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Does Distance Matter? Access to Family Planning Clinics and Adolescent Sexual Behaviors

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Abstract

The study examines the relationship between adolescent geographic access (distance, travel time, density) to Family Planning Clinics and adolescent sexual behaviors, including sexual initiation, number of partners and condom use. This cross-sectional study, conducted in 2005 in 10 California counties, utilized data from NICHD-funded study on adolescent sexual behavior ($n = 921$), geospatial coordinates of publicly-funded FPCs, and neighborhood characteristics. A series of regression models were used to assess the relationship between FPC distance, and density (number of FPCs within 1- and 3- mile radii of each adolescent's home), and adolescent sexual behaviors. Significant main effects between access measures of FPC and sexual behavior did not emerge. However, among older youth a significant inverse relationship emerged between number of FPCs within a 1-mile radius and initiating sexual intercourse. While not significant at $\alpha = .10$, the results also indicate a negative relationship between density of FPCs and sexual partners ($b = -.22, p < .15$) among older youth. Access to FPCs was not associated with condom use.

Conclusions: Results suggest that increased options for family planning services may lead to less risky sexual behaviors among older youth. This finding has significant implications with regards to making family planning resources more readily available to older adolescents.

Keywords

Adolescence; Sexual behavior; Family planning; GIS

Introduction

To date, few studies have examined contextual factors as potential correlates and predictors of adolescent reproductive behavior while many have focused on psycho-social variables [1–7]. Availability of community-based family planning clinics (FPCs) is one such contextual factor that has received limited attention [8–10]. Some research suggests that physical availability of and access to FPCs may reduce adolescents' risk for early sexual intercourse and increase the likelihood of effective contraceptive use [11–14]. Most of these studies, however, have relied on imprecise measures (i.e., county-level counts) of FPCs that may not adequately capture spatial relationships. For example, within a county an adolescent

who lives 15 miles away from an FPC is treated as having the same level of access as an adolescent who lives across the street, obscuring the association between FPC availability and adolescent sexual behavior. To address this shortcoming, we examined the relationship between both distance and travel time (from adolescent's residence to nearest FPC) and density (within a set of specified radii) and adolescent sexual initiation, number of partners, and condom use.

A handful of studies have examined the relationship between geographic access to FPCs and reproductive behaviors and have yielded a mixed collection of findings. Brewster et al. [12] found that an increase in the number of FPCs at the county level decreased the risk of intercourse initiation among white adolescents. The inclusion of individual-level variables attenuated the relationship suggesting that individual characteristics may mediate the relationship between FPCs and adolescent sexual behavior. Another study found that among currently married white women, the number of FPCs at the county level was positively associated with effective contraception use, controlling for individual and contextual variables [13]. More recently, Bishai et al. [11] found that the per capita number of FPCs was inversely related to the likelihood of adolescents having sex and the reported number of sexual partners. Conversely, one study using a more sophisticated measure of distance (travel time from the center point of an adolescent's ZIP Code area to nearest FPC), found that adolescents for whom availability was higher were actually at greater risk for pregnancy [10].

A substantial number of adolescents rely on subsidized family planning services; [15] however, the geographical distribution of FPCs is not uniform across counties [16]. Availability theory suggests that increased availability of services results in increased purchases or use and has been used to show a relationship between alcohol outlet density and alcohol-related harm, such as assaults or motor vehicle crashes [17]. Applying availability theory to the use of FPCs, we hypothesize that adolescents who live further from FPCs (less availability) will have greater costs/barriers (e.g., transportation constraints, travel time) associated with obtaining *both* reproductive health information and services and therefore will be less likely to access these services which in turn will lead to riskier sexual behavior.

The current study furthers previous research by utilizing more precise measures of spatial relationships. Specifically, we develop three different measures of distance and examine each one in turn: (1) miles from each adolescent's home to nearest FPC; (2) travel time to nearest FPC; and (3) density of FPCs within 1- and 3-mile radii of each adolescent's home. Evaluating these different measures of distance we can assess the extent to which increased availability at various geographic scales impacts adolescent sexual behavior.

