

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

**Michelle Houston MPAS (c) BSc.**

**Abstract**

Intrauterine contraceptive devices (IUCDs) are highly effective and recommended as first-line contraceptives for women. Very few Canadian women use these forms of contraception, and even fewer youths use these methods. Multiple research search engines allowed a literature review of papers about IUCDs, healthcare systems, patient and provider barriers, published between 2000 and 2020. Using a preference for Canadian studies identified and allowed investigating the barriers preventing the more widespread use of IUCDs by Canadian women with an emphasis placed on at-risk groups, in order to make recommendations for decreasing unintended pregnancies.

Barriers broadly fit into the three categories of the healthcare system, the patients', 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 upfront cost, and the systemic issues of limited access to contraceptive providers. Studies have shown that evidence-based education and removal of cost and access related barriers increase patient acceptance of and adherence to IUCDs.

To increase the use of IUCDs by Canadian women, large scale subsidy and policies to create programmes targeted at improving public and provider education and awareness are required. 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.

**AUTHOR: PA Michelle Houston MPAS (c) BSc.**

**Mentor Dr. Maggie Morris, MD, FRCS (c), M. Ed**

**Key Words: Health Care Barriers, Contraception, Contraception Devices, Systemic Limitations to Health Care.**

**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 young, tend to have a lower income, limited education and support, and often belong to a minority group (1,3,4). 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 the 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 copper-based intrauterine devices (Cu-IUD) and levonorgestrel intrauterine system (LNG-IUS), and are collectively known as intrauterine contraceptive devices (IUCDs). Once *in situ* IUCDs have extremely low failure rates, with effectiveness comparable to permanent sterilization 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 organizations 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 utilized 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 available in Canada are the 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 fertilization 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. The Copper ions are released from the unit and concentrate throughout the reproductive tract, making 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 an increased rate of apoptosis. This effectively decreases the duration of a woman's fertile window, thus minimizing the chance of fertilization (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 progesterone from the main stem of their T-frame. LNG causes the 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 are shown to reduce the risk of a woman developing endometrial cancer (7) and allow for the return of fertility immediately upon removal (9,10). Because they need to be inserted and removed by a healthcare provider, the likelihood of user error is limited. Rates of satisfaction and continuation of IUCDs have also 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 normalize over time, some women cannot tolerate this. Patients seeking early removal of their IUSC often cite dysmenorrhea, pain, and LNG-IUS related hormonal side effects as reasons for discontinuation (7,11).

All forms of contraception come with some level of risk. These risks and benefits must be discussed with patients before the initiation of any therapy. Uterine perforation during insertion is one severe potential 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). The risk of uterine perforation is higher in postpartum and breastfeeding women (7). If a 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 three 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 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, the Society of Obstetricians and Gynaecologists (SOGC) review of the Canadian Contraception Consensus (Part 3 of 4) Chapter 7 – Intrauterine Contraception is recommended.

### **Relevant Contraception Information**

A national survey of contraceptive use among Canadian women found that 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 stratifies broadly into three tiers. Tier 1 contains the most effective methods: the "set it and forget it" independent user modalities administered by healthcare professionals; permanent sterilization, IUCDs, and hormone-based subdermal implants (which are not available in Canada at this time but possibly shortly). 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 conventional 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

Using PubMed, a search for articles was restricted to full-text articles published in English between 2000 to 2020. Primary studies of any design were included. MeSH headings of LARC, long-acting reversible contraception, intrauterine devices, IUD, IUS, IUCD, IUC, satisfaction, barriers, attitudes, healthcare providers, nulliparous, and adolescent identified abstracts and articles. A total of 672 articles were yielded, and of that 22 articles were used in this review. Reference lists of articles were scoured to identify further relevant studies. 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 how 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 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 25 gynecologists), 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 the participants in these studies felt that more education or a course on IUCDs and insertion would be beneficial to their practices (15,16). This finding 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. 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 consideration of IUCD usage in women were variable. Citing the three most common IUCD related concerns in all women was the risk of developing pelvic inflammatory disease (PID), nulliparity, and the

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 their 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, although most are not evidence-based (19,20). Table 1 contains a list of misconceptions and facts that refute many of these concerns. Table 2 lists barriers to the provision of intrauterine contraceptives cited by healthcare providers.

