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## REPRODUCTIVE HEALTH

## Global trends in use of long-acting reversible and permanent methods of contraception: Seeking a balance

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## ABSTRACT

The global trend shows that the use of permanent contraception to prevent unintended pregnancy is high. Although the trend also shows a rise in the use of long-acting reversible methods, these are still underutilized despite having contraceptive as well as non-contraceptive benefits. Lack of knowledge among women, dependence on the provider for information, and provider bias for permanent contraception are cited as reasons for this reduced uptake. Training of healthcare providers and increased patient awareness about the effectiveness of long-acting reversible contraceptive methods will increase their uptake and help prevent unintended pregnancies.

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## 1. Introduction

Unintended pregnancies remain a substantial global public health issue despite considerable advances in contraceptive technologies. In the 21st century, women have gained access to many contraceptive options. However, the unmet need for contraception in low-resource countries has been estimated at 222 million women who are not using any contraceptive methods to delay or stop childbearing [1]. Numerous reasons explain this, such as limited choice of methods available, limited access to family planning services, fear or experience of adverse effects, cultural or religious opposition, poor quality of available services, and gender-based barriers. A basic right of all couples and individuals is to decide freely and responsibly the number and spacing of their children and to have the information, education, and means to do so.

## 2. Contraceptive prevalence

Contraceptive use and unmet need for family planning are key to understanding how reproductive health can be improved. Globally, contraceptive prevalence among married or in-union women of reproductive age has increased from 55% in 1990 to 63% in 2011 [2]. In the lowest-income countries, 36% of married or in-union women are using contraceptive methods, while it is twice as high in high-income countries at 66% [3]. Female sterilization and intrauterine devices (IUDs) were the two most common methods used in both 1990 and 2011 [3]. Method-specific prevalence has varied widely across regions since 1990, with female

sterilization common in Asia, Latin America, and the Caribbean and North America, and IUDs continuing to be important in Asia and Europe.

In countries where childbearing begins at a young age, the dominance of female sterilization (estimated to be 65% in India [3]) indicates a need for effective reversible methods that could help meet women's preference to delay the start of childbearing and to space birth. In high-resource countries, one out of every four contraceptive users relied on female sterilization or IUDs [3]. By contrast, in low-resource countries the methods with highest prevalence were female sterilization (21%) and IUDs (15%), accounting for 57% of overall contraceptive use [3]. Nine out of every 10 contraceptive users in the world rely on modern methods of contraception [3].

Table 1 shows that although the proportion of women using modern contraceptive methods did not increase substantially between 2003 and 2012, the number of users increased by 139 million over the same time period, with average annual increases of 15 million. Of this increase, 106 million is attributable to increased numbers of women, and 33 million to growth in the proportion using modern methods.

Between 2003 and 2012, the total numbers of women using each type of method increased, while the distribution by type of method showed increasing use of long-acting reversible contraception (LARC), oral contraceptives, and barrier methods, and falling trends in use of sterilization and IUDs.

## 3. Permanent methods

Sterilization has become the most popular method of contraception [4], and more than two-thirds of all sterilization procedures worldwide are performed for contraceptive purposes [5]. Around 190 million couples rely on tubal occlusion [6].

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**Table 1**  
Percentage distribution of women using modern contraceptives by type of method in 2003, 2008, and 2012.<sup>a</sup>

Region	Year		
	2003	2008	2012
<b>All low-income countries</b>			
PM	47	42	38
IUD	27	30	28
LARC	6	8	9
OCs	12	11	13
BM	7	10	13
Number (millions) of women (aged 15–49 years)	1321	1448	1520
Number (millions) wanting to avoid pregnancy (%)	716 (54%)	827 (57%)	867 (57%)
<b>69 poorest countries</b>			
PM	49	48	45
IUD	14	11	12
LARC	12	14	16
OCs	16	16	16
BM	9	11	11
<b>Higher-income countries</b>			
PM	46	38	33
IUD	34	41	38
LARC	4	4	4
OCs	10	8	1
BM	6	9	14

Abbreviations: PM, permanent method; IUD, intrauterine device; LARC, long-acting reversible contraception (injectables or implants); OC, oral contraceptives; BM, barrier methods.

<sup>a</sup> Source: Darroch and Singh [42].

### 3.1. Contraceptive prevalence

Globally, female sterilization is used by 19% of women aged 15–49 years who are married or in union [3]. It is the most prevalent method in Latin America and the Caribbean (26%), with the highest prevalence found in the Dominican Republic (47%). In Columbia, Costa Rica, El Salvador, and Puerto Rico, prevalence ranges between 30% and 40%, whereas it is over 25% in Brazil, 27% in China, and 36% in India [3]. Despite being safer, simpler, and more effective than female sterilization, male sterilization lags behind. The number of female sterilization procedures exceeds the number of male procedures by 5:1 [7]. Worldwide, 2.4% of men of reproductive age have had a vasectomy.

