

**INTRAUTERINE CONTRACEPTION: A LITERATURE REVIEW INVESTIGATING  
THE BARRIERS LIMITING USE BY CANADIAN WOMEN.**

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## **Abstract**

**Intro:** Intrauterine contraceptive devices (IUCDs) are highly effective and are recommended as first line contraceptives for women. Very few Canadian women use these forms of contraception, even fewer youths use these methods. The goal of this paper is to review relevant literature in order to identify and investigate the barriers preventing the more widespread use of IUCDs by Canadian women. Emphasis is placed on at risk groups, in order to make recommendations to increase uptake of the same, with the aim of decreasing unintended pregnancies.

**Methods:** An online literature review of relevant papers pertaining to information on IUCDs, healthcare system, patient and provider barriers between 2000 and 2020 was conducted with a preference on Canadian papers.

**Results:** Barriers can be broadly broken down into 3 categories: healthcare system, patient and practitioner based. Evidence suggests that there is an overall lack of awareness and limited knowledge regarding IUCDs among the public, provider misconceptions and lack of confidence in insertion capabilities, high up front cost, and systemic issues pertaining to limited access to contraceptive providers. Studies have shown that evidence based education and removal of cost and access related barriers increases patient acceptance of and adherence to IUCDs.

**Conclusion:** In order to increase the use of IUCDs by Canadian women, large scale subsidy and policies are required to create programmes targeted at improving public and provider education and awareness. Additionally, increased hands on training and task sharing with allied providers is necessary to increase patient access and timely availability of these highly effective contraceptives.

## **Introduction**

In Canada, there is a wide variety of highly effective contraception available. Despite this, scholars estimate that one third of pregnancies in Canada are unintended (1). Data from the most recent contraception consensus reports that 35% of women who are not trying to conceive, inconsistently, or never use contraception (2). The bulk of unintended pregnancies belong to “at risk” women. These women are typically, young, tend to have lower income, limited education and supports, and often belong to a minority group (1,3,4). In addition, the rates of induced abortion among young Canadian women have remained relatively unchanged since the 1980s (5). Statistics indicate that women under age 30 account for a majority of induced abortions in the country (6). Unplanned pregnancies not only inflict physical, emotional and financial stress on a woman, but they may completely disrupt her life plans, especially if she is young.

Unintended pregnancy also results in a financial burden on the healthcare and social service

system. We need to focus our efforts on improving consistent use of contraception to avoid unintended pregnancy, especially among at risk women. Since many of these unintended pregnancies occur due to user errors or lack of compliance, the most logical solution would be to increase the use of highly effective, non-user dependent contraception methods.

It is well established that long acting reversible contraceptives (LARC) are highly effective in preventing pregnancy. These methods do not require regular patient action for adherence or decision making at the time of intercourse (7). In Canada, LARC includes both copperbased intrauterine devices (Cu-IUD) and levonorgestrel intrauterine system (LNG-IUS), collectively intrauterine contraceptive devices (IUCDs). Once *in situ* IUCDs have extremely low failure rates, with effectiveness comparable to permanent sterilisation techniques (3,7). Less than 1 in 100 women become pregnant in the first year of typical use (7). In recent years both national and international organisations have published position statements recommending these modes of contraception as first line for all women, including nulliparous youths (7,8). Despite these recommendations, the uptake of LARC by women of reproductive age in Canada appears to be quite low, around 4.3% (2). Rates among adolescent women are estimated to be even lower, with only 1% of women under 20 using IUCDs (2).

It is therefore the goal of this paper to identify and discuss the major barriers limiting the uptake of IUCDs by women, especially those who are in high risk groups (i.e. young, nulliparous women). When possible information specific to Canada will be utilised in order to propose solutions aimed at reducing unintended pregnancy in this country.

## **Brief Background of IUCDs**

The idea of intrauterine devices has been seen in scientific literature since the 18<sup>th</sup> century, with the 1960s bringing the first generation of modern IUCDs to the market. Since then IUCDs have been highly modified, two types of IUCDs are available in Canada; copper-based devices as well as LNG based systems. More than half a dozen copper models are available, all of which are T shaped and contain varying amounts of exposed copper on different sized frames. Cu-IUD unit lifespans range from 5-10 years. Three types of LNG IUSs are on the market, Mirena, Kyleena and Jaydess; these differ in T-frame size and quantity of LNG released; lifespans range from 3 to 5 years depending on the device. These systems work to prevent fertilisation by different mechanisms.

Copper based IUDs offer women a non-hormonal birth control option and work by several mechanisms. As a foreign body in the uterus, copper alters the normal physiology and augments inflammatory responses in the endometrium. Copper ions released from the unit concentrate throughout the reproductive tract, making it a less hospitable environment for sperm. Ovum released are also negatively affected by ambient copper concentrations, leading to a decreased rate of tubal transport as well as increased rate of apoptosis. This effectively decreases the duration of a woman's fertile window, thus minimising the chance of fertilisation (7). Additionally, Cu-IUDs are the most effective form of emergency contraception available on the market and can be used within 7 days of unprotected intercourse (7). However, Cu-IUD may be associated with heavier, longer menstrual bleeds and dysmenorrhea (7).

