US "safety net" clinics provide access to effective contraception for adolescents and young women, 2017–2019

Blair G. Darney, PhD, MPH[1,2,3], **Frances M. Biel, MPH MS**[4], **Jee Oakley, MPH**[4], **Maria I. Rodriguez, MD**[1], **Erika K. Cottrell, PhD**[1,4]

[1]Oregon Health & Science University, 3181 S.W. Sam Jackson Park Rd., Portland, OR 97239, USA

[2]OHSU-PSU School of Public Health, 506 SW Mill St, Portland, OR 97201, USA

[3]National Institute of Public Health (INSP), Center for Population Health (CISP). Cuernavaca, Morelos, Mexico.

[4]OCHIN, Inc. PO Box 5426, Portland, OR 97228-5426, USA

Abstract

Objective—To describe patterns of moderate and most effective contraceptive provision, and with implants compared with IUDs in a national network of US Community Health Centers (CHCs; 2017–2019).

Methods—We conducted an historical cohort study. Our outcomes were woman-level receipt of most effective contraception (LARC; implants and IUDs) or moderately effective contraception. We use logistic regression to identify patient and clinic factors associated with provision of: 1) most vs moderately effective methods and 2) IUDs vs. implants. We calculated adjusted probabilities for both outcomes by age group.

Results—We included 199,652 contraceptive provision events to 114,280 women in 410 CHCs. Adjusted probabilities were similar across age groups for most effective versus moderately effective methods. However, the adjusted marginal means for receipt of an implant compared to IUD were highest for adolescents [15–17-year-olds: 78.2% (95% CI 75.6 – 80.6); 18–19-year-

Corresponding Author Contact Information: Correspondence should be sent to Blair G. Darney, MPH, PhD, Division of Complex Family Planning, Department of Obstetrics & Gynecology, Oregon Health & Science University, 3181 S.W. Sam Jackson Park Road Portland, OR 97239-3098 (darneyb@ohsu.edu; phone: 503 418-2585).

olds: 69.5% (66.7 – 72.3)], compared with older women. Women's health specialists were more likely to provide most versus moderate contraception.

Conclusion—CHCs are an important access point for most effective contraception for women of all ages. Adolescents are more likely to use implants than IUDs.

INTRODUCTION

Ensuring access to choice of effective forms of contraception is fundamental to support individuals in achieving their reproductive goals. Most effective contraception includes long-acting reversible contraception (LARC), the implant and the intrauterine device (IUD). Understanding patterns of provision of the most effective contraceptive methods, and how they may vary by clinic type and population served, is an important indicator of access to contraceptive care and risk for pregnancy. It is similarly meaningful to examine utilization of IUDs and implants separately. Each method has distinct medical eligibility criteria, mechanism of action, side effect profile, and requires different types of skill to insert and remove[1]. However, research often examines access to most effective methods overall, without disaggregating IUDs and implants, thus masking important differences that affect service delivery.[2,3]

Subdermal contraceptive implants are effective forms of contraception, but use is still relatively low due to lack of awareness, misperceptions about safety and efficacy by both providers and users, and high up-front costs.[4] While data on implant use are limited, the available reports[5] suggest that younger women (i.e., adolescents aged 14–17) are likely to choose the implant over IUD, perhaps due to not requiring a pelvic exam. Previous reports also suggest that implants users also tend to have lower-income and have Medicaid coverage or are uninsured (compared to having private coverage).

Community health centers (CHCs) play a vital role in providing access to contraceptive care for low-income and medically underserved populations, regardless of insurance status or ability to pay.[6] CHCs vary in the scope of family planning services they deliver, but most health centers offer contraceptive methods onsite to facilitate access to care.[7] However, barriers persist to delivering most effective contraceptive services in CHCs, including stocking devices onsite or staff trained for IUD or implant insertions or removals.

The purpose of this study is to describe patterns of moderate and most effective contraceptive provision over a three-year period (2016–2019) in a national network of CHCs. We describe patient and clinic characteristics of contraceptive provision, describe method mix by age group, and identify patient and clinic characteristics associated with the provision of most effective (LARC) methods compared with moderately effective methods, and with implants compared with IUDs.

