# Exploring Factors Associated with Dual-Method Use and the Impact on Sexually Transmitted Infections: A Literature Review

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## ***Introduction***

Long-acting reversible contraceptives (LARCs) are effective methods of birth control with failure rates of less than 1% (J. Trussell, 2011). LARCs include intrauterine devices and subdermal arm implants. These contraceptives have been heavily promoted in the United States over the past several years as a way to reduce unintended pregnancies, which most frequently occur because of incorrect or inconsistent use of contraception (Daniels, Daugherty, & Jones, 2014). Public health policy level changes, restructuring of physician reimbursement, and improvements in provider training have helped increase LARC uptake in all groups of reproductive aged women in the United States (Hubacher, Finer, & Espey, 2011). LARCs are also cost effective and provide more economic savings than short-acting reversible contraceptives (SARCs), which include oral contraceptives pills, patches, and rings. Prior research has shown that LARCs are able to overcome 53% of the cost of unintended pregnancies that occur because of contraceptive adherence (James Trussell et al., 2013). The increasing use of LARCs are significantly contributing to lower rates of teenage and unintended pregnancies in the United States (Lindberg, Santelli, & Desai, 2018).

The American College of Obstetricians and Gynecologists recommends LARCs for all women, including adolescents and young women, as they are a low maintenance but effective method of birth control (Payne, Sundstrom, & DeMaria, 2016). Only 0.2- 0.8% of women with a LARC experience an unintended pregnancy within the first year of use compared to 9% of oral contraceptive pill users and 21% of women using condoms as their method of birth control (J. Trussell, 2011). Most women can be candidates for LARCs, including women who are breastfeeding, have a history of pelvic inflammatory disease, and who have experienced abnormal vaginal bleeding (*The Texas Long-Acting Reversible Contraception Toolkit*, 2018).

While LARCs offer many benefits for family planning, they do not provide any protection against sexually transmitted infections (STIs). There are roughly twenty million new STIs reported each year in the United States, and young people fifteen to twenty-four account for nearly half of these cases (Satterwhite et al., 2013). Chlamydia is the most common notifiable disease in the United States and has the highest prevalence of any sexually transmitted infection (*Sexually Transmitted Disease Surveillance 2018*, 2019). STIs and unintended pregnancies are a significant public health issue and the testing and treatment of STI cases costs the United States an estimated $15.9 billion dollars per year. Many STIs, including chlamydia are asymptomatic, and untreated STIs may lead to many severe long-term health consequences such as infertility (James Trussell et al., 2013). Past research has shown higher rates of sexually transmitted infections among LARC users, but there is a wide amount of variability in the results and there are limited ways to control for cofounding factors. Male condoms that are used correctly at every sexual encounter can significantly reduce the risk of sexually transmitted infections, including HIV, but past research has shown that women with LARCs are less likely to use condoms compared to women who use traditional methods of hormonal birth control. (*The Texas Long-Acting Reversible Contraception Toolkit*, 2018).

LARC methods remain effective for a period of three to ten years after insertion and typically require less provider interaction for upkeep compared to SARCs. After a women imitates a LARC, there is no need for any user interaction to maintain the device after the initial checkup (*The Texas Long-Acting Reversible Contraception Toolkit*, 2018). It is estimated that 75% of women who receive testing for sexually transmitted infections obtain them from their gynecologist than women on traditional types of hormonal birth control such as oral contraceptive pills (OCPs) (Hall, Patton, Crissman, Zochowski, & Dalton, 2015). Most women

visit their gynecologist to receive or renew a contraceptive prescription. LARCs do not require a monthly prescription unlike most types of SARCs. Thus, research indicates women with LARCs get STI testing less frequently than women on traditional types of hormonal birth control such as oral contraceptive pills (OCPs) (Hall et al., 2015).

The effectiveness of LARCs at preventing pregnancy may reduce the perceived need to use condoms in conjunction with a LARC. This may be especially true for younger populations who engage in more risky sexual behavior. Recent studies have shown that adolescent populations using LARCs may be less likely to use condoms compared to those using moderately effective forms of birth control including birth control pills, injectables, patches, and rings (Steiner et al., 2019). Decreased condom use is associated with higher risk of STI acquisition. Thus, recent public health programs have tried to promote dual-contraceptive method use and many programs target younger populations (J. A. Higgins & Hirsch, 2007). Although rates of LARCs are increasing and rates of STIs are increasing in the United States, there is still relatively little research about this relationship. Furthermore, few studies examine motivations for dual-method use with LARCs and condoms. It can be hard to measure how dual-methods are used in a sexual and relationship context and little research explores the role of a relationship in context of dual-method use motivation (J. A. Higgins & Hirsch, 2007). Thus, there is a dire need to identify motivations for dual-method use with condoms and LARCs, as well as explore implications for STI contraction.