We also explore the potential moderating roles of gender and age. We entertained two competing hypotheses regarding the effect of age. Younger youth may have less ready access to transportation than older youth and therefore the association between proximity to FPCs and sexual behavior may be more pronounced among younger youth than among older youth, who may have their own cars or same-age friends who have access to cars. Conversely, younger adolescents are likely to be less sexually active or experienced than older youth. An adolescent who is not sexually active may feel less of a need to utilize FPC services than an adolescent who is sexually active. We would then expect availability of FPCs to be more strongly related to sexual behavior among older adolescents than among younger adolescents. With regards to gender, females may be more likely to be aware of FPCs than males as a majority of FPC services target female reproductive health needs resulting in a stronger relationship among females between access to FPCs and sexual behavior. The current study will examine both age and gender as moderating variables.

Findings from this study will help to inform both public policy and future research on FPC availability and adolescent sexual behavior.

Methods

Participants

Study data were drawn from Wave 3 of a three-wave longitudinal survey to study media exposure and adolescent sexual behavior. A list-assisted sample of households from 10 California counties was used to recruit study participants aged 12–16 at Wave 1. A total of 932 (84%) participants completed the survey at Wave 3; 2 years later. Data were collected using Computer Assisted Self Interviews (CASIs) administered in the home. Per the approved IRB protocol, active parental consent was obtained for all respondents, and adolescents were paid a \$30 incentive for their participation in each survey wave (for additional information) [18].

We excluded data from participants who had missing responses on measures of gender, age, or sexual behavior items ($n = 1$), participants whose addresses could not be successfully geocoded ($n = 6$), and participants who lived outside of the geographic sampling frame ($n = 4$). The sample of 921 respondents with complete data was nearly evenly divided between females (49%) and males (51%). In this sample, 128 respondents identified as Latina/o (13.9%), and of those who identified as non-Latina/o, 657 (71.3%) self-identified as White, 45 (4.9%) as Black/ African-American, 47 (5.1%) as Asian, 43 (4.7%) as multiracial, and 23 (2.5%) endorsed other.

Measures

Background Variables—Respondents were asked to provide their age ($M = 16.2$ years, $SD = 1.4$ years) and gender.

Sexual Behaviors—Vaginal intercourse was measured with a dichotomous item asking adolescents if they had ever had sexual intercourse. Sexual intercourse was defined as, “When a boy puts his penis into a girl’s vagina.” Adolescents who responded affirmatively were also asked an open ended question regarding number of partners, “During your lifetime, with how many different girls/boys have you had sexual intercourse?” Additionally, they were asked about condom use, “In general, when you have had sexual intercourse, how often have you or your partner used a condom to protect against STDs?” Response options ranged from “1” Never to “5” Always.

Distance and Density of FPCs—Behavioral data were supplemented by physical address data of public FPCs which were selected if they provided free or reduced cost family planning services to any adolescent, including those which operated on school campuses. Address data for FPCs were obtained through several sources including the California Office of Family Planning, California Community Clinics, county referral services, and the California Family Health Council. Jittered address information (from adolescent residence data) was geocoded. Nearest FPC (both distance and time) were determined using network distances through the Network Analyst function in ArcMap. FPC densities were computed as counts within circular spatial “buffers” with radii of 1 mile and 3 miles, respectively, and with the respondent’s residence defining the center of the buffer. The radii used were Euclidian distances, as opposed to roadway network distances. A 1-mile radius buffer was selected as this area represents a distance most adolescents can travel by foot. The choice of the 3-mile radius buffer was made based on the fact that on average, distance to the nearest FPC was just under 3 miles in this sample.

