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2 **Use of telemedicine to obtain contraception among young adults: Inequities by health**
3 **insurance**

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31 **Abstract**

32 **Objective:** The objective of this study was to describe use of telemedicine for contraception in a
33 sample of young adults and examine differences by health insurance coverage.

34 **Study Design:** We analyzed survey data collected May 2020-July 2022 from individuals at risk
35 of pregnancy aged 18–29 recruited at 29 community colleges in California and Texas. We used
36 multivariable mixed-effects logistic regression models with random effects for site and individual
37 to compare use of telemedicine to obtain contraception by insurance status, sociodemographic
38 characteristics, and state.

39 **Results:** Our analytic sample included 6,465 observations from 1,630 individuals. Participants
40 reported using a contraceptive method obtained through telemedicine in just 6% of observations.
41 Uninsured participants were significantly less likely than those privately insured to use
42 contraception obtained through telemedicine (adjusted odds ratio [aOR], 0.54; 95% confidence
43 interval [CI], 0.31–0.97), as were participants who did not know their insurance status (aOR,
44 0.54; 95% CI, 0.29–0.99). Texas participants were less likely to use contraception obtained via
45 telemedicine than those in California (aOR, 0.42; CI: 0.25–0.69).

46 **Conclusions:** Few young people in this study obtained contraception through telemedicine, and
47 insurance was crucial for access in both states.

48

49 **Implications:** Although telemedicine holds promise for increasing contraceptive access, we
50 found that few young adults were using it, particularly among the uninsured. Efforts are needed
51 to improve young adults' access to telemedicine for contraception and address insurance
52 disparities.

53

54 **Keywords:** Contraception; Telehealth; Telemedicine; Health insurance; Young adult

55 **1. Background**

56 Telemedicine is a safe and effective way to support contraceptive initiation, adherence, and
57 continuation [1, 2, 3]. The coronavirus disease 19 (COVID-19) pandemic motivated providers to
58 expand telemedicine services for contraceptive care in order to minimize in-person encounters
59 [4, 5]. While few family planning providers conducted telemedicine visits before the pandemic,
60 most offered telemedicine for contraception during the pandemic [6, 7]. The rapid growth of
61 telemedicine services included providers serving adolescents and young adults [8, 9]. Studies of
62 patients who received contraceptive services via telemedicine have found that most were
63 satisfied with the telemedicine visit and that it met their needs [10-13].

64

65 However, questions and concerns remain about potential disparities in telemedicine uptake,
66 including disparities by insurance coverage. While the federal government and many state
67 governments relaxed restrictions in order to make telemedicine visits more widely available
68 during the pandemic, coverage of telemedicine services varies by insurance plan and state
69 policies [14]. Uninsured individuals may have less access to telemedicine due to multiple
70 intersecting factors. Most community health centers, which serve a disproportionate share of
71 uninsured patients, were not offering telemedicine before the pandemic and faced considerable
72 barriers to implementing telemedicine programs [15]. In addition, the uninsured may experience
73 greater barriers to using telemedicine, such as lack of reliable Internet access and privacy
74 concerns.

75

76 There is limited data about how telemedicine use for contraception varies by insurance,
77 particularly among young adults. Two national surveys conducted in 2020 found that the

78 uninsured were less likely to use telehealth compared to those with private insurance, although
79 the studies did not disaggregate telehealth use by age nor by the type of medical care received
80 [16, 17]. In addition, several small single-center studies at the outset of the pandemic have shown
81 mixed results, with the publicly insured less [18] or more likely [19] to use telemedicine for
82 varied health services, or more likely to use phone, but not video, visits [20] than the privately
83 insured. A 2021 national online survey assessed use of telehealth for contraceptive services
84 among 18- to 49-year-olds, but the study exclusively analyzed those who obtained contraceptive
85 services, missing the experiences of individuals who were unable to access contraception
86 through in-person or telehealth visits [21]. Given the high need for contraceptive services among
87 young people aged 18-24 [22] and the inconsistent findings in the literature, research is needed
88 on use of telemedicine for contraception in this age group and the role of health insurance in its
89 use.

90

91 Our goal was to examine how often young adults used telemedicine to obtain contraception and
92 identify any differences by health insurance. Participants included young adults recruited from
93 community colleges in California and Texas, states with contrasting state-level policies [23].

94 Most notably, California expanded Medicaid coverage to low-income adults, while Texas has not
95 [24], and California requires private insurers to pay for telehealth and in-person services at the
96 same rate, while Texas does not [25]. Community college students are less likely to be insured
97 than 4-year college students [26]. Earlier studies of community college students found that the
98 uninsured faced barriers to accessing desired contraception in each state [23, 27]. We

99 hypothesized that young people who were uninsured would report lower use of telemedicine for
100 contraception than the insured.