Levonorgestrel systems slowly release a progesterone from the main stem of their T-frame. LNG causes thickening of cervical mucus, acting as a physical barrier to block sperm

passage, which is its primary mechanism of contraception. The LNG-IUS also induces a foreign body effect in the endometrium, while suppressing the action of endogenous estrogen and progesterone causing atrophy (7). LNG-IUS bears the benefit of lightening periods, reducing symptoms of dysmenorrhea and menorrhagia for many women (7). However, LNG-IUSs are associated with hormonal side effects such as acne, mood issues, breast tenderness and headaches. Hormonal IUCDs are also associated with increased prevalence of functional ovarian cysts, especially in users of higher dose units like the Mirena. These cysts are typically benign and asymptomatic, with many resolving spontaneously without intervention (7).

Both types of IUCDs have been shown to reduce the risk of a woman developing endometrial cancer (7) and allow for return of fertility immediately upon removal (9,10). Because they need to be inserted and removed by a health-care provider, the likelihood of user error is limited. Rates of satisfaction and continuation of IUCDs have also been found to be high among users (3,4,7). Changes in bleeding patterns are among the most common reason IUCDs are removed (10). Many IUCD users experience irregular bleeding or spotting in the first weeks or months after insertion (7). Although patterns tend to normalise over time some women cannot tolerate this. In addition, those who seek early removal of devices cite dysmenorrhea, pain and LNG-IUS related hormonal side effects as other common reasons for discontinuation (7,11).

All forms of contraception come with some level of risk. These risks and benefits must be discussed with patients prior to initiation of any therapy. Uterine perforation during insertion is one potential serious complication. Although this phenomenon is relatively rare and occurs less frequently with increasing inserter experience and proper insertion technique, scholars report anywhere between 0.3 and 2.6 per 1000 insertions result in perforation (7). Risk of uterine

perforation is higher in postpartum and breastfeeding women (7). If perforation is suspected an ultrasound should be ordered. If a perforation occurs the IUCD must be retrieved by surgical means, typically laparoscopic intervention (12). Expulsion is another potential complication that IUCD users face. Between 2 to 10% of users may experience this phenomenon, most commonly within the first year post insertion, especially in the first 3 months. Reported risk factors for expulsion include: menorrhagia, dysmenorrhea, uterine fibroids, history of expulsion, adolescence, and abnormal uterine shape (7). If an IUCD fails and a pregnancy occurs ectopic pregnancy must be urgently excluded. The absolute risk of ectopic pregnancy is lower in IUCD users than women using no contraception. However, 15-50% pregnancies with an IUCD *in situ* are ectopic (7). Additionally, the absolute risk of pelvic inflammatory disease (PID) is low in IUCD users but may be elevated in the first month after insertion. Sexually transmitted infections (STIs) are responsible for PID, not the IUCD itself (7,10). For more in depth background information, indications, contraindications, et cetera, a review of the Canadian Contraception Consensus (Part 3 of 4): Chapter 7 – Intrauterine Contraception from The Society of Obstetricians and Gynaecologists (SOGC) is recommended.

### **Relevant Contraception Information**

A national survey of Canadian women enquiring about their contraceptive use found that among sexually active women of reproductive age, who were not trying to become pregnant, the most commonly used contraceptives were condoms, oral contraceptive pills, followed by the withdrawal method. Less than 75% of women 15-19 and only 68% of women 20-29 reported that they “always used” contraception, these figures included women who rely on a permanent

method like tubal ligation or a partner's vasectomy. Surprisingly, 14.9% of all women reported never using contraception, despite not wishing to conceive (2).

Contraception can broadly be stratified into 3 tiers. Tier 1 contains the most effective methods, they are the "set it and forget it", user independent modalities administered by healthcare professionals; permanent sterilisation, IUCDs, and hormone based subdermal implants (which are not available in Canada at this time, but may be in the near future). Tier 2 includes hormonal contraceptives that depend on regular interval action by the user; pills, patches, rings, and injections. Tier 3 modalities are used at the time of coitus and are most prone to failure due to user error; they include condoms, sponges, diaphragms, spermicides and can extend to include emergency contraceptive pills (5,8).

Researchers studying patients' baseline knowledge of contraceptive effectiveness, indicate that many patients overestimate the efficacy of non-LARC methods while underestimating the efficacy of LARC (4,13). A statement from the Canadian Paediatric Society (CPS) published the failure rates in typical and perfect use for common contraception methods for adolescents (14). They report that the typical rate of failure in the first year of use for male condoms, OCP and withdrawal (8,14), the three most common modes used by this group based on consensus information, were 18%, 9% and 22% respectively (2). Rates of failure among IUCDs are reported to be the lowest as they have typical failure rates of 0.8% and 0.2% for Cu-IUD and LNG-IUS respectively (8,14).

