Title: Variation in contraceptive prescribing patterns by physician, practice, and clinical encounter characteristics

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Background

Most women will spend the majority of their reproductive lives using some form of contraception in order to avoid pregnancy.[1] Women themselves recognize that contraception has important beneficial effects in their lives by allowing them to have more control over their lives, meet their goals in education and work, and care better for their children.[2] Which contraceptive method women use has implications for their ability to successfully avoid pregnancy and for their general well-being, since different methods have varying efficacy rates and side effect profiles. Research consistently documents that contraceptive use patterns differ based on social characteristics, including race, income, and education.[3,4]

However, most methods – and the methods that are most effective at preventing pregnancy – necessitate contact with a healthcare provider to initiate or continue. Thus, the clinical encounter is the decision-making context for many contraceptive method choices. Previous research has shown that contraceptive method choice is associated with insurance coverage and cost of the method, and can be influenced by clinician counseling, particularly for more recently-introduced methods that are less familiar to women.[5–8] Little, however, is known about how characteristics of the physician's practice and the clinical encounter contribute to contraceptive method decisions. This study aimed to characterize the variation in contraceptive prescribing practices by physician specialty, practice, and visit characteristics in a national sample. We hypothesized that these characteristics might be related to differences in methods available at the point of care and the type of counseling and information offered to patients, and would therefore be related to contraceptive method choices.

Methods

Data and sample

Data are from the 2006-2010 National Ambulatory Medical Care Survey (NAMCS), a nationally-representative sample of visits to physicians in office-based practices. In the 2006-2010 data, there were 30,815 visits by reproductive age women. The study sample consisted of visits where the patient was a woman age 15-45 who was not pregnant or trying to become pregnant based on diagnostic and reason for visit codes (n=24,780).

Measures

We examined two dependent variables: 1) whether any contraceptive method was prescribed at the visit, and 2) contraceptive type (intrauterine contraception (IUC), Implanon, contraceptive patch (Ortho Evra), contraceptive ring (Nuvaring), and oral contraceptives) among those who

received some form of contraception. We used drug codes were used to identify most methods, but we also used procedure codes to identify women with non-hormonal IUC (Paragard), which was not available in the drug codes.

There were three categories of independent variables in our analysis: patient characteristics, visit characteristics, and physician/practice characteristics. Patient characteristics were age, race/ethnicity (white non-Hispanic, black non-Hispanic, Hispanic and other), quartile of poverty prevalence in the patient's zip code, and quartile of percent population with bachelor's degree in the patient's zip code. Visit characteristics included time spent with the physician, expected source of payment for visit (private insurance, public insurance, or other), major reason for visit (new or acute problem, chronic illness, preventive care, other), whether the physician or clinic was patient's primary care provider, whether the patient had been seen at the clinic before, and each type of provider that the patient saw during the visit (physician, nurse practitioner, RN/LPN, and PA). Finally, physician and practice characteristics were census region of office or clinic, whether the office or clinic is in a metropolitan statistical area, physician specialty (General/Family practice, Internal Medicine, OB/GYN, other) office type (private practice, federally qualified health center or other), physician ownership of practice, and solo practice status. We also included an indicator for data year as a covariate.

Analysis

We first examined bivariate associations between the predictors and each outcome. We then used multivariate logistic regression to assess predictors of any hormonal contraceptive being prescribed at an office visit, and multinomial logit regression to assess predictors of type of hormonal contraceptive (oral contraception, contraceptive patch, contraceptive ring, Depo Provera injection, hormonal intrauterine contraception (Mirena)) prescribed. Visits where Implanon was provided were excluded from the multinomial logit model because of small sample size. Analyses were weighted to be nationally representative and standard errors were adjusted to account for the complex survey design.

Results

Table 1 reports sample characteristics by whether or not a contraceptive was prescribed. A contraceptive prescription was identified at 8.6% of visits in the sample. Contraceptive prescription was associated with survey year, patient age, expected source of payment, major reason for visit, physician specialty, physician ownership of practice, and solo practice. Table 2 presents the same characteristics by contraceptive method provided at visits with a contraceptive prescription (n=1,988). Method type was associated with survey year, patient race/ethnicity, percent poverty in the patient's zip code expected source of payment, whether the provider was the patient primary care provider, whether the patient was an established patient, physician specialty, and office type.

