Preferences for sexual health smartphone app features among gay and bisexual men

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Abstract

Given the popularity of Geosocial networking applications ("apps") among gay, bisexual, and other men who have sex with men (GBMSM), this study sought to examine GBMSM's willingness to use sexual health and behavior tracking features if integrated within apps they are already using to meet sexual partners. Most GBMSM (91%) recruited on a popular app reported interest in one or more sexual health app features, including features to find LGBT-friendly providers (83%), receive lab results (68%), schedule appointment reminders (67%), chat with a healthcare provider (59%), and receive medication reminder alerts (42%). Fewer GBMSM were interested in tracking and receiving feedback on their sexual behavior (35%) and substance use (24%). Our data suggest that integrating sexual health and behavior tracking features for GBMSM who use apps could be promising in engaging them in HIV prevention interventions. Further research is needed on GBMSM's perspectives about potential barriers in using such features.

Keywords

MSM; HIV Prevention; Sexual Health; Mobile Technology; Smartphone App

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INTRODUCTION

Gay, bisexual, and other men who have sex with men (GBMSM) accounted for an estimated 82% of new HIV diagnoses among males in the United States (U.S.) at the end of 2015, and of all diagnoses among people 13–29 years of age, GBMSM accounted for 90% of new diagnoses [1]. It is estimated that 1 in 6 GBMSM will be diagnosed with HIV in their lifetime if current trends do not change [2]. Given a lack of GBMSM-relevant sexuality education in most schools, many young GBMSM turn to the Internet as a source of sexual health information [3, 4]. With the rapid expansion of mobile smartphone applications ('apps') and users worldwide [5], understanding acceptability of potential app-based HIV and STI prevention interventions for GBMSM is warranted in order to harness their potential for HIV prevention [6]. At this time there are few proven HIV prevention programs for young GBMSM [7, 8] and developing app-based prevention could potentially reach at-risk groups widely.

Geosocial networking (GSN) apps show promise for HIV prevention given their popularity among GBMSM [9, 10]. Research on Internet-based HIV prevention methods conducted in a large national sample of men who use the Internet to seek sex with men showed high interest and acceptability of various approaches and topics to engage GBMSM about sexual health [11]. Apps are used by individuals to connect with other users (i.e. share messages, photos, and exact location) based on geographical proximity via their cellphones. GBMSM use these apps for entertainment [12], socializing [9, 10, 12, 13], and finding sex partners [6, 9, 10, 12–15]. In a study conducted in a metropolitan area of Washington DC, nearly 64% of GBMSM reported using these apps [10]. Comparisons with the general population of GBMSM, app-using GBMSM report more sex partners [16] and reports from GBMSM using Grindr, a popular app, indicate that they log into sexual networking apps more than 8 times per day and use apps for about 1.3 hours per day [9].

GBMSM who report using apps to meet sexual partners seem to be at greater risk for HIV and other STIs than men who do not [6, 17]. Studies have reported increased risk with reports of a greater number of recent sex partners among app-using GBMSM [16] and condomless anal sex (CAS) with a partner met using an app compared to those not using an app to meet sex partners [17]. These data are similar to results from studies on men's use of the Internet to seek sex partners and increased HIV risk [18], but data do not provide evidence that the Internet leads to higher risk per se.[18–20] In a study conducted by our research team comparing daily diaries with retrospective reports of sexual behavior among GBMSM, data show that high-risk GBMSM tend to use the Internet as a tool to meet sexual partners, but daily reports showed that CAS was actually lower with partners met online compared to those met offline [21, 22]. Epidemiological data also add to our understanding of risk profiles of app-using GBMSM and underscore the need for interventions that reach sexual networks more widely. Data from STI clinics provide evidence that app-using GBMSM have higher odds of testing positive for chlamydia and gonorrhea compared to men reporting meeting partners offline [23]. This evidence suggests sexual networks with app-using GBMSM have higher STI network prevalence; thereby, increasing rapid HIV transmission potential given that individuals with bacterial STIs are at two- to five-fold higher risk of HIV [24–26].

