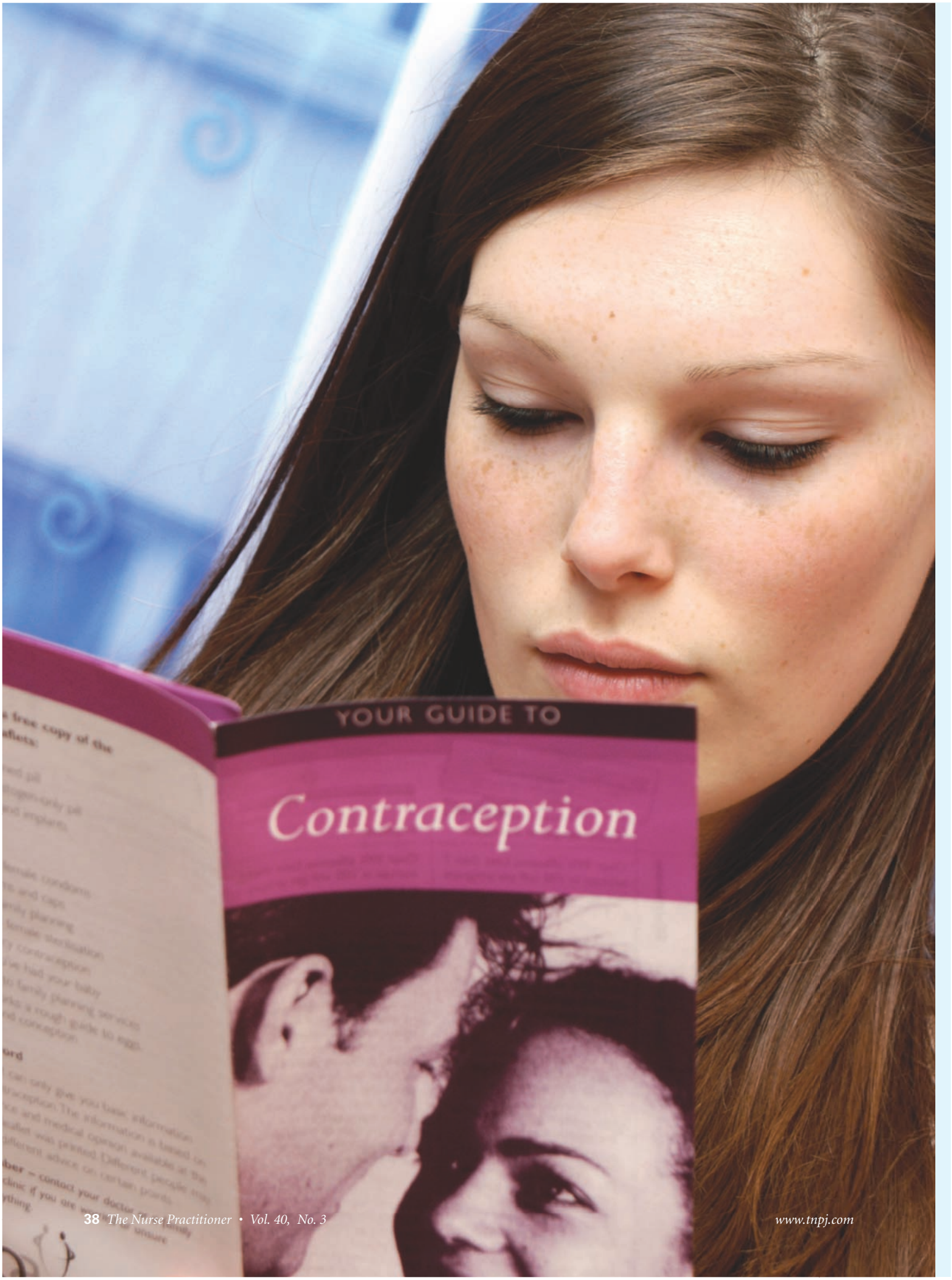

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Long-acting reversible contraceptives for teenagers:

Primary care recommendations

Abstract: ***Long-acting reversible contraceptive (LARC) methods are underutilized in the adolescent population despite their superior efficacy over non-LARC methods. The purpose of this article is to discuss the barriers that lead to underutilization of these methods and present an evidence-based approach for the use of LARC methods among adolescents in the primary care setting.***

