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# Trends and determinants of postabortion contraception use in a Canadian retrospective cohort☆

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ABSTRACT

*Objectives:* We aim to describe demographic trends associated with postabortion contraceptive choice, characteristics of intrauterine device (IUD) users and relation to subsequent abortion.
*Study design:* Our retrospective chart review study included all patients obtaining an abortion from 2003 to 2010 at the primary service provider in the Interior Health Region of British Columbia, tracking each patient for 5 years to detect subsequent abortion. We used descriptive statistics to analyze demographic trends and logistic regression to examine determinants of choosing an IUD and likelihood of subsequent abortion per contraceptive method.
*Results:* Our study cohort included 5206 patients, 1247 (24.0%) of whom chose an IUD. Patients increased IUD use from 10.14% to 45.74% of the cohort over the study period. Mean age of those choosing an IUD significantly decreased over the study period [30.9±7.3 years in 2003 to 26.2±6.5 years in 2010 ($p<.001$)]. In multivariable analysis, factors associated with choosing an IUD postabortion were prior delivery [aOR=2.77 (95% CI 2.40–3.20)] and being older than 20 years [20–29 years: AOR=1.87 (1.51–2.32); or 30+ years: AOR=1.96 (1.54–2.50)]. Patients choosing an IUD were less likely to have a subsequent abortion compared to those selecting oral contraceptives [aOR=1.96 (95% CI 1.54–2.52)] or depomedroxyprogesterone acetate [aOR=1.84 (95% CI 1.36–2.49)].
*Conclusions:* We found an increasing trend of choosing an IUD after an abortion in our population, especially among youth. Patients who chose an IUD postabortion were less likely to have a subsequent abortion over the next 5 years.
*Implications:* An important strategy for reducing subsequent abortion is to ensure that those seeking abortion have accurate information on the comparative effectiveness of postabortion contraception methods. Educational efforts, alongside removal of cost and other barriers, will contribute to the prevention of subsequent abortion and improve equitable access to IUDs among the population.

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## 1. Introduction

Intrauterine devices (IUDs), including copper intrauterine devices and levonorgestrel-releasing intrauterine systems, are a form of long-acting, reversible and highly effective contraception [1]. In Canada, no other long-acting reversible contraceptives, such as contraceptive implants, are currently available [2,3]. When provided immediately after abortion, IUDs have been shown to reduce subsequent abortion rates [4–9]. A Cochrane review and several national and international abortion care guidelines support immediate postabortion IUD insertion [1, 10–14]. Furthermore, multiple studies have reported that postabortion IUD is a desirable option for women seeking contraception [15–17]. Despite these known benefits, a relatively low uptake of IUDs persists in Canada; only 4.3% of women surveyed in 2006 used an IUD as their primary contraceptive method [18]. Research from the United States, New Zealand and China has found that the likelihood of a woman choosing an IUD as her contraceptive method increases with age and parity, especially postabortion [19–22]. Overall, young (under 20 years old), nulliparous women do not frequently choose IUD [18,21] despite many guidelines suggesting that IUD is a preferred option for this demographic [1,10,23–26].

A 2012 assessment, conducted within a health region in British Columbia, Canada, from 2003 to 2004, demonstrated that free contraception decreased subsequent abortion rates, with the lowest repeat abortion rate among those women who chose an IUD [5]. The current study is a continuation of this research on postabortion contraception in the same region of British Columbia.

We aimed to describe the trends in postabortion IUD use and to assess determinants of choosing IUD as a postabortion contraceptive