101

102 **2. Material and methods**

103 We conducted a supplementary study on the impact of COVID-19 in an ongoing randomized
104 controlled trial of an intervention to increase contraceptive education and access among young
105 adults attending community college. The overall study was launched in April 2018 and has
106 followed participants over time for reproductive health, educational and economic outcomes. We
107 recruited participants from 29 community college sites in California and Texas, two of the most
108 populous and racially and ethnically diverse states. We used multiple recruitment strategies,
109 including flyers, tabling, classroom announcements, presentations to student organizations,
110 targeted emails, social media posts, and advertisements through online campus resources (e.g.,
111 events calendars, Canvas learning management system). Participants were eligible if they were
112 aged 18–25, assigned female at birth (gender inclusive), spoke English, had vaginal sex with a
113 male partner in the last year, and were not currently pregnant or wanting to become pregnant at
114 baseline. All participants received a written consent form and provided electronic consent to
115 participate. Participants completed online surveys at baseline, every three months for one year,
116 and every six months thereafter. They received a \$50 electronic gift card following study
117 enrollment and a \$20-\$30 gift card after completing the follow-up surveys.

118

119 In May 2020, we added a series of items to each survey about the impact of the COVID-19
120 pandemic on young people’s health, education, and economic well-being, and their access to
121 telemedicine. The current analyses used surveys administered from May 2020 to July 2022.

122

123 This study was approved by the Institutional Review Boards (IRBs) at the University of
124 California, San Francisco and The University of Texas at Austin; participating colleges either
125 approved the study with their IRB or used the corresponding state university's IRB approval. We
126 developed a community advisory board and conducted interviews with students, staff, and
127 faculty at participating colleges to integrate community feedback into the research process. For
128 example, we inquired about the most effective strategies for student engagement and asked
129 students to review study flyers to ensure that the language and images were inclusive of diverse
130 populations.

131

132 **2.1 Measures**

133 *2.1.1 Outcome variable.* The primary outcome variable is a time-varying measure of whether
134 participants were using a contraceptive method obtained through a telemedicine visit, defined as
135 a phone or video appointment with a health provider. In each survey, we asked participants
136 which birth control methods they had used in the past 3 months. If they used more than one
137 method, we asked them to identify the method they considered their main method. Regarding
138 their main method, we asked, "How did you get this method? (Check all that apply)." If
139 participants reported having a phone or video appointment with a health provider, they were
140 coded 1 as using telemedicine to obtain a method; those not using telemedicine or not using a
141 method were coded as 0.

142

143 *2.1.2 Independent variable.* The primary independent variable is a time-varying measure of
144 health insurance coverage (private insurance, public insurance, uninsured, don't know).

145

146 *2.1.3 Covariates.* We collected information about social and demographic characteristics that
147 have been associated with use of telemedicine services during the COVID-19 pandemic [28, 29].
148 We included the following variables measured at baseline: self-reported race/ethnicity (Hispanic,
149 non-Hispanic White, non-Hispanic Asian/Pacific Islander, non-Hispanic Black, non-Hispanic
150 Other/Multi-racial); language spoken at home (English, language other than English); state of
151 residence (California, Texas). We included time-varying covariates for age, whether the
152 participant lived with a parent, and type of method used (the pill/patch/ring/emergency
153 contraceptive pill, condom, injectable, intra-uterine device (IUD)/subdermal implant,
154 other/none).

155

156 **2.2 Analytic Sample**

157 From May 2020 to July 2022, we collected 6,581 baseline and follow-up surveys from 1,638
158 participants. We excluded observations from analyses that were missing data on the following
159 variables: obtained a contraceptive method through telemedicine (n=78), health insurance
160 coverage (n=10), race/ethnicity (n=21), language spoken at home (n=20), whether lived with a
161 parent (n=4), and method type (n=12). Our final analytic sample included 6,465 observations
162 gathered from 1,630 participants.

163

164 **2.3 Statistical Analysis**

165 We used descriptive statistics to describe the use of telemedicine for contraception among young
166 people in the sample. We used mixed-effects logistic regression to model the likelihood of using
167 a contraceptive method obtained through telemedicine by insurance coverage. Each participant

168 contributed between one and seven observation periods. We included all periods in the analysis,
169 so we used mixed-effects models with random intercepts at the individual and site level. The
170 models adjusted for time-varying covariates, including the type of contraceptive method used,
171 age, and living with parents, and time-invariant covariates for race/ethnicity, language spoken at
172 home, and state of residence. We also modeled the interaction between insurance coverage and
173 state of residence. Significance is reported at the $p < 0.05$ level. All analyses were conducted in
174 Stata 16.

