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## Contraception

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### INTRODUCTION

#### The challenge

The human population was projected to hit 7 billion by the second half of 2011. The newest estimates are that we might stabilize at 9.3 billion – perhaps too many to have any hope of doing something for quite some time about the misery of the poorest 1–3 billion. Globally, 215 million women cannot get the reproductive information and the contraceptives that they want. If we solved this problem, according to the World Health Organization (WHO), there would be, over 5 years, 96 million fewer unintended pregnancies, 54 million fewer abortions, 110,000 fewer women dying in childbirth, 1.4 million fewer infant deaths and perhaps a better future for the planet. A worthy challenge (<http://www.rhmjournal.org.uk/news.php?newsID=851>).

#### When to use which contraceptive

Being pregnant is more dangerous than using contraception. Therefore, the higher the typical failure rate (Table 1)<sup>1,2</sup>, the riskier a method is. From the maternal mortality perspective, this failure rate is 300 times as important in Afghanistan, Somalia, Sierra Leone or Niger (nearly 2% chance that a pregnancy will result in a maternal death and generally no access to safe abortions) than in Scandinavia (0.007% chance, and induced abortions very safe). Not that the contraceptive failures in rich countries are insignificant – they have a large emotional impact. Moreover, due to his production of greenhouse gases and consumption of non-renewable resources, the typical Scandinavian has an ecological footprint a hundred times larger than, for example, an Ethiopian.

The above does not mean that any contraceptive will do, as long as it is reliable: the client's contentment is an objective in itself. Her knowledge, the costs, the method selected, the service, her fears, her culture, her trust and the quality of counseling are directly related to the failure rate.

#### *Tips and points to consider*

- Pay attention to unwanted fertility but also to infertility
- Consider the possible need for contraception of nearly every patient aged >12 years that you see
- Discuss post-delivery contraception in the antenatal period (for example in the ward while the partner is visiting, in the antenatal clinic, even sometimes during labor)
- Check if mothers seen with ill children or for vaccinations or with HIV would appreciate family planning (FP) advice
- Would a special FP clinician in your facility help?
- Are out-of-office-hours services helpful?
- Would exclusive FP services in a special clinic deter some clients afraid to be identified by bystanders?
- Follow up teenagers who delivered (house visits) to prevent (another) (unintended) pregnancy
- Also give attention to her teenage sister (teenage pregnancies cluster in families and sub-cultures)
- Be proactive in offering emergency contraception if there are natural or man-made disasters.
- Some useful addresses are listed in the Appendix.

Some women have specific risk factors, such as thrombophilia. While a pregnancy is still more dangerous for them than using combined hormonal contraceptives (CHC), long-acting reversible

**Table 1** Use of contraceptives

Method	Unintended pregnancy first year of use USA (%)		USA, % continuing use at 1 year	Developing countries, % FIR*
	Typical use	Perfect use		
No method	85	85		
Spermicides	28	18	42	20
FAB	24	4	47	10–30
Withdrawal	22	4	46	20
Female condom	21	5	41	30
Male condom	18	2	43	10
COC and POP	9	0.3	67	20
Depo-Provera (DMPA)	6	0.2	56	10–40
Copper T	0.8	0.6	78	20–50
Mirena (LNG-IUD)	0.2	0.2	80	20–70
Hormonal implant	0.1	0.1	84	20–60
Female sterilization	0.5	0.5	100	5–100
Male sterilization	0.2	0.1	100	15–70
LAM	10	2		10–30
EC	8 (25 without EC)	5 (25 without EC)		50
Cu-IUD EC	<1	<1		20

FIR, failed intention rate; FAB, fertility awareness-based method (calendar method, ‘natural’ FP (FP)); COC, combined oral contraceptive pill; POP, progestin-only pill; LNG, levonorgestrel; IUD, intrauterine device; LAM, lactation amenorrhea method; EC emergency contraception.

\*The FIR indicates the chance that a woman/couple, who had decided after counseling to use a specific method did not manage to employ that method within a reasonable time or before she was next at risk of pregnancy. For example, many women do not return for IUDs after undergoing abortions although they said they would; or in a FP clinic if a woman is asked to come back later to have an IUD inserted [when the doctor is there or when she has (had) her period or when she has collected the (expensive?) IUD from a pharmacy] what is the chance she will not return? Or a postpartum sterilization is agreed on but there are too many emergencies or the delivery is on a Friday and she is asked to come back in 6 weeks, what percentage will not have the sterilization? Sterilization planned with a cesarean section but the doctor forgets, or the consent forms are lost; or pill prescribed but pharmacy in hospital closed or pill too expensive or out of stock; or clinic refers for hormonal EC: raped on Thursday, in police station Friday, seen in hospital Saturday after the pharmacy closed, no emergency stock available, told to come back Monday. FIRs, like typical use failure rates differ enormously per location. Adapted from: Trussel<sup>1</sup> and Verkuy<sup>2</sup>

contraception (LARC) or sterilization of either partner is a better option. Eligibility for a method (Boxes 1 and 2) becomes especially relevant if there are options.

**Is she perhaps already pregnant?**

Before initiating any medical regimen including contraception, one should assess whether a woman might be pregnant, because some treatments and investigations might be potentially harmful to embryo/fetus and/or grávida. According to the WHO, there is no known harm if contraception is accidentally used in pregnancy excluding IUDs and hysteroscopic tubal occlusion (TO). Pregnancy tests are expensive or unobtainable for many. Moreover,

urine tests can’t exclude a pregnancy until 14 days after ovulation and it may even take, with a normal pregnancy, another 4 days before a sensitive test is positive. In other words, for a pregnancy test to be reliably negative you must perform it at least 3 weeks after the last episode of unprotected sex. A para 3, completed family, youngest 1.5 years, with a 4 week cycle, seen after a 2.5h walk to the clinic, on cycle day 26 for a first DMPA injection cannot be declared not pregnant, but it would be extremely unfair to ask such a woman to return when she has (had) her period or for a pregnancy test. She probably visits now because her husband might visit (unannounced) soon. Denying women like her non-barrier methods will result in many unintended pregnancies and no doubt dangerous abortions.

**Box 1** Eligibility criteria

The WHO and the US Centers for Disease Control (CDC) have made a compilation of experts' opinions informed by evidence. Eligibility for specific contraceptives is divided into four categories:

1. A condition for which there is no restriction for the use of the contraceptive method: use method in any circumstances.
2. A condition where the advantages of using the method generally outweigh the theoretical or proven risks: generally use the method.
3. A condition where the theoretical or proven risks usually outweigh the advantages of using the method: use of method not usually recommended unless other more appropriate methods are not available or not acceptable.
4. A condition which represents an unacceptable health risk if the contraceptive method is used. Method not to be used.

The above concentrates on the dangers of the methods, not on the dangers of failure. For example, trusting condoms is a no. 1 situation for a 35-year-old woman not allergic to latex. However, perhaps she lives in an area with a maternal mortality ratio (MMR) of 1000/100,000 and is also a para 6. Her risk of dying if she has an unintended pregnancy is perhaps 3% and condoms have a typical annual failure rate of 18%, more if her partner drinks. Therefore, over 10 years if she employs condoms her chance of dying of a pregnancy is

about 5%. If she dies, her children are likely to do very poorly. Conversely, for a woman of the same age who smokes 15 cigarettes/day, a combined oral contraceptive (COC) is no. 4, while her chance of dying in a rich country from 10 years of COC use would be <0.03%, and her children won't go hungry.

If you have access to the internet, the WHO and the CDC and Royal College of Obstetricians and Gynaecologists, UK (more for the US/UK circumstances) provide information about contraindications for specific contraceptives. You can print these or load them on a memory stick, or ask for the WHO book to be donated to your hospital by the national FP organization: [http://whqlibdoc.who.int/publications/2010/9789241563888\\_eng.pdf](http://whqlibdoc.who.int/publications/2010/9789241563888_eng.pdf)

<http://www.cdc.gov/mmwr/pdf/rr/rr5904.pdf>  
<http://www.ffprhc.org.uk/> (click clinical guidance)

There also exists a WHO wheel, similar to the wheels used for determining the estimated due date/expected date of delivery (EDD), to check on eligibility. Order (Department of Reproductive Health, WHO, 1211 Geneva 27, Switzerland; [rhr-publications@who.int](mailto:rhr-publications@who.int)) or manufacture them with a printer, paper, glue, scissors and a paperclip.

[http://whqlibdoc.who.int/publications/2009/9789241547710\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241547710_eng.pdf)

Wisdom is needed (has she not seen her partner for 2 months, can she leave her job and/or children again for a day etc.). Yes, there is a chance she is not quite honest about her behavior while her husband was away, but denying her DMPA or an IUD while a very early pregnancy can't be completely excluded is likely to result in more misery than providing these methods. Placing an IUD when a pregnancy can already be clearly detected on vaginal examination (VE) is, however, dangerous and can result in sepsis. If a pregnancy can't be excluded, COCs (or an implant) can be offered. These are good options, because if, in a few weeks, it transpires that she is in fact pregnant, removing the implant or stopping COC is easier than removing DMPA. Studies have shown that the use of a checklist (see Box 3) significantly improves access to contraceptive services. There is of course no guarantee that a woman is on day 5 of her bleeding if she says so, and even then it might be a threatened miscarriage.

**METHODS****Lactation amenorrhea method**

Without breastfeeding, bleeding can resume 3–4 weeks post-partum, although such a very early bleeding is rarely preceded by an ovulation. Few women want another pregnancy early. She has to rebuild her mental, caloric, vitamin and mineral resilience and offspring tend to do poorer physically, intellectually and sometimes emotionally if the next one is conceived within 2 years. There are also convincing indications that a cesarean scar will not develop its maximal strength in time if there is a new pregnancy within a year. The LAM rules are simple: provide near exclusive, on-demand breastfeeding, and another contraceptive method must be used from 6 months post-partum, or as soon as bleeding recommences. The WHO is retreating from its position that more or less exclusive breastfeeding for 6 months should be the norm: too much risk of

**Box 2** Summary of eligibility criteria categories no. 3 and no. 4

*Combined hormonal (estrogens plus progestogens) contraceptives (CHC) – combined oral contraceptives (COC), ring, combined injections (not Depo-Provera®/norethisterone enanthate, Net-En), patch*

Deep vein thrombosis (DVT)/pulmonary embolism (PE) or history of DVT/PE (not including varicose veins and superficial thrombophlebitis) or history of unprovoked DVT/PE in first-degree relatives, ischemic heart disease, <6 weeks post-partum and <6 months post-partum when breastfeeding, antiphospholipid antibodies [or systemic lupus erythematosus (SLE) where these antibodies' existence can't be excluded], severe hypertension (diastolic  $\geq 100$ , systolic  $\geq 160$ ), untreated gallbladder disease, earlier cholestasis on CHC, severe cirrhosis, acute viral hepatitis, hepatocellular adenoma, malignant hepatoma, breast cancer (not family history of), stroke, pulmonary hypertension, multiple factor arterial cardiovascular disease (smoking, hypertension, diabetes, older age, obesity), diabetes with nephro-, retino- or neuropathy, severe thrombocytopenia,  $\geq 35$  years of age and smoking, use of ritonavir-boosted protease inhibitors and tenofovir, use of most anticonvulsants or rifampicin, migraine with aura, major surgery with prolonged immobilization.

