



Original research article

Second-trimester surgical abortion practices in the United States

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ABSTRACT

Objective: To assess whether second-trimester surgical abortion practices of U.S. providers agree with evidence-based policy guidelines.

Study Design: We conducted a cross-sectional survey of abortion facilities in the U.S. identified via publicly available resources and professional networks from June through December 2013.

Results: Of 703 identified facilities, 383 (54%) participated, including 172 clinicians providing second-trimester surgical abortions (dilation and evacuations [D&Es]). The majority of clinicians were obstetrician-gynecologists (87%), female (67%), and less than 50 years old (62%). Most clinicians (93%) ever use misoprostol as a cervical preparation agent, including in the setting of a uterine scar (87%). Some clinicians refer to a hospital-based provider if the patient has a placenta previa and a history of cesarean section (31%) or a complete previa alone (17%). Many clinicians have weight or body mass index restrictions for cases performed under iv moderate sedation (32/97, 33%) or deep sedation (23/50, 46%). Most clinicians (69%) who report performing D&Es at 18 weeks last menstrual period or greater do not routinely induce fetal demise preoperatively. Clinicians employ routine intraoperative ultrasound (79%) more commonly than routine postoperative ultrasound (47%), with no difference by years of provider experience. Most clinicians routinely use prophylactic uterotonic agents, most often postoperatively. Most clinicians (80%) routinely give perioperative antibiotics, most often doxycycline (75%).

Conclusion: Overall, the second-trimester surgical abortion practices revealed in our survey agree with professional evidence-based policy guidelines. Wider variability was reported for practices lacking a strong evidence base.

Implications: In this third cross-sectional survey of U.S. abortion practices (prior 1997 and 2002), second-trimester surgical abortion providers are younger than before, reflecting an improvement in the “graying” of the abortion provider workforce. Facility restrictions on gestational age along with hospital restrictions on referrals pose barriers to outpatient abortion access.

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1. Introduction

Despite the safety of legal abortions in the U.S., many states have restrictive laws and regulations that create barriers to safe, effective, timely and equitable abortion services [1]. Abortion restrictions continue to increase each year [2] despite their lack of scientific foundation. Attempts to delegitimize abortion providers are likely to continue;

therefore, establishing a standard of care for clinical and liability purposes is paramount. Documenting the extent to which second-trimester practice in the U.S. follows established evidence-based guidelines and identifying areas that exhibit variability can inform future guidelines and training and protect providers from spurious claims related to these procedures.

In 2013, we conducted a survey of first-trimester and second-trimester abortion practices among U.S. abortion facilities. This survey expanded on a first-trimester survey conducted in 1997 [3] and a first- and second-trimester survey conducted in 2002 [4,5]. The current analysis assesses second-trimester abortion practices of U.S. providers and investigates variation in these practices by facility size and clinician characteristics.

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2. Methods

Previous surveys conducted in 1997 [3] and in 2002 [4,5] included providers from a single professional network, the National Abortion Federation (NAF). In this study, we expanded our pool to include all facilities identified via known legitimate websites and professional provider networks in both the U.S. and Canada; the sample included ambulatory clinics, physicians' offices and hospital-based clinics. In 2013, we mailed self-administered questionnaires to 797 abortion facilities in the U.S. and Canada and offered a web-based version of the survey upon request. As an incentive, two sites randomly selected from the respondent list received US\$500. Two weeks after the due date of the questionnaire, we called nonresponding facility administrators and mailed a second package to sites that agreed to participate.

Each mailed package included separate questionnaires for administrators and providers. We asked the administrators to complete the first survey, which elicited information about services and procedures offered at their facilities, and to distribute the surgical abortion surveys to five clinicians who performed the most surgical abortion procedures in 2012. The clinician questionnaires inquired about individual providers' sociodemographics and clinical practices pertaining to surgical and medication abortion during the calendar year 2012. Clinicians were instructed to respond for the current facility or network of facilities under the same ownership and to report on their most usual practice. Almost all questions had precoded responses. The City University of New York Institutional Review Board and the University of British Columbia approved the study.

