Intrauterine contraception: Candidates and device selection

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INTRODUCTION

Intrauterine contraception is the most commonly used method of long-acting reversible contraception because of its high efficacy and safety, ease of use, and low cost. It provides a nonsurgical option for pregnancy prevention that is as effective as surgical sterilization. There are two main types of intrauterine devices (IUDs) available in the United States, copper-containing or levonorgestrel (LNG)-releasing.

Several terms are used to describe IUDs, including IUD and intrauterine contraception; the hormonal IUD or progestin-containing device is also referred to as an intrauterine system. We use the term IUD for all types of IUDs. This topic will discuss IUD selection and use in specific populations. Issues related to IUD types, insertion, removal, side effects, and complications are discussed separately. (See "Intrauterine contraception: Background and device types" and "Intrauterine contraception: Insertion and removal" and "Intrauterine contraception: Management of side effects and complications".)

MYTHS AND MISPERCEPTIONS

Several factors have limited widespread use of the IUD in the United States, including a history of complications with older IUD types that resulted in negative publicity; misinformation regarding the risks of infection, ectopic pregnancy, and infertility; misinformation about eligible candidates for IUD use; misconceptions about the mechanism of action of the IUD; lack of clinician training; and fears of litigation [1].

Infection risk

- **Pelvic inflammatory disease (PID)** – The risk of PID among IUD users is low and similar to the risk of PID in women using combined oral contraceptives or the etonogestrel subdermal contraceptive implant [2]. Older observational studies reported an increased risk of PID among IUD users, especially within the first 30 days after insertion, but the studies were flawed because of uncertainty of PID diagnosis, inappropriate control groups, bias, and confounding [3,4]. When compared with the risk of PID in women without IUDs, other reports also concluded that the risk of PID was the same or lower for IUD users [5-9]. In two studies, the reported risk of PID was 2 per 1867 patients (approximately 0.01 percent) [8] and ≤1 percent [9].

- **Viral infection**

  - **HIV** – Concerns have been raised about the risk of HIV and human papillomavirus (HPV) infections in IUD users. Intrauterine contraception does not increase the risk of HIV acquisition over that in users of other contraceptives [10-13]. Both LNG and copper IUDs appear to decrease HIV target cell populations in the female genital tract and may, therefore, decrease the risk of HIV acquisition [14].

  - **Human papillomavirus (HPV)** – IUDs do not increase the risk of HPV infection and are associated with a reduced risk of developing cervical cancer. A prospective cohort study of nearly 680 women and girls (ages 13 to 22) reported no difference in HPV acquisition or clearance among those with or without an IUD [15]. This study controlled for potential behavioral confounders such as age at first intercourse, diagnosis of other sexually transmitted infections (STIs), HPV vaccination status, condom use, new sexual partner, use of combined hormonal contraception, smoking, and pregnancy. A different observational study that compared current IUD users with ever-users also reported no difference in the rates of HPV infection as well as no differences in rates of Papanicolaou (Pap) test progression and cervical cancer [16]. Data on reduced rates of cervical cancer in IUD users are reviewed separately. (See "Intrauterine contraception: Background and device types", section on 'Noncontraceptive benefits'.)

  All women at risk for STIs should still be counseled regarding consistent condom use. (See "Prevention of sexually transmitted infections".)

Ectopic pregnancy — The overall risk of ectopic pregnancy is lower for women using an IUD than for the general population because the absolute risk of pregnancy with an IUD is very low [17]. Women using no contraception have a 10-fold higher risk of ectopic pregnancy than IUD users (3.25 to 5.25 per 1000 woman-years versus 0 to 0.5 per 1000 woman-years) [18,19]. If pregnancy

occurs, however, IUD users are at higher risk of the pregnancy being ectopic than women not using IUDs [20]. Overall, LNG users are less likely than copper IUD users to have a contraceptive failure, but if a pregnancy occurs, it is more likely to be ectopic (27 to 50 percent) [21,22]. A history of prior ectopic pregnancy is not a contraindication to IUD use. (See "Ectopic pregnancy: Epidemiology, risk factors, and anatomic sites", section on 'Intrauterine devices'.)

Infertility — There is no evidence of an increased risk of infertility among IUD users. A case-control study of 1895 nulligravid women with tubal infertility reported that women with infertility due to tubal occlusion were no more likely to have previously used a copper IUD than women with other types of infertility or fertile controls [23]. Further, a trial of 209 women reported pregnancy rates in women under age 30 at one year after IUD removal that were similar to pregnancy rates in women not using any contraception [24]. In women who desired pregnancy after IUD use, clinical trials reported conception rates one year after device removal of approximately 80 percent, which is comparable to women who have not used a contraceptive device [25-28].

IUD SELECTION

Women who desire and are eligible for an IUD must decide between copper and LNG-releasing IUDs. To help a woman select a device, we ask her about her preference for cyclic bleeding, lighter periods, or amenorrhea and her tolerance of unscheduled bleeding. As most women can safely use either IUD, understanding preferences around bleeding patterns helps select an IUD that meets the patient's expectations and causes the fewest bothersome side effects. (See "Intrauterine contraception: Background and device types", section on 'Impact of device type on bleeding pattern'.)

Copper or levonorgestrel? — We take the following approach to helping patients select a copper or LNG IUD:

Reasons to choose the copper IUD — Reasons to choose the copper IUD include:

- **Avoidance of exogenous hormones** – The copper IUD contains no hormones and may be used by women who want or need to avoid exogenous hormones (ie, women with a history of breast cancer).
- **Continuation of pre-IUD bleeding pattern** – The copper IUD does not cause anovulation or amenorrhea. Copper IUD users continue to have cyclic menstrual bleeding and have less unscheduled bleeding or spotting than LNG IUD users.
- **Desire for longer term contraception** – The TCu380A is approved for more years of use than LNG IUDs (10 years for the TCu380A versus three to six years for LNG IUDs).

