Adolescent Contraception: Review and Guidance for Pediatric Clinicians

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The objectives of this article are to review current contraceptive methods available to adolescents and to provide information, guidance, and encouragement to pediatric clinicians to enable them to engage in informed up-to-date interactions with their sexually active adolescent patients. Pregnancy prevention is a complex and dynamic process, and young people benefit from having a reliable authoritative source for information, counseling, and support. Clinicians who provide services for adolescents have a responsibility to develop their skills and knowledge base so that they can serve as that source. This review begins with a discussion about adolescent sexuality and pregnancy in the context of the adolescent developmental stages. We discuss approaches to introduce the topic of contraception during the clinic visit and contraceptive counseling techniques to assist with the discussion around this topic. In addition, information is included regarding confidential services, support of parental involvement, and the importance of male involvement in contraception. The specific contraceptive methods are reviewed in detail with the adolescent patient in mind. For each method, we discuss the mechanism of action, efficacy, contraindications, benefits and risks from the medical perspective, advantages and disadvantages from the patient's perspective, side effects, patient adherence, patient counseling, and any medication interactions. Furthermore, we have included a section that focuses on the contraceptive management for the adolescent patient with a disability and/or chronic illness. The article concludes with an approach to frequently asked or difficult questions. This section largely summarizes subsections on specific contraceptive methods and can be used as a quick reference on particularly challenging topics. Finally, a list of useful contraceptive management resources is provided for both clinicians and patients.

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Given that almost half of high school students in the United States report having had sexual intercourse (range: 39%-61%, depending on the state),[1] it is inevitable that the pediatric clinician will provide care for youth who need information, support, and services for pregnancy prevention. Despite the realities of normative adolescent sexual activity, only 6 of 10 practicing pediatrician members of the American Academy of Pediatrics report addressing issues of sexual health and contraception in their routine preventative care visits, and only slightly more than half of respondents provided reproductive health services to their adolescent clients.[2] The reasons given by pediatricians for not discussing sexuality, sexual health, and contraception included insufficient time and lack of interest in adolescent health.

Sexual morbidity among adolescents, including unintended pregnancies, abortions, and sexually transmitted infections (STIs), is a major problem in the Unite States. Despite a recent decline in the national teen birth rate to 410,000 in 2009, the teen birth rate in the United States remains considerably higher than in most other developed countries.[3] Adolescents and young adults aged 15-24 years comprise only one-quarter of the sexually experienced population but bear the burden of nearly half of all incident STIs.[4]

The majority of sexual morbidity is preventable, and the pediatric office visit offers a critical opportunity for clinicians to support adolescent health by prescribing appropriate and effective contraception and encouraging STI prevention through consistent condom

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use, considering abstinence, limiting the number of sexual partners, modifying sexual behaviors to reduce risk, and obtaining preexposure vaccines.

In this article, we hope to provide information, guidance, and encouragement to readers, better preparing them to engage in informed up-to-date interactions with their sexually active adolescent patients. Pregnancy prevention is a complex and dynamic process, and young people benefit from having a reliable authoritative source for information, counseling, and support. Clinicians who provide services for adolescents have a responsibility to develop their skills and knowledge base so that they can be that source.

Sexuality and Pregnancy in the Setting of Early, Middle, and Late Adolescence

A basic understanding of adolescent development is an essential background for considering approaches to support youth in the prevention of unplanned or unwanted pregnancies. By the 11th grade, the majority (53%) of American adolescents have had intercourse. However, sexual debut is reported by 32% of 9th grade students, 41% of 10th graders, 53% of 11th graders, and 62% of high school seniors.[1] In fact, 5.9% of youth aged <13 years report having initiated sexual activity. These are significant data to consider when providing care to adolescents, as it highlights the concept that any one of the young people a clinician sees in a pediatric setting may be at risk for an unplanned pregnancy. Given the high rates of sexual debut during adolescence, it is clearly not enough to rely on one's intuition to identify the specific patients who are considering sexual activity. The approach used by the clinician must be tailored to be appropriate to the developmental stage, as well as the environmental context, and the strengths and risks of the individual youth.

Early childbearing carries with it associated physical, emotional, and social risks and repercussions. Medical risks include higher rates of maternal mortality, problems with progression of labor and delivery, anemia, and pregnancy-induced hypertension, all of which may lead to premature births and low-birth-weight babies.[5] These medical risks are partially mediated by access to early and consistent prenatal care, but still remain significant for pregnancies in young women age <15 years, even for those who have health care access.[6] Social and emotional outcomes for the adolescent parent include poorer psychological functioning, lower levels of educational attainment and high school completion, higher rates of single parenthood, and less stable employment than for those with similar background who postpone childbirth.[7]

Early sexual debut, defined for this purpose as onset of sexual intercourse at age ≤14 years, is associated with every negative reproductive health outcome commonly examined in the literature. Young girls reporting an early sexual debut are more likely to have a significantly older male sexual partner, multiple partners (increasing both their STI and pregnancy risk), unprotected sex, forced sex, and a pregnancy that results in childbirth.[8] They are also more likely to have experienced sexual and/or physical abuse in childhood and adolescence,[9] and young age at sexual debut serves as a reminder to clinicians to screen carefully for possible history of abuse. Early sexual activity is more common in settings of asynchrony of adolescent development, for example, when a young girl has a physically advanced mature body but psychosocially remains emotionally, psychologically, and cognitively immature. Sexual decision making and pregnancy prevention in the early adolescent are particularly challenging, as providers are less likely to anticipate the need for reproductive health services; youth are often embarrassed, frightened, and reticent to bring up the issue, and the cognitive ability to plan for the future is limited at best, given the concrete thought process that is normal during early adolescence. Gentle inquiry into attitudes and experiences related to sexuality and sexual activity allows the clinician to bring up the topic without alienating or frightening the young adolescent. Approaches such as "Many young teens have questions or worries about sex . . . do you have any concerns?" or "Many of my patients are thinking about romantic relationships . . . have you ever had a crush on anybody?" followed by specific questions to qualify and quantify their level of engagement in romantic relationships and sexual activity are helpful in assessing the early adolescent's need for contraception and STI risk reduction counseling.

In middle adolescence, as rates of sexual intercourse increase, the developmental ability to think abstractly, anticipate and plan in advance, delay gratification, and

think about the future consequences of current decisions are only beginning to be established. The middle-aged adolescent still needs concrete information and support in developing a personalized risk reduction plan for pregnancy prevention and STI risk reduction. Although middle adolescents may be increasingly future oriented, they often make decisions "in the moment" and only realize the long-term repercussions of that decision after the fact. Pregnancy rates increase in middle adolescence, with an estimated pregnancy rate in 2005 of 40.2/100,000 among teens aged 15-17 years, as compared with 1.6/100,000 among teens aged <15 years.[10] Consistent contraceptive adherence is challenging for middle adolescents, and there are low rates of continued use of any hormonal contraceptive method at 1 year after initiation for women aged 15-24 years, with lowest rates being associated with younger age.[11]

Late adolescents and young adults are highly likely to be sexually active, with 86% of unmarried women aged 18-29 years reporting having had sexual intercourse.[12] As abstract thinkers, late adolescents and young adults tend to be more future oriented and can perceive the long-range implications of current actions. However, they remain more impulsive and less able to delay gratification than adults, and continue to experience significant rates of unintended pregnancy. Although the vast majority of individuals endorse the idea that pregnancy should be planned, and 88% say that it is important to them to avoid pregnancy at this time, only half report consistent contraceptive use.[12] Reflecting on these data drives home the point that even late adolescents and young adults experience a continued significant risk of unintended pregnancies.

Introducing the Concept of Fertility Control to the Patient

Any interaction with an adolescent patient is an opportunity to assess their risk for pregnancy and to intervene as appropriate. Even when the patient is acutely ill or injured, the possibility of pregnancy should be addressed in female patients before prescribing medications or obtaining imaging. To encourage honest disclosure of sexual activity, it is essential that the adolescent has the opportunity to meet with the clinician alone, without a parent or caregiver present (see confidential services and parental involvement, later in the text). In the context of a psychosocial assessment, determine pregnancy risk and ascertain what, if anything, the youth is doing to reduce their risk of pregnancy. Assess satisfaction with their contraceptive method (if they are using 1) and any barriers they are experiencing to method use. Emphasize that if they are having vaginal intercourse and not contracepting, they have a 90% chance of becoming pregnant or of fathering a pregnancy within 1 year.[13] Encourage the patient to choose an effective method of pregnancy and STI risk reduction and empower them to follow through on their choice.

Motivational Interviewing

A comprehensive review of counseling approaches to encourage initiation and maintenance of a contraceptive method is beyond the scope of this article, but there are excellent resources available to guide the pediatric clinician in contraceptive counseling. Motivational interviewing, a directive client-centered counseling approach, has shown promise in increasing condom use,[14] smoking cessation,[15] and prevention of substance use[16] in adolescents. A systematic review of theory-based practices to increase contraceptive use found favorable results in experimental groups exposed to motivational interviewing as an intervention.[17] Further information regarding motivational interviewing can be found in a comprehensive review article on approaches to and the efficacy of motivational interviewing as a counseling approach with children and adolescents published in this journal in 2005.[18] Important to this approach is tailoring the intervention to the client's readiness to change (from noncontraceptor to effective contraceptor), exploring the client's motivation to engage in the desired behavior (in this case, pregnancy prevention), exploring the client's personal facilitators and barriers to behavior change, and problem solving with, rather than for, the client. This approach may include provision of information if the youth has a knowledge deficit, but is far more interactive and focused on motivation and problem solving than traditional content-focused health education interventions.

Sexual Decision Making

In the current environment of limited time for clinical interactions and increasing pressure related to

productivity, it is essential that the pediatric clinician invests time and energy engaging in discussions and interventions that make a difference in young people's health outcomes. Environmental factors, social and community norms, and parental, peer, and partner expectations and behaviors all exert significant influence on adolescent decision making regarding initiation and continuation of sexual intercourse. In fact, the health care provider's influence is negligible. In a national opinion poll conducted in 2010 by the National Campaign to Prevent Teen and Unplanned Pregnancy, "With One Voice," 46% of the >1000 teens surveyed said that parents most influence their decisions about sex. In comparison, 20% identified friends, religious leaders (7%), siblings (5%), teachers and other educators (4%), and the media (4%) as the most influential in their decisions to have sex. Health care providers may be represented in the "someone else" category (8%), but clearly are not exerting a major influence on sexual decision making. In contrast, in another opinion poll of adolescents by the Kaiser Family Fund and Seventeen Magazine, 25% of males and 50% of females aged 15-17 years reported talking with a health care provider about "contraception and protection," and 49% reported getting "a lot" or "some" information about birth control options from a health care provider.[19] Evidently, although not particularly influential in adolescent's sexual decision making, health care providers are viewed as a common resource for young people in the areas of pregnancy prevention and STI risk reduction.

Confidential Services and Parental Involvement

Concerns about confidentiality are a significant reason that youth delay or forgo seeking health care, and there is a higher prevalence of sexual risk among those who forgo care owing to confidentiality concerns.[20] Minors' right to consent to contraceptive services varies by state, with 26 states and the District of Columbia allowing all minors (12 years and older) to consent to contraceptive services. In 20 states, only certain categories of minors can consent to contraceptive services, and in 4 states, the law is silent with regard to minors' contraceptive consent rights.[21] In states that restrict minor's access to confidential contraceptive services, Title X Family Planning clinics (funded through the Office of Population Affairs' Office of Family Planning) are an important resource for the pediatric clinician. These clinics, often integrated into the local public health department clinic structure, provide free or low-cost confidential care to adolescents.[22] It is critical to note that even in states that support confidential reproductive health care for youth, private insurance billing practices may impair a young person's access to confidential care. Bills for copays and explanation of benefits' communications from the insurer to the guarantor (usually the parent) may inadvertently expose a confidential service performed under the minor's consent to a parent. Thus, not only is it essential that the pediatric provider be familiar with their state's minor consent laws, but clinicians must also remain alert to possible sources of breaches in confidentiality and provide appropriate anticipatory guidance to youth. Many young people also anticipate these issues and may receive "regular care" from their pediatric provider, but seek reproductive health care from another source owing to concerns about confidentiality. Specific questions to the adolescent about sources of care and access to contraceptive services will ensure that the pediatric clinician is aware of screenings, treatments, and medications that the client may be receiving from other sources of care. There may be situations when the clinician may appropriately conclude, after discussion with the adolescent client, that seeking care at another source (eg, a Title X Family Planning clinic) may be the best course of action to assure the confidentiality of the reproductive health visit.

Equally important as provisions for minor consent and confidentiality are considerations of parent/caregiver involvement in promoting sexual health for the adolescent. As noted earlier, adolescents endorse parents as highly influential in their sexual decision making. In addition, youth who have parental support and involvement in their contraceptive decisions and practices are more likely to contracept effectively.[23] Informing parents that involvement and support yields positive results and encouraging youth to engage with their parents regarding their contraceptive needs, while still respecting their autonomy and right to confidentiality, is a delicate balancing act for the pediatric clinician. It is not uncommon for clinicians to discover that their adolescent patient may welcome the clinician's offer to facilitate communication about these sensitive topics with a parent or other approachable adult. Assisting an adolescent in difficult conver-

sations and initiating an ongoing dialogue with the parent can lead ultimately to support for the adolescent and improved follow through on treatment plans.

Male Involvement

Partners, like parents, can have a positive impact on pregnancy prevention, but young men are often left out of the contraceptive equation.[24] Considering the facts that condoms are the most frequently used method at first intercourse, and that although condom use may be initiated by either partner, male involvement is essential for their use, addressing the male role in pregnancy prevention is a potentially productive approach.[25]

Research related to male involvement centers on changing group and individual norms through school- and community-based interventions. To date, there are no published interventions focused on clinician–client interactions to promote condom use. One-to-one educational interventions that familiarize young men with condoms on a practical level by encouraging them to privately handle, try on, and experiment with condom use before actual sexual interactions and by building condom negotiation skills have a positive impact on adolescent male client's sense of competence related to condom use.[26,27] Increasing young men's awareness of emergency contraception (EC) may contribute to use,[28] as young couples who contracept are likely to discuss pregnancy risk (such as a broken condom) and may be more likely to consider EC use if both are aware of it as an option.

By engaging with young men as assets and supporting contributors to contraceptive initiation and continuance, better adherence to both male- and female-controlled methods can be encouraged.

Supporting the Patient in Initiating, Maintaining, and/or Changing Their Contraceptive Method

Young women's contraceptive choices are influenced by a variety of sources, including their health care provider.[29] Adolescent clients enter into care with some knowledge of contraceptive methods, although they may also ascribe to myths and have many misconceptions regarding method use, side effects, risks, and benefits. By starting with an understanding of what the client already knows about a method, the pediatric clinician can then specifically tailor contraceptive counseling to address their concerns and knowledge deficits. Recent research has found that adolescents are aware of and influenced by both news stories and advertising campaigns about contraceptives, and that clinicians should be prepared to address concerns related to contraceptive information in the popular media.[30]

At each visit, the clinician should assess method adherence, satisfaction, any side effects, and concerns. Ensure that the youth is using the method correctly, is comfortable with the method, and is able to solve problems when she encounters barriers to consistent method use. If the client is dissatisfied with her method, discuss the reasons for her dissatisfaction and explore contraceptive options that may be more likely to meet her needs. The ideal counseling approach to promote adherence has yet to be discovered. A recent Cochrane review of strategies to enhance adherence and continuation of hormonal contraceptive methods, including peer counseling, group counseling, and intensive reminder systems via text messaging and phone reminders, found that most studies showed no overall benefit of these strategies to improve adherence, although they noted that there was a dearth of high-quality research on the topic.[31]

The issues of intimate partner violence, birth control sabotage, and pregnancy coercion are important considerations when working with a young woman who states that she does not desire pregnancy but seems unable to engage in effective contraceptive use. What may at first seem to be ambivalence related to pregnancy and pregnancy prevention on the part of the adolescent client may be a manifestation of powerlessness in the face of reproductive control exerted by an abusive partner.[32] A few simple questions such as "does your partner mess with your birth control, refuse to wear condoms, or pressure you to become pregnant" may uncover an abusive relationship in which power and control are manifested through reproductive coercion. If these issues are uncovered, the focus of the intervention shifts to an assessment of the

immediate safety of the client as an acute first priority, followed by problem solving related to both pregnancy prevention in the context of an abusive relationship, harm reduction strategies, and counseling about safe and healthy relationships. A full discussion of these issues is beyond the scope of this article, but excellent resources regarding adolescent relationship abuse and reproductive coercion are available through the Futures Without Violence Reproductive Health Initiative (http://www.futureswithoutviolence.org/content/features/detail/788/).

