ORIGINAL RESEARCH

Variations in Receipt of Contraceptives by Insurance Status and Race/Ethnicity

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BACKGROUND Although use of contraceptives has increased among young women in the United States, more than half of pregnancies remain unplanned. The goal of this study was to examine the association between insurance status and receipt of contraceptives among young women receiving care within a large integrated health care system in the Southeastern United States to better inform strategies for increasing access to contraception.

METHODS This retrospective study used electronic medical record data from an integrated health care system based in Charlotte, North Carolina. Data were analyzed for 51,900 women aged 18–29 who lived in Mecklenburg County and had at least 1 primary care visit between 2014 and 2016. Contraceptive orders were identified by service and procedure codes and grouped into long-acting reversible contraceptives (LARC) and non-LARC categories. Adjusted multinomial logistic regression models were used to assess the association between receipt of contraceptives and insurance status.

RESULTS Compared to non-Hispanic White women with commercial insurance, non-Hispanic Black (OR = 1.25; 95% CI, 1.13–1.38) and Hispanic (OR = 2.25; 95% CI, 1.93–2.61) women with Medicaid had higher odds of receiving LARC. Similar variations by insurance and race/ethnicity were observed for the non-LARC group.

LIMITATIONS Data were limited to a single health care system and did not capture contraceptive orders by unaffiliated providers. Analyses used the most frequent payor and did not account for changes in insurance status.

CONCLUSION Findings indicate an important role of race/ethnicity and insurance coverage in contraceptive care. Higher receipt of LARC among Black and Hispanic women also suggests that implicit biases may influence contraception counseling and promotion practices. Future study is warranted to further delineate these relationships.

Despite decreases in unintended pregnancies over the past decade, more than half of pregnancies among US women aged 18–29 are unplanned [1]. At 51%, the US unintended pregnancy rate is substantially higher than that of most European countries [2], with costs estimated at $21 billion in 2010 [3]. Unplanned pregnancies are associated with poorer outcomes including delayed or inadequate prenatal care, increased levels of stress and depression, and decreased rates of breastfeeding among mothers [4–6], and prematurity, low birth weight, and physical and mental health problems among children [1, 7]. Black and Hispanic women experience greater burden of unintended pregnancy than White women [1, 6, 8], for reasons that include lack of education about effective contraceptive methods [9], less access to family planning services [10, 11], distrust of the health care system stemming from historical injustices [9], cultural differences, and levels of acculturation [11, 12]. The burden of unintended pregnancy among younger women, especially women of color, is generally high in the United States. In North Carolina, 54% of all pregnancies and 70% of pregnancies among women under age 24 were considered unintended in 2015 [13]. Young women of reproductive age (15–34) make up 26.8% of the North Carolina population, with 24% being Black and 11% Hispanic [14]. Therefore, understanding the family planning needs of these women is an important and urgent public health need.

Long-acting reversible contraceptives (LARC), including intrauterine devices (IUDs) and subdermal hormonal implants, are an extremely effective contraception method associated with reducing unintended pregnancies with a failure rate of less than 1% [15]. However, cost as well as patient and provider knowledge and attitudes are key barriers to increased LARC use [16, 17]. While some insurance providers cover LARC, they still require an initial copay that can hinder access [18, 19]. For example, based on different insurance plans, the birth control shot (also known as Depo-Provera or the Depo shot) costs $0 to $150 every 3 months, which adds up to $600 per year; birth control pills cost $0 to $50 per month, also adding up to approximately $600 per year [20]. Although LARC lasts up to 12 years, up-front costs of up to $1300 may be required for insertion even with insurance [20]. The Affordable Care Act (ACA) aimed to eliminate these cost barriers by expanding contraceptive coverage starting in 2012. However, North Carolina has not yet adopted the Medicaid expansion provision of the ACA, creating a potential gap in access for women with low incomes. Ongoing examination of the role of insurance cov-

erage in use of LARC and other contraceptives is therefore useful for informing policies to improve access [17].

As part of a needs assessment to understand barriers to contraceptive use, this study examined the association between insurance status and receipt of contraceptives among young women aged 18–29 in Mecklenburg County, North Carolina. With approximately 1.1 million residents (54.5% non-Hispanic White, 31.3% Black/African American, 13.0% Hispanic, and 5.8% Asian), Mecklenburg is the second-most populous county in the state and one of the most diverse [21]. Approximately 15.0% of county residents are foreign-born, and 19.7% of residents speak a language other than English at home [22]. In 2018, 11.9% of Mecklenburg County residents did not have health insurance coverage, which is higher than the US average (9.4%), and 12.1% lived in poverty [21]. To our knowledge, no studies have used real-world data to investigate how insurance status influences contraceptive use including LARC among women from diverse racial/ethnic backgrounds. We aimed to identify opportunities to better inform strategies for increasing access to care.

Methods

Data Source

This retrospective study used electronic medical records from Atrium Health, a large integrated health care system based in Charlotte, North Carolina, which is the largest city in Mecklenburg County. Atrium Health has more than 900 care locations, including hospitals, urgent care centers, and a variety of medical practices across 3 states, and is one of 2 major health care providers in Mecklenburg County.