## **Methods**

Articles were broadly searched for using PubMed, searches were restricted to full text articles published in English between 2000 to 2020. Primary studies of any design were examined. MeSH heading included LARC, long acting reversible contraception, intrauterine devices, IUD, IUS, IUCD, IUC, satisfaction, barriers, attitudes, healthcare providers, nulliparous, adolescent. A total of 672 articles were yielded, and abstracts were reviewed individually to determine if papers were appropriate. . Reference lists of articles were scoured to identify further relevant studies. Subsequently 22 articles were deemed appropriate for use in this review. Grey literature was not included. Searches were specifically aimed to explore barriers related to healthcare systems and providers as well as users, to explore some of the ways in which these areas may be addressed. Studies from The United States and European countries were also included as their populations can be compared to Canadians as their studies included demographically diverse populations and participants from varying socioeconomic statuses.

## **Results**

### **Healthcare Provider Barriers**

Studies indicate that healthcare provider (HCP) barriers preventing the provision of IUCDs are often related to lack of knowledge and misconceptions about this form of contraception. Reporting suggests that many providers have difficulties with selection of appropriate candidates, counselling and IUCD insertion.

Buhling et al conducted a study of Canadian and European providers investigating their attitudes and beliefs towards IUCDs (15). They found that among 100 Canadian providers (75 general practitioners (GPs) and 125 gynaecologists), that 55% of providers insert IUDs, while 45% of providers refer to a colleague for insertion. Of the 55% that insert IUCDs, only 9% report

that they train or supervise insertion by other providers (15). Similarly, Stubbs and Schamp's study of GPs from Kingston, Ontario, found that among 96 providers, 82% prescribed and only half (41%) inserted IUCDs (16). In Manitoba sexual health centres frequently receive referrals from GPs specifically for IUCD insertions (17). Almost half of participants in these studies felt that more education or a course on IUCDs and insertion would be beneficial to their practises (15,16). This suggests that although many providers may be comfortable and competent in providing and inserting IUCDs that up to half may not, while also highlighting the limited number of capable providers who dedicate time to train other professionals on IUCD insertion. This can be problematic for women for a variety of reasons. Scheduling one appointment for contraception may be difficult; having to wait for a referral to a specialist or other provider for insertion can take a significant amount of time. During this waiting interval these women may be left vulnerable to unintended pregnancy, especially if they are not provided or do not adhere to user dependent contraceptive bridging methods in the meantime.

Scholars have found, in general, providers are more likely to counsel parous women compared to nulliparous about IUCDs (15,16,18,19). Bulhing reports that among Canadian providers, barriers in the consideration of IUCD usage in women were variable; citing the 3 most common IUCD related concerns in all women were her risk of developing pelvic inflammatory disease (PID), nulliparity, and high upfront cost of IUCD units. When asked about barriers in nullipara specifically, the top 3 anxieties were pertaining to difficult insertion, PID and infertility. Thirteen percent of Canadian providers report that they never offer nulliparous women IUCDs, regardless of her age. Participants also expressed concerns regarding expulsion, lack of efficacy, disruption of normal menses, ectopic pregnancy, and lack of training. Worries

the woman may not be monogamous, or providers thinking that women do not like IUCDs were also cited. A woman's age, concerns over legal risks and ethical/religious concerns regarding IUCDs mechanism of action were listed as well (15). Similarly, Stubbs reported 60% of GPs in their sample felt that PID and ectopic pregnancy were major risks of IUCDs. Forty-seven percent and 38% believed that there was a high risk of failure in the Cu-IUD and LNG-IUS respectively (13). Many of these concerns were echoed by other studies and most are not evidence based (19,20). Table 1 is lists barriers to the provision of intrauterine contraceptives cited by healthcare providers. Table 3 contains a list of misconceptions and facts that refute many of these concerns.

<b>Table 1. Barriers to the Provision of Intrauterine Contraceptives cited by Healthcare Providers.</b>
Concerns of insertion difficulty
Risk of developing pelvic inflammatory disease (PID)
Nulliparity
High cost of IUCD units
Concerns about infertility
Concerns of ectopic pregnancy
Women do not like IUCDs
Concerns that IUCDs are ineffective or prone to failure
Risk of expulsion
IUCDs disrupt normal menstruation
Lack of or inadequate training to provide an IUCD
A woman's age
Worries that the woman may not be monogamous
Concern about insertion pain
Legal risks and ethical/religious concerns regarding IUCDs mechanism of action

An interesting 2 part study conducted by Cook et al, investigating contraception knowledge and prescribing practises of Canadian pharmacists and practitioners, revealed useful information (20). They report that providing practitioners with evidence-based information and detailed guides to aid in IUCD patient selection and education greatly increased HCP competence and women's willingness to accept a prescription for an IUCD. The first part of the study consisted of a baseline assessment of practitioner's contraception knowledge, followed by an intergraded learning module on contraception. Specific emphasis was put on LARC and focused on debunking IUCD myths and assessing practitioner's ability to select appropriate patients to use the same. A post education test was administered to determine whether gaps in practitioner's knowledge had decreased after evidence-based education. Researchers found significant improvement in post test scores. Providers felt more comfortable, competent and likely to change their IUCD prescribing practises. Participants reported that they would be significantly more likely to recommend IUCDs to a broader range of women, including those that are nulliparous, and young. Part 1 data illustrates that after practitioners are provided evidence based education, they are better equipped to select, and counsel patients appropriate for IUCDs.