Given the popularity of apps among GBMSM and the efficient means to meet sexual partners almost immediately, apps represent one of the most promising environments in which to embed HIV prevention. Seventy percent of app-using GBMSM have indicated willingness to engage in app-based HIV prevention programs [6, 27], but no known prior research has explored the types and acceptability of health promotion features among GSN app-using GBMSM. This study sought to examine GBMSM's willingness to use sexual health and behavior tracking features integrated within GSN apps they are already using to meet sexual partners.

METHODS

Participants were recruited via pop-up advertisements and banner ads placed on a geospatial smartphone sexual networking application ("app") for GBMSM. The recruitment efforts served the dual purpose of recruiting participants for a randomized controlled trial (RCT; not reported here) and collecting survey data from GBMSM who were ineligible for the RCT [28]. Recruitment advertisements ran from November 2014 through February 2015, throughout the United States, and described a university survey seeking input to better understand and serve the health needs of the GBMSM community. Pop-up advertisements were shown 5 times –the first time a user logged onto the application within each of the scheduled 24-hour advertising periods. Supplementing the pop-up advertisements, banner advertisements ran continuously during the period of recruitment. No participation incentives were provided, although depending on responses participants may have been routed to the RCT that provided compensation. This study was approved by the Institutional Review Board of Northwestern University.

Those who clicked on advertisements were taken to an online eligibility screener. A total of 4,783 potential participants clicked the advertisements and of those, 2,932 (61.3%) consented and began the screening survey. Of those, 801 (27%) were ineligible due to the following reasons: 1) demographic characteristics (female gender or age under 18 years; $n = 30$), 2) provisional eligibility for the RCT (age 18–29 years, male sex assigned at birth and male gender identity, not in a serious monogamous relationship lasting more than 6 months, had ever had sex with a male, had condomless anal sex [CAS] in prior 6 months, and HIV negative or unknown status; $n = 428$), or 3) failure to complete the screening survey ($n = 343$). During the data cleaning process, 33 surveys were classified as duplicates by matching on 10 demographic characteristics (e.g., age +/−1 year, zip code, etc.) and examination of additional variables (survey date and completion time, survey responses), and were removed from the dataset prior to analysis. The remaining 2,098 men were routed to various surveys and of these, 557 GBMSM were asked to report on their interest in a potential mobile phone application ("app") to assist in managing their sexual health. Of the 557, 62 participants had incomplete data, resulting in a final analytic sample of 495 GBMSM.

Measures

Demographics and sexual behavior.—Participants self-reported their demographic characteristics, including age, sexual identity, race/ethnicity, educational achievement,

employment status, income, geography (rural, suburban, urban, other), relationship status, HIV-status, and engagement in CAS and group sex activities.

Sexual health app use.—To assess interest in a potential app features, participants were instructed: "Researchers are interested in developing a mobile app that would be helpful to gay and bisexual men in managing their sexual health. This app could involve a variety of features and we're interested in knowing which of them you would be willing to use. Choose all that apply." By design, items asked about sexual health (e.g., receive STI results) and behaviour-tracking features (e.g., daily sexual behavior and substance use). Participants had the choice to select nine app features, including a tenth option that stated the participant had no interest in an app to manage their sexual health. Participants who reported interest in one or more app features were then asked about their interest in these features being integrated within already-used apps. Responses were measured using a 4-point scale ranging from *not at all interested* to *very interested*.

Statistical Analysis

Univariate statistics were reported using frequency measures. Bivariate associations between predictors and app feature interest used chi-squares, Pearson's correlation, and one-way analysis of variance (ANOVA), as applicable. We used polychoric principal factor analysis with promax rotation to identify similar features to be included in scale measurement. All predictor variables were then retained for inclusion in the adjusted regression models, which were conducted using logistic regression and ordinary least squares regression for categorical and linear outcome variables, respectively.

RESULTS

Participants

A total of 495 GBMSM completed the survey items about their interest in using app features to manage their sexual health. The majority of respondents self-identified as gay and White with a mean age of 38 years old (see *Table 1*). Most respondents (70%) had a college degree or more; nearly three-quarters of men were employed full- or part-time, and 11% reported full-time enrollment in school. The sample was diverse by income, and more than half (54%) of the respondents reported living in an urban environment. Most men were single (78%) and HIV-negative (77%) or unknown status (11%). About half of the sample reported recent engagement in CAS, and a third of the men reported engaging in group sex within the past year.