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 the 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 administered to determine whether gaps in the practitioner's knowledge had decreased after evidence-based education found significant improvement in post-test scores. Providers felt more comfortable, competent and likely to change their IUCD prescribing practices. 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 providing practitioners 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 a 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. Again, a review of Table 1 debunks many of these concerns with evidence based facts. Table 3 lists barriers to the provision of intrauterine contraceptives cited by patients.

However, some concerns simply cannot overcome by an educational conversation alone. Confidentiality and cost are two of these and maybe 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 methods due to fear of parental repercussions (21).

Lack of awareness and understanding of IUCDs is prevalent among patients and demonstrated in a Californian cross-sectional survey 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 the IUCD aware participants reporting that they learned about them from a healthcare provider. When data was further broken down by parity, over half of the parous women that had heard about IUCDs were educated by an HCP. Whereas only 27% of nulliparous participants reported receiving IUCD education by a HCP.

This awareness discrepancy 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 recognize 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 an 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 counselling 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 described in a subsection of a large American prospective cohort study, the Contraceptive CHOICE project (23). They took things one step further by removing three 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 standardized script. Participants were able to choose and switch contraceptives as many times as they liked, free of charge throughout the two to three 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 a 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).

Data from the CHOICE study, 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, observing an overall reduction in unintended pregnancy among CHOICE members. 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 an unintended pregnancy than older, non-LARC users. No difference in the incidence of unintended pregnancy was observed in LARC users regardless of their age (4).

Combined, the 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 the 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. The 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 (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 laypeople 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 that collected data from a variety of practitioners, educators, policymakers 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, throughout 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. However, 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 to 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. They are making this route an inviable option to increase IUCD use by Canadian women on a large scale.

Access to primary care providers is a problem ubiquitous to Canadians. In Winnipeg, extended hours of sexual-health clinics and teen clinics exist, intending 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 individual 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 the current literature reveals that barriers to the uptake of LARC are diverse and divided into three 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 counselling 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 practise 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). Alternatively, perhaps mandating that a small portion of CME credits be dedicated to keeping relevant practitioners 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), could help reduce strain on the system and physicians by increasing access to care. Few Manitoban PAs work in primary care, and none yet employed by gynecology, 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 more providers to gain competency in IUCD insertion could eliminate or reduce the number of referrals to specialist providers, ultimately equating to cost-savings 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 contraceptive counselling would be beneficial as these are trusted individuals able to impact patients and their healthcare choices positively.

When educating patients, practitioners would preferably follow methods similar to those recommended by CPS, Cook et al. and the CHOICE studies (4,8,20), which recommends presenting evidence-based information on contraceptives in the order of most to least effective methods. Ideally, making distinctions between perfect use and commonly used, while discussing side effects, risks and benefits of each. Secondly, when possible, providers should offer patients a "quick-start" of contraceptives. Meaning that if pregnancy is 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 facilitated by clinical sites having a small stock of both Cu and LNG IUCDs available. Alternately, a woman coming to an appointment for counselling could go to a nearby 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 current, if necessary, taking samples 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 delayed until results are available and treatment initiated (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 before the initiation of sexual activity. The use of credible, existing online resources for both practitioners and patients should be utilized. 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 [www.itsaplan.ca](http://www.itsaplan.ca), which is targeted towards educating patients and recommending different contraceptive types based on lifestyle questions. The SOGC also runs the webpage, <https://www.sexandu.ca/>, providing a variety of contraceptive material, as well as comprehensive sexual and reproductive health information in varying levels of details. As sexual education is reported to be inconsistent among provinces and within school divisions (30), the possibility of a federally or provincially recommended/mandated, unified program based on current SOGC guidelines would be ideal. With technology, there is a potential for online distribution to the