Data were extracted from the enterprise data warehouse (EDW), which includes clinical, demographic, and health care visit data from more than 1.5 million patients annually. Admission and discharge diagnoses, services, and procedures were captured using the International Classification of Diseases, Ninth and Tenth Revision, Clinical Modification (ICD-9-CM and ICD-10-CM), Current Procedural Terminology (CPT), and the Healthcare Common Procedure Coding System (HCPCS) codes. The study was reviewed and approved by the University of North Carolina at Charlotte Institutional Review Board.

Study Population

The study population included 93,013 women aged 18–29 who lived in Mecklenburg County during 2014–2016. A total of 923 women who had sterilization, tubal ligation, or hysterectomy prior to December 31, 2016, were excluded, as were 24,567 women who did not have at least 1 documented primary care visit (family medicine, internal medicine, obstetrics/gynecology, or pediatrics) during the study period. Patients were also excluded if they did not have a valid address (n = 13,298), became deceased during the study period (n = 52), or had any visits with LARC insertion during the 5-year wash-out period (2009–2013) (n = 2273). The final sample included 51,900 women (Figure 1).

FIGURE 1.
Patient Inclusion and Exclusion Criteria
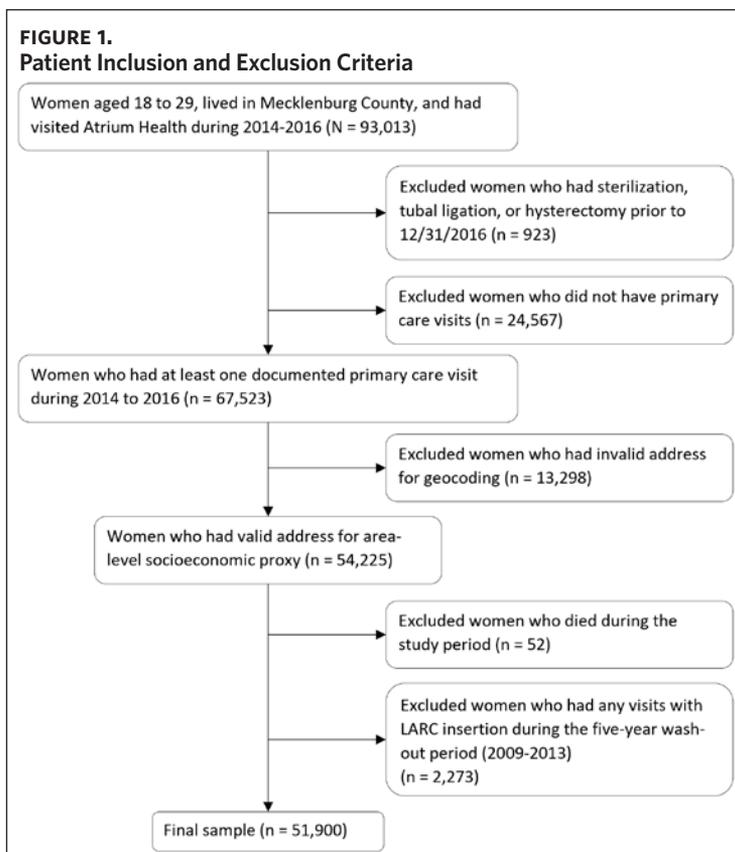
Measures

Contraceptives received in any setting within the health care system were classified as LARC (i.e., intrauterine devices [IUDs] and etonogestrel single-rod contraceptive implants) or non-LARC (i.e., contraceptive pills, injectable contraceptive, hormonal contraceptive ring, and hormonal transdermal patch) (Table 1). Women receiving both LARC and non-LARC during the study period were classified as LARC. Women receiving neither LARC nor non-LARC were classified as not receiving contraceptives requiring a clini-

TABLE 1.
ICD-9-CM, ICD-10-CM, CPT, and HCPCS Codes Used to Identify Contraceptive Methods