175

176 **3. Results**

177 The sample was racially and ethnically diverse with the largest group identifying as Hispanic
178 (58%), which reflects the composition of the community college population in California and
179 Texas [30, 31] (Table 1). Just over half of participants spoke a language other than English at
180 home (51%) and a majority lived with a parent (61%). Health insurance status included 42%
181 private insurance, 32% public insurance, 17% uninsured, and 9% did not know their insurance
182 status. The most common methods used were condoms (23%), pill (19%), and IUD (11%), while
183 22% were not using a method.

184

185 Overall, participants reported using a contraceptive method obtained through telemedicine in just
186 6% of observations. Among those with private insurance, 8% obtained a method through
187 telemedicine, compared to 7% of those with public insurance, 3% who were uninsured, and 4%
188 who did not know their insurance status. Eight percent of participants in California obtained a
189 method through telemedicine, compared to 4% in Texas.

190

191 As expected, use of telemedicine varied by method with the largest share of people obtaining
192 their method via telemedicine among pill, patch, ring, or emergency contraceptive pill users
193 (18%) (Figure 1). However, 7% of injectable users, 6% of IUD users, and 6% of implant users
194 also reported having a telemedicine visit, likely for contraceptive counseling prior to an in-
195 person visit for the injection or insertion.

196

197 In the multivariable model, the odds of using a method obtained through telemedicine varied
198 significantly by health insurance, controlling for sociodemographic characteristics and method
199 used (Table 2). Compared with participants who had private insurance, the uninsured (aOR =
200 0.54, CI: 0.31–0.97) and those who did not know their insurance status (aOR = 0.54; CI: 0.29–
201 0.99) were significantly less likely to use a method obtained through telemedicine. There were no
202 significant differences between participants with public and private health insurance. Participants
203 in Texas were significantly less likely to use a method obtained via telemedicine than those in
204 California (aOR = 0.42; CI: 0.25–0.69). There were no significant differences in use of
205 telemedicine for contraception by age, race/ethnicity, language spoken at home, or living with
206 parents. We tested for interactions between insurance coverage and state of residence, but they
207 were not statistically significant (not shown).

208

209 As a sensitivity test, we ran the model of the association between insurance coverage and use of
210 telemedicine for contraception excluding the observations in which participants were not using a
211 method. The model yielded similar results with the uninsured (aOR = 0.40; CI: 0.22–0.75) and
212 participants who did not know their insurance status (aOR= 0.48; CI: 0.25–0.91) less likely to
213 obtain their method through telemedicine than the privately insured. Given that practices around

214 virtual care changed rapidly during the pandemic, we also estimated separate models that
215 controlled for the number of months, quarters, or years into the pandemic. Use of telemedicine to
216 obtain contraception did not vary significantly by time period, regardless of how time was
217 measured.

218

219 **4. Discussion**

220 While healthcare providers rapidly expanded telemedicine for contraceptive services during the
221 COVID-19 pandemic [6, 7], we found low use among young adults. Telemedicine use for
222 contraception was particularly low among the uninsured and those who did not know their
223 insurance status. Previous studies have shown that lack of transportation is a common barrier for
224 the uninsured seeking health care, along with lack of time and other non-financial barriers to
225 clinic visits [32-34], suggesting that uninsured patients may benefit most from a telemedicine
226 option. However, the uninsured were least likely to report using telemedicine for contraception.

227

228 We also observed state differences in telemedicine for contraception, with young people in Texas
229 less likely to obtain contraception via telemedicine than in California. This finding may stem
230 from state differences in telehealth-related laws and regulations. While California and Texas both
231 have private payer reimbursement laws, only California requires the same payment rate or
232 amount to be reimbursed for telemedicine and in-person services [25], likely influencing
233 providers' willingness to offer telemedicine. Additionally, Texas is not a Medicaid expansion
234 state [24] and had dramatically cut and restricted contraceptive funding programs for the
235 uninsured, including the state family planning program, which led to the closure of 25% of
236 family planning clinics in the state [35].

