

University of Vermont

**UVM ScholarWorks**

---

Graduate College Dissertations and Theses

Dissertations and Theses

---

2016

## Long-Acting Reversible Contraceptives In Vermont: A Survey Based Assessment Of Current Knowledge Of Providers Of Women Of Reproductive Age

Erin O'Brien  
*University of Vermont*

Follow this and additional works at: <https://scholarworks.uvm.edu/graddis>



Part of the [Nursing Commons](#), and the [Public Health Commons](#)

---

### Recommended Citation

O'Brien, Erin, "Long-Acting Reversible Contraceptives In Vermont: A Survey Based Assessment Of Current Knowledge Of Providers Of Women Of Reproductive Age" (2016). *Graduate College Dissertations and Theses*. 471.

<https://scholarworks.uvm.edu/graddis/471>

This Thesis is brought to you for free and open access by the Dissertations and Theses at UVM ScholarWorks. It has been accepted for inclusion in Graduate College Dissertations and Theses by an authorized administrator of UVM ScholarWorks. For more information, please contact [scholarworks@uvm.edu](mailto:scholarworks@uvm.edu).

LONG-ACTING REVERSIBLE CONTRACEPTIVES IN VERMONT: A SURVEY  
BASED ASSESSMENT OF CURRENT KNOWLEDGE OF PROVIDERS OF  
WOMEN OF REPRODUCTIVE AGE

A Thesis Presented

by

Erin M. O'Brien

to

The Faculty of the Graduate College

of

The University of Vermont

In Partial Fulfillment of the Requirements  
for the Degree of Master of Science  
Specializing in Nursing

January, 2016

Defense Date: November 12, 2015

Thesis Examination Committee:

Ellen Long-Middleton, Ph.D., APRN, FNP, Advisor

Amy O'Meara, DrNP, WHNP-BC

Elizabeth Bonney, MD, Chairperson

Cynthia Forehand, Ph.D., Dean of the Graduate College

© Copyright by  
Erin M. O'Brien  
January, 2016

## **Abstract**

Unintended pregnancies are a long-standing public health issue nationally, with percentages hovering around 50% for at least the last five years. Vermont is doing slightly better than the national average, but is faced with its own challenges due to its rural nature. Agencies and organizations, such as the World Health Organization, March of Dimes and the Vermont Department of Health have made decreasing unintended pregnancies one of their priorities to improve maternal and fetal health outcomes, as well as social and economic opportunities for families. Current evidence-based guidelines call for long-acting reversible contraceptives (LARCs), including intrauterine devices (IUDs) and implants, as the first-line recommendation by healthcare providers for decreasing unintended pregnancies.

This study, in collaboration with several Vermont state organizations and agencies, engaged healthcare professionals throughout the state with an electronically disseminated survey aimed at assessing their knowledge of LARCs. The aim of this study was to ascertain whether healthcare professionals caring for women of reproductive age, are using current evidence-based practice guidelines to counsel women in their contraceptive choices.

Survey results revealed that the majority of the respondents consider themselves to be knowledgeable about and had received a high level of training in IUD counseling and/or insertion. Areas of uncertainty were primarily about side effects and the insertion and removal processes of the implant, as well as a few categories of medical eligibility. This was especially apparent when results were stratified by urban and rural regions of Vermont.

Although there seems to be a high level of provider confidence in knowledge about LARCs and reported counseling of LARCs as first-line, there is a discrepancy between what providers think they know and current evidence based contraception guidelines. Many factors exist that could explain this discrepancy, including but not limited to lack of training, provider bias, and system barriers. This study aims to illuminate gaps in provider knowledge to improve uptake of LARCs and over time make a shift in the numbers of unintended pregnancies in Vermont.

**Dedication:**

To Matt, Wilder and Ernie for all of the love and support to keep me going strong!

## **Acknowledgments**

Many thanks to all of the individuals who helped me with this project, including Adrienne Woike, Erica Gibson, Amy O'Meara, Ellen Long-Middleton, Elizabeth Bonney, and my peers who offered much needed moral support!

## Table of Contents

<b>Dedication:</b> .....	<b>ii</b>
<b>Acknowledgments</b> .....	<b>iii</b>
<b>Tables</b> .....	<b>v</b>
<b>Background and Significance:</b> .....	<b>2</b>
Long-Acting Reversible Contraceptives .....	2
Unintended Pregnancies .....	4
Contraception Recommendations .....	5
Barriers to LARC Use .....	7
Current Status of LARC .....	9
Project Significance .....	10
Research Objectives .....	11
<b>Chapter II: Literature Review</b> .....	<b>12</b>
<b>Theoretical Framework</b> .....	<b>12</b>
NP Competencies.....	14
<b>Review of Research</b> .....	<b>15</b>
Provider Knowledge and Current Practice .....	15
Improving uptake.....	19
Adolescents at Risk.....	22
Barriers to LARC placement in Adolescents.....	23
Improved Provision in Adolescents .....	24
Postpartum LARCs.....	26
Post-abortion LARCs.....	27
Cost Comparison.....	28
<b>Summary</b> .....	<b>31</b>
Implications for Current Study.....	32
<b>Chapter III: Methods and Materials</b> .....	<b>33</b>
<b>Population sample</b> .....	<b>33</b>
<b>Identification of Need</b> .....	<b>33</b>
<b>Project Development</b> .....	<b>34</b>
<b>Human Subjects Protection</b> .....	<b>35</b>
<b>Survey Implementation</b> .....	<b>35</b>
<b>Study Instrument</b> .....	<b>36</b>
<b>Literature Review</b> .....	<b>38</b>
<b>Data Analysis</b> .....	<b>39</b>
<b>Chapter IV: Results and Discussion</b> .....	<b>40</b>
<b>Limitations and Enhancements to Research</b> .....	<b>49</b>
<b>Implications</b> .....	<b>50</b>
<b>Conclusion</b> .....	<b>51</b>
<b>References</b> .....	<b>52</b>

## **List of Tables**

Table 1.1: Survey: Knowledge Assessment.....	36
Table 1.2: Main Clinical Practice Settings.....	41
Table 1.3: Provider Recommendation of Copper T IUD Based on Medical Eligibility...	45
Table 1.4: Provider Recommendation of Levonorgestrel releasing IUD Based on Medical Eligibility.....	46
Table 1.5: Provider Recommendation of Implant releasing IUD Based on Medical Eligibility.....	47



## **List of Figures**

Figure 1.1: Model of Tiered Contraceptive Effectiveness.....	21
Figure 1.2: Years in Practice (post-training).....	40
Figure 1.3: Types of Providers.....	41

## **Chapter 1: Introduction**

### **Summary Statement**

In 2010, 46% of all pregnancies (4,000) in Vermont were unintended, a figure placing the state just below the national average, but still startlingly high. At the same time, the teen pregnancy rate was 32 per 1,000 women aged 15-19 compared to a national teen pregnancy rate of 57 per 1,000 (Guttmacher, 2015). Although it appears that Vermont is having some success with its prevention of overall unintended pregnancies as compared to the rest of the United States, there are ways in which this public health issue could be vastly improved upon. A safe, economical, and proven method for reducing unintended pregnancies for all aged women are long-acting reversible contraceptives (LARCs), including intrauterine devices (IUDs) and the single-rod contraceptive implant. These methods are highly effective, yet under-utilized in the United States, begging the question, “how is Vermont doing with its use of LARCs?” The increased use of LARCs by Vermont providers among women of reproductive age could influence these unintended pregnancy statistics positively, improving social, economic and health outcomes for women, children and families across the state. Yet, we do not understand the level of knowledge Vermont health care providers have about LARC, nor what knowledge gaps exist. Hence, the purpose of this study was to understand the knowledge and practices of Vermont health care providers’ related to long-acting reversible contraception.. It is hoped that the results of this study will ultimately contribute to increased provider counseling and implementation, improved uptake of LARCs as priority contraception, and a decrease in unplanned pregnancies in the state of Vermont.

## **Background and Significance:**

### **Long-Acting Reversible Contraceptives**

LARCs have two categorizations: IUD and the single rod, progestin subdermal implant (Nexplanon®). IUD models are either levonorgestrel hormonal (Mirena®, Skyla® and Liletta™) or copper T380A (ParaGard®),

The levonorgestrel intrauterine system (LNG-IUS) is a T-shaped polyethylene frame containing 52 mg of levonorgestrel that is released at a rate of 20 micrograms per day for five years. After five years, the daily dose decreases by 50% (McNicholas & Peipert, 2012). The LNG-IUS prevents pregnancy and fertilization by thickening cervical mucus, inhibiting sperm motility, and thinning the endometrial lining. In some women, ovulation may be suppressed (McNicholas & Peipert, 2012). Other non-contraceptive benefits of the LNG-IUS include decreased monthly blood loss and reduction of dysmenorrhea.

The CuT380A IUD is a T-shaped, non-hormonal, polyethylene frame wrapped in copper wire. Pregnancy prevention is achieved through inhibition of fertilization. The ionic charge of the copper also has a spermicidal effect, (McNicholas & Peipert, 2012). Another benefit of the CuT380A IUD is its use as emergency contraception within five days following unprotected intercourse; it should be pointed out that this is the only time the IUD is believed to work by inhibiting implantation rather than fertilization. Due to the fact that it is non-hormonal, there is a consistent rapid return to fertility among users. (McNicholas & Peipert, 2012). Because of the potential to use this method for up to 12 years, this is also the most cost-effective contraceptive option, although it may be chosen

less frequently due to reported negative side effects, including menorrhagia and/or dysmenorrhea.

In addition to their excellent contraceptive profiles, the levonorgestrel-releasing IUD has been shown to aid in the prevention of endometrial and cervical cancer (McNicholas & Peipert, 2012). The mechanism of action is that progestin effects on the endometrium serve to protect against and cause regression of endometrial hyperplasia (Yoost, 2014).

There is only one contraceptive implant available in the United States: the etonogestrel-releasing subdermal (ENG) implant. ENG is a single rod, progestin-only implant that measures 4 cm in length and 2 mm in diameter and contains barium for radiographic identification. The ENG is inserted at the inner side of either upper arm about 8-10 cm above the medial epicondyle of the humerus in the sulcus between the bicep and triceps muscles (Merck Sharp & Dohme, 2011). ENG is currently approved for three years, and like the IUD, provides excellent contraceptive effectiveness. It works primarily through ovulation inhibition as well as thickening of cervical mucus. This method has been shown to appeal to younger age groups due its ability to improve acne and relieve dysmenorrhea, as well its non-user dependence for efficacy. Additionally, a pelvic exam is not required, which is appealing to many young women.