		Code	Description
LARC	ICD-9-CM	V25.11	Encounter for insertion of intrauterine contraceptive device
		V25.12	Encounter for removal of intrauterine contraceptive device
		V25.13	Encounter for removal and reinsertion of intrauterine contraceptive device
		V25.42	Surveillance of intrauterine contraceptive device
		V25.43	Surveillance of implantable subdermal contraceptive
		V25.5x	Insertion of implantable subdermal contraceptive
	ICD-10-CM	Z30.014	Encounter for initial prescription of intrauterine contraceptive device
		Z30.430	Encounter for insertion of intrauterine contraceptive device
		Z30.431	Encounter for routine checking of intrauterine contraceptive device
		Z30.432	Encounter for removal of intrauterine contraceptive device
		Z30.433	Encounter for removal and reinsertion of intrauterine contraceptive device
		Z97.5xx	Presence of (intrauterine) contraceptive device
	CPT	11981	Insertion, non-biodegradable drug delivery implant
		11982	Removal, non-biodegradable drug delivery implant
		11983	Removal with reinsertion, non-biodegradable drug delivery implant
		58300	Insertion of IUD
		58301	Removal of IUD
	HCPCS	J7297	Levonorgestrel-releasing intrauterine contraceptive system (Liletta®), 52 mg (4 year duration)
		J7298	Levonorgestrel-releasing intrauterine contraceptive system (Mirena®), 52 mg (5 year duration)
		J7300	Intrauterine copper contraceptive (Paragard®) (10 year duration)
		J7301	Levonorgestrel-releasing intrauterine contraceptive system (Skyla®), 13.5 mg (3 year duration)
		J7302	Levonorgestrel-releasing intrauterine contraceptive system, 52 mg
		J7307	Etonogestrel (contraceptive) implant system, including implant and supplies
Non-LARC	ICD-9-CM	V25.01	General counseling on prescription of oral contraceptives
		V25.02	General counseling on initiation of other contraceptive measures
		V25.03	Encounter for emergency contraceptive counseling and prescription
		V25.04	Counseling and instruction in natural family planning to avoid pregnancy
		V25.09	Other general counseling and advice on contraceptive management
		V25.3x	Menstrual extraction
		V25.40	Contraceptive surveillance, unspecified
		V25.41	Surveillance of contraceptive pill
		V25.49	Surveillance of other contraceptive method
	ICD-10-CM	Z30.011	Encounter for initial prescription of contraceptive pills
		Z30.012	Encounter for prescription of emergency contraception
		Z30.013	Encounter for initial prescription of injectable contraceptive
		Z30.015	Encounter for initial prescription of vaginal ring hormonal contraceptive
		Z30.016	Encounter for initial prescription of transdermal patch hormonal contraceptive device
		Z30.017	Encounter for initial prescription of implantable subdermal contraceptive
		Z30.018	Encounter for initial prescription of other contraceptives
		Z30.019	Encounter for initial prescription of other contraceptives, unspecified
		Z30.02x	Counseling and instruction in natural family planning to avoid pregnancy
		Z30.09x	Encounter for other general counseling and advice on contraception
		Z30.40x	Encounter for surveillance of contraceptives, unspecified
		Z30.41x	Encounter for surveillance of contraceptive pills
		Z30.42x	Encounter for surveillance of injectable contraceptive
		Z30.44x	Encounter for surveillance of vaginal ring hormonal contraceptive device
		Z30.45x	Encounter for surveillance of transdermal patch hormonal contraceptive device
		Z30.46x	Encounter for surveillance of implantable subdermal contraceptive
		Z30.49x	Encounter for surveillance of other contraceptives
		Z30.8xx	Encounter for other contraceptive management
		Z30.9xx	Encounter for contraceptive management, unspecified

Note. LARC, Long-acting reversible contraceptives; ICD-CM, International Statistical Classification Diseases, Clinical Modification; CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System; IUD, Intrauterine Device.

cian order. Data available for this study did not include any over-the-counter contraception methods. Insurance status was classified as commercial (including managed care), Medicaid (including those with Medicaid pending because these patients were expected to be covered by Medicaid), or self-pay and other (including self-pay, charity, indigent, Civilian Health and Medical Program of the Uniformed Services [CHAMPUS], occupational medicine, liabilities, workers' compensation, Medicare, internal accident, other [unspecified], and missing insurance status) based on the most frequent payor source used during the prior year. We combined both self-pay and other insurance as 1 group because the sample size for the standalone other group (2.7% of the sample) was small and more than a third of patients with other insurance (40%) could be classified as uninsured. Race/ethnicity was categorized as non-Hispanic White, non-Hispanic Black, Hispanic, or other. Marital status was dichotomized as married and unmarried. We used area-level socioeconomic factors, including median household income, poverty rate, bachelor's degree rate, and unemployment rate as proxy measures for socioeconomic status. Census data from the 2015 American Community Survey 5-year estimates were linked by census tract to patient records.

Statistical Analysis

Sample characteristics were reported as means or percentages as appropriate. Chi-square tests and generalized linear models were used for bivariate analyses. Multinomial logistic regression models were used to assess the association between contraceptive options and insurance status, adjusted for race/ethnicity, marital status, age, and area-level socioeconomic factors. Interactions between insur-

ance type and race/ethnicity were tested and included in the final model based on a significant interaction effect. Odds ratios (OR) and 95% confidence intervals (95% CIs) were reported. P-values < .05 were considered statistically significant. Analyses were conducted using SAS Version 9.4 (SAS Institute, Cary, NC).

Results

The average age among the study cohort was 23.6 years (SD = 3.5). More than half (65.0%) had commercial insurance and 15.5% had Medicaid. In addition, 80.4% were single, 45.8% were non-Hispanic White, and 32.2% were non-Hispanic Black (Table 2). Only 8.4% of women in our sample received a LARC during the study period, 16.1% received non-LARC, and 75.5% of patients did not receive any contraceptives. Women with Medicaid had more non-LARC prescriptions than LARC prescriptions. After stratifying by contraceptive group (LARC, non-LARC, no contraception), the non-LARC group included more non-Hispanic Black women than the LARC and no contraception groups (39.5%, 35.2%, and 30.3%, respectively); the LARC group included more Hispanics than the non-LARC and no contraception groups (16.4%, 15.0%, and 9.7% respectively). The group of patients who received no contraception during the study period included a higher percentage of non-Hispanic Whites than the other 2 groups.

