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Adolescents & Long Acting Reversible Contraception

Nicole Elizabeth Amstutz
Bethel University

Jessica Kesterson
Bethel University

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JESSICA KESTERSON & NICOLE AMSTUTZ

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JESSICA KESTERSON & NICOLE AMSTUTZ

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Approvals:

Project Advisor Name:_____

Project Advisor Signature:_____

Second Reader Name:_____

Second Reader Signature:_____

Director of Nurse-Midwifery Program Name:_____

Director of Nurse-Midwifery Program Signature:_____

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Jessica

Abstract

Background/Purpose: The purpose of this literature appraisal is to assess adolescent access to long-acting reversible contraception (LARCs).

Theoretical Framework: The Health Belief Model (HBM) helps describe the psychological and behavioral underpinnings of how one cares for one's health. The HBM can be applied to how adolescents perceive the risks associated with unprotected intercourse compared to the perceived benefits of LARC usage. The HBM considers the benefits, barriers, risk of susceptibility, risk severity, self-efficacy, and cues to the action of adopting positive health interventions in one's life (Jones et al., 2016).

Methods: Twenty-four relevant articles from the literature were appraised.

Results/Findings: LARCs prevent unintended pregnancies in diverse populations. LARCs are safe, long-acting, and reliable and associated with high satisfaction rates. Provider beliefs and knowledge base surrounding LARCs shape adolescent attitudes and access to these devices. Lack of time, training on insertion techniques, or sufficient counseling information pose barriers to LARC use.

Implications for Research and Practice: Midwives should be up-to-date, familiar, and comfortable with these methods in order for patients to trust in their use.

Midwives are well-suited to provide counseling regarding reproductive life planning, including dispensing contraception when adolescent pregnancy is not desired. Midwives should discuss LARC methods first as the most effective and ideal methods for all women, including adolescents. Further research is necessary to further examine barriers to LARC use in adolescents, including cost, same-day access to placement, concerns, and provider knowledge.

Keywords: Teens, LARCs, adolescents, long-acting reversible contraception, teen pregnancy prevention, contraception implant, intrauterine device, and teen access to LARCs.

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Chapter I: Introduction

Statement of Purpose

Approximately half of all pregnancies in the United States are unplanned, and a disproportionately high number of these involve adolescents and young women (Santibenchakul, Tschann, Carlson, Hurwitz, & Salcedo, 2019). Most commonly, unintended pregnancies occur in adolescents aged 15-19 (75%), followed by young women aged 20-24 (59%) (Santibenchakul et al., 2019). Additional disparities exist among women from different racial and ethnic groups (Yazdkhasti et al., 2015). There are significant risks and public health implications associated with unintended pregnancies, especially for adolescent pregnancy.

Long-acting reversible contraceptives (LARCs) include the intrauterine device (IUD) and the subdermal etonogestrel implant. These devices have been shown to be extremely effective in preventing unintended pregnancy (Rosenstock, Peipert, Madden, Zhao, & Secura, 2012). Efficacy rates of greater than 99%, high levels of safety, and ease of use for women (decreasing risk of forgetfulness) suggest LARCs are an excellent contraception option for adolescent populations.

The purpose of this work is to explore the benefits and barriers of LARCs among women between the ages of 15-24 and to describe how certified nurse-midwives (CNMs) may serve to facilitate their use. CNMs are licensed, independent health care providers that not only attend births but also meet women's health care needs throughout the lifespan (ACNM, 2019).

Evidence Demonstrating Need

According to the National Conference of State Legislatures (2018), teenage mothers are less likely to graduate from high school and meet occupational ambitions; they are also more likely to experience poverty and unemployment and rely on state funding for financial support.

Pregnancy complications associated with teen pregnancy include preeclampsia, anemia, and increased risk of cephalopelvic disproportion (American Pregnancy Association, 2019). Children born to teenage mothers are at an increased risk for infant mortality, behavioral and learning disorders, medical conditions, incarceration, and becoming teenage parents themselves (U.S. Department of Health & Human Services, 2019).

The social, financial, personal and public impact and burden of unplanned adolescent pregnancy necessitate the need for long term, effective, preventative contraception choices. LARCs are more likely to be continued in teens than short-acting contraception, with continuation rates over a one-year period of 81% versus 44% (ACOG, 2012). According to ACOG (2012), 96% of teens and young women aged 13-24 were able to receive an intrauterine device (IUD) on the first visit to their primary care provider, which demonstrates that these adolescents are appropriate candidates (ACOG, 2012). LARC use amongst adolescents aged 15-19 remains lower, at 8.2% compared to 13.1% of 20-29-year-olds (Centers for Disease Control and Prevention, 2019). U.S. Medical Eligibility Criteria Categories for Classifying Hormonal Contraceptives and Intrauterine Devices describes LARCs as category II, meaning that the benefit of LARC use in adolescents outweighs the potential risk (ACOG, 2012).

Despite immense support and promotion by both the American Academy of Pediatrics (AAP) and American College of Obstetricians and Gynecologists (ACOG), LARC use in adolescent populations remains low. The AAP notes that half of the pediatric teen patients under 18 years of age are sexually active. Due to the increased maternal morbidity associated with teen pregnancy, the AAP also states that current research has refuted previous false claims and misconceptions, concluding that the implant is an “ideal” method and that IUDs are safe for teen use (Ott & Sucato, 2014).

Historically, LARC use in adolescents has been highly controversial, due to provider practice patterns, biases, myths, and misconceptions regarding the side effects of LARCs, as well as women's attitudes toward LARCs (Peipert et al., 2011). Some of these misconceptions include that IUDs cause abortion, pelvic inflammatory disease, infertility, ectopic pregnancies, and even cancer (Russo, Miller, & Gold, 2013). Myths that LARCs cause weight gain, hair loss, osteoporosis, and worsening acne also persist. Once the safety of LARC use in adult women became well-established, research pertaining specifically to the safety of LARCs and adolescents lagged behind. Both patients and providers may raise concerns about uterine size and difficulty of insertion for nulliparous women, as well as the potential for uterine perforation. However, there is insufficient data to prove higher rates of expulsion or perforation risk for women who have or have not been previously pregnant (Russo, Miller, & Gold, 2013).

Although the concept of inserting a foreign object into the uterus may have been around for centuries, the first modern documented human IUD was developed in 1909 (Reproductive Health Access Project, 2013). Early IUDs had many different designs and many flaws. Some lacked strings to check placement and ease removal. The IUD was revolutionized in 1969 when the modern T-shaped design made with copper was found to have excellent contraceptive effects. Hormone releasing designs quickly followed in the market, including the Dalkon Shield IUD, which was pulled after just 3 years due to poor outcomes leading to over 300,000 lawsuits. IUD use declined significantly in the 1970s and early 1980s when poor string designs funneled bacteria into the uterus and caused cases of pelvic inflammatory disease, sepsis, and infertility. It was not until 1988 that the Copper T380A (ParaGard) was approved by the United States Food and Drug Administration. The much improved 52mg levonorgestrel-releasing IUD (Mirena) became available for use in the U.S. in 2001 (Reproductive Health Access Project, 2013). Today

there are three levonorgestrel-releasing IUDs available in the U.S. (Madden, 2019). Newer levonorgestrel-releasing IUDs (Kyleena and Skyla) boast smaller diameters, lower hormone levels, and are targeted toward nulliparous women (Madden, 2019).

Once inserted inside the uterus, an IUD's mechanism of action has several components: As a foreign body in the uterus, the IUD causes a sterile inflammatory response that is toxic to sperm and eggs (Madden, 2019). The IUD also works to thin the lining of the uterus, so that it is unfavorable for implantation or initiation of pregnancy. Copper IUDs, such as the ParaGard, have no effect on ovulation but rather act by impairing sperm migration, viability, and implantation into the uterine lining. In addition to copper IUDs, there are also plastic forms of IUDs available in the U.S. that emit levonorgestrel, a synthetic progesterone hormone. Levonorgestrel-containing IUDs work further to thicken cervical mucous and impair binding of sperm and egg while simultaneously creating an environment in the uterus that is unfavorable for pregnancy. Hormonal IUDs may or may not inhibit ovulation, however, this is not their main mechanism of action (Madden, 2019). Both IUDs and etonogestrel implants may be placed without surgery, in an outpatient setting such as a clinic.

Similar to hormonal IUDs, the subdermal implant works by slowly releasing a progestin hormone systemically in the body (Glasier & Gebbie, 2017). This implant is a small, flexible rod that is placed under the skin in a woman's upper arm. Unlike an IUD, the main mechanism of the subdermal implant is ovulation suppression, however, it may also cause thickening of cervical mucous. Subdermal implants may cause menstrual irregularities, so women should be counseled appropriately before insertion. The first subdermal implant, Norplant, became available in 1983 in Finland. The Norplant contained six capsules that offered different levels of circulating levonorgestrel. Eventually, the Implanon implant became available in the United States in 2006.

Early implants were often troublesome to remove, especially if they were inserted subcutaneously instead of subdermally. Newer technology has led to radiopaque implants, which can be seen on x-ray in case of difficult removal. Currently, the only subdermal implant available in the U.S. is the Nexplanon, released in 2011, which is a radiopaque single rod that can be used for 3 years (Glasier & Gebbie, 2017).

Worldwide, IUDs are the most commonly utilized form of reversible female contraception (Madden, 2019), yet the usage rates of LARCs vary greatly among industrialized nations. Among contraceptive using women in Asia, 27% used IUDs, followed by Europe (17.1%), Africa (15.4%), Latin America (9.6%), and finally North America (6.1%) (Buhling, Zite, Lotke, & Black, 2014). Wide variations among countries are influenced by government policy, funding, product availability, as well as social, cultural, and religious beliefs. Although the reasons for these variations are multifactorial, the most common reason for different rates of use is cost. For example, China's government pays for all women to have access to implantable contraception, whereas, in the United States, some women may pay up to $875 for an IUD plus an additional $300 for the insertion procedure. (Buhling et al., 2014).

Significance to Nurse-Midwifery

Certified Nurse-Midwives (CNMs) serve as licensed, independent primary health care providers for many women and newborns (American College of Nurse-Midwives, 2012). As practitioners, CNMs are held to a high standard of ethics and adhere to core competencies of care as defined by their professional organization, the American College of Nurse-Midwives (ACNM, 2012). These skills include providing primary and integrated care, referring to specialty practitioners when indicated, and prescribing pharmaceuticals. Although they are well-known for attending births, CNMs also provide reproductive health counseling, parenting education,

nutrition counseling, and annual exams (ACNM, 2019). According to the American Midwifery Certification Board (2018), there were 12,111 nurse-midwives certified in the United States in 2018. Midwifery continues to be a growing profession, meeting women's health care needs. The majority of CNMs in the U.S. practice alongside physician groups and in hospital settings (94.1%) whereas 3.2% practice in freestanding birth centers and 2.6% of CNMs provide in-home care (ACNM, 2019). CNMs are licensed to practice in all 50 states, including U.S. Territories and the District of Columbia (ACNM, 2019).

As primary care providers to women across the lifespan, CNMs are well-suited to provide counseling regarding reproductive life planning, including dispensing contraception when achieving pregnancy is not desired. Hallmarks of midwifery that support the midwife's role in contraception counseling and LARC placement in adolescents include: empowerment of women as partners in health care, skillful communication, guidance and counseling, promotion of a public health care perspective, and care to vulnerable populations (American College of Nurse-Midwives, 2012). Notably, midwives are held to a core standard of familiarity with gynecological care which includes knowledge of available contraception options, ethical counseling, and procedural skills for LARC insertion (American College of Nurse-Midwives, 2012).

The midwifery model of care incorporates walking alongside women, partnering with individuals to provide holistic care, and building trusting relationships. These components are radically important when discussing reproductive health and life planning, specifically long-acting reversible contraception with young women. Such counsel requires a degree of flexibility, confidentiality, sensitivity, up to date knowledge and skill for LARC insertion, and an accommodating "adolescent-friendly environment" (ACOG, 2017). Midwives take age,

development, personal beliefs, and goals into consideration. They provide ample time for adolescents to explore options, become familiar with contraception methods, and address questions. The midwifery care model provides clients with a unique, individualized approach to education and facilitates autonomous and informed decision making when discussing reproductive life plans (ACOG, 2017). Armed with current evidence-based knowledge regarding LARC use and the skill for placement, midwives are well equipped to directly offer LARC-promoting continuity of care. Midwives are perfectly suited to work with and walk beside adolescent women, helping to prevent unwanted teen pregnancies.

Theoretical Framework: Health Belief Model

During the 1950s, social scientists in the United States developed the Health Belief Model (HBM) to explain why individuals do and do not adopt disease prevention strategies (Boston University School of Public Health, 2019). Since then, this model has been applied across many cultures and disciplines to describe the psychological and behavioral underpinnings of how one cares for one's health. This model proposes the extent to which one believes in the recommended health benefit or intervention compared to the threat one perceives of illness determines the extent to which one will implement change (Boston University School of Public Health, 2019). Optimal behavior change is most likely to occur when perceived barriers, benefits, threats, and self-efficacy are addressed (Jones et al., 2016).

The HBM poses six constructs that are used to predict health behavior. These include risk susceptibility, risk severity, benefits to action, barriers to action, self-efficacy, and cues to action (Jones et al., 2016). Perceived susceptibility describes an individual's subjective estimation of the likelihood he or she would suffer an illness (Boston University School of Public Health, 2019). Similarly, perceived severity refers to the individual's subjective perception of the

physical and social consequences of illness. An individual's perception of benefits describes the effectiveness and value one sees in taking steps to prevent illness. These benefits are weighed against perceived barriers, such as cost, pain, or inconvenience, which would diminish one's likelihood of adopting a health behavior. Cues to action describe the internal or external stimuli required to adopt a new behavior. Finally, self-efficacy describes a person's confidence for success in carrying out a new behavior (Boston University School of Public Health, 2019).

Through the years, a large body of evidence has accumulated in support of the influence of the HBM's variables on health outcomes. However, there are still conflicting findings regarding which variables have the strongest impact (Jones et al., 2016). The relationships among HBM's six constructs remain somewhat ambiguous, which has led to variability in its application. Critics believe that the HBM should evaluate more complex causative factors (Jones et al., 2016). More research is necessary to identify and define the relationships between each of the HBM's constructs, as well as a deeper understanding of the intricacies concerning how changes in an individual construct impact changes in behavior (Montanaro & Bryan, 2014).

Application to LARC Usage Among Adolescents

The HBM may be applied to the usage of LARC devices among adolescents and young women (Bharadwaj et al., 2012). Specifically, this theory may help explore adolescents' perceptions of unprotected intercourse, including the risk of pregnancy and the severity of the physical and social consequences of pregnancy. This model may also serve as a framework to better explore the benefits and value which adolescents perceive in obtaining a LARC implant, including their understanding of its contraception effectiveness. For example, the reliability and long duration of LARCs tend to foster positive beliefs toward this contraceptive method. Identifying potential barriers to LARC access may lead to solutions for increased usage. Among adolescents, cost, fear of procedural pain and needles, and lack of awareness of methods are some commonly-cited barriers (Bharadwaj et al., 2012).

It is also necessary to evaluate adolescents' cues to action and self-efficacy surrounding their sexual health choices. Fostering self-determination, as well as a sense of responsibility for one's own fertility, are delicate yet consequential topics for all adolescents. As trusted care providers, midwives are in a position to highlight the advantages of LARCs when offering contraceptive counseling to young women and their parents (Bharadwaj et al., 2012). However, peer communication as a cue to action probably carries an even greater influence among this population than the CNM's recommendation. Young women may be willing to select LARCs when they know others have used it to their satisfaction. Women should be encouraged to share their positive experiences of LARCs with their peers (Bharadwaj et al., 2012). When constructs of the HBM are applied to issues surrounding LARC usage and adolescent development, a deeper understanding may be reached regarding why adolescents do or do not adopt this

contraceptive method. The HBM may also be used to clarify variables in order to modify sexual health behaviors and ultimately decrease unintended pregnancies among adolescents.

Summary

While 50% of teen pregnancies are unplanned, adolescent pregnancy has decreased over the last decade in the United States (Ott & Sucato, 2014). Although LARC use is supported by ACOG and AAP as an ideal method for adolescent pregnancy prevention, LARC use remains surprisingly low amongst this population (Centers for Disease Control and Prevention, 2019). In spite of misconceptions promulgated in the media and medical community, evidence supports that teens remain an appropriate population for LARC use and placement. Additionally, LARCs carry a high efficacy rate of >99% and are more likely to be continued in teens when compared to short-acting contraception options (ACOG, 2012). By walking alongside young women, midwives are in an ideal professional position to educate, listen to, counsel, serve, and support adolescents in their contraception choices as well as provide method initiation. Midwives regularly support adolescents by ensuring clients are aware of all available contraception options, including LARCs. As women's health providers, midwives also support adolescents by promoting access to care, including same day initiation to prevent unplanned pregnancies and honoring young women's individual wishes and reproductive life plans.

Chapter II: Methods

This chapter will describe the literature search surrounding adolescents' access to long-acting reversible contraception (LARCs). Articles were retrieved utilizing search databases with pertinent keywords. Exclusion and inclusion criteria further guided and reduced assessed literature to applicable studies. Evidence appraisal, including the level and quality of the incorporated articles, was evaluated utilizing the John Hopkins Evidence Level and Quality Guide.