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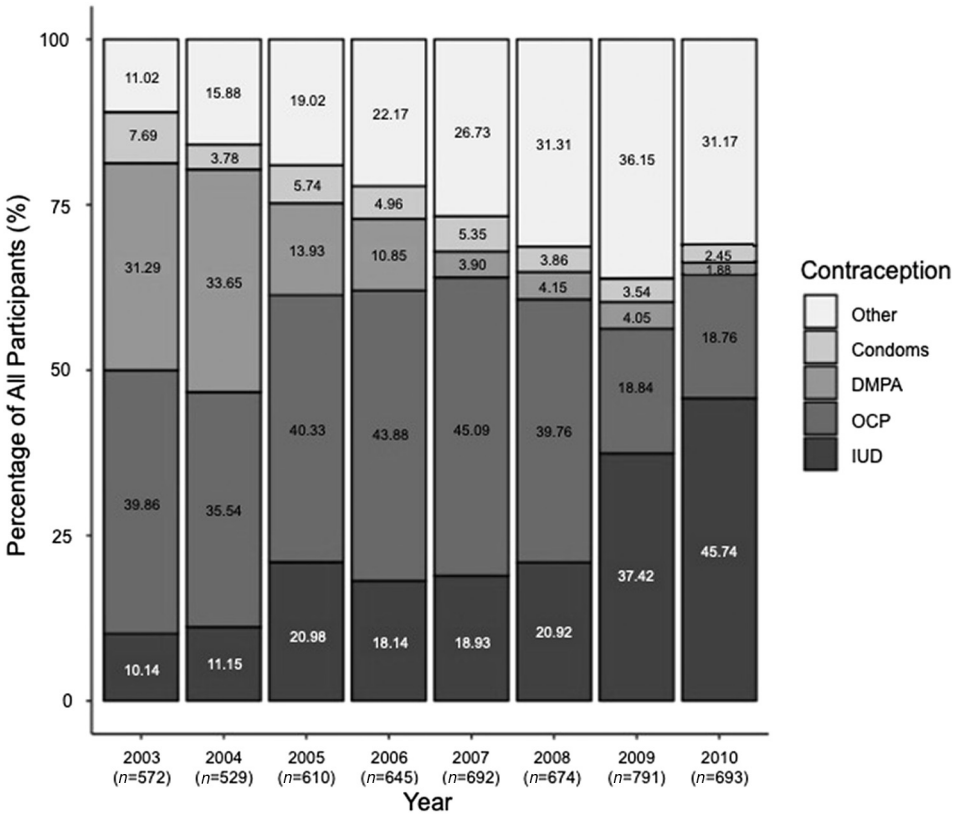


**Fig. 1.** The number of post index abortion patients choosing each type of contraceptive as their most effective contraceptive method, by percent of total yearly cohort, from 2003 to 2010.

method within the Canadian-specific context. Furthermore, we planned to replicate the earlier assessment and analyze whether IUD was still associated with a reduction in subsequent abortions compared to other contraceptive methods. Our goal was to identify which patients were most likely to choose IUD in a postabortion setting and whether these choices have changed with time.

## 2. Materials and methods

We examined paper medical records for all patients who obtained a first-trimester abortion at the principal abortion clinic in the Interior Health region of British Columbia, Canada, from January 1, 2003, to December 31, 2010, and followed each index patient forward until December 31, 2015, to detect subsequent abortion. The specified clinic is the primary provider of abortion services for 150,000 reproductive-age female residents. As such, in the event of an additional unintended pregnancy, women were likely to return to this clinic. During the study period, this clinic did not offer medical abortion, so all abortions reported were surgical abortions. The clinic's medical charts were the source for all demographic characteristics, medical history, contraceptive chosen at the time of index abortion and subsequent abortion events over the full study period (January 1, 2003, to December 31, 2010, for an index abortion and during the 5-year follow-up period to December 31, 2015, for additional abortions). After an abortion, the clinic provided all contraceptives free of charge with the exception of levonorgestrel-releasing intrauterine systems, which could be purchased upon request. We have previously published detailed information on the postabortion contraceptive options at this clinic [5].

We performed statistical testing using Microsoft Excel (2010) and R programming (R Foundation for Statistical Computing, Vienna, Austria). We conducted all analyses on an intention-to-treat basis, agnostic of whether or not treatment was discontinued. We used ANOVA or a test of proportions, as appropriate, to compare demographic variable trends and subsequent abortion rates. We performed logistic regression to analyze the effects of demographic variables and assess any potential confounding variables on the likelihood of choosing an IUD as a contraceptive method variables with a p value <.05 in univariate analysis. We also used logistic regression to evaluate the effect of contraceptive method on 1-year and 5-year subsequent abortions and controlled a priori for age and parity.

The University of British Columbia/Children's and Women's Health Centre of British Columbia Research Ethics Board approved this study (H12-00829).

## 3. Results

In total, 5206 patients underwent an index abortion from 2003 to 2010. For postabortion contraception, women most commonly chose oral contraceptive pills (OCP) ($n$=1804, 34.7%) and IUDs ($n$=1247, 24.0%). The proportion choosing an IUD significantly increased over

**Table 1**
Demographic variables of women undergoing abortion at a single center in British Columbia, Canada, according to postabortion contraceptive choice, 2003 to 2010

| | IUD | OCP | DMPA | Condom | Other | p[a] |
|---|---|---|---|---|---|---|
| | $n$ = 1247 | $n$ = 1804 | $n$ = 612 | $n$ = 239 | $n$ = 1304 | |
| Maternal age | 27.8±6.5 | 23.6±5.6 | 25.1±6.9 | 30.7±7.7 | 25.6±6.3 | <.001 |
| Gravidity | 3.0±1.6 | 1.9±1.3 | 2.5±1.7 | 2.8±1.7 | 2.3±1.5 | <.001 |
| Parity | 1.15 ±1.14 | 0.43 ±0.81 | 0.77 ±1.06 | 1.00 ±1.09 | 0.70 ±1.00 | <.001 |
| Ever prior abortion | 556 (44.59) | 436 (24.17) | 211 (34.48) | 80 (33.47) | 450 (34.51) | <.001 |
| Nulliparous | 448 (35.93) | 1321 (73.23) | 339 (55.39) | 109 (45.61) | 776 (59.46) | <.001 |

Data are presented as mean +/− standard deviation or $n$ (%).
[a] Calculated from a one-way ANOVA or test of equal or given proportions.