This analysis presents results on U.S. second-trimester surgical abortion practices, defined as instrumented or suction terminations performed at or after 14 weeks' gestation. We have published Canadian results elsewhere [6–8], as well as results on medication abortion [9]. We use *facilities* as the unit of analysis for results from the administrative survey and use *clinicians* as the unit of analysis for results from the clinician survey.

Facility administrators reported the annual number of second-trimester abortions performed via dilation and evacuation (D&E). We used these reports to calculate the total number of surgical abortions performed in 2012. Based on the annual volume of second-trimester surgical abortions, we classified facilities as small (less than 250), medium (250 to 500), or large (more than 500). We asked administrators to estimate the percentage of their procedures that were completed using different anesthesia regimens. We defined intravenous (iv) moderate (conscious) sedation as intravenous medications with or without local cervical anesthesia. We classified a regimen as used for a majority of cases if the proportion of procedures performed using that regimen was 51% or greater.

We explored differences in clinical practices by facility size and clinician demographics using Student's *t* test and chi-squared test for continuous and categorical outcomes, respectively. Analysis of clinician characteristics included age, gender, specialty and years of abortion provision since training. We examined associations between these characteristics and clinical practices and present all significant associations, as well as noteworthy nonsignificant findings.

3. Results

Of the 703 facilities identified in the U.S., 383 (54.4%) participated. Among the 320 nonresponding facilities, 42 (13.1%) provided medication abortion only, 57 (18.9%) limited services to the first trimester, 170 (53.1%) provided second-trimester services, and for 51 (15.9%), we did not have data on surgical abortion availability. Of participating facilities, 47% (179/383) provide second-trimester surgical abortions. These facilities reported 38,458-s-trimester surgical procedures in 2012. When we categorized facilities by annual caseload, over two thirds (70%, $n=125$) were small; only 8% ($n=15$) of facilities performed more than 500-s-trimester surgical abortions annually.

Almost half of facilities (85/179, 47%) self-identify as free-standing ambulatory health centers; fewer self-identified as private offices (49/179, 27%) or hospital-affiliated facilities (34/179, 19%). The geographic distribution of facilities is uneven: 41% (74/179) are located in the western U.S., 26% (46/179) in the east, 17% (31/179) in the south, and 16% (28/179) in the midwest; response rates also varied by region and were lower in the south (29.3%) and midwest (41.1%) than in the west (71.6%) and east (67.8%).

The 259 clinicians who completed the survey represent 249 facilities, with some providers working at (and thereby representing) more than one facility. Of these 259 clinicians, 172 (66%) provide second-trimester surgical abortions (Table 1). A majority of second-trimester surgical providers are female (67%) and middle aged (median age = 44 years, interquartile range = 38–60); 57% (97/169) of clinicians have at least 10 years of abortion experience after residency, and 30% (51/169) report greater than 20 years of experience. Almost one third (32%) of respondents performed more than 100-s-trimester surgical abortions in 2012.

3.1. Gestational age limits

Half of the facilities providing second-trimester surgical abortions (91/177, 51%) offer abortions after 20 weeks' gestation; 17% (30/177) offer abortions up to 24 weeks' gestation and 3% (5/177) do so after 24 weeks. We asked administrators about the circumstances under which their hospital or referral hospital permitted second-trimester abortions to be done in-hospital. Hospital-based facilities and those with equal provision in outpatient and hospital-based settings were less likely to report referral restrictions than private offices and ambulatory centers (Table 2).

3.2. Patient eligibility criteria

Almost all clinicians (166/168, 99%) will perform a second-trimester surgical abortion for a patient with a prior uterine incision. Seventy-five percent (124/165) of providers utilize more advanced testing (additional ultrasound, computed tomography scan or magnetic resonance imaging)

Table 1
Demographic characteristics of clinicians who performed second-trimester surgical abortions in 2012

Characteristic	Total (N=172)
Gender	
Female	115 (67)
Male	57 (33)
Age in years	
30–39	47 (27)
40–49	54 (31)
50–59	20 (12)
60–69	31 (18)
70–89	15 (9)
Missing data	5 (3)
Specialty	
OB/GYN	150 (87)
Family practice	17 (10)
Other	5 (3)
Board certified	154 (90)
Years of experience performing surgical abortion	
5 or fewer	33 (19)
6–10	39 (22)
11–20	46 (27)
Greater than 20	51 (30)
Missing data	3 (2)
Number of D&Es performed in 2012	
50 or fewer	67 (39)
51–100	44 (25)
101–250	33 (19)
Greater than 250	20 (12)
Missing data	8 (5)

All data presented as n (%).

