Patient-, Provider- and System-Level Factors Impacting Contraceptive Access and Use

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Contraception plays vital roles in promoting women's health, quality of life and reproductive autonomy. The research described in this dissertation aimed to identify and evaluate factors at the patient, provider, and system levels that contribute to individuals' abilities to access and use contraceptive methods in concordance with their goals and preferences. We assessed contraceptive preference matching and evaluated system-level policies and provider practices that directly impact access to specific methods, with a particular focus on the medically vulnerable population of women Veterans who use the Veterans Affairs (VA) healthcare system.

First, we used a novel measure to investigate the extent to which women Veterans are currently using the contraceptive methods they consider to be "ideal," and identified characteristics associated with ideal-current method match. Only 58% were currently using their stated ideal method, and match was reduced among non-white women and women with mental health disorders, suggestive of established health care disparities. However, qualitative analysis revealed that the bulk of reasons for ideal method non-use were personal and contextual, rather than resulting from access barriers. Our results underscore the complexity of contraceptive method selection and highlight enduring methodologic challenges of measuring contraceptive preferences.

Next, we used decision analysis to estimate financial and reproductive health impacts to the VA healthcare system of a policy change to allow for twelve-month dispensing of oral contraceptive pills. We found that extended dispensing would better enable women Veterans to

prevent unintended pregnancies, while also being economically feasible and sustainable for VA. These findings may help to inform evidence-based policy in VA.

Finally, we conducted a cross-sectional survey study to evaluate provider-level adherence to best practice guidelines for provision of long-acting reversible contraception (LARC, i.e. intrauterine devices and contraceptive implants) in a single large healthcare system in Western Pennsylvania. We found substantial room for improvement in adherence to best practices, particularly same-day provision of these methods, and identified provider-reported barriers to best practice implementation, which were primarily logistical rather than stemming from knowledge deficits. These results may be used to inform efforts to expand access to LARC methods across this healthcare system.

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Preface

This dissertation would not be possible without the contributions of numerous individuals, a few of whom I would like to acknowledge here. First, to my mentor, Dr. Sonya Borrero – thank you for three years of phenomenal mentorship. Thank you for setting high expectations for my work, for making me a better writer and communicator, and for providing opportunities to reach outside my comfort zone and grow. Your tireless dedication to your work and to its larger goals of equity and justice is so inspiring, and has set a high bar for advocacy as I move forward as a researcher and future physician. I am very grateful for your support and friendship.

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1.0 Introduction

1.1 Contraceptive methods and US epidemiology

Contraceptive methods comprise a variety of practices, medications and devices used to prevent pregnancy. These methods vary in their effectiveness at preventing pregnancy (Table 1), mechanisms of action, and frequency and timing of use.[1] In the United States, greater than 99% of heterosexually experienced women have ever used any contraceptive method, and 88% have used a moderately or highly effective, reversible method.[2] The distribution of contraceptive methods used by US women is shown in Figure 1. Female sterilization and oral contraceptive pills (OCPs) have remained the two most common contraceptive methods for decades.[2,3] Notably, the proportion of women using long-acting reversible contraceptive methods (LARC), including intrauterine devices (IUDs) and contraceptive implants, has increased dramatically in recent years, from 6.0% of contraceptive users in 2008 to 14.3% in 2014, while proportions of women relying on male and female sterilization have decreased over the same timeframe.[3]

Table 1 Contraceptive methods by effectiveness

HIGHLY EFFECTIVE[a] Typical-use failure rate <1%[b]	MODERATELY EFFECTIVE[a] Typical-use failure rate 4-7%[b]	LEAST EFFECTIVE Typical use failure rate 13-21%[b]	NO METHOD Pregnancy rate ~85%
Female sterilization Male sterilization Intrauterine device Subdermal implant	Contraceptive pills Transdermal patch Vaginal ring Medroxyprogesterone injections	Male condom Female condom Withdrawal Spermicides Diaphragm[a] Cervical cap[a] Sponge Fertility awareness	

[a] Requires a prescription or procedure for use.
[b] Indicates the percentage of women experiencing a pregnancy during the first year of typical use.[1]
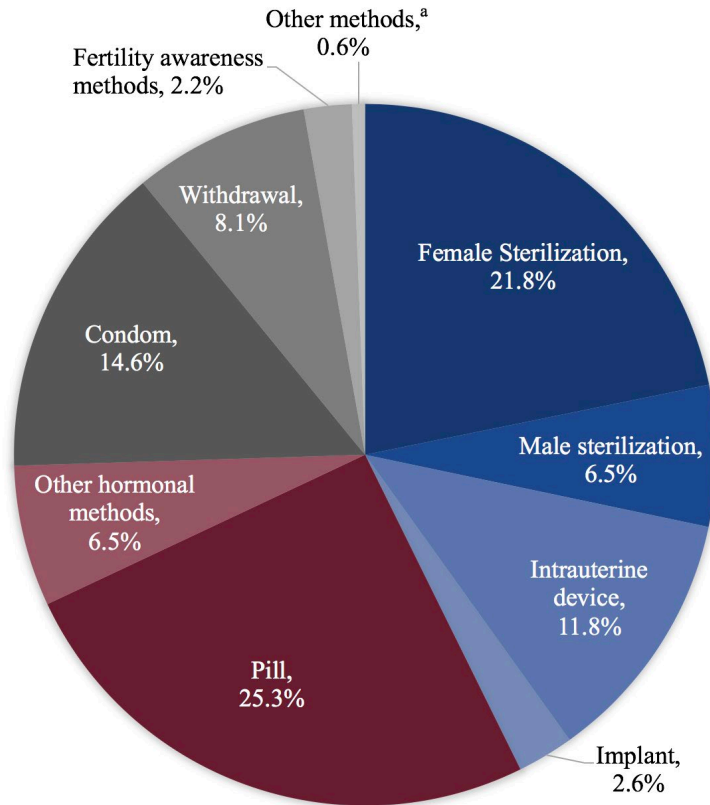
Figure 1 Contraceptive methods used by US women ages 15-44, 2014

Data are from the National Survey of Family Growth 2013-2015 female respondent files, as reported in Kavanaugh and Jerman, 2018.[3] Current method use is defined as use of a method within the past month, and is categorized according to the most effective method use, as participants could report use of more than one method.
Methods are listed according to effectiveness category: blue = highly effective methods; red = moderately effective methods; grey = least effective methods.
[a] Other methods include diaphragm, sponge, and spermicides.
[b] Other hormonal methods include patch, ring and injectables.

1.2 Contraception, health and human rights

Use of contraception allows women to prevent undesired pregnancies and to space their pregnancies in order to optimize maternal and neonatal health.[4,5] In addition to preventing pregnancy, contraceptive methods contribute to health and quality of life in a variety of ways. For example, hormonal methods are used to treat conditions such as menstrual disorders, acne, and

endometriosis, and their use is associated with reduced risks of endometrial, ovarian, and colorectal cancer.[6] Due to the numerous health-related benefits of contraceptive use, contraceptive counseling and provision are broadly recognized as essential preventive health services for women of reproductive age.[7]

Contraception also plays an essential role in guaranteeing reproductive autonomy, and the ability to delay and time pregnancies has had profound implications for the social and economic advancement of women worldwide.[8] Reproductive autonomy was affirmed as the basic human right of individuals "to decide freely… the number, spacing and timing of their children" at the International Conference on Population and Development in Cairo, Egypt in 1994.[9] The Reproductive Justice movement, which was founded by Black women in the US shortly before this convening, more broadly envisions reproductive rights in the context of social justice, including the right to "maintain personal bodily autonomy, have children, not have children, and parent the children we have in safe and sustainable communities."[10] Equitable access to acceptable contraceptive methods is one necessary, though not sufficient, piece of this bold vision.

1.3 Contraception and unintended pregnancy

Consistent use of effective contraception dramatically reduces the risk of unintended pregnancy, defined as pregnancies occurring sooner than desired or when no future children were desired.[11] Indeed, non-use or inconsistent use of contraception accounts for 95% of unintended pregnancies, with only 5% resulting from true contraceptive failure.[12] Unintended pregnancies comprise nearly half of all pregnancies in the United States each year,[13] a figure which has remained high over decades of measurement despite extensive public health programming aimed

at reducing unplanned childbearing.[14,15] Importantly, the highest rates of unintended pregnancy continue to be observed among non-white and low-income women, and those with lower educational attainment.[13,14]

The high rate of unintended pregnancy in the US is widely regarded as a public health crisis due to associations of unintended pregnancy with adverse health behaviors and outcomes, including delayed or inadequate prenatal care, increased substance use during pregnancy, and pre-term birth.[16,17] The strength of these associations has come under increasing scrutiny in recent years, largely because the observational studies necessary for studying human fertility are unable to fully untangle the effects of pregnancy intention from potent confounders such as socioeconomic status, age, and race/ethnicity, which are independently associated with both health outcomes and risk of unintended pregnancy.[17,18] There is also increasing recognition of the scientific and conceptual limitations of measures of pregnancy intention, including their retrospective nature, inability to account for emotional aspects of pregnancy and childbearing, and the non-universality of planning- and timing-based reproductive paradigms.[19-22] Nevertheless, the reduction of unintended pregnancy is a longstanding public health goal, and largely drives policy efforts to improve access to contraception.[7,23]

The unilateral focus of contraceptive policies and public health programs on reducing unintended pregnancy has led to efforts to measure contraceptive access by evaluating uptake of the most highly effective methods, such as IUDs and implants.[24] Recent declines in the rate of unintended pregnancy, from 51% in 2008 to 45% in 2011, have indeed been attributed in part to increasing use of highly effective contraceptive methods.[13,25] However, the assumption that optimizing contraceptive access automatically leads to use of more effective contraception by more people ignores the multifaceted reasons that individuals use contraceptive methods and threatens to devalue the primacy of individual preferences and autonomy.[26,27] Although efficacy

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at preventing pregnancy is important to the majority of women in selecting a contraceptive method,[28,29] other characteristics are highly influential in women's decisions to seek and use contraception, including frequency of use, side effect profiles and non-contraceptive benefits.[29-31] The perceived importance of avoiding pregnancy while using contraception is also not universal,[32,33] and many women express uncertain pregnancy intentions or ambivalence about avoiding or achieving pregnancy.[34-36] The clarity and strength of these intentions fluctuate over time and may predict the likelihood of consistent contraceptive use.[32,34,36-38]

Moreover, initiatives that focus solely on prevention of unintended pregnancy through uptake of highly effective methods can exacerbate societal stigmas and promote coercion, particularly of individuals belonging to socially marginalized groups.[27,39] There is a significant history of reproductive injustices inflicted upon people of color and low-income individuals in the US by health care providers and the government in the name of eugenics and in the service of misguided poverty alleviation strategies. This includes coercive sterilization programs targeting poor women and women of color, and policy proposals conditioning welfare benefits on contraceptive implant provision.[39,40] There is also ongoing potential for coercion and bias in contraceptive counseling according to sociodemographic characteristics.[41-43] In light of these injustices, family planning providers, researchers and policy makers have a responsibility to ensure that promotion of public health goals does not overshadow individual preferences and autonomy, particularly among vulnerable populations.

The limitations and potential harms of measures of unintended pregnancy and contraceptive efficacy have led to calls by reproductive justice advocates and family planning researchers to develop new frameworks and instruments that more accurately measure *access* to contraceptive methods, quality of contraceptive counseling, or meeting of patient preferences.[21,22,26,27] The research described in this dissertation, which assesses contraceptive

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preference matching and evaluates policies and practices impacting access to specific methods, strives to acknowledge the multifaceted contribution of contraception to health, quality of life and self-determination, in addition to its efficacy in preventing unintended pregnancy.

1.4 Contraceptive access and disparities

Differences in contraceptive use are observed among US women according to demographic characteristics, with non-white women and women of lower socioeconomic status being less likely to use any contraception or highly effective methods.[44-47] These differences are understood as disparities due to the corresponding higher rates of unintended pregnancy among these same populations.[13] The types of contraceptive methods that women select and use also vary according to race/ethnicity, socioeconomic status and educational attainment.[3,44,47] For example, non-Hispanic Black and lower-income women have historically been more likely to rely on female sterilization and barrier methods for contraception, whereas use of the pill and other hormonal methods is more common among white women and women with higher educational attainment.[44,48,49] Of note, longstanding differences in use of female sterilization appear to have decreased in the most recently available national data, with reductions driven by reduced use by low income and Black women, and are no longer statistically significant across race/ethnicity.[3,44]

The reasons for disparities in contraceptive use are complex, and include factors operating at the patient, provider, and healthcare system levels.[50] At the patient level, preferences for contraceptive method features are highly influential to women's decisions about contraception, and vary broadly. These include preferences about the use of synthetic hormones,[29,30] acceptability of a foreign object in the body, as with LARC methods,[51] the impact of methods on sexual

satisfaction,[51,52] the desirability of menstrual control or amenorrhea as compared to a "natural" menstrual cycle,[31,51,53,54] and the need for a method that can't be detected by an intimate partner.[55] Religious and cultural attitudes toward contraception and pregnancy may also influence contraceptive use and method selection,[53,56] as does the perceived importance of avoiding pregnancy at a given time.[32-34]

Importantly, preferences for method features have been found to vary across sociodemographic characteristics. For example, studies have found that non-white women are more likely than white women to prefer non-hormonal methods and methods that protect against sexually transmitted diseases, and may be less likely to consider method effectiveness as extremely important.[30,54] Emerging evidence suggests that women of minority race/ethnicity may also have stronger preferences for control over method discontinuation, and for methods that promise an immediate return to fertility.[54] Knowledge about contraceptive methods also informs method selection and use,[57] and disparities have been noted, with racial/ethnic minority women having reduced awareness of available methods and more limited knowledge about their safety and efficacy.[58-60] Correcting disparities in knowledge is essential to ensure that women can make informed decisions. However, contraceptive method provision is unique within medical care in that there is not a "correct" method for any given woman, and the close relationship of contraception with sexuality, intimate relationships and reproductive desires makes contraceptive method selection particularly preference-sensitive.[26]

Interactions with health care providers are necessary to obtain the most highly effective contraceptive methods, which require prescriptions or procedures for use (Table 1). Providers influence the contraceptive methods that women have access to and select in a variety of ways, including their knowledge and expertise,[61,62] counseling styles,[63] and practices related to method provision.[64-66] Providers may also exhibit biases with regards to particular methods or patient

sociodemographic characteristics. For instance, women from socially marginalized groups have reported feeling pressured to choose highly effective methods and that providers neglect their preferences in counseling.[43,67] When studied empirically, providers have been found to be more likely to recommend IUDs to women who were non-white and low-income.[41] Counseling strategies that operate under the assumption that efficacy is the most important feature or that focus on specific method promotion, such as "LARC First" initiatives, may reinforce or exacerbate stigmas and contribute to coercion.[27] In contrast, counseling strategies that are intentionally patient-centered and emphasize shared decision-making are associated with increased satisfaction with chosen contraceptive methods and with family planning care.[63]

Factors operating at the system level influence the broader context of contraceptive access and availability. For instance, costs of contraceptive methods and insurance coverage have been shown to influence method selection and continuation,[68] and research suggests that women are more likely to select methods with high upfront costs, such as IUDs and implants, when those costs are mitigated or removed.[69,70] Insured US women have seen significant reductions in out-of-pocket costs for contraception in recent years owing to provisions of the Affordable Care Act which mandate coverage of the full range of prescription contraceptive methods with zero cost sharing.[71,72] Concurrent expansion of Medicaid eligibility criteria and launch of the insurance marketplace led to a nearly 40% reduction in the number of uninsured women of reproductive age between 2012 and 2015.[73] Other system-level factors that impact contraceptive use include contraceptive method stocking and availability, and medication dispensing limits. As with other medications, dispensing of short-acting hormonal contraceptive methods (i.e. the pill, patch and ring) is typically capped at 30-, 60-, or 90-day supplies by most US insurers.[74] However, dispensing greater initial quantities of hormonal contraception is associated with improved continuation of those methods, fewer gaps in coverage, and reductions in unintended

pregnancies.[75,76] These data have led to state-level legislative efforts to mandate insurance coverage for 12-month contraceptive supplies dispensed at an initial fill.[74]

1.5 Women Veterans and contraception

Two projects in this dissertation focus on the population of women Veterans who use the Veterans Affairs (VA) healthcare system. Like women in the general population, women Veterans need access to contraception. The number of women Veterans using VA for health care has increased nearly 3-fold since the turn of the century, to almost half a million women in fiscal year (FY) 2015, of whom over 40% are of reproductive age (18-44 years old).[77] This demographic shift has propelled a growing commitment by VA to provide high-quality, comprehensive care to women Veterans.[78,79] Initiatives have included the development of comprehensive women's health clinics, and mandating that female VA patients have access to a primary care provider trained in gender-specific competencies, including contraceptive counseling and provision.[79]

Women Veterans who use VA for health care (~22% of all woman Veterans) comprise a unique and vulnerable population, with a high burden of chronic medical conditions and mental health disorders compared to women in the general US population,[77,80,81] as well as high rates of sexual trauma and adverse psychosocial factors including homelessness.[82,83] These characteristics may render this population particularly vulnerable to pregnancy-related morbidity, and to the potential negative consequences associated with unintended pregnancy.[17] This population is also disproportionately comprised of women of minority race/ethnicity (42% in FY2015),[77] who in the US population experience both higher rates of unintended pregnancy,[13] as well as dramatically higher risks of maternal and neonatal morbidity and mortality.[84,85] The unique demographics of

this population underscore the importance of contraceptive access in ensuring the health and well-being of women Veterans.

VA offers the full range of contraceptive methods approved by the US Food and Drug Administration (FDA), including short-acting hormonal methods and LARC, as well as sterilization procedures. These methods are available to Veterans at low or no cost through a centralized pharmacy and device formulary.[86,87] Importantly, contraceptive methods obtained through VA are not exempt from copayments, as they are for the majority of insured US women under the Affordable Care Act.[72] Instead, a Veteran's copayment status is determined by a combination of factors such as income and level of service-connected disability, defined as "injury or illness that was incurred or aggravated during active military service."[88,89] Individuals who are not exempt from copayments also incur copayments for contraceptive medications; in 2019 this is a flat fee of $8 for a 30-day supply.[86] While primary care providers are expected to provide counseling and prescribe the bulk of contraception, VA gynecologists are available for more complex cases and for LARC insertion procedures. However, the availability of onsite gynecology is known to vary between care sites and is associated with onsite LARC availability.[90] Other structural factors are also associated with availability and use of prescription contraception, such as being seen in a hospital-based versus community-based clinic, or in a designated women's health clinic versus other primary care setting.[91,92]

Until recently, little has been known about contraceptive use and unintended pregnancy among women Veterans. The Examining Contraceptive Use and Unmet Need among Women Veterans (ECUUN) study sought to fill this gap by surveying a nationally representative sample of 2,300 reproductive-aged women Veterans who use VA for primary care.[93] Women completed computer-assisted telephone interviews assessing their pregnancy histories, use of contraception, and experiences seeking reproductive health care in VA. Data from ECCUN indicate that overall

contraceptive use and unmet need for prescription contraception are similar among women Veterans who use VA compared to women in the general US population, although greater proportions of women Veterans use LARC methods and fewer use female sterilization compared to US women.[93] This population also reports a similarly high proportion of unintended pregnancies, and seeks abortion at similar rates as US women.[93,94] Notably, differences and potential disparities have been noted in contraceptive use, preferences and knowledge among vulnerable populations of women Veterans, including women of minority race/ethnicity,[30,95,96] women with chronic medical conditions,[97] and women with mental health disorders.[98,99] Increased understanding of factors impacting contraceptive access and use in this population is necessary to improve contraceptive care for women Veterans.

