (0.7%) | 936 (93.7%) | 53 (14.5%) | 23 (3.5%) | 386 (82.0%) | 8.8% | 2.8% |
| Hispanic | 122 (9.4%) | 11 (0.3%) | 1051 (90.2%) | 93 (16.6%) | 24 (3.9%) | 474 (79.6%) | 7.2% | 3.6% |
| Other | 28 (5.4%) | 6 (2.0%) | 403 (92.7%) | 42 (13.5%) | 7 (3.1%) | 207 (83.4%) | 8.1% | 1.1% |
| Total | 421 (7.8%) | 35 (0.5%) | 4847 (91.7%) | 348 (14.6%) | 87 (3.1%) | 2022 (82.3%) | 6.8% | 2.6% |

In adjusted multinomial logistic regression analysis, in the 2006-2010 data non-Hispanic black women were significantly less likely than non-Hispanic white women to be using the IUD relative to non-use of LARC methods, RRR=0.56 (95% CI 0.35-0.89). Women who identified with other racial/ethnic groups were significantly more likely to be using the implant than non-Hispanic white women, RRR=5.59 (95%CI 1.63-19.10). In the 2013-2015 analysis, there were no longer any significant differences between racial/ethnic groups in terms of implant or IUD use.

Table 5: Association between self-reported race/ethnicity and LARC use by method type before and after the Contraceptive Coverage Mandate

| | 2006-2010 | | 2013-2015 | |
|----------------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| | Implant | IUD | Implant | IUD |
| Non-Hispanic White | Ref | Ref | Ref | Ref |
| Non-Hispanic Black | | | | |
| Unadjusted RRR (95% CI, p-value) | 2.36 (0.50-11.18, P=.28) | 0.66 (0.43-1.02, P=.06) | 1.32 (0.60-2.88, P=.49) | 1.04 (0.65-1.65, P=.87) |
| Adjusted RRR (95% CI, p-value) | 1.25 (0.19-8.19, P=.81) | 0.56 (0.35-0.89, P=.02) | 0.72 (0.25-2.05, P=.53) | 0.89 (0.54-1.44, P=.62) |
| Hispanic | | | | |
| Unadjusted RRR (95% CI, p-value) | 1.23 (0.37-4.09, P=.73) | 1.17 (0.88-1.54, P=.27) | 1.48 (0.73-2.98, P=.27) | 1.22 (0.82-1.81, P=.31) |
| Adjusted RRR (95% CI, p-value) | 0.46 (0.12-1.83, P=.27) | 0.74 (0.53-1.04, P=.09) | 0.96 (0.39-2.32, P=.92) | 0.97 (0.61-1.55, P=.91) |

| Other | | | | |
|-------------------------------------|------------------------------|----------------------------|----------------------------|----------------------------|
| Unadjusted RRR (95% CI, p-value) | 6.22 (1.20- 33.53, P=.03) | 0.65 (0.35-1.21, P=.18) | 1.13 (0.42-3.08, P=.80) | 0.95 (0.59-1.52, P=.82) |
| Adjusted RRR (95% CI, p-value) | 5.59 (1.63- 19.10, P=.01) | 0.60 (0.32-1.13, P=.11) | 1.41 (0.50-3.91, P=.53) | 0.85 (0.47-1.51, P=.56) |

*non-hispanic white women and non-users of LARC are reference groups

Discussion

Aim 1: Differences in LARC use Over Time

For Aim 1, our hypothesis was partially correct. Data suggest that non-Hispanic black women were significantly less likely to be using LARC when compared to non-Hispanic white women prior to the implementation of the Contraceptive Coverage Mandate, but not after. Results also suggest that Hispanic women may have been less likely to be using LARC prior to the Contraceptive Coverage Mandate (although results were borderline significant), but not after. For other racial/ethnic groups, there were no significant differences in LARC use when compared to non-Hispanic white women prior to the ACA. Our data also indicate that across racial/ethnic groups, LARC use increased following the implementation of the ACA.

