

Canada First Trimester Surgical Abortion Practice

Cite as:

Renner R-M, Hu V, Guilbert ÉR, Albert AYK, White KOC, Jones HE, et al. First-trimester surgical abortion practice in Canada in 2012. *Canadian Family Physician*. 2023;69(1):36-44.

in Canada

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Words: 1999

Tables: 4

Figures: 3

Abstract

Objective

To evaluate practices among first-trimester surgical abortion facilities and providers in Canada and examine the characteristics of the surgical abortion workforce.

Study Design

Self-administered paper or electronic surveys adapted from a previously US fielded survey.

Setting

Abortion providers in Canada

Participants

Facility administrators and physicians

Main outcomes measures

We present descriptive statistics on reported first-trimester surgical abortion practice and provider demographics.

Results

Eighty-three percent of identified facilities (78/94), and 178 physicians responded. Of the respondents, 99% of facilities and 96% of physicians provided first-trimester surgical abortions. Responding facilities provided 68,154 first-trimester surgical abortion in 2012. This represented 96% of their reported total (combined medical and surgical) first-trimester abortions. Over half (55%) of responding facilities were community-based, while 45% were hospital-affiliated. Most abortion physicians were female (68%) and family practitioners (59%).

Preoperatively, 90% of physicians routinely used ultrasound, and 90% gave perioperative antibiotics. Almost half (48%) used manual vacuum aspiration, but less than 35% did so beyond 9 weeks LMP. Most facilities performed most procedures under combined local anesthesia and IV sedation (73%); only 7% indicated using exclusively deep sedation or general anesthesia. Postoperatively, 81% of physicians performed immediate tissue exam and 96% offered post-abortion contraception on the same day as the abortion. Other assessed outcomes included medication regimens and cervical preparation, with a high degree of consistency among facilities and physicians.

Conclusion

First-trimester surgical abortion providers are mostly family physicians and female. Practices across Canada were mostly uniform and followed evidence-based guidelines. Recently published updated Canadian practice guidelines may help further standardize patient care and improve routine perioperative antibiotic use and immediate tissue exam.

Key words/MeSH terms

First-trimester abortion; Surgical abortion; Pregnancy, unplanned; Abortion, Induced/methods; Abortion, Pregnancy Trimester, First; Family Planning Services.

Introduction

Induced abortion is common in Canada with 97,764 abortions reported to the Canadian Institute of Health Information (CIHI) for 2016. (1) CIHI reports on numbers of abortion in Canada, but not on the workforce or their clinical practices. (2) Based on provincial health regulations, up to 2017, only physicians could provide abortion services. National and international guidelines on evidenced-based abortion care have been available since 2006. (3-8) While prior studies have examined clinical practice among US based providers in 2007 and 2012 (9-11), and those in British Columbia in 2010, (12) there are no data on the extent to which these guidelines are followed across Canada or on the physician demographics.

We aimed to survey all surgical abortion facilities and their providers in Canada to document their workforce and their abortion practices. We report here on first-trimester surgical abortion practices; findings on abortion health services distribution, first-trimester medication abortion (MA) practices in Canada, and MA and surgical abortion practices in the US have been previously reported. (11, 13-16)

Material and methods

We conducted a cross-sectional survey among abortion providers in Canada from July through November 2013. We identified abortion service provider facilities through online and telephone directories, and professional networks. We distributed a self-administered

questionnaire on the abortion services provided in 2012 in every Canadian region. Detailed methods have been previously described. (14) We based the survey on an existing US instrument, (9, 10, 12) which we adapted for use in Canada. English and French survey versions were piloted by practicing English and Francophone abortion providers to ensure accuracy and relevance. Three types of survey booklets were distributed to each facility: administrator (questions on overall facility services & experiences), surgical abortion and MA Providers (questions on provider demographics, their practices and experiences with stigma).

This analysis will focus on the reported practices and provider characteristics for first-trimester surgical abortion (before 14 weeks gestation).

Survey Distribution and Collection

We distributed the surveys via mail and e-mail, in language appropriate print and internet-based formats. At weeks 1, 2, 4 & 6 we employed Dillman technique (call, fax and email) reminders. (17) We invited responses from an administrator as well as up to five surgical abortion and five MA providers at each facility.

Data Entry and Analysis

We employed verified double entry for all data from written survey booklets. In addition to descriptive statistics, we compared practice by facility and physician characteristics using Fisher's exact tests for categorical variables and t-tests, ANOVA, Wilcoxon rank sum tests or Spearman's rank correlation for continuous variables. For facility characteristics, we examined regional differences, facility type, and size (categorized by the total number of first and second trimester surgical abortion and MA provided annually,

defined as small (<500 cases), medium (500-1000 cases), or large (>1000 cases)). For clinician differences, we examined age, sex, years of experience, and specialty. We used R software for data analysis. (18)

The University of British Columbia Children's and Women's Hospital Research Ethics Board approved the study (H13-00090), as did the Human Research Protections Program Integrated Institutional Review Board of City University of New York related to the overall conduct of the project, which included data collection in the US.