For the purpose of this evaluation, the term LARC will be interchangeable with both the copper and levonorgestrel intrauterine device (IUD) and/or the etonogestrel implant. The studies revealed how patient education and counseling, provider knowledge and skills, peer and family influence, cost, contraception longevity, perceived or actual discomfort of initiation, and LARC advertisement were collective themes enveloping adolescents and access to LARCs.

Search Strategies

Multiple publication databases were searched for substantial and relevant articles published between the years 2010-2019 with the majority issued between 2016-2019. Four studies published between 2010 and 2013 were selected and incorporated due to their pertinent nature, quality, and strength of evidence. Employing the CINAHL database available through the Bethel University library search engine, a search was performed using the following terms: "teens and LARCs", "adolescents and LARCs", "long-acting reversible contraception", "teen pregnancy prevention", "contraception implant and adolescents", "intrauterine device", and "teen access to LARCs". The initial search yielded 294 articles. From this, results were narrowed down to 83 academic journal articles with full text available, less than 5 years old. The search

was also replicated using the PubMed database via the Bethel University library search engine. In order to achieve a manageable number, duplicates were removed, and 61 articles were excluded. In order to include the best evidence, the search term "randomized control trials and contraception" was also used to identify Level I experimental studies such as Oman et al. (2018). Data mining was an additional strategy for this search. For example, the work of Godfrey et al. (2010) was discovered through reading Peipert et al. (2011).

Criteria for Inclusion and Exclusion of Research Studies

Studies were chosen and implemented into matrices based on relevance to the topic of interest, LARC access and utilization in adolescence and young women ages 14-25 and published between 2010-2019. Dates of studies were limited to the most recent ten years in order to capture recent trends and the most relevant and up-to-date methods available to adolescents. Healthcare provider attributes and training specific to teens and LARCs were also included. Qualitative and quantitative studies were included to provide relevant statistical data as well as personal experiences of providers and adolescents. Research methods included randomized control trials, retrospective reviews, questionnaire surveys, cluster randomized control trials, single-arm prospective study, randomized pilot study, quasi-experimental studies, and retrospective chart reviews. International studies from industrialized nations were also included because LARC use is also well-established outside of the United States. However, studies were excluded if written in a language other than English. Studies without full text available or published before the year 2010 were also excluded.

Summary of Selected Studies

A total of 349 relevant abstracts were reviewed based on these search criteria. From this, 24 unique sources were carefully amassed. This included seven randomized control trials, eight quantitative observational design, seven cross-sectional observational qualitative studies, one logistic regression analysis, and one population based quasi-experimental study.

Evaluation Criteria

The John Hopkins Nursing Evidence Level and Quality Guide was used to evaluate the strength and quality of research studies (Dang & Dearholt, 2018). The strength of each study was assigned as levels I-III or V. Level I is the highest level of evidence. It includes experimental studies and randomized control trials (RCTs). Level II evidence includes quasi-experimental and explanatory mixed method studies. Level III evidence involves qualitative and nonexperimental studies. Level V evidence is based upon experiential or non-research data, including financial evaluation, case reports, and integrative reviews (Dang & Dearholt, 2018).

According to the John Hopkins Nursing Evidence Level and Quality Guide, once the evidence level has been established for a piece of research, its quality is rated as high, good, or low (Dang & Dearholt, 2018). Determinants of quality include consistency and generalizability of results, sample size, and definitive conclusions. With regard to qualitative studies, a quality rating is more subjective; objectives such as transparency, diligence, verification, self-reflection and scrutiny, as well as insightful interpretation are considered (Dang & Dearholt, 2018). This review included seven level I studies (five of which are of good quality and two with low quality), three level II studies of high/good quality, two level V studies (one with high and one with good quality), and nine high/good quality level III studies.

Summary

Research utilized search engines through the Bethel University library system, including PubMed and CINAHL, in order to access relevant scholarly articles. The available literature was further scrutinized and appraised for evidence by utilizing the John Hopkins Evidence Level and Quality Guide (Dang & Dearholt, 2018). Finally, inclusion and exclusion criteria aided to narrow the selected articles to 24 unique sources.

Chapter III: Literature Review and Analysis

Synthesis of Matrix

The matrix consisted of 24 unique scholarly articles including seven randomized control trials, five quantitative observational design studies, nine cross-sectional observational qualitative studies, and two population-based quasi-experimental studies. The sources were rigorously evaluated for strength utilizing the John Hopkins Nursing Evidence Level and Quality Guide; each study was assigned as levels I-III or V (Dang & Dearholt, 2018). The data from each article was organized to reveal the purpose, sample, setting, John Hopkins Nursing Evidence Level and Quality rating, and design. This included methods and instruments, results, conclusions, author recommendations, implications for practice, and the strengths and weaknesses of the study. The matrices were organized in alphabetical order by source. The goal for this literature review and analysis is to explore the benefits and barriers of LARCs among diverse groups of women between the ages of 15-24 and to describe how certified nurse-midwives (CNMs) may serve to facilitate their use. The Health Belief Model will serve as a theoretical framework for synthesizing variables surrounding LARC usage in young women.

Risk Susceptibility & Severity

The U.S. Medical Eligibility Criteria Categories for Classifying Hormonal Contraceptives and Intrauterine Devices describes LARCs as category II, proposing that the benefit of LARC use in adolescents outweighs the potential risk (ACOG, 2012). Actual physical consequences in comparison to adolescents' perception of risks associated with unprotected intercourse reveal discrepancies. High rates of sexually transmitted infections and unplanned pregnancies in this population prompt the need for dual protection. LARCs offer long-acting pregnancy prevention while condom use decreases the risk of sexually transmitted infections

(ACOG, 2018). Despite controversy regarding commencing LARCs in a populace identified as "high risk" for sexually transmitted infections, a quantitative observational study of adolescents (N=233) by Alton et al. (2013) concluded that IUDs did not increase the risk of infection. In fact, they suggested the intrauterine device may offer some degree of protection. One plausible explanation for this finding is that the hormonal effect of levonorgestrel-containing IUDs causes cervical mucus thickening, which may serve as a barrier to infection (Alton et al., 2013). Several social consequences surround unintended pregnancies in this population and additional risks are noted amongst racial minorities and low socioeconomic populations (Yazdkhasti et al., 2015).

Appropriate Populations

Several unique adolescent populations were found to have benefited from the use of LARCs in this literature review. These populations included nulliparous women, women living in institutions, ethnic groups that have a higher risk for unplanned pregnancy, and women who initiated LARC immediately after pregnancy such as with PP & abortion) (Alton et al., 2013; Bryant et al., 2017; Gemzell-Danielson et al., 2016; Gyllenberg, Juselius, Gissler, & Heikinheimo, 2018). The consistency, forgettability, and discreteness associated with LARCs enable adolescents to "live in the moment". Despite risky adolescent behaviors such as underage alcohol consumption, sexual promiscuity, or illicit drug use, the efficacy of LARCs remains uncompromised. For this reason, when discussing available contraception methods with adolescents, the provider should also convey comprehensive education on safe sexual practices, inclusive of the reliability of LARCs, in order to reduce risk and promote sexual health and holistic wellness. Numerous studies highlight the benefits of LARC usage in diverse populations of young women.

Nulliparous Women

Historically, intrauterine devices have been used only in women who have previously given birth. It was believed that only when a cervix had been previously dilated during the birthing process that it would be suitable for IUD insertion. Current research suggests that nulliparous women are good candidates for LARCs regardless of age. In a retrospective review of intrauterine devices in adolescents and young women, Alton et al. (2013) provides reassurance regarding the safety of IUD use in a diverse population of adolescents and nulliparous young women.

Alton et al. (2013) identified age as a greater risk of removal/expulsion (hazard ratio (HR) = 2.85) while parity (RR = 5.6 for nulliparous vs multiparous patients, $P < 0.001$) and prior STI (RR = 5.5, $P < 0.001$) were significant risk factors for infection. The hazard ratio refers to the probability of LARC removal/expulsion related to age versus the control group, while the relative risk compares the nulliparous vs multiparous groups to analyze risk factors for infection. The probability value of $P < 0.001$ indicates that the findings are highly statistically significant. Nulliparous patients were at a higher risk of expulsion ($P = 0.045$), though age was not a statistically significant risk factor. They established that the IUD did not increase the risk of infection, while endorsing that the IUDs appear to be a sound option in young adolescents (<18 years old) and nulliparous women (Alton et al., 2013).

Additionally, in a recent high-quality quantitative longitudinal study, Gemzell-Danielsson et al. (2016) examined low-dose levonorgestrel IUDs in healthy nulliparous adolescents aged 12-17 (n=304). They found no new or unexpected adverse effects associated with low-dose LNG-IUS 8 intrauterine contraception (Gemzell-Danielsson et al., 2016). The safety profile of LNG-IUS 8 in adolescents was comparable to data previously reported in adults. Adolescent

satisfaction with the levonorgestrel IUD was high, reported at 83.9%, while the rate of discontinuation at 12 months was low at 16.8% (Gemzell-Danielsson et al., 2016). Despite established safety profiles for IUDs in adolescents, many pediatricians are more likely to recommend the levonorgestrel implant over an IUD in nulliparous adolescents (Berlan, Pritt, & Norris, 2017).

Institutionalized Women

Women who reside in an institutional setting are a marginalized population and may have less access to family planning options. They also may not have control over when or how they prevent pregnancy, so LARCs may be a good option for these women. In a randomized control trial, Oman et al. (2018) utilized a Power Through Choices (PTC) intervention, an age-appropriate and medically up-to-date sexual health and birth control education program in an effort to reduce unplanned pregnancy and promote the use of contraception among system-involved youths. Of both males and females (N=1036) residing in a group home, those who received PTC education were less likely to participate in intercourse without using contraception (adjusted odds ratio [AOR] = 0.72; 95% confidence interval [CI] = 0.52, 0.98). A one-year follow up revealed that youth who received PTC as an intervention were at a reduced risk of becoming pregnant or impregnating a partner (AOR = 0.67; 95% CI = 0.46, 0.99). Adolescents in the intervention group versus the control group were 20.2% and 24.3% ($P = .14$) at 1 year. This study demonstrates that group homes can be a feasible and efficient setting for risk reduction, delivering pregnancy prevention programming to system-involved youths.

Ethnic groups

Race and sociodemographic factors play a nuanced yet significant role in young women's attitudes and decisions toward sex and contraception (Kusonoki, Barber, Ela, & Bueck, 2016).

Historically, Black women have been more skeptical of contraceptives and have held a more negative view of hormonal contraceptives (Kusunoki, Barber, Ela, & Bucek, 2016). This may be the result of systemic racism, historical association of family planning with the practice of eugenics, general mistrust of the medical system, and accounts of coerced sterilization. Yet today, Black teens have a three-times higher pregnancy rate than White teens, as well as a four-times higher abortion rate (Kusunoki, Barber, Ela, & Bucek, 2016). Despite the staggering racial disparities in unintended pregnancy rates, two studies in this literature review suggest similar patterns of LARC use among women, irrespective of race-ethnicity (Kramer, Higgins, Godecker, & Ehrenthal, 2018 & Kusunoki et al., 2016). Kusunoki et al. (2016) investigated the differences in pregnancy-related behaviors among adolescent women in order to gain a deeper understanding of racial disparities in the United States' unintended pregnancy rates. Through a series of interviews and longitudinal data analysis, they found that Black women in this study actually used LARC slightly more than White women (mean = 0.13 and 0.07, respectively) and there was no racial difference in how long LARC users used that method. Yet the overall usage of LARCs was low among all races. Strikingly, Black women used oral contraceptive pills less often than White women and relied more on condoms than White women, which may contribute to increased rates of unintended pregnancy among Black women. Young women from disadvantaged socioeconomic backgrounds tend to use less effective contraceptive methods and use contraception less frequently, although not necessarily less consistently (Kusunoki et al., 2016).

Through logistic regression analysis of data from National Surveys of Family Growth, Kramer et al. (2018) evaluated N=9321 women ages 15-44 for patterns in LARC usage among differing race-ethnic groups. According to the data, low income and education did not predict

LARC use more strongly among Black and Hispanic women than among White women. However, the experience of unintended pregnancy (p=.014) was one statistically significant racial interaction. Specifically, among White or Hispanic women who experienced an unintended pregnancy, these women had a higher predicted probability of LARC use after delivery than those who did not. Conversely, among Black women, the experience of prior unintended pregnancy was not associated with a higher predicted probability of LARC use (Kramer et al., 2018). Finally, a logistic regression analysis of data from the Planned Parenthood League of Massachusetts found that White women were more likely to initiate immediate LARC use after a surgical abortion compared to Black women (aOR 0.81, 95% CI 0.74–0.89) (Roe et al., 2019).

Post-Delivery Women

Adolescents who have been pregnant before are at increased risk for subsequent pregnancies (The Guttmacher Institute, 2019). Offering LARC post-delivery can help women space their pregnancies. Adolescents using LARCs are significantly less likely to have a repeat pregnancy within 2 years compared to those using other contraceptive methods (Russo, Miller, & Gold, 2013). Inpatient hospitalization at the time of birth presents unique opportunities to discuss LARC utilization with teens. Placing the implant during hospitalization provides immediate and direct access to care which may be beneficial for young women and adolescents who are more prone to closely spaced pregnancies and often less compliant with follow up appointments (Bryant et al., 2017). A randomized controlled trial of (N=96) postpartum adolescents ages 14-24 suggests the subdermal implant when initiated immediately postpartum (N=37) is more likely to result in method continuation (81%) and breastfeeding (40%) at 12 months versus insertion at 6 to 8 weeks postpartum (N=27) continuation of (78%) and breastfeeding rate of (17%). Insertion in the immediate postpartum period substantially increased the likelihood of continuous

usage for at least 12 months (P<.001), which is statistically significant. However the continuation rate of 78% of women who waited to receive the implant at 4-6weeks postpartum (p=.75) is not statistically significant (Bryant et al., 2017).

Post-Abortion Women

Almost one-half of unintended pregnancies end in abortion (The Guttmacher Institute, 2019). LARCs may be offered after a medical or surgical abortion to decrease the likelihood of additional abortions and to help support individual clients' reproductive life plans. According to a population-based, observational quasi-experimental study in Finland conducted by Gyllenberg et al. (2018), when LARCs were available free of charge to women aged 15-25, abortion rates were reduced by 16% (p<.001). The estimated resources saved from reduced abortions and unplanned pregnancies surpassed the financial expenditures spent on LARC methods (Gyllenberg et al., 2018). Furthermore, a quantitative longitudinal cohort study by Roe et al. (2019), utilized mixed-effect logistic regression to evaluate and predict outcomes related to same-day LARC initiation post-surgical abortion clients from 2012 to 2017 (N=26,858). Twenty-five percent of clients chose to pursue immediate LARC placement of an IUD or subdermal implant immediately after the surgical abortion procedure. Of those, 18% of women chose an IUD for contraception (77% the levonorgestrel IUD and 23% the copper IUD) while 7% pursued the subdermal implant.

Roe et al. (2019) also suggest younger women and nulligravidae were more likely to choose the implant over the IUD after a surgical abortion (<18 versus ≥35: aOR 3.26, 95% CI 2.26–4.71). The adjusted odds ratio provides information about different variables, i.e. the type of contraception method while the confidence interval of 95% is reassuring. Women who have previously given birth were more likely to initiate LARC use immediately post-abortion with the

IUD (aOR 1.69, 95% CI 1.57-1.82) or the subdermal implant (aOR 1.36, 95% 1.20-1.53). LARC usage and racial background varied as White women more likely to pursue an IUD than Black women after a surgical abortion (aOR 0.81, 95% CI 0.74-0.89). The 95% confidence interval reflects sureness in results. The gestational age of the pregnancy at the time of the abortion was not found to have impacted client choice for either the IUD or implant. The opportunity to receive anesthesia for the abortion procedure, thereby decreasing the perceived associated pain with IUD insertion could have potentially impacted client decisionmaking. Overall, one-fourth of post-abortion women from different ages and backgrounds chose to initiate the IUD or implant when offered same-day placement. The post-abortion procedure is an ideal time to offer same-day placement, decreasing the risk of losing clients to follow up appointments, while also avoiding the possibility of additional unintended pregnancies or surgical procedures (Roe et al., 2019).

Benefits

Long-Acting

The longevity of action with the benefit of reversibility are key strategic features of LARCs. The duration of effectiveness amongst intrauterine devices and subdermal implants varies; however, a common theme amongst these contraception models is the ease of reversibility and rapid return to fecundity. The copper T380A intrauterine device is FDA approved for 10 years with an unintended pregnancy rate of 1.9 out of 100 women over the course of a decade (ACOG, 2017). A distinctive benefit of this method is instant action and secondary ability to be utilized as emergency contraception. A variety of levonorgestrel intrauterine devices are FDA approved from 3 years of use (Skyla) to 5 years of use (Mirena (ACOG, 2017). The failure rate amongst levonorgestrel intrauterine devices is less than 1 in 100

women. The subdermal implant consists of etonogestrel and continues to provide contraceptive benefits for 3 years with a failure rate of 0.05% (ACOG, 2017).