Demographic Estimates (2003)—A set of 13 demographic variables describing the 913 block group areas in which the participants resided were obtained from GeoLytics [19]. Block group data included population density, proportion black, Asian, Hispanic, gender and age composition (proportion male, proportion aged 12–17 years), nationality (proportion U.S. born), socio-economic status (education, proportion unemployed, proportion of households in poverty), and residential stability (proportion owner-occupied housing, proportion housing vacant, proportion houses for sale).

Statistical Analysis

Prior to conducting regression analysis, we conducted a factor analysis to identify neighborhood characteristic constructs. Block group census variables all represent distinct facets of neighborhood composition and stability, but including all of them as predictors would result in unwieldy models. To strike a balance between comprehensiveness and model parsimony, we used factor scores based on a factor analysis of these block group characteristics (see Gruenewald) [20]. To determine the optimal number of factors to retain, we examined the scree plot and proportion of common variance accounted for by the extracted factors. These criteria suggested that a 4-factor model adequately described the underlying factor structure. The final neighborhood factor scores were based on a promax-rotated solution in which inter-factor correlations ranged from $-.14$ to $.42$ (Median = $.17$) indicating that the rotated factors were relatively independent of one another.

Given the potential for dependency among responses and spatial autocorrelation at the level of block group, we computed ICCs at the level of block group. These analyses showed that ICCs among respondents within the same census block group were negligible ($<.001$). Study hypotheses were then assessed by testing parallel linear, logistic, negative binomial regression models within a generalized linear model framework, varying only our measure of FPC physical availability (temporal distance to nearest FPC, physical distance to nearest FPC, density of FPCs within a 1-mile radius buffer, density of FPCs within a 3-mile radius buffer) and the dependent variable (sexual initiation, total number of sexual partners, condom use). Each model controlled for age, gender, metropolitan area (Los Angeles vs. Bay Area counties), and four composite measures of neighborhood characteristics. Additional analyses included interactions between age, gender, and FPC physical availability. To minimize nonessential multicollinearity between each interaction term and its constituent linear terms, we mean-centered each predictor variable prior to conducting the analyses described below [21,22]. Given the novelty and exploratory nature some of the questions posed and of the approach used in the current study, we followed recommendations by Selvin [22] to eliminate from our models only those interaction effects that were clearly discernable from zero and to retain and examine interactions significant at a probability level of $.20$. In addition, we also conducted post-hoc power analyses for the interaction effects retained.

Results

On average, youth lived approximately 2.56 miles from the nearest FPC. Most youth had three FPCs within a 3-mile radius (see Table 1). A total of 267 (29%) of the 921 respondents reported ever having vaginal sex by Wave 3 with an average of 3.26 sexual partners. Males reported more partners on average ($M = 3.75$) than females ($M = 2.78$). Respondents residing in the San Francisco Bay area were more likely to have ever had vaginal sex (31.7%) than were respondents from Los Angeles (26.1%).

Lifetime Vaginal Sex

Across both distance and density models, results from the main effects model indicate that age and metropolitan area were related to likelihood of ever having vaginal sex (see Table 2). Neither distance to nearest FPC nor density of FPCs within the selected buffers was significantly related to the likelihood of ever having vaginal sex.

Although we did not find linear effects of FPC density, we did find potential age $\times$ FPC density interactions for the 1- and 3-mile buffers ($ps < .20$, see Table 2). Using methods described by Aiken and West [21], we probed these interactions by evaluating the association between FPC availability and sexual behavior at 3 age levels: younger adolescents (age = 14 years), mean-aged adolescents (age = 16.16 years), and older adolescents (age = 18 years). At the 1-mile distance, among younger respondents, FPC density was positively but not significantly associated with likelihood of ever having vaginal sex; among median aged respondents, FPC density and likelihood of vaginal sex were unrelated; and among older respondents, FPC density was negatively and significantly related to the likelihood of ever having vaginal sex ($p < .10$). A similar pattern emerged at the 3-mile buffer distance, but the simple association between FPC density and vaginal sex was not observed for older adolescents at this distance. A gender $\times$ FPC density interaction was detected for 1-mile buffer ($p = .16$), such that FPC density and likelihood of ever having sex were positively, but not significantly, related among males, and negatively, but not significantly related among females ($ps > .10$ for both simple slope estimates).