237

238 These findings are important in light of evidence that reproductive-aged individuals faced
239 barriers to accessing contraception because of the COVID-19 pandemic, with about half of
240 contraception users who sought care during the pandemic reporting at least one barrier to care
241 [36]. Further, recent studies have found that the pandemic was more likely to disrupt
242 contraceptive access for disadvantaged populations, including those experiencing income loss
243 and hunger [36, 37]. It could be that more young people, particularly those in disadvantaged
244 populations, would have preferred to have a telemedicine visit and were not offered one. Prior to
245 the pandemic, just 15% of publicly funded family planning clinics offered telemedicine
246 prescriptions for oral contraceptives [38]. Expanding telehealth services can require considerable
247 investments in technology, training, and ensuring regulatory compliance [39], so telemedicine
248 visits may be offered less frequently to uninsured patients receiving contraceptive care at safety
249 net clinics. Young people who are uninsured and in other disadvantaged populations also may
250 face difficulty participating in a telemedicine visit, such as limited access to devices and Internet,
251 digital literacy, and concerns about privacy [40, 41]. Further research is warranted on the ways in
252 which inequitable access to telemedicine may have contributed to disparities in the use of sexual
253 and reproductive health care during the pandemic.

254

255 This study has limitations. Although our sample was diverse in terms of race/ethnicity and
256 socioeconomic characteristics, it is not generalizable to the population at large. Participants were
257 current or recent college students, a population that may have greater access to the Internet and
258 electronic devices than non-student populations. However, a strength of the study is that it was
259 population-based and therefore did not have the selection bias of a clinic-based study. Recruiting

260 participants through educational institutions provided a broader view of telemedicine use,
261 including young people receiving contraceptive services from varied providers, as well as those
262 who may be in need but unable to access services.

263

264 Despite these limitations, study results have important and timely implications for sexual and
265 reproductive health policy. Expanding health insurance coverage remains vital for improving
266 young people's access to contraception regardless of the mode of delivery, particularly in Texas
267 and other non-Medicaid expansion states. For the remaining uninsured, ongoing efforts are
268 needed to support the adoption of telemedicine in the safety net health system. For the insured,
269 extending federal and state laws and regulations that supported telemedicine use during the
270 COVID-19 public health emergency would help to ensure access to video and phone visits for
271 contraceptive services. While the federal government extended Medicare telehealth flexibilities
272 through December 2024, Medicaid telehealth policies will vary by state, and coverage for
273 telehealth will vary by private insurance plans [42], likely leaving many without telehealth
274 coverage. Finally, programs are needed to increase young people's awareness and knowledge of
275 how to use telemedicine and to address common barriers to telemedicine, including privacy
276 concerns and limited access to technology [43].

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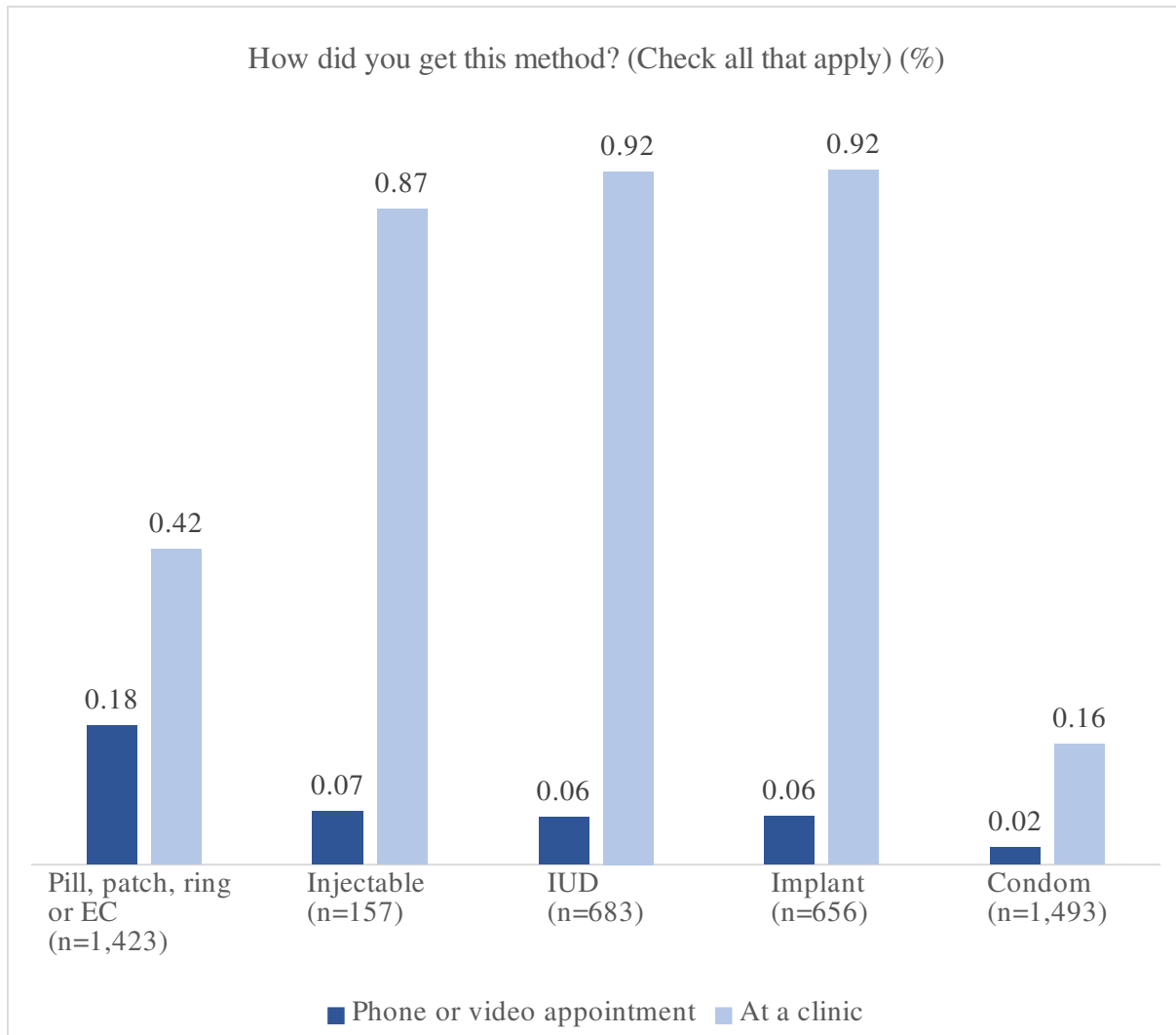
290 **Table 1. Sample characteristics of young adults assigned female at birth, recruited from**
 291 **community colleges in California and Texas, 2020-2022**