Several studies in this literature review associate LARC utilization with high continuation rates (Alton et al., 2013; Bharadwaj et al., 2012; Gemzell-Danielsson et al., 2016; Rosenstock et al., 2012). In a quantitative, observational, cohort study, Gemzell-Danielsson et al. (2016) examined the perceptions (N=203) of 12-17 year olds to gain insight about adverse events, satisfaction, and continuation experiences of postmenarcheal adolescents with the LNG-IUS 8. The LNG-IUS 8 was associated with a high overall user satisfaction rate (83.9% at 12 months/EOS). The Kaplan–Meier 12-month cumulative failure rate was 0% while the low discontinuation rate over 12 months was 16.8% unadjusted PI was 0.00 (95% CI: 0.00–1.86) and was found to be statistically significant due to the confidence interval of 95% (Gemzell-Danielsson et al., 2016).

Similarly, a quantitative, observational, cohort design by Alton et al. (2013) examined intrauterine device use and retention in young women from menarche to 21 years old (N=233). The reported rate of continuation over 5 years was lower in adolescents <18 at 50% compared to 18-21-year-olds at 71.5%, suggesting the age of insertion is a significant theme in method continuation ($P < 0.001$). Rosenstock et al. (2012) examined participants' (N= 7,472) continuation of reversible contraception amongst young women aged 14–25 years, comparing them to women older than 25 years of age in a quantitative, observational, cohort study. At 12 months of use, Rosenstock et al. (2012) stated 75% of participants reported method continuation. There was no statistically significant difference in continuation rates amongst teenagers at (81%) versus women older than 25 (86%) (Rosenstock et al., 2012). A quantitative, observational, cross-sectional study by Bharadwaj et al. (2012) surveyed adolescents <22 years

of age (N=194) to identify factors related to acceptance or rejection of long-acting reversible contraceptives. While LARC use in this sample was low (28%), the study suggested that adolescents who are well-informed about contraceptive options are likely to be satisfied with and to continue the use of their chosen LARC method than those who are not well-informed (Bharadwaj et al., 2012).

Satisfaction

Individual client satisfaction is a significant factor for method continuation. Both nulliparous and parous young women report high satisfaction with LARCs when they are counseled about the benefits and risks before insertion (Russo et al., 2013). Four studies in this literature review have established a high overall user satisfaction rate with LARC (Gemzell-Danielsson, 2016; Peipert et al. 2011; Godfrey et al., 2010; & Rosenstock et al., 2012). A quantitative, observational, longitudinal, quasi-experimental study by Peipert et al. (2011) described satisfaction and continuation rates of intrauterine device and implant users enrolled in the Contraceptive CHOICE Project, a community effort to promote the use of LARCs and reduce unintended pregnancies in St. Louis, Missouri. When participants (N=5,087) were offered free contraception for three years, 68% chose a LARC method (45% levonorgestrel intrauterine system, 10% copper IUD, 13% subdermal implant) while 11% choose oral contraceptive pills (OCPs), 10% the vaginal ring, 8% depo-medroxyprogesterone acetate and 2% the transdermal patch). Women who chose to initiate LARC methods had substantially higher 12-month continuation rates (86%) especially compared to OCP users (55%). Satisfaction rate with LARC methods emulated the continuation rates as over 80% of users were satisfied with the IUD compared to 54% with OCPs (Peipert et al., 2011). In an experimental, randomized, control trial, Godfrey et al., (2010) assigned adolescents aged 14–18 years (N=23) to the copper intrauterine

device or the Levonorgestrel Intrauterine System in order to assess user satisfaction and safety. At 6 months, continuation rates were 75% for the Levonorgestrel Intrauterine System users and 45% for the Copper T (p=.15). Overall satisfaction was found in both groups (Godfrey et al., 2010).

Rosenstock et al. (2012) examined participants' (N= 7,472) satisfaction with LARCs amongst young women aged 14–25 years, compared to women older than 25 years of age in a quantitative, observational cohort study. Satisfaction was higher amongst IUD users versus subdermal implant users at (74% versus 58%, p=0.002). Young women aged 14–19 years were less likely to be satisfied with non-LARC methods (42% v. 51%; 95% CI 0.65–0.98). Yet teenagers were not less likely to be satisfied with LARC methods (75% v. 83%; 95% CI 0.88–1.01), when compared to women over 25. These findings are statistically significant and suggest both teenagers and young women have high rates of LARC method continuation (Rosenstock et al., 2012).

Financial Efficiency

When LARCs prevent unintended pregnancy and abortions they save money. From a fiscal perspective, unplanned adolescent pregnancy and its associated healthcare are costly. Yet when a LARC is used for the full duration of its life, it actually provides cost savings compared to short-acting contraception. According to ACOG (2017), LARC use becomes "cost-neutral within 3 years of initiation when compared with the use of short-acting methods." In an analysis of LARC initiation for adolescents, Wilkinson, Downs, Tucker, and Edmonds (2019) discovered that same day insertions were associated with lower overall costs ($2016 per patient over 1 year) than LARC placement at a follow-up visit ($4133 per patient over 1 year). Same day LARC insertion is defined as implanting the device at the time of or within the same day it was

requested. In addition to lower associated healthcare costs, same-day LARC placement was associated with an unplanned pregnancy rate of 14% versus 48% and an abortion rate of 4% compared to 14%. No P value provided by researchers. Providing same-day LARC initiation could save taxpayer dollars and decrease the rate of unintended pregnancies and abortions among adolescents (Wilkinson, Downs, Tucker, & Edmonds 2019).

Providing contraception through public programs is both cost-efficient and economically promising (Gyllenberg et al., 2018; Sundstrom et al., 2015; Thompson et al., 2016). When high costs of LARC insertions are eliminated, the use of these highly effective methods will increase. One facet of the Patient Protection and Affordable Care Act of 2010 requires insurance companies to fully cover all contraceptive methods approved by the Food and Drug Administration, which includes the IUD and implant. (Sundstrom et al., 2015). Through a randomized control trial, Thompson et al. (2016) discovered that (N=1500) women aged 18-25 were more likely to initiate LARC through publicly funded programs compared to women who were uninsured or privately insured. Gyllenberg and colleagues (2018) also found that when LARCs were provided free of charge to women (N=23) in Finland through a public program, LARC usage doubled amongst women ($p<.001$). By making free LARCs available to adolescents ages 15-19, public programs provide effective means to both reduce the unmet need for contraception and the need for abortion, especially among women younger than 25 years (Gyllenberg et al., 2018). By providing LARCs at low or no cost to women, the consequential costs of unplanned adolescent pregnancy and abortion are also avoided.

Barriers to Action

Concern regarding safety associated with LARC use remains an active barrier to adolescent contraception options. Additionally, fear, misconceptions, cost, and lack of access to care pose barriers to LARC usage in young women.

Misconceptions

Despite the well-established safety of LARCs, many teens do not know that they are eligible candidates. According to a cross-sectional, observational study by Kavanaugh et al. (2013), of the n=48 young women aged 16-24 interviewed, 25% believed they were too young for LARCs. There were also misconceptions regarding the length of action and time to return to fertility after discontinuation. In a qualitative study by Sundstrom et al. (2015), interviews with young women aged 18-24 (N=53) revealed themes including participant concern regarding the length of action and perception of extended return to fertility as barriers to LARC initiation. The myth of perfect use and feeling more "in control" with daily oral contraceptive pill consumption were also cited as barriers to choosing LARCs (Sundstrom et al., 2015). For this reason, it is essential to provide anticipatory guidance to adolescents and young women during contraception counseling on the rapid reversibility of LARCs, the standing option for removal, and the lack of influence on future fertility.

Costs

Lack of insurance coverage, out-of-pocket costs, and lack of public funding for LARCs create significant cost barriers to LARC access (Sundstrom et al., 2015; Thompson et al., 2016). Currently, in the United States, Medicaid and Medicaid expansion family planning programs provide the largest public funding for contraception (Thompson, et al., 2016). In a randomized control trial based in Planned Parenthood clinics, clients (n=1500) who sought care at clinics with family planning funding related to expansion programs were twice as likely as the control

clinics to initiate LARC use. LARC initiation also increased among participants with public but not private health insurance (Thompson, et al., 2016). Sundstrom et al. (2015) conducted interviews with young women aged 18-24 (N=53) in which participants choose oral contraceptive pills over LARCs because they were less expensive or free compared to LARCs, which were only partially covered by insurance.

Lack of Access

Unfortunately, it may be difficult for some adolescents to initiate a LARC on same-day visits. In an observational cross-sectional qualitative study, Kavanaugh et al. (2013) discovered that a greater amount of time or multiple clinic visits may be necessary to counsel teens regarding LARCs and provide placement. Among (n=48) young women aged 16-24, a common barrier to LARCs included needing longer and often additional appointments. In the clinical atmosphere, cost and time constraints impact facilities' ability to provide continuing education for staff and up-to-date client education (Kavanaugh et al., 2013). Santibenchakul et al. (2019), evaluated LARC initiation among n=450 nonpregnant women between ages 14-25 in a high-volume Honolulu clinic. Through retrospective chart reviews in this cross-sectional observational study, researchers found that among eligible clinic visits, 9% of young women chose to initiate LARCs. Of those who desired a same-day LARC placement, 20% of women were unable to receive the LARC on the same day, due to lack device availability or lack of insurance coverage for placement that day (Santibenchakul et al., 2019). Every clinical visit is an opportunity to assess the risk of unintended pregnancy and ensure that contraceptive needs are addressed.

Fear

Adolescents may cite fear of pain, fear of undergoing a procedure, potential side effects, and fear of a foreign body as reasons they do not want to initiate LARCs. Through a qualitative, observational, cross-sectional study, Coates, Gordon, & Simpson (2018) invited young women ages 14-21 (n=18), who were without a history of past LARC use, to reflect on beliefs and potential barriers to LARC use in adolescents, through 15-minute semi-structured interviews. Researchers found that fear and uncertainty surrounding having a foreign body inside of the body

were common barriers to LARC access in young women ages 14-21. Fear of pain is also commonly linked to the IUD and implant, making LARCs less appealing to young people (Alton et al., 2013; Bharadwaj et al, 2012). Counseling adolescents by listening to and addressing concerns regarding the length of use, ability to remove the contraceptive device, and identifying benefits of utilizing LARCs to prevent unwanted pregnancy is essential while providing education and guidance to adolescents (Coates, Gordon, & Simpson, 2018).

Self-efficacy & Cues to Action

LARCs are efficacious and safe. These methods provide the highest level of contraceptive protection without the need for user action, responsibility, or participation. Forgetability, discreteness, reversibility, patient satisfaction, effectiveness, and longevity are characteristics that play into the need for engagement. These are all factors that may boost an adolescent's confidence for success in choosing and continuing LARC. Peer satisfaction, social media, prior pregnancy, providers' attitudes, and skills are examples of cues to action that influence the adolescent decision-making process to initiate LARCs.

Peer satisfaction

Two studies in this literature review found that young women are more willing to select a LARC when they know others have used it to their satisfaction (Bharadwaj, Akintomide, Brima, Copas, & D'Souza, 2012; Wilson, Degaiffier, Ratcliffe, & Schreiber, 2016). Among women younger than age 22 (n=194) in a sexual health clinic in North London, having friends or family who have used or recommended the implant significantly increased its favor over the injection ($p=0.002$) or IUD ($p = 0.001$) (Bharadwaj et al., 2012). Based on this finding, the authors recommend that women be encouraged to share their positive experiences of LARCs with their peers (Bharadwaj et al., 2012). In another randomized control trial of n=110 adolescents aged

13-21, the information provided by peers was discovered to be more helpful and influential (95%) than information provided by a health counselor (62%) among women considering LARC placement (Wilson et al., 2016). The positive experiences of female friends and family with LARC usage offer invaluable influence over young women's contraception choices.

Social Media

In addition to face-to-face communication, social media has been studied as a potential new frontier for promoting awareness about LARCs. In a recent stratified cluster randomized control trial, Byker, Myers, & Graff (2019), examined whether a social media campaign may increase the usage rates of LARCs among adolescents. In this study, female Facebook users ages 18-34 within targeted zip codes in New England received contraception advertisements sponsored by Planned Parenthood. After examining data on (n=152,743) patient visits, there was no statistically significant increase in the choice to use LARC or initiation within 4 months of the social media campaign. Although a correlation could not be proven, this project demonstrates the importance of evaluating the impact of resources invested on advertising with the goal of promoting public health (Byker, Myers, & Graff, 2019).

Recent Pregnancy

The overwhelming and life-changing experience of recent pregnancy may serve as a poignant cue to action for adolescents to initiate LARC. Both initiation and continuation rates of LARCs are especially successful during the immediate postpartum period. Hospitalization after birth provides immediate access to care, whereas some teenage or low-resource mothers may not return for a postpartum clinic visit after 4-6 weeks (Bryant et al., 2017). In one randomized control trial, young mothers ages 14-24 in a North Carolina hospital (n=96), who received the implant during their hospital visit were more likely than those who received it at a 4-6 week

follow-up visit to continue the method for at least 12 months (P<.001). Although not the focus of this study, an incidental discovery identified that these same mothers were also more likely to breastfeed their babies for at least 6 months (Bryant et al., 2017).

Providers' Attitudes and Skills

Provider attitudes and familiarity toward LARCs play a dramatic role in LARC usage. According to a small sample (n=23) study by Berlan, Pritt, & Norris (2017), a provider's personal lack of knowledge, comfort, or familiarity with etonogestrel implant or IUD may impact birth control methods offered to adolescents in practice. A provider's poor opinion of LARCs may hinder a teen from obtaining an implant or IUD. This underscores the importance of updating healthcare providers regarding the most current evidence about contraceptive methods in order to influence practices (Berlan, Pritt, & Norris, 2017). Norris, Pritt, & Berlan (2019) went on to evaluate barriers and identify factors in which LARCs may be offered to adolescents in the pediatric care setting. In a qualitative, observational, cross-sectional study involving n=23 pediatricians in Midwestern community clinics, reasons for low LARC use among pediatric clients included misunderstanding, a lack of pediatrician clinical knowledge, and discomfort with providing contraception to young people. Provider factors such as time, training on insertion techniques, and lack of counseling are other probable barriers to LARC use in the pediatric setting (Norris, Pritt, & Berlan, 2019).

Conversely, Gibbs et al. (2016) discovered that when providers in 20 Planned Parenthood clinics were offered a half-day in-service on LARC use in adolescents and (n=1500) sexually active female patients aged 18-25 were offered an informational video about LARCs, the initial use of LARCs increased among these intervention groups for both nulliparous (p=.12) and parous (p=.52) women. Although these results were not statistically significant, this study

demonstrates that providing LARC training and education to providers may help to increase patient awareness of LARCs and initiation in nulliparous and parous adolescents (Gibbs et al., 2016). Fostering a positive philosophy of LARC use amongst providers is vital to increase LARC use amongst teenagers.

Educating healthcare providers on LARC use may increase confidence and support, thus positively impacting providers' perceptions and practices in regard to these methods of birth control. In their qualitative, cross-sectional study, Murphy, Stoffel, Nolan, & Haider (2016), sampled n=16 private practice providers from diverse disciplines, such as pediatricians, advanced practice nurses, and physicians in Chicago. In surveying these providers regarding their attitudes toward LARCs in adolescents, researchers found that health care provider readiness to provide LARCs was positively influenced by their confidence to provide the method in practice, accessibility to LARC devices, and negatively influenced by lack of training or professional privileges. They demonstrate that current, ongoing training and education can impact health care providers' views and practices in regard to providing LARCS to adolescents (Murphy et al., 2016).

Critique of Strengths & Weaknesses

Strengths

Strength was found in the variety of aforementioned reviewed studies that shed light on a variety of factors and common themes influencing adolescent LARC usage. The individual perspectives and experiences of adolescents, as well as healthcare provider comfort, knowledge, and skill, were fully explored. The majority of the studies reviewed were all high/good quality ratings and were statistically significant. Seven randomized control trials were rated as high/good quality according to the Johns Hopkins Evidence Appraisal. Another strength identified was the

variety of populations, which was inclusive of teens and young women from different social backgrounds and ethnicities. Postpartum, post abortion, institutionalized women, multiparous and nulliparous women were also included. Multiple studies examined other important factors such as provider attitude and skill, the influence of social media, patient fears and misconceptions, access to care, cost, financial efficacy, user satisfaction, and barriers to action. Strong evidence supported LARC device initiation and continuation in adolescents, barriers to LARC uptake, and the role of LARCs in adolescent pregnancy prevention.

Weaknesses

The majority of reviewed research studies were qualitative. Qualitative studies help gain information on individual experiences; however, they often lack generalizable statistics. Unlike concrete calculations seen in quantitative studies, qualitative studies may be interpreted as subjective, flexible, and less rigid in form, which can impact data interpretation, application, and acceptance. Several studies were statistically insignificant or made up of small sample sizes and shed little light on the research question. These included the impact of the media on LARC uptake, an experimental, cluster-randomized control trial on LARC contraception counseling, and use for older adolescents and nulliparous women. Not all studies chose to include adolescents under the age of 18, which is an additional weakness.

Summary

Adolescents are a high-risk population for an unplanned pregnancy. Despite significant racial disparities in adolescent pregnancy rates, patterns of LARC use are similarly low among all races (Kusonoki et al., 2016). Teens have many misconceptions about LARCs or may not know they are eligible (Kavanaugh et al., 2013). Data support that LARCs are a safe option for all adolescents, including nulliparous, postabortion, or postpartum females, and system-involved

youths. The unparalleled efficacy, longevity, and forgetability associated with LARC use are especially beneficial to this population in preventing unplanned pregnancies. Due to their safety profile and high rate of efficacy, LARCs should be considered as first-line contraception agents while counseling adolescents. LARCs are safe and appropriate for nulligravida and young adolescents. LARCs utilization is associated with high continuation rates (Alton et al., 2013; Bharadwaj et al., 2012; Gemzell-Danielsson et al., 2016; Rosenstock et al., 2012).

