Contraception

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Faculty Disclosure

Contributing faculty, Julie Quinn, MD, has disclosed no relevant financial relationship with any product manufacturer or service provider mentioned.

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The division planners and director have disclosed no relevant financial relationship with any product manufacturer or service provider mentioned.

Audience

This course is designed for gynecologists, primary care physicians, nurse practitioners, and other primary care health providers, such as pharmacists, physician assistants, and nurses, who care for women of childbearing age.

Accreditations & Approvals

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Course Objective

Newer contraceptive methods and new techniques for old methods (such as hysteroscopic sterilization) are attractive to patients, and their contraceptive provider (or referring provider) should have a grasp of the wide range of options. The purpose of this course is to provide healthcare professionals with the information necessary to advise patients and prescribe effective and appropriate contraceptives.

Learning Objectives

Upon completion of this course, you should be able to:

1. Compare the efficacy rates of different contraceptive methods.
2. Evaluate various barrier and spermicidal contraceptive options.
3. Analyze the action and side effects of different combination oral contraceptive pills.
4. Discuss the risks of long-term progestin-only contraceptive methods.
5. Outline the side effects and alternative indications for intrauterine devices.
6. Compare and contrast traditional (surgical) and hysteroscopic sterilization.
7. Identify special concerns in postpartum contraception.
8. Describe different methods of providing emergency contraception.

Pharmacy Technician Learning Objectives

Upon completion of this course, you should be able to:

1. Compare various barrier, spermicidal, implanted, and surgical contraceptive options.
2. Evaluate various pharmacologic forms of contraception.
3. Discuss issues related to postpartum and emergency contraception.

Sections marked with this symbol include evidence-based practice recommendations. The level of evidence and/or strength of recommendation, as provided by the evidence-based source, are also included so you may determine the validity or relevance of the information. These sections may be used in conjunction with the course material for better application to your daily practice.

INTRODUCTION

Contraception is a topic with which any provider seeing women in a primary care environment should be familiar. It can be challenging to stay up to date with all possible methods and to answer patients' questions about side effects and health risks. It is worthwhile, however, as helping women take control over their reproductive potential is arguably one of the most important jobs in medicine.

Adolescents represent a particular challenge in providing contraception. Although the teen birth rate has declined over the last 20 years and contraceptive use has increased, there remain ethnic, racial, geographic, and socioeconomic differences in the use of highly effective contraception. The teen birth rate in the United States is higher than that of most other developed countries [1; 2; 58]. Half of teen births occur in women who were not using any contraception at the time of conception, and four in five teen pregnancies are unintended [3; 4; 5]. Healthcare providers should have accurate, evidence-based information to provide to all patients, particularly adolescents. Information on highly effective, long-term contraceptive methods can help reduce the ethnic and racial disparity in the use of these methods. An understanding of how teens think about sex and birth control is also crucial, although beyond the scope of this educational activity [6].

The wide range of contraceptive methods and various delivery systems within methods presents a challenge for providers. New formulations are coming out constantly, fueled partly by patient demand for lower hormone doses and fewer side effects. As generics and shorter patents impact the bottom line of pharmaceutical companies, new birth control formulations and delivery systems abound [7].

BACKGROUND AND BRIEF HISTORY OF CONTRACEPTION

According to the Guttmacher Institute, an estimated 46 million women 15 to 49 years of age in the United States (63%) are sexually active but not trying to become pregnant [8]. Most women are able to become pregnant for about 40 years—almost half of their lives. Forty-five percent of pregnancies in the United States are unintended, and 1 in 20 reproductive age women have an unintended pregnancy each year, with almost half of those ending in elective abortion [69]. Unintended pregnancy rates are lower in women with higher education level attainment and higher socioeconomic status. More than half of unintended pregnancies occur in women "using contraception," but a method will obviously be less effective if not used consistently or properly or if it is not a good contraceptive choice for that patient [4; 8; 9; 69]. More than 99% of sexually active women between 15 and 44 years of age use at least one contraception method [8; 59; 60].

The recorded history of contraception is as old as that of pregnancy itself. Before dedicated methods were developed, withdrawal, induced abortion, and even infanticide were practiced. References to condoms made from animal bladders or intestines date back to 3000 B.C.E. [10]. Pessaries of honey, crocodile dung, and sodium carbonate were used in Egypt as far back as 1850 B.C.E., and there is evidence that linen sheaths were widely used in Egypt by at least 1000 B.C.E. [10; 11]. Around 600 B.C.E., a fennel-like plant was purported to be an oral contraceptive; unfortunately, this plant was harvested to extinction by 100 C.E. [11]. In the 1500s, when men used linen sheaths to protect against syphilis, crude spermicides were first attempted [4; 10; 11]. Animal intestine condoms were common in the 18th century, with rubber condoms becoming available in the 19th century [4; 10]. Rubber cervical caps and diaphragms have been in use since the early 1900s in Europe [4]. When combination oral contraceptive pills were introduced in the 1960s, the doses of both estrogen and progesterone were much higher than they are today. Gradually, the doses came down as the formulations were improved and refined.

Long-acting methods of contraception are the most effective. Sterilization, intrauterine devices (IUDs), and progesterone implants are superior to barrier methods and combined hormonal methods, largely because they eliminate user error [12]. Although induced abortion can be used as a method of contraception, the scope of this topic is beyond the range of this educational activity.

Many factors will influence the choice of contraceptive method. The cost-effectiveness of a particular method will come into consideration for most patients. In addition, many hormonal contraceptives also have non-contraceptive benefits and are often used for these reasons [4]. This course focuses, however, on the contraceptive uses of each method, with a brief description of non-contraceptive benefits. It is not the intention to review all possible indications for each method discussed herein. An overview of the effectiveness of each method, expressed as first-year failure rates, is provided as well.

BEHAVIOR-BASED METHODS

First, a note on abstinence. Primary or secondary abstinence is fairly common for contraceptive or other reasons. Patients who practice abstinence should still be educated about contraceptive options, any pertinent non-contraceptive benefits, and methods of preventing sexually transmitted infections (STIs) [4].

Behavior-based birth control methods, also referred to as natural family planning, such as "rhythm" and withdrawal, have limited efficacy. However, they are preferable for many patients, particularly those who do not wish to take hormones or who have religious convictions prohibiting the use of other contraceptive methods.

NATURAL FAMILY PLANNING/FERTILITY AWARENESS-BASED METHODS

Fertility awareness methods depend on identifying the fertile days in each menstrual cycle and avoiding intercourse on those days. Natural family planning advises abstention on fertile days, while fertility awareness-combined methods allow for the use of barrier methods on those days [4]. Of course, these methods may also be used to calculate the likely fertile days in couples trying for conception.

Standard Days/Calendar Methods

The "fertile window" comprises the five days before ovulation, and the day of ovulation itself. In normal 26- to 32-day cycles, the fertile window will fall between cycle days 8 to 19. Using the standard days method, couples avoid intercourse on cycle days 8 through 19. The calendar rhythm method differs slightly, with the woman keeping a record of the length of her last 6 to 12 cycles and calculating the likely fertile days in the current cycle. Briefly, 18 days are subtracted from the length of the shortest cycle to find the first fertile day in the current cycle. To find the last fertile day, 11 days are subtracted from the length of the longest cycle. This method must be updated every month [4]. Women with irregular or short (fewer than 25 days) cycles will not have a high effectiveness with either of these methods [6]. Women in the first few years after menarche and the few years before menopause are prone to irregular cycles, and women who have recently given birth or who are breastfeeding will also have difficulty with these methods [4].

Ovulation Method

The ovulation method uses changes in cervical secretions to identify the beginning and end of the fertile window. Clear, stretchy, slippery secretions indicate fertility; thick, sticky, cloudy secretions determine the end of the fertile window [4]. Abstinence must be enforced from the first day of thin, slippery mucus until four days after resumption of normal cervical secretions [6].

ANNUAL CONTRACEPTIVE FAILURE RATES		
Contraceptive	**Failure Rate with Perfect Use**	**Failure Rate with Typical Use**
No method	N/A	85%
Fertility awareness methods (includes periodic abstinence, ovulation method, and symptothermal method)	0.4%–5%	28%
Withdrawal	4%	20%
Spermicide	18%	28%
Male condom	2%	13%
Female condom	5%	21%
Diaphragm	6%	12%
Sponge (parous/nulliparous)	20%/9%	24%/12%
Cervical cap (parous/nulliparous)	26%/9%	40%/20%
Combined oral contraceptive pills (COCs)	0.3%	8.7%
Transdermal patch	0.3%	9%
Vaginal ring	0.3%	9%
Progestin-only pills (POPs)	0.3%	13%
Depot medroxyprogesterone acetate (DMPA) injection	0.2%	4%
Progestin implant	0.05%	0.05%
Levonorgestrel intrauterine device (IUD)	0.2%	0.2%
Copper-T IUD	0.6%	0.8%
Female sterilization	0.5%	0.5%
Male sterilization	0.1%	0.15%
Source: [4; 8; 13]		*Table 1*

Symptothermal Method

The symptothermal method observes changes in basal body temperature. A temperature rise of at least 0.4 degrees F sustained for three days indicates that ovulation has occurred [4]. Basal body temperature may be taken orally, rectally, or vaginally, in the morning (after awakening but before arising), but the method must be consistent [4; 6]. Abstinence occurs from the first day of the menstrual period until three days of consecutive elevated basal body temperature [6].

The main behavior-based, fertility-awareness methods are, naturally, entirely user-dependent. First-year failure rates are around 20% for the ovulation and symptothermal methods, with the standard days and calendar rhythm methods showing slightly lower failure rates of 12% to 13% [4]. Some sources give failure rates as high as 35.3% (***Table 1***) [8; 59]. None of these methods protect against STIs [4].

Combination Contraceptive Mobile Medical Application

In 2018, the U.S. Food and Drug Administration (FDA) cleared marketing of the first direct-to-consumer mobile medical application (app) for contraception. The app, Natural Cycles, uses an algorithm to calculate fertility based on self-reported temperature using a basal body thermometer first thing in the morning and menstrual cycle information. Alternately, the app can be paired to an Oura Ring or Apple Watch, which report temperature data to Natural Cycles. The app is intended for users 18 years of age and older and relies heavily on user consistency. The typical failure rate in one study was 6.5%, which also accounted for women not using the app correctly and/or having unprotected intercourse on decidedly fertile days. While more information is needed on the efficacy of this method, it is the first technologic app to be used as a contraceptive and may lead to further technology-driven methods [68].