classroom or 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 a practitioner and patient education discussed above. These problems could potentially be solved by creating healthcare policies providing subsidized 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 policymakers to fully understand the magnitude of the problem and propose solutions to decrease the rates of unintended pregnancy in our country. Therefore, higher levels of government must 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 subsidize 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 subsidized (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 four years. This same plan would reduce the rate of unplanned pregnancy in women under 30 by 21% at this time. Projections indicate that this program would become cost-neutral within two 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, 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 Organization 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 essential 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 apply 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 specific 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. Expanding Provincial and Federally coordinated comprehensive data sets for urban, rural and remote locations that distinguish between pregnancy intent, outcomes, contraceptive modalities, ability to access services and other social determinants of health factors is needed, if not essential.

### **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 the 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, the 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 is also related to the high upfront costs of IUCD units. The healthcare system as a whole needs to work on the creation of large scale contraceptive subsidies and policies aimed toward offsetting high costs associated with IUCDs in order to increase the 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 1. 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).

<b>Table 2. 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

**Table 3. Barriers to the Provision of Intrauterine Contraceptives cited by Patients.**

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

## References

1. Oulman E, Kim THM, Yunis K, Tamim H. Prevalence and predictors of unintended pregnancy among women: an analysis of the Canadian Maternity Experiences Survey. *BMC Pregnancy Childbirth*. 2015 Dec;15(1):260.
2. Black A, Yang Q, Wen SW, Lalonde AB, Guilbert E, Fisher W. Contraceptive Use Among Canadian Women of Reproductive Age: Results of a National Survey. *J Obstet Gynaecol Can*. 2009 Jul;31(7):627–40.
3. Secura GM, Allsworth JE, Madden T, Mullersman JL, Peipert JF. The Contraceptive CHOICE Project: reducing barriers to long-acting reversible contraception. *Am J Obstet Gynecol*. 2010 Aug;203(2):115.e1-115.e7.
4. McNicholas C, Madden T, Secura G, Peipert JF. The Contraceptive CHOICE Project Round Up: What We Did and What We Learned. *Clin Obstet Gynecol*. 2014 Dec;57(4):635–43.
5. Canadian Contraception Consensus Chapter 1 Contraception in Canada. *J Obstet Gynaecol Can*. 2015 Oct;37(10):S5–12.
6. Canadian Institute for Health Information. Induced Abortions Reported in Canada in 2018. Canadian Institute for Health Information; 2019.
7. Black A, Guilbert E, Costescu D, Dunn S, Fisher W, Kives S, et al. Canadian Contraception Consensus (Part 3 of 4): Chapter 7 – Intrauterine Contraception. *J Obstet Gynaecol Can*. 2016 Feb;38(2):182–222.
8. Di Meglio G, Crowther C, Simms J. Contraceptive care for Canadian youth. *Paediatr Child Health*. 2018 Jun 12;23(4):271–7.
9. Mirena Product Monograph [Internet]. Bayer Inc; 2019. Available from: <https://www.bayer.ca/omr/online/mirena-pm-en.pdf>
10. Wildemeersch D. New intrauterine technologies for contraception and treatment in nulliparous/adolescent and parous women. *F, V & V IN OBGYN*. 2009;1(3):223–32.
11. Dickerson LM, Diaz VA, Jordan J, Davis E, Chirina S, Goddard JA, et al. Satisfaction, Early Removal, and Side Effects Associated With Long- Acting Reversible Contraception. *Fam Med*. 2013 Dec;45(10):7.
12. Morris M. Capstone Feedback, email to Michelle Houston housto13@myumanitoba.ca. 2020.
13. Hladky KJ, Allsworth JE, Madden T, Secura GM, Peipert JF. Women's Knowledge About Intrauterine Contraception: *Obstet Gynecol*. 2011 Jan;117(1):48–54.
14. Di Meglio G, Yorke E. Universal access to no-cost contraception for youth in Canada. *Paediatr Child Health*. 2019 May 15;24(3):160–4.