In adjusted models examining the association between insurance status, race/ethnicity, and receipt of contraception without interaction terms, women with Medicaid had significantly higher odds of receiving any contraceptives (LARC and non-LARC) than women with commercial insurance (OR = 1.32; 95% CI, 1.25–1.40, P < .001 and OR = 1.18; 95% CI, 1.13–1.23, P < .001, respectively). In addition, women

TABLE 2.
Patient Demographics by Contraception Type

	Total (N = 51,900)	LARC (n = 4,364)	Non-LARC (n = 8,333)	No contraception (n = 39,203)	P-value
Insurance, n (%)					< .001
Managed Care/Commercial	33,716 (65.0)	2,557 (58.6)	4,665 (56.0)	26,494 (67.6)	
Medicaid/pending	8,040 (15.5)	958 (22.0)	1,871 (22.5)	5,211 (13.3)	
Self-pay and other[a]	10,144 (19.6)	849 (19.4)	1,797 (21.6)	7,498 (19.1)	
Age, mean (SD)	23.6 (3.5)	23.4 (3.3)	22.8 (3.5)	23.8 (3.5)	< .001
Race/Ethnicity, n (%)					< .001
Non-Hispanic White	23,752 (45.8)	1,797 (41.2)	3,183 (38.2)	18,772 (47.9)	
Non-Hispanic Black	16,693 (32.2)	1,536 (35.2)	3,290 (39.5)	11,867 (30.3)	
Hispanic	5,773 (11.1)	715 (16.4)	1,252 (15.0)	3,806 (9.7)	
Other	5,682 (10.9)	316 (7.2)	608 (7.3)	4,758 (12.1)	
Marital status, n (%)					< .001
Married	7,309 (14.1)	718 (16.5)	891 (10.7)	5,700 (14.5)	
Single	41,730 (80.4)	3,464 (79.4)	7,146 (85.8)	31,120 (79.4)	
Area-level socioeconomic status					
Median household income in thousands, mean (SD)	60.6 (29.2)	55.7 (27.2)	55.6 (28.2)	62.2 (29.5)	< .001
Percentage of patients with poverty, mean (SD)	17.3 (13.1)	19.3 (13.6)	19.7 (13.8)	16.5 (12.8)	< .001
Percentage of patients with bachelor's degree, mean (SD)	41.7 (21.7)	37.9 (21.4)	37.4 (21.9)	43.1 (21.5)	< .001
Unemployment rate, mean (SD)	6.7 (3.7)	7.3 (3.9)	7.3 (3.9)	6.5 (3.6)	< .001

[a]Self-pay and other insurance include self-pay, charity, indigent, and missing insurance status. Among the total population, about 16.7% had self-pay and 2.7% had other insurance.

with self-pay and other insurance had significantly lower odds of receiving LARC (OR = 0.84; 95% CI, 0.79-0.89, P < .001) than women with commercial insurance. Conversely, non-Hispanic Black women had significantly higher odds of receiving non-LARC (OR = 1.12; 95% CI, 1.08-1.17, P < .001) when compared to non-Hispanic White women, but we did not find the same association in LARC usage among non-Hispanic Black women. In addition, Hispanic women had significantly higher odds of receiving both LARC and non-LARC than non-Hispanic White women (OR = 1.58; 95% CI, 1.47-1.71, P < .001 and OR = 1.39; 95% CI, 1.32-1.48, P < .001, respectively) (Supplementary Table 1).

After taking interactions between insurance status and race/ethnicity into consideration, variations in the association between insurance status and contraceptives by race/ethnicity remained. Compared to non-Hispanic White women with commercial insurance, odds of receiving LARC were higher for Hispanic women with commercial insurance (OR = 1.22; 95% CI, 1.04-1.42, P = .013), non-Hispanic Black (OR = 1.25; 95% CI, 1.13-1.38, P < .001) and Hispanic women with Medicaid (OR = 2.25; 95% CI, 1.93-2.61, P < .001), and for Hispanic women with self-pay or other coverage (OR = 1.38; 95% CI, 1.22-1.55, P < .001). Non-Hispanic White women with self-pay or other coverage had significantly lower odds of LARC than non-Hispanic White women with commercial insurance (OR = 0.70; 95% CI, 0.60-0.82, P < .001) (Figure 2a). Odds of receiving non-LARC were significantly higher for non-Hispanic Black (OR = 1.57; 95% CI, 1.46-1.69, P < .001) and Hispanic women on Medicaid (OR = 1.27; 95% CI, 1.10-1.46, P = .001) or self-pay/other insurance (OR = 1.80; 95% CI, 1.65-1.97, P < .001) than for non-Hispanic White women with commercial insurance (Figure 2b). Non-Hispanic White women with self-pay or other coverage were less likely to receive both LARC and non-LARC than non-Hispanic White women with commer-

cial insurance (OR= 0.70; 95% CI, 0.60-0.82, P < .001 and OR = 0.71; 95% CI, 0.63-0.80, P < .001, respectively). Older age and being married were both associated with higher odds of receiving contraceptives (Supplementary Table 2).