Results

We identified 94 facilities across Canada, of which 78 (83%) responded; 74 facilities (79%) returned administrator surveys, and 171 first-trimester surgical abortion providers returned surgical abortion provider surveys (Figure 1). Almost all facilities (n=73) offered first-trimester surgical abortions. One-hundred-sixty-seven physicians answered the remaining questions regarding surgical abortion.

Facility Characteristics

Facilities reported 68,154 first-trimester surgical abortions in 2012. This represented 90% of the combined total number of first and second trimester abortions they reported in our survey^{13, 14}, and 96% of the combined medical and surgical first-trimester procedures they reported in our survey. A third of the facilities were "large", and provided 78% of reported first-trimester surgical abortions (Table 1).

Over half of identified first-trimester surgical abortion facilities were in Quebec (55%), providing a third of first-trimester surgical abortions (Table 1). Facility size varied significantly

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between regions; two-thirds of 40 responding clinics from Quebec were small, while most of the 7 clinics from Ontario (86%) and all 5 clinics from the Prairies were large ($p < 0.01$).

Consistently across Canada, over 70% of first-trimester SAs were provided in community-based clinics rather than in hospitals. Procedure volume per individual provider was higher in community clinics than in the hospital setting, with a median of 300 procedures (IQR, 100-700) vs. 150 (IQR, 39-250), $p < 0.01$.

A third of facilities provided surgical abortion beginning at 5 weeks gestation, and 95% of community-based clinics and 71% of hospital-affiliated facilities offered surgical abortion services ($p=0.06$) by 7 weeks' gestation. Nearly half (44%) of the facilities provided surgical abortion up to or beyond 14 weeks' gestation.

Physician Characteristics

Participating physicians reported 52,028 first-trimester surgical abortions in 2012, which was 76% of all procedures reported by the facilities. A limit of 5 physicians per facility were permitted to respond to the survey, therefore the total number of procedures in larger facilities was underreported. Contraception and abortion care were reported to be on average 40% (SD 34%) of a physician's overall clinical practice.

Table 2 details characteristics of first-trimester surgical abortion providers. Female physicians were more likely to be family physicians (FP) than males (65% vs. 44%, $p = 0.03$). FPs provided more procedures per physician (median 250, IQR 120-600) than other specialties (median 96, IQR 24-250, $p < 0.0001$). Male providers were on average 12.5 years older than females (mean 57.5 ± 12.1 years vs. 45.1 ± 10.3 years, $p < 0.0001$). There was a significant positive

correlation between older age and higher annual procedure volume (Spearman's $\rho = 0.37$, 95%CI 0.23, 0.50).

Pre-operative procedures and techniques

Ultrasound was the most commonly used method to confirm gestational age (GA) (96% of participants). Multiple answers for dating criteria were allowed and participants reported also using last menstrual period (LMP) (60%) or bimanual exam (51%). If LMP and ultrasound were discrepant, 75% of providers used ultrasound as their preferred measure.

Cervical preparation increased with GA, with misoprostol being the most frequently used method (Figure 2). At 12 weeks gestation, more physicians used cervical preparation in nulliparous women, compared to use in multiparous women (77% versus 59%, $p = <0.01$). Community-based clinics used significantly less cervical preparation than hospital-affiliated facilities ($p <0.01$, Table 3).

Surgical techniques

Almost half the physicians (48%) reported using manual vacuum aspiration (MVA), with more FPs than OBs/GYNs (<6 weeks' 37% vs. 17%, $p = 0.008$; 6 – 7 weeks' 44% vs. 22%, $p = 0.004$). The use of MVA decreased as gestational age increased.

Medications and anesthesia

The most frequently used pre-operative analgesic was non-steroidal anti-inflammatory drugs (Table 4). Perioperative antibiotics were routinely used by 89% of physicians. In Atlantic

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Provinces, Ontario and Quebec, doxycycline was the most commonly used antibiotic ($\geq 89\%$) while it was metronidazole in BC and the Territories (87% and 57% respectively ($p < 0.01$)).

The primary choice of anesthesia reported by facilities was local anesthesia combined with intravenous (IV) moderate sedation; nearly half of facilities (46%) used this combination exclusively, and another quarter (27%) used it most of the time. Five facilities (7%) used deep sedation or general anesthesia exclusively. Twenty-nine percent of hospital-affiliated facilities reported using deep sedation or general anesthesia for more than 50% of their procedures, as opposed to only 3% of community-based facilities ($p = 0.004$). The majority of oral analgesics were non-steroidal anti-inflammatory drugs (NSAIDs, 64%) while oral opioids were rarely used (5%).

Non-pharmacological comfort measures

Physicians reported using a variety of non-pharmacological techniques to relieve pain (74%), such as focused breathing (63%) or music (55%, multiple responses permitted).