- **Need for emergency contraception** – The TCu380A can be inserted for emergency contraception and then left in place to provide ongoing contraception.

Reasons to choose an LNG IUD — Reasons to choose an LNG IUD include:

- **Greater efficacy at preventing pregnancy** – Both copper and LNG IUDs are among the most effective methods of reversible contraception (figure 1); however, the 52 mg LNG IUDs are more effective at preventing pregnancy than copper IUDs (table 1). In one study, first-year failure rates were 0.07 percent for the 52 mg LNG IUDs and 0.63 percent for copper IUDs (including those with less surface area of copper than the 380 mm^2 copper-containing IUD [abbreviated TCu380A]), and pregnancies per 100 woman-years were 6 and 52, respectively [22]. One multinational study reported that the cumulative pregnancy rate at seven years was significantly lower for 52 mg LNG IUD users compared with TCu380A users: 0.5 compared with 2.5 percent. In this study, women were randomized to 52 mg LNG or TCu380A IUD. Of note, the discontinuation rate was significantly higher in women randomized to the LNG IUD (70.6 versus 40.8 percent at seven years) and was believed to reflect cultural preference for maintaining menses [29]. Subsequent studies reported similar rates of continuation between copper and LNG IUDs [30-32].
- **Reduction of menstrual bleeding and anemia** – LNG IUDs reduce menstrual flow.
- **Possible amenorrhea** – This effect is mainly seen with the 52 mg LNG IUDs. (See 'Which LNG IUD?' below.)
- **Reduction in dysmenorrhea** – LNG IUDs can reduce dysmenorrhea.
- **Treatment of endometriosis-related pelvic pain** – The studies demonstrating reduction of endometriosis-related pain used the 52 mg LNG IUDs. It is not known if the 19.5 or 13.5 mg LNG IUDs have a similar effect.

In addition, we use the woman's prior contraceptive history to help her with IUD selection. As an example, women who report a history of progestin-related side effects may benefit from the copper IUD whereas women with no prior hormonal side effects may prefer the LNG IUDs if they desire lighter bleeding patterns.

Which LNG IUD? — Women who desire an LNG IUD can choose among the 52 mg, 19.5 mg, and 13.5 mg LNG devices. While changes in bleeding patterns are common to all types of LNG IUDs, the three LNG doses cause different amenorrhea rates, which may be leveraged to improve patient satisfaction.

- The 52 mg LNG IUDs will cause amenorrhea in 20 to 40 percent of users [25,26]. Although

amenorrhea was a significant cause of device discontinuation in the initial clinical trials [33], this side effect is now viewed as a benefit. We use the 52 mg LNG IUDs for women who desire or can tolerate amenorrhea, desire a reduction in menstrual flow (should they have periods), and desire a reduction in dysmenorrhea. By contrast, the amenorrhea rates for the 19.5 and 13.5 mg LNG IUDs are 12 to 20 percent and 6 to 12 percent, respectively [27,28]. We use this device for women who desire more predictable cyclic bleeding as well as reduction of dysmenorrhea and menstrual volume.

- As part of the LNG IUD selection process, women are counseled that the desired bleeding patterns may not occur. As noted above, up to 20 percent of women with a 19.5 mg LNG IUD and up to 12 percent of women with a 13.5 mg LNG IUD will have amenorrhea regardless of their preference for cyclic bleeding. We also counsel women that unscheduled bleeding can occur with either device; this symptom generally improves with time. Bothersome unscheduled bleeding can be treated medically and is discussed separately. (See "Evaluation and management of unscheduled bleeding in women using contraception", section on 'Intrauterine devices'.)

WHO SHOULD USE AN IUD?

Candidates for IUDs — We recommend IUDs or contraceptive implants based on their high typical-use effectiveness (figure 1), ease of use, and long duration of action [17,34,35].

IUDs are a good choice for adolescent and adult women who:

- Desire one highly effective contraceptive method
- Desire long-term yet reversible contraception
- Want or need to avoid estrogen exposure (all IUDs) or progestin exposure (copper IUDs)

The variables that impact contraceptive choice differ among women and may change for an individual over her reproductive life. Contraceptive counseling should include brief discussion of all methods of contraception including the risks, benefits (contraceptive and noncontraceptive), and side effects of the various options with the woman [36]. Some experts recommend presenting methods in order of effectiveness, starting with IUDs and contraceptive implants [36-38]. (See "Contraception: Counseling and selection".)

Long-acting reversible contraceptives, which include IUDs and the contraceptive implant, are recommended as the most effective contraceptives for most women and adolescents, including nulliparous patients (figure 1) [17,38,39]. For women at risk of unintended pregnancy, counseling should include all contraceptive options, including IUDs. We take the following

approach to determine which women are good candidates for IUDs:

- First we ask if the woman is considering pregnancy in the next one to two years. If she is, an IUD may not be cost-effective. Short-acting reversible contraceptives such as pills, ring, or patch may be less expensive when used for less than two years (the benefit point will vary based on the cost to the patient of the different products). Yet the typical-use effectiveness of pills, especially among adolescents and young women, is low, which may make the use of an effective contraceptive more important than the one-year cost of the contraceptive [40-42]. (See "Intrauterine contraception: Background and device types", section on 'Cost effectiveness'.)

