# Contraception in women over 40 years of age

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Despite declining fertility, women over 40 years of age require effective contraception if they wish to avoid pregnancy. According to the 2011 Canadian census, 15% of the female population was aged 40–49 years.[1] Most women in this age group who have partners or are married have vaginal intercourse.[2] However, this population has special attributes that influence contraceptive choice. Women of older reproductive age may be experiencing perimenopausal symptoms that could be managed with contraceptives. In addition, such women may have medical conditions that make some contraceptive methods inappropriate. Women over 40 are also more likely than younger women to desire a permanent form of contraception. Finally, older women of reproductive age have lower rates of contraceptive failure than younger women because of lower fecundity (probability of achieving a live birth per menstrual cycle), less frequent sexual intercourse and higher compliance with contraceptive regimens.[2,3]

In this article, we outline the risks and benefits of contraceptive methods for women over 40, and we review when it is appropriate to stop contraception. Most of the recommendations are based on guidelines that used systematic reviews. Where appropriate, we specify the types of studies (e.g., case–control, cohort, randomized trial) that support specific recommendations. Study findings reported are statistically significant unless otherwise stated. Box 1 outlines the evidence used in this review; details of the search strategy are given in Appendix 1 (available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.121280/-/DC1).

## What is the risk of pregnancy?

The risk of pregnancy among women over 40 years of age is low. Women in this age group have lower fecundity compared with younger women and therefore take longer to conceive. For example, in one study involving women undergoing insemination with frozen donor sperm, the fecundity was 0.2 for women less than 35 years of age, compared with 0.12 for women 35–40 years and 0.06 for women over 40 years.[4] In 2008, the Canadian fertility rate was 8.4 births per 1000 women among those aged 40–44 and 0.2 per 1000 among women aged 45 years and older, compared with 107.4 births per 1000 among women aged 30–34 years.[5] Nevertheless, the age-related decline in fecundity does not provide the basis for reliable contraception. Women of older reproductive age who no longer desire children still need to use effective contraception until menopause has occurred. Menopausal hormone therapy does not provide effective contraception.[6]

When they conceive, women over 40 are more likely than younger women to have adverse consequences. The risk of spontaneous abortion and chromosomal abnormalities increases markedly over age 40.[7] Older age is also associated with an increased risk of obstetric complications, including gestational diabetes, hypertension, placenta previa, cesarean delivery, perinatal death and maternal death.[7,8] In 2006 in Canada, the total number of induced abortions among women aged 40 and older was 3938 (4.3% of the total).[9] The abortion rate in this age group was 2.9 per 1000 females, compared with the overall rate of 13 per 1000. These data underscore the importance of effective contraception for women of older reproductive age who desire it.

## What contraceptive methods are used by women over 40?

The contraceptive methods used by women over 40 years old vary by country (Appendix 2, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.121280/-/DC1).[10–12] Unlike the United Kingdom and Canada, the United States has a

### Key points

- Although fertility declines with age, effective contraception is still required in women over 40 years of age who wish to avoid pregnancy.
- According to international guidelines, there are no contraceptive methods that are contraindicated based on age alone.
- Effective nonhormonal and progestin-only methods provide safe options for women who should avoid estrogen-containing contraceptives.
- For women who are using hormonal contraceptives, menopausal status and lack of need for contraception can be assumed at age 55.

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high prevalence of sterilization among older women of reproductive age.[10] In other countries, such as the UK, a substantial proportion of women over age 40 use intrauterine devices (IUDs).[11] Oral contraceptives and condoms are also popular among older women in the US, Canada and the UK.[12]

## How safe are contraceptives in women over 40?

The benefits of use outweigh the risks for most contraceptive methods used by women over 40 years of age. Even for women with risk factors for complications, there are methods available that can be safely used to prevent unintended pregnancy.