Intra- and Post-Operative Ultrasound Use

Most physicians used intra- (60%) and post-operative (70%) ultrasound only as clinically indicated. Routine post-operative use was more common in B.C. and the Territories (38% and 57% respectively), in contrast to other regions, $p < 0.0001$ (Figure 3).

Post-operative care

The majority of clinicians routinely performed an immediate postoperative tissue exam on-site (81%).

A post-abortion visit was routinely required by 51% of providers for early surgical abortions of $\leq 6-7$ weeks' gestation, and by 42% regardless of gestational age.

Discussion

We present the first national report on physician demographics and clinical practices for first-trimester surgical abortion care in Canada. In 2012, first-trimester abortion services across Canada were performed following best evidence and practice guidelines in most important aspects such as ultrasound use, cervical preparation, use of anaesthesia and postoperative care. Consistent with US data (19), we found 90% of abortions reported were first-trimester surgical abortions with the remaining 10% being first-trimester MA or 2nd trimester medical or surgical abortion.

Greater than half of survey respondents were FPs, consistent with FPs being the primary providers for other reproductive health care in Canada, such as contraception and cervical cancer screening. Interestingly, similarly to the U.S. data that had been collected at the same time by another study team(20) the majority of respondent were female while a 2006 review of Ontario billing codes showed that male FPs and General Practitioners had a higher number of office-based surgical procedures.(21) Female providers were younger than males and tended to be lower volume providers than their older male counterparts. This finding indicates that there is a transition of abortion care from older males who provide high volume care to younger females who provide low volume care. This change mirrors changes in medicine in general with more female than male medical school and family medicine graduates now compared to decades ago. (22) Our finding have implications for workforce planning including residency or post residency

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training as either the number of providers or the number of procedures per younger provider will need to increase to pick up the work from eventually retiring older high volume providers.

Over 70% of first-trimester surgical abortions were provided in community-based clinics. Extensive evidence supports similar clinical and safety outcomes in both hospital and outpatient settings. (4, 8, 23) Nonetheless, the province of New Brunswick continues to limit government provision of abortions exclusively to hospitals, a non-evidence based policy with the potential to limit access to service for women. (24, 25)

Only 10% of facilities offered surgical abortions at 4 weeks' gestation or less, despite the absence of a guideline to delay abortion until a certain gestational age. (5) Based on new data, the latest guidelines specifically recommend to perform surgical abortion as early as possible provided that tissue aspirate is examined and ectopic pregnancy ruled out. (6, 26, 27)

While 96% of providers used ultrasound as their primary method to establish gestational age in first-trimester, guidelines state that ultrasound is not required for dating and should not limit abortion service provision. Clinical history and bimanual pelvic exam are often sufficient to date a first-trimester pregnancy. (4, 8, 23, 26-28) It is important that abortion providers are aware of this dating recommendation as it supports access to abortion care especially in areas where ultrasound is not readily available. This is especially important as prior research has demonstrated disparities in abortion access with access in most provinces being centered in Canadian large urban areas rather than being equally present in rural locations. (14)

Providers reported significant variability in cervical preparation between 11-13 weeks' gestation. This reflects the lack of evidence when to initiate cervical preparation. Multiple international guidelines which were in place at the time of the survey recommend against routine cervical preparation, but to consider the use in women at risk of cervical or uterine injury, such

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as in all adolescents (<17 years), women between 12-14 weeks' gestation, women with cervical anomalies or previous surgery, or for a less experienced surgeon. (4, 8, 23, 26, 27, 29, 30) While Canadian providers were more likely to report cervical preparation for nulliparous women than multiparous women, this practice is not supported by evidence. (4, 26) Misoprostol was used almost twice as frequently as osmotic dilators. It is often preferred due to its ease of administration, shorter time interval to maximum effectiveness, patient preference, and less discomfort. (11, 30) The combination of misoprostol and cervical dilators was rarely used and has shown no benefit for cervical dilation in <19 weeks' gestation. (4, 26, 31)

Only 50% of Canadian abortion providers selectively used MVA as opposed to electric vacuum aspiration (EVA). MVA has shown equivalent efficacy and safety as EVA and is less costly. (4, 8-10)

Surprisingly and similarly to the U.S. survey (11) a tenth of physicians in Canada did not routinely provide antibiotics, despite strong and consistent guideline recommendations to use them preoperatively. (4, 8, 26, 27, 32, 33)

The majority of procedures were undertaken with IV sedation and local anesthesia which have been found to be effective and safe. (27, 34, 35) However, 7% of clinics used deep sedation or general anesthesia as the sole method of analgesia, despite guidelines advising against its routine use for these procedures. (4, 8) Disadvantages of general anesthesia include increased costs, longer recovery time, anesthesia related complications. (4) Consistent with evidence the mainstay of oral analgesics were NSAIDs; oral opioids have not been shown to decrease abortion related perioperative pain. (34, 36) This is reassuring in the context of the opioid crisis.