1.6 Goals of dissertation

The research described in this dissertation aims to evaluate patient-, provider-, and system-levels factors which may influence individuals' abilities to obtain and use contraception in concordance with their goals and preferences.

In the first paper, we investigate the extent to which women Veterans are using the contraceptive methods they consider to be "ideal," and identify characteristics associated with ideal-current method match, a novel measure designed to evaluate contraceptive access while centering patient preferences. We also qualitatively analyze women's open-ended reasons for non-use of their stated ideal method.

In the second paper, we use decision analysis to estimate the impact of twelve-month oral contraceptive pill dispensing on VA health system costs and women Veteran's efforts to prevent

unintended pregnancies. This work aims to translate existing research data to a real-world setting in order to inform evidence-based, system-level policy to improve contraceptive access for women Veterans using the pill.

Finally, in the third paper, we describe results from a cross-sectional survey study evaluating provider-level adherence to best practice guidelines for LARC provision in a single large healthcare system. By characterizing current practices and eliciting provider-identified barriers to same-day LARC provision, this work aims to inform efforts to expand access to LARC methods across this system.

2.0 Agreement Between Self-Reported "Ideal" and Currently Used Contraceptive Methods Among Women Veterans in the ECUUN Study

2.1 Introduction

The efficacy of contraceptive methods in preventing pregnancy is an important consideration for the majority of women;[28-30] however, additional factors are highly influential to decisions about contraceptive use and method type, including the perceived importance of avoiding pregnancy;[38] emotional orientations toward pregnancy;[100,101] personal and cultural attitudes toward pregnancy and birth control;[53,102] and preferences for method characteristics such as frequency of use, sexual satisfaction, and side effect profiles.[28-31,52,54] Although measures of contraceptive efficacy, such as the proportion of women using highly effective or prescription methods, remain predominant in family planning research and assessment of public health programs, calls are increasing to create more patient-centered measures of contraceptive access and use.[21,26] Assessing agreement between currently used contraceptive methods and contraceptive preferences or a stated preferred method aligns with a rights-based framework prioritizing patient preferences, and is one potential avenue for measure development.[21,22]

Emerging data suggest that sizable proportions of women experience discordance between the contraceptive methods they are currently using and the methods they would prefer to use or feel would be best for them.[103-106] This work has highlighted system-level barriers such as method costs and health care access inequities as the primary correlates of preference-use discordance.[103,104,106] However, provider biases in contraceptive counseling,[41,43] differences in method features valued by patients and health care providers,[107] the extent to which preferred

method features correspond with available methods,[54] and other factors may also impact women's ability to obtain and use methods that align with their goals and preferences. Improved understanding of reasons for preference-use discrepancies is needed to address potential disparities and better support women in achieving reproductive autonomy.

Women Veterans enrolled in the Veterans Affairs (VA) healthcare system are required to have access to a primary care provider (PCP) proficient in contraceptive management, and have access to the full range of FDA-approved contraceptive methods at low or no cost through a centralized pharmacy and device formulary.[86,87] While women Veterans engaged in VA care use highly effective contraceptive methods such as IUDs and contraceptive implants at higher rates than women in the general US population,[93] the extent to which Veterans' current contraceptive methods match their preferences for an "ideal" method remains unknown. We therefore sought to examine agreement between self-reported ideal and current contraceptive use in a population with access to an integrated healthcare system. Using mixed methods, we aimed to evaluate agreement between ideal and currently used contraceptive methods among women Veterans, to identify characteristics associated with ideal-current method match, and to describe women's reasons for non-use of their stated ideal method.

2.2 Methods

2.2.1 Study design and population

Data are from the Examining Contraceptive Use and Unmet Need among Women Veterans (ECUUN) study.[93] ECUUN recruited a nationally representative sample of 2,302 women Veterans,

ages 18-45, who had at least one primary care visit in the VA healthcare system within 12 months prior to study enrollment. Participants completed a cross-sectional, computer-assisted telephone survey regarding contraceptive use, reproductive histories, and contraceptive care received in VA. Surveys were administered by trained interviewers between April 2014 and January 2016. The survey completion rate was 83% among enrolled participants, and study participants were similar to non-participants from the sampling frame in terms of age, race/ethnicity, marital status, income, geographic region and presence of medical and mental illness. The institutional review boards of VA Pittsburgh healthcare system and the University of Pittsburgh approved this study. Full methodology has been previously reported.[93]

This analysis includes women identified as at risk for unintended pregnancy (n=992), defined as sexually active with a man within one month prior to the study interview; not pregnant, trying to conceive, or up to 6 weeks postpartum; and with no history of infertility or hysterectomy. We additionally excluded 13 women who did not report an ideal method (n=2), reported "other" ideal methods not consistent with contraception options offered on the survey (n=7), or had missing data on current method type (n=4), for a study sample of 979 women.

2.2.2 Measures

Per standard definitions, current contraceptive use was defined as use of a method within one month prior to the study interview.[11] Participants were asked whether they had used each of 17 contraceptive methods in the past month, including no method or "other" (non-listed) methods; women could report use of multiple methods. Following assessment of current contraceptive methods, participants were asked, "If you could choose any method of contraception or birth control to prevent pregnancy, what would be your ideal choice?" Participants were read a list of

the same 17 method options, and asked to select a single response. If participants responded prior to hearing the entire list of methods, the interviewer confirmed that the participant considered that method to be ideal among all available methods, and offered to read the entire list again to be sure. Participants who did not report current use of their stated ideal method were additionally asked, "why aren't you currently using this method of contraception?" Interviewers recorded open-ended responses verbatim.

We assessed patient-, provider- and system-level characteristics as potential covariates based on theoretical or empirical associations with contraceptive preferences or use. Patient-level variables included age, race/ethnicity, marital status, education, annual household income, parity, body mass index (BMI), self-reported history of at least one medical condition (hypertension, coronary artery disease, thromboembolic disease, breast cancer, stroke, liver disease, HIV/AIDS, diabetes, migraines, lupus, or seizure disorder) or mental health disorder (depression, anxiety, post-traumatic stress disorder, bipolar disorder or schizophrenia), history of military sexual trauma (MST), deployment history, and whether participants had additional, non-VA insurance. Race/ethnicity was dichotomized as non-Hispanic white vs. non-white due to small sample sizes for non-white subgroups. Provider-level variables were VA PCP gender and whether the participant sees their VA PCP for almost all medical care and/or for gynecologic care. System-level factors included presence of and receipt of primary care in a VA women's health clinic, presence of an on-site gynecologist, and census region of the primary care site. All variables were assessed using survey data except for census region, which was determined using administrative data.

2.2.3 Data analysis

Frequencies and percentages were generated to describe overall sample characteristics and the distribution of reported ideal methods. Ideal method type was described by sample characteristics, and differences in proportions tested using chi-square tests, or Fisher exact tests if expected counts were less than n=5. Our primary outcome was agreement between ideal and currently used methods. Any use of the stated ideal method in the past month was considered a match, regardless of additional methods used. The number and percentage of women with ideal-current method match was calculated for the total sample and by stated ideal method. We used unadjusted logistic regression to test bivariate associations between patient-, provider- and system-level characteristics and method match. Adjusted logistic regression was used to identify factors associated with match while adjusting for other pertinent predictors; variables associated with match at the $p<0.2$ level in bivariate analyses were included in the adjusted model. Stata 14.2 (StataCorp, College Station, TX) was used for all quantitative analyses.

Among the subset of women with ideal-current method mismatch, we analyzed open-ended reasons for non-use of the ideal method. We used an inductive approach, in which codes were created as they arose from the data, rather than based on preconceived notions of what themes might be present. Colleen Judge-Golden read all responses, created a codebook of 19 unique codes with definitions and representative quotes, and coded all responses using the final codebook. A second coder (Tierney Wolgemuth, B.S.) independently coded all responses using the final codebook. Codes were not mutually exclusive, i.e. more than one code could be applied to each response as necessary. Cohen's kappa was calculated using the full dataset as a measure of inter-coder reliability. The average overall kappa was 0.88, with individual codes ranging from 0.74 to 1. Following kappa calculation, the coders discussed discrepancies and coded all responses to

consensus for analysis. A total of 48 responses (14%) required a consensus discussion regarding the presence or absence of one or more codes. Content associated with each code was summarized, and related codes grouped into larger themes for interpretation and reporting. Microsoft Excel (Microsoft Corporation, Redmond, WA) was used for qualitative data management and coding.

2.3 Results

2.3.1 Sample characteristics

Table 2 displays sample demographic and healthcare utilization characteristics. Among 979 women Veterans at risk of unintended pregnancy, the median age was 34 (range 21-45), and 55% were non-Hispanic white. The majority had a bachelor's degree or higher (52%), were married or cohabitating (63%), were parous (71%), and reported at least one medical (54%) or mental (65%) illness. Over half reported a history of military sexual trauma (53%).

2.3.2 "Ideal" contraceptive methods and match with current methods

Participants reported a range of contraceptive methods that they considered "ideal" to prevent pregnancy (Table 3). IUDs were the most frequently cited ideal method by 215 women (22%), followed by partner vasectomy (19%), birth control pills (15%), and tubal ligation (14%). As shown in Appendix A, differences in ideal method type were observed according to numerous patient-level demographic characteristics, but not by provider or system-level factors.

Table 2 Sample characteristics of women Veterans at risk of unintended pregnancy

Characteristic	n (%) [a]
Patient-level	
Age	
20-29	222 (23)
30-34	320 (33)
35-39	251 (26)
40-45	186 (19)
Race	
Non-Hispanic white	538 (55)
Non-white	441 (45)
Marital Status [b]	
Single, never married	142 (15)
Married or Cohabitating	621 (63)
Formerly Married	215 (22)
Education	
Bachelor's degree or higher	507 (52)
Annual household income [b]	
< $20,000	174 (18)
$20,000-$59,999	506 (52)
>= $60,000	289 (30)
Parous (≥1 live birth) [b]	698 (71)
Body Mass Index [b]	
Underweight/Normal (<25)	328 (34)
Overweight (25 to <30)	324 (33)
Obese (≥ 30)	324 (33)
Medical Illness	530 (54)
Mental Illness	640 (65)
History of Military Sexual Trauma	514 (53)
Ever Deployed [b]	537 (55)
Has additional (non-VA) insurance [b]	520 (53)
Provider-level	
VA PCP is female [b]	760 (79)
Sees VA PCP for almost all care [b]	772 (80)
Sees VA PCP for gynecologic care [b]	558 (58)
System-level	
Primary Care in VA WHC	
No WHC at site, or don't know	312 (32)
WHC at site, not seen there	215 (22)
WHC at site and seen there	452 (46)
On-site gynecologist	601 (61)
Census Region	
Northeast	82 (8)
Midwest	188 (19)
South	503 (51)
West	206 (21)

Abbreviations: VA, Veterans Affairs; PCP, primary care provider; WHC, women's health clinic.
[a] N=979. Percentages may not add to 100% due to rounding.
[b] Missing data: marital status (n=1), annual household income (n=10), parity (n=2), BMI (n=3), deployment (n=1), additional insurance (n=1), VA PCP gender (n=12), sees VA PCP for all care (n=10) and gynecologic care (n=17).

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Table 3 Women Veterans' ideal contraceptive methods and match with current method(s)

Method	Identified as "ideal" method n (column %)	Percent currently using their stated ideal method n (row %)
Intrauterine device (IUD)	215 (22)	156 (73)
Partner's vasectomy	189 (19)	69 (37)
Birth control pills	142 (15)	95 (67)
Tubal ligation	133 (14)	94 (71)
Male condoms	83 (8)	45 (54)
Depo-Provera injections	55 (6)	27 (49)
Contraceptive implant	44 (4)	25 (57)
Vaginal ring	43 (4)	30 (70)
Natural family planning	41 (4)	15 (37)
Withdrawal	14 (1)	9 (64)
Patch	8 (1)	2 (25)
No method	7 (1)	2 (29)
Female condom	2 (0)	0 (0)
Spermicides	1 (0)	1 (100)
Sponge/Diaphragm/Cap	1 (0)	0 (0)
Emergency contraception	1 (0)	0 (0)
Total	**979 (100)**	**570 (58)**

Overall, 570 women (58%) reported current use of their stated ideal method. A single participant reported spermicide as both her ideal and current method, resulting in 100% match for this method. Otherwise, match was greatest among women who selected an IUD as their ideal method (73% currently using), followed by tubal ligation (71% currently using).

2.3.3 Factors associated with ideal-current method match

In bivariate analyses, non-white women were less likely to report ideal-current method match compared to non-Hispanic white women (54% match vs. 62%, respectively; p=0.02), as were women with a history of at least one mental health disorder compared to women with no history of mental illness (55% match vs. 64%, respectively; p=0.01) (Table 4). Presence of a gynecologist at the VA primary care site was associated with increased ideal-current match (61% match vs. 54% with no on-site gynecologist, p=0.045).

Table 4 Associations of sample characteristics with ideal-current method match

Characteristic	% Match	Unadjusted OR [a] (95% CI)	p-value	Adjusted OR [b] (95% CI)	p-value
		Match of Ideal & Current Method; n= 570 (58.2%)			
Patient-level					
Age			0.60		-
20-29	58	Ref.		-	
30-34	60	1.09 (0.77, 1.54)		-	
35-39	55	0.90 (0.62, 1.29)		-	
40-45	61	1.14 (0.76, 1.69)		-	
Race			**0.02**		**0.004**
Non-Hispanic white	62	Ref.		Ref.	
Non-white	54	**0.74 (0.57, 0.96)**		**0.68 (0.52, 0.89)**	
Marital Status			0.66		-
Single, never married	55	Ref.		-	
Married or Cohabitating	59	1.16 (0.81, 1.68)		-	
Formerly Married	60	1.21 (0.79, 1.85)		-	
Education			0.59		-
Less than college degree	59	Ref.		-	
Bachelor's degree or higher	57	0.93 (0.72, 1.20)		-	
Income			0.70		-
< $20,000	58	Ref.		-	
$20,000-$59,999	59	1.06 (0.75, 1.51)		-	
>= $60,000	56	0.94 (0.64, 1.37)		-	
Parity			0.37		-
Nulliparous	61	Ref.		-	
Parous (≥1 live birth)	57	0.88 (0.66, 1.17)		-	
Body Mass Index			0.62		-
Underweight/Normal (<25)	60	Ref.		-	
Overweight (25 to <30)	56	0.86 (0.63, 1.18)		-	
Obese (≥ 30)	59	0.97 (0.71, 1.32)		-	
Medical Illness			0.17		0.45
Yes	56	0.84 (0.65, 1.08)		0.90 (0.69, 1.17)	
No	61	Ref.		Ref.	
Mental Illness			**0.01**		**0.01**
Yes	55	**0.70 (0.54, 0.92)**		**0.69 (0.52, 0.92)**	
No	64	Ref.		Ref.	
History of Military Sexual Trauma			0.67		-
Yes	58	0.95 (0.73, 1.22)		-	
No	59	Ref.		-	
Ever Deployed			0.64		-
Yes	59	1.06 (0.82, 1.37)		-	
No	57	Ref.		-	
Additional (non-VA) insurance			0.48		-
No	57	Ref.		-	
Yes	59	1.10 (0.85, 1.41)		-	
Provider-level					
VA PCP is female			0.96		-
Yes	58	1.01 (0.74, 1.37)		-	
No	58	Ref.		-	
Sees VA PCP for almost all care			0.28		-
Yes	59	1.19 (0.87, 1.63)		-	
No	55	Ref.		-	

Table 4 (continued)

Characteristic	n (%)	Unadjusted OR [a] (95% CI)	p-value	Adjusted OR [b] (95% CI)	p-value
		Match of Ideal & Current Method; n= 570 (58.2%)			
Sees VA PCP for gynecologic care			0.25	-	-
Yes	60	1.17 (0.90, 1.51)		-	
No	56	Ref.		-	
System-level					
Primary Care in VA WHC			0.28		-
No WHC or don't know	57	Ref.		-	
Yes WHC, not seen there	55	0.93 (0.65, 1.32)		-	
Yes WHC and seen there	61	1.19 (0.88, 1.59)		-	
On-site gynecologist			**0.045**		**0.03**
Yes	61	**1.31 (1.006, 1.69)**		**1.35 (1.03, 1.75)**	
No/Don't know	54	Ref.		Ref.	
Census Region			0.51		-
Northeast	66	Ref.		-	
Midwest	57	0.68 (0.40, 1.18)		-	
South	57	0.69 (0.43, 1.13)		-	
West	59	0.74 (0.43, 1.26)		-	

Abbreviations: VA, Veterans Affairs; PCP, primary care provider; WHC, women's health clinic.
Percentages may not add to 100% due to rounding. Bolded cells indicate statistically significant results.
[a] Unadjusted logistic regression models with outcome of match vs. no match by sample characteristics. n=979 except for variables with missing data, as noted in Table 2.
[b] Adjusted logistic regression model with outcome of match vs. no match; variables associated with match in bivariate analyses at the p<0.2 level were included in the adjusted model. n=979 (no missing data for included variables).

In a model adjusting for race/ethnicity, mental illness, medical illness, and on-site gynecology (Table 4), ideal-current match remained significantly negatively associated with both non-white race (aOR 0.68; 95% CI: 0.52, 0.89) and mental illness (aOR 0.69; 95% CI: 0.52, 0.92). Presence of an on-site gynecologist remained positively associated with match (aOR 1.35; 95% CI:1.03, 1.75). Medical illness was not associated with match in the adjusted model.

2.3.4 Reasons for ideal-current method mismatch

Among 409 women with ideal-current method mismatch, 340 (83%) provided open-ended reasons for current non-use of their stated ideal method. Due to survey skip patterns, 68 women

with ideal-current mismatch were not asked this open-ended question – 63 were women who reported no contraceptive use in the past month, and 5 were women who reported "no method" as ideal. One woman was asked the open-ended question but did not provide a response. Qualitative analysis of open-ended responses revealed varied reasons for mismatch, which were classified into "modifiable barriers" to ideal method use, and "non-modifiable or personal factors" related to ideal method non-use (Table 5).

Table 5 Women Veterans' reasons for non-use of a stated ideal method

Reason for non-use of ideal method	Frequency (%) [a]
Modifiable barriers	**78 (23)**
Access issues	38 (11)
Cost	19 (6)
Provider barrier	14 (4)
Need (more) information	20 (6)
Non-modifiable/personal reasons	**267 (79)**
Using another method	95 (28)
Pregnancy plans/goals	62 (18)
Partner influence	55 (16)
Concern for side effects	23 (7)
Contraindication to ideal method	14 (4)
Ideal method inconvenient	11 (3)
Ideal method not necessary in relationship context	11 (3)
Lack of permanent sexual partner	7 (2)
Not sexually active (enough)	7 (2)
General fear re: ideal method	5 (2)
Perceived subfertility	1 (0.3)
Non-specific reason	14 (4)
In process of obtaining ideal	**11 (3)**

[a] n=340 women with ideal-current mismatch who provided an open-ended reason for current non-use of their stated ideal contraceptive method (83% of n=409 women with mismatch). Percentages do not add to 100% because codes were not mutually exclusive; 278 responses were assigned a single code (82%), 57 responses were double-coded (17%), and 5 responses had three codes (2%).

2.3.4.1 Modifiable barriers to ideal method use

Overall, 78 women (23%) reported a potentially modifiable barrier to current use of their ideal method, including barriers to accessing health care or specific methods; concerns about cost; and provider-level barriers. Access issues were described by 38 women (11%), with 23 mentioning barriers specific to VA. Several cited scheduling difficulties or unavailability of VA providers as reasons for ideal method non-use, explaining, "the VA usually has a month wait to get my birth control pills," or "it takes a while to get in to a VA OBGYN." Eleven women stated that their ideal method is not offered by VA, with most describing misconceptions based on rumor or hearsay. One woman explained, regarding an IUD, "I don't know if it was available, I heard rules that you had to be married in order to get it from the VA." However, a few women described having directly experienced unavailability of a desired method, such as one was not using her ideal method of an IUD, "because I went to the VA and they told me that they only give you pills." Another woman whose ideal method was Depo-Provera explained, "it wasn't offered when I got on birth control. Or they didn't have it at the VA, or something like that."