GSN App use and Sexual Health Feature Interest

GBMSM reported using GSN smartphone apps for a variety of reasons and had a high interest in sexual health app features (see *Table 2*). Sixteen percent of men used GSN apps for chatting, 13% for hooking up with sex partners, 12% for making friends, and about 5% for general networking. Only 3% of GBMSM or less reported using GSN apps for relationships and dating.

Most GBMSM (91%) reported interest in one or more sexual health features. Men were most interested in an app feature to find LGBT-friendly providers (83%), followed by receiving lab results (68%), scheduling appointment reminders (67%), live chatting with a healthcare provider (59%), and receiving medication reminder alerts (42%). A little over one-third (35%) were interested in tracking and receiving feedback on their sexual behavior, and only 24% were interested in tracking and receiving feedback on their alcohol and drug use patterns. Of the 495 respondents, 450 were asked about their interest in integrating features into existing apps already being used (1 did not respond). Mean interest in integrating these features into existing apps already used was modest (M = 2.42, SD = 0.94); however 84% of respondents were at least "somewhat interested" in integrating these sexual health app features into existing mobile applications (Table 2).

In an effort to identify sexual health features with similar preferences by users, we conducted an exploratory factor analysis of app feature preferences; results are presented in *Table 3*. The LR test of the factor analysis was significant [χ^2 (21) = 2342.5, $p < 0.001$], and two factors emerged from observation of eigenvalues and scree plot [eigenvalues: factor 1 = 3.8 (81% of variance) and factor 2 = 0.9 (20% of variance)]. The two factors that emerged were described as 1) sexual health-related app features and 2) behavior tracking and feedback; however, the eigenvalue < 1 and scree plot were used to distinguish the two items in factor two from factor one. Thus, we retained the items in factor one for scale measurement and analyzed the two items in the second factor separately. A five-item scale based on a count of the number of features endorsed was used to measure sexual health app feature preferences (α = 0.74). On average, GBMSM were interested in 3.2 health-related app features (SD = 1.6). Although the items were correlated and formed a factor in the factor analysis, we analyzed sexual behavior and alcohol and drug use behavior tracking/feedback items separately because of the limitations of a 2-item scale. Interests in tracking sexual behavior and alcohol and drug use are likely different based on variables of risky sexual behaviors (e.g., condomless anal sex and group sex); combining these measures was anticipated to reduce their effect size and thus, we chose to test these items separately.

Feature Preferences by Demographics and Sexual Behavior

In bivariate analyses (*Table 1*), while no significant differences in interest in tracking and receiving feedback on sexual behavior were found by race, education, income, relationship status, HIV-status, or engagement in CAS, interest in this feature differed significantly by age, employment status, living environment, and engagement in group sex. Younger men were more interested in the sexual behavior tracking feature compared to older men. GBMSM who were students were most interested in this feature (49%), as were unemployed men (47%). Individuals who reported "other" employment had the lowest percentage of men interested in this feature (19%). Men who lived in rural environment also had the most interest in tracking and receiving feedback on sexual behavior (54%). GBMSM who engaged in group sex in the past year were significantly more likely to be interest in this tracking and feedback feature compared to men who did not report group sex.

Interest in tracking and receiving feedback on alcohol and drug use was significantly different by age, employment status, and income. Younger men were more interested in the

alcohol and drug use feature compared to older men. GBMSM who were students were most interested in this feature (40%), followed by those unemployed (32%), employed (22%), and reporting "other" employment (11%). A dose-response gradient by income on interest in tracking and receiving feedback on alcohol and drug use was observed, where those with the lowest income (less than $25,000 annually) were most interested (34%) and those with the highest income or preferred not to disclose were least interested (18% and 12%, respectively). No significant differences in alcohol and drug-related app feature interested were found by race, education, living environment, HIV-status, or engagement in CAS or group sex.

Finally, interest in sexual health-related app features was highest among younger men and men with lower incomes. In a linear relationship by age, younger men reported interest in more features. A similar dose-response trend was observed, where men with lowest incomes were most interested ($M = 3.6$) and men with higher incomes were less interested (M 3.2, see Table 1). No significant differences in sexual health-related app features interest were found by race, education, employment, living environment, HIV-status, or engagement in CAS or group sex in bivariate analyses.

