First-trimester medical abortion practices in Canada

National survey

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Abstract

Objective To understand the current availability and practice of first-trimester medical abortion (MA) in Canada.

Design Using public sources and professional networks, abortion facilities across Canada were identified for a cross-sectional survey on medical and surgical abortion. English and French surveys were distributed by surface or electronic mail between July and November 2013.

Setting Canada.

Participants A total of 94 abortion facilities were identified.

Main outcome measures Descriptive statistics on MA practice and facility and provider characteristics, as well as comparisons of MA practice by facility and provider characteristics using χ^2 and *t* tests.

Results A total of 78 of 94 (83.0%) facilities responded. Medical abortion represented 3.8% of first-trimester abortions reported (2706 of 70 860) in 2012. Among the facilities offering MA, 45.0% performed fewer than 500 first-trimester abortions a year, while 35.0% performed more than 1000. More MAs were performed in private offices or ambulatory health centres than in hospitals. Sixty-two physicians from 28 of 78 facilities reported providing first-trimester MA; 87.1% also provided surgical abortion. More than three-quarters of MA physicians were female and 56.5% were family physicians. A preponderance (85.2%) of providers offered methotrexate with misoprostol. Nearly all physicians (90.3%) required patients to have an ultrasound before MA, and 72.6% assessed the completion of the abortion with ultrasonography. Most physicians (74.2%) offered MA through 49 days after the onset of the last menstrual period, and 21.0% offered MA through 50 to 56 days; 37.1% reported providing MA to patients who lived more than 2 hours away. Four physicians from 1 site provided MA via telemedicine.

Conclusion In Canada, MA provision using methotrexate and misoprostol is consistent with best-practice guidelines, but MA is rare and its availability is unevenly distributed.

EDITOR'S KEY POINTS

- First-trimester abortion is a common medical procedure in Canada. Geography is a substantial barrier to abortion access in Canada, and national statistics are incomplete. This study aimed to understand the current availability and practice of medical abortion (MA).
- Medical abortion represented a very small proportion (3.8%) of first-trimester abortions performed in Canada. Facilities reporting first-trimester MA were unevenly distributed across Canada (none were in the Atlantic provinces and 60.0% were in Quebec or British Columbia).
- More than half of current MA providers in Canada are family physicians, and more than 90% of MAs are provided in private offices or freestanding clinics.

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La pratique des avortements médicaux du premier trimestre au Canada

Une enquête nationale

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Résumé

Objectif Faire le point sur la disponibilité et la pratique des avortements médicaux (AM) du premier trimestre au Canada.

Type d'étude À l'aide de sources publiques et de réseaux professionnels, on a identifié les établissements qui font des avortements au Canada pour ensuite les soumettre à une enquête transversale sur l'avortement médical et chirurgical. Des exemplaires en anglais et en français de l'enquête ont été distribués par la poste ou par la voie électronique entre juillet et novembre 2013.

Contexte Le Canada.

Participants Un total de 94 établissements pratiquant des avortements.

Principaux paramètres à l'étude Des statistiques descriptives sur la pratique, les établissements et les personnes qui font des avortements, de même qu'une comparaison des méthodes utilisées et des caractéristiques de ceux qui en font à l'aide de tests du χ^2 et de tests de *t*.

Résultats Sur 94 établissements, 78 (83,0%) ont répondu. En 2012, les avortements médicaux représentaient 3,8% des avortements du premier trimestre déclarés (2706 sur 70 860). Parmi les établissements qui offrent des AM, 45% faisaient moins de 500 avortements du premier trimestre tandis que 35% en faisaient plus de 1000. Les bureaux privés et les centres de santé ambulatoires faisaient plus d'AM que les hôpitaux. Soixante-deux médecins œuvrant dans 28 des 78 établissements déclaraient faire des AM du premier trimestre; 87,1% effectuaient aussi des avortements chirurgicaux. Plus des trois-quarts des AM étaient faits par des femmes et 56,5% étaient des médecins de famille. La plupart offraient d'utiliser le méthotrexate avec le misoprostol. Presque tous les médecins (90,3%) exigeaient une échographie avant l'AM, tandis que 72,6% utilisaient une échographie pour s'assurer que l'avortement était complet. La plupart des médecins acceptaient de faire un AM jusqu'à 49 jours après le début des dernières menstruations alors que 21,0% allaient jusqu'à 50 à 56 jours; 37,1% ont déclaré effectuer des AM pour des patientes qui vivaient à plus de 2 heures de distance. Quatre médecins d'un établissement offraient des AM via la télémédecine.

