New contraceptive choices across reproductive life

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ABSTRACT

- The range of contraceptive options and consumer awareness of new contraceptive methods have both increased significantly over the past 10 years.
- New methods available in Australia include lower-dose oral contraceptive pills, new oral progestogens, progestogen implants, a progestogen-bearing intrauterine device and polyurethane female condoms.
- Contraceptive options which may soon be introduced in Australia include novel methods of administering combined (oestrogen–progestogen) contraception, such as dermal patches and vaginal rings.

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IN THE PAST 10 YEARS, the range of contraceptive options available in Australia has increased significantly, with the introduction of lower-dose oral contraceptive pills, several new oral progestogens, progestogen-only implants, a progestogen-bearing intrauterine device and polyurethane female condoms (Box 1). Further contraceptive options available overseas may soon be introduced in Australia, including novel methods of administering combined (oestrogen–progestogen) contraception, such as dermal patches and vaginal rings (Box 1). It is consequently even more difficult for clinicians to provide prospective users with the balanced, comprehensive information required for a fully informed choice, even as consumer awareness increases.

Contraceptive choice

Research has consistently shown that women's primary concerns when choosing a contraceptive method are its effectiveness and lack of unwanted side effects.[11,12] However, there is often an inherent tension between these two requirements (Box 2). Contraceptive users must first decide which methods on the continuum of effectiveness and side effects are acceptable to them.

Ways of facilitating contraceptive choice are shown in Box 3. Most important is the provision of accurate information on different contraceptive methods. While age is not the only, or even the primary, determinant of contraceptive options, it may be useful to examine the issues involved in counselling women according to different stages of reproductive life.

The adolescent and younger adult

About half of all high-school students in Australia are sexually active by 17 years of age.[14,15] The Australian national teenage pregnancy rate in 1999 was 44 per 1000 per year, and about half these pregnancies are terminated.[16] Adolescent pregnancies are not necessarily unplanned, and pregnancy rates are higher when adolescents hold idealised beliefs about pregnancy and parenthood.[16] Thus, it is important when counselling an adolescent about contraceptive options to deal not only with the medical issues, but also with the psychosocial impact of an unplanned pregnancy on the individual. The safer-sex message should also be reinforced, as adolescents are at higher risk of contracting sexually transmitted infections.[17]

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Polyurethane condoms (both male and female) have recently become available in Australia. These have the advantages of not containing latex allergens, being stronger than conventional condoms and allowing better heat transmission. As the female condom covers some of the vulva, it may provide better protection against sexually transmitted infections, such as herpes simplex and human papillomavirus infection, than male condoms. However, polyurethane condoms are more expensive than conventional latex condoms.

The oral contraceptive pill remains the most popular contraceptive method for Australian women aged 18–23 years,[18] but several issues affect its use in this age group. As weight gain and acne are significant concerns for younger women, preparations containing progestogens with less potential for androgenic side effects are preferred (eg, the newer progestogens, desogestrel, gestodene, cyproterone acetate and drospirenone). As adolescents often cease taking the oral contraceptive pill if breakthrough bleeding occurs,[19,20] preparations that provide good cycle control are preferred. This generally means avoiding preparations containing 20 μg or less of ethinyloestradiol.

Despite preferring the oral contraceptive pill as their method of choice, younger women have been shown to have higher contraceptive failure rates with methods such as this that require daily commitment.[13] New longer-acting methods may be better alternatives:

Progestogen implants (containing etonogestrel) provide effective, convenient, rapidly reversible long-term contraception, without the effects on bone density that have limited the use of the progestogen-only injectable contraceptive (depot medroxyprogesterone acetate; DMPA) in the past.