In fully-adjusted regression models, age, income, living environment, HIV-status, and engagement in group sex were significantly associated with app feature interest. GBMSM who lived in rural environments had significantly higher interest in tracking and receiving feedback on sexual behavior compared to men in urban environments. Men who reported group sex in the past year were significantly more interested in tracking their sexual behavior and receiving feedback. Younger men were significantly more interested in tracking and receiving feedback on their alcohol and drug use behaviors, as well as in sexual health-related app features. Men with the lowest incomes were interested in significantly more health-related app features compared to men with higher incomes (or chose not to report). Finally, GBMSM living with HIV were significantly less interested in health-related app features.

In further evaluation of bivariate statistics of GBMSM living with HIV, we explored interest in specific health-related app features because of their priority for connection to services as part of treatment as prevention (i.e., TasP)[29] and facilitating health care engagement. Significant omnibus chi-square differences were observed by interest in receiving scheduling alerts [$\chi^2 (2) = 8.4$, $p < 0.05$] and receiving lab test results [$\chi^2 (2) = 8.2$, $p < 0.05$]. Only 50% of GBMSM living with HIV were interested in receiving scheduling alerts for health care (e.g., HIV/STI testing, annual physicals) compared to 69% of HIV-negative and 66% of unknown status men. Similarly, only 52% of GBMSM with HIV were interested in receiving lab test results through a mobile app compared to 71% of HIV-negative and 66% of unknown status men.

DISCUSSION

In this study, we sought to examine willingness to use sexual health and behavior tracking features among GBMSM. Given research conducted to understand preferences in the development of stand-alone mobile HIV prevention apps [30, 31], we were particularly

interested in exploring whether GBMSM would find these features acceptable if they were integrated within GSN apps they are already using to meet sexual partners. We found most GBMSM who use GSN apps are interested in using sexual-health features, but fewer GBMSM are interested in the behavior tracking features. One of the most endorsed features was the capability to make connections with LGBT-friendly providers. Other sexual health features endorsed by the respondents seem to indicate an interest in accessing health information and alerts, including receiving lab results, medication reminder alerts and appointment reminders, as well as to be able to chat in real-time with a healthcare provider. Most were at least somewhat interested in having these features integrated into existing GSN apps, about one in three respondents were interested in features to track and receive feedback about their sexual behavior, and nearly a quarter expressed interest in tracking and receiving feedback on their alcohol and drug use.

These data provide support for the integration of sexual health features into existing dating/ meeting apps that are popular among GBMSM. Our findings are consistent with other studies that have found interest among GBMSM about various types of technologies, social media, and online resources for LGBT advocacy and sexual health [4, 6, 11, 32, 33]. Research early in the HIV epidemic has documented the willingness of GBMSM to participate in HIV prevention online [11, 34], and our results indicate GSN app-using GBMSM are willing to engage with HIV prevention and treatment efforts through this medium extension. Furthermore, there is promising evidence that that eHealth interventions are efficacious in reducing HIV risk.[35] Understanding GBMSM's interest in app features will enable the development of tailored programs that can be incorporated into smartphone apps that are already being used by GBMSM.

Preferences by subgroup were also considered to identify whether app features were preferred differentially by sociodemographic characteristics and sexual behavior. We found that younger GBMSM were more willing than older GBMSM to use features to track and receive feedback about their sexual behavior and substance use. Online diaries have been used successfully to track sexual behavior and substance use among young[36, 37] and adult GBMSM[38], and researchers are exploring the impact of coupling tailored feedback on behavioral patterns with self-monitoring diaries[39–42]. Thus, efforts to leverage this type of technology for tailored HIV prevention programs for young GBMSM could be key, given that this group of men continues to be at increased risk for HIV[6]. Similarly, given disproportionate rates of HIV in the rural South, our finding that GBMSM who live in rural environments had significantly higher interest in tracking and receiving feedback on sexual behavior compared to men in urban environments is also of relative importance. Additionally, GBMSM who reported group sex in the past year were significantly more interested in tracking their sexual behavior and receiving feedback. We did not ask participants about their reasons for wanting to track or receive feedback about their behavior; however, our data indicate that interventions with a focus on self-monitoring for GBMSM who engage in group sex could be useful in raising awareness about behaviors that may place them at risk of contracting HIV and other STIs and providing strategies to mitigate those risks.

