A New Era of Contraception
Jody Steinauer, MD, MAS

ABSTRACT

PURPOSE: To present data on new contraceptive methods and concepts that enable the primary care physician to help women prevent unintended pregnancy.

EPIDEMIOLOGY: Approximately 50% of all pregnancies in the United States are unintended, and 50% of these end in abortion. One half of unintended pregnancies occur among women using contraception.

REVIEW SUMMARY: A variety of obstacles prevent women from effectively using contraception. Research results that challenge traditional contraception practice have led to practical strategies for practitioners to help women overcome obstacles to contraceptive use and improve compliance. The recent addition of many new, longer-term contraceptive methods to a few older methods has resulted in a wide selection of easy-to-use, effective contraceptives. These methods have the potential to prevent hundreds of thousands of unintended pregnancies that otherwise might result from noncompliance. Strategies to remove practitioner-level obstacles to effective contraception use also are reviewed.

TYPE OF AVAILABLE EVIDENCE: Randomized-controlled trials; observational studies; systematic reviews.

GRADE OF AVAILABLE EVIDENCE: Good.

CONCLUSION: Primary care physicians should increase access to contraceptive care in their offices, use evidence to support their recommendations in contraceptive management, encourage patients to consider longer-term methods of contraception that are more efficacious, and prescribe emergency contraception in advance.


Each year in the United States there are 6.3 million pregnancies, nearly half (48%) of which are unintended. More than 50% of these unintended pregnancies end in abortion.2 Of women who become pregnant unintentionally, approximately 50% are using contraception at the time of conception; either the method failed, or it was being used incorrectly.1

Clearly, a variety of individual- and provider-level obstacles exist that may prevent women from accessing and using contraceptive methods effectively, as may larger issues such as public and private insurance coverage of contraception. On a provider level, these obstacles include the requirement of an annual examination prior to prescribing contraception, inadequate patient education regarding true contraceptive contraindications, and the fact that emergency contraception (EC) is not prescribed in advance. On an individual level, there also are the problems of patients choosing not to fill their prescriptions and/or not complying with contraception regimens.

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Conflict of Interest: Dr. Steinauer reports having no financial or advisory relationship with corporate organizations related to this activity.

Off-label Product Discussion: The author of this article discusses off-label extended-cycle use of combined hormonal methods.

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Unfortunately, oral contraceptive pills (OCPs), or “the pill,” and condoms, the 2 most commonly used methods of birth control with the exception of tubal ligation, have far from excellent efficacy. Only a small percentage of women are currently using longer-term combined hormonal, progestin-only, and intrauterine methods, all of which allow fewer opportunities for noncompliance and/or failure. Many providers consider the combined OCP to have outstanding efficacy, but studies show that while its effectiveness with perfect, or consistent, use approaches 99%, efficacy with actual use ranges from 92% to 95%. Of the 10 million women taking the OCP in the United States, these low “actual” efficacy rates translate into as many as 800 000 unintended pregnancies per year. Among women taking OCPs, missed doses are extremely common. Whereas only 10% of OCP users admit to missing 2 or more pills per month, a study that used an electronic tracking device inserted into pill packs found that 50% of women had missed 3 doses or more by a 3-month mark. Consequently, one problem contributing to contraceptive failure is overdependence on contraceptives such as the pill that require frequent interventions by the patient, and thus offer more opportunities for noncompliance. A variety of longer-term combined hormonal, progestin-only, and intrauterine contraceptive methods exist, all of which are easy to use and well tolerated.

Along with the development of many new contraceptives has been a flurry of research evaluating alternatives to traditional contraceptive practice that may substantially decrease unintended pregnancy rates. This article reviews some of the evidence for strategies to remove practitioner-level obstacles to effective contraception use, and provides an overview of current birth control methods (in order of decreasing frequency of patient intervention), with an emphasis toward improving compliance and efficacy. There also is a discussion of what is new in EC. Table 1 provides an overview of contraceptive methods, their costs, and benefits.