Discussion

Our primary finding was that insurance is associated with receipt of contraceptives among young women aged 18–29 and that this relationship varies by race/ethnicity. Specifically, non-Hispanic Black and Hispanic women with Medicaid had higher odds of receiving contraceptives, either LARC or non-LARC, compared to non-Hispanic White women with commercial insurance. In addition, Hispanic women with commercial or other insurance also had significantly higher odds of receiving LARC, compared to non-Hispanic White women with commercial insurance.
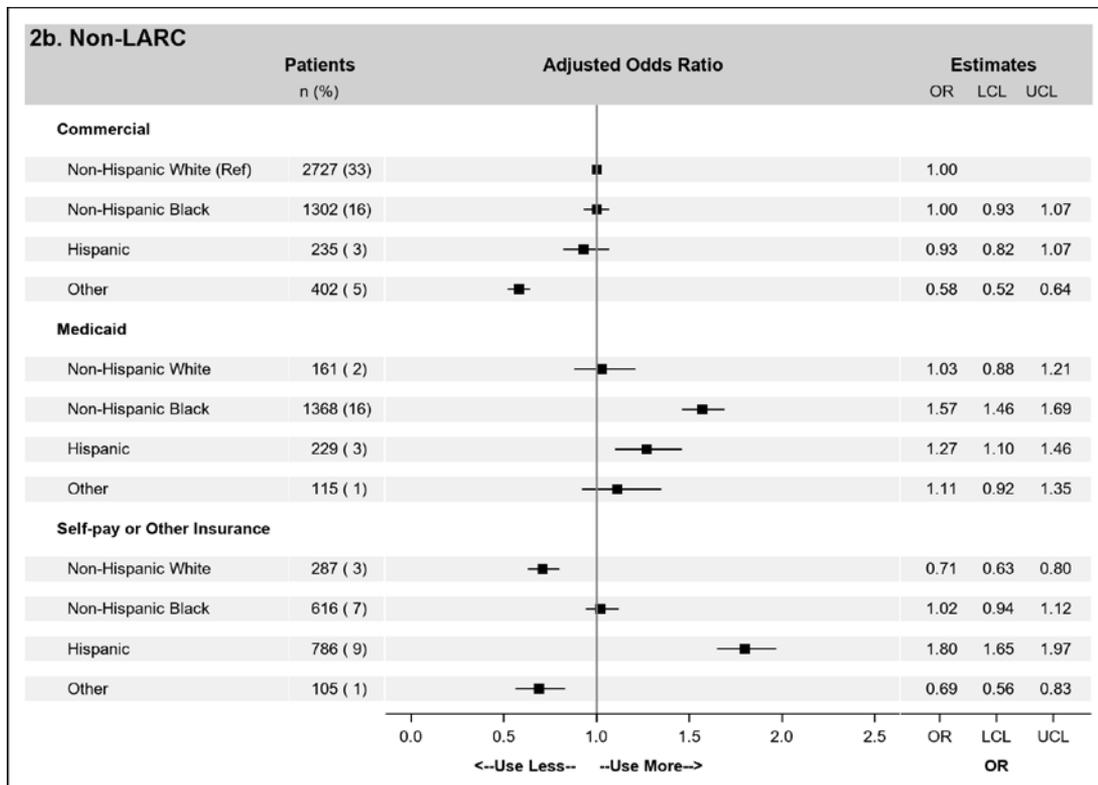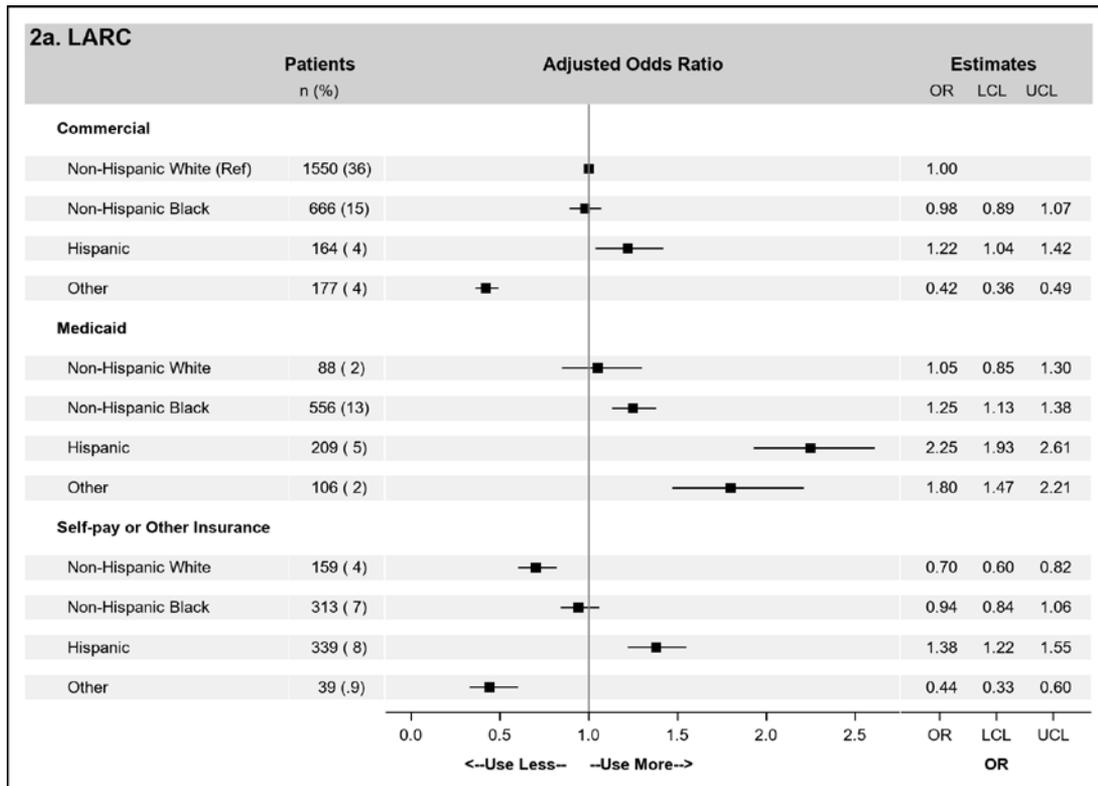
At 8.4%, the percent of women receiving LARC in our sample was lower than in the 2011–2015 pooled National Survey of Family Growth (NSFG), which reported 9.5% [23]. This is notable given that we included only women who had at least 1 primary care visit during the study period, reflecting active engagement with the health care system. Compared to the sample in the 2011–2015 NSFG, our sample had a higher percentage of women with commercial insurance and a lower percentage of women with either Medicaid or other insurance [23]. High out-of-pocket cost is a well-known barrier to LARC use [12, 19, 24]. Broecker and coauthors found that patients were 22% less likely to choose LARC for each $100 increase in out-of-pocket cost [17]. In North Carolina, the Medicaid Family Planning Program (BE SMART) covers LARC and other contraceptives without any copayments for eligible men and women with incomes less than or equal to 195% of the federal poverty level [25]. North Carolina Medicaid also began covering inpatient postpartum LARC insertion beginning in 2018. For women with