*Progestogen-based contraceptives – progestogen-only pill (POP), progestogen ring (coming on the market)*

Acute DVT/PE (not including varicose veins and superficial thrombophlebitis), current ischemic heart disease, <3 weeks post-partum, antiphospholipid antibodies (or SLE when these antibodies' existence can't be excluded), severe cirrhosis, hepatocellular adenoma, malignant hepatoma, breast cancer (not family history of), stroke, multiple factor arterial cardiovascular disease (smoking, hypertension, diabetes, older age, obesity), use of ritonavir-boosted protease inhibitors, tenofovir, use of most anticonvulsants (excluding lamotrigine) or rifampicin.

*Other progestogens – depot medroxyprogesterone acetate (DMPA, Depo-Provera®) and norethisterone enanthate (NET-EN)*

Acute DVT/PE (not including varicose veins and superficial thrombophlebitis), current ischemic heart disease, <4 weeks post-partum and <6 weeks when breastfeeding, antiphospholipid antibodies (or SLE when these antibodies' existence can't be excluded), severe cirrhosis, hepatocellular adenoma, malignant hepatoma, breast cancer (not family history of), multiple factor arterial cardiovascular disease (smoking, hypertension, diabetes, older age, obesity), severe hypertension (diastolic  $\geq 100$ ,

systolic  $\geq 160$ ), diabetes for more than 20 years or with nephro-, retino- or neuropathy, severe thrombocytopenia, stroke. Overweight clients especially if gaining fast weight after first DMPA dose because extra risk of gaining many more kg. Liver enzyme-inducing drugs are allowed.

*More progestogen-based contraceptives – implants and levonorgestrel intrauterine device (LNG-IUD)*

Acute DVT/PE (not including varicose veins and superficial thrombophlebitis), current ischemic heart disease with LNG-IUD *in situ*, <4 weeks post-partum and <6 weeks when breastfeeding, antiphospholipid antibodies (or SLE when these antibodies' existence can't be excluded), severe (decompensated) cirrhosis, hepatocellular adenoma, malignant hepatoma, breast cancer (not family history of), migraine with aura (if new on this medication or more severe attacks). LNG-IUD not for use with cervical cancer (which is not the same as an abnormal Pap smear), pelvic inflammatory disease (PID), pelvic tuberculosis, peritonitis, gestational trophoblastic disease (GTD) and as emergency contraception (EC). One can continue but not initiate LNG-IUD with cervical cancer, severely distorted uterine cavity, AIDS, PID and sexually transmitted infections (STI). Implant probably higher failure rate with liver enzyme-inducing drugs; this does not apply to LNG-IUD. *All progestin-only contraceptives are okay with sickle cell disease and thalassemia.*

*Copper IUDs*

Do not use with puerperal sepsis, direct post-septic abortion, with pelvic tuberculosis, GTD. One can continue but not initiate this method with: severe thrombocytopenia, cervical cancer, unexplained vaginal bleeding, AIDS, severely distorted uterine cavity or double cavity. In general wait until 4 weeks post-partum except when placing a Cu IUD within 10 min (not much later) of placental delivery (see under Copper IUD). Chronic anemia (sickle cell, thalassemia) might be a contraindication for a Cu IUD because length and intensity of menstrual blood loss tends to increase. Nulliparity is not a contraindication. If a cervicitis is seen on inspection before insertion exclude STI if realistic, or insert under good antibiotic cover [also treat (and inspect) partner].

*Male and female sterilization*

In practice, no absolute contraindications for these operations exist. Sometimes there is a high surgical risk for a woman (cardiovascular or severe adhesions after abdominal operations and/or infections).

**Box 3** Checklist to determine if a woman might be already pregnant

If any of the below situations apply and there are no signs or symptoms of pregnancy, then a pregnancy can be ruled out for contraceptive purposes. That does not mean that hormonal contraception is directly effective when started (see Box 4).

- Given birth in the last 5 weeks (or 6 weeks if the client wants a Cu IUD)
- Less than 6 months post-partum and on demand (nearly) exclusive breastfeeding, and no bleeding since delivery
- Last menstrual period started within the past 7 days (or it is <6 days after estimated time of ovulation if a Cu IUD is wanted)
- Had a miscarriage or abortion in the past 14 days (or 19 days if client wants a Cu IUD)
- Never had sexual intercourse, or abstained since her last menses/miscarriage/delivery
- Used a reliable contraceptive method consistently and correctly, with a 14 days 'grace period' for injectables (see DMPA and NET-EN). This

grace period can be extended by 5 days if a Cu IUD insertion is desired

- No sexual intercourse since the repeat DMPA or NET-EN injection was 2 weeks overdue

*If there are no good alternatives, COC/POP can be started any day of the cycle even if a pregnancy can't be completely excluded and even if abstinence or condom use is unrealistic for the first week of COC/POP use. COC/POP does not harm the pregnancy and there is, in the second half of the cycle even if exposed, only a 25% chance that she is pregnant. A pregnancy test (or ultrasound or VE) can determine in 3–4 weeks whether to continue or stop COC/POP.*

The above list can be adapted for your community health workers or clinic staff. If in doubt they should try to consult with you, because an unintended pregnancy is a major occurrence not only 'one of those things' and should be prevented if at all possible.

malnourishment. About a quarter of (near) exclusively breastfeeding women restart their periods within 6 months post-partum. The LAM failure rate for mothers partly separated from their infants because of, for example, employment is not easy to quantify. It is good to consider the relative risks of vertical HIV transmission, artificial feeding and the loss of LAM protection. It is a disaster for example if a mother does not breastfeed out of fear of vertical transmission and because of that starts ovulating early and the new child becomes HIV infected before it is born. It seems obvious that breastfeeding of a HIV-positive mother if she takes anti-retroviral therapy (ART) treatment is best in many circumstances. There are few tasks more important for a doctor than the prevention of vertical HIV transmission. However, in 2009, an estimated 370,000 children were newly infected with HIV, 90% of whom lived in sub-Saharan Africa. Many of them were unintended pregnancies in the first place.

It seems <50% of infants in developing countries are breastfed for  $\geq 6$  months. However, in many rural parts of Africa, non-exclusive breastfeeding is continued for much more than a year. The relevant data and many demographic and FP facts of your country may be found at <http://www.measuredhs.com/start.cfm> and <http://www.unfpa.org/swp/>.

Having sexual intercourse while breastfeeding is/was in many areas taboo (women sometimes chose an abortion because they were too ashamed

to advertise that they had obviously violated the taboo) and it was/is believed the milk would become poisonous. If a man was polygamous and a good offspring rotator, abstinence practiced by one wife was probably not a big problem, but otherwise (near) abstinence of nursing and pregnant women is probably a factor in the spread of STIs. Studies in Malawi and Zimbabwe showed many HIV seroconversions in nursing mothers and hence in their infants. It seems prudent to discourage this long (near) abstinence to promote faithfulness. Effective child spacing methods are however needed in compensation, if extended post-partum abstinence declines. A study from Egypt<sup>3</sup> showed that the majority of women (81.5%) interviewed with unplanned pregnancies within 2 years of delivery were breastfeeding at conception. Many thought breastfeeding would protect them. Some researchers have concluded that 1.8 million under-5 deaths could be averted if all deliveries were spaced 36 months from the preceding birth: <http://blog.k4health.org/blog/post/htsp-resources-announcing-new-toolkit-and-elearning-course>.

The teaching was that not only do COCs increase the already elevated risk of thrombosis in the early post-partum phase, they also reduce lactation. This influenced eligibility (Boxes 1 and 2). Six weeks post-partum, non-breastfeeding women lose their special position in relation to contraception eligibility, although, of course, the younger the child the

more important a low failure rate is. A recent update from the CDC in the USA advises that COCs are okay without breastfeeding from 21 days post-partum on condition there are no extra thrombosis risk factors (family history, smoking, age >35 years, obesity, immobilization). If there is well-established breastfeeding, COC can be used from 6 weeks post-partum. The fear of decreased milk production and of hormones in the milk is not evidence-based according to the experts consulted by the CDC. LARCs, Depo-Provera and sterilization of either partner are the methods of choice when the failure rate of LAM is considered too high or when the preconditions for LAM no longer exist. The WHO advises not to start progestogen-based methods when breastfeeding before 6 weeks post-partum and without breastfeeding 4 weeks post-partum. But, if the opportunities to provide injections or implants are scarce, then it is fine to start these methods before post-partum discharge. The above-mentioned CDC updates do not restrict the use of progestogens post-partum at all (breastfeeding or not) after post-partum mobilization. IUDs (both types) if not inserted directly post-partum should start at the earliest 4 weeks post-partum.

### **Fertility awareness-based methods**

'Natural' FP is a misnomer. The term natural is popular in marketing (another word for more or less subtle disinformation) circles. No species in nature intentionally abstains from sex around the time of ovulation. Officially, in addition to total abstinence, the fertility awareness-based method (FAB) is the only FP allowed since 1951, by the Roman Catholic Church (RCC) and then of course only within marriage.

The method can work well for a longer existing, middle class, stable partnership with already a few children, in which sex is discussable and negotiable, partners respect each other and one or two extra children are not a disaster. Disharmony is more likely if he wants seven children and she three, or when they see each other only occasionally. If FAB is not used for religious reasons, barrier methods can be used during possible fertile days. It takes about 3 months of supervised observation of their own cycle to become proficient in the method, while RCC-controlled courses are often only offered to the married, making it difficult for couples to postpone their first pregnancy. Moreover, there are

countries with millions of Catholics where these courses are non-existent. In practice in countries where all contraceptive methods are easily accessible, only a small percentage of the Catholics use FAB; overall prevalence in W. Europe is 2.1%, Ireland 3.3% and in South America 3.0%. FAB is unreliable post-partum, after a (spontaneous) abortion, during breastfeeding, post-menarche, in the years before the menopause, with irregular cycles, vaginal discharge, chronic diseases like HIV infection or malaria, psychiatric problems, for the homeless, with substance abuse, low IQ or high libido. The method is never out of stock and has no side-effects although it might affect the marital relationship positively or negatively and anxiety around the time of the expected (or late) period is common. The typical failure rate of FAB is quite high and in areas with a high MMR and/or for women with an extra personal hazard – i.e. four previous cesarean sections, FAB is dangerous. Logically, adamant 'Pro-Life' couples would try their utmost to avoid (the temptation of) an induced abortion by using the most reliable FP methods. Sterilization, LNG-IUD and implants would be the best choice.

### **Long-acting reversible contraceptives**

In 2010, 45 million women in sub-Saharan Africa who would have liked to space or limit their families had no access to modern contraception. Moreover, women in the reproductive age group in that subcontinent will increase by 60 million to 240 million by 2020. Massive contraceptive support is needed to reach the Millennium Development Goals (MDGs) and International Conference on Population and Development (ICPD) goals and much more reliance on LARCs will be essential<sup>4</sup>.

IUDs and implants constitute the LARC group (some countries include DMPA), also called 'fit and forget' methods [see also UK National Institute for Health and Clinical Excellence (NICE) guidelines<sup>5</sup>]. A woman can start on LARC at any time in her menstrual cycle, provided that you can be reasonably certain she is not pregnant (Boxes 3 and 4). LARCs need little client attention for years other than noticing an IUD expulsion and it is good if she checks the threads monthly with IUDs. Hence, there is little difference between typical use and perfect use of LARCs (Table 1). This difference is sometimes enormous for other non-permanent methods, especially if used by those not yet in a stable relationship

**Box 4** When to start and when does protection start

If according to Box 3 the client is unlikely to be pregnant then (modern) methods can be started *any day but not all are effective at once*. This depends on the mechanism of action.