Our findings are consistent with other studies examining racial/ethnic differences in contraception use prior to the implementation of the ACA. A study by Dehlendorf et al. examined data from the 2006-2010 NSFG and found that non-Hispanic black women were less likely to be using LARC methods than non-Hispanic white women.¹³ Literature reveals inconsistency in the discussion of Hispanic women's use of LARC during this time period. For example, Dehlendorf et al. found that Hispanic women were less likely to use LARC than non-Hispanic white women.¹³ Our results were consistent with Dehlendorf's findings, but only borderline significant. Kavanaugh et al.'s examination of LARC use among all women in the NSFG from 2009-2012 found no significant differences between non-Hispanic white and Hispanic women, but did find significant increases in LARC use among Hispanic women over time.¹⁰ The differences in results could be because of the slight differences in time periods observed and the increases in LARC use over the 2009-2012 period. The different levels of significance observed in our study as compared to Dehlendorf et al.'s could be a result of differing definitions of LARC, as Dehlendorf et al. included sterilization in their

definition.¹³ Further exploration of differences in use of sterilization among racial/ethnic groups, as well as exploration of Hispanic women's use of LARC over time, could be helpful to better understand racial/ethnic differences in family planning methods.

While to our knowledge, no studies have examined racial differences in LARC use in the 2013-2015 NSFG cycle, some studies have focused on this topic in the 2011-2013 time period, which we identified as a time of changing policy, when the ACA was just beginning to be implemented. A report on the 2011-2013 NSFG found that Hispanic women have rates of LARC use similar to those of non-Hispanic white women, and significantly higher than non-Hispanic black women.²³ This is consistent with our findings from 2013-2015, although we did not compare Hispanic women with non-Hispanic black women. Further, this report identified that, while there was a difference in LARC use between non-Hispanic black and white women, this difference was not significant. The study made no adjustments for multiple comparisons.²³ In another examination of the 2011-2013 NSFG by Kavanaugh et al. an adjusted analysis revealed significant differences in LARC use between non-Hispanic black and white women.¹⁰ Differences between the studies are likely the result of different statistical procedures and adjustments, but also could suggest changes in LARC use when comparing non-Hispanic black and white women during this time of changing insurance policies and coverage.

Women who identify with other racial categories are seldom discussed in these studies, particularly in terms of comparison with non-Hispanic white women or with other racial/ethnic groups. Disaggregation of the "other" category on the NSFG, and over-sampling of women from other racial/ethnic groups may allow for more meaningful comparison and conclusions about contraceptive use for women with racial/ethnic backgrounds that are not non-Hispanic white, non-Hispanic black, and Hispanic.

Overall, other studies comparing LARC use across NSFG cycles, have noted an increase in the prevalence of LARC use over time,^{23,10} which is consistent with our results. Trends of increasing LARC use that began in 2002¹² have continued through 2011-2013^{23,10} and into the 2013-2015 cycle.

Aim 2: Differences in LARC Use Over Time, by Method Type

As with Aim 1, our hypothesis for Aim 2 was only partially correct. There were observed significant differences in IUD use relative to non-use of LARC methods only between non-Hispanic white and black women prior to the Contraceptive Coverage Mandate. Women who identified with other racial/ethnic groups were significantly more likely to use implants when compared with non-Hispanic white women prior to the Contraceptive Coverage Mandate. When comparing Hispanic women with non-Hispanic white women, there were no significant differences in IUD or implant use prior to the Contraception Coverage Mandate. In qualitative comparison, there were no longer any significant differences in use by method type following the Contraceptive Coverage Mandate.

In terms of implant use, Kavanaugh et al. looked at NSFG data from 2008-2010 and 2011-2013 and found that significantly higher proportions of black women used implants when compared to all women surveyed.¹⁰ Although our results comparing non-Hispanic black and white women were not significant, they were generally in line with this study's findings. In qualitative comparison of proportions of implant users, our data show that in 2006-2010 higher proportions of black women were implant users when compared with non-Hispanic white and Hispanic women. However, we also found that for the 2006-2010 time period, women who identified with other racial/ethnic groups were more likely to be implant users than non-Hispanic white women. Differences between our findings and Kavanaugh et al.'s finding relative to implant use among other racial/ethnic groups could again be due to differences in comparisons, or perhaps changes over time. In 2013-2015, we found that there were relatively similar proportions of implant users across racial/ethnic categories. This lends credibility to the idea that racial/ethnic trends in implant use are changing over time. Additional research on implant use by race/ethnicity is necessary to understand both patterns and reasons for racial/ethnic differences in use.