Alternative delivery systems for combined contraception. Monthly injectable combined contraception is now

1: Newer contraceptive methods

Methods available in Australia

Progestogen implant[1] (Implanon [Organon])
Active ingredient: Etonogestrel
Failure rate: 0–0.07%
Action: Prevents ovulation; secondary effects on cervical mucus and endometrium
Administration: Plastic implant containing synthetic progestogen inserted under skin of upper arm
Clinical role: Those requiring long-term contraception; those willing to accept cycle disruption; those with contraindications to oestrogen
Adverse effects: Irregular bleeding; hormonal side effects
Advantages: Long acting; effective; quickly reversible; few side effects

Progestogen-bearing IUD[2] (Mirena [Schering])
Active ingredient: Levonorgestrel
Failure rate: 0.2%
Action: Prevents fertilisation and implantation
Administration: Device inserted into uterus (effective for 5 years)
Clinical role: Those requiring long-term contraception; those with heavy or painful menstrual periods; those physically suitable for IUD insertion
Adverse effects: Menstrual irregularity; systemic side effects (rare); insertion complications
Advantages: Effective; long acting; secondary beneficial effects on menstrual cycle; rapidly reversible on removal

Progestogen-only emergency contraception[3] (Postinor-2 [Schering])
Active ingredient: Levonorgestrel
Failure rate: 1%–4%
Action: Delays ovulation; prevents implantation
Administration: 2 progestogen tablets taken either together or at a 12-hour interval, within 72 hours of unprotected sex
Clinical role: After unprotected sexual intercourse
Adverse effects: Irregular bleeding; possible increase in risk of ectopic pregnancy if method fails
Advantages: Effective; few side effects

Combined pills containing cyproterone acetate[4] (Brenda 35-ED [Alphapharm]), Diane 35-ED, Juliet 35-ED [Schering])
Active ingredients: Ethinyloestradiol, cyproterone acetate
Failure rate: 1%–3%
Action: Prevents ovulation; antiandrogenic effect
Administration: Daily pill
Clinical role: Contraception; those with androgenic symptoms (hirsutism, acne)
Adverse effects: As for all COCPs (hormonal side effects; thromboembolism risk; increased risk of breast cancer)
Advantages: As for all COCPs plus antiandrogenic effect

Combined pills containing drospirenone[5] (Yasmin [Schering])
Active ingredients: Ethinyloestradiol, drospirenone
Failure rate: 1%–3%
Action: Prevents ovulation; antiandrogenic effect; mild diuretic effect
Administration: Daily pill
Clinical role: Contraception; those with androgenic symptoms; those with symptoms of fluid retention or premenstrual syndrome
Adverse effects: As for all COCPs
Advantages: As for all COCPs plus antiandrogenic effect and mild diuretic effect

Laparoscopic female sterilisation[6] (Essure pbc [Conceptus])
Failure rate: 0.6%
Action: Physical blockage of the Fallopian tubes prevents fertilisation
Administration: Fallopian tubes blocked by insertion of titanium microinsert
Clinical role: Contraception for those who have completed childbearing
Adverse effects: Not reversible; infection; bleeding
Advantages: Effective; permanent

Methods not yet available in Australia

Combined injection[7] (Lunelle [Pharmacia])
Active ingredients: Oestradiol, medroxyprogesterone acetate
Failure rate: 0.1%–1%
Action: Prevents ovulation
Administration: Injection every 30 ± 3 days
Clinical role: Those who are suitable to use COCPs but dislike daily pill taking
Adverse effects: As for all COCPs
Advantages: Effective; menstrual bleeding usually regular and light; quickly reversible; less ovarian and endometrial cancer

Combined transdermal patch[8] (Ortho Evra [Ortho–McNeil])
Active ingredients: Ethinyloestradiol, norelgestromin
Failure rate: 1%–3%
Action: Prevents ovulation
Administration: Weekly skin patch for 3 weeks then 1 week off
Clinical role: Those who are suitable to use COCPs but dislike daily pill taking
Adverse effects: As for all COCPs
Advantages: Effective; menstrual bleeding usually regular and light; quickly reversible; less ovarian and endometrial cancer