Conclusion Au Canada, l'utilisation de méthotrexate et de misoprostol pour des AM est conforme aux meilleures directives de pratique; toutefois, l'AM est rarement fait et il n'est pas également accessible partout.

POINTS DE REPÈRE DU RÉDACTEUR

- Effectuer des avortements médicaux du premier trimestre est une pratique courante au Canada. La géographie constitue un obstacle important pour se faire avorter au Canada; par ailleurs, les statistiques nationales sont incomplètes. Cette étude voulait déterminer où en sont l'accessibilité et la pratique des avortements médicaux (AM).

- Les avortements médicaux représentaient une très petite proportion (3,8%) des avortements du premier trimestre effectués au Canada. Les établissements qui disent effectuer des AM du premier trimestre étaient inégalement distribués au Canada (aucun dans les provinces maritimes, contre 60% au Québec et en Colombie-Britannique).

- Plus de la moitié de ceux qui effectuent des AM au Canada sont des médecins de famille et plus de 90% des AM sont effectués dans des bureaux privés ou dans des cliniques indépendantes.

Cet article a fait l'objet d'une révision par des pairs.
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First-trimester abortion is a common medical procedure in Canada, although gaps in surveillance make it difficult to accurately characterize the number of procedures done annually.[1] In North America, vacuum aspiration abortion has been the most common method for first-trimester pregnancy termination since the 1960s.[2] A non-surgical alternative, using an antiprogestin, mifepristone, with misoprostol (a prostaglandin), has been available in France and China since 1988.[2,3] This combination was approved in Great Britain in 1991, in Sweden in 1992, in other European countries throughout the 1990s, and in the United States (US) in 2000.[2,3] In Canada, the combination of mifepristone and misoprostol for medical abortion (MA) was recently approved by Health Canada in July 2015, and it is expected to be available in 2016.

In the 1990s, Canadian physicians began using methotrexate combined with misoprostol, off label, for the induction of first-trimester abortions.[4,5] Mifepristone with misoprostol achieves termination more quickly and has greater patient acceptability.[4] In addition, mifepristone with misoprostol for MA has a high success rate when used through 70 days' gestation.[6,7]

Geography is a substantial barrier to abortion access in Canada.[8] Approval of mifepristone could improve abortion access because it can be provided by family physicians with minimal additional training. Understanding where and how MA is currently provided in Canada is important for health services planning. Few data exist on MA provision in Canada. The Canadian Institute for Health Information (CIHI) only reports hospital-based MA procedures. According to the latest CIHI data reporting abortions performed in 2012,[1] MA represented less than 4% of hospital-based terminations. To better understand the current practice of MA in Canada, we conducted a survey of administrators and physicians working at all publicly advertised facilities providing abortion in Canada. Findings on abortion health services distribution, delivery, and providers, as well as facility characteristics and experiences of harassment, are presented in a companion paper in this issue (**page e209**).[9]

METHODS

In July 2013 we sent self-administered abortion practice questionnaires by surface or electronic mail to all known abortion-providing facilities existing in Canada (n=94). These sites were identified from Internet sources and professional networks. The survey instruments had previously been used in the US in 1997 and 2008 and in British Columbia (BC) in 2011.[10-12] We adapted the instruments for the Canadian context, including translation into French. The US version was sent to US sites during the same time frame; we report on the Canadian results relating to the provision of MA.