### Pregnancy

As previously discussed, the medical risks of unintended pregnancy are greater for older women than for younger women, and so the risks of contraceptive use need to be weighed against the risks of pregnancy. In addition, the most effective contraceptive methods should be emphasized in order to maximally decrease the medical risks of unintended pregnancy among older women.[12] The World Health Organization (WHO) categorizes copper IUDs, progestin IUDs, progestin implants and sterilization as "top-tier" methods with respect to effectiveness.[13] These methods are associated with failure rates of less than 1% with typical use in the first year of use. However, because contraceptive failure rates are lower among older women, less effective, short-acting methods such as oral contraceptives or coitally dependent methods (male and female condoms, diaphragms, emergency contraception) may be acceptable for some older women.[3]

### Cardiovascular events

Venous (e.g., deep venous thrombosis and pulmonary embolism) and arterial (e.g., stroke and myocardial infarction) thromboembolic events are rare in the reproductive years, but risks increase with age. Because progestin-only contraceptive methods do not appear to increase the risk of venous thromboembolism, they represent safe options for women at increased risk of cardiovascular events, whether because of age, obesity or medical comorbidities such as diabetes mellitus and hypertension. In a multinational case–control study, no increased risk of venous thromboembolism or myocardial infarction was found among women who used progestin-only injections or progestin-only pills compared with nonusers. The small subset of users of progestin-only methods who had pre-existing hypertension were noted to have an increased risk of stroke (odds ratio [OR] 12.4, 95% confidence interval [CI] 4.1–37.6) compared with nonusers who had hypertension.[14] However, in a large prospective cohort of women followed for 15 years, there was no increase in the incidence of arterial events among users of progestin-only methods (IUDs, implants or pills) compared with nonusers.[15] Two recent meta-analyses showed no association between progestin-only methods and arterial events.[16,17]

Use of estrogen-containing contraceptives increases the risk of venous and arterial thromboembolic events. Other risk factors include, but are not limited to, age, obesity, smoking, diabetes, hypertension, migraine headaches (with or without aura) and thrombogenic mutations. Estrogen-containing methods should be used with caution in women over 40 who have additional cardiovascular risk factors.[18] The incidence of venous thromboembolism among women of reproductive age has been reported to range from 5 to 10 per 10 000 woman-years, and the risk of venous thromboembolism increases with age.[19] Among women of reproductive age, the risk of venous thromboembolism among those who use estrogen-containing contraceptives is double that among nonusers (8–10 per 10 000 woman-years v. 4–5 per 10 000 woman-years).[20] However, pregnancy and the immediate postpartum period is associated with 3 times the risk of venous thromboembolism compared with the use of estrogen-containing contraceptives.[21]

Recent studies of estrogen-containing contraceptives and venous thromboembolism are consistent in several findings. First, the risk of venous thromboembolism was greatest in the first 3 months of oral contraceptive use (OR 12, 95% CI 7.1–22.4) and declined thereafter.[22] Second, the risk tended to increase with estrogen dose even with formulations that had a dose below 50 μg.[22–24] Finally, women using oral contraceptives who were obese (body mass index [BMI] ≥ 30) had about a 3-fold increased risk of venous thromboembolism compared with users who were normal weight.[25] The American College of Obstetricians and Gynecologists recommends that women over the age of 35 who have a BMI of 30 or

**Box 1: Evidence used in this review**

We searched MEDLINE using PubMed for English-language articles on contraception in older women published from 1957 to the end of June 2012. Details of our search strategy are given in Appendix 1. We also searched the Cochrane Library using the keyword "contraception." Bibliographies of identified articles were manually searched. We also reviewed summary statements and clinical practice guidelines from the US Centers for Disease Control and Prevention, the Society of Obstetricians and Gynaecologists of Canada, and the Faculty of Sexual and Reproductive Healthcare of the Royal College of Obstetricians and Gynaecologists.

greater should be prescribed an estrogen-containing hormonal contraceptive with caution.[26] All studies we found of estrogen-containing contraceptive use and risk of venous thromboembolism included women of all reproductive ages (up to age 59 in one study[24]), consistently noting age to be an independent risk factor.[19–23]

Although arterial events are less common than venous thromboembolism in women of reproductive age, the sequelae of stroke and myocardial infarction may be more devastating than those of venous thromboembolism. A large Danish cohort study found that women aged 45–49 years had 20 times the risk of stroke and 100 times the risk of myocardial infarction as women aged 15–19. In this cohort, estrogen-containing contraceptive use increased the overall risk of stroke by as much as 2.2 times and of myocardial infarction by as much as 2.3 times. Risks were not increased with past use. Somewhat smaller risk estimates were associated with contraceptives containing 20 μg of estrogen.[15] Similarly, a meta-analysis concluded that current use of contraceptives with a higher estrogen dose was associated with an elevated risk of myocardial infarction (OR 2.5, 95% CI 1.9–3.2), although no increased risk was observed among past users or users of 20-μg pills.[27] As with venous thromboembolism, the risk of stroke is higher among users of estrogen-containing contraceptives who are obese than among users who are of normal weight. This was shown in a Dutch case–control study in which the OR for stroke among obese users was 4.6 (95% CI 2.4–8.9) compared with nonusers who were of normal weight; the OR for stroke among users who were of normal weight was 2.2 (95% CI 1.5–3.0) compared with normal-weight nonusers.[28]