When counseled well about benefits and risks before insertion, adolescents have high overall satisfaction with these devices (Russo et al., 2013). There is evidence to support financial efficiency when LARCs are used to their full duration and successfully prevent unintended pregnancy and abortion. Providing same-day LARC insertions can both save money and avoid unwanted pregnancies (Wilkinson, Downs, Tucker, & Edmonds, 2019). Yet without public funding, high cost, lack of insurance, and lack of timely access present barriers to LARC. Barriers to LARC use include fear of pain and procedure, myths, fear of a foreign body, and misunderstandings are other reasons why adolescents may not choose LARC (Coates, Gordon, & Simpson, 2018). Additional barriers include personal beliefs, advice from friends and relatives, and cost. Health care providers' attitudes and skill sets, as well as the availability of same-day placement, also influence whether or not adolescents choose to utilize LARCs for contraception.

Chapter IV: Discussion, Implications, and Conclusions

Literature Synthesis

LARCs provide safe, reliable contraception to women, regardless of age or parity. LARCs are also associated with high satisfaction and continuation rates (Alton et al., 2013; Bharadwaj et al., 2012; Gemzell-Danielsson et al., 2016; Rosenstock et al., 2012). Satisfaction surrounding LARC usage is exceptionally high among women who are thoroughly counseled about the benefits and risks of use before insertion (Russo et al., 2013). Both intrauterine devices and subdermal implants are easily reversible, and in doing so, women can rapidly return to fertility when pregnancy is desired. Adolescent satisfaction with levonorgestrel IUD is high and discontinuation rates are low (Gemzell-Danielsson et al., 2016). Research has found that adolescents are more satisfied with and more likely to continue LARCs compared to OCPs (Peipert et al., 2011). There is evidence that adolescents have higher satisfaction rates with IUDs compared to the subdermal implant (Rosenstock et al., 2012). Although satisfaction is high with both levonorgestrel and copper IUDs, evidence shows higher satisfaction with hormone-emitting IUDs (Godfrey et al., 2010). Despite the well-established safety and satisfaction of IUDs among adolescents, pediatricians are still more likely to recommend the implant over the IUD (Berlan, Pritt, & Norris, 2017).

In general, adolescents from disadvantaged socioeconomic backgrounds tend to use less effective contraceptive methods and use them less frequently, although not necessarily less consistently (Kusunoki, Barber, Ela, & Bucek, 2016). Although Black teens face higher pregnancy and abortion rates in the United States compared to White teens, their usage of LARCs is about the same. Specifically, Black teens have been slightly more likely than White

teens to use LARCs, but there is no difference in length of use among races (Kusunoki et al., 2016). Overall, LARC usage remains relatively low among all races.

Adolescents with a history of previous pregnancy are more likely to experience subsequent pregnancies. When LARCs are offered to adolescents immediately after having an abortion or delivering a baby, they can help space future pregnancies. Adolescents using LARCs postpartum are significantly less likely to have a repeat pregnancy within two years, compared to those using other contraceptive methods (Russo, Miller, & Gold, 2013). When LARCs are inserted during hospitalization immediately after birth, this direct and timely access to contraception is beneficial for adolescents who are more prone to closely spaced pregnancies and often less compliant with follow up appointments (Bryant et al., 2017). Thus, LARC insertion should be offered to low-resource mothers before leaving the hospital, especially if there is a chance that they may not return for their postpartum follow up appointment. The same is true after surgical abortion; one-fourth of post-abortion women from different ages and backgrounds chose to initiate the IUD or implant when offered same-day placement. Same-day LARC placement after abortion is an ideal opportunity to decrease the risk of losing clients to follow-up appointments and prevent additional unintended pregnancies or surgical procedures (Roe et al., 2019).

LARCs are expensive to insert, yet when they are used to the fullest durational capacity, they pose cost savings compared to other forms of contraception (ACOG, 2017). LARCs also save money indirectly by preventing unplanned adolescent pregnancy and abortion services. Providing same-day LARC insertion saves money compared to scheduling adolescents to return for an additional procedural visit. Not only are there cost savings in one consolidated clinic visit, but same-day LARC insertions also decrease rates of unplanned pregnancy (Wilkinson, Downs,

Tucker, & Edmonds 2019). When the high costs of initiating LARCs are reduced or eliminated; the usage of these highly effective methods will increase. Several studies have demonstrated economic success in offering LARCs at low or no-cost through public programs (Gyllenberg et al., 2018; Sundstrom et al., 2015; Thompson et al., 2016).

Despite the indisputable benefits of LARC usage, the literature identifies many persistent barriers, including the cost of insertion, lack of awareness, fear of pain/procedure, and skepticism surrounding safety. For adolescents today in the U.S., lack of insurance coverage, out-of-pocket costs, and lack of public funding all create significant cost barriers to LARC access (Sundstrom et al., 2015; Thompson et al., 2016). Many teens believe they are too young for LARCs (Kavanaugh et al., 2013). Others believe LARCs may be detrimental to fertility or simply feel more "in control" when they take a pill each day (Sundstrom et al., 2015). Unfortunately, clinics that are unable to offer same-day LARC insertions also pose a barrier to access in adolescent women (Kavanaugh et al., 2013).

Young women are more likely to choose LARC when they hear that their peers are using them. The positive experiences of female friends and family members are influential in adolescent LARC initiation (Bharadwaj et al., 2012; Wilson et al., 2016). Social media may also be a method to promote LARC usage, but the correlation between advertisement and initiation rates has not yet been proven (Byker, Myers, & Graff, 2019).

Current Trends and Gaps in the Literature

Historically, LARC use in adolescents has been highly controversial due to provider practice patterns, biases, myths, misconceptions and women's attitudes toward LARCs (Peipert et al., 2011). Evidence supports that teens remain an appropriate population for LARC use and placement. Current recommendations set forth by ACOG and AAP support LARC use in

adolescents as a means of contraception; however, LARC use remains low amongst this population (Centers for Disease Control and Prevention, 2019). Current practices and governing body recommendations surrounding the efficacy and safety of LARC use in adolescents and young women has helped to promote progression towards improved accessibility. LARCs provide adolescents with multiple benefits, including contraceptive efficacy rates of greater than 99%, high levels of safety, client satisfaction, and ease of use or forgetability. Also, LARC use in adolescents often outweighs potential risks (ACOG, 2012). A robust framework of evidence supports LARC use in young women.

Gaps in the literature include deeper explanation as to why LARC usage is persistently low in the adolescent population. Further exploration should include public education programs and social media's influence on teen perception of LARC usage. More studies may also explore provider education and skill level with LARC insertion, adolescent experiences with LARC insertion and utilization over time. Lastly, more research could consider race, sociodemographic, and economic factors influencing LARC usage.

Implications for Midwifery Practice

Health care providers' beliefs and knowledge base surrounding LARCs play a dramatic role in shaping adolescent attitudes and access to these devices. It is imperative that midwives are up-to-date, familiar, and comfortable with these methods in order for their patients to trust in their use. Conversely, a provider's poor outlook on LARC use in adolescents may impede a young woman from obtaining an IUD or implant (Berlan, Pritt, & Norris 2017). When midwives lack time, training on insertion techniques, or sufficient counseling information, it poses barriers to LARC use (Norris, Pritt, & Berlan, 2019). Current and ongoing training and education

surrounding LARCs may impact health care providers' views and practices in adolescent reproductive services. (Murphy et al. 2016).

Recommendations for Future Research

Reviewing twenty-four studies leads to multiple recommendations for future research surrounding LARC use and adolescents. Recommendations encompass the topics of LARC insertion, possible side effects, the continuation of long-acting reversible contraception methods, provider and adolescent related concerns, the influence of provider and peer counseling, patient satisfaction, safety, cost, and the benefits of postpartum and postabortion insertion.

Deficits in provider knowledge, comfort, skill level, and personal beliefs may impact contraception counseling and adolescent access to LARCs. Coates, Gordon, and Simpson (2018), suggest additional research is needed to best address common adolescent concerns regarding LARC use for providers to offer comprehensive counseling to teens. After conducting a qualitative observational study aimed at equipping providers with knowledge to improve their perception of LARCs, Murphey et al. (2016) acknowledge the need for a more extensive study with greater sample size and variety of provider types to gain more knowledge and further assess correspondences between providers concerning LARCs. This recommendation aligns with the theory that medical professionals should discuss LARC methods first as the most effective and ideal methods for all women, including adolescents (Sundstrom et al., 2015).

Peer, advisor, and provider counseling influence the contraceptive choices of clients. For this reason, Wilson et al. (2016) recommend an additional study to investigate the number of teens who chose to pursue LARCs after peer or advisor counseling and follow up to assess pregnancy rates. Personal beliefs surrounding pregnancy prevention and LARC use influenced by individuals' culture and ethnic background impact adolescents from different races, ages, and

environments. Oman et al. (2018) state research with larger samples should be conducted to investigate potential differential intervention effects by gender, age, race/ethnicity, or by the type of system (i.e., child welfare or juvenile justice). Educational interventions may help to reduce unplanned pregnancies amongst at-risk populations and increase adolescent knowledge and contraceptive behaviors.

Accessibility of free LARC methods and same-day placement are associated with a substantially increased initiation of these methods in all age groups and associated with a reduced rate of unintended pregnancies amongst young women (Gyllenberg et al., 2018; Roe et al., 2019; Bryant et al., 2017 & Wilkinson et al., 2019). Additional studies with a larger sample size could help to examine the cost savings to the public associated with free LARC placement (Wilkinson, Downs, Tucker, & Edmonds, 2019). After pregnancy or an abortion, LARCs serve as a highly efficient means to prevent future unplanned pregnancy.

The IUD and the subdermal implant can both be initiated in the postpartum or post-abortion period. For this reason, Roe et al. (2019), proposes the subdermal implant and IUD should be further studied regarding immediate LARC initiation after a surgical abortion. Additionally, Bryant et al. (2017) asserts that further studies and trials should be conducted at multiple facilities to assess the continuation of the implant at 12 months postpartum as well as the impact on lactation and breastfeeding. Finally, client safety and satisfaction with LARC methods are essential in determining how often they are prescribed to adolescents. Godfrey et al. (2010) recommend, due to limited data surrounding safety and satisfaction with IUD use in adolescents, designing a larger randomized control trial could be useful and increase LARC access to adolescents.

Integration of the Health Belief Model

The Health Belief Model (HBM) helps describe the psychological and behavioral underpinnings of how one cares for one's health. This theoretical framework considers the benefits, barriers, risk of susceptibility, risk severity, self-efficacy, and cues to the action of adopting positive health interventions in one's life (Jones et al., 2016). The HBM can be applied to how adolescents perceive the risks associated with unprotected intercourse compared to the perceived benefits of LARC usage. Understanding the barriers to LARC usage in adolescents may help lead to solutions that may increase access for young women. The benefits of LARCs should be discussed with adolescents through both public health programming and private clinic visits. Midwives are in a unique position to partner with young women and empower them to take responsibility for their fertility, thereby promoting self-efficacy and providing impetus for initiating contraceptives. Applying the HBM to issues surrounding LARC usage and adolescents provides clarity as to why adolescents do or do not adopt this contraceptive method. The HBM may also serve to understand opportunities to modify sexual health behaviors and ultimately decrease unintended pregnancies among adolescents.

Conclusion

The pertinent findings of this critical literature review encompass the benefits of LARC use in regard to teens seeking to avoid an unplanned pregnancy among unique adolescent populations, including incarcerated, nulliparous, and postpartum women. Length of action, sociodemographic factors, patient satisfaction, financial cost and barriers to LARC initiation including fear, provider skills and beliefs, common misconceptions, lack of access, peer satisfaction, and the influence of social media were examined. These factors directly impact

adolescent LARC uptake and provider provision.

Twenty-four relevant articles from the literature were appraised and further scrutinized for evidence by utilizing the John Hopkins Evidence Level and Quality Guide (Dang & Dearholt, 2018). Statistically significant results were present for the safety of LARC use in adolescents. Provider attitudes and familiarity toward LARCs play a dramatic role in usage. As primary care providers to women across the lifespan, CNMs are well-suited to provide counseling regarding reproductive life planning, including dispensing contraception when adolescent pregnancy is not desired. Armed with current evidence-based knowledge regarding LARC use and the skill for placement, midwives are well equipped to offer LARC-promoting continuity of care directly. Application of the Health Belief Model (HBM) may help explore adolescents' perceptions of unprotected intercourse, including the risk of pregnancy and the severity of the physical and social consequences of pregnancy. This model may also serve as a framework to better explore the benefits and value which adolescents perceive in obtaining a LARC implant, including their understanding of its contraception effectiveness. By maintaining knowledge, skill, and confidence in LARC insertion and up to date recommendations, nurse-midwives can serve adolescents by improving access to care and also by dispelling myths and misconceptions surrounding teens and LARCs in the medical community and amongst adolescents.

References

American College of Obstetricians and Gynecologists. (2017, August). Counseling Adolescents About Contraception. Retrieved November 23, 2019, from https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Adolescent-Health-Care/Counseling-Adolescents-About-Contraception?IsMobileSet=false.

American College of Obstetricians and Gynecologists. (2017, November). Long-Acting Reversible Contraception: Implants and Intrauterine Devices. Retrieved January 19, 2020, from https://www.ncbi.nlm.nih.gov/pubmed/29064972

American College of Obstetricians and Gynecologists. (2018). Adolescents and long-acting reversible contraception: Implants and intrauterine devices. *The American College of Obstetricians and Gynecologists*, *131*(5), 130–139. https://www.acog.org/-/media/Committee-Opinions/Committee-on-Adolescent-Health-Care/co735.pdf?dmc=1&ts=20200112T1825190445

American College of Obstetricians and Gynecologists. (2012, October). Adolescents and Long-Acting Reversible Contraception: Implants and Intrauterine devices. Retrieved December 31, 2019, from https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Adolescent-Health-Care/Adolescents-and-Long-Acting-Reversible-Contraception?IsMobileSet=false.

Alton, T.M., Brock, G.N., Yang, D., Wilking, D.A., Hertweck, S.P. & Loveless, M.B. (2013). Retrospective review of intrauterine device in adolescent and young women. *Journal of Pediatric Adolescent Gynecology, 25*, 195-200. doi: 10.1016/j.jpag.2012.01.005

American College of Nurse Midwives (2016). Access to Comprehensive Sexual and Reproductive Health Care Services. Retrieved January 2, 2020 from http://www.midwife.org/acnm/files/ACNMLibraryData/UPLOADFILENAME/000000000087/Access-to-Comprehensive-Sexual-and-Reproductive-Health-Care-Services-FINAL-04-12-17.pdf

American College of Nurse-Midwives (2012). Core competencies for basic midwifery practice. http://midwife.org/ACNM/files/ACNMLibraryData/UPLOADFILENAME/000000000050/Core%20Comptencies%20Dec%202012.pdf

American College of Nurse-Midwives (2019). Essential facts about midwives. https://www.midwife.org/acnm/files/cclibraryfiles/filename/000000007531/EssentialFactsAboutMidwives-UPDATED.pdf

American Midwifery Certification Board (2018). 2018 annual report. Retrieved January 12, 2020, from https://www.amcbmidwife.org/docs/default-source/annual-reports/2018-amcb-annual-report.pdf?sfvrsn=6aaa6b9c_2

American Pregnancy Association. (2019, November 11). Teen Pregnancy Issues and Challenges. Retrieved January 1, 2020, from https://americanpregnancy.org/unplanned-pregnancy/teen-pregnancy-issues-challenges/.

Berlan, E. D., Pritt, N. M., & Norris, A. H. (2017). Pediatricians' attitudes and beliefs about long-acting reversible contraceptives influence counseling. *Journal of Pediatric and Adolescent Gynecology, 30*(1), 47-52. doi: 10.1016/j.jpag.2016.09.001

Bharadwaj P, Akintomide H, Brima N, Copas A, & D'Souza R. (2012). Determinants of long-acting reversible contraceptive (LARC) use by adolescent girls and young women. *European Journal of Contraception & Reproductive Health Care, 17*(4), 298–306.

doi: 10.3109/13625187.2012.675602

Boston University School of Public Health (2019). Behavioral change models: The health belief model. Retrieved from http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories2.html

Bryant, A.G., Bauer, A.E., Stuart, G.S., Levi, E.E., Zerden, M.L., Danvers, A. & Garrett, J.M. (2017). Etonogestrel-releasing contraceptive implant for postpartum adolescents: A randomized controlled trial. *Journal of Pediatric Adolescent Gynecology, 30,* 389-394. doi: 10.1016/j.jpag.2016.08.003

Buhling, K. J., Zite, N. B., Lotke, P., & Black, K. (2014). Worldwide use of intrauterine contraception: A review. *Contraception, 89*(3), 162-173. doi: 10.1016/j.contraception.2013.11.011

Byker, T., Myers, C., & Graff, M. (2019). Can a social media campaign increase the use of long-acting reversible contraception? Evidence from a cluster randomized control trial using Facebook. *Contraception, 100*(2), 116–122. doi: 10.1016/j.contraception.2019.04.001

Centers for Disease Control and Prevention. (2019, February 14). Current Contraceptive Status Among Women Aged 15–49: United States, 2015–2017. Retrieved January 1, 2020, from https://www.cdc.gov/nchs/products/databriefs/db327.htm.

