

## Contraception in Canada: a review of method choices, characteristics, adherence and approaches to counselling

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### ABSTRACT

Contraception is a significant concern for Canadian women of child-bearing age, their partners and their health care providers. In this narrative review we provide information on current trends and recent changes in Canadians' choices of contraceptive methods. We review the characteristics of contraceptive methods available in Canada, with an emphasis on hormonal methods and newer options such as the transdermal contraceptive patch, the vaginal contraceptive ring and the levonorgestrel-releasing intrauterine system. We also discuss adherence to contraception as well as approaches to counselling to promote adherence and to reduce the risk of sexually transmitted infections in the context of contraception.

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Contraception is a significant concern for Canadian women of child-bearing age, their partners and their health care providers.<sup>1-9</sup> In this narrative review we provide information on Canadians' contraceptive choices and on the characteristics of major contraceptive methods, including several newer methods. We also discuss adherence to contraception and approaches to counselling to promote adherence and to reduce the risk of sexually transmitted infections in the context of contraception.

### Trends in use

Canadian Contraception Studies,<sup>4-9</sup> conducted in 1993, 1995, 1998 and 2002 with nationally representative samples of women, have provided information about Canadians' choices of contraceptive methods. According to the 2002 report, among respondents aged 15-44 years, oral contraception, condoms and sterilization were the contraceptive methods of choice. Oral contraception and condoms were the predominant methods reported by unmarried women aged 15-17. Sterilization was the predominant method among married couples aged 35-44, with male sterilization more than twice as common as female sterilization.

The Canadian Contraception Studies<sup>8,9</sup> also explored reasons for Canadians' choices of contraceptive methods. Respondents who used oral contraception reported choosing this method on the basis of its effectiveness, ease of use and recommendation by their health care provider. Those who

used condoms reported choosing this method because of its lack of side effects, ease of use, use only when needed and effectiveness. Only 7% of the condom users indicated that they chose this method primarily for protection against sexually transmitted infections. Findings from these surveys<sup>8,9</sup> also indicate that the majority of respondents currently using contraception were satisfied with their chosen method.

Because similar survey questions and sampling approaches were used for every Canadian Contraception Study,<sup>4-9</sup> we are able to describe trends in the choice of contraceptive methods from 1993 to 2002 among Canadians aged 15-44 years. Use of oral contraceptives was steady during this period (27% in 1993, 28% in 2002) and remained the most commonly chosen method of reversible contraception. Condom use steadily declined, from a peak of 25% in 1995 to a decade low of 18% in 2002. This decline in condom use was paralleled by recent increases in gonorrhea and syphilis,<sup>10</sup> and in HIV infection among women.<sup>11</sup> Contributing factors may have included "safer sex fatigue" and the belief that HIV infection is now a manageable disease,<sup>12</sup> the fact that condom use can stop following prescription of oral contraceptives<sup>13</sup> and the fact that condom use is uncommon within what individuals perceive to be a relationship.<sup>14</sup> The frequency of male sterilization remained constant (14% in 1993, 13% in 2002); however, female sterilization experienced the most dramatic drop in prevalence of any contraceptive method during this time (16% in 1993, 7% in 2002). Use of intrauterine devices remained very low (1% in 1993, 1% in 2002). These findings of the predominance of oral contraception, condoms and sterilization reflect the narrow range of contraceptive method choices made by Canadians.

### Contraceptive options

A number of contraceptive options are available to Canadians (Table 1). Hormonal contraception, intrauterine devices and systems, and emergency contraception are addressed in more detail in the following section. Health care providers should work with their patients to determine which method would be most appropriate for each individual, acknowledging both medical issues and issues of adherence and safer sex.

### Combined hormonal contraception

Combined hormonal methods contain estrogen and progestin and include oral contraceptives, the transdermal contraceptive patch and the vaginal contraceptive ring.

## Oral contraception

Oral contraceptives are highly effective and may be considered, in the absence of contraindications (Box 1), for women seeking a reliable, reversible method of contraception. They also have a number of noncontraceptive benefits that may make them a desirable option.<sup>2</sup> Side effects are usually minor and diminish after the first 3 cycles of use.<sup>16</sup> Studies have not shown an association between use of a low-dose oral contraceptive (20–35 µg ethinyl estradiol per day) and weight gain<sup>22</sup> or mood changes.<sup>43</sup> Risks associated with oral contraceptive use include venous thromboembolism (3- to 4-fold increased risk compared with nonuse).<sup>17,18</sup> A significant pharmacokinetic interaction between oral contraceptives and antibiotics other than rifampin and griseofulvin has not been found.<sup>2</sup>

Traditional methods to start taking oral contraceptives (e.g., first-day start [on the first day of menses] or Sunday start) may be used. The “quick-start” method, whereby the woman takes her first pill on the day of her office visit, provided she is not pregnant, may also be used. A back-up method of contraception is required for the first 7 days. The quick-start method has been found to increase adherence, with no associated increase in breakthrough bleeding or other side effects.<sup>44,45</sup> A pelvic examination is not a prerequisite to providing hormonal contraception.<sup>2,46</sup>