Combined vaginal ring[9] (NuvaRing [Organon])
Active ingredients: Ethinyloestradiol, etonogestrel
Failure rate: 1%–3%
Action: Prevents ovulation
Administration: Plastic ring containing hormones placed within vagina for 3 weeks then 1 week off
Clinical role: Those who are suitable to use COCPs but dislike daily pill taking
Adverse effects: As for all COCPs
Advantages: Effective; menstrual bleeding usually regular and light; quickly reversible; less ovarian and endometrial cancer

Desogestrel progestogen-only pill[10] (Cerazette [Organon])
Active ingredient: Desogestrel
Failure rate: 1%–3%
Action: Prevents ovulation; secondary effects on cervical mucus and endometrium
Administration: Daily pill
Clinical role: Those who cannot use oestrogen-containing preparations but prefer oral contraception
Adverse effects: Hormonal side effects (rare); irregular bleeding
Advantages: Effective; low rate of side effects

IUD = intrauterine device. COCP = combined oral contraceptive pill.

available in several countries, with trials investigating the potential for self-injection systems. Transdermal patches need only be applied weekly, and combined vaginal rings three-weekly, to provide high contraceptive efficacy. These are likely to be available in Australia in the near future.

Emergency contraception. The availability of emergency contraception is an important issue for younger women in particular. The first commercially packaged emergency contraceptive, Postinor-2 (Schering P/L), was recently made available in Australia, eliminating the need for clinicians to make up the appropriate effective hormonal dose from conventional contraceptive pills. The progestogen-only (levonorgestrel) regimen in Postinor-2 is more effective and has fewer side effects than the combined (Yuzpe) regimen used since the 1980s.[3]

A recent study showed that progestogen-only emergency contraception retains some effectiveness up to 120 hours after unprotected intercourse.[21] This study also indicated that a single 1.5 mg dose of levonorgestrel (ie, two Postinor-2 tablets taken at once) is more effective than the previously advised divided dose, and this regimen is likely to be recommended in the future.

However, as the progestogen-only regimen, like the Yuzpe regimen, is more effective the earlier it is begun after unprotected sex, there is a need for ready access to this preparation.[3] There appear to be no significant contraindications to use of progestogen-only emergency contraception. Its rescheduling as a pharmacist-supplied item — as is the case in over 80 countries — is currently being considered in Australia.

The 20s to 40s

Planning pregnancy

If pregnancy is desired in the short term, the method of contraception should be rapidly reversible. This usually precludes injectable progestogens, which are associated with a prolonged and unpredictable return to fertility. Apart from the methods traditionally recommended for this group, such as the oral contraceptive pill, intrauterine devices, barrier methods and fertility awareness, a number of newer rapidly reversible alternatives should be considered:

Long-acting progestogen-only methods. Although progestogen implants and the progestogen intrauterine system may both be used long-term, they are rapidly reversible, with normal fertility levels restored almost immediately on their removal.

Alternative delivery systems for combined contraception. The time taken to achieve normal fertility levels on ceasing use of transdermal patches, vaginal rings and injections appears comparable to that seen after use of oral contraceptives.

Breastfeeding and family spacing

It is perhaps not widely recognised that a consensus statement by the World Health Organization in Bellagio, Italy, in 1988[22] confirmed that lactation alone can be regarded as an effective contraceptive method (2% failure rate) in the first six months postpartum provided the baby is fully breastfed, and menses have not yet commenced.

The combined oral contraceptive pill is contraindicated while breastfeeding as it can suppress lactation. Irregular cycles postpartum may make fertility awareness methods more difficult, and pelvic floor laxity may make female barrier contraception problematic. Traditionally, male condoms, the progestogen-only oral contraceptive pill, DMPA and copper intrauterine devices (IUDs) have been recommended during lactation. The use of copper IUDs is limited by their tendency to cause heavier menstrual bleeding and dysmenorrhoea. New methods to be considered include:

Frameless intrauterine devices. These comprise a number of copper cylinders on a string secured to the uterine fundus. They have been available in Europe and the United Kingdom since 1994, but are not available in Australia. These devices have a lower rate of expulsion than conventional copper IUDs and are said to cause less menstrual pain and bleeding.