Because rates of both venous and arterial events are still lower with estrogen-containing methods than during pregnancy, these methods have no upper age limit for use.[29] Nevertheless, the WHO "top-tier" methods (IUDs, implants and sterilization) are preferred for older women of reproductive age because of their superior effectiveness and lack of association with cardiovascular events.[13]

## Cancer

The incidence of cancer increases with age. A large cohort study by the Royal College of General Practitioners found that use of oral contraceptives (estrogen-containing or progestin-only pills) was associated with a decreased overall risk of cancer (OR 0.88, 95% CI 0.83–0.94); for most types of cancer, the OR was similar to the referent value of 1.0.[30] Use of oral contraceptives has been found to be protective against the development of endometrial and ovarian cancer (see the following section on noncontraceptive benefits).

Of particular concern to women and their clinicians is any association between hormonal contraceptives and breast cancer. A large case–control study found no association between past or ever use of oral contraceptives and risk of breast cancer, although a nonsignificant trend was noted between current use and breast cancer risk.[31] The Royal College of General Practitioners' study found no association with past, recent or current use of oral contraceptives and breast cancer risk.[30] Observational studies have consistently shown that ever use of depot medroxyprogesterone acetate (DMPA) is not associated with an increased risk of breast cancer. Only 2 studies found recent DMPA use to be associated with an increased risk of breast cancer, with an OR as high as 2.2.[32,33] These latter studies were limited by study design and low numbers of breast cancer cases among the participants. A large case–control study involving women over 35 years of age found no increased risk of breast cancer associated with current or past use of either the levonorgestrel-releasing or copper IUD.[34]

With regard to risk of cervical cancer, a systematic review found that an elevated risk was associated with long-term use of oral contraceptives (relative risk [RR] 1.6, 95% CI 1.4–1.7) and DMPA (RR 1.2, 95% CI 1.0–1.6) after 5 years of use, with the risk then dissipating with time since last use.[35] Although human papilloma virus and Pap smear screening were controlled for, the screening technologies used in the studies varied widely, and so these associations are difficult to interpret.[35]

## Fracture risk

Bone mineral density begins to decline during perimenopause because of inconsistent production of endogenous estrogens. Use of DMPA is associated with relative hypoestrogenemia and decreased bone mineral density during use. Bone density levels decline rapidly during the first year of DMPA use but then plateau with long-term use and recover after discontinuation.[36] Postmenopausal women who have previously used DMPA, even up until menopause, have not been found to have lower bone density compared with those who never used it.[36] Two case–control studies have raised the possibility that use of DMPA might elevate fracture risk in current users.[37,38] However, a recent retrospective cohort analysis showed that women choosing DMPA had an elevated fracture risk at baseline (before their first injection) compared with women choosing other contraceptives, possibly because of trauma, including motor vehicle crashes and domestic

trauma.[36,39,40] The Society of Obstetricians and Gynaecologists of Canada does not recommend restricting DMPA use in healthy women who have no other risk factors for bone loss.[41] It recommends that users be counselled on dietary and lifestyle habits that protect bone mass.[41]

Use of progestin-only methods such as implants, pills and the IUD have been associated with either no change or a slight increase in bone density.[38,39]

## What are the noncontraceptive benefits of contraceptives in this age group?

The noncontraceptive benefits associated with contraceptive methods that may be relevant to women over 40 years of age are outlined in Table 1.

### Heavy menstrual bleeding

About 4–6 years before their final menses, women will enter perimenopause and will likely experience changes in menstrual bleeding that lead to excessive or irregular menstruation.