Contraceptive Methods

The remainder of this article will review a variety of contraceptive methods. We have included the definition/mechanism of action, efficacy, medical benefits, medical risks, patient advantages, patient disadvantages, adherence, counseling, and medication interactions for each method as they apply. Efficacy or failure rates are reported according to "perfect use," defined as 1 year of consistent and correct use of the method, and "typical use," defined as 1 year of typical real-life use.

Abstinence

Definitions

"Abstinence" is a general term with a variety of definitions among patients and hence a variety of clinical implications. From the clinician's perspective, for the purpose of contraception, abstinence is defined as refraining from penile–vaginal intercourse. For the purpose of protection from STIs, abstinence would be defined as refraining from behaviors that permit exposure to infectious lesions or secretions, including penile-vaginal-anal contact, oral–genital contact, and other practices exposing partners to preejaculatory fluid, semen, cervical–vaginal secretions, or blood. Abstinence can be further classified as primary abstinence, defined as never having been sexually active; or secondary abstinence, defined as refraining from sexual activity after having a history of sexual experience. Secondary abstinence is an important concept that clinicians can routinely discuss with adolescents as part of conversations about romantic relationships and patient choices.

In any discussion with patients about abstinence, it is critical for providers to clarify the patient's specific definition and use of the term. A survey was conducted of 18-25-year-olds to determine which interactions individuals would consider as "having sex."[33] The survey sample represented 29 U.S. states; the majority of participants were from the Midwest. The mean age was 20.7 years, and 59% were female. Participants self-reported as 92% Caucasian, 4% African American, 4% other race/ethnicity, and 96% heterosexual. The survey found that 60% did not consider oral–genital contact having "had sex," and 20% did not consider penile–anal intercourse as having "had sex." In another study of adolescents who considered themselves "virgins," 2026 urban high-school students completed an anonymous self-administered survey.[34] The sample was evenly distributed between 9th, 10th, 11th, and 12th graders with approximately 25% in each grade. Respondents were 52% male, 47% Caucasian, 28% Latino, 10% Asian and Pacific Islander, 9% African American, and 6% other/mixed. Of the sample, 47% considered themselves "virgins." Of the virgins, 35% had engaged in 1 or more risky genital activities. For example, when behaviors were specifically defined, the study found that 29% of the self-identified "virgins" had engaged in heterosexual masturbation, 9% in fellatio with ejaculation, and 10% in heterosexual cunnilingus. After demographic variables were controlled, level of risk of virgins' sexual activities increased with illicit substance abuse and other nonsexual risk behaviors.

Efficacy

Perfect adherence to abstinence is the only 100% efficacious method in preventing pregnancy and STIs. It is difficult to quantify a "typical use" efficacy rate, as is traditionally reported for contraceptive methods.

Medical Benefits

Abstinence is clearly a safe and efficacious method of contraception that avoids medication.

Medical Risks

The greatest risk is nonadherence to abstinence, as the lack of preparation with condoms and an effective form of contraception further increase the risk for pregnancy and STIs.

Advantages (Patient Perspective)

As stated, strict abstinence is the only 100% effective means of preventing pregnancy and STIs. Secondarily, a period of primary abstinence also serves to

delay the first sexual experience, which is beneficial as well. Younger age at first sex is associated with more regret about the first sexual experience. Two-thirds of sexually experienced 12-14-year-old individuals said they wished they had waited longer to have sex.[35] Those who had sex at age ≤13 years had lower odds of using contraception than those who were aged 16-17 years.[36]

Disadvantages (Patient Perspective)

The main disadvantages of abstinence as a contraceptive method are related to nonadherence and the consequent risks of unprotected sex, as discussed under the section "compliance." Additionally, the decision to remain abstinent may have a negative impact on a young person's romantic relationships and add to the difficulty that they experience in maintaining this method.

Adherence

Adherence with abstinence is challenging. In a large epidemiologic study, only half of teens aged 15-19 years chose abstinence, and 42% of never-married females and 43% of never-married males aged 15-19 years had already had sexual intercourse.[37] Teens have stated many reasons for abstaining, including "against religion or morals," "don't want to get pregnant/get a female pregnant," "don't want to get a sexually transmitted disease," "haven't found the right person yet," "in a relationship, but waiting for the right time" or "other."[37] However, many adolescents change their mind or the circumstances in their relationships change. In addition, many teenagers spontaneously have sex for the first time without advance planning, which is consistent with the psychosocial developmental stage of early and middle adolescence. Early adolescence is normally characterized by lack of impulse control, and middle adolescence by risk-taking behavior. Given the stages of development, teens aged <17 years are not expected to demonstrate strong abilities to set limits and plan for the future.[38]

Difficulties in adherence are highlighted by studies of "virginity pledges."[39] In a longitudinal analysis of pledgers versus nonpledgers, 88% of the pledgers and 99% of the nonpledgers had engaged in premarital sex at the 6-year follow-up. Unfortunately, STI rates were similar in the 2 groups, as 7.3% of pledgers and 6.9% of nonpledgers had an STI at the 6-year follow-up.

Patient Counseling

The pediatric clinician has an important opportunity to support abstinence and delayed first sex by reinforcing the healthy decision to abstain, but also expressing open interest in any changes in their decision or behaviors. Although other contraceptive methods may not be immediately necessary, anticipatory guidance should include a clear and concrete discussion of how to access reproductive health care promptly. If it is not feasible for the clinician's office to offer a full spectrum of contraceptive care directly, the clinician still has a central role in providing referrals to teen-friendly clinics.

Providing comprehensive counseling to teenagers with the inclusion of abstinence, contraception, and condoms, will provide teens with tools to avoid the unintended consequences of unprotected sex. A recent position paper for the Society for Adolescent Health and Medicine reviewed the scientific evidence for abstinence-only education policies and programs.[40] The paper found little evidence of overall efficacy of these programs in delaying initiation of sexual intercourse. However, when offered as part of comprehensive programs that include information about different contraceptive methods and STI prevention, abstinence education in this setting appears to successfully delay initiation of sexual intercourse.

Each pediatric visit provides an opportunity to discuss abstinence, condoms, and EC, which are the most accessible methods to teens. Abstinence counseling can also identify the other ways that couples can show affection and feel close without initiating sexual activity. Remember that partners may disagree about the choice for abstinence. For some patients, this could raise issues of coercion, risk for rape, or other forms of violence. Counseling should routinely include discussion of the partner's opinion of abstinence and screening for intimate partner violence.

Quick Start

The traditional practice for initiating hormonal contraception involves waiting to start a new contraceptive method at the time of the next menses. More recently, the quick start method was introduced first for oral contraceptives, with the goal of the patient starting their method on the same day as the clinical encounter. The overall intent is to begin the pill as soon as possible and minimize the time

gap between prescription and achieving contraceptive efficacy. The benefit is the teen is more likely to initiate and continue the method of contraception, at least initially.[41,42] However, the quick start approach has not been shown to improve the continuation rates at 6 months' follow-up. This evidence underscores the concept that simply starting a method is not enough, and frequent follow-up is important.

Quick start is accepted as a safe approach. Inadvertent exposure to combined oral contraceptives (COCs) early in pregnancy has no association with congenital malformations.[43, 44-46]

The Quick start algorithm is depicted in detail in Figure 1, as originally published by the Center for Reproductive Health Education in Family Medicine (RHEDI).[47]

The basic approach when beginning a new method includes: (1) rule out pregnancy before starting contraception; (2) provide EC if indicated (more detail in Emergency Contraception section); (3) counsel teens regarding the use of condoms for 1 week as a backup method to prevent pregnancy; and (4) counsel teens to use condoms continuously for protection from STIs plus extra efficacy against pregnancy.

Quick start has now expanded to other hormonal contraceptives as well, including the depot medroxyprogesterone injection, transdermal contraceptive patch, and the intrauterine device (IUD).

Clinical Assessment Before Prescribing Hormonal Contraception

What is Necessary?

This document created by the Centers for Disease Control and Prevention (CDC) is based on similar criteria from the World Health Organization (WHO), and provides current national guidelines regarding contraindications for the use of specific contraceptive methods. This guidance should be referenced when selecting a new method, or when considering contraceptive continuation for a patient who develops a medical condition.[48]

With these CDC guidelines in mind, a thorough medical history should include inquiring specifically about blood clots, strokes, hypertension, diabetes, seizures, migraines, surgery, hospitalizations, hepatitis, liver disease, kidney disease, bone disease, cancer, breast disease, uterine fibroids, ovarian cysts, eczema or "sensitive skin," depression, mood disorders, and suicidality. Family history should focus on first-degree relatives with blood clots because some conditions that increase the risk of deep venous thromboses (DVT) and pulmonary embolisms (PE) are inheritable. If possible, speak with a parent or a caregiver to obtain an accurate family history. Additionally, ask the patient about their menstrual history, including age of menarche, menstrual frequency and duration, menstrual symptoms, and any past pregnancies. Obtain a sexual history, including number of lifetime sexual partners, recent partners, current partners, gender of partners, STI screening results, and any genital symptoms. Ask about contraceptive history, methods used in past, any side effects, reasons for discontinuation, method used at last sex, and access to health care. Gain an understanding of their personal beliefs and those of their friends, partners, and family. The choice of a method may be influenced by the patient's desire for confidentiality and the feasibility of keeping the method confidential. Also consider the patients' age and psychosocial maturity, the complexity of the method, and their ability to adhere. Finally, acknowledge that patients may be at different stages of readiness for contraception, including precontemplation, contemplation, action, maintenance, and relapse.[49] The stage may change from 1 visit to the next, so continue to assess this to form an appropriate plan with the patient.

What is Not Necessary?

Contrary to earlier traditional practices, a pelvic examination is not necessary for routine contraception prescription or routine STI screening. An important exception is that sexually active patients with genital symptoms should have a speculum examination to evaluate for physical signs of STIs or other causes of symptoms. However, this is not necessary for asymptomatic patients.

Hence, speculum examinations in adolescents are much less common than in the past. According to the new guidelines for cervical cytology (Papanicolaou smears), a speculum examination for the purpose of

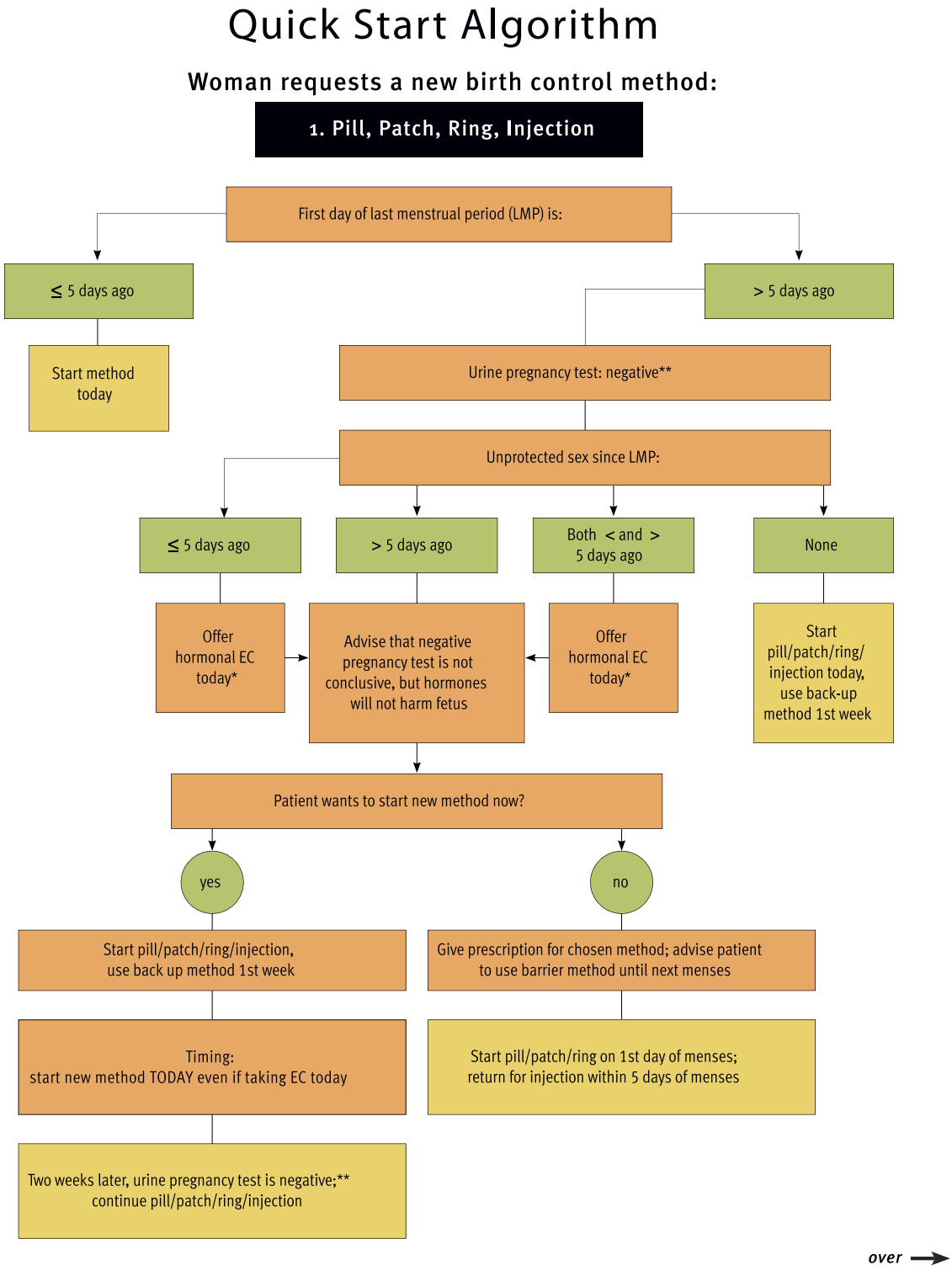

FIG 1. Quick start algorithm as accessed from http://www.rhedi.org. (Color version of figure is available online.)