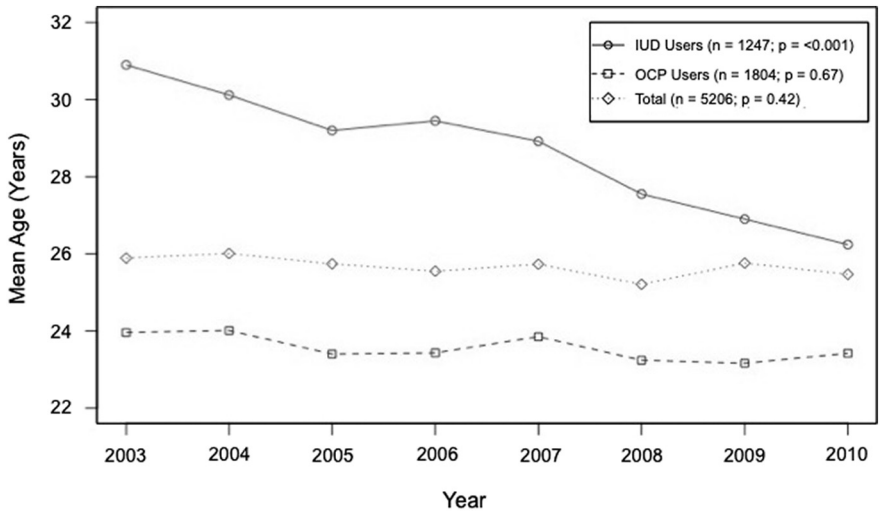


**Fig. 2.** The mean age of post index abortion patients based on their most effective contraceptive choice, per yearly cohort, from 2003 to 2010.

the duration of the study, from 10.14% to 45.74% of the cohort (p<.001), whereas the number choosing OCP or depomedroxyprogesterone acetate (DMPA) as their postabortion contraceptive method decreased (p<.001) (Fig. 1). On average, IUD and condom (as the most effective method chosen) users were older than users of all other contraceptive methods (Table 1). However, the mean age of women choosing an IUD decreased over the study period, from 30.9±7.3 years in 2003 to 26.2±6.5 years in 2010 (p<.001) (Fig. 2), whereas the age of the overall cohort (25.5±6.4 years in 2003; 25.9±6.8 years in 2010, p=.42) and of OCP users (24.0±5.8 years in 2003; 23.5±5.3 years in 2010, p=.67) remained stable (Fig. 2).

Of all the demographic characteristics examined, only age and parity were associated with choosing an IUD postabortion (Table 2). However, this association was largely driven by the earlier years in the study; when analyzed per yearly cohort, the odds ratio effect sizes decreased with each subsequent year for parity and both age groups (Table 2). Likewise, for the age-related measures, statistical significance lessened with time. Notably, 2006 was the only year in which women over the age of 30 years were more likely to choose an IUD than women under the age of 20 years (Table 2).

Fewer IUD users sought a subsequent abortion over the study period compared to OCP and DMPA users; the 5-year subsequent abortion rate for IUD users was 99.4 per 1000, the rate for OCP users was 191.8 per 1000, and the rate for DMPA users was 207.5 per 1000 (p<.001). After adjusting for age and parity, the odds of having a subsequent abortion remained greater for OCP, DMPA and other contraceptive users compared to IUD users (Table 3). Other demographic variables did not confound this relationship.

## 4. Discussion

Our study investigated factors associated with choosing an IUD in a postabortion cohort and assessed the trends in these choices over time. Older and parous patients were the most likely to choose IUDs as a postabortion contraceptive; choosing an IUD was less common among nulliparous women and women under the age of 20 years. The mean age of IUD users decreased over the study period in comparison to the relatively constant mean age of OCP users and the total study cohort. IUD increased throughout the duration of the study period. In comparison to OCP and DMPA, IUD users had approximately half the odds of having a subsequent abortion at 1 or 5 years after the index abortion, confirming the results of the previous study [5]. These results also agree with studies performed in the United States, Finland, Sweden and New Zealand, which found that IUDs are significantly more effective at reducing subsequent abortions than OCP [4,6–9].