Estrogen-containing oral contraceptives restore menstrual regularity[42] and prevent the development of endometrial hyperplasia and endometrial cancer.[43] A placebo-controlled randomized trial of estrogen-containing oral contraceptives involving women with dysfunctional uterine bleeding showed that 80% of the participants in the treatment group had improvement in their bleeding pattern compared with those in the placebo group, although this study was not focused on women over 40.[42] Unfortunately, few studies have examined the use of oral contraceptives specifically for perimenopausal bleeding. One study including 132 perimenopausal women showed that estrogen-containing oral contraceptives reduced the risk of blood clots and heavy bleeding.[44] Oral contraceptives were shown in a small randomized trial to reduce menstrual bleeding by 43%.[45] Randomized trials involving women with heavy menstrual bleeding have shown the efficacy of an oral contraceptive containing estradiol valerate and dienogest, and of a combined contraceptive vaginal ring in treating this condition.[46,47] However, this oral contraceptive is not currently available in Canada. Furthermore, observational studies have shown that oral contraceptives can reduce menstrual blood loss and increase hemoglobin concentrations, and their use is supported in clinical practice guidelines.[48,49]

The use of the levonorgestrel-releasing IUD has been proven effective in treating heavy menstrual bleeding, including when it is associated with adenomyosis and leiomyomas.[18,48,50] The levonorgestrel-releasing IUD is licensed in countries including the US, the UK and Canada for the treatment of heavy menstrual bleeding. Its use leads to a 97% reduction in menstrual blood loss by 12 months and has high satisfaction rates.[51] Although irregular bleeding can occur initially, amenorrhea rates of 20% to 80% have been reported at 12 months.[49,52] A systematic review and meta-analysis found the levonorgestrel-releasing IUD to be as effective as endometrial ablation in reducing heavy menstrual bleeding.[53] In addition, a clinical trial involving women with heavy menstrual bleeding showed that the levonorgestrel-releasing IUD was comparable to hysterectomy in improving hematologic parameters and quality of life.[54]

Use of DMPA leads to high rates of amenorrhea and is an option for the treatment of heavy menstrual bleeding, although it may be less effective than the levonorgestrel-releasing IUD.[55] The etonogestrel implant (approval is being pursued in Canada) and progestin-only pill, although associated with an overall reduction in bleeding, may lead to irregular and unpredictable bleeding.[26]

**Table 1:** Noncontraceptive benefits associated with contraceptive methods among women over 40 years of age

| Method | Noncontraceptive benefits |
|---|---|
| Copper IUD | Reduces risk of endometrial cancer |
| Levonorgestrel-releasing IUD | Reduces heavy menstrual bleeding |
| DMPA | Reduces heavy menstrual bleeding, vasomotor symptoms, and risk of endometrial and ovarian cancers |
| Estrogen-containing oral contraceptive | Reduces heavy menstrual bleeding, bone loss, vasomotor symptoms, and risk of ovarian, endometrial and possibly colorectal cancers |
| Female sterilization | Reduces risk of ovarian cancer |
| Condom | Prevents sexually transmitted infections |

Note: DMPA = depot medroxyprogesterone acetate, IUD = intrauterine device.

### Vasomotor symptoms

Many perimenopausal women experience vasomotor symptoms such as hot flashes and night sweats. Estrogen-containing contraceptives are likely an effective treatment, especially for severe vasomotor symptoms.[18] Although there are few data, one 3-year observational study found that 90% of perimenopausal women with vasomotor symptoms had relief of symptoms after taking an estrogen-containing oral contraceptive, compared with 40% of nonusers.[56] Perimenopausal women who take a 28-day pack of oral contraceptives (with 21 active pills) may experience hot flashes on the hormone-free

days.[18] These women may benefit from extended or continuous use of oral contraceptives.[18]

Older clinical trials have shown that DMPA also alleviates vasomotor symptoms.[57] The levonorgestrel-releasing IUD is licensed in the UK for protection against endometrial hyperplasia during use of estrogen therapy by perimenopausal and menopausal women. This approach provides an excellent option for women experiencing hot flashes who also need contraception or suppression of abnormal uterine bleeding, or both.[52]

### Skeletal health

Overall, oral contraceptives appear to have little impact on bone mineral density in premenopausal women.[36] However, a systematic review found a possible benefit of estrogen-containing oral contraceptives in preventing declines in bone density that accompany late perimenopause.[58] Among postmenopausal women, fracture risk among former users of estrogen-containing oral contraceptives was shown to be decreased in some studies and unchanged in other studies compared with nonusers.[18] A systematic review did not find any impact of oral contraceptives on fracture risk, positive or negative.[39] Data are limited on whether the contraceptive patch or vaginal ring have similar effects.[59]