Concerns about costs were cited by 19 women (6%) as a reason for non-use of ideal methods ranging from hormonal methods to sterilization procedures. While such concerns were often not well-explained ("It's expensive;" "It cost too much"), numerous stemmed from perceived lack of insurance coverage for ideal methods, for example, "my insurance won't cover it and it's really expensive," regarding an IUD. Although cost concerns generally reflected misconceptions about VA contraceptive coverage, 5 women identified lack of coverage for a partner's vasectomy as a gap in their VA benefits. One explained, "we don't have the money for me to talk him into doing that, and that's not covered by the VA, because he's not the Veteran."

Provider-level barriers to use of an ideal method were described as a reason for mismatch by 14 women (4%). Several women described receiving misinformation about their ideal method

from a provider, such as one who explained, "I was told I had to have a baby first, or its easier to get implemented after a birth," regarding an IUD. Others perceived provider biases against particular methods, such as a woman whose ideal method was Depo Provera, who said, "I actually asked for it from my doctor, and he gave me a list of side effects. He recommended that I stick with the pill." Another woman described the impact of conscientious objection from a VA provider, explaining, "The VA doctor said it was against his religion and wouldn't give [the pill] to me. So they've put me on a list for another doctor." Half of the women who reported provider barriers cited tubal ligation as their ideal method (n=7/14). One explained, "I just turned 25 and my doctor didn't want to do it when I was young." Others described refusal from providers to even discuss sterilization as an option, such as one woman who explained, "Usually my doctor says that it is too extreme of a choice."

Finally, twenty women cited a need for additional information about their stated ideal method as a potentially modifiable barrier to use. Most of these women expressed a need to discuss features or side effects of a prescription or procedural method with their doctor prior to initiation, or to get information regarding VA's provision or coverage of the method. However, several women described needing more information about non-prescription methods such as female condoms ("I wasn't very aware that there were any") or natural family planning ("I just don't know enough about it. There's a lot of learning that goes into it").

2.3.4.2 Non-modifiable/personal factors related to ideal method non-use

A total of 267 women (79%) reported non-modifiable or personal reasons for ideal-current method mismatch, including partner influences and relationship contexts; pregnancy plans incongruent with ideal method use; perceived medical contraindications and side effects; and

current use of another method. While some non-modifiable reasons reflect circumstantial barriers to ideal method use, others suggest limitations of our measure of "ideal" contraceptive methods.

The direct influence of a romantic or sexual partner was cited as a reason for non-use of an ideal method by 55 women (16%), with partner vasectomy being the selected ideal method in nearly all of these instances (n=52). Women explained non-use of vasectomy in terms of their partners' decisions, for example, "Because it's not my choice. It's my partner's choice." Numerous women described a partner's fears about the procedure, such as, "he's scared and won't get it done," while several described partners' concerns about diminished masculinity with vasectomy saying, for example, "my husband said he'd feel like less of a man." For others, absence of a permanent partner precluded use of vasectomy as an ideal method. One woman explained, "I'm not in a serious long-term relationship, so I feel like I don't have the right to ask that of someone." Aside from vasectomy, a few women described their partner as the primary reason for non-use of another method, such as one woman who reported, "my husband doesn't like [condoms]." Distinct from direct partner influences, multiple women mentioned that non-use of an ideal method of condoms occurred in the context of trusting relationships, either by describing the social context of the relationship (e.g. "I'm married"), or implying low risk of STD transmission ("We have been together for two years, and I don't know, I trust him that he isn't going to sleep around").

Sixty-two women (18%) described incompatibility of their stated ideal method with current or future childbearing plans as a reason for current non-use of the ideal method, suggesting that many women may have interpreted the word "ideal" in the abstract, rather than within their current life contexts. Having reported an IUD as ideal, one woman explained, "We're going to start trying again in April. We would not be heartbroken if we ended up pregnant before April. We're fine with using condoms until April. After the next baby we'll pick the IUD again." Multiple women who selected tubal ligation or vasectomy as their ideal method similarly indicated that this method was

not currently appropriate due to future childbearing goals. With regards to partner vasectomy, one woman explained, "We're just waiting a few more years just to be sure we don't want more kids." Conversely, numerous women cited completion of childbearing as a reason for non-use of reversible ideal methods, such as one who explained relying on her tubal ligation rather than her stated ideal method of Depo-Provera, saying, "I decided I never want to have any more kids, and I made a permanent choice instead of a temporary choice." Another who cited the implant as ideal explained, "my husband's had a vasectomy. Our family-- we're done with our kids. Our kids are growing up." Such responses nearly always suggested that the already obtained permanent method was actually superior to the stated ideal method given the respondent's life context.

Other reasons for ideal-current mismatch that suggest differential interpretation of the word "ideal" include contraindications and side effects, inconvenience of the ideal method, and current use of a different method. Fourteen women (4%) indicated that their stated ideal method was not available to them due to potential contraindications. One woman explained that she cannot use the pill, "because I smoke, and I'm over 35," while another described a contraindication to male condoms, stating, "I have an allergy to latex and to spermicide." Similarly, 23 women (7%) described potential or experienced side effects as reasons for non-use, such as one who said, "I had a lot of bad side effects from hormones before" to explain her non-use of the ring. Others explained that their stated ideal method was actually too inconvenient within their life contexts. Regarding non-use of the pill, one woman explained, "my life is too busy, I forget to take them," while another reported she could not practically use her ideal method of natural family planning, "because it's not a perfect world, and I don't have the ability to think about that at the time." Finally, 95 women (28%) described current use of a different contraceptive method as a reason for non-use of their stated ideal method (e.g. "I have my tubes tied," "I chose the IUD"), with 69 citing

this as the sole reason for mismatch. These responses often implied that the currently used method was working for them at this time, or was in fact superior to the stated ideal method.

2.4 Discussion

Despite engagement in an integrated healthcare system offering low or no cost access to the full range of contraceptive methods, current use of a stated "ideal" contraceptive method was reported by only 58% of female VA enrollees at risk of unintended pregnancy, with non-white women and women with mental illness having reduced odds of ideal-current method match and women with a gynecologist at their VA care site having increased odds of match. Nearly one quarter of women reported a potentially modifiable barrier to current use of their ideal method, such as access issues, cost concerns or provider barriers; however, 79% of responses included non-modifiable or personal factors, many of which suggest that women may have interpreted the word "ideal" in the abstract, rather than within their current life contexts.

Our finding of substantial levels of mismatch between stated ideal and currently used methods aligns with emerging work examining contraceptive preference matching in other settings. Among a recent national sample of US women, 36% were not "currently using the type of birth control that [they] would most like to use."[103] Similarly, stated preferences for certain methods were found to greatly exceed actual use among samples of college and postpartum women in Texas, particularly for long-acting reversible methods and sterilization.[104,106] In these studies, method costs and inadequate health care access are highlighted as the primary reasons for preference-use discordance.[103,104,106] In contrast, system-level barriers were far less common reasons for ideal method non-use among our sample of women Veterans. This is not surprising

given our study population's uniform access to an integrated healthcare system through VA enrollment, as compared to more heterogeneous access to health care among US women. Nevertheless, women in our study identified barriers to VA health care that may have contributed to non-use of an ideal method, such as long wait times and provider unavailability. Our finding that an on-site gynecologist at the VA primary care location was independently associated with increased ideal-current method match suggests that proximity to specialized gynecologic care may contribute to preference matching or the overall convenience of contraceptive method acquisition. This result is consistent with prior work noting associations of on-site gynecology with access to reproductive health services, particularly provision of procedural contraceptive methods such as IUDs and implants.[92,108]

Misconceptions about VA contraceptive benefits was another prominent barrier to ideal method use identified in our study, with a number of women reporting erroneous beliefs that VA does not offer or cover particular methods. This result highlights a need to improve patient awareness of VA contraceptive services. However, women Veterans may indeed experience financial barriers to contraceptive use despite their access to VA health care. First, in contrast to most insured US women who have zero cost-sharing for contraception under the Affordable Care Act,[71] a significant subset of VA enrollees incur copayments for contraceptive medications.[86] Copayments have been associated with reduced adherence to hormonal contraception in VA populations,[109] and may serve as a barrier to contraceptive use. Furthermore, as multiple women pointed out, VA does not cover vasectomy for Veterans' male partners, precluding access to this method for some based on financial means.

Women in our study also reported provider-level barriers to use of ideal contraceptive methods. Several responses suggested gaps in provider knowledge or expertise despite VA's policy of requiring access to a PCP proficient in contraceptive management.[87] Other provider-level

obstacles to ideal contraceptive use are similar to those identified in the general population, such as pressure to use specific methods endorsed by a provider,[42,43] discouragement from using a method of choice, particularly in the case of female sterilization,[110,111] and conscientious refusal, which can produce substantial access barriers in reproductive health care.[112] Our findings highlight the ongoing need across healthcare settings to promote evidence-based, patient-centered and non-biased counseling strategies which elicit and respect the primacy of patient preferences in contraceptive method selection.[21,63]

Reduced ideal-current match among non-white women and women with mental illness observed in this study is concerning, and is likely reflective of broader health care disparities. Differences in contraceptive use by race/ethnicity are well established, with non-white women being less likely to use any contraception and prescription methods in both the general US population[49] and among our sample of women Veterans.[95] Reasons for such discrepancies are complex and multifactorial, including structural inequalities such as health care access disparities,[50] disparities in contraceptive knowledge,[96] and differential preferences for certain method features.[30,54] Consistent with prior research on contraceptive preferences, greater proportions of non-white women in our study cited non-prescription and barrier methods as ideal as compared to non-Hispanic white women.[54] Women of minority race/ethnicity and other socially marginalized identities are also particularly vulnerable to biased or coercive contraceptive counseling,[41,43,67] which could impede their ability to use prescription methods aligned with their preferences. Prior analyses from the ECUUN study have found that perceived race-based discrimination while seeking VA health care is associated with reduced odds of using prescription contraceptive methods independent of race/ethnicity, suggesting that negative interactions with providers or the healthcare system at large may directly impact contraceptive use.[95]

Prior analyses from the ECUUN study revealed no significant differences in overall contraceptive use or method effectiveness according to mental health status, which was interpreted as evidence of equitable service delivery to women with and without mental health disorders.[98] Our novel finding of reduced ideal-current method match among this same population of women Veterans with mental illness underscores the inability of efficacy-based metrics to account for method preferences or satisfaction, and the potential promise of measures based on preference matching to better assess contraceptive access and equity. Further research is needed to better understand reasons for preference-use mismatch in this vulnerable population.

Despite the potential advantages of measuring contraceptive preferences, methodological challenges remain. Prior work has found that preferences for specific method features do not necessarily align with or predict chosen contraceptive methods,[29,113] suggesting that a single method meeting all desired criteria may not exist for many women. Similarly, the high prevalence of contextual reasons for ideal-current method mismatch in our study draws attention to the complexity of contraceptive decision-making, and to potential limitations of our outcome measure. By asking women to select a single "ideal" method rather than asking about specific method features, our measure left room for the chosen method to have both pros and cons. However, the complexity of our qualitative results suggest that many women interpreted the word "ideal" in an abstract sense rather than within their current life circumstances. As such, caution should be used in interpreting our quantitative measure of ideal-current match as an indicator of disparity.

Other studies examining preference-use discordance have asked women to identify the method they would "most like to use … regardless of cost of other difficulties,"[103] or "if you could use any birth control method you wanted."[104] However, this type of language may also be subject to variable interpretation. For instance, in He *et al.*'s study of US women at risk of unintended pregnancy,[103] "lack of perceived/actual need" for the preferred method was the second most

commonly cited reason for preference-use mismatch, after cost and insurance concerns. Other reasons for non-use of the preferred method included "pregnancy ambivalence" and "fear of side effects and health concerns."[103] These reasons are similar to the non-modifiable reasons for ideal method non-use identified in our study, and suggest that mismatch is not necessarily suboptimal in the context of respondents' life contexts. Clearly, optimization of preference-based measures remains incomplete.

Strengths of this study include a large sample size relative to prior work and our ability to examine preference-use matching in a population with relatively homogeneous access to health care. There are also several limitations. First, small sample sizes for qualitative reasons for ideal-current mismatch leave us unable to examine statistical differences in reasons for mismatch across patient characteristics. Next, due to survey skip patterns, we are missing qualitative data for women not using contraception (n=63) or who stated that their ideal method was no method (n=5). These women may have had unique reasons for ideal method non-use, which we are unable to explore. Finally, our qualitative results suggest that asking about an "ideal" method may have encouraged women to consider contraceptive preferences outside of their current life contexts. The evident variability in participants' interpretation of the word "ideal" is a significant limitation of our work, and suggests that this measure may not be a valid marker of access or disparity.

In conclusion, healthcare-related barriers to use of preferred contraceptive methods persist even among women Veterans with access to the full range of contraceptive methods through an integrated healthcare system. Continued efforts are needed to ensure that Veterans are informed of their insurance benefits and available contraceptive options, and that providers deliver accurate and person-centered counseling. However, the factors that influence women Veterans' perceived ideal contraceptive methods and drive their ability to use those methods at a given time are complex, and include both modifiable and contextual elements. While our qualitative findings

suggest limitations to asking about an "ideal" contraceptive method, this work contributes to a growing evidence base demonstrating that measures of contraceptive use and method efficacy are insufficient as markers of contraceptive access or reproductive autonomy. Our results underscore the ongoing need for new measures that can more fully assess women's abilities to select, access and use contraception in accordance with their goals and preferences.

3.0 Financial Implications of 12-month Dispensing of Oral Contraceptive Pills in the Veterans Affairs Health Care System

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3.1 Introduction

The Veterans Affairs (VA) healthcare system is the largest integrated healthcare system in the United States[115] and provides care to a growing population of reproductive-aged women Veterans, including provision of all contraceptive methods approved by the US Food and Drug Administration.[77,87] Similar to within the general US population, oral contraceptive pills (OCPs) are among the most commonly used methods of contraception among women Veterans.[93] To be most effective at preventing pregnancy, OCPs require adherence to daily use, timely medication refills, and prescription renewals. Missing more than 2 consecutive pills can increase a woman's chance of contraceptive failure and thus the potential for unintended pregnancy.[116] The effects of this user dependence are evidenced by dramatic differences between perfect and typical use failure rates for OCPs (0.3% and 9.0% in the first year of use, respectively).[117]

Although OCP prescriptions can be written for a full year, pill pack quantity per fill is primarily determined by the patient's insurance. In the US, medication dispensing is typically limited to 30-, 60-, or 90-day supplies, as a mechanism designed to control costs.[74,118] Three-month

supplies are increasingly common among commercial and public insurers owing to associations with improved adherence and cost savings for patients and payers.[119-122] Nevertheless, 90-day limits still necessitate multiple refills annually. Gaps in OCP coverage due to prescription refill delays are an established barrier to perfect contraceptive use among US women.[123,124]

Like most US health plans, VA stipulates a 3-month dispensing limit for all prescription medications, including OCPs. However, VA data indicate that 43% of women dispensed 3-month contraceptive supplies experience at least 1 gap of at least 7 days between refills during the course of a year of use.[125] Conversely, US women dispensed 12-month contraceptive supplies experience fewer gaps and improved method continuation compared to women receiving fewer pills upfront,[75,126,127] which in turn leads to reductions in unintended pregnancy and abortion.[76] Citing this research, international and US guidelines now recommend routine initial dispensing of up to 1-year supplies of hormonal contraception.[116,128]

Despite mounting evidence favoring 12-month dispensing strategies for improving contraceptive access and reproductive outcomes, the financial consequences for VA are unclear, and will likely shape policy decisions. We used decision modeling to estimate financial and reproductive health implications to VA of a revised policy allowing for 12-month dispensing of OCPs. Based on existing data, we hypothesized that 12-month dispensing would reduce VA costs while decreasing unintended pregnancies among women Veterans.

3.2 Methods

3.2.1 Model design and cohort

The institutional review board of VA Pittsburgh healthcare system determined this study's use of retrospective administrative data to be exempt from human subjects review. Additional approval was obtained from the VA Pharmacy Benefits Management Service to utilize administrative data. This study followed the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) reporting guideline for economic evaluation.

We developed a decision analysis model from the VA payer perspective to estimate incremental costs of a 12-month OCP supply option (twelve 28-day pill packs) compared with conventional 3-month dispensing (three 28-day packs dispensed 4 times). Figure 2 shows a simplified model schematic. The 12-month strategy is modeled as an option to account for personal preference (e.g. trialing a new pill type) and because some VA enrollees are subject to copayments for contraceptive medications,[89] which may disincentivize some women from accepting a 12-month supply. The model was run over a time horizon of twelve 28-day periods (approximately one year).

Our model assumes a cohort of reproductive-aged, heterosexually active female VA enrollees who wish to avoid pregnancy for at least 1 year. Pregnancy outcomes include abortion, miscarriage (pregnancy loss before gestational age of 20 weeks) and live birth. Stillbirths (fetal death after gestational age of 20 weeks) and ectopic pregnancies were excluded for model parsimony because these outcomes represent less than 2% of pregnancies, and because pregnancy outcome probabilities are not expected to differ between strategies.[129,130] Model outcomes were per-woman average costs for 3-month and 12-month dispensing, the incremental cost difference

between strategies, and total incremental annual cost difference among all women using OCPs. A cohort of 24,309 women was used to calculate total annual costs, based on the number of VA enrollees who filled an OCP prescription during fiscal year 2017 (FY2017). Model construction and analyses were performed using TreeAge Pro 2018 and 2019 software (TreeAge Software, Williamstown, MA). Independent coding of model components and review of model accuracy by Colleen Judge-Golden and Kenneth Smith, MD, MS, was used to reduce risk of model errors or programming bugs (internal validity).[131]
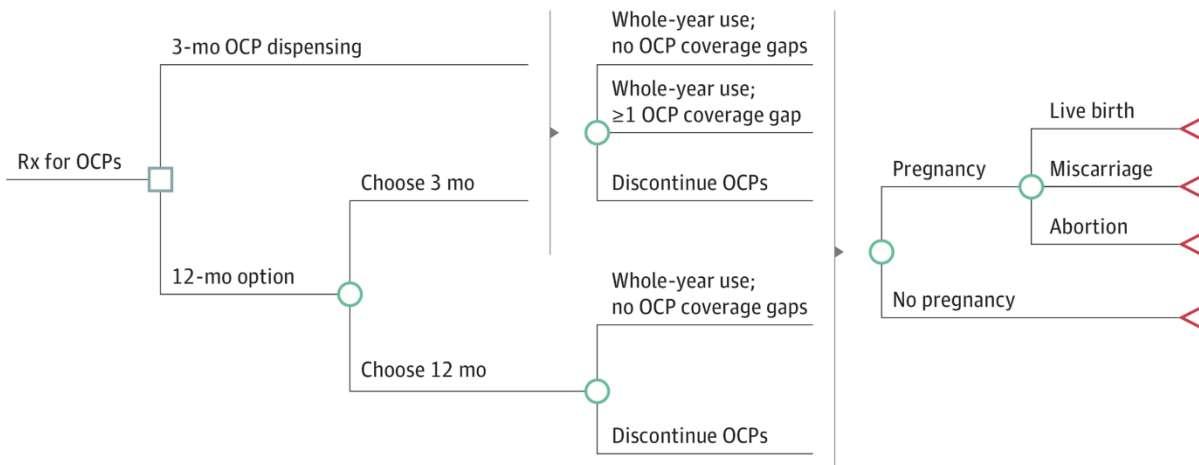
Figure 2 Decision model schematic

Decision analysis model of 3- vs. 12-month dispensing strategies for oral contraceptive pills (OCPs). Rx indicates prescription.

