

IMPROVING IUD USAGE AMONG ADOLESCENTS THROUGH PROVIDER  
EDUCATION

By

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A Thesis Submitted to The Honors College

In Partial Fulfillment of the Bachelors degree  
With Honors in

Nursing

THE UNIVERSITY OF ARIZONA

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## ABSTRACT

The purpose of this thesis is to develop curriculum guidelines for nurse practitioner programs to use when teaching NP students about intrauterine device (IUD) use in adolescents. About 50% of all pregnancies that are conceived each year in the United States are unplanned, and teenagers have the highest rates of unintended pregnancy of all sexually active age groups. Eighty-two percent of teen pregnancies are unintended and many teenage mothers report that they were not using contraception at the time of conception. Modern IUDs are among the most effective forms of long acting reversible contraception. They have a high rate of user satisfaction and are over 99% effective at preventing pregnancy. In 2017, most major women's health organizations recommend that intrauterine devices be used as first-line methods of birth control for adolescents. By introducing a curriculum that includes didactic, skills, and simulation portions, educators can ensure that nurse practitioners go into practice with the appropriate knowledge, skills, and counseling abilities to safely and effectively provide IUDs to the adolescent population.

## CHAPTER 1

### **Statement of Purpose**

This thesis will propose nurse practitioner curriculum changes to improve provider understanding of intrauterine device (IUD) use in adolescents. It will explore the background of intrauterine devices in the United States. The author will present research into the safety, efficacy, and proper use of IUDs in adolescent populations. In addition, the research will cover methods of effective provider education. This research will inform the curricula guide that will be presented in chapter three.

### **Background**

The intrauterine device, or IUD, is a long-acting reversible contraceptive option (LARC) that is available to patients through health clinics and hospitals in the United States. It is approximately an inch to 1.5 inches in length and is made either of hormone impregnated plastic or a combination of copper and plastic. It is inserted through the cervix and into the uterus by a provider in order to prevent pregnancy. These devices can be left in place anywhere from three to ten years and are used primarily for the long-term prevention of pregnancy (Bayer, 2017; Teva Women's Health, 2016).

There are two types of intrauterine devices that exert slightly different effects on the body to prevent pregnancy: the copper IUD and the hormonal IUD. Copper IUDs release copper ions, which are toxic to sperm, impair implantation, and cause an increased cytotoxic inflammatory response in the uterus (Thonneau & Almont, 2008). Hormonal IUDs contain levonorgestrel, which thickens cervical mucous, thins the endometrial lining, and inhibits binding between sperm and egg (Thonneau & Almont, 2008). Both types of IUDs are perceived by the immune

system as a foreign body in the uterus, causing a sterile inflammatory response that creates a hostile environment for sperm and eggs (Thonneau & Almont, 2008).

The concept of an intrauterine device that prevents conception has existed since the early 1900s (Rosenfield, Peterson, & Tyler, 1997). However, the invention of the first modern IUDs did not occur until the rise of thermoplastics in the 1950s (Rosenfield et al., 1997). Early IUDs came in many shapes and sizes and were typically made of flexible plastic that could be bent for insertion through the cervix and pop back into shape once they had been placed in the uterus. Modern IUDs are usually T-shaped to fit the shape of the uterus.

In the 1970s, the US drug company A. H. Robins marketed a new IUD, the Dalkon Shield, which led to a historical legacy of mistrust of intrauterine devices. Over 2.5 million Dalkon Shields were sold over the four years that it was on the United States market (Lolata, 1987). These IUDs had serious design flaws that began the legacy of mistrust of intrauterine devices. The Dalkon Shield had short spurs around the perimeter that made it especially difficult and painful to remove (Szaller, 1999). These spurs made it more likely to perforate the uterus and require surgical removal from the abdominal cavity (Szaller, 1999). The most serious design flaw was the choice of filament for the removal string. The removal string is attached to one end of the device and runs through the cervix so that the device may be removed when it is no longer needed (Szaller, 1999). The Dalkon Shield had a multifilament string, which is capable of wicking bacteria-laden fluids from the vagina into the uterus (Szaller, 1999). This action of the multifilament string caused a high incidence of pelvic inflammatory disease among women fitted with this IUD. The device was also associated with high rates of septic abortion and septic pregnancies (Szaller, 1999). One study found that women using the Dalkon shield were seven times more likely to get pelvic infections than those who used no contraceptives (Lolata, 1987).

After the Dalkon shield case, all IUDs were removed from the US market. The Dalkon Shield was never sold in Europe, so it did not have the same negative effect of IUD usage there as it did in the US. Rates of IUD usage in the US continue to be lower than rates in other developed countries (Thonneau & Almont, 2008).

IUDs were slowly reintroduced onto the American birth control market after their period of absence following the Dalkon Shield case. However, they remained unpopular because providers were reluctant to prescribe them and patients associated them with infertility and other health problems (Hubacher, 2002). Regulatory entities such as the Centers for Disease Control (CDC) recommended that they be used in older, nulliparous women with only one partner (Hubacher, 2002). Adolescent use was contraindicated. Over the subsequent decades more and more research was conducted on IUDs as women continued to use them in other countries (Hubacher, 2002). IUD design has changed several times and companies have introduced a variety of IUDs containing different concentrations of copper and hormones.

Modern copper and hormonal IUDs are among the most effective forms of long acting reversible contraception (ACOG, 2012; Thonneau & Almont, 2008). They have a high rate of user satisfaction and are over 99% effective at preventing pregnancy (ACOG, 2012). One study found that 75% of study participants were still using the IUD one year after placement, which was higher than the continuation rates for all non-LARC methods of contraception (Rosenstock, Peipert, Madden, Zhao, & Secura, 2012). They carry a low associated risk with placement, which is an outpatient procedure performed by specially trained nurse practitioners or physicians without the use of anesthesia (Bayer, 2017; Teva Women's Health, 2016). They can be left in place for 5 to 10 years (Bayer, 2017; Teva Women's Health, 2016). Unfortunately, since the Dalkon Shield case many American providers continue to be reluctant to prescribe IUDs (Rubin

et al., 2010; Stanwood, Garrett, & Konrad, 2002). Older guidelines for IUD placement indicated that they should not be used in young women, nulliparous women, or women with multiple sexual partners. The thought was that young women and women who had not had children have a narrower cervix that is not suitable for IUD insertion. Providers' reasons for not offering IUDs to women with multiple sexual partners are more complicated. In the past, IUDs were thought to increase the risk of pelvic inflammatory disease (PID), especially in women with multiple sexual partners. This is because women with multiple sexual partners are at higher risk for contracting sexually transmitted infections (STIs), which can lead to PID (Carr & Espey, 2013). However, current data shows that IUDs are not associated with a higher risk of contracting PID or with an increased severity of infections (Carr & Espey, 2013). Hormonal IUDs may decrease risk for upper reproductive tract infection because they thicken cervical mucous (ACOG, 2012).