WITHDRAWAL

As of 2019, 64.8% of women reported having used withdrawal as a form of contraception at some point [8; 58]. However, only 3% to 7% used it as a primary method [8; 59]. It is a more common method among adults (particularly women 20 to 34 years of age) than adolescents, and withdrawal as birth control is more common among women with higher socioeconomic status. In this method, also known as coitus interruptus, the penis is withdrawn from the vagina and moved away from the external genitalia prior to ejaculation. This relies on the male's sensation that ejaculation is imminent. With perfect use, the rate of pregnancy in the initial year of use should be about 4%; with typical use, a 20% failure rate is seen [4; 8].

The advantages of this method include its price (free) and its nonhormonal nature. It does not involve calculating cycle times, as natural family planning methods do. The disadvantages include the failure rate, its extreme user-dependency, and the fact that it does not provide adequate protection from STIs. Pre-ejaculate may contain pathogens, and skin lesions are not protected [4].

BARRIER AND SPERMICIDAL METHODS

Many patients who do not wish to use a hormonal form of contraception find barrier and spermicidal methods preferable. In addition, condoms (male and female) remain the only method of birth control that reliably protects against most STIs.

Any barrier or spermicidal method has the potential to cause discomfort or irritation and may predispose to bacterial vaginosis or urinary tract infection. There is also a small risk of toxic shock syndrome with female barrier methods such as the diaphragm and cervical cap. Latex allergies must also be taken into account with male condoms [4].

VAGINAL SPERMICIDES

Vaginal spermicides can be used alone or with barrier methods of contraception. They come in the form of gels, foams, creams, films, suppositories, or tablets. Products in the United States contain nonoxynol-9, a surfactant that destroys sperm cell membranes. Films, suppositories, and tablets must be given adequate time to dissolve against the cervix before intercourse. The products must also be left in place for at least six hours after intercourse [4]. Vaginal spermicide methods are inexpensive but do not have a high efficacy with typical use (***Table 1***).

MALE CONDOMS

Male condoms are widely available, inexpensive, and popular. An estimated 95% of women have used this form of contraception at some point [58; 60]. Among women currently using contraception, an estimated 8% to 15% use condoms as part of their repertoire [4; 8; 59; 70]. Condoms are much more frequently used by adolescents (approximately 50% of unmarried teenage women report using a condom at last intercourse) [58].

The male condom provides good protection against bacterial and viral STIs. It acts as a physical barrier and is most effective when worn for the entire act of intercourse, with a fresh condom used for repeated acts. Latex or polyurethane condoms are most effective for STI protection, although "natural" condoms (lamb cecum) are also available for contraception [9]. Latex and synthetic condoms can also be used during oral or anal intercourse to prevent STIs [4].

Latex condoms must not be used with oil-based lubricants; natural or polyurethane condoms do not have this restriction. Condoms often come with, or are used with, the spermicide nonoxynol-9, although this has not been proven to increase contraceptive efficacy and may cause adverse effects such as genital ulceration, irritation, or urinary tract infections [4].

FEMALE CONDOMS

The female condom also provides good protection against bacterial and viral STIs [9]. It has been available in the United States since 1993 and acts as a physical barrier that lines the vagina and partially covers the vulva and perineum. It consists of a closed-end ring that is the internal anchor and an external, open ring. Made of polyurethane, it is stronger than latex and is compatible with oil-based lubricants [4]. Female and male condoms should not be used together. Statistics indicate that female condoms are not popular [58; 70].

DIAPHRAGM

The diaphragm is a rubber cup that is placed at the end of the vagina with the posterior rim in the posterior fornix and the anterior rim behind the pubic bone. Spermicide is placed on the inner surface, ensuring its application next to the cervix. Unlike male and female condoms, diaphragms must be fitted by a healthcare practitioner [4]. When used with spermicide, the diaphragm provides some protection against bacterial and viral STIs, but not nearly to the extent that more extensive, skin-covering barrier methods such as condoms provide [9]. The concomitant use of spermicide is recommended, although large-scale studies to prove increased efficacy have not been conducted [4].

Once inserted, the diaphragm is considered effective for six hours. The device must be left in place for six additional hours after intercourse. If it is left in place for longer than six hours total, it is recommended to apply additional spermicide. Due to risk of toxic shock syndrome, use for longer than 24 consecutive hours is not recommended [4].

CERVICAL CAP

The cervical cap is similar in concept to the diaphragm, but much smaller. It is a deeper cup that fits snugly around the base of the cervix. Spermicide is used to fill the inner surface one-third full. The cap may be left in place for 48 hours and does not require additional spermicide for repeated acts of intercourse [4].

SPONGE

The contraceptive sponge provides both contraception and some protection against STIs [15]. It was first approved in the United States in 1983, then taken off the market in 1995 for business reasons. As of 2012, the sponge, under a different manufacturer, is once again available in the United States.

The device consists of a polyurethane sponge containing nonoxynol-9. It is moistened with water and placed in the vagina, with the dimpled surface against the cervix. The outer surface has a ring for removal. The sponge may be worn for 24 hours and must be left in place for 6 hours after intercourse [4].

HORMONAL METHODS

COMBINED ORAL CONTRACEPTIVE PILLS

Combined oral contraceptive pills (COCs), which have been available for more than 50 years, have undergone radical changes and today's pills would be unrecognizable to the original inventors. An estimated 80% of U.S. women report using oral contraceptive pills at some point in their lives [8; 9]. Among women 15 to 49 years of age, oral contraceptives are the most commonly used nonpermanent contraceptive method [8; 59]. New doses and formulations are rapidly being produced, in addition to different delivery vehicles such as the intravaginal ring, and health concerns are frequently raised on existing pills. The wide range of progesterones used in combination oral contraceptive pills affects their side effect profile, and many primary care providers may not be aware of how to adjust oral contraceptives in order to minimize side effects.

COCs are taken daily, and formulations vary regarding how many days involve hormone pills. The traditional regimen involves 21 days of hormones, followed by 7 days of placebo pills to allow for a withdrawal bleed. Many newer formulations have 24 days of hormones, with a shortened placebo period to adhere to a 28-day cycle [15]. Still others administer continuous hormones for 84 days or longer [12; 15]. Women on continuous COCs experience more breakthrough bleeding, but women on these longer regimens experience reduced follicular development and reduced symptoms during the hormone-free period [15].

Pills may be started on the Sunday following the onset of menses (referred to as the traditional "Sunday start"), or by "quick start" at any time of the cycle. Quick start has been shown to increase compliance and has the same incidence of abnormal bleeding as a Sunday start. Depending on the timing, backup contraception may be needed for the first seven days. If the quick start occurs in the first six days of the cycle, no backup is needed; if it occurs in the last 14 days of the cycle, backup contraception and a pregnancy test are needed as conception may already have occurred [12].

Mechanism of Action

The estrogen component of COCs inhibits follicle-stimulating hormone (FSH) and endometrial proliferation, providing cycle control. The progesterone component provides the main contraceptive effect, inhibiting the luteinizing hormone (LH) surge that triggers ovulation and thinning of the endometrium; it also thickens cervical mucus, which inhibits sperm motility and function [9; 12]. Combined, they suppress ovulation and produce a thin, asynchronous endometrium with decreased tubal mobility [12]. Almost all COCs in the United States use ethinyl estradiol for their estrogen component, although a newer estradiol-based contraceptive, Natazia (estradiol valerate and dienogest), was approved by the FDA in 2010 [9; 16; 18].

Estrogen Side Effects

The lower the dose of estrogen, the fewer the side effects, including nausea, headache, and breast tenderness, as well as more serious side effects such as the risk for venous thromboembolism (VTE). When the estrogen dose is lowered, however, the risk for other side effects rises. Breakthrough bleeding and spotting is much more common in lower-estrogen pills [9].

Progestin Side Effects

There are many different types of progesterone used in COCs, and their androgenic effects have a wide range. The three progestins that have the lowest androgenic side-effect profile are norgestimate, desogestrel, and drospirenone. Progestins with higher androgenicity may increase acne and may antagonize estrogen's beneficial lipid profile to a greater degree. For patients experiencing these side effects or for patients who have acne or hyperlipidemia to begin with, a less androgenic progestin is indicated. Desogestrel and drospirenone, however, seem to have a higher risk of VTE compared with levonorgestrel, a more androgenic progestin [9; 17].

Drospirenone is a derivative of spironolactone and has antimineralocorticoid effects. It is beneficial for acne and has an indication for premenstrual dysphoric disorder (PMDD), but it must not be used with spironolactone or daily nonsteroidal anti-inflammatory medications, or for patients with renal, adrenal, or hepatic compromise. It is recommended to check serum potassium in any woman on drospirenone and a second medication that may affect potassium levels (e.g., heparin, angiotensin converting enzyme inhibitors, diuretics) [18].

Continuous Dosage

Continuous dosage, whereby a woman takes COCs for 3, 6, or 12 months before taking a placebo week, is useful for women with severe dysmenorrhea, PMDD, or breakthrough bleeding on lower dose regimens. If an extended regimen does not eliminate breakthrough bleeding after three months, the estrogen dose should be raised or a different method found if the patient is already on a 35-mcg pill [9]. Most extended regimens, however, use lower doses of estrogen [15].

Non-Contraceptive Benefits

Oral contraceptive pills have benefits other than contraception. They are often used for control of menorrhagia and/or dysmenorrhea and have been shown to have beneficial effects in women with leiomyoma [71]. They promote cycle regularity, decrease blood loss from menstrual periods, and decrease both dysmenorrhea and iron-deficiency anemia. Like all contraceptives, they decrease the risk for ectopic pregnancy by reducing pregnancy risk itself. COC users have fewer instances of ovarian cysts and decreased fibroadenomas and fibrocystic breast changes. Newer, lower-estrogen pills may not have the benefit of reducing functional ovarian cysts; patients with this concern may need higher-estrogen pills. COCs are useful for the treatment of endometriosis and perimenopausal symptoms in younger women as well. They may also have beneficial effects on bone mass and rheumatoid arthritis. Finally, COCs decrease the risk of pelvic inflammatory disease (PID) by thickening cervical mucus, impeding the ascent of pathogens [9; 20; 21].