3.2.2 Key assumptions

Base case analyses assume that 50% of OCP users opt to receive a 12-month supply of OCPs, and this value was varied from 0% to 100% in sensitivity analyses; cohorts choosing 12- versus 3-month supplies are assumed to be identical in demographic factors and unintended pregnancy risk. Based on a cohort wishing to avoid pregnancy for at least 1 year, all pregnancies in the model are unintended (i.e. occurring sooner than desired or when no future pregnancies were desired, per standard definitions).[11] This assumption informs the base case proportion of pregnancies that result in abortion (42%).[13] Although empirical evidence indicates that continuation of OCP use is improved among women dispensed greater numbers of pills,[125,126] discontinuation rates are equivalent between the 3- and 12-month strategies, and treated as a single variable in the model, biasing against the 12-month strategy. The model assumes an equal probability of daily contraceptive adherence between 3- and 12-month cohorts (i.e. if women have no gaps in pill coverage, they are equally likely to take pills consistently). Typical use failure rates are used to account for imperfect daily adherence.[117] Finally, pregnancy risk is assumed to be constant on average over time, allowing for pregnancy risk prorating based on time covered by OCPs.

3.2.3 Model parameters

Model parameters are listed in Table 6. Probabilities of contraceptive continuation, coverage gaps, pregnancy, and pregnancy outcomes were drawn from published literature.[13,93,117,125,132,133] Our model does not allow for switching from OCPs to other prescription contraceptive methods over the 1-year time horizon. However, prior work indicates that

prescription contraceptive method switching is low among VA enrollees using hormonal contraception (4.8% switched to another short-acting method over 1 year)[125] and among non-VA women using OCPs (average of 0.11 OCP cycles wasted annually owing to method switching).[76] Women discontinuing use of OCPs are assumed to use nonprescription methods or no method for the remainder of the time horizon. The base case pregnancy risk among those who discontinue OCP use is a weighted average of annual typical use failure rates for condoms, withdrawal, fertility awareness methods, spermicides and no contraceptive use, based on the distribution of use of these methods among a nationally representative sample of women Veterans who use VA for primary care.[93,117] Women with gaps between OCP refills are assumed to use no contraception during gaps, with an 85% annual pregnancy risk.[117] Pregnancy probabilities are prorated based on OCP coverage time versus gap or discontinuation. All annual pregnancy probabilities were additionally prorated to account for a model time horizon of twelve 28-day cycles (336 days) rather than 365 days.

Costs were drawn from VA administrative data. Intermediate costs include the average cost of pills (including fixed and variable supply costs and overhead) and average dispensing costs (including labor and, for mail-order prescriptions, supplies and overhead) for each 3-month OCP supply; average costs include prescriptions filled at pharmacy windows and via VA's mail-order pharmacy in FY2017. Intermediate costs were multiplied by 4 in 12-month dispensing arms, and scaled in 3-month dispensing arms based on the minimum number of 3-month supplies required to account for average OCP coverage time in that arm (e.g. multiplied by 3 for discontinuers in the base case to account for an average of 8 months OCP coverage). Our assumption of direct scalability for pill and dispensing costs from 3- to 12-month supplies biases against the 12-month option, as dispensing of larger quantities may be associated with reduced per-unit costs and thus lower relative intermediate costs.

Table 6 Parameters for base case and sensitivity analyses

Parameter	Base Case	One-way Sensitivity Analysis [a]		Probabilistic Sensitivity Analysis [b]		Reference
		Low Value	High Value	SD	Dist	
COSTS (2017 US $)						
Intermediate Costs [c]						
3-month OCP supply	$38.48	$0.01	$5,000.00	$100.68	gamma	VA data
Dispensing for 3-month OCP supply	$8.58	$0.01	$110.00	$6.70	gamma	VA data
Copayment for 3-month OCP supply	-$24.00	-	-	-	-	134
Outcome Costs						
Live Birth						
Prenatal care [d]	$2968.79	$100.00	$15,000.00	$3789.39	gamma	132
Intrapartum/delivery care	$7933.67	$1,000.00	$100,000.00	$6827.42	gamma	VA data
Newborn care (7 days)	$6480.85	$300.00	$100,000.00	$6000.00	gamma	VA data
Miscarriage	$1186.41	$100.00	$5,000.00	$1452.71	gamma	VA data
Abortion	$0	-	-	-	-	135
PROBABILITIES						
Choose 12-month supply	0.50	0	1.00	0.20	beta	Assumption
Have copayments for OCPs	0.35	0	1.00	0.10	beta	VA data
OCP use probabilities						
Discontinue OCPs given 3 or 12 months	0.35	0	0.70	0.10	beta	125; assumption
≥ 1 gap in coverage given 3 months	0.43	0	0.70	0.15	beta	125
Annual pregnancy probabilities [e]						
Pregnancy given continuous OCP use	0.09	0	0.20	0.05	beta	117
Pregnancy given discontinued OCPs [f]	0.47	0	1.00	0.15	beta	93,117
Pregnancy during OCP coverage gap(s)	0.85	0	1.00	0.08	beta	117; assumption
Pregnancy outcome probabilities						
Miscarriage	0.10	0	0.40	0.07	beta	133
Abortion	0.42	0	0.70	0.05	beta	13
Live birth	0.48	-	-	-	-	-
Pregnancy paid for by VA	0.52	0	1.00	0.20	beta	93; assumption
Newborn care paid for by VA [g]	0.58	0	1.00	0.20	beta	VA data
DURATIONS (months)						
OCP use given ≥ 1 coverage gap	10	3	11.75 [h]	1	beta	125
OCP use given discontinuation of OCPs	8	0	12	1.5	beta	125

Abbreviations: SD, standard deviation; Dist, distribution; OCP, oral contraceptive pill; VA, Veterans Affairs

[a] Cost ranges for one-way sensitivity analysis are based on extremes of empirical VA data. All other ranges are based on published literature and are intentionally broad to reflect parameter uncertainty and allow for extreme value analysis.[136]

[b] Distributions means are equal to the base case. Distributions were chosen based on established best practices.[136]

[c] Intermediate costs are scaled directly based on the minimum number of 3-month supplies necessary to account for time covered by OCPs, or multiplied by 4 for 12-month supplies.

[d] Prenatal care costs are based on average costs paid by commercial insurers for prenatal care in 2010 ($2641), adjusted to 2017 US dollars.

[e] Based on 1 full year of use and prorated in the model to account for the proportion of time in a given state (covered by OCPs, OCP use gap, or discontinuation of OCP use), and for a time horizon of twelve 28-day periods (336 days) instead of a full calendar year.

[f] The base case probability is a weighted average of annual typical use failure rates for nonprescription contraceptive methods (male condoms, withdrawal, fertility awareness-based methods and spermicides) and no method use, based

on the distribution of current use of these methods observed among women Veterans at risk for unintended pregnancy in the Examining Contraceptive Use and Unmet Need Among Women Veterans (ECUUN) study.[93,117]
[g] Indicates the probability that newborn care is paid for by VA among women whose pregnancy care is covered by VA.
[h] Indicates the maximum amount of time that can be covered by OCPs if a woman misses at least 7 days between a single refill in a time horizon of twelve 28-day time periods (336 days).

Veteran copayments represent negative intermediate costs (i.e. profit) to VA and were fixed in the model at –$24 per 3-month supply, or –$96 for a 12-month supply, based on copayment rates for 2017.[134] Copayments were scaled as above in 3-month arms based on OCP coverage time. Whether a Veteran is subject to copayments for medications, including contraceptive methods, is based on a variety of factors including income level, military service timeframe and service-connected disability level.[89,134] The proportion of women subject to OCP copayments (35%) was determined using FY2017 administrative data. Copayment amounts were multiplied by the proportion of Veterans with copayments.

Outcome costs include the average costs incurred by VA for live births and miscarriages. Abortion cost is set at $0, because VA does not cover pregnancy termination under any circumstances.[135] Live birth costs include prenatal care, intrapartum and delivery care, and newborn care, which VA covers for a maximum of 7 days. VA does not provide pregnancy or newborn care directly, but contracts with non-VA entities to reimburse this care using VA benefits.[77] Costs of intrapartum care, newborn care and miscarriage management represent VA average payments in FY2015, the latest available data from which we could derive reliable estimates. Costs associated with prenatal care are drawn from average costs paid by commercial insurers for prenatal care in 2010.[132] All costs are presented in 2017 US dollars, with costs from prior years inflated using the US Consumer Price Index.

A proportion of VA enrollees use non-VA insurance benefits (e.g. private insurance or Medicaid) to cover pregnancy care. Our base case of 52% of pregnancies paid for by VA was

derived from unpublished data from the Examining Contraceptive Use and Unmet Need among women Veterans (ECUUN) study,[93] where 52% of Veterans currently receiving OCPs from VA have no additional, non-VA insurance coverage. Administrative data indicates that VA paid for newborn care for approximately 58% of infants born to women whose maternity care was covered by VA in FY2015.

3.2.4 Estimating the number of unintended pregnancies associated with each dispensing strategy

Unintended pregnancy frequency per 1000 women per year associated with each strategy was calculated based on the proportion of the cohort experiencing a pregnancy outcome (live birth, miscarriage, or abortion) over the model time horizon. We estimated the expected total unintended pregnancy frequency by multiplying the frequency per 1000 women per year by the number of VA enrollees using OCPs (n=24,309).

3.2.5 Sensitivity analyses

We performed one-way sensitivity analyses, independently varying model parameters across the ranges shown in Table 6, to identify parameters with the greatest effect on base case results. Cost ranges are based on empirical VA data; ranges for probabilities and other parameters are based on the literature and are intentionally broad to reflect uncertainty and allow consideration of potentially extreme values.[136] A tornado diagram was generated to graphically represent one-way sensitivity analyses, and threshold values (i.e. parameter values at which favored strategies change) were determined.

To assess overall model robustness and further estimate the effects of parameter uncertainty, probabilistic sensitivity analysis with 5000 iterations was performed, simultaneously varying all model parameters across plausible distributions.[136] Per established guidelines, beta and gamma distributions were chosen to approximate probability distributions and right-skewed cost data, respectively.[136] Table 6 shows distribution means and standard deviations. Standard deviations for cost parameters are from VA data; resulting distributions were compared with empirical data to ensure reasonable approximation. Standard deviations for other parameters were selected to approximate broad but plausible ranges similar to those used in one-way sensitivity analyses. We calculated the likelihood that the 12-month option resulted in a lower per-woman cost compared to the 3-month strategy, and the 95% probability range of incremental cost differences between strategies.

3.3 Results

3.3.1 Base case analyses

Average annual cost per woman was $700.60 for the 12-month dispensing option, compared with $787.72 for the 3-month dispensing strategy, resulting in incremental VA cost savings of $87.12 per woman per year with the 12-month option. Among the 24,309 women receiving OCPs in VA, the 12-month dispensing option is expected to save $2,117,800 annually.

Cost savings with 12-month dispensing result primarily from reductions in unintended pregnancies. Annually, 149 unintended pregnancies per 1,000 women were expected with the 12-month option, compared to 173 per 1,000 women with the 3-month strategy, for an absolute

reduction of 24 unintended pregnancies per 1,000 women per year. This reduction translates to 583 unintended pregnancies averted annually among women receiving OCPs in VA with adoption of a 12-month dispensing option.

3.3.2 Sensitivity analyses

One-way sensitivity analyses are shown in Figure 3. Cost savings with 12-month dispensing were sensitive to changes at the extremes of plausible ranges for probability of OCP coverage gaps with 3-month dispensing, pregnancy risk during gaps, and the proportion of pregnancies paid for by VA. Threshold values for these parameters are shown in Table 7.

In probabilistic sensitivity analysis simultaneously varying each parameter across a plausible distribution, the 12-month strategy was cost saving in 95.4% of model iterations. The 95% probability range of the incremental cost difference ranged from annual cost savings of $389.79 per woman to additional costs of $13.34 per woman with the 12-month option compared with 3-month dispensing.
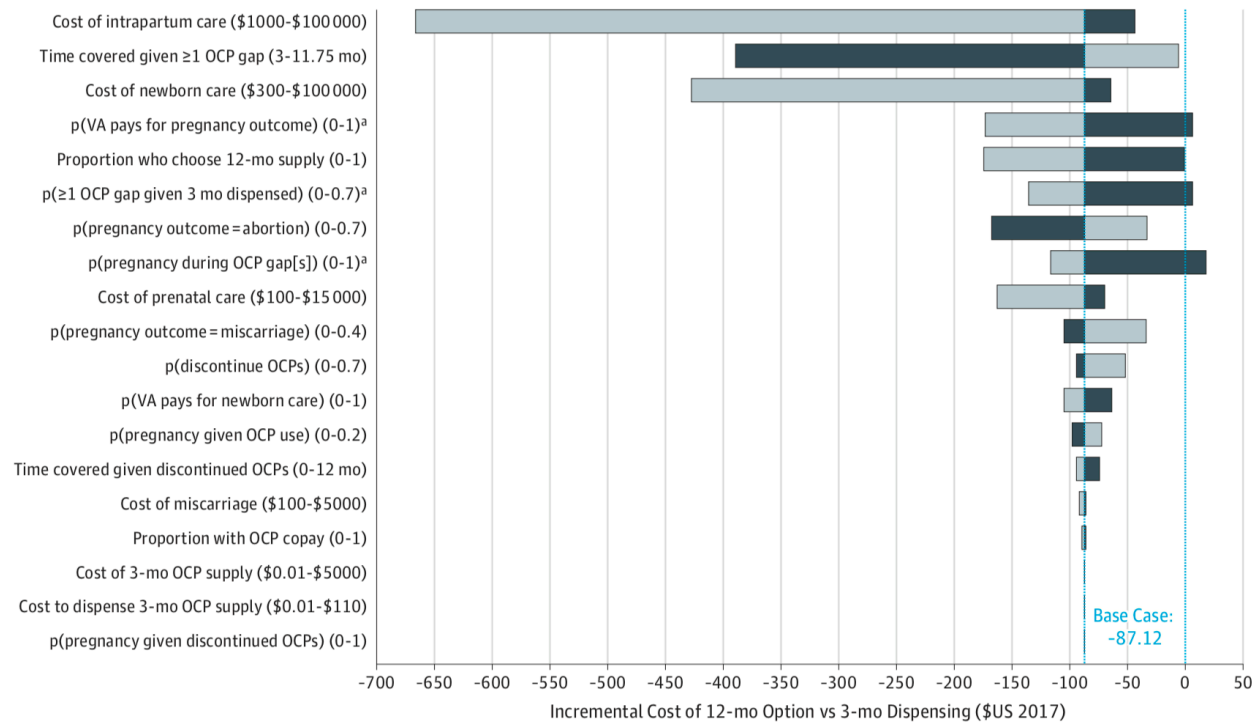
Figure 3 One-way sensitivity analyses

Abbreviations: OCP, oral contraceptive pill; p, probability; mo, month; VA, Veterans Affairs
Bar colors denote the directionality of the parameter range associated with the resultant incremental cost (i.e. dark blue bars represent decreasing and light blue bars indicate increasing parameter values relative to the base case).
[a] Variation can result in result in the 3-month strategy being favored over the 12-month option. Threshold values are reported in Table 7.
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Table 7 Threshold values from one-way sensitivity analyses

Parameter	Threshold value [a]
Probability VA pays for pregnancy outcome	< 0.037
Probability of ≥ 1 OCP coverage gap given 3 months of OCPs dispensed	< 0.031
Probability of pregnancy during OCP coverage gap(s) [b]	< 0.133

Abbreviations: VA, Veterans Affairs; OCP, oral contraceptive pill
[a] 3-month dispensing is less costly than 12-month dispensing at the indicated parameter range.
[b] Annual probability of pregnancy given no contraceptive use, which is assumed during OCP coverage gaps (base case, 0.85). The overall probability of pregnancy over the model time horizon is prorated according to time using OCPs vs. coverage gaps. Annual pregnancy probabilities are also prorated in the model to account for a time horizon of twelve 28-day periods (336 days) instead of a full calendar year.

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3.4 Discussion

Adoption of a 12-month OCP dispensing option is expected to produce substantial cost savings for the VA healthcare system while reducing unintended pregnancies experienced by women Veterans. Model results are robust to variations across broad but plausible parameter ranges, suggesting that 12-month OCP dispensing is economically feasible for VA while better meeting the reproductive needs of the women VA serves.

The potential consequences of an adverse event (i.e. unintended pregnancy) resulting from short gaps in contraceptive coverage are arguably greater than for other prescription medications, and pregnancy is a costly outcome for both women and insurers. Although VA uses innovative strategies such as a centralized mail-order pharmacy used for nearly 80% of prescriptions, refills are not automatic or instantaneous, and potential coverage gaps remain; this is evidenced by the 43% of women Veterans who experience at least 1 gap between contraceptive refills,[125] similar to patterns observed in US populations.[123,124,126] In this model, sensitivity analyses indicate that only 3% of women can incur a coverage gap for 3-month dispensing to be favored, an implausibly low value based on empirical evidence. In contrast, robust evidence now highlights the potential for reduced contraceptive gaps and improved reproductive outcomes with dispensing of greater quantities of contraceptives,[75,76,126,127] while additional healthcare system contacts have little effect on continuation of contraceptive use or patient safety.[137,138] In addition to influencing national and international medical guidelines,[116,128] these data have spurred recent US state-level legislative efforts, with 17 states and the District of Columbia requiring coverage of 12-month contraceptive supplies as of January 2019.[74] As the largest US integrated healthcare system, and with its centralized pharmacy, VA is uniquely positioned to implement similar evidence-based policy change on a national scale.

The substantial incremental cost savings predicted by our model with a 12-month OCP dispensing option are in alignment with existing empirical evidence and other models of contraceptive cost-effectiveness[126,139,140] and, in fact, are intentionally conservative due to multiple assumptions biasing against the 12-month strategy. Our model's projected 14% reduction in unintended pregnancy for 12-month versus 3-month dispensing is notably less than the empirically observed 30% reduced odds of pregnancy among California family planning program clients,[76] suggesting that real-world implications of this policy change may be greater than our model estimates. Despite our conservative assumptions, probabilistic sensitivity analysis indicates that 12-month dispensing is nearly always cost saving, and that additional costs per woman are minimal in rare iterations in which 3-month dispensing is favored. This robustness of model results to variations over generous ranges suggests that the projected cost savings with 12-month dispensing may translate to other US healthcare contexts, despite potential differences in baseline costs or population characteristics.

Allowing for 12-month OCP dispensing is one mechanism to enhance contraceptive access for both US women and women Veterans; however, other policies also limit Veterans' receipt of optimal reproductive health care. First, unlike most insured US women, who have zero cost-sharing for contraception under the Affordable Care Act,[71] some VA enrollees incur copayments for contraception, including 35% of women who filled VA OCP prescriptions in FY2017. Copayments are associated with reduced contraceptive adherence among women Veterans across all income levels[109] and may be a barrier to use. In addition, VA policy excludes all abortion coverage. While Veterans seek abortion at rates similar to women in the general population,[94] VA policy is more restrictive than many public insurance programs and the Department of Defense, which allow for coverage in cases of rape, incest, or life endangerment.[141] Although our model

defines abortion as a $0 cost to VA, it clearly represents a nonzero cost to Veterans seeking termination of unintended pregnancies.