Characteristics	%
<i>Baseline characteristics (N=1,630 participants)</i>	
Race/ethnicity	
Hispanic	58.3
Non-Hispanic White	20.0
Non-Hispanic Asian/Pacific Islander	10.1
Non-Hispanic Black	5.4
Non-Hispanic American Indian/other/multi-racial	6.2
Speaks language other than English at home	51.1
State of residence	
California	70.4
Texas	29.6
<i>Time-varying characteristics (N=6,465 observations)</i>	
Age	
18-19 years	33.7
20-21 years	47.1
22 years or older	19.2
Lives with parent	61.4
Insurance	
Private	42.1
Public	32.3
No insurance	16.6
Don't know	9.0
Method used	
Pill	19.2
Patch	0.9
Ring	1.0
Emergency contraceptive pill	1.0
Injectable	2.4
IUD	10.6
Implant	10.2
Condom	22.9
Withdrawal	8.5
Rhythm	1.1
Other	0.6
None	21.8

292

293

294 **Figure 1. Percentage of person-periods when young adults assigned female at birth used**
 295 **telemedicine and in-person visits to get their main method of contraception, by method**
 296 **type, 2020-2022**



298 **Table 2. Characteristics associated with using a contraceptive method obtained through**
 299 **telemedicine among young adults assigned female at birth, recruited from community**
 300 **colleges in California and Texas, 2020-2022^a**

	aOR	95% CI
Insurance		
Private	Ref.	
Public	0.92	0.62–1.34
No insurance	0.54*	0.31–0.97
Don't know	0.54*	0.29–0.99
Method used		
IUD/implant	Ref.	
Pill/patch/ring/emergency contraceptive pill	4.69***	3.10–7.09
Condom	0.35***	0.20–0.61
Injectable	1.35	0.53–3.43
Other/none	0.11***	0.06–0.20
Age in years	1.01	0.91–1.13
Race/ethnicity		
Hispanic	1.38	0.82–2.30
Non-Hispanic White	Ref.	
Non-Hispanic Asian/Pacific Islander	0.70	0.34–1.44
Non-Hispanic Black	1.86	0.76–4.59
Non-Hispanic Native American/other/multi-racial	1.26	0.58–2.75
Speaks language other than English at home	0.75	0.48–1.16
Lives with parent	1.27	0.89–1.83
State of residence		
California	Ref.	
Texas	0.42**	0.25–0.69

301 * $p < .05$, ** $p < .01$, *** $p < .001$

302 Sample includes 1,630 individuals, 6,465 observations. aOR = adjusted odds ratio. 95% CI = 95%
 303 confidence interval.

304 ^aWe used mixed-effects logistic regression with random effects for site and individual to assess these
 305 associations.

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357 [barriers-for-telemedicine-in-the-u-s-during-the-covid-19-emergency-and-beyond](https://www.kff.org/womens-health-policy/issue-brief/opportunities-and-barriers-for-telemedicine-in-the-u-s-during-the-covid-19-emergency-and-beyond)

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