*Research Questions*

**a.** How do long-acting reversible contraceptives influence dual-method use among women in the United States?

**b.** How do intrapersonal and organizational factors effect dual-method use and the testing and prevalence of sexually transmitted infections?

## ***Methods***

Searches for this review were conducted through the PubMed database. This resource provided reputable, peer-reviewed articles for the study. The selection criteria for included studies was that they were peer-reviewed, published in the last ten years, conducted on females using long-acting reversible contraceptives, relevant to LARC uptake, and discussed dual-method use or sexually transmitted infections. Key words and phrases looked for when scanning article abstracts included: STI, LARC, provider influence, chlamydia, condom, initiation, testing, partner, and dual-method. Since LARC is an acronym for "long-acting reversible contraceptive," searches were conducted for both the phrase and the acronym to ensure the maximum number of relevant articles could be identified. The same search strategy was use for the term STI and "sexually transmitted infection."

Boolean terms used to find articles on PubMed were "AND" and "THEN." The term "AND" helped identify articles that focused on the relationship between LARCs, dual-method use, and sexually transmitted infections. The term "THEN" helped identify studies that discussed sexually transmitted infections after the initiation of a LARC. A total of seventeen articles were found using the PubMed database. After these articles were identified, the reference lists of included articles were scanned to identify additional relevant studies. Key words looked for in reference lists were the same as terms used when scanning abstracts. A total of three articles

were found using the reference lists of included articles. A detailed description of search strategies is outlined in *Table 1*.

*Table 1. Search Strategies for Included Studies*

| **Articles Identified Through PubMed** | | |
|---|---|---|
| **Search Term** | **# of Results** | **# of Articles Included** |
| LARC AND STI | 145 | 2 |
| LARC AND Dual Method | 20 | 2 |
| Long acting reversible contraception AND sexually transmitted infection | 101 | 2 |
| Long acting reversible contraception AND sexually transmitted infection and relationship | 6 | 1 |
| Long acting reversible contraception AND STI | 30 | 1 |
| Chlamydia AND LARC | 4 | 1 |
| LARC AND condom use | 82 | 3 |
| Chlamydia AND long acting reversible contraception | 13 | 2 |
| LARC THEN STI | 16 | 1 |
| LARC AND Condom | 79 | 2 |
| **Articles Identified Through Reference Lists** | | |
| **Reference List Used** | **Article Found** | |
| Contraceptive Method Use and Chlamydia Positivity Among Family Planning Clinics | Effects of relationship context on contraceptive use among young women | |
| Condom use and incident sexually transmitted infection after initiation of long-acting reversible contraception | Dual use of condoms with other contraceptive methods among adolescents and young women in the United States | |
| Chlamydia testing and diagnosis following initiation of long-acting reversible contraception: A retrospective cohort study. | Positive testing for neisseria gonorrhoeae and chlamydia trachomatis and the risk of pelvic inflammatory disease in IUD users. | |

## ***Results***

### 1. Dual-Method Prevalence and Factors Associated with Dual-Method Use

*1(a) Differences of Dual-Method Use Among Contraceptive Users*

Women who use LARCs as their primary method of birth control have a low risk of pregnancy, which may decrease their motivations for condom use. Aside from abstinence, condoms are the most effective way to prevent STIs (Finer & Zolna, 2016). The use of two methods of birth control, such as a LARC and a condom, is referred to as "dual-method use." Dual-method use was commonly analyzed in the studies included in this review. Dual-method use was mostly compared among LARC and short-acting reversible contraceptive (SARC) users.

LARC users often report lower condom usage than SARC users, and adolescent dual-method use is commonly a focus in contraceptive research. One study of high school aged students examined the prevalence of dual-method use and found LARC users reported the lowest rates of condom use (16.4%) among women using any method of contraception. LARC users were nearly 60% less likely to use condoms compared to those who used oral contraceptives (Steiner, Liddon, Swartzendruber, Rasberry, & Sales, 2016). Another study that focused on adolescents had similar findings. In adjusted analyses, LARC users were about half as likely to use condoms compared to women who used non-LARC hormonal methods of birth control. Condom use was lower for those that had an IUD (15.1%) compared to those who had an implant (21.5% )(Kortsmit et al., 2019).

