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Long-Acting Reversible Contraception: Implants and Intrauterine Devices

Intrauterine devices and contraceptive implants, also called long-acting reversible contraceptives (LARC), are the most effective reversible contraceptive methods. The major advantage of LARC compared with other reversible contraceptive methods is that they do not require ongoing effort on the part of the patient for long-term and effective use. In addition, after the device is removed, the return of fertility is rapid (1, 2). The purpose of this Practice Bulletin is to provide information for appropriate patient selection and evidence-based recommendations for LARC initiation and management. The management of clinical challenges associated with LARC use is beyond the scope of this document and is addressed in Committee Opinion No. 672, Clinical Challenges of Long-Acting Reversible Contraceptive Methods (3).

Background

Two types of LARC are available in the United States: 1) intrauterine devices (IUDs) and 2) the etonogestrel single-rod contraceptive implant. Five IUDs are currently marketed in the United States: the copper-containing IUD and four levonorgestrel-releasing intrauterine devices (LNG-IUDs). Use of LARC has increased during the past decade, from 2.4% in 2002 to 8.5% in 2009 to 11.6% in 2012, the most recent year for which data are available from the National Survey of Family Growth (4). Of the 11.6% of U.S. women who rely on LARC, 10.3% use IUDs and 1.3% use the implant. An historic 18% decrease in unintended pregnancy occurred in the United States between 2008, when 51% of pregnancies were unintended, and 2011, when only 45% of pregnancies were unintended (5). Although the reduction in unintended pregnancy is multifactorial, increased use of LARC likely has contributed (6, 7).

In the Contraceptive CHOICE research project, a prospective cohort of 9,256 women aged 14–45 years

were offered their choice of contraceptive method without charge (6). Seventy-five percent of the cohort chose LARC: 46% chose the LNG-IUD, 12% chose the copper IUD, and 17% chose the subdermal implant. Continuation rates for participants who chose LARC were higher than for those who chose short-acting methods (Table 1) (8). The CHOICE project identified a significant reduction in unintended pregnancies and in the abortion rate of study participants compared with a similar population from the same geographic area (6).

Building on outcomes from the CHOICE Project, the Colorado Family Planning Initiative provided access to LARC methods at no cost to clients through Title X-funded clinics in 37 of Colorado's 64 counties, which comprised 95% of the state's total population (9). Similar to findings in the CHOICE study (10), during the Colorado Family Planning Initiative, LARC use increased from 5% to 19% among low-income teenagers (aged 15–19 years) and young women (aged 20–24 years). The increase in LARC use was accompanied by a 29% decrease in birth rates and a 34% decrease in abortion

Table 1. Long-Acting Reversible Contraception Continuation Rates From the CHOICE Project ↵

Method	Continuation, % (95% CI)		
	1 Year	2 Year	3 Year
Levonorgestrel-20 IUD	87.3 (85.8–88.6)	76.7 (74.8–78.5)	69.8 (67.6–71.8)
Copper IUD	84.3 (80.7–87.3)	76.2 (72.1–79.9)	69.7 (65.1–73.7)
Implant	81.7 (78.3–84.7)	68.7 (64.7–72.3)	56.2 (51.8–60.3)
LARC methods overall	85.8 (84.5–87.0)	75.2 (73.6–76.7)	67.2 (65.4–68.9)
Non-LARC methods overall*	55.8 (54.2–59.4)	39.5 (36.9–42.1)	31.0 (28.5–33.5)

Abbreviations: CHOICE, The Contraceptive CHOICE Project; IUD, intrauterine device; LARC, long-acting reversible contraception.

*Non-LARC methods were depot medroxyprogesterone acetate, oral contraceptive pills, contraceptive patch, and vaginal ring.

Data from Diedrich JT, Zhao Q, Madden T, Secura GM, Peipert JF. Three-year continuation of reversible contraception. *Am J Obstet Gynecol* 2015;213:662.e1–8.

rates among teenagers. Birth and abortion rates also fell among young women enrolled in the study, with decreases of 14% and 18%, respectively (9).

Reducing barriers to LARC access for appropriate candidates may continue to help lower unintended pregnancy rates in the United States, given that gaps in use and discontinuation of shorter acting methods are associated with higher unintended pregnancy rates (11). Typical-use pregnancy rates for LARC are lower when compared with those for oral contraceptives (Table 2) (12). A recent cost-effectiveness analysis from the public payer perspective determined that LARC use becomes cost neutral within 3 years of initiation when compared with use of short-acting methods (13).

Long-Acting Reversible Contraceptive Devices

Copper Intrauterine Device

The copper T380A IUD is a T-shaped device of polyethylene wrapped with copper wire around the stem and arms. Studies indicate that the copper IUD exerts its contraceptive effects primarily by preventing fertilization through inhibition of sperm migration and viability (14, 15). The available evidence supports that the copper IUD does not disrupt pregnancy (15) and is not an abortifacient. The U.S. Food and Drug Administration (FDA) has approved use of the copper IUD for up to 10 continuous years, during which it remains highly effective. It has a reported failure rate at 1 year of 0.8 per 100 women, and a 10-year failure rate comparable with that of female sterilization (1.9 per 100 women over 10 years) (12). The most common adverse effects reported are heavy menstrual bleeding and pain (16).

Levonorgestrel-Releasing Intrauterine Devices

Several types of LNG-IUDs are currently available in the United States; all are T-shaped and include a polydimethylsiloxane sleeve that contains levonorgestrel on the stem. Two types of LNG-IUDs contain a total of 52 mg of levonorgestrel: the LNG-20 IUD (Mirena) releases 20 micrograms/day, and the LNG-18.6 IUD (Liletta) releases 18.6 micrograms/day (17, 18). The LNG-19.5 IUD (Kyleena) contains a total of 19.5 mg of levonorgestrel, releasing 17.5 micrograms/day of levonorgestrel,

Table 2. Comparison of First-Year Unintended Pregnancy Rates Among Intrauterine Device and Implant Users in the United States

Method	Percentage of Women Experiencing an Unintended Pregnancy in the First Year of Use	
	Typical Use*	Perfect Use†
Intrauterine Device		
Copper T	0.8	0.6
Levonorgestrel-20	0.2	0.2
Implant	0.05	0.05
Combined pill and progestin-only pill	9	0.3

*Among typical couples who initiate use of a method (not necessarily for the first time), the percentage reflects women who experience an accidental pregnancy during the first year if they do not stop use for any other reason.