<table>
<thead>
<tr>
<th>Table 1. Comparison of Contraceptive Methods*</th>
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<tbody>
<tr>
<td><strong>Contraceptive</strong></td>
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<tr>
<td><strong>Methods</strong></td>
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<tr>
<td>Barrier Methods</td>
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<tr>
<td>Birth Control Pills</td>
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<td>Transdermal Patch</td>
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<tr>
<td>Vaginal Ring</td>
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<tr>
<td>3-Month Injections</td>
</tr>
<tr>
<td>Implants</td>
</tr>
<tr>
<td>Levonorgestrel Intrauterine System</td>
</tr>
<tr>
<td>Copper IUD</td>
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</tbody>
</table>

FDA = Food and Drug Administration; IUD = intrauterine device; STD = sexually transmitted disease.

*Adapted with permission from Association of Reproductive Health Professionals.”
NEW APPROACHES TO CONTRACEPTION

IMPROVING ADHERENCE TO CONTRACEPTIVE THERAPY

A variety of obstacles—many of which are created by health practitioners—prevent women from effectively initiating and continuing contraceptive use. Three of these obstacles have simple solutions.

First, many women experience unnecessary barriers when initiating or refilling birth control methods due to office policies that require women to receive yearly Pap smears before they may receive a prescription for contraceptives. With the exception of a blood pressure measurement prior to initiation of combined birth control, no physical examination is required before initiating a non-intrauterine birth control method. Once a woman has been started on a contraceptive method, obtaining refills should not be tied to appointments for preventive services.

Second, many women who leave the practitioner’s office with prescription in hand do not fill their prescriptions. A prescribing method that may reduce this problem is termed Quick Start. With the Quick Start approach, a woman is started on oral contraceptives (OCs) during her clinic visit, regardless of where she is in her menstrual cycle. A small prospective cohort study showed that women who began OCs immediately were much more likely to complete the first cycle. Furthermore, 88% of those women then continued on to take their second pill cycle, compared with 74% who started at the time of menses. (In this study, each woman had a negative pregnancy test before beginning OCs; however, even if conception had occurred too recently for the patient to test positive, taking the first cycle is not harmful. Combined birth control pills are not teratogenic. Quick Start currently is being studied with a variety of contraceptive methods.

Finally, many practitioners are not up-to-date about evidence-based contraceptive prescribing, and contraceptive myths often keep clinicians from prescribing optimal, long-term methods for patients. Remaining current is made even more difficult by clinicians’ busy schedules and inadequate time for reviewing the literature.

The World Health Organization (WHO) produces an evidence-based contraception guide called Medical Eligibility Criteria for Contraceptive Use, available on their Web site. This resource clarifies the evidence for hundreds of potential contraindications to contraceptive use, and provides guidelines for when each contraceptive method can be safely prescribed. A guideline of “1” indicates that the benefits of prescribing clearly outweigh the risks and the method should almost always be used; “2,” that the benefits generally outweigh the risks and the method should almost always be used; “3,” that the risks generally outweigh the benefits and the method should only be used if no other method is available; and “4,” that the risks always outweigh the benefits, and therefore the method should never be used. For example, let’s say that you are seeing a 24-year-old woman who has a history of migraines with auras and desires the combined hormonal vaginal ring, and you cannot remember whether this method is contraindicated for this patient. The WHO guide enables the clinician to quickly search for this clinical scenario, and discover that the contraceptive method in question is a category 4 for this patient and should not be used. A selection of situations in which the risks outweigh the benefits for prescription of combined hormonal contraception is shown in Table 2.