Consistent with recommendations, less than half the physicians recommended routine follow up post-procedure. However, appropriate post-procedure follow-up should be accessible. (4, 8, 26, 27)

Strengths and Limitations

The major strength of this survey was our 83% response rate with data from every Canadian region – capturing facilities reporting provision of 81% of all abortions reported by CIHI for 2012. (2) Additionally, techniques were reported by individual physicians who provided over three-quarters of abortions at these facilities. Our preliminary data informed the recently published updated Canadian surgical abortion guidelines.

Focusing recruitment on known abortion facilities, rather than all abortion providers or facilities may have led to under-sampling of the true population and limiting generalizability of our data. This is particularly true for Ontario where providers only reported 8,233 of the 25,400 procedures reported to CIHI. (2)

Our data were collected in 2012 prior to mifepristone becoming available in Canada in 2017. While mifepristone medical abortion will likely have changed the workforce and practice for first trimester medical abortion, as well as the proportion of medical versus surgical abortion, this will have had little if any impact on actual practice of first trimester surgical abortion. The updated guidelines for first trimester surgical abortion did not include significant changes (26) other than emphasizing the evidence on care aspects we identified in our study as not being well adhered to such as antibiotic use. We therefore consider our data still relevant for current practice. This data will further be very helpful to interpret workforce changes that might have occurred with mifepristone becoming available in Canada or with retirement of the older

workforce participants of our survey and is useful for workforce planning including policies and programs around residency training and continued medical education.

Conclusion

Our survey data provides the first national documentation of first-trimester surgical abortion practices in Canada, demonstrating a high degree of evidence-based practice. Recently updated Canadian guidelines may help standardize first-trimester cervical preparation and increase universal preoperative antibiotic prophylaxis. Improvements could be made with regards to decreasing routine use of general anesthesia and authorizing community-based services in all jurisdictions.

Figure 1: Distribution and responses received by type of survey.