We explored an interaction between age and travel time to nearest FPC ($p = .13$), and found that distance to nearest outlet was positively, but not significantly, related to lifetime sexual status for younger adolescents, unrelated for mean-aged adolescents, and negatively related for older adolescents ($p = .084$).

Lifetime Number of Partners

No significant linear associations between FPC densities and the number of lifetime vaginal sex partners reported by respondent, regardless of travel time, distance or buffer radius considered (see Table 3). We explored a potential age $\times$ FPC density interaction for the 1-mile buffer ($p = .18$). Among younger respondents (age = 14) FPC density was positively, but not significantly, associated with the number of vaginal sex partners reported; among mean-aged respondents (age = 16) density and number of partners were unrelated; and among older respondents (age = 18), FPC density was negatively, but not significantly, related to the number of vaginal sex partners.

Condom Use

No linear associations between any background variables, FPC availability measures, and frequency of condom use among sexually active participants ($n = 248$) were evident. We probed a potential interaction between age and FPC density for the 3-mile buffer ($p = .07$). FPC density was positively, but not significantly, related to condom use among younger adolescents (age = 14), but unrelated among mean-aged (age = 16), and older adolescents (age = 18).

Discussion

The current study evaluated whether physical availability of FPCs was associated with adolescent sexual behavior. The results suggest a complex process by which adolescents may be differentially influenced by access to family planning resources. First, main effect models found that access measures *distance to nearest FPC*, and *number of FPCs within a 1-mile and 3-mile radius* were not significantly associated with either initiation of sexual

intercourse, total number of sexual partners, or condom use, failing to support our first hypothesis. However, several significant age and gender interactions emerged indicating that a significant relationship between access to FPCs and sexual behavior exists among a subset of youth.

Among older youth a significant inverse relationship emerged between number of FPCs within a 1-mile radius and sexual intercourse. Specifically, a greater number of FPC within this area was associated with delaying initiation. While not significant at $\alpha = .10$, the results also indicate that among older youth, a negative relationship also exists between density of FPCs and number of sexual partners ($b = -.22$, $p < .15$). Note that while our p-value criteria is set above conventional levels, we conducted post-hoc power analyses for the interaction effects which showed that, on average, this probability level afforded modest power to detect these effects, with a median lower bound power estimate of .42 ($M = .49$), and a median upper bound estimate of .68.

In tandem, these results suggest that increased access or availability to FPCs has a protective effect among older youth. It may be that increased options for family planning services decreases the burden on older youth to access needed services. Alternatively, increased exposure to FPCs may reinforce social norm messages that early sexual activity is frowned upon as well as reinforce the message of responsible planful behavior. Older youth are more likely to be sexually active and as a result perhaps more attentive or receptive to messages within the neighborhood or community regarding FPCs. Newcomer and Brown reported a similar phenomenon as they noted sexually active teens were more likely to seek out television with high sexual content [23]. Older youth also have more options (e.g. car, increased independence) for accessing FPC services should they choose not to attend a clinic near their home. More importantly, however, this finding suggests that increased access to family planning information and services does not lead to increased risky sexual behavior among older youth. The results, however, should be interpreted with caution as additional research is necessary.

Surprisingly, the converse was found among younger adolescents, with a positive, although not significant, association between geographic access to FPCs and both sexual initiation and lifetime number of partners. To some degree, these findings parallel results indicating that youth who lived more 30 min from a FPC were less likely to become pregnant [10]. Younger youth may be more negatively influenced by greater availability of FPCs.

The findings also indicate that availability of FPC has a differential effect on sexual behavior depending on gender. Among males, increased availability of FPC within a 3-mile radius was positively associated with sexual initiation, though not significantly, whereas among females, the relationship was negative, though also not significant. This result is especially surprising given that historically males are underrepresented as FPC clients [24]. However, as early as 2001 there has been concerted effort by FPC to expand outreach efforts to males. This finding may be an artifact of these targeted efforts which may serve to make males aware of available resources.