Since adolescents are younger, often nulliparous, and more likely to engage in high-risk sexual behaviors, many practitioners are reluctant to offer them IUDs (Luchowski et al., 2014; Rubin et al., 2013; Stanwood et al., 2002). However, the research and guidelines that pertain to these three areas of perceived risk have changed dramatically over the last decade. In 2017, the World Health Organization (WHO), Center for Disease Control (CDC), American College of Nurse Midwives (ACNM), the National Association of Nurse Practitioners in Women's Health (NPWH), and the American College of Obstetricians and Gynecologists (ACOG) all recommend that intrauterine devices be used as first-line methods of birth control for adolescents.

### **Significance of the Problem**

The United States has a higher rate of unintended pregnancy than most of the industrialized world (Daley, 2014). About 50% of all pregnancies that are conceived each year in the United States are unplanned, and teenagers have the highest rates of unintended pregnancy of

all sexually active age groups (Kavanaugh et al., 2013). Eighty-two percent of teen pregnancies are unintended and many teenage mothers report that they were not using contraception at the time of conception (ACOG, 2012; Waggoner, Lanzi, & Klerman, 2012). Many teens report a lack of sex education and access to birth control (Daley et al., 2014). Furthermore, adolescents overwhelmingly use condoms or oral contraceptives versus IUDs, both of which have relatively high failure rates because their effectiveness depends on the user's adherence to the method (Kavanaugh et al., 2013).

### **Conclusion**

Unplanned pregnancy among teenagers and young adults is a pressing problem in the United States. Evidence shows that IUDs are highly appropriate for use in adolescents. The primary obstacle to widespread use of IUDs among adolescents is the hesitancy or unwillingness of many providers to offer them as options because of the negative history of the IUD in the United States. This could be changed through provider education that includes the newest research on the efficacy and safety of IUD use in adolescents. This thesis will propose changes to nurse practitioner education that will include insertion practice as well as information on efficacy, safety, and method suitability for different populations.



## CHAPTER 2

### Literature Review

This literature review addresses common misconceptions and important information about the use of intrauterine devices in patients ages 14 to 24. Sixteen articles were reviewed for this paper. The author found these articles on the PubMed and CINAHL databases using the search terms “adolescents,” “intrauterine devices,” “nurse practitioners,” and “pelvic inflammatory disease.” The articles were published between 2008 and 2017. The articles are both qualitative and quantitative. The following themes found are: the effectiveness of IUDs, nurse practitioners and IUDs, positive outcomes of IUD use in adolescents, provider barriers, pelvic inflammatory disease, pain management, patient education, provider training and competency, and provider education effectiveness. These are addressed in detail below.

#### **Effectiveness of IUDs**

IUDs are an extremely effective form of birth control. The levonorgestrel IUD has a cumulative five-year pregnancy rate of less than 0.5%, and the copper IUD has a cumulative five-year pregnancy rate between 0.3% and 0.6% (Thonneau & Almont, 2008). This is a lower pregnancy rate than almost all other forms of contraception except abstinence. There are currently five brands of IUDs on the US market, and all of them have similarly low pregnancy rates. One of the reasons for the IUD’s effectiveness is that it allows little opportunity for user error. Users are only responsible for checking the IUD strings periodically (ACOG, 2012). For this reason, there is very little difference between the typical and perfect use of IUDs because they do not require active daily maintenance (Waggoner, 2012). The American College of Obstetricians and Gynecologists (ACOG) stated “Intrauterine devices and the contraceptive implant are the best reversible methods for preventing unintended pregnancy, rapid repeat

pregnancy, and abortion in young women” (ACOG, 2012, p 986). In a 2013 qualitative study by Kavanaugh, Frohwirth, Jerman, Popkin, and Ethier, patients and providers also found that the long-acting and forgettable nature of IUDs and implants were appropriate for the lifestyle and contraceptive desires of young women.

Waggoner, Lanzi, and Klerman (2012) studied the relationship between pregnancy intentions, long-acting contraceptive use, and rapid subsequent pregnancies among adolescent and adult first-time mothers. They hypothesized that adolescents would be less likely than adult women to use long-acting contraceptive methods and more likely than adult women to experience a rapid subsequent pregnancy. Participants were selected from four communities and separated into three groups. This study only used two of the three groups: 396 adolescents aged 15-18 and 169 low education adults. Only participants with full data sets were used, and ten participants were removed from the sample because they were pregnant again at the 6-month point. The final analytic sample included 227 participants with complete data. Pregnancy intention was ascertained during the prenatal assessment through a number of questions. At the 6-month follow-up assessment, participants were asked whether they were using contraception, and if so, what method. Women who used sterilization, Norplant, implants, IUDs, Depo-Provera, or injectables were recorded as users of LARCs. This study did not separate the data based on which type of LARC the participants chose; they divided the participants into LARC users and non-LARC users. The researchers asked participants about their pregnancy status again at 18 and 24 months (Waggoner et al., 2012).

