

GYNECOLOGY

Experience with intrauterine device insertion in never sexually active adolescents: a retrospective cohort study



Chelsea A. Kebodeaux, MD; Beth I. Schwartz, MD

BACKGROUND: Intrauterine devices can offer both contraceptive and noncontraceptive benefits to never sexually active adolescents. There are increasing data on intrauterine device use in adolescents; however, most data on intrauterine devices in adolescents are related to contraceptive use. There is very limited literature on intrauterine device placement in adolescents who have never been sexually active.

OBJECTIVE: The objective of the study was to compare intrauterine device insertion success between never sexually active and sexually active cohorts.

STUDY DESIGN: We performed a retrospective chart review of patients aged 10–20 years with attempted intrauterine device insertion at a children's hospital between October 2015 and September 2017.

RESULTS: A total of 210 patients were included, of whom 82 were never sexually active. Never sexually active adolescents were younger at insertion (15.6 vs 16.7 years, $P < .001$), more likely to have at least 1 medical problem (75.6% vs 54.7%, $P = .046$), and to have special needs

(23.2% vs 4.7%, $P < .001$). Never sexually active adolescents were less likely to have intrauterine device insertion performed in the office setting (52.4% vs 94.5%, $P < .001$). There was no significant difference in success of intrauterine device insertion on the first attempt (90.2% vs 96.1%, $P = .086$). In a subanalysis of office insertions alone, never sexually active adolescents were more likely to have an unsuccessful intrauterine device insertion (16.3% vs 4.3%, $P = .015$) and less likely to tolerate the procedure well (81.4% vs 94.2%, $P = .026$).

CONCLUSION: To our knowledge, this is the first study describing intrauterine device insertion in never sexually active patients. Although office success rates were lower, intrauterine device insertion in never sexually active adolescents was very successful overall, and intrauterine devices should be offered to this population.

Key words: adolescent, contraception, intrauterine device, never sexually active, nulliparous, vaginal

Intrauterine devices (IUDs) have increased in popularity in the United States because of their excellent contraceptive efficacy and safety profile.¹ The American College of Obstetricians and Gynecologists and the American Academy of Pediatrics recommend the use of long-acting reversible contraception, including IUDs, as first-line contraceptive options for adolescents.^{2,3}

There are also many noncontraceptive benefits of levonorgestrel IUDs including improvement in dysmenorrhea, pelvic pain, endometriosis, and abnormal uterine bleeding.^{4,5} IUDs have been shown to benefit unique populations including adolescents with bleeding disorders and heavy menstrual bleeding, adolescents with cardiac conditions, and women with special needs desiring menstrual suppression.^{6–10}

Compared with the contraceptive implant, levonorgestrel IUDs have a higher amenorrhea rate and are generally favored when menstrual suppression is the treatment goal.¹⁰ In addition, IUDs are more likely to be recommended as safe for women with chronic medical conditions according to the US Medical Eligibility Criteria for Contraceptive Use.^{6,11}

Unfortunately, myths about infection, infertility, and difficulty with insertion among providers remain a significant barrier to IUD use in adolescents, despite quality evidence that describes their efficacy and refutes increased adverse outcomes including pregnancy rates, infection, or uterine perforation.^{12–15}

The only adverse outcome that may be increased in adolescents is IUD expulsion, but this is still debated in the literature.¹³ In addition, complication rates are similar among nulliparous and parous adolescents.¹⁵ Based on survey data, providers continue to have inaccurate information. Despite their respective societies' recommendations, in some surveys only 43% of obstetrician-gynecologists and only 10%

of pediatricians would consider an IUD for contraception in an adolescent.^{16,17}

In a qualitative study of pediatricians, family medicine physicians, and advanced practice nurses, providers expressed concern that IUD insertion may be physically and/or emotionally traumatic for nulliparous adolescent patients; however, this concern was not expressed regarding patients who had given birth.¹⁸ Some providers do not feel comfortable offering IUDs to patients or restrict their usage to certain patient demographics, often excluding nulliparous and adolescent patients.^{18–21} In surveys of adolescent health providers, family medicine and obstetrics-gynecology practitioners were more likely and pediatricians were less likely to offer IUDs to adolescents.¹⁶

Data are also limited regarding IUD use for medical indications, and no data are available regarding provider perception of IUD use for medical indications in adolescents.^{4,6–9} After reviewing the data regarding provider misconceptions, it is not surprising that as many as 45–70% of teenagers have not even heard of an IUD.^{16,22}

Cite this article as: Kebodeaux CA, Schwartz BI. Experience with intrauterine device insertion in never sexually active adolescents: a retrospective cohort study. *Am J Obstet Gynecol* 2018;219:600.e1–7.

