

Is Emergency Contraception Effective at Preventing Pregnancy?

HIGHLIGHTS

- Efficacy of EC differs from that of routine contraceptive methods – it refers to the efficacy of preventing pregnancy after a single use, rather than continuous use over the course of one year.
- EC efficacy depends on the point in the menstrual cycle at which a woman has unprotected sex.
- The levonorgestrel regimen for EC is more effective and involves fewer side effects than the Yuzpe regimen.
- EC is not appropriate as a routine method of birth control because it is less effective than other hormonal forms of contraception.

What Is Efficacy?

Contraceptive efficacy is the likelihood that a woman will become pregnant while using a given method of contraception. For routine contraceptive methods, such as birth control pills or condoms, efficacy rates are based on one year of use.

Emergency contraception (EC), which women use only once or occasionally, is not a routine method of contraception. As a result, studies of EC efficacy are usually based on one single use. In addition, EC efficacy does not measure the absolute risk of pregnancy over a year's use, but rather, the percent reduction in pregnancies expected to occur without EC. Thus, EC efficacy rates are not easily comparable to those of routine methods of contraception.

Additionally, because EC efficacy is based on a single use, estimates can vary depending on the day of the menstrual cycle at which a woman has unprotected sex. The likelihood that a woman will become pregnant at a given point in her cycle (whether or not she uses a contraceptive method) is known as the probability of conception. During the six most fertile days of the cycle, the probability of conception (without birth control) is 10 to 33 percent.¹ On the remaining cycle days, a woman is unlikely to become pregnant regardless of whether or not she uses contraception. Many studies of EC efficacy look at the point in the cycle at which unprotected sex occurs and compare the number of pregnancies that actually result among women using EC with the number that is expected to occur without contraception based on the cycle day. This comparison shows the percent reduction in expected pregnancies resulting from EC use.

How Effective Is EC at Preventing Pregnancy?

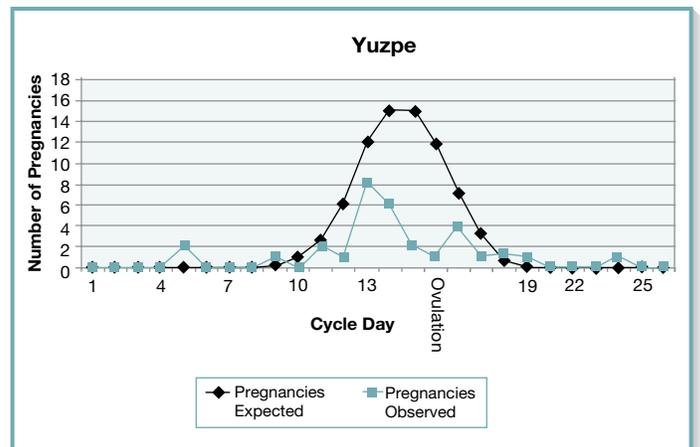
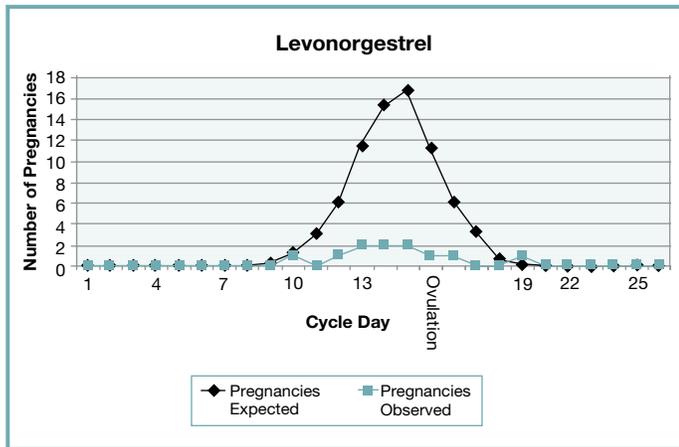
EC is currently available in the United States in two forms: (1) a single-hormone method marketed under the brand name of Plan B[®] (two doses of 0.75 mg levonorgestrel) and (2) a combined hormonal (estrogen and progestin) method known as the Yuzpe regimen, which is dispensed in the form of multiple birth control pills.¹ Both methods can reduce the number of pregnancies expected to occur on a given cycle day after unprotected sex, particularly on the most fertile days of the menstrual cycle (see Figure 1).



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¹ A dedicated product for the Yuzpe regimen was previously available under the brand name of Preven[®] (two doses of 100 µg ethinyl estradiol and 0.5 mg levonorgestrel) but was discontinued in 2004 because it was less effective and caused more side effects than Plan B[®].

Figure 1: Observed and Expected Pregnancies for the Levonorgestrel and Yuzpe Regimens²



The levonorgestrel regimen is more effective than the Yuzpe regimen, and women who take it experience fewer side effects such as nausea and vomiting. A key study measured pregnancies among women who took either the levonorgestrel or Yuzpe regimen after a single act of unprotected sex occurring at various times throughout the menstrual cycle. The levonorgestrel regimen reduced the number of pregnancies expected to occur by up to 89 percent, while the Yuzpe regimen reduced this number by up to 76 percent.² For both regimens, these reductions were greatest during the most fertile days of the menstrual cycle.