## **Unintended Pregnancies**

Population trends for the last 20 years consistently indicate that 51% of pregnancies are unintended across the United States (Finer & Zolna, 2014). According to the Centers for Disease Control there are higher proportions of unplanned pregnancies (UPs) among adolescent and young women, women who are racial/ethnic minorities, and women with lower levels of education and income (2014). Approximately half of UPs are among women who were not using contraception at the time they became pregnant and the other half are among women who became pregnant despite reported use of contraception indicating imperfect use of these methods (CDC, 2013). There are many consequences linked to these UPs, including delayed prenatal care, worse maternal and fetal outcomes, premature birth and negative physical and mental health effects for children, only to name a few (The Guttmacher Institute, 2015). Other negative outcomes include higher costs to the overall healthcare system and economy, with annual direct costs at \$4.5 billion yearly (Committee on Adolescent Health Care Long-Acting Reversible Contraception Working Group, 2012).

Additional burdens affecting young women, especially adolescents experiencing unplanned pregnancies include depressed educational, social and economic opportunities. Only about half (51%) of teen mothers get a high school diploma by age 22 compared to 89 percent of women who didn't have a teen birth. If a teen has a child before the age of 18, they are even less likely to graduate from high school at 38% obtaining a high school diploma and about 19% getting their General Education Development. Additionally, less than 2% attain a college degree by 30 years old, (Ng & Kaye, 2012). While there are confounding factors to consider, numerous studies reveal that teen childbearing is

significantly associated with discontinuation or serious delay of education and decreased future earnings and employment opportunities. According to the National Campaign to Prevent Teen and Unplanned Pregnancy, roughly 48% of all mothers age 15 to 19 were living below the poverty line from 2009-2010. Teen mothers living with family had slightly better statistics, with 34% living below the poverty line. Impact of teen childbearing is also stratified by race, with higher numbers of Hispanic, non-white women living at the poverty level. Research has also shown that children of adolescent mothers have higher rates of abuse and neglect, are more likely to become teen mothers themselves and are more likely to be incarcerated, (The National Campaign to Prevent Teen Pregnancy, 2007).

### **Contraception Recommendations**

A topic that has gained traction in US healthcare in the last decade is the use of more efficient contraception, namely LARCs, to reduce overall numbers of UPs. LARC methods have many advantages including excellent safety profile, non-user dependence, and ease of placement after minimal provider training (Committee on Adolescent Health Care Long-Acting Reversible Contraception Working Group, 2104). They have also been shown to have higher continuation rates after one year (>80%) than other reversible methods (49% to 57%) and are more cost-effective over time than other forms of contraception (Hathaway et al., 2014).

Recommendations for increased use of LARCs was highlighted in 2007, when the American Congress of Obstetricians and Gynecologists (ACOG) Committee Opinion stated that IUDs should be considered as first-line choices for both nulliparous and

parous adolescents (American College of Obstetricians and Gynecologists, 2007). To address barriers to placement, ACOG published another set of recommendations in 2009, encouraging LARCs for all appropriate candidates of reproductive age and urging providers to avoid delays to placement, specifically to adopt same-day insertion protocols, including placement immediately post-abortion, or vaginal or C-section birth (ACOG, 2009). These recommendations were reaffirmed in 2014 by both the ACOG and American Academy of Pediatrics, which both urged providers to recommend LARC's as first line contraception. Additionally, the Centers for Disease Control and Prevention emphasized the importance of increasing access to LARC methods to reach the Healthy People 2020 objective of reducing unintended pregnancy rates from 49% to 44% (United States Department of Health and Human Services, 2012).

Even though these recommendations have been in place for almost 10 years, the current use of IUDs and implants amongst US women is 11.6% (Daniels et al., 2015), which is low when compared against most European countries, including France 23%, Finland 26% and Norway at 27% where healthcare systems focus on preventive and primary care (Mosher & Jones, 2010). Current trends suggest that the majority of sexually active women in the United States are using oral contraceptives (25.9%), sterilization (female 25.1%), and condoms (male) at 15.3%. Other short acting reversible contraceptives (SARCs) include the vaginal ring or transdermal patch (2.6%), and hormonal injections (4.5%). Withdrawal and other methods are reported at 6.8% (Daniels et al., 2015). The failure rate of oral contraceptives with typical use (as opposed to perfect use) hovers around 10%, where failure rates of male condom use are closer to 20%, almost equal to the withdrawal method (CDC, 2013). LARCs failure rate is almost

equivalent to sterilization at 0.2%, yet is not consistently recommended as first line by most providers (Harper et al., 2013).

### **Barriers to LARC Use**

Providers may be reluctant to promote LARCs due to their historical controversy, initial marketing to limited patient populations and changing recommendations over the years by both pharmaceutical companies and national guideline organizations. A significant historical factor was the creation of the Dalkon Shield, an IUD that had some serious design flaws that increased the risk of pelvic inflammatory disease, infertility and septic abortions due to its higher pregnancy prevention failure rate (Harper et al., 2008). At that time, in the 1970s, IUD use was on the rise, as women were attracted to the “forgettable” nature of the method and its high efficacy in pregnancy prevention. Following the negative publicity and health scares tied to the unique flaws of the Dalkon Shield, all IUDs lost public and provider favor.

Often cited reasons for limited uptake of LARCs are patients’ fear, and lack of information or knowledge. These could be due to limited counseling on LARC methods, persistent historical bias regarding IUD safety, perceived negative experiences relayed from woman to women regarding discomfort of the procedures or side effects, and the influence of pharmaceutical marketing to name a few.

Outdated or insufficient provider knowledge is certainly a barrier to increased uptake of LARCs. For instance, Mirena® IUD initially was only marketed to parous women and placement was considered optimal during menses. Some providers have held onto these practices, even though they have been proven unnecessary. Additionally, many conditions have previously precluded women from being offered LARCs. For instance,



IUD use was formerly contraindicated for women with previous pelvic inflammatory disease (PID) or chlamydia/gonorrheal infections, history of ectopic pregnancy or hypertension, smokers, HIV-positive women and diabetic and obese women. Other outdated knowledge concerning side effects of IUD's that precluded placement include belief that they increase risks of PID, tubal infertility and decreased bone mineral density (Yoost, 2014).

Insufficient or lack of training in IUD and implant counseling and insertion is another barrier to provider use of LARCs. Multiple opportunities for training in these areas are available to healthcare providers, including training embedded into the medical or nursing education program, at the work site, through CME/CEUs, or as a part of a medical or nursing residency or fellowship (Harper et al., 2012). A practitioner must have the desire to offer these services, support from their practice setting, as well as the appropriate patient population. Despite receiving training, skills may remain unused or be forgotten if not implemented on a regular basis.

Although the Affordable Care Act has significantly reduced the cost barrier for some women, it is still cited as a major obstacle to obtaining a LARC. Upfront costs of IUDs and implant devices without insurance, not including insertion and removal fees are between 500 dollars and 700 dollars. This is prohibitive for many women who may not have comprehensive health insurance coverage or insurance that still requires cost-sharing (Trussell, 2015).

## **Current Status of LARC**

Four IUDs and a few iterations of implantable hormonal rods have since come on the market with excellent safety and pregnancy prevention profiles. Currently, the Centers for Disease Control and Prevention Medical Eligibility Criteria gives IUDs and implants a classification of 1 or 2, meaning that there is either (1) no restriction for the use of the contraceptive method or (2) that the advantages of using the method generally outweigh the theoretical or proven risks (CDC, 2010). Additionally, The CDC's most recent report on US Selected Practice Recommendations for Contraceptive Use affirms that LARC can be used in almost all women of childbearing age as long as providers are reasonably certain that these patients are not already pregnant (Hathaway et al, 2014). Despite this updated safety profile and guideline, providers continue to exclude many patients from being offered LARCs (Harper, 2015). There are a few true contraindications to the use of IUDs. Those contraindications include: current mucopurulent discharge, acute cervicitis, current pregnancy, copper allergy (for copper IUD), congenital uterine abnormalities or cervical or uterine malignancies. The levonorgestrel intrauterine system (LNG-IUS) and implant also should not be initiated or continued when severe cirrhosis or breast cancer are present (Hathaway et al., 2014).

Research has repeatedly proven the incredibly low failure rate of IUDs and implants, yet the small percentage of users would suggest that contraception providers are not recommending LARCs based on misinformation regarding best practice guidelines, outdated knowledge, or are faced with institutional, policy or other barriers and challenges (Biggs et al., 2014).

Potential barriers to use are created by provider personal bias, lack of formalized training, perceived lack of patient interest, insurance company reimbursement models and outdated individual clinic policies regarding availability of the contraceptive products or protocols for placement. Some insurance companies require prior approval for payment of the IUD or implant procedure, while some clinics/practices necessitate a two-part visit, including counseling sessions and screening tests prior to LARC insertion. These barriers result in many women being lost to follow-up and placed at risk of an unintended pregnancy (Bergin et al., 2012).

### **Project Significance**

Unintended pregnancies are considered to be a public health issue in Vermont. 46% of all pregnancies are unintended in Vermont, with higher numbers for younger women, including 81% for teenagers and 67% for women ages 20-24 (VT Department of Health, 2015). This data highlights that there is clearly room for improvement in terms of patient contraception counseling and education. To date, there has not been a study specifically investigating the LARC knowledge and practices of Vermont healthcare providers. This study will shed light on factors that may be contributing to low LARC uptake by women. Some variables that will be considered are perceived knowledge of current guidelines and best practice around contraception counseling, and what health or demographic factors are being taken into consideration with the recommendation of certain contraception methods. This survey-based research will guide organizations around the state in their efforts to update providers' knowledge and practices in the

counseling and provision of LARCs. The long-term measurable goal, beyond the scope of this research, will be a decrease of unintended pregnancies in Vermont.

### **Research Objectives**

To meet the purpose of understanding the educational and training needs of Vermont health care providers related to LARCs, the objectives of this study are to:

1. Describe health care providers' perceived LARC knowledge base
2. Identify knowledge gaps related to LARC

## **Chapter II: Literature Review**

### **Theoretical Framework**

Nurse Practitioners (NPs) have an important role to play in the increased provision of LARC's. Aside from being trained in counseling, insertion procedures and referral processes, they also bring a unique perspective grounded in nursing theory to patient interactions. Nola Pender's Health Promotion Model is especially applicable to patient contraception counseling and guides the foundational perspective for this research process. Pender's theory takes into account the complex factors that contribute to a person's health-related decisions. The Health Promotion model encourages providers to consider a patient's family and community, environment, and their own definition of health to guide the nursing process (Butts & Rich, 2011). Other applicable assumptions made by the model include: people seek to actively regulate their own behavior, people value growth in directions viewed as positive and attempt to achieve a personally acceptable balance between change and stability and that health professionals constitute a part of a patient's interpersonal environment and can therefore influence decision making and behavior change (Pender, 2011). In terms of making decisions about contraception, a patient is likely to be influenced by friends, family and healthcare providers' opinions and experiences, their economic resources and their self-perception of health. Patients are certainly biased by the experiences of people who are close to them, and may have a pre-conceived notion about financial and health costs of particular types of contraceptives. For instance, patients may choose the copper IUD due to its "natural",

non-hormonal method, but may be unaware of the potential side effects of menorrhagia or dysmenorrhea. If these are symptoms a patient is already struggling with, the Nurse Practitioner can be a source of information, to guide a patient towards behaviors and decisions that best promote their health, while holding the patient's value system in high regard. One area where Pender's Health Promotion model can be most helpful is in the prevention of delay of placement of IUD's and implants, especially post-abortion or post-partum. If a patient has a high number of unintended pregnancies ending in abortion, birth, adoption, miscarriage, etc., they may be particularly good candidates for immediate LARC implementation. NPs, using the health promotion model, can identify these patients as benefactors for behavior change and promote a patient's self-efficacy in making a decision to not delay LARC placement. Nurse practitioners are also key players in counseling patients, guiding them to identify their intention (no more unintended pregnancies), make goals and plans that they perceive to be reasonable and attainable and commit to a plan of action. This could all reasonably occur over the course of one appointment, which would potentially end with LARC placement. Due to the nature of Pender's Health Promotion Model, patients have the opportunity to direct their own care under the guidance, supervision, and encouragement of an NP. Ideally, this provides the patient with a sense of empowerment and self-efficacy to choose contraception that best suits their situational or family planning needs based on clear, fact-based, evidence-guided counseling.