Women may choose to take oral contraception in an extended or continuous fashion, with no 7-day pill-free interval. Continuous use for several cycles without periodic withdrawal bleeding may be considered for women who have symptoms during the pill-free interval (e.g., pelvic pain, headaches, menstrual migraines) or who have dysmenorrhea or menorrhagia. Breakthrough bleeding with extended or continuous regimens typically decreases with time.<sup>47</sup> Women who have breakthrough bleeding while taking an extended regimen may manage this by continuing to take the pill or they may stop the pill for 3–7 days and then resume taking it.<sup>48</sup> At no time should the pill-free interval exceed 7 days. The longest follow-up study of an extended or continuous regimen included 189 women in an open-label observational study in which all patients received an extended 91-day cycle regimen for 2 years.<sup>49</sup> A Cochrane review of 6 randomized controlled trials concluded that continuous and traditional regimens had similar rates of bleeding, discontinuation and reported satisfaction; however, the included trials were too small to address efficacy, rare adverse events and long-term safety.<sup>50</sup> Although continuous or extended regimens appear to be a reasonable approach to oral contraception and may in some cases be beneficial, health care providers should inform their patients of the limited evidence regarding long-term risks of therapy.

## Transdermal contraceptive patch

The transdermal contraceptive patch (Evra) is an effective method of reversible contraception whose mechanism of action is similar to that of oral contraceptives (Table 1). The patch's once-a-week dosing schedule may help with adherence.<sup>2</sup> Limited evidence suggests that the effectiveness of the patch may decline for women weighing 90 kg or more.<sup>23</sup> Pending further evidence, contraindications for using the patch are the same as

those for oral contraceptives. No studies have examined whether avoidance of the first-pass effect of hormones on the liver with use of the patch lessens concerns about drug interactions or about use of the patch for women with liver conditions. Studies have shown increased serum total cholesterol and triglyceride levels in both patch and oral contraceptive users;<sup>23</sup> however, the increases are typically not clinically significant.

Side effects and risks associated with use of the contraceptive patch are similar to those experienced by oral contraceptive users. Although patch users have been reported to have significantly higher rates of spotting in cycles 1 and 2, cycle control is otherwise comparable to that with oral contraceptives.<sup>23</sup> Breast symptoms and headache are the most common side effects reported by patch users, with rates of breast symptoms in the first 2 cycles being higher among patch users than among oral contraceptive users.<sup>23</sup> Local reactions at the application site may occur in up to 20% of patients, but only 2% of users have reportedly discontinued use of the patch for this reason.<sup>23</sup>

Concerns have been raised that the contraceptive patch exposes users to more estrogen than a 35-µg oral contraceptive pill and thus may theoretically increase the risk of estrogen-related adverse events. Users of the patch are exposed to 60% more estrogen overall than oral contraceptive users, but the peak blood level of ethinyl estradiol is higher with the oral contraceptive than with the patch.<sup>51</sup> It is unknown whether this additional estrogen exposure causes additional harm, such as blood clots. The Canadian version of the patch contains less ethinyl estradiol than the version sold in the United States (0.60 mg v. 0.75 mg), and the total estrogen exposure with the Canadian version appears to be closer to that of a 35-µg pill.<sup>52</sup>

When initiating the patch, the first-day start method (first day of menses) is recommended, although the quick-start method (at the physician's office) can also be used. A new patch is applied weekly for 3 weeks on the “patch change day,” and a fourth week is patch-free, during which withdrawal bleeding occurs. The patch has also been used continuously, with no patch-free week, with high rates of patient satisfaction.<sup>53</sup>

Patch detachment is uncommon. Should the patch become detached for less than 24 hours, the woman should attempt to reapply it and, if unsuccessful, apply a new patch. If detachment has occurred for more than 24 hours, a new patch should be applied and back-up contraception should be used for 7 days. If the woman is late in changing her patch by less than 48 hours, she should change it immediately. If she waits more than 48 hours, a new 4-week cycle should be started by applying a new patch and back-up contraception should be used for 7 days.

