



Original article

Factors associated with provision of depot medroxyprogesterone acetate to adolescents by US health care providers^{☆,☆☆,★}

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ABSTRACT

Objective: Identify factors associated with healthcare providers' frequency of depot medroxyprogesterone acetate (DMPA) provision to adolescents.

Study design: We analyzed data from surveys mailed to a nationally representative sample of public-sector providers and office-based physicians ($n=1984$). We estimated adjusted odds ratios (aORs) and 95% confidence intervals (CIs) of factors associated with frequent DMPA provision to adolescents in the past year.

Results: Although most providers (>95%) considered DMPA safe for adolescents, fewer reported frequent provision (89% of public-sector providers; 64% of office-based physicians). Among public-sector providers, factors associated with lower odds of frequent provision included working in settings without Title X funding (aOR 0.44, 95% CI 0.30–0.64), reporting primary care as their primary clinical focus versus reproductive or adolescent health (aOR 0.42, 95% CI 0.28–0.61), and providing fewer patients with family planning services. Among office-based physicians, factors associated with lower odds of frequent provision included specializing in obstetrics/gynecology (aOR 0.50, 95% CI 0.27–0.91) and family medicine (aOR 0.21, 95% CI 0.09–0.47) versus adolescent medicine, completing training ≥ 15 versus <5 years ago (aOR 0.27, 95% CI 0.09–0.83), and reporting that 0–24% of patients pay with Medicaid or other government healthcare assistance versus $\geq 50\%$ (aOR 0.23, 95% CI 0.09–0.61). The reason most commonly reported by providers for infrequent DMPA provision was patient preference for another method.

Conclusions: While most providers reported frequently providing DMPA to adolescents, training on evidence-based recommendations for contraception, focused on subgroups of providers with lower odds of frequent DMPA provision, may increase adolescents' access to contraception.

Implications: Although >95% of providers considered depot medroxyprogesterone (DMPA) a safe contraceptive for adolescents, only 89% of public-sector providers and 64% of office-based physicians reported frequently providing DMPA to adolescents. Provider training on evidence-based recommendations for contraception counseling and provision may increase adolescents' access to DMPA and all methods of contraception.

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1. Introduction

Adolescents are more likely to have an unintended pregnancy, experience contraceptive failure, and discontinue contraceptive methods than adult women [1–3]. Depot medroxyprogesterone acetate (DMPA), an injectable contraceptive method administered every 3 months, is safe for adolescents and more effective than shorter-acting methods typically used by adolescents [4–6]. DMPA generally decreases menstrual bleeding and can be used confidentially, two factors that address concerns influencing contraceptive use by many adolescents [7].

Despite these benefits, DMPA is used infrequently by adolescents in the United States [5]. According to the National Survey of Family Growth, between 2011–2015, 17% of adolescents (ages 15–19 years, who had ever had sexual intercourse) reported ever using DMPA compared with oral contraceptives (56%) and condoms (97%) [5].

Understanding the reasons for the low prevalence of DMPA use among adolescents, including factors associated with DMPA provision to adolescents, could help ensure that this population has access to the full range of contraceptive methods.

While much of the recent literature has focused on barriers to long-acting reversible contraception (intrauterine devices and implants) for adolescents, there is recognition that access to the full range of contraceptive methods can be improved to meet adolescents' needs [8,9]. Recommendations for improving access to contraception for adolescents include ensuring that services are accessible, acceptable, and effective [10,11]. Health care providers are key to implementing these recommendations. Between 2006–2010, 28% of adolescent females (ages 15–19 years) ever visited a private physician, and 16% ever visited a clinic, over the past 12 months for a family planning or related medical service [12]. In surveys from 2003–2006, most primary care visits for young female adolescents were to pediatricians, and by ages 15–16 years, most visits were to family practice/general medicine physicians or obstetrician-gynecologists [13]. The purpose of this analysis was to assess health care providers' frequency of DMPA provision to adolescents, identify factors associated with frequency of provision, and assess reasons for infrequent DMPA provision.