Although our results suggest financial benefits to VA of a 12-month OCP dispensing policy, it is vital that contraceptive policies serve first and foremost to augment women's reproductive outcomes and autonomy. Economic arguments in family planning have historically been used to promote racist and classist policies by positing that limiting the reproduction of poor women and women of color can curb societal poverty. Such poverty amelioration arguments have led to coercive sterilization programs targeting socially marginalized populations and proposals conditioning receipt of welfare benefits on Norplant provision, among other injustices.[39,40] Thus, although the favorable bottom line suggested by our results may be helpful in influencing policy change in VA and other settings, we highlight these potential financial gains as a secondary benefit to the more important and evidence-based goal of improving contraceptive access and facilitating women Veterans' individual abilities to manage their reproductive lives as they see fit.

There are limitations to our work. First, our model does not allow for switching to additional prescription contraceptive methods over the 1-year time horizon or account for resultant pill wastage, which is a common counterargument against extended medication dispensing. However, prescription method switching and pill wastage were low in two large-scale studies in Veteran and non-Veteran populations.[125,126] In addition, intermediate costs of additional methods would likely be negligible compared to cost savings due to reduced unintended pregnancies, as seen in empirical data.[126] Second, our model may overestimate pregnancy risk by assuming use of only non-prescription methods or no contraception among women who discontinue OCPs, and no contraception use during OCP coverage gaps. We account for this limitation by broadly varying pregnancy probabilities in sensitivity analyses. Results were not sensitive to variations in pregnancy probability after discontinuation of OCP use, and annual pregnancy risk given no

contraceptive use (assumed during OCP gaps) would have to be less than 13.3% for 3-month dispensing to be favored. This value is notably lower than the established annual pregnancy risk with no contraception (85%), as well as failure rates for all non-prescription contraceptive methods (range 18-28%) that women might use during coverage gaps. Third, our model does not account for the possibility that groups of women Veterans choosing 12- versus 3-month OCP supplies may differ according to characteristics associated with OCP use, adherence, or risk of unintended pregnancy, including medical and mental health comorbidities. Finally, our work is subject to inherent limitations of model-based approaches, wherein applicability to real-world situations is bounded by assumptions, input data quality and combined parameter uncertainty. To mitigate these limitations and produce policy-relevant results, we made structural and parameter assumptions to bias against the 12-month dispensing option wherever possible, and varied all parameters individually and simultaneously over generous bounds.

In conclusion, adoption of a 12-month dispensing option for oral contraceptive pills may support reproductive autonomy and improve reproductive outcomes for women Veterans, and is expected to produce cost savings for VA due to reductions in unintended pregnancies. Thus, the proposed policy is expected to be economically feasible for VA while better supporting women Veterans in meeting their reproductive goals.

4.0 Adherence to Best Practice Guidelines for Provision of Long-Acting Reversible Contraception in a Single Large US Healthcare System

4.1 Introduction

Use of long-acting reversible contraceptive methods (LARC), including IUDs and contraceptive implants, has increased more than 4-fold among US women since the early 2000s,[142,143] likely contributing to recent declines in unintended pregnancy.[13] Health care providers trained in LARC provision are pivotal to facilitating access to these methods, which are appealing to many patients, providers and public health advocates for their high efficacy and low maintenance.[144] Best practice guidelines for LARC provision, which synthesize existing evidence and provide recommendations to maximize access while ensuring patient safety, are maintained by the American College of Obstetricians and Gynecologists (ACOG) and the Centers for Disease Control and Prevention (CDC).[116,145] Best practices include same-day LARC provision, placement at any point in the menstrual cycle when pregnancy can be reasonably excluded, provision to nulliparous and adolescent women, STD screening concurrent with IUD placement, and limiting unnecessary follow up.

Over 90% of obstetrician gynecologists (OBGYNs) provide IUDs and over half provide implants,[64,146] compared to LARC provision by less than a quarter of family physicians and less than 10% of pediatricians.[147,148] Prior research suggests substantial variation in knowledge of LARC practice guidelines among OBGYNs[65,149] and across medical specialties.[62,150,151] However, there is less research examining specific practices for LARC provision or provider-level adherence to best practices, which may impact contraceptive access. We therefore aimed to assess adherence

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to LARC best practices, particularly same-day LARC provision, among health care providers affiliated with a single, large healthcare system in Western Pennsylvania. Specifically, this study aimed to describe LARC best practice adherence, characterize provider and practice characteristics associated with adherence, and identify provider-reported barriers to best practice implementation within a single healthcare system.

4.2 Methods

4.2.1 Study design and population

This study was approved by the institutional review board of the University of Pittsburgh. We conducted a web-based, cross-sectional survey with all health care providers affiliated with the University of Pittsburgh Medical Center (UPMC) who were associated with at least one LARC-related diagnosis, procedure or device code in electronic medical records between October 1, 2017 and September 30, 2018. Providers currently enrolled in a training program were excluded. Provider email addresses were manually sourced using the UPMC email directory; lack of a functioning health system email address was assumed to indicate lack of current affiliation with the health system. Data cleaning and exclusions resulted in a final recruitment pool of 363 providers. Additional details regarding recruitment pool creation are provided in Appendix B.

4.2.2 Recruitment and data collection

The survey was administered online using University of Pittsburgh licensed Qualtrics software (Qualtrics©, Provo, UT). Potentially eligible providers received an email inviting them

to participate in the "UPMC LARC Provider Survey" via a personalized link. Participants were offered a $10 physical or electronic Starbucks gift card upon survey completion. Participants were recruited from December 11, 2018 through January 19, 2019. Three reminder emails were distributed to individuals who had not yet completed the survey at approximately 1, 3 and 5 weeks after the initial email. An additional message was sent from an OBGYN division chief encouraging colleagues to participate. Additional details regarding recruitment are provided in Appendix B.

4.2.3 Survey development

We developed a 25-question survey to assess adherence to best practices for LARC provision, in accordance with the CDC 2016 US Selected Practice Recommendations (SPR) for Contraceptive Use[116] and ACOG Practice Bulletin on LARC[145] (Appendix C). The survey was developed with reference to previously published literature[64,152,153] and with iterative input and feedback from content experts, including OBGYN family planning specialists. Scenario-based questions were used when possible to aid in assessing real-world practice patterns as opposed to provider knowledge about best practice guidelines. We pilot tested the survey with 10 residents and fellows with relevant experience providing LARC (3 OBGYN residents, 2 OBGYN family planning fellows, 2 internal medicine women's health fellows, and 3 adolescent medicine fellows). Pilot participants provided feedback on the online survey format, question wording and response options.

4.2.4 Measures

We assessed average monthly frequency of IUD and implant provision over the past 12 months (none, <1/month, 1-5/month, 6-10/month, >10/month). Participants who had inserted less than one or no IUDs or implants per month were asked to select all that apply from a list of potential reasons for having placed few or no IUDs/implants, including "other" with an open-ended text box. Open-ended "other" responses were recoded to available discrete response options if applicable. Providers who reported no provision of a given method during the prior 12 months were not asked the remainder of survey questions pertaining to that method.

Our primary outcome was provision of same-day LARC, which was assessed via two questions. Considering their primary practice location, providers were asked to estimate the number of office visits experienced by a "typical" patient for IUD or implant placement, from deciding she wants the method to having the device placed. Response options were "1 visit," "2 visits" or "3 or more visits," which was dichotomized to 1 visit or 2 or more visits for analysis due to low frequency of providers reporting 3 or more visits (n=1 for each method). A second item assessed providers' ability to add a LARC insertion procedure to an annual exam visit at their primary practice location, using the following scenario:

> Layla is a 26-year-old, established patient of yours. During her **scheduled annual exam**, she tells you she has "done a lot of research" and wants an [IUD/implant] for contraception. She has not been sexually active for three weeks and her menstrual period ended 2 days ago. Layla is asking if you can insert the [IUD/implant] today. Based on your current clinical practice, how likely is it that you can insert the [IUD/implant] during today's visit?

Response options were "very unlikely," "unlikely," "equally likely and unlikely," "likely" and "very likely," which was dichotomized as "likely/very likely" versus all other responses for analysis. Of note, this scenario intentionally describes a patient whom clinicians can clearly be

"reasonably certain" is not pregnant per CDC guidelines;[116] immediate IUD insertion is therefore appropriate. Regardless of the reported likelihood of add-on, participants were then asked to identify potential reasons why they might be unable to complete the LARC insertion described in the scenario, using a select-all-that-apply question including "other" with an open-ended text box. Open-ended "other" responses were recoded to available discrete response options if applicable.

Other best practice outcomes are based on the CDC SPR and include provision of IUDs to nulliparous women (recommended); LARC provision to women under 18 years of age (recommended); parental consent requirements for women under 18 (not required under Pennsylvania law[154]); timing of IUD insertion in relation to STD screening (recommendation: screen but do not delay insertion; treat with IUD in place); timing of IUD insertion within the menstrual cycle (recommendation: insert at any time if reasonably certain not pregnant), use of misoprostol for IUD insertion (not recommended), and scheduling of routine follow-up after IUD insertion (not recommended).[116] We additionally assessed routine stocking of IUDs and implants at primary practice locations.

We collected demographic information including provider type (physician, nurse practitioner, physician assistant or midwife), primary medical specialty (OBGYN, family medicine, internal medicine or pediatrics), years in practice, gender, and whether the provider spends any time practicing in a federally qualified health center (FQHC), Title X or public health clinic. Practice-related characteristics include whether the provider's primary practice is located in an academic setting (specified as involved in the training of medical students, residents or other health professions trainees), the location of the primary practice (Allegheny County, the location of the health system's main academic medical center and educational programs, versus all other counties), and the average number of patients seen per week. All variables were assessed via self-report on the survey instrument.

4.2.5 Data analysis

Descriptive statistics were generated for all variables and to describe demographic characteristics of our study sample. Bivariate associations between provider and practice characteristics and same-day provision and other outcomes were tested using Chi-square or Fisher exact tests if expected counts were less than n=5. We used multivariable logistic regression to identify characteristics associated with same-day LARC outcomes (typical single visit and high add-on ability) while adjusting for all variables associated with these outcomes in bivariate analyses at the p<0.2 level. Due to prohibitively small sample sizes, participants reporting a medical specialty of internal medicine or pediatrics were excluded from analyses examining provider specialty as an independent variable. We calculated frequencies of reasons for no/low LARC provision and inability to add-on, as well as the number of reasons selected by each participant. The relationship between number of potential barriers to LARC add-on and likelihood of LARC add-on was assessed using the Jonckheere-Terpstra test for ordered alternatives. All analyses were conducted using Stata 14.2 (StataCorp, College Station, TX).

4.3 Results

4.3.1 Study population

Of 363 providers contacted via email, 167 consented to participation in the survey (46%). Ten were ineligible (6%), and 4 did not complete the entire survey, for a total of 153 completed surveys (response rate 42%) (Figure 4). The majority of respondents were physicians (n=103,

67%), and reported a primary medical specialty of OBGYN (n=104, 68%) (Table 8). All advanced

practice providers (APPs) reported working in OBGYN specialties except for one family medicine

physician assistant. Participants varied with respect to practice settings, years in practice and

number of patients seen per week, and 80% were female.
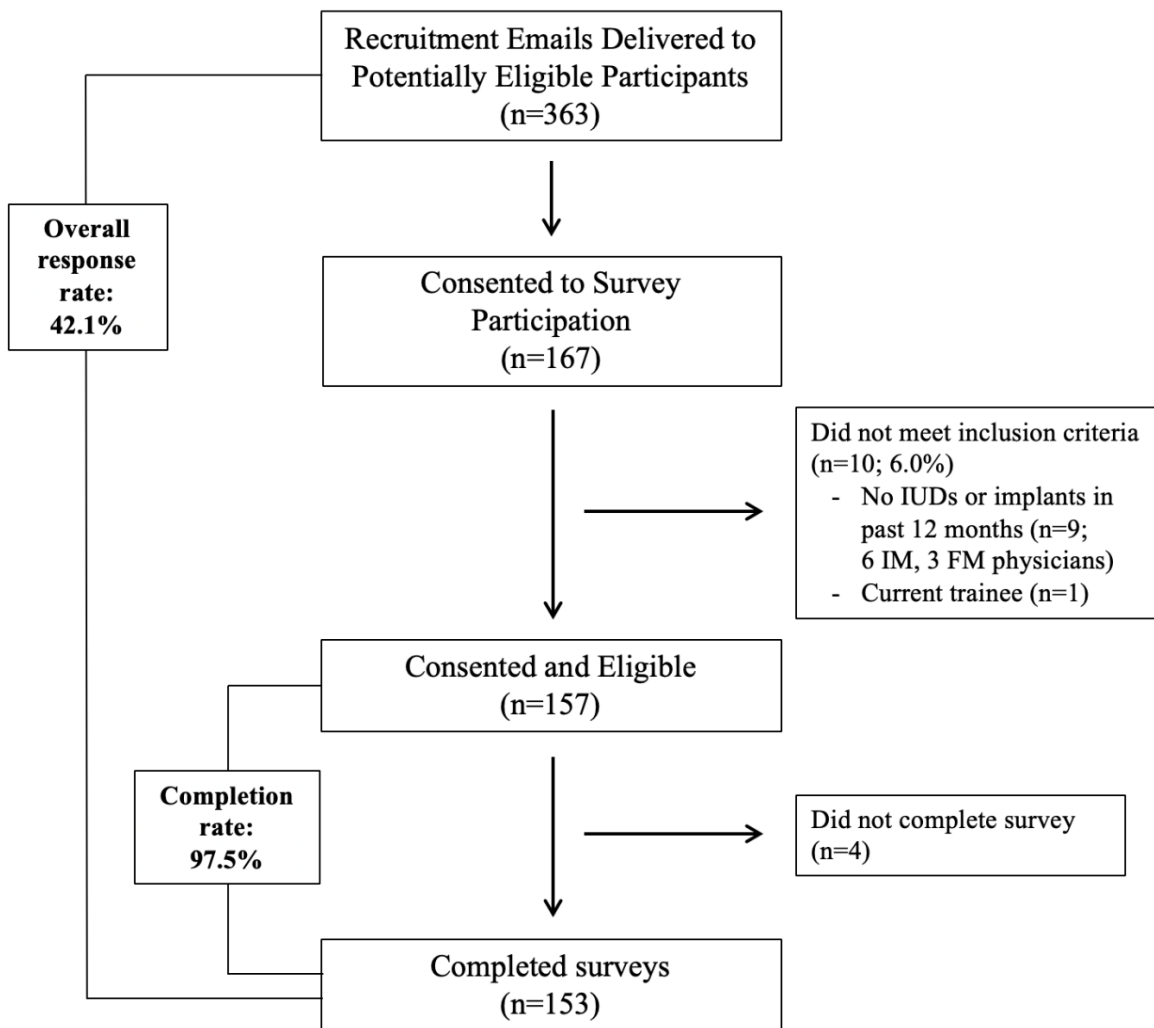
Figure 4 UPMC LARC Provider Survey – Recruitment flow diagram

Table 8 Sample characteristics of UPMC-affiliated LARC providers

Characteristic	n (%) [a]
Provider Type	
Physician (MD or DO)	103 (67)
Advanced Practice Provider	50 (33)
Nurse Practitioner	19 (12)
Certified Nurse Midwife	16 (10)
Physician Assistant	15 (10)
Primary Medical Specialty	
Obstetrics and Gynecology	104 (68)
Family Medicine	40 (26)
Internal Medicine	5 (3)
Pediatrics	4 (3)
Gender	
Female	122 (80)
Male	31 (20)
Years in Practice	
0-4 years	35 (23)
5-9 years	32 (21)
10-14 years	24 (16)
15-19 years	16 (10)
20 years or more	46 (30)
Patients seen per week	
1-10	12 (8)
11-50	50 (33)
51-100	78 (51)
>100	13 (9)
Any time practicing in FQHC, Title X or public health clinic	
Yes	24 (16)
No	129 (84)
Primary practice in academic setting	
Yes	121 (79)
No/Unsure	32 (21)
County of primary practice [b]	
Allegheny County	92 (61)
Any other county	58 (39)

Abbreviations: FQHC, federally qualified health center

[a] N=153. Percentages may not add to 100% due to rounding.

[b] Missing data for county of primary practice (n=3). Allegheny County is the location of the health system's main academic medical center and educational programs.

4.3.2 Frequency of LARC provision and reasons for low or no provision

The majority of providers reported placing an average of 1-5 IUDs and implants per month (Figure 5a). Ten participants (7%) reported providing no IUDs and 23 (15%) provided no implants over the past 12 months. Reasons for no or low provision are shown in Figure 5b, and include few or no patients requesting LARC, insufficient training, and another provider in the practice responsible for LARC provision.

4.3.3 Same-day LARC provision

4.3.3.1 Typical number of visits to obtain LARC

A single visit to obtain LARC was reported as typical by 37% of IUD providers (n=53/143) and 51% of implant providers (n=66/130) (Table 9). For both methods, a typical single visit was associated with OBGYN specialty compared to family medicine (IUD: 44% vs. 12%, respectively, p=0.001; Implant: 57% vs. 26%, p=0.002) and practicing in Allegheny County versus any other county (IUD: 48% vs. 20%, p=0.001; Implant: 65% vs. 27%, p<0.001). For IUDs, a typical single visit was additionally associated with seeing fewer patients per week (p=0.02). In multivariable models, OBGYN specialty and practicing in Allegheny County remained significantly positively associated with reporting a typical single visit for both LARC methods (Table 9).

a) Average monthly frequency of LARC provision

No or low provision

	None	<1/month	1-5/month	6-10/month	>=10/month
IUDs	10	23	79	25	16
Implants	23	37	75	14	4

b) Reasons for no/low provision

"Few or none of my patients have requested [IUDs/implants]" — IUD 36, Implant 62

"I feel I do not have sufficient training to provide [IUDs/implants]" — IUD 21, Implant 23

"There is another provider within my practice that is primarily responsible for [IUD/implant] provision" — IUD 18, Implant 27

"Placing [IUDs/implants] is generally outside the scope of my practice" — IUD 18, Implant 10

"Few or none of my patients are appropriate candidates for [IUDs/implants]" — IUD 15, Implant 3

"It is too logistically challenging to provide [IUDs/implants] within my clinical practice" — IUD 9, Implant 2

Other: Little time spent in office/practicing — IUD 3, Implant 3

Other: Don't recommend implant due to side effects — Implant 7

Other: Negative experience with implant insertion/removal — Implant 3

"I receive inadequate reimbursement for providing [IUDs/implants]"

IUD (n=33), Implant (n=60)

Figure 5 Frequency of LARC provision and reasons for low/no provision

Panel a) shows the average number of IUDs and implants inserted per month over the past year. Participants who placed less than 1 or no IUDs/implants per month selected all that apply from a list of potential reasons for placing few or no IUDs/implants.

Panel b) shows the percentage of respondents selecting each reason for no/low provision, with "other" responses recoded as discrete options if applicable. Discrete response options are shown in quotations. Responses labeled "Other:" are summarized based on open-ended responses. Responses are not mutually exclusive.