  The details of short-acting reversible methods are discussed separately. (See "Contraception: Counseling and selection".)

- Next we review the risks and benefits of estrogen exposure for each woman. None of the IUD types contain estrogen and can be used by women with contraindications to estrogen, such as women with a history of thromboembolic events. In contrast, women who may benefit from estrogen-containing contraceptives are directed to these methods instead of the IUD or contraceptive implants. (See 'When to consider an estrogen-progestin contraceptive instead of an IUD' below.)

- Lastly, we consider the woman's other medical issues that may be treated by the noncontraceptive benefits of the different methods. For example, symptoms of dysmenorrhea, menorrhagia, and endometriosis-related pain and endometrial hyperplasia do not improve with the copper IUD. Women with these issues will likely benefit from an LNG IUD [43-47]. (See "Intrauterine contraception: Background and device types".)

For women and adolescents who are not directed to another method based on the above conversation, we next review the indications and contraindications listed below to ensure that an IUD is appropriate for the patient.

Contraindications — There are relatively few absolute, evidence-based contraindications to IUDs [48]. The following are the major conditions in which IUDs may be contraindicated:

- **Severe distortion of the uterine cavity** – Anatomic abnormalities, including bicornuate uterus, cervical stenosis, or leiomyoma (fibroids), that severely distort the uterine cavity are contraindications to IUD use because of increased difficulty with insertion and increased risk of expulsion when an IUD is placed in a distorted, small, or extremely large uterine cavity [49]. (See "Uterine fibroids (leiomyomas): Epidemiology, clinical features, diagnosis, and natural history", section on 'Diagnostic evaluation' and "Congenital uterine anomalies: Clinical

manifestations and diagnosis", section on 'Diagnostic tools'.)

Manufacturers of the TCu380A and the 52 mg LNG IUDs recommend that the uterine cavity sound to between 6 and 9 cm for optimal performance, but this is not based on good evidence. The Liletta IUD clinical trial used a lower limit of 5.5 cm for uterine length with no upper limit [26]. The clinical trials for the 19.5 and 13.5 mg LNG IUDs did not specify a uterine length. Non-distorting leiomyomas are not a contraindication to intrauterine contraception [37]. Leiomyomas and uterine volume, as well as vaginal bleeding, often decline after insertion of the 52 mg LNG IUDs [37,49,50]. Women with leiomyomas may have a higher rate of expulsion than women without them [49].

- **Active pelvic infection** – IUD insertion in women with active pelvic infection, including pelvic inflammatory disease (PID), endometritis, mucopurulent cervicitis, and pelvic tuberculosis, is contraindicated because a foreign body may impede resolution of the infection. The IUD may be inserted in women after PID or puerperal or postabortion sepsis has resolved [37]. Treatment of women with an active pelvic infection and IUD in place is discussed separately. (See "Intrauterine contraception: Management of side effects and complications", section on 'Infection and/or pelvic inflammatory disease'.)

- **Known or suspected pregnancy** – IUD insertion during pregnancy can lead to miscarriage and increases the risk of septic abortion. (See "Intrauterine contraception: Management of side effects and complications", section on 'Pregnancy'.)

  We use the following table of questions to reasonably exclude pregnancy prior to device insertion (table 2). (See "Intrauterine contraception: Insertion and removal", section on 'Timing of insertion and pregnancy testing'.)

- **Wilson's disease or copper allergy** – The amount of copper released daily by the TCu380A is less than that consumed in the average diet. Although no adverse event related to copper allergy or Wilson's disease has ever been reported in a woman with a copper IUD, LNG IUDs are preferred for use in women with these conditions [51].

- **Unexplained abnormal uterine bleeding** – Evaluation of women with abnormal uterine bleeding precedes IUD placement because, after placement, the abnormal bleeding may be erroneously attributed to the IUD rather than the preexisting pathology, such as endometrial hyperplasia or malignancy. Women who develop abnormal bleeding that requires evaluation are able to have endometrial tissue sampling with an endometrial Pipelle or small suction curette. Evaluation and management of abnormal bleeding associated with IUD use depends in part on the amount of time that has passed since IUD insertion. More information is available in the links below:

- (See "Intrauterine contraception: Management of side effects and complications", section on 'Post-insertion bleeding'.)
- (See "Intrauterine contraception: Management of side effects and complications", section on 'Irregular bleeding and/or cramping'.)
- (See "Intrauterine contraception: Management of side effects and complications", section on 'Continued bleeding and cramping'.)

- **Breast cancer** – Current breast cancer is a contraindication to use of the LNG IUDs. Although the data on LNG IUD use in women with a history of breast cancer are limited, at least one study suggests an increased risk of cancer recurrence with LNG IUD use despite a low rate of systemic hormone absorption [52]. In accordance with the Centers for Disease Control and Prevention (CDC), we do not use the LNG IUD for contraception in women being treated for breast cancer or with a history of breast cancer. However, there may be a role for using the LNG IUD for endometrial protection in select women with a history of breast cancer after counseling regarding the possible increased risk of breast cancer recurrence. (See "Approach to the patient following treatment for breast cancer", section on 'Contraception after breast cancer'.)

  For women who do not have a history of breast cancer, the data regarding the risk of developing breast cancer with LNG IUD use are conflicting. A 2017 registry study of over 1.8 million Danish women found an increased risk of breast cancer among women who had used the LNG IUD with a relative risk of 1.21 (95% CI 1.11-1.33) compared with women who had never used hormonal contraception [53]. However, the study was unable to control for several known confounders for breast cancer. By contrast, a 2011 retrospective study comparing over 5000 Finnish and German women with breast cancer who had used an LNG IUD with over 20,000 control women reported no increased risk of breast cancer with LNG IUD use [54]. Further data are needed to clarify the risk of breast cancer with LNG IUD use.