Coates, C., Gordon, C. M., & Simpson, T. (2018). A qualitative study exploring contraceptive practices and barriers to long-acting reversible contraceptive use in a sample of adolescents living in the southern United States. *Journal of Pediatric and Adolescent Gynecology, 3*1(6), 605-609. doi:10.1016/j.jpag.2018.07.006

Dang, D. & Dearholt, S. L. (2018). *Johns Hopkins Nursing Evidence-Based Practice: Model and Guidelines* (3rd ed.). Indianapolis, IN: Sigma Theta Tau International.

Gemzell-Danielsson, K., Buhling, K. J., Dermout, S. M., Lukkari-Lax, E., Montegriffo, E., Apter, D. (2016). A phase III, single-arm study of LNG-IUS 8, a low-dose levonorgestrel intrauterine contraceptive system (total content 13.5 mg) in postmenarcheal adolescents. *Contraception, 93*(6), 507-512. doi: 10.1016/j.contraception.2016.02.004

Gibbs, S. E., Rocca, C. H., Bednarek, P., Thompson, K. M., Darney, P. D., & Harper, C. C. (2016). Long-acting reversible contraception counseling and use for older adolescents and nulliparous women. *Journal of Adolescent Health, 59*(6), 703-709. doi:10.1016/j.jadohealth.2016.07.018

Glasier, A. & Gebbie, A. (2017). Contraceptive implant. *International Encyclopedia of Public Health* (2nd ed). https://www.sciencedirect.com/topics/medicine-and-dentistry/contraceptive-implant/pdf

Godfrey, E. M., Memmel, L. M., Neustadt, A., Shah, M., Nicosia, A., Moorthie, M., Gilliam, M. (2010). Intrauterine contraception for adolescents aged 14–18 years: A multicenter randomized pilot study of levonorgestrel-releasing intrauterine system compared to the Copper T 380A. *Contraception 81*(2), 123–127. doi:10.1016/j.contraception.2009.09.004

Gyllenberg, F. Juselius, M., Gissler, M., & Heikinheimo, O. (2018). Long-acting reversible contraception free of charge, method initiation, and abortion rates in Finland. American *Journal of Public Health 108*(4) 538-543. doi: 10.2105/AJPH.2017.304280

Jones, C. L., Jensen, J. D., Scherr, C. L., Brown, N. R., Christy, K., & Weaver, J. (2015). The Health Belief Model as an explanatory framework in communication research: exploring

parallel, serial, and moderated mediation. *Health Communication, 30*(6), 566–576. doi: 10.1080/10410236.2013.873363

Kavanaugh, M. L., Frohwirth, L., Jerman, J., Popkin, R., & Ethier, K. (2013). Long-acting reversible contraception for adolescents and young adults: patient and provider perspectives. *Journal of Pediatric and Adolescent Gynecology, 26*(2), 86–95. doi:10.1016/j.jpag.2012.10.006

Kramer, R., Higgins, J., Godecker, A., & Ehrenthal, D. (2018). Racial and ethnic differences in patterns of long-acting reversible contraceptive use in the United States, 2011-2015. *Contraception., 97*(5), 399-404. doi: 10.1016/j.contraception.2018.01.006

Kusunoki,Y., Barber, J. S., Elizabeth, J., Ela, E. J., & Bucek, A. (2016). Black-White differences in sex and contraceptive use among young women. *Demography 53*:1399–1428. doi: 10.1007/s13524-016-0507-5

Madden, T. (2019). Intrauterine contraception: Background and device types. In K. Eckler (Ed.), *UpToDate*. Retrieved January 12, 2020, from https://www.uptodate.com/contents/intrauterine-contraception-background-and-device-types?csi=3f58d43a-3328-4ce9-8cb8-390b59bcde16&source=contentShare

Montanaro, E. A., & Bryan, A. D. (2014). Comparing theory-based condom interventions: Health belief model versus theory of planned behavior. *Health Psychology, 33*(10), 1251–1260. doi:10.1037/a0033969

Murphy, M. K., Stoffel, C., Nolan, M., & Haider, S. (2016). Interdependent barriers to providing adolescents with long-acting reversible contraception: Qualitative insights from providers. *Journal of Pediatric and Adolescent Gynecology, 29*(5), 436–442. doi:10.1016/j.jpag.2016.01.125

National Conference of State Legislatures. (2018, November 10). Teen Pregnancy Prevention. Retrieved January 1, 2020, from http://www.ncsl.org/research/health/teen-pregnancy-prevention.aspx.

Norris, A., Pritt, N., & Berlan, E. (2019). Can pediatricians provide long-acting reversible contraception? *Journal of Pediatric and Adolescent Gynecology, 32*(1), 39-43. doi:10.1016/j.jpag.2018.09.008

Oman, R. F., Vesely, S. K., Green, J., Clements-Nolle, K., & Lu, M. (2018). Adolescent pregnancy prevention among youths living in group care homes: A cluster randomized controlled trial. *American Journal of Public Health, 108*, S38–S44. doi: 0.2105/AJPH.2017.304126

Ott, M. A., & Sucato, G. S. (2014, October 1). Contraception for Adolescents. Retrieved January 1, 2020, from https://pediatrics.aappublications.org/content/134/4/e1257.

Peipert, J. F., Zhao, Q., Allsworth, J. E., Petrosky, E., Madden, T., Eisenberg, D., & Secura, G. (2011). Continuation and satisfaction of reversible contraception. *Obstetrics and Gynecology, 117*(5), 1105–1113. doi:10.1097/AOG.0b013e31821188ad

Reproductive Health Access Project (2013, January 17). A history: The IUD. Retrieved from https://www.reproductiveaccess.org/2013/01/a-history-the-iud/

Roe, A., Fortin, J., Janiak, E., Maurer, R., & Goldberg, A. B. (2019). Prevalence and predictors of initiation of intrauterine devices and subdermal implants immediately after surgical abortion. *Contraception*, *100*(2), 89–95. doi: 10.1016/j.contraception.2019.05.001

Rosenstock, J. R., Peipert, J. F., Madden, T., Zhao, Q., & Secura, G. M. (2012). Continuation of reversible contraception in teenagers and young women. *Obstetrics and Gynecology, 120*(6), 1298–1305. doi:10.1097/AOG.0b013e31827499bd

Russo, J. A., Miller, E., & Gold, M. A. (2013). Myths and misconceptions about long-acting reversible contraception (LARC). *Journal of Adolescent Health* 52, S14-S21. http://www.kdheks.gov/c-f/integration_toolkits/LARC/Myths_Misconceptions.pdf

Santibenchakul, S., Tschann, M., Carlson, A. D. P., L. Hurwitz, E., & Salcedo, J. (2019). Promotion of long-acting reversible contraception among adolescents and young adults. *Journal of Midwifery & Women's Health, 64*(2), 194–200. doi: 10.1111/jmwh.12934

Sundstrom, B., Baker-Whitcomb, A., & DeMaria, A. (2015). A qualitative analysis of long acting reversible contraception. *Maternal & Child Health Journal, 19*(7), 1507-1514. doi:10.1007/s10995-014-1655-0

The Guttmacher Institute. (2019, January 9). Unintended pregnancy in the United States. Retrieved February 22, 2020, from https://www.guttmacher.org/fact-sheet/unintended-pregnancy-united-states

Thompson, K. M., Rocca, C. H., Kohn, J. E., Goodman, S., Stern, L., Blum, M., … Harper, C. C. (2016). Public funding for contraception, provider training, and use of highly effective contraceptives: A cluster randomized trial. *American Journal of Public Health, 106*(3), 541–546. doi:10.2105/AJPH.2015.303001

U.S. Department of Health & Human Services. (2019, March 28). Negative Impacts of Teen Childbearing. Retrieved January 1, 2020, from https://www.hhs.gov/ash/oah/adolescent-development/reproductive-health-and-teen-pregnancy/teen-pregnancy-and-childbearing/teen-childbearing/index.html.

Wilkinson, T. A., Downs, S. M., Tucker Edmonds, B. (2019). Cost minimization analysis of same-day long-acting reversible contraception for adolescents. *JAMA Network Open, 2*(9), 1-9. doi: 10.1001/jamanetworkopen.2019.11063

Wilson, S. F., Degaiffier, N., Ratcliffe, S. J., & Schreiber, C. A. (2016). Peer counselling for the promotion of long-acting, reversible contraception among teens: a randomized, controlled trial. *European Journal of Contraception & Reproductive Health Care, 21*(5), 380–387. doi: 10.1080/13625187.2016.1214698

Yazdkhasti, M., Pourreza, A., Pirak, A., & Abdi, F. (2015). Unintended pregnancy and its adverse social and economic consequences on health system: A narrative review article. *Iranian Journal of Public Health*, *44*(1), 12–21.

Appendix 1 – Literature Review Matrix

Source:
Alton, T.M., Brock, G.N., Yang, D., Wilking, D.A., Hertweck, S.P. & Loveless, M.B. (2013). Retrospective review of intrauterine device in adolescent and young women. *Journal of Pediatric Adolescent Gynecology, 25*, 195-200. doi: 10.1016/j.jpag.2012.01.005

Purpose/Sample	**Design**	**Results**	**Strengths/Limitations**
Purpose: To examine experience with intrauterine device (IUD) use in adolescents and young women. **Sample/Setting:** N=233 females between menarche and 21yo, at three sites including a Pediatric and Adolescent gynecology private practice, a Title X clinic, and community based, grant funded clinic serving a high risk teen population **Johns Hopkins Evidence Appraisal:** **Strength:** Level III **Quality:** High/good quality for insightful interpretation; describes specific techniques to enhance quality of inquiry such as diverse population	-Quantitative, Observational, Cohort Design. -The date of insertion, removal, and/or expulsion was collected for each patient, and calculation of the probability of device retention to a given time was performed using the Kaplan-Meier method -Differences in IUD retention probabilities between patient groups were evaluated using the log-rank test,17 and the stratified log-rank test was used when potential confounding existed between two risk factors (e.g., parity and age group). Multivariable Cox regression models were also used. Competing risks methods were used to evaluate time to removal and time to expulsion separately, with differences between groups tested using the chi-square test statistics	- 50% of the <18-year-old age group and 71.5% of the 18-21-year-old group had their IUD in place at 5 years. -Age was found to be a significant factor for removal ($P < 0.001$), with under 18-year-olds at greater risk of removal/expulsion (hazard ratio (HR) = 2.85). -Parity (RR = 5.6 for nulliparous vs multiparous patients, $P < 0.001$) and prior STI (RR = 5.5, $P < 0.001$) were significant risk factors for infection -Nulliparous patients were at higher risk of expulsion ($P = 0.045$), but age was not a statistically significant risk factor ($P=0.22$). **Conclusion:** The rate of continuation was lower in adolescents under 18 compared to 18-21-year-olds, but was higher than for other hormonal contraceptives. Despite this group's high risk for STI, the IUD did not increase the risk of infection and may offer some degree of protection. IUDs appear to be a safe option in young adolescents (<18 years old) and nulliparous women.	**Strengths:** -Population of this study represents the largest sample size on IUD use in this age group -Reflects a diverse population. - 23% of patients were from a private office where IUDs were often used for medical indications. -Remaining 77% came from a Title X funded clinic which cares for high risk adolescents and adolescent pregnancies, and from a grant funded contraceptive clinic in the community **Limitations:** -Due to the retrospective nature of the study, patients lost to follow-up or who changed their care site may have been lost from the data set.

Author Recommendations:
Fear of difficulty with insertion and infection are commonly cited reasons that providers avoid insertion of IUDs in nulliparous women. However, the only increased risk this study found in nulliparous women was a slightly higher rate of expulsion.

One of the greatest challenges in contraception for the adolescent and young women is the continuation of the method. IUDs are a promising contraception option given their relatively higher continuation rates compared to other forms of hormonal contraception

Implications:
This limited retrospective study provides reassurance regarding the safety of IUD use in a diverse population of both young adolescents and nulliparous young women. IUDs appear to be a safe option for the adolescent population.

Source:
Berlan, E. D., Pritt, N. M., & Norris, A. H. (2017). Pediatricians' attitudes and beliefs about long-acting reversible contraceptives influence counseling. *Journal of Pediatric and Adolescent Gynecology, 30*(1), 47-52. doi://doi.org/10.1016/j.jpag.2016.09.001

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To determine the viewpoints and opinions held by pediatricians in regard to etonogestrel implant and intrauterine devices use in adolescents. **Sample/Setting:** Convenience sample of primary care (N=23). Pediatricians associated with a Nationwide Children's Hospital in a Midwestern City **Johns Hopkins Evidence Appraisal:** **Strength:** Level III **Quality:** Good	Qualitative, Observational, Ecological design. After informed consent, pediatricians were independently interviewed for 30 minutes. Open ended questions were utilized. Audio recordings and surveys on the topic of adolescents and reproductive health were used to collect data from which statistical analyses were performed.	-Data revealed a variety of beliefs and understandings regarding adolescents and reproductive health: -Lack of comfort, lack of current knowledge on IUD, and misunderstandings regarding the safety of IUDs -The etonogestrel implant was more likely to be accepted and supported as a safer form of long-term birth control by pediatricians in cases regarding nulliparous teens. **Conclusion:** A pediatrician's personal lack of knowledge, discomfort, or unfamiliarity with etonogestrel implant or intrauterine device may impact birth control methods offered to adolescents in practice. A provider's poor opinion of LARCs may hinder a teen from obtaining an implant or IUD.	**Strengths:** -Interview privacy and anonymity provided to participants enabled providers to genuinely express their attitudes and beliefs. -Variety of ages, sexes, and years of practice amongst pediatricians provided a variety of outlooks. -Research assistant was not affiliated with the healthcare setting decreasing possible bias. **Limitations:** -Small sample size. -AAP policy regarding adolescents and LARCs changed during the time period in which the study was conducted.

Author Recommendations:
A lack of several factors including knowledge deficit, time, and personal beliefs will continue to impact pediatricians' outlook on LARCs, directly influencing availability of the IUD or implant to young adults. A call of action to educate pediatricians and healthcare providers regarding up-to-date data is vital to influence practices.

Implications:
Up to date data, education, and awareness of LARCs should be required and initiated for all providers who offer reproductive health care to adolescents or young women in order to increase provider knowledge, patient reproductive options, and decrease unwanted pregnancies.

Source:
Bharadwaj P, Akintomide H, Brima N, Copas A, & D'Souza R. (2012). Determinants of long-acting reversible contraceptive (LARC) use by adolescent girls and young women. *European Journal of Contraception & Reproductive Health Care*, *17*(4), 298–306. doi: 10.3109/13625187.2012.675602

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To identify factors relevant for adolescents and young women in their selection of a contraceptive method and reasons for acceptance or rejection of long-acting reversible contraceptives (LARCs). **Sample/Setting:** N=194 women under age 22, attending an integrated young people Sexual & Reproductive Health service in North London. **Johns Hopkins Evidence Appraisal:** **Strength:** Level III **Quality:** High	Quantitative, Observational, Cross sectional study. Questionnaire survey asked respondents to score on a scale of 1-4 factors that impacted their selection of contraceptive method The Chi-squared test was used in determining whether LARC use is associated with the rating of each factor describing young people's expectations from contraception use. Participants reported whether or not they felt that a range of incentives and disincentives to use applied to each LARC method. Cochran Q test was used to assess whether incentives and disincentives were more commonly reported for some methods than for others.	-Number of respondents who had used a LARC was low N=53 (28%) compared to number of those who had heard about LARCs N=182 (95%) had heard about implants and N=135 (71%) had heard about IUDs -Awareness of intrauterine methods was the lowest, compared to other LARCs. -High efficacy, protection against STIs and noninterference with sex were important factors when choosing contraceptive. -Alteration of menses was not considered important at time of insertion -Reliability and duration encourage young women to accept LARCs. -Fear of pain restraints. Pain was commonly linked to the IUD, implant, and injection ($p < 0.001$). -Having friends or family who have used or recommended the implant significantly increased favor versus the injection or IUD ($p = 0.002$ and $p = 0.001$). **Conclusion:** -Fear of pain and needles made LARCs less appealing to young people.	**Strengths:** -This survey did not rely on the participants' memory of LARCs--the questionnaire contained pictures of available LARCs, which aided respondents to answer correctly **Limitations:** -It was beyond the scope of this study to establish detailed knowledge of LARCs. -It was not possible to ascertain that having awareness equates to adequate knowledge. -Conducted in a single sexual health clinic and most LARC users among participants had previously attended a sexual health clinic; therefore, these findings may not apply to a wider population.

Author Recommendations:
Healthcare providers should highlight the advantages of LARCs when offering contraceptive counseling. Young women may be willing to select one of these when they know others have used it to their satisfaction. Women should be encouraged to share their positive experiences of LARCs with their peers.

Implications:
Young people are interested in using LARCs because of their reliability and long duration of action. At the same time they are positively influenced by their peers. LARCs are specifically well-suited for adolescents because they eliminate the possibility of forgetting or choosing not to use contraceptive methods 'in the moment' or as the result of being under the influence of drugs or alcohol. Women who are well-informed about contraceptive options are more likely to be satisfied with and to continue to use their chosen LARC method.