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Table 9 Associations of provider characteristics with same-day LARC: Typical single visit

Characteristic	%	p-value [a]	aOR (95% CI) [b]	%	p-value [a]	aOR (95% CI) [b]
	Single Visit is Typical for LARC Provision					
	IUD (n=143)			**Implant (n=130)**		
Total	**37**	-	-	**51**	-	-
Provider Type		0.25			0.29	
Physician	40		-	54		-
Advanced Practice Provider	31		-	44		-
Primary Medical Specialty [c]		**0.001**			**0.002**	
Obstetrics and Gynecology	44		**7.94 (2.17, 29.06)**	57		**4.77 (1.83, 12.46)**
Family Medicine	12		Ref	26		Ref
Gender		0.66			0.74	
Female	36		-	50		-
Male	41		-	54		-
Years in Practice		0.80			0.61	
0-4 years	39		-	45		-
5-9 years	33		-	59		-
10-14 years	43		-	59		-
15-19 years	25		-	38		-
20 years or more	40		-	51		-
Patients seen per week		**0.02**			0.36	
1-10	64		Ref	73		-
11-50	49		1.13 (0.24, 5.36)	54		-
51-100	27		0.47 (0.10, 2.12)	45		-
>100	31		0.78 (0.11, 5.48)	56		-
Any time practicing in FQHC, Title X or public health clinic		0.38			0.75	
Yes	45		-	48		-
No	36		-	51		-
Primary practice in academic setting		0.30			0.11	
Yes	39		-	54		1.20 (0.44, 3.23)
No/Unsure	29		-	37		Ref
County of primary practice [d]		**0.001**			**<0.001**	
Allegheny	48		**3.06 (1.29, 7.28)**	65		**4.68 (1.96, 11.17)**
All others	20		Ref	27		Ref

Abbreviations: FQHC, federally qualified health center
Bolded cells indicate statistically significant results.
[a] p-values are from Chi-square tests, or Fisher's exact tests if expected number <5.
[b] Logistic regression model with outcome of single visit typical vs. 2 or more visits for IUD or implant provision. n=133 for IUD model and n=119 for implant model due to missing data and exclusions. Models are adjusted for the variables shown based on associations with the outcome in bivariate analysis at the p<0.2 level.
[c] Due to prohibitively small sample sizes, participants reporting a medical specialty of internal medicine (n=5) or pediatrics (n=4) were excluded from analyses examining provider specialty as an independent variable.
[d] Missing data for county (n=3).

4.3.3.2 Ability to add LARC to an annual exam

In the scenario-based question regarding ability to add LARC insertion to an annual exam, 48% of IUD providers (n=68/143) and 51% of implant providers (n=66/130) reported it was either "likely" or "very likely" they could place the LARC method during the appointment (Table 10). High likelihood of add-on ability was associated with OBGYN specialty compared to family medicine (IUD: 56% vs. 18%, p<0.001; Implant: 59% vs. 20%, p<0.001) and practicing in Allegheny County versus any other county (IUD: 55% vs. 35%, p=0.02; Implant: 61% vs. 33%, p=0.002). For implants, high likelihood of add-on ability was additionally associated with the provider's primary practice being located in an academic as compared to a non-academic setting (56% vs. 30%, p=0.01). In multivariable models, only OBGYN specialty remained associated with high likelihood of add-on ability for both IUDs and implants (Table 10).

Table 10 Associations of provider characteristics with same day LARC: Add-on ability

Characteristic	Provider is Likely/Very Likely Able to Add LARC to Annual Exam					
	IUD (n=143)			Implant (n=130)		
	%	p-value [a]	aOR (95% CI) [b]	%	p-value [a]	aOR (95% CI) [b]
Total	**48**	-	-	**51**	-	-
Provider Type		0.34			0.23	
Physician	45		-	47		-
Advanced Practice Provider	53		-	59		-
Primary Medical Specialty [c]		**<0.001**			**<0.001**	
Obstetrics and Gynecology	56		**7.89 (2.66, 23.37)**	59		**7.27 (2.58, 20.47)**
Family Medicine	18		Ref	20		Ref
Gender		0.72			0.93	
Female	48		-	51		-
Male	44		-	50		-
Years in Practice		0.09			0.18	
0-4 years	58		Ref	61		Ref
5-9 years	63		1.37 (0.39, 4.86)	62		0.91 (0.26, 3.24)
10-14 years	43		0.39 (0.11, 1.34)	47		0.41 (0.10, 1.74)
15-19 years	38		0.79 (0.20, 3.18)	31		0.58 (0.14, 2.47)
20 years or more	35		0.32 (0.10, 0.99)	43		0.46 (0.14, 1.53)
Patients seen per week		0.18			0.20	
1-10	64		Ref	73		Ref
11-50	58		1.47 (0.30, 7.21)	59		0.64 (0.11, 3.86)
51-100	41		0.79 (0.17, 3.69)	43		0.51 (0.09, 2.81)
>100	38		1.17 (0.16, 8.44)	44		0.53 (0.06, 4.91)
Any time practicing in FQHC, Title X or public health clinic		0.48			0.87	
Yes	55		-	52		-
No	46		-	50		-
Primary practice in academic setting		0.05			**0.01**	
Yes	52		2.13 (0.79, 5.70)	56		2.41 (0.82, 7.13)
No/Unsure	32		Ref	30		Ref
County of primary practice [d]		**0.02**			**0.002**	
Allegheny	55		1.77 (0.75, 4.17)	61		2.19 (0.88, 5.43)
All others	35		Ref	33		Ref

Abbreviations: FQHC, federally qualified health center
Bolded cells indicate statistically significant results.
[a] p-values are from Chi-square tests, or Fisher's exact tests if expected number <5.
[b] Logistic regression model with outcome of likely/very likely able to add [IUD or implant] to annual exam vs. very unlikely, unlikely, or equally likely and unlikely. n=133 for IUD model and n=119 for implant model due to missing data and exclusions. Models are adjusted for the variables shown based on significant associations with the outcome in bivariate analysis at the p<0.2 level.
[c] Due to prohibitively small sample sizes, participants reporting a medical specialty of internal medicine (n=5) or pediatrics (n=4) were excluded from analyses examining provider specialty as an independent variable.
[d] Missing data for county (n=3).

Reasons for potential inability to add a LARC insertion to an annual exam visit are shown in Figure 6, and include scheduling/clinic flow issues, needing time to ensure LARC is covered by the patient's insurance, insufficient time for education, counseling or consent, and needing to order the LARC device. Only 13% of IUD providers and 12% of implant providers cited no potential barriers to LARC add-on. The number of potential barriers cited was inversely associated with add-on ability (p-for-trend <0.001 for both IUDs and implants), i.e. the greater the number of barriers reported, the lower the reported likelihood of add-on ability.
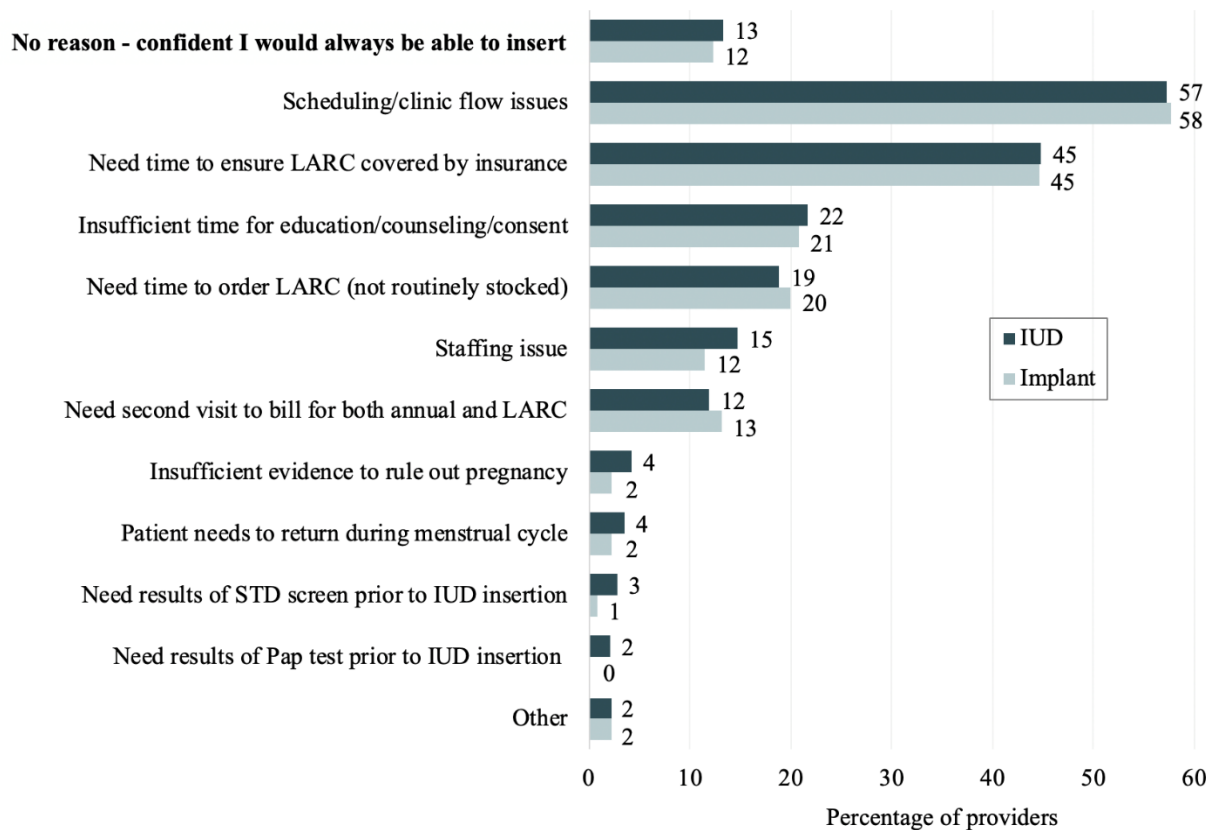
Figure 6 Reasons for potential inability to add LARC insertion to an annual exam

Participants were asked to select all reasons they might be unable to add an IUD or implant insertion to the annual exam scenario, considering their primary clinical practice location. Data are percentage of respondents selecting each reason among providers of IUDs (n=143) and implants (n=130). Responses were not mutually exclusive with the exception of "No reason – I am confident I would always be able to insert."

4.3.3.3 Routine stocking of LARC devices

When asked directly about stocking of LARC devices, 83% of participants who provide IUDs (n=118/143) and 78% of participants who provide implants (n=102/130) reported routine stocking of the respective device at their primary practice location. Among the 118 participants who reported routine stocking of IUDs, specific device availability was as follows: Mirena 100%; ParaGard 93%; Skyla 73%; Kyleena 63%; Liletta 18%.

4.3.4 Adherence to other LARC best practices

4.3.4.1 LARC for nulliparous women and women under 18 years of age

All participants reported providing IUDs to nulliparous women, except four who reported providing contraception only in the postpartum setting (1 OBGYN physician and 3 OBGYN APPs). Nearly all participants reported providing LARC to women under 18 years of age (96% of IUD providers; 98% of implant providers); those that did not provide to minors reported seeing few or no non-adult patients (data not shown). Among participants who provide LARC to patients under 18 years of age, 12% (n=17/137) reported requiring parental consent for IUDs, and 15% (n=19/128) for implants. For IUDs, parental consent requirements were less prevalent among providers practicing in academic settings (8% vs. 26% non-academic setting providers, p=0.01). No providers who spend any time practicing in an FQHC, Title X or public health clinic reported requiring parental consent for LARC (IUDs: 0% vs. 15% all other providers, p=0.07; Implants: 0% vs. 18% all other providers, p=0.04).

4.3.4.2 Timing of IUD insertion with STD testing

When asked about the timing of IUD insertion with routine STD screening for a 23 year-old patient with three new sexual partners in the past year, 79% of IUD providers (n=113/143) reported they would perform STD screening concurrent with IUD insertion, i.e. without delaying insertion; 17% (n=25/143) would collect the STD screen and schedule a separate visit for IUD insertion once results have returned, and 2% (n=3/143) said they would counsel the patient that she is not an appropriate candidate for IUD use based on her sexual partner history.

4.3.4.3 Timing of IUD insertion within the menstrual cycle

Among IUD providers, 90% (n=128/143) reported placing IUDs at any time during the menstrual cycle if they are confident the patient is not pregnant; 7 (5%) place IUDs during the first half of the cycle only, and 8 (6%) place IUDs during menstruation only. Among the 8 providers who insert IUDs during menstruation only, all reported they find it easier to insert IUDs during menstruation, and 6 reported they require active menstruation to ensure the patient is not pregnant.

4.3.4.4 Use of misoprostol for IUD insertion

Among IUD providers, 35% (n=50/143) reported having used misoprostol to assist with an IUD insertion in the prior 12 months. Any use of misoprostol was more prevalent among APPs (47% vs. 29% of physicians, p=0.03), among individuals working in OBGYN specialties (47% vs. 6% of family medicine providers, p<0.001), and among providers working in non-academic compared to academic settings (52% vs. 30%, respectively, p=0.028). Use of misoprostol was less prevalent among providers who spend any time practicing in an FQHC, Title X or public health clinic (9% vs. 40% among providers with no time in these settings, p=0.006).

Routine use of misoprostol (half of the time or more) was most commonly reported for patients with a prior failed IUD insertion (62% of misoprostol users, n=31/50), while 42% of misoprostol users (n=21/50) reported routine use for first attempt insertions in nulliparous women, and 6% (n=3/50) reported routine use for first attempt insertions in parous women.

4.3.4.5 Routine follow-up after IUD insertion

Among IUD providers, 73% (n=104/143) routinely schedule follow-up appointments after IUD insertion. OBGYN providers were less likely to schedule routine follow-up compared to family medicine providers (67% vs. 88%, p=0.02), as were providers practicing in Allegheny County (67% vs. 84% other counties, p=0.03) or academic settings (68% vs. 90% in non-academic settings, p=0.01).

4.4 Discussion

In our sample of LARC providers within a single, large, academic healthcare system, fewer than half reported typical same-day LARC provision or high ability to add LARC to an annual exam, while adherence to other best practices was higher. Barriers to same-day provision were largely structural or logistical in nature, suggesting substantial room for improving LARC access via practice- or system-level interventions.

This study adds to the literature by examining specific LARC practices and adherence to best practice guidelines among physician and advanced practice LARC providers. While two-visit insertion protocols are an established barrier to LARC access,[155-157] same-day LARC provision remains uncommon, despite best practice guidelines. A recent national survey of OBGYN

physicians found that only 29% offer same-day IUD placement.[146] In our study sample, 44% of providers working in OBGYN specialties reported that a single visit is typical for IUDs, and 57% for implants, suggesting that providers in our health system may be more adherent to this best practice than are providers nationwide. Family medicine providers were significantly less likely to offer same-day LARC compared to OBGYN specialists, suggesting that OBGYN physicians and women's health APPs may be more aware of current guidelines for LARC provision than are other providers, as noted in prior studies,[62,150] or that OBGYN practices are more adept at offering this service. Same-day provision was also associated with practicing in Allegheny County, the location of our system's flagship academic medical center and educational programs. This may reflect increased awareness of guidelines, or proximity to efforts by departmental leadership and our hospital-owned health plan to increase LARC access, as compared to providers practicing in satellite locations. Regardless of differences across provider and practice characteristics, our results indicate that same-day LARC access is not the norm for the majority of patients in our health system.

Approximately half of providers reported a high likelihood of being able to add a LARC insertion to an annual exam. However, only 12-13% were confident they would always be able to complete the insertion, and an increasing number of potential barriers was strongly associated with reduced likelihood of add-on ability. Practice- and system-level interventions emerge as potential solutions to many of the provider-identified barriers to same-day LARC provision identified in our study, which were largely logistical. First, same-visit LARC provision is only possible if devices are stocked and available on site, which was not the case at the primary practice location of 20% of providers in our survey. Practices should be encouraged to purchase devices directly and bill for LARC as a medical benefit (i.e. a buy and bill approach), rather than covering LARC methods as a pharmacy benefit, in which individual insurance plans are billed to order devices as they are

requested. The Family Planning National Training Center (FPNTC), an organization supported by the US Department of Health and Human Services Office of Population Affairs, maintains a toolkit for same-visit contraceptive provision based on the experiences of family planning experts and Title X clinics.[158] This toolkit includes a calculator for practices to forecast method demand, information about distributor discount programs and other approaches to obtain devices at reduced cost to help enable stocking. In addition to distributing such resources, direct incentivization of device stocking by the health system, for example by absorbing the cost of unused devices, would go a long way to improve access to these methods.

Many participants were concerned about inadequate appointment durations and potential clinic flow disruption with added LARC provision. Some practices mitigate this barrier by routinely asking female patients of reproductive age if they wish to discuss contraception or are considering LARC when making an appointment, in order to schedule additional time for visits requiring more extensive counseling or potential procedures. The FPNTC toolkit recommends maintaining pre-made kits of materials needed for LARC insertions to reduce time needed for LARC procedures, and suggests performing a time study to evaluate the true impact of same-visit contraceptive provision.[158]

In addition to time for insertion procedures, nearly half of providers reported time needed to ensure insurance coverage as a barrier to LARC add-on. Some practices adept at same-day provision designate an administrative employee to verify insurance coverage during appointments. If this is not possible, signs in the waiting room could encourage interested patients to verify coverage prior to their appointment. Furthermore, because provisions of the Affordable Care Act mandate contraceptive coverage without cost sharing for the majority of insured US women,[71,72] the health system could help reduce the need for universal verification by maintaining a list of insurers with exceptions to this coverage (e.g. employers with religious affiliations). For those

patients who do lack insurance coverage for IUDs, Liletta provides a lower-cost alternative; however, this option was the least available in our system, compared to near universal availability of Mirena and Paragard among practices stocking IUDs. Finally, approximately 10% of providers reported needing a second visit to bill for both the annual exam and the LARC procedure, suggesting that some providers are unaware of the option to add a procedure code to an evaluation and management (E/M) service code. ACOG maintains a coding guide as part of its LARC Program,[159] which could be distributed to providers system-wide to correct this common misconception and preclude the need for an additional visit.

Adherence to best practices related to LARC eligibility criteria was substantially greater than for indicators of same-day provision, suggesting that efforts to improve provider knowledge about LARC eligibility may not be enough to improve access to these methods. Nearly all providers reported placing IUDs at any time during the menstrual cycle if they are confident a patient is not pregnant, with only 6% requiring patients to be menstruating for IUD insertion. Likewise, when reporting barriers to the LARC add-on scenario, less than 5% of providers cited inappropriate concerns about pregnancy risk or responded that the patient needed to return during menses for insertion. With regards to STD screening, nearly 80% of our sample appropriately indicated they would perform routine STD screening concurrent with IUD insertion. Although 17.5% reported they would schedule a separate visit for insertion following result return, it is difficult to interpret this result independently from stocking barriers and other reasons for not providing same-day insertions, such as inappropriate concerns about pregnancy. Encouragingly, nearly all respondents provide IUDs to nulliparous women and adolescents, and none reported eligibility concerns for these populations. However, greater than 10% of providers cited inappropriate parental consent requirements for adolescents requesting LARC. The state of Pennsylvania allows minors over the age of 14 to provide consent for contraceptive services

without parental notification or consent;[154] this practice therefore represents an unnecessary, provider-created barrier to LARC access for adolescent women. Education around this topic, particularly for providers in the community who may be less familiar with legal statutes or see fewer adolescent patients, could help to improve availability of the confidential contraceptive services that adolescent women deserve.

Scheduling of routine follow up visits after IUD insertion was reported by greater than 70% of providers, and nearly 90% of family medicine providers. Follow-up visits are recommended by IUD manufactures and typically include a "string check" examination to ensure proper placement, in addition to assessment of satisfaction and side effects. However, additional health system interactions following contraceptive provision have not been shown to increase method continuation or detection of adverse events,[137,138] and best practice guidelines specifically recommend against routine follow up, instead advocating for follow up as necessary or during "other routine visits."[116] Unnecessary follow up visits create additional burdens of time for patients, often require copayments, are poorly attended,[160] and may contribute to clinic flow issues and long provider wait times. Instead, all patients should be encouraged to follow-up with questions or concerns as necessary, potentially via phone or electronic communication to determine the need for an in-person visit; education of providers and practice managers regarding appropriate follow up may help to reduce this barrier.