- **Other** – The LNG IUDs have additional relative contraindications related to specific hormonally sensitive conditions, such as active liver disease. Women with these issues can safely use the copper IUDs. (See "Contraception: Counseling and selection", section on 'Special populations'.)

  A current history of dysmenorrhea or menorrhagia is a relative contraindication to use of the TCu380A IUD, as the device can worsen these symptoms.

When to consider an estrogen-progestin contraceptive instead of an IUD — Some women who are eligible for an IUD may benefit from luteinizing hormone suppression provided by

combined estrogen-progestin contraceptive pills, patches, and rings. For example, use of estrogen-progestin contraceptives can lead to improvements in acne and hirsutism and maintain bone mineral density in women at risk of osteopenia. Estrogen-progestin contraceptives also provide more reliable ovulation suppression for women with medical conditions sensitive to endogenous hormonal fluctuations. For these women, the noncontraceptive benefits of the estrogen-progestin methods may be the major factor in contraceptive choice.

Traditionally, women with menorrhagia, dysmenorrhea, and endometriosis-related pain and women at risk for endometrial hyperplasia have been treated with estrogen-progestin contraceptives [55-57]. Newer data suggest that the progestin-releasing IUDs and implants may also treat these problems [58-60]. The 52 mg LNG devices are US Food and Drug Administration (FDA)-approved for treatment of heavy menstrual bleeding [25]. However, comparative studies have not been done, and therefore, the optimal treatment is not known. Women with these issues can be counseled that all hormonal methods are reasonable choices for treating these problems.

Lastly, estrogen-progestin contraceptive use has been associated with reductions in ovarian and colon cancer. It is unknown if the IUDs have similar effects. One study of LNG IUD users found a reduction in risk of ovarian cancer (standardized infection ratio 0.60, 95% CI 0.45-0.76) compared with the general population [61]. Women at risk for ovarian and colon cancers may prioritize cancer reduction over the benefits from the IUDs and, therefore, prefer estrogen-progestin contraceptives. (See "Combined estrogen-progestin oral contraceptives: Patient selection, counseling, and use", section on 'Noncontraceptive uses'.)

IUD versus implant — Unless contraindicated, we begin our contraceptive counseling with a discussion of IUDs and contraceptive implants, as they are the most effective reversible contraceptive methods [17,42]. Compared with contraceptive implants, IUDs have less unscheduled bleeding, fewer systemic hormonal side effects, and longer duration of action compared with the progestin-releasing implants. However, the implants are excellent options for women who do not want to or cannot use an IUD, as implants are more effective at preventing pregnancy than short-acting reversible methods (figure 1). The implants also provide more reliable ovulation suppression for women with medical conditions sensitive to endogenous hormonal fluctuations.

We discuss the following issues with patients when choosing between an IUD and a contraceptive implant:

- **Alteration in bleeding patterns** – Women are counseled that the implants are associated with unscheduled bleeding that generally persists for the duration of the device [62,63]. While unscheduled bleeding may occur with IUD use, it is less common and generally improves with duration of use [25-28,47,64]. Therefore, the contraceptive implant should be avoided in

women who have a low tolerance for unscheduled uterine bleeding.

- **Amenorrhea** – Amenorrhea occurs in 20 to 40 percent of 52 mg LNG-releasing IUD users [25,26] and up to 20 percent of contraceptive implant users [65]. For women who tolerate the possibility of either amenorrhea or unscheduled bleeding but do not want an IUD, we recommend contraceptive implants.

- **Hormone level** – The contraceptive implants have higher systemic progestin levels, which may cause progestin-related side effects such as emotional lability, weight gain, acne, and depression [65]. (See "Etonogestrel contraceptive implant", section on 'Counseling points'.)

  While the main progestin effect of the LNG IUDs is at the level of the endometrium, serum LNG levels are detectable, although they decrease with time [25-27,66]. Because there is wide variation in the systemic progestin level in women using LNG IUDs and variation in sensitivity to various serum levels, some women may have progestin-related side effects similar to the contraceptive implant. The copper IUDs do not release any hormone and, therefore, do not cause hormonal side effects [67]. For women who are concerned about hormonal side effects, we use the copper IUD.

- **Duration of use** – Women who desire longer contraceptive action will benefit from a 52 mg LNG IUD (FDA approved for 6 years, although data suggest contraceptive efficacy for up to 7 years) or a CuT380A IUD (FDA approved for 10 years, but data suggest contraceptive efficacy for at least 12 years). The contraceptive implant is approved for three years of use in the United States, but data suggest contraceptive efficacy for four to five years [25-27,65,67]. (See "Intrauterine contraception: Background and device types", section on 'Duration of use' and "Intrauterine contraception: Background and device types", section on 'Duration'.)

- **Privacy** – Contraceptive implants are placed subdermally into the medial side of the non-dominant upper arm while the IUDs are inserted into the uterine cavity. Women should be counseled that the implant is palpable and may be visible in very thin women.

USE OF IUDs IN SPECIAL POPULATIONS

Women with comorbidities — The Centers for Disease Control and Prevention (CDC) has published US Medical Eligibility Criteria for IUDs by maternal medical condition or personal characteristics.

Selected populations are discussed in more detail below.

Adolescents — Adolescents without medical contraindications can safely use IUDs. Use of IUDs in

adolescents is recommended by experts in contraceptive care and professional societies, including the American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG), and we regularly place IUDs in women younger than 18 [17,35,38,39,68].