## Vaginal contraceptive ring

The vaginal contraceptive ring (NuvaRing) is a 54-mm ring made of an ethylene vinyl acetate copolymer that releases a constant dose of 15 µg of ethinyl estradiol and 0.120 mg of etonorgestrel per day (Table 1). Hormone levels needed to suppress ovulation are achieved within the first day of use. Each ring is used for 1 cycle and then removed. A cycle consists of 3 weeks of continuous use of the ring followed by a 1-week ring-free interval of no longer than 7 days. Extended or continuous use of the ring (less frequent or no ring-free inter-

**Table 1:** Characteristics, effectiveness, advantages, side effects and risks of selected methods of contraception<sup>1-3,15</sup>

Method	Characteristics	Effectiveness <sup>15</sup>	Advantages	Side effects and risks	Comments
<b>Combined estrogen-progestin contraception</b>					
Oral contraceptive pill	<ul style="list-style-type: none"> <li>• Mechanism of action: inhibition of ovulation; endometrial effects; cervical mucus effects; tubal peristalsis<sup>15</sup></li> <li>• 1 pill daily: cyclically or continuously</li> <li>• Initiation: first-day start (on first day of menses), Sunday start or “quick start” (at doctor’s office)</li> </ul>	Perfect use: 99.7% Typical use: 92%	<ul style="list-style-type: none"> <li>• Effective and reversible</li> <li>• Noncontraceptive benefits:<sup>2</sup> <ul style="list-style-type: none"> <li>- cycle regulation; decreased menstrual flow; decreased dysmenorrhea</li> <li>- increased bone density</li> <li>- fewer perimenopausal symptoms</li> <li>- less acne and hirsutism</li> <li>- decreased risk of ovarian, endometrial and possibly colorectal cancer; fewer ovarian cysts; decreased incidence or severity of premenstrual symptoms</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Side effects:<sup>16</sup> irregular bleeding or spotting; breast tenderness; nausea; headache</li> <li>• Risks:               <ul style="list-style-type: none"> <li>- risk of venous thromboembolism: increased 3- to 4-fold; absolute risk is 1 to 1.5 events per 10 000 users per year of use; risk highest in first year of use<sup>17,18</sup></li> <li>- no increased risk of myocardial infarction, cerebrovascular accident or gallbladder disease in healthy women<sup>2</sup></li> <li>- Risk of breast cancer is increased only slightly<sup>19</sup> if at all<sup>20,21</sup></li> </ul> </li> </ul>	Not associated with weight gain <sup>22</sup> Pill-free intervals not necessary No limit to duration of use in healthy women Final height of adolescent users not affected Future fertility not affected May be used by healthy, nonsmoking women over age 35 Not teratogenic
Transdermal contraceptive patch	<ul style="list-style-type: none"> <li>• Contains ethinyl estradiol and norelgestromin</li> <li>• Mechanism of action: same as that of oral contraceptive</li> <li>• 1 patch weekly: cyclically (1 patch weekly for 3 weeks, then 1 patch-free week) or continuously</li> </ul>	Perfect use: 99.7% Typical use: 92%	<ul style="list-style-type: none"> <li>• Effective and reversible</li> <li>• Once-a-week dosing schedule</li> <li>• 48-hour “window of forgiveness”</li> <li>• Noncontraceptive benefits similar to those of oral contraceptive</li> </ul>	<ul style="list-style-type: none"> <li>• Side effects: similar to those of oral contraceptives; local skin irritation in 20%<sup>23</sup></li> <li>• Patch detachment (uncommon)</li> <li>• Risks: similar to those of oral contraceptive; possibly increased risk of venous thromboembolism</li> </ul>	May be less effective in women weighing > 90 kg <sup>23</sup> Higher overall estrogen dose, but lower peak levels, than with oral contraceptive Effect of avoiding first-pass metabolism in liver uncertain
Vaginal contraceptive ring	<ul style="list-style-type: none"> <li>• Contains ethinyl estradiol and etonorgestrel</li> <li>• Mechanism of action: same as that of oral contraceptive</li> <li>• 1 ring monthly: cyclically (1 ring for 21 days, then 7-day ring-free interval) or continuously</li> </ul>	Perfect use: 99.7% Typical use: 92%	<ul style="list-style-type: none"> <li>• Effective and reversible</li> <li>• Once-a-month dosing schedule</li> <li>• 1-week “window of forgiveness”</li> <li>• Noncontraceptive benefits similar to those of oral contraceptive</li> </ul>	<ul style="list-style-type: none"> <li>• Side effects: similar to those of oral contraceptive. Ring-specific side effects:<sup>24</sup> vaginitis (5.6%), leukorrhea (4.6%), vaginal discomfort (2.4%)</li> <li>• Expulsion (uncommon)</li> <li>• Uterovaginal prolapse or vaginal stenosis are relative contraindications</li> <li>• Risks: similar safety profile as that of oral contraceptive</li> </ul>	Vaginal spermicides and antifungals have no effect on ring efficacy <sup>25</sup> Use does not worsen low-grade squamous intraepithelial lesions <sup>26</sup> Effect of avoiding first-pass metabolism in liver uncertain
<b>Progestin-only contraception</b>					
Progestin-only pill	<ul style="list-style-type: none"> <li>• Contains norethindrone</li> <li>• Mechanism of action: cervical mucus changes; impaired sperm motility; possible inhibition of ovulation</li> <li>• 1 pill daily: no pill-free interval; must be taken at same time every day (back-up method of contraception required if &gt; 27 hours between pills)</li> </ul>	Perfect use: 99.7% Typical use: 92%	<ul style="list-style-type: none"> <li>• Effective and reversible</li> <li>• Can be taken by women with contraindications to estrogen</li> </ul>	<ul style="list-style-type: none"> <li>• Side effects: irregular bleeding; headache; bloating; acne; breast tenderness</li> <li>• Risks: no apparent increased risk of venous thromboembolism or cerebrovascular accident</li> </ul>	Although often used by breast-feeding women, it may be used by any woman seeking reliable, reversible contraception