Risks/Contraindications

Unless otherwise stated, the risks of COCs apply to other combined methods of contraception, such as the transdermal patch and vaginal ring, as well. The American College of Obstetricians and Gynecologists (ACOG) states that progestin-only or non-hormonal methods may be safer for women with the following: history or risk of VTE or inherited thrombogenic mutations; history of migraines with neurologic symptoms (aura); smoking after age 35 years; hypertension; systemic lupus erythematosus (SLE) with positive (or unknown) antiphospholipid antibodies [19]. COCs should not be used in women who have had diabetes for more than 20 years and/or have evidence of microvascular disease and in women who have breast cancer. Women who are postpartum fewer than three weeks should also use non-estrogen-containing contraception [19].

Venous Thromboembolism

The estrogen component of birth control pills does increase the risk for VTE, as it increases hepatic production of factors involved in coagulation [19]. The clot risk for most modern pills (less than 50 mcg ethinyl estradiol) is about three to four times that of women not on hormonal contraception, although it remains much lower than the clot risk during pregnancy, which is 12 times that of women not on hormonal contraception [4; 12; 19]. Pills containing desogestrel as their progesterone component pose a clot risk similar to those with levonorgestrel [19]. Drospirenone has also received publicity about a possible increased clot risk compared with other progesterones. An FDA review had cautioned that it was possibly associated with a higher risk of blood clots, but the data were not conclusive [17]. It is now thought that the risk of clots with drospirenone is similar to that of older formulations of progesterone [19].

Women who have had a previous unexplained blood clot or one associated with pregnancy or estrogen use are not candidates for COC use, regardless of progesterone type. If a woman is currently on anticoagulant therapy or had a non-recurring risk factor for the clot, then COC use may be considered [19]. Oral contraceptive pills do not increase

VTE risk for appropriately anticoagulated patients [12; 19]. Women on anticoagulation therapy may also consider the depot progesterone injection to suppress ovulation and therefore prevent bleeding from the corpus luteum. The levonorgestrel IUD will decrease menorrhagia from anticoagulation but often will not prevent ovulation [19]. The use of estrogen-containing emergency contraception has not been shown to raise the risk for VTE [22].

Other risk factors for VTE include increasing age, obesity, surgery, air travel, postpartum status, and coagulation disorders [19]. These risk factors should be considered when prescribing COCs. The Centers for Disease Control and Prevention (CDC) recommends that postpartum women should not use COCs during the first 21 days after delivery due to a high risk for VTE during this period [23]. The coagulation disorders most likely to predispose to clot while on COCs are Factor V Leiden, prothrombin gene mutation, Protein C, Protein S, and antithrombin deficiency. Women heterozygous for Factor V Leiden have a clot risk 6 to 8 times that of healthy young women; this risk rises to 10 to 15 times when Factor V Leiden patients take COCs [12]. Even so, the ACOG does not recommend screening for these disorders in women who have never had a clot, as the likelihood of experiencing a de novo clot, even on COCs, is extremely low [19]. However, if a first-degree relative has a known thrombophilia or unexplained VTE, screening is recommended [12; 19]. If a patient is already known to have a clotting disorder, a different contraceptive method should be sought [19]. In general, it is advisable to stop estrogen-containing contraceptives one month before major surgery or arthroscopic surgery, as prolonged immobilization raises the risk for VTE. This must, of course, be balanced against the risks involved in unintended pregnancy. Heparin prophylaxis may be used if oral contraceptives are not stopped before surgery. COCs may be continued before laparoscopic tubal ligation or other minor procedures that do not raise VTE risk through [19].

Cardiovascular Events

The risk of thrombotic stroke and myocardial infarction is also increased in women on estrogen-containing contraceptives. Although these risks remain low in terms of absolute risk, the relative risk is higher with higher oral doses of estrogen (i.e., ≥50 mcg) and with the patch and ring delivery systems [24]. Smoking, hypertension, and diabetes all increase the risk for cardiovascular disease, although they do not directly increase clot risk [19; 25]. In women with hypertension taking COCs, the relative risk of acute myocardial infarction increases by a factor of twelve compared with those women not using COCs; despite this, the absolute risk of myocardial infarction remains low. Non-contraceptive benefits of COCs should also be considered in these patients when making the decision to prescribe oral contraceptives. Non-estrogen-containing methods may be preferred.

EVIDENCE-BASED PRACTICE RECOMMENDATION

According to the Centers for Disease Control and Prevention, the risk for cardiovascular disease increases with age and might increase with combined hormonal contraception use. In the absence of other adverse clinical conditions, combined hormonal contraception can be used until menopause.

(https://www.cdc.gov/mmwr/volumes/73/rr/rr7304a1.htm. Last accessed November 21, 2024.)

Level of Evidence: Expert Opinion/Consensus Statement

The risk for stroke in reproductive-age women is low, but the risk factors may be synergistic and include smoking, age older than 35 years, obesity, family history of early stroke, hypertension, diabetes, hyperlipidemia, and migraine (both with and without aura) [9; 26]. Healthy women not on COCs have half the absolute stroke risk of those on COCs; with migraine, the risks go up to double (no COCs). Migraine with aura raises the risk even further (up to 12 times greater odds) [19]. COCs

may be used in women with migraines without aura (focal neurologic signs) [19]. If a woman has any type of migraine and is older than 35 years of age, it is generally advisable to find a different form of contraception. Before the age of 35 years, COCs may be given to non-aura migraine sufferers after weighing the risks and benefits. Women experiencing auras should not be prescribed COCs [9; 19; 26]. Clinicians may consider giving lower-estrogen pills or continuous pills for women whose headaches are triggered by the withdrawal of estrogen. These women will require close follow-up in the first few months on oral contraceptives [9].

Due to the risks described for stroke and myocardial infarction, women older than 35 years of age who smoke and/or have multiple other risk factors should not use COCs. It is generally considered advisable to use non-estrogen contraceptives in these women [9; 19; 26]. Non-smokers older than 35 years of age may continue to use COCs, individualizing care and exercising caution in patients with obesity or other cardiovascular risk factors.

Perimenopausal women may enjoy the beneficial effects on bone density and vasomotor symptom reduction, but the possibility of breast cancer risk should be weighed against these benefits. As there are limited data on COCs and breast cancer risk in perimenopausal women, the risk is considered to be similar to that of women on hormone replacement therapy. Progesterone-only and non-hormonal methods (such as the copper IUD) may be used in patients concerned about this risk. However, COCs seem to confer a decreased risk for endometrial and ovarian malignancies [19; 21].

Cancers

COCs are thought to reduce the risk for ovarian and endometrial cancer, and this risk reduction persists for many years after stopping use [21]. The effect on breast cancer risk has been controversial, but the vast majority of studies indicate that current or former COC use is not associated with an increased breast cancer risk in reproductive age women (contrasted with perimenopausal women, as discussed) regardless of the estrogen dose, duration of use, or family history of breast cancer. There also appears to be a small reduction in the risk for colorectal cancer, along with a possible increased risk of cervical cancer. It is not known whether the cervical cancer risk is due to the pills themselves or the fact that women on COCs are less likely to use barrier methods to protect themselves from human papillomavirus infection [9]. COCs may be used in women with benign breast disease or even a family history of breast cancer with *BRCA1* or *BRCA2* mutations [27; 28]. As these mutations increase the risk for ovarian cancer, the effect of COCs to decrease this risk is an important benefit [19]. They are, however, contraindicated in patients with current or past breast cancer [9; 12].

Obesity

Obesity raises the risk for COC failure and patch failure by altering how the drugs are absorbed, distributed, metabolized, or eliminated [29; 30]. In women with obesity, steady state contraceptive steroid levels take longer to achieve when initiating therapy and after the hormone-free period [19]. ACOG suggests that a continuous oral contraceptive or a higher dose therapy may be more effective in this cohort if an oral therapy is desired by the patient.

Obesity also raises the clot risk above that conferred by the contraceptive method itself. One study showed a 10-fold higher clot risk in women on oral contraceptives with a body mass index greater than 25, compared with leaner women. However, if overweight or obese women are more likely to use these methods than those with higher failure rates (e.g., behavior-based methods, barrier methods), the risks must be weighed against the risks of unintended pregnancy. A thorough discussion on contraceptive methods, including progesterone-only methods and intrauterine devices (neither of which seem to be affected by body weight), is appropriate for any overweight or obese patient [19; 23]. Indeed, a thorough discussion on all available contraceptive methods is appropriate for any patient desiring contraception.

Hypertension

Women with hypertension must have their care individualized. COCs may increase blood pressure and do increase the risk for myocardial infarction or stroke, although the absolute risk remains low. These risks must be weighed against the risk of a pregnancy complicated by hypertension, as well as against the non-contraceptive benefits of COCs. ACOG and the CDC have identified increased risks associated with COCs when blood pressure is systolic 140–159 mm Hg or diastolic 90–99 mm Hg [19]. In patients with systolic 160 mm Hg or greater or diastolic 100 mg Hg or greater, or in patients with vascular disease, COCs are absolutely contraindicated [19]. Progesterone-only and non-hormonal methods may be used in these patients [19; 23]. In women younger than 35 years of age with well-controlled hypertension without other risk factors, a well-monitored trial of COCs may be undertaken [9; 19].

Diabetes

COCs may be used in women with uncomplicated diabetes, and they do not appear to precipitate development of type 2 diabetes in women at risk for the condition [19; 23]. If there are any other heart disease risk factors in a patient with diabetes, however, COCs are contraindicated. When choosing a COC for a patient with diabetes, keep in mind to choose a pill with a low estrogen dose (as estrogen decreases insulin release) and a progesterone with low activity (as progesterone is a competitive inhibitor of insulin) [9]. Low-progesterone agents include norgestimate, norethynodrel, norethindrone, and ethynodiol [31]. COCs are not contraindicated in women with a history of gestational diabetes that resolved in the postpartum period [9]. As discussed, COCs should not be used in women who have had diabetes for more than 20 years and/or who have evidence of microvascular disease [19].