DAILY: THE COMBINED ORAL CONTRACEPTIVE PILL RECONSIDERED IN EXTENDED-USE FORMULATION

Most failures associated with OCs occur when women delay the start of their next cycle of contracep-

<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>WHO Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast-feeding and less than 6 weeks postpartum</td>
<td>4</td>
</tr>
<tr>
<td>Breast-feeding and between 6 weeks and 6 months postpartum</td>
<td>3</td>
</tr>
<tr>
<td>Multiple risk factors for arterial CVD</td>
<td>3</td>
</tr>
<tr>
<td>Smoking &lt;15 cigarettes/day and age of ≥35 years</td>
<td>3</td>
</tr>
<tr>
<td>Smoking &gt;215 cigarettes/day and age of ≥35 years</td>
<td>4</td>
</tr>
<tr>
<td>Uncontrolled hypertension (SBP &gt;159 and/or DBP &gt;99)</td>
<td>4</td>
</tr>
<tr>
<td>Controlled hypertension (SBP = 140-159 or DBP = 90-99)</td>
<td>3</td>
</tr>
<tr>
<td>Current and history of ischemic heart disease</td>
<td>4</td>
</tr>
<tr>
<td>Stroke</td>
<td>4</td>
</tr>
<tr>
<td>DM with vascular involvement or of &gt;20 years’ duration</td>
<td>3</td>
</tr>
<tr>
<td>Valvular heart disease with thrombogenic complications</td>
<td>4</td>
</tr>
<tr>
<td>Current or past DVT or PE</td>
<td>4</td>
</tr>
<tr>
<td>Major surgery with prolonged immobilization</td>
<td>4</td>
</tr>
<tr>
<td>Migraines with focal aura</td>
<td>4</td>
</tr>
<tr>
<td>Migraines without aura and age of ≥35 years</td>
<td>3</td>
</tr>
<tr>
<td>Current breast cancer</td>
<td>4</td>
</tr>
<tr>
<td>History of breast cancer and without evidence of disease</td>
<td>3</td>
</tr>
<tr>
<td>Active hepatitis or severe cirrhosis</td>
<td>4</td>
</tr>
<tr>
<td>Benign or malignant liver tumors</td>
<td>4</td>
</tr>
<tr>
<td>Use in women taking rifampin or griseofulvin</td>
<td>3</td>
</tr>
<tr>
<td>Use in women taking convulsants that affect liver enzymes</td>
<td>3</td>
</tr>
</tbody>
</table>

CVD = cardiovascular disease; SBP = systolic blood pressure; DBP = diastolic blood pressure; DM = diabetes mellitus; DVT = deep vein thrombosis; PE = pulmonary embolism; WHO = World Health Organization. *Category 3 = risk generally outweighs benefit; Category 4 = unacceptable health risk.
tive tablets. By day 7 of the placebo week, up to 25% of women have developed an ovarian follicle large enough to ovulate unless immediately suppressed by hormones. Thus, fewer "starts" or fewer placebo days make it possible for OCs to be more effective. For this reason, the body of evidence that supports extending the length of the contraceptive dosing cycle is growing. One Food and Drug Administration (FDA)-approved oral contraceptive, Seasonale® (levonorgestrel/ethinyl estradiol [EE]), administers 12 weeks (84 days) of hormone followed by 1 week of placebo. Taking Seasonale, a woman will have only 4 menstrual periods per year.

A randomized multicenter study found that the failure rate of Seasonale was 0.60 per 100 women-years based on Pearl Index calculations. By comparison, a study of a traditionally prescribed oral contraceptive, Nordette® (levonorgestrel/EE), demonstrated a comparable and possibly higher failure rate of 1.78 per 100 women-years.12 However, because of a lack of definitive data on endometrial hyperplasia.11 and no evidence of endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12 However, because of a lack of definitive data on endometrial hyperplasia.12

Seasonale is well tolerated. Data from a randomized clinical trial showed that breakthrough bleeding with Seasonale decreased in each successive 12-week cycle from a median of 12 days (cycle 1) to 4 days (cycle 4). It is unlikely that the few weeks of extra low-dose hormone exposure would lead to an increased risk of long-term outcomes such as breast and endometrial cancer when compared with traditionally dosed pills, but definitive data are lacking. Among women taking traditionally prescribed combined pills there is a decreased risk of endometrial cancer, and among extended-cycle users there is no increase in endometrial thickness and no evidence of endometrial hyperplasia. However, because of a lack of definitive data about potential increased estrogen exposure, the recommendation is to use a low-dose estrogen-containing pill in extended dosing regimens.