Low rates of dual-method use were also identified in analyses of national surveys, which may be an even stronger indication of this relationship based on the nationally-representative sample. Two studies identified in this review used data from this study the National Survey of Family Growth. In multivariable analysis, LARC users were significantly less likely to not use a condom compared to non-LARC users (Bernard, Zhao, & Peipert, 2018). Only 3.3% of LARC users

reported dual-method use compared to 21.7% of those using oral contraceptives, 32.6% of ring users, and 16.7% of patch users (Eisenberg, Allsworth, Zhao, & Peipert, 2012). Another national study analyzed was the American College Health Association National Health Assessment, which examined predictors of LARC use among college-aged females. After controlling for demographic variables, women who used oral contraceptive pills had higher usage of condoms than women who used LARCs. At the time of last sexual intercourse, rates of condom usage were higher among women who used patches, shots, or rings (60.4%) compared to women who used LARCs (40.0%)(Walsh-Buhi & Helmy, 2018). The previously mentioned studies reported dual-method use over a period of time or at a specific time, but these studies did not specify the frequency that women used dual-methods. Furthermore, these studies did not compare dual-method use with the prevalence of sexually transmitted infections.

A few studies identified in this review assessed the frequency of dual-method use. One study focused on the frequency of dual-method usage in comparison with STI history. In this study, dual-method usage was considered "always" using dual-methods over the six months prior to the survey. This study found 11.3 of SARC users compared to 5.2% of initiated LARC users reported always used dual-methods ($p<.001$)(McNicholas, Klugman, Zhao, & Peipert, 2017). Notably, 42.6% of LARC users reported a history of a STI and 34.6% of non-LARC users reported a history of a STI ($p<.01$)(McNicholas et al., 2017). The National Survey of Family Growth also provided data about the frequency of dual-method use. One analysis found that the proportion of women who used condoms during recent sexual intercourse was highest among those who used oral contraceptive pills compared to lowest among LARC users. The study design is notable because women were asked about condom usage in the past three months and at the time of last sexual intercourse. In the last 3 months, 17.6% of pill users and 1.8% of LARC users reported condom

use (Pazol, Kramer, & Hogue, 2010). Another study conducted an analysis that found at the last sexual intercourse, 14.5% of pill users and 1.9% of LARC users reported condom use (Pazol et al., 2010).

*(b) Implications of Dual-Method Use on STI Prevalence*

Evidence found in the previously mentioned studies suggests that LARC users have lower usage of condoms compared to women who use short-acting methods of birth control. Several studies included in this review explored how lower rates of dual-method use impacted the testing and prevalence of sexually transmitted infections. While the included studies in this review found a consistent pattern in lower condom usage among LARC users, there were mixed findings about STI prevalence among LARC users.

Many studies found increased risk of STIs among LARC users. STI testing is commonly suggested at the time an IUD is inserted (Rose, Garrett, Stanley, & Pullon, 2017). One study explored testing rates of chlamydia among different types of contraceptive users. Women who got a subdermal arm implant had significantly lower rates of chlamydia compared to women who used oral contraceptive pills (RR= 0.83, 95% CI= 0.72-0.99). However, in this study women who initiated intrauterine devices had higher rates of chlamydia testing than those using oral contraceptive pills (RR= 1.4, 95% CI = 1.06-1.35). A reason for this difference may be that women who obtain an IUD are more likely to receive chlamydia testing at the time of insertion (Rose et al., 2017). Two studies found in this review analyzed the Contraception Choice Project, which is a project aimed at promoting LARCs in St. Louis, MO. One analysis found that the initiation of a LARC was associated with increased incidences of sexually transmitted infections (OR= 2.0 95% CI, 1.07-3.72)(McNicholas et al., 2017). Another analysis found IUD users were more likely to report never using condoms compared to non-IUD users (41.9% vs. 29.7%; p=0.1), which may

contribute to the increased STIs prevalence. Furthermore, IUD users were less likely to report using a condom every time during sexual intercourse compared to non-IUD users (33.8% vs. 40.0%; p<.01)(Birgisson, Zhao, Secura, Madden, & Peipert, 2015).