While not directly related to method access, we also identified potentially inappropriate use of misoprostol, a prostaglandin E1 analogue used to induce cervical softening and dilation,[161] among IUD providers in our system. CDC guidelines specifically recommend against routine use of misoprostol prior to IUD insertions,[116] citing high quality evidence that misoprostol use does not improve the ease or success of IUD insertions, but may increase patient pain and side effects.[162,163] Misoprostol may be useful among women with a previously failed insertion,[164,165] a

patient type cited by the majority of misoprostol users. However, 42% of misoprostol users (15% of all IUD providers) also reported routine use of misoprostol for first attempt insertions in nulliparous women, suggesting that inappropriate use of misoprostol is fairly common in our health system, as noted in other studies.[166] Routine use of misoprostol for IUD insertions is concerning given the substantial side effects of this medication (including nausea, vomiting, diarrhea, cramping and bleeding), which may worsen patient experiences with IUD insertion without meaningful benefit. Education should be targeted to practices or providers routinely using misoprostol, perhaps in conjunction with additional insertion training to reduce the perceived need for a cervical ripening agent.

Strengths of this study include our ability to compare LARC practices across provider and practice characteristics within a single large healthcare system. Key barriers to best practice implementation identified by this study will help inform interventions to improve access to LARC methods across this system. While our findings are not immediately generalizable to other healthcare systems, our sample does comprise multiple types of providers working in different specialties and practice settings. Results of this study, and particularly the provider-identified barriers to same-day LARC provision, may therefore be applicable to efforts to improve access to LARC in other systems.

Our study has several limitations. First, our study is limited by potential selection bias, as providers who chose to complete the survey may be more interested or active in LARC provision, and therefore more likely to be adherent to best practices. This could have contributed to overestimation of best practice adherence across our healthcare system, and may account for the higher rates of same-day provision observed in our study compared to national estimates.[64,146] Desirability bias may also have influenced participants' reporting of their practice patterns to align with knowledge of established guidelines, as opposed to how they actually practice. We attempted

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to minimize this possibility by using scenario-based questions, maintaining participant confidentiality and identifying this research as a student project rather than an assessment by the health system. Next, the bulk of respondents were OBGYN physicians and APPs working in OBGYN specialties, with more limited representation from primary care providers, who may have different experiences providing LARC and face unique barriers. However, our sample is likely reflective of the population providing LARC within our system. Although provider practices are likely influenced by practice-wide policies and logistics, we are unable to account for clustering of providers by practice location. Finally, our study does not examine provider practices related to LARC removal, an overlooked component of access for these methods which is vital to protect patients' bodily and reproductive autonomy.

In conclusion, adherence to established best practice guidelines for LARC provision is mixed among providers in a single large healthcare system, with substantial room for improvement in same-day LARC provision. Barriers to best practice implementation identified in this study may be useful to inform practice- and system-level interventions to improve access to LARC.

5.0 Conclusions

The ability to prevent and time pregnancies through the use of contraception is vital to the health, well-being and autonomy of US women. The research presented in this dissertation aimed to advance understanding of factors at the patient, provider and system levels that influence contraceptive access and use, particularly among the understudied and growing population of women Veterans who use VA for health care. Our findings contribute to efforts within the field of family planning to develop new measures of contraceptive access rooted in patient preferences, and to ongoing endeavors to improve access to contraceptive methods in the VA and UPMC healthcare systems.

In the first paper, we examined contraceptive preference matching among a population of women Veterans at risk of unintended pregnancy who have uniform coverage of contraceptive methods through VA care. This work represents an important step in the development of more patient-centered measures of contraceptive access based on the meeting of patient preferences.[22,26] Similar to prior efforts to examine contraceptive preference matching, our quantitative measure of "ideal" contraceptive methods was limited by variable interpretation of an ambiguous question stem.[103,104] Nevertheless, our findings of high rates of ideal-current method mismatch and particularly of reduced match among non-white women and women with mental illness are important, and highlight the potential of a more rigorous measure of preference-use agreement to serve as a meaningful indicator of disparities in contraceptive access. Future work could focus on development and testing of a measure that more clearly defines a preferred or "ideal" method as the single method that women most want to be using at the present time within the context of their lives, which could then be compared with current use. Better understanding of the reasons that

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women do not use the methods they feel are best for them at a given time is necessary to inform public health initiatives and clinical counseling. However, our qualitative results also emphasize the complexity of contraceptive decision-making, such as conflict between preferred method features and desire to prevent pregnancy, and of measuring the relative strengths of different preferences. Measuring women's perceived *ability* to use the contraceptive methods that they most want to be using, rather than assessing actual use of a stated preferred method, may be another way to gauge access via a slightly different construct.

This study also identified several modifiable barriers to women Veterans' use of their stated ideal methods, including patient misconceptions about VA contraceptive coverage and provider-level barriers resulting from knowledge gaps and potential biases. These findings emphasize the ongoing need to promote contraceptive education for VA providers, as well as use of patient-centered counseling strategies which elicit and center patient preferences.[21,167] Efforts are ongoing in VA to improve awareness of women's health services, and innovations such as the MyPath decision support tool are being evaluated as a method to improve Veterans' contraceptive knowledge and ensure receipt of quality contraceptive counseling in VA primary care.[168]

In the second paper, we used decision modeling to translate existing administrative and research data and produce real-world estimates of the expected impacts to VA of a 12-month contraceptive dispensing policy. We found that offering 12-month OCP supplies would better enable women Veterans using OCPs to prevent unintended pregnancies, while also being economically sustainable for the healthcare system. The population of women Veterans using VA for health care carries a high burden of medical and mental health comorbidities, which may increase the vulnerability of this population to pregnancy-related morbidity and other negative consequences related to unintended pregnancy.[77,81] This medical vulnerability, coupled with zero coverage for abortion through VA[135] and increasing abortion restrictions across the country,[169]

underscores the importance of enacting strategies in VA that can help women Veterans prevent pregnancy when that is their goal. The results of our analysis suggest that extended dispensing is a win-win solution for helping women Veterans achieve their reproductive goals while reducing VA health system costs, and are in line with emerging empirical data suggesting economic benefits related to such policies.[170] Our hope is that these results will be considered to inform policy change for contraceptive dispensing in VA.

Were an extended dispensing policy to be adopted in VA, we could use administrative data to empirically evaluate the assumptions used to construct our model. For instance, we could assess whether sociodemographic characteristics are truly similar between cohorts of women who choose to receive 12-months upfront versus shorter supplies, and evaluate differences in refill patterns and gaps according to initial dispensing quantities. We could also examine pregnancy occurrence and associated costs according to initial dispensing quantities; however, it would be difficult to assess the context of pregnancies using administrative data, i.e. whether they were intended, or resulted from gaps in contraceptive coverage or contraceptive failure. Furthermore, not all pregnancies experienced by women Veterans are expected to be represented in VA data, for example because many Veterans have additional insurance coverage and seek pregnancy care in other settings. As abortion care is never covered by VA, pregnancies ending in abortion (the outcome of 42% of unintended pregnancies among US women) are also unlikely to appear in VA records. Thus, in addition to examining administrative data, prospective survey research with longitudinal follow-up would be necessary to fully evaluate the impact of extended contraceptive dispensing on Veterans' ability to prevent unintended pregnancies. The anticipated difficulty of empirical assessment is one reason that modeling is a useful approach for estimating the impacts of this proposed policy. Sensitivity analyses suggest that our model's predictions of favorable reproductive and financial outcomes are robust to wide variations in parameter values, which

bolsters our conclusion that extended dispensing is an economically sustainable strategy to improve women Veterans' access to hormonal contraception.

Finally, in the third paper, we examined provider-level adherence to best practice recommendations for provision of IUDs and implants across the UPMC healthcare system. We found that same-day availability of LARC methods is suboptimal within this system, and that adherence to best practice guidelines varies across provider specialties and practice characteristics, with OBGYN providers and those practicing in geographic proximity to the main academic medical center being more likely to provide same-day access. Providers in our study were generally adherent to best practices related to LARC eligibility criteria, such as provision to nulliparous women and women under 18, but reported a number of logistical barriers related to same-day LARC provision. These barriers aligned with larger problems in healthcare such as physician workloads and short appointment times, but also included challenges specific to LARC provision, such as device stocking and billing concerns. The results of this study can be used inform efforts to improve LARC access within UPMC. Our findings have already been shared with OBGYN departmental leadership and incorporated into provider education initiatives for providers in non-academic settings. As a next stage, educational initiatives for practice managers may be helpful with regards to implementing practice-level solutions regarding stocking, staffing, billing, and scheduling of insertion and return visits. Sharing results with the UPMC hospital-owned health plan may inspire additional system-level interventions.

There are several future directions for research on LARC best practice implementation. First, our survey could be re-administered to UPMC providers in the future, after resource sharing and ongoing educational initiatives have reached the majority of providers. This would enable us to compare adherence to best practices and availability of same-day provision over time with these strategies. Administration of a similar survey to a national sample of LARC providers would be

useful to understand specific LARC practices and best practice adherence more broadly, and to establish national norms against which individual providers and institutions could evaluate their practices. Within UPMC, a standardized set of best practice recommendations could be developed, and implementation research approaches used to assess whether interventions such as single-visit billing, buy and bill stocking strategies, or maintaining of insertion kits are being incorporated by providers and practices, as well as the impact of these strategies on LARC provision.

5.1 Clinical implications

Helping women obtain and use contraceptive methods in alignment with their goals and preferences is a vital component of preventive health care for women. The research presented in this dissertation was performed with the aim of better understanding women's access to contraceptive methods, and furthering that access via evaluation of provider- and system-level practices and policies. Our assessment of "ideal" versus current contraceptive use contributes to a growing body of literature highlighting the importance of patient preferences and features other than efficacy in the selection and use of contraceptive methods. These results can be used in support of the development and dissemination of contraceptive counseling strategies which elicit and center patient preferences for contraceptive features in addition to reproductive goals.[21,167] The two other projects in this dissertation contribute valuable evidence to inform practical efforts to expand access to specific prescription contraceptive methods within the VA and UPMC healthcare systems. Together, the results of this research have the potential to directly impact women's ability to obtain and use contraception, and to improve their experiences in interacting with providers and the healthcare system while doing so.

Appendix A Women Veterans' Ideal Method Type According to Sample Characteristics

Table 11 Women Veterans' ideal method type according to sample characteristics

| Characteristic | Stated Ideal Method Type (%) | | | | | p-value [d] |
	Tubal ligation	Partner vasectomy	LARC [a]	Hormonal [b]	Non-Rx/ None [c]	
Total	**14**	**19**	**27**	**25**	**15**	**-**
Patient-level						
Age						<0.001
20-29	4	12	37	27	21	
30-34	12	20	27	30	10	
35-39	21	17	24	20	19	
40-45	18	30	17	23	12	
Race						0.01
Non-Hispanic white	13	19	28	28	12	
Non-white	14	20	25	23	20	
Marital Status						<0.001
Single, never married	6	10	30	28	27	
Married or Cohabitating	16	24	25	24	12	
Formerly Married	13	13	29	27	18	
Education						<0.001
Less than a bachelor's degree	13	14	27	28	18	
Bachelor's degree or higher	14	24	26	23	12	
Annual household income						<0.001
< $20,000	11	9	32	27	21	
$20,000-$59,999	15	16	27	28	15	
>= $60,000	13	32	24	21	11	
Parity						<0.001
Nulliparous	6	12	28	36	19	
Parous (≥1 live birth)	17	22	26	21	14	
Body Mass Index						0.03
Underweight/Normal (<25)	10	18	24	31	17	
Overweight (25 to <30)	14	21	28	25	13	
Obese (≥ 30)	17	19	28	20	15	
Medical Illness						0.10
Yes	16	20	26	23	15	
No	11	19	27	28	16	
Mental Illness						0.02
Yes	15	21	28	23	14	
No	11	17	25	30	17	
History of Military Sexual Trauma						0.90
Yes	13	20	27	26	14	
No	14	19	26	25	16	
Ever Deployed						0.03
Yes	11	17	29	26	17	
No	16	22	24	24	14	
Has additional (non-VA) Insurance						0.01
Yes	14	24	28	24	13	
No	13	16	25	27	18	

Table 11 (continued)

Characteristic	Stated Ideal Method Type (%)					p-value [d]
	Tubal ligation	Partner vasectomy	LARC [a]	Hormonal [b]	Non-Rx/ None [c]	
Provider-level						
VA PCP is female						0.25
Yes	14	20	26	26	14	
No	13	18	27	23	20	
Sees VA PCP for almost all care						0.23
Yes	13	18	26	27	16	
No	15	24	25	21	14	
Sees VA PCP for gynecologic care						0.75
Yes	15	20	26	26	15	
No	13	19	28	24	17	
System-level						
Primary Care at VA WHC						0.68
No WHC or don't know	14	19	26	27	14	
Yes WHC, not seen there	16	18	29	21	17	
Yes WHC and seen there	12	20	26	27	15	
On-site gynecologist						0.94
Yes	14	19	27	25	15	
No/Don't know	13	20	26	26	16	
Census Region						0.29
Northeast	11	12	28	37	12	
Midwest	14	24	22	26	14	
South	14	19	26	25	15	
West	13	19	30	21	18	

Abbreviations: VA, Veterans Affairs; PCP, primary care provider; WHC, women's health clinic.

Data are row percentages. Percentages may not add to 100% due to rounding.

[a] Long-acting reversible contraceptive methods, including intrauterine devices and contraceptive implants.

[b] Pill, patch, ring, Depo-Provera injections.

[c] Non-prescription methods include female or male condoms, withdrawal, natural family planning/fertility awareness-based methods, spermicides, sponge, and emergency contraception.

[d] p-values are from chi-square tests, or Fisher exact tests if expected values were less than n=5.

Appendix B UPMC LARC Provider Survey – Recruitment Methods

B.1 Recruitment pool creation

The Health Record Research Request (R3) service of the University of Pittsburgh's Department of Biomedical Informatics was used to create a recruitment pool of potentially eligible health care providers for the UPMC LARC Provider Survey. R3 provides researchers with access to data from the Neptune Research Data Warehouse, which compiles and standardizes electronic medical record data from various sources across the UPMC health system on a monthly basis.[171] R3 performed a search to identify all health care providers associated with at least one LARC-related diagnosis, procedure and device code between October 1, 2017 and September 30, 2018 (Table 12).

Provider name, credentials (MD, DO, CRNP, CNM or PA), medical specialty, and National Provider Identifier (NPI) were provided; no patient data was collected. The initial search by R3 resulted in 629 potentially eligible participants (Figure 7). Our recruitment pool was reduced to 405 providers following exclusion of current trainees (n=94); two OBGYN physicians who were closely involved in survey development; a neurology CRNP with a single code for IUD removal and insertion, which was presumed to be a coding error; and individuals associated only with CPT codes 11981 and/or 11983 (insertion and/or removal of a non-biodegradable drug delivery implant) and working in specialties unlikely to provide contraception (e.g. anesthesiology, non-OBGYN surgical specialties, podiatry) (n=127). Use of these non-specific CPT codes by these providers was assumed to indicate alternative applications. Email addresses were then manually sourced using the UPMC email directory. Emails were not found or were undeliverable for 42

individuals, of whom 33 (79%) were confirmed via NPI and/or internet searches to have left the

UPMC healthcare system; for the 9 providers not confirmed to have left the system, lack of a

functioning health system email address was assumed to indicate lack of current affiliation with

UPMC. These exclusions resulted in a final recruitment pool of 363 providers.

Table 12 UPMC LARC Provider Survey – diagnosis, procedure and device codes used to identify potentially

eligible providers

Code	Definition
Diagnosis Codes – *International Classification of Diseases,* **10th revision, Clinical Modification**	
Z30.014	Encounter for initial prescription of intrauterine contraceptive device
Z30.017 [a]	Encounter for initial prescription of implantable subdermal contraceptive
Z30.430	Encounter for insertion of intrauterine contraceptive device
Z30.433	Encounter for removal and reinsertion of intrauterine contraceptive device
Procedure Codes – Current Procedural Technology (CPT®)	
58300	Intrauterine contraceptive device insertion
11981 [b]	Insertion, non-biodegradable drug delivery implant
11983 [b]	Removal with reinsertion, non-biodegradable drug delivery implant
Device Codes – Healthcare Common Procedure Coding System (HCPCS)	
J7296	Levonorgestrel-releasing intrauterine contraceptive system (Kyleena), 19.5 mg
J7297	Levonorgestrel-releasing intrauterine contraceptive system, 52 mg, 5-year duration
J7298	Levonorgestrel-releasing intrauterine contraceptive system, 52 mg, 5-year duration
J7300	Intrauterine copper contraceptive
J7301	Levonorgestrel-releasing intrauterine contraceptive system, 13.5 mg
J7307	Etonogestrel (contraceptive) implant system, including implant and supplies

[a] Z30.017 was not found in electronic medical records within the time frame queried.
[b] These codes are not specific to contraceptive implants. Providers who were only associated with one or both of these codes and with medical specialties unlikely to prescribe contraception were excluded from the recruitment pool (n=127).
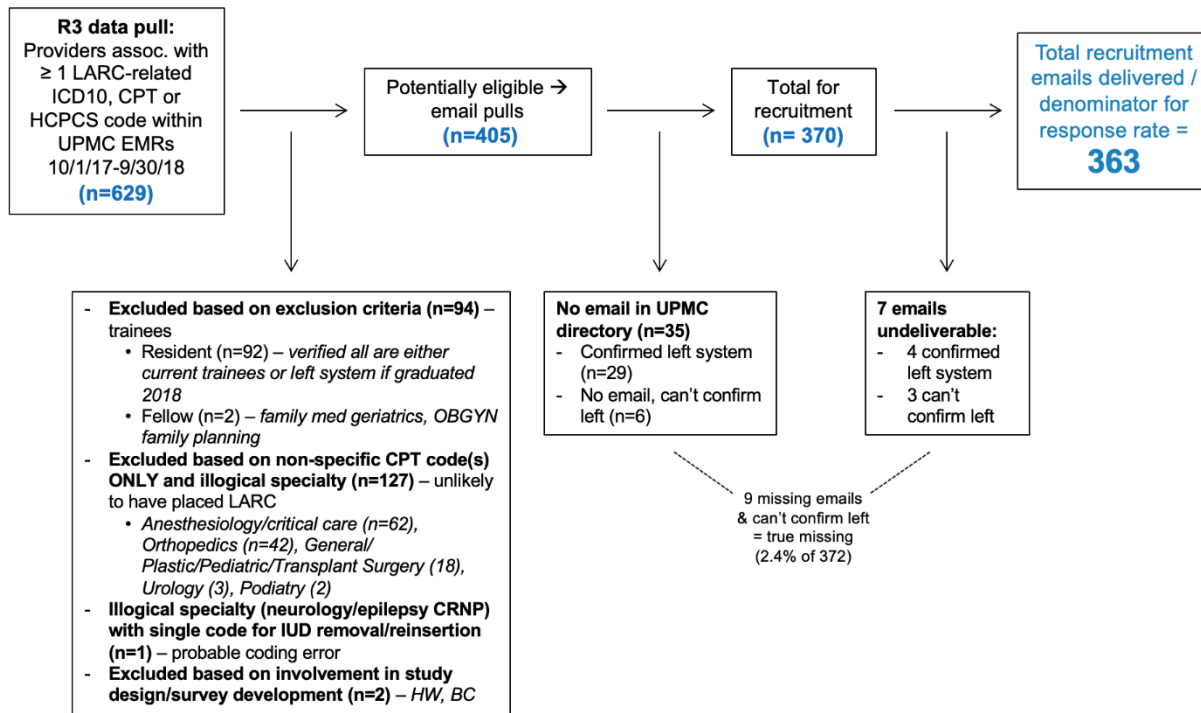
Figure 7 UPMC LARC Provider Survey – Recruitment pool creation

B.2 Recruitment

Providers on our recruitment list were sent a recruitment letter via their UPMC email address inviting them to participate in the "UPMC LARC Provider Survey" (Figure 8). Emails contained a personalized URL link to the survey, to allow for response tracking and targeting of reminder emails to non-responders. The survey was hosted on pitt.co1.qualtrics.com, using Qualtrics software (Qualtrics©, Provo, UT) licensed to the University of Pittsburgh. Participants were recruited from December 11, 2018 through January 19, 2019, with reminder emails sent to individuals who had not yet completed the survey on December 18, January 2, and January 14. A message from an OBGYN division chief encouraging colleagues to participate was also sent on January 14.