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The number of teen pregnancies in the United States has steadily decreased since the early 1990s. In 2010, the teen pregnancy rate reached its lowest point in over 30 years at 57.4 pregnancies per 1,000 women.[1] The decline in teen pregnancy is due in part to improved contraceptive use among teens with increasing acceptance of long-acting reversible contraceptive (LARC) methods; however, approximately 625,000 U.S. women younger than 20 became pregnant in 2010.[1] Despite the observed improvements, the U.S. teen pregnancy rate remains one of the highest among developed nations, and large disparities by race, ethnicity, and geographic location still exist.[1,2]

It is estimated that approximately 50% of unintended pregnancies are the result of contraceptive failure.[3] The contraceptive methods of choice among adolescents in the United States are the male condom, the withdrawal method, and the oral contraceptive pill (OCP).[4] Because these methods require use with each act of intercourse or require daily dosing, the typical failure rates for these methods are higher than the perfect failure rates. Failure rates are expressed as the percentage of women who become pregnant within the first year of use with a particular method. Perfect use refers to when the contraceptive method is used as directed, consistently and correctly, whereas typical use refers to how effective the method is during actual use, which includes incorrect and inconsistent dosing. The typical failure rate for the male condom is 18%, withdrawal method is 22%, and OCPs is 9% but can be as high as 30% in adolescents and among high-risk populations.[3,5]

Once inserted, LARCs are nonuser-dependent methods of contraception with failure rates of less than 1%.[5] The American Congress of Obstetricians and Gynecologists (ACOG) has strongly endorsed the use of LARC methods in the adolescent population, recommending them as first-line contraceptive options.[6] In addition, the CDC and the World Health Organization (WHO) support the use of LARC methods in nulliparous women younger than age 20, while noting that use of these methods still

Keywords: adolescents, LARC, long-acting reversible contraception, primary care, teen pregnancies

remains low. Only 4.5% of adolescents ages 15-19 used a LARC method in 2009.[7,8] There are several barriers to the utilization of LARC methods in adolescents in the United States, but one prevailing theme is the lack of knowledge among both patients and providers regarding use of LARC methods in this population.[9]

Nurse practitioners (NPs) in primary care are often on the forefront of providing contraception to adolescents and young women. The implementation of the Affordable Care Act (ACA), which includes contraception as an essential preventive care service, will further enhance the important role NPs have with regards to contraception provision in this population.[10]

This article provides a review of the most up-to-date data on safety, efficacy, and patient satisfaction with LARC methods. Recommendations for clinical management are presented, with an emphasis on providing these highly effective methods to adolescents.

LARC methods in the United States

The four LARC methods currently available in the United States include the etonogestrel subdermal implant (ENG implant), the copper intrauterine device (Cu-IUD), and two levonorgestrel intrauterine systems (LNG-IUD). (See *Summary of LARC methods.*) With each method, a visit with a healthcare provider for both insertion and removal is required.[5]

Efficacy of LARC methods

The superior efficacy of the LARC methods is based on the fact that typical use is equal to perfect use, with failure rates of less than 1% for the four methods, which is comparable to rates of permanent tubal sterilization.[11]

The efficacy of LARC methods in comparison to other contraceptive methods was addressed in a large prospective cohort study of women ages 14-45. The study found that participants who were using OCPs, the contraceptive patch, or the vaginal ring had a 20-fold increase in contraceptive failure as opposed to women using LARC methods. For women younger than 21, the risk of unintended pregnancy was almost doubled when compared to older women using the same methods.[3] In addition, adolescents who chose an LARC method were less likely to have an abortion or experience a repeat pregnancy within 2 years of a previous pregnancy.[12,13]