A few studies included in this review found no significant relationship between LARC uptake and increased STI risk. While these studies found high rates of STIs among LARC users, they failed to have statistically significant results. One study of high-risk African American women found higher rates of *T. vaginalis* among IUD users, but it was not a statistically significant predictor of STI acquisition (Kortsmit et al., 2019). However, this study found chlamydia was most prevalent in younger age clients (p <.001)(Kortsmit et al., 2019). This may suggest that age could be a significant predictor of STI after LARC initiation. Another study done on only African women found that rates of chlamydia and gonorrhea were not higher among IUD users (Kiweewa et al., 2019). Lastly, one study found condom use "usually or always" was reported by 26.1% of LARC users compared to 27.8% of non-LARC users (Nguyen et al., 2019). This finding was not statistically significant in multivariable analysis after adjusting for relationship status, the number of partners in the last three months, and previous STI (Nguyen et al., 2019).

**2. Intrapersonal and Organizational Factors Associated with Dual Method Use**

Past research has shown that healthcare providers can have a significant influence on a women's choice to get a LARC. Providers are held responsible for educating women about the effectiveness of LARCs and how they do not provide protection from STIs (*The Texas Long-Acting Reversible Contraception Toolkit*, 2018). Providers should provide patient-centered education about the effectiveness of LARCs, how to recognize and address problems, and information about how they do not provide protection from STIs and HIV (*The Texas Long-Acting Reversible Contraception Toolkit*, 2018). LARCs can safely stay inserted for a period of

three to ten years and unlike moderately effective birth control, LARCs do not require multiple doctors visits for checkups and prescription refills. Many women report getting STI test as a part of their prescription refill checkup (*The Texas Long-Acting Reversible Contraception Toolkit*, 2018). For these reasons, this review analyzed how LARCs may influence the frequency and motivations of STI tests among women with LARCs.

*2a. Relationship Status and Dual-Method Use*

Relationship status was found to be a significant predictor of dual-method use. Typically, women in relationships and women who only had one sexual partner at a time were less likely to use dual-methods. One study that compared dual method use in SARC users versus LARC users found that having a primary partner was significantly associated with reduced dual-method use. Women that reported having a primary partner had 52% lower odds at dual-method use compared to women who were not in a relationship (aOR 0.48, 95% CI 0.30-0.76). (El Ayadi et al., 2017). Similarly, another study that examined the results from the National College Health Assessment-II showed that relationship status was significantly correlated with dual-method use and those in a relationship were significantly less likely to use a condom than women who reported not being in a relationship (Thompson et al., 2017). In this study, all relationship categories were significantly less likely to use a condom than women who reported not being in a relationship (Thompson et al., 2017).

The number of sexual partners a women has may also be associated with dual-method use. One study found women who had two or more partners in the past twelve months were more likely to use condoms than those who had one sexual partner (Thompson et al., 2017). Another study of college women found that among women with new partners women with a SARC were more likely to use condoms than those who used LARCS (82.4% versus 59.6% OR=3.17 95%

CI 1.19-8.43). Similarly, another study found LARC users were more than twice as likely to have two or more sexual partners in the last three months and were about twice as likely to have four or more sexual partners in their lifetime compared to oral contraceptive users (Steiner, Liddon, Swartzendruber, Rasberry, & Sales, 2016). Another study found that the most significant factor associated with dual-method use was not knowing the sexual partner and 79.7% of LARC users reported using a condom because they did not know their sexual partner ((Nguyen et al., 2019). Furthermore, 3.9% of LARC users who reported using dual-methods said that they were worried about sexually transmitted infections(Nguyen et al., 2019). These studies show that relationship status may be a strong predictor of dual-method use. The 2009 Survey of Sexual Health and Behavior looked at condom use among LARC users during the last penile-vaginal intercourse. Only 5% of those in a relationship reported dual-method use, while 17% of casual dating partners, 23% of friends, and 19% of new acquaintances reported dual-method use ($p<.000$)(Jenny A. Higgins et al., 2014). These results were not consistent among all studies included in this review. An analysis of the National Survey of Family Growth found that dual-method use was higher among women with only one partner (21.4%) compared to women with three or more partners (16.6%)(Tyler et al., 2014).