0002-9378/\$36.00

© 2018 Published by Elsevier Inc.

<https://doi.org/10.1016/j.ajog.2018.09.033>

AJOG at a Glance

Why was this study conducted?

To demonstrate success of intrauterine device insertion in never sexually active adolescents.

Key findings

Intrauterine device insertion was equally successful in never sexually active adolescents when compared with sexually active adolescents in the overall population, although insertion was less likely to be successful when only insertions in the office were compared.

What does this add to what is known?

Never sexually active adolescents should be offered intrauterine devices because insertion success rates are similar and this population can benefit from their use.

In light of these data, it is likely many adolescent patients are simply not offered IUDs. Furthermore, a never sexually active patient is even less likely to be offered or counseled regarding IUD placement. We sought to describe IUD placement in a never sexually active population and compare placement success rates with a sexually active cohort at our institution.

Materials and Methods

We conducted a retrospective chart review at Nemours/A. I. duPont Hospital for Children. Using current procedural terminology codes, the electronic medical record was used to identify adolescents aged 10–20 years who had an IUD insertion or attempted IUD insertion between Oct. 1, 2015, and Sept. 20, 2017. This study was approved by the Nemours Institutional Review Board.

Identified patient charts were reviewed to collect sociodemographic information as well as medical, reproductive, and contraceptive history. We excluded patients >20 years old or who did not have attempted IUD insertion at our institution. Never sexually active (NSA) was defined as no history of consensual penetrative vaginal intercourse. Patients with a history of oral sex alone or previous history of sexual abuse without a history of consensual intercourse were included in the never sexually active group.

Sexual activity was documented for all patients. Patients were labeled as having no history of medical problems if they had no medical problems or diagnosis

codes listed in the chart other than obesity or one of the codes listed as the indication for the procedure. Special needs was defined as a diagnosis of a learning disability, intellectual disability, cerebral palsy, other physical disability, or autism/autism spectrum disorder or if special needs was noted in the descriptive sections of the note.

Prior treatment affecting the cycle was defined as prior use of hormonal medications, including combined oral contraceptives, progestin-only pills, the vaginal ring, the contraceptive patch, depot medroxyprogesterone, or the progestin implant. If a sexually active patient was noted to be using a hormonal treatment and condoms for contraception, the most recent treatment was coded based on the current hormonal method.

IUD insertion procedure notes or operative reports were reviewed and data were abstracted regarding the IUD type, indication(s), clinical location, provider type performing the insertion, uterine sound measurement, technical equipment or special procedures required, oral analgesia used, documented complications at placement, patient tolerance of the procedure, and sexually transmitted infection screening results. If multiple indications for IUD placement were listed, the primary indication was considered to be the first diagnosis code listed.

The clinical locations available at our institution included the office, an outpatient sedation unit, and the operating room. Location was decided based

on discussion with the patient or family. Sexually active patients were not offered insertion under anesthesia unless undergoing another procedure. Patients with special needs were offered placement under anesthesia. Some patients underwent a practice speculum examination prior to the IUD insertion, especially if a same-day insertion was not performed, but this was not routinely attempted or documented.

The providers placing IUDs during this time period included 1 gynecologist, 2 adolescent medicine pediatricians, and 1 pediatric advanced practice nurse practitioner. Only the gynecologist had privileges to perform IUD insertion in the sedation unit or operating room. The Mirena IUD was the only available levonorgestrel IUD during the study period. Simultaneous procedures performed included progestin implant removal or any operative procedures performed with the same episode of anesthesia as IUD insertion.