Pender's Health Promotion Model is an appropriate foundation for this study because it reflects the importance of shared decision-making between the provider and patient and patient-centered care. The model emphasizes provider influence in a patients

decision making process, which is pertinent considering the key role that counseling plays in a woman's contraceptive choice. When providers practice based on current evidence based guidelines, with a tiered counseling approach, they afford women the opportunity to make an informed decision that truly meets their reproductive health needs.

### **NP Competencies**

This research represents three nurse practitioner competencies, as stated by the National Organization of Nurse Practitioner Faculties (NONPF, 2013); leadership, quality, and ethics. This study was undertaken as a part of a larger study with the Vermont Child Health Improvement Program (VCHIP). As an example of leadership, this author was able to connect with the VCHIP project team, establish a relationship and collaborate to create and implement the provider survey. Additionally, the larger scope of the project aims to “influence health outcomes of a population focus” (NONPF, 2012, p. 2), namely, Vermont women of reproductive age.

This study also embodies the core competency of quality, as its aims are to investigate whether providers are using the best available evidence to provide quality clinical care. Furthermore, it explores variations in knowledge between providers, to determine what interventions can be implemented to ensure excellent standardized care.

Finally, ethics is an underlying variable of interest. Providers are bound by ethical principles in their practice, including non-maleficence, social justice and encouraging patient autonomy in decision-making. Family planning and reproductive rights involve much bigger issues than just choosing a form of birth control. These issues include but

are not limited to, education and career planning, financial stability and dynamic relationships. Providers are ethically obligated to be knowledgeable about and non-biased in their delivery of contraception counseling to best serve the reproductive priorities of their patients.

### **Review of Research**

The following literature review highlights the significance of increasing LARC use among women of reproductive age. First, ways in which providers are enhancing or limiting access to LARCs. Second, demographics of women who would most benefit from access to LARCs and finally, barriers to effective implementation of these effective contraceptive methods.

Of the groups significantly affected, adolescents are at an increased risk of unintended pregnancy. This is due to inconsistent or lack of contraception use, pediatric provider discomfort discussing sexual and contraception practices with teens, and predominant use of user-dependent contraception (Minnis, et al., 2014). Other at-risk groups include women living at or below poverty level, those with substance use issues, women who have already had multiple unintended pregnancies, those not under the care of a primary care provider and women without insurance (ACOG, 2015).

### **Provider Knowledge and Current Practice**

Healthcare providers are gatekeepers of contraceptive services, and their level of training and willingness to provide LARC methods are prerequisites to increased use. There have been a number of studies nationwide to assess multiple provider types for



knowledge, attitudes, training, current practice and barriers to providing LARC methods to their patients (Harper 2013, 2015; Philliber . These studies have all been in an effort to expose reasons for under-utilization and low patient uptake of LARCs.

Multiple studies analyze the type and amount of training providers received in LARC procedures and counseling. For example, Merck Pharmaceuticals provides a standardized training for the insertion of the Nexplanon implant. Likewise, IUD insertion training may be formalized in a classroom didactic and clinical setting, as a part of a conference or during residency/fellowship (Lunde, 2014).

A 2013 survey of 1,221 Fellows of the American college of Obstetricians and Gynecologists found that 92% of respondents reported residency training on IUDs, 50.8% reported residency training on implants and 78.5% reported both didactic and clinical IUD training. Additionally, the survey indicates that implant insertion is most strongly associated with recent continuing education. Finally, only 31.7% of respondents cited the greatest barrier to implant insertion as a lack of insertion training (Luchowski et al., 2014).

A 2009 survey of 586 primary care nurse practitioners and women's health nurse practitioners found that 66% of WHNPs were trained in IUD insertion, compared with 12% of primary care NPs. Training and skills in the contraceptive implant were also low, with 26% of WHNPs reporting competency in insertions and only 6% of primary care NPs. Overall, half of NPs desired further training in LARC methods with no significant difference between specialties (Harper, 2013).

Years that multiple healthcare provider types have been in practice has also been investigated, in particular looking at LARC practices and attitudes of those who had

received training in IUD and implant insertion. Ninety-five providers from Iowa and Colorado who were eligible to insert IUDs and implants were included in a survey-based study that investigated IUD and implant insertion training, attitudes relative to LARC insertion, and barriers to its use and their views on eligible candidates for LARCs (Philliber et al., 2014). This study found that the most experienced practitioners were the least likely to have received training in LARC insertion, but that only 88% of newly trained practitioners had received training in IUD insertion, with only 74% trained in implant insertion. An interesting finding is that the most novice practitioners (1-9 years) reported the most comfort with LARC insertion, with those at mid-career (10-19 years) reporting the least comfort. Those with the most experience (>20 years) reported moderate comfort with the procedures. Most of the clinicians agreed that all LARC methods were safe for women with diabetes, smokers, history of hypertension, young women, and unmarried women. The most novice clinicians approved more often of hormonal and copper IUDs for women with a history of STIs and ectopic pregnancies than clinicians with the most years of experience. Although clinicians with the most experience overall felt comfortable with IUD procedures, they were the most conservative with their recommendation and implementation of LARCs. A somewhat counterintuitive finding of this study was that clinicians with the most years of experience were more liberal with their approval of implants for patients, than those with the most recent licenses (Philliber et al., 2014). This finding contradicts the idea that providers with the most years in practice would be the least comfortable with newer contraceptive methods, such as the implant (Philliber et al., 2014).

Harper et al. also focused on provider training and practices (Harper et al., 2008), and inferred years of experience from reported years of licensure. Both Harper et al., 2008 and Philliber et al., 2014, found that clinicians with a greater number of years in practice were less likely to be trained for LARC insertion. Subjective knowledge concerning medical eligibility for LARCs was variable and inconsistent amongst respondents (Philliber et al., 2014).

The above studies and others have investigated practice patterns in regards to patient populations considered as appropriate candidates for LARCs. Providers held the most restrictive practices around IUD placements and were often inconsistent with CDC guidelines (Harper, 2013). The 2014 Ob/gyn study by Luchowski et al. found that 51 of their respondents had not inserted IUDs in the past year, most frequently due to the belief that they act as abortifacients (23.3%) and/or because of inadequate reimbursement (21.6%) (Luchowski et al, 2014). Respondents from Harper et al.'s 2013 NP survey, especially primary care NPs, often did not view adolescent and nulliparous women as IUD candidates, at 29% and 45% respectively, and reported even lower candidacy for those with a history of ectopic pregnancy (17%), STI in the last two years (29%) and PID history (11%). WHNPs were twice as likely to recommend to all of these populations of women, but still not in line with the evidence-based CDC US Medical Eligibility Criteria for Contraceptive Use (Harper, 2013). Of note, results showed that women with common conditions seen in the primary care setting, including history of hypertension, obesity and diabetes were viewed as ineligible for IUD use, but were frequently prescribed estrogen-containing methods that could put these women at an increased risk for cardiovascular complications (Harper, 2013).

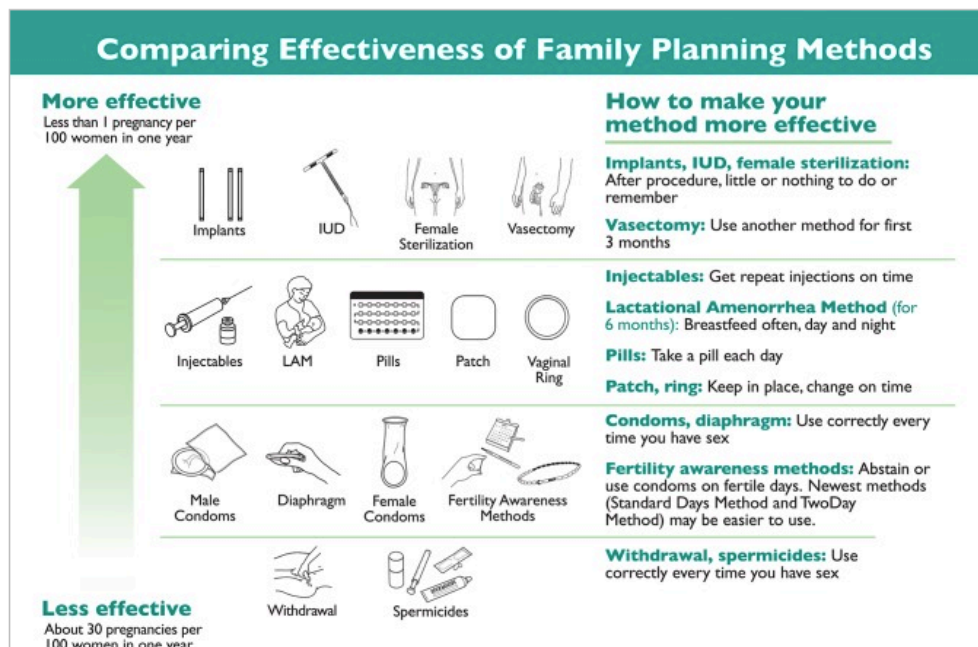
Several studies have also investigated contraceptive counseling practices amongst reproductive healthcare providers, including Harper's 2013 Nurse Practitioner study mentioned above. The NP study found that over 75% of NPs reported having enough time to counsel their patients on contraceptive options, and 89% reported that their patients would be receptive to learning about IUDs. Even though 73% of NPs thought that IUDs were under-used by their patient population, only 30% of primary care NPs and 72% of women's health NPs included IUDs in their contraceptive discussions (Harper et al., 2013).