2. Materials and methods

We developed a 33-question survey for health care providers to assess their knowledge, attitudes, and practices regarding contraception safety and provision, with specific relevance to national recommendations [4,14]. We pilot-tested the survey with health care providers who represented the targeted groups for the survey. During 2013–2014, we mailed surveys to a random sample of 4000 public-sector health centers that provided family planning services and 2000 office-based physicians. We identified public-sector health centers from a Guttmacher Institute database of all publicly-funded family planning health centers nationwide [15]. By design, we sampled 2000 clinics that received Title X funding (federal funding for family planning services) and 2000 clinics that did not. Within these strata (Title X clinics, non-Title X clinics), we randomly selected clinics by health center type, proportionate to the relative number in the universe for that strata. For each sampled health center, we asked that one provider complete the survey. We sampled office-based physicians specializing in obstetrics and gynecology, family medicine, or adolescent medicine from the American Medical Association (AMA) Physician Masterfile (<https://www.ama-assn.org/life-career/ama-physician-masterfile>), a database that includes information on US AMA member and nonmember board-certified physicians.

Providers were eligible to complete the survey on paper or online if they provided family planning services to at least two women of reproductive age per week. Non-responders received reminder postcards and a second mailing of the survey. Additional efforts to contact non-responders were made by telephone. This project was determined to be non-research, public health practice by the Centers for Disease Control and Prevention, thus Institutional Review Board approval was not needed.

Of 6000 surveys distributed to public-sector clinics and office-based physicians, 2118 clinics/physicians were eligible, 1000 were ineligible (comprised mainly of office-based physicians not providing family planning services and public-sector clinics that had closed), and 2882 had unknown eligibility (comprised mainly of non-respondents and those with surveys returned as undeliverable). We calculated the response rate by assuming that the proportion of health care providers eligible in the unknown eligibility subgroup was the same as the proportion in the known eligibility subgroup. The resulting response rate was 51.2%. For this analysis, we excluded respondents who identified as clinic administrators or managers ($n=26$) and those who did not see adolescent patients ($n=5$). We also excluded respondents who failed to answer the survey question on frequency of DMPA provision to adolescents ($n=72$), resulting in an analytic sample of 1984.

For this analysis, we assessed responses to the following survey question: "In the past year, how often have you (or your clinical team) provided DMPA to adolescents?" Response options included "very often or often" (frequent provision) or "not often or never" (infrequent provision). Providers who reported infrequent provision were asked to identify reasons. Response options were: rarely having adolescent patients, unavailability of DMPA in the practice/health center, provider concern about safety of DMPA for adolescents, provider concern about side effects that may lead to discontinuation, patient preference for other methods, practice/health center protocol not allowing provision to adolescents, and "other" (with an option to write in a reason). If an "other" response matched one of the pre-specified responses, it was recoded accordingly.

To assess factors related to frequency of DMPA provision to adolescents, we analyzed information on provider characteristics and their patient populations. Specifically, we examined the following characteristics: health center Title X funding status and provider primary clinical focus (reproductive health/adolescent health or primary care) for public-sector providers; physician specialty (adolescent medicine, family medicine, or obstetrics/gynecology) for office-based physicians; and provider gender, US region, years since completing most recent formal clinical training, proportion of female patients of reproductive age receiving family planning services, proportion of female patients of reproductive age paying for their visit using Medicaid or other government healthcare assistance, and proportion of female patients who were adolescents for both provider types.

We calculated descriptive statistics and conducted bivariate and multivariable logistic regression to determine factors associated with frequency of DMPA provision to adolescents. Data were weighted to account for nonresponse and sample selection probabilities. Because prior analyses of these data identified that different factors are associated with contraception attitudes and practices among public-sector providers and office-based physicians [16,17], we created separate models for each group. For each model, we reported unweighted frequencies and weighted percentages of providers who reported frequent DMPA provision by each characteristic. Bivariate analyses between each characteristic and provision frequency were conducted and unadjusted odds ratios were estimated. The multivariable models included two variables selected a priori (US region and provider gender) and variables that were significant ($p<.05$) in bivariate analyses, after ruling out collinearity between independent variables. Because the survey question assessing frequency of DMPA provision to adolescents asked respondents to answer on behalf of themselves and their clinical team (since non-physicians may lack the authority to provide or prescribe contraception), individual provider variables, including occupation (i.e., physician, advanced practice clinician, or nurse) and time since completing training were not examined in the public-sector model. We assessed reasons reported by providers for infrequent DMPA provision to adolescents by provider type. SAS software version 9.4 (SAS Institute, Cary, NC, USA) and Stata software release 14 (StataCorp LP, College Station, TX, USA) were used to conduct analyses.