In a study of 210 female patients aged 10 to 20 years, IUD insertion was successful in more than 90 percent, including never sexually active adolescents [69]. However, never sexually active adolescents were less likely to have the procedure in an office setting compared with sexually active teens (54 versus 95 percent, respectively). In sub-analysis of office-based insertions, never sexually active adolescents were more likely to have an unsuccessful IUD insertion compared with sexually active teens (16 versus 4 percent), although overall successful office insertion rate remained greater than 80 percent. A trial of 95 women aged 14 to 22 years that compared lidocaine paracervical block or sham block at the time of insertion of a 13.5 mg LNG IUD reported that 77 percent noted high overall satisfaction with the procedure, 67 percent would recommend the IUD to a friend, and 83 percent perceived the IUD was worth the discomfort [70].

Use of contraception, including the IUD, by adolescents is presented in detail separately. (See "Contraception: Issues specific to adolescents", section on 'Long-acting reversible methods'.)

Anticoagulation/bleeding diathesis — The LNG IUDs are a good contraceptive choice for women on anticoagulant medication or who have a bleeding diathesis because the LNG IUDs reduce menstrual flow, often induce amenorrhea, and increase both hemoglobin and quality of life [71]. In a prospective study of 33 women with thrombophilia and/or history of thrombosis who initiated a 52 mg LNG IUD, oral anticoagulant users (n = 16) had similar bleeding patterns to nonusers (n = 17) during the first 12 months after insertion [72]. Three-quarters of the women developed amenorrhea or infrequent bleeding, and no women experienced more frequent or prolonged bleeding. By contrast, the 19.5 and 13.5 mg LNG devices have lower rates of amenorrhea and, therefore, may not benefit these women.

Endometrial protection — Women who are at increased risk of developing endometrial hyperplasia (ie, anovulatory women, women using unopposed estrogen therapy) can benefit from the local progestin effects of the LNG IUDs, although this is an off-label use of these IUDs [60,73-75]. The use of the LNG IUDs for endometrial protection in women being treated with tamoxifen for a history of breast cancer is more controversial. In a systematic review of four trials including over 500 women taking adjuvant tamoxifen for breast cancer, women with a 52 mg LNG IUD had reduced risk of endometrial polyps (Peto odds ratio [OR] 0.22, 95% CI 0.13-0.39) and endometrial hyperplasia (Peto OR 0.13, 95% CI 0.03-0.67) compared with women without an IUD [76]. However, the overall incidence of endometrial cancer was too small to detect a treatment difference, and therefore, no conclusion could be reached. The main side effects were an increase in abnormal

vaginal spotting or bleeding in the treated women. Because of the lack of data on endometrial cancer in the prior systematic review as well as studies that have reported an increased risk of breast cancer in women with prior LNG IUD use [53,61], the CDC's US Medical Eligibility Criteria state that use of an LNG IUD in a woman being actively treated for breast cancer or who has been disease-free for less than five years is an unacceptable risk [37].

While the copper IUDs have also been associated with reduced rates of endometrial cancer, the mechanism of action is unknown [58,77].

Immunocompromised women — The CDC do not consider immunosuppression a contraindication to IUD use, primarily based on safety and efficacy data from HIV-positive women [37].

- **HIV** – Women who are HIV-infected, like other women, need effective long-term contraception. In conjunction with correct and consistent condom use, the IUD may be safely used in women with or at risk for HIV infection [10-13,78]. For HIV-infected IUD users, there is no evidence of greater cervical shedding of HIV RNA and no increased risk of virus transmission to an HIV-uninfected partner [10,13]. In addition, there are no known drug interactions between IUDs and antiretroviral therapy [11-13]. Limited data also show no increased risk of pelvic inflammatory disease in HIV-infected IUD users compared with HIV-uninfected IUD users or HIV-infected women not using an IUD; the lack of increased risk also applies to HIV-infected women with low CD4 counts.

- **Other immunocompromise** – There are sparse data on the safety and efficacy of IUD use by women with immunosuppression unrelated to HIV (eg, women undergoing cancer chemotherapy, organ transplant recipients, women receiving immunosuppressive therapy for autoimmune disease), but the limited studies do not report higher infection rates for immunocompromised IUD users [10].

In addition, the advantages of both the copper and LNG IUDs are considered to outweigh the risks for women with uncomplicated solid organ transplants [37]. Contraception in women with renal transplants is presented separately. (See "Kidney transplantation in adults: Overview of care of the adult kidney transplant recipient", section on 'Contraception'.)

Nulliparity — IUD use is appropriate for nulliparous women of all ages and is advocated by multiple medical societies [17,40,79]. Former restrictive product labeling (IUD use was recommended for women with at least one child) and misinformation about the health risks of IUDs caused limited IUD use in this population in the United States. Subsequent research documenting the safety and efficacy of the IUDs caused the US Food and Drug Administration to change the package labeling to include nulliparous women for the TCu380A (2005) and the LNG

52 mg IUD (2017). Use of the 19.5 and 13.5 mg LNG IUDs is not restricted to parous women by package labeling; nulliparous women were included in the clinical trials. Both the TCu380A and LNG IUDs have been reported to have equivalent high efficacy and low infection rates for nulliparous and multiparous women [23,80].