During the prenatal assessment, 38.8% of the pregnant adolescent and adult mothers reported that they never wanted to get pregnant again, 41.4% indicated that they wanted to get pregnant again but were goal-oriented about when they wanted to get pregnant again, and 19.8%

were not goal-oriented (Waggoner et al., 2012). Those who were goal oriented were more likely to use a LARC at 6 months. Using a LARC at 6 months, when compared to using no method, decreased the risk of rapid subsequent pregnancy by 70% at a 95% confidence interval. One weakness of the study is that it did not assess whether the participants had their LARCs removed after the 6-month period. Strengths include the longitudinal nature and the use of multiple questions to assess the participants' goals. The results of this study indicate that LARCs, when used to support new mothers' family planning goals, are effective in reducing rapid subsequent pregnancies (Waggoner et al., 2012).

### **Nurse practitioners and IUDs**

Nurse practitioners are important in the provision of contraceptive services to underserved populations such as teenagers and adolescents, for they prescribe much of the birth control that these patients receive. In a 2013 national survey of nurse practitioners conducted by Harper et al., researchers found that only 12% of primary care NPs and 66% of women's health NPs (WHNPs) had received clinical IUD insertion training (Harper et al., 2013). More than 20% of nurse practitioners surveyed were interested in receiving further training (Harper et al., 2013). These statistics indicate that nurse practitioner programs are not adequately preparing providers to routinely insert IUDs in the clinical setting. Nurse practitioners who do not feel confident in their ability to place an IUD are less likely to offer them to patients. Therefore, only 30% of primary care NPs and 72% of women's health NPs reported that they regularly mentioned IUDs as a contraceptive option to patients (Harper et al., 2013). Nurse practitioners also had an increased perception of risk when it came to IUDs. Less than half of primary care NPs would consider offering an IUD to a nulliparous patient, while only 65% of women's health NPs would do the same (Harper et al., 2013). Furthermore, only 33% of primary care NPs and 13% of

women's health NPs considered the IUD an appropriate method of birth control for an unmarried woman (Harper et al., 2013). Seventy-nine percent of primary care NPs and 49% of WHNPs thought that teenagers were ineligible for IUDs (Harper et al., 2013). This study shows that gaps in clinical and didactic training have created a population of nurse practitioners who do not adequately provide IUDs to populations for whom the CDC, WHO, ACNM, NPWH and the American College of Obstetricians and Gynecologists recommend that it be a first-line contraceptive method (ACOG, 2012; Harper et al., 2013).

### **Positive outcomes of IUD use in adolescents**

A 2012 study published in the journal *Obstetrics and Gynecology* shows that not only are IUDs safe for use in adolescents, but that adolescent IUD users are more satisfied with their method of contraception than users of other methods. This study investigated levels of user satisfaction by using data from the Contraceptive CHOICE Project to compare continuation rates of different forms of contraception among women of different ages. The prospective cohort study split the participants into three age groups: 14 to 19 years old, 20 to 25 years old, and over 26 years old. Participants in the youngest age group were significantly more likely to be satisfied with their chosen method of contraception than participants their age who had chosen non-LARC methods (Rosenstock et al., 2012). IUD users ages 14-19 reported a satisfaction rate of 76%, whereas users of non-LARC methods in the same age range reported a satisfaction rate of 42% (Rosenstock et al., 2012). They also had significantly lower rates of discontinuation as compared to their peers who chose non-LARC methods. Hormonal IUD users had a continuation rate of 80.6% and copper IUD users had a continuation rate of 75.6%, whereas users of non-LARC methods had a continuation rate of 44% (Rosenstock et al., 2012).

### **Provider barriers**

A 2013 qualitative study by Kavanaugh, Frohwirth, Jerman, Popkin, and Ethier investigated patient and provider perspectives on LARCs in order to identify challenges experienced by facilities in providing LARC methods, including IUDs, to young women. There were three sources of data: twenty semi-structured phone interviews with directors of publicly-funded family planning clinics, 6 focus group discussions with a total of 37 facility staff, and 48 semi-structured in-depth interviews with clients 16-24 years of age. Patients and providers agreed that the long-acting and forgettable nature of IUDs and implants were appropriate for the lifestyle and contraceptive desires of young women. However, some clients believed that IUDs are more appropriate for older women who want to limit their family size. Some staff believed that age-related reasons such as a smaller cervix and having multiple partners could disqualify young women from IUD eligibility. The high efficacy of IUDs was more important to the clients than to the staff, who cared more about clinic costs and time constraints. This study had several limitations. The use of IUDs and implants was more common among the participants than it is nationally. In addition, since the IUD was mentioned before the implant in the interviews, attitudes about the implant were often expressed as compared to the IUD. The misconceptions and limited knowledge about IUDs expressed by young women in the study indicate the need for in office education about IUDs during provider visits (Kavanaugh et al., 2013). This will require educating the providers about the correct information and how to talk to their younger patients about these methods.

Another study examined the differences in barriers stemming from providers and barriers originating from patients. The goal of a qualitative study by Gilmore et al. (2015) was to examine a program in Seattle that provides LARC services that include IUDs from school-based

health centers in order to identify facilitators and barriers to its implementation. The information was gathered through separate semi-structured interviews with 14 key players involved in the implementation of LARC services, such as nurse practitioners, physician assistant, administrators, public health officials, and community partners. Researchers used a combination of purposive and snowball sampling to identify people to interview. They used content analysis software to analyze the barriers and facilitators that were mentioned by participants. Two barriers and four facilitators were commonly named across participant groups. The common barriers on the side of clinicians were bias, negative attitudes about IUDs, lack of skill, lack of confidence, and lack of training. Many clinicians expressed fear of harming the patient because of a lack of training. The four facilitator themes were clear communication strategies, contraceptive counseling practice changes, provider trainings, and stakeholder engagement (parents, teens, school officials, and teachers). Clinicians stated that they were surprised how many teens chose to use a LARC method after being educated about their options (Gilmore et al., 2015). One participant stated, “It’s not the kids who have this negative association about IUDs. It’s the adults in their lives” (Gilmore et al., 2015, p.661). These obstacles can be overcome with additional training for clinicians using up-to-date information and insertion practice.