3. Results

Fifty-three percent of 1588 public-sector providers worked at health centers that received Title X funding and 62% reported reproductive health/adolescent health as their primary clinical focus (Table 1). The majority were female, advanced practice clinicians (i.e., nurse practitioners, physician assistants, and certified nurse midwives), and provided family planning services to at least 50% of their female patients of reproductive age; 46% completed their formal clinical training at least 15 years ago. Forty-nine percent reported that at least half of their female patients of reproductive age pay for their visit using Medicaid or other government healthcare assistance and 47% reported that 0–24% of their patients were adolescents. The majority (96%) reported that they believed DMPA was safe or very safe for adolescents.

Table 1
Sample characteristics among US health care providers who provide family planning services, by provider type (n=1984).

Characteristic	Public-sector providers ^a (n=1588), n (%) ^b	Office-based physicians (n=396), n (%) ^b
Title X funding		
Yes	1022 (53.1)	--
No	566 (46.9)	--
Primary clinical focus		
Reproductive health/adolescent health	1055 (62.1)	--
Primary care	529 (37.6)	--
Provider occupation		
Physician	324 (24.4)	--
Advanced practice clinician ^c	978 (60.2)	--
Nurse	264 (13.9)	--
Physician specialty		
Adolescent medicine	--	78 (0.4)
Family medicine	--	59 (38.4)
Obstetrics and gynecology	--	259 (61.3)
US Region		
Northeast	217 (14.5)	77 (15.8)
Midwest	299 (19.2)	85 (23.2)
South/Mid-Atlantic	631 (36.8)	135 (34.5)
West	441 (29.6)	102 (26.4)
Gender		
Male	135 (10.1)	168 (43.0)
Female	1447 (89.6)	227 (56.3)
Time since completed formal clinical training		
<5 years	294 (19.7)	50 (15.7)
5–14 years	509 (32.8)	112 (27.6)
≥15 years	770 (46.5)	231 (55.1)
Proportion of female patients of reproductive age receiving family planning services		
0–24%	153 (11.5)	59 (20.1)
25–49%	253 (17.8)	105 (27.2)
>50%	1164 (69.5)	229 (51.1)
Proportion of female patients of reproductive age paying for their visit using Medicaid or other government healthcare assistance		
0–24%	393 (22.8)	219 (60.5)
25–49%	420 (26.9)	87 (22.6)
≥50%	754 (49.1)	88 (16.7)
Proportion of female patients of reproductive age who are adolescents		
0–24%	707 (46.6)	268 (83.8)
25–49%	653 (39.7)	53 (14.7)
≥50%	199 (11.7)	70 (0.5)
Attitudes on the safety of DMPA for adolescents		
Very safe or safe	1525 (96.0)	380 (95.4)
Very unsafe, unsafe, or don't know	51 (3.3)	14 (4.1)

DMPA, depot medroxyprogesterone acetate.

^a Includes Title X and non-Title X providers.

^b Data are unweighted frequencies and weighted percentages. Percentages may not add to 100% because of missing responses, rounding, or both.

^c Includes nurse practitioners, physician assistants, certified nurse midwives.

Sixty-one percent of 396 office-based physicians specialized in obstetrics/gynecology followed by family medicine (38%) and adolescent medicine (0.4%) (Table 1). About half were female and provided family planning services to at least 50% of their female patients of reproductive age. The majority reported 0–24% of their patients were adolescents and that only 0–24% of their female patients of reproductive age pay for their visit using Medicaid or other government healthcare assistance. Most office-based physicians (95%) believed that DMPA was safe or very safe for adolescents.