IUD placement is well-tolerated by most nulliparous women despite some pain with IUD insertion [81,82]. Nulliparous women report more pain than parous women with IUD insertion [83]. Copper-based IUDs have been associated with a slightly higher frequency of pain and bleeding in nulliparas than in multiparas [23,84], but the degree of pain reported by nulliparas is variable, ranging from the low end of the pain scale to moderate to severe [85-87]. Nonsteroidal anti-inflammatory drugs or local anesthetic usually provides adequate pain management for these women. (See "Intrauterine contraception: Insertion and removal", section on 'Analgesia'.)

Nulliparous women report high acceptability and continuation rates with IUDs. Although past studies suggested IUD expulsion rates were higher in nulliparous women [88], a prospective study found no difference in rates of expulsions by parity among TCu380A users and lower expulsion rates in nulliparous users of a 52 mg LNG IUD compared with parous users [89]. Most women, including nulliparas, experience a rapid return to fertility after discontinuing intrauterine contraception [90,91]. The clinical trials for the LNG IUDs reported conception rates of approximately 80 percent for the 52 mg LNG IUD users, 87 percent for the 19.5 mg LNG users, and 77 percent for the 13.5 mg LNG users one year after device removal, which is comparable to women who have not used a contraceptive device [25-28].

Postpartum, postabortion, and lactating women — (See "Postpartum contraception: Counseling and methods".)

Previous problems with IUD — Women who had problems with a previous IUD, including method failure (ie, pregnancy), ectopic pregnancy, expulsion, pain, abnormal bleeding, and cervical or uterine perforation, can still use an IUD as long as they are appropriately counseled about the risk of recurrence and other contraceptive options. Depending on the problem (eg, heavy bleeding with the copper IUD or intermenstrual bleeding with an LNG IUD), switching from one type of IUD to another might be useful. (See "Intrauterine contraception: Management of side effects and complications".)

Women with prior thromboembolic events — Women with a prior history of deep vein thrombosis, pulmonary embolus, or stroke can use either an LNG- or copper-containing IUD [37]. Similarly, women at increased risk of these conditions can also use either type of IUD. For all categories of thromboembolic disease, the CDC's US Medical Eligibility Criteria rate the LNG IUD either a category 1 or 2 (benefits outweigh theoretical risks). The only category of vascular disease for which the LNG IUD is rated a 3 (real or theoretical risks usually outweigh benefits) is for

women who develop ischemic heart disease with an LNG IUD in situ. For these women, the theoretical concern about the effect of LNG on lipids may outweigh the benefits of continued use [37].

OTHER CONSIDERATIONS

MRI in women with an IUD — Women with IUDs can undergo magnetic resonance imaging (MRI) procedures safely. Although some IUDs contain metal (copper IUDs, the 19.5 and 13.5 mg LNG IUDs have a silver ring), these IUDs do not move or significantly increase local temperature during MRI utilized for medical diagnosis (magnetic fields ≤3.0 Tesla units) [25-28,67,92]. Users of copper and 19.5 and 13.5 mg LNG IUDs should inform the radiologist of the presence of the IUD at the time of MRI since this could affect the type of sequences utilized, the length of time of the study, and the artifacts that might occur. Specifically, the TCu380A package insert notes that magnetic fields of 1.5 Tesla are acceptable, but the device has also been studied and found safe at 3.0 Tesla [67]. Users of the 52 mg LNG 52 IUD Liletta can safely undergo MRI studies with magnetic fields of ≤3.0 Tesla [26].

Management at menopause — IUDs that were inserted for contraception are typically removed one year after the last menstrual period (ie, menopause) [93]. However, because the 52 mg LNG IUDs cause amenorrhea in many women, it may be difficult to determine whether menopause has occurred in the absence of other menopausal symptoms. Therefore, in 52 mg LNG IUD users with a history of more than 12 months of amenorrhea, we suggest removal of the device no earlier than age 51 to 52 years since the average age of menopause is 51.3 years. Checking a follicle-stimulating hormone level can help guide decisions about whether to remove the LNG IUD or leave it in place. However, women should be counseled that they may have return to menses if they are not yet postmenopausal. (See "Clinical manifestations and diagnosis of menopause".)

Women who elect to use systemic estrogen therapy for treatment of menopausal symptoms may leave the 52 mg LNG IUD in place to provide protection from endometrial hyperplasia [94], although this is considered an off-label use. This protection is provided for the duration of contraceptive efficacy of the device [95-97]. There are no data to support the use of the 13.5 or 19.5 mg devices for endometrial protection.

Recurrent vaginal infections — There are limited data exploring the association between IUDs and bacterial vaginosis (BV). A longitudinal study of 48 women initiating the copper IUD reported that the prevalence of BV assessed by Nugent score increased from 27 percent at baseline to 49 percent at six months [98]. Another longitudinal study reported that the incidence of BV, also assessed by Nugent score, was higher among IUD users (37.0 percent) compared with combined hormonal contraceptive users (19.3 percent) [99]. A cross-sectional study reported that women

using the LNG IUD were approximately 50 percent more likely to be colonized by BV-associated bacteria [100]. However, none of these studies measured the prevalence or incidence of symptomatic BV. In our practice, we treat the BV infection as indicated and leave the IUD in place unless the patient specifically requests removal. Associations between IUDs and recurrent vulvovaginal yeast infections have not been described.

IUD after uterine artery embolization and endometrial ablation — After treatment of leiomyoma by uterine artery embolization, it usually takes the uterus three to six months to reach its reduced size. As a result, we suggest waiting until there is no evidence of ongoing necrosis (as evidenced by passage of necrotic tissue or watery discharge), and until the uterus has completed its shrinking process before inserting an IUD after embolization for leiomyoma. For women undergoing endometrial ablation, the safety of concomitant IUD insertion is not known. (See "Overview of endometrial ablation", section on 'Intrauterine device insertion'.)