The ENG implant: The subdermal implant is a 4 cm long and 2 mm wide radiopaque rod (Nexplanon) or a nonradiopaque rod (Implanon) that contains 68 mg of etonogestrel. The ENG implant is a progestin-only method that is approved for up to 3 years of use and is placed subdermally by a trained provider in the inner aspect of the upper arm. Typically the nondominant arm is chosen. The contraceptive efficacy of the implant occurs through ovulation inhibition, thickening of cervical mucus, and thinning of the endometrial lining.[11] Bleeding irregularities are the most common adverse reaction. The majority of patients will experience light and/or unscheduled bleeding, while approximately 22% of women will experience amenorrhea, and an additional 18% may experience more frequent or heavier prolonged bleeding.[11] The bleeding patterns that are experienced during the first 3 months of use with the ENG implant are generally predictive of what the future bleeding pattern will be for the duration of use of the device. Other adverse reactions observed with the ENG implant that can lead to a discontinuation of the method include emotional lability, depression, weight increase, acne, and headaches. Insertion complications that include infection, hematoma, and local skin irritation occur in less than 1% of insertions.[11] Additionally, most women report a decrease

Summary of LARC methods[5,11]

	ENG Implant	Cu-IUD	52 mg LNG-IUD	13.5 mg LNG-IUD
Mechanism of action	Inhibits ovulation, thickens cervical mucus, and thins endometrial lining	Inhibits fertilization by interference with sperm transport from the effect from the copper	Thickens cervical mucus and thins endometrial lining	Thickens cervical mucus and thins endometrial lining
Duration	3 years	10 years	5 years	3 years
Back-up method of contraception	Required for 7 days if inserted > 5 days after onset of menstruation	Not required	Required for 7 days if inserted > 7 days after onset of menstruation	Required for 7 days if inserted > 7 days after onset of menstruation
Expected bleeding patterns	Unpredictable. Some experience amenorrhea, light infrequent bleeding, or (rarely) frequent/prolonged bleeding	May have unscheduled bleeding first 3-6 months with possible increase in bleeding and dysmenorrhea	Irregular bleeding first 3-6 months followed by light bleeding or amenorrhea	Irregular bleeding first 3-6 months followed by light bleeding or amenorrhea

in dysmenorrhea and some women notice an improvement in acne with the implant.[5,11]

The CuT380A IUD: The copper intrauterine contraceptive (ParaGard) is a T-shaped polyethylene device that contains coiled copper wiring along the stem and the arms of the device, with polyethylene monofilament strings that are used for removal. Pregnancy prevention occurs by inhibiting fertilization by interference with sperm transport from the effect from the copper ions.[11] The device is inserted into the uterine cavity by a trained provider, is immediately effective upon insertion, and is approved for use for up to 10 years. Unscheduled bleeding, as well as an increase in menstrual flow and dysmenorrhea, is common during the first 3 to 6 months of use, though this has been shown to improve with continued use.[5]

The LNG-IUD: The two LNG-IUDs both have a T-shaped polyethylene frame with a steroid reservoir containing either 13.5 mg or 52 mg of levonorgestrel and have monofilament strings that are used for removal.[11,14] The contraceptive efficacy of these progestin-only devices occurs through a thickening of the cervical mucus (inhibiting sperm motility), thinning of the endometrial lining, and in some cases suppression of ovulation.[11] These devices are inserted into the uterine cavity by a trained provider. Patients can expect bleeding irregularities within the first 3 to 6 months of use with both devices. With continued use, most women experience decreased menstrual flow as well as an improvement in dysmenorrhea. Additional adverse reactions that occur infrequently with the LNG-IUDs (typically less than 10% of the time) include ovarian cysts, headaches, acne, depressed mood, heavy or prolonged menstrual bleeding, vulvovaginitis, abdominal or pelvic pain, dysmenorrhea, breast discomfort, and nausea.[11,14]

The 13.5 mg LNG-IUD (Skyla) is approved for up to 3 years of use and has been studied in nulliparous women.[14] Additionally, it is smaller in size (which is thought to decrease the discomfort associated with insertion). After placement, women experience a decrease in monthly blood loss, and approximately 6% of users will become amenorrheic at 1 year of use.[14]

The 52 mg LNG-IUD (Mirena) is approved for up to 5 years and is also recommended for women who have had at least one child. Additionally, it also has FDA approval for the treatment of menorrhagia in women who also choose intrauterine contraception.[5,11,14] After placement, women can expect to see a drop in their average monthly blood loss by approximately 90%, and between 20% and 40% of women will become amenorrheic after 1 year of use.[11]