### **Improving uptake**

Improved clinical counseling on LARCs as the best contraceptive option may improve uptake of these methods, as was shown in Harper et al.'s RCT study of family planning clinics across the United States where trainings were held on counseling and implementation (Harper et al. 2015). Priority training interventions included increasing providers' knowledge of eligibility, indications for different methods, insertion skills, and introducing the WHO tiers-of-effectiveness evidence-based approach to contraceptive counseling (Harper et al. 2015). Results of LARC uptake in clinics where trainings were held were compared against clinics providing standard care. This revealed greater uptake of LARCs amongst the intervention group of providers than the control clinics, where oral contraceptives were recommended most frequently. This study demonstrates the power of a standardized, easy to replicate training to update and improve provider practice (Harper et al., 2015). A key factor in this research was that LARCs were offered at regular cost, offering a closer representation of real world practice.

A significant barrier to LARC use is the upfront cost of the methods. When the Kaiser Foundation Health Plan in California provided full coverage without copays for LARCs, use of these methods increased substantially over a 5-year period (Weisman et al., 2014). Additionally, the well-known CHOICE study offered thousands of women free, same-day services and followed up for 3 years to document reproductive health and other outcomes. Given availability of free contraception, 70%-75% of women chose LARCs with a high rate of continuation (Stanback et al., 2015).

Improved patient knowledge depends on evidence-based, bias free, tiered counseling from a well-informed reproductive healthcare provider, ideally utilizing the World Health Organization's tiered-effectiveness chart (WHO, 2015). This type of counseling affords patients the opportunity to make a decision that supports their personal reproductive plan without coercion or confusion. Women believe that effectiveness is usually the most important factor when choosing a contraceptive method, but often lack accurate knowledge to make this decision (Stanback et al., 2015). Due to variables, including side effects, convenience, comfort-level using hormones or devices and, in particular, partner influences (Weisman, et al., 2014), women may not choose LARCs, despite full disclosure.



World Health Organization Model of Tiered Contraceptive Effectiveness

**Figure 1.1: Model of Tiered Contraceptive Effectiveness**

(WHO, 2015)

Increased uptake of LARCs is dependent on whether providers' offer LARCs as first-line contraception options. Providers must either be offered LARC training through their educational track or practice setting, or independently pursue it through conferences/CMEs. Reproductive health care providers must do their due diligence to remain up to date on guidelines that are frequently in flux, to assure optimum quality care for patients. Unintended pregnancies stand as a public health issue, and therefore garner the attention of government agencies. To assist providers with the challenging task of staying current, the Office of Population Affairs (US Department of Health and Human Services) and the Center for Disease Control released evidence-based national *Quality Family Planning Guidelines* in 2014 to establish best practice for family planning services (Hathaway et al., 2014). An additional challenge within the changing healthcare

arena is the push for greater access and services offered through primary care. These services include LARC counseling and implementation. As Hathaway et al. point out, “successfully integrating LARC services into primary care can be challenging given time constraints and competing priorities” (p.720). Important steps, in addition to in-depth training, are to foster cooperation between all stakeholders within practices to support comprehensive contraceptive care (Hathaway et al., 2014).

### **Adolescents at Risk**

As cited from Henshaw and Carlin (2010), yearly approximately 750,000 adolescents become pregnant, with 80% of these pregnancies unintended. Within this population, condoms are the most frequently used form of contraception (52%), with combined oral contraceptives and other hormonal methods being used at 31% and 12% respectively (American Academy of Pediatrics, 2014). One study of youth aged 15 through 24 initiating hormonal contraception at four clinics in the San Francisco Bay Area found that continuation rates at 12 months were low for all methods of contraception and younger age was especially associated with discontinuation (Trussell et al., 2013). Continuation rates for LARC methods were higher (76%) than for oral contraceptives (44%) at 24 months (Peipert, 2012).

The use of LARCs among adolescents is highly variable, depending on local access and counseling. As shown in the CHOICE project in St. Louis, 70% of adolescents aged 14 through 20 chose a LARC method when access and financial barriers were removed (Mestad et al., 2011). Rapid return to pregnancy (RRP), or pregnancy within two years of a previous pregnancy, is also associated with nonuse of a LARC method, as

demonstrated by another study of postpartum adolescents in Colorado from 2008 through 2009. Those participants who received a contraceptive implant immediately after delivery were significantly less likely to get pregnant within one year (2.6%) as compared to those who did not receive the implant (18.6%). By 12 months, 86.3% of implant users had continued with the implant method. Most discontinuation was due to irregular bleeding (Tocce et al., 2012). Even when LARC methods are discontinued there is a decrease in RRP compared with those using non-LARC methods due to the period of time that the LARC was in place (Baldwin & Edelman, 2013). Important interventions to increase LARC uptake and decrease RRP include counseling, education and contraception planning during pregnancy, and immediate initiation of a LARC method following abortion or birth. The contraceptive implant can be an especially appealing option to adolescents post-abortion or following delivery due to the fact that it can be placed immediately (even if breastfeeding), it may decrease total bleeding time and the provider can be certain that the patient is not pregnant at the time of placement (Winner et al., 2012). Given the evidence that LARCs effectively reduce unintended pregnancy and RRP in teens, increased provision by health care providers is imperative.

### **Barriers to LARC placement in Adolescents**

Some consistent barriers have been recognized among pediatric providers in their use of LARCs. A survey of family medicine residents and faculty found that IUDs were recommended at very low rates to nulliparous teens, even when they qualified as appropriate candidates. Recommendation rates were higher with parous teens (Diaz et al., 2011). An analysis of the National Survey of Family Growth found that adolescent and



young women who had a history of an STI, were nulligravid, unmarried or were not currently cohabitating with a monogamous partner were more likely to receive the depot medroxyprogesterone acetate (DMPA) injection as opposed to the IUD (Whitaker et al., 2010). Although the DMPA is considered a long-acting form of contraception, it is user-dependent, requiring subsequent injections by a health care provider every three months. This may reflect providers' reluctance to offer the IUD to young, nulliparous women whom they believe may be at increased risk for PID by nature of their sexual practices. This is despite the fact that the World Health Organization (WHO) 2009 Medical Criteria Guidelines state that a patient may keep her IUD in place safely through the treatment of PID.

### **Improved Provision in Adolescents**

One major obstacle to the use of LARCs amongst teens is lack of familiarity with the methods. A cross-sectional study of teens and young women at an urban family planning clinic found that none of the participants were currently or had ever used the IUD and less than half had even heard of the IUD method. Participants were given written educational materials and surveyed afterwards, with many reporting interest in the IUD due to its efficacy, the fact that it could be used discretely and that it was long-acting with little to no maintenance (Fleming et al., 2010). A survey of 144 girls and women aged 14 through 24 years (half of whom were 18 years and under) found that providing a brief educational intervention including patients seeing and touching actual IUDs, significantly increased the proportion of patients who viewed IUDs favorably. Another study comprised of 67 women aged 16 through 21 recorded visits with providers and

qualitatively analyzed conversations regarding contraception counseling for contextual influences and missed opportunities. Features that defined effective counseling included interactive and developmentally targeted sessions, including questions/conversations about contraceptive use (past, current and knowledge on side effects and failure), lifestyle characteristics (who they live with), knowledge of method use (misinformation, myths, rumors) and the role of peer influence in method choice and use, including that of the current sexual partner. Non-interactive sessions failed to engage patients, and contraceptive choice often was made based on provider preference. One major issue noted throughout many of the conversations was provider failure to follow-up clear patient lack of knowledge with education. For instance, when one patient stated using condoms “most of the time” the provider simply stated, “that’s better than never”, rather than exploring the reason and potential consequences of inconsistent use (Minnis et al., 2014). This small but important study highlights the need to tailor contraceptive counseling to the dynamic, inconsistent behaviors of adolescents, with providers recognizing the context of patients’ lives and experiences as being paramount to their contraceptive choice and continuation rates.

Pediatricians and family practice providers’ long-term relationships with adolescents and families invites discussions related to sexual practices, healthy sexual decision-making, and contraceptives counseling. According to the Public Health Service Act: Title X Family Planning Program, adolescents are afforded the right to confidentiality regarding their sexual health decisions, and should be counseled with this in mind. However, the law requires providers to encourage adolescents to include guardians in their decision-making (Napili, 2014). The fact that many adolescents will

choose to remain independent regarding sexual health decisions highlights the need for frequent, clear, open communication and counseling between the practitioner and adolescent patient.

### **Postpartum LARCs**

Dependable contraception is also incredibly beneficial to women in the postpartum period. It is highly recommended that women space their pregnancies at least 24 months apart to reduce neonatal, infant and maternal morbidity and mortality, (Sober & Schreiber, 2014). With this in mind, contraception counseling optimally is initiated as part of prenatal care, revisited before hospital discharge and implemented by three weeks postpartum, (Sober & Schreiber, 2014). As this is not always a consistent practice amongst providers, many women become pregnant within their first few months postpartum (Sober & Schreiber, 2014).

Ideally, any woman desiring immediate postpartum placement of an IUD or implant could have one placed post-placental if there are no contraindications. True contraindications include peripartum chorioamnionitis, endometritis or puerperal sepsis. Post-placental placement of an IUD is defined as “within 10 minutes of placental separation” (ACOG, 2011). This benefits patients who don’t have other contraceptive options, are unwilling or unable to return for later insertion or will have a barrier to obtaining one at their postpartum visit (Sober & Schreiber, 2014). According to the U.S. Medical Eligibility Criteria for Contraceptive Use (2013), immediate postpartum copper IUD insertion is classified as Category 1 and immediate postpartum levonorgestrel intrauterine system insertion in both breastfeeding and non-breastfeeding women as

Category 2. Immediate postpartum placement is an uncommon practice amongst most practitioners, probably due to the fact that expulsion rates are higher than for interval insertion and may be as high as 24% (ACOG, 2011). Expulsion rates may be lower for cesarean section versus vaginal delivery (ACOG, 2011), but expulsion rates overall are higher if an IUD is inserted within two to 72 hours post-placental, as opposed to within the first ten minutes (Sober & Schreiber, 2014).

### **Post-abortion LARCs**

Women who have one or more abortions are also prime candidates for LARC use due to their high risk for repeat unintended pregnancy and rapid resumption of ovulation (ACOG, 2011). Pre-abortion contraception counseling is imperative, as well as access to contraception at the time of abortion. Many providers believe that women are too distressed to discuss contraception, however, studies have shown that women appreciate the opportunity to explore their options (Cameron et al., 2014). LARCs are the best option for women post-abortion due to the fact that they can be inserted immediately and are the most reliable method for pregnancy prevention. According to the CDC, implants and IUDs can be inserted in almost any patient immediately post-abortion (medical and surgical), with IUDs contraindicated in the case of septic abortion or incomplete medical abortion (2013). A randomized controlled trial in Sweden of over 100 women who were randomized to either immediate or delayed insertion of an IUD showed that those who delayed were less likely to attend for insertion, and that uptake was higher for appointments made within one week as opposed to two (Cameron et al., 2014). An observational study of contraceptive choice post-abortion in the UK showed that women

choosing implant insertion at the time of medical or surgical abortion were 16 times less likely to have another abortion within the next two years, as compared to those choosing SARCs (Cameron et al. 2010). A retrospective chart review of 4,698 women at a New Zealand public hospital abortion clinic over two years investigated subsequent pregnancies at 12, 24, 36 and 48 months comparing different birth control methods, in particular levonorgestrel implants versus short acting methods. Twenty percent of the cohort received an implant, 26% an intrauterine method and 54% chose a short acting reversible contraceptive (SARC) method. At 24 months implant users had a 3.8% rate of subsequent abortion, whereas SARC users had an 11.6% rate, at 48 months there were 6.6% and 18.3% rates respectively, showing a significant reduction in unintended pregnancies amongst the LARC users (Rose et al., 2015).