SUPPLEMENTARY TABLE 1.
Multinomial Logistic Regression on Contraception Use

	LARC OR	95%CI		P	Non-LARC OR	95%CI		P
Insurance								
Commercial	1.00	--	--	--	1.00	--	--	--
Medicaid	1.32	1.25	1.40	< .001	1.18	1.13	1.23	< .001
Self-pay and other	0.84	0.79	0.89	< .001	1.02	0.98	1.06	.319
Race/Ethnicity								
Non-Hispanic White	1.00	--	--	--	1.00	--	--	--
Non-Hispanic Black	1.03	0.97	1.09	.332	1.12	1.08	1.17	< .001
Hispanic	1.58	1.47	1.71	< .001	1.39	1.32	1.48	< .001
Other	0.61	0.56	0.67	< .001	0.68	0.63	0.72	< .001
Age	0.97	0.96	0.98	< .001	0.94	0.93	0.94	< .001
Marital status	1.43	1.30	1.57	< .001	1.02	0.94	1.10	.608
Area-level socioeconomic status								
Median household income in thousands	1.00	0.99	1.00	.002	1.00	1.00	1.00	.129
Percentage of patients with poverty	1.00	1.00	1.01	.366	1.01	1.00	1.01	< .001
Percentage of patients with bachelor's degree	1.00	1.00	1.00	.618	1.00	0.99	1.00	.005
Unemployment rate	1.02	1.00	1.03	.012	1.00	0.99	1.01	.758

Note. No contraception, ORs show the odds of using LRAC/Non-LARC for difference insurances. Other controlled variables: age, race/ethnicity, and area-level proxy including median household income, percentage of patients with poverty, percentage of patients with bachelor's degree, and unemployment rate.