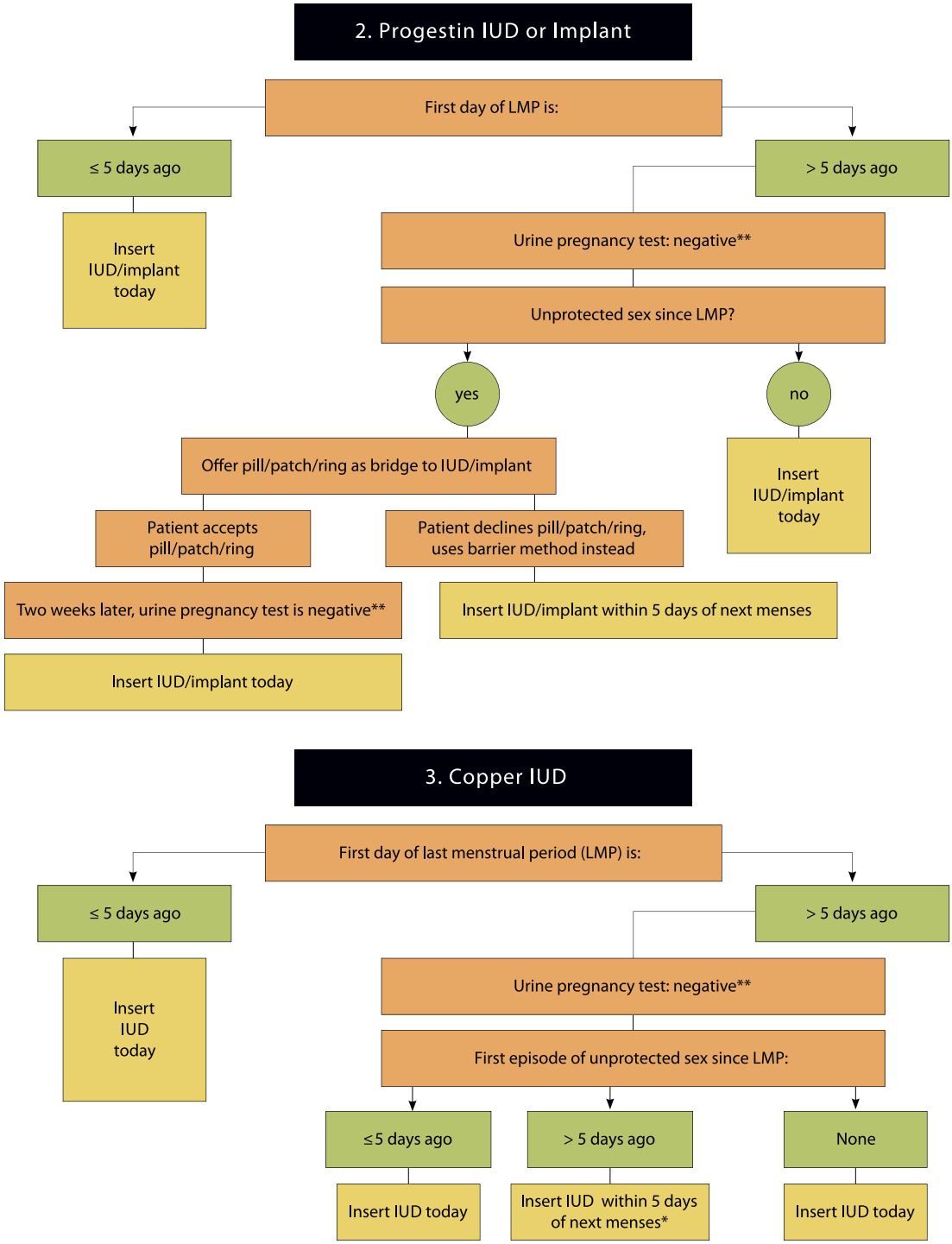

FIG 1. Continued. (Color version of figure is available online.)

cervical dysplasia screening is not recommended until the patient is 21 years old.[50,51] Furthermore, screening adolescents <21 years of age can be potentially harmful because it can lead to unnecessary interventions and treatment. The exception is patients with certain important risk factors, such as human immunodeficiency virus (HIV) infection, immunosuppression, history of exposure to diethylstilbestrol in utero, or history of treatment for cervical intraepithelial neoplasia 2, cervical intraepithelial neoplasia 3, or cervical cancer, for whom cervical cytology should not wait until 21 years of age.

Emergency Contraception (EC)

Mechanism of Action

Hormonal EC is a medication taken after unprotected/underprotected sexual intercourse to avoid unintended pregnancy. In the United States, 3 EC products have been approved by the Food Drug Administration (FDA) specifically for this use. Two of the products contain only progestin: Plan B One-Step (Teva Women's Health, North Wales, PA) (levonorgestrel [LNG], 1.5-mg single tab), and Next Choice (Watson Pharmaceuticals, Inc. Morristown, NJ) (LNG, 0.75-mg tab now and repeat in 12 hours). Despite the product labeling to administer Next Choice as 2 separate doses, the current standard-of-care practice is to administer the 2 pills together at 1 time, which is equivalent to the Plan B 1-Step product. Studies have shown that the single 1.5-mg dose is as effective as two 0.75-mg doses, 12 hours apart,[52,53] and avoids the risk of missing the second dose. The third product, Ella (Watson Pharmaceuticals, Inc. Morristown, NJ), contains a single 30-mg tab of ulipristal acetate, a progesterone receptor modulator.

The exact mechanism of EC in preventing pregnancy is uncertain, and may vary depending on the day of the cycle that the medication is administered. The primary mechanism is to delay or inhibit ovulation.[54,55] Other proposed mechanisms include suppression or delay of the luteinizing hormone (LH) peak to thereby inhibit follicle rupture,[56,57] or changes in cervical mucus and tubal motility, but neither are directly supported by evidence.[58,59] EC does not disrupt an implanted embryo.[59,60] Distinction between EC and medical abortion should be made clear when counseling teens.

Before initiating a new contraceptive method, clinicians should be familiar with the U.S. Medical Eligibility Criteria for Contraceptive Use, 2010.

TABLE 1. Indications for emergency contraception, as recommended by the WHO

When the patient had sex but
No contraceptive was used
Condom breakage, slippage, or incorrect use
Three or more consecutive missed combined oral contraceptive pills
POP (minipill) taken >3 hours late
More than 2 weeks late for depot medroxyprogesterone acetate injection
Dislodgment, delay in placing, or early removal of a contraceptive hormonal skin patch or ring
Dislodgment, breakage, tearing, or early removal of a diaphragm or cervical cap
Failed coitus interruptus (eg, ejaculation in vagina or on external genitalia)
Miscalculation of the periodic abstinence method or failure to abstain on fertile day of cycle
IUD expulsion

IUD, intrauterine device; WHO, World Health Organization; POP, Progestin-only pill.

Efficacy

The LNG products reduce the risk of pregnancy by 89%, compared with unprotected sex not treated by EC (FDA). EC should be given as soon as possible after unprotected intercourse, as the efficacy declines with time postevent.[61] Although the FDA approval is for administration up to 72 hours postevent, the postmarket evidence supports administration up to 5 days postevent.[52]

Two studies of ulipristal acetate taken up to 72 hours postevent have shown similar efficacy to the progestin-only methods.[62] Furthermore, the efficacy appears better sustained up to 5 days postevent without the obvious steady decline seen with progestin-only methods.[63]

Formal indications for EC as advised by the WHO[64] are listed in Table 1. Additionally, EC should be offered to female victims of sexual assault as the standard of care.[65]

Contraindications

The WHO contraindications that are applied to other hormonal contraceptive methods do not apply to EC. Even in patients with medical conditions, such as

cardiovascular disease, thrombophilic disorders, migraine, and liver disease, the advantages of using EC are thought to outweigh the theoretical or proven risks.[48]

Medical Benefits

The primary medical benefit is the safety profile of EC.

Medical Risks

EC has an excellent safety profile for nearly all women without appreciated medical risks.[66]

Advantages (Patient Perspective)

Adhering to a primary form of contraception and using it correctly is challenging for women of all ages. EC provides an effective measure to prevent pregnancy for women who have had recent unprotected intercourse.

Disadvantages (Patient Perspective)

The main disadvantages for patients are nausea and vomiting, which tend to be mild. Nausea is seen in 23% of women (vs 50% when COC pills were used as EC in the past), and vomiting occurs in approximately 5% of women (vs 18% with COC pills).[67] There is no consensus or research on whether to repeat the dose if the woman vomits after taking EC. Other disadvantages are menstrual cycle changes including spotting and change in the flow and timing of next menses, dizziness, fatigue, headache, breast tenderness, and lower abdominal pain.[67]

Adherence

There are no appreciated issues with adherence because the patient usually seeks out the treatment as an isolated event. On the contrary, repeated use of EC is not an appropriate contraceptive strategy, which will be addressed in the counseling/follow-up section later in the text.

Patient Counseling

At routine office visits, EC should be discussed with both male and female adolescents as part of the anticipatory guidance. A major issue for adolescents is timely access, and thus the logistics of access should be clearly stated. When EC is indicated, directly observed administration in the clinic would be ideal. However, if the patient must obtain EC from a pharmacy, counseling should clearly emphasize timely administration because efficacy declines with time. In March 2009, a federal court order established LNG EC products as over the counter for females and males aged ≥17 years.[68] However, ulipristal remains available by prescription only, regardless of age. Clinicians should also be familiar with local pharmacy practices because some pharmacies may refuse to dispense EC for various reasons, including personal objections or confusion about the mechanism of action.[69] In contrast, some states support "pharmacy access," a training program for pharmacists to provide EC and EC counseling without a prescription, including for patients aged <17 years.

"Advanced Provision" refers to the practice of providing EC in advance of actual need. A randomized control trial was conducted at 4 California clinics for 2117 women aged 15-24 years, who were not desiring pregnancy, using long-term hormonal contraception, or requesting EC.[70] The study assigned participants to one of the following groups: (1) pharmacy access to EC, (2) advance provision of 3 packs of EC, or (3) routine clinic access (controls). The results showed the frequency of unprotected intercourse among the groups was similar. However, the advance provision group was twice as likely to use EC (when indicated) than controls. The pharmacy access group was no more likely to use EC than controls. The groups did not differ in use of primary contraception or condoms, or risky sexual behaviors. This study showed that advanced provision increases the appropriate use of EC, and neither pharmacy access nor advance provision detracted from adolescents' use of primary contraception.

Repeated Use. Counseling should clarify that EC is appropriate for emergency use only and would be unreliable as a primary contraceptive method.[71]

Patients should also be educated about the mechanism of action and counseled that EC does not disrupt an implanted embryo. Any instance of EC use is also a teachable moment and a prime opportunity to improve the patient's primary contraceptive use and prevent the need for EC again in the future.

Other Products Used as EC

COCs can be used off-label for the purpose of EC and has been referred to as the "Yuzpe method," as the Canadian physician Albert Yuzpe introduced this method in 1974.[72] The exact dose varies by the type of pill, but typically consists of multiple COC pills given as 2 doses 12 hours apart (Information regarding

specific doses is available at http://Not-2-Late.com).[73] The Yuzpe method is less efficacious, with 57% of pregnancies prevented compared with 85% with the progestin-only method,[67] and is associated with significantly more nausea and vomiting. Owing to these disadvantages, Yuzpe is a second-line approach when the patient is unable to access progestin-only product in a timely manner, but COCs are available.

A copper IUD inserted after unprotected intercourse serves as highly effective EC and was first reported in 1976.[74,75] A recent study conducted in China on 1963 women who received a copper IUD within 120 hours of unprotected intercourse demonstrated 100% efficacy, as there were no pregnancies at follow-up visits.[76] There are no specific studies of adolescents using copper IUDs as EC. The use of LNG-releasing IUD for EC has not been studied.

Male Condom

Mechanism of Action

A conversation with teens about contraception would be incomplete without discussing the use of a condom. Besides being the most commonly used method, condoms are also the only method available that significantly reduces the risk of acquiring STIs. The male condom serves as a physical barrier to prevent pregnancy by blocking the passage of semen, and reduces STI transmission by blocking the exchange of blood, semen, and vaginal fluid between partners. The majority of condoms available in the United States are made from natural rubber latex. Less commonly used and available options include condoms made from lamb intestine as well as polyurethane or other synthetic materials.

Efficacy

With perfect use of the male latex condom, 2% of women become pregnant during the first 12 months of use.[77] However, perfect condom use is reported by less than half of all sexually active adolescents.[78] With typical use of condoms, 15% of women will become pregnant during the first year, which makes it an unreliable sole form of contraception for a teen trying to prevent pregnancy.[77] Using condoms along with a more reliable hormonal method provides improved contraceptive efficacy and STI prevention. The contraceptive efficacy of nonlatex condoms requires more research.[79]

Contraindications

Fortunately, there are minimal contraindications for condom use. The primary contraindication is a latex allergy, which has $<1\%$ prevalence among the general population. The clinical symptoms can range from urticaria to anaphylaxis.[80] Alternative nonlatex choices include condoms made of polyurethane or other synthetic materials. Notably, milder allergy symptoms may be related to the lubricant prepackaged on the condom rather than the latex itself. If a patient reports skin sensitivity in the absence of a latex allergy, one option is to try condom brands containing other lubricants or lubricant-free condoms, adding a lubricant of choice to which he/she is not sensitive.

Medical Benefits

The most important noncontraceptive benefit of condom use is reducing the risk of acquiring STIs. For this reason, condoms should be encouraged for adolescents even if another effective contraceptive method is being used. "Dual use" of condoms plus another method also offers the advantage of increasing the overall efficacy for pregnancy prevention.

Medical Risks

The only appreciated medical risk is in the context of a latex allergy.

Advantages (Patient Perspective)

In addition to STI prevention, benefits of condoms include their accessibility without a prescription, availability at many convenient locations, and affordability. Condoms are the most inexpensive contraception, and are often free to teens at clinics and other public health facilities.

Disadvantages (Patient Perspective)

An important disadvantage of condom use is difficulty with communication and cooperation among partners. Some adolescents feel uncomfortable asking their partner to use a condom. Some partners may disagree about consistent condom use. This can create a stressful situation, decreasing the frequency of condom use. It can be useful to teens to explore their perceptions of their partners' views of condom use, and strategize ways to have a conversation with their partners.

Adherence

The Youth Risk Behavior Surveillance System surveyed 24,638 sexually active 9th-12th graders from 1999 to 2007 regarding the use of contraception at last intercourse.[81] Nearly two-thirds of participants were Caucasian and nearly half were aged ≥17 years. Of the participants, 64% of males and 48% of females used condoms only at their last sexual intercourse. Dual methods were used by 6% of males and 8% of females and included condoms plus birth control pills or depot medroxyprogesterone.

Condom use among male adolescents was explored in detail in a data analysis of the 2002 National Survey of Family Growth of 347 males aged 15-19 years who reported on condom use consistency with their most recent sexual partner.[82] Of the participants, three-fifths of sexually experienced males were non-Hispanic white or other race/ethnicity, 61% lived with 2 biological/adoptive parents, and nearly two-thirds had parents who earned a college or advanced degree. The results found 71% of sexually experienced males reported condom use at first sex and at most recent sexual intercourse, and 51% reported consistent condom use with their most recent partner. Male adolescents who were Hispanic and those who did not receive formal sex education had lower odds of condom use and/or consistency. African American male adolescents and those with more positive attitudes about condoms had a greater likelihood of condom use. Males had reduced odds of using condoms if they were in longer relationships, engaged in more frequent sex, or had either an older sexual partner, a partner who used other methods of contraception or a casual first sexual partner. In addition, condom use appears to decrease with age, with 59% of 17-18-year-old males using a condom the first time they had intercourse with their most recent partner compared with 46% of 21-22-year-old males.[83]

Patient Counseling

When counseling an adolescent about methods of contraception, it is critically important to also discuss condoms in conjunction with any other chosen contraceptive method as an approach to STI risk reduction. If available in the provider's office, provide condoms to teens or make certain that the teen knows where to get condoms. Additionally, patients should be counseled about how to use a condom. Instructions may include a plastic-model demonstration or providing important information, such as leave a small space at the tip, unroll the condom from the tip, do not use 2 condoms at a time because they will tear, and use only water-based lubricants intended for use with condoms because other substances may damage the latex.

Nearly one-third of pediatricians do not discuss condoms at preventive health care visits. In a random-sample mailed survey of 468 U.S. members of the American Academy of Pediatrics,[2] 61% of pediatricians reported discussing condoms at preventive care visits; 22% mentioned that they distribute condoms and 19% provide condom instructions or demonstrations in their office. Of the participants, hospital/clinic-based and inner-city practitioners were more likely to provide and demonstrate condoms. All patients who choose this method as their sole contraceptive method should especially receive education about EC, in the event of condom failure or nonadherence.