Barriers to LARC use in adolescents

Despite the decrease in teen pregnancy rates in the United States, there remains a low overall understanding of LARC methods among adolescents and many of their care providers. The lack of knowledge among adolescents can largely be attributed to a lack of counseling by providers due to biases regarding the LARC methods, as well as a lack of understanding regarding the safety and efficacy of their use in adolescents.[15-17]

A lack of training with LARC methods contributes to the knowledge gap among providers due to the skills that are required for the insertion of these methods, in particular with IUDs.[18,19] Contraceptive implants require little instruction beyond the FDA-mandated training and no additional equipment is needed beyond the implant inserter; however, implants are used even less frequently than IUDs due to providers' lack of knowledge regarding implants as a contraceptive option.[20,21]

Perceived pain with the insertion of the LARC methods, in particular IUDs, is another barrier to their uptake among adolescents. The self-reported pain from IUD insertions among adolescents is variable and unpredictable.[22] Factors that are associated with increased pain with IUD insertion include nulliparity, a history of dysmenorrhea, and anxiety regarding anticipated pain during insertion.[23] Clinicians often recommend that patients take oral nonsteroidal anti-inflammatory drugs (NSAIDs) prior to the appointment for IUD insertion. Some clinicians also recommend either self- or provider-administered misoprostol prior to the insertion, to soften the cervix, facilitate insertion, and decrease pain. Although providers cite anecdotal evidence that the use of misoprostol has helped with specific patients, evidence is lacking to support the routine use of misoprostol.[24,25] In fact, in a recent randomized controlled trial of self-administered misoprostol, patients in the experimental group reported higher pain scores than those in the control group, and providers reported no improvement in ease of the IUD insertion.[26]

There remains a low overall understanding of LARC methods among adolescents and many of their care providers.

Cost is also a major barrier to the uptake of LARC methods among. The total cost can be upward of $1,000 when taking into account the cost of the device, the office visit, and the insertion procedure.[27]

The Contraceptive CHOICE project was a large prospective cohort study that enrolled 9,256 women ages 14-45

and was aimed at removing barriers to the most effective methods of contraception with the overall goal of reducing unintended pregnancy. The study demonstrated that when provided with comprehensive counseling regarding contraceptive options, and when cost and access are removed as barriers, 75% of participants chose a LARC method.[28]

The cost barrier is uniquely complex for adolescents who are covered by their parents' health insurance, as this situation leads to compromised confidentiality. Currently there are 21 states that allow teens to access family planning services without parental consent. Unfortunately, for teens whose care is covered by their parents' private insurance, maintaining privacy about utilization of services is not possible, as the services obtained would appear on an explanation of benefits statement.[27,28] The Society of Adolescent Medicine and Health is making efforts to prevent this from occurring.

The implementation of the ACA required that private health plans provide coverage for contraceptive methods without cost-sharing to the patient.[29] The requirement to remove cost-sharing with regards to contraception took effect for millions of Americans as of January 2013; however, many plans are able to be exempt from this requirement through either a grandfather or a religious stipulation. In a survey of approximately 3,000 women with private health insurance, a significant reduction in cost-sharing was observed among users of OCPs, but data indicate a lack of improvement in cost reduction for women using IUDs. This indicates that private health plans may not be removing cost-sharing for all methods of contraception, particularly the LARC methods, which involve a higher initial cost. Further research is needed to determine how the ACA will continue to impact the provision of LARC methods moving forward, though experts are hopeful that the ACA holds the potential to increase LARC use if cost-sharing is removed for all methods of contraception.[29,30]

Having adolescents return for a follow-up visit after insertion of an LARC may improve adherence and continued use.

Preference, satisfaction, and continuation

Data from the previously mentioned CHOICE project revealed that the majority of adolescents receiving comprehensive information on contraceptive options chose a LARC method if the barriers of cost and access were removed. This included a health system that could provide patients with timely insertion of the LARC methods, including same-day insertion where clinically appropriate. Women ages 14-17 were more likely to choose the ENG implant and those ages 18-20 were more likely to choose an IUD.[31] Continuation rates with the LARC methods among adolescents were high, at approximately 75% at 12 months of use. This is similar to continuation rates seen in older women (85%), and far greater than continuation and satisfaction rates of adolescents using non-LARC methods.[32] Additionally, having adolescents return for a follow-up visit after insertion of an LARC has the potential to improve adherence to the method and lead to continued use.[22]