*continued on next page*

Table 1 continued

Method	Characteristics	Effectiveness <sup>15</sup>	Advantages	Side effects and risks	Comments
Depot medroxy-progesterone acetate (DMPA)	<ul style="list-style-type: none"> <li>Contains medroxyprogesterone acetate</li> <li>Mechanism of action: suppresses ovulation; cervical mucus changes; endometrial effects</li> <li>1 injection (150 mg) intramuscularly every 12-13 weeks</li> </ul>	<p>Perfect use: 99.7%</p> <p>Typical use: 97%</p>	<ul style="list-style-type: none"> <li>Effective and reversible</li> <li>Infrequent dosing (only 4 times per year)</li> <li>Can be used by women with contraindications to estrogen</li> <li>Amenorrhea occurs in 55%-60% of users at 12 months</li> <li>Noncontraceptive benefits: amenorrhea, and thus less dysmenorrhea and anemia; decreased risk of endometrial cancer; fewer symptoms from endometriosis, premenstrual syndrome and chronic pelvic pain; fewer seizures; possible decreased risk of pelvic inflammatory disease; possible decreased risk of sickle-cell crises</li> <li>Only 2 known drug interactions: aminoglutethimide and nevirapine</li> </ul>	<ul style="list-style-type: none"> <li>Side effects: menstrual irregularities; hormonal side effects: headache, decreased libido, nausea, breast tenderness; weight gain (mean 2.5 kg in first year); mood effects (not proven in prospective studies)</li> <li>Risks: delayed return of fertility; no increased risk of venous thromboembolism or cerebrovascular accident; decreased bone mineral density<sup>27-34</sup></li> </ul>	<p>Effect on bone mineral density (see text). Not teratogenic if given in pregnancy</p> <p>If woman is late for an injection:<sup>2</sup></p> <ul style="list-style-type: none"> <li>&lt; 14 weeks: Give injection. No back-up contraception required</li> <li>≥ 14 weeks: Give injection. Back-up contraception required for 2 weeks, followed by pregnancy test if sexually active</li> </ul> <p>Management of bleeding:<sup>2</sup></p> <ul style="list-style-type: none"> <li>Nonsteroidal anti-inflammatory drug</li> <li>Increasing DMPA dose</li> <li>Decreasing dosing interval</li> <li>Supplemental estrogen therapy</li> <li>Addition of oral contraceptive for 1-3 months</li> </ul>
<b>Intrauterine device/system</b>					
Copper intrauterine device (IUD)	<ul style="list-style-type: none"> <li>Contains copper wire on a vertical stem</li> <li>Multiple mechanisms of action; primary mechanism is prevention of fertilization<sup>35</sup></li> <li>Duration of effectiveness is 5 years<sup>36</sup></li> </ul>	<p>Typical use: 99.4%</p> <p>Perfect use: 99.2%</p>	<ul style="list-style-type: none"> <li>Effective and reversible</li> <li>Can be used by women with contraindications to estrogen</li> <li>May decrease risk of endometrial cancer<sup>37</sup></li> <li>Can be used for emergency contraception up to 7 days after unprotected intercourse<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Side effects: bleeding irregularities or changes; increased menstrual flow; pain or dysmenorrhea</li> <li>Risks: perforation at time of insertion (rare); increased risk of infection in first 20 days after insertion;<sup>38,39</sup> expulsion (up to 5% of cases);<sup>36</sup> does not increase risk of ectopic pregnancy overall, but if pregnancy occurs with IUD in situ, ectopic pregnancy must be ruled out</li> </ul>	<p>It does not increase the risk of infertility and can be used by nulliparous women<sup>40</sup></p> <p>After the first 20 days after insertion, there is no increased risk of pelvic inflammatory disease</p>
Hormonal intrauterine system	<ul style="list-style-type: none"> <li>Contains levonorgestrel on a vertical stem released in continuous fashion</li> <li>Mechanism of action: same as for copper IUD; changes in cervical mucus</li> <li>Duration of effectiveness is 5 years</li> </ul>	<p>Perfect use: 99.9%</p> <p>Typical use: 99.9%</p>	<ul style="list-style-type: none"> <li>Effective and reversible</li> <li>Can be used by women with contraindications to estrogen</li> <li>Decreased menorrhagia; some users experience amenorrhea</li> <li>Decreased dysmenorrhea</li> <li>May protect against endometrial hyperplasia<sup>41</sup></li> </ul>	<ul style="list-style-type: none"> <li>Side effects: bleeding irregularities; hormonal side effects despite low levels of systemic hormones; functional cysts</li> <li>Risks: same as for copper IUD</li> </ul>	<p>Same as for copper IUD</p>