Our results related to IUD use align with other published literature. For example, a 2017 review reported that Hispanic women used IUDs at significantly higher rates than black and white women.²⁴ While our results were not significant, data from the 2013-2015 NSFG indicated that Hispanic women did use IUDs at higher rates than white women. We did not statistically compare differences between Hispanic and non-Hispanic black women, but a higher proportion of Hispanic women were IUD users when compared to black

women both before and after the Contraceptive Coverage Mandate was implemented. Kavanaugh et al. also show in a comparison of LARC use by method type from 2009-2012, that non-Hispanic black women had the lowest proportion of IUD use relative to implant use, when compared with other racial/ethnic groups.¹⁰ They also found that non-Hispanic white women were more likely to use IUDs than women of color.¹⁰

Due to limitations in our dataset, it was not possible to separate hormonal IUD users from copper IUD users in comparison with referent non-users of LARC. While it was not the focus of this study, further analysis comparing IUD type by race/ethnicity, or comparing women who use hormonal LARC, non-hormonal LARC, and other hormonal and non-hormonal contraceptive methods, might yield interesting results. Prior research among women Veterans found that non-Hispanic black and Hispanic women, when compared with non-Hispanic white women, had higher odds of considering it extremely important that their contraceptive method of choice did not contain hormones.²⁵ A recent study looking at the NSFG from 2008-2013 found that, among IUD users, Hispanic women were significantly less likely to use hormonal IUDs, when compared with non-Hispanic white women.¹⁰ Another study of racial/ethnic differences in contraceptive preferences also found that black non-Hispanic, Hispanic, and Asian/Pacific Islander women were more likely than non-Hispanic white women to look for contraception that would not interfere with their menstrual period.²⁴ These potential cultural or racial/ethnic differences in use of hormonal contraception methods should be further explored with both quantitative and qualitative research.

Implications

Overall, we found that LARC use increased over time and that the disparity between non-Hispanic black and white women was reduced in the time period after the Contraceptive Coverage Mandate was implemented. This suggests that the mandate may have played a role in reducing disparities in LARC use particularly between non-Hispanic black and white women.

In addition to increased contraceptive access through the mandate, other factors including cultural shifts and increasing diversity in the field of family planning, may have also played a role in reducing racial/ethnic disparities in LARC use. To illustrate, research suggests that negative historical experiences related to

contraception, including a history of forced sterilization among many women of color,²⁶⁻²⁹ as well as experiences of racism from providers³⁰ may have made women less willing to use contraceptive methods that require insertion and removal procedures by a healthcare provider (e.g. LARC).³¹⁻³² Recently, conversations related to equity and structural racism have begun to influence the field of family planning and the practice of obstetrics and gynecology. Organizations such as the American College of Obstetrics and Gynecology (ACOG) have released statements committed to addressing racial and ethnic disparities in health and health care.³³ The number of non-Hispanic black women in practices as OBGYNs has also increased markedly over time.³⁴⁻³⁵ Research has shown that social concordance, or shared characteristics (such as gender and race) between physicians and patients, is related to perceived quality of care and improved satisfaction.³⁶ The changes in OBGYN practice, and the increase in non-Hispanic black gynecologists in particular, may have had an influence on non-Hispanic black women's satisfaction with and trust in their family planning physicians, and in turn on their willingness to use provider-controlled LARC methods.

Further research is necessary to better understand the impact of increased contraceptive access and changing family planning practice on LARC use by race/ethnicity, and to explain the drivers of change in LARC use over time. Exploration of LARC use by method type and within racial/ethnic groups would also be helpful to understand women's preferences, and could lead to development of methods that are better suited to the needs of a variety of women. Finally, access to contraception should continue to be monitored as policies around contraception change. The Trump administration, for example, has recently expanded the number and types of employers who can claim exemption from the Contraceptive Coverage Mandate for religious reasons.³⁷ Work should focus on documenting the impact, both in general and by race/ethnicity, of this rule and other policies that may limit access to contraception.