IUD safety

The safety of modern IUDs is well established and recognized by the CDC, WHO, and ACOG, and IUD insertions have not been shown to be more difficult or problematic in the adolescent population.[5-7] Recent data suggest that adolescents experience few complications with regards to IUD insertion and use and have similar rates of successful insertion when compared to adults.[33]

There has been long-term concern regarding the risk of pelvic inflammatory disease (PID) among adolescent users of IUDs and it is the most common reason why healthcare providers do not offer these methods to their adolescent patients. A review of the data among 15- to 24-year-old women revealed that the risk of PID was only present for the first 20 days immediately following IUD insertion.[34] It is important to note that an increased risk for PID is observed in populations with higher rates of sexually transmitted infections (STIs) and adolescents fall into that category; however, IUDs are not contraindicated in patients who have an STI if it has been more than 3 months since treatment and active infection can be ruled out.[7]

Concerns regarding subsequent infertility and an increased risk for ectopic pregnancy with IUD use are unsupported by current data. A history of genital chlamydia infection or the presence of antichlamydia antibodies is associated with infertility; IUD use alone is not a risk factor.[11] The data on the effect of IUDs on the risk of ectopic pregnancy have been misunderstood. IUDs significantly lower both the risk of pregnancy and the risk of an ectopic pregnancy; however, the very low percentage of women who become pregnant with an IUD in place do have a higher risk of an ectopic pregnancy. Patients with an IUD in place and a positive pregnancy test should have an early ultrasound to determine if an intrauterine pregnancy is present and should be referred to an obstetrician to be managed closely with caution.[11,24]

Evidence-based management for use of LARC methods

Prior to insertion of any of the LARC methods, it is essential to obtain a detailed history from the patient and to rule out pregnancy as well as determine if there are any contraindications to use of the methods. The CDC sets forth criteria that are highly accurate in ruling out pregnancy among women who are not pregnant.[5] A urine pregnancy test (UPT) can be obtained in addition to using these criteria, but it is important to understand that the accuracy of a UPT is dependent upon its timing in relation to recent unprotected intercourse. Typically, it can take up to 2 weeks after conception for a UPT to become positive, therefore, it is crucial that clinicians use sound clinical judgment if the concern for pregnancy is present when considering LARC methods.[5]

Contraindications for insertion of LARC methods

The contraindications for insertion of the LARC methods are based on the manufacturer's prescribing information and the CDC medical eligibility criteria for contraceptive use, which have been adapted from the WHO medical eligibility criteria.[7] (See *Contraindications to LARC methods.*)

Best practices for insertion and adherence of IUDs

A trained provider can insert either the Cu-IUD or the LNG-IUD into the uterine cavity at any time during the menstrual cycle as long as it is possible to reasonably rule out pregnancy. There is no evidence that insertion during menstruation provides any benefit, but it does make scheduling insertions far more difficult for patients and can decrease timely access to these methods. An additional contraceptive method is required for 7 days after insertion of the LNG-IUD if it is inserted after the first 7 days of the onset of the menstrual cycle.[5] The Cu-IUD is immediately effective upon insertion. Counseling with regards to the expected changes in menstrual bleeding should occur prior to insertion of either IUD.

CDC recommendations for adults and adolescents include screening for gonorrhea and chlamydia at the time of insertion. In the absence of purulent cervicitis, it is not necessary to delay insertion until test results are received.[5] The CDC does not recommend prophylactic antibiotic administration prior to the insertion of IUDs in adolescents. If the screening test for either infection is positive, the IUD can remain in place as long as the patient is treated promptly and seen for a follow-up visit typically within 72 hours, as the risk of developing PID in such cases is low.[6,34]

The pain with an IUD insertion has been compared to that of a strong menstrual cramp followed by less-severe cramping that often resolves within a few hours to a few days. It is important to counsel all patients, including adolescents, that pain is to be expected during insertion but a period of intense pain is often very brief.[23,33] Despite a lack of evidence that NSAIDs can significantly decrease pain associated with IUD insertion, they have been found to relieve postinsertion pain. If there are no contraindications for use, it is acceptable to advise patients to take an NSAID prior to insertion.[6,22]