In the multivariate logistic regression model (Table 3), later survey years were associated with higher odds of a contraceptive prescription. Patient age was the only patient characteristic associated with lower odds of a contraceptive prescription (AOR=0.94, p<0.001). In visits where the expected source of payment was non-private insurance, odds of a contraceptive being prescribed were lower (AOR=0.73, p=0.005 for public insurance). The major reason for visit being a chronic problem or preventive care (vs. a new or acute problem) was positively associated with a contraceptive being prescribed. Federally qualified health center office type (vs. private practice), the reason for the visit being a chronic problem or preventive care (vs. a new or acute problem), and longer visit length were associated with increased odds of a contraceptive being prescribed. OB/GYN physician specialty was associated with more than twice the odds of a contraceptive prescription (AOR=2.11; p<0.001), while physician ownership of the practice was associated with reduced odds (AOR=0.77, p=0.001).

Multinomial logit results are shown in Table 4. Later survey years are associated with higher rates of IUC and lower rates of Nuvaring relative to 2006. Non-Hispanic black women (vs. non-Hispanic white women) were more likely to use Depo Provera (RRR=2.15, p=0.002) relative to oral contraceptives, and Hispanic women (vs. non-Hispanic white women)were more likely to use IUC (RRR=3.02, p=0.003). Public insurance (vs. private insurance) as the source of payment was associated with higher relative risk of each method compared to oral contraceptives except Nuvaring. Physicians who were OB/GYNs (vs. general or family practice) were six times as likely to provide IUC relative to oral contraceptives, and twice as likely to prescribe Nuvaring. The physician's office being a solo practice was associated with decreased likelihood of providing IUC vs. oral contraceptives.

Discussion

Contraceptive prescriptions were relatively rare among visits by reproductive-age women to office-based physicians in the U.S., and when contraceptives were provided, most (75%) were oral contraceptives. However, this low rate of contraceptive prescriptions is consistent with other analyses using the NAMCS,[9] and the high proportion of oral contraceptive users relative to other methods is also consistent with other estimates,[10] taking into account the fact that we were limited in which methods we could identify using this data source.

Our findings indicate that likelihood of a contraceptive being prescribed and the type of contraception prescribed are associated with at least some characteristics at the level of the physician, practice and clinical encounter while controlling for patient-level characteristics. However, as prior research has shown, contraceptive type was most consistently associated with patient race/ethnicity and expected source of payment, despite our ability examine many characteristics that are not available in other sources of data. OB/GYNs were more likely than physicians in general or family practice to provide methods such as IUC, which is not surprising given that IUC provision requires particular training, and professional guidelines about appropriate candidates for IUC have changed in recent years.[11]

While research on contraceptive method choice has tended to focus on the characteristics of individual women and their circumstances, this study suggests that physicians' structural arrangements and aspects of the clinical encounter in which prescriptions for hormonal contraceptives are obtained may also play an important role. Further research is needed to investigate whether these characteristics have a causal impact on contraceptive method decisions.

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Table 1: Any contraceptive prescription by selected characteristics among non-pregnant women age 15-45 (N = 24,780), NAMCS, 2006-2010.

	Contraceptive prescribed		
	No	**Yes**	**p**
Total	91.4	8.6	--
Survey year			0.0097
2006	18.7	15.1	
2007	20.4	17.2	
2008	20.0	20.6	
2009	20.8	22.7	
2010	20.1	24.5	
Patient characteristics			
Age, mean(SE)	32.1 (0.10)	29.0 (0.25)	<0.001
Race			0.151
Non-Hispanic white	68.4	70.7	
Non-Hispanic black	12.6	13.4	
Hispanic	13.5	11.8	
Other/multiple race	5.5	4.1	
Percent poverty in patient's zip code			0.212
Quartile 1 (Less than 5.00%)	23.7	26.0	
Quartile 2 (5.00-9.99%)	31.1	30.7	
Quartile 3 (10.00-19.99%)	31.6	31.6	
Quartile 4 (20.00% or more)	13.6	11.6	
Urban patient zip code	86.1	84.9	0.427
Visit characteristics			
Expected source of payment			<0.001
Private	67.3	75.8	
Public (Medicare or Medicaid)	16.9	15.8	
Other, self-pay, unknown	15.8	8.3	
Major reason for visit			<0.001
New or acute problem	41.7	26.8	
Chronic problem	32.1	19.3	
Pre/post surgery or unknown	9.1	4.6	
Preventive care	17.1	49.2	
Physician or clinic is patient's PCP	31.8	33.5	0.351
Physician or clinic has seen patient before	81.5	84.6	0.038
Office/clinic characteristics			
Census region of office/clinic			0.087
Northeast	18.6	16.3	
Midwest	21.1	25.4	
South	39.9	39.4	
West	20.4	18.9	
Office or clinic in MSA area	88.8	87.8	0.517
Physician specialty			<0.001
General/family practice	29.7	30.7	
Internal Medicine	12.2	8.0	
OB/GYN	16.4	48.5	
Other	41.7	12.9	
Office type			0.025
Private practice	87.5	88.2	
Federally qualified health center	3.1	4.3	
Other	9.3	7.5	
Physician owns practice	67.5	59.9	<0.001
Solo practice	34.1	27.8	0.006

Note: Percentages are weighted to be nationally representative.