METHODS

We used individual-level electronic health record (EHR) data to conduct an historical cohort study using the Accelerating Data Value Across a National Community Health Center Network (ADVANCE) clinical research network, a member of PCORnet.[8] ADVANCE is a

multicenter collaborative led by OCHIN Inc in partnership with Health Choice Network, Fenway Health, and Oregon Health & Science University. Outpatient EHR data from CHCs in the 4 data-sharing partner organizations are integrated and standardized into a common data model.[8] ADVANCE data includes information from more than 7 million patients from CHCs across 31 states, represents 25% of all CHC patients nationwide, and is demographically similar to the national profile of patients in CHCs.[9] ADVANCE data are collected under a waiver of authorization because of minimal risk to patients and the practical issues of getting consent from the number of patients included. ADVANCE EHR data are not originally developed for research but have been validated by multiple validation studies.[10,11]

For this study, CHC clinics (i.e., brick-and-mortar care locations) were selected when meeting certain care type characteristics and patient volume criteria, as described below. We applied exclusions at the clinic and then patient level. We used data from CHC clinics that were live on the EHR system by September 1, 2016 (four months before study start, i.e. January 1, 2017) and through the study end of June 30, 2019 (we chose to end the study prior to the implementation of the 2019 Trump-Pence Title X rule changes, which could impact service delivery).[12,13] We excluded clinics that did not provide primary care services (e.g. dental clinics) or provided fewer than 50 visits to women of reproductive age (12–49) per study year (see Appendix for details).

Within included clinics, we first identified people documented as female in the EHR with at least one ambulatory visit between January 1, 2017 and June 30, 2019 (n = 745,979 patients). We were unable to comprehensively assess gender identity and will use the term 'women' throughout the analysis to refer to these patients. We identified the receipt of a most or moderately effective contraceptive method to 118,022 patients. We included all contraceptive methods except for ones provided to women after evidence of sterilization or to women with infecundity (381 women with sterilization, 2,433 with infecundity excluded). We excluded the <1% of the study population with no data in the EHR for age (n=83) or payor (n=812) (See Appendix Figure 1 for study flow diagram). Our sample did not observe any contraceptives provided to individuals ages 12–14, so our final study sample is 114,280 women aged 15–49 who received contraceptive services. These women were seen at 410 CHCs.

Our outcomes were woman-level contraceptive method type: moderately effective (short-acting hormonal contraception methods of injectables, oral contraceptives, patch, vaginal ring)[14] versus most effective (LARC; IUDs and implants) and then within most effective, IUD versus implant, following Office of Population Affairs (OPA) metric specifications.[15] We extracted contraception information from several structured EHR fields, including prescription orders as identified by medication code and name searches, records of medical procedures using CPT, HCPCS and ICD-10 procedure codes, as well as ICD-10 diagnosis codes (see Appendix Table 1). Contraceptive methods were captured at the woman-visit level (n=198,734 visits) while some visits (n=918) included more than one method (e.g. IUD and oral contraceptives). We assigned women to their highest efficacy contraceptive over the study time period. We therefore chose to describe our unit of analysis as 'contraceptive provision' (hereafter simply 'provision').

We assigned patient demographic characteristics based on their first contraceptive visit within the study period. We included age (15–17 years old at first study visit, 18–19, then 5-year age bands to 49), race/ethnicity (Latina, non-Latina White, non-Latina Black, non-Latina Other [including Asian, American Indian/Alaska Native], non-Latina missing race), patient income as a proportion of the Federal Poverty Level (FPL) category (<100% FPL, 101–150% FPL, 151–200% FPL, 200%+, missing income), payor/insurance (private, public, or uninsured; additional details on insurance in Technical Appendix), and medical provider (women's health specialist or not). If missing data were encountered, we then used the next most recent contraceptive visit with known data. Data were not missing at random for missing patient race/ethnicity (5.5%) and for income category (11.6%) (Appendix Tables 2 and 3), we therefore we chose to include missingness as its own level in categorical variables and did not perform multiple imputation.

We identified clinic Title X funding status, which is known to be associated with provision of most effective methods[13], by cross-referencing ADVANCE CHC addresses with a list of Title X-funded clinics that we obtained from the Office of Population Affairs.[6] We classified clinics as rural using 2010 Rural-Urban Commuting Area (RUCA) codes; small towns and lower were categorized as rural.[16] We also included state level indicators: presence of a state family planning program (1115/State Plan Amendment/Family Planning waiver) status[17], and Medicaid expansion status (as of Jan 1, 2016)[18].