Long-acting progestogen-only methods. Progestogen implants and the progestogen-bearing intrauterine system could be considered during lactation and beyond. A frameless version of the progestogen-bearing intrauterine system is in development. These methods provide very effective contraception and do not suppress lactation or affect the quality of the breast milk, although the infant ingests small quantities of hormone.

When no further pregnancies are desired

If a woman is certain that she wants no further children then she or her partner may opt for a sterilisation procedure. Data from the National Health Surveys carried out by the Australian Bureau of Statistics in 2001 indicated that 9% of women and 11% of men in Australia had used sterilisation as their method of contraception.[23] This comparatively low rate may reflect the fact that women are having children later in life, reducing the length of time between the last pregnancy and menopause.

In the past, women who had completed their families but were unwilling to consider permanent contraception have used either the oral contraceptive pill or the copper IUD. New options that will increasingly be the methods of choice in this group include:

Long-acting progestogen-only methods. The absence of oestrogen from progestogen implants and the progestogen-bearing intrauterine system increases the safety of these methods in the older age group. The progestogen-bearing intrauterine system also reduces menstrual loss, a potential advantage in older women who more commonly have heavy menstrual bleeding.

Less invasive sterilisation procedures. As hysteroscopic female sterilisation can usually be performed under local anaesthesia, recovery time is shorter than with conventional surgical female sterilisation. Minimally invasive vasectomy procedures with smaller incisions and techniques such as the "no-scalpel" technique allow most vasectomies to be

2: The contraceptive continuum (adapted from Guillebaud[13])

Less potential for side effects		More potential for side effects
Withdrawal (coitus interruptus)	Female barriers	Injectable contraception
Natural methods	Condoms	Contraceptive implants
Spermicides alone		Intrauterine devices and systems
		Oral contraceptive pills, patches and rings
Less effective		**More effective**

performed as outpatient procedures, with fewer complications.

The older and perimenopausal woman

Present recommendations are that, to reliably prevent pregnancy, women should continue to use contraception until 12 months after the last menstrual period.[13] Traditionally, women in this age group who have not had a sterilisation procedure have been directed towards less effective contraceptive methods because of their decreased background fertility. However, it should be noted that women over the age of 35 years represented 12% of all women presenting for abortion in a survey of Australian private termination clinics in 1995.[24] Contraceptive options in this group include:

Combined oral contraceptive pills. These have the advantage of controlling the dysfunctional uterine bleeding common in this age group and effectively control hot flushes, particularly when used continuously. Oral contraceptive pills are safe to use in women up to the age of menopause provided they have no risk factors for cardiovascular disease,[25] but the increasing risk of thromboembolic events with age means that preparations with the lowest oestrogen content are preferable. In Australia at present, this means 20 μg ethinyloestradiol, although pills containing 15 μg and vaginal rings (which provide a 15 μg equivalent) are likely to be available in the very near future.

Long-acting progestogen-only methods. Methods such as DMPA and progestogen implants are safe to use in older women and tend to reduce uterine bleeding, although the pattern of bleeding may be more irregular. However, they do not ameliorate vasomotor symptoms, and there are no studies as yet on their use as the progestogen component of hormone replacement therapy.

Intrauterine devices. Copper IUDs have long been recommended as a contraceptive for older women, as the rate of complications such as infection and expulsion decreases with age. However, copper IUDs tend to worsen pre-existing bleeding problems. This is not the case with the newer progestogen-bearing IUD, which is likely to be increasingly recommended as the contraceptive of choice in this age group, especially as it is now listed on the Pharmaceutical Benefits Scheme. It not only provides excellent contraception and reduces the incidence of bleeding problems, but can also be used as the progestogen component of hormone replacement therapy after menopause.

Contraceptive directions for the future

The range of available contraceptive options has increased markedly over the past 20 years, and is likely to continue to do so as consumers and pharmaceutical companies continue to seek safer, more effective contraception. A progestogen-only pill that reliably suppresses ovulation and is as effective as the combined contraceptive pill is already available in some countries.[10] Studies, as yet unpublished, are presently investigating the use of natural oestrogens and progestogens closer in structure to natural progesterone in place of the synthetic hormones in use for over 40 years.