On the other hand, our survey results showed that HIV-positive GBMSM were significantly less interested in using health-related app features compared to HIV-negative and unknown GBMSM. Stigma, negative attitudes and stereotypes have been identified as barriers to engagement in HIV treatment and prevention [43]. Therefore, it is not surprising that fewer HIV-positive men were interested in health app features that would facilitate alerts about scheduled medical appointments and receipt of lab results. While GSN apps could be a convenient approach for improving HIV treatment by providing HIV-positive GBMSM easy access to their patient data and convenient scheduling alerts for health care, potential barriers need to be considered for the development of mobile interventions. Further research is needed on GBMSM's perspectives and concerns about other potential issues, including unintentional HIV status disclosure, confidentiality, and other unintended consequences of using mobile apps. It is particularly important to gain insight from GBMSM of color, for whom there is a historical context of mistrust of medical and research communities in general [44]. While this is key for both, treatment and care for people living with HIV and TaSP, it is of equal importance in terms of biomedical prevention efforts, such as pre-exposure prophylaxis (PrEP) that require somewhat similar engagement with the medical community for HIV prevention. Stigma-related barriers to PrEP use are emerging [45] but it is encouraging that two-thirds of the HIV-negative or unknown participants in this study were interested in receiving scheduling alerts and lab results. However, mobile health apps are already developed for an array of public health issues, and embedding HIV-related features into GSN apps GBMSM are using to hook up with other men may not be appropriate for all GBMSM.

Limitations

This study is not without limitations. First, this is a cross sectional survey that was completed by users of one GSN app, therefore the results presented indicate associations, not causality, and could be favorably biased toward app features than if we had a more diverse sample of GBMSM. Second, inclusion criteria for the parent study meant that GSN app members in a serious monogamous relationship (lasting more than 6 months) were not recruited for this study and thus, results could be different with a more diverse sample of GBMSM. Third, although there was ethnic and racial diversity within the sample, most of respondents identified as gay, White, single and HIV-negative and thus, care must be taken in generalizing our findings to GBMSM of color and the larger GBMSM population. However, no statistically significant differences were found among the racial and ethnic groups in their willingness to use the app features described in this study. Furthermore, the study sample was diverse in terms of GSN app use from general networking purposes to seeking relationships and dating, indicating a diverse set of interests. Finally, while GBMSM's willingness to use sexual health app features is fundamental to integrate sexual health interventions into popular GSN apps, this study did not conduct interviews with app owners or developers to understand their perspectives about adding such features in GSN apps popular among GBMSM and what considerations may be key to successfully incorporate them, such as the level of investment that is needed and perhaps ways to offset costs. Given prior initiatives by GSN app owners to incorporate sexual health information and available resources on their sites through advertising and other means, working in

partnership with app developers could help to identify innovative interventions that position sexual health without a primary focus on disease and further stigmatizing sex between men.

Conclusions

Despite these limitations, GBMSM who use GSN apps are interested in using various sexual health related features that could be used for HIV prevention. In fact, these features could reach a wider group of GBMSM more quickly and be cost-effective than in-person programs. As demonstrated through our analysis, subgroup comparisons are key and could provide a more nuanced understanding of app preferences that may lead to tailored efforts targeting at-risk subgroups of GBMSM. We were able to delineate preferences based on various demographic and behavioral characteristics that can be used to tailor HIV prevention interventions for specific subgroups of GBMSM. Future research should engage GBMSM, and particularly men of color, in the development app-based HIV prevention efforts and assessment of their use.