15. Buhling KJ, Hauck B, Dermout S, Ardaens K, Marions L. Understanding the barriers and myths limiting the use of intrauterine contraception in nulliparous women: results of a survey of European/Canadian healthcare providers. *Eur J Obstet Gynecol Reprod Biol.* 2014 Dec;183:146–54.
16. Stubbs E, Schamp A. The evidence is in. Why are IUDs still out? *Can Fam Physician.* 2008 Apr;54:560–556.
17. Hulme J, Dunn S, Guilbert E, Soon J, Norman W. Barriers and Facilitators to Family Planning Access in Canada. *Healthc Policy Polit Santé.* 2015 Feb 25;10(3):48–63.
18. Fleming KL, Sokoloff A, Raine TR. Attitudes and beliefs about the intrauterine device among teenagers and young women. *Contraception.* 2010 Aug;82(2):178–82.
19. Black KI, Lotke P, Lira J, Peers T, Zite NB. Global survey of healthcare practitioners' beliefs and practices around intrauterine contraceptive method use in nulliparous women. *Contraception.* 2013 Nov;88(5):650–6.
20. Cook J, Waddington A, Black D, Costescu D, Desjardins D, Duchesne E, et al. Intrauterine Contraception: Knowledge and Prescribing Practices of Canadian Health Care Providers. *J Obstet Gynaecol Can.* 2019 Aug;41(8):1084–92.
21. Di Meglio G, Yeates J, Seidman G. Can youth get the contraception they want? Results of a pilot study in the province of Quebec. *Paediatr Child Health [Internet].* 2019 May 2 [cited 2020 Mar 21]; Available from: <https://academic.oup.com/pch/advance-article/doi/10.1093/pch/pxz059/5482487>
22. Whitaker AK, Johnson LM, Harwood B, Chiappetta L, Creinin MD, Gold MA. Adolescent and young adult women's knowledge of and attitudes toward the intrauterine device. *Contraception.* 2008 Sep;78(3):211–7.
23. Secura GM, Madden T, McNicholas C, Mullersman J, Buckel CM, Zhao Q, et al. Provision of No-Cost, Long-Acting Contraception and Teenage Pregnancy. *N Engl J Med.* 2014 Oct 2;371(14):1316–23.
24. Falk J, Friesen K, Budgen Shawn. Price Comparison Of Commonly Prescribed Medications In Manitoba 2020. 2020.
25. Jones I. Mb PA Query, email to Michelle Houston michelleokabehouston@gmail.com. 2020.
26. Norman W, Stirling B. Contraception Cost-Effectiveness in British Columbia. The University of British Columbia Contraception Access Research Team; 2018.
27. Canada H. A Prescription for Canada: Achieving Pharmacare for All - Final Report of the Advisory Council on the Implementation of National Pharmacare [Internet]. *aem.* 2019 [cited 2020 Mar 26]. Available from: <https://www.canada.ca/en/health-canada/corporate/about-health-canada/public-engagement/external-advisory-bodies/implementation-national-pharmacare/final-report.html#3.2>
28. World Health Organization Model List of Essential Medicines, 21st List [Internet]. World Health Organization; 2019. Available from: <https://apps.who.int/iris/bitstream/handle/10665/325771/WHO-MVP-EMP-IAU-2019.06-eng.pdf>
29. Bahamondes L, Mansour D, Fiala C, Kaunitz AM, Gemzell-Danielsson K. Practical advice for avoidance of pain associated with insertion of intrauterine contraceptives. *J Fam Plann Reprod Health Care.* 2014 Jan;40(1):54–60.
30. DB Robinson, V MacLaughlin, J Poole. Sexual health education outcomes within Canada's elementary health education curricula: A summary and analysis. *The Canadian Journal of Human Sexuality.* Vol. 28, No. 3 DOI: 10.3138/cjhs.2018-0036 Volume 28 Issue 3, November 2019, pp. 243-256