Additionally, the results suggest that the influence of FPC access may differ depending on the behavior in questions. Risky sexual behavior encompasses distinct behavioral components: sexual behaviors, including timing of first intercourse, frequency of sex, number of partners, and prophylactic behaviors, including the use of condoms and contraception to prevent pregnancy or STIs (e.g., an adolescent may be engaging in frequent sex, yet always use condoms). FPC density emerged as a significant factor when examining sexual initiation and number of partners. However, no relationship emerged when predicting condom use. It may be that increased access to reproductive health care simply does not

influence condom use but rather specific forms of contraception, perhaps those that require a prescription or injection. Alternatively, it may be a function of condom availability which can be accessed at many different venues ranging from drug stores to public bathrooms. Nonetheless, these findings are somewhat contradictory to previous research suggesting a positive relationship between increased access (at the county level) to FPC and condom use at last intercourse [9]. Additional research should further examine the relationship between FPC access and contraceptive use.

Study Limitations and Strengths

The current study has several limitations. One common critique leveled at research examining the relationship between outlets/structures and behavior argues that outlets are located in particular areas in response to need or demand. Thus, any significant findings are due to local neighborhood characteristics rather than the outlet in question. We address this issue by controlling for neighborhood factors such as percent unemployed, vacant homes, and youth population.

Second, our measure of geographic access was based on the adolescent's home address at Wave 3. We do not have data on length of residence at that location or whether an adolescent may reside at several homes, factors which may indirectly affect availability measures. However, a supplementary analysis found that a majority of the sample was living with both biological parents (82%) and only 2% moved between Waves 2 and 3. Nonetheless, the current study is cross-sectional and thus causal inferences must be avoided.

And third, the current study did not collect data on *use* of FPCs and findings should not be interpreted as such. In other words, we *did not* assess whether adolescents who live closer to FPCs actually *utilize* those nearby clinics or any clinic at a greater rate than adolescents who live further away. Rather, the current study examines the proposition that the local ecology, the presence or absence of family planning clinics, directly or indirectly impact adolescent sexual behavior. Brofenbrenner's ecological model of human development and a social ecological framework support the reasoning behind this investigation [25–27]. Both theories suggest that in order to understand development and behavior we must assess how an individual interacts with both the immediate and larger environment. Environmental structures such as the family, school, worksites, and community organizations, provide informational, economic, and social resources as well as function as transmitters of social norms and values that may indirectly impact behavior and beliefs. Exposure to FPCs through neighborhood structure may (a) provide adolescents with a source for reproductive health information and supplies, (b) inform youth that a source on reproductive health exists to serve youth, and (c) serve to reinforce community norms regarding sexual behavior, which in turn may influence behavior. The current study is preliminary and serves to establish whether a link exists between the built environment, in the form of an FPC, and adolescent sexual behaviors.

Missing from the current study is an understanding of process. Clearly, additional research is needed to elucidate the mechanisms underlying these associations. Post-hoc analyses were conducted to explore whether increased access to FPCs systematically influences adolescent social norms and attitudes, and whether this in turn, impacts behavior. Simple correlations found weak, non significant associations between FPC density and negative, positive, and health-related sexual expectancies, perceived peer and parental attitudes. Further research is necessary to explore additional psycho-social processes that may mediate the relationship between FPC availability and adolescent sexual behaviors. Future investigations should determine whether actual use of clinic services, or perceived obstacles to accessing services differs significantly between youth who have greater FPC access or fewer FPC choices. Additionally, to what degree does utilization moderate or mediate the relationship between

access and sexual behavior. We also must better understand why younger youth with greater FPC access appear more susceptible to negative sexual behavior outcomes.