Acknowledgements

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Table 1

Demographic, behavioral, and app use characteristics and their bivariate relationships with app feature preferences (n = 495)

Categorical Demographic & Behavioral Characteristics	n	Col. %	Tracking and Feedback on Sexual Behavior			Tracking and Feedback on Alcohol & Drug Use			Health-Related App Features		
			n	Row %	χ^2	n	Row %	χ^2	M	SD	F-test (df)
Sexual Identity					0.7			1.1			$F(2, 492) = 1.0$
Gay	423	85.5	143	33.8		103	24.4		3.2	1.6	
Bisexual	51	10.3	20	39.2		11	21.6		3.1	1.6	
Other	21	4.2	8	38.1		7	33.3		3.7	1.4	
Race/Ethnicity					1.2			0.3			$F(3, 491) = 1.4$
Black	32	6.5	13	40.6		9	28.1		3.2	1.5	
Latino	71	14.3	27	38.0		17	23.9		3.5	1.6	
White	367	74.1	122	33.2		89	24.3		3.1	1.6	
Other	25	5.1	9	36.0		6	24.0		3.5	1.6	
Education					3.7			2.6			$F(2, 492) = 0.1$
High school or less	28	5.7	8	28.6		9	32.1		3.3	1.7	
Some college	120	24.2	50	41.7		34	28.3		3.2	1.6	
College graduate or more	347	70.1	113	32.6		78	22.5		3.2	1.6	
Employment					12.1**			11.7**			$F(3, 491) = 1.0$
Employed full- or part-time	368	74.3	118	32.1		82	22.3		3.1	1.6	
Full-time student	47	9.5	23	48.9		19	40.4		3.6	1.4	
Unemployed	53	10.7	25	47.2		17	32.1		3.2	1.7	
Other	27	5.4	5	18.5		3	11.1		3.2	1.5	
Income					5.0			13.8**			$F(3, 491) = 5.8***$
Less than $25k per year	134	27.1	54	40.3		46	34.3		3.6	1.5	
$25k to $49,999 per year	128	25.9	48	37.5		34	26.6		3.2	1.7	
$50k or more per year	208	42.0	61	29.3		38	18.3		3.0	1.6	
Prefer not to answer	25	5.1	8	32.0		3	12.0		2.8	1.6	

Categorical Demographic & Behavioral Characteristics	n	Col. %	Tracking and Feedback on Sexual Behavior			Tracking and Feedback on Alcohol & Drug Use			Health-Related App Features		
			n	Row %	χ^2	n	Row %	χ^2	M	SD	F-test (df)
Living Environment					11.1*			6.5			$F(3, 491) = 0.7$
Rural	54	10.9	29	53.7		19	35.2		3.2	1.5	
Suburban	167	33.7	59	35.3		42	25.2		3.3	1.5	
Urban	266	53.7	81	30.5		60	22.6		3.2	1.7	
Don't know	8	1.6	2	25.0		0	0.0		2.5	2.1	
Relationship Status					0.9			1.3			$F(2, 492) = 2.5$
Serious, monogamous	22	4.4	8	36.4		5	22.7		2.7	1.9	
Serious, open or casual partner	86	17.4	26	30.2		17	19.8		2.9	1.7	
Not in a relationship	387	78.2	137	35.4		99	25.6		3.3	1.6	
HIV Status					0.7			3.2			$F(2, 492) = 1.9$
HIV-negative	383	77.4	133	34.7		90	23.5		3.3	1.6	
HIV-positive	56	11.3	17	30.4		12	21.4		2.8	2	
Don't know	56	11.3	21	37.5		19	33.9		3.2	1.6	
Engaged in Condomless Anal Sex (Past 6-mo.)					1.6			0.1			$F(1, 493) = 0.1$
No	248	50.1	79	31.9		62	25.0		3.2	1.6	
Yes	247	49.9	92	37.3		59	23.9		3.2	1.7	
Engaged in Group Sex (Past 12-mo.)					5.8*			1.1			$F(2, 493) = 0.8$
No	330	66.7	102	30.9		76	23.0		3.1	1.6	
Yes	165	33.3	69	41.8		45	27.3		3.3	1.6	
Continuous Predictors	M	SD	OR	SE		OR	SE		Pearson's r		
Age	38.3	11.4	0.98*	0.01		0.96**	0.01		-0.22***		

*
Notes: p 0.05

**
p 0.01

***
p 0.001. Percentages may not add up to 100 because of rounding.

Table 2

Purpose of app use and app feature preferences (n = 495)