There were several limitations in this study. The purpose of the study was to examine the implementation of LARC services in schools, yet many of the participants were interviewed four years after the introduction of LARC services at their schools (Gilmore et al., 2015). They may have had trouble recalling events and may have been more inclined to think positively of the program because they were invested in it. In addition, the findings may not be generalizable to other geographical areas because of policies specific to Washington State that ensure access to confidential reproductive health services for minors. Despite these weaknesses, the researchers

concluded that providing LARC counseling and services in a school-based health center is an effective way to promote access to contraceptive health care options for adolescent women (Gilmore et al., 2015).

### **Pelvic inflammatory disease**

Several studies have found that providers often cite an increased risk for pelvic inflammatory disease (PID) and infertility as the reason that they do not offer IUDs to adolescents (Carr & Espey, 2013; Harper et al., 2008; Luchouski et al., 2014; Rubin, Davis, & McKee, 2013; Rubin, Fletcher, Stein, Gold, & Segall-Gutierrez, 2010; Stanwood et al., 2002). However, a 2013 review by Carr and Espey found that the risk of PID in all women increases only in the first 20 days after insertion, after which it returns to baseline. Evidence also indicates that IUD use is not correlated with a higher rate of tubal infertility. Instead, the presence of chlamydia antibodies is positively associated with tubal infertility. Researchers have long known that STIs and PID can lead to infertility. A patient's risk for PID is inversely proportional to their age, most likely because younger women have a higher incidence of STIs. Having an IUD in place does not significantly increase a woman's risk for PID after the first month. This period of increased risk may be due to the insertion process itself. If a patient has an STI at the time of insertion, the procedure could potentially transfer bacteria from the vagina to the uterus, increasing the likelihood of PID. This can be prevented by STI testing immediately prior to IUD placement. The CDC recommends routine STI testing for all teens. In the case of same-day IUD placements, providers should check the patient's STD and PID history prior to insertion. If the patient has purulent vaginal discharge or other STI symptoms, the procedure should be delayed until testing and treatment have been performed. However, if the patient has no current STI symptoms, it is acceptable to perform the insertion and collect a cervical swab to test for STIs in

the same clinical visit. If the STI test results are positive, the IUD can be left in place but the patient should receive a course of antibiotics. There is no evidence that antibiotic prophylaxis at the time of insertion reduces the rate of PID (Carr & Espey, 2013).

### **Pain management**

Twenty-one percent of nulliparous women report severe pain during IUD insertion, and pain is often cited as a barrier to getting an IUD (Allen, Micks, & Edelman, 2013). Pain management during the insertion procedure should be a priority for providers who want to increase access to the method. Unfortunately, studies show that there are very few effective methods of pain relief for IUD placement (Allen et al., 2013). Eight hundred milligrams of ibuprofen, 2% topical lidocaine gel, and lidocaine cervical block all made no statistically significant difference in pain scores of women receiving IUDs (Allen et al., 2013). One randomized controlled trial studied the effect of nitrous oxide on pain scores during IUD placement for nulliparous women and found that it did not reduce pain of insertion (Singh et al., 2016). Misoprostol, a cervical ripening agent, is sometimes used to soften the cervix before insertion. However, it has not been shown to decrease the pain of insertion or the ease of insertion as rated by the provider (Allen et al., 2013). Misoprostol can also increase cramping after the procedure (Allen et al., 2013). Nitroprusside, another cervical ripening agent, has been found to be similarly ineffective at reducing pain and facilitating insertion (Allen et al., 2013). One 2015 study by Doty and MacIsaac found that pre-procedure anxiety was correlated with higher pain ratings during the insertion procedure. Unfortunately, little research can be found on the use of anxiolytics for the prevention of pain during IUD placement. This is a potential area for future research.



### **Patient education**

Effective provider education should cover information on safety, the placement procedure, STIs, expulsion, and possible placement times. A 2013 study by Carr and Espey found that IUDs do not cause infertility. They can be placed during a single visit, after an abortion, or as emergency contraception. The risk for pelvic inflammatory disease increases only during the first 20 days after insertion, after which the risk for PID is not significantly higher than it is for women not using an IUD. Patients should be screened for STIs prior to and at the time of insertion, and the IUD can be left in place during antibiotic treatment. Expulsion is slightly more common among adolescents, so it is important to teach young patients to watch for the signs and symptoms of expulsion. Providers must also educate patients about the expected changes in bleeding that may occur after placement, and how these changes differ from the symptoms of expulsion (ACOG, 2012). If young patients know what to expect, they may feel less inclined to discontinue the method when confronted with side effects such as spotting or dysmenorrhea.

### **Provider training and competency**

One of the barriers to the provision of IUDs by new providers is a lack of confidence in their skills and a fear of perforating the uterus (Khadivzadeh & Erfanian, 2012). Two studies have examined the effect of simulation-based insertion training on self-perceived competence and confidence in students. The first study separated midwifery students into two groups, one of which received traditional IUD insertion training (specify), while the other received simulation-based training using gynecologic models (Khadivzadeh & Erfanian, 2012). The study found that there were significant differences in the anxiety levels of students between the two groups. The

simulation-based groups reported lower levels of anxiety using two different metrics (Khadivzadeh & Erfanian, 2012).

The second study was a randomized controlled trial conducted with 39 nurse practitioner students and 20 interns (Nippita, et al., 2015). Half of the subjects were trained in IUD insertion using lifelike PelvicSim models, while the other half were trained on “coaster” models that consists of a model uterus under a clear plastic cover (Nippita, et al., 2015). Self-perceived competency with the insertion process improved equally across both groups, although the students reported that they thought the PelvicSim was more valuable (Nippita, et al., 2015). These results indicate that more expensive models may not be necessary to train students and improve their perception of competency. This makes it easier for nurse practitioner programs to implement simulation-based training because it requires a smaller financial investment for each student.

### **Provider education effectiveness**

A nationwide study conducted by researchers Harper and Rocca in 2015 tested whether a clinic intervention that included educating providers could not only increase the uptake of LARC methods, but also decrease the rate of unintended pregnancy during the subsequent 12 months. CDC recommendations from 2016 state that LARC methods, and specifically intrauterine devices, are appropriate for adolescents and women who have not given birth. However, studies have shown that only 38% of US physicians who provide contraception offer IUDs to adolescents. This study was a cluster-randomized trial conducted in 40 Planned Parenthood sites across the United States. Twenty clinics were randomly assigned to the experimental group and 20 clinics to the control group. The clinics in the experimental group received provider training

that was intended to improve provider's knowledge, counseling, and placement skills for IUDs and implants. The clinics in the control group were given no training (Harper et al., 2015).