Other extended-cycle options include using other pill types in an off-label manner, allowing women the option of withdrawing every 6, 8, or 12 weeks, or not at all. A recently published small study compared a continuous regimen of levonorgestrel 100 µg/EE 20 µg tablets with the traditional regimen of 21 days of combination OC followed by 7 days of placebo. Although continuous users had significantly greater incidence of spotting than cyclic users during cycles 1 through 3, by the end of the trial, there was no difference in the incidence of spotting. By the end of the trial, 72% of the continuous users were amenorrheic. The FDA currently is considering a pill of this continuous regimen. Studies of an extended-cycle combined hormonal patch and ring also are ongoing. Finally, pill manufacturers are studying decreasing the length of the placebo week to improve efficacy, such as in the currently available pill Mircette® (desogestrel/EE and EE), whose fourth week includes 5 days of 10-µg EE pills and 2 days of placebo.

**Weekly: The Combination Transdermal Contraceptive System**

Ortho Evra® (norelgestromin/EE transdermal system), or the TCS/PATCH, is another fairly recent addition to women's contraceptive choices. This product is a 1.75 inch × 1.75 inch patch that is applied each week for 3 weeks, followed by 1 week patch-free. When a patch is not applied, withdrawal bleeding occurs. The patch should be applied on the first day of menses anywhere on the body except the breast, and there is no need for initial back-up contraception. If using Sunday start or applying the first patch after day 1 of the menstrual cycle, a back-up contraceptive is required for 1 week. If the patch-free interval between cycles exceeds 7 days (if the patient forgets to apply a new patch), a back-up contraceptive is required for 1 week.

The TCS/PATCH releases 150 µg norelgestromin (the primary active metabolite of norgestimate) per day and 20 µg EE per day. The system is formulated with a lower dose of EE than that of combination OCs because it is absorbed through the skin and thus avoids first-pass metabolism in the liver. Continuous diffusion through the skin maintains a constant level of hormones for week-long contraception. As with the combination OCs, the transdermal contraceptive patch suppresses ovulation approximately 90% of the time.

Data from the intent-to-treat population of clinical trials of the TCS/PATCH showed that it had a failure rate of 0.88 pregnancies per 100 woman-years. However, clinical data suggest it is less effective in women whose body weight exceeds 198 lb (90 kg). Five of the 15 treatment failures occurred in this patient population, which only constituted 3% of the study population. Of note, studies of other low-dose regimens, such as the contraceptive vaginal ring (CVR) and low-dose pills, did not focus on women whose body weight exceeded 198 lb, so it is possible that with all low-dose, combined regimens, efficacy is lower in this group. Studies to evaluate this concern are ongoing. Consequently, women of a body weight >198 lb should be advised that they are at slightly greater risk of pregnancy than are other women when they choose to use the patch (and other low-dose combined methods) for contraception.

Patients were more likely to be adherent to the dose schedule of the TCS/PATCH than to that of the combination OC; 88% of participants who used the patch exercised perfect compliance, compared with 78% of women who took combination OCs (P = .001). Approximately 20% of women who used the patch experienced more spotting or breakthrough bleeding in the first 2 cycles than did women who used the
CONTRACEPTIVE VAGINAL RING

MONTHLY: THE COMBINED

NuvaRing® (etonogestrel/EE) is a combined CVR with an outer diameter of about 2 inches and a cross-sectional diameter of about 1/8 inch. It is self-inserted into the vagina during the first 5 days of menses, left in position for 3 weeks, and then removed for 1 week. Among women who used the ring as recommended, there were 0.77 failures per 100 woman-years. In the study population, patients complied with the dosage regimen perfectly in 85.6% of the cycles; 97% of women never temporarily removed the ring during the 3-week period in which it was to be in place.