†Among couples who initiate use of a method (not necessarily for the first time) and who use it perfectly (consistently and correctly), the percentage reflects women who experience an accidental pregnancy during the first year if they do not stop use for any other reason.

Modified with permission from Trussell J. Contraceptive failure in the United States. *Contraception* 2011;83:397–404.

and the LNG-13.5 IUD (Skyla) contains a total of 13.5 mg of levonorgestrel, releasing 14 micrograms/day of levonorgestrel (19–21).

All LNG-IUDs have a similar primary mechanism of action: they prevent fertilization by causing a profound change in the amount and viscosity of cervical mucus, making it impenetrable to sperm (15, 22, 23). The available evidence supports that LNG-IUDs do not disrupt pregnancy (15) and are not abortifacients. The LNG-20 IUD is FDA approved for up to 5 years of use (17). The LNG-18.6 IUD is FDA approved for up to 4 years of use (18).

The LNG-19.5 IUD is FDA approved for up to 5 years of use with a cumulative pregnancy rate of 0.31 per 100 women-years (19, 24). The LNG-13.5 IUD is FDA approved for up to 3 years of use (20). The cumulative pregnancy rate is 0.33 per 100 women-years of use (24). Compared with the LNG-20 IUD, the LNG-13.5 IUD has a narrower inserter, smaller “T” frame, and releases less hormone daily (25).

Although only a small amount of steroid is released from the LNG-IUD, some women may experience hormone-related effects, such as headaches, nausea, breast tenderness, mood changes, and ovarian cyst formation. Users of the LNG-IUD report weight gain that is comparable to those using the copper IUD (26, 27). Acne is rarely reported with use of the LNG-IUD (28). The LNG-IUD does not appear to have an adverse effect on bone mineral density or to increase the risk of fracture (29, 30). Most women who use an LNG-IUD continue to ovulate but experience diminished menstrual bleeding because of the local effect of levonorgestrel on the endometrium. One small study of the LNG-20 IUD reported ovulation in 63% of the amenorrheic group and in 58% of the regularly menstruating group (31).

Overall, complications with IUDs are uncommon and include expulsion, method failure, and perforation. The expulsion rate is between 2% and 10% during the first year (12). Perforation is rare, occurring in 1.4 per 1,000 LNG-IUD insertions and in 1.1 per 1,000 copper-IUD insertions (32).

Contraceptive Implant

The contraceptive implant is placed subdermally and consists of an ethylene vinyl acetate copolymer core that contains 68 mg of etonogestrel surrounded by an ethylene vinyl acetate copolymer skin. The ethylene vinyl acetate copolymer allows for controlled release of etonogestrel over 3 years. Etonogestrel is the active metabolite of desogestrel. The single-rod implant is 4 cm in length and 2 mm in diameter and is packaged preloaded in a disposable sterile applicator. The

2001 version of the implant was radiolucent (33). The updated implant, introduced in the United States in 2011 (34) is radio-opaque and is easily visualized on X-ray. Additionally, the updated inserter is designed to prevent deep implant insertion and to keep the implant from falling out of the preloaded applicator before the insertion procedure.

The primary mechanism of action of the implant is suppression of ovulation (35). Additional contraceptive efficacy may be conferred by the implant’s thickening of cervical mucus (36, 37) and alteration of the endometrial lining (37, 38). The contraceptive implant is the most effective method of reversible contraception, with a typical-use pregnancy rate of 0.05% (12). Pregnancy rates are similarly low in obese, overweight, and normal-weight users of the contraceptive implant (39). After implant insertion, changes in menstrual bleeding patterns are common and include amenorrhea or infrequent, frequent, or prolonged bleeding. Other reported adverse effects include gastrointestinal difficulties, headaches, breast pain, and vaginitis (40–42). Approximately 12% of implant users in contraceptive studies report weight gain, and only 2–7% discontinue use because of weight change (42–44). And, an analysis from the CHOICE study showed no difference in weight gain at 1 year, after adjusting for confounders, between contraceptive implant users and copper IUD users (26). Approximately 10–14% of users experience worsening of acne; however, less than 2% of implant users discontinue the method for this reason (42, 44). The limited evidence available is reassuring that implants do not have a major effect on bone mineral density, a surrogate marker for fracture risk (45, 46).

Complications related to implant insertion (1.0%) and removal (1.7%) are uncommon. Insertion complications include pain, slight bleeding, hematoma formation, deep or incorrect insertion, and unrecognized noninsertion. Removal may be complicated by breakage of the implant and inability to palpate or locate the implant because of deep insertion (42). Location may be determined for both implants using high-frequency ultrasonography or magnetic resonance imaging, and for the barium-containing implant (34) using X-ray, computerized tomography, or fluoroscopy (3). Fertility returns rapidly after discontinuation of the implant (42). All health care providers who perform implant insertions and removals must receive training that is provided through the manufacturer. For more information on addressing the clinical challenges of LARC use, please see Committee Opinion No. 672, [Clinical Challenges of Long-Acting Reversible Contraceptive Methods](#) (3).

Long-Acting Reversible Contraceptive Eligibility

Long-acting reversible contraceptives have few contraindications and should be offered routinely as safe and effective contraceptive options for most women. The Centers for Disease Control and Prevention (CDC) has developed evidence-based guidance for contraceptives, the *U.S. Medical Eligibility Criteria for Contraceptive Use* (US MEC) (available at www.cdc.gov/reproductivehealth/contraception/usmec.htm) (47). Separate recommendations are given for the initiation and continuation of use, and guidelines are assigned to one of four categories based on the level of risk (Box 1) (47). Intrauterine device and contraceptive implant use in women with a variety of characteristics and medical conditions are addressed in the US MEC, which has been endorsed by the American College of Obstetricians and Gynecologists (ACOG). The CDC also has developed guidance on common contraceptive practices, such as appropriate initiation of methods, when women may rely on the method, and follow-up after initiation. This guidance is contained in the *U.S. Selected Practice Recommendations for Contraceptive Use* (available at www.cdc.gov/reproductivehealth/contraception/usspr.htm), which also has been endorsed by ACOG (48).