### **User Based Barriers**

Much like providers, many women have concerns and misperceptions regarding IUCDs. Reasons for lack of interest in IUCDs by women include high upfront cost (3,17,20), fear of insertion and associated pain (18,20), dislike of the idea that something foreign would be in their body (18,20), dislike that the device must be inserted and removed by a healthcare provider, or disinterest in the potential of changes to bleeding patterns or menses (18). Others report being

dissuaded by someone else’s IUCD experience (20), or express uncertainties regarding the effects of having an IUCD and the associations related to infection, infertility and cancer (13). Many of these concerns highlight women’s lack of knowledge and awareness regarding this mode of contraception and several could be explained or clarified by a conversation with a knowledgeable healthcare provider. Table 2 lists barriers to the provision of intrauterine contraceptives cited by patients. Again, a review of Table 3 debunks many of these concerns with evidence-based facts.

<b>Table 2. Barriers to the Provision of Intrauterine Contraceptives cited by Patients.</b>
Fear of pain during insertion
Disinterest in something foreign in their body
High cost of IUCD units
Dislike that the IUCD must be inserted and removed by a healthcare provider
Dislike potential changes to bleeding patterns and menstruation
Concerns about infection
Dissuaded by someone else’s IUCD experience
Concern IUCD use may be related to cancer
Concern IUCD use may be related to infertility
Concern that they may not be able to access an IUCD confidentially

However, some concerns simply cannot overcome by an educational conversation alone. Confidentiality and cost are two of these and may be significant barriers to certain women, especially adolescents. An online convenience sampling on the contraceptive use and barriers experienced by Quebec youths found that cost, access and confidentiality were identified as major barriers; with 71% of respondents reporting that they relied exclusively on free contraceptives (21). Quebec is often thought to have one of the best drug coverage plans for

youths, as the provincial program covers the cost of all contraceptives for those who are not covered under another plan and are under 18, or under 25 if they are a full time student (17). However, women beyond this age range or situation, and those that fall within the range but are covered by their parents' benefits are in a less than ideal situation. These women may be forced to pay 100% of the cost upfront and wait for reimbursement from plans, which could be hundreds of dollars for an IUCD user. Alternately, women who are covered under parental plans but want to maintain anonymity may have to choose between paying out of pocket or risk their parents learning that they have purchased contraception due to current insurance policies that prevent confidential access (21). This study reported that many adolescents with private drug coverage had no idea that their parents would be notified of their use of benefits; with one respondent stating that this was how her parents learned she was sexually active. So, despite appointments and insertion being confidential and covered, adolescent women who use their parents private drug benefits may opt for less effective free method due to fear of parental repercussions (21).

Lack of awareness and understanding of IUCDs is prevalent among patients and has been demonstrated in a cross-sectional survey from California investigating patients' attitudes and beliefs about IUCDs. Researchers interviewed a diverse group of young, mostly nulliparous, women presenting to health clinics in the Bay Area (18). None of the members in their sample were using or had used IUCDs in the past. At baseline, they found that less than half (45%) of women had heard of IUCDs. Thirty percent of IUCD aware participants reporting that they learned about them from a healthcare provider. When data was further broken down by parity, over half of parous women that had heard about IUCDs were educated by an HCP; whereas only

27% of nulliparous participants reported receiving IUCD education by an HCP. This may in part be a direct consequence of gaps in provider knowledge or inability to identify appropriate IUCD users and parallels previous data indicating that many providers do not recognise that nulliparous women are appropriate IUCD candidates. Additionally, this same study found that women who had been educated about IUCDs by a healthcare provider, regardless of parity were 2.7 times more likely to have interest in using an IUCD than their non-professionally educated or IUCD naïve counterparts (18). Whitaker reported comparable data in terms of young women's awareness, with only 40% of their 144 participants having heard of IUCDs. Researchers found that after a brief, 3 minute counseling session discussing IUCDs, 53.5% of patients reported a positive attitude toward them (22). Part 2 of the Cook study also yielded comparable results. After the educational module in part 1, practitioners recorded outcomes of 10 patient interactions pertaining to contraception counselling and prescriptions written. Roughly half of women in this section were nulliparous (52.8%) and young (55.1% 21-30 years old). After HCP counselling 55% of patients reported being most comfortable with an IUCD and subsequently accepted a prescription for the same (20).