The patient was considered to have used oral analgesia if it was prescribed on the previous visit or noted as administered on the day of placement (only acetaminophen and ibuprofen were available in the office setting). Documentation did not always indicate whether the patient had filled and taken the medication prior to the IUD insertion. If the IUD was placed in the operating room, this was coded as no oral analgesia.

Poor patient tolerance of the procedure was defined as either a vasovagal reaction, need for extended recovery, significant cramping, or inability to proceed with insertion because of poor tolerance of the speculum. If none of the abovementioned conditions were noted, good tolerance was indicated in the note, or if the IUD was placed in the operating room, then the patient was considered to have tolerated the procedure well.

Difficult placement was calculated as a composite variable if at least 1 of any of the following was noted: use of os finder, use of cervical dilators, and/or difficulty sounding the uterus. No patients in the study received a paracervical block on first IUD insertion attempt or misoprostol for insertion. If the IUD

placement was not successful, follow-up data were collected and the same data were collected regarding the second attempt at placement if applicable.

The primary outcome was successful IUD insertion on first attempt. Descriptive statistics were used to evaluate baseline characteristics. Comparisons were made between NSA and sexually active (SA) cohorts. Bivariate analyses were used to compare groups, using χ^2 and Fisher exact tests for categorical data and a Student *t* test and Mann-Whitney for continuous data where appropriate. The *P* values were 2 sided, and a value of *P* < .05 was considered statistically significant. Data were analyzed using SAS (version 9.2; SAS Institute, Cary, NC).

Results

A total of 213 charts were identified by current procedural terminology codes related to IUD insertion and/or attempt during the study period. Of these, 3 patients did not actually have IUD insertion attempts at our institution during the study period, so 210 patients were included in the final analysis. Of these, 82 were never sexually active.

The sociodemographic characteristics of the study population are presented in Table 1.

The majority of patients (98.6%) were nulliparous. NSA adolescents were younger at insertion (15.6 vs 16.7 years, *P* < .001). The age range was the same in both groups (10–20 years). NSA adolescents were also more likely to have at least 1 medical problem (75.6% vs 54.7%, *P* = .046), to have special needs (23.2% vs 4.7%, *P* < .001), and to have attempted at least 1 prior treatment affecting the menstrual cycle (82.9% vs 60.9%, *P* = .001).

In SA adolescents, the most common primary indication for IUD insertion was contraception (85.2%). Abnormal uterine bleeding was the most common secondary indication (15.6%) and was most often described as heavy menstrual bleeding. The most common indications for IUD use in NSA adolescents were abnormal uterine bleeding (43.9%) and menstrual suppression (24.4%). Dysmenorrhea was the most

TABLE 1
Sociodemographic characteristics

Variables	Sexually active (n = 128)	Never sexually active (n = 82)	<i>P</i> value
Age at insertion, y ^a	16.7 (1.7)	15.6 (1.8)	< .001
Race			.883
Caucasian/white	69 (53.9)	48 (58.5)	
African American/black	37 (28.9)	23 (28.0)	
Hispanic	8 (6.3)	4 (4.9)	
Other	14 (10.9)	7 (8.5)	
Medicaid Insurance	58 (45.3)	30 (23.4)	.211
BMI ^a	27.6 (7.7)	25.9 (7.8)	.127
Medical problem	70 (54.7)	62 (75.6)	.046
Special needs	6 (4.7)	20 (24.4)	< .001
Menarche, y ^a	11.7 (1.7)	11.7 (1.7)	1.000
Prior treatment affecting cycle	78 (60.9)	68 (82.9)	.001
Most recent method			< .001
None	24 (18.8)	37 (45.1)	
Combined oral contraception	35 (27.3)	20 (24.4)	
Norethindrone	3 (2.3)	10 (12.2)	
Vaginal ring/contraceptive patch	4 (3.1)	2 (2.4)	
Depot medroxyprogesterone	16 (12.5)	12 (14.6)	
Progestin implant	17 (13.3)	1 (1.2)	
Condoms	29 (22.7)	0 (0.0)	
Primary indication			< .001
Menstrual suppression	3 (2.3)	20 (24.4)	
Dysmenorrhea	7 (5.5)	12 (14.6)	
Abnormal uterine bleeding	9 (7.0)	36 (43.9)	
Pelvic pain	0 (0.0)	4 (4.9)	
Contraception	109 (85.2)	10 (12.2)	
Secondary indication			.012
Menstrual suppression	4 (3.1)	2 (2.4)	
Dysmenorrhea	17 (13.3)	25 (30.5)	
Abnormal uterine bleeding	20 (15.6)	9 (11.0)	
Endometriosis	0 (0.0)	1 (1.2)	
Contraception	10 (7.8)	2 (2.4)	
Pelvic pain	0 (0.0)	3 (3.7)	
Other	16 (12.5)	11 (13.4)	