Overall, 89% of public-sector providers reported that they or their clinical team frequently had provided DMPA to adolescents in the past year (Table 2); 95% of those working in centers with Title X funding and 82% of those working in centers with no Title X funding reported frequent provision. Ninety-five percent of those who reported reproductive health/adolescent health as their primary clinical focus and 80% of those who reported primary care reported frequent DMPA provision. More than 90% of providers who provided family planning services to at least 50% of their female patients of reproductive age, or who reported that at least 50% of their female patients of reproductive age pay for their visit using Medicaid or other government healthcare assistance, reported frequent DMPA provision to adolescents. Among providers who reported that 25% or more of their female patients of reproductive age were adolescents, more than 90% reported frequent DMPA provision.

In adjusted analyses (Table 2), public-sector providers practicing in facilities without Title X funding had significantly lower odds of reporting that they or their clinical team frequently provided DMPA to adolescents compared with those practicing in facilities with Title X funding (adjusted odds ratio [aOR] 0.44, 95% confidence interval [CI] 0.30–0.64). Providers who reported their primary clinical focus as primary care had lower odds of frequent provision of DMPA compared with providers who reported reproductive health/adolescent health (aOR 0.42, 95% CI 0.28–0.61). Those who provided family planning services to less than 25% (aOR 0.31, 95% CI 0.20–0.49) and 25–49% (aOR 0.50, 95% CI 0.32–0.77) of their female patients had lower odds of frequent provision compared with those who provided services to at least 50% of their female patients.

Among office-based physicians, 64% reported that they or their clinical team frequently had provided DMPA to adolescents in the past year (Table 3). More than 80% of those who specialized in adolescent medicine, 69% in obstetrics/gynecology, and 56% in family medicine reported frequent DMPA provision to adolescents. Seventy-seven percent of those within 5 years of completing formal training and 82% of those who reported that at least 50% of their female patients of reproductive age pay for their visit using Medicaid or other government healthcare assistance also reported frequent DMPA provision to adolescents.

Table 2
Factors associated with frequent DMPA provision to adolescents in the past year by public-sector providers^a (n=1588).

Characteristic	Frequent DMPA provision, n (%) ^b	Unadjusted OR (95% CI)	Adjusted OR ^c (95% CI)
Total	1442 (89.2)	--	--
Title X funding			
Yes	974 (95.2)	1.00	1.00
No	468 (82.3)	0.23 (0.17–0.32) ^d	0.44 (0.30–0.64) ^d
Primary clinical focus			
Reproductive health/adolescent health	1006 (94.8)	1.00	1.00
Primary care	432 (79.7)	0.21 (0.15–0.30)	0.42 (0.28–0.61) ^d
Proportion of female patients of reproductive age receiving family planning services			
1–24%	106 (67.5)	0.13 (0.09–0.19) ^d	0.31 (0.20–0.49) ^d
25–49%	215 (83.0)	0.30 (0.21–0.45) ^d	0.50 (0.32–0.77) ^d
≥50%	1103 (94.1)	1.00	1.00
Proportion of female patients of reproductive age paying for their visit using Medicaid or other government healthcare assistance			
0–24%	356 (88.8)	0.82 (0.56–1.22)	0.80 (0.51–1.28)
25–49%	373 (86.5)	0.66 (0.46–0.96) ^d	0.79 (0.53–1.18)
≥50%	693 (90.6)	1.00	1.00
Proportion of female patients of reproductive age who are adolescents			
0–24%	603 (83.0)	0.30 (0.17–0.54) ^d	0.65 (0.35–1.21)
25–49%	626 (95.1)	1.21 (0.63–2.32)	1.86 (0.96–3.62)
≥50%	188 (94.2)	1.00	1.00

OR, odds ratio; DMPA, depot medroxyprogesterone acetate.

^a Includes Title X and non-Title X providers.

^b Data are unweighted frequencies and weighted percentages.

^c Adjusted for all characteristics in table, as well as US region and gender.

^d P<0.05.

In the adjusted model, family medicine physicians (aOR 0.21, 95% CI 0.09–0.47) and obstetricians/gynecologists (aOR 0.50, 95% CI 0.27–0.91) had significantly lower odds of frequently providing DMPA to adolescents compared with those specializing in adolescent medicine. Providers who completed their formal clinical training at least 15 years before the survey versus less than 5 years had lower odds of frequently providing DMPA to adolescents (aOR 0.27, 95% CI 0.09–0.83). Providers who reported that less than 25% of their female patients of reproductive age pay for their visit using Medicaid or other government healthcare assistance had lower odds of frequently providing DMPA to adolescents compared with those who reported that at least 50% of their female patients of reproductive age populations pay using assistance (aOR 0.23, 95% CI 0.09–0.61).