- *Condoms* work immediately under all circumstances (even if 'only' as STI prevention), also of course, when the client is or could be pregnant.
- If *COCs/POPs* are started but not within the first 5 days of a cycle or within 5 days after an abortion/miscarriage, then *clients should abstain or use condoms for a week* (= CSAOUCFAW). If not breastfeeding, a COC can be started from day 21 post-partum (if there are no extra thrombotic risk factors) and COCs are then effective directly. If there are these extra risk factors [such as high body mass index (BMI), post-caesarean], then – after post-partum day 42 – being post-partum is not a risk factor anymore and COC eligibility is decided as per Box 2. By this time when non-breastfeeding CSAOUCFAW applies for COC/POP/LNG-IUD/implant, otherwise there is a small chance of becoming pregnant. There are no known side-effects to the pregnancy if COC or progestogen-based contraceptives (PBC), except LNG-IUD, are accidentally used during pregnancy.
- *PBC* are effective directly if given in the first 5 days of the cycle (LNG-IUD up to 7 days), or post-abortion, or 28–35 days post-partum. In all other cases except during lactation amenorrhea method (LAM): CSAOUCFAW.
- If there are no good alternatives, *COC/POP* can be started any day of the cycle, even if a pregnancy can't be completely excluded and even if CSAOUCFAW is unrealistic. COC/POP does not harm the pregnancy and a pregnancy test (or ultrasound or even VE) 3–4 weeks later can determine whether to stop, continue or switch to DMPA, LARC or TO. There are *theoretical* concerns of possible virilization of a female fetus with use of DMPA and implants, but they are not proven.
- If you are afraid to place an *IUD* immediately because of possible chlamydia/gonorrhoea, you can use prophylactic antibiotics (national guidelines) or if possible do a PCR. If, while waiting for the results, CSAOUCFAW is unrealistic, then COC can be started as above for a few weeks.
- *Cu IUDs* can be placed any day in the cycle if according to Box 3 she is unlikely to be pregnant. They are immediately effective, even retrospectively, if used as EC (see under Emergency contraception). If inserted during pregnancy (also with LNG-IUD) (septic abortion, infection and perforation are the risks. Many doctors/nurses have the mistaken belief that IUDs should always be placed during menstruation.
- *TO*: immediately effective, CSAOUCFAW afterwards is not sensible because if she turns out to be pregnant, then the culprit spermatozoon, except under very unusual circumstances, was already in her body before the TO. Consult Box 3 and for extra considerations, the section on female sterilization. If she could be pregnant but it is too early to tell and she has succeeded in getting on the operation list only after a lot of trouble, perform the operation anyway: it does not cause a miscarriage, there is maximum 25% chance she became pregnant this cycle and if she is pregnant she will at least be protected in future.
- If there was again unprotected intercourse after hormonal EC use in the same cycle then this EC could be repeated or, better, a Cu IUD could be inserted.
- *Male sterilization* is effective after 3 months. Continue previous reliable method (unless partner is pregnant) or – less reliable – CSAOUCF 3 months.
- After proper *COC*, *CHC ring* or *CHC patch* use, the stop week (real stop or use of placebo tablets) is a good time (the earlier the better) to start LARC, TO or DMPA in order to have direct protection. If on POP, give LARC/DMPA/COC or TO during POP use, stop POP 7 days later. Cu IUD and TO are effective directly.
- *Implants* can be safely inserted a week before Cu IUD removal. Also on day of: miscarriage; first- and second-trimester abortion; ectopic operation; removal of LNG-IUD; removal of previous implant; post-partum discharge. If access to services is easy and very likely, then when breastfeeding, implants perhaps better on day 21–28 post-partum.
- After *NET-EN* or *DMPA* use start *COC/POP/LARC* on the day next injection was due with 14 days 'grace period' to have direct effect. Earlier is also possible.
- Consider EC if very recently exposed to risk, followed if successful by an appropriate method.

and often very fertile, and those who think they are, because of their age, unlikely to get pregnant. The reversibility of LARCs, unlike TOs, makes LARC a good option for women who want to postpone having children, who want to space, or who are not yet certain that their family is complete. All LARCs are suitable for women who have a high BMI, a history of ectopic, of DVT or migraine with aura, HIV, are nulliparous or breastfeeding.

Logistically it is much easier to insert an implant or IUD than to perform a TO, unless the client needs to be operated on anyway or is postpartum. Dedicated staff can make an enormous contribution to reproductive health if there is access to LARCs<sup>6</sup>. LARCs are, if used their whole lifespan, in general more cost-effective than COC, POP or DMPA, certainly when the costs of unintended pregnancies are included, but for many it is quite an upfront investment. Prices under different circumstances in different countries differ enormously for LARCs, up to a factor of 50 more in some instances compared with others. Copper IUDs are the most economical, good for at least 10 years. Only TOs when a laparotomy/laparoscopy has to be performed anyway or under local analgesia is cheaper per couple-years protection, and often so is vasectomy. In circumstances where supply systems are not optimal or where there are upheavals (war, revolutions, earthquakes, tornados, strikes) it can be very advantageous to be on LARC.

### **Implants**

Jadelle<sup>®</sup> (labelled for 5 years) and Sino-implant<sup>®</sup> (4 years) both consist of two rods with 75 mg LNG each, and Implanon<sup>®</sup> (3 years) consists of one rod with 68 mg etonorgestrel. No maintenance is needed. They are inserted far from a possible genital STI. They are the best hope for the unmet need of 45 million sub-Saharan women<sup>4</sup>. Training is easy, there are even fewer risks than with IUDs, and, because the private parts are not involved, there are fewer understandable cultural/religious/psychological sensitivities. Inserting them costs 2 min, removing them 5 min. Placing them just under the skin is the knack; this facilitates easy removal. Providers need a good training course, however, (five insertions under supervision; practice on a dummy also helps) because a few, placed much too deeply, very-difficult-to-remove implants can, via the press (tabloids) or rumors, ruin a

national implant campaign. This happened in the UK years ago. Make it known that the side-effects can be a nuisance but are not dangerous and mostly the advantages overshadow them. After removal there is a quick return to fertility.

The method can be used by nearly every woman (Box 2) whether she has a completed family or wants to space, or postpone her first pregnancy. The implant can be inserted directly after an abortion/miscarriage, shortly after a delivery if there is no breastfeeding and 4–6 weeks post-partum with breastfeeding. This is WHO teaching, but studies show that an implant inserted just before post-partum discharge is also fine: a US study showed that placing an implant just before discharge from hospital after delivery does not affect breastfeeding<sup>7</sup>. This is a good idea if there are transport problems.

These progestogens interfere with ovulation and they make the cervical mucus impenetrable for sperms. They protect from PID but not from STI urethritis/cervicitis/syphilis. They are extremely reliable (Table 1). All progestogen-based contraceptives are safe with sickle cell disease. A recent study showed that the use of hormonal contraceptives, especially injectables, just like pregnancy itself, probably facilitates HIV-1 acquisition and transmission in HIV-discordant couples by increased viral shedding in the vagina and perhaps an immunological effect<sup>8</sup>. Other studies give different results, and more research should be done to clarify this issue, but it is important that women are counseled on the importance of dual protection (condoms and contraceptives).

A study in Kenya estimated that if 100,000 COC/POP users switched to implants, then an estimated 26,000 unintended pregnancies could be prevented over 5 years<sup>9</sup>. What is keeping us?

The only real setback is the unpredictable bleeding pattern seen with implants. This is also the case with POP, DMPA and LNG IUD, but with the last two methods amenorrhea is more likely. Amenorrhea is not unpleasant for most, but is sometimes a problem for Muslim women, although DMPA (and implants) are popular in Bangladesh and Indonesia, the most populous Muslim countries. Beside amenorrhea (10–15% first year), implants frequently give irregular bleedings, sometimes long light bleedings or sometimes the cycle continues (around 25%) often with fewer bleeding days. Some women complain of weight gain (not proven), acne (but can also improve), mood changes and headaches.



Complaints tend to improve over time. If at some stage, bleeding becomes irritating the best approach is to use a 30µg COC for a few months. Recent studies showed that 50mg of mifepristone (used for 1 day) during an irritating stretch of bleeding will do wonders for the next month or so in stopping the bleeding; something for the future perhaps<sup>10</sup>? It is very important to counsel the client about probable changes in bleeding patterns. If she knows she can expect that, it will not frighten/irritate her that much and she is more likely to continue. She should be informed that amenorrhea is very unlikely to indicate a pregnancy because the method is so reliable and that amenorrhea does not mean that she will be infertile in future.

The rod(s) can be inserted at any time during the cycle (see checklist in Boxes 3 and 4). If inserted after day 5 of the cycle, after 6 months LAM or more than 2 weeks after miscarriage/abortion/DMPA was due, she should be advised to have her partner use condoms for a week or to abstain. Postponing insertion until the following menstruation will in general result in more unintended pregnancies and there are no negative effects reported if an implant (or COC, POP, DMPA, non-IUD emergency contraception, or TO), happens to be combined with an early pregnancy. The advantage of an implant over DMPA is that with unacceptable side-effects the rods can be removed at once, while with DMPA the effects can linger for 9–12 months. With DMPA, if the client does nothing, after 3–4 months she is at risk of pregnancy, while with an implant, positive action is needed to become fertile again for at least 3 years after insertion. When a woman is aged >43 years at insertion one can leave the implant a few years longer unless she gets irritating bleedings. (The same logic applies to LNG-IUD or copper IUD expiring.) In the UK <0.03% of the deliveries plus induced abortions involve women who became pregnant at >47 years of age. There is a fraction more failures when LNG IUDs or implants expire, but pregnancies are unlikely in this group because a fraction increase of nearly nothing is still nearly nothing. More information is available at: <http://www.k4health.org/toolkits/implants>.

### ***Copper intrauterine devices***

IUDs are experiencing a comeback. Many potential clients have incorrect information or even believe

myths about IUDs. The RCC limited IUD access because IUDs were suspected of causing abortions. The USA and UK Colleges of Obstetrics and Gynecology became very positive about the use of IUDs, also in nullipara, and so too became the WHO. Many European (Cu and LNG IUDs) and Muslim (Cu IUDs) countries and China kept on using IUDs with success. In the Western world there is much more use for IUDs in nullipara than elsewhere, because adolescents are not all too seriously embarrassed to go to a general practitioner (GP) or FP clinic before they are married for contraception, and they are seldom chased away. Counseling might result in either type of IUD being chosen. In other cultures IUDs are nearly exclusively placed after at least one (perhaps aborted) pregnancy.

Concerns exist about gonorrhoea and chlamydia and IUD insertion/use. If there is already such an STI present, then there is an increased risk of PID in the first 3 weeks after insertion. STI acquisition during IUD use does not increase PID risk, but women with IUDs are less likely to insist on condoms, and hence more likely to pick up an STI. In circumstances where gonorrhoea/chlamydia can be easily excluded (in some countries one can even do anonymous postal tests before a doctor's visit) – test for it. Otherwise it needs judgment to decide whether gonorrhoea/chlamydia should, if possible, be excluded first or prophylactic antibiotics are better, or whether her sexual history makes an STI unlikely. Often women postpone a FP visit until just before (or just after) they are at risk. For example, a non-breastfeeding Muslimah is seen for a Cu IUD 39 days post-partum and in her culture sexual intercourse can be resumed 40 days after delivery – first excluding an STI while she is very unlikely to have one, is a bad idea. Good studies from Kenya demonstrate that women with an HIV infection (not outright AIDS) can safely use IUDs. It is not known whether IUDs facilitate HIV transmission. There is good epidemiological evidence that Cu IUDs protect somewhat against cervix carcinoma<sup>11</sup>. CuT 380s can be used for at least 10 years so can the ML375. CuT 380 IUDs have the best properties of the copper devices according to a Cochrane meta-analysis<sup>12</sup>.