### **Cost Comparison**

Despite the fact that national public expenditure and investment on family planning services exceeds \$2 billion and collectively, states report spending \$68 million of their own funds on abortion services in 2010, the annual direct cost of UPs is estimated at \$4.5 billion yearly. Additionally, the total cost burden of UP to US taxpayers is reported to range from \$9.6 to \$12.6 billion per year, (Trussel et al., 2015). These statistics provide additional support for LARC counseling and implementation, but a common reason cited for non-use of LARCs is cost of the actual device as well as the high cost of implementation by a provider.

One study analyzed the direct medical costs, from the perspective of a public payer, of LARC vs. SARC methods against the cost of UPs. The analysis assumed a

cohort of 1000 women aged 20 through 29 years, based on the idea that if this group switched from a SARC method to a LARC method, it would have the greatest overall impact on rates of UP. The analysis used a five-year time span to reflect this group's "time requiring contraception" and outcomes were measured in terms of method failure and cost. Method failure was estimated as total number of UPs and costs were reflected per drug/method acquisition, administration and method failure, (Trussell et al., 2015). The study found that the wholesale cost breakdown per year (including device and provider counseling/insertion fees) placed IUDs and implants at approximately \$900, ring and patch at \$1000, Generic OC \$400 (13 packs per year), injection \$350 and condoms around \$50 (based on 83 units/yr.) (Trussell et al., 2015). Using three different population scenarios that compared cost over time, the higher LARC upfront costs quickly became the most cost-effective methods as their duration of use increased. On average, "LARC methods became cost-neutral in comparison to SARC methods within three years of use, after which point the continued use of LARC methods is cost-saving" (p. 53), and at the 2.1-year mark LARC methods were still more cost-effective than SARC methods (Trussell et al., 2015, p. 53). Cost-savings are especially marked when compared to the ring or patch methods, with LARCs achieving cost-neutrality within 0.3-0.4 years, respectively. This analysis also took into consideration discontinuation costs of LARC methods, due to the fact that a provider visit is required, and found that even this inclusion of cost did not change the overall finances saved with LARC vs. SARC methods (Trussell et al., 2015).

When comparing the cost of LARC vs. pregnancy, live birth and ectopic pregnancy intervention costs were estimated at \$5,000, with induced abortion at \$700

(Trussell et al., 2015). These costs are significant, but become much more so when considering statistics concerning RRP. Unfortunately, contraceptive access can be limited by lack of patient awareness, provider counseling, insurance type, and restrictive legislative measures (ACOG, 2015). State and employee restrictive measures based on religious beliefs and other reasons for exclusion, including restricting minors' ability to consent to contraceptive services can create roadblocks to those desiring contraception. Additionally, lack or type of insurance coverage can serve as a barrier to access. Most private health plans cover prescription contraception, but cost sharing and types of method covered vary (Trussell, 2015). As stated in the 2015 ACOG Committee Opinion paper, "Under the Affordable Care Act (ACA), all FDA-approved contraceptive methods, sterilization procedures, and patient contraceptive education and counseling are covered for women without cost sharing by all new and revised health plans and issuers as of the first full plan year beginning on or after August 1, 2012" (p. 252). This is also the case for those insured by Medicaid. Major issues that persist in coverage are exempted employers who can choose to not cover contraception as a part of their plan, and insurance plans that limit the number of contraceptive products dispensed. "Insurance plan restrictions prevent 73% of women from receiving more than a single month's supply of contraception at a time, yet most women are unable to obtain contraceptive refills on a timely basis" (ACOG, 2015). An additional barrier created by some insurers and clinic systems is a "requirement" that women "fail" certain contraceptive methods before a more expensive method, like a LARC, will be covered (ACOG, 2015).

The upfront cost of LARC methods are a barrier to use for some women, but with improved public family planning assistance services (Trussell et al., 2015), no-cost

sharing insurance coverage, appropriate provider reimbursement for services and longer duration of use, they are very economical. As the CHOICE project demonstrated, once the cost barrier is removed and quality education is provided about the effectiveness of LARC methods, more women of all ages choose LARCs (Peipert et al. 2012). This should be weighed against the serious public health costs and societal economic burden of UP that could be alleviated by stronger efforts to increase provision of LARCs.

### **Summary**

A wide sweeping literature review reveals common themes related to the under-utilization and uptake of LARC methods in the United States. As shown by multiple survey results, providers' current practice, frequently rooted in outdated knowledge, inadequate training, lack of awareness of updated guidelines or reticence to place LARCs in certain populations of women, is at the heart of this issue.

All of the cited research unanimously agrees that increased uptake of LARCs could positively benefit multiple groups of women. When given the opportunity to make an informed decision, especially when the financial barrier is removed, most women choose either implants or IUDs (McNicholas et al., 2014). Use of LARCs is associated with healthier pregnancy spacing (>2 years between pregnancy), decline in repeat abortions, and decreased teen pregnancy rates. These three statistics give context to the importance of training healthcare providers in the counseling and insertion of LARCs.



### **Implications for Current Study**

An important piece of knowledge that is absent from the literature is the effect that being in a rural area can have on providers' practice, which is why a study of Vermont providers is both timely and imperative. Rural Vermont providers may desire to provide counseling and implementation of LARC methods, but may face unique challenges. The challenges that Vermont healthcare providers face is currently unknown, but may include clinical systems that don't support training in LARC methods, or are unable to afford keeping LARC supplies on hand for the potentially few interested patients. Other difficulties may include a limited referral system, loss of skills due to few patients requesting or desiring LARC methods, and lack of connection to other providers or institutions that offer frequent guideline updates through grand rounds or conferences (Lunde et al., 2014). Another potential challenge in a rural state like Vermont is the distance that a patient would have to travel to reach a clinician who inserts LARCs. This inconvenience could act as a serious deterrent to many patients, with the unintended consequence being pregnancy.

## **Chapter III: Methods and Materials**

### **Population sample**

Multiple health care provider types- physicians, NPs and physician assistants (PAs), were electronically surveyed through Lime Survey to capture the majority of clinicians who provide contraceptive services in the state of Vermont. An introduction to the survey and a survey link, were emailed through list serves by direct contacts within Vermont chapters of various professional organizations. These include the American Academy of Family Physicians, American Academy of Pediatrics, Vermont Nurse Practitioner Association, American Congress of Obstetrics and Gynecologists, and Physician Assistant Academy of Vermont for a total of approximately 1,100 surveys disseminated. Some responses were excluded from the study based on self-reported non-contraceptive provider, no longer in practice, or not providing clinical services. There were seven responses from practitioners outside of Vermont, which were retained in the final data analysis.

### **Identification of Need**

This research is being conducted in collaboration with the Vermont Child Health Improvement Program (VCHIP), a population-based maternal and child health services research and quality improvement program of the University of Vermont. VCHIP is grant-funded by the March of Dimes for this research. This study analyzed a small portion of a comprehensive survey study that VCHIP is utilizing for its research, specifically the demographics and knowledge assessment sections. The parent survey investigated Vermont providers' knowledge, current practice, barriers to LARC use, and

educational needs assessment. VCHIP will create webinars and LARC implementation trainings for providers based on identification of need. VCHIP, the Vermont Department of Health, Department of Vermont Health Access, Planned Parenthood of Northern New England, University of Vermont Medical Center and this author are all stakeholders in this study to assess Vermont providers' awareness and current practices around the counseling and implementation of LARCs. This study is considered necessary due to long-standing and unchanging statistics regarding unintended pregnancies in Vermont and their associated negative outcomes. This type of study has not been conducted in Vermont and has the potential to shed light on the unique challenges faced by providers in a primarily rural state.

### **Project Development**

All stakeholders met initially in early March 2015 to discuss the scope and goals of this research study, including timeline, groups of providers to be surveyed, categories of survey questions, and types of trainings that were made available to interested providers. Subsequently, this author, the VCHIP project manager, an adolescent pediatric MD from UVM Medical School/Medical Center and a Vermont Department of Health representative met multiple times to create the survey that was sent electronically to providers of women of reproductive age across Vermont. The survey was sent out to the larger stakeholder group for editing and testing, and was disseminated in early June, 2015.

### **Human Subjects Protection**

Due to the fact that this author is only participating in the survey portion of this research project and only receiving de-identified information from VCHIP survey responses, VCHIP and this author submitted two separate Institutional Review Board (IRB) proposals. Both IRB proposals were submitted by May 15, 2015, with this author submitting a proposal that was deemed exempt by the University of Vermont Institutional Review Board. The International Review Board Committee on Human Research in the Behavioral and Social Sciences at the University of Vermont was consulted and approved of this research.

No surveys were distributed, and no information was collected until permission was granted by the IRB. Additionally, only providers were surveyed and no patient personal health information was collected.

### **Survey Implementation**

The complete survey was comprised of a demographics section and a Likert Scale questionnaire assessing categories of knowledge, attitudes, current practice, barriers and education needs/interests regarding LARCs. It included a hard stop for those who are not currently providing clinical services. Study participation was voluntary, and respondents elected to be anonymous or not depending on their desire to participate in future trainings. Informed consent was implied when respondents read the e-mail description and completed the survey. The survey was electronically disseminated in early June with three email reminders, and results were collected until August 3, 2015. Participation was incentivized with optional entry into a raffle of an iPad Mini.

## Study Instrument

The survey instrument used for this study was partially adapted, with permission, from the 2008 National Pregnancy & HIV/STI Prevention Survey by author Cynthia Harper and California Family Planning Health Care Providers' Challenges to Same-Day Long-Acting Reversible Contraception Provision by author M. Antonia Biggs (2015) at the University of California San Francisco Bixby Center for Global Reproductive Health.

This needs assessment survey was formatted in an electronic survey tool and securely sent via Lime Survey from VCHIP to contacts within professional associations mentioned above and then through listservs directly to providers. Survey results were returned directly to VCHIP from providers.

The first section of the survey inquired about provider participants demographics, including: gender, years in practice (post training/education), professional licensure qualifications, specialty, main clinical practice setting, age range of patients, geographic setting of practice (i.e.: rural, city), zip code, and if they provide direct patient care.

**Table 1.1: Survey: Knowledge Assessment:**

1.