The study found that providing clinics with training increased the number of women who chose IUDs by 5%. There was a significant reduction in pregnancy rates for women who received counseling about LARCs during a family planning visit, but not for women who received the counseling during an abortion visit. Knowledge of method effectiveness also increased significantly in the intervention group as compared to the control group (Harper et al., 2015).

### **Conclusion**

The papers reviewed in this chapter show that intrauterine devices are safe and effective for use in adolescents, and that young women often choose IUDs over other birth control methods. However, the largest barriers to IUD use in adolescents are provider misconceptions and lack of education about the risks and benefits of this long-acting reversible birth control method. Therefore, creating an educational plan for students in nurse practitioner programs would be an effective way of increasing adolescents' access to IUDs. This new coursework would include information about the safety of IUDs, IUD placement, STIs in patients with IUDs, and necessary patient education at time of placement.

## CHAPTER 3

## Best Practice Recommendations

The purpose of this thesis is to create a clinical education guideline for nurse practitioner programs that will educate students about the use of intrauterine devices in adolescents and young women. They will include information about the safety and efficacy of these devices in patients ages 14-24, skills training, and methods of educating young patients about these devices. The purpose of these guidelines is to challenge misconceptions surrounding the use of IUDs in young women, namely that they are unsafe, often discontinued, or otherwise inappropriate for younger patients.

The education guidelines can be classified into two training modules: skill training and didactic training. The skill training will include hands-on education about the placement procedure, from sounding the uterus to checking placement. This will require the use of plastic models and insertion training kits. Paragard offers placement-training kits to healthcare professionals upon request. Liletta offers office training visits and product demonstration kits upon request. Mirena, Paragard, Liletta, Kyleena, and Skyla all offer step-by-step instructions and videos to providers on their websites free of cost. The American College of Obstetricians and Gynecologists released a pamphlet that covers how to request training from each company, as well as independent organizations that offer IUD training (See appendix B).

The studies reviewed in chapter two of this paper show that IUDs are not only safe and effective in adolescents, but that adolescents who use them have higher levels of satisfaction than adolescent users of other forms of contraception. Young women may have a lack of knowledge about IUDs, but they do not express biases against using the method. Studies show that providers are more likely to express biases that prevent them from prescribing IUDs to younger patients.

These biases include the idea that a smaller cervix, multiple partners, or nulliparity could disqualify patients from using an IUD. Changes in provider education have the potential to reverse these biases and increase the availability of IUDs to adolescents. Table one summarizes the evidence informed components of a curriculum for nurse practitioners.

**Table 1.**

Content of Training Module	Topics/Recommendation	References
If given the choice, adolescents prefer IUDs	-Offer IUDs in the contraceptive options during contraception counseling	Gilmore, K., Hoopes, A. J., Cady, J., Amies Oelschlager, A. M., Prager, S., & Vander Stoep, A. (2015). Providing long-acting reversible contraception services in Seattle school-based health centers: Key themes for facilitating implementation. <i>The Journal of Adolescent Health : Official Publication of the Society for Adolescent Medicine</i> , 56(6), 658-665. doi:10.1016/j.jadohealth.2015.02.016 Harper, C. C., Rocca, C. H., Thompson, K. M., Morfesis, J., Goodman, S., Darney, P. D., . . . Speidel, J. J. (2015). Reductions in pregnancy rates in the USA with long-acting reversible contraception: A cluster randomised trial. <i>Lancet (London, England)</i> , 386(9993), 562-568. doi:10.1016/S0140-6736(14)62460-0 Mestad, R., Secura, G., Allsworth, J. E., Madden, T., Zhao, Q., & Peipert, J. F. (2011). Acceptance of long-acting reversible contraceptive methods by adolescent participants in the contraceptive CHOICE project. <i>Contraception</i> , 84(5), 493-498. doi:10.1016/j.contraception.2011.03.001
Young women with IUDs are satisfied with their method of contraception	-Adolescent users of IUDs have high levels of satisfaction with their method and are more likely to be satisfied than users of other methods	Rosenstock, J. R., Peipert, J. F., Madden, T., Zhao, Q., & Secura, G. M. (2012). Continuation of reversible contraception in teenagers and young women. <i>Obstetrics and Gynecology</i> , 120(6), 1298-1305. doi: <a href="http://10.1097/AOG.0b013e31827499bd">http://10.1097/AOG.0b013e31827499bd</a>
IUDs are safe for use in	-Risk for tubal infertility is positively associated with testing positive for	Carr, S., & Espey, E. (2013). Intrauterine devices and pelvic inflammatory disease among adolescents. <i>The Journal of Adolescent Health : Official Publication of</i>