### ***Insertion of an intrauterine device***

It is not easier to insert an IUD during menstruation. Hundreds become pregnant every year

because they are told to wait for their periods (or until the gonorrhea/chlamydia test results are in). Because a Cu IUD is also an EC, it can still be inserted, after proper counseling, until  $\leq 5$  days (this is day 19 of a 28 day cycle or day 26 of a 35 day cycle) after the estimated day of ovulation, even if unprotected intercourse (also) took place earlier in the cycle. Some desperate women might know they are pregnant and request an IUD in the hope that it will solve their problem. Better, in most cases to do an ultrasound, or VE when an ultrasound is not feasible, before you insert an IUD. Randomized studies show that giving oral analgesics or prostaglandins before insertion is not better than placebo. Try not to perforate (1 in 300–1000), which happens especially, if you are not very careful, in the post-partum weeks (not with direct post-placental delivery insertion, see below).

Use a non-sterile glove for the VE. After that you discard that glove – no gloves, or non-sterile gloves, are needed for the remainder of the procedure as long as you do not touch the top half of the introducer and the IUD. There are different types of Cu-T380A on the market, 380 is the copper surface area in  $\text{mm}^2$ ; they have copper sleeves round the arms. With the most common 380s it is easy without opening the packet to fold and then insert both arms of the IUD about 1 cm in the top of the inserter tube, shortly before the insertion (otherwise the arms lose ‘memory’).

Hold the inserter very lightly. It is good practice to pull the uterus straight via a vulsellum on the anterior lip so that there is less chance of perforating the posterior or sometimes the anterior wall of the uterus. If you do this pulling, in the case of a nullipara, first infiltrate the anterior lip with local analgesia. Use of a sound is often not necessary, the inserter is your sound (slide the centimeter marker/flange in your direction so that it does not prevent you reaching the fundus). There is less chance of perforation with less sounding. But sometimes the external os looks very tiny and then it is better to use a sound very carefully. You may even have to bend the distal end and search around (pulling the uterus straight with the other hand) because the cervical channel is crooked or there is a sort of valve in it. If you find the right (not a false) route, exert pressure to all sides (not fundus wards) while moving the sound in and out without going into the cervix more than 3 cm. This way you widen access with massage. You can also use small Hegar’s. If you

can obtain a sound which gets somewhat thicker more centrally that helps. If you can’t get in the uterus (only happens a few times with your first 50 insertions, but even when experienced it can take sometimes 5 min to get access), insert two misoprostol tablets deep, vaginally, and try again in 2h. If difficulties are anticipated don’t open the sterile packet. If you can’t get the sound in and the IUD is not sterile any more that is a waste, and embarrassing if the client has paid for it, especially with the expensive LNG IUD.

With the ends of the folded arms in the introducer, ‘sound’ the top of the uterine cavity. When reached you can stop pulling the anterior cervix but keep contact with the fundus with your ‘sound’. The plunger/rod inside the inserter tube just touches the IUD during this part of the procedure. You then keep that rod in place while retracting the inserter tube 1.5 cm in your direction. The arms now unfold. Then push only the inserter tube (**not** the plunger; prevent plunger movement, keep rod *in situ*) lightly until you feel resistance after about 2 cm. (This last step is necessary although the IUD is now at the right spot, to prevent pulling the IUD 2 cm down while you pull out the plunger which might pull at the threads via friction.) Withdraw the plunger completely while keeping the tube *in situ*, then remove the tube. Practice with a dummy. You can see the procedure at: <http://www.youtube.com/watch?v=FuPFbgSm0QQ>.

If you think you perforated, pull the IUD out while you can still reach the strings. Try again in 2 weeks or perhaps an immediate implant is better.

If the IUD has disappeared in the abdominal cavity the most elegant way is to remove it with a laparoscope (after ultrasound or X-ray) or, if not available, via a mini-lap (see under Female sterilization). It is nearly always in the pouch of Douglas. Check first if the client may want a TO. If not, inserting a new IUD while observing the fundus is an option.

Strings are left 2.5–3 cm long (record in notes). Threads are like a beard; if short it pricks (the partner), if longer it is soft because it bends. Be careful that the strings are not caught in the scissors and pulled out while removing these. If you do not have the policy or the option to check the position of the IUD with (vaginal) ultrasound after the next period, you can, if you follow her up, look at the strings. If they became much longer, that means the IUD is now laying low in the uterus and with Cu

IUDs (not LNG IUDs) that gives an increased, but still small, chance of a pregnancy. Probably you will have to insert a new (you can also re-use, see under LNG IUD) Cu IUD, or, if you have access, a LNG IUD or implant. If the stem of an IUD is visible or palpable in the cervix, that is certainly a reason to replace. You could counsel clients to feel for that after the first or, better, every period. The lengths of the strings are of course not a good indicator if an IUD was inserted after an (induced) miscarriage, postpartum or if somebody else has placed the IUD because few keep to the 2.5–3 cm.

Some clients faint after/during insertion, a vagus nerve reflex with sweating, paleness, unrest, bradycardia and involuntary muscle movements. It will improve after some rest; leg elevation might help. Be careful that a client does not keel over after you have invited her to stand up.

It is possible to insert a Cu IUD within 10 min (the best time) after placental delivery. Expulsion will happen in ~12–15% of cases. Depending on the failed intention rate (FIR) of postponed insertions in your community (Table 1), direct post-partum insertion or post-abortion insertion can be better than asking women to come back in 4–6 weeks. With post-partum insertion, the inserter and plunger are discarded and the Cu IUD is grasped with a long sponge-holding/ring forceps. The cervical opening and direction of the cavity is identified via a vaginal hand and the IUD slid carefully into the uterus until the fundus is felt. It helps to have the other hand on the fundus via the abdomen wall. Then release the IUD and carefully withdraw the forceps; you might even squeeze the fundus with your external hand to prevent dislodging the IUD. You are unlikely to need a speculum/retractor to cut the threads; make them as short as possible. Women will be more inclined/less afraid to return to trim the threads than to come 6 weeks post-partum for insertion. Also, nurses in remote clinics can trim threads, if needed. There are good studies showing that many more women will have an IUD *in situ* 6 months post-abortion and fewer will have repeat abortions, if IUDs are placed immediately, in contrast to women supposed to come back later for insertion<sup>13</sup>; 50% of women ovulate within 3 weeks of an abortion. Many women will get antibiotics around the time of an abortion which will also help, if the right antibiotics are given, against IUD-related PID.

If a woman gets pregnant with an IUD it is better, if you can reach the strings, to remove the

IUD. Otherwise she might develop a dangerous sepsis in the second trimester. So, if she accepts the pregnancy then try to remove the IUD very carefully. Removing the IUD gives less chance of a miscarriage than leaving it in.

IUDs are sometimes expelled, more often with nullipara and with a Cu IUDs there is a 3–6% rate over 5 years.

The heavier blood loss and somewhat increased pain during periods experienced with Cu IUDs tend to improve over time. Abdominal complaints independent of the periods mostly do not improve; these are especially seen in nullipara. Sometimes you can solve this problem by cutting 1–2 mm from the lateral ends of the arms of an IUD, because it could be related to a narrow cavum. Women who have severe dysmenorrhea (or used to have that before COC, implant or DMPA use) are not very good candidates for Cu IUDs; LNG IUDs are better for them.

If a salpingitis/PID is suspected during IUD use, first try antibiotics (national guidelines; see Chapter 17), including those covering chlamydia/gonorrhoea and anaerobes (metronidazole), and monitor erythrocyte sedimentation rate or C-reactive protein. In most cases IUD removal is not necessary. Check/treat/counsel partner.

IUDs prevent all types of pregnancies but they are better against intrauterine pregnancies. Therefore, if there is a pregnancy during IUD use, then the chance of an ectopic is rather increased. The rate of ectopic pregnancy without contraception is 0.3–0.5%. The risk of an ectopic pregnancy in IUD users is 0.02% annually. Methods that prevent ovulation, such as COC, DMPA and implants protect even more effectively against ectopics. IUDs are safe with an ectopic history and much better than no contraception (since the ectopic recurrence rate is about 20%).

If the IUD strings are not seen at check-up or when a woman wants removal, that usually means the threads are curled up inside the cervix. If you have an ultrasound and the IUD is *in situ* leave it alone. Finding the threads is of course relevant if/when she wants it out. If no ultrasound is available you won't know if the device is *in situ*. First, try to find the threads in the cervix very carefully with a small forceps or cytobrush without pulling the IUD out (unless she wants it removed). The forceps you need (Kelly, alligator or polyp forceps) are rare – if you have one, treasure it. If no success, try a little

less carefully with local analgesia injected in or around the cervix; some dilatation might be needed. By now if you find the IUD, it will be dislodged so if the client wants to continue, re-insertion will be needed. If you can't find the IUD, try manual vacuum aspiration (MVA) with a 3–6-mm Karman cannula. Often during the above process you can feel the IUD; in that case an X-ray is not needed. But if you can't feel it and you have no ultrasound then an X-ray is an option. The problem with an X-ray is that you can't locate the uterus with it so if you do see the IUD somewhere in the pelvis you often do not know if it is in the uterus. The best option is to insert another Cu IUD before the X-ray and if they seem to touch that makes it very likely both are in the uterine cavity. If you do not see the lost IUD while the whole abdomen is visible then she must have lost it. Perforations occur at insertion, not later, although perhaps at insertion the IUD is sometimes placed inside the uterine wall and subsequently moves to the abdominal cavity. Perseverance will always succeed in removing an intrauterine IUD even if an old fashioned dilatation and curettage (D&C) under spinal/propofol/ketamine is needed (does she perhaps also want a TO?). More information is available at: <http://www.k4health.org/toolkits/iud>.

#### *Levonorgestrel intrauterine device*

Much of what is written above about Cu IUDs also applies to LNG IUD. The differences are emphasized here. LNG IUD are more expensive, work for 5 years [although without complaints you could leave them in the premenopause (if inserted at 42–45 years of age) for up to 8 years], are much better in combination with and for the prevention of fibroids and endometriosis. They are often good against heavy and/or painful periods. They are marginally more complicated to insert. For instructions read insert or look at: <http://www.youtube.com/watch?v=hlvV8tKgw6E>. They often lead to amenorrhea/light 'periods' but also, especially at first, irregular, mostly light, unpredictable bleedings. They may give some systemic progestogen adverse effects (acne, headache, mood and libido change). They often prevent a hysterectomy in women with heavy periods (with or without fibroids) because the bleeding disappears or becomes manageable. They are not labeled for EC and immediate post-partum use, but, like Cu IUDs,

are excellent post-abortally. After an expulsion (because they are so expensive), a quick rinse with boiled (not boiling) water and perhaps some added Betadine® (povidone iodine), followed by re-insertion (use a thin Karman cannula with the top cut off as inserting tube and sound or much thinner tube as plunger) has been done successfully. On occasion, after (repeated) expulsions in women who have an excellent indication (preventing a hysterectomy in a 40 year old with fibroids) tying and knotting some catgut or even nylon sutures around the IUD will prevent expulsion until the anti-contraction effect of the LNG has kicked in. It is not possible to predict who will discontinue IUD use for bleeding-related side-effects. However, persistent LNG IUD bleedings in older women may be related to (small) pedunculated fibroids. If you can't exclude them, perhaps a formal D&C (scraping a fibroid out) followed by re-insertion works.