The menstrual cycle profile that is associated with use of the combined CVR mimics the normal menstrual cycle fairly well. When the ring was removed, 98.9% of women experienced withdrawal bleeding. Only 5.5% of women had breakthrough bleeding during their cycles. In a head-to-head trial between the combined CVR and a combination OC (levonorgestrel 150 µg/EE 30 µg), a significantly greater percentage of women who used the CVR had a desirable bleeding profile than did those who used the combination OC.

In a 1-year study of 2322 women to assess the tolerability of the CVR, more than 95% of women reported it was easy to insert and remove, with 83% never or rarely feeling the ring during intercourse. Overall, 85% of women who used the ring reported satisfaction with it, and 90% stated they would recommend it to their friends.

In clinical trials, 15.2% of participants discontinued use of CVR prematurely because of adverse events. Adverse events specific to the ring included vaginitis, leukorrhea, “feeling the ring” when it is in place, and very rarely, expulsion. Participants using the combined CVR also experienced common adverse effects similar to those associated with combination OCs, including headaches; nausea; weight gain; fluid retention; breast tenderness; depression; nervousness; increased blood pressure; amenorrhea or abnormal menstruation; or breakthrough bleeding.

Most of the precautions, contraindications, and warnings about the use of the combined CVR are similar to those of combination OCs or the TCS/PATCH. If a woman removes the ring for more than 3 hours at a time, she should use EC (if applicable) and use a back-up method for 7 days. If a woman is more than 1 week late in replacing her ring, she should do the same. (The serum levels are adequate for a total of 5 weeks.) However, the combined CVR should be used cautiously, if at all, in women with organ prolapse, chronic vaginitis, or severe constipation, as these conditions may increase the risk of accidental expulsion.

In summary, the combined CVR is an effective contraceptive device that essentially allows a normal menstrual cycle. It is convenient, well tolerated, and well accepted by users. The schedule of use of the combined CVR is more convenient for many women than is that of a combination OC, because the former method does not require the patient to take medication daily. At least 1 study has shown that many American women would prefer to use contraception monthly rather than adhering to a daily regimen.
addition, because the hormone levels associated with the use of the ring remain consistent for up to 5 weeks, studies currently are under way to assess the safety and efficacy of use beyond 3 weeks: for example, continuous use for 1 month at a time, which could further improve compliance.

**Every 3 Months:**

**Progestin Intramuscular Injection**

The progestin intramuscular injection, Depo-Provera® (medroxyprogesterone acetate, 150 mg/mL), is highly effective and acceptable, requiring injection by a healthcare provider every 3 months. A new version of Depo-Provera, the low-dose Depo-subQ provera 104 (104 mg/dose), has recently been approved by the FDA. Both forms are highly effective with 1-year failure rates of 0.3%, and each is well tolerated.

The most common side effects are weight gain (averages 5.4 lb at 1 year and 8 lb at 2 years) and menstrual irregularity. The majority of women experience irregular spotting; up to 50% experience amenorrhea at 1 year and 80% at 5 years. Fertility returns to normal after approximately 9 months after discontinuation, so while some women may become pregnant immediately, others will have delayed fertility. The most significant adverse effect is a decrease in lumbar bone mineral density of 3.1% over 2 years of use. Bone loss is greater with increasing duration of use and, though statistically reversible to prior density upon discontinuation, concern exists regarding the quality of the bone that is reformed. This effect has sparked controversy and caution in prescribing this drug to young women, who may be at higher risk of bone mineral loss. Most experts in family planning, however, continue to prescribe injections for up to 3 to 5 years for women who will not use a different method effectively. The low-dose, subcutaneous version has similar efficacy and effect on bleeding and fertility, but data have not yet been published about the effect on bone mineral density. Contraindications for Depo-Provera are listed in Table 3.