Systemic Lupus Erythematosus (SLE)

Women with mild, stable SLE, with no history of antiphospholipid antibodies, vascular disease, or nephritis, may safely use COCs, although many practitioners steer these patients toward IUDs [19]. If antiphospholipid antibody status is unknown, this should be ascertained before initiating hormonal contraception. COCs are contraindicated in women with SLE and positive antiphospholipid antibodies [19].

Depression

COCs are not thought to have an effect on depression or on the efficacy of commonly prescribed antidepressants. St John's wort is a hepatic enzyme inducer and increases the risk of ovulation in women on COCs [19; 23]. If this supplement is being used, a backup or alternate birth control method should be considered.

Drug Interactions

Some anticonvulsants may induce hepatic enzymes and decrease levels of COC steroids. It has not been proven whether increasing pill dosage overcomes this effect; therefore, the use of backup condoms or switching to an IUD should be considered in women on these medications, including barbiturates, carbamazepine, oxcarbazepine, phenytoin, primidone, felbamate, topiramate, vigabatrin, and lamotrigine [12; 19; 23]. Depot progesterone injection increases the seizure threshold and therefore is a good contraceptive choice for these patients [12].

The clinical impact of antiretroviral medications on COC users is unknown [19]. Theoretically, any antiretroviral that induces cytochrome P450, including fosamprenavir, may decrease COC effectiveness and a backup method would be indicated [12; 23]. In addition, there is evidence of an increased risk of acquiring HIV among progestin-only injectable users; however, there are no firm data to determine whether COCs affect HIV transmission. The CDC recommends that women considering progestin-only injectables should not be denied use but should be advised that there is uncertainty over whether there is a causal relationship [61].

Despite much anecdotal "knowledge" to the contrary, rifampin/rifabutin and griseofulvin are the only antibiotics known to decrease steroid hormone levels in COC users. Backup contraception should be used when taking rifampin or griseofulvin, but this is not necessary for other antibiotics [12; 18; 19].

Other Conditions

According to the World Health Organization (WHO), there are no restrictions for COC use in women with mild, compensated cirrhosis, chronic viral hepatitis, or carriers of the hepatitis virus. In women with acute hepatitis, the risks usually outweigh the benefits for initiating use of COCs. However, COC use is contraindicated in women with severe liver disease [23; 32]. Symptomatic gallbladder disease is also a relative contraindication [9]. Undiagnosed genital tract bleeding is a contraindication to COC use [12]. Pregnancy should always be ruled out if bleeding occurs while on a hormonal contraceptive.

CONTRACEPTIVE PATCH

As of 2024, there were two types of contraceptive patches on the market. The first contraceptive patch delivers both estrogen (35 mcg/day ethinyl estradiol) and progesterone (150 mcg/day norelgestromin), and the second contraceptive patch delivers 30 mcg/day ethinyl estradiol and 120 mcg/day levonorgestrel [18]. The contraceptive patch operates on the same mechanism of action as COCs: gonadotropins are suppressed, the cervical mucus is thickened, and endometrial changes occur [9; 15; 33]. The patch is changed once weekly for three weeks of hormone dosage, then one week is allowed patch-free for withdrawal bleeding to occur [18; 33]. There is a two-day "patch forgiveness" window to change patches without losing efficacy [9].

Each patch is considered to have similar risks and benefits to their equivalent formulation COCs, except as described in the following sections. Possible side effects include breast discomfort, headache, nausea, skin reaction at the application site, dysmenorrhea, acne, hair loss, and abdominal pain [9; 18; 33].

The contraceptive patch has beneficial effects on lipid levels, increasing HDL and decreasing LDL [19]. Similar to oral contraceptive pills, the patch has a higher failure rate for heavier women, particularly those weighing more than 90 kg (198 lbs) [9; 18]. Both patches are approved for women with a BMI <30 [18].

The same contraindications apply for the patch as those described for COCs. There is an increased thromboembolic risk with this method, as there is with COC use, and the same cautions should be used in patients with risk factors for VTE or cardiovascular disease [18]. The contraceptive patch results in higher estrogen exposure for patients—60% higher than women on 35 mcg COCs—and there is a higher risk for developing VTE compared with women on COCs [12; 18]. The relative risk for VTE for women on contraceptive patches, compared with women on COCs, has been reported to be 2.3 [34]. Again, the entire risk/benefit profile must be taken into account, including the risk of VTE in pregnancy, which remains higher than any contraceptive method [12]. Although COCs and the ring may be used continuously, patients should maintain one patch-free week each month because of the higher estrogen dose [12; 18].

VAGINAL RING

There are currently two vaginal rings on the market. The first vaginal ring (NuvaRing) contains ethinyl estradiol (15 mcg/day) and etonogestrel (120 mcg/day), and the second vaginal ring (Annovera) contains ethinyl estradiol (0.013 mg/day) and segesterone acetate (0.15 mg/day) [18]. The mechanism of action is the same as that of COCs and contraceptive patches [35].

The NuvaRing silicone ring is 5.4 cm in diameter and well-tolerated, although it sometimes produces an increased physiologic discharge, headache, weight gain, or nausea [15]. It is disposed of once monthly (three weeks in, one week ring-free for withdrawal bleeding to occur), although it can be left in place continuously for up to 35 days [35]. In 2018, the FDA approved another vaginal ring, Annovera, that may be used for one year, with washing and storage

of the ring during the one ring-free week per month [18; 62]. If the ring is removed for more than three hours during the three weeks of dosing, a backup contraceptive is needed for seven days [35]. The ring provides good cycle control and sustained low-dose hormones. The local delivery of hormones avoids the first-pass hepatic effect and the consequent effects on lipids [9].

Although the serum levels of hormones are lower with the vaginal ring than with the patch or COCs, the ring is thought to have a similar clot risk to the patch (i.e., higher than that of COCs) [24; 34]. The relative risk of ring users, compared with COC users, for VTE has been reported to be 1.9 [34]. However, 2012 data seem to show a risk comparable to, not higher than, COCs [36]. More data are required on the annual vaginal ring approved in 2018 to determine the risk of VTE and other adverse effects [62].

Body weight does not appear to have an effect on the ring's efficacy, and vaginal miconazole does not decrease the efficacy of the ring for contraception [12].

PROGESTIN-ONLY PILLS

Progesterone-only contraceptives come in the form of pills, patches, subcutaneous implants, injections, and intrauterine devices. These are used for various indications and patient preferences and have their own health concerns and side effect profiles. Their mechanism of action is the same as that of the progesterone component of COCs: thinning of the endometrium, thickening of cervical mucus, and inhibiting the LH surge that triggers ovulation [12].

Progestin-only pills suppress ovulation, but because there is no estrogen to provide back-up for the progesterone, they are very time sensitive and dependent on patient compliance. Patients must take these pills at the same time every day. If a dose is missed by even three hours, a backup method of contraception is needed [12]. In addition, any concomitant medication that induces liver enzymes (such as antiretrovirals) will lower the already low dose of progesterone in serum and a different contraceptive method should be sought. Progesterone-only pills and implants have lower serum progestin levels than COCs.

Progesterone-only pills make women more prone to irregular bleeding (30% to 40% rate) [12]. They can decrease overall blood loss and dysmenorrhea, and there is no delay in return to fertility once they are discontinued [12]. Breakthrough bleeding on any progestin-only method should be evaluated to rule out pregnancy, infection, or cervical/uterine pathology.

Progesterone-only methods of contraception have the advantage of not raising VTE risk, as estrogen-containing methods do. Therefore, they may be used in many of the medical conditions for which COC use is contraindicated or limited. Progesterone-only pills should not be used in women with current or past breast cancer [9].

Historically, a prescription has been required for access to COC and progestin-only pills. ACOG issued an opinion in 2019 (reaffirmed in 2021) supporting over-the-counter access to hormonal contraception without age restrictions [72]. In the opinion, the authors note that over-the-counter access has continuation rates of hormonal contraception comparable to prescription-only access and has the potential to decrease unintended pregnancy. In 2023, the FDA approved the first daily oral contraceptive for use in the United States without a prescription: a norgestrel tablet (Opill) [73].

Pharmacists furnishing self-administered hormonal contraception should follow established protocols and state laws. In general, patients are asked to complete a self-screening tool, which is then reviewed by the pharmacist. If indicated, the patient's seated blood pressure may be measured and recorded. Patients should also receive education on dosage, effectiveness (including the need to take at the same time every day), potential side effects, safety, the importance of preventive health screenings, and STI prevention [74]. Some states require that the pharmacist refer the patient for appropriate follow-up and notify the patient's primary care provider of the drug being furnished (either directly or via written record provided to the patient) [74].

PROGESTERONE DEPOT INJECTION

The progesterone injection, depot medroxyprogesterone acetate (DMPA), is typically given as a 150-mg intramuscular injection once every three months. The progesterone acts to suppress ovulation by inhibiting the hypothalamic-pituitary-ovarian axis and also thins the endometrial lining [37]. This produces the unwanted side effect of unpredictable bleeding for the first several months but often leads to amenorrhea in the long term [9]. This can be useful in women with menorrhagia from leiomyoma, and DMPA is often used for this purpose. It can be used to temporize, or even prevent, hysterectomy for this indication [19]. DMPA is also often used for the management of endometriosis-related pain. Women on the contraceptive injection experience a decrease in dysmenorrhea, ovarian cysts (better than low-dose pills), endometriosis symptoms, seizures, PID, anemia, and fibroids [9]. The convenience and high efficacy rate (failure rate is 0.2%) of DMPA have made it increasingly popular with adolescents [8; 38].

