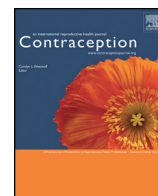




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Original research article

Surgical sterilization among US men and women with employer-based insurance: A claims data analysis^{☆,☆☆,★}

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ABSTRACT

Objective: To assess variability in the use of surgical sterilization among privately insured U.S. men and women. **Study design:** We queried the MarketScan Commercial Claims database using CPT, ICD9, and HCPCS codes to identify 658,509 individuals between 18–65 years old (0.37% of total) who underwent male or female sterilization between 2009–2014. We examined annual trends using Cochran–Mantel–Haenszel test. We analyzed differences in age, geographic distribution, and family size using Wilcoxon sum-rank and generalized chi-squared tests.

Results: Between 2009–2014, 422,290 men (0.55% of total men) and 236,219 women (0.24% of total women) with employer-sponsored insurance underwent male and female sterilization, respectively. Annual male sterilizations decreased from 77,565 (0.60%) in 2009 to 61,436 (0.51%) in 2014 ($p < .001$), while annual female sterilizations decreased from 43,766 (0.26%) to 30,465 (0.19%) ($p < .001$) over the same time period. Median age at time of male or female sterilization was 38 and 37 years, respectively. The decision to undergo sterilization at age 35 or older was associated with family size of 4 or more individuals ($p < .001$). Sterilization was more common in urban areas, with 84% of male sterilizations and 79% of female sterilizations performed in urban areas. 79% of men compared to 60% of women who underwent sterilization were the primary policyholders of their employer-sponsored healthcare plans ($p < .001$).

Conclusion: Male sterilization was twice as common as female sterilization in this privately insured cohort. Use of surgical sterilization was associated with increased age and larger family size. There was a decline in the annual number of male and female sterilizations during the study period.

Implications: Male sterilization is more common among US men with employer-based insurance than among the general population. The decline in sterilization may reflect cultural factors and the rise of long-acting reversible contraception. Analyzing the sociodemographic factors impacting sterilization may provide insight into contraceptive choice and improve reproductive health services.

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1. Introduction

Surgical sterilization is a well-established method of permanent contraception for men and women [1]. When accounting for both male and female procedures, surgical sterilization is also the most

common contraceptive method in the United States (US), with an estimated 500,000 male sterilizations and 680,000 female sterilizations performed annually [2–4]. Nationwide, male sterilization remains less popular than use of female sterilization, despite male sterilization being a safer, less invasive, and more cost-effective option for permanent contraception [5–7]. Data from the 2006–2010 National Survey for Family Growth (NSFG) demonstrated that 6.6% of men and 16.4% of women aged 18–45 utilized male and female sterilization, respectively [8]. Pile et al. studied estimates from United Nations global surveys and found that use of female sterilization was almost twice as common as male sterilization in developed countries [9].

Few studies have examined the sociodemographic factors associated with the choice of surgical sterilization among men and women, such as age, geographic location of residence, number of living children, and insurance type [1,7,8]. Anderson et al. used 2006–2008 NSFG data and

Abbreviations: NSFG, National Survey for Family Growth; MSAs, metropolitan statistical areas; IUD, intrauterine device.

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found that increased age, married status, and increased number of offspring were associated with male and female sterilization [7]. They also found that men relying on male sterilization had a higher education and income level, as compared to those relying on female sterilization [7]. Sharma et al. reported similar results using 2006–2010 NSFG data [8]. However, these analyses based on survey data are limited by response rate and sample size.

We aimed to describe changes in rates of sterilization among US men and women with employer-based insurance between 2009 and 2014, using a contemporary and comprehensive claims database. We expect this analysis to advance our understanding of the demographic factors impacting the use of surgical sterilization, and shaping the socioeconomic landscape of permanent contraception for both men and women with private insurance.

Table 1
Sociodemographic characteristics of privately insured men and women undergoing surgical sterilization, 2009–2014, (n=658,509).