For each site, the administrator was asked to complete a questionnaire describing facility characteristics, abortion practices, and patient eligibility criteria. Separate questionnaires were provided for completion by up to 5 physicians providing MA and 5 physicians providing surgical abortion at each site; eligible physicians performed at least 15% of MAs on site. The physician surveys included questions on provider demographic characteristics, preprocedural and postprocedural requirements, patient eligibility criteria, MA regimens, procedures, and follow-up. Standard Dillman tailored design techniques were used to maximize response[13]: reminders were provided 1 to 2 weeks after the first contact and at 4 and 6 weeks for nonresponders. Completed surveys received by mail underwent double data entry into the research data capture (REDCap) system,[14] which included range checks and preprogrammed skip patterns to ensure high-quality data entry. Inconsistent or unclear responses to key questions were verified on clinic websites or by telephone, as were missing data for key variables. Participants choosing to complete the Internet-based survey entered answers directly into the REDCap system. We abstracted the results on the facility characteristics from the administrator questionnaires and all other results from the MA provider questionnaires. The City University of New York Institutional Review Board and the University of British Columbia and Children's and Women's Health Centre of British Columbia Research Ethics Board approved the study.

Statistical analysis

We present descriptive findings for facility characteristics, as well as characteristics of physicians and MA practice. Facilities were classified as providing MA if the administrator described offering this service or a physician reported providing MA in 2012. Physicians who provided MA were included in the physician-level analysis whether or not administrators of their facilities responded to the survey or reported MA being performed. We present descriptive statistics on MA practice, as well as comparisons of practice by facility and provider characteristics using χ^2 or Fisher exact tests for categorical variables and Student *t* tests for continuous variables, performed in R 3.0.0.[15]

RESULTS

The survey was completed by the end of November 2013, with an overall response rate of 83.0% (78 of 94) and an administrator response rate of 78.7% (74 of 94). About 1 out of every 4 sites (27.0%) offered MA services, as reported by clinic administrators (20 of 74). Sixty-two

physicians who provided first-trimester MA returned surveys. This included 49 physicians from 20 sites identified by administrators, as well as 2 physicians from 2 sites where no administrator survey was completed and 11 physicians from 6 sites where the administrator indicated that MA was not offered. Using all surveys, at least 1 physician provided MA in 35.9% of responding sites (28 of 78). Medical abortion represented 3.8% of all first-trimester abortions reported in 2012 by the 74 responding administrators (2706 of 70 860).

Facility characteristics

Among the administrators reporting MA provision, 45.0% (9 of 20) indicated their facilities performed fewer than 500 first-trimester medical plus surgical abortions annually, while a third (7 of 20) performed more than 1000 first-trimester abortions a year (**Table 1**). Only 3 facilities reported performing more than 100 first-trimester MAs in 2012. One of these reported performing 1973 terminations or 72.9% of all MA performed in Canada. Facilities reporting first-trimester MA were unevenly distributed across Canada, with none in the Atlantic provinces (1 provider from this province completed a survey but did not provide any MA in 2012) and 60.0% (12 of 20) in Quebec or BC. More than half (11 of 20) of the facilities providing MA were private offices or ambulatory health centres and these facilities provided almost all (93.1%) MAs.

Characteristics of physicians providing MA

Most physician respondents who reported providing MA also provided surgical abortion (87.1%). As shown in **Table 2**, nearly 4 out of 5 were female physicians and more than half (56.5%) were family physicians. All 7 of the physicians providing only MA were female and all were co-located in sites with physicians who offered surgical abortion. There was no significant difference ($P = .78$) in the mean age of physicians who provided only MA (48.0 years) compared with physicians providing both medical and surgical abortion (47.1 years). Physicians providing exclusively MA were family physicians practising in the territories, Quebec, or Ontario.

Regimens

As shown in **Table 3**, most physicians providing MA in 2012 (85.2%) used a combination of methotrexate and misoprostol. All 9 providers using misoprostol-only regimens were trained as obstetrician-gynecologists and worked at sites performing fewer than 250 first-trimester medical and surgical abortions per year. Notably, 8 out of 9 physicians providing misoprostol-only MA practised in Quebec.