Clinical Considerations and Recommendations

► *Are intrauterine devices and implants appropriate for nulliparous women and adolescents?*

Intrauterine devices and the contraceptive implant should be offered routinely as safe and effective contraceptive options for nulliparous women and adolescents. The US MEC classifies IUD use in nulliparous women and in adolescents (aged 20 years or younger) as Category 2, (advantages outweigh the risks) (47). The American Academy of Pediatrics and ACOG endorse the use of LARC, including IUDs, for adolescents (49, 50). National data suggest that LARC use by adolescents remains much lower than in other age groups, although discontinuation for dissatisfaction is no higher in this group than in others (4). In the Contraceptive CHOICE study, 62% of the 1,054 adolescents and young adults, aged 14–20 years, chose LARC; satisfaction and continuation rates were high (51, 52). Use of LARC increased substantially in nulliparous women, from 2.1% in 2009 to 5.9% in 2012 (4).

Concern about IUD complications, including pelvic inflammatory disease, intolerance of adverse effects, or pain and difficulty with insertion, continues to limit obstetrician–gynecologists’ or other health care providers’ willingness to recommend IUDs to adolescents and nulliparous women (53–55). Accumulating evidence suggests that complications such as uterine perforation, ectopic pregnancy, and pelvic inflammatory disease are uncommon in all users, including adolescents and nulliparous women (56, 57).

Despite concerns about difficulty of IUD insertion in adolescent and nulliparous women, a recent study of 1,177 females aged 13–24 years, 59% of whom were nulliparous, demonstrated a first-attempt success rate of 95.5% (58). Most of these insertions (86%) were performed by advanced practice clinicians; complications were rare, and no perforations were reported. Routine use of misoprostol to ease IUD insertion is not recommended (3, 48). For more information on the management of pain associated with IUD insertion, please see Committee Opinion No. 672, *Clinical Challenges of Long-Acting Reversible Contraceptive Methods* (3).

A systematic review reported expulsion rates for adolescents ranging from 5% to 22% (59); analysis of CHOICE study data suggest expulsion rates may be higher in adolescents than in older women, and lower in nulliparous than in parous women (60). Similar to all women, adolescents and nulliparous women are more likely to choose an LNG-IUD rather than a copper

Box 1. U.S. Medical Eligibility Criteria Categories for Classifying Hormonal Contraceptives and Intrauterine Devices

- 1 = A condition for which there is no restriction for the use of the contraceptive method
- 2 = A condition for which the advantages of using the method generally outweigh the theoretical or proven risks
- 3 = A condition for which the theoretical or proven risks usually outweigh the advantages of using the method
- 4 = A condition that represents an unacceptable health risk if the contraceptive method is used

Data from Curtis KM, Tepper NK, Jatlaoui TC, Berry-Bibee E, Horton LG, Zapata LB, et al. U.S. medical eligibility criteria for contraceptive use, 2016. *MMWR Recomm Rep* 2016;65(RR-3):1–103.

IUD (57, 61). In one study, the rate of copper IUD removal for reports of pain and bleeding were higher than for the LNG-IUD (57). Overall, LNG-IUD and copper IUD continuation rates are high for adolescents and nulliparous women, which suggests high levels of satisfaction with these contraceptive methods (52).

The risk of infection is low after IUD insertion (62). There are no studies that demonstrate an increased risk of pelvic inflammatory disease (PID) in nulliparous IUD users, and no evidence that IUD use is associated with subsequent infertility (63). In a 2001 case-control study of 1,895 women with primary tubal infertility and general infertility, previous copper IUD use was not associated with an increased risk of tubal occlusion in nulliparous women. Those with tubal infertility were more likely to have antibodies to chlamydial infection, which indicates that a past sexually transmitted infection (STI) was the likely explanation of infertility (63).

Implant

The US MEC assigns a Category 1 rating (ie, no restriction) to the use of the contraceptive implant by nulliparous women and adolescents (47). Data on implant use in adolescents and nulliparous women are limited, although the CHOICE study demonstrated high uptake of IUDs and implants by adolescents when these contraceptive methods are made readily available (51). Adolescents aged 14–17 years who chose a LARC method were more likely to use the contraceptive implant (51). Contraceptive acceptability and continuation rates were studied in a group of 137 postpartum adolescents (64). At 24 months, continuation rates were higher in contraceptive implant users compared with contraceptive injection and combined contraceptive pill users ($P<.001$) (64). In another study of 116 adolescents, continuation rates for the implant were high, 78% at 12 months and 50% at 24 months (65).

► When is an appropriate time to insert an intrauterine device or contraceptive implant?

Insertion of an IUD or an implant may occur at any time during the menstrual cycle as long as pregnancy may be reasonably excluded (48).

Interval Insertion

Interval insertion refers to the placement of an IUD or contraceptive implant that occurs at any time during the menstrual cycle and is not in relationship to the end of a pregnancy. Clinicians traditionally have inserted the IUD during menses; however, a systematic review concluded that outcomes of continuation, effectiveness, and safety were no better when a copper IUD was inserted during

menses and that requiring a woman to be menstruating is an obstacle to access (66). Similarly, two-visit IUD insertion protocols are a barrier to contraceptive access and do not appear to improve quality of care (67). A study of Medicaid-insured women who requested IUDs in an urban clinic that required two visits found that only 54.4% actually had an IUD inserted (68).

No backup contraceptive method is needed after inserting the copper IUD, regardless of when in the menstrual cycle it is inserted (48). In contrast, a backup method of contraception (ie, use of a condom) is recommended for 7 days after insertion of the LNG-IUD or contraceptive implant, unless these devices are inserted immediately after surgical abortion, within 21 days of childbirth, upon transition from another reliable contraceptive method, within the first 7 days since menstrual bleeding started for the LNG-IUD, or within the first 5 days since menstrual bleeding started for the implant (48).