Female Condom

Mechanism of Action

A far less commonly used method among adolescents is the female condom, another physical barrier method. The first female condom (FC1) is made of polyurethane, prevents semen from entering the vagina, and was approved for use in 1993, but was relatively costly. The second-generation female condom (FC2) was approved in 2009. The FC2 is made of latex, which improved its affordability.[84]

Efficacy

The female condom is a less-effective method than the male condom. With "perfect use" of the FC1, 5% of women become pregnant during the first 12 months of use. With "typical use," 21% become pregnant within the first year of use.[77] The effectiveness of FC2 was shown to be comparable with FC1.[85]

Contraindications

A latex allergy is a contraindication to the latex FC2, as discussed in the Male Condom section.

Medical Risks and Benefits

For medical risks and benefits, refer to the section under Male Condoms.

Advantages (Patient Perspective)

Theoretically, the female condom offers STI protection, although the data are more limited than for the male condom. Similar to the male condom, female condoms are available without a prescription and can be obtained at drug stores and supermarkets. However, a distinct and important advantage is that condoms are female initiated. The FC2 is another barrier option for teens whose partners refuse to wear a male condom.

Disadvantages (Patient Perspective)

A major disadvantage of the female condom is the higher probability of pregnancy compared with nonbarrier hormonal methods and the male condom.[86] Discussing "dual use" of condoms plus another method, as described in the Male Condom section, is important, as it will improve the overall efficacy for pregnancy prevention. Other reported disadvantages are the visibility outside the vagina with either the FC1 or FC2 and the noise of the FC1 during intercourse, although this issue has reputedly been resolved with the FC2, which is made of latex instead of polyurethane. Discussion about these drawbacks can help to determine whether the female condom would be acceptable to the woman or her partner.

Adherence

Only 1.7% of adolescents report ever using a female condom. This is comparable with 71% of adolescent males who report having used a male condom.[87] Adolescents typically use the female condom inconsistently, and often choose the male condom instead.[88] Adolescents used FC1 less frequently than the male condom because of greater cost and less efficacy.[38,89] The FC2 may be more accepting with its improved cost, although the research on this method in teens is still limited.

Patient Counseling

Many adolescents may not be aware of the female condom. Introducing the idea to adolescents as a way to protect themselves from STIs if their partners refuse to use male condoms may be beneficial for some patients. As with the male condom, product demonstration can be helpful, and all patients who choose this method as their only contraceptive method should receive education about EC.

TABLE 2. Classification of progestin components commonly found in combined oral contraceptive pills

Progestin generation	Examples
1st (Estranes)	Norethindrone, norethindrone acetate, ethynodiol diacetate
2nd and 3rd (Gonanes)	Norgestrel, levonorgestrel, norgestimate, desogestrel
4th (spironolactone derivatives)	Drospirenone

Combined Oral Contraceptive Pills (COCs)

Mechanism of Action

The list of COCs available on the U.S. market is extensive and frequently modified. However, most COCs contain the same major components—estrogen and progestin. Progestin is responsible for the majority of the contraceptive effect by thickening the cervical mucus and preventing sperm entry. Additionally, both estrogen and progestin suppress ovulation through negative feedback to the hypothalamic–pituitary axis.[90]

Estrogen. The vast majority of COCs in the United States contain ethinyl estradiol (EE), which is available at doses ranging from 10 to 50 mcg. Typical prescriptions are for doses of 35 mcg or less, to avoid the side effects and higher risks associated with the unnecessary higher doses. The lowest dose of EE is 10 mcg, found only in Lo Lo-Estrin (Warner Chilcott Company, LLC, Fajardo, PR), and recently introduced in October 2010.[91] Alternatively, mestranol is an older form of estrogen used in the first COC's on the market decades ago. Because mestranol requires hepatic conversion to its active metabolite, EE, a 50-mcg dose of mestranol, is considered to be biologically equivalent to a 35-mcg dose of EE.

Progestin. Currently, 8 synthetic progestins are available. The most commonly used classification system organizes the progestins by historical "generations," with the higher generations being the most recently introduced formulations (Table 2). Another method of classification is based on the metabolites of the progestins. Seven of the 8 progestins are derived from an androgen precursor. The eighth progestin, drospirenone, is derived from spironolactone, a potassium-sparing diuretic used to treat hypertension.[90] One common myth is that drospirenone increases potassium levels in all women. However, this is only a concern for high-risk patients, for example, women

with metabolic or renal disorders, or women using other potassium-sparing medications. High-risk patients may simply avoid drospirenone COCs, or a potassium level may be drawn at day 14 of the first drospirenone COC pack for monitoring. There are no guidelines for further monitoring.

Additional Ingredients. Some formulations may include supplemental ingredients such as iron or folic acid metabolites, which some manufacturers may promote as potential benefits.

Typically, a 28-day COC pack contains a minimum of 21 active pills (1 pill each day), followed by placebo pills. Monophasic packs contain a consistent dose of estrogen and progestin in each active pill. In multiphasic packs (biphasic, triphasic, or 4-phasic), the doses of estrogen or progestin vary throughout the active pills. Given the vast array of options, choosing the "right" pill can seem challenging for clinicians. Fortunately, the majority of healthy patients can tolerate most formulations of EE at a dose of 35 mcg or less. Often, local availability and insurance formularies influence the choice of formulation. Common practice is to begin with a monophasic formulation that the clinician is familiar and comfortable with, then adjust based on side effects after the initial 3 months of use, unless the patient states a specific brand preference. Some of the newer brands now include a higher number of active pills together with fewer placebo pills (such as 24 active pills followed by 4 placebo pills), which may be appealing for some teens because of the possibility of shortened duration of menses.

Extended-Cycle Regimen. "Extended-cycling" or "continuous-use" is the practice of taking >28 active pills continuously so that menses are spaced less frequently. The FDA-approved products include Seasonale (Teva Women's Health, North Wales, PA), 84 active pills (30 mcg EE + 0.15 mg LNG) and 7 placebo; Seasonique (Teva Women's Health, North Wales, PA), 84 active pills (30 mcg EE + 0.15 mg LNG) and 7 active pills (10 mcg EE); and LoSeasonique (Teva Women's Health, North Wales, PA), 84 active pills (20 mcg EE + 0.1 mg LNG) and 7 active pills (10 mcg EE). Historically, the extended-cycle regimen was prescribed for treatment of endometriosis, dysmenorrhea, menorrhagia, or other menses-related symptoms; however, recently, this approach has become more widely prescribed in response to the patient's personal preference. There have been 6 randomized control trials of clinical outcomes in users of extended cycling versus traditional cycling.[92] Extended-cycle users had the same or less bleeding/spotting; less headaches, fatigue, bloating, menstrual pain, and genital irritation; and the same adherence, discontinuation, and satisfaction with the method. Data on long-term sequelae of continuous EE exposure are not available.[92]

Efficacy

With "perfect use" of COCs, 0.3% of women are expected to become pregnant within the first year. With "typical use," 8% of women are estimated to become pregnant within the first year,[77] although some estimates of typical use failure rates have been as high as 15%-26%, as nonadherence varies across populations.[93]

Contraindications

The CDC recently published the U.S. Medical Eligibility Criteria for Contraceptive Use, 2010, largely based on long-standing contraceptive guidelines from the WHO that are periodically updated and intended for clinicians (http://www.cdc.gov/mmwr/preview/mmwrhtml/rr59e0528a1.htm).[48] These guidelines are endorsed by the American College of Obstetricians and Gynecologists.[94] Any clinician providing contraceptive services must be familiar with these cornerstone guidances, as they provide detailed information about medical contraindications for each specific hormonal method. Potential contraindications are classified from category 1 to 4, with category 4 representing absolute contraindications. For example, combined hormonal contraceptives including the COC, patch, and ring have the following category 4 contraindications:

- Greater than 35 years and ≥15 cigarettes/day
- Multiple risk factors for arterial cardiovascular disease (such as older age, smoking, diabetes, and hypertension)
- Systolic: ≥160 mm Hg or diastolic: ≥100 mm Hg
- Vascular disease
- Higher risk for recurrent DVT or PE
- Acute DVT or PE
- Major surgery with prolonged immobilization
- Known thrombogenic mutations (eg, factor V Leiden; prothrombin mutation; protein S, protein C, and antithrombin deficiencies)
- Current and history of ischemic heart disease
- Stroke (history of cerebrovascular accident)

- Complicated valvular heart disease (pulmonary hypertension, risk for atrial fibrillation, history of subacute bacterial endocarditis)
- Peripartum cardiomyopathy
- Systemic lupus erythematosus with antiphospholipid antibodies
- Migraines with aura
- Current breast cancer
- Diabetes with retinopathy, nephropathy, neuropathy, or other vascular disease
- Severe cirrhosis
- Liver tumors
- Complicated organ transplants

Medical Benefits

Reduction in Overall Mortality Rate. A retrospective cohort study of 46,112 women who were observed for up to 39 years found that users of oral contraception had a significantly lower rate of death from any cause (adjusted relative risk [RR]: 0.88, 95% confidence interval: 0.82-0.93), compared with never users. Users had significantly lower rates of death from all cancers; large bowel/rectum, uterine body, and ovarian cancer; main gynecologic cancers combined; all circulatory disease; ischemic heart disease; and all other diseases.

Menstrual Cycle Benefits. Many pediatric providers prescribe COCs for noncontraceptive purposes, particularly for dysmenorrhea. Treating dysmenorrhea is especially helpful for adolescents, as dysmenorrhea is the leading cause of missed school days for adolescents.[95] In addition to dysmenorrhea, COCs can be used to treat menorrhagia and irregular menses.[96] COCs are also commonly prescribed to regulate anovulatory bleeding in women with polycystic ovarian syndrome.[97]

Hyperandrogenism. Oral contraceptives are helpful in suppressing ovarian androgens and reducing bioavailable testosterone by an estrogen-mediated increase in steroid hormone–binding globulin.

Acne. COCs are effective in reducing inflammatory and noninflammatory acne lesions through its antiandrogenic effects, because sebum production is normally stimulated by androgen. The impact on acne does not differ between the various COC formulations.[98] Patients should be counseled that time to maximal effect may take up to 6 months.[99]

Hirsutism. Hair growth, is also androgen sensitive, and therefore is reduced with the administration of COCs. COCs reduce the hair shaft diameter,[100] and again the beneficial effect can take up to 1-2 years.

Endometriosis. Another benefit of COCs is reduction of pelvic pain associated with endometriosis. Continuous use of COCs (discussed later) to achieve menstrual suppression constitutes the main treatment for most adolescents with endometriosis,[101] although evidence is limited.[102]

Ovarian Cancer. COCs provide long-term protection from developing ovarian cancer. It is estimated that COCs have already prevented 200,000 ovarian cancers and 100,000 deaths from the disease.[103] The longer women have used COCs, the greater the reduction in ovarian cancer risk. Using COCs for at least 10 years reduces a woman's risk of developing ovarian cancer by 80%.[104]

Endometrial Cancer. COCs also provide long-term protection from endometrial cancer. Using COCs for 12 months reduces the risk of all 3 major subtypes of endometrial cancer, adenocarcinoma, adenoacanthoma, and adenosquamous carcinoma by approximately 40%. The protective effect persists for at least 15 years after cessation of the COC.[105]

Benign Breast Disease. Using COCs reduces the risk of developing fibrocystic breast changes, cysts, and fibroadenomas.[106] These conditions are also less likely to progress in COC users.

Reduction in Incident Ovarian Cysts. COCs reduce the risk of developing functional ovarian cysts by suppressing ovulation.[107,108] However, COCs do not seem to be beneficial in the treatment of existing cysts. A recent review found no advantage in using COCs, and concluded that simple observation for 2 or 3 cycles would be appropriate management.[109]

Protection From Iron-Deficiency Anemia. COCs conserve women's hemoglobin and ferritin levels by reducing menstrual blood loss.[110] This benefit is further increased by extended-cycle use of COCs.

Medical Risks

Thrombotic Risk. Estrogen is associated with the following alterations in coagulation factors: increases in factor II, VII, VIII, X, and fibrinogen; and decreases in antithrombin and protein S.[111] Certain progestins also have thrombotic effects. COCs containing desogestrel cause increased levels of factor VII, VIII, and X, as well as antithrombin and protein S. Additionally, activated protein C resistance is higher in women taking COCs with LNG.[112]

In general, COCs are associated with an estimated 5-fold increased risk of venous thromboembolism (VTE), but this risk differs by type of progestin and

dose of estrogen. Estimates of absolute risk for VTE in healthy nonpregnant women have been reported as 0.5-3.01 events per 10,000 woman-years in nonusers, and 1.5-18.1 events per 10,000 woman-years in oral contraceptive pill users.[113] VTE risk in users appears to be highest during the first year of COC use and declines with longer duration of use. The level of risk also decreases with lower EE dose. Recent concerns of increased VTE risk because of the progestins, desogestrel, and drospirenone have not been definitively supported by currently available evidence.[113]

One recent large case-control study proposed that the safest option with regard to risk of VTE is a COC that contains LNG combined with a low dose of estrogen.[114] However, this study involved patients aged 18-50 years, with a mean age of 37.4, and, therefore, is difficult to extend to adolescents. An important observation is that adolescents have a low-baseline thrombotic risk of 1-10 per 100,000 per year. Therefore, a 5-fold increased risk is still only 0.05% per year.[115]

Furthermore, an adolescent's thrombotic risk is influenced by many noncontraceptive factors, including personal, medical, family history, and numerous lifestyle choices. The risks and benefits of COCs must be carefully weighed in an adolescent patient with additional thrombotic risk factors. However, not to be overlooked is the risk of thrombosis with pregnancy, which is greater than the risk of all COCs.[116]

A recent multidisciplinary collaboration has provided useful guidelines for approaching hormonal therapy in the setting of a thrombotic risk. When COCs are used for contraceptive purposes, the significant risk of unplanned pregnancy should be weighed against the thrombotic risk of particular hormone therapies.[115] The following guidelines are intended for patients with a history of thrombosis, known thrombophilia, current anticoagulation, or family history of thrombophilia or thrombosis:

1. Evaluate indication for hormone therapy and whether both estrogen and progestin are needed.
2. Assess the patient's thrombotic risk and personal and family history.
3. Assess pregnancy risk and provide education about unplanned pregnancies.
4. Discuss therapeutic options with the patient, considering differing risk of hormone type, dosage, and mode of administration.
5. Assess the patient's preference.
6. Educate the patient about reducing risk for thrombosis and symptoms of VTE.

Stroke. Use of COCs (containing EE, ≤35 mcg) does not appear to increase risk for stroke among women who are otherwise healthy.[117] Rather, patient evaluations should include assessment for other stroke risk factors, such as smoking and hypertension. Smoking among COC users increases the risk of stroke, particularly in those aged >35 years,[118] and the risk of hemorrhagic stroke increases 10-fold in COC users with hypertension.[119]

Bone Density. Concerns have been raised recently regarding the potentially adverse effects of lower-dose COCs on bone mineral density (BMD). A recent cross-sectional study of 606 women aged 14-30 years examined both COC duration and estrogen dose and their associations with BMD at the hip, spine, and whole body as measured by dual-emission x-ray absorptiometry.[120] In women aged 19-30 years, longer COC use was associated with lower mean BMD of the spine and whole body. The greatest effect was observed in the BMD measures for women who took >12 months of COCs that contained ≤30 mcg of EE. Another cross-sectional study of 248 women aged 18-24 years found that women who reported any previous use of COCs had significantly lower BMD at the femoral neck and tibial shaft.[121] Research is ongoing to characterize the effects in adolescents specifically. Unresolved issues include the extent of potential recovery of BMD in the long-term, and the long-term effect of BMD decreases on future clinical outcomes such as fracture. For current practice, clinicians are advised to avoid COCs with very low EE doses (ie, 20 mcg or less), especially in patients who have other risk factors for decreased BMD, or younger patients who have yet to build BMD.