Partner communication is another key factor that is associated with dual-method use as well as sexually transmitted infection susceptibility. One study conducted qualitative interviews about motivations for dual-method use. Participants reported that conversations about sex with partners most often focused on pregnancy prevention and not STI prevention, and lower condom use was reported among these individuals (Steiner et al., 2019). Living with a partner may also influence motivations for dual-method use. One study found that women cohabitating with their partner reported lower rates (13.3%) compared to those who did not cohabitate with their partner

(22.4%). This study also found dual-method use was higher among women with only one partner (21.4%) compared to women with three or more partners (16.6%)(Tyler et al., 2014). Another study found that the length that a women is in a relationship may also impact the decision to get a LARC. Women in relationships for one year or more were significantly more likely to use a LARC than women who were in a relationship for zero-three months (aOR= 0.67, p<.05)(Upadhyay, Raifman, & Raine-Bennett, 2016).

*2b. Provider Influence and Visit Frequency*

Provider influence to get a LARC and the frequency that women visit their healthcare provider may also influence STI testing and prevalence. One study looked at how a provider targeted intervention could affect condom use with LARCs. In this study, one group was provided extensive education about condom use from their provider, while the other received standard care. Of the women who reported that their providers discussed condom use at baseline, 61% higher odds of reporting dual-method use at the 12-month follow up and 71% higher odds of reporting condom use during the last time having sex. (El Ayadi et al., 2017). Overall, this study found a very low prevalence (14%) of dual-method use among intervention and control groups. However, provider counseling about condom use can be associated with higher condom and dual-method use (El Ayadi et al., 2017).

Another study at publicly funded family planning clinics in California examined how type of contraceptive method is associated with rates of chlamydia. Women were classified based on effectiveness of their contraception and women with short acting reversible contraceptives were more likely than women with LARC'S to have condoms given to them (p <.001) (Hunter, 2018). Another study found that new LARC users, but not continuing users, were more likely than less effective method users to be tested for chlamydia and have their sexual risk assessed (Steiner et

al., 2018). The results indicate that initiating a LARC provides a good opportunity to get STI/HIV testing as well as a sexual risk assessment. This study also highlights how the use of LARCs among adolescents is still very low, which could have implications on testing (Steiner et al., 2018). Women may also be likely to get a LARC inserted at the time of abortion. One study that examined LARC uptake at the time of an abortion found that the implementation of an IUD could increase opportunity for STI testing, as it is convenient to do the test at the time of LARC insertion (Rose et al., 2017).

An additional organizational factor that may influence dual-method use and STI testing is education about contraceptives and the importance of STI testing. Specifically, education about contraceptives may be a large predictor to STI testing. One study found that multiple participants reported that sexual health education in schools taught them that condoms could prevents pregnancy, but they did not learn about STI prevention. Participants also reported that conversations about sex with patents most often focused on pregnancy prevention and not STI prevention. This study shows that education may be a significant contributor to high STI rates among young women and adolescents (Steiner et al., 2019).

## DISCUSSION

### *Terminology and Partner Communication*

While the majority of studies included in this review that compared condom usage among contraceptive users found that LARC users were less likely to use dual-methods, overall condom use is still low among all groups of contraceptive users in the United States. This could significantly contribute to the rising rate of sexually transmitted infections, and it is important to address the issue of low condom usage in all types of contraceptive users. The choice to use a condom is made between both partners at the time of a sexual encounter, and it is important that

all people who engage in sexual activity have condom negotiation skills and are aware of the risks of not using condoms. The studies in this review only reported females motivations for condom use, but it is important that future research considers the motivating factors for males. Specific partner communication skills regarding with negotiation of condom use may be something that needs to be addressed to promote the usage of condoms.

Furthermore, this review identified studies that showed initiated LARCs users got tested for STIs less frequently than women using traditional hormonal methods of birth control. This was more commonly seen for subdermal implants compared to IUDs. This difference could be largely attributed to the way IUDs must be inserted vaginally compared to implants being inserted without a vaginal examination and some providers may suggest a STI tests at the time of insertion. Thus, it is important that all providers encourage testing at the time of an IUD insertion. Future interventions should target testing for STI at the time of insertion of subdermal implants as well as intrauterine devices to help detect STIs before women are able to go long periods of time with little need to see their provider. It is also important that healthcare providers educate women to get regularly tested for STIs even after the initiation of a LARC.