In 2012, 93.4% of physicians providing MA offered misoprostol using a dosage of 800 µg, and 93.4% dispensed a second dose of misoprostol as part of take-home medications for possible use as clinically indicated. The vaginal route for misoprostol administration was most common (77.0%). Almost all physicians (95.1%) allowed

Table 1. Characteristics of Canadian facilities offering first-trimester MA services in 2012 who responded to the 2013 cross-sectional survey of abortion provision in the United States and Canada (administrator survey): *N = 20.*

CHARACTERISTICS	FACILITIES OFFERING MA, N (%)	ESTIMATED NO. OF FIRST-TRIMESTER MA IN 2012	ESTIMATED NO. OF FIRST-TRIMESTER MEDICAL AND SURGICAL ABORTIONS IN 2012	PROPORTION OF FIRST-TRIMESTER ABORTIONS THAT WERE MA IN 2012
Clinic size				
• Small (< 500 abortions per y)	9 (45.0)	112	1044	10.7
• Medium (500-1000 abortions per y)	4 (20.0)	100	3251	3.1
• Large (> 1000 abortions per y)	7 (35.0)	2494	21 915	11.4
Region where site is located				
• Atlantic Canada*	0 (0.0)	NA	NA	NA
• British Columbia	7 (35.0)	2242	8090	27.7
• Ontario	2 (10.0)	101	2767	3.7
• Quebec	5 (25.0)	62	2821	2.2
• Prairies	4 (20.0)	274	12 099	2.3
• Territories	2 (10.0)	27	433	6.2
Facility type				
• Private office or ambulatory health centre†	11 (55.0)	2520	21 279	11.8
• Hospital affiliated	9 (45.0)	186	4931	3.8
Total	20 (100.0)	2706	26 210	10.3

MA—medical abortion, NA—not applicable.

*One MA provider survey was returned from the Atlantic region, but no MA was performed in 2012.

†Includes 2 facilities offering ambulatory MA services affiliated with a hospital-based surgical abortion service.

Table 2. Characteristics of Canadian physicians providing MAs in 2012 responding to the 2013 cross-sectional survey of abortion provision in the United States and Canada: *N = 62.*

CHARACTERISTICS	MA PROVIDERS, N (%)	ESTIMATED VOLUME OF MA*
Age, y		
• 30-39	16 (25.8)	Low
• 40-49	16 (25.8)	High
• 50-59	20 (32.3)	Moderate
• ≥ 60	9 (14.5)	High
• Unknown	1 (1.6)	NA
Sex		
• Male	12 (19.4)	Low
• Female	49 (79.0)	High
• Unknown	1 (1.6)	NA
Specialty		
• Obstetrics and gynecology	21 (33.9)	Moderate
• Family medicine	35 (56.5)	High
• Other	5 (8.1)	Moderate
• Unknown	1 (1.6)	NA
Region where physicians are located		
• Atlantic Canada	1 (1.6)	Low
• British Columbia	9 (14.5)	High
• Ontario	7 (11.3)	Low
• Quebec	25 (40.3)	Low
• Prairies	11 (17.7)	Moderate
• Territories	9 (14.5)	Low
Provides surgical abortion		
• Yes	54 (87.1)	High
• No	7 (11.3)	Low
• Unknown	1 (1.6)	Low
Total	62 (100.0)	NA

MA—medical abortion, NA—not applicable.
*The volume of MA reported by all physicians in a category is described as high (> 1000 MAs per y), moderate (150-1000 MAs per y), or low (< 150 MAs per y).