Kebodeaux et al. Intrauterine device insertion in never sexually active adolescents. Am J Obstet Gynecol 2018.

(continued)

common secondary indication in NSA adolescents (30.5%).

Table 2 summarizes IUD insertion experience for the 2 groups. The vast

majority of adolescents in both groups (93.8%) were able to have an IUD inserted on the first attempt. Overall, there was no statistically significant

TABLE 1
Sociodemographic characteristics (continued)

Variables	Sexually active (n = 128)	Never sexually active (n = 82)	Pvalue
Current drug use	27 (21.1)	0 (0.0)	< .001
Current tobacco use	10 (7.8)	1 (1.2)	.057
Current alcohol use	17 (13.3)	1 (1.2)	.004
History of sexual abuse	20 (15.6)	2 (2.4)	.002
STI result positive	8 (6.3)	0 (0.0)	.152

Values are n (percentage) unless noted.

BMI, body mass index; STI, sexually transmitted infection.

^a Mean ± SD.

Kebodeaux et al. Intrauterine device insertion in never sexually active adolescents. Am J Obstet Gynecol 2018.

difference in success of placement between the NSA and SA groups on the first attempt ($P = .086$) or when second attempts were also included ($P = 1.000$).

NSA adolescents were less likely to have IUD insertion performed in the

office setting (52.4% vs 94.5%). Table 3 is a comparison between the 2 groups including only office insertions. The majority of patients who had IUDs placed in the sedation unit were NSA (19 of 25, 76%) and half of those patients

had special needs (9 of 19, 47.4%). Half of the 6 SA adolescents who had IUDs placed in the sedation unit had simultaneous procedures (3 of 6, 50%) and 1 had special needs (1 of 6, 16.7%).

The 1 sexually active patient with placement in the operating room had a simultaneous procedure. The remaining 20 patients with placements in the operating room were NSA. In this group, half had special needs (10 of 20, 50%) and 70% of those without special needs (7 of 10) had simultaneous procedures, including diagnostic laparoscopy and hymenectomy.

There was no statistical difference between NSA and SA adolescents in terms of whether or not a simultaneous procedure was performed at the time of IUD insertion. Notably, all of the insertions with simultaneous procedures in NSA adolescents were in the operating room, while SA adolescents had simultaneous procedures in a mixture of locations. In patients with special needs, those who were SA were more likely to have their insertion performed in the office than NSA adolescents (83.3% vs 5.0%, $P = .001$).

NSA adolescents were significantly more likely to have the IUD insertion performed by a gynecologist. The majority of IUDs inserted were Mirena IUDs, and the 3 Paragard IUDs inserted in the study period were placed in SA patients. There was no difference in composite technical difficulty between NSA and SA adolescents. There was, however, a significant difference in patient tolerance, with a higher proportion of SA adolescents noted to tolerate the procedure well (93.8% vs 81.7%, $P = .006$).

In NSA patients, all but 1 of the unsuccessful attempts occurred in the office setting. One IUD insertion attempt performed under outpatient sedation was cancelled after examination under anesthesia revealed a microperforate hymen. This patient was able to have an IUD inserted in the operating room, along with hymenectomy, and this was considered the second attempt. All unsuccessful attempts in SA adolescents occurred in the office setting.