<p>adolescents and do not increase incidence of PID or infertility</p>	<p>chlamydia, not IUD use          -Risk for PID increases only during the first 20 days after insertion, after which it returns to baseline          -In the absence of STI symptoms, a patient can safely be tested for STIs at the time of insertion          -Treatment of STIs can be performed with the IUD in place</p>	<p><i>the Society for Adolescent Medicine</i>, 52(4 Suppl), S22-8. doi:10.1016/j.jadohealth.2013.01.017</p>
<p>Lack of clinician skill, confidence, training, and clinician bias are major barriers to the use of IUDs in adolescents</p>	<p>-Teach that smaller cervix or younger age does not disqualify a woman from receiving an IUD          -Provide appropriate skills training through one of the organizations provided to increase provider confidence and skill          -Provider education increases LARC uptake and decreases pregnancy rates          -Teach providers about different sizes and types of IUDs</p>	<p>Kavanaugh, M. L., Frohwirth, L., Jerman, J., Popkin, R., &amp; Ethier, K. (2013). Long-acting reversible contraception for adolescents and young adults: Patient and provider perspectives. <i>Journal of Pediatric and Adolescent Gynecology</i>, 26(2), 86-95. doi:10.1016/j.jpag.2012.10.006</p> <p>Gilmore, K., Hoopes, A. J., Cady, J., Amies Oelschlager, A. M., Prager, S., &amp; Vander Stoep, A. (2015). Providing long-acting reversible contraception services in Seattle school-based health centers: Key themes for facilitating implementation. <i>The Journal of Adolescent Health : Official Publication of the Society for Adolescent Medicine</i>, 56(6), 658-665. doi:10.1016/j.jadohealth.2015.02.016</p> <p>Harper, C. C., Rocca, C. H., Thompson, K. M., Morfesis, J., Goodman, S., Darney, P. D., . . . Speidel, J. J. (2015). Reductions in pregnancy rates in the USA with long-acting reversible contraception: A cluster randomised trial. <i>Lancet (London, England)</i>, 386(9993), 562-568. doi:10.1016/S0140-6736(14)62460-0</p>
<p>IUDs are an effective method of preventing pregnancy in adolescents as compared to other methods</p>	<p>-The copper IUD has a cumulative five-year pregnancy rate of between 0.3% and 0.6%          -The levonorgestrel IUD has a cumulative five year pregnancy rate of less than 0.5%          -Little room for user error</p>	<p>Thonneau, P. F., &amp; Almont, T. (2008). Contraceptive efficacy of intrauterine devices. <i>American Journal of Obstetrics and Gynecology</i>, 198(3), 248-253. doi:10.1016/j.ajog.2007.10.787</p>

Lack of knowledge about IUDs among young women necessitates in-office education by providers	-Some patients believe that IUDs are meant for older women who want to limit their family size -Expulsion may be more common among younger women. Providers should teach about the signs and symptoms of expulsion.	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. <i>Journal of Pediatric and Adolescent Gynecology</i> , 26(2), 86-95. doi:10.1016/j.jpag.2012.10.006
IUDs should be one of the first line forms of contraception considered for adolescents	-User error is a major source of contraceptive failure among adolescents -IUD's offer little opportunity for user error because they do not require continued action by the user other than string checks	Committee on Adolescent Health Care Long-Acting Reversible Contraception Working Group, The American College of Obstetricians and Gynecologists. (2012). Committee opinion no. 539: Adolescents and long-acting reversible contraception: Implants and intrauterine devices. <i>Obstetrics and Gynecology</i> , 120(4), 983-988. doi:10.1097/AOG.0b013e3182723b7d

IUDs are a form of long-acting reversible contraception that is underutilized in adolescent populations, despite being named as a first-line contraceptive for adolescents by the WHO and the CDC (Harper et al., 2013). The evidence listed in the table above shows that not only are IUDs effective in preventing pregnancy without causing an increase in PID or infertility; they are also well-liked by the young women who use them (Carr & Espey, 2013; Rosenstock et al., 2012; Thonneau & Almont, 2008). However, many nurse practitioners lack the knowledge, training, skills, or confidence to offer this method to adolescents (Kavanaugh et al., 2013; Gilmore et al., 2015; Harper et al., 2015). Instituting changes to nurse practitioner curriculum is a viable method of improving the underutilization of IUDs among adolescents (Gilmore et al., 2015).

## CHAPTER 4

### Implementation and Evaluation

This chapter will present information on planning and implementing a curriculum for nurse practitioner students that is based on the current evidence pertaining to the use of intrauterine devices in adolescents. It will also include information on how the effectiveness of this curriculum should be evaluated by educators. Evidence shows that with proper education, nurse practitioners place a higher number of IUDs in patients because they feel confident in their ability to offer and place the device, in addition to fully understanding the current guidelines for recommended use (Harper et al., 2015). Implementing this curriculum in nurse practitioner programs could increase the availability of IUDs to at risk populations such as adolescents.

#### **Implementation**

The purpose of this thesis is to develop a set of curriculum guidelines that can be used to guide nurse practitioner programs as they develop courses to educate their students on the appropriate use of IUDs. These curriculum guidelines will include information about educational methods as well as recommended curriculum content. See appendix C for the full curriculum guidelines.

The nurse practitioner curriculum should include a didactic portion, a skills practice, and a simulation portion. The didactic portion will be devoted to teaching students the most current research on how to use IUDs in adolescents. This will include safety information such as research on the incidence of PID in adolescent IUD users, as well as contraindications for IUD use, such as a symptomatic STI or possible current pregnancy (Teva Women's Health, 2016). It will include the signs and symptoms of possible complications such as perforation, expulsion, or infection. The skills portion of the curriculum will include hands-on skills practice using



gynecologic models. Skills testing using the simulation models is suggested to increase student's investment in skills practice. The simulation portion will consist of a simulated patient appointment in which the nurse practitioner student must counsel the adolescent patient on her contraceptive options, especially IUDs.

There are several steps that should be taken when implementing this curriculum guideline. First, the educators should evaluate the current curriculum to identify strengths and shortcomings. Based on this evaluation, they should then identify the need to change and the specific aspects of the curriculum that should be changed under the new guidelines. This "need to change" can then be used as a reason for implementation during the next step, which is educating the faculty on the new information. Once the faculty is appropriately educated in the new information and curriculum, the new curriculum is ready to be implemented. The purpose of these three forms of education is to change the students' knowledge, skills, and attitudes.

There are three main populations that must be taken into account when developing and implementing these curriculum guidelines. First, there is the target audience of the curriculum guidelines: instructors in nurse practitioner programs. Program instructors will be reading the guidelines and developing a plan to use them in developing their own curriculum that is tailored to their students. The guidelines must be easy to understand and use when developing curriculum. Program instructors are highly educated, so the guidelines can include technical language at a graduate school reading level. Second, the guidelines must take into account the target audience of the curriculum that will be developed. This audience will be the nurse practitioner students themselves, and it is important to suggest material to be included in their curriculum that is appropriate for their level of education. The discretion to include or leave out material based on the students' knowledge and material redundancy belongs to the instructors,

but the guidelines will provide an overview of the information that students should know in order to safely provide IUDs to an adolescent population. Learning materials can be given commensurate with a masters or doctorate level curricula. Despite the fact that both of these populations are very well educated, effort should be made to make the material easy to absorb for people of a high reading level (CDC, 2009).