Statistical analysis

First, we described patient, provider, clinic, and state-level characteristics at the woman level, stratified by the receipt of most effective versus moderately effective contraceptive provision during the study time period. We next describe contraceptive provision by individual method type and age by the age distribution within each method type, and by the method mix within each age group. Finally, to identify the patient, clinic, and state level factors associated with most versus moderately effective methods and the provision of implants versus IUDs; we fit two generalized logistic linear models (GLM) with logit link function and binomial distribution, clustered on the clinic with an exchangeable correlation structure. Women with the evidence of having both implant and IUD during the study period (n=499) were excluded from the second model. We calculated predicted population absolute probabilities (marginal means) of each outcome for all age categories.

To assess the robustness of our model results, we performed the following sensitivity analyses. We tested models without either payor or income, models with one then the other singly, and a model with both; results were unchanged (data not shown); we present the full model here." We tested the interaction of age and payor and of age and clinic Title X status; the interaction terms were not statistically significant (data not shown) and we present the models with fixed effects. All analyses were conducted in SAS (version 8.3); the figure was prepared in PowerPoint. This study was approved by the Western Institutional Review Board (WIRB).

RESULTS

We identified a total of 199,652 contraceptive provision events to 114,280 women in 410 CHCs between January 1, 2017, and June 30, 2019. Nearly 14% of patients were aged 15–17 years, 10% 18–19, and just over 41% between 20–29 and just over 35% over 30 years old (Table 1). The largest proportion of contraceptive visits were to Latina women (39%), followed by non-Latina White (30%) and Black (19%) women. The majority (63%) of the sample had incomes under 100% FPL, and 21% were uninsured. The provider on record for contraceptive provision was most often a general practitioner (71.2%) and 29% of women with contraceptive provision had their first study visit to a Title X clinic. There were no meaningful differences in age by whether a woman received any most effective method compared with only moderately effective contraception during the study period. Other bivariate differences between use of only moderately and any most effective methods can be seen in Table 1.

Table 2 shows the age distribution of specific contraceptive methods. The largest proportions of injectable, patch, and ring users were 20–29 years old (Table 2); the age distribution was more even for oral pill users. Among implant users, the largest proportion were 20–24 (22% of implant users) and 15–17-year-olds (19% of implant users). The population of IUD users skewed older, with the largest age groups 25–29 and 30–34 years old (Table 2).

Table 3 displays method mix within each age category. The oral pill and injectable were the most common methods across all age groups. In the youngest age category, 17% of 15–17-year-olds used an implant. Use of implants decreased as a proportion of all contraceptive method use by increasing age; by 30–34 years old, implants account for 11% of contraceptive use. The pattern is reversed for IUD use: IUD use as a proportion of contraceptive use was 5% among 15–17-year-old and increased to 15% of contraceptive use among women 40–49..

Finally, we examined two multivariable models controlling for patient, clinic, and state factors (Table 4): most effective versus moderately effective method and implant versus IUD. Adjusted probabilities were similar across age groups for any most effective method compared with moderately effective methods, ranging from 19.3% (95% CI 16.6% – 22.4) among 25–29-year-olds to 17.5% (95% CI 14.9 – 20.4) among 18–19-year-olds.

The adjusted absolute probability for receipt of an implant compared to IUD are highest for adolescents [15–17-year-olds: 78.2% (95% CI 75.6 – 80.6); 18–19-year-olds: 69.5% (66.7 – 72.3)], compared with older women [25–29-year-olds: 51.0% (95% CI 48.1 – 53.8); 40–49-year-olds: 30.4% (95% CI 27.1 – 33.8)].