Table 2

Proportion of U.S. facilities reporting hospital restrictions on referral of patients for second trimester abortions, by facility type and reason for referral, 2012

	Private offices/ambulatory centers (n=134)	Hospital-affiliated or equal provision in hospital/ambulatory settings (n=45)
Only for severe fetal or maternal indication	29 (22%)	6 (13%)
Only up to 16 weeks' gestation	1 (1%)	0
Only up to 18 weeks' gestation	2 (2%)	0
Only up to 20 weeks' gestation	5 (4%)	3 (7%)
Only up to 22 weeks' gestation	14 (10%)	4 (9%)
Only up to 24 weeks' gestation	26 (19%)	30 (67%)
Over 24 weeks' gestation for certain indications	25 (19%)	14 (31%)
No permissible indication	39 (29%)	n/a

Multiple answers permitted. We asked facility administrators the following: "Under what circumstances does your hospital (or referral hospital(s) if you are a private office or ambulatory clinic) permit second trimester abortions (terminations ≥ 14 weeks LMP) to be done in-hospital?"

for patients with a uterine scar. For women with a uterine scar, these providers obtain this additional testing either routinely (23/124, 19%) or in the following circumstances: complete previa (72/124, 58%), partial previa (66/124, 53%), anterior placenta (16/124, 13%) or gestational age exceeding 18 weeks last menstrual period (5/124, 4%; multiple responses allowed). Among nonhospital-affiliated providers, there was no association between referral for placenta previa and operator's age, years of abortion experience or number of D&Es performed.

For clinicians not affiliated with a hospital ($n=115$), placenta previa alone often leads to hospital referral: 26% (30/115) refer for complete previa, 21% (24/115) refer for partial previa and 12% (14/115) refer patients with any previa who are more than 18 weeks' LMP. In the setting of a placenta previa and a uterine scar, 46% of these clinicians (53/115) will refer to a hospital-based provider.

3.3. Anesthesia

During second-trimester surgical abortions, 85% (143/168) of clinicians offer iv moderate sedation, and 53% (90/170) offer general anesthesia. Responding facilities employ iv moderate sedation (87/173, 50%), deep sedation (32/174, 18%) or general anesthesia (36/174, 21%) for the majority of their cases.

At sites offering sedation, less than half of clinicians have weight or BMI restrictions for cases performed under iv moderate (32/97, 33%) or deep sedation (23/50, 46%), though 40% of clinicians report that the decision is made by the anesthesiology provider. We found no association between these restrictions and age or years of experience, though providers who performed a greater number of D&Es were more likely to have restrictions for deep sedation only ($P=.002$). Providers not affiliated with hospitals were more likely to report BMI/weight restrictions than hospital-affiliated providers for both iv moderate sedation (25% vs. 13%, $P=.03$) and deep sedation (49% vs. 6%, $P<.001$).

3.4. Cervical preparation

Eighty-five percent (147/172) of clinicians routinely use osmotic dilators—natural (75%) and synthetic (55%)—for cervical preparation. Seventy-five percent of respondents use misoprostol as a cervical preparation agent, and only 8% (13/168) use mifepristone. Nearly three-quarters of clinicians combine osmotic dilators and misoprostol, a practice that increased with gestational age and was most common at 20 weeks' gestation or more (Fig. 1, multiple responses permitted). Sixty-one percent (100/165) of providers routinely give antibiotic(s) to asymptomatic D&E patients during the period of cervical preparation. Of these providers, 85% give a single oral drug (85%) or parenteral drug (8%).

3.5. Clinical practices

All clinicians reported routine use of ultrasound to determine gestational age prior to second-trimester surgical abortion. Virtually all (166/167, 99%) clinicians use biparietal diameter to calculate gestational age; 68% (114/167) use femur length or head circumference as well (51/167, 31%; multiple responses permitted). Only 9% (15/167) of providers routinely estimate fetal weight. Most clinicians use intraoperative ultrasound routinely (79%), more often than postoperatively (47%). Clinicians use ultrasound as clinically indicated 19% of the time during a procedure and 47% of the time after a procedure. We found no association between intraoperative or postoperative ultrasound use and operator's age, years of abortion experience or number of D&Es performed.