The third population that should be taken into account when implementing these guidelines is that of the adolescent patients that the future nurse practitioners will someday treat. Though this population has a smaller impact on the language of these guidelines than the instructors of the students, it is important to take it into account as well. The guidelines include a small section on patient education, for the needs of this population are specific to education and developmental stage. It is important that providers be prepared to counsel adolescents on the risks and benefits of IUDs. Adolescent patients must also be educated on the general insertion process and signs and symptoms that they may experience after insertion. They should also be counseled on safe sex and the continued importance of a barrier method to protect against STIs.

### **Evaluation**

In order to assess whether the implementation of the curriculum guidelines has been effective, it is necessary to evaluate their impact on students' knowledge. Since this is a set of educational recommendations, one way to evaluate it is to administer pre and post-tests to the students who have been taught using the guidelines. A sample pre and post-test can be found in appendix A. The pre-test should be administered to the students prior to the introducing any IUD related curriculum. The answers should not be provided after the pre-test, for knowing the exact answers could skew the results of the post-test. The post-test should be administered after the unit is complete. The answers to the pre and post-test questions can be provided at this time. The

results of the evaluation may vary based on the educators who implement the curriculum guidelines. After the curriculum guidelines have been implemented and evaluated several times, the data could be used to make the guidelines more effective and specific by addressing any consistent problems revealed by the pre and post-tests.

### **Recommendations for Future Research**

The review of the literature conducted in this paper revealed that leaders in women's health recommendations agree that IUDs should be considered first-line methods of contraception for adolescents. However, one area that could be addressed in future research is effective pain control during IUD placement. Pain is often cited as a barrier to getting an IUD, especially for nulliparous women (Allen et al., 2013). Studies on methods of pain control during the placement procedure have found that neither ibuprofen, topical lidocaine gel, lidocaine cervical block, inhaled nitrous oxide, misoprostol, nor nitroprusside make any statistically significant difference in pain scores during insertion (Allen et al., 2013; Singh et al., 2016). Anecdotal evidence suggests that providers are prescribing anxiolytics to control pain and anxiety during IUD placement. However, at the time of this review, little research could be found on the effects of anxiolytics on pain ratings during procedures. One study found that pre-procedure anxiety correlated with higher pain scores during insertion, but no randomized controlled trials of anxiolytics could be found (Allen et al., 2013). This is an area for future research, for effective pain control during the procedure may lower the barriers to IUD use for some patients.

### **Summary**

The United States has high rates of unplanned teen pregnancies, and IUDs should be prescribed as a first line contraceptive method. The purpose of this thesis was to develop

curriculum guidelines about the use of IUDs in adolescents that could be used in nurse practitioner programs to educate the next generation of NPs. Research indicates that appropriate education can increase nurse practitioners' feelings of confidence in their ability to prescribe IUDs and therefore increase the number of IUDs that they prescribe, leading to a possible reduction in the number of unplanned adolescent pregnancies (Khadivzadeh & Erfanian, 2012).

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## Appendix A.

## Pre-test/Posttest

Which method of contraception has the highest levels of satisfaction and continuation in the 14-19 age range?

- a. Condoms
- b. Contraceptive implant
- c. Intrauterine devices
- d. Hormonal birth control pill

Correct answer: c. intrauterine devices. IUD users ages 14-19 report a satisfaction rate of 76%, whereas users of non-LARC methods in the same age range report a satisfaction rate of 42% (Rosenstock, 2012).

If given the choice of a free method of contraception, what percentage of teenagers ages 14-20 choose IUDs?

- a. 5%
- b. 40%
- c. 90%
- d. 14%

Correct answer: c. 40% (Mestad, 2011)

Are IUDs a first-line method of birth control for patients in the 14-24 (adolescent) age group?

- a. No, because the pain of insertion is too high
- b. No, because adolescents have a high rate of STIs
- c. Yes, because adolescents must be made to choose methods that they are less likely to discontinue
- d. Yes, because they have a high rate of user satisfaction among adolescents and are highly effective

Correct answer: d. yes. The American College of Obstetricians and Gynecologists (ACOG) stated "Intrauterine devices and the contraceptive implant are the best reversible methods for preventing unintended pregnancy, rapid repeat pregnancy, and abortion in young women" (ACOG, 2012)

Does IUD use in teenagers increase their risk for pelvic inflammatory disease?

- a. Yes, if the teen has multiple sexual partners
- b. No, teens typically understand the importance of using a barrier method to prevent STIs and PID
- c. Yes, regardless of the number of partners that a teen has
- d. Only during the first 20 days after insertion

Correct answer: d. only during the first 20 days after insertion. Several studies have found that providers often cite an increased risk for pelvic inflammatory disease (PID) and infertility as the reason that they do not offer IUDs to adolescents (Carr & Espey, 2013) (Harper et al., 2008) (Luchouski et al., 2014) (Rubin, Davis, & McKee, 2013) (Rubin,

Fletcher, Stein, Gold, & Segall-Gutierrez, 2010) (Stanwood, Garrett, & Konrad, 2002). However, a 2013 review by Carr and Espey found that the risk of PID increases only in the first 20 days after insertion, after which it returns to baseline. Having an IUD in place does not significantly increase a woman's risk for PID after the first month. This period of increased risk may be due to the insertion process itself (Carr & Espey, 2013). If a patient has an STI at the time of insertion, the procedure could potentially transfer bacteria from the vagina to the uterus, increasing the likelihood of PID. This can be prevented by STI testing prior to or at the time of IUD placement. STIs can be treated with the IUD in place (Carr & Espey, 2013).