Source:
Bryant, A.G., Bauer, A.E., Stuart, G.S., Levi, E.E., Zerden, M.L., Danvers, A. & Garrett, J.M. (2017). Etonogestrel-releasing contraceptive implant for postpartum adolescents: A randomized controlled trial. *Journal of Pediatric Adolescent Gynecology, 30,* 389-394. doi: 10.1016/j.jpag.2016.08.003

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: Assess immediate implant placement postpartum versus at 4-6 weeks. To further investigate use of implant utilization at 12 months postpartum in addition to patient satisfaction and breastfeeding rates. **Sample/Setting:** **Sample:** Teens and women ages 14-24 (N=96). Tertiary Care Hospital in North Carolina **Johns Hopkins Evidence Appraisal:** **Strength: Level** I **Quality:** Good	A randomized controlled trial, Experimental, & Noncrossover study. Data analysis included descriptive statistics, "*t* test for continuous variables, and Pearson χ^2 for categorical variables. Statistical analysis was performed using Stata version 13 software". Participants were randomly assigned to receive the implant immediately after delivery (N=37) versus at the 4-6-week postpartum visit (N=27). After delivery, an envelope revealed the time in which the patient would receive the implant. Participants were contacted at 3, 6, 9, and 12 months postpartum. Data for only 64 participants (N=64) was available after 12 months of this study.	-81% of participants in the group who received the implant prior to hospital discharge continued to utilize the implant for 12 months postpartum versus 78% of the women who received the implant at the 4-6-week appointment; P=.75, which is not statistically significant. -At 3 months postpartum, 92% of women who had the implant placed immediately were likely to continue the method versus 70% who received the method at the 4-6-week postpartum visit; P=.02, which is statistically signifcant. -The immediate group was more likely to breastfeed at 6 months 40%, versus 17% of the women who received the implant at the 4-6-week appointment. -Insertion in the immediate postpartum period increased the likelihood of continuous usage for at least 12 months (P<.001). **Conclusion:** Adolescents and young women who received the implant as a birth control method during their postpartum hospitalization were more likely to continue the method at 3 months and were more likely to continue breastfeeding for 6 months postpartum.	**Strengths:** -Randomized control trial. -Clients were closely followed over a one-year time period and participants were able to contribute data in a longitudinal fashion. **Limitations:** -33% of clients were lost during the one year in which this study took place. -Small sample size. -Conducted at 1 facility.

Author Recommendations:
Further studies and trials should be conducted at multiple facilities regarding use of the implant at 12 months postpartum as well as the impact on breastfeeding.

Implications:
Placing the implant during the hospitalization may be beneficial for young women and adolescents who are more prone to closely spaced pregnancies. The hospitalization provides immediate access to care, whereas in many cases adolescents may not be compliant with attendance of the 4-6-week postpartum visit.

Source:
Byker, T., Myers, C., & Graff, M. (2019). Can a social media campaign increase the use of long-acting reversible contraception? Evidence from a cluster randomized control trial using Facebook. *Contraception, 100*(2), 116–122. doi: 10.1016/j.contraception.2019.04.001

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To test whether an informational campaign carried out on social media increased use of long-acting reversible contraception (LARC). **Sample/Setting:** -N=152,743 patient visits -randomized all zip codes in a three-state study area -Female Facebook users age 18–34 living in treated clusters received advertisements **Johns Hopkins Evidence Appraisal:** **Strength:** Level 1 **Quality:** Low	Experimental, Stratified cluster Randomized control trial Goal to identify the effect of an informational campaign carried out using Facebook advertisements designed to increase knowledge of the efficacy, ease of use and safety of LARC. -randomized all zip codes in a three-state study area to either a control group or a treatment group. Female Facebook users age 18–34 living in treated clusters received advertisements developed by the researchers in partnership with Planned Parenthood of Northern New England (PPNNE), which sponsored the campaign. -1.8 million Facebook advertisements to women residing in 536 randomly assigned treatment clusters. -Women living in 545 control clusters did not receive advertisements. -Researchers assessed changes in the number and rate of LARC insertions at PPNNE health centers by patients' treatment status.	-Researchers observed 152,743 patient visits across New England's Planned Parenthoods' 21 health centers over a 26-month period of the ad campaign. -After treatment, the number of LARC insertions increased by 5.7% (95% CI 0.4%–11.3%, p=.04) among patients living in treated relative to control clusters. -The result is driven by patients at a single large health center that was experiencing an increase in patient volume prior to the intervention. -No evidence that the campaign had an effect on LARC insertions (0.8% reduction, 95% CI −7.6 to 6.5, p=.83). -When controlled for patient volume, there was no evidence that the campaign increased insertions per patient (0.5% relative increase in insertions, 95% CI −4.9% to 5.2%, p=.87). **Conclusion:** The intervention did not have a detectable impact on LARC insertions in the 4 months after the ad campaign	**Strengths:** -Offers evidence on the effectiveness of a different type of intervention, a simple, low-cost, low-effort advertising campaign on social media targeting potential patients. **Limitations:** the target audience for the Facebook campaign was all women 18 to 34 in Northern New England, -Researchers only measured outcomes at PPNNE health centers. -advertising campaign only ran for 1month, -only measured outcomes for the 4 months following the campaign It also is often difficult or impossible to obtain information about potential contaminating effects in field experiments due to on-the-ground changes in the environment.

Author Recommendations:
This study was an initial step in motivating and exploring whether there may be other simple and low-cost but effective interventions that would have this effect. This project also demonstrates the importance of evaluating the impact of resources invested on advertising with the goal of promoting public health.
This should not be regarded as a failure of the randomization strategy, which produced a balanced sample in the period prior to the intervention.
It appears that the findings were influenced by a pretreatment trend at a single location. Such trends are often not described in reports of randomized control trials because they are difficult or impossible for researchers to observe.

Implications:
This project demonstrates the importance of evaluating the impact of resources invested on advertising with the goal of promoting public health.

Source:
Coates, C., Gordon, C. M., & Simpson, T. (2018). A qualitative study exploring contraceptive practices and barriers to long-acting reversible contraceptive use in a sample of adolescents living in the southern United States. *Journal of Pediatric and Adolescent Gynecology, 31*(6), 605-609. doi:10.1016/j.jpag.2018.07.006

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To better comprehend barriers to LARC use in adolescents living in the Southern United States. **Sample/Setting:** An academic medical center in the Southern United States. 18 women ages 14-21 with no current history of LARC use (N=18). **Johns Hopkins Evidence Appraisal:** **Strength:** III **Quality:** Good	Qualitative, Observational, Cross-sectional study. Participants were interviewed for 15 minutes and conversations audibly recorded to collect and analyze data and assess LARC related themes. Interview questions followed a semi structured format and later analyzed and coded to assess common themes.	-The majority of participants, 73-87 % were aware of the IUD and implant LARC methods, however, 67% of participants had no plans to initiate LARC use for future contraception. **Conclusion:** Common barriers identified regarding LARC use among the adolescent participants were invasiveness of having a foreign object inside the body and extended length of time 3-5 years of pregnancy prevention.	**Strengths:** -Semi structured interviews enabled participants to share and reflect on beliefs or potential barriers related to LARC use in adolescents. **Limitations:** -Small sample size. -Convenience sample**.** -Not generalizable to the public.

Author Recommendations:
Additional research is needed to best address common adolescent concerns regarding LARC use in order for providers to offer comprehensive counseling to teens.

Implications:
Counseling adolescents and listening to and addressing concerns regarding length of use, ability to remove the contraceptive device, and benefits of utilizing long acting contraception to prevent unwanted pregnancy is essential while providing education and guidance to adolescents.

Source:
Gemzell-Danielsson, K., Buhling, K. J., Dermout, S. M., Lukkari-Lax, E. Montegriffo, E., Apter, D. (2016). A phase III, single-arm study of LNG-IUS 8, a low-dose levonorgestrel intrauterine contraceptive system (total content 13.5 mg) in postmenarcheal adolescents. *Contraception, 93*(6) 507-512

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To explore the use of LNG-IUS 8 in an adolescent population; obtain information on adverse events, satisfaction and continuation **Sample/Setting:** N=304 healthy nulliparous or parous postmenarcheal adolescents aged 12–17 years (inclusive), with regular menstrual cycles of 21–35 days (without hormonal contraceptive use) requesting contraception **Johns Hopkins Evidence Appraisal:** **Strength:** Level III **Quality:** High/Good	Quantitative, Observational, Cohort (longitudinal) study. Participants reported user satisfaction at Month 12/EOS, using a 5-point Likert scale with the options of "very satisfied", "satisfied", "neither satisfied nor dissatisfied", "dissatisfied", and "very dissatisfied". The overall satisfaction rate was defined as the percentage of participants who reported that they were "very satisfied" or "satisfied". The overall discontinuation rate was summarized using Kaplan–Meier analysis.	-LNG-IUS 8 was associated with a high overall user satisfaction rate (83.9% at 12 months/EOS) -LNG-IUS 8 not associated with any new or unexpected safety events, -Safety profile of LNG-IUS 8 observed in this study of adolescents aged 12–17 years consistent with safety profile in nulliparous and parous adults -Low premature discontinuation rate (16.8% at 12 months) -No pregnancies during the 12-month study. - 12-month unadjusted PI was 0.00 (95% CI: 0.00–1.86), and the Kaplan–Meier 12-month cumulative failure rate was 0%. **Conclusion:** No new or unexpected safety events were associated with the low-dose LNG-IUS 8. The safety profile of LNG-IUS 8 in adolescents was consistent with that previously reported in adults.	**Strengths:** -The high overall user-satisfaction rate at study end and the low discontinuation rate over 12 months demonstrate that LNG-IUS 8 is a highly acceptable contraceptive method among adolescents. **Limitations:** Poor compliance with bleeding diaries made bleeding data unreliable; consequently, investigators were unable to draw any meaningful conclusions.

Author Recommendations:
Despite a recent decline in adolescent pregnancy rates, unintended pregnancy continues to be a serious public health issue. Adolescent pregnancy could be substantially reduced through more widespread use of contraceptive methods that do not require user compliance, such as LARC methods, particularly LNG-IUS 8

Implications:
This study – the first to assess the next-generation, low-dose LNG-IUS 8 in females less than 18 years old – confirms the safety, efficacy, and acceptability of LNG-IUS 8 in an adolescent population and provides data that could be considered during contraceptive counseling. LNG-IUS 8 offers another contraceptive option for young women and may increase usage of LARC in this group.

Source:
Gibbs, S. E., Rocca, C. H., Bednarek, P., Thompson, K. M., Darney, P. D., & Harper, C. C. (2016). Long-acting reversible contraception counseling and use for older adolescents and nulliparous women. *Journal of Adolescent Health,59*(6), 703-709. doi:10.1016/j.jadohealth.2016.07.018

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To examine low LARC use in relation to clinical counseling amongst sexually active women ages 18-25. **Sample/Setting:** Sexually active women ages 18-25 (N=1500). 40 United States Planned Parenthoods inclusive of 15 states. **Johns Hopkins Evidence Appraisal:** **Strength:** I **Quality:** Good	Experimental, Cluster randomized control trial. 1500 participants were assessed at 40 Planned Parenthood sites for contraception counseling. 20 clinics served as control sites (N=698), while 20 clinics implemented interventions (N=802). Clinics were randomly assigned to provide interventions to show patients an educational video on LARCs. Providers in the intervention group received a half day of clinical training in LARC methods, insertion, removal, and reproductive life planning. Patient follow up occurred at intervals over 12 months via phone to evaluate choice of method.	The intervention group was more successful than the control group at discussing LARC options in clinic "66% vs. 33% for adolescents and 73% vs. 41% for young adults". The intervention group also was more likely to choose to pursue LARC use when compared to the control group "27% vs. 12% for adolescents and 28% vs. 18% for young adults". LARC use was increased in the intervention group "(19/100 PY vs. 13/100 PY for nulliparous p = .12 and 32/100 PY vs. 29/100 PY for parous p = .52)". **Conclusion:** Providing LARC training and education to providers may help to increase patient awareness of LARCs and initiation in nulliparous and parous adolescents.	**Strengths:** -Randomized control trial. -Trans United States study allowed sampling from a diverse population. -Large sample size. **Limitations:** -Clients younger than age 18 were not included in the study.

Author Recommendations:
No specific recommendations were cited by the Author.

Implications:
All women whether nulliparous or parous should receive counseling on LARC methods. Healthcare providers should remain up to date on training, recommendations, and eligibility set forth by ACOG in providing contraception counseling and management to patients.

Source:
Godfrey, E. M., Memmel, L. M., Neustadt, A., Shah, M., Nicosia, A., Moorthie, M., Gilliam, M. (2010). Intrauterine contraception for adolescents aged 14–18 years: A multicenter randomized pilot study of levonorgestrel-releasing intrauterine system compared to the Copper T 380A. *Contraception* 81(2):123–127. doi: 10.1016/j.contraception.2009.09.004

Purpose/Sample	**Design**	**Results**	**Strengths/Limitations**
Purpose: To compare two FDA approved IUC methods regarding rates of pregnancy, expulsion, continuation, infection, side effects, bleeding and satisfaction among 14-18year olds. Having clinical information for health care providers about each IUD method may help them to offer it more readily to adolescents. Intrauterine contraception can provide adolescents with effective, long-term contraception as well as with other health benefits. In adult populations, intrauterine contraception rates high patient satisfaction and safety rates. It is rarely prescribed to adolescents because of limited data. **Sample/Setting:** N=23 female participants between 14-18 years of age; 12 received the Levonorgestrel Intrauterine System, and 11 received the Copper T 380A **Johns Hopkins Evidence Appraisal:** **Strength:** Level I **Quality:** Low	Experimental randomized, control trial. 14-18-year-old females assigned to the Copper T 380A intrauterine device or the Levonorgestrel Intrauterine System. Participants were randomized at time of insertion and followed up for 6 months following insertion. Descriptive statistics, chi-square tests and means testing via Satterthwaite t tests (to account for unequal variances between groups) were used to compare each IUC group. $p<.05$ was considered significant. Satisfaction was rated with a 5-point Likert scale from very unhappy to very happy.	-At 6 months, the continuation rates were 75% for the Levonorgestrel Intrauterine System users and 45% for the Copper T 380A users ($p=.15$). -Two Copper T 380A users experienced partial expulsion. -Heavy bleeding and pelvic pain were the most commonly reported side effects. -Participants rated both methods favorably. **Conclusion:** -At 6 months, though not statistically significant, adolescent continuation rates trended towards being greater with the Levonorgestrel Intrauterine System. - "(36%) in the CuT380A group terminated early versus one participant (8%) in the LNG-IUS group ($p=.13$)". -These pilot data will be helpful in the design of a larger trial of intrauterine contraception use among adolescents.	**Strengths:** -Offers preliminary findings and demonstrates that a randomized trial of IUC in adolescents can be conducted **Limitations:** -Limited sample size due to limited funding. Results not statistically significant. -Parental consent was required for younger adolescents, perhaps reflecting a particular parent-daughter relationship and limiting the external validity. Parental involvement may have also affected continuation rates. -Data is 10 years old

Author Recommendations:
Pilot data will be helpful in the design of a larger RCT regarding IUD use in adolescents.

Implications:
Designing a RCT is possible regarding IUD use in adolescents. This pilot data can serve as a springboard for future research. Once patient satisfaction and safety is better established through research, IUDs may be more widely prescribed to adolescents.

Source:
Gyllenberg, F., Juselius, M., Gissler, M., & Heikinheimo, O. (2018). Long-acting reversible contraception free of charge, method initiation, and abortion rates in Finland. American Journal of Public Health 108(4) 538-543. doi: 10.2105/AJPH.2017.304280

Purpose/Sample	Design	Results	Strengths/Limitations
Purpose: Evaluate whether a public program providing LARC methods free of charge increases the LARC initiation rate and reduces the unintended pregnancy rate in the general population. **Sample/Setting:** Vantaa Finland **Johns Hopkins Evidence Appraisal:** **Strength:** Level II: Quasi-experimental, population based study **Quality:** High/good	Population based, observational Quasi-experimental study -Interrupted time series methods and high-quality data from Finnish national registers -Since 2013, all women in Vantaa, Finland, have been entitled to 1 LARC method free of charge -Time-series analysis between 2000 and 2015 assessing whether this public program was associated with changes in steady-state mean rates of LARC initiation and abortions.	-Initiation rate of LARCs per 1,000 women increased 2.2-fold from 1.9 to 4.2 after the intervention ($P < .001$). -Abortion rate per 1,000 women declined by 16% from 1.1 to 0.9 in the total sample ($P < .001$), by 36% from 1.3 to 0.8 among those aged 15 to 19 years ($P < .001$), and by 14% from 2.0 to 1.7 among those aged 20 to 24 years ($P = .01$). **Conclusion:** -LARC program was associated with increased use of LARC methods and fewer abortions in the population. -Among those aged 15 to 19 years, the estimated resources saved from reduced abortions exceeded the money spent on LARC methods, and among those aged 20 to 24 years, the costs and savings were of equal amounts.	**Strengths:** -Reliable data source through Finnish National registries -Highly generalizable results based on highly available family planning clinics **Limitations:** -Causal inference due to observational study design -Diluting effects of in and out migration from Vantaa

Author Recommendations:
-Providing LARC methods free of charge is associated with an increased initiation of these methods in all age groups. It is also associated with a reduced rate of unintended pregnancies, measured as the number of induced abortions among women younger than 25 years old.