Table 2: Type of contraceptive prescription by selected characteristics, non-pregnant women age 15-45 (N=1,988), NAMCS 2006-2010.

	IUC	Depo Provera	Nuvaring	Patch	Pill	
	%	%	%	%	%	p
Total	4.3	12.9	6.2	2.1	74.5	
Survey year						<0.001
2006	2.2	13.4	3.8	4.6	76.0	
2007	2.3	15.7	10.1	2.6	69.3	
2008	1.0	13.8	4.3	0.8	80.2	
2009	7.4	12.3	5.8	1.7	72.8	
2010	7.1	10.5	6.9	1.5	74.0	
Patient characteristics						
Age, mean(SE)	27.0 (0.91)	27.0 (0.68)	27.0 (0.83)	28.3 (1.21)	28.4 (0.29)	--
Race						<0.001
Non-Hispanic white	3.7	10.2	6.5	1.6	78.0	
Non-Hispanic black	3.2	24.6	6.9	1.9	63.4	
Hispanic	8.8	17.9	4.9	4.4	64.0	
Other/multiple race	5.4	7.5	2.8	3.9	80.4	
Percent poverty in patient's zip code						0.020
Quartile 1 (Less than 5.00%)	4.2	7.8	6.5	2.0	79.6	
Quartile 2 (5.00-9.99%)	4.2	12.4	6.6	1.8	75.1	
Quartile 3 (10.00-19.99%)	5.2	14.0	5.1	2.2	73.5	
Quartile 4 (20.00% or more)	2.9	22.7	7.7	2.5	64.3	
Urban patient zip code	4.3	12.7	6.4	2.0	74.6	0.908
Visit characteristics						
Expected source of payment						<0.001
Private	4.0	8.3	6.2	1.7	79.8	
Public (Medicare or Medicaid)	7.5	31.3	7.1	2.8	51.3	
Other, self-pay, unknown	1.4	19.6	4.4	4.4	70.3	
Major reason for visit						0.001
New or acute problem	4.8	9.2	6.9	1.6	77.5	
Chronic problem	0.8	17.0	4.3	0.3	77.6	
Pre/post surgery or unknown	3.4	11.2	2.8	2.5	80.1	
Preventive care	5.6	13.5	6.8	3.0	71.1	
Physician or clinic is patient's PCP	2.8	15.7	8.2	1.6	71.7	0.006
Physician or clinic has seen patient before	4.8	13.9	6.6	1.8	72.9	0.004
Physician seen	4.5	11.6	6.2	2.1	75.5	<0.001
Office/clinic characteristics						
Census region of office/clinic						0.402
Northeast	3.4	9.6	7.8	2.2	77.0	
Midwest	3.8	12.3	6.0	1.9	76.0	
South	5.2	14.0	6.3	1.1	73.3	
West	4.0	14.2	4.8	4.2	72.9	
Office or clinic in MSA or non-MSA area	4.0	12.8	6.2	1.9	75.2	0.325
Physician specialty						<0.001
General/family practice	1.9	13.9	8.2	1.8	74.2	
Internal Medicine	0.1	15.1	6.4	0.1	78.3	
OB/GYN	7.5	12.1	5.8	2.7	71.9	
Other	1.1	12.0	2.8	1.6	82.5	
Office type						0.016
Private practice	4.5	12.4	6.0	1.9	75.2	
Federally qualified health center	3.3	26.8	4.7	5.7	59.4	
Other	2.3	11.2	9.6	2.2	74.8	
Physician owns practice	4.1	12.9	5.6	2.0	75.4	0.790
Solo practice	2.8	15.9	5.6	2.0	73.6	0.272

Note: Percentages are weighted to be nationally representative. Implanon users are excluded.

Table 3: Odds of receiving any contraceptive prescription among visits by non-pregnant, reproductive age women, NAMCS 2006-2010 (n=24,780).