There was no statistical difference between the groups in the percentage of

TABLE 2
IUD insertion experience

Variables	Sexually active (n = 128)	Never sexually active (n = 82)	Pvalue
Successful placement (first attempt)	123 (96.1)	74 (90.2)	.086
Second attempt performed	3/5 (60.0)	7/8 (87.5)	.511
Successful placement (total)	126 (98.4)	81 (98.7)	1.000
Location			< .001
Office	121 (94.5)	43 (52.4)	
Outpatient sedation	6 (4.7)	19 (23.2)	
Operating room	1 (0.8)	20 (24.4)	
Simultaneous with another procedure	17 (13.3)	7 (8.5)	.376
Performed by gynecologist	75 (58.6)	72 (87.8)	< .001
IUD type			.283
Mirena	125 (97.7)	82 (100.0)	
Paragard	3 (2.3)	0 (0.0)	
Sound, cm ^a	7 (6-8.5)	7.5 (6-9)	
Difficult placement (composite)	9 (7.0)	4 (4.9)	.528
Os finder	6 (4.7)	3 (3.7)	1.000
Cervical dilators	0 (0.0)	1 (1.2)	.371
Difficulty sounding	7 (5.5)	3 (3.7)	.746
Bleeding from tenaculum site	1 (0.8)	1 (1.2)	1.000

Kebodeaux et al. Intrauterine device insertion in never sexually active adolescents. Am J Obstet Gynecol 2018.

(continued)

TABLE 2
IUD insertion experience (continued)

Variables	Sexually active (n = 128)	Never sexually active (n = 82)	Pvalue
Patient tolerated well	120 (93.8)	67 (81.7)	.006
Vasovagal reaction	2 (1.6)	1 (1.2)	1.000
Extended recovery needed	7 (5.5)	1 (1.2)	.153
Oral analgesia			
NSAID	77 (60.2)	25 (30.5)	< .001
Acetaminophen	3 (2.3)	1 (1.2)	1.000
Lorazepam	26 (20.3)	26 (31.7)	.062

Values are n (percentage) unless noted.

IUD, intrauterine device; NSAID, nonsteroidal antiinflammatory drug.

^a Median (range).Kebodeaux et al. Intrauterine device insertion in never sexually active adolescents. *Am J Obstet Gynecol* 2018.

patients who underwent a second IUD attempt (60% vs 87.5%, $P = .511$). All second attempts were successful. Of the 7 NSA successful reattempts, 1 occurred in the office, 4 occurred in the sedation unit, and 2 occurred in the operating room. Of the never sexually active patients who had a second attempt, no extra procedures were needed for

placement. In contrast, the sexually active patients who required a second attempt tended to require more procedural complexity: 2 were performed under sedation and required use of the os finder, and the other was able to be performed in the office but required a paracervical block because of the difficulty passing the uterine sound.

TABLE 3
IUD insertion in office

Variables	Sexually active (n = 121)	Never sexually active (n = 43)	Pvalue
Successful placement	116 (95.9)	36 (83.7)	.015
Special needs	5 (4.1)	1 (2.3)	1.000
Medical problem	52 (43.0)	18 (41.9)	.996
Medicaid insurance	54 (44.6)	15 (34.9)	.266
Prior treatment affecting cycle	72 (59.5)	37 (86.0)	.001
Performed by gynecologist	69 (57.0)	33 (76.7)	.022
Patient tolerated well	113 (93.4)	35 (81.4)	.034
Vasovagal reaction	2 (1.7)	1 (2.3)	1.000
Extended recovery needed	7 (5.8)	1 (2.3)	.682
Difficult placement (composite)	9 (7.4)	3 (7.0)	1.000
NSAID	76 (62.8)	23 (53.5)	.283
Lorazepam	26 (21.5)	26 (60.5)	< .001
Acetaminophen	3 (2.5)	1 (2.3)	1.000

Values are n (percentage) unless noted.

IUD, intrauterine device; NSAID, nonsteroidal antiinflammatory drug.

Kebodeaux et al. Intrauterine device insertion in never sexually active adolescents. *Am J Obstet Gynecol* 2018.

The number of patients in our study with unsuccessful placements was very low ($n = 13$). Possible factors associated with the lack of success were poor patient tolerance of the procedure ($P < .001$) and composite difficulty ($P < .001$). None of the oral analgesic medications were associated with successful placement. The only modifiable factor associated with lack of success was placement by a nongynecologist provider ($P = .023$).

