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Dual method contraceptive use among long-acting reversible contraceptive users

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Abstract

Objective: To compare rates of dual method use (concurrent use of condoms and an effective method of contraception) in long acting reversible contraception (LARC) and non-LARC hormonal contraceptive users, and to determine factors associated with dual method use.

Methods: We conducted a secondary analysis of the Contraceptive CHOICE Project, an observational, prospective cohort study of 9256 women in St. Louis, Missouri. Our sample included 6744 women who initiated a contraceptive method within 3 months of enrollment, continued use at 6 months post-enrollment, and responded regarding dual method use. Our primary outcome was the rate of dual method use among LARC users at 6 months post-enrollment.

Results: Dual method use was reported by 32% of LARC and 45% of non-LARC hormonal contraceptive users ($p < 0.01$). After adjusting for other covariates and comparing to non-LARC hormonal contraceptive users, LARC users were less likely to report dual method use (RR_{adj} 0.76, 95% CI 0.70–0.83). Factors associated with dual method use in our multivariable analysis were age <25 years, black race, lower education, single relationship status, baseline dual method use, baseline diagnosis of sexually transmitted infection (STI), greater partner willingness to use a condom, and higher condom self-efficacy score.

Conclusions: LARC users are less likely to report dual method use compared to non-LARC hormonal contraceptive users, but other factors also impact dual method use. Further studies should be performed to determine whether this lower dual method use increases the risk of STI.

Keywords

Dual method use; LARC; condom use; sexually transmitted infections; unintended pregnancy

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Introduction

Unintended pregnancy and sexually transmitted infections (STIs) are both persistent public health problems that greatly affect women's reproductive health. Use of the most effective methods of reversible contraception, intrauterine devices (IUDs) and contraceptive implants, termed long-acting reversible contraception (LARC), has been shown to decrease the risk of unintended pregnancy.[1] In fact, teen pregnancy rates in the United States have drastically declined over the past 20 years, and the recent decline is largely attributed to increased use of LARC in this population.[2, 3] However, non-barrier contraceptive methods do not protect against STIs and recent data from the Centers for Disease Control (CDC) show that STI rates, specifically gonorrhea, chlamydia, and syphilis, are increasing for the first time since 2006.[4] Young people aged between 15 and 24 account for the highest rates of gonorrhea and chlamydia.[4] Consistent condom use has been shown to reduce the risk of STIs, pelvic inflammatory disease (PID), and its sequelae, including chronic pelvic pain and infertility.[5] A potential solution to prevent both STIs and unintended pregnancy is dual method use: the concurrent use of condoms in addition to the use of a more effective primary method of contraception.

Some have advocated that the promotion of dual method use instead of a condom-only approach may inadvertently decrease condom use and therefore increase the risk of STI acquisition. This concern is largely based on the premise that women at risk for STIs who use non-barrier contraception are less likely to concurrently use condoms.[6] However, there is insufficient evidence to determine whether this is true. As the use of LARC has increased among adolescents, it is important to understand how the use of LARC might affect dual method use and, in turn, the rate of STIs. Our objective was to assess whether participants in the Contraceptive CHOICE Project who utilized LARC methods were less likely to report dual method use, compared to women using non-LARC hormonal contraceptive methods. Our secondary aim was to identify factors other than primary contraceptive method that are associated with dual method use among this population. Based on previous data, our hypothesis was that LARC users would have lower rates of dual method use compared to non-LARC hormonal contraceptive users, but that there would also be other factors which impact dual method use.

Materials and Methods

We performed a secondary analysis of the Contraceptive CHOICE Project database, an observational cohort study of 9,256 women. A detailed description of the Contraceptive CHOICE Project methods was reported previously.[7] The primary goal of the CHOICE Project was to educate a large number of women in the St. Louis region regarding the superior effectiveness of the intrauterine device (IUD) and subdermal contraceptive implant. In the CHOICE Project, comprehensive contraceptive education was provided, and access and financial barriers to contraceptive methods were removed. The three LARC methods used in the CHOICE Project were the 52-mg levonorgestrel intrauterine system (LNG-IUS), copper IUD, and subdermal etonogestrel implant. Participants were given the option to choose any U.S. Food and Drug Administration-approved contraceptive method and switch methods at any time during their participation in the study. The Human Research Protection

Office at Washington University School of Medicine approved the Contraceptive CHOICE Project protocol before participant recruitment began.