Among respondents who reported infrequent DMPA provision to adolescents, we examined reasons for infrequent provision. The most common reason was provider perception of patient preference for a different method, regardless of provider type (Table 4). Other common reasons included concerns about DMPA safety among public-sector providers who practiced in facilities receiving Title X funding, rarely seeing adolescent patients among public-sector providers who practiced in facilities that did not receive Title X funding, and concerns about side effects leading to discontinuation among office-based physicians. None of the office-based physicians and only a small proportion of Title X and non-Title X providers (8% and 7%, respectively) reported restrictive protocols at their health care practice or health center that did not allow for DMPA provision to adolescents.

Table 3
Factors associated with frequent DMPA provision to adolescents in the past year by office-based physicians (n=396).

Characteristic	Frequent DMPA provision, n (%) ^a	Unadjusted OR (95% CI)	Adjusted OR ^b (95% CI)
Total	278 (64.1)	--	--
Physician specialty			
Adolescent medicine	66 (84.6)	1.00	1.00
Family medicine	33 (55.9)	0.23 (0.12–0.45) ^c	0.21 (0.09–0.47) ^c
Obstetrics and gynecology	179 (69.1)	0.41 (0.25–0.67) ^c	0.50 (0.27–0.91) ^c
Time since completed formal clinical training			
<5 years	41 (77.4)	1.00	1.00
5–14 years	83 (69.1)	0.65 (0.24–1.81)	0.55 (0.17–1.83)
≥15 years	153 (58.4)	0.41 (0.16–1.03)	0.27 (0.09–0.83) ^c
Proportion of female patients of reproductive age who receive family planning services			
1–24%	34 (50.3)	0.46 (0.22–0.94) ^c	0.60 (0.26–1.41)
25–49%	72 (66.5)	0.89 (0.48–1.67)	1.17 (0.59–2.31)
≥50%	171 (68.9)	1.00	1.00
Proportion of female patients of reproductive age paying for their visit using Medicaid or other government healthcare assistance			
0–24%	131 (55.4)	0.27 (0.11–0.64) ^c	0.23 (0.09–0.61) ^c
25–49%	69 (74.8)	0.64 (0.23–1.77)	0.50 (0.15–1.64)
≥50%	78 (82.3)	1.00	1.00

OR, odds ratio; CI, confidence interval; DMPA, depot medroxyprogesterone acetate.

^a Data are unweighted frequencies and weighted percentages.

^b Adjusted for all characteristics in table, as well as US region and gender.

^c P<0.05.

Table 4
Reasons for infrequent DMPA provision to adolescent patients by US health care providers.

	Providers practicing in health centers with Title X funding n (%) ^a	Providers practicing in health centers with no Title X funding n (%) ^a	Office-based physicians n (%) ^a
Reported infrequent provision	48 (4.8)	98 (17.7)	118 (35.9)
Reasons for “not often or never” providing DMPA to adolescents			
Rarely have adolescent patients	11 (24.1)	31 (32.0)	29 (23.7)
DMPA is unavailable in practice/health center	4 (8.5)	13 (12.9)	9 (9.3)
Concerned about safety of DMPA for adolescents	17 (35.1)	11 (10.9)	13 (13.2)
Concerned about side effects that may lead to discontinuation	6 (11.8)	12 (12.6)	38 (31.2)
My adolescent patients generally prefer a different method	23 (48.4)	41 (42.3)	58 (53.3)
My practice/health center protocol does not allow it	4 (8.4)	7 (6.8)	0 (0.0)
Other	1 (2.0)	3 (3.1)	4 (2.6)

DMPA, depot medroxyprogesterone acetate.

^a Data are unweighted frequencies and weighted percentages. Percentages may not equal 100% because of the ability of responders to select multiple reasons for infrequent provision.