The type of provider seen was associated with both receipt of any most effective method, and with receipt of an IUD as compared with an implant. Overall, women's health providers were more likely to provide any most effective method, as compared with general practitioners (aOR 2.92; 95% CI 2.33 – 3.65; Appendix Table 4). Provider type (women's health provider vs general practitioner) was negatively associated with receipt of implant compared with IUD (aOR = 0.67; 95% CI 0.58 – 0.77), indicating that women's health care providers are more likely to provide IUDs (compared with implants) than general

practitioners. Other factors associated with implant use compared with IUD use are Latina ethnicity (aOR = 1.51; 95% CI 1.39 – 1.65, compared with non-Latina White women), low income (<100% FPL aOR 1.28; 95% CI 1.14 – 1.43 compared with 200%+ FPL), and public insurance (aOR 1.12; 95% CI 1.03 – 1.23 compared with private). Se Appendix Table 4 for the full models and adjusted ORs.

DISCUSSION

The CHC network is an important access point for contraception for women of all ages. In 2016, over six million low-income women of reproductive age has received care in CHCs or other "safety net" settings.[19] We show, in a large sample of community health center (CHC) clinics, that adolescents, young women, and older women have similar proportions of most effective contraception (i.e. LARC) provision compared with moderately effective method provision, but that variations exist in the use of individual most effective methods (i.e., IUDs, implants) by age. We find that the probability of receipt of an implant compared to IUD was highest for adolescents, compared with older women. As hypothesized, we find that patient- (e.g. age) and provider- (e.g. provider type) level factors are associated with provision of most effective contraception overall, and with type of most effective methods (IUDs and implants).

In line with previous research[5,20–22], we found that younger (15–17) and older (18–19) adolescents have a much higher probability of using implants over IUDs than older women, controlling for patient, clinic, and state factors that could influence method provision such as insurance status, provider type, Title X, or insurance. Also similar to previous reports[21], implant use decreased as a proportion of all contraceptive method use with increasing age. Higher implant use among younger women may be attributed to their desire for most effective contraception without a pelvic examination[23], lower maintenance and chance of user error, or their availability at publicly-funded clinics.

Adolescents have been shown to choose and continue most effective methods when cost barriers are removed.[22,24] However, provider bias and lack of provider training can pose barriers to adolescent access to most effective methods, [25], in spite of the endorsement of the safety of implants for adolescents by medical organizations[4,26] In addition, young women and women of color are more likely to report experiences of coercion or lack of autonomy in contraceptive decision-making; it is critical that all contraceptive counseling be centered in a reproductive justice framework that is developmentally-appropriate and uses patient centered-counseling and shared decision-making can emphasize attention to the needs and preferences of adolescents.[27,28]

At the clinic level, we find that provision by a women's health care specialist (physician or advanced practice provider) was positively associated with provision of most effective methods overall (IUD and implant) compared with moderately effective methods, which supports previous research.[29] However, provision by a woman's health care specialist was negatively associated with receipt of implant compared with IUD, showing that women's health care specialists do the bulk of IUD provision and that implants are provided by a wider range of providers, which expands access. However, barriers exist to the provision of

most effective methods, including implants, in safety net settings, due to lack of awareness, lack of staff training for required insertion and removal, and logistical and cost-related difficulties stocking devices on site.[30,31]

Previous findings have often focused on the effectiveness or the use of most effective methods overall[2,3,6,32], or have focused on commercially insured women[3,33], aggregate clinic-level reports[7], small samples of clinics, or population based prevalence data[2] which do not allow us to see where care is provided. Our data using individual-level clinical data from CHCs across the US support and improve upon previous work. Our study has limitations. First, our sample of CHCs may not be generalizable to all patients in CHCs, CHC clinics, or states. However, our data come from the largest national set of data from people accessing care in safety net settings, and the ADVANCE patient population is demographically and clinically similar to the overall CHC population[8] Second, our EHR data source precludes information about patient experience of care or content of counseling. Third, we do not know if women sought contraceptive services outside of our CHC network; however, our study question focuses on provision, not on population-level prevalence of method use. Fourth, we do not have consistently available data for gravidity or parity, which are known to influence contraceptive use patterns. Finally, we chose to end our study in June 2019, prior to the Trump-Pence administration changes to the Title X program, which support access to contraception for uninsured women. Contraceptive use patterns may have changed after the implementation of these changes, which have since been reversed under the Biden-Harris administration; future work is necessary to evaluate this period.