FIGURE 2.
Multinomial Logistic Regression Estimating the Odds of Contraception Use

2a. LARC

	Patients n (%)	Adjusted Odds Ratio	OR	LCL	UCL
Commercial					
Non-Hispanic White (Ref)	1550 (36)		1.00		
Non-Hispanic Black	666 (15)		0.98	0.89	1.07
Hispanic	164 (4)		1.22	1.04	1.42
Other	177 (4)		0.42	0.36	0.49
Medicaid					
Non-Hispanic White	88 (2)		1.05	0.85	1.30
Non-Hispanic Black	556 (13)		1.25	1.13	1.38
Hispanic	209 (5)		2.25	1.93	2.61
Other	106 (2)		1.80	1.47	2.21
Self-pay or Other Insurance					
Non-Hispanic White	159 (4)		0.70	0.60	0.82
Non-Hispanic Black	313 (7)		0.94	0.84	1.06
Hispanic	339 (8)		1.38	1.22	1.55
Other	39 (.9)		0.44	0.33	0.60

Axis: 0.0 0.5 1.0 1.5 2.0 2.5 — OR LCL UCL
<--Use Less-- --Use More--> OR

2b. Non-LARC

	Patients n (%)	Adjusted Odds Ratio	OR	LCL	UCL
Commercial					
Non-Hispanic White (Ref)	2727 (33)		1.00		
Non-Hispanic Black	1302 (16)		1.00	0.93	1.07
Hispanic	235 (3)		0.93	0.82	1.07
Other	402 (5)		0.58	0.52	0.64
Medicaid					
Non-Hispanic White	161 (2)		1.03	0.88	1.21
Non-Hispanic Black	1368 (16)		1.57	1.46	1.69
Hispanic	229 (3)		1.27	1.10	1.46
Other	115 (1)		1.11	0.92	1.35
Self-pay or Other Insurance					
Non-Hispanic White	287 (3)		0.71	0.63	0.80
Non-Hispanic Black	616 (7)		1.02	0.94	1.12
Hispanic	786 (9)		1.80	1.65	1.97
Other	105 (1)		0.69	0.56	0.83

Axis: 0.0 0.5 1.0 1.5 2.0 2.5 — OR LCL UCL
<--Use Less-- --Use More--> OR

Note. No contraception, ORs show the odds of using LARC/Non-LARC for difference insurances and race/ethnicity groups compared to the non-Hispanic White women with commercial insurance. Models were adjusted for age and area-level socioeconomic proxy including median household income, percentage of patients with poverty, percentage of patients with bachelor's degree, and unemployment rate.

SUPPLEMENTARY TABLE 2.
Multinomial Logistic Regression on Contraception Use

	LARC OR	95%CI	P-value	Non-LARC OR	95%CI	P-value
Insurance/Race						
Commercial/non-Hispanic White	--	--	--	--	--	--
Commercial/non-Hispanic Black	0.97	(0.93-1.02)	.575	1.00	(0.96-1.03)	.887
Commercial/Hispanic	1.19	(1.10-1.29)	.030	0.93	(0.87-0.99)	.279
Commercial/Other race	0.43	(0.40-0.46)	< .001	0.58	(0.55-0.61)	< .001
Medicaid/non-Hispanic White	1.05	(0.95-1.17)	.636	1.02	(0.94-1.10)	0.835
Medicaid/non-Hispanic Black	1.25	(1.19-1.32)	< .001	1.57	(1.52-1.63)	< .001
Medicaid/Hispanic	2.23	(2.07-2.41)	< .001	1.26	(1.17-1.36)	.001
Medicaid/Other race	1.78	(1.61-1.97)	< .001	1.13	(1.02-1.25)	.215
Self-pay and Other insurance/non-Hispanic White	0.70	(0.65-0.76)	< .001	0.71	(0.66-0.75)	< .001
Self-pay and Other insurance/non-Hispanic Black	0.94	(0.89-1.00)	.346	1.02	(0.98-1.07)	.646
Self-pay and Other insurance/Hispanic	1.38	(1.30-1.47)	< .001	1.80	(1.72-1.88)	< .001
Self-pay and Other insurance/Other race	0.45	(0.38-0.52)	< .001	0.70	(0.63-0.77)	< .001
Age	0.97	(0.96-0.97)	< 0.001	0.93	(0.93-0.94)	< .001
Married	1.44	(1.38-1.51)	< 0.001	0.99	(0.95-1.03)	.834
Area-level socioeconomic status						
Median household income in thousands	1.00	(0.99-1.00)	0.001	1.00	(1.00-1.00)	.023
Percentage of patients with poverty	1.00	(1.00-1.00)	0.392	1.01	(1.00-1.01)	< .001
Percentage of patients with bachelor's degree	1.00	(1.00-1.00)	0.906	1.00	(1.00-1.00)	.053
Unemployment rate	1.02	(1.01-1.02)	0.009	1.00	(0.99-1.00)	.908

Note. No contraception, ORs show the odds of using LRAC/Non-LARC for difference insurances and race/ethnicity groups compared to the non-Hispanic White women with commercial insurance. Other controlled variables: age and area-level proxy including median household income, percentage of patients with poverty, percentage of patients with bachelor's degree, and unemployment rate.

other types of coverage, including those with commercial insurance and the uninsured, cost may continue to be a barrier to LARC use.