Table 3. Regimens for MA offered by Canadian physicians in 2012 who responded to the 2013 cross-sectional survey of abortion provision in the United States and Canada: *N = 61; one physician did not respond to questions about MA regimens.*

MA REGIMEN	PHYSICIANS USING METHOD, N (%)
Method of MA	
• Misoprostol only	9 (14.8)
• IM methotrexate 50 mg/m^2 of body surface and misoprostol	42 (68.9)
• Methotrexate 50 mg orally and misoprostol	10 (16.3)
Initial dose of misoprostol	
• 400 µg	4 (6.6)
• 800 µg	57 (93.4)
Misoprostol route	
• Vaginal	47 (77.0)
• Sublingual	6 (9.8)
• Buccal	8 (13.1)
Misoprostol timing	
• 1 or 2 d after methotrexate	12 (19.7)
• 3 d after methotrexate	11 (18.0)
• 4-6 d after methotrexate	18 (29.5)
• Other range (all ≤ 7 d)	10 (16.3)
• > 7 days after methotrexate	1 (1.6)
• Misoprostol only	9 (14.8)
Location misoprostol is taken	
• At home	58 (95.1)
• At medical facility	3 (4.9)
Repeat dose of misoprostol	
• Dispensed routinely	57 (93.4)
• Dispensed only as needed	3 (4.9)
• Never given	1 (1.6)
Total	61 (100.0)

IM—intramuscular, MA—medical abortion.

their patients to self-administer misoprostol at home. Additional doses of misoprostol were prescribed in the following circumstances: no bleeding 24 to 48 hours after the first dose (28 of 61), clinically symptomatic retained blood or decidua (26 of 61), retained nonviable gestational sac (23 of 61), ongoing viable pregnancy (15 of 61), prolonged bleeding (9 of 61), or heavy bleeding (7 of 61).

Most physicians (88.7%) prescribed analgesics; most routinely prescribed nonsteroidal anti-inflammatory medications (72.6%) or acetaminophen with codeine (58.1%). Routine antibiotics were prescribed only by 25.8% of physicians. The most commonly prescribed antibiotic was metronidazole (9.7%), followed by azithromycin (6.5%) and doxycycline (6.5%). Use of antibiotics was not evenly distributed among specialties, with a greater proportion of family physicians (31.4%) prescribing antibiotics compared with obstetrician-gynecologists (9.5%). Physicians who were trained in other specialties or who did not list their specialties had the highest (60.0%) use of routine antibiotics ($P < .01$).

Most physicians (90.3%) required patients to have an ultrasound before MA, and 72.6% used ultrasonography to assess the completion of the abortion. Most physicians (80.0%) not requiring a preprocedure ultrasound practised in rural BC or the territories. A few physicians (21.0%) used serial serum human chorionic gonadotropin (hCG) values to assess completion. When asked about follow-up visits, 75.8% answered that they required an in-person follow-up visit for all patients. The follow-up contact was typically scheduled 7 to 14 days (59.7%) after administration of methotrexate.

Physicians were asked to estimate what proportion of their patients required surgical intervention for retained products of conception, an ongoing viable pregnancy, or severe bleeding. The average proportion was higher (*t* test; $P<.01$) among physicians using a misoprostol-only regimen (21.7%) than among physicians using a regimen of both methotrexate and misoprostol (11.7%). Eight physicians did not respond to this question.

Patients' eligibility criteria

Most physicians (74.2%) provided MA up to 49 days after the onset of the last menstrual period (LMP), with 21.0% offering it up to 50 to 56 days. The only physician who provided MA after 56 days dispensed misoprostol alone up to 70 days after the LMP.

Among physicians providing MA, 37.1% reported providing MA to patients who lived more than 2 hours away (23 of 62). Four physicians (6.5%) from 1 site provided MA via telemedicine.

DISCUSSION

In this Canadian national survey, MA represented 3.8% of all reported first-trimester abortions. Medical abortion provision using predominantly methotrexate and misoprostol was relatively uniform and followed guidelines and best evidence.[16-19] Our results revealed geographic disparities in the availability of MA services; more than half of facilities providing this service were located in Quebec or BC. Almost all MA services were provided in private offices or ambulatory health centres rather than hospitals.