Clinicians routinely utilize postoperative uterotonic agents most often before 20 weeks and intraoperative agents after 15 weeks (Fig. 2). Uterotonic use was not associated with years of experience. Number of abortions performed was associated with intraoperative uterotonic use at 20 weeks gestation and above; the more D&Es a provider

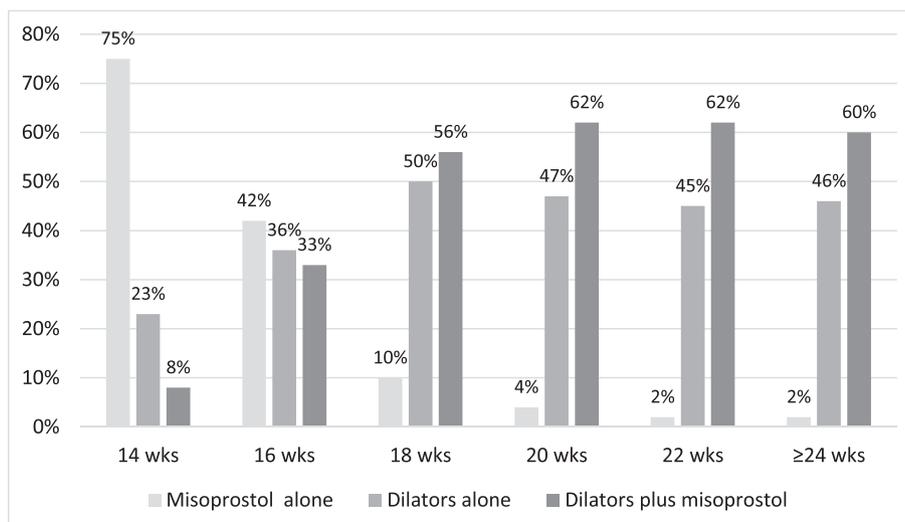


Fig. 1. Proportion of U.S. second-trimester surgical abortion providers using various cervical preparation techniques in 2012 * Multiple responses permitted.

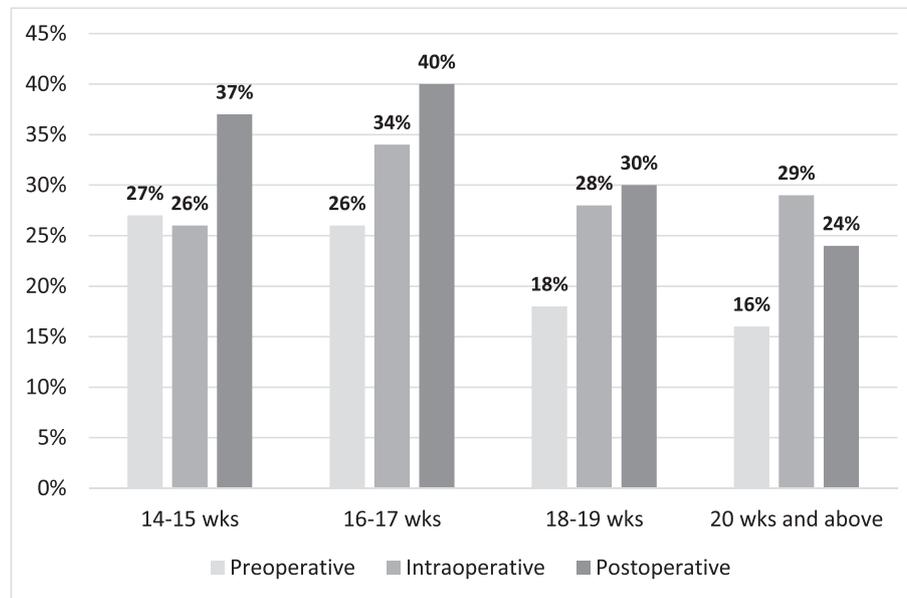


Fig. 2. Routine use of uterotonic agents among U.S. second-trimester surgical abortion providers in 2012

performed, the more likely they were to use intraoperative uterotonics ($P=.023$). Clinicians most often routinely use methylergonovine (64%), misoprostol (54%) and oxytocin (44%), followed by vasopressin (37%) and carboprost (6%). Ninety percent (153/169) of clinicians use misoprostol to treat excessive bleeding, most often 800 mcg and most commonly by the rectal (69%) or buccal (16%) route.