Our findings also indicate that use of different contraceptive methods varies by racial/ethnic group. While non-Hispanic Black women with Medicaid were more likely to receive LARC and non-LARC than no contraception when compared to non-Hispanic White women with commercial insurance, the percent of young Black women receiving either contraceptive type in our sample was less than 30%. Efforts to increase contraceptive use in this population need to address historical injustices that contribute to mistrust of health care professionals. Between 1929 and 1974, the North Carolina Eugenics Board authorized the forcible sterilization of over 7000 citizens, mostly in Mecklenburg County [26, 27]. The board gave the power to social workers who threatened poor Black women by withholding welfare benefits if they did not comply [27]. During this period many teenagers were put under sterilization surgery without formal consent from their legal guardians [26]. Although the Eugenics Board was disbanded in 1974, perspectives regarding contraception as a means of government population control remain [9]. Building trust between providers and patients, increasing women's autonomy in contraceptive choice, and shared decision-making are all needed and under-studied, especially among Black women and women with low incomes.

Hispanic women in our sample across all insurance statuses had significantly higher odds of receiving LARC when compared to non-Hispanic White women with commercial insurance. Mecklenburg County, where the women in our sample resided, is a relatively new Latino immigrant gateway, where immigrants have moved into older suburbs and neighborhoods with a high percent of Latinos due to a booming economy and large number of jobs [28, 29]. Coffman and colleagues estimated that fewer Latino adults in Mecklenburg County had health insurance than reported in the US Census due to undercounts of immigrant and undocumented residents [30]. Lack of insurance coverage has been shown to influence use of prescription contraceptives in studies involving national samples and among Hispanic women [23]. However, 1 recent national study found that Hispanic women aged 18–45 with insurance coverage were not more likely to use prescription contraceptives during the period following the ACA when compared to those without insurance [31]. A national survey of 897 female respondents aged 20–29 found that, among Hispanic women, foreign-born individuals had lower awareness of contraceptives—including the IUD and vaginal ring—compared to their United States-born peers [32]. These data also showed that Hispanic women knew less about available contraceptive methods and side effects than White women. More acculturated immigrants tend to have earlier sexual debut and increased use of contraception [33, 34], while less-acculturated women may choose not to use LARC because of social stigma [12], less access to health care [10, 11], or distrust of the health care system [24]. With limited access to health care, foreign-born and less acculturated Hispanic women may have fewer opportunities to improve their knowledge of available contraception options and to cover the associated costs.

Provider bias may also play a role in how patients receive contraceptives. Researchers have reported that, without proper training, providers are uncomfortable talking about contraceptives with their patients and that some are unwilling to educate their patients about LARC because of the increased time required [19]. A study using national data from women aged 18–44 found no differences among racial/ethnic groups in terms of overall use of family planning services [35]. However, the study also found that Hispanic and Black women were more likely than White women to receive counseling for birth control and Hispanic women were more likely than White women to be counseled for sterilization [35]. On the other hand, Higgins and colleagues found that women, mostly White respondents, considered providers to be a trusted source of contraceptives and LARC [36]. However, several women in their study expressed that their preferences regarding contraceptive selection or removal were undervalued by their providers, especially when the conversation may lead to LARC removal. In addition, many participants, including all races, believed that providers tend to recommend LARC to "women of color, poor women, and women deemed uneducated or unintelligent by providers" [36]. Although studies have found mixed results regarding whether including training during residency helps with overall IUD insertion [37, 38], continuing education for physicians was found to be a strong predictor of LARC insertion [39]. Efforts to improve contraceptive rates need to a) consider ways to address cost, especially for postpartum LARC; b) create strategies to reduce physician bias [40] and misconceptions regarding promoting LARC; and c) provide culturally tailored patient education.

This study is the first to use real-world data to examine factors associated with contraceptive use in North Carolina. In addition, this study provides a unique opportunity to study how young women with different insurance status and racial/ethnic backgrounds use contraceptives. Yet, our approach is not without limitations. First, our data only captured prescription contraceptives ordered by a physician. Other nonprescription methods, such as condoms or vaginal contraceptive film, were not captured. Therefore, our results may underestimate the use of non-LARC contraceptives. Second, the data used in this study did not include information on potential confounding variables including parity, religion, level of acculturation, and socioeconomic status. We addressed the lack of individual data on socioeconomic status by including 4 area-level measures as proxies. Third, misclassification of insurance status is possible because of changes in insurance over the study period that are not reflected in our measure based on the most frequent payor type. However, we expect that misclassification would be nondifferential between groups of women studied. Fourth, although we excluded about one-fourth of the population due to lack of PCP visits and invalid addresses, patients who were excluded did not differ from the study sample with respect to age or race/ethnicity. Lastly, data were from a single health care system in the Southeastern United States and may not be generalizable to other regions.

Conclusion

In summary, insurance is associated with receipt of contraceptives among young women aged 18–29 and this relationship varies by race/ethnicity. Efforts to reduce unplanned pregnancy should consider the unique needs of women and cultural differences that may influence the choice of contraceptives. With the expansion of postpartum LARC reimbursement in North Carolina, these cultural factors are likely to play a more important role than insurance status for women who are already engaged with the health care system. Future studies should examine strategies for improving prescription contraceptive education for both young women and physicians, reduce provider bias in contraception promotion, and reduce cost barriers to LARC access for women without Medicaid. NCMJ

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