Migraine Headaches. Migraines with aura are listed as an absolute contraindication (level 4) to COC use,[48] owing to the increased risk for stroke. For women aged 25-30 years, the absolute baseline risk for ischemic stroke is reported at 3 per 100,000 per year.[122] Migraines with aura triples the risk to 9 per 100,000, and the addition of COC use further raises the risk to 18 per 100,000 in those with migraines with aura. Consultation with a neurologist can be helpful in clarifying the specific headache diagnosis and determining eligibility for COCs.

Hypertension. As mentioned earlier, an absolute contraindication (level 4) for COC use is systolic

blood pressure (BP) ≥160 mm Hg or diastolic BP ≥100 mm Hg.[48] COCs can increase both the systolic and diastolic BP by increasing the circulating levels of angiotensiogen and its metabolite, angiotensin II, as well as enhancing aldosterone activity. In a prospective study of 68,297 women aged 25-62 years, COC users had an increased risk of developing hypertension (RR = 1.8; 95% CI = 1.5-2.3) compared with nonusers.[123] The risk of hypertension was higher with longer duration of use and increased potency of progestins and decreased after COC cessation. Studies are not available for adolescents specifically, but clinicians are advised to monitor BP among COC users.

Cervical Cancer. COCs have long been studied as a known risk factor for cervical cancer, but the underlying causal mechanisms remain unclear. An analysis of data from 16,573 women with cervical cancer and 35,509 women without cervical cancer from 24 epidemiologic studies found that among current users of COCs, the risk of invasive cervical cancer increased with increasing duration of use.[124] A 10-year history of COC use from around ages 20-30 years increased the cumulative incidence of invasive cervical cancer by age 50 years from 7.3 to 8.3 per 1000 in less developed countries and from 3.8 to 4.5 per 1000 in more developed countries. Notably, the risk declined after cessation of COCs and by 10 years had returned to the risk of never users.

Breast Cancer. Evidence regarding COC effects on breast cancer risk has been mixed. One meta-analysis examined 53,297 women with breast cancer and 100,239 women without breast cancer from 54 epidemiologic studies in 25 countries.[125] The study found that although women are taking COCs, and in the 10 years after cessation, there is a small increase in the RR of incident breast cancer (RR for current use: 1.24, 99% CI: 1.15-1.33). After ≥10 years after COC cessation, there is no significant excess risk of incident breast cancer. Additionally, the breast cancers diagnosed in COC users were more localized and less clinically advanced. A more recent population-based case-control study of women aged 35-64 years was done to determine the risk of breast cancer among former and current users of COCs.[126] Former and current users were at no higher risk of developing breast cancer than nonusers. The use of COCs by women with a family history of breast cancer was neither associated with an increased risk of breast cancer nor was initiation of COCs at a younger age.

Advantages (Patient Perspective)

Advantages are reviewed earlier in the Medical Benefit section. Menstrual cycle control and improvement in hyperandrogenism (acne, hirsutism) are especially appreciated by teens. COCs are a female-controlled method not associated with the act of intercourse, which is a potential advantage for young women.

Disadvantages (Patient Perspective)

Adherence to a daily pill can be challenging for some patients, and nonadherence will decrease the COC efficacy. Another disadvantage includes lack of protection from STIs, including HIV. Patients are encouraged to practice the dual method of condoms and COCs, although the data show that only a small percentage of adolescent contraceptors use dual methods. A third possible disadvantage is the need for confidential storage for adolescents who are worried about others finding their pills.

Adherence

Remembering to take a daily pill can be challenging. A study of adults involved an electronic device on the pill bottle that found that >50% of women missed ≥3 pills by the third cycle of use.[127] Adherence can be even more challenging for teens. Estimates based on the 2002 National Survey of Family Growth, a nationally representative sample of U.S. women, found that teens are more than twice as likely to experience a pill failure as women aged ≥30 years.[128]

Patient Counseling

Patient counseling typically includes the following topics: patient's concerns or myths about using COCs; potential benefits and risks; practicalities of accessing the pharmacy, understanding the pill pack layout, and acquiring refills; concrete strategies for adherence; how to handle missed pills; indications for EC; and encouragement to use condoms for STI prevention as well as additional contraceptive benefit. Adolescents also benefit from basic education that hormonal contraception is part of their medical history that should be reported to new health care providers as well, such as in acute care or emergency care situations. Quick start (as discussed previously) is typically advised to establish efficacy as soon as possible. Patients should

be advised to use backup contraception (such as condoms or abstinence) for at least 7 days after COC initiation.

A useful mneumonic to discuss with patients when counseling about the risks of thromboembolic complications of COCs is ACHES. This stands for Abdominal pain, Chest pain, Headache (severe), Eye (blurred vision), Swelling or sharp leg pain. Patients should be aware of these warning signs and should seek immediate medical attention should these symptoms occur.

Frequent follow-up is important to support adherence and long-term continuation of this method. Frequent follow-up also allows an opportunity to monitor for side effects, weight changes, and BP; update the sexual history; and counsel about sexual risk reduction. Common practice is to follow-up at 1 month, again at 3 months, and then every 6 months.[90] Because teens often miss or reschedule follow-up appointments, the option of phone follow-up for counseling visits and the practice of providing a prescription with 12 months of refills are recommended. In a recent randomized controlled trial[129] found that on-site dispensing of COC packs (vs giving a prescription), as well as dispensing of 7 packs instead of the more standard 3 packs at a time, resulted in greater rates of continuation at 6 months. These findings were more marked for the study participants <18 years of age.

Medication Interactions

Medications that increase hepatic enzymes can increase the metabolism of estrogen and progestin and decrease their serum concentrations, thereby decreasing COC efficacy. These medications include the following:

Anticonvulsants. Several anticonvulsants (phenobarbital, phenytoin, carbamazepine, topiramate) increase the metabolism of COCs, although the degree of increased metabolism is highly variable and unpredictable among individuals.[130] This presents a dilemma for health care providers because anticonvulsants are also teratogenic. Other methods of contraception, including depot and IUDs, should be strongly considered in patients on these particular medications. Collaboration with the patient's neurologist is essential when weighing the risks and benefits of the anticonvulsant and contraceptive methods being prescribed. In some cases, the patient may be eligible for another anticonvulsant that does not influence COCs, such as valproic acid.[131]

Antibiotics. The widespread belief that many antibiotics affect the efficacy of COCs is not supported by evidence,[131-133] with the exception of rifampin, which has been found to reduce efficacy. Griseofulvin and some anti-HIV protease inhibitors have also been found to reduce the efficacy of COCs. Other contraceptive methods should be considered when patients are taking these medications.

St. John wort is an over-the-counter herbal medication taken by individuals to treat depression, and also may reduce the efficacy of COCs. Clinicians should routinely inquire about over-the-counter medications, as patients may not realize the need to report these.[134]

Other Combined Hormonal Contraceptive Methods

Similarly to COCs, both the transdermal contraceptive patch and the vaginal contraceptive ring contain both estrogen and progestin hormones. Therefore, the mechanism of action, medical benefits/risks, patient advantages/disadvantages, side effects, contraindications, and medication interactions are generally similar to the COC. The unique characteristics of each method are highlighted below.

Transdermal Contraceptive Patch

Ortho Evra (Janssen Pharmaceuticals, Inc. Titusville, NJ), a transdermal contraceptive patch, is a tan-colored adhesive patch delivering 20 μg of EE and 150 μg of norelgestromin daily. The patch can be applied to the buttock, abdomen, upper outer arm, or upper torso, in a place that avoids rubbing by tight clothing. It should not be placed on the breasts or on skin that is red, irritated, or cut. Similarly to COCs, the patch uses the 28-day dosing schedule, with 21 days of active hormone. A new patch is applied each week for 3 weeks, and week 4 is patch free.

Efficacy

Estimates of both typical and perfect use are similar to COCs. Better efficacy owing to improved adherence has not been shown in randomized trials.[77] Efficacy is decreased in women weighing >198 pounds,[135] and thus clinicians are cautioned to consider other contraceptive methods for these women.

Advantages (Patient Perspective)

Ease of use, ease of concealment, and the fact that it does not require daily attention are all advantages of the patch that teens appreciate.[136]

Disadvantage (Patient Perspective)

Patch users may have skin irritation, redness, or rash at the patch site. Patients are advised to apply the weekly patches to new sites to limit irritation.[137]

Patient Counseling

Quick Start. Similar to COCs, quick start is advised for the patch. However, interestingly, compared with quick start with COCs, quick start of the patch did not increase short-term continuation rates.[45]

Detachment. Patch detachment is more likely to be experienced by adolescents than by adults.[136] Patients should regularly check that the patch edges are flat and adherent to the skin. Instructions regarding detachment include:

- If the patch was detaches for <24 hours, she may reattach the same patch or replace it with a new patch immediately.
- If the patch was detached >24 hours or an unknown amount of time, a new patch should be applied to initiate a new cycle. This becomes day 1 of the cycle, and this day of the week becomes the new patch change day. As this situation is considered to be similar to a new start, backup contraception (eg, condoms) should be used for the first 7 days.[137]

FDA Notice Regarding Higher Estrogen Exposure and Thrombotic Risk

Although the peak levels of serum estrogen achieved with the patch are 25% lower than the daily peak of estrogen from 35-μg EE pills, the patch maintains a higher steady state EE concentration because of the pharmacokinetics of the patch's steady release. Thus, the total daily estrogen exposure (area under the curve) from the patch is 60% higher than from a 35-μg dose of EE pills.[137] As a result, in 2005, the FDA required a change on the product labeling to warn health care providers and patients that this product exposes women to higher levels of estrogen than most birth control pills.[138] However, data about the actual risk of VTE associated with patch use are conflicting. Three case-control studies have found no increased thrombotic risk compared with 35-μg EE pills,[139-141] whereas another recent study found a 2-fold increased risk.[142] As research is ongoing regarding clinical outcomes, clinicians can be reassured that the absolute risk for a thrombotic event for healthy adolescents (as discussed under thrombotic section of COCs) remains extremely low.

Vaginal Contraceptive Rings

NuvaRing (Merck & Co., Inc., Whitehouse Station, NJ) is a flexible transparent latex-free contraceptive vaginal ring that releases on average 15 mcg of EE and 120 μg of etonogestrel daily. Similar to COCs and the patch, the ring has a 28-day cycle, during which a single ring is inserted vaginally and left in place for 3 weeks, and then removed for week 4. A new ring is used for the next cycle.

Efficacy

Typical- and perfect-use estimates are the same as the COC and patch.[77] In a 1-year randomized trial comparing efficacy and safety of the NuvaRing versus the COC, the pregnancy rates were the same in both groups (5 pregnancies, 1.2 per 100 women-years of exposure).[143]

Advantages (Patient Perspective)

An advantage of this method is the convenience of once-monthly placement. A randomized crossover study was conducted at an urban family planning clinic with 130 participants aged 15-21 years comparing the acceptability of the ring versus COCs.[144] Participants found the ring easier to remember to use correctly; 14% found it difficult to remember to use the ring correctly versus 58% who found the pill difficult to remember. Another advantage is the confidentiality of the method compared with the patch.

Disadvantages (Patient Perspective)

A possible disadvantage is patient perception of interference with sex. In the study mentioned earlier assessing the acceptability of the ring compared with the COC, 24% of participants reported that it interfered with sex, versus 6% who reported the pill interfered with sex.[144] Another possible patient concern is vaginal symptoms. However, despite reports of more vaginal discharge or wetness among adults using the ring, the study by Stewart et al. found no increase in vaginal symptoms among adolescents using the ring compared with COCs.[144]

Patient Counseling

Quick Start. Similar to COCs and the patch, quick start is advised for the ring.

Expulsion. Expulsion is thought to occur in fewer than 3% of ring users but may occur especially during sex or when straining during a bowel movement. Instructions include the following:

- If the ring has been out of the vagina for <3 hours, the contraceptive efficacy is not reduced.
- If the ring has been out of the vagina for >3 hours, the contraceptive efficacy is reduced. If this occurs during weeks 1-2, the ring should be rinsed and reinserted and backup contraception should be used for the next 7 days.
- If ring expulsion occurs during week 3, the patient may choose 1 of 2 options, each of which requires backup contraception until the new ring has been in place for a full 7 days, either (1) insert a new ring and begin a new cycle; or (2) leave the ring out, have a withdrawal bleed, and insert a new ring 7 days from when the last ring was expelled.[145]

Extended-Cycle Use

As with COCs, NuvaRing can be used continuously to decrease the frequency of withdrawal bleeds. A new ring can be inserted every 3 or 4 weeks to appreciate the same benefits as seen with extended-cycle COCs, although this use is currently off-label.[146]

Progestin-Only Methods

Mechanism of Action

Progestin-only pills (POPs) also known as the "mini-pill" are used infrequently by teens in the United States. As the name suggests, they contain only progestin hormone, and no estrogen. The progestin hormone formulation in the United States is norethindrone, and it is taken daily, without interruption or on hormone-free days. There are 4 potential mechanisms of action for POPs, which have been proposed. These mechanisms include ovulation inhibition,[147] cervical mucus thickening,[148] altering the activity of cilia in the fallopian tubes,[149] and altering the endometrium.[150]

Efficacy

The efficacy rates officially available for POPs are the same as for COCs; failure rates are 0.3% in perfect use and 8% in typical use. However, it is challenging to fully discuss efficacy of POPs accurately[77] because POPs are still hypothesized to be less effective than COCs. The dose of hormone is lower in POPs than in COCs, and the serum progestin levels peak after pill ingestion and then decline to undetectable levels 24 hours later.[147] For this reason, it is recommended that POPs are taken within 3 hours of the same time everyday. The narrow window for error can pose a significant challenge for teens, and needs to be carefully considered when choosing this method for contraception.

Contraindications

The only absolute contraindication to POPs according to the WHO and CDC is current breast cancer.[48]

Medical Benefits

Safety data on POPs that are distinct from COCs are relatively limited. The available data support the notion that POPs are safer than COCs because they lack estrogen. Studies support that there is no increased risk of stroke, myocardial infarction, or venous thromboembolism in women taking the POP.[151-153] Studies also report no association of elevated BP and the use of POPs.[154] An additional benefit is the lack of contraindications. As mentioned in the Contraindication section, this method can be used safely by almost all women. Other health benefits appreciated with COCs, such as reduced risk of ovarian and endometrial cancers, have not been well studied in POPs, although they may also provide this benefit.

Medical Risks

The risks include lower contraceptive efficacy than other methods, as explained previously.

Advantages (Patient Perspective)

POPs can be an advantageous method in breastfeeding teens. POPs have no adverse effects on the ability to breastfeed, and may even enhance lactation by increasing prolactin release.[155] The WHO supports using POPs in breastfeeding women, and states that the advantages outweigh the risks.[48] Another potential advantage for teens is the simple instructions. Unlike other methods with interruptions of hormone, POP users will take the same pill every day without any changes from day to day or week to week. Some teens may appreciate the consistent fixed regimen.

Disadvantages (Patient Perspective)

Menstrual changes in patients on POPs can be unpredictable, and include prolonged bleeding, irregular bleeding, and amenorrhea. This is an important disadvantage for providers to be aware of because it is the most common reason for discontinuation of the method.[156] Some adolescents may dislike amenorrhea, as it makes interpreting signs and symptoms of pregnancy more challenging. However, prolonged episodes of bleeding or amenorrhea occur less frequently with POPs than in depot medroxyprogesterone acetate (DMPA).[149] Other disadvantages include androgenic effects, such as hirsutism and acne. Headaches, depression, fatigue, and weight gain may also be reported by patients. However, there are no data studying the association of these symptoms with POPs.[147,157]

Adherence

There are no known studies available comparing compliance in COCs versus POPs. For more information, refer to the Adherence section of COCs.