Postabortion Insertion

Insertion of LARC immediately after an induced or spontaneous abortion is safe and effective. Women who have an abortion are at high risk of repeat unintended pregnancy; ovulation may resume as early as 10 days after abortion (69). Prompt initiation of a contraceptive method for women who desire it may reduce repeat unintended pregnancy. Women who choose to have an IUD inserted immediately after abortion have higher rates of use compared with those who choose interval insertion (70), and lower rates of repeat abortion than those who choose a non-IUD contraceptive method (71). In the CHOICE study, women who were offered immediate postabortion contraception were more than three times more likely to choose an IUD and 50% more likely to choose an implant than women presenting for a family planning visit (72). The authors concluded that women seeking abortion may be more likely to choose a LARC method because they are already undergoing a procedure and are more highly motivated to initiate contraception.

Postabortion Intrauterine Device Insertion

Insertion of an IUD immediately after first-trimester uterine aspiration should be offered routinely as a safe and effective contraceptive option (73, 74). Insertion of an IUD immediately after confirmed completion of first-trimester medication-induced abortion should be offered routinely as a safe and effective contraceptive option (75, 76). Immediate insertion of the copper IUD or LNG-IUD after a first-trimester induced or spontaneous abortion is classified as Category 1 in the US MEC and Category 2 for second-trimester postabortion insertion because of a higher risk of expulsion compared with

insertion after a first-trimester abortion (47). Immediate IUD insertion is contraindicated after septic abortion (47).

Systematic review of studies that compared immediate IUD insertion after first-trimester uterine aspiration with second-trimester dilation and evacuation report a low risk of complications (bleeding, infection, pain, expulsion, and need for IUD removal), similar to that of interval insertion (73). Intrauterine device insertion immediately after second-trimester induced or spontaneous abortion is associated with higher expulsion rates compared with first-trimester postabortion insertion, but no differences in the rate of removal for pain (73). In a randomized trial of immediate versus delayed IUD insertion after first-trimester uterine aspiration, no difference was noted in the 6-month rate of expulsion (5% in the immediate group compared with 2.7% in the delayed group), but 6-month use rates in the immediate group (92.3%) were higher compared with the delayed insertion group (76.6%; $P<.001$) because many were never inserted in the interval group (74).

Immediate IUD insertion after confirmation of completed medication-induced abortion is associated with low expulsion rates, high continuation rates, and low risk of complications (ie, pelvic infection, uterine perforation, and hemorrhage) (75, 76). A randomized controlled trial of 156 women who received copper IUD placement either 1 week after (immediate group) or 4–6 weeks after (delayed group) medication-induced abortion reported comparable expulsion rates among the immediate and delayed groups, with no identified cases of serious infection, uterine perforation, or hemorrhage (76). Continuation rates at 6-month follow up were higher in the immediate placement group (69% versus 60%, $P=.24$), although the difference did not reach statistical significance (76). In an observational study of 97 women who received either a copper IUD or LNG-IUD immediately after confirmation of completed medication-induced abortion, at 3-month follow-up there was a 4.1% expulsion rate (95% CI, 0–8%), no reported cases of pelvic infection or uterine perforation, and an 80% continuation rate for the copper IUD and LNG-IUD combined (75).

Postabortion Implant Insertion

Insertion of the contraceptive implant on the same day as first-trimester or second-trimester induced or spontaneous abortion should be offered routinely as a safe and effective contraceptive option. In addition, same day insertion eliminates the need for an additional visit that would not be routinely scheduled for postabortion follow-up. Contraceptive implant insertion immediately after an induced or spontaneous first-trimester abortion or second-trimester abortion (through medication, uter-

ine aspiration, or dilation and evacuation) is classified as US MEC Category 1, although this is based on studies of a levonorgestrel implant system no longer marketed in the United States (47). A randomized controlled trial assigned 236 participants to placement of the contraceptive implant on the day of mifepristone administration or placement after the medication-induced abortion. Risk of abortion failure was low and similar between groups; the group that received the implant at the time of mifepristone was more satisfied with their assignment than the later start group (77).

Two studies have examined continuation of the contraceptive implant in women who received postabortion placement compared with those who received interval placement. In a prospective cohort study of 105 women, 53 received an implant immediately postabortion and 52 received the implant at a family planning visit (78). Women who received immediate postabortion implant placement did not have a statistically significant change in risk of discontinuation at 1 year compared with women who received interval placement (unadjusted hazard ratio, 1.79; 95% CI, 0.86–3.96). In the CHOICE study, 141 women received an immediate postabortion implant, whereas 935 women had interval placement (79). Continuation rates were approximately 82% in both groups at 1 year.

Postpartum Insertion

The American College of Obstetricians and Gynecologists supports immediate postpartum LARC insertion (ie, before hospital discharge) as a best practice, recognizing its role in preventing rapid repeat and unintended pregnancy (80, 81). Optimally, women should be counseled prenatally about the option of immediate postpartum LARC. Counseling should include discussion of the advantages and disadvantages to allow for informed decision making (81). The immediate postpartum period is particularly favorable for IUD or implant insertion. Women who have recently given birth often are highly motivated to use contraception and are known not to be pregnant. The hospital setting offers convenience for the patient and the health care provider. In addition, women are at risk of an unintended pregnancy in the period immediately after delivery as resumption of ovulation may occur shortly after delivery (82). Between 40% and 57% of women report having unprotected intercourse before the routine 6-week postpartum visit (83–85).

Postpartum Intrauterine Device Insertion

Immediate postpartum IUD insertion (ie, within 10 minutes after placental delivery in vaginal and cesarean births), should be offered routinely as a safe and effective option for postpartum contraception. Women should

be counseled about the increased expulsion risk, as well as signs and symptoms of expulsion (81). Despite the higher expulsion rate of immediate postpartum IUD placement over interval placement, cost-benefit analysis data strongly suggest the superiority of immediate placement in reduction of unintended pregnancy, especially for women at greatest risk of not attending the postpartum follow-up visit (86).

The US MEC classifies immediate postpartum IUD insertion as Category 1 except in the case of immediate postpartum LNG-IUD insertion in breastfeeding women, which is MEC Category 2, mainly based on conflicting results in studies of this IUD (see [Effect on Breastfeeding](#)) (47). Insertion of the copper IUD or a LNG-IUD from 10 minutes after placental delivery up until 4 weeks postpartum is classified as a US MEC Category 2, and insertion at or after 4 weeks postpartum is classified as a US MEC Category 1 (47). Immediate postpartum insertion is contraindicated for women in whom uterine infection (ie, peripartum chorioamnionitis, endometritis, or puerperal sepsis) or ongoing postpartum hemorrhage are diagnosed (US MEC Category 4) (47).