Although our survey revealed that most physicians (90.3%) required patients to have an ultrasound before MA, it is not an absolute requirement in the 2006 Canadian abortion guidelines,[16] or in guidelines from the Society of Family Planning (SFP),[17] the American College of Obstetricians and Gynecologists,[18] or the National Abortion Federation (NAF),[19] all of which recommend that gestational age be confirmed by clinical evaluation or ultrasound before MA is performed. Clark et al[20] showed that using a clinical protocol that involved obtaining pretreatment and posttreatment serum hCG levels, with use of ultrasonograms only when indicated, had outcomes similar to a protocol that used mandatory pretreatment and posttreatment ultrasonograms. Literature reviews[21,22] on the safe provision of MA without the routine use of ultrasound concluded that MA with mifepristone and misoprostol can be delivered in an effective and safe manner using the LMP and physical examination to estimate gestational age. In our survey, rural physicians in BC and the territories made up most of those offering MA without preprocedure ultrasound. The efficacy of this practice highlights the fact that dating ultrasound does not need to limit expansion of MA services to underserved and remote communities.

According to the 2006 Canadian guidelines,[16] MA induced with methotrexate and misoprostol can be offered up to 56 days' gestation. In our survey, most physicians did not offer MA after 49 days' gestation. It is possible that the reduced efficacy of the methotrexate-misoprostol combination[23] and the longer induction-to-expulsion time might have limited physician willingness to offer MA at later gestational age. According to the SFP[17] and the American College of Obstetricians and Gynecologists,[18] the upper gestational age for MA regimens varies based on the types, dosages, and routes of administration of the medication. The NAF clinical policy guidelines[19] state that an evidence-based regimen using methotrexate and vaginal, buccal, or sublingual misoprostol is recommended for gestational age up to 63 days.

Following the 2006 Canadian guidelines,[16] 85.2% of physicians providing MA used 50 mg/m^2 of intramuscular methotrexate or a fixed dose of 50 mg of methotrexate taken orally. Most physicians used vaginal misoprostol administration, while 23.0% of physicians used a non-vaginal route. One trial[24] compared buccal versus vaginal administration of misoprostol 3 to 6 days after methotrexate. The vaginal route was significantly more effective for achieving complete abortion (relative risk=1.43, 95% CI 1.08 to 1.90), and side effects were comparable between the groups. The 2006 Canadian guidelines[16] recommended administering misoprostol on the fifth, sixth, or seventh day after methotrexate. However, one study showed no significant difference between day 3 versus day 5 administration of prostaglandin after methotrexate (relative risk=0.72, 95% CI 0.36 to 1.43).[25] The variation in practices found in this study might reflect the lack of clear evidence on the best route and timing of administration of misoprostol after methotrexate.

Recent research has not consistently shown that repeat doses of misoprostol following mifepristone bring clear benefit in emptying the uterus.[26] In Canada, most physicians systematically dispensed 2 doses of misoprostol following methotrexate. Given the long induction-to-expulsion time with methotrexate and misoprostol, additional doses of misoprostol might

be perceived as an efficient way to hasten the abortion process. Also, for the management of continuing pregnancy, 24.2% of Canadian physicians providing MA reported advising a repeat dose of misoprostol, just like 22% of American clinicians.[11]

A postprocedural ultrasound was done by 72.6% of physicians, while 21.0% used serial hCG measurement to assess completion. In a study of methotrexate and misoprostol for MA, Creinin[27] found that a 50% decline in serum hCG levels taken before and 24 hours after misoprostol predicted successful abortion. Patient history appears to be highly predictive of successful pregnancy termination in the setting of mifepristone and misoprostol MA up to 63 days after the LMP,[21] but it has not been studied in the context of methotrexate regimens.

As stated by the NAF[19] and the SFP,[17] no strong data exist to support universal use of prophylactic antibiotics for MA. Potential drawbacks of antibiotic use include poor compliance, side effects, and development of antibiotic resistance.[28] Nevertheless, 25.8% of Canadian physicians providing MA reported routine antibiotic prophylaxis.