As noted, frequent spotting is common, particularly after the first injection, but periods typically become very light after the second injection, with many women going on to amenorrhea (50% to 60% at one year) [9; 15]. Breakthrough bleeding on any progestin-only method should be evaluated to rule out pregnancy, infection, or cervical/uterine pathology. Once this is done, generally all that is needed is reassurance that bleeding is common during the first three to six months. COCs may be used for one cycle, or ibuprofen up to 600 mg three times daily may be taken for five days, to decrease bleeding [12]. The injection is an excellent option for women with poor compliance with daily, weekly, or even monthly methods. DMPA does not provide protection from STIs [9]. Upon discontinuing DMPA, there can be a significantly delayed return to fertility of up to 9 or 10 months [12].

There is much anecdotal evidence that the contraceptive injection causes weight gain, but this has not been proven in controlled studies [9]. Weight gain, when it occurs, can be up to 5 pounds at one year of use, and 16 pounds at five years of use. It is thought that the weight gain occurs due to a progesterone-induced increase in appetite, not a decrease in metabolism [12]. This modest increase in body weight does not appear to diminish the effectiveness of DMPA in preventing pregnancy [12; 19].

Long-term use may slightly improve depressed mood, and depression is not a contraindication [19]. In some women, however, progesterone-only methods may cause an increase in depression. This is a particular problem with the injected form, as it is not possible to "stop using" the contraceptive. It is advisable to use caution in women with a history of severe depression, including postpartum depression. It may be worth a trial of oral progesterone before prescribing the contraceptive injection in women with a history of depression [4].

Women on anticoagulation therapy can also use DMPA to suppress ovulation and prevent bleeding from the corpus luteum [19]. Women with seizure disorders may benefit from DMPA as a contraceptive, as it raises the seizure threshold [4; 12; 19]. Anticonvulsants have no effect on DMPA's effectiveness [4]. DMPA reduces the risk of painful sickle cell crisis by stabilizing red blood cell membranes, making sickle crises fewer and less intense; it can be a good contraceptive choice for women with this disease [12]. There is no evidence that the same precaution regarding antiretroviral use (decreased serum hormonal levels due to liver enzyme induction) applies to this contraceptive, as it does to the progesterone-only pills and implants [19; 23].

A significant side effect that steers many women away from DMPA is the well-established loss of bone mineral density while on this medication. The large dose of progesterone suppresses estradiol production from the ovaries, impacting bone mineral density. There have been no cases of osteoporosis or bone fracture while on DMPA, and bone mineral density appears to return to the level of non-DMPA users within 12 to 30 months of discontinuing the medication, with adult former users having similar bone mineral density to those who never used the medication [12; 39]. However, the FDA recommends no more than two years of use unless there is no other acceptable contraceptive method available [40]. The Society for Adolescent Medicine does not restrict use to two years [12]. Likewise, the ACOG does not impose a two-year limit on the use of DMPA, but it does recommend that women, particularly adolescents, exercise and take calcium and vitamin D; the ACOG does not recommend estrogen supplementation [9; 39; 40]. It also notes that implants and IUDs do not impact bone mineral density. The ACOG also notes that the bone loss seen with DMPA is similar to the temporary bone loss seen in pregnancy and breastfeeding (i.e., no long-term loss is observed) [39; 40]. The concern is that adolescents using DMPA are losing bone at a time of their life when they would typically be building bone. The loss of bone mineral density while on DMPA has unknown long-term effects on fracture risk later in life [12]. It is thought that bone density deficit is greater in women who started DMPA before 21 years of age and those who have used it for longer than 15 years [4]. At this time, dual-energy x-ray absorptiometry scanning is not recommended for otherwise healthy women on DMPA [40].

Women who have migraines with aura while on DMPA, those with current deep vein thrombosis or pulmonary embolism, active liver disease, unexplained vaginal bleeding, or increased cardiovascular risk (e.g., hypertension with vascular disease, diabetes longer than 20 years, history of stroke, ischemic heart disease) are not good candidates for DMPA. The DMPA injection reduces the risk for endometrial hyperplasia and cancer, but women with hormonally sensitive breast cancer should not use DMPA [9; 23]. It is contraindicated in women with current or past breast cancer, as it has been found to increase the risk of invasive breast cancer, and it is relatively contraindicated in women with a personal history of breast cancer. It should be used with caution in women with active liver disease or liver tumors [9; 18; 23].

PROGESTERONE IMPLANTABLE DEVICE

The first progesterone implant (Norplant) system of six subdermal progestin rods was FDA approved in 1990 but has not been available since 2000 [15]. A single-rod progesterone implant device (Implanon) became available in 2006 and consists of a 4-cm subdermal implant containing etonogestrel, the active metabolite of desogestrel, released at the rate of 60 mcg/day [9; 12]. Nexplanon is the second generation of Implanon. It utilizes a new inserter and contains barium to allow localization with x-ray [41]. The progesterone in this device is released over a three-year period, inhibiting ovulation, altering the endometrial lining, and thickening cervical mucus. It has a low failure rate (***Table 1***), and there is a rapid return to fertility after device removal [12; 37]. It is considered effective eight hours after insertion [12]. Along with both types of intrauterine devices, the progesterone implant is considered a long-acting reversible contraceptive (LARC). LARCs are favorable for their lack of user-dependency and long-term effects [37].

The device can be inserted at any time during the menstrual cycle, after confirming that the patient is not pregnant. A backup method of contraception should be used for seven days, unless the device is inserted within five days of the first day of menses [9; 37]. A backup method is not needed if the device is inserted immediately after childbirth or abortion or if there has been no gap between this method

and another hormonal method of contraception [37]. The contraceptive implant may be used postpartum. Although some guidelines advise waiting at least four weeks before insertion, it has not been shown to have any effects on breast milk or infant growth and the ACOG supports the use at any time postpartum [37].

Side effects include irregular bleeding, with prolonged bleeding common (>14 days: 18%); eventual amenorrhea is also common (22% at three months) [18]. Heavier patients tend to experience more bleeding episodes; however, there is no decrease in contraceptive effectiveness in overweight or obese women [37; 42]. Other side effects can include weight gain (in 6% to 14% of users), headaches (25%), and acne (14%) [18; 37]. Although acne usually improves with progesterone-only contraceptives, it can worsen in 10% to 14% of women. Gastrointestinal upset/abdominal pain, breast pain, and vaginitis can also occur. There can be pain and bleeding at the time of insertion or removal. Mild insulin resistance can be a side effect, but with no effect on blood-glucose levels in healthy women. The device is not contraindicated in women with diabetes, as the benefits of the birth control method are thought to outweigh the risks [23; 37]. The progesterone implant does not appear to have an effect on bone mineral density, although data are limited at this point. The relative risk for VTE, compared with that of women not using any hormonal medications, has been reported to be 1.4 [34].

The progesterone implant has no effect on the likelihood of ectopic pregnancy [37]. Breakthrough bleeding on any progestin-only method should be evaluated to rule out pregnancy, infection, or cervical/uterine pathology. Once this is done, reassurance that bleeding is common during the first three to six months may be necessary. COCs may be used for one cycle or ibuprofen up to 600 mg three times daily for five days to decrease bleeding [12]. This method offers no protection against STIs.

INTRAUTERINE DEVICES

IUDs are extremely effective birth control, and they have one of the highest satisfaction and continuation rates among patients [37]. They are available in both hormonal and non-hormonal forms. They are considered LARCs, remarkable for their lack of user-dependence and their rapid return to fertility upon removal [37]. There are two IUDs currently available in the United States: the levonorgestrel IUD and the copper T380A. Both are considered appropriate for use in adolescents and nulliparous patients [37]. Neither has been shown to increase the rate of PID or tubal infertility. Both are acceptable for women with a history of ectopic pregnancy or PID [37]. Although the risk of a pregnancy occurring through IUD failure being ectopic is high, the absolute risk of pregnancy is so low that the absolute risk of ectopics is not increased statistically [37]. Expulsion, uterine perforation, and intrauterine pregnancy are also risks, though relatively low. Expulsion may be more common in adolescents and parous women [37].

Testing for STIs is not required before IUD insertion, although testing on the day of insertion is recommended in women who have not been screened for STIs, those at increased risk for STIs, and those with a personal history of STI [37]. A positive test may be treated without removing the IUD [37]. If there is a known STI or mucopurulent discharge at the time of insertion, the infection should be treated before inserting the IUD [37]. PID rates after insertion are the same as for the general population. The increased risk of PID attributed to IUDs appears to be associated with insertion; the risk is only elevated for the first 20 days after insertion. There is no relationship between IUD use and tubal infertility [12]. Routine prophylactic antibiotics at the time of insertion are not recommended [37]. If *Actinomyces* bacteria is noted on a Pap test for a woman with an IUD in place, treatment is not indicated unless the patient is symptomatic, in which case the IUD would be removed and antibiotics given [12]. All IUDs are contraindicated in women with congenital or acquired (e.g., due to fibroids) uterine cavity distortion [18].

According to the American Congress/College of Obstetricians and Gynecologists, routine antibiotic prophylaxis to prevent pelvic infection is not recommended before intrauterine device insertion.

(https://www.acog.org/Clinical-Guidance-and-Publications/Practice-Bulletins/Committee-on-Practice-Bulletins-Gynecology/Long-Acting-Reversible-Contraception-Implants-and-Intrauterine-Devices. Last accessed November 21, 2024.)

Level of Evidence: A (Based on good and consistent scientific evidence)

HORMONAL

The levonorgestrel IUD (marketed under the brand names Mirena, Skyla, Liletta, and Kyleena in the United States) is a T-shaped plastic device embedded with levonorgestrel on the long axis. Initially, 14–20 mcg of progesterone are released daily, but this rate slowly decreases to deliver a mean 6–14 mcg/day of progesterone, depending on the brand [18; 37]. The progesterone in the device suppresses the endometrium, induces a weak foreign body reaction, and thickens cervical mucus, which inhibits sperm motility and function [44]. It inhibits ovulation in some, but not all, women [19; 44]. All contraceptive effects of this device occur before implantation of the ovum [37]. The Liletta levonorgestrel IUD is approved in the United States for eight years of continuous use; Mirena is also used for up to eight years; Kyleena may be used for up to five continuous years; and Skyla is approved for three years of continuous use [18]. The levonorgestrel IUD is very effective contraception, with a one-year failure rate of 0.1 to 0.2 per 100 women [4; 8; 37].