Comment

To our knowledge, this is the first study describing insertion of IUDs in a never sexually active population. Overall, IUD placement was highly successful in never sexually active adolescents (90.2%). IUD placement success rate in this study was comparable with other studies in nulliparous adolescents.¹⁵ When second attempts were included, the insertion success rate in never sexually active adolescents was exceptional at 98.7%, and the difference in the success rate remained nonsignificant.

Patient tolerance of the procedure was higher in the sexually active group, but still greater than 80% of never sexually active adolescents in both the full analysis and office subanalysis were noted to tolerate IUD insertion well. Vasovagal reaction and need for extended recovery were uncommon in both groups. Technical difficulty with placement was also infrequent. The statistically significant difference between the overall data and the office subanalysis speaks to the importance of proper planning and shared patient-clinician decision making regarding the level of sedation required for placement to promote success on first attempt.

The major limitations of this study are its retrospective nature and the relatively small sample size. As with all retrospective chart reviews, recorder or systematic bias may affect the data. Charts with missing or incomplete data contribute to nonresponse and hidden bias. While the primary outcome can be objectively measured, secondary outcomes such as placement difficulty and patient tolerance were documented less systematically, making these data less reliable.

A prospective study would allow for the results to be adequately powered and would decrease the incidence of missing data. The small sample size increases the likelihood of a type 2 error from inadequate power. The results are from a children's hospital with a large referral base and a variety of providers with specific training in either adolescent medicine or pediatric gynecology, which may limit the generalizability.

During the study period, the pediatricians and advanced nurse practitioner who performed some of the IUD insertions were being trained on IUD insertion, and this may have affected the results. Increased experience should only further increase insertion success rates, so this is unlikely to have affected the primary outcome.

Insertion success rates were high for all providers despite different experience levels. Practice patterns also evolved, so that by the end of the study period, some patients underwent a practice speculum examination before scheduling IUD insertion. This may have eliminated some patients from being included in the data set if they did not tolerate a speculum examination and chose a different method and therefore were never coded as an attempted IUD insertion. It may have also led the provider to offer placement in a nonoffice setting. This could lead to an overestimation of success rates in office insertions.

This study also does not include follow-up data on continuation or complication rates, but that is an area in which we are actively pursuing further research at this time.

The strength of this study is that it describes a significant number of cases in a population that has never before been described in the literature. While follow-up data are important, there are many existing studies that illustrate the safety and efficacy of IUD use in adolescents and young women, and it is reasonable for these data to be extrapolated to the never sexually active population.^{12–14} From survey and qualitative studies of providers, it seems that the primary barrier regarding providing IUDs to this population is not necessarily

safety or efficacy but specifically related to concerns around placement and trauma to adolescents who are not sexually active.¹⁸

These data can be used to address provider concerns as well as those of patients and their families. In our clinical experience, many young women are interested in the benefits of an IUD and are willing to undergo placement after counseling on the full range of treatment options and details of the insertion procedure. The use of nonoffice settings should be considered for certain patients, although further research is needed to determine who would most benefit from these settings.

We hope these data help to allay provider and patient fears regarding IUD placement in never sexually active adolescents and to encourage providers to offer IUDs to appropriately selected patients, regardless of sexual activity. ■