Limitations

The NSFG is a cross-sectional survey and thus does not capture reasons for continuation or discontinuation of methods or changes in contraceptive behavior over time. Analyses using the NSFG are also restricted to measuring variables captured in the survey. Reasons for use and non-use of contraception are complex, and may be influenced by factors not captured in the survey (e.g. side effects, partner

dissatisfaction with the method, other health issues or medical reasons for contraceptive use), resulting in unmeasured confounding. Provider behaviors and practice patterns may be another unmeasured confounder relationship between the Contraceptive Mandate and LARC use by race/ethnicity. Provider behavior, independent of the mandate, could influence the overall increased use of LARC and possibly also the decreased disparity if providers' behaviors resulted in increased uptake in LARC use among non-Hispanic black women. We are not able to account for provider behaviors in this cross-sectional analysis.

In addition, the NSFG only provides the racial/ethnic categories of non-Hispanic black, Hispanic, non-Hispanic white, and other in publicly available data. The other category includes populations with very different cultures and experiences with health disparities. Grouping into broad racial/ethnic categories ensures adequate sample sizes, but masks diversity between groups, and overlooks the needs and experiences of many women.

While it would have been ideal to combine data across NSFG cohort years, merging data from 2006-2010 with data from 2013-2015 was not possible due to a lack of continuous data collection. Therefore, we were unable to statistically compare odds of LARC use by race/ethnicity in the two time periods.

Further, the NSFG does not divide publicly available data by state. This would be an important factor to consider, as states had different policies around contraceptive coverage and different rules about the contraceptive methods covered through Medicaid prior to the ACA. Prior to the Contraceptive Coverage Mandate, Medicaid programs were prohibited from charging out of pocket costs for contraception, but did not have to cover all contraceptive methods. Only Medicaid expansion programs were required to cover the full range of methods under the mandate, and traditional Medicaid programs could continue to cover a limited range of contraception.³⁸ Adjusted analysis controlled for differences in insurance type in this study, but in future studies, it would be useful to examine racial/ethnic differences in contraceptive use both between and among Medicaid beneficiaries and those who are privately insured. This analysis might be most feasible using state-level data.

Conclusion

This study found that use of LARC has increased over time across all racial/ethnic groups, and the difference in LARC use between non-Hispanic black and white women decreased after implementation of the ACA's Contraceptive Coverage Mandate. The mandate therefore, in combination with changing practice patterns, may have contributed to a decline in disparities related to LARC use.

Future data collection and research should focus on providing more appropriate representation of women who do not identify as non-Hispanic white, non-Hispanic black, and Hispanic. In addition, qualitative studies exploring the experiences of women of color related to contraception and LARC use could help to ensure that existing systems and contraceptive methods are responsive to the needs of women of varying racial, ethnic, and cultural backgrounds.

Ultimately, continued efforts to research, understand, and improve access to safe and effective contraception for women seeking it, is an important part of a pathway toward eliminating health disparities and inequity in family planning. The importance and impact of expanded access to contraception should continue to be considered in future research and policy development.