It has been suggested that young age, prior IUD expulsion, and nulliparity are risk factors for increased IUD expulsion rates among adolescents; however, the data to support this are limited.[6] Recent evidence that evaluated expulsion rates in adolescents reported an IUD expulsion rate of 6.3% at 12 months of use among nulliparous adolescents and 2.9% among both parous and nulliparous adolescents at 12 months of use.[33,35] These data indicate that IUD expulsions are low among adolescents and have little effect on continuation rates. Prior expulsion of an IUD should not be used as a contraindication for providing the patient with another IUD as long as the patient is appropriately counseled regarding the risk of another potential expulsion.[6]

Contraindications to LARC methods[7,11]

ENG implant
- Pregnancy
- Current or past history of breast cancer
- Active liver disease
- Systemic lupus erythematous with unknown or positive antiphospholipid antibodies
- Undiagnosed abnormal uterine bleeding
- Allergy to components of the device
- Current or past history of thromboembolic disease

Cu-IUD
- Pregnancy
- Uterine anomaly
- Acute PID within the last 3 months
- Purulent cervicitis or current gonorrhea/chlamydia infection
- Postpartum or postabortion sepsis within last 3 months
- Reproductive tract malignancy
- Undiagnosed abnormal uterine bleeding
- Pelvic tuberculosis
- Wilson disease or allergy to components of the device

LNG-IUD
- Pregnancy
- Uterine anomaly
- Acute PID or history of PID unless there was a subsequent intrauterine pregnancy
- Purulent cervicitis or current gonorrhea/chlamydia infection
- Postpartum or postabortion sepsis within last 3 months
- Current or past history of breast cancer
- Reproductive tract malignancy
- Undiagnosed abnormal uterine bleeding
- Active liver disease
- Systemic lupus erythematous with unknown or positive antiphospholipid antibodies
- Pelvic tuberculosis
- Allergy to components of the device

Uterine perforation is a rare complication that occurs in less than 1 per 1,000 IUD insertions and is usually related to the experience of the clinician performing the IUD insertion.[11] Uterine perforation diagnosis can occur either at the time of insertion or at a follow-up visit if IUD strings are not visible. A pelvic ultrasound can be ordered to confirm placement and if perforation is suspected, the patient should be referred to an obstetrician/gynecologist for management.[11]

The CDC recently recommended that a routine follow-up visit is not required after an IUD insertion if the patient is asymptomatic and satisfied with the method, but does suggest a routine follow-up visit could be beneficial.[5] Such benefits include the opportunity to discuss tolerance of the method, bleeding patterns, cramping, and whether the patient has been able to locate the IUD strings. Patients of all ages are more likely to have their IUD removed if they do not have routine scheduled follow-up visits. The encouragement and reassurance of the provider during follow-up visits may improve the adolescent's adherence to the method.[22] The return to fertility following expulsion or removal of an IUD is rapid; patients should be counseled regarding this and offered another method of contraception if they are not planning to become pregnant.[36]

Key points of evidence-based recommendations for LARC use in adolescents

- Adolescents are at high risk for unintended pregnancy.[1,2]
- LARC methods are the most effective methods of contraception available in the United States.[3]
- Counseling regarding all contraceptive methods should take place at all visits with sexually active adolescents.[6,10,27,38]
- Increasing knowledge and skills-based training opportunities regarding LARC methods for providers are necessary to improve adolescent access to these methods.[17,18]
- Age or nulliparity is not a contraindication to a LARC method.[5,7]
- Adolescents should be screened for STIs at the time of or prior to IUD insertion.[6]
- A history of PID, if it has been more than 3 months since treatment, is not a contraindication to IUD use in adolescents.[7]
- Counseling regarding expected adverse reactions prior to insertion is essential for patient adherence with the LARC methods.[42]
- All LARC methods can be placed at any time during the menstrual cycle as long as pregnancy can be reasonably ruled out. With the ENG implant and the LNG IUD, an additional method of contraception may be required if the device is not inserted during the patient's menstrual cycle.[5]
- Routine prophylactic antibiotic administration is not recommended prior to IUD insertion.[5]
- A follow-up visit following insertion of a LARC method is encouraged to improve patient adherence.[5,22]
- There is a rapid return to fertility after discontinuation of all LARC methods.[36]
- The ENG implant requires less procedural skill by the provider and is an excellent option for providing LARC in the primary care setting.[20,40]