Despite the limitations, this study provides important preliminary information regarding adolescent access to reproductive services and the impact on sexual behaviors. Recent work suggests that this may serve as an avenue for prevention. Health promotion programs have introduced ecological strategies based on the premise that health is an interaction between the individual and their environment and that a change in environment can promote healthy behaviors. With regards to obesity, programs have expanded from a focus on modifying an individual's diet and exercise, to creating a "health-promotive" environment (e.g., increased access to gyms, bike lanes) that impacts individuals within a geographic area [27]. Likewise, the current preliminary study functions to commence the debate as to whether placement of FPCs may serve as an innovative strategies regarding pregnancy and STI prevention. Based on results from the current study, it would seem that FPCs should conduct outreach efforts that target older youth, perhaps through school-based campaigns that focus on juniors and seniors. Additional research in this area, however, is necessary to inform school policies on sexual education and reproductive services as well as placement of services.

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References

1. Borawski EA, Ievers-Landis CE, Lovegreen LD, et al. Parental monitoring, negotiated unsupervised time, and parental trust: The role of perceived parenting practices in adolescent health risk behaviors. *Journal of Adolescent Health*. 2003; 33(2):60–70. [PubMed: 12890596]
2. Corcoran J. Ecological factors associated with adolescent pregnancy: A review of the literature. *Adolescence*. 1999; 34(135):603–619. [PubMed: 10658868]
3. Huebner AJ, Howell LW. Examining the relationship between adolescent sexual risk-taking and perceptions of monitoring, communication, and parenting styles. *Journal of Adolescent Health*. 2003; 33(2):71–78. [PubMed: 12890597]
4. Kotchick BA, Shaffer A, Forehand R, et al. Adolescent sexual risk behavior: A multi-system perspective. *Clinical Psychology Review*. 2001; 21(4):493–519. [PubMed: 11413865]
5. Lammers C, Ireland M, Resnick M, et al. Influences on adolescents' decision to postpone onset of sexual intercourse: A survival analysis of virginity among youths ages 13 to 18 years. *Journal of Adolescent Health*. 2000; 26(1):42–48. [PubMed: 10638717]
6. Paul C, Fitzjohn J, Herbison P, et al. The determinants of sexual intercourse before age 16. *Journal of Adolescent Health*. 2000; 27(2):136–147. [PubMed: 10899475]
7. Resnick MD, Bearman PS, Blum RW, et al. Protecting adolescents from harm: Findings from the national longitudinal study of adolescent health. *JAMA*. 1997; 278(10):823–833. [PubMed: 9293990]
8. Anderson JE, Cope LG. The impact of family planning program activity on fertility. *Family Planning Perspectives*. 1987; 19:152–157. [PubMed: 3678481]
9. Averett SL, Rees DI, Argys LM. The impact of government policies and neighborhood characteristics on teenage sexual activity and neighborhood characteristics on teenage sexual activity and contraceptive use. *American Journal of Public Health*. 2002; 92:1773–1778. [PubMed: 12406807]
10. Goodman DC, Klerman LV, Johnson KA, et al. Geographic access to family planning facilities and the risk of unintended and teenage pregnancy. *Maternal and Child Health Journal*. 2007; 11:145–152. [PubMed: 17131196]