#### **Female sterilization**

Female sterilization or TO is the modern method with the highest prevalence. Nearly every doctor can learn how to perform this operation. However, it is often difficult for a patient to organize an interval TO. Doctors are, or feel, busy and do not see this operation as a priority, especially if they are not in private practice. In poor countries, because of understaffing and underpayment in the non-private sector, motivation for such an elective operation is especially a problem. An incentive system for health workers is an option. There are also financial barriers for the client. Moreover, the system might demand consent of the partner. Also, operations may be cancelled because the woman is in the second half of the cycle or there are unexpected emergencies or stock outs. Women who succeed in receiving an interval TO are often very insistent, brave, rich or lucky.

In many busy hospitals in low-resource areas, TOs are treated as minor elective operations which are often postponed for other more important operations, such as emergency cesareans, until no further elective operations are done in the afternoon. In this way, women planned for TO may be starved for several days in a row and then they leave the hospital without the TO, disgusted. By introducing a new rule: TOs first, this problem was solved. Surgeons, nurses and anesthesia staff would not cancel elective cesarean sections even in the

afternoon because that would mean the patient involved would often come back in labor for a cesarean in the middle of the night. Considering the potential misery if a TO is cancelled, TOs should be treated always as emergencies, also on a Friday afternoon for a woman who just delivered her sixth baby.

Donors organize very successful TO courses with per diems for attending doctors. After the courses, it is often business as usual. Therefore, if there is an opportunity for TO because there is an operation anyway or admission, give her the TO option. This is even more important because, as mentioned above, it appears that hormonal contraception might to some extent facilitate (just like pregnancy) horizontal HIV transmission and perhaps that will in future affect continuation rates of, for example, injectables or implants. Or perhaps there will be future civil unrest in the area you work in and LARCs will become unobtainable, which is especially dangerous if there is a scar after a cesarean.

Without a laparoscope it is easiest to start with TOs in combination with a cesarean, then, if proficient post-vaginal delivery (under local analgesia, subumbilical incision) and then interval TOs (suprapubic incision). Interval TOs are best started on thin clients and later also on the more obese. At first, interval procedures under local anesthetic are difficult – many a junior doctor has despaired. But after a few weeks those doctors do them in 40 min flat, all included. It is the small things: good, well-directed light, table in steep Trendelenburg position (a form of shoulder support will allow some extra tilt), the bladder emptied just before the TO, an instrument on the cervix to help bring the tubes nearer the incision, the patient relaxed, and because you are confident, she is not straining and therefore no bowel is in the way. The more experienced the surgeon, the smaller the incision can be. This results in less postoperative pain, and some women try to keep their partner in the dark. Special instruments are helpful, especially Babcock forceps and uterine manipulator. The hook to fish out the tubes can be home-made from a double helix metal wire, angled at the blunt end. Special instruments are, however, not essential and certainly not for TOs combined with cesarean section and subumbilical procedures. Special instruments could be present in your hospital locked in a cupboard somewhere. Otherwise the national FP organization or the UNFPA might help, or perhaps you can reach EngenderHealth (via <http://www.EngenderHealth.org>) or via the

US embassy. Put the relevant operation instructions on a memory stick.

There is in practice no objection, even in most RCC hospitals (although it is illegal in Poland), to perform a TO with the second, third or fourth cesarean section or after a uterine rupture or eclampsia when there are already a few children. Official RCC teaching does not allow it because the aim of TO is infertility. A hysterectomy for heavy periods (routine operation 20–40 years ago in RCC hospitals for contraceptive purposes) or uterine rupture is on the other hand allowed because the aim is ostensibly to solve a bleeding problem; infertility is an ‘unfortunate’ side-effect. This should also make DMPA, COC, LNG IUD for heavy bleeding or dysmenorrhea allowable in hospitals where the RCC rules still hold. Logically, using condoms to prevent STIs with, as ‘unfortunate’ side-effect contraception, should also be fine within marriage.

The International Federation of Gynecology and Obstetrics (FIGO) in a recent (2011) ethical report advises that pregnant women possibly interested in a TO in case they turn out to need a cesarean section deserve antenatal TO counseling, and also early discussion of a post-vaginal delivery TO is warranted with potential candidates.

Try to insert a pre-printed area on the antenatal forms to record that a possible TO, in case a cesarean section turns out to be necessary, has been discussed and whether the patient (and ?partner) would like a TO – or not. This way it can become a routine to ask all paras  $\geq 1$ . However, many are only seen when already in labor.

### **Regrets**

It is also important to separate two sorts of regret. There is regret because she would, if she had not had a TO, try to become pregnant, and there is regret because her medical condition like diabetes, scarred uterus, HIV or hypertension makes another pregnancy unwise, and she regrets having that medical condition.

In some areas fertile women with a cesarean scar are in extreme danger because there is no guarantee that they will have professional, well-equipped labor supervision next time. This certainly applies to regions where vesico-vaginal fistulas (VVF) (global annual incidence 50,000–100,000; WHO) are still prevalent. These are the same areas where access to reliable contraception is at best erratic. It

takes in general a much shorter labor to cause a ruptured scar than a VVF. Therefore, it could well be that multipara in these areas who had a delivery related TO or a TO after admission following an unsafe abortion or after ectopic pregnancy (recurrence rate if no TO performed, 20%) are less likely to regret a combined TO (if they had been given the option) than to die of the next pregnancy. Not offering a TO with a cesarean section results in unintended pregnancies, but giving the option results in some regretted TOs. How many of the former are worse than one of the latter? Perhaps you can study what the data are in your area; see potential questionnaires on the internet<sup>14</sup>.

There is evidence from many, but not all, studies that peripartum TOs, result in some more regrets than interval TOs. Not surprisingly, because often the extraordinarily motivated are selected for by the latter<sup>14</sup>. Evidence is however lacking for more TO regrets after TOs first discussed shortly before a cesarean section, as opposed to 'suppose you need a cesarean section' counseling. There is however proof, provided by 784 multipara followed up after a cesarean section in Zimbabwe, that belated TO discussion leads to more regretted TO-rejections (8.0%) than earlier initial counseling (1.4%,  $p < 0.001$ )<sup>15</sup>. Something similar, on a small scale, was seen in the Netherlands<sup>14</sup>. Apparently when under stress or in doubt these women do not by mistake consent to a TO. The existence of these regretted rejections support early counseling, if at all possible, but it is no justification, without studies from diverse settings, to condemn providing the TO option shortly before a cesarean section or after a vaginal delivery, if earlier counseling, the ideal to aim for, has not taken place. The Zimbabwe setting involved 784 successfully interviewed para  $\geq 3$  (after delivery) who had had a cesarean section, 553 of whom had a TO during that cesarean section<sup>15</sup>. The study revealed that women without TO option before an elective or emergency cesarean section ( $n = 137$ ) were 8.8 times more likely to be dissatisfied later (64.2%, 88/137) than women who were offered a TO ( $n = 647$ , dissatisfaction rate 47/647, 7.3%). Moreover, of these 47, most ( $n = 31$ , 66%) were dissatisfied because they had not taken that option. The remaining 16 (16/647, 2.5%) were unhappy because they had agreed to the TO. However, only three of these women were interested in the offer of an all-costs-paid reversal operation, of which one, after HIV tests, was ultimately per-

formed. There is of course a relation between regretted TO and HIV infection because loss of partner and/or child is more likely. Even the widow who had a re-anastomosis was HIV-positive but she allowed testing only if not told the result.

Women who had an emergency cesarean section regretted the TO less often (2.0%), but had on average 1.3 more children, than those (2.9% regret) with an elective (mostly repeat) cesarean section (mean 4.4 children). In the same study, 749 multipara were followed up after vaginal delivery; 420 (mean 6.0 children) had a TO with 0.5% (2/420) regret, while of the women (mean 5.4 children) who had no TO, 45.0% (148/329) regretted that, a factor of 94. Of course, the personal and institutional thresholds for such a TO is much higher than for a TO with cesarean section. Of the 170 who declined an offered TO after vaginal delivery, 64 (37.6%) regretted this decision at follow-up. If possible discuss a post-vaginal delivery TO during pregnancy. Visit your post-natal ward. There was perhaps a delivery overnight of a para 6. Ask her if she wants a TO. Many women would like a TO but need/want to consult their partner. Does he have a cell phone? If you work in an urban area you might send a man on a bicycle to contact the husband, or perhaps his employer has a telephone. If the opportunity is lost you might see her again for the next delivery, perhaps with a ruptured uterus.

TO regret is not much related to parity. Age, loss of partner or (in some cultures especially male) child are more important factors. Therefore a 25-year-old para 4 will more likely regret a TO, than a 38-year-old para 2. However, it is much more likely that women who did not have the TO option regret than that women regret having had a choice. Having a choice is also a matter of reproductive/human rights.

Sometimes with an interval TO a mistake is made or the client successfully deceives the doctor, and during the procedure it becomes clear she is pregnant. Pregnancy is no contraindication for a TO. It will not interfere – continue with the operation. Some doctors in this situation perform the TO and remove the corpus luteum after consultation with the awake (spinal/local anesthesia) client (if the pregnancy is  $< 9/40$ ). This is of course only sensible where a MVA/electrical suction curettage or a course of misoprostol could have legal consequences. Some doctors nearly always combine an interval TO with suction curettage, if

they are not absolutely sure the client is not (very early) pregnant. Remember that curettage in a very early stage can be ineffective – follow her up. If the theatre staff is used to the TO/curettage combination, you could solve a serious early problem unnoticed. As mentioned above, a pregnancy test cannot exclude a very early pregnancy. Some doctors want a pregnancy test, although a positive test is not a definite reason to postpone the operation, but it can deflect accusations of incompetence. Some doctors, to protect themselves, have a negative pregnancy test recorded at the laboratory (before TO plus curettage).

#### *Side-effects of tubal occlusion*

A study<sup>16</sup> found that post-TO women were likely to report positive effects on sexual relationships. Complications of TO are mostly operation risks directly related to the experience and training of the surgeon. An interval TO is more difficult (possible adhesions) after a previous cesarean section. It is difficult to make a mistake (like perforation of the bowel or bladder or causing a bleeding) if a TO is performed during a cesarean section or even postpartum. Some women complain of dysmenorrhea post-TO. In the overwhelming majority of cases the complaints are not caused by the TO but because hormonal contraception is stopped and women have forgotten how painful a menstruation was before pill or DMPA use. The same complaints are seen after their partners' vasectomy. For unknown reasons TO protects (like COC) against ovarian carcinoma<sup>14</sup>.

Most TOs can be done under local anesthesia but if you can get help from an anesthetist and the patient is afraid of local anesthesia, then spinal hyperbaric bupivacaine 7.5 mg injected in the R lateral position, after preloading, is fine for postpartum TO, with a minimal duration of motor block.