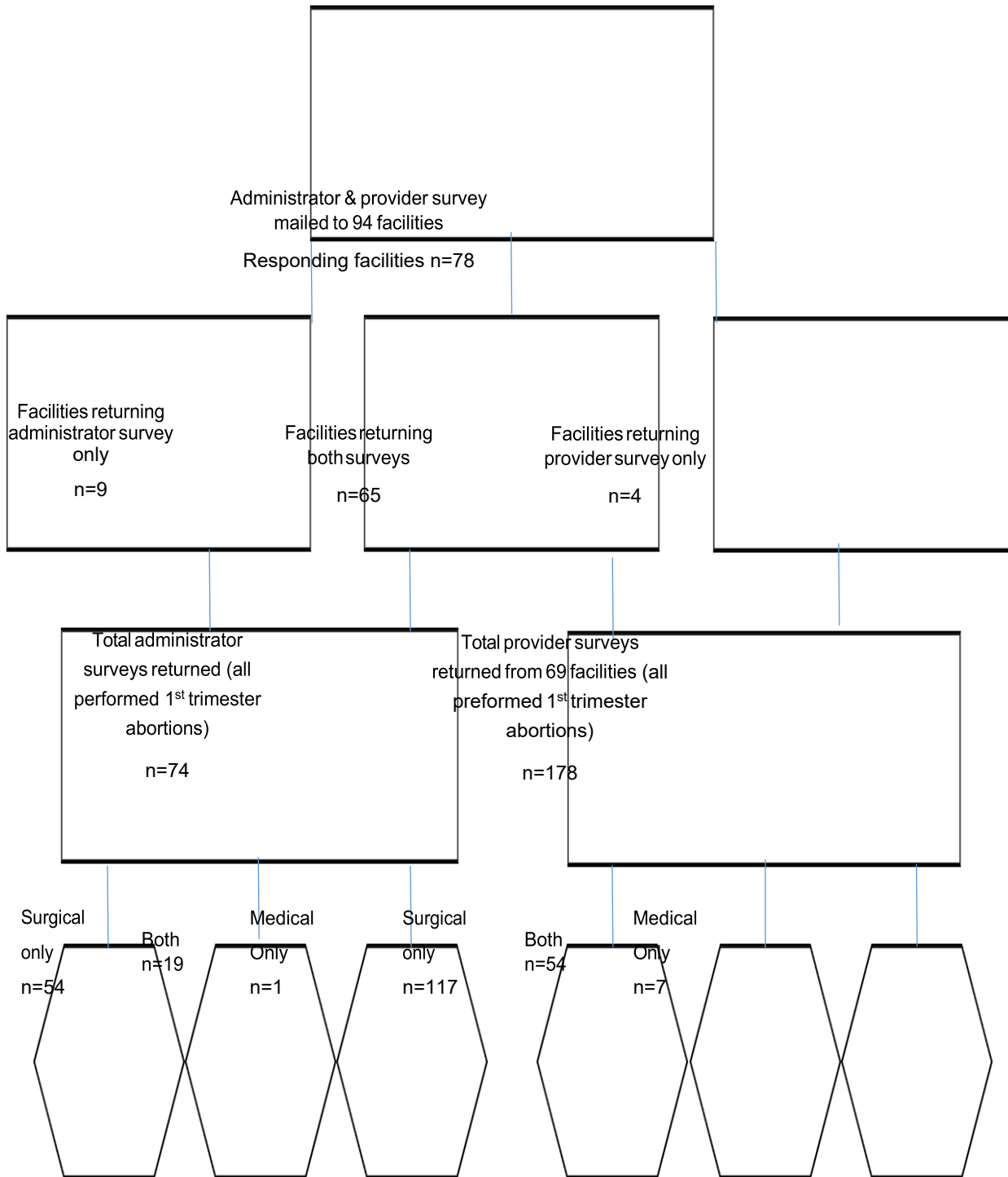
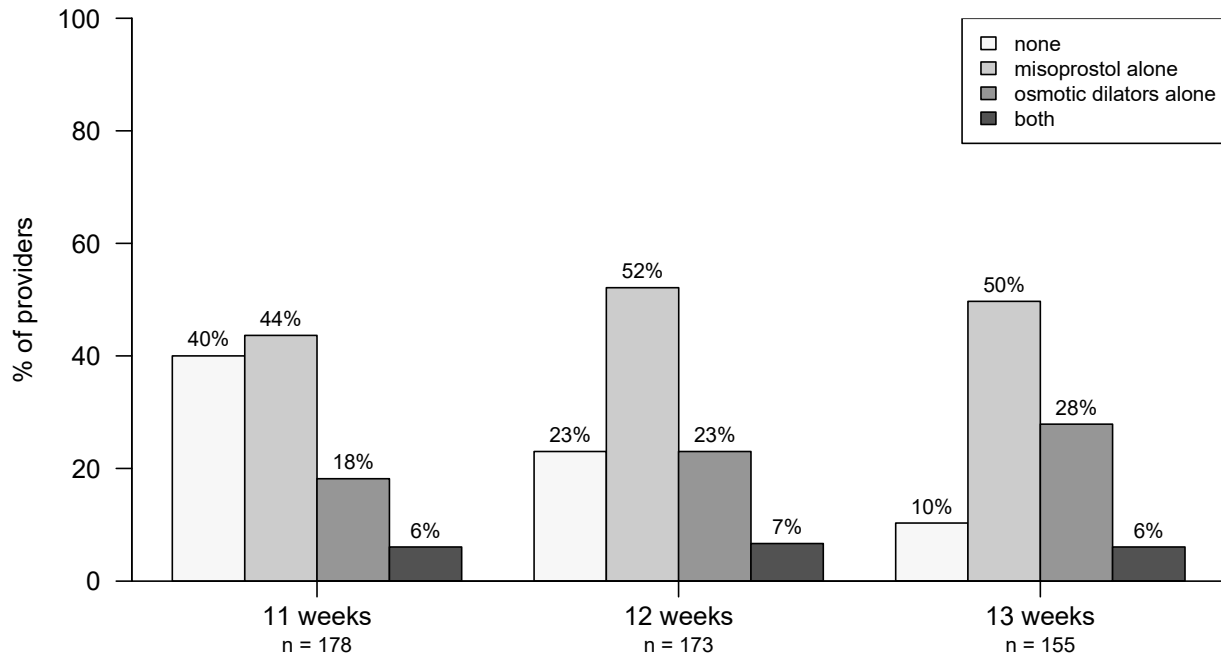
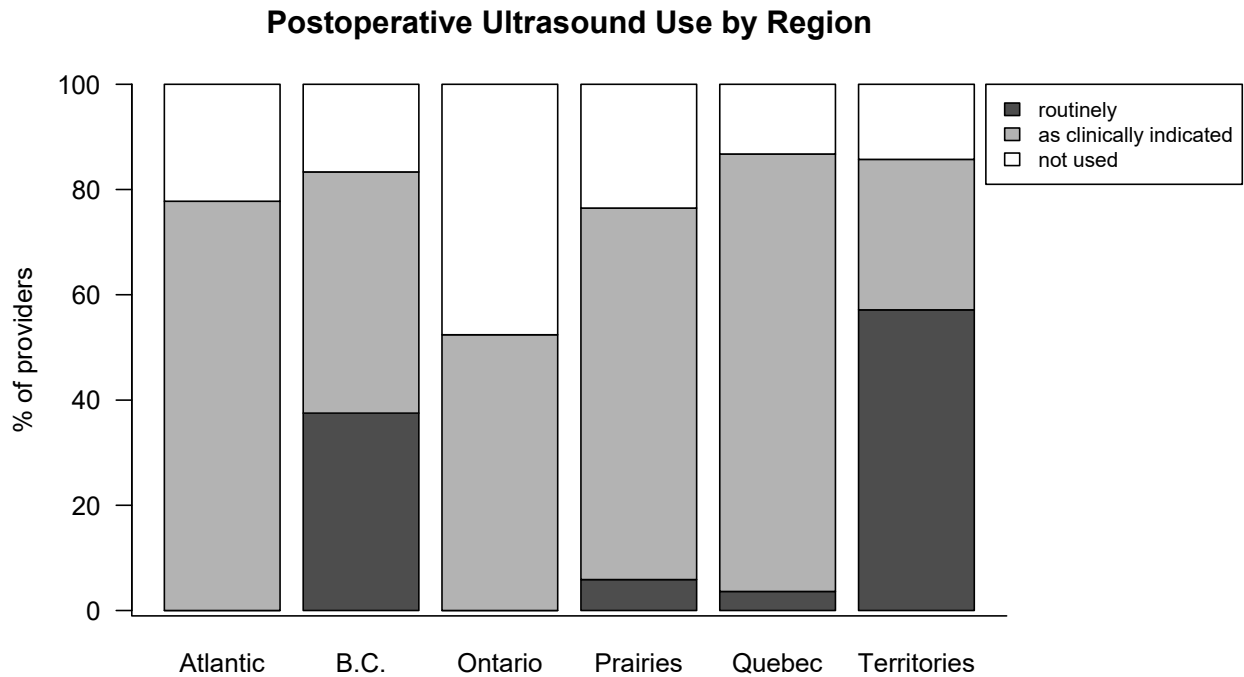