Expulsion rates for immediate postpartum IUD insertion are higher than for interval or postabortion insertion, vary by study, and may be as high as 10–27% (87–90). Differences in expulsion rates are similar with manual insertion versus use of ring forceps, but may differ depending on the experience of the inserter. However, the benefits of immediate insertion may outweigh the increased risk of expulsion. Disadvantages of waiting 4–6 weeks postpartum for interval insertion include failure to return for follow up and not obtaining an IUD at the follow-up visit (87, 91). In a study of IUD continuation at 6 months postpartum among 112 women randomized to immediate IUD insertion at cesarean delivery versus delayed insertion (6 weeks), significantly more women in the immediate postpartum placement group continued the IUD (83% versus 64%, relative risk [RR], 1.3; CI, 1.02–1.66). In the interval group, 39% did not obtain the IUD, 25% did not return for the postpartum visit, and 14% either declined the IUD or had an unsuccessful insertion (92).

Many postpartum women who choose the IUD undergo insertion at the postpartum visit (delayed postpartum insertion). Delayed postpartum IUD insertion may be associated with an increased risk of uterine perforation, although the absolute risk is low (32). In a study of more than 60,000 women who received delayed postpartum IUD insertion, the risk of uterine perforation was increased in women who were breastfeeding at the time of IUD placement (RR, 6.1; 95% CI, 3.9–9.6) and who received an IUD at 36 weeks or less postpartum (RR, 1.7; 95% CI, 0.8–3.1). Despite the increased

relative risk, the absolute risk of uterine perforation was low: 1.4/1,000 LNG-IUD insertions and 1.1/1,000 copper IUD insertions (32).

Postpartum Implant Insertion

Immediate postpartum initiation of the contraceptive implant (ie, insertion before hospital discharge after a hospital stay for birth) should be offered routinely as a safe and effective option for postpartum contraception, regardless of breastfeeding status. Immediate postpartum initiation of the contraceptive implant refers to insertion before discharge after a hospital stay for birth. The US MEC classifies the placement of an implant in nonbreastfeeding women less than 21 days postpartum as Category 1 (47). The US MEC classifies the placement of an implant in breastfeeding women less than 30 days postpartum as Category 2 (advantages generally outweigh risks) because of theoretical concerns regarding milk production and infant growth and development (see [Effect on Breastfeeding](#)). In women who are breastfeeding, delayed insertion (ie, beyond 30 days postpartum), is classified as US MEC Category 1 (47).

Effect on Breastfeeding

An advantage of the copper IUD is its lack of hormonal content, avoiding any theoretical effect on breastfeeding. Concerns remain that hormonal methods, including the LNG-IUD and the contraceptive implant, could have a negative effect on breastfeeding outcomes. However, systematic review findings show that progestin-only contraceptives do not appear to adversely affect a woman's ability to successfully initiate and continue breastfeeding or an infant's growth and development (93).

In a single randomized controlled trial that examined the effect of IUDs on breastfeeding in women randomized to insertion of an LNG-IUD (n=163) or a copper IUD (n=157) at 6–8 weeks postpartum, there were no differences in breastfeeding duration or infant growth between the two groups (94). A small randomized controlled trial that compared the breastfeeding outcomes of women who received immediate postpartum implant placement with those who used no contraception found no significant differences in breast milk volume, newborn weight, or exclusive breastfeeding rates within the first 6 weeks after delivery (95). Similarly, a randomized noninferiority trial that compared insertion of the etonogestrel contraceptive implant at 1–3 days postpartum with standard insertion at 4–8 weeks postpartum found no differences between groups in time to lactogenesis or in lactation failure; there were also no differences between groups in mean milk creatinocrit values (ie, estimated fat and energy content of human milk) (96). In addition, a prospective nonrandomized cohort study

examined breast milk composition in 80 women using the contraceptive implant versus a nonhormonal IUD, initiated at 28–56 days after childbirth. Breast milk composition (measured by total protein, fat, and lactose content) did not differ between the groups, nor did the quantity of breast milk (97). At 3-year follow-up of the infants, there were no differences in body length and weight or head circumference between the groups (98).

The American College of Obstetricians and Gynecologists recommends a shared decision-making approach to contraceptive counseling. Obstetric care providers should discuss the limitations and concerns associated with the use of hormonal LARC within the context of each woman's desire to breastfeed and her risk of unplanned pregnancy so that she can make an autonomous and informed decision (99). Given available evidence, women who are considering immediate postpartum hormonal LARC should be counseled about the theoretical risk of reduced duration of breastfeeding, but that the preponderance of the evidence has not shown a negative effect on actual breastfeeding outcomes (81).

► ***When is an intrauterine device appropriate for emergency contraception?***

Insertion of a copper IUD is the most effective method of emergency contraception when inserted no later than 5 days after unprotected intercourse (48, 100–102). The copper IUD should be offered routinely to women who request emergency contraception and are eligible for IUD placement (47, 48, 102). Obese women may have higher failure rates with the use of levonorgestrel and ulipristal oral emergency contraception than women of normal body weight (103–105). The efficacy of the copper IUD is not affected by body weight (101, 106). Consideration should be given to use of a copper IUD as an alternative to oral emergency contraception for all women, but particularly for obese women (102). In a study of 1,963 women who underwent insertion of a copper IUD for emergency contraception, including 95 nulliparous women, the pregnancy rate was 0.23% (107).

Women who use the copper IUD for emergency contraception may benefit from retention of the device for long-term contraception. One observational study of 542 women who received emergency contraception found significantly lower 1-year cumulative pregnancy rates among women who chose a copper IUD compared with women who chose oral levonorgestrel emergency contraception (108). The LNG-IUD is under investigation for use as emergency contraception but should not be used for this purpose outside of clinical trials at present.

► ***How many years can intrauterine devices and contraceptive implants protect against pregnancy?***

Data indicate that the copper IUD, the LNG-20 IUD, and the contraceptive implant are all effective beyond their FDA-approved durations of use.