*Racial and Age Differences*

There are significant health disparities surrounding unintended pregnancy in the United States and low income and colored women most often experience this burden. (Parks & Peipert, 2016). Increased coverage under the Affordable Care Act and other no-cost coverage methods are increasing contraceptive use, including LARCs, among high risk populations (Parks & Peipert, 2016). There were several studies identified in this review that showed racial differences among LARCs and dual-method initiation. A reason for this could be that over the past decade there has been significant policy changes that have subsidized long-acting reversible

contraceptives in economically challenged communities. These subsidies more frequently target communities with higher prevalence of African American and Hispanic women. The studies in this review found that African American women were the most likely demographic to get a LARC and more likely to not use a condom in conjunction with their LARC. Future interventions should target this demographic. Age is a also an important variable to address in context with this research. The findings of the included studies found that younger women were less likely to use dual-methods and more likely to get a STI compared to older women. Adolescents were also more likely to report engaging in high-risk sexual behavior, which could contribute to the high prevalence of STIs in this population.

*Further Research*

The current available research about the relationship between LARCs, dual-method use, and STIs are mainly prospective cohort and cross-sectional design studies. There are relatively few randomized controlled studies about the relationship between LARCs and sexually transmitted infections. There are several limitations with observational and cross-sectional studies, and randomized control studies could help clarify the relationship between LARCs and STIs (Hubacher et al., 2008). One research study evaluated women's willingness to take part in a randomized control trial to compare acquisition risk of chlamydia and gonorrhea for IUD users compared to other contraceptive methods. Over 70% of participants reported willingness to take part in the study, and 29% of respondents reported a past STI (Hubacher et al., 2008). Thus, the findings of this study suggest that randomized control studies could be feasible and should be conducted in the future to further examine the relation between LARCs and STI risk.

*Limitations*

There were strengths in the included studies including large sample sizes and high response rates. However, this review was not without limitations. The self-reported nature of many of the included studies may have created reporting bias. Several studies mentioned that women may be less likely to accurately report risky sexual behaviors. Furthermore, "dual-method" is a term that was commonly used and its definition could vary if a researcher is not clear on how the term dual-method is defined. There is a difference between using a condom for a portion of sexual intercourse compared to using a condom during the entire course of a sexual encounter. Furthermore, not all of the studies examined dual-method use consistently over a time period. Various rates of consistent dual method use-age could change STI risk and there may be differences across data because of this terminology. The discrepancies in this terminology may be part of the reason for the variability of the results in these studies. In the future, there should be a standardization for the term dual-method use.

Another limitation of this research is that many include studies were cross-sectional study designs. As mentioned previously, there is potentially a large amount of bias with self-reported sexual behaviors. Individuals in these studies may have recall bias or want to answer questions based on socially acceptable norms about sexual behaviors. Another limitation of these studies is that there was no data from males regarding sexual behaviors. While LARCs are initiated by women, it could be beneficial to obtain data about dual-method use motivations from males. Lastly, many of these studies took place at a reproductive health center or clinic, which makes it difficult to generalize the results to be representative of all women in the United States.

## CONCLUSIONS

Based on the results found in this review, LARC users are less likely to engage in dual-method use compared to women who use traditional hormonal forms of contraception. This could lead to higher risks of sexually transmitted infections, but further research is needed to analyze this relationship. Despite the results found from this study, there is still little data about how the initiation of a LARC effects sexually transmitted infections and motivations for dual-method use with LARCs. There are multiple factors that influence motivations for STI testing, and LARCs could influence a women's choice to receive an STI test. Moving forward, it is imperative to create interventions that ensure women are adequately educated about the benefits of dual-method use and the STI risk that is associated with using a LARC without an additional barrier of birth control.

Works Cited

Bernard, C., Zhao, Q., & Peipert, J. F. (2018). Dual method use among long-acting reversible contraceptive users. *Eur J Contracept Reprod Health Care, 23*(2), 97-104. doi:10.1080/13625187.2018.1445850

Birgisson, N. E., Zhao, Q., Secura, G. M., Madden, T., & Peipert, J. F. (2015). Positive testing for neisseria gonorrhoeae and chlamydia trachomatis and the risk of pelvic inflammatory disease in IUD users. *J Womens Health (Larchmt), 24*(5), 354-359. doi:10.1089/jwh.2015.5190

Daniels, K., Daugherty, J., & Jones, J. (2014). Current contraceptive status among women aged 15-44: United States, 2011-2013. *NCHS Data Brief*(173), 1-8.