**Every 3 Years:**

**The Single-Rod Progestin Implant**

Implanon® (etonogestrel) is a single-rod subdermal implant that is inserted under the skin of the upper arm by a medical professional. Implanon slowly releases etonogestrel—the active metabolite of desogestrel—providing reliable contraception for up to 3 years. Like other progestogen-only contraceptives, the implant can cause irregular bleeding. Although it has been marketed outside of the United States since 1998, FDA approval in this country is not expected until sometime later this year (2005). In the original studies, there were no pregnancies out of more than 70 000 woman-cycles for women using the implant, which demonstrated that it is highly effective. Like other progestogen-only methods, the main reason for discontinuation is irregular bleeding.

**Every 5 to 10 Years:**

**Intrauterine Contraception**

Intrauterine contraception (IUC) is a highly effective and acceptable form of birth control that is underused in the United States compared with other developed countries, secondary to a variety of misconceptions among providers and women. Mirena®, a levonorgestrel-releasing intrauterine system (LNG IUS) and ParaGard®, a copper intrauterine device (IUD), are methods of IUC that must be professionally inserted in the uterus. Insertion can occur at any time during the menstrual cycle and rarely requires local anesthetic and/or cervical dilation. LNG IUS releases 20 µg of levonorgestrel per day, and the copper IUD releases copper ions. According to package labeling, the LNG IUS must be replaced after 5 years, but worldwide data demonstrate efficacy for up to 7 years. The copper IUD is FDA approved for 10 years of use, but worldwide data show efficacy for up to 12 years.

IUC is very effective in preventing contraception and is comparable to sterilization. In clinical trials of LNG IUS, 12-month pregnancy rates were ≤0.2 per 100 women, and the 5-year cumulative pregnancy rate was 0.7 per 100 women. LNG IUS prevents pregnancy by a number of mechanisms: decreasing sperm

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**Table 3. When Risks Outweigh Benefits of Initiating Depo-Provera, Based on WHO Criteria**

<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>WHO Category</th>
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<tbody>
<tr>
<td>Breast-feeding and less than 6 weeks postpartum</td>
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<tr>
<td>Current DVT or PE</td>
<td>3</td>
</tr>
<tr>
<td>Multiple risk factors for arterial cardiovascular disease</td>
<td>3</td>
</tr>
<tr>
<td>SBP of ≥160 or DBP of ≥100</td>
<td>3</td>
</tr>
<tr>
<td>Vascular disease</td>
<td>3</td>
</tr>
<tr>
<td>Current and history of ischemic heart disease</td>
<td>3</td>
</tr>
<tr>
<td>Stroke</td>
<td>3</td>
</tr>
<tr>
<td>DM with vascular involvement or of &gt;20 years’ duration</td>
<td>3</td>
</tr>
<tr>
<td>Current breast cancer</td>
<td>4</td>
</tr>
<tr>
<td>History of breast cancer and without evidence of disease</td>
<td>3</td>
</tr>
<tr>
<td>Active hepatitis or severe cirrhosis</td>
<td>3</td>
</tr>
<tr>
<td>Benign or malignant liver tumors</td>
<td>3</td>
</tr>
</tbody>
</table>

WHO = World Health Organization; DVT = deep vein thrombosis; PE = pulmonary embolism; SBP = systolic blood pressure; DBP = diastolic blood pressure; DM = diabetes mellitus.

*Data from World Health Organization.

†Category 3 = risk generally outweighs benefit; Category 4 = unacceptable health risk.
motility and function, diminishing growth of the endometrium, increasing and thickening cervical mucus, and causing a weak foreign body reaction. The copper IUD has a 1-year pregnancy rate of 0.8%, and a 7-year failure rate of 1.3%. It works primarily by decreasing sperm motility and function, and by causing a foreign body reaction.