The Contraceptive CHOICE Project study population was a convenience sample of women in the St. Louis region recruited between August 2007 and September 2011 from word of mouth, referral from medical providers, newspaper advertisements, and study flyers. Recruitment sites included a university-affiliated clinic, two abortion facilities, and community clinics in our region. Interested women who met the following inclusion criteria were eligible: 1) age 14–45 years, 2) English- or Spanish-speaking, 3) heterosexual activity in the past 6 months, or anticipated activity in the next 6 months, 4) desire to avoid pregnancy in the next year, and 5) willing to try a new reversible contraceptive method. All potential participants were read a standardized counseling script regarding LARC methods, and those who enrolled received additional contraceptive counseling. The counseling session included a standardized review of all available reversible contraceptive methods in order of effectiveness, including common side effects and risks and benefits of each method, as well as a standardized discussion and demonstration of the use of condoms for the prevention of STIs which was provided regardless of method choice.[8]

Participants completed a comprehensive baseline interview, were screened for STIs, and provided no-cost, reversible contraception for 2–3 years (depending on the date of enrollment). Participants were followed with structured telephone interviews at 3 and 6 months, and every 6 months for the duration of participation, and received a \$10 gift card for every completed follow-up survey. Method continuation was assessed at each follow-up telephone survey. We defined method continuation as continuous use of the baseline method at each survey time point without a period of discontinuation greater than 1 month in duration. The rate of follow-up in CHOICE was 97% at 6 months.

This analysis focused on reported dual method use among participants choosing LARC methods, compared to those choosing other, non-LARC hormonal contraceptive methods. We excluded participants who used no method, withdrawal, natural family planning methods, or condoms alone as their primary method of contraception. Participants selected for this analysis met the following additional criteria: 1) received and initiated their chosen method of contraception by 3 months post-enrollment and 2) continued using that method at 6 months post-enrollment. The rationale for these criteria was to allow time to evaluate for potential behavior change in condom use when a new method of contraception was initiated.

At baseline and 6-months post-enrollment, participants were asked questions regarding their contraceptive and condom use during the past 6 months. Dual method use was determined by asking participants the following survey question: *‘Some women and their partners choose to use two methods of contraception to be extra safe or to prevent pregnancy and STDs [sexually transmitted diseases]. Are you using two methods of contraception at the same time? By same time, I mean you use both methods every time or almost every time you have sex.’* This was followed by the question: *‘What are the two methods?’* Participants were considered to be dual method users if they used condoms in addition to another primary method of contraception. Primary methods of contraception included intrauterine devices, subdermal contraceptive implants, injectable contraception (depot

medroxyprogesterone acetate, DMPA), oral contraceptive pills (OCPs), or the contraceptive patch or ring. Condom use self-efficacy questions were based on the 5-item version of the Confidence in Safer Sex scale measuring a participant's confidence in their ability to negotiate condom use with their sexual partner.[9] Scores on each of the five condom use self-efficacy questions were summed for each participant (range 5–25), with higher scores reflecting higher condom use self-efficacy. Based on their summed scores, participants were stratified by a total score of <20 vs. ≥20. The cut-off for this score is based on a prior publication showing that score <20 is associated with an increased number of acts of unprotected intercourse.[10]

To describe the baseline demographic characteristics, we used means and standard deviations for continuous variables and frequencies and percentages for categorical variables. We used chi-square tests to compare these characteristics between LARC and non-LARC hormonal contraceptive users. We also compared characteristics between dual method users and non-dual method users, stratified by LARC or non-LARC hormonal contraceptive use. The variables significantly associated with dual method use were further evaluated for potential confounding and effect modification with primary contraceptive method used. Confounding was defined if there was more than 10% change in the effect size when the variable of interest was included in the model together with the variable of primary contraceptive method compared to the effect size of the univariable model with only the variable of primary contraceptive method. Effect modification was evaluated by including an interaction term between the variable of interest and the contraceptive method in the model. All the significant variables were included in a multivariable model to further select the independent factors associated with dual method use using stepwise backward selection technique. Additional multivariable models were performed to identify unique independent factors associated with dual method use among LARC users and, separately, among non-LARC users.