Participants were offered a $10 Starbucks gift card upon survey completion as a token of appreciation. Participants could elect to receive the gift card electronically at an email address of their choosing or via US Mail to a provided address; they could also decline to receive a gift card. Among 153 participants who completed the survey and were therefore eligible for compensation, 100 (65%) selected an electronic gift card, 36 (24%) selected a physical gift card, and 17 (11%) declined compensation.

Subject: UPMC LARC Provider Survey
Date: Thursday, October 25, 2018 at 2:13:37 PM Eastern Daylight Time
From: Colleen Judge-Golden
To: Judge-Golden, Colleen

Dear Dr. Judge-Golden,

You are invited to participate in the **UPMC LARC Provider Survey!** This research study aims to understand healthcare providers' practices and experiences with regards to intrauterine devices (IUDs) and contraceptive implants, and to identify barriers that providers might face to providing these methods. For this reason, we are surveying *all UPMC-affiliated healthcare providers who have placed an IUD or an implant in the past year*.

This study is being conducted by **Colleen Judge-Golden and Dr. Sonya Borrero**. Colleen is an MD/PhD student at the University of Pittsburgh, and is conducting this study as part of her PhD dissertation research. Dr. Borrero is an internal medicine physician who studies patient-, provider- and system-level factors impacting women's access to and use of contraception. Please feel free to contact us with any questions or concerns.

Participation in this study involves completion of a **brief online survey**, accessible here or via the link below. We will ask about your experiences providing IUDs and implants, and will ask you to consider how you would respond to a variety of patient scenarios in your current clinical practice. We will also collect personal and practice information such as your age, medical specialty and practice characteristics to better understand how these factors are associated with practices related to IUDs and implants.

> **Follow this link to the Survey:**
> Take the Survey

The survey will take **10-15 minutes** to complete. Your progress will be saved if you need to complete the survey in more than one sitting (simply re-click on the link in this email at a later time). All of the information you provide is *strictly confidential*, and will be kept separate from information that could be used to identify you, such as your name and email address.

As a token of our appreciation, you will receive a **$10 Starbucks gift card** upon completion of the survey, which can be sent to your email or a physical location.

Thank you for your interest in our study!

Colleen Judge-Golden, BA
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Medical Scientist Training Program
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Sonya Borrero, MD, MS
Associate Professor of Medicine, Clinical and Translational Science, and Obstetrics, Gynecology, and Reproductive Sciences;
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University of Pittsburgh School of Medicine
borrerosp@upmc.edu

Figure 8 UPMC LARC Provider Survey – Sample recruitment email

Appendix C UPMC LARC Provider Survey – Survey Instrument

Screening questions: (**bold** = answer necessary for survey participation)

1. Are you a health care provider currently affiliated with The University of Pittsburgh Medical Center (UPMC)?
    a. **Yes** / No
2. *Are you currently completing a clinical training program* (e.g. professional school, residency, or fellowship)?
    a. Yes / **No**
3. Have you, or a trainee under your direct supervision, inserted at least 1 intrauterine device (IUD) <u>or</u> 1 contraceptive implant in the past 12 months?
    a. **Yes** / No

    → If eligible, continue to survey. If not eligible, thank for time and exit survey.

Intrauterine Devices

1. **Over the past 12 months**, how many intrauterine devices (IUDs) have you placed per month, on average? Please include IUDs inserted by trainees under your *direct supervision*.

    a. No IUDs in past 12 months
    b. <1 IUD per month
    c. 1-5 IUDs per month
    d. 6-10 IUDs per month
    e. ≥10 IUDs per month

    If none (a) or <1/month (b),

    1a) What are the reasons you have placed few or no IUDs in the past year? (*select all that apply*)

    a. I feel I do not have sufficient training to provide IUDs
    b. Placing IUDs is generally outside the scope of my practice
    c. Few or none of my patients have requested IUDs
    d. Few or none of my patients are appropriate candidates for IUDs
    e. I receive inadequate reimbursement for providing IUDs
    f. It is too expensive to provide IUDs within my clinical practice
    g. It is too logistically challenging to provide IUDs within my clinical practice
    h. There is another provider within my practice that is primarily responsible for IUD provision
    i. Other (specify): _____

1b) If a patient expresses interest in an IUD, is there a specific colleague you refer them to?

    a. Yes, to a colleague inside of my primary clinical practice
    b. Yes, to a colleague outside of my primary clinical practice
    c. No, I do not typically refer patients for IUDs
    d. N/A – I have not had a patient express interest in an IUD

None (a) → skip to Implants
<1/month (b) → continue to Q2

2. **Consider the following scenario in the context of your *primary clinical practice location*:**
Abbi is a 23-year-old woman who calls your office asking to <u>set up an appointment for IUD insertion</u>. She is a new patient. How would your office respond to Abbi's request? **My office would:**

    a. schedule Abbi for an **initial appointment** for contraceptive counseling, to be followed by a return visit specifically for IUD placement if medically appropriate and desired
    b. schedule Abbi for a **single appointment** for counseling and potential IUD insertion, if medically appropriate and desired
    c. Other (specify): _____

3. **Consider the following scenario in the context of your *primary clinical practice location*:**
Layla is a 26-year-old, established patient of yours. During her **scheduled annual exam**, she tells you she has "done a lot of research" and wants an IUD for contraception. She has not been sexually active for three weeks and her menstrual period ended 2 days ago. <u>Layla is asking if you can insert the IUD today.</u> *Based on your current clinical practice,* how likely is it that you can insert the IUD during today's visit?

    a. Very unlikely that I can insert the IUD today
    b. Unlikely that I can insert the IUD today
    c. Equally likely and unlikely
    d. Likely that I can insert the IUD today
    e. Very likely that I can insert the IUD today

3a) ***Considering your primary clinical practice location,*** which of the following are reasons why you might be <u>unable</u> to place an IUD for Layla during this visit? (*select all that apply*)

    a. None of the reasons below – I am confident I would always be able to insert the IUD in the above scenario

    b. Scheduling/clinic flow – I may not have time to add the procedure to today's appointment
    c. Insufficient time for patient education, method counseling and/or consent
    d. Staffing issue (e.g. unavailability of an assistant)
    e. My office does not routinely stock IUDs; need time to order
    f. My office needs time to ensure that the IUD will be covered by the patient's insurance (pre-authorization)
    g. My office needs to schedule a second visit to be able to bill for both the annual exam and the IUD placement procedure
    h. The patient needs to return during her menstrual cycle for IUD insertion
    i. I need to have results of an STD screen prior to IUD insertion
    j. I need to have results of a Pap test prior to IUD insertion
    k. I do not have enough evidence to rule out pregnancy at this time
    l. Other (specify): _____

4. **Consider the following scenario in the context of your *primary clinical practice location*:**
Deena is a 23-year-old woman presenting for an **annual exam and IUD insertion**. She is currently using Depo-Provera for birth control, and her last dose was 2 months ago. She reports 3 new sexual partners in the past year. Per CDC guidelines, you recommend routine STD screening. *Based on your current practice*, which of the following would you do with regards to STD screening and IUD insertion?

    a. Collect STD screen and insert the IUD today (i.e. in the same visit)
    b. Collect STD screen and schedule the insertion for after the test results have returned
    c. Counsel Deena that she is not an appropriate candidate for an IUD based on her sexual partner history
    d. Other (specify): _____

5. In your estimation, how many office visits does your <u>typical</u> patient have for IUD placement (i.e. from deciding she wants an IUD to having the device placed)? *Please consider your primary clinical practice location.*

    a. 1 visit
    b. 2 visits
    c. 3 or more visits

6. Does your primary clinical practice location routinely stock IUDs?

    a. Yes
    b. No
    c. Unsure

6a) Which of the following IUDs does your primary clinical practice routinely stock? (*select all that apply*)

    a. ParaGard (copper IUD)
    b. Mirena (52 mg levonorgestrel)
    c. Liletta (52 mg levonorgestrel)
    d. Kyleena (19.5 mg levonorgestrel)
    e. Skyla (13.5 mg levonorgestrel)
    f. Other (specify): _____

7. When during a woman's menstrual cycle do you place an IUD?

    a. During menstruation only
    b. During the first half of the menstrual cycle (i.e. before ovulation to assure she is not pregnant)
    c. At any time during the menstrual cycle provided I am confident that she is not pregnant.

7a) Which of the following explain why you insert IUDs during menstruation only? (*select all that apply*)

    a. I find it easier to insert an IUD while the patient is menstruating
    b. I require my patients to be actively menstruating to ensure that they are not pregnant
    c. Other (specify): _____

8. Do you provide IUDs to nulliparous women (i.e. women who have never given birth)?
    a. Yes
    b. No

8a) What reasons explain why you do not provide IUDs to nulliparous women? (*select all that apply*)

    a. I feel that IUDs are medically inappropriate for nulliparous women
    b. I feel that IUDs are socially or morally inappropriate for nulliparous women
    c. I find it more challenging to insert an IUD in nulliparous women
    d. Other (specify): _____

9. Do you provide IUDs to patients under 18 years of age?

    a. Yes
    b. Yes, if the patient has previously given birth
    c. No

9a) Do you require parental consent to place an IUD for women under 18 years of age?
    a. Yes
    b. No

9b) What reasons explain why you do not provide IUDs to women under 18 years of age? (*select all that apply*)

    a. I feel that IUDs are medically inappropriate for adolescents
    b. I feel that IUDs are socially or morally inappropriate for adolescents
    c. I find it more challenging to insert an IUD in adolescent patients
    d. I am concerned about potential medicolegal consequences of providing IUDs to patients under 18
    e. Other (specify): _____
    f. N/A – I do not see any patients under 18 years of age

10. Providers use a variety of methods to help manage patient discomfort during IUD insertion. *In the past 12 months*, how often have you recommended or provided the following to your patients for <u>pain management during IUD insertion</u>?

Method	Never	Occasion-ally	About half of the time	Most of the time	Always
OTC painkiller					
Vaginal lidocaine gel					
Cervical block					
Other (specify): ___					

11. Are you trained to provide a cervical block?
    a. Yes
    b. No

12. *In the past 12 months,* have you ever used <u>misoprostol</u> to assist with an IUD insertion?
   a.   Yes
   b.   No

   If yes,

   12a) *In the past 12 months,* how often have you used misoprostol to assist with IUD insertion for the following types of patients? (*select all that apply*)

	Never	Occasio nally	About half of the time	Most of the time	Always	N/A – I have not inserted an IUD for this type of patient
Nulliparous women (1st insertion attempt)						
Parous women (1st insertion attempt)						
Women who have had a failed IUD insertion						
Other (specify): _____						

   12b) Please share more about your experience using misoprostol for IUD insertion: _____

13. Do you routinely schedule patients for a return/follow-up visit after IUD insertion (string check, ultrasound, etc.)?
   a.   **Yes**, I routinely schedule patients for a return visit after IUD insertion
   b.   **No**, I do not routinely schedule patients for a return visit after IUD insertion

   13a) Please describe the reasons you do or do not recommend a routine return visit following IUD insertion: _____

14. **Consider the following scenario:** Jesse is a 21-year-old patient with a scheduled appointment for **IUD removal**. Upon talking with her you learn that her Mirena IUD was placed 5 months ago. She describes unpredictable light bleeding and says she "just doesn't want it anymore." Briefly, how would you counsel Jesse and proceed?
   [text box]

Contraceptive Implants

15. **Over the past 12 months,** how many contraceptive implants (e.g. Nexplanon) have you placed per month, on average? Please include implants inserted by trainees under your *direct supervision*.
    a. No implants in past 12 months
    b. <1 implant per month
    c. 1-5 implants per month
    d. 6-10 implants per month
    e. ≥10 implants per month

If none (a) or <1/month (b),

15a) What are the reasons you have placed few or no contraceptive implants in the past year? (*select all that apply*)

    a. I feel I do not have sufficient training to provide contraceptive implants
    b. Placing contraceptive implants is generally outside the scope of my practice
    c. Few or none of my patients have requested contraceptive implants
    d. Few or none of my patients are appropriate candidates for contraceptive implants
    e. I receive inadequate reimbursement for providing contraceptive implants
    f. It is too expensive to provide contraceptive implants within my clinical practice
    g. It is too logistically challenging to provide contraceptive implants within my clinical practice
    h. There is another provider within my practice that is primarily responsible for contraceptive implant provision
    i. Other (specify): _____

15b) If a patient expresses interest in a contraceptive implant, is there a specific colleague you refer them to?

    a. Yes, to a colleague inside of my primary clinical practice
    b. Yes, to a colleague outside of my primary clinical practice
    c. No, I do not typically refer patients for implants
    d. N/A – I have not had a patient express interest in a contraceptive implant

None (a) → skip to General/end
<1/month (b) → continue to Q16

16. **Consider the following scenario in the context of your *primary clinical practice location*:**
A 25-year-old woman named Mikayla calls your office asking to set up an <u>appointment for contraceptive implant insertion</u>. She is a new patient. How would your office respond to Mikayla's request?
My office would:

    a. schedule Mikayla for an **initial appointment** for contraceptive counseling, to be followed by a return visit specifically for implant placement if desired and medically appropriate
    b. schedule Mikayla for a **single appointment** for counseling and potential placement of the implant, if medically appropriate and desired at that time
    c. Other (specify): _____

17. **Consider the following scenario in the context of your *primary clinical practice location*:**
Carla is a 26-year-old, established patient of yours. During her **scheduled annual exam**, she tells you she has "done a lot of research" and wants "the arm implant" for contraception. She has not been sexually active for three weeks and her menstrual period ended 2 days ago. <u>Carla is asking if you can insert the implant today</u>. *Based on your current clinical practice,* how likely is it that you can place the implant for Carla during today's visit?

    a. Very unlikely that I can place the implant today
    b. Unlikely that I can place the implant today
    c. Equally likely and unlikely
    d. Likely that I can place the implant today
    e. Very likely that I can place the implant today

17a) *Considering your primary clinical practice location*, which of the following reasons explain why you might be <u>unable</u> to place the implant for Carla during this visit? *(select all that apply)*

    a. None of the reasons below – I am confident I would always be able to insert the implant in the above scenario
    b. Scheduling/clinic flow – I may not have time to add the procedure to today's appointment
    c. Insufficient time for patient education, method counseling and/or consent
    d. Staffing issue (e.g. unavailability of assistant)
    e. My office does not routinely stock contraceptive implants; need time to order
    f. My office needs time to ensure that the implant is covered by the patient's insurance (pre-authorization)
    g. My office needs to schedule a second visit to be able to bill for both the annual exam and the implant placement procedure
    h. The patient needs to return during her menstrual cycle for implant insertion

     i.   I need to have results of an STD screen prior to implant insertion
    j.   I need to have results of a Pap test prior to implant insertion
    k. I do not have enough evidence to rule out pregnancy at this time
    l. Other (specify): _____

18. In your estimation, how many office visits does your <u>typical</u> patient have for implant placement (i.e. from deciding she wants an implant to having the device placed)? *Please consider your primary clinical practice location.*

    a. 1 visit
    b. 2 visits
    c. 3 or more visits

19. Does your primary clinical practice routinely stock contraceptive implants (e.g. Nexplanon)?

    a. Yes
    b. No
    c. Unsure

20. Do you provide contraceptive implants to patients under 18 years of age?

    a. Yes
    b. No

If yes (a),

20a) Do you require parental consent to place a contraceptive implant for women under 18 years of age?

    a. Yes
    b. No

If no (b),

20b) What reasons explain why you do not provide implants to women under 18 years of age? *(select all that apply)*

    a. I feel that contraceptive implants are medically inappropriate for adolescents
    b. I feel that contraceptive implants are socially or morally inappropriate for adolescents
    c. I am concerned about potential medicolegal consequences of providing contraceptive implants to patients under 18

d. Other (specify): _____
    e. N/A – I do not see any patients under 18 years of age

21. Consider the following scenario: Alexis is a 21-year-old patient with a scheduled appointment for contraceptive implant removal. Upon talking with her you learn that her implant was placed 5 months ago. She describes unpredictable light bleeding and says she "just doesn't want it anymore." Briefly, how would you counsel Alexis and proceed?
[text box]

General

22. *Consider the following scenario*: You obtain a PAP smear from Ava, a 21-year-old healthy woman, during a routine annual examination. The PAP smear is normal. When do you recommend she undergoes her next PAP smear?

    a. Next year
    b. 2 years from now
    c. 3 years from now
    d. 5 years from now
    e. Other: _____
    f. N/A – I do not perform PAP smears

23. Do you have access to a specific provider or clinic with expertise in IUDs and/or implants for referral or consultation, for example in the case of a difficult insertion or removal?

    a. Yes
    b. No
    c. Unsure

Open-ended questions

1. What barriers, if any, exist to IUD and/or contraceptive implant provision at your primary practice location?
[text box]

2. What can the health system do to help reduce these barriers?
[text box]

Demographic Questions

1. What type of provider are you?

   a. Physician (MD, DO)
   b. Nurse Practitioner (CRNP, APRN)
   c. Midwife (CNM, CPM, CM)
   d. Physician Assistant (PA)
   e. Other provider type (specify): _____

   1a) What is your primary medical specialty?

   a. Obstetrics and Gynecology
   b. Internal Medicine
   c. Family Medicine
   d. Pediatrics
   e. Other (specify): _____

   If MD/DO:

   1b) Have you completed subspecialty or fellowship training?

   a. Yes
   b. No

   If yes,

   1bi) Please specify the type of subspecialty or fellowship training you have completed:

   [text box]

2. How many years have you been in practice *(i.e. following completion of your training)*?
   a. 0 – 4 years
   b. 5 – 9 years
   c. 10 – 14 years
   d. 15 – 19 years
   e. 20 years or more

3. Which of the following best describes your primary clinical practice?
   a. Hospital-based clinic
   b. Free-standing/community clinic
   c. Other (specify): _____

4. Is your primary clinical practice located in an **academic setting** *(i.e. involving the training of medical students, residents or other health professions trainees)*?

    a. Yes
    b. No
    c. Unsure

5. Is any portion of your time spent practicing in a federally qualified health center, Title X clinic or public health clinic?

    a. Yes
    b. No

6. In what state is your primary clinical practice located?

    a. Pennsylvania (PA)
    b. Ohio (OH)
    c. Other (specify): _____

7. In what county is your primary practice location?

    [Drop down list of counties depending on which state selected]

8. What is the US Postal Code of your primary practice location?

    [Text box with validation for US Postal Code]

9. Approximately how many patients do you see in an **average week**, including encounters in which you are directly supervising a trainee?

    a. 1-10 patients/week
    b. 11-50 patients/week
    c. 51-100 patients/week
    d. 101-150 patients/week
    e. More than 150 patients/week

10. Approximately what percentage of your patients are *female*?
    [Sliding scale for percentages 0-100%, base = 50%]

11. Approximately what percentage of your encounters with *female patients* involve <u>contraceptive counseling</u> or <u>contraceptive method provision</u>?

[Sliding scale for percentages 0-100%, base = 0%]

12. Approximately what percentage of your patients are <18 years of age?

[Sliding scale for percentages 0-100%, base = 0%]

13. What is your age?

[Drop down list ages 22-95]

14. What is your gender?

a. Female
b. Male
c. Transgender male
d. Transgender female
e. Non-binary/Gender non-conforming/Genderqueer
f. Other identity (please specify): _____

Thank you for taking the **UPMC LARC Provider Survey**! We appreciate your participation. Please select **"Finish"** below to submit your responses. You will be redirected to enter your contact information to receive a **$10 Starbucks gift card** as a token of our appreciation. Thank you!

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