Public Health Implications

Access to effective contraception, including most effective methods, is key to support individuals in achieving their reproductive goals, including avoiding unintended pregnancy. CHCs are an important access point for most effective contraception for women of all ages, including women with low incomes or without insurance, who bear the largest burden of unplanned pregnancy[34]. We show that CHCs provide access to adolescents and young women to most and moderately effective contraceptive methods, including the implant and IUDs. CHCs rely on diverse funding streams from the fragmented public family planning service delivery system to provide contraceptive services, regardless of insurance status or ability to pay. Medicaid expansion under the ACA[6], the federal Title X family planning program[13], and state family planning programs[35] all contribute to expanding access to contraceptive services in the safety net. CHCs must be supported to provide high quality, developmentally appropriate, non-coercive, and confidential contraceptive services to adolescents and young women.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments:

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Table 1:

Client and clinic characteristics of women with contraceptive provision[a] visits in US Community Health Centers, 2017– 2019

	All Patients (N, %)	Any most effective contraceptive during study (N, %)	Only moderately effective during study (N, %)	p-value
Women	114,280	88,167	26,113	
Woman-level characteristics at first contraceptive visit during study time period				
Age				<0.001
15–17	15,672 (13.7)	12,205 (13.8)	3,467 (13.3)	
18–19	10,966 (9.6)	8,718 (9.9)	2,248 (8.6)	
20–24	23,710 (20.7)	18,414 (20.9)	5,296 (20.3)	
25–29	23,271 (20.4)	17,572 (19.9)	5,699 (21.8)	
30–34	18,094 (15.8)	13,763 (15.6)	4,331 (16.6)	
35–39	12,224 (10.7)	9,359 (10.6)	2,865 (11.0)	
40–49	10,343 (9.1)	8,136 (9.2)	2,207 (8.5)	
Race/ethnicity				<0.001
Latina	44,754 (39.2)	33,370 (37.8)	11,384 (43.6)	
White, non-Latina	34,354 (30.1)	26,692 (30.3)	7,662 (29.3)	
Black, non-Latina	21,535 (18.8)	17,881 (20.3)	3,654 (14.0)	
Other, non-Latina	7,388 (6.5)	5,604 (6.4)	1,784 (6.8)	
Missing	6,249 (5.5)	4,620 (5.2)	1,629 (6.2)	
Income as percentage of federal poverty level				<0.001
< 100%	71,937 (62.9)	55,297 (62.7)	16,640 (63.7)	
101–150%	15,185 (13.3)	11,589 (13.1)	3,596 (13.8)	
151–200%	6,203 (5.4)	4,754 (5.4)	1,449 (5.5)	
Over 200%	7,973 (7.0)	6,258 (7.1)	1,715 (6.6)	
Missing	13,220 (11.6)	10,327 (11.7)	2,893 (11.1)	
Payor				<0.001
Private	23,846 (20.9)	18,756 (21.3)	5,090 (19.5)	
Public	66,008 (57.8)	50,045 (56.8)	15,963 (61.1)	
Uninsured	24,426 (21.4)	19,366 (22.0)	5,060 (19.4)	
Provider				<0.001
Women's health MD/APC[b]	32,873 (28.8)	23,477 (26.6)	9,396 (36.0)	
Other provider	81,407 (71.2)	64,690 (73.4)	16,717 (64.0)	
Clinic-level characteristics				
First study visit to a Title X clinic	33,570 (29.4)	24,310 (27.6)	9,260 (35.5)	<0.001
First study visit at a rural clinic	4,675 (4.1)	3,860 (4.4)	815 (3.1)	<0.001
State-level characteristics				

	All Patients (N, %)	Any most effective contraceptive during study (N, %)	Only moderately effective during study (N, %)	p-value
State Family Planning/1115 Waiver as of January 2016	90,606 (79.3)	69,857 (79.2)	20,749 (79.5)	0.430
Medicaid Expansion under ACA as of January 2016	84,312 (73.8)	61,880 (70.2)	22,432 (85.9)	<0.001

[a]Contraceptive provision is captured from prescription records and administrative diagnosis and procedure codes.

[b]MD/APC refers to persons with MD, DO, or advanced practice nursing (APRN, CNM, DNP, PA) degree.

Table 2.