In order to ensure sufficient power to detect our primary outcome, we performed a sample size calculation. Based on prior studies[11] we assumed that 25% of non-LARC users would report dual method use, and that a 50% difference in dual method use among LARC users compared to non-LARC users would be clinically significant. Using 90% power to detect this difference, and given an alpha (type I) error rate of 0.05, our calculated total sample size is 614. Analyses were performed using Stata 14 (College Station, TX) and all the tests were two-sided with significance level at 0.05.

Results

Of the 9,256 adolescents and women enrolled in the Contraceptive CHOICE Project, 6,744 participants initiated their chosen reversible contraceptive method within 3 months of enrollment, continued using that method at 6 months post-enrollment, and responded to questions about dual method use. Of these 6,744 participants included in this analysis, 60% (4050) initiated an IUD, 18% (1220) an implant, 8% (560) OCPs, 6% (419) DMPA, 6% (411) the contraceptive ring, and 1% (84) the contraceptive patch. Our study sample was a diverse representation of reproductive-aged women with approximately half being less than 25 years old, nulliparous, and black. Table 1 describes the baseline characteristics of study

participants, stratified by LARC vs. non-LARC hormonal contraceptive users. LARC users were more likely to be older, multiparous, Hispanic, have high school or less education, be married or living with a partner, have private insurance, have at least one previous unintended pregnancy and abortion, and have a history of a STI.

Overall, 35% of women reported dual method use at 6 months post-enrollment. When stratified by primary contraceptive method used, 32% of LARC users compared with 45% of non-LARC hormonal contraceptive users reported dual method use ($p < 0.01$). Dual method use was reported by 30% of IUD users, 37% of implant users, 51% of DMPA users, 44% of OCP users, 40% of patch users, and 39% of ring users. Chi-square tests comparing the distribution of factors between dual method and non-dual method users, stratified by LARC or non-LARC hormonal contraceptive use, showed that multiple demographic and clinical characteristics were significantly associated with method use (Table 2). Among both LARC and non-LARC hormonal contraceptive users, dual method users were more likely to be <25 years old, black, have lower educational attainment, single/never married, nulliparous, have an STI at baseline, and to be using either condoms alone or dual method protection at baseline. Dual method users in both groups were more likely to have a partner who was at least somewhat willing to use a condom, have higher condom self-efficacy scores, and less likely to have experienced violence/abuse. There were a few differences between LARC and non-LARC dual method users. Hispanic LARC users were less likely to utilize dual method protection, while there was no difference in dual method use by Hispanic ethnicity among non-LARC hormonal contraceptive users. Among LARC users, women with private or public insurance vs. no insurance were less likely to be dual method users, while there was no difference in dual method use among non-LARC hormonal contraceptive users by insurance status. LARC users with a history of an STI were more likely to utilize dual method protection, while non-LARC hormonal contraceptive users with a history of STI were not more likely to utilize dual method protection. This difference continued to be significant in final modeling (Tables 3 and 4).

In multivariable analysis, after adjusting for other covariates and comparing to non-LARC hormonal contraceptive users, we found that LARC users were still less likely to report dual method use (IUD users RR_{adj} 0.74, 95% CI 0.65–0.84 and implant users RR_{adj} 0.71, 95% CI 0.61–0.83; see Table 3). Age <25 years, black race, single relationship status, and high school or less education were significantly associated with dual method use. Women who reported dual method use at baseline, women whose partners were somewhat or extremely willing to use a condom and those with condom self-efficacy score ≥ 20 were also more likely to report dual method use. We also performed separate multivariable analyses to determine factors related to dual method use among LARC users (Table 4) and non-LARC hormonal contraceptive users (Table 5). The results were similar to the overall modeling and similar factors were related to dual method use between both LARC and non-LARC hormonal contraceptive users. However, among non-LARC hormonal contraceptive users, women who reported current substance use were less likely to utilize dual method protection, while among LARC users, women with a history of STI and an STI at baseline were more likely to utilize dual method protection.