Have you received any training to provide IUD counseling?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
---	------------------------------	-----------------------------

If yes, check any that apply

How long ago was this training?	<input type="checkbox"/> 0-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> 11-15 years	<input type="checkbox"/> 16-20 years	<input type="checkbox"/> >20 years
How would you describe this training?	<input type="checkbox"/> Introductory		<input type="checkbox"/> Intermediate		<input type="checkbox"/> In-depth
Where did you receive this training?	<input type="checkbox"/> In school	<input type="checkbox"/> In residency/fellowship/clinical training		<input type="checkbox"/> In practice	<input type="checkbox"/> Other (CME, conference)

2.

Have you received any training to provide IUD insertion?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
--	------------------------------	-----------------------------

If yes, check any that apply

How long ago was this training?	<input type="checkbox"/> 0-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> 11-15 years	<input type="checkbox"/> 16-20 years	<input type="checkbox"/> >20 years
How would you describe this training?	<input type="checkbox"/> Introductory		<input type="checkbox"/> Intermediate		<input type="checkbox"/> In-depth
Where did you receive this training?	<input type="checkbox"/> In school	<input type="checkbox"/> In residency/fellowship/clinical training		<input type="checkbox"/> In practice	<input type="checkbox"/> Other (CME, conference)

3.

Have you received any training to provide Implant counseling?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
---	------------------------------	-----------------------------

If yes, check any that apply

How long ago was this training?	<input type="checkbox"/> 0-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> 11-15 years	<input type="checkbox"/> 16-20 years	<input type="checkbox"/> >20 years
How would you describe this training?	<input type="checkbox"/> Introductory		<input type="checkbox"/> Intermediate		<input type="checkbox"/> In-depth
Where did you receive this training?	<input type="checkbox"/> In school	<input type="checkbox"/> In residency/fellowship/clinical training		<input type="checkbox"/> In practice	<input type="checkbox"/> Other (CME, conference)

4.

Have you received any training to provide Implant insertion?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
--	------------------------------	-----------------------------

If yes, check any that apply

How long ago was this training?	<input type="checkbox"/> 0-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> 11-15 years	<input type="checkbox"/> 16-20 years	<input type="checkbox"/> >20 years
How would you describe this training?	<input type="checkbox"/> Introductory		<input type="checkbox"/> Intermediate		<input type="checkbox"/> In-depth
Where did you receive this training?	<input type="checkbox"/> In school	<input type="checkbox"/> In residency/fellowship/clinical training		<input type="checkbox"/> In practice	<input type="checkbox"/> Other (CME, conference)

5. How would you rate your knowledge of the Copper T IUD

	High	Moderate	Low	None
Contraceptive efficacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Side effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insertion/removal procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. How would you rate your knowledge of the Levonorgestrel-releasing IUD

	High	Moderate	Low	None
Contraceptive efficacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Side effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insertion/removal procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. How would you rate your knowledge of the Implant

	High	Moderate	Low	None
Contraceptive efficacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Side effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insertion/removal procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. How comfortable do you feel counseling a woman about

	Very Comfortable	Comfortable	Uncomfortable	Very Uncomfortable
Copper T IUD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Levonogestrel-releasing IUD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Implant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Would you recommend an IUD/implant for women with the following?

	Copper T IUD (Paragard®)			Levonogestrel-releasing IUD (Mirena®, Skyla® or Liletta™)			Implant (Nexplanon®)		
	Yes	No	Unsure	Yes	No	Unsure	Yes	No	Unsure
Menorrhagia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dysmenorrhea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fibroids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Obesity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
History of HTN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Iron-deficiency anemia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Literature Review

A comprehensive review of the literature was conducted to reveal study results and common themes regarding healthcare provider knowledge and practice around LARCs. Studies investigating populations of women affected by LARCS were also included to give appropriate historical and current context to this research. Several search engines were used, including: CINAHL, OVID Medline, Web of Science and PubMed. Search terms included individual and combination key words, including: long acting reversible contraception, contraception, provider knowledge, post-partum contraception, post-abortion contraception, adolescents, LARCs, IUDs, contraceptive implant, provider practice. The majority of the research included in the literature review was from the last five to 10 years.

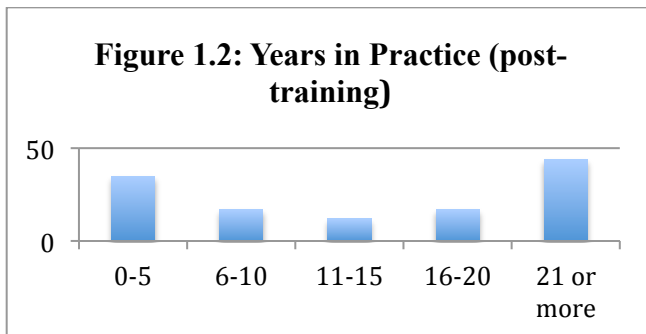
### **Data Analysis**

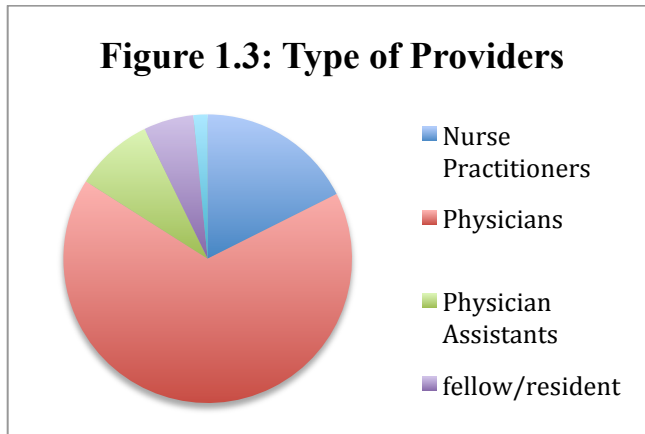
Completed surveys were returned to VCHIP via Lime Survey, and data for separate sections was compiled with the above demographic and knowledge dataset given to this author de-identified. Responses were extracted from an Excel spreadsheet, downloaded into IBM SPSS Statistics 23, and analyzed using descriptive statistics.



## Chapter IV: Results and Discussion

A total of 126 complete surveys out of approximately 1000 were returned from various healthcare specialty providers, four of which are not currently in clinical practice and therefore were asked to not answer all survey questions. Their responses are limited to the demographics section. Respondents included: 83 attending physicians, seven fellow/residents, 22 nurse practitioners, 11 physician assistants, two medical students and one without a response. Included in this group were 31 ob/gyn or women's health specialists, 43 family medicine, 36 pediatric, nine internal medicine/adult, five from other specialties and two who did not specify. There was a broad range of years in practice (post-training), including 35 providers with 0-5 years, 17 provider with 6-10 years, 12 providers with 11-15 years, 17 providers with 16-20 years and 44 providers with 21 or more years of experience.





Greater than half of the providers practice at a University Medical center (33%) and private clinics (31%), with the remainder at community hospitals, family planning clinics, rural health clinics, federally qualified health centers and rural health centers. Seven practitioners were from out of state (five in NH, one in MA and one in ME), with a total of 117 Vermont-specific practitioners. Most of these practitioners practice in Chittenden County (67), while others practice in Addison and Orange Counties (4), Franklin County (5), Lamoille and Bennington Counties (6), Orleans and Caledonia Counties (2), Washington County (11), Windsor County (7) and 1 in Grand Isle, Rutland and Windham Counties.

**Table 1.2: Main Clinical Practice Settings**

	Frequency	Percent	Valid Percent	Cumulative Percent
Community hospital/clinic	22	17.6	17.6	17.6
University medical center/clinic	41	32.8	32.8	50.4
Private office or clinic	39	31.2	31.2	81.6
Family planning clinic	6	4.8	4.8	86.4
Federally Qualified Health Center (FQHC)	10	8.0	8.0	94.4
Rural Health Center (RHC)	3	2.4	2.4	96.8
University/College health center	1	.8	.8	97.6
Other	3	2.4	2.4	100.0
Total	125	100.0	100.0	

The knowledge assessment portion of the survey included questions about training in the counseling and insertion of LARCs. Seventy six percent of respondents received training in IUD counseling, most of which occurred in the last five years and was considered by the practitioner to be intermediate or in-depth. These trainings primarily occurred in residency, fellowship or clinical training. Fifty three percent of providers reported in-depth training on IUD insertion that occurred during residency, fellowship, clinical training, or in practice. IUD insertion training was anywhere from five years to over 20 years ago.

Sixty percent of practitioners reported training to provide implant counseling, also within the last five years at an intermediate to in-depth level across a broad range of settings, including at conferences for CMEs, in residency, fellowship, clinical practice and in practice. Of the <40% of providers who have received training in implant insertion, most occurred less than five years ago at a conference or in practice and was considered to be in-depth.

Assessment of providers' knowledge included ratings of LARC methods in terms of efficacy, side effects, and insertion and removal processes. Responses regarding the copper IUD included: 88% reporting moderate or high knowledge of the efficacy of the method, 81% moderate to high knowledge of side effects and 58% moderate to high knowledge of the insertion and removal processes. Responses regarding the levonorgestrel IUD included: 94% moderate to high knowledge of the efficacy of the method, 88% moderate to high knowledge of side effects, 63% moderate to high knowledge of the insertion and removal processes. Responses regarding the implant, 85% reported moderate to high knowledge of the efficacy, 78% moderate to high knowledge

of side effects and 59% moderate to high knowledge of the insertion and removal process. The majority of providers stated that they were comfortable or very comfortable counseling on each method, including 83% for the copper IUD, 88% for the levonorgestrel IUD and 84% for the implant.

Providers were also asked about their recommendation of different LARC methods for women with various medical conditions. The majority of respondents (60% to 89%) were confident in recommending both IUDs (copper and levonorgestrel) and implants to women with diabetes, obesity, smokers, history of hypertension, and women breastfeeding immediately postpartum. Most (40% to 75%) were not comfortable recommending the Copper-T IUD to women with menorrhagia, dysmenorrhea, iron-deficiency anemia or fibroids.

A separate statistical analysis was run to compare results from “urban” Vermont providers against providers from the rest of the state, which was considered “rural”. “Urban” was classified as those providers who recorded zip codes within Chittenden County, which has the highest population in the state, sources of public transportation, as well as access to a Level I Trauma Medical Center. “Rural” was classified as zip codes that were outside of Chittenden County. The greatest differences between rural and urban providers were evident in the section rating knowledge of LARC eligibility for women with various medical conditions. In general, there were a greater number of providers who reported “uncertainty” for women with various conditions. Specifically, 30% of rural providers stated uncertainty of whether they would recommend the Copper T IUD for women with menorrhagia, versus 15% of urban providers. Similarly, 53% and 17% of rural providers reported uncertainty with the recommendation of the Copper T IUD for

women with fibroids and smokers, respectively, versus 39% and 6% of urban providers. When asked about the Levonorgestrel-releasing (hormonal) IUD, 10% of rural providers reported uncertainty for women with menorrhagia, versus 6% of urban providers. Again, 53% and 21% of rural providers were uncertain about the hormonal IUD for women with fibroids and smokers, respectively, versus 29% and 4% of the urban providers. Twice as many (15%) rural providers were uncertain about the hormonal IUD for women with iron-deficiency anemia, versus urban providers (7%). The only implant statistic that was significantly different was uncertainty about the implant for women who smoke, with rural providers reporting 32% and urban providers reporting 20%.