Figure 2: Method of cervical preparation by gestational age in nulliparous patients



**Multiple responses were allowed*

Figure 3: Post-operative ultrasound use in first-trimester surgical abortion, by Region in 2012



*BC and the Territories used post-operative ultrasound significantly more than other regions (Fisher's exact test $p < 0.0001$).

Table 1: Characteristics of Canadian facilities offering first-trimester abortion in 2012. (administrator survey) (n=73)

Characteristics	Facilities n (%)	First-trimester surgical abortions n (%)	All first-trimester abortions n (%)	Proportion of first-trimester abortions that were surgical %
Facility size, by number of abortions per year				
Small (<500)	37 (51)	6,088 (9)	6,806* (10)	90*
Medium (500-1000)	12 (16)	8,814 (13)	8,814 (12)	100
Large (>1000)	24 (33)	53,252 (78)	55,225 (78)	96
Region				
1 – Atlantic	4 (6)	3318 (5)	3318 (5)	100
2 – BC	14 (19)	11608 (17)	13850 (20)	84
3 – Ontario	7 (10)	14994 (22)	15095 (21)	99
4 – Quebec	40 (55)	22319 (33)	22381 (32)	100 [#]
5 – Prairies	5 (7)	15389 (23)	15648* (22)	98
6 – Territories	3 (4)	526 (1)	553 (1)	95
Facility type				
Community- based	40 (55)	48404 (71)	50869* (72)	95
Hospital- affiliated	33 (45)	19750 (29)	19976 (28)	99
Total	73 (100)	68154 (100)	70845* (100)	100 [#]

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* Note that this table does not include 15 medical abortions reported from one facility that performed medical abortion only

less than 0.5% medical abortions

Acknowledgements:

The authors wish to sincerely thank all participating clinics and staff members for their time and effort in completing the surveys. We are grateful for the time and efforts of Dr. Christopher Opaleke in distributing this survey, and for the coordination of Dr. Weihong Chen.

Funding statement

This study was funded by the Society of Family Planning (SFP6-3). The views and opinions expressed are those of the authors and do not necessarily represent the views and opinions of Society of Family Planning. Supplemental funding from the Clinical Translational Science Center, National Center for Advancing Translational Sciences (UL1-RR024996) was used for French translations of the surveys. Infrastructure support for Dr. Norman and her team throughout this project was provided by The Women's Health Research Institute of British Columbia Women's Hospital and Health Centre. Dr. Norman is supported as a Canadian Institutes of Health Research Chair in Family Planning Public Health Research (grant number CPP - 137903), and as a Scholar of the Michael Smith Foundation of Health Research (Award #2012-5139 (HSR)).

Contributors

The survey was developed by HJ and KW and revised for Canadian relevance by WN and EG. Canadian data were collected by WN and EG. Analyses were conducted by AA, VH, XG, RR, and WN. The first draft was prepared by VH, RR, and XG, all authors contributed to revisions and accepted the final version of the manuscript.

Competing Interests

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None of the authors declare any competing interests.

Key Points

- This survey of first-trimester surgical abortions in Canadian facilities in 2012 and their providers to date is the most comprehensive account of the workforce and their clinical practice in Canada.
- These data informed updated clinical guidelines and policy changes in abortion services provision in Canada.