Discussion

We found an overall dual method use rate of 35% in this CHOICE cohort, with 32% of LARC users and 45% of non-LARC users reporting dual method use. Even after controlling for other sociodemographic characteristics, we found that LARC users were less likely than non-LARC users to report dual method use. We also found that multiple factors other than primary contraceptive method are significantly associated with dual method use.

In both LARC and non-LARC users, our reported rate of dual method use is higher than the previously reported rates of 7–24%. [11, 12, 13] Our finding of a small, but statistically significantly lower dual method use rate among LARC users compared to non-LARC users is consistent with some prior studies, but is a more modest estimated difference compared with studies based on National Survey of Family Growth (NSFG) (overall LARC RR_{adj} 0.76 in this analysis compared to OR_{adj} 0.3 in the NSFG data). [11, 14] However, while the NSFG cohort may be more generalizable to the U.S. population, it is not as contemporary as our sample and included a much smaller proportion of LARC users.

Another analysis of a cohort of CHOICE participants revealed that women using LARC were less likely to use a condom every time with every partner (5.2% vs. 11.3% in non-LARC users), but that the condom use patterns did not change over the year after initiating a LARC method. [15] Similarly, a recent randomized controlled trial evaluating the effect of initiation a contraceptive implant on condom use did not find any difference in condom use before compared to after implant insertion, or when comparing women who received immediate vs. delayed implant insertion. [16] These findings suggest that it may not be initiation of the LARC method itself that impacts condom use, but that other factors related to LARC use may also impact condom use.

Consistent with prior studies, we found that regardless of primary contraceptive method, young age, black race, and being single are significantly positively correlated with dual method use. [11, 14, 17] Given that these factors are also correlated with higher risk of STIs [4], condom use among these women may reflect a higher perceived STI risk, as has previously been reported in adolescents. [18, 19] Similarly in our multivariable analysis of LARC users, women with a history of STI and STI at baseline were more likely to utilize dual method protection. The finding that those with higher actual and perceived risk of STIs are engaging in dual method use is encouraging. This points to the fact that while our findings suggest that LARC users are less likely to report dual method use, it is unclear whether this results in an actual increase in STI acquisition compared to non-dual method users. Another analysis of a cohort of CHOICE participants revealed that LARC users did have higher rates of STI (3.9% vs. 2.0% in non-LARC users), but this was not attributable to a decrease in condom use after LARC initiation. [15] One previous study suggested that lower condom use among implant users compared to pill users did not confer a greater risk of STIs due to more stable sexual relationships among implant users. [20] Conversely, another study evaluating high school adolescents found that LARC users were 60% less likely to use condoms, and also more likely to have a greater number of sexual partners, putting them at increased risk for STIs. [21] As the authors point out, providers might have

preferentially recommended LARC to more sexually active adolescents, given their higher risk for unintended pregnancy.

Similar to prior studies, we found that higher condom self-efficacy and greater partner willingness to use a condom are positively correlated with dual method use. [12, 17] This indicates the importance of the role of the male partner and the relationship dyad in condom negotiation and ultimately condom use. In the all-too-common situation in which a woman cannot negotiate condom use, an emphasis on a condom-only approach may leave her unprotected from both STI and unintended pregnancy. This points to the need for further understanding of these dynamics and to design intervention programs to improve condom use self-efficacy and male partner willingness to use a condom.

We believe that this evidence reinforces the argument for emphasizing dual method use as opposed to condom-only use. Improved access to LARC has been shown to be an important way to reduce the risk of unintended pregnancy and our findings support the fact that LARC use is not the primary determinant of dual method use behavior. Thus, limiting LARC access to focus on condom-only use would not likely reduce the risk of STI but would increase the risk of unintended pregnancy.

The strengths of our analysis are the large, prospective cohort nature of the study and the higher rate of LARC use compared to previous studies. This allows for greater statistical power and fairly precise effect estimates of dual method use in LARC users. One weakness of our secondary analysis is that dual method use is measured by participant report only, and may be subject to recall and social desirability biases as well as differential misclassification of condom use. Additionally, the difference in wording of questions regarding dual method use is a key limitation across this area of research which would benefit from standardization to compare both within and among studies.