The majority of providers reported patient eligibility that is in line with the CDC MEC, however, there was consistently 10%-45% uncertainty about the indications of LARC methods. The following medical conditions are category 2 with use of the Copper T IUD: iron deficiency anemia, dysmenorrhea, and fibroids. Diabetes mellitus and fibroids are category 2 with the Levonorgestrel-releasing IUD and diabetes mellitus is category 2 with the implant. All other medical issues are category 1 with all of the methods, meaning that there are no restrictions to their usage. This highlights the fact that many providers, especially in rural areas of Vermont, may not be informed about current evidence-based guidelines for LARCs and therefore may be excluding eligible patients from counseling and insertion/referral.

As previously noted, there is a high level of uncertainty throughout all categories of knowledge concerning medical eligibility. Additionally, only 50% reported a high level of knowledge about the IUDs and implant side effects, and contraceptive efficacy, with moderate knowledge concerning IUD and implant insertion/removal processes.

However, the majority (70%-80%) of respondents stated that they felt comfortable or very comfortable counseling on all types of LARCs..

Despite subjective uncertainty, all rural and urban providers reported a moderate to high level of knowledge about the side effects, contraceptive efficacy and insertion/removal. At least 40% of all providers, urban and rural, also reported being very comfortable counseling women about all three methods of LARC.

**Table 1.3: Provider Recommendation of Copper T IUD Based on Medical Eligibility**

<b>Copper T IUD</b>	<i>Yes</i>		<i>Uncertain</i>		<i>No</i>		<i>CDC MEC Category I/II</i>
	%	n	%	n	%	n	
Menorrhagia	5	6	21	26	74	93	Yes (II)
Dysmenorrhea	9	11	32	40	59	74	*
Fibroids	16	20	45	57	39	49	Yes (II)
Diabetes	70	88	26	33	4	5	Yes (I)
Obesity	80	101	18	23	2	3	Yes (I)
Smoker	88	111	10	13	2	3	Yes (I)
History of Hypertension	86	108	12	15	2	3	Yes (I)
Fe-deficiency anemia	33	42	27	34	41	52	Yes (II)
Breastfeeding immediately postpartum	73	92	18	23	9	11	Yes (I)

N= 126

CDC Medical Eligibility Criteria for Contraceptive Use (2012)

Category I= no restriction, method can be used

Category II= advantages generally outweigh theoretical or proven risks

\*Not evaluated by CDC MEC

(Highlighted areas denote the categories with greatest discrepancy between provider knowledge and CDC MEC guidelines.)

**Table 1.4: Provider Recommendation of Levonorgestrel releasing IUD based on Medical Eligibility**

Levonorgestrel releasing IUD	Yes		Uncertain		No		CDC MEC Category I/II
	%	n	%	n	%	n	
Menorrhagia	88	111	8	10	4	5	Yes (I)
Dysmenorrhea	83	104	11	14	6	8	*
Fibroids	50	63	39	49	11	14	Yes (II)
Diabetes	71	89	23	29	3	4	Yes (I)
Obesity	80	101	16	20	4	5	Yes (I)
Smoker	75	95	11	14	14	18	Yes (I)
History of Hypertension	74	93	20	25	6	8	Yes (I)
Fe-deficiency anemia	89	112	10	13	1	1	Yes (I)
Breastfeeding immediately postpartum	62	78	20	25	18	23	Yes (II)

N= 126

CDC Medical Eligibility Criteria for Contraceptive Use (2012)

Category I= no restriction, method can be used

Category II= advantages generally outweigh theoretical or proven risks

\*Not evaluated by CDC MEC

(Highlighted areas denote the categories with greatest discrepancy between provider knowledge and CDC MEC guidelines.)

**Table 1.5: Provider Recommendation of Implant Based on Medical Eligibility**

<b>Implant (Nexplanon ®)</b>	<i>Yes</i>		<i>Uncertain</i>		<i>No</i>		<i>CDC MEC Category I/II</i>
	%	<u>n</u>	%	<u>n</u>	%	<u>n</u>	
Menorrhagia	72	91	15	19	13	16	Yes (II)
Dysmenorrhea	75	95	17	21	8	10	*
Fibroids	70	88	26	33	4	5	Yes (I)
Diabetes	67	91	29	37	4	5	Yes (I)
Obesity	57	72	32	40	11	14	Yes (I)
Smoker	64	81	25	32	12	15	Yes (I)
History of Hypertension	64	81	27	34	9	11	Yes (I)
Fe-deficiency anemia	80	101	17	21	3	4	Yes (I)
Breastfeeding immediately postpartum	53	67	31	39	16	20	Yes (II)

N= 126

CDC Medical Eligibility Criteria for Contraceptive Use (2012)

Category I= no restriction, method can be used

Category II= advantages generally outweigh theoretical or proven risks

\*Not evaluated by CDC MEC

(Highlighted areas denote the categories with greatest discrepancy between provider knowledge and CDC MEC guidelines.)



## **Chapter 5: Discussion**

This study revealed that the majority of respondents rated themselves as highly knowledgeable about LARCs. Most healthcare providers were trained in LARC insertion and/or counseling; IUDs slightly more so than implants. Most of the healthcare providers were trained within the last five years, with some receiving training in IUD insertion as long as twenty years ago. Training for IUD counseling and insertion occurred primarily in residency, during fellowship or clinical training, or in practice. Training for implant insertion occurred most often in conferences or in practice.

This study revealed that Vermont providers report slightly less training in LARC insertion as compared with other national survey-based studies. About half (53%) of the Vermont providers reported IUD insertion training, and less than 40% reported implant insertion training. The 2013 study of ObGyn residents by Tang et al. reported 92% training for IUDs and 51% for implants, whereas the Harper et al., 2013 NP study cited 66% of women's health NPs and only 12% of primary care NPs inserted IUDs. These studies were both conducted on a national scale.

A significant feature revealed by this study is the relatively high percentage of providers who report uncertainty about LARC medical eligibility criteria. This is even more apparent when stratified for urban and rural providers. This uncertainty could be attributed to two different factors. The first factor could be a lack of knowledge about whether a particular method is appropriate for a particular medical condition. The second factor could be that reported uncertainty may reveal provider discernment around recommendations based on unique patient situations. In other words, it is not a true lack of knowledge of guidelines but rather a reflection of the often “gray area” of medical

decision-making. Additionally, the CDC categorizations leave room for interpretation about which patients are most eligible. Therefore, it is difficult to determine whether providers are perfectly knowledgeable about the medical eligibility criteria or not.

Many other studies have highlighted lack of evidence-based knowledge as a reason for low LARC uptake. For instance, nurse practitioners in the 2013 study reported low candidacy for women with a history of ectopic pregnancy, STI in the last 2 years and PID history- all of which do not exclude them from LARC use according to the CDC MEC (Harper et al. 2013). ObGyn residents who were a part of a 2010 survey study were also deficient in certain areas of knowledge, including not knowing the non-contraceptive profiles of LARCs and not being familiar with all of the medical eligibility criteria (Tang et al., 2013). Although these particular health concerns were not measured in this study, it highlights a ubiquitous gap in provider knowledge.

### **Limitations and Enhancements to Research**

The primary enhancement of this research was collaboration with VCHIP, a well-established organization that is affiliated with the University of Vermont along with other well-respected partners. A secondary enhancement was access to a large cohort of reproductive healthcare practitioners throughout the state of Vermont.

Limitations of this study include reporting bias due to the subjective nature of the survey methodology. Respondents may have unintentionally inflated their responses regarding knowledge, as well as the intensity of the training that they have received. The survey may have only been completed by providers who feel competent in their knowledge and use of LARCs, contributing to response bias. Further, purposive versus

random sampling was used given the constraints of the study. A significant limitation in this study is that the definitive number of surveys distributed is unknown. This is due to the fact that surveys were administered through third party volunteers within professional organizations at their convenience and discretion. It is estimated that there were over 1000 surveys emailed, with 126 returned, resulting in a 12% response rate based on 1000 distributed surveys. Additionally, this author only received partial data derived from the survey. The latter two limitations may result in an inaccurate reflection of the true knowledge and practice patterns of Vermont practitioners. Finally, results may not be generalizable to other practices and states due to differing provider demographics including ethnicity, practice environment, healthcare and insurance systems.

### **Implications**

Increased provision of LARCs in Vermont has the potential to benefit society as well as individuals within diverse social groups. Several areas of research could inform and improve LARC practice patterns. First, a study investigating specific challenges of providers in rural Vermont, giving context to the level of uncertainty that was demonstrated in their responses. A second area of research would be a review of reimbursement for LARC methods based on practice type, along with an exploration of systems barriers to LARC use. For example, do most practices require a two-part visit for LARC placement? A third study could provide standardized trainings to providers in multiple practice settings and measure and compare changes in LARC uptake over time.

These studies could provide context for some of the unclear results of this study and deliver much needed clarity around Vermont provider knowledge gaps. With these

necessary pieces in place, actionable steps could be furthered towards the larger goal of reducing unintended pregnancies.

### **Conclusion**

This study reveals a gap between what providers' believe they know and current evidence-based guidelines. The results of this study elucidate the importance of improved and ongoing LARC trainings for providers, to ensure that patients have complete information to make informed decisions regarding their care. Toward the end of increasing LARC use and decreasing unintended pregnancies, we now have an increased understanding of Vermont providers' LARC knowledge and knowledge gaps. This improved understanding may contribute to the development of interventions for providers aimed at increasing LARC use among women of reproductive age.

## References

- American Academy of Pediatrics, (2014). Policy Statement: Contraception for Adolescents. *Pediatrics*, 134:4 e1244-e1256.
- American College of Obstetrics and Gynecologists (ACOG) Committee Opinion No. 392, December 2007. Intrauterine device and adolescents. *Obstetrics & Gynecology*; 110:1493–5.
- ACOG Committee Opinion No. 450, December 2009 (Reaffirmed 2011). Increasing Use of Contraceptive Implants and Intrauterine Devices to Reduce Unintended Pregnancy. Retrieved from: <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Gynecologic-Practice/Increasing-Use-of-Contraceptive-Implants-and-Intrauterine-Devices-To-Reduce-Unintended-Pregnancy>.
- ACOG Practice Bulletin, (2011). Long-Acting Reversible Contraception: Implants and Intrauterine Devices. *Obstetrics & Gynecology*, 118(1):183-195.
- ACOG Committee Opinion No. 615, January 2015. Committee on Health Care for Underserved Women: Access to Contraception. *Obstetrics & Gynecology*, 125(1): 250-256.
- Baldwin, M., Edelman, A., (2014) The Effect of Long-Acting Reversible Contraception on Rapid Repeat Pregnancy in Adolescents: A Review. *Journal of Adolescent Review*, 52; S47-S53.
- Bergin A, Tristan S, Terplan M, Gilliam ML, Whitaker AK., (2012). A missed opportunity for care: two-visit IUD insertion protocols inhibit placement. *Contraception*, 86(6):694–697.
- Biggs, M.A., Harper, C., Malvin, J., Brindis, C., (2014). Factors Influencing the Provision of Long-Acting Reversible Contraception in California. *Obstetrics & Gynecology*, 123(3): 593-603
- Biggs, MA., Harper, C., Brindis, C., (2015). California Family Planning Health Care Providers' Challenges to Same-Day Long-Acting Reversible Contraception Provision. *Obstetrics & Gynecology*, 126(2): 338-345.
- Butts, J.B., Rich, K., (2011). *Philosophies and Theories for Advanced Nursing Practice*. Salisbury, MA: Jones & Bartlett Learning.