The levonorgestrel IUD can be inserted at any time in the menstrual cycle after confirming that the patient is not pregnant, except in cases of postpartum or postabortion sepsis [23]. A backup method of contraception should be used for seven days, unless the device is inserted within five days of the first day of menses. A backup method is not needed if the device is inserted immediately after childbirth or abortion or if there has been no gap between this method and another hormonal method of contraception [37]. Expulsion rates are higher if the IUD is inserted immediately postpartum (10% to 27%); however, this timing may be considered if there is a high likelihood that the patient will not return for postpartum care or that they may not be able to obtain an IUD in the future. There is no known effect of the levonorgestrel IUD on breastfeeding [37]. IUDs inserted immediately after elective first-trimester abortion have an increased rate of expulsion compared with interval insertions, but if there is doubt as to the patient's returning for follow-up, it is preferable to provide the long-term contraceptive [37]. The insertion of an IUD should be delayed in the case of any known uterine infection, but if an STI is diagnosed after insertion, the IUD does not need to be removed.

The levonorgestrel IUD will decrease menorrhagia resulting from anticoagulation but often will not prevent ovulation. If this is a concern, other methods, such as DMPA, should be considered. Although the levonorgestrel IUD reduces menorrhagia, it is generally not used for bleeding that results from leiomyomata, as these patients tend to have distortion of the uterine cavity. The efficacy does not seem to be affected by antiepileptic or other liver enzyme-inducing medications [19; 23].

This IUD may be a particularly good choice in overweight and obese women, who are at risk for abnormal uterine bleeding and endometrial neoplasia, as the local progesterone effect produced by the IUD can counter both of these risks [19]. It can also be used for endometrial protection for women on estrogen replacement [9]. Weight gain is listed as a potential side effect of the levonorgestrel IUD, although studies have shown weight gain is not clinically significant and occurs in a low percentage of individuals [9; 44].

As the hormone dose is quite low, side effects with the levonorgestrel IUD are minimal. Irregular bleeding is common following insertion, particularly in the first four months, and oligomenorrhea or amenorrhea frequently follow due to the local effect of the progesterone on the endometrium [18]. About 20% of women are amenorrheic by one year of use, and up to 35% may be oligomenorrheic or amenorrheic immediately after insertion [37]. By 12 months of use, women with menorrhagia experience a 90% reduction in blood loss, although menses return rapidly after removal of the IUD [9; 10]. Side effects such as headaches, depression, nausea, breast tenderness, acne, and ovarian cyst formation can occur [9; 37]. Pregnancy and malignancy must always be included in the differential of any abnormal uterine bleeding [37]. The relative risk for VTE in women using this contraceptive compared with women not on any hormonal medication has been reported to be 0.6 [34].

Any IUD can lead to complications such as expulsion, uterine perforation, and contraceptive failure. If the device fails and pregnancy occurs, it is important to rule out ectopic pregnancy as soon as possible, as ectopic pregnancies occur in 20% of IUD failures [9; 45]. If intrauterine pregnancy occurs with an IUD, the risk for first-trimester spontaneous abortion is increased by a factor of 3, and there are also increases in the risk of septic abortion in the second trimester and preterm birth in the third trimester [45]. The risk for fetal anomalies is not increased [12]. If the strings are visible, the IUD should be removed as early as possible in pregnancy [12]. If perforation into the peritoneal cavity occurs, the device must be removed by laparoscopy or laparotomy [37].

NON-HORMONAL

The copper T380A is marketed under the brand name Paragard in the United States. It is a T-shaped plastic device wrapped in copper wire along both arms and the long axis [37]. It is approved for 10 years of continuous use in the United States [18].

The device has several proposed mechanisms of action, including inhibition of ovum transportation speed, damage to the ovum itself, and impairment of sperm motility and viability [9; 18; 37]. It is also possible that the fertilized ovum can be damaged before implantation, although pre-fertilization effects are thought to be the primary mechanisms of action. The copper IUD can be used as effective emergency contraception before implantation occurs up to five days after unprotected intercourse [22]. As noted, the IUD can be used for 10 years and has a 1-year failure rate of 0.6 to 1.0 per 100 women and a 10-year failure rate of 1.9 per 100 women [4; 8; 37]. The failure rate of the copper IUD may be higher in younger women than older women [45].

The copper IUD can be inserted at any time in the menstrual cycle after confirming that the patient is not pregnant, except in cases of postpartum or postabortion sepsis [23]. A backup method of contraception is not needed. Expulsion rates are higher in adolescents and parous women and if the IUD is inserted immediately postpartum or after first-trimester abortions, but it may be considered based on patient-related factors [37]. There is no known effect of the copper IUD on breastfeeding. The insertion of an IUD should be delayed if a patient has a current uterine infection, but it does not need to be removed if an STI is diagnosed after insertion [9].

Irregular bleeding, cramping, heavier menses, and dysmenorrhea, along with pain on insertion, are the most common side effects [4; 9]. Heavy menses and dysmenorrhea do decrease over time, although intermenstrual spotting and pain do not decrease. Pregnancy and malignancy should always be included in the differential of any abnormal uterine bleeding [37].

As discussed, IUD use can lead to complications such as expulsion, uterine perforation, contraceptive failure, and ectopic pregnancy [9; 45]. The copper IUD should not be used in women with copper allergies or Wilson disease. It should be employed with caution in women with already heavy menses [9; 23].

STERILIZATION

Sterilization is the most common form of contraception in the United States, with female sterilization more common than male, ranking only slightly below the use of the oral contraceptive pill in terms of overall usage [8; 12; 45]. Sterilization is the most common method in Black and Hispanic women, women older than 35 years of age, ever-married women, women with two or more children, women living below 150% of the federal poverty level, women with less than a college education, women living outside of a metropolitan area, and those with public or no health insurance [8]. In contrast, oral contraceptives are the most common method in White women, women in their teens and 20s, never-married and cohabiting women, childless women, and college graduates [8]. There are new, minimally invasive methods of achieving female sterilization. However, these methods are not without drawbacks, including delayed time for full effectiveness.

Tubal sterilization can be performed postpartum or following a spontaneous or induced abortion. About half of the time, it is performed as an interval procedure, unrelated in its timing to pregnancy [45]. Before any sterilization procedure takes place, the patient must be counseled that there remains a failure rate and that menses will continue, as will the need for pelvic exams and Pap tests [12].

As tubal sterilization is a permanent form of contraception, a thorough discussion of all the risks and benefits, stressing the permanent nature of the procedure, must be conducted with the patient before coming to the decision to perform sterilization. Studies have shown that the chance of future regret is higher in women who are younger at the time of their sterilization, with the age of decreasing regret occurring at 30 years of age [12; 45].

If a pregnancy occurs after any method of tubal sterilization, the patient must be evaluated for ectopic pregnancy. An intrauterine pregnancy can also occur after tubal sterilization.

Many women report menstrual changes after sterilization, but these are thought to be the result of discontinuing previous forms of contraception. There have been no study results supporting this claim [12; 45].

There appears to be a beneficial effect of tubal sterilization on the development of ovarian cancer (except in women with *BRCA* mutations). For many speculative reasons, hysterectomy rates are four to five times higher in women who have had tubal ligation; however, this seems to be associated with a preprocedure history of menstrual disorders and other benign gynecologic disorders (e.g., endometriosis, uterine fibroids). [12; 45]. Tubal sterilization is protective against PID, but it has no effect on breast or endometrial cancer or bone density [12].

SURGICAL

Surgical sterilization is often performed postpartum, either at the time of cesarean delivery, when it is easily added to the procedure, or following vaginal delivery by minilaparotomy. The procedure is often conducted under regional anesthetic, although it can be performed under general or local anesthetic with sedation [45]. Any surgical sterilization method carries the risks of anesthesia, as well as bleeding, organ or blood vessel injury, and death [12].

There are many different techniques for ligating the fallopian tube at minilaparotomy, largely coming down to physician training and preference. Fimbriectomy can also be performed. Regardless of which method is chosen, care must be taken to ligate the entire tubal lumen and to visualize fimbriae in order to ensure it is the tube, and not the round ligament, that is being manipulated [4; 45]. If a segment of tube is removed, as it is with most laparotomy methods, it must be sent to pathology for evaluation of complete transaction [4; 45].

Laparoscopy is usually used for post-abortion or interval tubal sterilization. It results in a smaller surgical scar than minilaparotomy, although there are at least two incisions, with the attendant risk for organ or vessel injury with each trochar insertion

[45]. There are also the risks of general anesthesia, necessary for laparoscopy, to consider with this method. There is also no pathologic specimen to send for confirmation of complete transaction. Methods of tubal occlusion with laparoscopy include coagulation with bipolar cautery, which is probably the most common method. At least 3 cm of the isthmic tube must be thoroughly cauterized [12; 45]. Mechanical devices can also be applied to the tube during laparoscopy; these include silicone rubber bands and metal clips. There is a small risk of clip or band migration or expulsion with the mechanical methods, but these methods cause less destruction to the tube, making surgical reversal an easier option should the patient express regret at a later time [12; 45]. Patients wishing for surgical tubal ligation reversal should have a detailed conversation with a reproductive specialist about the pros and cons of the surgery versus in vitro fertilization.

Failure rates are low with surgical sterilization methods, but pregnancies can occur. If a pregnancy occurs after tubal sterilization, the patient must be evaluated for ectopic pregnancy. One-third of sterilization failures are ectopic pregnancies [12; 45]. An intrauterine pregnancy can also occur after tubal sterilization, but unlike with IUDs, there is no known risk to the mother or fetus. Taken together, surgical sterilization failure rates range from 7.5 to 36 per 1,000 procedures. Postpartum partial salpingectomy has the lowest failure rate [45].

HYSTEROSCOPIC (DISCONTINUED)

No hysteroscopic sterilization devices are currently available for use [45]. In 2002, the Essure device was approved in the United States for hysteroscopic sterilization [45]. However, based on reports of adverse events from patients and clinicians, the FDA held a postmarket panel meeting in 2015 to re-evaluate the benefits and risks [46; 47]. Reported adverse events included implant perforation and migration, chronic pain, allergic reactions, irregular bleeding, and unintended pregnancy. Essure was removed from the market in 2018 [57].