Female sterilization is a safe and effective method that involves occlusion of the fallopian tubes by either an abdominal or transcervical route. Using the abdominal route, the fallopian tubes can be accessed either by mini-laparotomy or laparoscopically. This procedure can be performed at the time of delivery or shortly after (puerperal sterilization) or at any time (interval sterilization). Puerperal sterilization performed during the postpartum hospital stay is a convenient, efficient, and cost-effective means of preventing future pregnancy. Most sterilization procedures performed in low-resource countries are by mini-laparotomy owing to lack of equipment, facilities, and expertise in laparoscopic surgery. Laparoscopic sterilization can be carried out under local anesthesia, which is well tolerated. The transcervical route of sterilization is performed either by hysteroscopic blockage of tubal ostia or by placement of quinacrine hydrochloride pellets in the uterine cavity.

### 3.2. Long-term concerns with permanent sterilization

Post-tubal sterilization syndrome and risk of menstrual disturbance following sterilization have been identified. The CREST study showed an association between tubal occlusion and subsequent hysterectomy [8], but there is no evidence suggesting a higher risk of subsequent menstrual disorders following tubal sterilization [8]. One study showed a direct association between tubal sterilization and a greater risk of

hospitalization for menstrual disorders, but a biological association was not supported by the results [9].

Failed sterilization may result in ectopic pregnancy and the risk is 7.3 per 1000 procedures for all methods of tubal occlusion [5].

The probability of a woman regretting having undergone sterilization is estimated to be 14% [5], which may be due to a number of psychosomatic factors. The CREST study reported regret following sterilization among 11 232 women [10,11]. According to this study, regret was more commonly expressed by women who were sterilized under the age of 30, women of low or nulliparity, and those sterilized immediately after delivery. Factors that have been identified that can reliably predict regret among women include young age at the time of sterilization followed by subsequent life changes such as divorce and remarriage [12]. Regret was three times more likely among women who had substantial conflict with their husband prior to tubal sterilization [12].

Request for reversal of sterilization is five times more likely among women who have had a conflict with their partner or husband prior to the procedure [12]. Following reversal, successful pregnancy rates will depend on the age of the woman, the type of tubal occlusion method, and use of microsurgery. The successful pregnancy rate following reversal is approximately 50%, although the rate of successful reanastomosis varies between 30% and 70% [5].

### 3.3. Non-contraceptive benefits of permanent methods

Epidemiologic studies have shown that tubal ligation may reduce the risk of developing ovarian cancer in women with the BRCA1 gene mutation [13]. The underlying mechanism of this is yet to be determined.

Although tubal sterilization does not provide protection from sexually transmitted infections, tubal occlusion prevents ascending pelvic infections and therefore reduces hospitalization resulting from pelvic inflammatory disease.

### 3.4. Failure of permanent methods

A multicenter, prospective cohort study of 10 685 women (CREST) suggested that the failure rate was related to the method of sterilization and age of the woman [14]. The failure rate was 1.3% for tubal occlusion and the highest probability of failure was with the use of spring clips (36.5 pregnancies in 1000 procedures) [14]. The younger a woman is, the greater the failure rate; women over the age of 40 have the lowest failure rate (18.5 in 1000 procedures [14]). The lifetime failure rate for female sterilization is 1 in 200, with a 10-year failure rate of 2–3 in 1000 procedures [15]. The reasons for failure of sterilization are: incorrect placement of the mechanical device; development of tuboperitoneal fistula; spontaneous recanalization of the ends of the fallopian tube; and unidentified luteal phase pregnancy.

## 4. Long-acting reversible contraception (LARC)

LARC methods comprise intrauterine contraception (including copper intrauterine devices and the levonorgestrel intrauterine system), injectables, and implantable progestogens. LARC methods are the most effective modern contraceptive methods for preventing unintended pregnancy. They are long-acting, reliable, safe, cost-effective, and have additional non-contraceptive benefits for a broad range of women seeking spacing or limiting methods of contraception. LARC methods do not rely on user adherence and are also suitable for women with medical disorders.

### 4.1. Contraceptive prevalence

Globally, 61% of women aged between 15 and 49 years who were married or in a consensual union used some form of contraception in 2003, with only 9% and 18% using LARC methods in high- and low-resource countries, respectively [16]. In the UK, 53% of women of

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