Age distribution[a] within each contraceptive method in US Community Health Centers, 2017–2019, N = 114,280

Method (n/%[c])	Most Effective Contraceptive Methods		Moderately Effective[a] Contraceptive Methods			
	Implant 14,079 (12.3)	IUD 12,034 (10.5)	Injectable 26,980 (23.6)	Oral Pill 54,516 (47.7)	Patch 3,428 (3.0)	Ring 3,243 (2.8)
15–17	2,700 (19.2)	767 (6.4)	4,469 (16.6)	7,089 (13.0)	454 (13.2)	193 (6.0)
18–19	1,589 (11.3)	659 (5.5)	2,756 (10.2)	5,448 (10.0)	325 (9.5)	189 (5.8)
20–24	3,165 (22.5)	2,131 (17.7)	5,448 (20.2)	11,556 (21.2)	706 (20.6)	704 (21.7)
25–29	2,878 (20.4)	2,821 (23.4)	4,960 (18.4)	10,920 (20.0)	751 (21.9)	941 (29.0)
30–34	1,945 (13.8)	2,386 (19.8)	3,982 (14.8)	8,486 (15.6)	590 (17.2)	705 (21.7)
35–39	1,125 (8.0)	1,740 (14.5)	2,859 (10.6)	5,812 (10.7)	356 (10.4)	332 (10.2)
40–49	677 (4.8)	1,530 (12.7)	2,506 (9.3)	5,205 (9.5)	246 (7.2)	179 (5.5)

[a] An individual woman is assigned age at first study visit and is assigned the most effective methods received if more than one method received during study period.

[b] Moderately effective method: contraceptive injection, oral pill, contraceptive patch, contraceptive vaginal ring.

[c] Percent of all contraceptive provision.

Table 3

Contraceptive method mix in US community health centers by age category, 2017–2019, N = 114,280.

Age Category	Most Effective Methods		Moderately Effective Methods			
	Implant	IUD	Injectable	Oral Pill	Patch	Ring
15–17	2,700 (17.2)	767 (4.9)	4,469 (28.5)	7,089 (45.2)	454 (2.9)	193 (1.2)
18–19	1,589 (14.5)	659 (6.0)	2,756 (25.1)	5,448 (49.7)	325 (3.0)	189 (1.7)
20–24	3,165 (13.3)	2,131 (9.0)	5,448 (23.0)	11,556 (48.7)	706 (3.0)	704 (3.0)
25–29	2,878 (12.4)	2,821 (12.1)	4,960 (21.3)	10,920 (46.9)	751 (3.2)	941 (4.0)
30–34	1,945 (10.7)	2,386 (13.2)	3,982 (22.0)	8,486 (46.9)	590 (3.3)	705 (3.9)
35–39	1,125 (9.2)	1,740 (14.2)	2,859 (23.4)	5,812 (47.5)	356 (2.9)	332 (2.7)
40–49	677 (6.5)	1,530 (14.8)	2,506 (24.2)	5,205 (50.3)	246 (2.4)	179 (1.7)

Table 4.

Adjusted absolute probability of most effective vs moderately effective contraception[a] and implant versus IUD and most effective vs moderately effective among contraceptive users by age group[b]

Age Category	Most Effective (26,113) vs Moderately Effective (88,167)	Implant (13,580) vs IUD (12,034)
15–17	17.7 (15.1 – 20.7)	78.2 (75.6 – 80.6)
18–19	17.5 (14.9 – 20.4)	69.5 (66.7 – 72.3)
20–24	17.9 (15.3 – 20.9)	59.7 (56.8 – 62.6)
25–29 (ref)	19.3 (16.6 – 22.4)	51.0 (48.1 – 53.8)
30–34	18.6 (16.0 – 21.5)	44.7 (41.8 – 47.6)
35–39	18.2 (15.7 – 21.1)	38.5 (35.4 – 41.7)
40–49	16.8 (14.5 – 19.4)	30.4 (27.1 – 33.8)

[a] Moderately effective contraceptive methods: ring, patch, oral pill, injectable. Most effective contraceptive methods: IUD, implant.

[b] Generated from the full model in Appendix Table 4. Models are adjusted for age, race/ethnicity, income, payor, provider type, Title X clinic visit status, rural clinic visit status, State Family Planning/1115 waiver status, and state Medicaid expansion status.