Best practices for insertion and adherence of ENG implants

The subdermal implant can be placed at any time during the menstrual cycle as long as the healthcare provider can reasonably rule out pregnancy. An additional contraceptive method is required for 7 days after insertion if the device is inserted after the first 5 days of the onset of the menstrual cycle. In cases where pregnancy is unlikely but cannot be absolutely ruled out, the CDC does suggest that inserting the implant could be considered as long as the patient is instructed to return for a pregnancy test in 2 to 4 weeks. The rationale for this is that the benefits of the implant are likely greater than any risk. Prior to insertion, it is recommended that providers counsel patients on the bleeding irregularities that can occur with the implant.[5]

Continuation rates with the ENG implant are generally high, ranging from 83% to 94% at 6 months and 69% at 24 months; younger age of the individual is not associated with higher discontinuation rates.[37] Routine follow-up is not required after the implant is inserted, though the CDC does state the adolescents may benefit from a follow-up visit to discuss any adverse reactions, problems, or concerns with the device.[5]

The procedure skills for insertion and removal of the ENG implant are minimal; however, an FDA-mandated training is required prior to clinicians inserting the implant.[20] Patients should be counseled regarding the quick return to fertility following removal of the ENG implant and offered another method of contraception if they are not planning to become pregnant.[36]

Improving LARC use among adolescents in the primary care setting

With the implementation of the ACA came the requirement that contraception be covered as an essential preventive care service, thus increasing the need for NPs in primary care to adequately provide these services to patients. However, a recent survey of NPs revealed that only 29% of those in primary care thought adolescents were eligible for an IUD and only 10% of NPs offered the contraceptive implant to their adolescent patients.[10] The lack of knowledge regarding LARC methods among providers and adolescents is significant, and it has been demonstrated that adolescents

are more likely to choose a LARC method if a healthcare provider takes the time to present information on the method, rather than the adolescent relying solely on written information.[38]

Provider education and comfort with managing LARC methods is a crucial factor in increasing patient access to and adoption of these highly effective methods of contraception. Training with regards to LARC methods in advanced practice nursing programs and continuing-education programs is essential to increasing access to and utilization of the LARC methods for adolescents.[10] Skills-based training opportunities have the potential to increase the ability of NPs to integrate provision of LARC methods into primary care settings, and to decrease unplanned pregnancy in adult and adolescent women.[19]

Due to the specific skills that are required for insertion of LARC methods, in particular IUDs, it has been suggested that having a dedicated provider within a practice who offers insertion of these methods can improve access. Both skill levels and comfort with counseling increases with the increased knowledge attained with training and insertion opportunities.[32,39] Additionally, due to the minimal procedural skills that are required for insertion of the ENG implant, primary care providers may be more willing to consider this method if provided with the appropriate FDA-required training, as it has been demonstrated that implants can be both safely and successfully inserted in the primary care setting if providers are well trained.[20,40]

NPs who provide care for sexually active adolescents have an important role in educating patients about LARC methods, obtaining informed consent, and preparing patients for and managing expected adverse reactions.[41] Additionally, it is essential to counsel adolescent patients that condoms should be used in addition to their LARC method to prevent STI exposure.

In addition, incorporating young women's perceptions and fears surrounding LARC and tailoring a counseling approach to address those concerns are essential for acceptance of and adherence with these methods.[42] (See *Key points of evidence-based recommendations for LARC use in adolescents.*)

Moving forward

The evidence supports that adolescents are more likely to choose a LARC method and continue with that method if it is offered to them and they are provided with the opportunity for a timely insertion. In addition, these methods have been shown to be safe, effective, and well tolerated in this population. NPs who care for adolescents in the primary care setting have the responsibility to meet the contraceptive needs of their patients. By incorporating counseling regarding LARC methods into their practice and increasing opportunities for insertion of these methods for their patients, NPs have the potential to greatly impact the reproductive health outcomes of adolescent women. NP

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The authors and planners have disclosed that they have no financial relationships related to this article.

DOI-10.1097/01.NPR.0000460853.60234.c2

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