- Cameron, S., (2014). Postabortal and postpartum contraception. *Best Practice & Research Clinical Obstetrics and Gynaecology*, 28: 871-880.
- Cameron, S., Glasier, A., Chen, Z., (2012). Effect of contraception provided at termination of pregnancy and incidence of subsequent termination of pregnancy. *BJOG*;199: 1074-1080
- Centers for Disease Control and Prevention, 2013b. Unintended Pregnancy Prevention. Retrieved from: <http://www.cdc.gov/reproductivehealth/UnintendedPregnancy/>
- Committee on Adolescent Health Care Long-Acting Reversible Contraception Working Group. Committee opinion no. 539: adolescents and long-acting reversible contraception: implants and intrauterine devices, 2012. *Obstetrics & Gynecology*; 120:983–988.
- Daniels, K., Daugherty, J., Jones, J., Mosher, W., (2015). Current Contraceptive Use and Variation by Selected Characteristics Among Women aged 15-44: United States 2011-2013. *National Health Statistics Report*, 86: 1-15.
- Diaz, V., Hughes, N., Dickerson, L., (2011). Clinician Knowledge about Use of Intrauterine Devices in Adolescents in South Carolina AHEC. *Family Medicine*, 43:407-411.
- Fleming, K., Sokoloff, A., Raine, T., (2010). Attitudes and Beliefs about the Intrauterine Device Among Teenagers and Young Women. *Contraception*, 82: 178-182.
- Finer LB & Zolna MR, Shifts in intended and unintended pregnancies in the United States, 2001–2008, *American Journal of Public Health*, 104(S1): S44-S48
- Gold, R.B., Sonfield, A., Richards, C.L. & Frost, J.J. (2009). Next steps for America's family planning program: Leveraging the potential of Medicaid and Title X in an evolving health care system. New York: Guttmacher Institute.
- Grady, C., Dehlendorf, C., Cohen, E., Bimla Schwarz, E., Borrero, S., (2015). Racial and ethnic difference in contraceptive use among women who desire no future children, 2206-2010 National Survey of Family Growth. *Contraception* 92: 62-70.
- The Guttmacher Institute, 2015. "Unintended Pregnancy in the United States". Retrieved from: <http://www.guttmacher.org/pubs/FB-Unintended-Pregnancy-US.html#6>.
- Hathaway, M., Torres, L., Vollett-Krech, J., Wohltjen, H., (2104). Increasing LARC Utilization: Any Woman, Any Place, Any Time. *Clinical Obstetrics and Gynecology*, 57;(4): 718-730.
- Harper, C., Blum, M., de Bocanegra, H.T., Darney, P., Speidel, J.J., Policar, M., Drey, E., (2008). Challenges in Translating Evidence to Practice: The Provision of

- Intrauterine Contraception. *Obstetrics & Gynecology*, 111,(6): 1359-1369.
- Harper, C., Henderson, J., Raine, T., Goodman, S., Darney, P., Thompson, K., Dehlendorf, C., Speidel, J., (2012). Evidence-based IUD Practice: Family Physicians and Obstetrician-Gynecologists. *Family Medicine*, 44(9): 637-645.
- Harper, C., Stratton, L., Raine, T., Thompson, K., Henderson, J., Blum, M., Postlewaithe, D., Speidel, J., (2013). Counseling and provision of long-acting reversible contraception in the US: National Survey of Nurse Practitioners. *Preventive Medicine*, 57:883-888.
- Kelly, L., Sheeder, J., Stevens-Simon, C., (2005). Why Lightning Strikes Twice: Postpartum Resumption of Sexual Activity during Adolescence. *Journal of Pediatric and Adolescent Gynecology*, 18;(327-335).
- Luchowski, A., Anderson, B., Power, M., Raglan, G., Espey, E., Schulkin, J., (2014). Obstetrician-Gynecologists and contraception: long-acting reversible contraception practices and education. *Contraception* 89:578-583.
- Lunde, B., Smith, P., Grewal, M., Kumaraswami, T., Cowett, A., Harwood, B., (2014). Long Acting Contraception Provision by Rural Primary Care Physicians. *Journal of Women's Health*, 23(6):519-524.
- Merck Sharp & Dohme B.V., a subsidiary of Merck & Co. (2011). Highlights of Prescribing Information. Retrieved from: [https://www.merck.com/product/usa/pi\\_circulars/n/nexplanon/nexplanon\\_pi.pdf](https://www.merck.com/product/usa/pi_circulars/n/nexplanon/nexplanon_pi.pdf)
- Mestad, R., Secura, G., Allsworth, J., (2011). Acceptance of Long-Acting Reversible Contraceptive Methods by Adolescent Participants in the Contraceptive CHOICE Project. *Contraception*, 84; 493-498.
- Minnis, A., Mavedzenge, S., Luecke, E., Dehlendorf, C., (2014). Provider Counseling to Young Women Seeking Family Planning Services. *Perspectives on Sexual and Reproductive Health*, 46(4): 223-231.
- Mosher, W.D., Jones, J., 2010. Use of contraception by women in the United States: 1982–2008. National Center for Health Statistics. *Vital Health Statistics* 23.
- Napili, A., (2014). Title X (Public Health Service Act) Family Planning Program (CRS Report No. RL33644). Retrieved from Congressional Research Service. <https://www.fas.org/sgp/crs/misc/RL33644.pdf>
- Ng, A. S., & Kaye, K. (2012). *Why It Matters: Teen Childbearing, Education, and Economic Wellbeing*. Washington, DC: The National Campaign to Prevent Teen and Unplanned Pregnancy.

- O'Neil-Calahan, M., Peipert, J.F., Zhao, Q., Madden, T., & Secura, G. (2013). Twenty-four month continuation of reversible contraception. *Obstetrics & Gynecology*, 122, 1083-1091.
- Peipert, J., Madden, T., Allsworth, J., Secura, G., (2012). Preventing unintended Pregnancies by Providing No-Cost Contraception. *Obstetrics and Gynecology*, 120: 1291-1297.
- Pender, N.J., Murdaugh, C., & Parsons, M.A. (2011). *Health Promotion in Nursing Practice* (6th ed.). Boston, MA: Pearson.
- Rigsby, DC, Macones, GA, Driscoll, DA, (1998). Risk Factors for Rapid Repeat Pregnancy Among Adolescent Mothers: A Review of the Literature. *Journal of Pediatric and Adolescent Gynecology*, 11; 115-126.
- Rose, S., Garrett, S., Stanley, J., (2015). Immediate postabortion initiation of levonorgestrel implants reduces the incidence of births and abortions at 2 years and beyond. *Contraception*, 92:17-25.
- Stanback, J., Steiner, M., Dorflinger, L., Solo, J., Cates, W., (2015). WHO Tiered-Effectiveness Counseling is Rights-Based Family Planning. *Global Health: Science and Practice*. 3(3):352-357.
- Thomas, A., Crabtree, M., Delaney, K., Dumas, MA., Kleinpell, R., Logsdon, M., Marfell, J., Nativio, D., (2012). Nurse Practitioner Core Competencies. The National Organization of Nurse Practitioner Faculties. Retrieved from: <http://c.ymcdn.com/sites/www.nonpf.org/resource/resmgr/competencies/npcorecompetenciesfinal2012.pdf>
- Tocce, K.M., Sheeder J., Teal, S., (2012). Long-Acting Reversible Contraception in Postpartum Adolescents: Early Initiation of Etonogestrel Implant is Superior to IUDs in the Outpatient Setting. *Journal of Pediatric and Adolescent Gynecology*, 25: 59-63.
- Trussell, J., Henry, N., Hassan, F., Prezioso, A., Law, A., Filonenko, A., (2013). Burden of Unintended Pregnancy in the United States: potential savings with increased use of long-acting reversible contraception. *Contraception*, 87(2); 154-161
- Trussell, J., Hassan, F., Lowin, J., Law, A., Fionenko, A., (2015). Achieving cost-neutrality with long-acting reversible contraceptive methods. *Contraception*, 91: 49-56.
- US Department of Health and Human Services, 2010. U S. Medical Eligibility Criteria



for Contraceptive Use, 2010. Centers for Disease Control and Prevention: Morbidity and Mortality Weekly Report: Recommendations Report; 59(RR-4): 1–6.

US Department of Health and Human Services, 2012. Healthy People 2020. Retrieved from: <http://www.healthypeople.gov/2020/topicsobjectives2020>.

US Department of Health and Human Services, 2013. U.S. Selected Practice Recommendations for Contraceptive Use, 2013: Adapted from the World Health Organization Selected Practice Recommendations for Contraceptive Use, 2<sup>nd</sup> Edition. Centers for Disease Control and Prevention: Morbidity and Mortality Weekly Report, (62),5:1-64. Retrieved from: <http://www.cdc.gov/mmwr/pdf/rr/rr6205.pdf>

Vermont Department of Health, (2015). Data source: PRAMS and Statistics.

Weisman, C., Chuang, C., (2014). Making the Most of the Affordable Care Act's Contraceptive Coverage Mandate for Privately- Insured Women. *Women's Health Issues*, 24-5:465-468.

Whitaker, A., Dude, A., Neustadt, A., (2010). Correlates of Use of Long-Acting Reversible Methods of Contraception Among Adolescents and Young Adult Women. *Contraception*, 81: 299-303.

Winner, B., Peipert, J., Zhao, Q., (2012). Effectiveness of Long-Acting Reversible Contraception. *New England Journal of Medicine*, 366: 1998-2007.

World Health Organization, 2015. Medical Eligibility criteria for contraceptive use. 5<sup>th</sup> edition. Retrieved from: [http://www.who.int/reproductivehealth/publications/family\\_planning/MEC-5/en/](http://www.who.int/reproductivehealth/publications/family_planning/MEC-5/en/)

Yoost, J., (2014). Understanding benefits and addressing misperceptions and barriers to intrauterine device among populations in the United States. *Patient Preference and Adherence*, 8: 947-957.