Patient Counseling

As stated previously under the section Efficacy, it is recommended that POPs are taken within 3 hours of the same time everyday. Likelihood of patient adherence should be assessed before starting the method. Additionally, patients should be warned of the menstrual effects seen with this method, as this is the most common reason for discontinuation. Similar counseling that was discussed with COCs should also be given for POPs, including plan if pills are missed, quick start, EC, accessing the pharmacy, condoms, and follow-up plans.

Medication Interactions

Although interactions between POPs and other drugs have not been well studied, the same drugs that affect the metabolism of COCs (ie, rifampin, certain anticonvulsants, some antiretrovirals, griseofulvin, St. John wort) may also impact POPs. Using a barrier method along with POP to increase contraceptive efficacy while taking these medications should be considered.[157]

Injectable Progestins

Mechanism of Action

A commonly used progestin-only method among teens is DMPA, an injectable form of progestin. There are 2 formulations available: 1 is injected intramuscularly and the other subcutaneously. The intramuscular formulation, 150 mg/1 mL of DMPA-intramuscular, is administered every 11-13 weeks into the gluteal or deltoid muscle. The subcutaneous formulation, 104 mg/0.65 mL of DMPA-subcutaneous, is also injected every 12-14 weeks. DMPA prevents fertilization by 2 primary mechanisms. The first is through thickening the cervical mucus and preventing sperm penetration,[158] and the second is by suppressing follicle-stimulating hormone and LH, thereby preventing the LH surge and inhibiting ovulation.[159]

Efficacy

DMPA is highly efficacious, with perfect-use failure rate of 0.3% and typical-use failure rate of 3%, which is especially attractive to teens.[77] The efficacy of the 2 formulations is similar, despite the lower dose of hormone in DMPA-SC.[160] Two large open-label phase 3 studies assessed the 1-year contraceptive efficacy with DMPA-SC and reported zero pregnancies.[160]

Contraindications

According to the 2010 Morbidity and Mortality Weekly Report medical eligibility criteria, similarly to POPs, the only absolute contraindication to using DMPA is current breast cancer.[48] There are conditions placed in category 3, where the theoretical or proven risks usually outweigh the advantages of using DMPA. Many of these conditions are rare in adolescents, but will be mentioned for completeness. These include multiple risk factors for arterial cardiovascular disease (older age, smoking, diabetes mellitus, and hypertension), systolic BP $>$160 mm Hg or diastolic $>$100 mm Hg, vascular disease, ischemic heart disease, history of stroke, women with systemic lupus erythematosus and positive antiphospholipid antibodies or thrombocytopenia, unexplained vaginal bleeding (before evaluation), past history of breast cancer and no disease for 5 years, diabetes with nephropathy/retinopathy/neuropathy, other vascular disease or diabetes of $>$20 years duration, severe cirrhosis, and hepatocellular adenoma and malignant hepatoma.

Medical Benefits

Reduction of Menstrual Bleeding. DMPA has a tendency to decrease menstrual bleeding, or cause amenorrhea. Reduction in menstrual bleeding can be particularly helpful for teens with menorrhagia or dysmenorrhea. In a prospective study of adolescents who selected DMPA, 60% were amenorrheic by the end of 6 months of treatment.[161]

Cardiovascular Safety. DMPA does not contain estrogen, which minimizes the complications that can be caused from estrogen. Studies performed have not found an increase in adverse cardiovascular effects, including venous thrombosis, stroke, or myocardial infarctions, in women who are either past or current DMPA users.[147,151]

Reduced Risk of Ectopic Pregnancy. Women who use DMPA have a reduced risk of ectopic pregnancies compared with women using no contraception. However, pregnancies and ectopic pregnancies can still occur while using DMPA. In one study, 1.5% of women who got pregnant using DMPA had an ectopic pregnancy.[162,163]

Seizure Prevention. DMPA seems to have antiseizure properties. It has been studied as the treatment for seizures[164,165] and should be considered for contraception in patients with seizures.

Reduced Sickle-Cell Pain Crises. DMPA reduces pain crises in patients with sickle-cell disease. In a 1-year study done to assess possible effects of contraceptives on patients' painful crises found that at the end of 12 months, 70% of patients receiving DMPA were pain free, and only 16% of those having pain crises rated them as severe. In contrast, 50% of the controls reported an improvement in their painful crises, which the authors thought was because of closer medical attention.[166]

Decreased Risk of Pelvic Inflammatory Disease (PID). Although there is no decreased risk of cervicitis with DMPA, the risk of acquiring PID is reduced. This is thought to be because of thickened cervical mucus, preventing bacteria from traveling to the upper genital tract.[167]

Decreased Risk of Endometrial Cancer. In a case-control WHO study of the relationship between DMPA and endometrial cancer, DMPA decreased the prevalence of endometrial cancer by 80%, and was associated with a greater protective effect against endometrial cancer than that seen with COCs.

Medical Risks

Effect on BMD. A primary concern for the use of DMPA is its impact on BMD. This is particularly important for adolescents because this is the time period when most bone mineralization occurs. In November 2004, the FDA issued a black-box warning for DMPA, stating that bone loss increases with prolonged DMPA use, and may not be reversible. The clinically relevant questions are whether these BMD changes are reversible on DMPA cessation, and whether the risk for fracture is increased.

Studies to date are reassuring and suggest that bone loss is reversible. One study of 170 adolescents aged 14-18 years with 80 DMPA users and 90 age-similar controls monitored BMD every 6 months for 24-36 months and after discontinuation of the method.[168] In this study, BMD at the spine and hip significantly declined in DMPA users. However, there were significant gains of BMD postdiscontinuation. In another study of 98 adolescents aged 12-18 years, BMD was measured while receiving DMPA and then for 240 weeks after DMPA discontinuation.[169] Within 60 weeks of discontinuation of DMPA, the lumbar spine BMD had returned to baseline, and at 240 weeks after discontinuation, the lumbar spine BMD was above baseline. The rate of recovery of BMD in the hip was slower than the spine, but did show full recovery by 240 weeks after discontinuation of DMPA.

The data regarding the long-term clinical outcome of fracture risk are limited. In a recent case-control study of participants aged 20-44 years, the use of DMPA was associated with a slightly increased risk of fractures, compared with nonusers.[170] The risk was mainly increased in women taking DMPA for >2-3 years, with an odds ratio of developing a fracture in users compared with nonusers of 1.54. Still, the fracture risk seems to be reversible, as the increased risk disappeared when DMPA had been discontinued >720 days.

The current WHO recommendation for adolescents states, "the advantages of using DMPA generally outweigh the theoretical safety concerns regarding fracture risk. Since data are insufficient to determine if this is the case with long-term use among these age groups, the overall risk and benefits for continuing use of the method should be reconsidered over time with the individual user."[48] In a position paper for the Society for Adolescent Health and Medicine, the primary recommendation is to continue to prescribe

DMPA with counseling about risks and benefits in most of the adolescent population who are using or interested in using this method.[171]

Weight Changes. Weight gain with the use of DMPA is a commonly reported side effect, but it is not seen in all patients. Weight gain appears to be more likely for adolescents, although this is complicated by the fact that all female adolescents do gain more weight per year than adults. The subgroup most at risk for weight gain seems to be obese adolescents. A study of 450 adolescent girls aged 12-18 years examined weight changes in a cohort of obese and nonobese adolescent girls initiating DMPA, COC, or no hormonal method.[172] DMPA use was associated with the most weight gain in obese participants. At 18 months, the mean weight gain was most significant in girls using DMPA who were obese at baseline with 9.4 kg gained over 18 months in this population. Nonobese patients using DMPA gained 4 kg during this time period. A retrospective chart review of female adolescents showed similar results.[173] The authors measured the weight change at 1 year of DMPA or COC use in 239 female adolescents aged 12-19 years. Those using DMPA gained significantly more weight than those using COCs (8.9 vs 4.7 pounds). After adjusting for age, race, and the contraceptive method, the initial body mass index was the primary factor associated with more significant weight gain during the first year of use. However, the data on this topic are not completely consistent. A recent prospective study of adolescent girls aged 15-19 years also investigating weight change with different contraceptive methods, found there were no differences in weight gain between nonobese and obese women.[174] However, the study did show women using DMPA gained more than twice as much weight as those using COCs or no hormonal method. Consideration should be given before initiating DMPA in an obese patient, and counseling should be given to all patients about potential weight gain.

Mood Disturbances. Some patients may experience increased mood disturbances with the use of DMPA, although the data on this association are not consistent. A prospective study was done of 39 adolescents using DMPA compared with 24 nonusers.[175] Two standardized questionnaires (Beck depression inventory and Multiple Affect Adjective Checklist–Revised) were administered at 3, 6, and 12 months. Adolescents using DMPA showed no depressive symptoms on the Beck depression inventory, or positive or negative changes in affect on the Multiple Affect Adjective Checklist–Revised. A second multicenter prospective study also found that DMPA does not worsen a woman's mood.[176] In this study, 495 women using DMPA were evaluated for depression before initiating the method and then again 1 year later. Women with preexisting depression were unlikely to have their mood worsened with DMPA. Furthermore, women who continued the method had lower depressive symptom scores at baseline than did the women who discontinued the method or who were lost to follow-up. In women who continued DMPA, their depressive symptom scores improved slightly at 1 year. Those subjects with the highest (ie, worst) scores at enrollment demonstrated improved scores at follow-up. However, another prospective study found differing results.[177] A total of 183 women aged 18-39 years using DMPA and 274 nonusers were administered questionnaires at 6- month intervals up to 3 years. In this study, there was an increased likelihood that DMPA users would report depressive symptoms, compared with nonusers.

Despite conflicting results, discontinuing or withholding DMPA from women with depression is not recommended. According to the CDC Medical Eligibility Criteria, depression is category 2 (benefits usually outweigh risks).[48] Certainly, health care providers should ensure mental health follow-up in patients with depression, regardless of their method of contraception.

Anaphylaxis. Severe anaphylactic reactions can occur immediately after receiving the injection; however, this is rare. History of previous allergic-type reactions from DMPA would be a contraindication.[178]

Advantages (Patient Perspective)

DMPA is effective, and patients can feel confident that they are receiving a highly effective method of contraception. Another advantage for some patients is the high possibility of decreased menstrual bleeding or amenorrhea. This is considered a benefit to many patients, certainly for women with menorrhagia or dysmenorrhea. A third advantage of the method is convenience. Compared with pills, patch, and the ring, this method requires attention only every 3 months when the teen needs to return for reinjection.

Disadvantages (Patient Perspective)

Although some patients appreciate the decreased menstrual bleeding, others consider this a disadvantage of the method. Some teens appreciate the reassurance of lack of pregnancy with a monthly period.

As mentioned earlier, potential weight gain can occur with this method. This is a deterrent for some youth and a reason for either not starting or discontinuing the method. Patients should be counseled about menstrual changes and the possibility of weight gain before initiating DMPA.

Although a convenient method for some, others may find that seeking medical attention every 3 months for injections challenging. Another disadvantage some teens notice is headaches. In a study of 3875 women using DMPA, 17% had headaches.[179] Although the data studying the association between headaches and DMPA are limited, it is not an uncommon symptom reported by patients. A final disadvantage, as is seen with all of the other methods with the exception of condoms, is that there is no protection from STIs, and patients need a dual method of condoms with DMPA to reduce their risk of acquiring STIs.

Adherence

DMPA injections every 3 months have been thought to be an easier method for teens to adhere to, as there is no maintenance on a daily, weekly, or monthly basis. However, in a recent 12-month longitudinal cohort study of adolescent females aged 15-24 years, the continuation rate for DMPA was discouraging.[11] In a comparison of the patch, ring, pills, and DMPA, the continuation rate (per 100 person years) at 12 months was low for all methods. However, the rates were lowest for the patch and DMPA, 10.9 and 12.1 per 100 years compared with ring and pill users at 29.4 and 32.7 per 100 person-years, respectively. The majority of DMPA users discontinued the method by 4 months. As concluded by the authors, the "real life" view of what happens once a contraceptive method is initiated highlights the need for counseling interventions to improve contraception continuation.

Patient Counseling

The most common reasons why adolescents discontinue DMPA are irregular menstrual bleeding (64%), weight gain (41%), and increased headaches (30%).[180] Patients should be counseled before initiating the method about the possibility of these side effects. Patient concerns about these symptoms should not be dismissed, as they may lead to discontinuation of the method.

Follow-up. DMPA-IM is given every 11-13 weeks and DMPA-SC every 12-14 weeks. The product labeling recommends administering the first injection only during the first 5 days of a normal menstrual period to ensure that the patient is not pregnant, although in practice, this is infrequently done because quick start has become more commonplace. If exclusively breastfeeding, women should wait 6 weeks postpartum before administering the medication. If the time interval between injections is >13 weeks, the physician should determine that the patient is not pregnant before administering the drug.[181] It is important to avoid massaging over the injection site, as it can decrease efficacy.[182] At each follow-up visit, monitor the patient's weight and screen for side effects.

Medication Interactions

Another benefit of DMPA is the lack of drug interactions. Aminoglutethimide (Cytadren, Novartis Pharmaceuticals Corporation, East Hanover, NJ) is the only drug known to reduce its effectiveness. Fortunately, this is an uncommonly administered medication used to suppress adrenal function in some people with Cushing syndrome.[183]

Long-Acting Reversible Contraceptives

One topic that warrants special consideration is the newer long-acting reversible contraceptives, including the implant and the IUD. Substantial recent evidence offers hope that this form of contraception may be a more effective alternative for adolescents than methods that rely on daily, weekly, monthly, or intercourse-related use.

Etonogestrel (ETN) Implant (Implanon or Nexplanon, Merck & Co., Inc., Whitehouse Station, NJ)

Mechanism of Action

ETN implant is an off-white, ETN-containing single sterile rod implant placed subdermally in the inner upper arm. The small implant is only 4 cm in length, and has a diameter of 2 mm.[184] The ETN implant provides up to 3 years of contraceptive protection and has 3 primary mechanisms of action. It suppresses ovulation, thickens the cervical mucus, and causes thinning of the endometrium.[185]

Efficacy

The ETN implant is one of the most effective methods of contraception. This method does not re-

quire adherence, and, therefore, the perfect-use and typical-use failure rates are the same at 0.05%. The outstanding efficacy is a major benefit for teens.[77]

Contraindications

Fortunately, the absolute contraindications with the ETN implant are minimal. Current breast cancer is the only absolute contraindication to using this method. Category 3 contraindications, where a condition for which the theoretical or proven risks usually outweigh the advantages of using the method, include the following: liver tumors, cirrhosis, unexplained vaginal bleeding before an evaluation, positive or unknown antiphospholipid antibodies, ischemic heart disease, and stroke.[48]

Medical Benefits

The contraceptive efficacy and safety profile, as discussed earlier, are important medical benefits with using this method. Another benefit includes a reduction in the risk of ectopic pregnancies. In fact, there have been no reported ectopic pregnancies in the ETN implant users.[186] An additional notable benefit is a reduction in pain symptoms for patients with endometriosis.[187]

Medical Risks

Weight Gain. In clinical studies, the mean weight gain in U.S. ETN implant users was 2.8 pounds at 1 year and 3.7 pounds after 2 years. However, these studies did not include a comparison group of women not using the ETN implant. However, weight gain still has clinical implications as 2.3% of ETN implant users reported weight gain as the reason for having the ETN implant removed.

Ovarian Cysts. Developing ovarian cysts or enlarged ovarian follicles during the first year of use of the ETN implant is common. The cysts usually resolve without treatment, do not require intervention, and should not be interpreted as pathologic.[188]

Lack of Protection Against STIs. As with other hormonal contraceptive methods, this method does not protect against STIs and requires dual use of condoms to reduce the risk of pregnancy and STIs.