4. Discussion

The majority of health care providers considered DMPA safe for adolescents, but fewer frequently provided DMPA to adolescents. Office-based physicians generally reported lower prevalence of frequent DMPA provision to adolescents than did public-sector providers. Among public-sector providers, practicing in a facility that did not receive Title X funding, having a primary clinical focus in primary care versus reproductive health/adolescent health, and providing family planning services to less than 50% of female patients of reproductive age were associated with lower odds of frequent DMPA provision. Factors associated with infrequent provision among office-based physicians included specializing in family medicine or obstetrics/gynecology versus adolescent medicine, completing formal clinical training at least 15 years before the survey, and having less than 25% of female patients of reproductive age paying for their visit with government health care assistance. Overall, these findings may suggest that providers who work in clinical settings with relatively fewer family planning patients may not have the infrastructure to support frequent DMPA provision, which is consistent with a previous provider survey that found when less than one quarter of patients received contraceptive services, providers were less likely to provide a wide range of contraceptive services [18].

Among providers who reported infrequent DMPA provision to adolescents, the most common reason reported was patient preference for another method, regardless of provider type. This finding may suggest that many adolescents are able to choose from a wide range of contraceptive methods and prefer methods other than DMPA. However, this finding could also reflect provider assumptions about their patients' contraceptive preferences, or provider biases that affect contraceptive choice. While some studies indicate that adolescents have limited knowledge about the full range of contraceptive methods, including intrauterine devices and implants [7,19,20], little is known about adolescents' knowledge and attitudes about DMPA. A study of over 1000 adolescents and young adults found that of 82% of respondents who were aware of DMPA, 74% reported “low personal acceptability” of DMPA [21]. Gaining a better understanding of adolescents' knowledge and preferences around DMPA may help determine whether adolescents truly have access to the full range of contraceptive methods.

Among providers practicing in facilities that received Title X funding, the second most commonly cited reason for infrequent provision was concern about the safety of DMPA. In 2004, the US Food and Drug Administration released a warning about DMPA's negative effects on bone mineral density [22]. Since 2004, studies have found that the effects were small and DMPA users generally regained bone mineral density after discontinuation [4,22]. The U.S. Medical Eligibility Criteria for Contraceptive Use classifies DMPA use by adolescents younger than age 18 years as Category 2, meaning that the advantages of DMPA generally outweigh the theoretical or proven risks [4]. Both the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics support the use of DMPA among adolescents and provide

guidance on balancing concerns around bone health and pregnancy prevention with DMPA [9,22]. In addition, 31% of office-based providers listed concern about side effects leading to discontinuation as a reason for infrequent provision; training on side effect management and anticipatory counseling, especially around bleeding changes [14], may alleviate these concerns.

We considered possible limitations to this analysis. Although data were weighted to account for nonresponse by Title X funding status and health center type (for public-sector providers) and physician specialty (for office-based physicians), the distribution of other characteristics of providers who responded compared with those who did not may be different. Misclassification of providers by certain characteristics, particularly patient-level characteristics such as proportion of adolescent patients or proportion of patients receiving Medicaid, may have affected our results. Response options for frequency of DMPA provision to adolescents were subjective, which may have led to misclassification. While the survey focused on provider types who are most likely to provide care to female adolescents [13], we did not collect data from general pediatricians, internal medicine physicians, office-based advanced practice clinicians, or others who may provide contraception to this patient population. Finally, data were collected in 2013–2014 and may not reflect current practice patterns, although findings can still be used to identify subgroups of providers who may need additional training.

Adolescents face many systemic barriers to accessing contraception, and efforts to address these barriers have focused on protecting confidentiality, ensuring availability to the full range of methods, and improving access through no or reduced cost services, same-day provision, and improved clinic access [10]. Health care providers play a key role in ensuring access to contraception for adolescents by providing developmentally appropriate services, including education and counseling about contraceptive methods [23–25]. DMPA, along with intrauterine devices and implants, may be appealing to many adolescents because of its higher effectiveness and lack of need for frequent action. Although a majority of providers reported frequently providing DMPA to adolescents, training on evidence-based recommendations for contraception counseling, provision, and management [4,14,23] for subgroups of providers with lower odds of frequent DMPA provision may increase adolescents' access to DMPA and all contraceptive methods.

Disclosure/Conflict of Interest Statement

The authors of this paper have nothing to disclose.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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