Perhaps the area of most interest is that of alternative hormonal delivery systems, such as vaginal rings, transdermal patches and creams, new implants and intrauterine systems, which offer not only greater convenience but also the potential to provide effective contraception at lower and more constant plasma hormone levels.

Another developing area is male hormonal contraception. While a male "Pill" is probably some way off, there are already effective male hormonal contraceptive regimens that use progestogens (oral, injected or implanted) plus add-back testosterone in the form of a subdermal implant.[26]

Antiprogestins, which interfere with implantation of a fertilised embryo, have been studied in primates and offer the possibility of "once-a-month" contraception.[27,28] There has been interest in the development of a reversible, tissue-specific vaccine against human chorionic gonadotrophin

3: Facilitating contraceptive choice

Accurate information should be provided on different methods of contraception:
Effectiveness of the method
Mode of action
Suitability for individual needs
Risks and benefits
Mode of use
Additional factors to be considered include:
Medical history
Duration and nature of the sexual relationship
Frequency of intercourse
When (or whether) pregnancy or breastfeeding are desired
Past contraceptive failure
Effect on menstrual pattern
Financial cost
Personal, religious and ethical beliefs of self and partner
Introduction of a new contraceptive method

and therefore against pregnancy. This has the potential to provide very effective, long-acting contraception.[29]

Research is also continuing into increasing the effectiveness and other benefits of non-hormonal methods. Computerised devices and improved bioassays can be used to detect approaching ovulation more accurately in those using fertility awareness methods.[30] It may also be possible in the future to increase the ability of barrier methods to protect against sexually transmitted infections by impregnating these with effective, safe microbicides.

Contraceptive choices of the future are likely to be limited only by the diversity of those requiring contraception and the responsiveness of those charged with developing new methods.

Competing interests

Terri Foran is the Medical Director of FPA Health (formerly Family Planning New South Wales). She has been involved in developing educational material and consumer product information for several pharmaceutical companies. FPA Health has a research function that is actively involved in clinical trials of new contraceptive methods.