### Cancer

Women who use combined oral contraceptives have a reduced risk of endometrial cancer compared with nonusers.[26,43,60] One large case–control study showed that as little as 12 months of use conferred protection.[60] The longer a woman uses estrogen-containing oral contraceptives, the lower her risk of endometrial cancer. A meta-analysis showed that the risk was decreased by 56% after 4 years of use, by 67% after 8 years and by as much as 72% after 12 years of use ($p_{trend} < 0.0001$).[61] The protective effect lasted up to 15–20 years after use of the pill was stopped.[60,61]

There are few data on the use of DMPA and the risk of endometrial cancer; however, one small case–control study showed an 80% risk reduction (RR 0.21, 95% CI 0.06–0.79).[62] Use of the copper IUD and the levonorgestrel-releasing IUD is associated with a reduction in the risk of endometrial cancer, although the mechanism for the copper IUD is unclear.[63] The levonorgestrel-releasing IUD has been used to treat endometrial hyperplasia and early endometrial cancer.[49] There are no data on the etonogestrel implant or combined contraceptive patch and vaginal ring, although they may share the same effect.

There is robust evidence that use of oral contraceptives (estrogen-containing or progestin-only) reduces subsequent risk of ovarian cancer. This protection may result from the suppression of ovulation associated with such use. A recent collaborative meta-analysis reviewed 45 studies that compared women who had ever used oral contraceptives with those who had never used them.[64] The RR of ovarian cancer among users was 0.73 (95% CI 0.70–0.76). The RR was decreased by 20% for each 5 years of use, and the protective effect was still present 30 years after stopping use. Other studies have confirmed a risk reduction of up to 40% to 50%.[65,66]

Although a 2011 meta-analysis showed a significant risk reduction of ovarian cancer among women with *BRCA1* and *BRCA2* mutations who had ever used oral contraceptives,[67] the evidence regarding the effect of oral contraceptives on the risk of breast cancer among women with these mutations was inconsistent.[67,68] It appears reasonable for women with *BRCA1* or *BRCA2* mutations and no personal history of breast cancer to use oral contraceptives; however, the risks and benefits should be weighed by the woman and her physician.[69]

A large case–control study of the effect of DMPA use on ovarian cancer risk found that such use was associated with a 39% risk reduction (OR 0.61, 95% CI 0.44–0.85); the risk reduction was as much as 83% (OR 0.17, 95% CI 0.07–0.39) when the duration of DMPA use was 3 years or longer.[70] Tubal sterilization has also been associated with a decreased risk of ovarian cancer.[71]

A lesser-known benefit of estrogen-containing oral contraceptives is the possible modest protection against colon cancer. A large meta-analysis found an 18% reduction in colorectal cancer among women who ever used estrogen-containing oral contraceptives compared with nonusers (RR 0.82, 95% CI 0.74–0.92).[72] Women whose use was more recent experienced the greatest reduc-

**Table 2:** When to stop contraception[74]

| Contraception | Age < 50 yr | Age ≥ 50 yr |
|---|---|---|
| Nonhormonal method | May stop after 2 yr of amenorrhea | May stop after 1 yr of amenorrhea |
| Progestin-only method (IUD, implant, injection, pill) | Can be continued to age 55 yr | Can be continued to age 55 yr, or switch to nonhormonal method and stop after 1 yr of amenorrhea |
| Estrogen-containing method (pill, patch, vaginal ring) | Can be continued to age 50 yr or longer if no cardiovascular risk factors | Can be continued to age 55 yr if no cardiovascular risk factors, or switch to nonhormonal method and stop after 1 yr of amenorrhea |

Note: IUD = intrauterine device.

tion (RR 0.46, 95% CI 0.30–0.71). A nested case–control study found that ever use of oral contraceptives was associated with a marginally reduced risk of colorectal cancer, but the effect was not statistically significant (hazard ratio [HR] 0.92, 95% CI 0.83–1.02); this association was stronger among postmenopausal women (HR 0.84, 95% CI 0.74–0.95).[73]

**Table 3:** US and UK medical eligibility criteria for the use of contraceptive methods in older women[29,80]

| Method of contraception | Age group, yr | Medical eligibility criteria |
|---|---|---|
| Estrogen-containing method | ≥ 40 | Benefits outweigh risks |
| Progestin-only pill | ≥ 40 | No restriction |
| Progestin implant | ≥ 40 | No restriction |
| DMPA | ≥ 40 to 45 | No restriction |
| | > 45 | Benefits outweigh risks |
| Copper IUD | ≥ 40 | No restriction |
| Levonorgestrel-releasing IUD | ≥ 40 | No restriction |

Note: DMPA = depot medroxyprogesterone acetate, IUD = intrauterine device.