References

1. Canadian Institutes for Health Information. Induced Abortions Reported in Canada in 2016 2016 [cited 2018 Dec 2]. Available from: <https://www.cihi.ca/en/search?query=block=abortions+in+2016&Search+Submit=>.
2. Canadian Institutes for Health Information. Induced abortions performed in Canada in 2012. 2012 [cited 2015 18 Nov]. Available from: http://www.cihi.ca/CIHI-ext-portal/pdf/internet/TA_11_ALLDATATABLES20140221_EN
3. Davis V. Induced Abortion Guidelines. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC. 2006;28(11):1014-27.
4. World Health Organization Department of Reproductive Health and Research. Safe abortion: Technical and policy guidance for health systems - 2nd edition Geneva: WHO Press; 2012 [cited 2013 January 1]. Available from: http://www.who.int/reproductivehealth/publications/unsafe_abortion/9789241548434/en/index.html.
5. National Abortion Federation. Clinical Policy Guidelines. Washington: National Abortion Federation; 2012.
6. Lichtenberg ES, Paul M, Society of Family P. Surgical abortion prior to 7 weeks of gestation. Contraception. 2013;88(1):7-17. Epub 2013/04/12. doi: 10.1016/j.contraception.2013.02.008. PubMed PMID: 23574709.
7. Guiahi M, Davis A. First-trimester abortion in women with medical conditions: release date October 2012 SFP guideline #20122. Contraception. 2012;86(6):622-30. Epub 2012/10/09. doi: S0010-7824(12)00811-6 [pii] 10.1016/j.contraception.2012.09.001. PubMed PMID: 23039921.
8. Royal College of Obstetrics and Gynaecology. The Care of Women Requesting Induced Abortion London: RCOG Press; 2011 [cited March 1, 2013 March 1, 2013]. Available from: http://www.rcog.org.uk/files/rcog-corp/Abortion%20guideline_web_1.pdf.
9. Lichtenberg ES, Paul M, Jones H. First trimester surgical abortion practices: a survey of National Abortion Federation members. Contraception. 2001;64(6):345-52. PubMed PMID: 11834232.
10. O'Connell K, Jones HE, Simon M, Saporta V, Paul M, Lichtenberg ES. First-trimester surgical abortion practices: a survey of National Abortion Federation members. Contraception. 2009;79(5):385-92. Epub 2009/04/04. doi: S0010-7824(08)00520-9 [pii]

10.1016/j.contraception.2008.11.005. PubMed PMID: 19341852.

11. White KO, Jones HE, Lavelanet A, Norman WV, Guilbert E, Lichtenberg ES, et al. First-trimester aspiration abortion practices: a survey of United States abortion providers. *Contraception*. 2019;99(1):10-5. Epub 2018/08/21. doi: 10.1016/j.contraception.2018.08.011. PubMed PMID: 30125557.

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. Epub 2013/07/11. doi: 10.1371/journal.pone.0067023. PubMed PMID: 23840578; PubMed Central PMCID: PMC3696020.

13. Guilbert ER, Hayden AS, Jones HE, White KO, Steven Lichtenberg E, Paul M, et al. First-trimester medical abortion practices in Canada: National survey. *Canadian family physician Medecin de famille canadien*. 2016;62(4):e201-e8. Epub 2017/02/14. PubMed PMID: 28192275; PubMed Central PMCID: PMC4830676.

14. Norman WV, Guilbert ER, Okpaleke C, Hayden AS, Steven Lichtenberg E, Paul M, et al. Abortion health services in Canada: Results of a 2012 national survey. *Canadian family physician Medecin de famille canadien*. 2016;62(4):e209-e17. Epub 2017/02/14. PubMed PMID: 28192276; PubMed Central PMCID: PMC4830677.

15. Jones HE, O'Connell White K, Norman WV, Guilbert E, Lichtenberg ES, Paul M. First trimester medication abortion practice in the United States and Canada. *PloS one*. 2017;12(10):e0186487. Epub 2017/10/12. doi: 10.1371/journal.pone.0186487. PubMed PMID: 29023594; PubMed Central PMCID: PMC5638562.

16. White KO, Jones HE, Shorter J, Norman WV, Guilbert E, Lichtenberg ES, et al. Second-trimester surgical abortion practices in the United States. *Contraception*. 2018. doi: 10.1016/j.contraception.2018.04.004. PubMed PMID: 29665357.

17. Dillman DA. *Mail and Internet Surveys: the Tailored Design Method* New York: John Wiley and Sons Inc.; 2000.

18. R Core Team. *R: A language and environment for statistical computing*. R. Foundation for Statistical Computing, Vienna, Austria. 2013 [cited 2014 Jun 7]. Available from: <http://www.R-project.org/>.

19. Pazol K, Creanga AA, Burley KD, Jamieson DJ. Abortion surveillance - United States, 2011. *Morbidity and mortality weekly report Surveillance summaries*. 2014;63(11):1-41. PubMed PMID: 25426741.

20. White KO, Jones HE, Lavelanet A, Norman WV, Guilbert E, Lichtenberg ES, et al. First-trimester aspiration abortion practices: a survey of United States abortion providers. *Contraception*. 2018. doi: 10.1016/j.contraception.2018.08.011. PubMed PMID: 30125557.