Similar results were produced in a subsection of a large American prospective cohort study, the Contraceptive CHOICE project (23). They took things one step further by removing 3 major barriers to the uptake of LARC; limited access to contraception, cost and lack of evidence-based knowledge. Researchers investigated whether educating and offering adolescent women, living in the St Louis, Missouri area, no-cost contraception, increases the uptake of LARC and decreases the rate of unintended pregnancy. Women were educated about contraceptive options in order of effectiveness, via a standardised script. Participants were able to choose and switch

contraceptives as many times as they liked, free of charge throughout the 2-3 year study period. The contraception mode chosen by most participants was LARC (71.5%). Overall, 37% chose an IUCD, while 34.5% of participants chose a subdermal implant. Two thirds of LARC users were still using that method of contraception, compared to 1/3 of non-LARC users at the time of 2 year follow up (23). Researchers reported that teens in the CHOICE cohort experienced over a 75% reduction in birth, induced abortion, and pregnancy when compared to relevant national data for that time period (4). Furthermore, data from the entire CHOICE study, which was intended to promote LARC to women between 14 and 45 years old, under the same provisions as those described for the teen cohort, found that LARC users were much more likely to continue with their contraception than their non-LARC using counterparts (4). Rates of continuation in IUCD users exceeded those who had selected a subdermal implant, with 88% and 84% 1 year continuation rates and 79% and 77% 2 year continuation rates for LNG-IUS and Cu-IUD respectively (4). Again, an overall reduction in unintended pregnancy among CHOICE members was also observed. There was also a 22 fold increase in unintended pregnancy in non-LARC users when compared to LARC users (4). Overall, CHOICE found that non-LARC using women under 21 years old were twice as likely to experience and unintended pregnancy than older, non-LARC users. No difference in incidence of unintended pregnancy was observed in LARC users regardless of their age (4).

Combined, results of these studies suggest a few things. In addition to indicating that women's awareness and understanding of IUCDs are limited, data collected also illustrates that young, nulliparous women are interested in highly effective, contraception like IUCDs when provided quality counseling (4,20,23). Data also suggests that source and method of education

(i.e. evidence based, stratified by efficacy tier) regarding IUCDs may be an important factor in patients' interest in the same. Moreover, results of the CHOICE studies demonstrate that when other barriers are removed, the use of LARC is preferred by women regardless of age or parity. It also illustrates that when comparing LARC users to those using other contraceptive methods, increased use of LARC results in fewer pregnancies, births and abortions in women, especially those who are at higher risk of unintended pregnancy. It also supports the notion that women who choose LARC are generally satisfied and tend to continue using the same over a long period of time (3,4,23).

### **Systemic Barriers**

Healthcare system barriers are diverse, many reported issues revolve around cost and funding, access to care. Informants have also cited inconsistencies in sexual health education among programs delivered in schools across the country and within provinces for both lay people and medical professionals.

As noted previously, high upfront costs related to IUCD units may limit some patients and providers from considering these as a viable first line contraceptive option. There is a lack of uniform federal, provincial or private subsidy available to users to offset costs. This notion is echoed in a national survey which collected data from variety of practitioners, educators, policy makers and other stakeholders, who identified cost, access and knowledge as the most important barriers preventing women from accessing contraception (17). Despite the high upfront cost of IUCDs, over the duration of a unit's lifetime, they work out to be one of the most cost effective contraceptive options (21). The cost of a Cu-IUD in Manitoba ranges between \$54-\$110 (24).

Copper based units are ineligible for Pharmacare and private insurance coverage is variable as this product is considered a device and not a drug. Non-Insured Health Benefits (NIHB) covers the cost of one unit every 12 months for those who identify as Indigenous or Inuit and are eligible for this program. The cost of LNG-IUS is substantially more, ranging from \$287-\$346. Units are eligible for coverage by Pharmacare, although private insurance coverage of these products is variable. NIHB covers the cost of one unit every 24 months (24). In Winnipeg, The Women's Hospital was fortunate enough to receive funding from the Ryan Program based out of the United States (US) which was used to pay for IUCDs. Unfortunately, funding was cut in 2017 as the program discontinued allowance of dispersal outside of the US. Consequently, Women's Hospital no longer has an onsite stock of LNG-IUS units to offer to patients free of charge. Though they do have a small amount of funding dedicated to purchasing Cu-IUD units as they cost significantly less. The SOGC has a Compassionate Contraceptive Assistance Program, designed to help those in need access birth control. Though excellent in theory, this service is reportedly less functional in actuality (17). This program is only available to physicians, at certain times, with a limited number of products available. All requests are processed on a case-by-case basis and can take several weeks to review. Making this route an inviable option to increase IUCD use by Canadian women on a large scale.

It is well known that access to primary care providers is a problem ubiquitous to Canadians. In Winnipeg, extended hours sexual health clinics and teen clinics exist and are intended to help provide individuals receive the reproductive care they need. However, many of these clinics have variable but firm age restrictions, limited hours, require pre-booked appointments, or have long wait times due to limited staff and resources all of which may

prohibit access to contraception. A Quebec based study of young people found that participants reported difficulties accessing either clinics or prescriptions for contraceptives, sometimes both, despite having a large number of teen clinics (21). Other reports suggest that patients attending fee-for-service based clinics may experience more rushed appointments, consequently limiting the comprehensiveness of contraceptive counselling, and possibly discouraging these providers from inserting IUCDs (17). These, combined with evidence previously discussed regarding limited access to competent IUCD providers, may further contribute to women being unable to access LARC in a timely fashion or at all.