**Table 4:** US and UK medical eligibility criteria* for the use of estrogen-containing contraceptive methods, by characteristic or medical condition[29,80]

| Characteristic/condition | Medical eligibility criteria |
|---|---|
| Smoking at age ≥ 35 yr | |
| < 15 cigarettes/d | Risks outweigh benefits |
| ≥ 15 cigarettes/d | Unacceptable risk |
| Obesity | |
| BMI 30–34 | Benefits outweigh risks |
| BMI ≥ 35 | Benefits outweigh risks (UK: Risks outweigh benefits) |
| Hypertension | |
| Controlled hypertension | Risks outweigh benefits |
| Elevated blood pressure | |
| Systolic > 140–159 mm Hg or diastolic > 90–94 mm Hg | Risks outweigh benefits |
| Systolic ≥ 160 mm Hg or diastolic ≥ 95 mm Hg | Unacceptable risk |
| Vascular disease | Unacceptable risk |
| Diabetes | |
| No vascular disease | Benefits outweigh risks |
| Vascular disease or duration of diabetes > 20 yr (UK: Duration of diabetes not addressed) | Either risks outweigh benefits or unacceptable risk (based on severity of condition) |
| Stroke | Unacceptable risk |
| Current or past ischemic heart disease | Unacceptable risk |
| Multiple risk factors for cardiovascular disease† | Either risks outweigh benefits or unacceptable risk (based on severity of condition) |

Note: BMI = body mass index.
*Differences between US and UK criteria are shown in parenthesis when applicable.
†Risk factors include higher age, smoking, obesity, diabetes and hypertension.

## When should contraception be stopped?

Most women will be able to use contraception safely until they are assured of menopause. Determining when to stop a contraceptive method should include an evaluation of the benefits of the method, the health risks resulting from its use as age increases, the diminishing risk of pregnancy and the availability of alternative methods (Table 2).[74] According to international guidelines, the use of the copper IUD is safe up to and into menopause unless bleeding abnormalities develop. For progestin-only methods, the potential benefits of decreased menstrual bleeding and endometrial protection outweigh the risks of continuing use, because arterial and venous cardiovascular events are not increased.[14–17] The risk of venous thromboembolism among women using estrogen-containing oral contraceptives increases with age.[18,23] The continued use of estrogen-containing methods may need to be re-evaluated as a woman nears menopause if her risk of cardiovascular events has increased.[29]

European guidelines suggest that natural sterility can be assumed after age 55 in amenorrheic women.[74] In women who are not using hormonal contraception, menopause can also be assumed after 1 year of amenorrhea in a woman 50 years of age or over, or after 2 years of amenorrhea in a woman under 50.[74] Observational studies have consistently shown that average follicle-stimulating hormone (FSH) levels increase in perimenopausal women as age increases, but individual levels can vary over time. These hormone levels are not suppressed substantially during DMPA use, but similarly they may be an unreliable signal of menopause in younger users.[75–77] Two studies showed that FSH levels were significantly suppressed in women who were using estrogen-containing oral contraceptives and may not rebound until 2 weeks after the last active pill;[77,78] therefore, FSH measurement during oral contraceptive use may not be reliable in determining menopausal status. In the absence of contraindications or risk factors, estrogen-containing and progestin-only hormonal contraception can be safely continued until age 55.

## What do guidelines recommend?

The World Health Organization's medical eligibility criteria for contraceptive use give evidence-based guidance on the safety of contracep-

tive methods for women with certain physical characteristics or medical problems.[79] The US and the UK have each adapted their guidelines from these criteria.[29,80] Conditions affecting eligibility for the use of each contraceptive method are categorized into 4 categories: a condition for which there is no restriction for the use of the contraceptive method; a condition where the advantages generally outweigh the theoretical or proven risks; a condition where the theoretical or proven risks usually outweigh the advantages of using the method; and a condition that represents an unacceptable health risk if the contraceptive method is used.[79] According to both the US and UK guidelines, no contraceptive methods are contraindicated based on age alone (Table 3).[29,80] However, there are some medical conditions more common in older women that may make the use of some contraceptive methods inappropriate (Tables 4 and 5).[29,80] Clinical judgment will be required to balance the risks and benefits when a woman has multiple medical conditions. The availability of safe, effective options suggests that estrogen-containing methods should increasingly be used with caution in older women who have cardiovascular risk factors. Box 2 provides links to Canadian, US and UK guidance on contraception for women.