Strengths and limitations

A strength of this study was the high response rate, allowing it to capture 90.4% of the terminations reported to CIHI in 2012.[1] It also presents the first picture of MA in Canada and can provide a basis for further evaluations. However, we recognize that it might not be completely representative; physicians were recruited from publicly advertised sites providing surgical abortion services, which might have introduced a lower response rate from hospital-based services and from MA providers not associated with an advertised abortion facility. Another potential limitation is the low response rate observed in Ontario (56.3%), a high-population area; thus, the results of this survey might not be generalizable to every province, especially Ontario.

Conclusion

Now that the mifepristone and misoprostol combination is approved in Canada, the dispensation of MA is set to change. Availability of mifepristone and misoprostol in the US has led to an enormous uptake of this option.[29] About 35% of first trimester abortions in the US are currently performed using mifepristone and misoprostol, primarily using an evidence-based regimen of oral mifepristone (200 mg) followed in 24 to 48 hours by buccal or vaginal misoprostol.[30] Our study shows that the infrastructure for MA provision already exists in Canada, although work still needs to be done to address geographic disparities. More than half of current MA providers in Canada are family physicians, and more than 90% of MAs are provided in private offices or freestanding clinics. These family physician providers are widely distributed throughout several provinces and provide the MA option as safely and effectively as their counterparts in other medical specialties. Their predominance as providers of MA augurs well for increased access to MA for Canadian women.

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Contributors

The survey was developed by **Drs Jones**, **O'Connell White**, **Paul**, and **Lichtenberg**, and was revised for Canadian relevance by **Drs Guilbert** and **Norman**. Canadian data were collected by **Drs Guilbert** and **Norman**. Analyses were conducted by **Drs Guilbert**, **Hayden, Jones,** and **Norman**. The first draft was prepared by **Drs Guilbert** and **Hayden**. All authors contributed to revisions and accepted the final version of the manuscript.

Competing interests

Dr O'Connell White received consultant fees from Teva Women's Health outside of the submitted work. **Dr Norman** is the lead investigator on an investigator-initiated Canadian Institutes of Health Research–funded randomized controlled trial to which Bayer Canada donated contraceptive devices. Bayer Canada had no influence on the study design, the collection or analysis of data, or on the decision to publish. Neither **Dr Norman** nor any member of her team has received support from Bayer Canada. **Dr Guilbert** has received honoraria from Bayer Canada and Actavis Canada for conferences and participation in advisory boards and from Paladin Labs for personal consultation. None of these companies was involved in the current research.

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References

1. Canadian Institute for Health Information. *Number of induced abortions reported in Canada in 2012, by province/territory of hospital or clinic.* Ottawa, ON: Canadian Institute for Health Information; 2014.
2. Kulier R, Kapp N, Gulmezoglu AM, Hofmeyr GJ, Cheng L, Campana A. Medical methods for first trimester abortion. *Cochrane Database Syst Rev* 2011;(11):CD002855.
3. World Health Organization Task Force on Post-Ovulatory Methods of Fertility Regulation. Termination of pregnancy with reduced doses of mifepristone. *BMJ* 1993;307(6903):532-7.
4. Wiebe E, Dunn S, Guilbert E, Jacot F, Lugtig L. Comparison of abortions induced by methotrexate or mifepristone followed by misoprostol. *Obstet Gynecol* 2002;99(5 Pt 1):813-9.
5. Wiebe E, Hempstock W. Comparison of four regimens of misoprostol after methotrexate for early abortion. *Int J Gynaecol Obstet* 2008;101(2):192-3. Epub 2008 Mar 4.
6. Kopp Kallner H, Fiala C, Stephansson O, Gemzell-Danielsson K. Home self-administration of vaginal misoprostol for medical abortion at 50-63 days compared with gestation of below 50 days. *Hum Reprod* 2010;25(5):1153-7. Epub 2010 Feb 19.
7. Winikoff B, Dzuba IG, Chong E, Goldberg AB, Lichtenberg ES, Ball C, et al. Extending outpatient medical abortion services through 70 days of gestational age. *Obstet Gynecol* 2012;120(5):1070-6.
8. Norman VW, Guilbert ER, Okpaleke C, Lichtenberg ES, Paul M, O'Connell White K, et al. Abortion service in Canada: results from a 2012 national survey. *Contraception* 2014;90(9):300.
9. Norman WV, Guilbert ER, Okpaleke C, Hayden AS, Lichtenberg ES, Paul M, et al. Abortion health services in Canada. Results from a 2012 national survey. *Can Fam Physician* 2016;62:e209-17.