Copper Intrauterine Device

Three studies have reported no pregnancies among parous women who used the copper IUD for longer than 12 years. However, very few women were followed for more than 12 years of copper IUD use (109).

Levonorgestrel-20 Intrauterine Device

Current data support the efficacy of the LNG-20 beyond its approved duration of use. Extended-use studies are ongoing for the LNG-18.6, and data are not yet available for the newer devices such as the LNG-19.5 IUD and the LNG-13.5 IUD.

In the contraceptive CHOICE study, there were two pregnancies among 496 women using the LNG-20 IUD for at least 1 year beyond its FDA-approved 5-year duration of use, for a failure rate of 0.25 per 100 women-years in the sixth year of use and 0.43 per 100 women in the seventh year of use (110). Another multicenter randomized trial also found that the LNG-20 IUD is effective for at least 7 years, with a 7-year pregnancy rate of 0.5 per 100 among women using the LNG-20 IUD (111). In that trial, there were no pregnancies in the last 2 years of use (111).

The LNG-18.6 IUD is FDA-approved for 4 years of use, but preliminary data suggest extended efficacy of up to 5 years. It eventually may be approved for use up to 7 years because the ongoing Phase III trial for this IUD accumulates yearly effectiveness data (112).

Contraceptive Implant

The etonogestrel implant is effective for at least 4 years. One large study reported no pregnancies among 204 women using the etonogestrel implant for 5 years (113). In another study, no pregnancies were reported among 102 study participants who used the etonogestrel implant for 5 years (110). These study results may not be generalizable to obese women because only 6% of participants in the first study and 50% in the second study were obese.

► ***Is routine screening for sexually transmitted infections required before insertion of an intrauterine device?***

Women who have not undergone routine screening for sexually transmitted infections (STIs) or who are

identified to be at increased risk of STIs based on patient history (114) should receive CDC-recommended STI screening at the time of a single visit for IUD insertion. Intrauterine device insertion should not be delayed while awaiting test results. Treatment for a positive test result may occur without removal of the IUD (48, 115). Asymptomatic women who are at low risk of STIs and have previously undergone routine screening do not need additional screening at the time of IUD insertion (48). In a cohort of 57,728 women, the incidence of pelvic inflammatory disease was equivalent among women prescreened for STIs and those screened on the day of IUD insertion (116).

The US MEC assigns a Category 2 for IUD initiation among women with vaginitis or who are at increased risk of STIs (47). Because condom use is lower among LARC users compared with users of other contraceptive methods (117), women at risk of STIs should be counseled about the benefits of condom use for STI protection.

A positive test result for chlamydial infection or gonorrhea that was detected after IUD insertion should be treated, and the IUD may be left in place (48). The US MEC assigns a Category 2 rating for IUD continuation in a woman found to have a chlamydial infection or gonorrhea and then treated with appropriate antibiotic therapy (47). Women with an undiagnosed STI at the time of IUD insertion are more likely to develop pelvic inflammatory disease (PID) than women without an STI (118, 119); however, even in women with an STI, the risk appears low (120, 121).

Intrauterine device insertion is contraindicated in women with current purulent cervicitis or with known chlamydial infection or gonorrhea (US MEC Category 4) (47). Although the optimal time for IUD insertion among women treated for cervical infections is unclear, clinicians are advised to delay IUD insertion until the treatment course is complete, symptoms have resolved, the cervical examination results appear normal, and the bimanual examination is without masses or tenderness. Because of the high risk of reinfection, the CDC recommends repeat testing at 3 months for women who have been treated for gonorrhea or chlamydial infection (115).

► ***Does antibiotic prophylaxis before intrauterine device insertion decrease the risk of subsequent pelvic infection?***

Routine antibiotic prophylaxis is not recommended before IUD insertion (48, 122). In a meta-analysis of all known randomized controlled trials, antibiotic prophylaxis at the time of IUD insertion did not decrease the risk of PID nor did it reduce the likelihood of IUD removal within the first 3 months (123). Most of the risk of IUD-related

infection occurs within the first few weeks to months after insertion, suggesting that bacterial contamination of the endometrial cavity at the time of insertion is the cause of infection and not the IUD itself (124). Although the relative risk of PID is increased, the absolute risk of developing PID is less than 0.5% (119, 125).

► ***What are the effects of intrauterine devices and the contraceptive implant on the menstrual cycle?***

Each of the LARC methods affect menstrual bleeding differently. To improve LARC method satisfaction and continuation, patient counseling should include information on expected bleeding changes and reassurance that these changes are not harmful (48, 126).

New-onset abnormal uterine bleeding should be evaluated similarly to abnormal bleeding in non-LARC users; the differential diagnosis remains similar, including complications of pregnancy, infection, and gynecologic malignancy. Because LARC methods affect menstrual bleeding, some women may experience irregular, unpredictable bleeding over the entire course of LARC use. Young or low-risk women whose bleeding coincides with LARC initiation rarely require extensive evaluation.

Intrauterine Devices

A randomized trial found that long-term copper IUD users were more likely than LNG-20 IUD users to discontinue the device because of heavy menstrual bleeding and dysmenorrhea (9.7 per 100 women versus 1.3 per 100 respectively), whereas LNG-20 IUD users were more likely than copper IUD users to discontinue the device because of amenorrhea and spotting (4.3 per 100 women versus 0 per 100 women, respectively) (127).

Women should be advised that menstrual bleeding and cramping may initially increase with use of the copper IUD (48). Nonsteroidal antiinflammatory medications are effective for the treatment of dysmenorrhea or bothersome bleeding from the copper IUD (16, 48, 128). Reports of bleeding and dysmenorrhea decrease over time in copper IUD users (129).

Hormone released from the LNG-IUD concentrates in the endometrium and produces a thin decidualized endometrial lining that becomes resistant to endogenous estrogen stimulation. Most women continue to ovulate while using the LNG-IUDs (21). An increase in irregular or prolonged spotting is common during the first 90 days of use; bleeding and spotting lessen over time (24, 25). Decreased bleeding has been reported with insertion of the second consecutive LNG-20 IUD compared with first-time use (130). The reduction in menstrual bleeding

is less pronounced with IUDs that contain lower doses of levonorgestrel; women using these lower-dose IUDs experience more bleeding or spotting days on average than women using the LNG-20 IUD with higher doses of levonorgestrel, although overall bleeding patterns are similar and well tolerated (25).