Eisenberg, D. L., Allsworth, J. E., Zhao, Q., & Peipert, J. F. (2012). Correlates of dual-method contraceptive cse: An analysis of the National Survey of Family Growth (2006-2008). *Infectious Diseases in Obstetrics & Gynecology*, 1. doi:10.1155/2012/717163

El Ayadi, A. M., Rocca, C. H., Kohn, J. E., Velazquez, D., Blum, M., Newmann, S. J., & Harper, C. C. (2017). The impact of an IUD and implant intervention on dual method use among young women: Results from a cluster randomized trial. *Prev Med, 94*, 1-6. doi:10.1016/j.ypmed.2016.10.015

Finer, L. B., & Zolna, M. R. (2016). Declines in unintended pregnancy in the United States, 2008—2011*(9),* 843. Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsbl&AN=RN607966574&site=eds-live

Hall, K. S., Patton, E. W., Crissman, H. P., Zochowski, M. K., & Dalton, V. K. (2015). A population-based study of US women's preferred versus usual sources of reproductive health care. *American Journal of Obstetrics and Gynecology, 213*(3), 352.e351-352.e314. doi:https://doi.org/10.1016/j.ajog.2015.04.025

Higgins, J. A., & Hirsch, J. S. (2007). The pleasure deficit: revisiting the "sexuality connection" in reproductive health. *Perspect Sex Reprod Health, 39*(4), 240-247. doi:10.1363/3924007

Higgins, J. A., Smith, N. K., Sanders, S. A., Schick, V., Herbenick, D., Reece, M., . . . Fortenberry, J. D. (2014). Dual method use at last sexual encounter: a nationally representative, episode-level analysis of US men and women: Prepared for resubmission to Contraception. *Contraception, 90*(4), 399-406. doi:10.1016/j.contraception.2014.06.003

Hubacher, D., Finer, L. B., & Espey, E. (2011). Renewed interest in intrauterine contraception in the United States: Evidence and explanation. *Contraception, 83*(4), 291-294. doi:10.1016/j.contraception.2010.09.004

Hubacher, D., Raymond, E. R., Beksinska, M., Delany-Moretlwe, S., Smit, J., Hylton-Kong, T., & Moench, T. R. (2008). Hormonal contraception and the risks of STI acquisition: results of a feasibility study to plan a future randomized trial. *Contraception, 77*(5), 366-370. doi:10.1016/j.contraception.2008.01.006

Hunter, L. N., L.; Chow, J.; Holt, B.; Bauer, H. . (2018). Research data from University of California update understanding of chlamydia (contraceptive method use and chlamydia positivity among California family planning clients: The case for new multipurpose prevention t

echnologies), 5655. Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsgit&AN=edsgit.A545817113&site=eds-live

Kiweewa, F. M., Brown, E., Mishra, A., Nair, G., Palanee-Phillips, T., Mgodi, N., . . . Baeten, J. M. (2019). Acquisition of sexually transmitted infections among women wsing a variety of contraceptive options: A prospective study among high-risk African Women. *Journal of the International AIDS Society*(2). doi:10.1002/jia2.25257

Kortsmit, K., Williams, L., Pazol, K., Smith, R. A., Whiteman, M., Barfield, W., . . . Warner, L. (2019). Condom use with long-acting reversible contraception vs non-long-acting reversible contraception hormonal methods among postpartum adolescents. *JAMA Pediatr, 173*(7), 663-670. doi:10.1001/jamapediatrics.2019.1136

Lindberg, L. D., Santelli, J. S., & Desai, S. (2018). Changing patterns of contraceptive use and the decline in rates of pregnancy and birth among U.S. adolescents, 2007-2014. *J Adolesc Health, 63*(2), 253-256. doi:10.1016/j.jadohealth.2018.05.017

McNicholas, C. P., Klugman, J. B., Zhao, Q., & Peipert, J. F. (2017). Condom use and incident sexually transmitted infection after initiation of long-acting reversible contraception. *Am J Obstet Gynecol, 217*(6), 672.e671-672.e676. doi:10.1016/j.ajog.2017.09.009

Nguyen, J., Williams, H., McNamee, K., Shaffeu, N., Vaisey, A., & Hocking, J. (2019). Condom use among young women in Australia using long-acting reversible contraceptives or other hormonal contraceptives. *Sex Health*. doi:10.1071/sh19045