10. Lichtenberg ES, Paul M, Jones H. First trimester surgical abortion practices: a survey of National Abortion Federation members. *Contraception* 2001;64(6):345-52.
11. Wiegerinck MM, Jones HE, O'Connell K, Lichtenberg ES, Paul M, Westhoff CL. Medical abortion practices: a survey of National Abortion Federation members in the United States. *Contraception* 2008;78(6):486-91. Epub 2008 Sep 9.
12. Norman WV, Soon JA, Maughn N, Dressler J. Barriers to rural induced abortion services in Canada: findings of the British Columbia Abortion Providers Survey (BCAPS). *PLoS ONE* 2013;8(6):e67023.
13. Dillman DA. *Mail and Internet surveys: the tailored design method.* New York, NY: John Wiley and Sons Inc; 2000.
14. Child and Family Research Institute. *REDCap.* Vancouver, BC: Child and Family Research Institute; 2014.
15. R Core Team. *A language and environment for statistical computing.* Vienna, Austria: R Foundation for Statistical Computing; 2013.
16. Davis VJ. Induced abortion guidelines. *J Obstet Gynaecol Can* 2006;28(11):1014-27.
17. Medical management of first-trimester abortion. *Contraception* 2014;89(3):148-61.
18. American College of Obstetricians and Gynecologists. Medical management of first-trimester abortion. *Pract Bull* 2014;143:676-92.
19. National Abortion Federation. *2014 Clinical policy guidelines.* Washington, DC: National Abortion Federation; 2014.
20. Clark W, Panton T, Hann L, Gold M. Medication abortion employing routine sequential measurements of serum hCG and sonography only when indicated. *Contraception* 2007;75(2):131-5. Epub 2006 Dec 22.
21. Kaneshiro B, Edelman A, Sneeringer RK, Ponce de Leon RG. Expanding medical abortion: can medical abortion be effectively provided without the routine use of ultrasound? *Contraception* 2011;83(3):194-201. Epub 2010 Sep 17.
22. Schonberg D, Wang LF, Bennett AH, Gold M, Jackson E. The accuracy of using last menstrual period to determine gestational age for first trimester medication abortion: a systematic review. *Contraception* 2014;90(5):480-7. Epub 2014 Jul 18.
23. Creinin MD, Vittinghoff E, Keder L, Darney PD, Tiller G. Methotrexate and misoprostol for early abortion: a multicenter trial. I. Safety and efficacy. *Contraception* 1996;53(6):321-7.
24. Wiebe ER, Trouton K. Comparing vaginal and buccal misoprostol when used after methotrexate for early abortion. *Contraception* 2004;70(6):463-6.
25. Carbonell JL, Varela L, Velazco A, Fernandez C. The use of misoprostol for termination of early pregnancy. *Contraception* 1997;55(3):165-8.
26. Clark W, Shannon C, Winikoff B. Misoprostol for uterine evacuation in induced abortion and pregnancy failure. *Expert Rev Obstet Gynecol* 2007;2:67-108.
27. Creinin MD. Change in serum beta-human chorionic gonadotropin after abortion with methotrexate and misoprostol. *Am J Obstet Gynecol* 1996;174(2):776-8.
28. Frye LJ, Chong E, Winikoff B. What happens when we routinely give doxycycline to medical abortion patients? *Contraception* 2015;91(1):19-24. Epub 2014 Sep 15.
29. Finer LB, Wei J. Effect of mifepristone on abortion access in the United States. *Obstet Gynecol* 2009;114(3):623-30.
30. Jones RK, Jerman J. Abortion incidence and service availability in the United States, 2011. *Perspect Sex Reprod Health* 2014;46(1):3-14. Epub 2014 Feb 3.