As with the copper IUD, evidence supports treating bleeding and spotting associated with LNG-IUD use with nonsteroidal antiinflammatory medications. In one randomized placebo-controlled trial, naproxen significantly reduced bleeding and spotting days in the first 12 weeks of LNG-20 IUD use, whereas transdermal estradiol significantly increased bleeding and spotting (131). However, another trial found that tranexamic acid and mefenamic acid did not alleviate nuisance bleeding during the first 90 days of LNG-20 IUD use (132).

The LNG-20 IUD is FDA-approved for the treatment of heavy bleeding in women who use the method for contraception, and it is used widely for this indication (17). A review of 18 studies of the LNG-20 IUD used for the treatment of heavy menstrual bleeding found a menstrual blood loss reduction of 79–97% (133). The number of bleeding or spotting days may be increased relative to baseline during the first year of use (134). The LNG-20 IUD is more effective than oral medications for treating heavy menstrual bleeding, including in women who do not use it for contraception (135, 136). In addition, studies document an overall high rate of satisfaction and continued use in women with heavy menstrual bleeding (135).

Contraceptive Implant

A noncontraceptive benefit of the implant is a significant decrease in dysmenorrhea (44, 137, 138). However, uterine bleeding patterns with contraceptive implant use are unpredictable and are cited as among the most common reasons for discontinuation. In CHOICE study analysis, of 1,184 contraceptive implant users, 42% reported decreased bleeding frequency, and 35% reported increased bleeding frequency at 3 months of use; at 6 months, bleeding frequency had decreased for 48% of users and increased for 21% of users (8).

An integrated analysis of 11 international clinical trials that assessed the variable bleeding patterns (in 90-day reference periods) among 923 implant users found that women usually experienced infrequent bleeding (33.6% of the reference periods) or amenorrhea (22.2% of the reference periods) (137). Frequent bleeding was found in 6.7% of the reference periods and prolonged bleeding in 17.7% of the reference periods. Only 11.3% of patients discontinued the implant because of bleeding irregularities, mainly because of frequent and prolonged bleeding. Overall, the mean number of

spotting or bleeding episodes was less than the number reported in normal menstrual cycles. Women with favorable bleeding profiles in the first 3 months of use were likely to continue with that bleeding pattern for the first 2 years, whereas those who started with an unfavorable pattern had a 50% chance of improving (41, 44, 137).

Timing of contraceptive implant insertion does not appear to affect discontinuation for bleeding. One analysis found similar discontinuation rates of the implant for irregular bleeding among women who underwent immediate postpartum insertion, insertion at 6–12 weeks postpartum, and interval insertion (139). Similar results were seen in women who received implants immediately after abortion versus those who received interval insertion (79).

A 5–7-day course of nonsteroidal antiinflammatory medication may be considered for contraceptive implant users who experience irregular bleeding. Women with bothersome implant-associated bleeding who are medically eligible for treatment with estrogen can receive a course of low-dose combined oral contraceptive pills (48, 140). A randomized controlled trial of 32 women with bothersome bleeding found significant improvements in bleeding during a 14-day treatment with low-dose combined oral contraceptive pills when compared with placebo. However, bleeding resumed for most women within 10 days after stopping treatment (141). Another trial found similar beneficial effects with the use of mifepristone in combination with ethinyl estradiol or doxycycline in improving bleeding, but with resumption of bothersome bleeding after treatment ended (142).

► *What gynecologic procedures can be performed with an intrauterine device in place?*

Endometrial biopsy, colposcopy, cervical ablation or excision, and endocervical sampling may all be performed with an IUD in place. As with other women who experience abnormal uterine bleeding in the perimenopausal period, unexpected bleeding should prompt evaluation in women with IUDs (143). Endometrial sampling can be performed with a small endometrial suction curette; sampling should be repeated if there is insufficient tissue for diagnosis. During cervical ablation or excision procedures, IUD strings may be tucked into the cervical canal if possible, or cut.

► *What treatment options are appropriate for an asymptomatic patient with an IUD who has actinomyces identified by cervical cytology screening?*

Actinomyces on cytology is considered an incidental finding. In the absence of symptoms, no antimicrobial

treatment is needed, and the IUD may be left in place (3, 144). Although options for management have included oral antibiotics, or removal of the IUD, or both, expectant management is currently recommended for asymptomatic patients with an IUD and actinomyces found by cervical cytology screening. Both the UK Faculty of Family Planning and the Standards and Guidelines of the Planned Parenthood Federation of America recommend continued IUD use and patient education about the small risk of actinomycosis (144). Most frequently, however, IUD users whose Pap test results incidentally report a finding of actinomyces are asymptomatic and are at extremely low risk of pelvic actinomycosis. The prevalence of actinomycosis, characterized by granulomatous pelvic abscesses, has been estimated to be less than 0.001% (144).

► ***In pregnant women, does removal of the intrauterine device affect pregnancy outcome?***

Pregnancy in IUD users is uncommon. However, when an intrauterine pregnancy does occur with an IUD in place, management depends on the woman's desire to continue or terminate the pregnancy, gestational age, IUD location, and whether IUD strings are visible (3, 48). Initial guidance is to determine the location of the pregnancy because women who become pregnant with an IUD in place are more likely to have an ectopic pregnancy (48). For women who have an intrauterine pregnancy, there are risks associated with removing and retaining the IUD. However, the risks of adverse pregnancy outcome are greater in the setting of IUD retention (145). Therefore, IUD removal is recommended in pregnant women when the strings are visible or can be removed safely from the cervical canal (48). For women who choose pregnancy termination, the IUD can be removed at the time of the procedure or before medication-induced abortion.

If a woman decides to continue the pregnancy with an IUD in place, she should be counseled regarding the increased risks of spontaneous abortion, septic abortion, chorioamnionitis, and preterm delivery (145). These risks are reduced, but not eliminated, with the removal of the IUD (145). A population-based retrospective review of all pregnancies beyond 22 weeks that occurred from 1998 to 2007 in a large hospital in Israel reported that women with a retained copper IUD had significantly increased rates of placental abruption, placenta previa, preterm delivery, cesarean delivery, low-birth-weight infants, and chorioamnionitis compared with women who became pregnant without an IUD in place. Women who became pregnant with an IUD in place, but whose IUD was removed had outcomes that were intermediate between the other two groups (146).