Online purchase — Authorities have advised against purchase and use of lower-cost IUDs that are available online because improper storage of these devices, especially during transport, may decrease product efficacy [101]. Legal problems can also arise since federal and state laws in the United States require that these devices be approved by the US Food and Drug Administration and purchased through United States-licensed pharmaceutical and medical device suppliers; imported devices do not meet these criteria [102].

Removal for conception — Women who use IUDs appear to have similar pregnancy rates after device removal compared with nonusers [90,91]. Both copper and LNG IUDs impact the endometrium [14,103-107], and it is unknown how much time is required to reverse these changes after IUD removal or if these changes negatively impact conception. In our practice, we recommend that women use barrier contraception until one normal period after IUD removal at which point they may attempt conception. This allows for usual proliferation of the endometrium prior to implantation of a fertilized egg.

For a woman using an LNG IUD with irregular bleeding or amenorrhea, a pregnancy test should be performed if the woman does not have a period six to eight weeks after removal. If the test is positive, an ultrasound is performed to establish the estimated date of delivery. If the pregnancy test is negative, then the couple continues to attempt conception. If the woman does not re-establish her period by 12 weeks after removal and is not pregnant, we advise an evaluation for amenorrhea. (See "Prenatal assessment of gestational age, date of delivery, and fetal weight" and "Evaluation and management of secondary amenorrhea".)

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Contraception".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "Patient education: Intrauterine devices (IUD) (The Basics)" and "Patient education: Long-acting methods of birth control (The Basics)")
- Beyond the Basics topic (see "Patient education: Long-acting methods of birth control (Beyond the Basics)")

SUMMARY AND RECOMMENDATIONS

- Several factors have limited widespread use of the intrauterine device (IUD) in the United States, including a history of complications with previously available IUDs and resulting negative publicity; misinformation regarding the risks of infection, ectopic pregnancy, and infertility; misinformation about eligible candidates for IUD use; misconceptions about the mechanism of action of the IUD; lack of clinician training; and fears of litigation. (See 'Myths and misperceptions' above.)
- Women who desire and are eligible for an IUD must decide between copper and levonorgestrel-releasing (LNG) IUDs. To help a woman select a device, we ask her about her preference for cyclic bleeding, lighter periods, or amenorrhea and her tolerance of unscheduled bleeding. We also ask about prior IUD use and hormonal side effects. As most women can safely use either IUD, understanding preferences around bleeding patterns helps select an IUD that meets the patient's expectations and causes the fewest bothersome side effects. (See 'Copper or levonorgestrel?' above.)

- Women who desire an LNG IUD can choose among the 52 mg, 19.5 mg, and 13.5 mg LNG devices. While changes in bleeding patterns are common to all types of LNG IUDs, the three LNG doses cause different amenorrhea rates, which may affect patient satisfaction. (See 'Which LNG IUD?' above.)

- IUDs are a good choice for adolescent and adult women who desire one highly effective contraceptive method, long-term yet reversible contraception, or who want or need to avoid estrogen exposure (all IUDs) or progestin exposure (copper IUDs). (See 'Candidates for IUDs' above.)

- There are few medical contraindications to IUD use. For women with medical comorbidities, the Centers for Disease Control and Prevention have published US Medical Eligibility Criteria for intrauterine contraception by maternal medical condition or personal characteristics. (See 'Women with comorbidities' above.)

- Women with IUDs can undergo magnetic resonance imaging (MRI) procedures safely. Although some IUDs contain metal (copper IUDs, the 19.5 and 13.5 mg LNG IUDs have a silver ring), these IUDs do not move or significantly increase local temperature during MRI utilized for medical diagnosis (magnetic fields ≤3.0 Tesla units). (See 'MRI in women with an IUD' above.)

- For women who desire IUD removal to achieve pregnancy, it is unknown how much time is required to reverse the IUD-induced endometrial changes after IUD removal or if these changes negatively impact conception. In our practice, we recommend that women wait until one period after IUD removal at which point they may attempt conception. This allows for normal proliferation of the endometrium prior to implantation of a fertilized egg. (See 'Removal for conception' above.)