	AOR	95% CI
Survey year		
2006	Ref	
2007	1.01	(0.79, 1.31)
2008	1.25	(0.96, 1.63)
2009	**1.45**	**(1.12, 1.89)**
2010	**1.51**	**(1.18, 1.94)**
Patient characteristics		
Age	**0.94**	**(0.94, 0.95)**
Race/ethnicity (Ref=Non-Hispanic white)		
Non-Hispanic black	0.88	(0.73, 1.07)
Hispanic	0.81	(0.63, 1.04)
Other/multiple race	**0.67**	**(0.48, 0.94)**
Percent poverty in patient's zip code (Ref=Quartile 1)		
Quartile 2 (5.00-9.99%)	0.95	(0.79, 1.13)
Quartile 3 (10.00-19.99%)	1.02	(0.82, 1.26)
Quartile 4 (20.00% or more)	0.93	(0.70, 1.23)
Percent population w/ bachelor's degree in patient's zip (Ref=Quartile 1)		
Quartile 2 (12.84-19.66 percent)	1.16	(0.95, 1.42)
Quartile 3 (19.67-31.68 percent)	1.05	(0.84, 1.32)
Quartile 4 (31.69 percent or more)	1.10	(0.87, 1.38)
Visit characteristics		
Time spent with MD (Ref=Less than 15 minutes)		
Less than 15 minutes	Ref	
15 minutes	1.14	(0.94, 1.38)
16-29 minutes	1.19	(0.99, 1.43)
30 minutes or more	1.23	(0.99, 1.53)
Expected source of payment (Ref=Private)		
Public (Medicare or Medicaid)	**0.73**	**(0.58, 0.91)**
Other, self-pay, unknown	**0.58**	**(0.46, 0.73)**
Major reason for visit (Ref=New or acute problem)		
Chronic problem	**1.45**	**(1.24, 1.71)**
Pre/post surgery or unknown	0.93	(0.69, 1.26)
Preventive care	**2.88**	**(2.43, 3.41)**
Physician or clinic is patient's PCP	0.94	(0.80, 1.10)
Physician or clinic has seen patient before	1.08	(0.92, 1.26)
Office/clinic characteristics		
Census region of office/clinic (Ref=Northeast)		
Midwest	1.31	(1.00, 1.72)
South	1.15	(0.90, 1.47)
West	1.08	(0.79, 1.48)
Office or clinic in MSA	1.04	(0.81, 1.33)
Physician specialty (Ref=General/family practice)		
Internal Medicine	0.74	(0.54, 1.01)
OB/GYN	**2.11**	**(1.69, 2.64)**
Other	**0.29**	**(0.23, 0.38)**
Office type (Ref=Private practice)		
Federally qualified health center	1.19	(0.83, 1.69)
Other	0.83	(0.63, 1.11)
Physician owns practice	**0.77**	**(0.65, 0.90)**
Solo practice	0.98	(0.80, 1.20)

Note: AOR=Adjusted Odds Ratio. Boldface type indicates $p<0.05$. Model adjusts for rural/urban status of patient zip code and provider type seen.

Table 4: Selected multinomial logistic regression results for contraceptive type among visits by reproductive-age women where a contraceptive was prescribed, NAMCS 2006-2010 (n=1,988, base outcome=oral contraceptives).

	IUC vs. oral contraceptives	Depo Provera vs. oral contraceptives	Patch vs. oral contraceptives	Nuvaring vs. oral contraceptives
	RRR	**RRR**	**RRR**	**RRR**
Survey year (Ref=2006)				
2007	1.71	1.09	**2.94**	0.46
2008	0.43	1.01	1.05	**0.12**
2009	**5.13**	0.80	1.53	**0.23**
2010	**4.00**	0.73	1.77	**0.30**
Patient characteristics				
Race/ethnicity (Ref=Non-Hispanic white)				
Non-Hispanic black	0.60	**2.15**	1.02	1.96
Hispanic	**3.02**	1.50	0.93	2.01
Other/multiple race	2.58	0.68	0.57	2.08
Visit characteristics				
Expected source of payment (Ref=private)				
Public (Medicare or Medicaid)	**2.98**	**5.34**	**2.02**	1.82
Other, self-pay, unknown	0.48	**2.14**	0.78	2.44
Major reason for visit (Ref=New or acute problem)				
Chronic problem	**0.13**	1.80	0.68	**0.16**
Pre/post surgery or unknown	0.25	1.05	0.30	1.37
Preventive care	0.54	1.32	0.96	1.88
Physician or clinic is patient's PCP	0.84	1.18	1.20	1.72
Physician or clinic has seen patient before	**4.63**	**2.16**	1.86	0.52
Physician/practice characteristics				
Office or clinic in MSA	0.49	1.28	1.04	**0.35**
Physician specialty (Ref=General/family practice)				
Internal Medicine	**0.05**	1.05	0.81	**0.08**
OB/GYN	**6.20**	1.05	0.80	**2.03**
Other	0.69	0.95	**0.40**	1.95
Solo practice	**0.42**	1.12	0.88	1.25

Note: Models are weighted to be nationally representative. Standard errors are adjusted for the complex survey design. RRR=Relative Risk Ratio. IUC=Intrauterine Contraception. Boldface type indicates $p<0.05$. Model adjusts for patient age, percent poverty in patient's zip code, education level in patient's zip code, rural/urban status of patient zip code, time spent with the MD, provider type seen, census region of physician office, office type (private practice, federally qualified health center or other), and physician ownership of practice.