See Figure 1 for position of incisions for a TO. Step by step instructions for TO are available at: <http://www.engenderhealth.org/files/pubs/family-planning/minilaparotomy-a.pdf>

#### **Vasectomy**

There are nine countries, South Korea (16.8%), Bhutan (13.6%), New Zealand (19.5%), UK (21.0%), Canada (22.0%), Australia (13.7%), USA (12.7%), Spain (7.9%) and Switzerland (8.3%),

where more than 7.5% of couples using contraceptives utilize vasectomies (and 50 countries where this applies to TO). If you have the opportunity to perform a vasectomy you can find more information at: <http://www.engenderhealth.org/pubs/family-planning/vasectomy.php>

#### **Depot medroxyprogesterone acetate and norethisterone enantate**

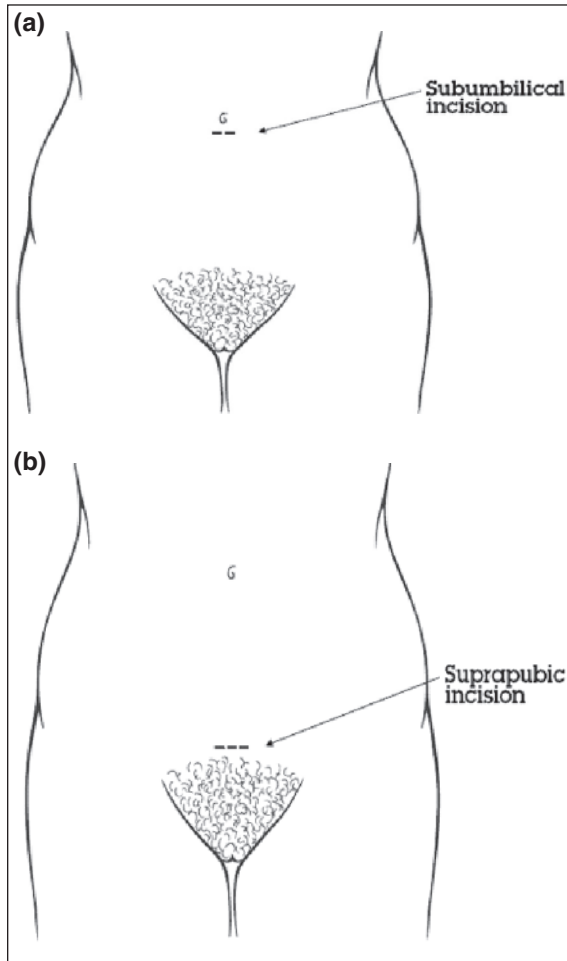
Sufficient evidence exists according to the WHO, for national policies to support the introduction, continuation and scale-up of community-based provision of progestin-only injectables, especially DMPA. Between 1999 and 2009 the number of women using injectables doubled to over 35 million.

In sub-Saharan Africa, >33% of modern contraceptive users rely on injectables, more than any other modern contraceptive method. Even so, most countries report high levels of unmet need for injectables. Community-based providers/distributors (CBDs) do well after a short training. Even where women are not allowed to move in public unaccompanied, DMPA provision via house visits has been a success (Bangladesh). DMPA and NET-EN protect directly if initiated within 5 days after a miscarriage/abortion or start of menstruation and within 4 weeks of delivery or during LAM. If given any other time during the cycle (which is no problem assuming she is unlikely to be pregnant, Box 3) condoms should be used or abstinence practiced the first week after injection.

In the Western world the typical failure rates of DMPA are similar to those for COCs (Table 1) – probably, because DMPA is especially prescribed if daily pill taking seems too difficult for that client. This subgroup often does not turn up in time for repeat injections.

In some countries, DMPA users are often better motivated and disciplined, also because unintended pregnancies are more dangerous. A study involving Zimbabwe and Uganda showed that the unintended 1-year pregnancy rate was 7 times higher with oral contraceptives than with DMPA, and 14 times with condoms. Results from Thailand were better<sup>17</sup>.

Still, studies from South Africa show that women tend to come somewhat late for the repeat injections. Events occur: funerals, ill children, inconvenient clinic hours, husbands who return unexpectedly, civil unrest, strikes, roads washed



**Figure 1** Incisions for a tubal occlusion (TO): (a) immediately postpartum (subumbilical incision) and (b) interval TO (suprapubic incision)

away, no money for transport or amenorrhea-related anxiety. Women are then often denied the injection and told to return when bleeding, and to use condoms in the meantime (COC or POP are not given because tradition incorrectly demands a period also). It can take months (of anxiety) for those bleedings to appear (lingering effect). Moreover, women often don't have the power to make their partners use a condom. A real menstrual period will however only happen after an ovulation.

The WHO advises giving a 14-day 'grace period' for DMPA and NET-EN. Women are advised after an injection to come back in 3 or 2 months, respectively, (not 12 or 8 weeks). Give an appointment date. If clients happen to be fewer than 14 days late, the injection can still be given.

Inject also if she has had no sexual intercourse after 3 (or 2 with NET-EN) months plus 2 weeks since the last injection. Being unfriendly does not improve compliance. If clients return up to 14 days too early give the injection anyway. A late visit demands a balancing act. Giving DMPA when already pregnant is a waste but has no demonstrable negative side-effects. If you let her wait until the next period there is perhaps a 20% chance of an unintended pregnancy with perhaps in your area a 0.5% maternal mortality rate, or even higher if seriously unintended, or perhaps she has a scar in the uterus. But strict, simple rules are important for CBDs. Perhaps it is feasible for them to refer to you sometimes. You might do a VE and find a very firm small uterus and give the injection or perhaps an IUD (now that she is on an examination table anyway), even a TO (see Female sterilization). In case of doubt, she can start on COC, POP or even an implant (in these cases condoms or abstinence for a week are advised). COC, POP and implants can be stopped easily, unlike DMPA, if she turns out to be pregnant in 4 weeks.

#### *Side-effects*

DMPA is the only contraceptive with confirmed weight gain as a side-effect. In places where food is scarce this is a sign of beauty. Broadly speaking, after 3 months, around 10% of users is amenorrheic, at 6 months a quarter, at 9 months more than a third and after a year >50%. Around 10% still has a regular cycle after four injections. Especially after the first injection, irregular bleedings are common, and also 4–5 months after the last injection. So a woman who decides to stop after one injection because of side-effects might suffer in total 7–8 months from annoying bleeding episodes. This will often be a very dissatisfied client. On the other hand a woman who uses DMPA for 5 years might suffer from unpleasant irregular bleeding for the first 2 months. She might then get an extra injection (at first, irregular bleeding is often 'breakthrough' bleeding improvable by giving a new injection 6 to 1 weeks before the next injection was scheduled) and the bleeding stops. Years later, 4 months after the last injection she might get irregular/frequent bleeding curable by taking COC for a few months. This will often be a very satisfied client. Amenorrheic women on regular DMPA may have, after a few years, a long episode of irregular bleeding – exclude cervical



cancer, a polyp or prolapsed fibroid. These are not thought to be breakthrough bleedings so an extra injection is unlikely to help, but a few months of COC while DMPA is continued tends to work. LNG IUDs and implants also bring on bleeding problems in different frequencies but they do not have the lingering effects.

NET-EN lingers for a shorter time and is in the eyes of many teenagers more 'cool', so NET-EN is perhaps better suited (but for 1.5 times more effort) for women whose family is not yet complete. Teenagers can have impulse pregnancies. Some lingering on the threshold for implant or IUD removal is not all that bad. Without ultrasound, after injectables, EDDs are difficult to predict.

Women with fibroids and heavy bleeding are often given DMPA (sometimes starting with a double dose) even if they do not need contraception (like nuns); this can often contain the problem until menopause.

More information is available at: [www.k4health.org/toolkits/injectables](http://www.k4health.org/toolkits/injectables) and <http://www.k4health.org/toolkits/cba2i>

### Oral contraception

Prescribing a year's supply of OCs is better for compliance than for a month or 6 months.

There are many brands and types of low-dose combined oral contraceptives (COC) [ $\leq 50 \mu\text{g}$ , or according to other definitions  $\leq 35 \mu\text{g}$  of ethinyl-estradiol (EE) or equivalent]. One hundred million users makes selling COCs profitable but patents expire, generics follow and revenues plummet. In order to safeguard share values, newer patentable pills are marketed. Innovations such as implants and medicated IUDs are obviously fantastic but that is not evidently the case for new COCs. Young females show off with the newest brands without evidence of superiority. Good marketing generates a placebo effect.

First-generation COCs had different progestogens and often stronger estrogen effects. Second-generation COCs combine 20–50  $\mu\text{g}$  EE with LNG or, less commonly, norethisterone. Sometimes the dose of hormones varies with the day of the pill pack (phasic pill). The above two progestogens are likely the safest in relation to DVT/PE in COCs/CHC. It is not that the newer progestogens cause thrombosis. If progestogens are used without estrogen (implants, POP, injection,

LNG-IUD) then an increased thrombosis risk cannot be demonstrated. However, estrogens (not needed much for their contraceptive effect but more for cycle control/prevention of irritating unscheduled bleedings) can cause thrombosis and second-generation progestogens reduce that effect to a larger extent than the newer generations, but not completely. Dropping the estrogen content of COCs reduces the tendency to clot but the lowest dose of estrogen (20  $\mu\text{g}$  EE) will often result in spotting and breakthrough bleedings, affecting compliance. Even if this very low-dose EE is combined with third-generation progestogens, then the thrombosis risk is higher than with 35  $\mu\text{g}$  EE combined with LNG. But remember, without contraception, during pregnancy and the first weeks postpartum, the risk of DVT/PE is even higher. Roughly speaking the second-generation COC increases the DVT/PE risk by a factor 2.5, the third-generation and newest brands COC by a factor 5, and pregnancy and the early post-partum phase by a factor  $>20$ . Having a very sedentary lifestyle is as risky in relation to PE as second-generation pills.

There is no proof that the newer pills (with as progestogen: gestodene, lynestrenol, desogestrel, norgestimate and also not those with drospirenone or cyproterone) have important beneficial effects on acne, hirsutism and weight gain etc. However, it is likely that all six of them are more risky in relation to DVT/PE in combination with EE than LNG. Although their DVT risk is typically two times higher, it is still very small (an estimated 7400 women have to switch from third- to second-generation COC to prevent one DVT). However if there are no certain benefits, why increase the DVT/PE risks? Thrombotic risks related to COC are mainly seen in the first year of use and also are positively correlated to age, smoking, long haul flights and BMI. Perhaps one-third of patients with DVT/PE have a demonstrable thrombophilic factor.

Women with hypermenorrhea, dysmenorrhea or headache in the stop week may benefit from the safe continuous use of second-generation pills, also called bicycling or tricycling. Only the active pills of two or three strips, 42 or 63 pills, respectively, are taken before a stop week is scheduled. There are no medical reasons for not taking the pill every day for years. When breakthroughs occur stop the pill for 3–4 days and then restart. The problem with having no regular withdrawal bleed is reassuring the client who thinks that not bleeding is

unnatural and some believe that poison is accumulating. She also loses of course one indicator for an unintended pregnancy. A home pregnancy test is only feasible for the well to do.

Pregnancies in classical pill-taking mostly happen because a maximum of a week interruption (taking the non-active pills) is fine but a few more days because of gastroenteritis or forgetfulness, is not. This mechanism is mainly behind the large difference in perfect and real-life reliability of the pill (see Table 1). These are US figures, the Western European results are probably somewhat better. Clients should be very well counseled about the need not to forget – especially in circumstances where failure could lead to stopped education in teenagers, unsafe abortions or uterine rupture in multipara. It is not unlikely, incidental studies show, that typical failure rates of COCs and POPs, are worse than in Table 1, in some areas of Africa<sup>17</sup>. These failures also undermine confidence in science-based healthcare. Why would a woman trust her anti-tuberculosis medication if she has already become pregnant twice on the pill? Conversely, the impression is that DMPA has lower failure rates in Africa than the high rates seen in, for example, some areas of the USA<sup>18</sup> – probably because in Africa, mostly those women who have already experienced the dangers of three to eight deliveries, often under basic circumstances not devoid of fear of death, use DMPA. Putting up with the side-effects (weight gain, irregular or no periods) is for many a small price to pay compared with the realistic threat of maternal death or another mouth to feed or back to dress.