Finally, it is worthwhile to mention that more varieties of IUCDs and LARC exist around the world. Frameless IUCDs and subdermal implants may be appealing to a wider variety of women than the current options available on the Canadian market. As seen in the CHOICE study, subdermal implants were quite popular, especially among younger teens (23). Such a modality may be more palatable to certain users as they may perceive that an implant placed into their arm is less invasive than an IUCD. Subdermal implants may also be an option for women who have atypical uterine anatomy or those who are simply not interested in an IUCD. Additionally, some European studies have demonstrated decreased rates of expulsion and rates of removal due to abnormal bleeding in women using frameless and flexible units (10).

## **Discussion and Recommendations**

A review of current literature reveals that barriers to the uptake of LARC are diverse and can be broadly divided into 3 main categories: systemic, patient based, and practitioner based. Issues within these categories do not exist discreetly. Each is closely intertwined and combine to

attribute to the low uptake of IUCDs by patients. Consequently, these barriers are likely contributing to the persistence of unintended pregnancy, and the need for induced abortion, especially among young Canadian women. Practitioner, user and healthcare system barriers are intimately linked and many of the following proposed solutions involve collaboration across all three of these levels.

Results from previous studies highlight the link between gaps in practitioner's knowledge and the influence it has on their counselling, prescribing practices and in turn the acceptance of IUCDs by patients. Findings presented by studies that surveyed practitioners suggest several things; that a portion of practitioners are not interested or do not feel comfortable with counseling or insertion of IUCDs. It also illustrates that a variety of non-evidence-based misconceptions about LARC exist. Results from part 1 of the Cook et al study demonstrate that providers learned well from online practice assessment modules, consequently debunking many misconceptions and allowing HCP to educate patients more effectively. A simple incentive to encourage practitioners to complete a similar online program would be to allow participants to claim their hours as part of their continuing medical education (CME) credits (20). Perhaps mandating that a small portion of CME credits for relevant practitioners be dedicated specifically to keeping up to date on contraceptive information could be adopted by governing colleges. Another possible way to increase practitioner competence and IUCD insertion could come from providing proficient practitioners incentives to aid in the hands on education and training of less confident providers and learners.

Furthermore, initiatives to support and promote task sharing with competent providers such as physician assistants (PA), and nurse practitioners (NP) which could help reduce strain on the system and other providers by increasing access to care. Few Manitoban PAs work in primary care and none are employed by gynaecology, two areas that regularly provide contraceptive services (12,25). PAs do not operate on a fee-for-service model; thus, in theory, PAs may be less subjected to fee-for-service driven time constraints that some NPs and Doctors may experience. Allowing a greater number of providers to gain competency in IUCD insertion could eliminate or reduce the number of referrals to new providers. This could ultimately equate to cost saving to the healthcare system while providing women improved access and continuity of care. Of course, this would rely on willing patients and skilled providers to participate but seems like a reasonable, cost effective avenue to explore. Additionally, training allied professionals such as nurses and pharmacists in effective contraceptive counselling would be beneficial as these are trusted individuals who are able to positively impact patients and their healthcare choices.

When educating patients, practitioners would preferably follow methods similar to those recommended by CPS, Cook et al and the CHOICE studies (4,8,20). Evidence based information on contraceptives should be delivered in order of most to least effective methods. Ideally, making distinctions between perfect use, and typical use of methods, while discussing side effects, risks and benefits of each. Secondly, when possible, providers should offer patients “quick start” of contraceptives. This means that if pregnancy can be ruled out, providers should not wait until a woman’s next menstrual period to start the new contraceptive (8). In terms of IUCDs, this may be more easily facilitated by clinical sites having a small stock of both Cu and

LNG IUCDs. Alternately, a woman coming to an appointment for counseling could go to an adjacent pharmacy, pick up an IUCD and return to the clinic the same day for insertion to avoid delays in method initiation. For the quick start method to be maximally effective, providers should be up to date with screening guidelines. Practitioners should not delay IUCD insertion, even if a woman's Pap smear is not up to date; if necessary, samples can be taken at the time of IUCD insertion. Furthermore, although STI testing should be taken around the time of IUCD insertion, the SOGC states that it is not necessary to delay IUCD insertion and wait for results if a practitioner has no or a very low index of suspicion of an STI (7,8). However, patients with cervical motion tenderness, mucopurulent discharge or pelvic tenderness should have samples taken and IUCD insertion should be delayed until results are available and the woman has received treatment (7). Finally, when educating patients regardless of the contraceptive method they choose, the use of condoms should always be recommended to reduce the risk of sexually transmitted infections.