Covariate	Procedure Year						p
	2009	2010	2011	2012	2013	2014	
Female sterilization							
Age of patient							
Mean ± SD	36.7± 6.6	36.8±6.7	36.8±6.8	36.9±6.9	36.8± 7	36.8±7.2	0.036
Metropolitan statistical area							
No	9669 (22.1)	9066 (20.9)	9441 (21.5)	9262 (22)	6871 (21)	6396 (21)	<.001
Yes	34,097 (77.9)	34,255 (79.1)	34,478 (78.5)	32,807 (78)	25,808 (79)	24,069 (79)	
Type of health plan ^a							
Comprehensive	337 (0.9)	325 (0.8)	266 (0.7)	268 (0.7)	360 (1.1)	335 (1.2)	<.001
HDHP/CDHP	1850 (4.7)	2555 (6.5)	2557 (6.3)	2575 (6.7)	3948 (12.3)	4323 (15.5)	
HMO	6799 (17.2)	6713 (17.1)	6073 (15.1)	4525 (11.7)	4550 (14.2)	2684 (9.6)	
POS/POS w/cap	3624 (9.2)	3240 (8.3)	3189 (7.9)	2626 (6.8)	2475 (7.7)	2072 (7.4)	
PPO/EPO	26,890 (68.1)	26,410 (67.3)	28,194 (70)	28,569 (74.1)	20,776 (64.7)	18,414 (66.2)	
Region							
Northeast Region	6980 (15.9)	6829 (15.8)	6898 (15.7)	6305 (15)	4166 (12.7)	4862 (16)	<.001
North Central Region	10,065 (23)	10,179 (23.5)	10,538 (24)	9499 (22.6)	7369 (22.5)	6411 (21)	
South Region	19,476 (44.5)	19,167 (44.2)	18,758 (42.7)	18,838 (44.8)	14,107 (43.2)	13,783 (45.2)	
West Region	5384 (12.3)	6098 (14.1)	6136 (14)	6288 (14.9)	5903 (18.1)	4549 (14.9)	
Unknown Region	1861 (4.3)	1048 (2.4)	1589 (3.6)	1139 (2.7)	1134 (3.5)	860 (2.8)	
Relation to employee							
Employee	25,824 (59)	26,188 (60.5)	26,010 (59.2)	24,992 (59.4)	19,592 (60)	18,327 (60.2)	<.001
Dependent	17,942 (41)	17,133 (39.5)	17,909 (40.8)	17,077 (40.6)	13,087 (40)	12,138 (39.8)	
Family size ^b							
1	-	-	9278 (21.1)	8484 (20.2)	5963 (18.2)	6391 (21)	<.001
2	-	-	6067 (13.8)	5865 (13.9)	4368 (13.4)	4241 (13.9)	
3	-	-	7765 (17.7)	7582 (18)	5773 (17.7)	5399 (17.7)	
4	-	-	11,836 (26.9)	11,312 (26.9)	9148 (28)	8049 (26.4)	
5/+	-	-	8973 (20.4)	8826 (21)	7427 (22.7)	6385 (21)	
Male sterilization							
Age of patient							
Mean ± SD	38± 6.6	38.1± 6.6	38.1± 6.6	38.1± 6.6	38.1±6.5	38±6.5	<.001
Metropolitan statistical area							
No	14,352 (18.5)	11,364 (15.8)	12,322 (16.7)	12,543 (16.5)	9395 (15.5)	8857 (14.5)	<.001
Yes	63,158 (81.5)	60,641 (84.2)	61,491 (83.3)	63,407 (83.5)	51,211 (84.5)	52,315 (85.5)	
Type of health plan ^a							
Comprehensive	793 (1)	518 (0.7)	350 (0.5)	473 (0.6)	494 (0.8)	517 (0.8)	<.001
HDHP/CDHP	4530 (5.8)	6232 (8.7)	6003 (8.1)	6481 (8.5)	8582 (14.2)	10,470 (17.1)	
HMO	11,144 (14.4)	9312 (12.9)	8826 (12)	8242 (10.9)	8316 (13.7)	6565 (10.7)	
POS/POS w/cap	9988 (12.9)	9018 (12.5)	9386 (12.7)	8106 (10.7)	4118 (6.8)	5769 (9.4)	
PPO/EPO	51,055 (65.9)	46,925 (65.2)	49,248 (66.7)	52,648 (69.3)	39,096 (64.5)	37,851 (61.9)	
Region							
Northeast Region	12,680 (16.4)	12,510 (17.4)	12,861 (17.4)	12,563 (16.5)	9271 (15.3)	11,365 (18.6)	<.001
North Central Region	21,928 (28.3)	19,918 (27.7)	19,986 (27.1)	19,842 (26.1)	15,475 (25.5)	15,053 (24.6)	
South Region	26,655 (34.4)	25,227 (35)	25,095 (34)	26,145 (34.4)	19,556 (32.3)	20,381 (33.3)	
West Region	12,956 (16.7)	13,453 (18.7)	14,000 (19)	15,867 (20.9)	14,843 (24.5)	13,024 (21.3)	
Unknown Region	3291 (4.2)	897 (1.2)	1871 (2.5)	1533 (2)	1461 (2.4)	1349 (2.2)	
Relation to employee							
Employee	61,781 (79.7)	56,470 (78.4)	58,322 (79)	60,373 (79.5)	47,212 (77.9)	48,105 (78.6)	<.001
Dependent	15,729 (20.3)	15,535 (21.6)	15,491 (21)	15,577 (20.5)	13,394 (22.1)	13,067 (21.4)	
Family size ^b							
1	-	-	7448 (10.1)	7439 (9.8)	5348 (8.8)	6136 (10)	<.001
2	-	-	5598 (7.6)	5517 (7.3)	4082 (6.7)	4340 (7.1)	
3	-	-	9553 (12.9)	9523 (12.5)	7374 (12.2)	7810 (12.8)	
4	-	-	28,905 (39.2)	30,258 (39.8)	24,691 (40.7)	24,418 (39.9)	
5/+	-	-	22,309 (30.2)	23,213 (30.6)	19,111 (31.5)	18,468 (30.2)	

All differences were statistically significant.

^a HDHP high-deductible health plan.
 CDHP consumer-driven health plan.
 HMO health maintenance organization.
 POS point-of-service.
 PPO preferred provider organization.
 EPO exclusive provider organization.

^b Family size measured as patient plus number of dependents on plan.

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