Parks, C., & Peipert, J. F. (2016). Expert Review: Eliminating health disparities in unintended pregnancy with long-acting reversible contraception (LARC). *American Journal of Obstetrics and Gynecology, 214*, 681-688. doi:10.1016/j.ajog.2016.02.017

Payne, J. B., Sundstrom, B., & DeMaria, A. L. (2016). A qualitative study of young women's beliefs about intrauterine devices: Fear of infertility. *Journal of Midwifery & Women's Health, 61*(4), 482-488. doi:10.1111/jmwh.12425

Pazol, K., Kramer, M. R., & Hogue, C. J. (2010). Condoms for dual protection: patterns of use with highly effective contraceptive methods. *Public Health Rep, 125*(2), 208-217. doi:10.1177/003335491012500209

Rose, S. B., Garrett, S. M., Stanley, J., & Pullon, S. R. H. (2017). Chlamydia testing and diagnosis following initiation of long-acting reversible contraception: A retrospective cohort study. *Aust N Z J Obstet Gynaecol, 57*(6), 665-675. doi:10.1111/ajo.12685

Satterwhite, C. L., Torrone, E., Meites, E., Dunne, E. F., Mahajan, R., Ocfemia, M. C., . . . Weinstock, H. (2013). Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. *Sex Transm Dis, 40*(3), 187-193. doi:10.1097/OLQ.0b013e318286bb53

*Sexually Transmitted Disease Surveillance 2018*. (2019). Retrieved from Center for Disease Control and Prevention:

Steiner, R. J., Liddon, N., Swartzendruber, A. L., Rasberry, C. N., & Sales, J. M. (2016). Long-acting reversible contraception and condom use among female US high school students: implications for sexually transmitted infection prevention*(5)*, 428. Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsgao&AN=edsgcl.455829488&site=eds-live

Steiner, R. J., Pazol, K., Swartzendruber, A., Liddon, N., Kramer, M. R., Gaydos, L. M., & Sales, J. M. (2018). Use of Long-Acting Reversible Contraception Among Adolescent

and Young Adult Women and Receipt of Sexually Transmitted Infection/Human Immunodeficiency Virus–Related Services. *Journal of Adolescent Health, 62*(4), 417-423. doi:10.1016/j.jadohealth.2017.10.017

Steiner, R. J., Swartzendruber, A., Cushing, K., Gaydos, L. M., Pazol, K., Kramer, M. R., . . . Sales, J. M. (2019). Being on the Safe Side: A Qualitative Study of Condom Use Motivations According to Contraceptive Type among Adolescents in Atlanta, Georgia. *Journal of Pediatric and Adolescent Gynecology, 32*(4), 388-394. doi:10.1016/j.jpag.2019.02.122

*The Texas Long-Acting Reversible Contraception Toolkit*. (2018). Retrieved from Texas Health and Human Services:

Thompson, E. L., Vamos, C. A., Griner, S. B., Logan, R., Vázquez-Otero, C., & Daley, E. M. (2017, 2017). *Sexually Transmitted Infection Prevention With Long-Acting Reversible Contraception: Factors Associated With Dual Use*, United States.

Trussell, J. (2011). Contraceptive failure in the United States. *Contraception, 83*(5), 397-404. doi:10.1016/j.contraception.2011.01.021

Trussell, J., Henry, N., Hassan, F., Prezioso, A., Law, A., & Filonenko, A. (2013). Burden of unintended pregnancy in the United States: potential savings with increased use of long-acting reversible contraception. *Contraception, 87*(2), 154-161. doi:https://doi.org/10.1016/j.contraception.2012.07.016

Tyler, C. P., Whiteman, M. K., Kraft, J. M., Zapata, L. B., Hillis, S. D., Curtis, K. M., . . . Marchbanks, P. A. (2014). Dual use of condoms with other contraceptive methods among adolescents and young women in the United States. *J Adolesc Health, 54*(2), 169-175. doi:10.1016/j.jadohealth.2013.07.042

Upadhyay, U. D., Raifman, S., & Raine-Bennett, T. (2016). Effects of relationship context on contraceptive use among young women. *Contraception, 94*(1), 68-73. doi:10.1016/j.contraception.2016.02.025

Walsh-Buhi, E. R., & Helmy, H. L. (2018). Trends in long-acting reversible contraceptive (LARC) use, LARC use predictors, and dual-method use among a national sample of college women. *J Am Coll Health, 66*(4), 225-236. doi:10.1080/07448481.2017.1399397