11. Bishai D, Mercer D, Tapales A. Can government policies help adolescents avoid risky behavior? *Preventive Medicine*. 2005; 40:197–202. [PubMed: 15533529]
12. Brewster KL, Billy JOG, Grady WR. Social context and adolescent behavior: The impact of community on the transition to sexual activity. *Social Forces*. 1993; 71(3):713–740.
13. Grady WR, Klepinger DH, Billy JOG. The influence of community characteristics on the practice of effective contraception. *Family Planning Perspectives*. 1993; 25:4–11. [PubMed: 8432376]
14. Katende C, Neeru G, Bessinger R. Facility-level reproductive health interventions and contraceptive use in Uganda. *International Family Planning Perspectives*. 2003; 29(3):130–137. [PubMed: 14519590]
15. Alan Guttmacher Institute. Contraceptive Counts-California. 2002 [Accessed October 15th, 2005]. [On-line]. Available at: www.guttmacher.org/pubs/state_data/states/california.html
16. Frost JJ, Ranjit N, Manzella K, et al. Family planning clinic services in the United States: Patterns and trends in the late 1990s. *Family Planning Perspectives*. 2001; 33(3):113–122. [PubMed: 11407434]
17. Stockwell, T.; Gruenewald, P. Controls on the physical availability of alcohol. In: Heather, N.; Peters, T.J.; Stockwell, T., editors. *International handbook of alcohol dependence and problems*. New York: Wiley; 2001. p. 699-720.
18. Bersamin M, Todd M, Fisher DA, et al. Parenting practices and adolescent sexual behavior: A longitudinal study. *Journal of Marriage and the Family*. 2008; 70(1):97–112. [PubMed: 19750131]
19. GeoLytics, Inc. [DVD]. *Estimates 2001–2005 Professional*. E. Brunswick, NJ: 2006.
20. Gruenewald PJ, Freisthler B, Remer L, et al. Ecological models of alcohol outlets and violent assaults: Crime potentials and geospatial analysis. *Addiction*. 2006; 101(5):666–677. [PubMed: 16669900]
21. Aiken, LS.; West, S. *Multiple regression: Testing and interpreting interactions*. Sage: Newbury Park; 1991.
22. Selvin, S. *Statistical analysis of epidemiologic data*. New York: Oxford University Press; 1991.
23. Newcomer J, Brown S. Television viewing and adolescents' sexual behavior. *Journal of Homosexuality*. 1991; 21:77–89. [PubMed: 1856474]
24. Dailard C. Challenges facing family planning clinics and Title X. *The Guttmacher Report on Public Policy*. 2001; 4(2):8–11.
25. Brofenbrenner, U.; Morris, PA. The evolution of environmental models in developmental research. In: Mussen, PH.; Kessen, W., editors. *Handbook of child psychology, vol. 1. History, theory, and methods*. New York: Wiley; 1983. p. 357-414.(Series Ed) (Vol. Ed.)
26. Green LW, Richard L, Potvin L. Ecological foundations of health promotion. *American Journal of Health Promotion*. 1996; 10(4):270–281. [PubMed: 10159708]
27. Stokols D. Establishing and maintaining healthy environments. *American Psychologist*. 1992; 47(1):6–22. [PubMed: 1539925]

Table 1

Correlations and univariate descriptive statistics for study variables (associations are among full population)

Variable	1	2	3	4	5	6	7	8	9	10
1. Respondent age	–	.02	.01	–.02	–.01	.03	.01	.39*	.25*	–.12
2. Respondent gender ^a		–	.02	.02	.00	–.05	–.06	–.02	.04	.09
3. Metro area ^b			–	.00	–.03	–.02	–.04	.06	.00	–.08
4. Distance to nearest FPC				–	.97*	–.39*	–.43*	.01	.02	–.07
5. Travel time to nearest FPC					–	–.38*	–.41*	.01	.01	–.05
6. 1-mile buffer FPC density						–	.62*	.02	.01	.04
7. 3-mile buffer FPC density							–	.02	.02	–.03
8. Sexual status ^c								–	.55*	–
9. Number of sexual partners									–	–.09
10. Condom use frequency ^d										–
Descriptive statistic										
Minimum	13.00	0.00	0.00	0.06	0.13	0.00	0.00	0.00	0.00	1.00
Maximum	19.00	1.00	1.00	20.28	46.46	7.00	30.00	1.00	30.00	5.00
Median	16.00	1.00	1.00	2.02	4.07	0.00	2.00	0.00	0.00	4.00
<i>M</i>	16.16	0.51 ^e	0.52 ^f	2.56	5.03	0.41	3.36	0.29 ^g	0.94	3.74
SD	1.44	0.50	0.50	2.24	4.37	0.89	4.36	0.45	2.68	1.39