References

1. Archer D, Kovacs L, Landgren BM, editors. Implanon, a new single rod contraceptive implant; presentation of the clinical data. *Contraception* 1998; 58 Suppl: 75S-115S.
2. Luukkainen T. Levonorgestrel-releasing intrauterine device. *Ann New York Acad Sci* 1991; 626: 43-49.
3. World Health Organization Task Force on Post-Ovulatory Methods of Fertility Regulation. Randomised controlled trial of levonorgestrel versus the Yuzpe regimen of combined oral contraceptives for emergency contraception. *Lancet* 1998; 352: 428-433.
4. Sahin Y, Bayram F, Kelestimur F, Muderris I. Comparison of cyproterone acetate plus ethinyl estradiol and finasteride in the treatment of hirsutism. *J Endocrinol Invest* 1998; 21: 348-352.
5. Huber J, Foidart JM, Wuttke W, et al. Efficacy and tolerability of a monophasic oral contraceptive containing ethinylestradiol and drospirenone. *Eur J Contracept Reprod Health Care* 2000; 5: 25-34.
6. Kerin JF, Carigan CS, Cher D. The safety and effectiveness of a new hysteroscopic method for permanent birth control: results of the first Essure pbc clinical study. *Aust N Z J Obstet Gynaecol* 2001; 41: 364-370.
7. Kaunitz AM. Lunelle monthly injectable contraceptive. An effective, safe, and convenient new birth control option. *Arch Gynaecol Obstet* 2001; 265: 119-123.
8. Burkman RT. The transdermal contraceptive patch: a new approach to hormonal contraception. *Int J Fertil Womens Med* 2002; 47: 69-76.
9. Roumen FJME, Apter D, Mulders TMT, Dieben TOM. Efficacy, tolerability and acceptability of a novel contraceptive vaginal ring releasing etonogestrel and ethinylestradiol. *Hum Reprod* 2001; 16: 469-475.
10. Collaborative Study Group on the Desogestrel-containing Progestogen-only Pill. A double-blind study comparing the contraceptive efficacy, acceptability and safety of two progestogen-only pills containing desogestrel 75mcg/day or levonorgestrel 30mcg/day. *Eur J Contracept Reproduct Health Care* 1998; 3: 169-178.
11. Walsh J, Lythgoe H, Peckham S. Contraceptive choices: supporting effective use of methods. London: The Family Planning Association, 1996.
12. Oddens B, Visser A, Vermer H, et al. Contraceptive use and attitudes in Great Britain. *Contraception* 1994; 49: 73-78.
13. Guillebaud J. Contraception: your questions answered. 3rd ed. London: Churchill Livingstone, 1999.
14. Dunne M, Donald M, Lucke J, et al. 1992 HIV risk and sexual behaviour survey in Australian secondary schools: final report. Canberra: Australian Government Publishing Service, 1993.
15. Lindsay J, Smith A, Rosenthal D. Secondary students, HIV/AIDS and sexual health 1997. Carlton: La Trobe University, Centre for the Study of Sexually Transmitted Diseases, 1998.
16. Condon JT, Corkindale CJ. Teenage pregnancy: trends and consequences. *Curr Ther* 2002; 43: 25-31.
17. Social and behavioural determinants of the epidemiology of STDs: industrialised and developing countries. In: Holmes KK, Sparling PF, Mardh P, et al, editors. Sexually transmitted diseases. 3rd ed. New York: McGraw Hill, 1999.
18. Bryson L, Strazzari S, Brown W. Shaping families. Women control and contraception. *Family Matters (Australian Institute of Family Studies)* 1999; 53 Winter: 31-38.
19. Adams Hillard PJ. Oral contraception non-compliance: the extent of the problem. *Adv Contracept* 1992; 8 Suppl 1: 13-20.
20. Davis AJ. The role of hormonal contraception in adolescents. *Am J Obstet Gynecol* 1994; 170: 1581-1584.
21. Von Hertzen H, Piaggio G, Ding J, et al. Low dose mifepristone and two regimes of levonorgestrel for emergency contraception: a WHO multicentre randomised trial. *Lancet* 2002; 360: 1803-1810.
22. Kennedy KI, Rivera R, McNeilly AS. Consensus statement on the use of breastfeeding as a family planning method. Bellagio 1998. *Contraception* 1989; 39: 477-496.
23. Australian Bureau of Statistics. National Health Survey 2001: summary of results. Canberra: Australian Bureau of Statistics, 2002. (Cat. no. 4364.0.)
24. Weisberg E. Postcoital emergency contraception. Master of Medicine Thesis, University of Sydney, Sydney, New South Wales 1995.
25. Croft P, Hannaford PC. Risk factors for acute myocardial infarction in women: evidence from the Royal College of General Practitioners' oral contraceptive study. *BMJ* 1989; 298: 165-168.
26. Martin CW, Riley SC, Everington D, et al. Dose-finding study of oral desogestrel with testosterone pellets for suppression of the pituitary-testicular axis in normal men. *Hum Reprod 2000*; 15: 1515-1524.
27. Gemzell-Danielsson K, Swahn M-L, Svalander P, et al. Early luteal phase treatment with mifepristone (RU486) for fertility regulation. *Hum Reprod* 1993; 8: 870-873.
28. Swahn M-L, Bygdeman M, Chen GK, et al. Once a month treatment with a combination of mifepristone and a prostaglandin analogue misoprostol. *Hum Reprod* 1999; 14: 485-488.
29. Herr JC. Immunocontraceptive approaches. In: Harrison PF, Rosenfield A, editors. Contraceptive research and development. Washington, DC: National Academy Press, 1996: 401-429.
30. Trussell J. Measuring the contraceptive efficacy of Persona. *Contraception* 2001; 63: 77-79.

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