One study found that only half of participants who reported dual method use also reported using a condom during all prior episodes of intercourse with their current partner [12] and a previous analysis of the CHOICE cohort showed that up to 40% of women who reported using condoms used them inconsistently and/or incorrectly. [10] Therefore, an emphasis by providers on correct and consistent use of condoms, along with a highly effective contraceptive method, is important to improve effective dual method use.

Conclusions

LARC users may be less likely to use condoms in addition to their primary contraceptive method, but many factors other than primary contraceptive method contribute to dual method use behavior. The clinical significance of lower dual method use among LARC users in relation to STI acquisition is still unclear. However, a condom-only approach is unlikely to be superior in overall prevention of both unintended pregnancy and STIs. Emphasis on dual method use should be an important part of comprehensive sexual and reproductive health counseling, especially for women at highest risk for STI acquisition.

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Table 1.

Characteristics of study participants who responded to dual method use questions at 6 months, according to contraceptive method chosen at baseline and continued through 6 months

Characteristic	LARC users (N=5270)		Non-LARC hormonal contraceptive users (N=1474)		P value*
	N	%	N	%	
Age (mean)	25.6	6.0	24.2	5.2	<0.01
Age category					<0.01
<25	2634	50.0	902	61.2	
≥25	2636	50.0	572	38.8	
Race					0.20
Black	2551	48.4	737	50.0	
White	2299	43.6	639	43.4	
Other	420	8.0	98	6.6	
Hispanic					0.01
Yes	281	5.3	54	3.7	
No	4989	94.7	1420	96.3	
Educational level					<0.01
High school or less	1813	34.4	418	28.4	
Some college	2183	41.4	652	44.3	
College degree or higher	1272	24.1	403	27.4	
Marital Status					<0.01
Single/never married	3007	57.1	1040	70.6	
Married/living with partner	1897	36.0	376	25.5	
Separate/divorced/widowed	361	6.9	58	3.9	
Insurance status					<0.01
None	2060	39.3	674	46.5	
Public	2298	43.8	694	47.9	
Private	885	16.9	82	5.7	
Receiving public assistance or having difficulty paying for basic necessities					<0.01
Yes	3054	58.0	738	50.1	
No	2215	42.0	735	49.9	
Parity					<0.01
0	2222	42.2	965	65.5	
1	1384	26.3	296	20.1	
2	1037	19.7	136	9.2	
3	627	11.9	77	5.2	
Previous unintended pregnancies					<0.01

Characteristic	LARC users (N=5270)		Non-LARC hormonal contraceptive users (N=1474)		P value*
	N	%	N	%	
	0	1754	33.3	746	50.7
	1	1442	27.4	368	25.0
	2	949	18.0	181	12.3
	3	1117	21.2	175	11.9
Previous abortions					<0.01
	0	3395	64.4	997	67.6
	1	1177	22.3	333	22.6
	2	450	8.5	98	6.6
	3	248	4.7	46	3.1
History of STI					<0.01
	Yes	2132	40.5	519	35.2
	No	3136	59.5	955	64.8
STI at baseline					0.67
	Yes	332	6.6	96	6.9
	No	4716	93.4	1295	93.1

* P values obtained using Chi-square test

Table 2. Univariable analysis of factors related to dual method use, stratified by LARC vs. non-LARC hormonal contraceptive use

Characteristic	LARC users (N=5270)			Non-LARC hormonal contraceptive users (N=1474)			P value*
	Dual method use	Non-dual method use	P value*	Dual method use	Non-dual method use	P value*	
	N	%	N	%	N	%	
Age							<0.01
<25	1029	61.2	1605	44.7	455	69.1	54.8
25	653	38.8	1983	55.3	203	30.9	45.2
Race							<0.01
Black	1143	68.0	1408	39.2	396	60.2	41.8
White	442	26.3	1857	51.8	229	34.8	50.2
Other	97	5.8	323	9.0	33	5.0	8.0
Hispanic							0.76
Yes	49	2.9	232	6.5	23	3.5	3.8
No	1633	97.1	3356	93.5	635	96.5	96.2
Educational level							<0.01
High school or less	691	41.1	1122	31.3	220	33.5	24.3
Some college	716	42.6	1467	40.9	295	44.9	43.8
College degree or higher	275	16.3	997	27.8	142	21.6	32.0
Marital Status							<0.01
Single/never married	1292	77.0	1715	47.8	538	81.8	61.5
Married/living with partner	291	17.3	1606	44.8	98	14.9	34.1
Separate/divorced/widowed	96	5.7	265	7.4	22	3.3	4.4
Insurance status							0.59
None	673	40.3	1387	38.8	309	48.0	45.3
Public	633	37.9	1665	46.6	300	46.6	48.9
Private	365	21.8	520	14.6	35	5.4	5.8

