

## GYNECOLOGY

## Trends in contraceptive use according to HIV status among privately insured women in the United States

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**BACKGROUND:** There is limited information on the patterns and trends of contraceptive use among women living with HIV, compared with noninfected women in the United States. Further, little is known about whether antiretroviral therapy correlates with contraceptive use. Such information is needed to help identify potential gaps in care and to enhance unintended pregnancy prevention efforts.

**OBJECTIVE:** We sought to compare contraceptive method use among HIV-infected and noninfected privately insured women in the United States, and to evaluate the association between antiretroviral therapy use and contraceptive method use.

**STUDY DESIGN:** We used a large US nationwide health care claims database to identify girls and women ages 15-44 years with prescription drug coverage. We used diagnosis, procedure, and National Drug Codes to assess female sterilization and reversible prescription contraception use in 2008 and 2014 among women continuously enrolled in the database during 2003 through 2008 or 2009 through 2014, respectively. Women with no codes were classified as using no method; these may have included women using nonprescription methods, such as condoms. We calculated prevalence of contraceptive use by HIV infection status, and by use of antiretroviral therapy among those with HIV. We used multivariable polytomous logistic regression to calculate unadjusted and adjusted odds ratios and 95% confidence intervals for female sterilization, long-acting reversible contraception, and short-acting hormonal contraception compared to no method.

**RESULTS:** While contraceptive use increased among HIV-infected and noninfected women from 2008 through 2014, in both years, a lower proportion of HIV-infected women used prescription contraceptive methods (2008: 17.5%; 2014: 28.9%, compared with noninfected women (2008: 28.8%; 2014: 39.8%,  $P < .001$  for both). Controlling for demographics, chronic medical conditions, pregnancy history, and cohort year, HIV-infected women compared to HIV-noninfected women had lower odds of using long-acting reversible contraception (adjusted odds ratio, 0.67; 95% confidence interval, 0.52–0.86 compared to no method) or short-acting hormonal contraception method (adjusted odds ratio, 0.59; 95% confidence interval, 0.50–0.70 compared to no method). In 2014, HIV-infected women using antiretroviral therapy were significantly more likely to use no method (76.8% vs 64.1%), and significantly less likely to use short-acting hormonal contraception (11.0% vs 22.7%) compared to HIV-infected women not using antiretroviral therapy. Those receiving antiretroviral therapy had lower odds of using short-acting hormonal contraception compared to no method (adjusted odds ratio, 0.45; 95% confidence interval, 0.32–0.63). There was no significant difference in female sterilization by HIV status or antiretroviral therapy use.

**CONCLUSION:** Despite the safety of reversible contraceptives for women with HIV, use of prescription contraception continues to be lower among privately insured HIV-infected women compared to noninfected women, particularly among those receiving antiretroviral therapy.

**Key words:** antiretroviral therapy, contraception, HIV

## Introduction

It is estimated that as of 2014, 25% of people living with HIV in the United States were women.<sup>1</sup> Access to accurate contraceptive method information and a full range of effective options is important for HIV-infected women not only to prevent unintended pregnancy, but also to prevent vertical transmission of HIV.<sup>2</sup> According to the US Medical Eligibility Criteria for Contraceptive Use (MEC),<sup>3</sup> all contraceptive methods are

considered safe or generally safe for use by HIV-infected women.<sup>4</sup> Further, concern regarding drug interactions may limit providers from recommending hormonal contraceptives. In contrast, the most recent US MEC guidelines do not recommend limiting any contraceptives based on antiretroviral therapy (ART) use. An exception to this recommendation is the infrequently prescribed protease inhibitor fosamprenavir. For women using fosamprenavir, current recommendations state that the risks of combined hormonal contraception outweigh the benefits.<sup>3</sup> HIV-infected individuals are encouraged by their providers to use condoms to prevent HIV transmission to uninfected partners. While there is increasing use of effective prescription contraceptive methods in the general population,<sup>5</sup>

specifically long-acting reversible contraceptives (LARC) (which include intrauterine devices [IUDs] and implants), some data suggested that women with HIV are more likely to use less effective contraceptive options such as condoms.<sup>6</sup> High rates of female sterilization<sup>7</sup> and reduced overall pregnancy rates during early stages of the HIV epidemic may not have continued. Among women with HIV, ART use has increased due to efforts to improve access to testing and ART and guidelines suggesting earlier initiation of ART.<sup>8-10</sup> Due to increasing ART use, improved health outcomes, and the lower perceived HIV transmissibility associated with viral load suppression, the trends in contraceptive use among HIV-infected women may be becoming more similar to those among noninfected women.

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111 Our aim was to evaluate prescription  
112 contraceptive use among HIV-infected  
113 women compared to noninfected  
114 women in the United States in 2008 and  
115 2014. Specifically, we aimed to examine  
116 differences in the pattern of prescription  
117 contraceptive methods based on HIV  
118 infection status and to explore the  
119 impact of ART use on contraceptive  
120 method use. This information will pro-  
121 vide contemporary contraceptive trends  
122 and explore the associations between  
123 HIV and ART use and contraceptive  
124 practice patterns.