Table 1 continued

Method	Characteristics	Effectiveness <sup>15</sup>	Advantages	Side effects and risks	Comments
<b>Barrier method</b>					
Male condom	<ul style="list-style-type: none"> <li>Latex or non-latex sheath used over the penis during intercourse</li> </ul>	Perfect use: 98% Typical use: 85%	<ul style="list-style-type: none"> <li>Effective if used consistently and correctly</li> <li>No prescription required</li> <li>Protects against many sexually transmitted infections</li> <li>May reduce premature ejaculation</li> </ul>		For women or men with latex allergy, non-latex condoms are available (polyurethane and natural lambskin)  Natural-membrane condoms do not prevent sexually transmitted infections as effectively as other condoms
Female condom	<ul style="list-style-type: none"> <li>Polyurethane sheath inserted into the vagina before intercourse; can be placed up to 8 hours before intercourse</li> </ul>	Perfect use: 95% Typical use: 79%	<ul style="list-style-type: none"> <li>Effective if used consistently and correctly</li> <li>No prescription required</li> <li>Protects against many sexually transmitted infections</li> <li>Female controlled</li> </ul>	<ul style="list-style-type: none"> <li>Can be noisy during intercourse</li> <li>Some users find it difficult to insert</li> <li>The inner ring may cause discomfort during intercourse</li> </ul>	Should not be used at the same time as a male condom
Diaphragm	<ul style="list-style-type: none"> <li>Dome-shaped latex cup (silicone diaphragms also available) that covers the cervix; inserted into the vagina up to 6 hours before intercourse</li> <li>Must be left in the vagina for at least 6 hours, but no more than 24 hours, after intercourse</li> <li>Used with a spermicide</li> <li>Must be fitted by a health care provider</li> </ul>	Perfect use: 94% Typical use: 84%	<ul style="list-style-type: none"> <li>Nonhormonal</li> <li>Some protection against sexually transmitted infections</li> <li>Can be used during menses</li> </ul>	<ul style="list-style-type: none"> <li>Some women find correct insertion difficult</li> <li>Possible sensitivity to latex or spermicide</li> <li>May increase risk of persistent urinary tract infection</li> <li>Does not protect against HIV infection</li> <li>Wearing diaphragm &gt; 24 hours may increase risk of toxic shock syndrome</li> </ul>	Should not be used with oil-based lubricants or medications
Sponge	<ul style="list-style-type: none"> <li>Soft, disposable foam device that is impregnated with spermicide and inserted into the vagina before intercourse</li> <li>Must be left in the vagina for at least 6 hours, but no more than 24 hours, after intercourse</li> </ul>	<i>Nulliparous</i> Perfect use: 91% Typical use: 84%  <i>Parous</i> Perfect use: 80% Typical use: 68%	<ul style="list-style-type: none"> <li>Nonhormonal</li> <li>One size fits all</li> <li>No prescription required</li> </ul>	<ul style="list-style-type: none"> <li>Some women find correct insertion and removal difficult</li> <li>Possible sensitivity to spermicide</li> <li>Should not be used during menstruation</li> <li>May be less effective in multiparous women</li> </ul>	

val) is associated with fewer bleeding days but more spotting days than that associated with the 28-day cycle.<sup>54</sup>

The ring can be considered for women seeking a reliable reversible method of contraception. Its once monthly dosing schedule may cause fewer adherence problems than other methods. Pending further evidence, absolute contraindications are similar to those for oral contraceptives. Uterovaginal prolapse or vaginal stenosis may be considered relative contraindications if they prevent retention of the ring. To date, no studies have examined whether avoidance of the first-pass effect of hormones on the liver with ring use lessens concerns about drug interactions or about ring use among women with

liver conditions. Neither vaginal spermicides nor vaginal miconazole has an effect on ring efficacy.<sup>25</sup>

Hormonal side effects of the vaginal contraceptive ring are similar to those of oral contraceptives. Other side effects specific to the ring include vaginitis (5.6%), leukorrhea (4.6%) and vaginal discomfort (2.4%).<sup>24</sup> According to available evidence, the ring provides a comparable safety profile to that of oral contraceptives with similar hormone formulations. Evidence suggests that the ring does not alter vaginal flora,<sup>26</sup> and limited evidence from studies involving women with low-grade squamous intraepithelial lesions found that use of the ring did not worsen the condition.<sup>26</sup>

Expulsion of the ring is rare. If it occurs and the ring has been out of the vagina for less than 3 hours, the ring should be rinsed in lukewarm water and reinserted. If the ring has been out of the vagina for more than 3 hours, the ring should be rinsed in lukewarm water and reinserted, and a back-up method of contraception should be used for 7 days. If the ring remains in the vagina for more than 3 weeks but less than 4 weeks, it is still effective in preventing pregnancy. It should be removed and a new ring inserted after a 1-week ring-free interval. If the ring has been in place for more than 4 weeks, it may no longer provide adequate protection against pregnancy. Emergency contraception should be considered and a back-up method of contraception used until a new ring has been in place for at least 7 days.<sup>2</sup>

## Progestin-only contraception

Progestin-only contraception is available in Canada in the form of injectable depot medroxyprogesterone acetate (Depo-

Provera) and in oral form (Micronor). The 6-rod implant system (Norplant) is no longer available.