Characteristic	LARC users (N=5270)						Non-LARC hormonal contraceptive users (N=1474)					
	Dual method use			Non-dual method use			Dual method use			Non-dual method use		
	N	%	P value*	N	%	P value*	N	%	N	%	P value*	
Parity			<0.01			<0.01					<0.01	
	0	725	43.1	1497	41.7		446	67.8	519	63.6		
	1	499	29.7	885	24.7		141	21.4	155	19.0		
	2	291	17.3	746	20.8		47	7.1	89	10.9		
	3	167	9.9	460	12.8		24	3.6	53	6.5		
History of STI			<0.01			<0.01					0.89	
	No	889	52.9	2247	62.6		425	64.6	530	65.0		
	Yes	792	47.1	1340	37.4		233	35.4	286	35.0		
STI at baseline			<0.01			<0.01					<0.01	
	No	1426	88.5	3290	95.7		576	90.7	719	95.1		
	Yes	185	11.5	147	4.3		59	9.3	37	4.9		
Previous unintended pregnancies			0.01			0.01					0.15	
	0	508	30.2	1246	34.8		352	53.7	394	48.4		
	1	486	28.9	956	26.7		159	24.2	209	25.7		
	2	313	18.6	636	17.8		78	11.9	103	12.7		
	3	373	22.2	744	20.8		67	10.2	108	13.3		
Substance use			0.19			0.19					<0.01	
	No	1360	80.9	2955	82.4		549	83.4	632	77.5		
	Yes	321	19.1	632	17.6		109	16.6	183	22.5		
Baseline condom use			<0.01			<0.01					<0.01	
	No	397	38.3	1623	63.5		123	28.5	337	60.7		
	Yes	640	61.7	933	36.5		309	71.5	218	39.3		
Baseline contraception use			<0.01			<0.01					<0.01	
	None	1122	66.7	2005	55.9		441	67.0	427	52.3		
	IUDs	17	1.0	33	0.9		7	1.1	7	0.9		

Characteristic	LARC users (N=5270)						Non-LARC hormonal contraceptive users (N=1474)					
	Dual method use			Non-dual method use			Dual method use			Non-dual method use		
	N	%	P value*	N	%	P value*	N	%	P value*	N	%	P value*
Implant	10	0.6		17	0.5		5	0.8		7	0.9	
DMPA	82	4.9		196	5.5		8	1.2		13	1.6	
Pills	216	12.8		648	18.1		83	12.6		161	19.7	
Patch	11	0.7		20	0.6		2	0.3		11	1.3	
Ring	49	2.9		157	4.4		18	2.7		41	5.0	
Condom	30	1.8		80	2.2		31	4.7		28	3.4	
Others	145	8.6		432	12.0		63	9.6		121	14.8	
Baseline dual method use			<0.01			<0.01			<0.01			<0.01
No	882	85.1		2398	93.8		371	85.9		519	93.5	
Yes	155	14.9		158	6.2		61	14.1		36	6.5	
Partner willingness to use a condom			<0.01			<0.01			<0.01			<0.01
Not at all/not very willing	130	12.6		593	23.9		42	9.8		117	20.2	
Somewhat/extremely willing	900	87.4		1887	76.1		388	90.2		461	79.8	
Condom self-efficacy score			<0.01			<0.01			<0.01			<0.01
<20	631	37.6		1854	51.8		213	32.4		413	50.7	
20	1049	62.4		1728	48.2		444	67.6		402	49.3	
Desire to avoid pregnancy in the next 3 months			0.07			0.07			0.07			0.55
Strong desire to avoid pregnancy	1518	90.6		3153	88.5		569	87.3		707	87.1	
Neutral	90	5.4		241	6.8		40	6.1		59	7.3	
No desire to avoid pregnancy	67	4.0		169	4.7		43	6.6		46	5.7	
History of Violence/Abuse			0.01			0.01			0.01			<0.01
No	704	48.9		1379	44.6		325	55.0		348	47.1	
Yes	736	51.1		1715	55.4		266	45.0		391	52.9	

* P values obtained using Chi-square test

Table 3.