3.6. Induction of fetal demise

In 2012, 74% (123/167) of clinicians who reported performing D&Es at 18 weeks LMP or greater did not routinely induce preoperative fetal demise. Of the providers who did routinely induce fetal demise, 70% (31/44) began at 20 weeks' gestation or greater. Most of these providers (36/44, 82%) induce fetal demise 1 day prior to uterine evacuation using digoxin 1.0 mg (52%) by varying routes: intrafetal (40%), intraamniotic (26%), intracardiac (16%) and intrafunic (5%). Most clinicians (32/44, 73%) confirm fetal demise before D&E. Of providers who routinely induce fetal demise, many (16/37, 43%) reported that the Partial Birth Abortion Ban Act [10] altered their facility's technique to achieve fetal demise; four of these providers reported routine initiation of fetal demise after the ban was enacted.

3.7. Postoperative practices

Most clinicians (137/172, 80%) routinely provide perioperative antibiotics. Clinicians most often use doxycycline (97/129, 75%) followed by azithromycin (16/129, 12%). Clinicians have varying regimens for doxycycline, ranging from 7 days (30/97, 31%), one dose preoperative and postoperative (25/97, 26%), one day (21/97, 22%) to 2 to 3 days (19/97, 20%). Forty percent (66/166) of providers require routine scheduling of a postabortion visit following D&E, and 27% (45/166) require one if a perioperative complication occurred.

4. Discussion

Overall, the second-trimester surgical abortion practices revealed in our survey agree with professional evidence-based policy guidelines from NAF, the American College of Obstetricians and Gynecologists (ACOG) and the Society of Family Planning (SFP) [15–18]. Similar to the last cross-sectional survey of NAF providers, clinicians routinely use ultrasound to confirm dating, provide perioperative antibiotics

and perform D&E for patients with a prior uterine incision, and most do not require preoperative induced fetal demise. When placenta previa is suspected in a patient with a uterine scar, most respondents follow ACOG evidence-based guidelines by obtaining further diagnostic imaging [16]. Most D&E providers routinely employ intraoperative ultrasound, a practice that is recommended by NAF [15] and is informed by an early time series study showing a significantly reduced rate of perforation after initiation of routine ultrasound guidance [19]. While age of the provider was not associated with ultrasound use, this survey included a network of training programs; we did not assess the extent to which the presence of learners affects intraoperative ultrasound use.

Provider practices continue to vary when a strong evidence base is lacking. Antibiotic use during cervical preparation was common, despite a lack of studies that address the practice [17]. Clinicians show heterogeneity in uterotonic use, in terms of agents used, timing and route of administration. The available data about the effectiveness of routine prophylactic use of uterotonic agents in procedures over 20 weeks' gestation are both limited and conflicting [18,20]. Many providers reported weight or BMI restrictions, some of which were imposed by anesthesiologists. At the time of our survey, limited data were available to compare the safety of D&E in obese and nonobese patients [21]. Recent retrospective cohort studies involving more than 15,000 patients reveal no increased risk of surgical or anesthetic complications for obese patients [22–24], although one study found a significantly increased rate of major complications in D&E patients with BMIs exceeding 40 kg/m² [25]. Facilities may have legitimate reasons for imposing these restrictions that relate to location of the facility, providers' skill level or other factors. Since the time of our survey, newer SFP guidelines have emerged that may affect future practices, such as a recommendation for treating hemorrhage with buccal or sublingual misoprostol rather than rectal (owing to the less favorable pharmacokinetic properties of rectal administration).

Our survey found some restrictions on practice that may affect abortion access. Half of responding facilities are unable to refer patients for a hospital-based abortion either altogether or for reasons other than severe maternal or fetal indications. Many of the responding providers reported needing the option of hospital referral for second-trimester patients with placenta previa, particularly when accompanied by prior uterine incision. Because D&E may pose a risk of hemorrhage in these circumstances [26], patients who require hospital referral may not be able to obtain an abortion at all.