21. Jaakkimainen RL, Sood PR, Schultz SE. Office-based procedures among urban and rural family physicians in Ontario. *Canadian family physician Medecin de famille canadien*. 2012;58(10):e578-87. PubMed PMID: 23064937; PubMed Central PMCID: PMC3470536.

22. Jaakkimainen RL, Schultz SE, Glazier RH, Abrahams C, Verma S. Tracking family medicine graduates. Where do they go, what services do they provide and whom do they see? *BMC Fam Pract*. 2012;13:26. doi: 10.1186/1471-2296-13-26. PubMed PMID: 22453049; PubMed Central PMCID: PMC3342112.

23. Paul M, Lichtenberg ES, Borgatta L, Grimes DA, Stubblefield PG. *Management of unintended and abnormal pregnancy*. Paul M, Lichtenberg ES, Borgatta L, Grimes DA, Stubblefield PG, editors. Chichester, W. Surrey: Wiley-Blackwell; 2009.

24. CBC News. New Brunswick women will be able to get abortion pill free of charge Government wants to reduce financial barriers to women's right to choose, health minister says. 2017 [cited 2017 July 29]. Available from: <http://www.cbc.ca/news/canada/new-brunswick/abortion-pill-new-brunswick-1.4054517>

25. Global News. New Brunswick directing women to receive abortions at hospitals dealing with COVID-19.: Global News.; 2020 [cited 2021 03/03]. Available from: <https://globalnews.ca/news/6802731/new-brunswick-abortion-services-covid-19/>.
26. Costescu D, Guilbert E, Bernardin J, Black A, Dunn S, Gomes M, et al. No. 360-Induced Abortion: Surgical Abortion and Second Trimester Medical Methods. *Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC.* 2018;40(6):750-83. doi: 10.1016/j.jogc.2017.12.010. PubMed PMID: 29861084.
27. National Abortion Federation. Clinical Policy Guidelines for Abortion Care Washington, DC: National Abortion Federation; 2020 [cited 2020 Jul 8]. Available from: <https://prochoice.org/resources/clinical-policy-guidelines/>.
28. Costescu D, Guilbert E, Bernardin J, Black A, Dunn S, Fitzsimmons B, et al. Medical Abortion. *Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC.* 2016;38(4):366-89. doi: 10.1016/j.jogc.2016.01.002. PubMed PMID: 27208607.
29. Kapp N, Lohr PA, Ngo TD, Hayes JL. Cervical preparation for first trimester surgical abortion. *Cochrane Database Syst Rev.* 2010(2):CD007207. doi: 10.1002/14651858.CD007207.pub2. PubMed PMID: 20166091.
30. Allen RH, Goldberg AB. Cervical dilation before first-trimester surgical abortion (<14 weeks' gestation). *SFP Guideline 2007. Contraception.* 2007;76(2):139-56. Epub 2007/07/28. doi: S0010-7824(07)00152-7 [pii] 10.1016/j.contraception.2007.05.001. PubMed PMID: 17656184.
31. Edelman AB, Buckmaster JG, Goetsch MF, Nichols MD, Jensen JT. Cervical preparation using laminaria with adjunctive buccal misoprostol before second-trimester dilation and evacuation procedures: a randomized clinical trial. *Am J Obstet Gynecol.* 2006;194(2):425-30. PubMed PMID: 16458640.
32. Low N, Mueller M, Van Vliet HAAM, Kapp N. Perioperative antibiotics to prevent infection after first-trimester abortion. *The Cochrane database of systematic reviews.* 2012(3):CD005217. doi: <https://dx.doi.org/10.1002/14651858.CD005217.pub2>.
33. Achilles SL, Reeves MF. Prevention of infection after induced abortion: release date October 2010: *SFP guideline 20102. Contraception.* 2011;83(4):295-309. Epub 2011/03/15. doi: S0010-7824(10)00644-X [pii] 10.1016/j.contraception.2010.11.006. PubMed PMID: 21397086.
34. Renner RM, Jensen JT, Nichols MD, Edelman A. Pain control in first trimester surgical abortion. *The Cochrane database of systematic reviews.* 2009(2):CD006712. Epub 2009/04/17. doi: 10.1002/14651858.CD006712.pub2. PubMed PMID: 19370649.
35. Renner RM, Edelman AB, Nichols MD, Jensen JT, Lim JY, Bednarek PH. Refining paracervical block techniques for pain control in first trimester surgical abortion: a randomized controlled noninferiority trial. *Contraception.* 2016;94(5):461-6. doi: 10.1016/j.contraception.2016.05.005. PubMed PMID: 27235677.
36. Micks EA, Edelman AB, Renner RM, Fu R, Lambert WE, Bednarek PH, et al. Hydrocodone-acetaminophen for pain control in first-trimester surgical abortion: a randomized controlled trial. *Obstet Gynecol.* 2012;120(5):1060-9. Epub 2012/10/24. doi: <http://10.1097/AOG.0b013e31826c32f000006250-201211000-00012> [pii]. PubMed PMID: 23090523.