Note: *N* = 920.* *p* < .01.^a 0 = female, 1 = male.^b 0 = Los Angeles, 1 = San Francisco Bay Area.^c 0 = never had vaginal sex, 1 = ever had vaginal sex.^d Statistics based on participants who reported ever having sex at Wave 3 (*n* = 247).^e proportion of male participants.^f proportion of participants residing in San Francisco Bay Area.

proportion of participants reporting ever having vaginal sex_g

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Table 2

Odds ratios and 95% confidence intervals from logistic regression models predicting lifetime vaginal sex status

Predictor	Availability measure			
	1-mile buffer	3-mile buffer	Travel distance	Travel time
Intercept	0.25 ^{**} (0.20–0.33)	0.26 ^{**} (0.20–0.33)	0.25 ^{**} (0.20–0.33)	0.25 ^{**} (0.20–0.331)
Age	2.02 ^{**} (1.78–2.28)	2.02 ^{**} (1.78–2.28)	2.02 ^{**} (1.78–2.29)	2.02 ^{**} (1.78–2.28)
Gender ^a	0.87 (0.64–1.19)	0.88 (0.64–1.20)	0.88 (0.64–1.20)	0.88 (0.65–1.21)
Metro area ^b	1.69 ^{**} (1.19–2.40)	1.66 ^{**} (1.17–2.36)	1.68 ^{**} (1.18–2.38)	1.68 ^{**} (1.18–2.38)
FPC availability	0.93 (0.77–1.12)	0.99 (0.95–1.03)	1.04 (0.96–1.12)	1.02 (0.98–1.06)
Gender × Availability	1.28 [†] (0.90–1.81)	–	–	–
Age × Availability	0.91 [†] (0.80–1.03)	0.98 [†] (0.95–1.01)	–	1.03 [†] (0.99–1.06)

Because the derived factor scores were not associated with conceptually meaningful factors, we do not include them in the tables. Full model results are available from the second author

Note: $n = 920$.

[†] $p < .20$.

^{††} $p < .10$.

^{*} $p < .05$.

^{**} $p < .01$. Main effect coefficients from main effects-only models. Coefficients for four census variable factor score covariates not presented here.

^a Coded as 0 = female, 1 = male.

^b Coded as Los Angeles = 0, San Francisco Bay Area = 1

Table 3

Coefficients and 95% confidence intervals from negative binomial regression models predicting number of lifetime vaginal sex partner

Predictor	Availability measure			
	1-mile buffer	3-mile buffer	Travel distance	Travel time
Intercept	−0.51 ** (−0.75, −0.27)	−0.50 ** (−0.74, −0.26)	−0.51 ** (−0.75, −0.28)	−0.51 ** (−0.75, −0.27)
Age	0.67 ** (0.55, 0.80)	0.67 ** (0.55, 0.80)	0.67 ** (0.55, 0.80)	0.67 ** (0.55, 0.80)
Gender ^a	0.21 (−0.10, 0.53)	0.21 (−0.10, 0.53)	0.21 (−0.10, 0.52)	0.21 (−0.10, 0.53)
Metro area ^b	0.10 (−0.25, 0.44)	0.08 (−0.26, 0.42)	0.10 (−0.24, 0.44)	0.09 (−0.26, 0.43)
FPC availability	−0.05 (−0.25, 0.15)	−0.00 (−0.04, 0.04)	0.04 (−0.03, 0.12)	0.01 (−0.03, 0.05)
Gender × Availability	–	–	–	–
Age × Availability	−0.10 [†] (−0.24, 0.05)	–	–	–

Because the derived factor scores were not associated with conceptually meaningful factors, we do not include them in the tables. Full model results are available from the second author

Note: $n = 920$.

[†] $p < .20$.

^{††} $p < .10$.

* $p < .05$.

** $p < .01$. Main effect coefficients from main effects-only models.

^a Coded as 0 = female, 1 = male.

^b Coded as Los Angeles = 0, San Francisco Bay Area = 1