## 125 Materials and Methods

126 We analyzed data from the Truven  
127 Health MarketScan Commercial Claims  
128 and Encounters databases. These data-  
129 bases consist of a large convenience  
130 sample of individuals with employer-  
131 based health insurance and include  
132 individual-level health care claims in-  
133 formation from employer health plans  
134 with both inpatient and outpatient di-  
135 agnoses and procedure codes and links  
136 to filled outpatient prescription drug  
137 claims. All claims for a particular in-  
138 dividual can be linked even if the employer  
139 changes insurance plans, but may not be  
140 linked if the individual changes  
141 employment. The average number of  
142 female enrollees in the database is  
143 approximately 11.4 million per year in  
144 years 2003 through 2008 and approxi-  
145 mately 24 million per year in years 2009  
146 through 2014. These databases undergo  
147 quality assessments to maintain validity  
148 of the data.<sup>11</sup> As the databases are de-  
149 identified, the institutional review board  
150 of the Centers for Disease Control and  
151 Prevention determined that this was not  
152 human subjects research.

153 We evaluated 2 cohorts of women to  
154 determine contraceptive use for index  
155 years 2008 and 2014. For each index year,  
156 we included women continuously  
157 enrolled for 5 years prior, to account for  
158 previously initiated LARC methods or  
159 sterilization. Specifically, for 2008, we  
160 included women continuously enrolled  
161 from 2003 through 2008; for 2014, we  
162 included women continuously enrolled  
163 from 2009 through 2014. Girls and  
164 women were included if they were ages  
165 15-44 years and had health plans with

166 prescription drug coverage. We excluded  
167 women who had a prior diagnostic or  
168 procedure code for hysterectomy from  
169 the analysis of contraceptive method use.  
170 Notably any women with a hysterectomy  
171 code identified in the 2003 through 2008  
172 period, thus excluded in 2008, were also  
173 excluded from the 2014 cohort. To  
174 identify the exposures, outcomes, and  
175 covariates, such as pregnancy and  
176 chronic medical conditions, we used  
177 *International Classification of Diseases,  
178 Ninth Revision, Clinical Modification  
179 (ICD-9-CM)* and *Current Procedural  
180 Terminology* codes (see Appendix for  
181 specific coding for conditions and  
182 medications).

183 Our primary exposures of interest  
184 were HIV infection status and ART use  
185 (among HIV-infected women). HIV  
186 infection was defined by meeting 1 of the  
187 following 4 criteria: (1) 2 outpatient  
188 visits with HIV diagnosis codes sepa-  
189 rated by  $\geq 30$  days; (2) 1 outpatient  
190 diagnosis code for HIV and at least 1  
191 antiretroviral drug (see list in Appendix  
192 of ART medications considered; medi-  
193 cations typically used for preexposure or  
194 postexposure prophylaxis without  
195 concomitant other ART medication were  
196 excluded); (3) 2 pharmacy charges for at  
197 least 1 ART separated by  $\geq 30$  days; or (4)  
198 1 inpatient stay with HIV diagnosis code.  
199 We defined HIV-infected women as ART  
200 users if they filled at least 1 prescription  
201 for ART (drug names listed in Appendix)  
202 during the 6 years of the cohort.

203 Our primary outcome of interest was  
204 female sterilization or reversible pre-  
205 scription contraceptive use during the  
206 index year. This was identified from  
207 inpatient, outpatient, and pharmaceu-  
208 tical databases using *ICD-9-CM* diag-  
209 nosis and procedure codes, Healthcare  
210 Common Procedure Coding System  
211 supply codes, *Current Procedural Termi-  
212 nology* codes, and the US Food and Drug  
213 Administration National Drug Codes.  
214 We considered prescriptions to be a  
215 proxy measure for actual use. Contra-  
216 ceptive methods examined included fe-  
217 male sterilization and reversible  
218 prescription methods such as IUDs,  
219 implants, injectables, pills, patches, and  
220 rings. A woman was identified as steril-  
221 ized if a sterilization code was present in

222 the inpatient or outpatient databases in  
223 the 6 years of the cohort. A woman was  
224 considered to be an IUD user during the  
225 index year if the method was placed  
226 based on a procedure code or supply  
227 code from the inpatient or outpatient  
228 databases during that index year or  
229 within the 5 years prior without a  
230 removal code noted. A woman was  
231 considered to be an implant user during  
232 the index year if the method was placed  
233 based on a procedure code or supply  
234 code from the inpatient or outpatient  
235 databases during that index year or  
236 within 3 years prior without a removal  
237 code noted. We searched for codes in the  
238 index year indicating injectable, pill,  
239 patch, or ring use. These methods  
240 needed to be identified at least once  
241 during the index year to be considered as  
242 use during that year. Injectable use was  
243 identified from inpatient and outpatient  
244 claims if there was a depot medrox-  
245 yprogesterone acetate supply code or a  
246 family planning encounter diagnosis  
247 code coupled with a generic injection  
248 procedure code. Use of oral contracep-  
249 tive pills (including combined and  
250 progestin-only pills), combination hor-  
251 monal patches, or combination vaginal  
252 rings was identified by National Drug  
253 Codes in the pharmaceutical databases.  
254 If there were no sterilization or contra-  
255 ceptive codes identified, the individual  
256 was classified as using no method. In-  
257 dividuals classified as using no method  
258 may have been using nonprescription  
259 methods such as condoms. We used a  
260 method of hierarchal classification to  
261 determine the most effective method of  
262 contraceptive used similar to one previ-  
263 ously described.<sup>7</sup> We collapsed the  
264 methods into 4 categories to evaluate  
265 trends in method use: (1) female steril-  
266 ization; (2) LARC method (IUDs and  
267 implants); (3) short-acting hormonal  
268 contraception (SAHC), including  
269 shorter-acting prescription methods  
270 (injectable, pills, patch, or ring); and (4)  
271 no prescription method.

272 For covariates, we included age (3  
273 categories: 15-24, 25-35, 36-44 years),  
274 region in the United States (defined as  
275 the following 5 categories by Truven  
276 Health: Northeast, North Central,  
277 South, West, unknown), chronic

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