Implications:
Entitling the population to LARC methods free of charge is an effective means to reduce both the unmet need of contraception and the need for abortion, especially among women younger than 25 years.
-Providing contraception through public programs is also cost efficient and economically promising

Source:
Kavanaugh, M. L., Frohwirth, L., Jerman, J., Popkin, R., & Ethier, K. (2013). Long-acting reversible contraception for adolescents and young adults: patient and provider perspectives. *Journal of Pediatric and Adolescent Gynecology*, *26*(2), 86–95. doi:10.1016/j.jpag.2012.10.006

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: Examine provider and adolescent women ages 16-24 perspectives of LARCs and identify common challenges to healthcare providers who offer LARCs to adolescents. **Sample/Setting:** 20 government-funded sites family planning sites inclusive of Hospitals, Planned Parenthood Clinics, health departments, and others clinical establishments. 20 Facility staff directors (N=20) and 48 adolescents 16-24 years old (N=48). **Johns Hopkins Evidence Appraisal:** **Strength:** Level III **Quality:** Good	Observational, Cross-sectional, Qualitative study. 3 methods were utilized in this study from June to December in 2011. All methods, telephone, focus groups, and interviews were recorded. Initially, telephone interviews were conducted with facility administrators at each of the 20 family planning sites. Next, focus groups were conducted with participants at 6 of the 20 sites. Finally, In-depth interviews were conducted with adolescents aged 16-24. NVivo 8 was utilized to code, organize, and analyze the qualitative data.	-Adolescents and facility directors agreed that the key advantages of LARC use are the length of function and not having to remember birth control. -¼ of teens in the study believed they were ineligible for LARCs due to age. -A greater amount of time or visits may be necessary to counsel teens regarding LARCs and provide placement. -Appropriate funding is necessary to overcome common barriers such as time constraints and longer and possibly additional appointments. **Conclusion:** Assessing and considering adolescent attitudes on LARC methods can impact and influence how family planning sites educate adolescents on LARCs.	**Strengths:** -Assessment from both adolescent and facility beliefs and attitudes on implant and IUD methods. -Multiple methods utilized to collect data and analyze perspectives. **Limitations:** -Small sample size. -Qualitative study. -Not generalizable to the public population. -IUD focused questions were asked prior to discussing the implant, which led the study and discussion to potentially be more IUD focused.

Author Recommendations:
No specific recommendations were cited by the author.

Implications:
LARCs have been nationally identified as an effective form of birth control to prevent adolescent and unplanned pregnancy. While LARCs are currently becoming a more popular choice, a lack of knowledge may impact a teen's choice to pursue LARC options for family planning. In the clinical atmosphere, cost and time constraints impact facilities ability to provide modern staff training and client education.

Source:
Kramer, R., Higgins, J., Godecker, A., & Ehrenthal, D. (2018). Racial and ethnic differences in patterns of long-acting reversible contraceptive use in the United States, 2011-2015. *Contraception., 97*(5), 399-404. Doi: 10.1016/j.contraception.2018.01.006

Purpose/Sample	Design	Results	Strengths/Limitations
Purpose: -To investigate whether demographic, socioeconomic, and reproductive health characteristics affect LARC use differently by race-ethnicity. -To inform the dialogue on racial pressure and bias in LARC promotion **Sample/Setting:** N=9321 women ages 15-44 Data derived from 2011-13 and 2013-15 National Surveys of Family Growth **Johns Hopkins Evidence Appraisal: Strength:** Level III Meta-synthesis **Quality:** High/good	Logistic regression analyses predicted current LARC use (yes vs. no). Researchers tested interaction terms between race-ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic) and covariates (for example, education, parity, poverty level) to explore whether their effects on LARC use vary by race-ethnicity	-Data did not show that low income and education predict LARC use more strongly among Black and Hispanic women than among white women. -The experience of unintended pregnancy (p=.014) was one statistically significant race interaction. -Among Whites and Hispanics, women who reported ever experiencing an unintended pregnancy had a higher predicted probability of LARC use than those who did not. -Among Black women, the experience of unintended pregnancy was not associated with a higher predicted probability of LARC use. **Conclusion:** With the exception of the experience of unintended pregnancy, findings from this large, nationally representative sample of women suggest similar patterns in LARC use by race-ethnicity.	**Strengths:** -Large, nationally-representative sample and the use of race-interaction terms to explore differences in patterns of LARC use by race and ethnicity **Limitations:** -A small sample of implant users prevented separate analyses of IUD and implant users by race. -Logistical procedures assume that variation in the outcome arising from variables not included in the analysis is equal across the groups of study -Not able to capture nuances that could help explain racial differences in contraceptive choice and use

Author Recommendations:
Clinicians should promote LARC and other contraceptive methods sensitively and responsibly, using patient-centered approaches that allow each contraceptive client to select a method that works for her. Policies and programs are needed that will promote further reproductive justice, giving all women the freedom to control their own fertility.

Implications:
-Results do not provide evidence that observed differences in LARC use by race-ethnicity represent socioeconomic disparities, and may assuage some concerns about reproductive coercion among women of color.
-It is critical that providers use patient-centered approaches for contraceptive counseling that promote women's autonomy in their reproductive health care decision-making.

Source:
Kusunoki,Y., Barber, J. S., Elizabeth, J., Ela, E. J., & Bucek, A. (2016). Black-White differences in sex and contraceptive use among young women. *Demography 53*:1399–1428. Doi: 10.1007/s13524-016-0507-5

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: -Examine black-white and other sociodemographic differences in young women's sexual and contraceptive behaviors. -Investigate hypotheses about dynamic processes in these behaviors during early adult-hood in order to shed light on persisting racial differences in rates of unintended pregnancies in the United States **Sample/Setting:** n=1,003 18- to 19-year-old women in a single Michigan county spanning 2.5 years **Johns Hopkins Evidence Appraisal: Strength:** Level III, qualitative **Quality:** High/good	Initial face-to-face interviews as well as using longitudinal data from a weekly journal-based study, assessing sociodemographic characteristics, attitudes, relationship characteristics and history, contraceptive use, and pregnancy history. -The study design also included dynamic measurement of current pregnancy desires and pregnancy status, as well as characteristics of current relationships (such as commitment level, sexual involvement, and contraceptive use)—collected in weekly five-minute surveys over the following 30 months	Women used a LARC method about 10 % of the time (mean = 0.09); and among those who ever used LARC, they did so about 60 % of the time (mean = 0.59). -Black women used LARC slightly more than white women (mean = 0.13 and 0.07, respectively) -No race difference in how long LARC users used that method **Conclusion:** -Black women spent less time in relationships and had sex less frequently in their relationships than white women, but did not differ in the number of relationships they formed or in their frequency or consistency of contraceptive use within relationships. -Black women were more likely to use less effective methods for pregnancy prevention (e.g., condoms) than white women, who tended to use more effective methods (e.g., oral contraceptives). -Although LARC was used more often by black women than white women, LARC use was low in both groups. -Black women did not differ from white women in their number of discontinuations or different methods used and had fewer contraceptive method switches.	**Strengths:** -Size and length of the study -Deep inquiry into pregnancy attitudes, characteristics of current relationships, etc. in addition to socioeconomic factors **Limitations:** -Narrow geographic area -A small number of Latinas -Nuances of socio-economic factors;

Author Recommendations: The authors of this study provide no specific recommendations.

Implications: Race and other sociodemographic characteristics are related to dynamic pregnancy-related behaviors. This research is important because sex and contraceptive use vary substantially across other sociodemographic factors (e.g., by income), and black-white differences in these factors may produce what appears to be variation by race.

Source:
Murphy, M. K., Stoffel, C., Nolan, M., & Haider, S. (2016). Interdependent barriers to providing adolescents with long-acting reversible contraception: Qualitative insights from providers. *Journal of pediatric and adolescent gynecology*, *29*(5), 436–442. doi:10.1016/j.jpag.2016.01.125

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: Detect and assess barriers to healthcare providers providing adolescents with LARCs. **Sample/Setting:** Pediatricians, advanced practice nurses, and family physicians providing care to adolescents at a minimum of 3x a week (N=16). Chicago based private practices and health centers (public, school, and government funded). **Johns Hopkins Evidence Appraisal:** **Strength:** III **Quality:** Good	Qualitative, Cross-sectional Observational, study. Data was collected through semi structured interview based on the question "If an adolescent is eligible for LARC and lacks knowledge about these methods but is open to learning about them, what provider-based supports and competencies are required to result in the successful provision of LARC to that adolescent?" The data was further scrutinized via a modified grounded theory approach. Further coding ensued with a Cohen K consistency of 93.61%.	-Health care provider readiness to provide LARCs was influenced by their confidence to provide the method in practice, accessibility to LARC devices, lack of training or professional privileges. **Conclusion:** Current and ongoing training and education can impact health care providers' views and practices in regard to providing adolescents LARCS.	**Strengths:** -Variety sample of healthcare providers including pediatricians, advanced practice nurses, and family med physicians. -Semi structured interviews enabled participants to share and reflect on beliefs or potential barriers related to LARC use in adolescents. **Limitations:** -Convenience sample, not generalizable to the public. -Study participants may have been swayed to join the study based on strong feelings related to LARCs or $30 gift card provided. -Prior to starting the study, results could have been influenced by a previous theory of obstacles to LARC use in adolescents amongst providers.

Author Recommendations:
The author recommends an initiation of a larger study with more participants, inclusive of all provider types to gain more data and further assess correspondences between providers in regard to LARCs.

Implications:
Fostering a positive philosophy of LARC use amongst providers is vital to increase LARC use amongst teenagers. Educating healthcare providers on LARC use may increase confidence and provide support thus positively impacting providers perceptions and practices in regard to these methods of birth control.

Source:
Norris, A., Pritt, N., & Berlan, E. (2019). Can pediatricians provide long-acting reversible contraception? *Journal of Pediatric and Adolescent Gynecology*, 32(1), 39-43. doi:https://doi.org/10.1016/j.jpag.2018.09.008

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: Evaluate barriers and identify factors in which LARCs may be provided to adolescents in the pediatric setting. **Sample/Setting:** 23 primary care pediatricians (N=23). 23 Community clinics in a Midwestern city. **Johns Hopkins Evidence Appraisal Strength:** III **Quality:** Good	Qualitative, Observational, Cross-sectional study. Participants were interviewed for 30 minutes to collect data. Interview questions followed a semi structured format. The recorded and transcribed data was analyzed and coded by 3 investigators via a priori and open coding.	-LARC use amongst pediatric clients may be low due to a lack of pediatrician clinical knowledge, comfort, and misunderstandings. -Provider factors such as time, training on insertion techniques, and lack of counseling are other probable barriers to LARC use in the pediatric setting. **Conclusion:** While providing LARCs is within a pediatrician's scope of practice, LARC initiation in the pediatric setting is uncommon due to a variety of barriers.	**Strengths:** -Semi structured interviews enabled participants to share and reflect on beliefs or potential barriers related to LARC use in adolescents. -Variety of clinical locations. **Limitations:** -Small sample size. -Not generalizable to the public

Author Recommendations: No specific recommendations were cited by the author.

Implications:
In order to increase LARC availability and initiation in the pediatric setting, providers should be trained on the insertion technique as well as on counseling patients regarding LARC birth control methods. In cases where pediatricians cannot supply LARCs, a referral program should be available to ensure a smooth transfer of care and increased LARC availability and provision.

Source:
Oman, R. F., Vesely, S. K., Green, J., Clements-Nolle, K., & Lu, M. (2018). Adolescent pregnancy prevention among youths living in group care homes: A cluster randomized controlled trial. *American Journal of Public Health*, 108, S38–S44. doi: 0.2105/AJPH.2017.304126

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To determine if the Power Through Choices (PTC) intervention can increase the use of birth control and reduce pregnancy **Sample/Setting:** System-involved youths living in group care homes. N=1036 **Johns Hopkins Evidence Appraisal:** **Strength:** Level 1 **Quality:** Good	An experimental randomized controlled trial. This study involved group care homes operated by child welfare or juvenile justice systems in California, Maryland, and Oklahoma with assessments immediately before and after the intervention -Power Through Choices (PTC) is an age-appropriate and medically accurate sexual health education intervention, and at 6- and 12-month follow-up. -Researchers collected data from 2012 to 2014 via self-administered questionnaires. Participants were young (mean age = 16.1 years), predominantly male (79%), racially/ethnically diverse (37% Hispanic, 20% Black, 21% White, 17% multiracial), and sexually experienced (88%).	-At 6-month follow-up, participants in the intervention group had less odds of having recent sexual intercourse without using contraception (adjusted odds ratio [AOR] = 0.72; 95% confidence interval [CI] = 0.52, 0.98). -At the 12-month follow-up assessment, participants in the intervention group had significantly lower odds of ever being pregnant or getting someone pregnant (AOR = 0.67; 95% CI = 0.46, 0.99). -Adolescents "living in the group homes for the intervention and control groups, respectively, were 25.2% and 34.3% (P = .004) at 6 months and 20.2% and 24.3% (P = .14) at 12 months". **Conclusion:** -PTC is an effective sexual health education intervention that can be implemented with system-involved youths who represent a sexually experienced multiracial youth population	**Strengths:** -Recruitment in 3 states and high response rate -To the authors' knowledge, this was the first published RCT to demonstrate that a pregnancy prevention intervention designed specifically for youths living in group care settings can reduce sexual risk behavior and pregnancy. The results are particularly compelling because most of the youths were sexually experienced **Limitations:** -Behaviors and outcomes were self-reported, which is typical in studies that include very sensitive and personal activities. - Although researchers controlled for previous self-reports of lifetime pregnancy in post-intervention analyses, it would have been preferable to objectively measure pregnancy incidence.

Author Recommendations:
Future research with larger samples should be conducted to investigate potential differential intervention effects by gender, age, race/ethnicity, or by the type of system (i.e., child welfare or juvenile justice) in which the youths were involved

Implications:
An age-appropriate and medically accurate sexual health education intervention designed specifically for youths living in group home foster care settings and other out-of-home placements significantly improved contraceptive behaviors at 6- month follow-up and reduced pregnancies at 12-month follow-up. The results are particularly notable because the youth study population was sexually experienced, mostly male, and diverse in regard to race/ethnicity. This study demonstrates that group homes can be a feasible and efficient setting for delivering pregnancy prevention programming to system-involved youths.

Source:
Peipert, J. F., Zhao, Q., Allsworth, J. E., Petrosky, E., Madden, T., Eisenberg, D., & Secura, G. (2011). Continuation and satisfaction of reversible contraception. *Obstetrics and Gynecology*, *117*(5), 1105–1113. doi:10.1097/AOG.0b013e31821188ad

Purpose/Sample	**Design (Method/ Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To estimate 12-month satisfaction and continuation rates of intrauterine device (IUD) and implant users enrolled in the Contraceptive CHOICE Project and compare these measures to women using the oral contraceptive pills (OCPs) **Sample/Setting:** **N=**5,087 participants enrolled in a prospective cohort study of women in the St. Louis region offered contraception at no cost for 3 years **Johns Hopkins Evidence Appraisal:** **Strength:** Level II **Quality:** High	Quantitative, Observational, Cohort (longitudinal), Quasi-experimental study. The primary purpose of CHOICE is to promote the use of long-acting reversible contraception (IUDs and implants) and to reduce unintended pregnancies in our region. This analysis includes participants who received their baseline contraceptive method within 3 months of enrollment and who reached the 12-month follow-up phone survey time point (N=4,167	-Sixty-eight percent of participants chose a long-acting reversible contraception method (45% levonorgestrel intrauterine system, 10% copper IUD, and 13% subdermal implant), - 23% chose combined hormonal methods (11% OCPs, 10% vaginal ring, and 2% transdermal patch), -8% chose depo-medroxyprogesterone acetate. -Long-acting reversible contraception users had higher 12-month continuation rates (86%) than OCP users (55%) -Two IUDs with highest 12-month continuation rates: levonorgestrel intrauterine system (88%) and copper IUD (84%). -Women using the implant also had very high rates of continuation at 1 year (83%). -Satisfaction mirrored continuation: over 80% of users were satisfied with the IUD compared to 54% satisfied with OCPs. **Conclusion:** -IUDs and the subdermal implant have the highest rates of satisfaction and 12-month continuation. -When findings were stratified by age (< 21 years versus ≥ 21 years), younger women using the copper IUD were more likely to discontinue compared to older women	**Strengths:** Prospective design, large sample size, and low rate of loss to follow-up at 12 months. **Limitations:** **-**Convenience sample - inclusion criterion that specified that participants must be willing to try and initiate a new contraceptive method -Lack of randomization. (because participants were not randomized, their baseline expectations of a contraceptive method may be different. - Could not ethically randomize patients to a method of contraception, and randomization may adversely impact continuation which was one of the primary outcomes -The convenience sample, inclusion criteria, and regional recruitment may limit the generalizability of the study.

Author Recommendations:
LARCS have the highest contraceptive efficacy and satisfaction and continuation of all reversible contraceptive methods. LARCS should be first-line methods offered to women trying to avoid unintended pregnancy.

Implications:
LARC methods have the highest rates of user satisfaction and continuation of all reversible contraceptive methods. Because they are also the most effective reversible methods of contraception, they should be the methods of choice (first-line option) for women trying to avoid an unintended pregnancy.