 LNG IUS can alter the menstrual cycle, but most monthly cycles are ovulatory. Spotting is frequent and irregular, particularly during the first 1 to 6 months of use; however, by 6 months, most women experience 5 to 7 days of spotting, which comes in a cyclic pattern owing to ovulation. Overall, there is a decrease in menstrual blood loss of 70% to 90%. At 12 months post-insertion, 20% of women will be amenorrheic. The copper IUD does not affect cycle regularity, but increases the quantity of blood loss with menses.

Both IUDs have an approximate rate of expulsion of 5%, and perforation is very rare. One of the largest misconceptions about IUC is its relationship to pelvic inflammatory disease (PID). IUC is associated with a transitory increased risk of PID at the time of insertion, thought to be secondary to bacterial presence in the cervix at the time of insertion. For this reason, women should be screened for chlamydia and gonorrhea before or at the time the device is inserted. The risk of transient PID is between 1 and 8 per 1000. After the first month of use, there is no increased risk of PID associated with IUC. There also is evidence that IUC does not increase risk of future tubal infertility. In addition to a lack of positive association between both IUDs and PID, the LNG IUS is associated with an overall decreased rate of PID. While the manufacturer has not published these data, it makes physiologic sense that use of LNG IUS would decrease PID in the same way combined hormonal contraception decreases PID through thickening of the cervical mucus.

According to the WHO, contraindications for IUC include pregnancy; postpartum endometritis or septic abortion within 3 months prior to use; undiagnosed abnormal vaginal bleeding; distorted uterine cavity; current or recent PID within 3 months; current cervicitis; risk factors for sexually transmitted infections; gestational trophoblastic disease; or cervical neoplasm. In addition, the WHO recommends that LNG IUS not be used in women with current deep vein thrombosis or pulmonary embolism, current or past breast cancer, or severe liver disease. Nulliparity and nulligravidity are not contraindications to IUC use, although they may be related to an increased expulsion rate and increased dysmenorrhea.

IUC is well tolerated. Eighty-one percent of IUC users continued to use LNG IUS for 1 year or more. A study that investigated long-term acceptability of LNG IUS found that 69% of women were satisfied at 6 months and 77% after 36 months of use. The copper IUD has been found to be acceptable. IUC is cost effective if used for more than 2 years, even if a woman must pay out of pocket.

EMERGENCY CONTRACEPTION

In theory, EC has the capability of reducing the number of unwanted pregnancies by as much as 50%. It also offers the potential to reduce the number of abortions by up to one half—which equates to more than 700,000 abortions per year. To date this has not occurred. In actuality the use of EC in the United States during 2002 probably only reduced the incidence of abortion by 51,000 procedures; this lack of use is partially explained by current underprescribing of EC, and may be partially explained by a theoretical overestimate of the effect of EC on pregnancy prevention.

EC refers to methods used to prevent pregnancy following intercourse. There are 3 approaches: specifically, high doses of OC tablets that contain estrogen and progesterin, high doses of OCs that contain progestin alone, or the insertion of a copper-T IUD. Of the 3 options, the copper-T IUD is the most effective. Nevertheless, though very common in Europe, its use is much less so in the United States.

Evidence suggests that EC has multiple mechanisms of action: inhibition of ovulation; thickening of cervical mucus and trapping sperm; inhibiting tubal transport of eggs or sperm; interference with fertilization; early cell division, or transport of the embryo; and disruption of the uterine lining to prevent implantation. None of these mechanisms disrupt pregnancy once implantation has occurred; consequently, early timing of EC is important to its success.

Efficacy estimates show that if 100 women each were to have 1 act of unprotected intercourse during their cycle, 8 would become pregnant. If all 100 of these women were to use the combined EC, only 2 would become pregnant—a 75% reduction in incidence of pregnancy. If the progestin-only EC method were used, only 1 woman out of 100 would become pregnant—an 89% reduction in unwanted pregnancies.