References

- Finer LB, Jerman J, Kavanaugh MC. Changes in the use of long-acting contraceptive methods in the United States, 2007–2009. *Fertil Steril* 2012;98:893–7.
- Adolescents and long-acting reversible contraception: implants and intrauterine devices. Committee Opinion No. 539. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2012;120:983–8.
- Committee on Adolescence: contraception for adolescents. *Pediatrics* 2014;134:e1244.
- Bahamondes L, Petta CA, Fernandes A, et al. Use of the levonorgestrel-releasing intrauterine system in women with endometriosis, chronic pelvic pain and dysmenorrhea. *Contraception* 2007;75:S134–9.
- Noncontraceptive uses of hormonal contraceptives. Practice Bulletin No. 110. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2010;115:206–18.
- Bryant AG, Stuart GS, Narasimhan S. Long-acting reversible contraceptive methods for adolescents with chronic medical problems. *J Pediatr Adolesc Gynecol* 2012;25:347–51.
- Adeyemi-Fowode OA, Santos XM, Dietrich JE, Srivaths L. Levonorgestrel-releasing intrauterine device use in female adolescents with heavy menstrual bleeding and bleeding disorders: single institution review. *J Pediatr Adolesc Gynecol* 2017;30:479–83.
- Amies Oelschlager AE, Micks EA, Debiec KE, et al. Long acting reversible contraception in adolescents with cardiovascular conditions. *J Pediatr Adolesc Gynecol* 2014;27:353–5.
- Pillai M, O'Brien K, Hill E. The levonorgestrel IUS (Mirena) for the treatment of menstrual problems in adolescents with medical disorders or physical or learning disabilities. *BJOG* 2010;117:216–21.
- American College of Obstetricians and Gynecologists. ACOG Committee on Adolescent Health Care. Menstrual manipulation for adolescents with physical and developmental disabilities. ACOG Committee opinion no. 668. *Obstet Gynecol* 2016;128:e20–5.
- Centers for Disease Control and Prevention. US medical eligibility criteria for contraceptive use. *MMWR Recomm Rep* 2010;59:1.
- Winner B, Peipert JF, Zhao Q, et al. Effectiveness of long-acting reversible contraception. *N Engl J Med* 2012;366:1998–2007.
- Jatlaoui TC, Riley HEM, Curtis KM. The safety of intrauterine devices among young women: a systematic review. *Contraception* 2017;95:17–39.
- Deans EI, Grimes DA. Intrauterine devices for adolescents: a systematic review. *Contraception* 2009;79:418–23.
- Bayer LL, Jensen JT, Li H, et al. Adolescent experience with intrauterine device insertion and use: a retrospective cohort study. *Contraception* 2012;86:443–51.
- Pritt NM, Norris AH, Berlan ED. Barriers and facilitators to adolescents' use of long-acting reversible contraceptives. *J Pediatr Adolesc Gynecol* 2017;30:18–22.
- Luchowski AT, Anderson BL, Power ML, et al. Obstetrician-gynecologists and contraception: practice and opinions about the use of IUDs in nulliparous women, adolescents and other patient populations. *Contraception* 2014;89:572.
- Murphy MK, Stoffel C, Nolan M, Haider S. Interdependent barriers to providing adolescents with long-acting reversible contraception: qualitative insights from providers. *J Pediatr Adolesc Gynecol* 2016;29:436–42.
- Kohn JE, Hacker JG, Rouselle MA, et al. Knowledge and likelihood to recommend intrauterine devices for adolescents among school-based health center providers. *J Adolesc Health* 2012;51:319–24.
- Lewis C, Darney P, Thiel de Bocanegra H. Intrauterine contraception: impact of provider training on participant knowledge and provision. *Contraception* 2013;88:226–31.
- Berlan ED, Pritt NM, Norris AH. Pediatricians' attitudes and beliefs about long-acting reversible contraceptives influence counseling. *J Pediatr Adolesc Gynecol* 2017;30:47–52.
- Fleming KL, Sokoloff A, Raine T. Attitudes and beliefs about the intrauterine device among teenagers and young women. *Contraception* 2010;82:178–82.

Author and article information

From the Nemours/A. I. duPont Hospital for Children, Wilmington, DE (Drs Kebodeaux and Schwartz); the Department of Obstetrics and Gynecology, Christiana Care Health System, Newark, DE (Dr Kebodeaux); and the

Division of Adolescent Medicine and Pediatric Gynecology, Department of Pediatrics (Dr Schwartz), and the Department of Obstetrics and Gynecology (Dr Schwartz), Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA.

Received May 24, 2018; revised Aug. 25, 2018; accepted Sept. 24, 2018.

The authors report no conflict of interest.

Presented as a poster at the 32nd annual clinical and research meeting of the North American Society for

Pediatric and Adolescent Gynecology, West Palm Beach, FL, April 12–14, 2018.

Corresponding author: Chelsea A. Kebodeaux, MD. chelsea.a.kebodeaux@christianacare.org, chelsea.kebodeaux@gmail.com