Source:
Roe, A., Fortin, J., Janiak, E., Maurer, R., & Goldberg, A. B. (2019). Prevalence and predictors of initiation of intrauterine devices and subdermal implants immediately after surgical abortion. *Contraception*, *100*(2), 89–95. doi: 10.1016/j.contraception.2019.05.001

Purpose/Sample	**Design**	**Results**	**Strengths/Limitations**
Purpose: Assess initiation of LARC methods, including the IUD and implant immediately after a surgical abortion. To evaluate differences between social groups and demographics in relation to LARC initiation immediately after a surgical abortion. **Sample/Setting:** **Sample:** N=26,858 female surgical abortion patients. **Setting:** Planned Parenthood League of Massachusetts at 3 clinics sites from 2012 through 2017. **Johns Hopkins Evidence Appraisal:** **Strength:** Level V **Quality:** Good	A quantitative, longitudinal, retrospective cohort study -IUD and implant initiation were computed, and a mixed effect logistic regression was utilized to appraise and predict outcomes. -Women who chose an IUD or implant immediately post-abortion were compared to those who declined LARC initiation and statistical analysis was completed using SAS version 9.4.	-25% of clients who received a surgical abortion chose to initiate LARCs immediately after the procedure. -18.4% chose an IUD while 7% chose the subdermal implant. -White women were more likely to initiate LARC use after a surgical abortion when compared to black women (aOR 0.81, 95% CI 0.74–0.89). -Younger women and nulligravidae were more likely to choose the implant after a surgical abortion (<18 versus≥35: aOR 3.26, 95% CI 2.26–4.71) **Conclusion:** Immediate LARC initiation (same day) should be an available option for women seeking abortion care.	**Strengths:** -Large sample size. -Exploration of LARC uptake amongst women from different ages and racial backgrounds. **Limitations:** -Not generalizable as additional funding enabled a greater number of women to receive free or discounted access to LARCs. - Single state study

Author Recommendations: The subdermal implant and IUD should be further studied in regard to immediate LARC initiation after a surgical abortion. Same-day LARC initiation should be an option for women seeking abortion care.

Implications: Same-day access to LARCs after a surgical abortion can help women avoid unintended pregnancies and therefore additional abortions. Immediate initiation can increase the number of women who choose LARCs due to increased availability and convenience compared to returning for an additional appointment.

Source:
Rosenstock, J. R., Peipert, J. F., Madden, T., Zhao, Q., & Secura, G. M. (2012). Continuation of reversible contraception in teenagers and young women. *Obstetrics and Gynecology*, *120*(6), 1298–1305. doi:10.1097/AOG.0b013e31827499bd

Purpose/Sample	Design	Results	Strengths/Limitations
Purpose: To examine the effect of age on continuation rates of reversible contraceptive methods among teenagers and young women aged 14–19 years and women aged 20–25 years, compared to women older than 25 years of age. **Sample/Setting:** N= 7,472 participants enrolled in the Contraceptive CHOICE Project; a prospective cohort study of women offered no-cost contraception. **Johns Hopkins Evidence Appraisal:** **Strength:** Level II **Quality:** High	Quantitative Observational Cohort (longitudinal) study. Compared 12-month continuation rates between teenagers and women aged 14–19, 20–25, and 26 years and older. Collected data about method continuation from telephone surveys and chart review. Kaplan-Meier survival curves to estimate continuation and Cox proportional hazard models to examine the risk of contraceptive method discontinuation	-12 month satisfaction rates of long-acting reversible contraceptive (LARC) methods were high for all age groups: 75% for 14-19year olds; 82% for 20-25year olds; and 83% for >26year olds. -Satisfaction with LARC methods was decreased among implant users versus IUD (74% and 58%, respectively, p=0.002). -Young women ages 14–19 years using LARC methods had slightly lower continuation rates (81%) than older women (85–86%), but this did not reach statistical or clinical significance. -14-19year olds were more likely to be Black, have trouble paying for basic expenses. Also more likely to be nulliparous and less likely to have experienced unintended pregnancy or STI. -Levonorgestrel IUD had the highest 12-month continuation rate in both 20-25year old and 26+ year old groups. -Compared to women older than 25 years of age, teenagers aged 14–19 years had lower continuation rates for non-LARC methods (44% v. 53%; 95% CI 1.02–1.73). -Teenagers aged 14–19 years were less likely to be satisfied with non-LARC methods (42% v. 51%; 95% CI 0.65–0.98), but not LARC methods (75% v. 83%; 95% CI 0.88–1.01) when compared to women over 25 years of age; however, the differences were small. **Conclusion:** Teenagers and young women have high rates of LARC method continuation.	**Strengths:** -Large sample size, -prospective design, -Low rate of loss to follow-up at 12 months (6%), -Evaluation of all forms of reversible contraception. **Limitations:** -The requirement that participants start a new contraceptive method, utilization of a convenience sample, -recruitment limited to the St. Louis region which may limit the generalizability of our findings. -The continuation was self-reported and therefore subject to reporting bias. -Methods were provided at no cost which could have resulted in a higher continuation of refillable methods (OCPs, patch, ring) and DMPA.

Author Recommendations:
Teenagers and young women represent a population at especially high risk for sexually transmitted infections. An ideal approach in counseling teenagers and young women should emphasize dual method use, utilizing reliable contraception for pregnancy prevention and condom use to prevent STIs.
In a previous CHOICE analysis, we found that teenagers (age 14–17 years) were more likely to favor the implant over the IUD, compared to women between 18–20 years of age (12). These findings suggest that adolescents may prefer the implant for long-acting and highly effective contraception.

Implications:
Given the high rates of continuation and satisfaction of LARC methods among teenagers and young women, long-acting reversible contraception should be offered to women of all ages as first-line contraceptive methods in order to best serve females who want to prevent unintended pregnancy.

Source:
Santibenchakul, S., Tschann, M., Carlson, A. D. P., L. Hurwitz, E., & Salcedo, J. (2019). Promotion of long-acting reversible contraception among adolescents and young adults. *Journal of Midwifery & Women's Health*, 64(2), 194–200. DOI: 10.1111/jmwh.12934

Purpose/Sample	Design	Results	Strengths/Limitations
Purpose: to examine LARC counseling and usage rates among adolescents and young women in high-volume hospital based OBGYN resident clinic in Honolulu, HI **Sample/Setting:** A retrospective chart review of all visits of N=450 nonpregnant women aged 14 to 25 years at the primary obstetrics and gynecology clinic associated with the residency training program at the University of Hawaii in Honolulu, during the calendar year 2014 **Johns Hopkins Evidence Appraisal:** **Strength:** Level V **Quality:** High	Quantitative observational, Cross-sectional study. Retrospective chart review of visits of nonpregnant women aged 14 to 25 years seen at an obstetrics and gynecology resident physician clinic during a calendar year. A logistic regression model was used to assess demographic factors associated with LARC education and use	-LARC discussion was documented during 47.8% (215/450) of visits -Among visits with documentation of LARC counseling, 45.6% (98/215) had documentation of a LARC placement plan -40.8% (40/98) of patients who decided to initiate a LARC had a device placed at the same visit. -LARC placement was documented during 8.9% (40/450) of visits -Counseling for women aged 14 to 19 years was documented by clinicians more frequently than for women aged 20 to 25 years -Compared with women who did not use any method of contraception, clinicians documented LARC counseling less frequently for women who used short-term hormonal contraception **Conclusion:** Among all eligible visits, use of LARC in this clinic was approximately 9%. Approximately 20% of patients who decided to initiate LARC did not have a LARC device placed during the same visit despite their preference to have it placed that day.	**Strengths:** -Evaluated the entire population of clinic visits by nonpregnant women aged 14 to 25 years over a given calendar year, which provides the most accurate reflection of standard practice in this clinical setting. -To optimize the accuracy of contraceptive method discussion and uptake, investigators reviewed all available aspects of the health records, including resident and attending-level clinician notes and prescription histories, and did not rely on lower-fidelity methods such as charge codes. -First study to address clinician adherence to documentation of LARC education consistent with current standards of care and to examine the impact of demographic factors on documentation of LARC discussion and use in a residency training clinic setting. **Limitations:** -Limited generalizability (Relied on data available in medical charts in a single hospital-based resident obstetrics and gynecology clinic) -Cross-sectional study: causal relationships between demographic factors and LARC counseling and use could not be established. -Demographic data of race and ethnicity collected from the electronic health record: may not represent the self-identified racial identity of all patients

Author Recommendations:
Clinicians in a training clinic did not document LARC counseling for more than half of eligible patients. Assess risk of unintended pregnancy and ensure that contraceptive needs are addressed at every clinic visit.

Implications:
Increasing uptake of long-acting reversible contraception (LARC) is an important public health intervention for addressing high unintended pregnancy rates.
-Women aged 14 to 19 years are more likely to have documentation of LARC counseling than women aged 20 to 25 years. Those using effective forms of contraception are less likely to have documentation of LARC counseling compared with women who are not using contraception.
-Every clinical visit is an opportunity to assess risk of unintended pregnancy and ensure that contraceptive needs are addressed.

Source:
Sundstrom, B., Baker-Whitcomb, A., & DeMaria, A. (2015). A qualitative analysis of long acting reversible contraception. *Maternal & Child Health Journal, 19*(7), 1507-1514.
doi:10.1007/s10995-014-1655-0

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To investigate young women's knowledge, perceptions, decision-making process, beliefs, and use of LARC methods. **Sample/Setting:** N=53 women aged 18–24 years completed in-depth interviews. -convenience sample created through informal contacts and flyers. -All participants were students at a mid-sized, urban, public liberal arts and sciences university located in the Southeast United States **Johns Hopkins Evidence Appraisal:** **Strength: Level** III Qualitative **Quality:** High/Good	-Qualitative semi structured interviews -Constant-comparative method was used by researchers to discover themes -Analytical techniques from the grounded theory approach were used to identify patterns and themes across the data	Barriers to LARCs included: -Rumors and misunderstandings about the insertion process of LARCs -Health insurance coverage and cost -Participants overestimated the risks of LARCs and underestimated the risks of OCPs -Medical provider resistance limited participants' choice of LARCs -Loss of user control and long duration of use -Myth of perfect use emerged as participants described being in control when taking the pill every day. -Concerns about fertility **Conclusion:** -Barriers to LARC methods, including the myth of perfect use, access, medical resistance, and cost construct a false choice of contraceptive methods. -Among participants, the OCP served as the default contraceptive choice despite its decreased effectiveness and lack of convenience.	**Strengths:** -Participant driven inquiry -Insightful interpretation **Limitations:** -Women recruited for this study already had an awareness of LARCs -Results may not be generalizable to a different geographical region

Author Recommendations:
-Medical professionals should discuss LARC methods as the most effective and ideal methods for all women, including adolescents in order to promote true choice for contraception.
-Public health interventions and communication campaigns should emphasize desirable side effects, safety, and increased effectiveness of LARC methods
-Messages from health care providers and public health communications will help young women view LARC methods more favorably and as a realistic and safe option for preventing pregnancy.

Implications
-Strategies for health care providers to distribute satisfactory and effective contraception for young women.
-Effective health communication campaigns will emphasize the desirable side effects, safety and increased effectiveness of LARC methods.

Source:
Thompson, K. M., Rocca, C. H., Kohn, J. E., Goodman, S., Stern, L., Blum, M., … Harper, C. C. (2016). Public funding for contraception, provider training, and use of highly effective contraceptives: A cluster randomized trial. *American Journal of Public Health, 106*(3), 541–546. doi:10.2105/AJPH.2015.303001

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To assess if public funding for birth control was linked to LARC utilization after provider training. **Sample/Setting:** Women ages 18-25 (N=1500). 40 Planned Parenthood clinics in 15 states from February 2011 to May 2013. **Johns Hopkins Evidence Appraisal:** **Strength:** Level I **Quality:** Good	Experimental, randomized control trial. In order to assess the effect of the intervention and funding Cox proportional hazards model with shared frailty was utilized, to assess whether the model was met, repeated analyses ensued inclusive of "Schoenfeld residuals and log-log plots against time". Stata version 13.0 was used for analysis. 20 clinics were randomly designated as intervention sites. These clinics participated in a 4-hour LARC training session. Also, the clinic waiting room ran a video of patients' experiences with LARCs. (N=802) 20 Planned Parenthoods served as control clinics and provided traditional care. (N=698) Information regarding if women had initiated LARC use (yes or no) was collected over 3, 6, 9, and 12 months via questionnaires. Health care records were also reviewed.	-Clients at intervention sites were more likely to initiate LARC use at 22/100 versus the control at 18/100. -Clients who sought care at clinics with family planning funding related to expansion programs were 2x as likely than the control clinics to initiate LARC use "(25 vs 13 per 100 person-years; AHR = 2.26; 95% CI = 1.59, 3.19). LARC initiation also increased among participants with public (AHR = 1.56; 95% CI = 1.09, 2.22) but not private health insurance". **Conclusion:** Access to public funding and trained medical professionals increases LARC initiation.	**Strengths:** -Cluster randomized design. -Data collected from a variety of states within the U.S. -Large sample size. **Limitations:** -Conducted solely within Planned Parenthood clinics. -Clinics were aware that they were the intervention or control group. This could have changed or influenced traditional practices.

Author Recommendations: In order to reduce the number of unplanned pregnancies clinics should assess the cost of LARC initiation as well as the skills of the provider personnel.

Implications:
Provider skill in LARC use should be addressed and reinforced with training**.** Focus should examine the high expense of LARCs as a barrier to utilization. Public funding directly impacts a woman's choice to pursue LARC initiation.

Source:
Wilkinson, T. A., Downs, S. M., Tucker Edmonds, B. (2019). Cost minimization analysis of same-day long-acting reversible contraception for adolescents. *JAMA Network Open, 2*(9), 1-9. doi: 10.1001/jamanetworkopen.2019.11063

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
Purpose: To analyze Indiana Medicaid's cost savings associated with providing adolescents with same-day access to LARC **Sample/Setting:** Net costs of providing same-day LARC based on Indiana state Medicaid -Participants were payers (Medicaid) **Johns Hopkins Evidence Appraisal:** **Strength:** Level V **Quality:** Good	Quantitative, Observational, Cross sectional study -Economic evaluation of cost minimization from the payer's (Medicaid) perspective -from August 2017 through August 2018. -cost model examined the anticipated outcome of providing LARC at the first visit compared with requiring a second visit for placement. The costs and probabilities of clinic visits, devices, device insertions and removals, unintended pregnancy, and births, according to previously published sources, were incorporated into the model. The participants were payers (Medicaid). -Followed consolidated Health Economic Evaluation Reporting Standards	-Same-day LARC placement was associated with lower overall costs ($2016 per patient over 1 year) compared with LARC placement at a subsequent visit ($4133 per patient over 1 year). -Compared with the return-visit strategy, same-day LARC was associated with an unintended pregnancy rate of 14% vs 48% and an abortion rate of 4% vs 14% -This cost minimization analysis did not report P-values or significance. **Conclusion:** Providing same-day LARC could save costs for Medicaid, largely by preventing unintended pregnancy. Expected cost savings could be used to implement policies that make this strategy feasible in all clinical settings.	**Strengths:** -Implications for both policy and practice -Describes barriers to access in LARCs without human subjects/need for the ethical review board. **Limitations:** -Does not consider costs associated with children born from unintended pregnancy which may tend to favor same-day LARC. -Not able to account for women using a less-effective form of contraception if a LARC was not obtained or its use was discontinued. -Because the model was developed from the payer's perspective, did not consider or include patient preferences or utilities in the model.

Author Recommendations:
The findings suggest that providing same-day LARC placement may save payers money by preventing unintended pregnancy, and efforts to make this model of care feasible in all clinical settings should be undertaken.

Implications:
Providing same-day LARC could save costs for Medicaid, largely by preventing unintended pregnancy. Expected cost savings could be used to implement policies that make this strategy feasible in all clinical settings. Most importantly this would decrease the rate of unintended pregnancy and abortion among adolescents.

Source:
Wilson, S. F., Degaiffier, N., Ratcliffe, S. J., & Schreiber, C. A. (2016). Peer counseling for the promotion of long-acting, reversible contraception among teens: a randomized, controlled trial. *European Journal of Contraception & Reproductive Health Care*, *21*(5), 380–387. doi: 10.1080/13625187.2016.1214698

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: Assess the influence of peer's perceptions and influence teens choosing to pursue same day placement of LARCs. **Sample/Setting:** 110 women ages 13-21 pursuing contraception (N=110). Title X Family Planning Clinic at the Hospital of the University of Pennsylvania **Johns Hopkins Evidence Appraisal:** **Strength:** I **Quality:** Good	Experimental Randomized control trial. Questionnaires were utilized to assess client desire for same day LARC placement and perceptions of LARCs post peer counseling. An analysis of data via a computerized system Stata compared variables. Chi-squares were utilized to reflect individual patient choice and perception of LARCs.	-The women who participated in the study appreciated hearing peer experience with LARCs and found peer counseling to be beneficial when choosing to pursue LARCs. -95% of women considering LARC placement deemed the information provided by a peer to be beneficial in decision-making compared to 62% of individuals which found education by a health counselor to be helpful in decision making. **Conclusion:** Teens often rely on the experiences of their peers. This may be beneficial to raise awareness of and improve familiarity with LARCs.	**Strengths:** -Randomized control trial -Adequate sample size of 110. -Randomization enabled client anonymity. **Limitations:** -Study was completed at a single site. -The clinic where the study was held doesn't regularly offer same day LARC placement.

Author Recommendations:
The author recommends a further study be conducted to assess the number of teens who chose to pursue LARCs after peer or advisor counseling including follow up to assess pregnancy rates.

Implications:
Teens have the ability to influence peers. Educating adolescents on LARCs can influence their choice to pursue LARC placement and potentially decrease teen pregnancy rates.