While age and parity were important determinants of IUD choice, more young and nulliparous women chose IUDs in recent years. Overall, IUDs became a more popular choice with each successive year; from 2003 to 2010, we observed an increase in IUD selection from 10% to 46% of the study cohort. This proportion of IUD users differs greatly from Canadian population measurements, which estimated in 2006 that 4.3% of reproductive-age women at risk for unintended pregnancy use IUDs [18]. While this large disparity can be partially attributed to removing the cost barrier for some IUDs, the increasing trend over time within our study coincided with the increasing number of clinical guidelines recommending IUDs as a first choice contraceptive method for all women, including young nulliparae [1,10,23–29]. In North

**Table 2**
Associations between parity and age group in choosing an IUD as a postabortion contraceptive method, by yearly cohort in a single clinic in British Columbia, Canada

| | Parity adjusted odds ratio[a] | 20–29-Year age group adjusted odds ratio[b] | 30+-Year age group adjusted odds ratio[b] |
|---|---|---|---|
| 2006 | 5.22 (3.13–8.98) *** | 2.60 (1.12–7.07) * | 3.49 (1.42–9.94) * |
| 2007 | 6.92 (4.29–11.46) *** | 2.11 (0.96–5.32) | 2.02 (0.85–5.36) |
| 2008 | 4.27 (2.74–6.75) *** | 1.70 (0.91–3.40) · | 1.52 (0.73–3.32) |
| 2009 | 2.35 (1.67–3.31) *** | 1.90 (1.24–2.97) ** | 1.53 (0.89–2.66) |
| 2010 | 1.76 (1.25–2.49) ** | 1.42 (0.93–2.17) | 1.48 (0.88–2.53) |
| Total | 2.77 (2.40–3.20) *** | 1.87 (1.51–2.32) *** | 1.96 (1.54–2.50) *** |

Data are presented as adjusted odds ratios (95% CI).
Data from 2003 to 2005 were not displayed because cell counts were too small (<5) to calculate odds ratios accurately.
Significance legend: ***=0; **=.001; *=.01; ·=.05.
[a] Reference level is nulliparous, adjusted for age.
[b] Reference level is women under the age of 20, adjusted for parity.

**Table 3**
Subsequent abortion within 1 year or 5 years of index abortion across all yearly cohorts from 2003 to 2010, according to postabortion contraceptive choice

| | 1-Year odds ratio | 5-Year odds ratio |
|---|---|---|
| IUD | Reference group | Reference group |
| OCP | 1.98 (1.29–3.14)** | 1.96 (1.54–2.52) *** |
| DMPA | 1.15 (0.61–2.09) | 1.84 (1.36–2.49)*** |
| Other | 2.55 (1.65–4.03)*** | 2.14 (1.66–2.76)*** |

Condom or barrier method as sole method chosen was too rare to be included in this analysis.
Data are presented as adjusted odds ratios (95% CI).
Odds ratios adjusted for age and parity.
Significance legend: ***=0; **=.001.

America, both the ACOG and SFP released guidelines in 2009 and 2010, respectively, emphasizing the general lack of contraindications for IUD use for all women [30,31]. Furthermore, a health care program within the province of British Columbia now provides free contraceptives, including IUD, to all patients at the time of abortion [32]. Additionally, Quebec and Ontario provide free prescription contraceptives to residents under the age of 25 [33,34]. Advancement of policies such as these will ideally have a twofold effect of reducing subsequent unintended pregnancy and the need for subsequent abortion while additionally encouraging more women to choose more highly effective contraceptive methods.

The primary limitation of our study is our inability to ensure data completeness; as the study clinic is the primary abortion provider in the health region, we assume that the data are relatively complete, but our study design does not account for patients who could have traveled to a different health region for a procedure. However, this effect would apply equally to all contraceptive groups and therefore create conservative estimates of the effect measures. Additionally, we made no differentiation between the different types of IUDs, as the data were unavailable via chart review. An RCT conducted in 2011 among all abortion clinics across the same Canadian province found an uptake ratio of 6:1 of for purchase levonorgestrel-releasing intrauterine systems (LNG-IUS) to free copper IUDs [15]. While this can provide a general idea of the IUD distribution in our population, the true ratio is likely even lower, as the LNG-IUS had only just been introduced in Canada at the start of our study period.

Our data confirm the effectiveness of IUDs in preventing subsequent abortion and display an encouraging trend to higher acceptability of IUDs as a postabortion contraception, particularly among young women. Yet, while we observed a diversification in the user base within Canada, much still needs to be done to encourage the uptake of highly effective contraception, especially after an abortion. Given the updated clinical guidelines, health care professionals' efforts to educate patients about the safety and efficacy of IUDs, particularly within the abortion context, will prove influential in further improving the uptake of IUDs. Efforts to increase use of long-acting reversible contraceptives will serve to reduce subsequent abortion and promote a higher standard of reproductive health for Canadians.

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## Declaration of competing interests

None with respect to this research. U.B.C. received a postdoctoral fellowship grant from Bayer Canada Inc. in 2016 that supported the research work of a postdoctoral fellow (PDF) supervised by W.N.; the PDF was not involved in this study.

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