Depot medroxyprogesterone acetate is highly effective and has a number of advantages. It does not contain estrogen, which may make it suitable for women who have absolute or relative contraindications to estrogen use (e.g., those with thrombophilias or who are smokers over the age of 35, those with hypertension and those who experience migraines with associated neurologic symptoms).<sup>2</sup> This injectable form of progestin has also been used to treat menorrhagia, dysmenorrhea, endometriosis and chronic pelvic pain. Women who prefer not to have menses may benefit from the associated amenorrhea, which occurs in 55%–60% of users at 12 months. Depot medroxyprogesterone acetate may also pose fewer adherence problems than other forms of contraception because it is given as an intramuscular injection every 12 to 13 weeks. Frequently reported side effects include menstrual cycle disturbances, headache, weight changes and mood effects.<sup>2</sup> Although depot medroxyprogesterone acetate is a reversible method of contraception, return of fertility may be delayed for 9 months on average.

Strategies for the management of menstrual cycle disturbances include increasing the dose of depot medroxyprogesterone acetate for 2–3 injections, decreasing the dosing interval, prescribing supplemental estrogen therapy for 1 month, administering a nonsteroidal anti-inflammatory drug (ibuprofen 400–800 mg twice daily for 10 days, repeat once if necessary) or prescribing an oral contraceptive for 1–3 months.<sup>2</sup> Women who are late for their injection may still receive their next injection provided that it has been less than 14 weeks since the last one. If it has been 14 or more weeks since the last injection, but the woman has not had intercourse within the last 10 days and her serum pregnancy test result is negative, the injection can be given. She should be advised to use a back-up method of contraception for 2 weeks. If the woman has had intercourse within the last 10 days, the injection can still be given if the pregnancy test result is negative; however, the woman will need to use a back-up method of contraception and have another pregnancy test in 2 weeks.<sup>2</sup> Depot medroxyprogesterone acetate is not teratogenic if given inadvertently during pregnancy.

A potential long-term consideration for users of depot medroxyprogesterone acetate is whether their risk of fracture is increased because of reduced bone mineral density.<sup>27–29</sup> The greatest reduction in bone mineral density occurs during the first 2 years of use of this contraceptive method;<sup>27</sup> however, studies have shown substantial recovery of bone mineral density once use is stopped.<sup>27,30</sup> Interim results from clinical studies prompted the US Food and Drug Administration to issue a “black box warning” for depot medroxyprogesterone acetate in 2004<sup>31</sup> and Health Canada to issue an advisory in 2005.<sup>32</sup> Interim analysis found that adult women who used depot medroxyprogesterone acetate for 5 years had a decrease of 5%–6% in hip and spine bone mineral density. The decline was most pronounced in the first 2 years of use. Partial but not complete recovery of bone mineral density occurred in the 2 years after discontinuation. Changes in bone mineral density associated with use of depot medroxyprogesterone acetate may be particularly important for adolescents, who have not yet attained their peak bone mass. It is unclear whether this loss prevents them from attaining their po-

### Box 1: Absolute contraindications to contraceptive methods<sup>42</sup>

#### Oral contraceptive pill

- < 6 weeks postpartum if breast-feeding
- Hypertension (systolic blood pressure > 160 mm Hg or diastolic > 100 mm Hg)
- Venous thromboembolism (current or past)
- Ischemic heart disease
- History of cerebrovascular accident
- Complicated valvular heart disease
- Migraine headache with focal neurologic symptoms
- Migraine headache without aura in woman over age 35
- Breast cancer (current)
- Diabetes with end-organ involvement
- Severe cirrhosis
- Liver tumour
- Active viral hepatitis
- Woman over age 35 who smokes (> 15 cigarettes/day)
- Known thrombogenic mutation (factor V Leiden; prothrombin mutation; or protein C, protein S or antithrombin III deficiency)

#### Depot medroxyprogesterone acetate

- Breast cancer (current)
- Pregnancy

#### Intrauterine device/system

- Pregnancy
- Current, recurrent or recent (within 3 months) sexually transmitted infection or pelvic inflammatory disease
- Puerperal sepsis
- Immediate post-septic abortion
- Severely distorted uterine cavity
- Unexplained vaginal bleeding
- Cervical or endometrial cancer (awaiting treatment)
- Malignant trophoblastic disease
- Breast cancer (current) – for levonorgestrel-releasing intrauterine system
- Copper allergy – for copper intrauterine device

tential ultimate peak bone mass, or whether it will increase the risk of osteoporosis and fracture later in life.