Continuing a pregnancy with a retained LNG-IUD raises the theoretical concern about the effect of fetal exposure to the hormone. There is insufficient evidence to determine whether any negative fetal effects occur in the setting of this very small exposure to levonorgestrel during gestation. In a case series of 40 pregnancies with a retained LNG-IUD, more than one half were ectopic; of the 10 cases of continued pregnancy, 8 ended in spontaneous pregnancy loss, and the other two pregnancies resulted in healthy infants born at term (147).

For additional information on the management of pregnancy with an IUD in place, see Committee Opinion No. 672, *Clinical Challenges of Long-Acting Reversible Contraceptive Methods*.

► ***Do intrauterine devices and implants cause ectopic pregnancy?***

The use of an IUD or implant does not increase the absolute risk of ectopic pregnancy, thus intrauterine devices may be offered to women with a history of ectopic pregnancy. In women with a history of ectopic pregnancy, the US MEC classifies use of copper and LNG-IUDs and the contraceptive implant as Category 1 (47). A meta-analysis of 16 case-control studies concluded that IUDs do not increase the risk of ectopic pregnancy because they prevent pregnancy so effectively (148). If pregnancy does occur with an IUD in place, the pregnancy is more likely to be ectopic. Case-control studies of ectopic pregnancy associated with IUD use indicate an increased relative risk; however, prospective data from randomized controlled trials describe a low absolute risk, a measure that is more useful clinically (149, 150).

► ***When should an intrauterine device or implant be removed in a menopausal woman?***

There is no compelling evidence for the removal of an IUD or implant before its expiration date in menopausal women. Awaiting 1 year of amenorrhea in women using a copper IUD to ensure menopausal status is advisable before removing the device. Given that amenorrhea may be a secondary effect of the LNG-IUD and the contraceptive implant, and that no well-validated tool exists to confirm menopause, it is reasonable to continue these methods until age 50–55 years, which is when most women in North America will reach natural menopause (48).

No clinical trials have examined the risks from prolonged IUD retention in asymptomatic menopausal women. Generally, menopausal women tolerate IUDs well. The LNG-IUD has been found to be effective for

noncontraceptive indications in menopausal women, such as the progestin component of hormone therapy (151).

Summary of Recommendations

The following recommendations are based on good and consistent scientific evidence (Level A):

- ▶ Insertion of an IUD immediately after first-trimester uterine aspiration should be offered routinely as a safe and effective contraceptive option.
- ▶ Insertion of the contraceptive implant on the same day as first-trimester or second-trimester induced or spontaneous abortion should be offered routinely as a safe and effective contraceptive option.
- ▶ Routine antibiotic prophylaxis is not recommended before IUD insertion.

The following recommendations are based on limited or inconsistent scientific evidence (Level B):

- ▶ Intrauterine devices and the contraceptive implant should be offered routinely as safe and effective contraceptive options for nulliparous women and adolescents.
- ▶ Insertion of an IUD or an implant may occur at any time during the menstrual cycle as long as pregnancy may be reasonably excluded.
- ▶ Insertion of an IUD immediately after confirmed completion of first-trimester medication-induced abortion should be offered routinely as a safe and effective contraceptive option.
- ▶ Immediate postpartum IUD insertion (ie, within 10 minutes after placental delivery in vaginal and cesarean births) should be offered routinely as a safe and effective option for postpartum contraception.
- ▶ Immediate postpartum initiation of the contraceptive implant (ie, insertion before hospital discharge after a hospital stay for birth) should be offered routinely as a safe and effective option for postpartum contraception, regardless of breastfeeding status.
- ▶ Women who have not undergone routine screening for STIs or who are identified to be at increased risk of STIs based on patient history should receive CDC-recommended STI screening at the time of a single visit for IUD insertion. Intrauterine device insertion should not be delayed while awaiting test results. Treatment for a positive test result may occur without removal of the IUD.

- ▶ Intrauterine devices may be offered to women with a history of ectopic pregnancies.

The following recommendations are based primarily on consensus and expert opinion (Level C):

- ▶ Long-acting reversible contraceptives have few contraindications and should be offered routinely as safe and effective contraceptive options for most women.
- ▶ The copper IUD should be offered routinely to women who request emergency contraception and are eligible for IUD placement.
- ▶ To improve LARC method satisfaction and continuation, patient counseling should include information on expected bleeding changes and reassurance that these changes are not harmful.
- ▶ Endometrial biopsy, colposcopy, cervical ablation or excision, and endocervical sampling may all be performed with an IUD in place.
- ▶ Actinomyces on cytology is considered an incidental finding. In the absence of symptoms, no antimicrobial treatment is needed, and the IUD may be left in place.
- ▶ Intrauterine device removal is recommended in pregnant women when the strings are visible or can be removed safely from the cervical canal.
- ▶ There is no compelling evidence for the removal of an IUD or implant before its expiration date in menopausal women.

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The MEDLINE database, the Cochrane Library, and ACOG's own internal resources and documents were used to conduct a literature search to locate relevant articles published between January 2000 and June 2017. The search was restricted to articles published in the English language. Priority was given to articles reporting results of original research, although review articles and commentaries also were consulted. Abstracts of research presented at symposia and scientific conferences were not considered adequate for inclusion in this document. Guidelines published by organizations or institutions such as the National Institutes of Health and the American College of Obstetricians and Gynecologists were reviewed, and additional studies were located by reviewing bibliographies of identified articles. When reliable research was not available, expert opinions from obstetrician-gynecologists were used.

Studies were reviewed and evaluated for quality according to the method outlined by the U.S. Preventive Services Task Force:

- I Evidence obtained from at least one properly designed randomized controlled trial.
- II-1 Evidence obtained from well-designed controlled trials without randomization.
- II-2 Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one center or research group.
- II-3 Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments also could be regarded as this type of evidence.
- III Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:

Level A—Recommendations are based on good and consistent scientific evidence.

Level B—Recommendations are based on limited or inconsistent scientific evidence.

Level C—Recommendations are based primarily on consensus and expert opinion.

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