References

1. Jackson AV, Wang L-F, Morse J. Racial and Ethnic Differences in Contraceptive Use and Obstetric Outcomes: A Review. *Seminars in Perinatology* 2017; 41(5): 273-277.
2. Sonfield A, Hasstedt K, Kavanaugh ML, Anderson R. The Social and Economic Benefits of Women's Ability To Determine Whether and When to Have Children. New York: Guttmacher Institute. Available at: <https://www.guttmacher.org/report/social-and-economic-benefits-womens-ability-determine-whether-and-when-have-children>. Published March 2013. Accessed May 22, 2018.
3. Hellerstedt WL, Pirie PL, Lando HA, Curry SJ, McBride CM, Grothaus LC, Nelson JC. Differences in preconceptional and prenatal behaviors in women with intended and unintended pregnancies. *American journal of public health* 1998; 88(4), 663-666. DOI: 10.2105/AJPH.88.4.663
4. D'Angelo D, Williams L, Morrow B, et al. Preconception and Interconception Health Status of Women Who Recently Gave Birth to a Live-Born Infant—Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 Reporting Areas, 2004. *Morbidity and Mortality Weekly Report* 2007;56(SS10):1-35.
5. Herd P, Higgins J, Sicinski K, Merkurieva I. The implications of unintended pregnancies for mental health in later life. *Am J Public Health* 2016; 106(3):421–429.
6. Kavanaugh ML, Anderson R. *Contraception and Beyond: The Health Benefits of Services Provided at Family Planning Centers*. New York: Guttmacher Institute, 2013.
7. Secura G. Long-acting reversible contraception: a practical solution to reduce unintended pregnancy. *Minerva Ginecol* 2013; 65(3): 271-277. PMID: 23689169
8. Winner B, Peipert JF, Zhao Q, Buckel C, Madden T, Allsworth JE, Secura GM. Effectiveness of long-acting reversible contraception. *N Engl J Med* 2012; 24: 1998-2007. PMID: 22621627.
9. Stoddard A, McNicholas C, Peipert JF. Efficacy and safety of long-acting reversible contraception. *Drugs* 2011; 71(8): 969-980. PMID:21668037.
10. Kavanaugh ML, Jerman J, Finer LB. Changes in Use of Long-Acting Reversible Contraceptive Methods Among U.S. Women, 2009-2012. *Obstet Gynecol* 2015; 126(5): 917–927.
11. Kusunoki Y, Barber JS, Ela EJ, Bucek A. Black-White Differences in Sex and Contraceptive Use Among Young Women. *Demography* 2016; 53:1399–1428 DOI 10.1007/s13524-016-0507-5
12. Kavanaugh ML, Jerman J, Hubacher D, Kost K, Finer LB. Characteristics of Women in the United States Who Use Long-Acting Reversible Contraceptive Methods. *Obstet Gynecol* 2011; 117:1359-57.
13. Dehlendorf C, Park SY, Emeremni CA, Comer D, Borrero S. Racial/ethnic disparities in contraceptive use: variations by age and women's reproductive experiences. *Am J Obstet Gynecol* 2014; 210(6): 526e1-526e9.
14. Sobel L, Beamesderfer A, Salganicoff A. Private Insurance Coverage of Contraception. The Kaiser Family Foundation. Issue Brief. December 2016. Available online: <https://www.kff.org/womens-health-policy/issue-brief/private-insurance-coverage-of-contraception/>. Accessed November 12, 2016.
15. Dehlendorf C, Rodriguez MI, Levy K, Borrero S, Steinauer J. Disparities in Family Planning. *Am J Obstet Gynecol* 2010;202(3):214-220. doi:10.1016/j.ajog.2009.08.022.
16. Chen J, Vargas-Bustamante A, Mortensen K, Ortega AN. Racial and Ethnic Disparities in Health Care Access and Utilization Under the Affordable Care Act. *Med Care* 2016; 54: 140-146.
17. Guttmacher Institute. Uninsured Rate Among Women of Reproductive Age Has Fallen More Than One-Third Under the Affordable Care Act. Website: <https://www.guttmacher.org/article/2016/11/uninsured-rate-among-women-reproductive-age-has-fallen-more-one-third-under>. Published November 2016. Accessed October 21, 2017.
18. Sobel L, Beamsderfer A, Salganicoff A. Private Insurance Coverage of Contraception. Kaiser Family Foundation Women's Health Policy. Available at: <https://www.kff.org/womens-health->