The critical outcome with regard to bone health is the occurrence of fracture.<sup>33</sup> It is not known whether the loss of bone mineral density due to the use of depot medroxyprogesterone acetate places women at increased risk of postmenopausal fracture. Available data do not support routine bone mineral density testing in users of this form of contraception; however, such testing may be appropriate for users with other significant risk factors for osteoporosis. Women using depot medroxyprogesterone acetate should be counselled on aspects of bone health, including calcium and vitamin D supplementation, weight-bearing exercise, decreased caffeine and alcohol intake, and smoking cessation. Supplemental estrogen therapy may attenuate the negative effects of depot medroxyprogesterone acetate on bone mineral density, but there are insufficient data to recommend its routine use.<sup>34</sup>

### Intrauterine devices and systems

Two types of intrauterine devices and systems are currently available in Canada: copper intrauterine devices (Nova-T or Flexi-T 300) and a levonorgestrel-releasing intrauterine system (Mirena). Intrauterine devices and systems have multiple mechanisms of action, but the chief one appears to be prevention of fertilization (Table 1).<sup>35</sup> Both types are highly effective for up to 5 years. In the absence of contraindications, an intrauterine device or system can be considered for any woman seeking a reliable reversible method of contraception. This method is particularly suited for women who would like long-term birth control, who want a method that is easy to adhere to or who have contraindications to estrogen use. Nulliparity is not a contraindication to use.<sup>40</sup>

Intrauterine devices and systems provide a number of non-contraceptive benefits. Copper devices may decrease the risk of endometrial cancer,<sup>37</sup> and the levonorgestrel-releasing intrauterine system is associated with improvement in menorrhagia and dysmenorrhea and may protect against endometrial hyperplasia.<sup>41</sup> A significant proportion of women who use the levonorgestrel-releasing intrauterine system will experience a decrease in menstrual blood loss (reduction of between 74% and 97%) or amenorrhea.

Bleeding irregularities are the most common side effects, particularly in the first months after insertion of the intrauterine device or system. Other potential side effects include pain or dysmenorrhea, hormonal side effects associated with the levonorgestrel-releasing intrauterine system (despite the fact that systemic levels of levonorgestrel are extremely low<sup>36</sup>), and functional cysts, reported in up to 30% of women who use the levonorgestrel-releasing intrauterine system.

Risks associated with insertion include perforation (0.6 to 1.6 per 1000 insertions), expulsion (2%–10% in the first year of use)<sup>36</sup> and infection. There is an inverse relation between risk of infection and time since insertion; risk of infection is highest in the 20 days following insertion and then decreases to baseline.<sup>38</sup> Large trials have shown that any risk of infection after the first month of use, when the relative risk of pelvic inflammatory disease is 3.8, is small and similar to that

in the general population.<sup>39</sup> Exposure to sexually transmitted infections, not the intrauterine device or system itself, is responsible for the occurrence of pelvic inflammatory disease after the first month of use. Intrauterine devices and systems do not increase the risk of ectopic pregnancy,<sup>36</sup> although if a pregnancy does occur with an intrauterine device or system in situ, ectopic pregnancy should be ruled out.

Intrauterine devices and systems can be inserted at any time during the menstrual cycle once the possibility of pregnancy is excluded. There is no evidence to support the practice of insertion only during menses. Antibiotic prophylaxis before insertion is not beneficial.<sup>55</sup>

### Emergency contraception

Emergency contraception may be considered for any woman who wishes to avoid pregnancy after unprotected intercourse. This may include instances when no contraception was used or the contraceptive method failed, or sexual assault. Types of emergency contraception include hormonal methods (Yuzpe method and Plan B) and the copper intrauterine device. Plan B is available in Canada from pharmacists without a prescription. Although it is generally recommended that hormonal emergency contraception be taken within 72 hours after unprotected intercourse, it can in fact be taken up to 5 days afterward,<sup>56,57</sup> whereas a copper intrauterine device can be inserted up to 7 days afterward. Hormonal emergency contraception is usually taken in 2 doses, 12 hours apart, although Plan B is as effective if both tablets are taken at the same time.<sup>58,59</sup> Hormonal methods may reduce the risk of pregnancy by 75%–85% and are more effective the sooner they are taken.

Emergency contraception has several potential mechanisms of action. It may interfere with follicular development, cervical mucus, sperm migration, corpus luteum activity and fertilization.<sup>60</sup> It has no effect on an established pregnancy. Women who use emergency contraception should be advised to have a pregnancy test if they do not experience normal menstrual bleeding by 21 days after treatment. Testing for sexually transmitted infections should also be considered.