Only half of the responding facilities offer surgical abortion after 20 weeks' gestation, and only 27% of facilities do so after 22 weeks' gestation. In 2012, six states had laws banning abortion beyond 20 weeks' gestation (often 22 weeks LMP), and another 13 states have since enacted similar legislation [27]. It is unclear to what extent the proliferation of these laws has affected facilities' practices. While later procedures are uncommon, women who seek them are often in complex social or medical circumstances and need every available option.

When compared to the last cross-sectional survey of solely NAF providers, our results reveal important trends in the demographics of clinicians who provide second-trimester abortions. Responding clinicians were more than twice as likely to be female than at the time of our 2002 survey of NAF members (67% vs. 31%) [3]. This change parallels the increases in both female obstetrics and gynecology (OB/GYN) residents/fellows and female OB/GYN physicians in practice from 2007 to 2010 (77% to 81% and 43% to 47%, respectively) [11,12]. In addition, the proportion of younger clinicians (less than 50 years old) was nearly twice that reported in our previous NAF survey (60% vs. 37%) [5]. These differences in the characteristics of respondents may be due to the increased scope of our sample or reflect changes in provider demographics over time. This finding also may, in part, reflect the efforts of the Kenneth Ryan Residency Training Program and the Fellowship in Family Planning to increase abortion training among OB/GYN residents and graduates.

Most abortions in the U.S. (94%) occur in facilities outside of the traditional academic learning environment [13], requiring concentrated efforts to integrate abortion training into medical school and residency curricula [14]. Accordingly, the majority of responding facilities self-identified as free-standing ambulatory health centers or private practices; only 19% of facilities were hospital affiliated.

Our study has limitations, particularly regarding the generalizability of our findings. Our methodology identified 703 of the 839 (84%) outpatient surgical abortion-providing facilities identified in the Guttmacher Institute's 2011 National Abortion Provider Survey [28]; we identified significantly fewer private offices and hospital-based practices, which provide relatively fewer abortions. Private offices and hospital-based practices may be less likely to be members of national organizations (such as NAF or Planned Parenthood Federation of America) than free-standing clinics and, as such, may be less likely to participate. Our response rate in the U.S. was 54%, comparable to that of other abortion provider surveys [13,28]. However, response rates in the south and mid-west were lower than the west and east; thus, the practices in this survey may reflect practice better in the west and east. Nevertheless, collectively, the reporting sites provided an estimated 45% of second-trimester abortions in the U.S., thus representing a sizable proportion of abortion practice. Additionally, by specifically inviting residency and fellowship training programs to participate, our results include current abortion teaching practices. The data reflect preferences and opinions in 2012, and practices have continued to change. Providers who worked at multiple facilities, reported on most usual practice, and thus, any important variation in their practice between facilities was not captured. Because we did not ask participants about the reasons for their practices, we do not know if legitimate factors other than evidence influenced practice patterns.

Our study suggests that second-trimester U.S. surgical abortion providers generally follow evidence-based practice recommendations. Some restrictions may limit abortion access for women with pregnancy complications or those beyond 20 weeks of gestation.