The traditional Yuzpe method of EC involves 2 large doses of combination OCs, a minimum of 100 µg EE and 1 mg norgestrel or 0.50 mg levonorgestrel per dose, within 12 hours of intercourse and then repeated 12 hours later (Table 4). The sooner it is taken, the more effective it is. If a woman takes EC within 12 hours, her risk of pregnancy is 0.5%. If she doesn’t use it all, her risk is 8%.

The progestin-only EC is more effective than the combined method EC and is better tolerated.
Table 4. Emergency Contraception Options Using Combination Oral Contraceptives

<table>
<thead>
<tr>
<th>Brand</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preven®</td>
<td>2 blue pills</td>
</tr>
<tr>
<td>Ovral®, Ogestrel®</td>
<td>2 white pills</td>
</tr>
<tr>
<td>Alesse®, Levlita®</td>
<td>5 pink pills</td>
</tr>
<tr>
<td>Nordette® 28, Leven®</td>
<td>4 light-orange pills</td>
</tr>
<tr>
<td>Levora®, Lo/Ovral®, Low-Ogestrel®</td>
<td>4 white pills</td>
</tr>
<tr>
<td>Triphasel®, Tri-Levlen®</td>
<td>4 yellow pills</td>
</tr>
<tr>
<td>Trivora®</td>
<td>4 pink pills</td>
</tr>
</tbody>
</table>

Whereas prescribing information for the commercially available progestin-only EC product, Plan B® (levonorgestrel 0.75 mg),\(^4\) states that the first tablet should be taken within 72 hours of intercourse and the second, 12 hours later; evidence supports equivalent efficacy of 1.5 mg (or both pills in Plan B) in 1 dose.\(^4\) Like combined EC, the earlier it is taken, the more likely it is to prevent pregnancy, but it continues to be effective for up to 5 days following intercourse.

FDA-approved contraindications for the combination EC are the same as for estrogen-containing OCs and for the progestin-only EC\(^4\): known or suspected pregnancy, hypersensitivity to any component of the product, and undiagnosed abnormal genital bleeding. According to the WHO’s guidelines, there are no contraindications for either emergency contraceptive pill.

Nausea and vomiting are reported by 50% and 20%, respectively, of women on combined EC\(^4\) and by 23% and 6%, respectively, of women taking the progestin-only EC.\(^4\) Discussing these side effects with the patient, as well as prescribing an antiemetic in the case of the combined EC, is important. If vomiting occurs within 1 hour of taking the EC, the dosing schedule should be repeated.

It is important to emphasize to the patient that she needs to begin regular contraception immediately following EC (ie, the very next day). If she becomes amenorrheic, or does not experience menses within 21 days of taking EC, a pregnancy test should be performed.

**Making Emergency Contraception Available**

Studies that evaluated the efficacy of advanced prescription EC\(^4\)\(^\text{a}\)\(^\text{b}\) have demonstrated that women given an advanced prescription were more likely to use EC, equally likely to use their primary contraceptive method and/or condoms, and had a trend toward fewer unintended pregnancies. Practitioners should give all women at risk of unintended pregnancies an advanced prescription for EC.

**Conclusion**

There are too many unintended pregnancies in the United States, in large part because of overdependence on methods that require frequent intervention and because of barriers to effective contraceptive use. Health practitioners should increase access to contraceptive care in their offices, use evidence to support their recommendations for contraceptive management, encourage patients to consider longer-term methods that are more efficacious, and prescribe EC in advance of its need.

**REFERENCES**


43. Trussell J, Stallings C, Stewart F. The effectiveness of the Yuzpe regimen of emergency contraception [published cor-

44. Emergency contraception: how effective is it? Prog Hum Reprod Res. 1999;51:2. Available at: http://www.repro-
tline.jhu.edu/english/6read/6issues/6progress/prog51_a.h tm Accessed March 15, 2004.


49. Glasser A, Baird D. The effects of self-administering emer-
gency contraception with levonorgestrel or the Yuzpe relie-