Probably, in future, folic acid will be added to the pill because then if somebody stops the pill in order to get pregnant or if an unintended pregnancy occurs, the folic acid stores are filled sufficiently.

### **Interactions**

The effectiveness of COC (and POP) is affected by most medications against epilepsy, (lamotrigine only with POP) and some ART drugs and certainly rifampicin and possibly rifabutin. The above drugs induce more liver activity resulting in lower hormone levels with COC and POP use. This is very important because unintended pregnancies for women using these drugs are an extra problem for mother and/or child. Even if these drug inter-

actions did not exist then COCs and POPs would still have unacceptably high typical failure rates for these women unless there is no alternative. With ARTs, anti-tuberculous and anti-epileptic drugs, DMPA and implants are fine, also both types of IUDs are suitable as long as there is no pelvic tuberculosis. If there is absolutely no reliable alternative for the pill in combination with rifampicin then a 50 µg EE pill (difficult to get in some places) or two 30 µg pills daily, will do. One often hears about antibiotic use and reduced effectiveness of COC but it is more a rumor; there is no good evidence, unless the antibiotics result in severe diarrhea.

### **Contraindications for combined oral contraceptives**

There is a very long list of contraindications for COC (Box 2). However, in practice you will seldom see it. Fibroids are not a contraindication for any hormonal contraception. There are however reports that progestogens (LNG-IUD, POP, DMPA, NET-EN, implants) only when given in the first few months post-partum, diminish the post-partum involution of large fibroids.

### **Side-effects**

These are seen mostly when COC is started: nausea (should improve if the pill is taken just before sleeping), breast tenderness, headache, breakthrough bleeding, spotting. Some women have positive or negative mood changes or have an increase or decrease in libido. DVT/PE is discussed above. Women who smoke a lot have in combination with COC a higher coronary risk, much higher than when only using COC. Weight gain directly caused by pill use is not proven (unlike with DMPA use); other authorities claim that a third of users gains 2 kg, a third loses 2 kg and a third keeps the same weight. The pill does not cause infertility in fact the opposite happens, via protection against PID (and therefore also against ectopic pregnancies), maybe fibroids and endometriosis. The pill is fine for women with irregular or long cycles or polycystic ovaries. Of course, if the pill is used to postpone pregnancy until the woman is much older, then it becomes more difficult to get pregnant, not because of the pill but because of the age-effect. Sometimes it takes a few months for the cycles to return after stopping the pill. If much pressure is exerted, you could prescribe POP three times a day for a week, she will then often have a withdrawal

bleeding. With this you gain time. If after 6 months her own cycles have not resumed and she is very desperate to get pregnant, try ovarian stimulation with clomiphene as described in Chapter 16 on subfertility. Amenorrhoea combined with spotting is typically seen with low-dose pills, not with 35–50 µg EE pills. Some women with amenorrhoea stop taking the pill (or DMPA) until ‘the system is in order again’, sometimes on the advice of health workers. This is unnecessary and causes unintended pregnancies.

**Hypertension** It is not necessary to routinely check blood pressure of women opting for COC. A positive family history of hypertension, diabetes or age >35 years is an indication. Hypertension only caused by COC is rare, but stopping COC will then soon normalize the blood pressure.

**Carcinoma and hormonal contraception** COC protects against ovarian, endometrial and colon carcinoma and increases the risks of cervical, liver and breast carcinoma. Ovarian carcinoma is positively related to the number of ovulations and these are reduced by pregnancies, breastfeeding and hormonal contraception. Strangely enough, TO also protects against ovarian carcinoma. Just as strangely, Cu IUDs seem to protect against endometrial carcinoma and cervical carcinoma<sup>11</sup>. On balance, total cancer mortality is not increased by COC use or perhaps even reduced because screening for cervix and breast carcinoma helps, while COC protection against ovarian carcinoma is extra beneficial because this cancer is very difficult to cure and screening does not work. The protective effect on ovarian carcinoma continues after menopause, the increased risk of breast and cervical carcinoma disappears 10 years after stopping COC. Progestogens in LARCs and DMPA protect against endometrial and ovarian carcinoma but do not increase breast and cervical carcinoma. With COC (and use of other effective contraceptives) parity decreases and therefore lifetime breastfeeding, while breastfeeding protects against breast cancer. There are reasonable indications that ever-COC use increases life expectancy somewhat compared with never-use, at least in the UK<sup>19</sup>.

### **Forgotten pills**

Table 2 describes what to advise when COC is forgotten. Studies show that far more tablets are

skipped than clients recollect as forgotten. By definition, a COC pill is forgotten when a woman is >12h late. With POP forgotten >3h, use condom/abstinence until the pill has been taken continuously again for a week. During patient contact for forgotten pills use the opportunity to reassess if oral contraception is the right method for her.

### **Progestogen-only pills**

Table 1 shows POP to be as effective as COC. This is certainly not everybody’s experience. A disadvantage of most POPs is that they have to be taken every day at around the same time (3h margin). If too late, condoms should be used, but of course that needs the cooperation of the partner. POPs are taken continuously – no stop-week. If irritating breakthroughs occur one tablet extra for a few days tends to help. The available POPs in developing countries do not suppress ovulation much; they contain far less progestogen than COCs. They act mainly by making the cervical mucus inhospitable for sperms. POPs are an option the first 6 months post-partum for women for whom the 2–8% LAM failure risk is too high. POPs are also suitable for employed women who can’t breastfeed their under-6-month child during the daytime or who have started with menses and do not like DMPA, implants or IUDs. Medical reasons for POP use are rare because if, for example, cardiovascular problems prevent COC use (in that case pregnancy is even more dangerous) but allow POP use, then the reliability of the method is so important that LARCs (or well-supervised DMPA) would be much better. If POPs are not started post-partum or after an abortion (there is no good reason to prefer POP over COC after abortion) then it is best to start on day 1–5 of the period. If later, condoms or abstinence are advised for the first week of POP use. POPs in higher doses (see below) can be used for emergency contraception (EC). With POP forgotten >3h: use condom/abstinence until POP taken continuously again for a week.

### **Emergency contraception**

EC is also known as the ‘morning after pill’ – a confusing term: good candidates have been rejected because it was afternoon. If a pregnancy is not wanted, EC is indicated after unprotected intercourse from 6 days before ovulation until 4

days after (Table 3). Even if the unprotected intercourse was outside this time frame her visit is a good reason to discuss and provide contraception.

- **LNG:** If the routine 1.5 mg doses of LNG are unavailable, it is easy to organize an alternative approach. Current POPs available in developing countries often contain: norgestrel 75 µg, or levonorgestrel 30 µg, or norethisterone 350 µg. A LNG EC 1.5 mg equivalent would be 40 tablets, 50 tablets and 30 tablets, respectively. Although LNG is no longer given as two times 0.75 mg with 12h in between but as one dose, it is perhaps prudent to divide the above quantities for psychological reasons into two separate doses. The effects of the different progestogens vary depending on the target organ but the above number of tablets seems the best equivalent of 1.5 mg LNG and are certainly not dangerous.

Around ovulation, unprotected intercourse will result in 25% of clinical pregnancies. The most used EC method – 1.5 mg LNG or equivalent – is around 80% effective. Therefore 5% pregnancies still occur with EC use around ovulation. LNG acts by preventing/postponing proper ovulation. The LNG EC failures are seen if given too late to prevent ovulation. Because sperm survive much longer inside the female genital tract than oocytes do, there is a longer period when LNG is effective before ovulation,

3–5 days, than it is ineffective post-ovulation, 12–24h; hence the 80% effectiveness. According to the WHO, with LNG, 95% of the expected pregnancies are prevented if given within 24h, 85% between 25 and 48h and 58% between 49 and 72h. LNG not only works less well if given later after unprotected intercourse, but also if given later in the cycle. For example, if the condom tore at day 12 of the cycle and LNG is taken within 24 h, ovulation is likely to be prevented/postponed. If the same mishap happened at day 14, ovulation and fertilization may have taken place before you see her and a Cu IUD or ulipristal (see below) would be a better choice. In many countries LNG is obtainable over the counter at pharmacies and drugstores and used extensively. Use in developing countries is limited but increasing. Lack of privacy in pharmacies often precludes a good FP counseling session. It is good to check if pharmacies, clinics and GPs in your area are knowledgeable about EC and stock them. One study with make-believe-clients in Zimbabwe demonstrated much to be desired. Also stock anti-emetic tablets (or better, suppositories) in case she vomits within 2h so that the oral EC can be repeated with success as soon as possible, or consider IUD use. It is also possible to give the EC tablets vaginally.

- **Cu IUD:** The insertion of a Cu IUD is nearly 100% successful. A Cu IUD can also be used up to 120h after the first act of unprotected intercourse, or even longer if ovulation is likely to have occurred <120h ago. Copper is toxic to sperm (its main action in routine contraception) and causes a sterile inflammatory response in the endometrium interfering with implantation if sperm had passed before insertion, or, rarely, passed despite an IUD. There are no studies showing that widespread availability of oral EC lowers abortion rates in general. For the individual woman (couple) it is however often an easy escape compared with the alternatives. Of course, when Cu IUDs are often used as EC and continued for regular contraception, abortion rates will decrease.
- **Ulipristal acetate:** A new, more expensive selective progesterone receptor modulator, ulipristal acetate 30 mg, is still effective up to 5 days after the first act of unprotected intercourse. It not only interferes with ovulation but also with implantation.

**Table 2** Forgotten combined oral contraceptive pills

Time	Number	
	forgotten	Advice
Always	1	Take the forgotten pill ASAP
Week 1	≥2	As above, plus finish strip, consider EC, condom/abstinence until pill again taken continuously for a week
Week 2	2 or 3	Take last forgotten pill ASAP, finish strip, no extra measures
	≥4	Take last forgotten pill ASAP, finish strip, condom/abstinence until pill taken again continuously for a week
Week 3	≥2	Either, take last forgotten pill ASAP, finish strip and continue without interruption with next strip (discard dummy pills) Or interrupt for 7 days starting from first forgotten pill

ASAP, as soon as possible; EC, emergency contraception.

**Table 3** Emergency contraceptive (EC) use. Use ASAP if exposed from day 6 before, until day 4 after ovulation. In cases of rape collect/document evidence

<i>Method</i>	<i>Risk of pregnancy</i>	<i>Remarks</i>	<i>Further remarks</i>
LNG 1.5 mg in 1 dose. Use within 72 h of unprotected intercourse	5%	May need anti-emetic; repeat dose if vomits within 2 h. LNG can be used more than once in one cycle	Expected period may be delayed up to 10 days: counsel. Follow up. STI screening/prophylaxis?
POP 30–50 tablets (see text), start within 72 h, give in 1 dose or 2 half doses with 12 h in between	5%	May need anti-emetic; repeat dose if vomits within 2 h	Expected period may be delayed up to 10 days: counsel. Follow up. STI screening/prophylaxis?
4 tablets 30 µg estrogen COC (within 72 h), repeat after 12 h	5%	More chance of nausea and needing anti-emetic; repeat dose if vomits (20%) within 2 h	Expected period may be delayed up to 10 days: counsel. Follow up. STI screening/prophylaxis?
Cu IUD up to 5 days after first act of unprotected intercourse or up to 5 days after time of estimated ovulation	<1%	Often prophylactic antibiotics use wise. May continue IUD, or remove with next period	Expected period probably in time: counsel. Follow up. STI screening/prophylaxis?
No EC	25%	Start folic acid, at once	Counsel. Follow up. STI screening/prophylaxis?