Possible Increased Risk of VTE. The progestin in the ETN implant, ETN, is a metabolite of desogestrel, which can increase the risk of VTEs in users of COCs containing the same hormone. However, no studies have shown that ETN implants increase the VTE risk, and the WHO Medical Eligibility Criteria does not distinguish the progestin in DMPA versus ETN implant in terms of risk for VTEs.[189]

Advantages (Patient Perspective)

Ease of Use. ETN implant is a highly effective form of contraception that is "forgettable" for 3 years. The teen does not need to see a doctor or a pharmacy for the purpose of contraception while the ETN implant is in place.

Discreet. ETN implant is virtually invisible, and therefore a good option for those who want to keep their contraception private.

Breastfeeding. ETN implant can be used safely during breastfeeding, which makes it a good option for some teens postpartum.[190]

Improvement of Acne. A noncontraceptive benefit that may be appealing to teens is that ETN implant may improve acne. In a 2-year single-arm study, of the 84 patients who had acne at the initiation of the study, the majority reported that their acne had improved or was unchanged. Only 8% reported that their acne had worsened.[191]

Reduction of Dysmenorrhea. In the same 2-year single-arm study mentioned earlier, of 187 women who had dysmenorrhea at the study initiation, the majority reported improvement of these symptoms with ETN implant in place.[191]

Disadvantages (Patient Perspective)

Change in Menses. ETN implant can change the teen's bleeding pattern and cause "irregularly irregular menses," which can include frequent irregular bleeding, heavy menstrual flow, prolonged bleeding, amenorrhea, or spotting.[192,193] This nonpatterned bleeding should be thoroughly discussed with young women before insertion to minimize discontinuation. A study of 1183 women reported an unfavorable bleeding pattern in almost one-third of women, and bleeding was the most common reason for implant removal.[194] The mechanisms of vaginal bleeding disturbances are complex and poorly understood. The data for how to manage the irregular bleeding are limited. The use of estrogen, nonsteroidal anti-inflammatory drugs, COCs, and watchful waiting have all been used, but there is no substantial evidence for any individual therapy, particularly for long-term use.[195,196] EE (not other estrogens) will terminate a bleeding episode and may help women to cope in the early months of implant use until bleeding patterns improve spontaneously with time.[197] Fortunately, 50% of women with

irregularly irregular bleeding will continue to improve over time with decreased frequency and volume of menstrual bleeding.

Other disadvantages that have been reported are headache, breast pain, emotional lability, and depression. No randomized control trials have been done establishing a direct association between the reported effects and the ETN implant.[198] Among U.S. ETN implant users, 6.1% experienced emotional lability that led to discontinuation and 2.4% experienced depression that led to discontinuation of the ETN implant.[184]

Adherence

Adherence with the ETN implant is a nonissue because once the implant is inserted, there is no additional attention required for 3 years. Continuation with the method is also more promising than other methods. In a prospective cohort study of 48 postpartum teenagers aged 12-18 years, those using the ETN implant were significantly less likely to become pregnant and were found to continue with this method of contraception longer compared with those who choose COCs or DMPA; the mean duration for ETN implant users was 18.7 months (95% CI: 17.0-20.3) compared with 11.9 months (95% CI: 9.5-14.3) for COC/DMPA.[199]

Unfortunately, despite ease of continuation and high efficacy in pregnancy prevention, many young women choose to discontinue this method early because of problems with unpredictable irregular bleeding.

Patient Counseling

Patients should be counseled carefully regarding menstrual cycle changes that are likely to continue over time, as some patients may not be good candidates if they find those effects to be too bothersome. Their current medication list and any medications they may begin in the future (medication interactions are listed later in the text) must be discussed.

Medication Interactions

Taking other drugs that inhibit hepatic cytochrome P (CYP3A) enzymes may increase serum ETN concentrations and risk toxicity. Potent CYP3A inhibitors include amiodarone, atazanavir, cisapride, clarithromycin, itraconazole, ketoconazole, nefazodone, nelfinavir, ritonavir, telithromycin, troleandomycin, and voriconazole. Moderate CYP3A inhibitors include amprenavir, aprepitant, ciprofloxacin, diltiazem, erythromycin, fluconazole, fluvoxamine, fosamprenavir, grapefruit juice, norfloxacin, and verapamil. In addition, drugs that induce CYP3A4 may decrease the efficacy of ETN and cause unintended pregnancies. CYP3A inducers include carbamazepine, efavirenz, nevirapine, phenytoin, phenobarbital, rifabutin, rifapentine, rifampin, St. John wort, and topiramate in doses >100 mg/day.[200] There are cases in the medical literature of pregnancies occurring while the implant was intact, but these women were taking concomitant and interfering medications.[201]

Bone Density, Is It a Concern?

As discussed earlier, BMD is a concern with prolonged use of DMPA. Fortunately, despite common misperceptions, implants are not associated with decreased BMD. In a prospective 2-year comparison study of 44 women with single-rod implants and 29 women with nonmedicated IUDs, BMD was measured using dual energy x-ray absorptiometry at the lumbar spine.[202] The changes in BMD were similar between the 2 groups. In fact, the only statistically significant difference between the 2 treatments was an increase in BMD at the lumbar spine with ETN implant users.

Intrauterine Device (IUD)

IUDs are one of the most popular forms of reversible contraception used worldwide. However, in the United States, IUDs are underused with 5% women aged 15-44 years reporting IUD use, compared with 17% using the pill. An even smaller percentage of adolescents are choosing IUDs as their method of contraception, with 1% of U.S. teens aged 15-19 years reporting use of IUDs from 2006 to 2008.[203] Despite the underuse of the method, there are many advantages to using IUDs, particularly among adolescents, which will be discussed later in the text. The 2 IUDs available in the United States are LNG intrauterine system (Mirena, Bayer HealthCare Pharmaceuticals, Berkeley, CA) and then CopperT380A (ParaGard, Teva Women's Health, Sellersville, PA).

Copper IUD (ParaGard)

Mechanism of Action

The Copper T380A IUD is a T-shaped device measuring 32 mm horizontally and 36 mm vertically, with a 3-mm diameter bulb at the tip of the vertical stem. Copper wire surrounds the vertical stem, and the

horizontal arms are encased in solid copper.[204] The copper IUD causes a cytotoxic reaction with an increase in copper ions, enzymes, prostaglandins, and white blood cells in the uterine and tubal fluids. This reaction interferes with sperm transport and prevents fertilization and implantation.[204,205]

Efficacy

Along with the ETN implant, the IUD is in the top tier of contraceptive effectiveness. The perfect-use failure rate is approximately 0.6%, and the typical-use failure rate is approximately 0.8%.[77]

Contraindications

The main categories of contraindications for using the copper IUD involve pregnancy, infection, bleeding, anatomic abnormalities, and malignancies. The absolute contraindications include pregnancy, puerperal sepsis, immediate postseptic abortion, unexplained vaginal bleeding before evaluation, gestational trophoblastic disease (persistently elevated β-human chorionic gonadotropin levels or malignant disease), cervical or endometrial cancer, anatomic abnormality of the uterine cavity, current PID, current purulent cervicitis or chlamydial infection or gonorrhea, and pelvic tuberculosis.[48]

Medical Benefits

An important health benefit of the copper IUD is protection from endometrial cancer.[206] Although the mechanism of action is unknown, 6 of 7 case-control studies found protection against endometrial cancer when using nonmedicated or copper IUDs.[207]

Medical Risks

The primary medical risks with the copper IUD include expulsion, perforation, and pregnancy. Between 2% and 10% of women experience expulsion of their IUD during the first year of use. The risk of expulsion is increased with younger age, and therefore, this is important to discuss with adolescents. Increased menstrual flow and dysmenorrhea are additional risk factors for expulsion.[208] Perforation of the uterus is rare and is estimated to occur in approximately 1 per 1000 insertions.[209] An increased risk of perforation is associated with a less experienced clinician doing the insertion.[210] A third risk is pregnancy while an IUD is in place, as the clinician must determine whether it is an intrauterine or ectopic pregnancy. A pregnancy that occurs with the copper IUD in place is more likely to be ectopic than a pregnancy in the general population. However, because the copper IUD reduces the overall sheer number of pregnancies, teens who use the copper IUD have a lower risk of ectopic pregnancy than in women who do not use any contraception.[211,212]

Advantages (Patient Perspective)

As mentioned earlier, the copper IUD has the advantage of being a highly effective method. Additionally, the copper IUD is approved for 10 years of continuous use and therefore has the advantage of being both convenient and easy to use.[204] Furthermore, the copper IUD is a safe and appropriate method for many women for whom estrogen is contraindicated.

Disadvantages (Patient Perspective)

The 2 major disadvantages for patients include menstrual effects and pelvic cramping. Irregular bleeding is common during the few months after insertion of the IUD. The bleeding seen with the copper IUD is usually heavier than that seen with the LNG intrauterine system particularly during early use.[205] Fortunately, over time, bleeding during the time of menses tends to decrease. However, bleeding during intramenstrual intervals continues for many patients.[213]

The second major disadvantage is pelvic pain. After the initial pain at the time of IUD insertion and 10-15 minutes postinsertion,[205] many women experience recurrent pelvic pain. Menstrual pain tends to decrease over time, similar to the pattern seen with bleeding, but nonmenstrual pain can persist.[213]

Adherence

As long as the copper IUD remains in place, there are no adherence issues.

Patient counseling

Counseling. It is important to educate teens about disadvantages, including bleeding and cramping, and possible medical risks. Take the opportunity to address the commonly held beliefs with IUDs, as described later in the text. As with the other methods, counsel patients about the lack of protection from STIs with this method, condom use, and risk reduction. Teens should also be advised on how to check for the string ends. In the first few months after IUD insertion, they should check for string ends every few days. Teens should schedule a follow-up visit at 1 month. Advise the patient to return sooner if they cannot feel the IUD

string, if the string seems too long, or if the IUD is palpable in the cervix.[205] Check-in with teens about any bleeding, spotting, or pain, and offering nonsteroidal anti-inflammatory drugs may help avoid early discontinuation of the method.[205]

Medication Interactions

There are no appreciable medical interactions for using copper IUD.

LNG-IUD (Mirena)

Mechanism of Action

The LNG-IUD is a T-shaped polyethylene frame with a steroid reservoir containing 52 mg of LNG packaged within a sterile inserter.[214] In vivo, it initially releases 20 mcg of LNG daily, but the dose declines by approximately 50% after 5 years. At that time, the LNG-IUD should be replaced.[214] The exact mechanism by which the LNG-IUD prevents pregnancy is unknown, but there are likely several factors involved. These primary mechanisms are likely thickening of the cervical mucous and inhibition of sperm motility.[215] In addition, there is inhibition of ovulation in some women.[216]

Efficacy

As mentioned earlier, IUDs are among the most effective forms of contraception. There are no differences between the perfect- and typical-use failure rates of this method, making it an excellent method with which adolescents can adhere. It is estimated that 0.2% of women will experience an unintended pregnancy within the first year of use with the LNG-IUD.

Contraindications

The contraindications for the LNG-IUD are the same as those mentioned with the copper IUD.[48]

Medical Benefits

An important medical benefit appreciated with this method is the treatment of menorrhagia. The use of this method results in a reduction of menstrual blood loss by 86% at 3 months, and 97% at 6 months with improved anemia.[217] At 24 months, 50% of users have amenorrhea and 25% have oligomenorrhea.[218] As a result of this benefit, the LNG-IUD was approved by the FDA in October 2009 for treatment of heavy menstrual bleeding.[219] In addition, there is some evidence that the LNG-IUD system can be used to treat bleeding associated with leiomyomas[206,220] and adenomyosis.[206,221]

Medical Risks

The medical risks are similar to those mentioned for the copper IUD and include expulsion, perforation, and pregnancy.

Advantages (Patient Perspective)

The advantages are similar to those for the copper IUD including convenience (LNG-IUD remains in place for 5 years), efficacy, and safety for patients who cannot use estrogen. For the LNG-IUD specifically, there is the added advantage of decreased menstrual bleeding and cramping. In addition, the LNG-IUD has higher continuation rates. In a multicenter, randomized, controlled, participant-blinded pilot study of 23 adolescents aged 14-18 years assigned to the copper IUD or the LNG-IUD, participants were followed up for 6 months after insertion. At 6 months, the continuation rates were 75% for the LNG-IUD users, compared with 45% for the copper IUD users.[222] Although these are promising results, a larger study is needed in the future.

Disadvantages (Patient Perspective)

Menstrual changes and pelvic pain are seen with both types of IUDs. However, as mentioned earlier, there is a marked decrease in menstrual bleeding over time with the LNG-IUD. This can be perceived as an advantage or disadvantage, depending on the individual.

Adherence

For further discussion, refer to the section of the Copper IUD.

Patient Counseling

For patient counseling, refer to counseling under the section of Copper IUD.

Medication Interactions

Drugs or herbal products that induce the CYP3A4 enzyme may decrease the serum concentration of progestins and thus decrease LNG-IUD efficacy. These drugs include barbiturates, bosentan, carbamazepine, felbamate, griseofulvin, oxcarbazepine, phenytoin, rifampin, St. John wort, and topiramate. Additionally, either increasing or decreasing serum concentrations of the

TABLE 3. Which IUD is right for me?

	Copper IUD	Hormonal IUD
Brand name	Paragard	Mirena
How long can one IUD stay in the uterus?	10-12 years	5-7 years
Does it contain hormones?	No	Yes, low dose of progestin (no estrogen)
Side effects	Heavy periods	Spotting
	Cramps with period	Less common: bloating, nausea, headaches, breast pain
		No period after a few months: this is not risky, and many women like it
Benefits	No need to think about birth control at any time	No need to think about birth control at any time
	Private	Private
	Works better than the pill, the patch, the ring, or the shot	Works better than the pill, the patch, the ring, or the shot
	Can be used while breastfeeding	Can be used while breastfeeding
	Can be used as emergency contraception	Can decrease heavy periods, cramps, PMS
Cost	Covered by most insurance plans	Covered by most insurance plans
	If not covered, may cost a few hundred dollars	If not covered, may cost a few hundred dollars

PMS, premenstrual syndrome.
Accessed from http://www.rhedi.org.

progestin has been observed with coadministration of HIV protease inhibitors or with non-nucleoside reverse transcriptase inhibitors.[214]

Common Misconceptions About IUDs: Concerns About PID and Infertility and Use in Nulliparas

IUDs Do Not Cause PID

A common myth about IUDs is that they increase the risk of PID. This has been a longstanding concern arguing against placing IUDs in teens because they have a high incidence of STIs. However, it is now known that a preexisting STI at the time of insertion, not the IUD itself, increases the risk of PID. However, this risk is eliminated if screening and treatment of STIs are done before insertion. The incidence of PID is rare beyond the 3 weeks after insertion.[223,224] In addition, IUD users who develop an STI or PID should be tested for relevant organisms and treated appropriately. Evidence is insufficient to recommend the IUD be removed in women diagnosed with acute PID.[225]

IUD Does Not Cause Infertility

Previous use of a copper IUD is not associated with an increased risk of tubal occlusion and ultimately infertility among nulligravid women. In a case-control study of 1895 women, history of chlamydial infection was associated with an increased risk of infertility, rather than the past use of copper IUDs.[226]

Appropriate for Nulliparous and Parous Adolescents

Contraceptive efficacy, convenience, and high continuation rate makes the IUD an excellent contraceptive method for adolescents. They are safe methods to use in nulliparous women.[227-229] The CDC Medical Eligibility Criteria classifies women from menarche to <20 years and nulliparous women as category 2, where the advantages of using the method generally outweigh the theoretical or proven risks.[48] Despite the safety and appropriateness of the method, 55% of adolescents at an urban family planning clinic had not heard of the IUD. Participants who had heard of the IUD from a health care provider were 2.7 more likely to be interested in using the method.[230] Providers of adolescents should be encouraged to talk to their patients about this method.