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References

- [1] National Academies of Sciences, Engineering, and Medicine. The safety and quality of abortion care in the United States. Washington, DC: The National Academies Press; 2018. <https://doi.org/10.17226/24950>.
- [2] Boonstra H, Nash E. A surge of state abortion restrictions puts providers—and the women they serve—in the crosshairs. *Guttmacher Policy Rev* 2014;17(1):9–15.
- [3] Lichtenberg ES, Paul M, Jones H. First-trimester surgical abortion practices: a survey of National Abortion Federation members. *Contraception* 2001;4:345–52.
- [4] 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;79:385–92.
- [5] O'Connell K, Jones HE, Lichtenberg ES, Paul M. Second-trimester surgical abortion practices: a survey of National Abortion Federation members. *Contraception* 2008;78:492–9.
- [6] 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.
- [7] 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. *Can Fam Physician* 2016;62(4):e209–17.
- [8] Guilbert ER, Hayden AS, Jones HE, White KO, Steven Lichtenberg E, Paul M, et al. First-trimester medical abortion practices in Canada: National survey. *Can Fam Physician* 2016;62(4):e201–8.
- [9] Jones HE, White KO, Norman WV, Guilbert E, Lichtenberg SL, Paul M. First trimester medication abortion practice in the United States and Canada. *PLoS One* 2017;12(10):e0186487.
- [10] Gordon A. The Partial-Birth Abortion Ban Act of 2003. *Harv J Legis* 2004;41(2):501–15.
- [11] The American Medical Association (AMA). Physician Masterfile (data as of Dec. 31, 2010), population estimates from the U.S. Census Bureau, and the AAMC/AMA National GME Census; 2011.
- [12] The American Medical Association (AMA). Physician Masterfile (January 2008); ©2008 by the American Medical Association, population estimates from the U.S. Census Bureau; and the AAMC/AMA National GME Census; 2008.
- [13] Jones RK, Jerman J. Abortion incidence and service availability in the United States, 2014. *Perspect Sex Reprod Health* 2017;49(1):17–27.
- [14] Committee on Health Care for Underserved Women. ACOG Committee opinion no. 612: abortion training and education. *Obstet Gynecol* 2014;124(5):1055–9.
- [15] National Abortion Federation. Clinical policy guidelines. Washington, DC: National Abortion Federation; 2012.
- [16] ACOG Practice Bulletin no 135: Second-trimester abortion. *Obstet Gynecol* 2013;121(6):1394–406.
- [17] Achilles SL, Reeves MF. Prevention of infection after induced abortion. *SFP Clinical Guidelines* 20102. *Contraception* 2011;83:295–309.
- [18] Kerns J, Steinauer J. Management of postabortion hemorrhage: release date November 2012 SFP Guideline #20131. *Contraception* 2013;87:331–42.
- [19] Darney PD, Sweet RL. Routine intraoperative ultrasonography for second-trimester abortion reduces incidence of uterine perforation. *J Ultrasound Med* 1989;8:71–5.
- [20] Kerns JL, Pearlson GA, Mengesha BM, Harter K, Jackson RA, Drey EA. The UP trial: a randomized controlled trial of uterotonic prophylaxis with methylergonovine maleate for late dilation and evacuation abortions. *Contraception* 2017;96(4):270.
- [21] Murphy LA, Thornburg LL, Glantz JC, Wasserman EC, Stanwood NL, Betstadt SJ. Complications of surgical termination of second-trimester pregnancy in obese versus nonobese women. *Contraception* 2012;86:402–6.
- [22] Benson LS, Micks EA, Ingalls C, Prager SW. Safety of outpatient surgical abortion for obese patients in the first and second trimesters. *Obstet Gynecol* 2016;128(5):1065–70.
- [23] Gokhale P, Lappen JR, Waters JH, Perriera LK. Intravenous sedation without intubation and the risk of anesthesia complications for obese and non-obese women undergoing surgical abortion: a retrospective cohort study. *Anesth Analg* 2016;122(6):1957–62.
- [24] Lederle L, Steinauer JE, Montgomery A, Aksel S, Drey EA, Kerns JL. Obesity as a risk factor for complications after second-trimester abortion by dilation and evacuation. *Obstet Gynecol* 2015;126(3):585–92.
- [25] Mark KS, Bragg B, Talai T, Chawla K, Murphy L, Terplan M. Risk of complication during surgical abortion in obese women. *Am J Obstet Gynecol* 2018;218(2):238.e1–5.
- [26] Perriera LK, Arslan AA, Masch R. Placenta praevia and the risk of adverse outcomes during second-trimester abortion: a retrospective cohort study. *Aust N Z J Obstet Gynaecol* 2017;57(1):99–104.
- [27] Nash E, Gold RB, Mohammed L, Ansari-Thomas Z, Cappello O. Policy trends in the states, 2017. *Guttmacher Institute*; 2018 <https://www.guttmacher.org/article/2018/01/policy-trends-states-2017>, Accessed date: 12 January 2018.
- [28] Jones RK, Jerman J. Abortion incidence and service availability in the United States, 2011. *Perspect Sex Reprod Health* 2014;46:3–14.