Another transcervical hysteroscopic device, Adiana, was approved in 2009 [12]. Rather than a metal coil, this method used a soft polymer insert and delivered bipolar radiofrequency energy to damage a small portion of the fallopian tube at the insert site. Tissue then grew into the matrix of the insert. With a high failure and complication rate, the manufacturer of Adiana discontinued its production in 2012 [48].

Patients who received these devices who never had a follow-up to check for proper placement should be advised to undergo hysterosalpingography or transvaginal ultrasonography to confirm bilateral tubal sterilization, as the failure rate is higher in this group [45]. Persons who are experiencing complications suspected of being related to one of these devices and for whom conservative treatment options have failed should be counseled about the risks and benefits of surgical device removal. Cornuectomy, hysteroscopic removal, and laparoscopic salpingectomy have been successful; hysterectomy is not typically necessary or recommended unless otherwise indicated [45].

MALE STERILIZATION

Vasectomy is a commonly performed surgical procedure, and it is safely done in the office under local anesthesia. It is safer and less expensive than female surgical sterilization, although less commonly performed (17% of sterilizations) [12; 45]. Failure rates are less than 2% [4; 45].

Complications such as bleeding, hematoma, and epididymitis can occur. No-scalpel techniques, wherein the scrotum is punctured but no scalpel incision is made, carry lower risks of bleeding and infection [4; 12; 45]. Men are not immediately infertile after vasectomy. Infertility must be confirmed by semen analysis and can take around three months to be complete [12; 45].

POSTPARTUM CONTRACEPTION

Women who are exclusively breastfeeding will usually not ovulate for at least three months postpartum, although non- or partially breastfeeding women may ovulate as early as three weeks postpartum [12]. Women can have a false sense of security after giving birth and may not realize they can become pregnant. This can be a problem, as short inter-pregnancy intervals can lead to low birth weight and preterm deliveries [23].

Progesterone-only contraceptive methods, such as DMPA and progestin-only pills, may be used immediately postpartum as they do not increase coagulability or have effects on breast milk [12; 19]. It is advised to wait four to six weeks before beginning COCs or other estrogen-containing methods due to the risk of clot from estrogen products and from the pregnancy/puerperium itself [19]. Some sources advise waiting six months if the woman is breastfeeding [12]. COCs have not been shown to impact infant development in well-nourished lactating women, although they may have effects on milk production and content [12; 19].

It is advisable to wait four to six weeks for IUD insertion to avoid expulsion, although IUDs may be inserted sooner, even immediately after delivery, if the contraceptive benefits outweigh the risks [9; 37]. Delayed postpartum insertion (i.e., at the postpartum visit) is commonplace. If there has been a uterine infection with delivery or in the puerperium, it is advisable to wait three months before inserting an IUD [19; 23]. Condoms may be used postpartum without a waiting period; other barrier methods should be delayed for six weeks [23].

EMERGENCY CONTRACEPTION

Emergency contraception, as an FDA-approved entity, is a relatively new phenomenon, approved in 1998. Research on it began, however, in the 1960s, when it was first used as a treatment for rape victims, and the first published article on a combination oral regimen (now known as the Yuzpe method) was seen in 1974 [4; 22]. When emergency contraception was first available, both patient and clinician knowledge was severely lacking; however, since the late 1990s, information has become more readily available, and several states have enacted legislation to provide easier access to and information about emergency contraception. Healthcare providers have historically been poorly informed or reluctant to give information on emergency contraception to their patients. As a result of these and a variety of other factors, approximately 40% of patients are unaware that emergency contraception exists; the rate is even higher among those born outside the United States, in lower socioeconomic statuses, and those who never completed high school [22].

The CDC's National Survey of Family Growth, conducted between 2006 and 2010, reported that in 1995, 1% of sexually experienced women between 15 to 44 years of age had ever used emergency contraception. That number grew to 4.2% in 2002 and to 11% (5.8 million women) between 2006 and 2010. Of the 11%, 59% had used some form of emergency contraception once, 24% had used it twice, and 17% had used it three or more times [64]. When broken down by age, adults 20 to 24 years of age were most likely to use emergency contraception (23%), followed by women 25 to 29 years of age (16%), adolescents 15 to 19 years of age (14%), and finally women 30 to 44 years of age (5%). In addition, more users of emergency contraception have never been married (19%) or are currently cohabiting (14%), compared with women who are currently or formerly married (6%) [64]. The National Survey of Family Growth conducted between 2017 and 2019 reported that 25.1% of women between 15 and 49 years of age had ever used emergency contraception [60].

Postcoital contraception is synonymous with emergency contraception. Most methods are effective up to five days after unprotected intercourse [12; 22; 50; 52]. They may be used when intercourse has not been protected by any contraceptive, when contraception was not properly used (e.g., missed oral contraceptive pills, nonconsensual condom removal or "stealthing"), or when contraceptive methods failed (e.g., broken or slipped condoms) [50]. Progestin-only emergency contraceptives are available over the counter without a prescription. Although they are recommended for people 17 years of age and older, no proof of age is necessary for purchase and they are available for people of any age [50]. Despite being theoretically available in pharmacies without a prescription, the products are relatively expensive ($40 to $50 on average) and are typically kept behind the counter, require a pharmacist consultation, or are in locked cases, which deters use, particularly for younger persons [22; 52; 76]. A 2015 survey found emergency contraception was stocked in only 64% of pharmacies, and a 2019 "secret-shopper" review found emergency contraception in only 69% of pharmacies visited, although the authors noted increasing availability [43; 52]. In 2022, a "secret-shopper" study of 313 stores found that 18% of pharmacies did not stock emergency contraception [76]. In many cases, products were in locked boxes or in very short supply, and about half the time the product was behind the counter. About a quarter of pharmacies enforced outdated age restrictions, and overall, shoppers found emergency contraception harder to find than expected.

Many of the contraceptive methods described in this educational activity can be used off-label as emergency contraception, including COCs, progesterone-only pills, and the copper IUD. More rarely, estrogen-only or antiprogestin methods (such as mifepristone) can be used [4; 22; 51; 52]. The most common methods used in the United States have been progestin-only and COC methods; however, ulipristal acetate (UPA), a single-dose (30 mg) progesterone-receptor modulator, is a newer option and also the most effective oral emergency contraceptive [22; 51; 52]. UPA was approved for emergency contraception in 2010 and is only available by prescription.

The combined method of emergency contraception is no longer sold as a dedicated product, and it is no longer recommended due to the availability of more effective options with fewer adverse effects [22]. However, it can be prescribed if necessary. This option comprises two doses taken 12 hours apart, each with 100 mcg of ethinyl estradiol and 0.5 mg of levonorgestrel. The progestin-only method can be taken as one dose of 1.5 mg levonorgestrel (preferred) or two doses of 0.75 mg levonorgestrel taken 12 hours apart (although the second dose can be taken up to 24 hours after the first dose) [18; 22]. The first dose should be taken as soon as possible after unprotected intercourse, up to five days later [51; 52]. Although the package inserts advise use by 72 hours, studies have shown effectiveness with the first dose taken by 120 hours [22; 52]. Emergency contraception is more effective the sooner it is taken after intercourse [18].

Again, UPA is the most effective pill form of emergency contraception (1.4% pregnancy rate) [22]. The progestin-only regimens (2.2% pregnancy rate) are more effective than combined regimen. All methods have greatest efficacy when taken as soon after unprotected intercourse as possible [22]. If a patient does not have access to UPA or the progestin-only method, they can use an existing oral contraceptive to make up the appropriate dosage for emergency contraception. The copper IUD may also be used as emergency contraception; it is inserted as soon as possible up to five days after unprotected intercourse [22; 50; 66]. The pregnancy rate with this approach is approximately 0.1%. The copper IUD acts by impairing fertilization, altering sperm motility, and impairing implantation [50; 66].

As the UPA and progestin-only pills have fewer side effects (mainly less nausea and vomiting) and are more effective, they are recommended by ACOG [22]. All hormonal methods are capable of inhibiting ovulation or delaying ovulation, depending on the timing of the dose in relation to the menstrual cycle. It is also theorized that these medications can alter the endometrial lining, inhibit sperm transport, or interfere with the functioning of the corpus luteum. However, the data have not consistently supported these theories. Emergency contraception is ineffective after pregnancy is established; it is not an abortifacient, and it is not teratogenic [12; 22].

The most common side effect is nausea and vomiting, particularly with combination methods [18; 50]. An antiemetic given one hour before taking the combination dose can help to alleviate this side effect [50]. If vomiting occurs within two to three hours of emergency contraception ingestion, the dose should be repeated. Severe or persistent vomiting can be addressed with vaginal administration of the emergency contraception tablets, which does not impair their absorption. Irregular bleeding is also common, lasting from one day to one month after emergency contraception [18]. The next menstrual period is commonly either hastened or delayed by one week from the expected time. Less frequent side effects can include breast tenderness, abdominal pain, fatigue, headache, and dizziness [18]. There have never been any reports of deaths or severe complications from emergency contraception [22].

Emergency contraception has no effect on the risk of subsequent ectopic pregnancy [12; 22]. It may also be used in any woman who has had a previous ectopic pregnancy and in women with other contraindications to combined oral contraceptives, such as migraines, cardiovascular disease, and liver disease. Emergency contraception may be used while breastfeeding [22].

A physical exam or pregnancy test is not required before dispensing emergency contraception [52]. A follow-up exam is also not required [22]. However, if menses have not occurred by one week after the expected time or within 21 days of emergency contraception use or if abdominal pain or bleeding are persistent, the patient should be evaluated [12; 22].

When a woman presents to her healthcare provider for emergency contraception, it can be a good opportunity to discuss more reliable, long-term forms of contraception. It is also an opportunity to offer testing for STIs. It is important that any victim of sexual assault be offered emergency contraception; as noted, in some states this is required by law [12; 63; 65]. Long-term contraception should be initiated immediately after emergency contraception (in cases where a copper IUD was not used), as a woman can become pregnant later in the same cycle. Emergency contraception may be repeated more than once in the same cycle. Any non-barrier method of birth control may be initiated either immediately (with a barrier back-up method) or at the next menstrual period. Long-term methods, such as the progesterone injection, implant, or hormonal IUD, should be delayed until the next menstrual period confirms that the patient is not pregnant [22].