Ideally, public sexual education occurs from a young age, prior to the initiation of sexual activity. The use of credible, existing online resources for both practitioners and patients should be utilised. The SOGC has excellent online resources in French and English geared towards practitioners and patients of all genders and ages regarding contraception, general sexual health education and more. Some of these resources include interactive features, like the short quiz found on [itsaplan.ca](http://itsaplan.ca), which is targeted towards educating patients and recommending different contraceptive types based on lifestyle questions. The SOGC also runs the webpage, [sex&u](http://sexandyou.ca), which provides a variety of contraceptive material, as well as comprehensive sexual and reproductive health information in varying levels of details. Since sexual education is reported to

be inconsistent among provinces and within school divisions the possibility of a federally or provincially recommended/mandated, unified program based on current SOGC guidelines would be ideal. With the widespread use of technology there is a potential for this to be delivered online in the classroom or at home via computer or smartphone. Perhaps a more comprehensive program with multiple modules and intergraded quizzes, similar to that used in part 1 of the study by Cook et al could be used as a model and adapted for formal education of school aged children.

A major barrier to the uptake of IUCDs is cost. In Canada, as many other places, healthcare is taken care of jointly with stakeholders from federal, provincial, and regional health authorities. Funding and resources would be necessary to facilitate the proposed solutions pertaining to practitioner and patient education discussed above. These problems could potentially be solved by creating healthcare policies providing subsidised contraception. Unfortunately, the federal government has not conducted a comprehensive, accurate reproductive and sexual health survey of Canadians in many years. Data from the most recent contraception consensus is nearly 15 years old (2). Information on contraception, pregnancy intent, and abortion, are valuable and integral for Canadian researchers and policy makers to fully understand the magnitude of the problem and propose solutions to decrease the rates of unintended pregnancy in our country. Therefore, it is imperative for higher levels of government to act and collect this vital information on a large scale. Federal, provincial, territory and local governments need to work together to formulate a plan to improve access to and significantly reduce the cost of, or completely subsidise contraceptives. The CPS recommends that government and private insurers cover the costs of all contraceptives completely and

confidentially at the point of sale to all individuals under 25 years old (14). The province with the highest rate of IUCD usage is Quebec, with 7% (2). Quebec is the only province whose provincial plan covers the full cost of contraceptives for high risk women. For all other women roughly 80% of contraceptive costs are subsidised (17). While the Quebec system is not perfect, researchers could consider looking to this funding model for potential solutions as this is possibly related to the high uptake of IUCDs in their province (17).

Although complete subsidy of contraceptives would initially increase public health spending significantly, models proposed by Contraception Access Research Team to the government of British Columbia (BC) suggest that this cost could quickly be made up by reducing the direct costs associated with the number of abortions, unintended pregnancies and medical bills related to the same (26). Their models project that providing a complete subsidy of highly effective contraception to all women in BC would reduce unintended pregnancies by 12.8% over 4 years. This same plan would reduce the rate of unplanned pregnancy in women under 30 by 21% in this time. Projections indicate that this program would become cost neutral within 2 years; subsequently saving the BC government 27 million dollars yearly, by the 4th year. Models illustrate that costs to manage unintended pregnancies that would be preventable with improved contraception access, exceeds the cost of providing contraception subsidy to all BC women (26).

Finally, another possible solution to funding could come from the implementation of universal, single-payer, public pharmacare. Canada is the only country in the world with universal health care that does not provide universal coverage for prescription drugs. Instead, we

rely on a confusing patchwork system with variable coverage from multiple levels of government and private insurance providers (27). Specifics of national Pharmacare plans will not be discussed in detail here. However, it is clear that uniting provinces under one plan would increase bargaining power with pharmaceutical companies, enabling Canada to negotiate lower drug prices for consumers (27). Both the Cu-IUD and LNG-IUS is listed in The World Health Organizations model list of essential medicines (28). As such, IUCDs as well as other modes of contraception should and must be included on Canada's National Formulary/essential medicine list.

### **Limitations**

The focus of this paper is limited to the use of LARC/IUCD methods to aid in reducing unplanned pregnancy. A complete and exhaustive discussion regarding the background information, risks, benefits and contraindication of the same are not fully explored. Even with exceptional, thorough counselling, not all women are willing or able to accept an IUCD for contraception whether it be for personal, anatomical or physiological reasons. IUCDs have no role in the prevention of sexually transmitted infections (STIs). Condoms are integral to reducing the transmission of STIs. However, theoretically, reduced pregnancy may equate to reduced transmission of STIs to unborn infants and is still important as it reduces financial/resource burden to the system and patient.

Furthermore, it is of note that many of these studies are cross-sectional or survey based and consequently carry the limitation that their results are unable to illustrate causation. They also may be subjected to self reporter biases, misunderstanding or misinterpretations of questions

asked by researchers. Also, these studies focused on urban populations and consequently data may not be applicable to rural or remote communities. Additionally, studies investigating patients may have attracted women that were more interested in LARC or IUCDs at baseline which may skew data from certain studies.

### **Prospective Investigations**

Possible prospective studies could include a survey of Manitoban practitioners and patients. Gaining a better understanding of our populations contraceptive prescribing, education and most common methods used would be particularly helpful in formulating a plan to alter government policy to help increase the uptake of LARC in our population. Additionally, since collection of Canadian data from the federal government in general is lacking, it would be useful to see a current comprehensive data set for urban, rural and remote locations, that distinguishes between pregnancy intent, outcomes, contraceptive modalities, ability to access services and other social determinants of health factors.