### Adherence to contraception, counselling and safer sex

Use of contraception is the end result of a person's performance of a complicated sequence of cognitive and behavioural steps.<sup>61</sup> For a person to initiate and maintain contraception, he or she will have to acquire relevant information about contraception; acknowledge the probability of future sexual activity; take public actions to acquire contraceptives; communicate with his or her partner about contraception; use the contraceptive method consistently over time; and make accurate judgments about the need to practise safer sex. Whether this person will successfully navigate this sequence of steps depends on environmental factors (e.g., cost and availability of contraception and medical services, voluntary or involuntary nature of sexual activity) and personal factors (e.g., the person's age, sex and marital status) and is heavily influenced by the person's level of knowledge of contra-

ception and his or her motivation and skill for performing the sequence of contraceptive behaviours in question.<sup>61</sup> Viewed from this perspective, the health care provider's advice to "use contraception" actually places heavy demands on a patient's knowledge of contraception, motivation and behavioural skills.

As a result of the complexity of contraceptive behaviour<sup>61</sup> and additional factors as simple as forgetting, Canadian's adherence to contraceptive methods is far from perfect. About 9% of Canadians who responded to a study on contraception<sup>8,9</sup> indicated that they use *no* method of contraception, despite the lack of desire to conceive. Adherence problems with chosen methods were also common: 62% of the respondents who identified themselves as current oral contraceptive users reported having missed at least one pill during the 6 months before the survey; 31% of these respondents missed 1 or 2 pills, and 11% missed 6

or more pills during this time.<sup>8,9</sup> Similarly, 30% of the respondents who reported using condoms indicated that they did not always use a condom during sexual intercourse in the 6 months before the survey. Perhaps not surprisingly, some 28% of the female respondents reported having experienced an unplanned pregnancy.<sup>8,9</sup> On the basis of these findings, it appears that adherence to a contraceptive method and not the choice of method per se may be the more challenging goal for clinical counselling and patient practice. Box 2 presents empirically validated counselling techniques<sup>62-64</sup> that may be effective in challenging situations in which patients have particular difficulties adhering to their chosen method of contraception.

The use of contraception and its relation to safer sex and risky sexual behaviour presents an additional clinical concern. There is an association between the use of oral contraceptives, cessation or nonuse of barrier methods, and increased risk of sexually transmitted infection.<sup>13,14</sup> The primary concern of sexually active people is often avoidance of pregnancy. Once a nonbarrier contraceptive method has been prescribed, the health care provider may have inadvertently eliminated this primary concern of the patient's and increased his or her risk of sexually transmitted infection.<sup>13,14</sup> Counselling strategies<sup>9</sup> for enhancing condom use when providing nonbarrier contraception include suggesting scripts for safer sexual behaviour such as "Always use condoms *together* with the pill for 3 months, then come in with your partner for STI/HIV testing and safer sex counselling."

## Summary

We have reviewed evidence concerning Canadian's contraceptive choices, the characteristics and controversies associated with familiar and with newer contraceptive methods, and findings for inconsistent adherence and risk of sexually transmitted infection in the context of contraception. Method choice, management and counselling strategies are suggested to assist the physician in addressing these important challenges in contraceptive practice in Canada.

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### Box 2: Approaches to counselling patients about adherence to contraception and practice of safer sex<sup>62-64</sup>

To clarify and strengthen the importance of adhering to contraception and practising safer sex, the physician asks:

Question 1: "On a scale of 1 to 10, how important is it to you to ...?" ["... take the pill as prescribed, each and every day?"] or ["... see to it that you and your partner always use condoms?"]

- If the patient responds with a score of 7 or less, ask: "Why did you say [score] and not lower?" (This paradoxical question challenges patients to come up with personally convincing reasons why it is important to adhere to contraception or to practise safer sex.)
- If the patient responds with a score of 8 or higher, proceed to question 3.

Question 2: "What would it take [or What would have to happen] for it to become more important to you to ...?" ["... take the pill as prescribed, each and every day?"] or ["... see to it that you and your partner always use condoms?"]

- Patients know best what it would take to change their opinion, and they will tell the clinician what it would take to make adherence or safer sex more important to them personally. Physician and patient can discuss these responses.

To clarify and strengthen the ability to adhere to contraception and to practise safer sex, the physician asks:

Question 3: "On a scale of 1 to 10, how confident are you that you could ...?" ["... take the pill as prescribed, each and every day?"] or ["... see to it that you and your partner always use condoms?"]

- If the patient responds with a score of 7 or less, ask: "Why did you say [score] and not lower?" (This paradoxical question prompts patients to think about their strengths in managing adherence or practising safer sex.)
- If the patient responds with a score of 8 or higher, explore possible barriers that could occur and how the patient might deal with them.

Question 4: "What would it take [or What would have to happen] for you to become more confident that you could ...?" ["... take the pill as prescribed, each and every day?"] or ["... see to it that you and your partner always use condoms?"]

- Patients again know best what it would take to change their behaviour, and they will tell the clinician what it would take to do so. Patient and physician can use this as a context for problem-solving around adherence and safer sex.



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