- **Extended window for starting EC:** EC is most effective the sooner it is taken after unprotected sex.³ However, it can still prevent pregnancy beyond the 72-hour window for which it has traditionally been provided. A large-scale trial examining EC efficacy within 120 hours (five days) of unprotected sex found that the levonorgestrel regimen prevented 77 percent of expected pregnancies overall, though the percent reduction was lower (60 percent) when EC was taken on the fourth or fifth day after unprotected sex.⁴ Many reproductive health care providers now offer EC within this 120-hour window.

Alternative EC Regimens May Improve EC Efficacy, Acceptability, and Accessibility

Both the Yuzpe and levonorgestrel regimens are generally administered in two doses: the first is taken as soon as possible – up to 72 hours (three days) – after unprotected sex; the second is taken 12 hours after the first. However, alternative timing and dosing regimens have also been studied to determine whether they improve the efficacy, acceptability, and/or accessibility of EC (see Table 1).

Table 1: Percent Reduction in Pregnancies for EC Regimens

EC Regimen	% Reduction in Pregnancies
Levonorgestrel (Plan B®)	
Taken within 72 hours ²	89%
Taken between 72–120 hours ⁴	60%
Single-dose (1.5 mg) levonorgestrel	
Taken within 72 hours ²	84%
Taken between 72–120 hours ⁴	63%
Yuzpe (Preven®), taken within 72 hours²	76%
Norethindrone, taken within 72 hours⁵	60%

- **Single-dose levonorgestrel:** Levonorgestrel EC is typically prescribed in two doses of 0.75 mg each, taken 12 hours apart. However, an alternative regimen combining these into a single, 1.5 mg dose has also been studied. When taken within 72 hours of unprotected sex, the single dose regimen prevented 84 percent of expected pregnancies, and when taken between 72 and 120 hours, the reduction was 63 percent.⁴ Side effects were uncommon and did not differ from those experienced by women using the two-dose regimen. Thus, a single dose can substitute for two doses of levonorgestrel as a way to simplify the EC regimen.
- **Norethindrone:** In addition to the Yuzpe and levonorgestrel regimens, an alternative hormonal regimen has been studied that contains two doses of 2.0 mg norethindrone and 100 µg ethinyl estradiol – hormones found in certain brands of birth control pills. The norethindrone regimen has been shown to prevent 60 percent of expected pregnancies after unprotected sex.⁵ Though less effective than levonorgestrel, norethindrone offers a viable EC alternative, particularly in international contexts where the full range of EC options may not be available.

EC Is Not Appropriate as a Routine Method of Contraception

A number of trials have examined the effectiveness of EC as a routine method of contraception. In other words, women used EC after every act of intercourse as their only method of birth control. These studies concluded that EC is not appropriate for routine use because high proportions of women experienced side effects such as menstrual problems (e.g., bleeding or spotting between periods), nausea, breast tenderness, headache, dizziness, or fatigue/weakness.⁶⁻⁸ In fact, one-third of women dropped out of one study before its completion because of these side effects.⁶ Furthermore, long-term use of EC is not as effective as other hormonal methods of contraception.⁶ Thus, women seeking long-term birth control should select another method suitable to their individual preferences and needs.

In addition, EC is intended for use after a single act of unprotected sex and does not provide protection for additional acts of intercourse. A study of women using the levonorgestrel regimen found that only 64 percent of expected pregnancies were prevented for those having sex after using EC, compared with 83 percent for those who did not have additional acts of unprotected sex.⁴ Women who have unprotected sex after taking EC need to take it again to maximize its protection.

Improved EC Availability Is Needed to Determine the Impact on Unintended Pregnancy and Abortion Rates

It has been estimated that widespread availability and use of EC could have prevented at least 1.7 million of the 3.5 million unintended pregnancies and 800,000 of the 1.6 million abortions occurring in 1992 in the U.S.⁹ A more recent analysis indicated that 51,000 abortions may have been prevented by EC use in the year 2000, and that EC use might account for 43 percent of the decline in abortions in the U.S. between 1994 and 2000.¹⁰ However, these studies are based on extrapolation and do not measure the actual effect of widespread EC use across the U.S. population.

A number of studies have found that increased access to EC does not affect unintended pregnancy or abortion rates in the study populations.^{11,12} However, it is important to distinguish between EC *efficacy* – the protection that occurs under ideal conditions, such as single use trials – and EC *effectiveness* – the protection provided under actual or typical conditions over time. Efficacy depends solely on the product's properties, such as impact on ovulation,¹¹ while effectiveness depends on both the product's properties and the user's behavior, such as frequency of unprotected sex. In the EC trials that failed to demonstrate reductions in pregnancy or abortion rates, it is uncertain whether EC use was “optimal” (i.e., used correctly for every act of unprotected sex). Because levels of unprotected sex are high in the U.S. and EC continues to be a relatively underused option, the actual impact of increased use remains unknown.¹² Improved knowledge of and access to EC, along with correct and consistent use, are critical to determining the public health impact of EC.

|| For additional information about EC's mechanism of action, see the brief in this series titled: *Does Emergency Contraception Cause Abortion?*

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