Tubal sterilization for women and vasectomy for male partners are also options for women over 40 years of age who have completed childbearing. Older women are less likely to regret permanent sterilization.[81] Hysteroscopic sterilization is less invasive than traditional laparoscopic techniques, presumably leading to a lower risk of serious complications.[82] Hysteroscopic tubal occlusion is advantageous for many older women who may not be good candidates for laparoscopic tubal sterilization because of intra-abdominal adhesions, medical comorbidities or obesity.[82]

**Box 2: Resources**

- Society of Obstetricians and Gynaecologists of Canada: *Canadian Contraception Consensus*; 2004. Available: www.sogc.org/guidelines/index_e.asp#Contraception
- US Centers for Disease Control and Prevention: *US Medical Eligibility Criteria for Contraceptive Use*; 2010. Available: www.cdc.gov/reproductivehealth/unintendedpregnancy/usmec.htm
- Faculty of Sexual and Reproductive Healthcare, Royal College of Obstetricians and Gynaecologists: *Clinical Guidance: Contraception for Women Aged Over 40 Years*; 2010. Available: www.fsrh.org/pdfs/ContraceptionOver40July10.pdf

**Table 5:** US and UK medical eligibility criteria* for the use of progestin-only contraceptive methods, by characteristic or medical condition[29,80]

| Characteristic/ condition | Progestin-only pill | DMPA | Implant | Levonorgestrel-releasing IUD |
|---|---|---|---|---|
| Smoking at age ≥ 35 yr | No restriction | No restriction | No restriction | No restriction |
| Obesity | No restriction | No restriction | No restriction | No restriction |
| Hypertension | | | | |
| Controlled hypertension | No restriction | Benefits outweigh risks | No restriction | No restriction |
| Elevated blood pressure | | | | |
| Systolic > 140–159 mm Hg or diastolic > 90–94 mm Hg | No restriction | Benefits outweigh risks (UK: No restriction) | No restriction | No restriction |
| Systolic ≥ 160 mm Hg or diastolic ≥ 95 mm Hg | Benefits outweigh risks (UK: No restriction) | Risks outweigh benefits (UK: Benefits outweigh risks) | Benefits outweigh risks (UK: No restriction) | Benefits outweigh risks (UK: No restriction) |
| Vascular disease | Benefits outweigh risks | Risks outweigh benefits | Benefits outweigh risks | Benefits outweigh risks |
| Diabetes | | | | |
| No vascular disease | Benefits outweigh risks | Benefits outweigh risks | Benefits outweigh risks | Benefits outweigh risks |
| Vascular disease or duration of diabetes > 20 yr (UK: Duration of diabetes not addressed) | Benefits outweigh risks | Risks outweigh benefits | Benefits outweigh risks | Benefits outweigh risks |
| Stroke | I: Benefits outweigh risks<br>C: Risks outweigh benefits | Risks outweigh benefits | I: Benefits outweigh risks<br>C: Risks outweigh benefits | Benefits outweight risk (UK: Risks outweigh benefits for continuation) |
| Current or past ischemic heart disease | I: Benefits outweigh risks<br>C: Risks outweigh benefits | Risks outweigh benefits | I: Benefits outweigh risks<br>C: Risks outweigh benefits | I: Benefits outweigh risks<br>C: Risks outweigh benefits |
| Multiple risk factors for cardiovascular disease† | Benefits outweigh risks | Risks outweigh benefits | Benefits outweigh risks | Benefits outweigh risks |

Note: C = continuation, DMPA = depot medroxyprogesterone acetate, I = initiation, IUD = intrauterine device.
*Differences between US and UK criteria are shown in parenthesis when applicable.
†Risk factors include higher age, smoking, obesity, diabetes and hypertension.

## Gaps in knowledge

There are several important questions about contraception in women over the age of 40 that need further investigation. Several of these centre on the safety of ethinyl-containing oral contraceptives. Are formulations of oral contraceptives containing 10–20 μg of ethinyl estradiol safer than those containing 25–35 μg in women over 40? Are formulations of oral contraceptives containing estradiol valerate safer than those containing ethinyl estradiol in this age group? With the advent of newer contraceptive methods, such as the patch and vaginal ring, more information is needed on their noncontraceptive benefits.

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