### **Conclusion**

Intrauterine contraceptives are highly effective in preventing pregnancy. IUCDs have few contraindications, are safe, and are typically well tolerated by users of all ages and parity. Results from large studies indicate that increased use of LARC in populations is associated with decreased rates of unintended pregnancy, especially among high risk women (4). Yet despite this, the uptake of LARC by women in Canada appears to be quite low, especially among young, nulliparous women who are at highest risk for unintended pregnancy.

A review of relevant literature revealed a multitude of barriers likely contributing to the low uptake of LARC. Three main categories of barriers exist, healthcare system, patient, and practitioner based. Researchers report that despite recommendations, many providers disregard young and nulliparous women as suitable IUCD candidates. Inaccurate knowledge and misconceptions about IUCDs are common among both providers and patients. Studies have shown that many reported concerns could be alleviated through correct, evidence based information. Low uptake has also been found to be related to high up front costs of IUCD units. The healthcare system as a whole need to work on the creation of large scale contraceptive subsidies, and policies aimed toward off setting high up front costs associated with IUCDs in order to increase use of these highly effective contraceptives. Facilitation of programmes focused on addressing IUCD related costs, HPC knowledge, hands on training, as well as patient awareness and public education is also necessary. By addressing these we may be able to significantly increase the uptake of LARC which may ultimately contribute to decreasing the rates of unintended pregnancy among Canadian women.

<b>Table 3. Common Intrauterine Contraception Misconceptions and Counterevidence.</b>	
Myths that IUCDs...	Facts
Cause PID or elevated risk of the same	Absolute risk of PID is low in IUCD users but may be elevated in the first month after insertion. STIs are responsible for PID, not the IUCDs. There is no evidence supporting antibiotic prophylaxis for IUCD insertion to reduce the incidence of PID (7,10,22).
Are contraindicated in patients with a history of STIs or PID or high risk of the same	STI risk should not be an absolute contraindication to IUCD use in high risk women(18). Patients who have an IUCD but become infected with an STI or develop PID do not need to have the device removed and can be treated with it in situ. However, patients with PID that do not respond to appropriate antimicrobial therapy in 48-72 hours should have their device removed(7).

Impact future fertility	There is no evidence that IUCD use causes or increases the risk of infertility(7).
Cause or increase the risk of ectopic pregnancy	Absolute risk of ectopic pregnancy is lower in IUCD users than women using no contraception. However, if a pregnancy occurs with an IUCD in situ 15-50% are ectopic. Ectopic pregnancy must be urgently excluded if a woman becomes pregnant with an IUCD suspected to be in situ (7).
Cause changes to bleeding patterns that are harmful.	<p>Many IUCD users experience irregular bleeding or spotting in the first weeks or months after insertion, overtime these lessen(7).</p> <p>LNG-IUSs significantly decrease total volume of menstrual blood lost and is indicated as a treatment for menorrhagia and dysmenorrhea. LNG systems may cause amenorrhea in some users, especially those using devices containing 52mg LNG(7).</p> <p>Cu-IUD users often experience an increase in total volume of menstrual blood lost and a slight increase in dysmenorrhea(7).</p> <p>Persistent, painful unexpected bleeding should be investigated to rule out a pelvic pathology(7).</p>
Are not first line method of contraception	IUCDs should be offered as first line contraception to all women regardless of parity, in the absence of contraindications (7).
Insertion is unacceptably painful.	Pain is subjective and difficult to predict. Research reviewing pain mitigation techniques have not produced significant consistent data to support any specific methods (29). The use of anticipatory analgesics, local anesthetics, or cervical relaxation agents are recommended by some practitioners (10). Cramping and discomfort is common during and in the days after insertion. Insertion may be more painful among nullipara (7). Though other scholars reporting state that nullipara reported insertion to be “moderately” painful (15).
Prone to failure or less effective than other contraceptive methods.	IUCDs are as effective as permanent sterilisation procedures and are the most effective reversible contraceptives available in Canada (7).
Insertion is more difficult in nulliparous women.	Scholars reporting on providers interpretation of IUCD insertion in nullipara were cited as being “easy” or “easier than expected” (15).

Perforation is higher in nulliparous women	Overall, perforation incidence is low regardless of parity(15). Risk of uterine perforation is higher in postpartum and breastfeeding women. Perforation risk decreases with inserter experience. Between 0.3 and 2.6 per 1000 insertions result in perforation (7).
Are abortifacients.	Both Cu-IUD and LNG-IUS work by preventing fertilisation(7).
Are associated with increased risk of cancer.	Both Cu-IUD and LNG-IUS are associated with a significantly decreased risk of endometrial cancer (7).
Nullipara are more likely to experience expulsion.	Expulsion rates are low regardless of parity (15). IUCD expulsion is not associated with nulliparity. Expulsion most commonly occurs within the first year post insertion, especially in the first 3 months. Reported risk factors for expulsion include: menorrhagia, dysmenorrhea, uterine fibroids, history of expulsion, adolescence, and abnormal uterine shape(7).

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