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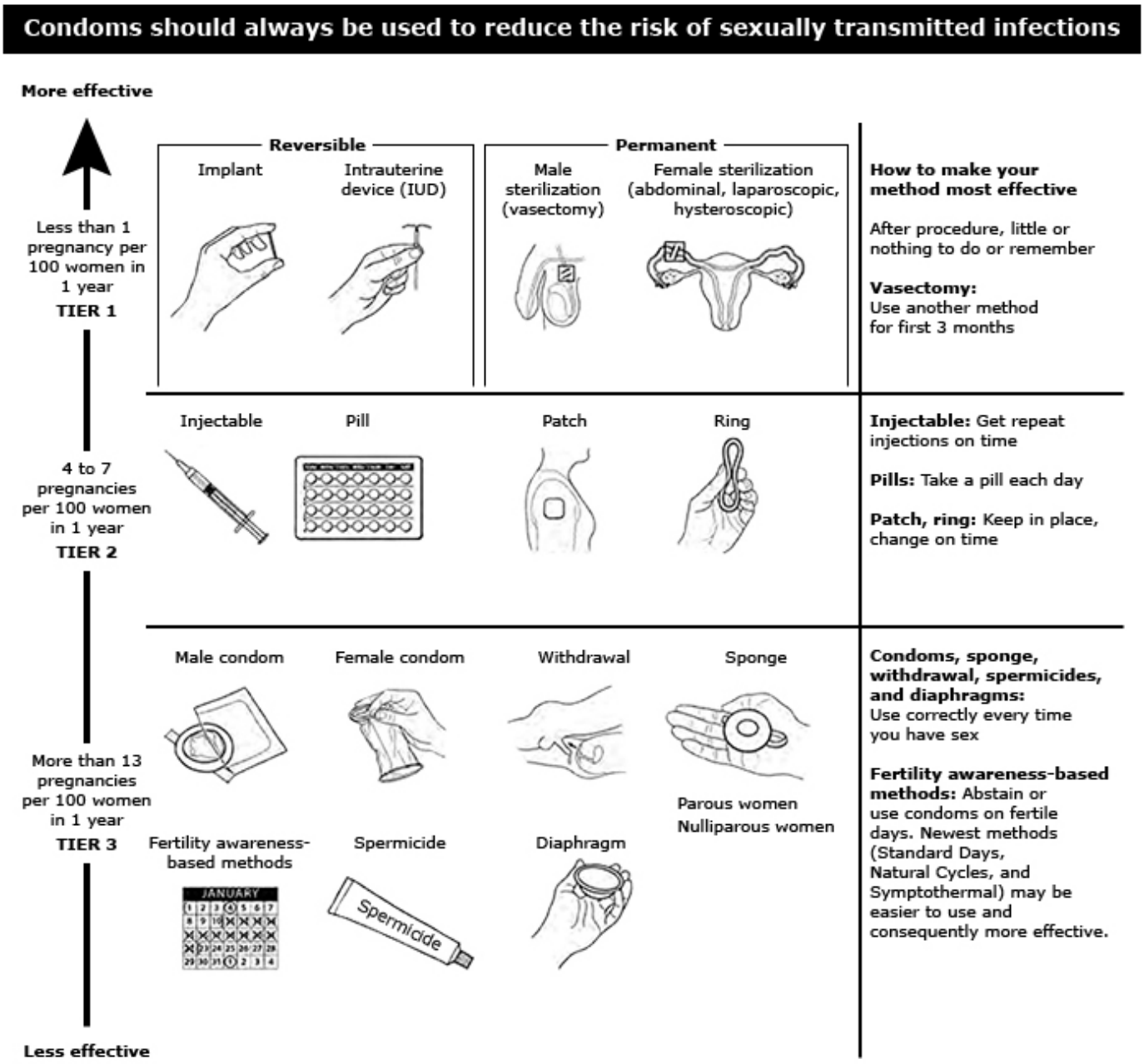
Topic 5419 Version 103.0

GRAPHICS

Comparison of effectiveness of contraceptive methods



Other methods of contraception:

- Lactational amenorrhea method – LAM is a highly effective, **temporary** method of contraception
- Emergency contraception – Emergency contraceptive pills or a copper IUD after unprotected intercourse substantially reduces risk of pregnancy

LNG: levonorgestrel.

Adapted from: U.S. Selected Practice Recommendations for Contraceptive Use, 2013: Adapted from the World Health Organization Selected Practice Recommendations for Contraceptive Use, 2nd Edition. MMWR Morb Mortal Wkly Rep 2013; 62:1.
Additional information from:

1. *Trussell J, Aiken ARA, Mickes E, Guthrie K. Efficacy, Safety, and Personal Considerations. In: Contraceptive Technology, 21st ed, Hatcher RA, Nelson AL, Trussell J, et al (Eds), Ayer Company Publishers, Inc., New York 2018.*

Graphic 57795 Version 9.0

Comparison of intrauterine devices

	Type		
	TCu380A IUD	**Levonorgestrel IUD (52 mg)**	**Levonorgestrel IUD (13.5 mg)**
Duration of therapeutic effect (years)	12	7	3
First year of use pregnancy rate, perfect use (percent)	0.6	0.1	0.4
First year of use pregnancy rate, typical use (percent)	0.5 to 0.8	0.1 to 0.2	
5-year cumulative pregnancy rate (percent)	1.4±0.4	1.1±0.5	0.9*
10-year cumulative pregnancy rate (percent)	2.2		
FDA-approved duration of use (years)	10	5	3

IUD: intrauterine device; FDA: US Food and Drug Administration.
* Skyla is approved for 3 years of use. The 3-year cumulative pregnancy rate is 0.9 percent.

Graphic 80860 Version 8.0

Checklist used to assess the possibility of pregnancy

The provider can be reasonably certain that the patient is not pregnant if the patient has no symptoms or signs of pregnancy and meets ANY of the following criteria:
☐ The patient has not had intercourse since last normal menses.
☐ The patient has been correctly and consistently using a reliable method of contraception.
☐ The patient is within 7 days from the first day of menstrual bleeding.
☐ The patient is within 4 weeks postpartum (for nonlactating patients).
☐ The patient is within the first 7 days postabortion or miscarriage.
☐ The patient is fully or nearly fully breastfeeding, amenorrheic, and less than 6 months postpartum.

A systematic review of studies evaluating the performance of a pregnancy checklist compared with urine pregnancy test to rule out pregnancy concluded the negative predictive value of a checklist similar to the one above was 99 to 100%.

Data from:

1. *Tepper NK, Marchbanks PA, Curtis KM. Use of a checklist to rule out pregnancy: A systematic review. Contraception 2013; 87:661.*
2. *Curtis KM, Tepper NK, Jatlaoui TC, et al. United States Medical Eligibility Criteria for Contraceptive Use, 2016. MMWR Recomm Rep 2016; 65:1.*

Graphic 67567 Version 19.0

Contributor Disclosures

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