## Appendix B.



## Clinical Training Opportunities

### Method-Specific Training Opportunities

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- **Kyleena™ (levonorgestrel-releasing intrauterine system) 19.5mg — Bayer HealthCare Pharmaceuticals**
  - To watch an online insertion and removal video, visit <https://hcp.kyleena-us.com/#insertionandremoval>
  - To request a training, call 1-888-84-BAYER (1-888-842-2937)
  - For more information, visit <https://hcp.kyleena-us.com/contactus/>
- **Liletta® (levonorgestrel-releasing intrauterine system) 52mg — Medicines360**
  - To watch an online insertion and removal video, visit <https://liletta.biodigital.com/>
  - To request a training, visit <https://www.lilettahcp.com/request-a-rep>
  - For more information, call 1-415-951-8700 or visit <http://medicines360.org/connect>
- **Mirena® (levonorgestrel-releasing intrauterine system) 52mg — Bayer HealthCare Pharmaceuticals**
  - To watch an online insertion and removal video, visit <http://hcp.mirena-us.com/placement-and-removal/insertion-and-removal-video.php>
  - To request a training, call 1-888-84-BAYER (1-888-842-2937)
  - For more information, visit <http://hcp.mirena-us.com/contact.php>
- **Nexplanon® (etonogestrel implant) 68mg — Merck & Co., Inc.**
  - To request a training, call 1-877-467-5266 or complete the form at <http://www.nexplanon-usa.com/en/hcp/services-and-support/request-training/>
  - For more information, visit <https://www.merckconnect.com/nexplanon/contact-a-representative.html>
- **ParaGard® (intrauterine copper contraceptive) — Teva Women's Health, Inc.**
  - To watch an online insertion and removal video, visit <http://hcp.paragard.com/Resources/Videos.aspx>
  - To request a training, call 1-877-PARAGARD (1-877-727-2427)
  - For more information, visit <http://hcp.paragard.com/>
- **Skyla® (levonorgestrel-releasing intrauterine system) 13.5mg — Bayer HealthCare Pharmaceuticals**
  - To watch an online insertion and removal video, visit <http://hcp.skyla-us.com/insertion-and-removal/skyla-insertion-and-removal-video.php>
  - To request a training, call 1-888-84-BAYER (1-888-842-2937)
  - For more information, visit <http://hcp.skyla-us.com/contact-us/>

### Contraceptive Technology Conferences

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- For information on upcoming training sessions, visit <http://www.contraceptivetechnology.org/conferences/upcoming-ct-conferences/>

### Family Planning National Clinical Training Center

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- For a list of training opportunities, visit <http://www.ctcfp.org/larc>
- For more information, contact Kimberly Carlson at 1-866-91-CTCFP (1-866-912-8237) or [carlsonkim@umkc.edu](mailto:carlsonkim@umkc.edu)

### Family Planning/Community Health Centers

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- **University of California, San Francisco (UCSF) Bixby Center for Global Reproductive Health**  
The **Beyond the Pill** program partners with health care providers, researchers, and educators to improve women's access to effective contraception and reproductive health care. This training program is designed to increase provider knowledge and skills for IUDs and implants, and improve women's access to these methods of birth control.
  - To view an online training, visit <http://beyondthepill.ucsf.edu/online-training>
  - To request an on-site training, contact Jennifer Grand at 1-415-502-0331 or [Jennifer.Grand@ucsf.edu](mailto:Jennifer.Grand@ucsf.edu)
  - For more information, visit <http://beyondthepill.ucsf.edu>
- **Upstream USA<sup>SM</sup>**  
**Upstream USA<sup>SM</sup>** provides on site, comprehensive consulting and technical training to health centers so that they can provide the full range of contraceptive methods, same day, including IUDs and implants. This training includes CME/CE accredited content for clinicians such as IUD and Nexplanon placement skills. In addition, it offers counseling tips for health educators, counselors, and medical assistants as well as in depth revenue cycle management assistance and/or coding review for billing and financial staff.
  - To request a training, email Peter Belden at [peter@upstream.org](mailto:peter@upstream.org)
  - For more information, visit <http://www.upstream.org/contact-information/>

This resource was last updated on April 3, 2017, please visit the LARC Program website at <http://www.ACOG.org/LARC> for the most updated version. Please email Mica Bumpus, LARC Program Director, at [MBumpus@ACOG.org](mailto:MBumpus@ACOG.org) with suggestions or comments.

The resources listed above are for information purposes only. Referral to these sources and sites does not imply the endorsement of ACOG. Further, ACOG does not endorse any commercial products that may be advertised or available from these organizations or on these web sites. These lists are not meant to be comprehensive. The exclusion of a source or site does not reflect the quality of that source or site. Please note that sites and URLs are subject to change without notice.

## Appendix C.

## Curriculum Guide

**Didactic portion**

- Current research on iud use in adolescents
  - IUDs are an effective method of preventing pregnancy in adolescents as compared to other methods
    - The copper IUD has a cumulative five-year pregnancy rate of between 0.3% and 0.6%
    - The levonorgestrel IUD has a cumulative five year pregnancy rate of less than 0.5%
  - IUDs are safe for use in adolescents and do not increase incidence of PID or infertility
    - Risk for tubal infertility is positively associated with testing positive for chlamydia, not IUD use
    - Risk for PID increases only during the first 20 days after insertion, after which it returns to baseline
    - In the absence of STI symptoms, a patient can safely be tested for STIs at the time of insertion
    - Treatment of STIs can be performed with the IUD in place
  - Young women with IUDs are satisfied with their method of contraception
  - IUDs should be one of the first line forms of contraception considered for adolescents
- Indications and contraindications
  - Important contraindications such as existing/possible pregnancy, altered uterine structure, symptomatic STI

**Skills**

- Lack of clinician skill, confidence, training, and clinician bias are major barriers to the use of IUDs in adolescents
- Students should be trained on pelvic models
  - These can be the smaller “coaster” style models as well (more cost effective)
- Skills testing may be used to increase students’ investment in practicing
- Many IUD companies will provide insertion training for free
  - See included resource guide

**Simulation**

- If given the choice, adolescents prefer IUDs
- Lack of knowledge about IUDs among young women necessitates in-office education by providers
- Normal vs. abnormal symptoms following IUD placement
  - When they might need to come back in for a second visit
- Ask adolescent patients “What do you already know about IUDs?” Teens often make decisions based on peer experiences and it can be helpful to assess prior knowledge