The Faculty of Sexual and Reproductive Healthcare asserts that patients should be advised that oral emergency contraceptive methods do not provide contraceptive cover for subsequent unprotected sexual intercourse and that they will need to use contraception or refrain from sex to avoid further risk of pregnancy.

(https://www.fsrh.org/Common/Uploaded%20files/documents/fsrh-guideline-emergency-contraception 03dec2020-amendedjuly2023-11jul.pdf. Last accessed November 21, 2024.)

Level of Evidence: B (Robust experimental or observational studies)

An analysis published in 2015 found that only 21% to 50% of sexual assault patients were offered or given emergency contraception in the emergency department [22]. Since then, 20 states have enacted legislation requiring hospital emergency departments to inform sexual assault patients about their emergency contraception options, but only 16 states and the District of Columbia require emergency departments to provide these patients with contraception on request [65]. Some states allow pharmacists to initiate emergency contraception if working in collaboration with a physician or without a prescription after completing a training program [63]. One study found that 0% to 65% of adoles-

cent sexual assault patients are being provided with emergency contraception in American emergency departments, despite the majority (74%) visiting the hospital within 72 hours of the assault [49].

Studies have shown that people are more likely to use emergency contraception if they have a prescription or the pills at the time of unprotected intercourse [12; 22; 52]. It has also been shown that retaining emergency contraception does not lead to increased/risky sexual activity or more frequent unintended pregnancy. The American Academy of Pediatrics recommends that pediatricians provide adolescent patients with an advanced provision of emergency contraceptive (i.e., a supply of progesterone-only or UPA pills or a prescription, with refills, of the same) in addition to condoms [52]. This same recommendation applies to any physician providing care for patients who may become pregnant. All patients should receive education regarding the availability of emergency contraception, and a prescription for emergency contraception should be offered as part of routine gynecological visits [22]. In its guideline, the American Academy of Pediatrics also notes that pharmacists and prescribers have a duty to provide access to relevant and legally available treatments, even if they have personal objections or to offer a referral to another provider who will provide those services [52].

MALE CONTRACEPTIVES

There are newer contraceptive methods in the pipeline, such as the much-publicized but not-yet-seen male contraceptive pill. Systemic male contraceptives have proven tricky. As men are continuously producing sperm, the physiology of contraception is not as straightforward as it is in women. Possible approaches include blocking hormonal control over testicular cell function, stopping sperm production by altering seminiferous tubule function, and blocking maturation, functioning, or transport of sperm [4]. Side effects and acceptability must also be taken into account.

There have been reported studies on a new transdermal gel for men, containing testosterone and nestorone. Preliminary research showed that it reduced sperm concentration to ≤1 million/mL [14; 53]. There were no serious adverse effects in initial studies, and a phase 2b clinical trial with 222 men found that the gel achieved the target sperm count within 15 weeks [75].

Another novel oral contraceptive option for men is dimethandrolone undecanoate (DMAU), which is converted to dimethandrolone (DMA), an ester and prodrug that binds to androgen and progesterone receptors, suppresses gonadotropins, maintains androgenic effects, and inhibits spermatogenesis in pre-clinical studies [67]. Research results have been encouraging, showing a reduction of serum testosterone to near castrate levels, without significant side effects. Continued research is necessary to determine the safety and efficacy of this drug as a successful male contraceptive [67].

Attitudes toward the male contraceptive pill have been less favorable than those toward female contraceptive pills, with women more positive than men [54]. However, this appears to be changing. A study conducted by the Kaiser Foundation found that 66% of men were willing to take a birth control pill, 44% were willing to take a birth control shot, and 36% were interested in the idea of an implant [55; 56]. Women have expressed concern regarding male adherence to regimens and less perceived engagement in the consequences of unintended pregnancies.

CONSIDERATIONS FOR NON-ENGLISH-PROFICIENT PATIENTS

Because selecting the appropriate contraception is linked so closely to patient-related factors and wishes, communication is a vital aspect of the process. The patient population in the United States is diverse and becoming more so. Therefore, consideration should be given to those patients who are not proficient in spoken and/or written English. When there is an obvious disconnect in the communication process between the practitioner and patient, an interpreter is required.

In this multicultural landscape, interpreters are a valuable resource to help bridge the communication and cultural gap between patients and practitioners. Interpreters are more than passive agents who translate and transmit information back and forth from party to party. When they are enlisted and treated as part of the interdisciplinary clinical team, interpreters serve as cultural brokers who ultimately enhance the clinical encounter. When providing care for patients for whom English is a second language, consideration of the use of an interpreter and/or patient education materials in their native language may improve patient understanding and outcomes.

CONCLUSION

Different contraceptive methods abound—from natural family planning techniques to hormonal contraception to sterilization. The range of hormonal methods is vast and growing rapidly. COCs remain extremely popular among patients, but new doses, delivery vehicles, and formulations make staying current on these methods a challenge. The wide selection of progesterones in oral contraceptive pills complicates selecting a pill based on the desired side-effect profile. The wide range of contraceptive options, as well as newer contraceptive methods on the market, can pose a challenge when attempting to advise patients and address their concerns. All healthcare professionals should have a clear understanding of the contraceptive options available and how they may impact patient health and quality of life.

GLOSSARY OF TERMS

Abstinence: refraining from sexual activity, particularly intercourse.

Actinomyces: gram-positive, rod-shaped anaerobic bacterium that forms branching networks in colonies.

Amenorrhea: absent menstrual flow.

Androgenic: acting as an androgen, masculinizing. When referring to progesterones, refers to those that may promote acne or hair growth.

Bacterial vaginosis: imbalance of naturally occurring bacteria in the vagina.

BRCA: genes (BRCA1 and BRCA2) whose specific mutations predispose to breast or ovarian cancer.

Breakthrough bleeding: abnormal bleeding between menstrual periods.

Corpus luteum: the progesterone-producing "yellow body" left behind from the ovarian follicle after the oocyte has been released during ovulation.

Cytochrome P450: group of enzymes in the body that metabolize medications and chemicals, among other functions.

Dysmenorrhea: painful menstruation.

Ectopic pregnancy: a pregnancy implanted outside the uterine cavity.

Endometriosis: condition in which endometrial cells grow outside the uterus; may be painful and affect fertility.

Endometrium: glandular inner lining of the uterus.

Estrogen: steroid hormone responsible for thickening the endometrium in the first half of the menstrual cycle (proliferative phase).

Fibroadenoma: noncancerous breast tumors consisting of fibrous stromal (connective) and glandular tissue.

Fimbriectomy: surgical removal of the distal ends of the uterine tubes.

Follicle-stimulating hormone (FSH): Hormone that promotes estrogen production, follicle development, and the first phase of endometrial proliferation. In males, promotes spermatogenesis.

Hysterectomy: surgical removal of the uterus that may or may not involve removing the cervix, fallopian tubes, and ovaries.

Hysterosalpingogram: radiographic examination of the uterus and tubes after transcervical installation of radio-opaque dye.

Hysteroscopy: examination of the uterine cavity by a transcervical camera.

Isthmus: the long, narrow, central portion of the uterine tube usually recommended as the site for tubal ligation.

Laparoscopy: examination of the abdominal cavity by placement of a camera via a small incision.

Laparotomy: examination of the abdominal cavity by traditional surgical incision.

Long-acting reversible contraceptive (LARC): comprising the progesterone implant and both commercially available intrauterine devices.

Leiomyoma: fibroid; a benign smooth muscle growth.

Luteinizing hormone (LH): hormone that promotes ovulation and the production of androgens and progesterone.

Menorrhagia: heavy or excessive menstruation.

Neoplasia: abnormal, uncontrolled cell growth.

Nulliparity: the state of never having been pregnant.

Oligomenorrhea: light or infrequent menstrual flow.

Ovulation: the release of an oocyte from a primary follicle in the ovary.

Pelvic inflammatory disease (PID): general term for infection of the uterine lining, fallopian tubes, and/or ovaries. Sexually transmitted organisms may be causative but are not always found.

Perimenopause: the period of several years before actual menopause when symptoms such as hot flushes and irregular menses are common.

Pessary: medical device placed inside the vagina (or rectum). May be used for organ support or to deliver medication.

Premenstrual dysphoric disorder (PMDD): a severe form of premenstrual syndrome, with mood symptoms predominant.

Progesterone: steroid hormone responsible for the development of the endometrium in the second half of the menstrual cycle (secretory phase). Also responsible for supporting gestation.

Progestin: a synthetic hormone often used in hormonal birth control.

Puerperium: the period immediately following childbirth, traditionally considered as lasting six weeks.

Seminiferous tubules: the site of male sperm production.

Suppository: drug-delivery system whereby the medication is embedded in a material designed to melt when placed into a body cavity.

Thrombophilia: abnormality of blood coagulation that predisposes to clot formation.

Venous thromboembolism (VTE): pathologic blood clot formed within a vein.

Implicit Bias in Health Care

The role of implicit biases on healthcare outcomes has become a concern, as there is some evidence that implicit biases contribute to health disparities, professionals' attitudes toward and interactions with patients, quality of care, diagnoses, and treatment decisions. This may produce differences in help-seeking, diagnoses, and ultimately treatments and interventions. Implicit biases may also unwittingly produce professional behaviors, attitudes, and interactions that reduce patients' trust and comfort with their provider, leading to earlier termination of visits and/or reduced adherence and follow-up. Disadvantaged groups are marginalized in the healthcare system and vulnerable on multiple levels; health professionals' implicit biases can further exacerbate these existing disadvantages.

Interventions or strategies designed to reduce implicit bias may be categorized as change-based or control-based. Change-based interventions focus on reducing or changing cognitive associations underlying implicit biases. These interventions might include challenging stereotypes. Conversely, control-based interventions involve reducing the effects of the implicit bias on the individual's behaviors. These strategies include increasing awareness of biased thoughts and responses. The two types of interventions are not mutually exclusive and may be used synergistically.

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