Multivariable analysis of factors related to dual method use among all method users (N=6744)

Characteristic	Adjusted relative risk	95% CI	P value*
Contraceptive method used			
Oral contraceptive pills		Reference	
Intrauterine device	0.74	0.65 0.84	<0.01
Contraceptive implant	0.71	0.61 0.83	<0.01
DMPA	0.96	0.82 1.12	0.59
Contraceptive patch/ring	0.93	0.78 1.11	0.43
Age			
<25		Reference	
25	0.78	0.71 0.86	<0.01
Race			
White		Reference	
Black	1.85	1.68 2.04	<0.01
Other	1.10	0.90 1.35	0.35
Educational level			
High school or less		Reference	
Some college, college degree or higher	0.85	0.78 0.93	<0.01
Marital Status			
Single/never married		Reference	
Married/living with partner	0.49	0.44 0.56	<0.01
Separate/divorced/widowed	0.82	0.67 1.00	0.05
Baseline dual method use			
Yes	1.51	1.36 1.67	<0.01
No		Reference	
Partner willingness to use a condom			
Not at all/not very willing		Reference	
Somewhat/extremely willing	1.48	1.28 1.71	<0.01
Condom self-efficacy score			
<20		Reference	
20	1.28	1.17 1.40	<0.01
STI at baseline			
	1.24	1.10 1.39	<0.01

* P values obtained using Chi-square test

Table 4.

Multivariable analysis of factors related to dual method use among LARC users (N=5270)

Characteristic	Adjusted relative risk	95% CI	P value*
Contraceptive method used			
Contraceptive implant		Reference	
Intrauterine device	1.06	0.94 1.19	0.31
Age			
<25		Reference	
25	0.78	0.69 0.87	<0.01
Race			
White		Reference	
Black	2.03	1.79 2.30	<0.01
Other	1.19	0.94 1.52	0.15
Educational level			
High school or less		Reference	
Some college, college degree or higher	0.88	0.79 0.98	0.02
Marital Status			
Single/never married		Reference	
Married/living with partner	0.45	0.39 0.52	<0.01
Separate/divorced/widowed	0.76	0.60 0.97	0.03
Baseline dual method use			
No		Reference	
Yes	1.53	1.35 1.73	<0.01
Partner willingness to use a condom			
Not at all/not very willing		Reference	
Somewhat/extremely willing	1.50	1.27 1.77	0.00
Condom self-efficacy score			
<20		Reference	
20	1.23	1.11 1.37	0.04
STI at baseline			
	1.31	1.14 1.51	<0.01
History of STI			
	1.14	1.03 1.25	0.01

* P values obtained using Chi-square test

Table 5.

Multivariable analysis of factors related to dual method use among non-LARC hormonal contraceptive users (N=1474)

Characteristic	Adjusted relative risk	95% CI	P value*
Contraceptive method used			
Oral contraceptive pills		Reference	
DMPA	1.04	0.89 1.22	0.63
Contraceptive patch/ring	0.91	0.77 1.09	0.30
Age			
<25		Reference	
25	0.73	0.62 0.87	<0.01
Race			
White		Reference	
Black	1.36	1.16 1.59	<0.01
Other	0.90	0.64 1.28	0.57
Educational level			
High school or less		Reference	
Some college, college degree or higher	0.77	0.67 0.88	0.00
Marital Status			
Single/never married		Reference	
Married/living with partner	0.63	0.52 0.77	<0.01
Separate/divorced/widowed	1.09	0.77 1.54	0.62
Baseline dual method use			
No		Reference	
Yes	1.42	1.18 1.70	<0.01
Partner willingness to use a condom			
Not at all/not very willing		Reference	
Somewhat/extremely willing	1.39	1.07 1.82	0.01
Condom self-efficacy score			
<20		Reference	
20	1.44	1.24 1.67	<0.01
Substance use	0.75	0.61 0.91	0.01

* P values obtained using Chi-square test