IUDs Are Not Abortifacients

The mechanism of action of the 2 IUDs differs as outlined earlier, but neither will cause an abortion.[231]

Table 3 shows a http://rhedi.org patient education handout describing the differences between the IUD types.[47]

Other Methods

Other methods such as the diaphragm and cervical cap are not commonly used in adolescents and therefore are beyond the scope of this article. However, we

will discuss withdrawal later in the text because it is one of the most commonly used methods among adolescents, with 55% of adolescents aged 15-19 years reported having used withdrawal as their method.[87,88]

Withdrawal

Mechanism of Action

Withdrawal, or coitus interruptus, is characterized by withdrawal of the penis from the vagina before ejaculation in an attempt to prevent the sperm from fertilizing the egg. The male partner must take responsibility for knowing when he is going to ejaculate, and must withdraw at the appropriate time.

Efficacy

As noted in the Mechanism of Action, this method and its efficacy rely on the male partner's ability to withdraw before ejaculation. An estimation of the proportion of women becoming pregnant during a year of perfect use withdrawal is 4%. However, given the challenge of using this method correctly, among typical users, 27% of women would become pregnant during the course of the year.[77] This failure rate, similar to the failure rates of diaphragms and spermicides used alone, is an unacceptable probability for teens trying to prevent pregnancy.

Medical Benefits

One benefit of this method is the lack of medical side effects, including no allergies, chemicals, or adverse reactions. Another potential benefit is that withdrawal may decrease the risk of acquiring HIV. Compared with unprotected intercourse with ejaculation, studies have demonstrated that withdrawal may reduce the risk of acquiring HIV infection in women from a stable infected male partner.[232]

Medical Risks

Despite the protection from HIV compared with unprotected intercourse with ejaculation, using withdrawal as a method does put patients at risk for acquiring STIs. Partners are exposed to infections spread on mucosal surfaces, as well as in some preejaculatory fluid.

Advantages (Patient Perspective)

Advantages include affordability, availability, and accessibility. The patient does not need contact with health care provider or pharmacy to use the method. Another advantage is that unlike many other methods of contraception, male partners can take an active role in preventing pregnancy.

Disadvantages (Patient Perspective)

Male partners may struggle with correct and consistent use of this method, which increases the likelihood of pregnancy. The challenge of perfect use with this method is demonstrated by the estimate that >1 in 4 typical users will become pregnant by the end of the year.

Adherence

It is estimated that the number of women continuing this method at 1 year is 43%.[77] With frequent follow-up and method counseling by a medical provider, however, a more effective method may be initiated.

Patient Counseling

Providers may not consider this a method of contraception because of the poor efficacy with typical use. However, with 55% of adolescents having used this method, we do need to acknowledge and counsel on withdrawal. Patients may not appreciate their risk of getting pregnant or causing a pregnancy with this method, and we as providers can provide them with this information. Offer more reliable effective methods during your counseling time with the patient. They should be counseled on the need for condoms to decrease their risk of acquiring STIs and HIV, as well as EC. If possible, schedule the patient to return to clinic often to readdress their interest in more effective contraceptive methods.

Vaginal Spermicides

Mechanism of Action

Spermicides function as a chemical barrier. They are applied intravaginally, and available in multiple formulations including gels, foams, creams, suppositories, films, and tablets. Similar to withdrawal, spermicides are not recommended to be used alone as a form of contraception.

Efficacy

The primary reasons to counsel against the use of spermicides alone are the lack of efficacy in preventing pregnancy and possible increased risk of STI and

HIV acquisition due to mucosal irritation and breakdown. It is estimated that the percentage of women who would become pregnant in 1 year using spermicides correctly and consistently is 18%. With typical use, 29% of women are estimated to become pregnant at the end of the first year.

Medical Benefits

There are minimal significant side effects and no absolute contraindications to using vaginal spermicides.

Medical Risks

Despite common misconceptions, spermicides do not provide protection from STIs.[233] In fact, spermicides may increase the transmission of HIV and other STIs when used during either vaginal or rectal intercourse.[234] The FDA now requires labels to warn consumers of the risk of mucosal chemical irritation to the vagina and rectum, which may increase the risk of contracting STIs and HIV from an infected partner.[235] Condom use is essential to reduce the risk of acquiring STIs.

Advantages (Patient Perspective)

Advantages include accessibility and availability. Patients can purchase the method over the counter, without the need of a medical provider or pharmacy.

Disadvantages (Patient Perspective)

Vaginal and urethral irritation, burning, and itching have been reported.[236] Some women find that spermicides leak or are messy. An additional disadvantage is the requirement for appropriate timing of insertion before intercourse, which can be challenging for many individuals.

Adherence

The percentage of women estimated to be using this method at the end of the year is 42%.[77] However, with the lack of efficacy, compliance with spermicides does not indicate protection from pregnancy.

Patient Counseling

As with the withdrawal method, make patients aware of the unacceptable risk of pregnancy and increased STI risk with this method of contraception. Offer more reliable methods during your counseling with the patient. Counsel on the need for condoms to decrease his/her risk of acquiring STIs and HIV and discuss the use of EC. Try to schedule the patient to return to the clinic often to readdress his/her interest in more effective contraceptive methods.

Contraception in Adolescents with Chronic Illness, Disability, or Multiple Medications

The most salient point for the pediatric clinician to keep in mind when considering the reproductive health needs of youth with chronic conditions and disabilities is that they, like all humans, are sexual beings with drives, desires, and patterns of sexual behavior in adolescence that are more similar than different from their nonaffected peers. Despite some differences, data related to age at consensual sexual debut are remarkably similar to nondisabled adolescents.[237] Where there are demonstrated differences, they are related to the type of relationship in which first intercourse occurs, the extent of discussion regarding contraception with partners, and pregnancy desire. A relevant finding regarding pregnancy desire is that young women with multiple or function-limiting disabilities are more likely to desire pregnancy at first intercourse.[237] However, of importance to note is that adolescent girls with a physical limitation or chronic condition are more likely to report experiencing forced sex than their nonaffected peers.[238]

Apart from the need for contraception for pregnancy prevention, adolescents with mobility restrictions, spasticity, autism, intellectual disabilities, and other conditions, as well as their caregivers, may request menstrual management because of physical challenges or behavioral issues related to menstruation. For those without contraindications to the use of estrogen, a simple approach is the use of extended cycling with combination hormonal contraception, as discussed in previous sections. Capitalizing on the reduced bleeding/amenorrhea induced by progestin-only methods is another approach that can be used to reduce or eliminate menstrual bleeding. It is essential that the clinician clearly ascertain the desired outcome . . . is the goal predictable bleeding, less bleeding, and reduced dysmenorrhea, eliminating bleeding or reducing hormonal cycling, as the mechanism of action must be considered and matched to the goal. For example, the LNG-IUD reduces bleeding and induces amenorrhea, but it does not consistently suppress ovulation, and so hormonal cycling continues.

Before prescribing contraception for an adolescent with a chronic condition or disability, a thorough review of the CDC Medical Eligibility Criteria[48] is necessary to avoid an unanticipated contraindication. The reader who desires further detailed information on specific conditions and appropriate contraceptive methods can refer to an extensive review by Bacopoulou et al.[239] as well as the American Congress of Obstetricians and Gynecologists Practice Bulletin on "Use of Hormonal Contraception in Women With Coexisting Medical Conditions."[240]

Contraceptive choice may be limited because of drug interactions that impact the efficacy of the condition-treating medication and/or of the contraceptive. For those youth with verbal or cognitive impairments, obtaining a complete medication history may require parental participation. Of equal importance is a clearly communicated message that hormonal contraceptives are medications, even when the hormones are delivered through transdermal, intrauterine, intravaginal, or implanted modes, and therefore, it is essential that the youth (or parent/caregiver) always inform all health care providers about their use of hormonal contraception.

Potential drug interactions are of particular concern with youth with chronic conditions. They are more likely to be on long-term prescribed medications, and before engaging in contraceptive counseling, a detailed medication history is essential.

An additional concern related to multiple medication use and adolescents' risk for pregnancy is the use of teratogenic medications in adolescents. This concern is not limited to those youth with a typically identified chronic condition or disability, as teratogenic medications may be prescribed for common adolescent conditions as well. Considering the distinct likelihood that most youth (with or without chronic conditions) will become sexually active during their adolescence, all adolescents who are prescribed a category D or X drug should have a pregnancy test before drug initiation, receive contraceptive counseling, and be provided with an effective contraceptive method of their choice.[241] These steps are appropriate even in the adolescent who is not yet sexually active. Despite these common-sense recommendations, studies of adult primary care providers find that many do not provide adequate counseling and contraceptive services in these situations, which the providers attributed to lack of knowledge and time to engage in these essential services.[242] In fact, in a large study of pediatric and adult primary care providers, contraceptive counseling was provided in <20% of the visits that had documented use of a potential teratogen.[243]

Another essential consideration is whether the diagnosed condition or its treatment may alter the adolescent's clotting function (either pro- or antithrombotic effects). Again, contraceptive method choice and instructions for administration (eg, use of continuous hormonal contraception in young women with bleeding disorders) may be impacted by the patient's thrombotic function. The prothrombotic activity of estrogen-containing hormonal contraceptives has been addressed in earlier sections of this article. This activity poses a relative or absolute contraindication for the use of these methods in the patient with underlying thrombotic risk, but may alternatively become useful to achieve a therapeutic effect in those with conditions or medications that reduce clotting activity, such as some types of von Willebrand disease. In situations of absolute contraindication, a progestin-only or nonhormonal method should be recommended. In equivocal situations, the specific progestin in the combined hormonal method should be considered before prescribing, as the interaction between estrogen and the specific progestin contributes to the prothrombotic activity of the hormonal combination. Trenor et al recently published a useful comprehensive review, with recommendations related to the use of hormonal contraceptives and thrombotic risk, which can guide the pediatric clinician in the management of these complex situations.[115]

Other potential uses of the noncontraceptive benefits of hormonal methods include extended cycling with combination hormonal contraceptives or the use of progestin-only methods as useful adjuncts in the management of seizure disorders that are cyclic and linked to menses. The use of progestin-only methods may also improve red blood cell stability, reducing painful crises in women with sickle-cell disease.[244]

The pediatric clinician, with the support of up-to-date resources, can manage most problems related to contraceptive method choice in young women with

chronic conditions. However, good communication with the subspecialists involved in the patient's care is also highly advisable for a variety of reasons. Subspecialists are often familiar with common off-label prescribing practices to manage menorrhagia related to hematologic conditions, are more familiar with novel or experimental drugs used to treat the primary condition, and need to be informed of any medications that may impact on their management of the primary condition. A team approach is always advisable for the management of complex conditions, and contraceptive management in the context of chronic conditions is no exception. In their role as a patient's advocate, it is incumbent on the pediatric clinician to communicate with subspecialists about the confidentiality concerns of the youth and the level of parental knowledge and involvement in the youth's contraceptive management, highlighting the importance of building the young person's sense of autonomy, respecting their desires related to confidential services, and encouraging open communication between youth and their parents.

An Approach to Frequently Asked or Difficult Questions

The topics discussed next have been largely covered in the subsections on specific contraceptive methods. However, we will highlight the take-home messages of these controversial topics. A clear understanding of the evidence can prepare the provider to respond to difficult questions.

Will I Gain Weight? Weight gain with combination contraceptives is not supported by the evidence.[245] Weight gain is seen most frequently with DMPA, but is not seen in all women using DMPA. The subgroup most at risk for weight gain seems to be obese females, warranting consideration of other effective methods in an obese patient. Additionally, before initiating the method, counseling should be given to all patients about potential weight gain. Use this conversation as an opportunity to talk about healthy eating habits and exercise. At each follow-up visit, check weight and monitor for increasing trends. Have an open dialogue with the patient and encourage her to consider changing methods if weight is of concern.

Will My Bones be Affected by My Contraceptive Method? The majority of questions about bone health are with regard to DMPA. Despite the loss of BMD with the use of DMPA, studies are reassuring that the bone loss is reversible. Although there may be a slight increase in fracture risk with prolonged DMPA use, fracture risk also appears to be reversible. Both the WHO and Society for Adolescent Health and Medicine have published statements endorsing the use of DMPA in adolescents.[171,246] The risks and benefits for continuing use of the method should be reconsidered over time with the individual user.[246]

Questions also arise with combined hormonal methods, particularly with "ultra low-dose" COCs that contain <20 mcg of EE. Emerging evidence suggests that ultra low-dose COCs may adversely affect BMD in adolescents. More research is needed in this field. Have caution when prescribing newer even lower (ie, 10 μg EE) doses of COCs, particularly in patients already at risk for decreased bone density, such as patients with immobility issues or anorexia nervosa.

IUDs are among the most effective methods available. Time should be spent dispelling the common myths and considering this method for use in teens.

Am I at Risk for a Blood Clot With My Contraceptive Method?

As discussed earlier, adolescents have a low-baseline thrombotic risk of 1-10 per 100,000 per year. Although the risks of hormonal contraceptives do need to be carefully considered in an adolescent patient with thrombotic risk factors, it is important to remember that the risk of thrombosis with pregnancy is greater than the risk of all COCs.

For a patient who has thrombotic risk factors, it may be helpful to consider following guidelines for approaching hormonal therapy, such as the one compiled by a recent multidisciplinary collaboration.[115] They recommend the following steps:

1. Evaluate the indication for hormone therapy and whether both estrogen and progestin are needed.
2. Assess the patient's thrombotic risk, including their personal and family history.
3. Assess the patient's pregnancy risk, and provide education about unplanned pregnancies.
4. Discuss therapeutic options with the patient; consider the differing risk of hormone type, dosage, and mode of administration.

5. Assess the patient's preference.
6. Educate your patient about reducing their risk for thrombosis and symptoms of VTEs.

Will the IUD Lead to PID or Infertility? Can I Use It If I Have Never Had a Baby?

There are common misconceptions that both patients and their parents hold about the safety of IUDs. As mentioned earlier, a preexisting STI at the time of insertion, not the IUD itself, increases the risk of PID.[223,224] Therefore, the risk for PID is eliminated if screening for STIs is done before the insertion of the IUD. In addition, IUDs do not cause infertility. A history of chlamydial infection, rather than the past use of IUDs, is associated with an increased risk of infertility.[226] Patients and their parents may also question whether IUDs are appropriate in nulliparous adolescents, and clinicians can reassure them that they are safe methods to use in nulliparous women.[227-229] The CDC Medical Eligibility Criteria classifies women from menarche to <20 years and nulliparous women as category 2, where the advantages of using the method generally outweigh the theoretical or proven risks.[48]

Can I Rely on EC as My Primary Form of Contraception?

At this time, repeated use of EC is not recommended. Although safety is not a concern per se, counseling should emphasize that EC is appropriate for emergency use only and would be unacceptably ineffective as a primary contraceptive method.[71]

Resources for You and Your Patients

Providers

Adolescent Health Working Group: http://www.ahwg.net. A sexual health adolescent provider toolkit can be downloaded from the web site.

Journeyworks: http://www.journeyworks.com. It provides quality health promotion materials for providers.

Managing Contraception: http://www.managingcontraception.com. It provides up-to-date educational contraceptive resources to providers.

RHEDI: http://rhedi.org: RHEDI, the Center for Reproductive Health Education in Family Medicine. It provides clinical resources about contraception and useful fact sheets that can be printed for patients.

U.S. Medical Eligibility Criteria for Contraceptive Use, 2010: http://www.cdc.gov/mmwr.pdf. It provides recommendations about contraceptive use for women.

Patients

Bedsider: http://bedsider.org. It is a support network for birth control; includes information for patients, including where to find a doctor and find the right method; and other helpful facts to help continue your method.

Not-2-late: http://www.not-2-late.com. An EC web site for providers and patients that helps patients find EC providers, provides information, and a Q and A about EC.

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