ASAP, as soon as possible; LNG, levonorgestrel; STI, sexually transmitted disease; OPO, progestin-only pill; COC, combined oral contraceptive; IUD, intrauterine device.

- *Mifepristone* (the abortion pill, also a progesterone receptor modulator) in a dose of 10 mg is also effective for 5 days. There is much experience in China with mifepristone as EC. In the Western world it is not licensed for EC use.

Perhaps a poster in the hospital and an interview in the local newspaper, even on the radio will help spread the word. Perhaps you could get donors/manufacturers of condoms interested in printing on the packet: 'In case you failed to use this product properly consider use of emergency contraception via your nearest clinic ASAP'. That will certainly boost EC awareness. In most countries where abortions are very restricted, EC is not illegal. The prosecution will have a hard time proving that she was pregnant, especially with LNG and equivalents, because as mentioned, they only prevent ovulation. Just like regular pill-use and breastfeeding.

There are many areas where EC use is limited to rape. Rape is very prevalent in war/refugee situations and you should actively promote EC. Many women don't know about this option and perhaps they also need HIV prophylaxis and antibiotics.

Time is essential. Make sure LNG or equivalent is available in your hospital/clinics. At casualty have instructions and a list with the right quantity of the POP you happen to stock taped to the wall and make sure provisions are also available at night and during the weekend. Also add other instructions: about antibiotics and post-exposure prophylaxis; in cases of rape, how to collect evidence perhaps including baseline HIV/syphilis tests; follow-up (in cases where EC failed); option of Cu IUD plus antibiotics as EC.

Liaise with the police (and/or traditional authorities) to prevent them mediating first or taking statements before rape victims are taken to health workers. In some countries abortion after rape is only legal after a conviction. That can take months. This delay is likely to be a disaster mentally, but also an instrumental abortion performed in the second trimester under general anesthetic is risky, if you are not specialized. Use of vaginal misoprostol (somewhat but not much more effective after a start dose of 200 mg mifepristone) is then much safer, but psychologically more taxing. Therefore, judgment is needed. Is a 10–15% chance of

pregnancy to be accepted because a girl could only see you 3 days after rape for EC? Or, is it better to ensure the <1% pregnancy risk of an IUD? Although insertion in a 15-year-old who was recently raped might be mentally quite traumatic? The rapist is unlikely to have used a condom therefore the proper antibiotics (depending on the national guidelines) to prevent/cure *Chlamydia*/gonorrhea/syphilis and HIV should be given. Even if an IUD is not inserted antibiotics are a good idea.

In all cases of EC failure there is a somewhat higher ectopic ratio per ongoing pregnancy (chance not higher if the successful EC users are also in the denominator).

### Condoms

For condoms (male and female) to be reliable as contraceptives, similar 'bourgeois' conditions are required as for FAB methods. Condom use within stable relationships is rare, while in 'non-bourgeois' conditions condoms are often not good enough (see Table 1), especially when combined with alcohol or khat. The contraceptive failure rate of condoms can be tolerable when it is safe, practical, affordable and ethically acceptable for the couple to use abortion as back-up, more or less the model in Japan. Of course, STI prevention is the major advantage of condoms and the spread of HIV, *Chlamydia*, gonorrhea, chancroid and syphilis (but not so much HPV) could be dramatically limited if everybody would (also) employ condoms before or outside a stable relationship. Many have difficulties in grasping why condoms could be poor contraceptives but excellent tools in confronting the HIV pandemic. However, if these two functions are considered at a population level this is easier to understand. Contrast global non-use of contraception, to consistent use of condoms. That would make a dramatic difference in world population in 30 years despite the flaws of condoms for FP. Similarly, never, as opposed to, always use of condoms for HIV prevention would make a dramatic difference in the magnitude of the HIV epidemic in 30 years.

A good metaphor is measles vaccinations. Before these vaccinations everybody would catch measles sooner rather than later. When however, 5–10% of a population is not vaccinated the 'herd' is still protected and there are only isolated, imported cases. If condoms are used consistently, but sometimes tear

or slip off, that will have a similar effect. The failures are not enough to drive the HIV epidemic because that would require that HIV victims transmit HIV on average to at least one other person during their lifetime. The above are simplifications with high reality content.

The claim that condoms structurally have holes large enough for HIV is deceitful. The virus diameter is literally a 1000 time larger than a H<sub>2</sub>O molecule. Sperm are much bigger still. Many condom opponents (pre)tend to believe that the typical condom failure rate is per act not per year.

Condoms are best, outside a (not yet) more permanent relationship, combined with a more reliable contraceptive. It is called 'double Dutch' or 'belt and braces'.

### CONTRACEPTIVES AND HIV

Regrettably, the use of, for example COC, with condoms affects perseverance in condom-use negotiations, because the fear of pregnancy is often, especially among teenagers, a better motivator than the fear of HIV. This is a serious dilemma, because according to UNICEF (2011) about 2500 young people aged between 15 and 24 years around the world are newly infected with HIV every day. Core HIV prevention interventions include abstinence, male circumcision, condom use, voluntary HIV testing and school-based sexuality education programs. UNICEF stresses that abstinence-only programs are not effective in changing behavior and HIV prevention in the long term.

There is some evidence that with proper ART, HIV transmission becomes very unlikely, but beware, the medication often affects the reliability of COC and POP and so does rifampicin which is often used by those infected with HIV. Better access to LARCs in Africa and sterilizations can prevent thousands of vertical HIV transmissions just by preventing unintended pregnancies, especially in women who do not know that they (or their partner) are HIV positive.

Without access to LARC, HIV-infected women on ART, not obviously ill, can have a higher risk of unintended pregnancies than their uninfected peers because of the drug interactions mentioned above, the frequent HIV-associated neurocognitive impairment interfering with reliable COC/POP taking, and the HIV-related reduction in breastfeeding. A recent (2011) study suggested (although

some earlier studies did not) that HIV transmission in discordant couples from man to woman and vice versa increased with COC and DMPA use<sup>8</sup>. Low-dose hormonal methods like LNG IUD or implants might not have this problem. It is not yet known what the use of Cu IUDs does to horizontal HIV transmission. Double protection (a reliable contraceptive plus a condom, tenofovir gel or ART) seems the best option in theory. Pregnancy also facilitates HIV transmission not only horizontally but also vertically. If a family is complete, try to facilitate TO. It has no known effect on horizontal HIV transmission and will very effectively prevent vertical transmission. It seems likely that vasectomy will reduce the male-to-female transmissions.

## REFERENCES

- Trussell J. Contraceptive failure in the United States. *Contraception* 2011;83:397–404
- Verkuyl DA. Intention-to-treat studies crucial for contraception research. *Contraception* 2009;80:234–6
- Tilley IB, Shaaban OM, Wilson M, *et al.* Breastfeeding and contraception use among women with unplanned pregnancies less than 2 years after delivery. *Int J Gynaecol Obstet* 2009;105:127–30
- Contraceptive Projections and the Donor Gap. Meeting the Challenge. Reproductive Health Supplies Coalition, 2009. <http://www.rhsupplies.org>
- National Institute for Health and Clinical Excellence. Long-acting reversible contraception: Guideline. London: NICE, 2005
- Neukom J, Chilambwe J, Mkandawire J, *et al.* Dedicated providers of long-acting reversible contraception: new approach in Zambia. *Contraception* 2011;83:447–52
- Gurtcheff SE, Turok DK, Stoddard G, *et al.* Lactogenesis after early postpartum use of the contraceptive implant: a randomized controlled trial. *Obstet Gynecol* 2011;117:1114–21
- Heffron R, Donnell D, Rees H, *et al.* Use of hormonal contraceptives and risk of HIV-1 transmission: a prospective cohort study. *Lancet Infect Dis* 2012;12:19–26
- Hubacher D, Kimani J, Steiner MJ, *et al.* Contraceptive implants in Kenya: current status and future prospects. *Contraception* 2007;75:468–73
- Abdel-Aleem H, d’Arcangues C, Vogelsong KK, Gülmezoglu AM. Treatment of vaginal bleeding irregularities induced by progestin only contraceptives. *Cochrane Database Syst Rev* 2007;4:CD003449
- Castellsagué X, Díaz M, Vaccarella S, *et al.* Intrauterine device use, cervical infection with human papillomavirus, and risk of cervical cancer: a pooled analysis of 26 epidemiological studies. *Lancet Oncol.* 2011;12:1023–31
- Kulier R, Helmerhorst FM, O’Brien P, *et al.* Copper containing, framed intra-uterine devices for contraception. *Cochrane Database Syst Rev* 2006;3:CD005347
- Bednarek PH, Creinin MD, Reeves MF, *et al.* Immediate versus delayed IUD insertion after uterine aspiration. *N Engl J Med* 2011;364:2208–17
- Verkuyl DA, van Goor GM, Hanssen MJ, *et al.* The right to informed choice. A study and opinion poll of women who were or were not given the option of a sterilisation with their caesarean section. *PLoS One* 2011;6:e14776
- Verkuyl DA. Sterilisation during unplanned caesarean sections for women likely to have a completed family – should they be offered? Experience in a country with limited health resources. *BJOG* 2002;109:900–4
- Smith A, Lyons A, Ferris J, *et al.* Are sexual problems more common in women who have had a tubal ligation? A population-based study of Australian women. *BJOG* 2010;117:463–8
- Steiner MJ, Kwok C, Dominik R, *et al.* Pregnancy risk among oral contraceptive pill, injectable contraceptive, and condom users in Uganda, Zimbabwe, and Thailand. *Obstet Gynecol* 2007;110:1003–9
- Raine TR, Foster-Rosales A, Upadhyay UD, *et al.* One-year contraceptive continuation and pregnancy in adolescent girls and women initiating hormonal contraceptives. *Obstet Gynecol* 2011;117:363–71
- Hannaford PC, Iversen L, Macfarlane TV, *et al.* Mortality among contraceptive pill users: cohort evidence from Royal College of General Practitioners’ Oral Contraception Study. *BMJ* 2010;340:c927

## APPENDIX

### Useful addresses

e-Learning Course: Adolescent Sexual and Reproductive Health for Humanitarian Settings  
<http://www.iywg.org/youth/home>  
<http://www.un.org/esa/population/publications/publications.htm>  
[http://www.usaid.gov/our\\_work/global\\_health/](http://www.usaid.gov/our_work/global_health/)  
<http://www.un.org>  
<http://www.guttmacher.org/idc/communications@pathfinder.org>  
[prbnews@prb.org](mailto:prbnews@prb.org)  
[toolkits@k4health.org](mailto:toolkits@k4health.org)  
[rhrpublications@who.int](mailto:rhrpublications@who.int)  
<http://www.engenderhealth.org>  
[www.globalhealthlearning.org](http://www.globalhealthlearning.org)  
<http://www.measuredhs.com/start.cfm>  
<http://www.unfpa.org/swp/>  
<http://www.k4health.org>  
<http://www.ffprhc.org.uk/>  
<http://www.postabortioncare.org/>