- [policy/issue-brief/private-insurance-coverage-of-contraception/](#). Published December 7, 2016. Accessed May 22, 2018.
19. Bearak JM, Jones RK. Did Contraceptive Use Patterns Change after the Affordable Care Act? A Descriptive Analysis. *Women's Health Issues* 2017; 27(3): 316-321.
 20. Centers for Disease Control and Prevention. National Survey of Family Growth. Website: https://www.cdc.gov/nchs/nsfg/about_nsfg.htm. Updated May 13, 2016. Accessed October 1, 2017.
 21. US Department of Health and Human Services. Public Use Data File Documentation 2013-2015 National Survey of Family Growth User's Guide. Available at: https://www.cdc.gov/nchs/data/nsfg/nsfg_2013_2015_userguide_maintext.pdf. Published October 2016. Accessed May 22, 2016.
 22. US Department of Health and Human Services. Public Use Data File Documentation 2006-2010 National Survey of Family Growth User's Guide. Available at: https://www.cdc.gov/nchs/data/nsfg/nsfg_2006-2010_userguide_maintext.pdf Published October 2011. Accessed May 22, 2016.
 23. Daniels K, Daugherty J, Jones J, Mosher W. Current Contraceptive Use and Variation by Selected Characteristics Among Women Aged 15-44: United States 2011-2013. *National Health Statistics Reports*. November 10, 2015: Report No. 86.
 24. Jackson AV, Karasek D, Dehlendorf C, Foster DG. Racial and ethnic differences in women's preferences for features of contraceptive methods. *Contraception* 2016; 93(5):406-11. doi: 10.1016/j.contraception.2015.12.010.
 25. Callegari LS, Zhao X, Schwarz EB, Rosenfield E, Mor MK, Borrero S. Racial/ethnic differences in contraceptive preferences, beliefs, and self-efficacy among women veterans. *Am J Obstet Gynecol* 2017; 216(5):504.e1-504.e10. doi: 10.1016/j.ajog.2016.12.178.
 26. Farber SA. U.S. Scientists' Role in the Eugenics Movement (1907–1939): A Contemporary Biologist's Perspective. *Zebrafish* 2008; 5(4): 243–245.
 27. National Institutes of Health. Native Voices. Website: <https://www.nlm.nih.gov/nativevoices/timeline/543.html>. Accessed October 1, 2017.
 28. Volscho T. Racism and Disparities in Women's Use of the Depo-Provera Injection in the Contemporary USA. *Critical Sociology* 2011; 37(5): 673-688.
 29. Gold RB. Guarding Against Coercion While Ensuring Access: A Delicate Balance. *Guttmacher Policy Review* 2014; 17(3). Available Online: <https://www.guttmacher.org/gpr/2014/09/guarding-against-coercion-while-ensuring-access-delicate-balance>.
 30. MacDonald S, Hausmann LRM, Sileanu FE, Zhao X, Mor MK, Borrero S. Associations Between Perceived Race-based Discrimination and Contraceptive Use Among Women Veterans in the ECUUN Study. *Medical Care* 2017; 55(9): s43-s49.
 31. Thorburn Bird S, Bogart LM. Conspiracy Beliefs About HIV/AIDS and Birth Control Among African Americans: Implications for the Prevention of HIV, Other STIs, and Unintended Pregnancy. *Journal of Social Issues* 2005; 61(1):109--126
 32. Thorburn S, Bogart LM. Conspiracy Beliefs About Birth Control: Barriers to Pregnancy Prevention Among African Americans of Reproductive Age. *Health Education & Behavior* 2005; 474-487.
 33. Racial and ethnic disparities in obstetrics and gynecology. Committee Opinion No. 649. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2015;126:e130–4. Available at: <https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Health-Care-for-Underserved-Women/Racial-and-Ethnic-Disparities-in-Obstetrics-and-Gynecology>
 34. American College of Obstetrics and Gynecologists. Profile of Ob-Gyn Practice. 1991-2003. Available at: <https://www.acog.org/-/media/Departments/Practice/ProfileofOb-gynPractice1991-2003.pdf?dmc=1>

35. Rayburn WF, Xierali IM, Castillo-Page L, Nivet MA. Racial and Ethnic Differences Between Obstetrician-Gynecologists and Other Adult Medical Specialists. *Am J Obstet Gynecol* 2016; 127(1): 148-52. doi: 10.1097/AOG.0000000000001184.
36. Johnson Thornton RL, Powe NR, Roter D, Cooper LA. Patient-Physician Social Concordance, Medical Visit Communication and Patients' Perceptions of Health Care Quality. *Patient education and counseling* 2011;85(3):e201-e208. doi:10.1016/j.pec.2011.07.015.
37. Pear R, Ruiz R, Goodstein L. Trump Administration Rolls Back Birth Control Mandate. *The New York Times*. October 6, 2017. <https://www.nytimes.com/2017/10/06/us/politics/trump-contraception-birth-control.html>. Accessed May 22, 2018.
38. Rosenquist R. The ACA and Contraceptive Coverage. University of Pennsylvania Leonard Davis Institute of Health Economics. Available at: <https://ldi.upenn.edu/aca-and-contraceptive-coverage>. Published July 7, 2016. Accessed May 22, 2018.