App Use	n	Row %
Purpose of app use (*select all that apply*)		
Chat	79	16.0
Hooking up	65	13.1
Friends	57	11.5
Networking	26	5.3
Relationships	15	3.0
Dates	14	2.8
App feature preferences		
Finding LGBT-friendly providers	413	83.4
Receiving lab results	337	68.1
Scheduling alerts	331	66.9
Live chat with health care provider	292	59.0
Medication alerts	208	42.0
Tracking and feedback on sexual behavior	171	34.6
Tracking and feedback on alcohol and drug use	121	24.4
App integration interest (*M, SD;* range 1–4; $n = 449$[a])	2.42	0.94
Not at all	71	15.8
Somewhat interested	189	42.0
Interested	118	26.2
Very interested	71	15.8

[a]Notes: Of the 495 respondents, 450 were asked about their interest in integrating features into existing apps already used with 1 participant not providing any response.

Table 3

Health app feature preferences and pattern matrix factor loadings (n = 495)

App Features		Factor 1 Loadings	Factor 2 Loadings
1.	Finding LGBT-friendly providers	**0.82**	−0.06
2.	Scheduling alerts	**0.86**	−0.03
3.	Medication alerts	**0.65**	0.17
4.	Receiving lab results	**0.82**	−0.02
5.	Live chat with health care provider	**0.62**	0.14
6.	Tracking and feedback on sexual behavior	−0.01	**0.92**
7.	Tracking and feedback on alcohol & drug use	0.00	**0.91**

Note: Pattern maxtrix of factor loadings using polychoric principal factor analysis with promax rotation.

Table 4

Results of fully-adjusted regression models predicting app feature preferences (n = 495)

Categorical Demographic & Behavioral Characteristics	Tracking and Feedback on Sexual Behavior			Tracking and Feedback on Alcohol & Drug Use ‡			Health-Related App Features		
	AOR	95% CI	AOR†	AOR	95% CI	AOR†	B	SE	β
Age	0.99	0.97-1.01	0.86	0.97*	0.95-1.00	0.73	-0.03***	0.01	-0.21
Sexual Identity (Ref: Gay)									
Bisexual	1.26	0.65-2.45	1.07	0.81	0.38-1.76	0.94	-0.06	0.25	-0.01
Other	1.03	0.39-2.74	1.01	1.27	0.47-3.46	1.05	0.28	0.36	0.03
Race/Ethnicity (Ref: White)									
Black	1.15	0.52-2.56	1.04	0.89	0.38-2.13	0.97	0.01	0.30	0
Latino	1.26	0.72-2.21	1.08	0.90	0.47-1.71	0.96	0.22	0.21	0.05
Other	1.16	0.48-2.81	1.03	1.03	0.38-2.81	1.01	0.35	0.33	0.05
Education (Ref: College graduate or more)									
High school or less	0.77	0.30-1.93	0.94	1.46	0.57-3.73	1.09	0.04	0.32	0.01
Some college	1.08	0.66-1.77	1.03	0.98	0.57-1.69	0.99	-0.20	0.19	-0.05
Employment (Ref: Employed)									
Full-time student	1.80	0.84-2.87	1.19	1.28	0.58-2.84	1.08	-0.29	0.29	-0.05
Unemployed	1.73	0.88-3.39	1.18	1.51	0.72-3.14	1.13	-0.17	0.26	-0.03
Other	0.50	0.17-1.46	0.86	0.47	0.13-1.71	0.84	0.09	0.33	0.01
Income (Ref: Less than $25k per year)									
$25k to $49,999 per year	1.07	0.59-1.93	1.03	0.86	0.46-1.61	0.94	-0.53*	0.22	-0.14
$50k or more per year	0.85	0.46-1.58	0.93	0.63	0.32-1.24	0.80	-0.66**	0.23	−0.2
Prefer not to answer	0.89	0.34-2.35	0.98	0.33	0.09-1.23	0.79	-0.85*	0.35	-0.11
Living Environment (Ref: Urban)									
Rural	2.35**	1.25-4.42	1.31	1.63	0.83-3.19	1.17	-0.06	0.24	-0.01
Suburban	1.24	0.80-1.92	1.11	1.18	0.73-1.91	1.08	0.16	0.16	0.05
Don't know	0.75	0.13-4.30	0.96	--	--	--	-0.48	0.58	-0.04
Relationship Status (Ref: Not in a relationship)									
Serious, monogamous	1.13	0.43-2.98	1.13	1.13	0.37-3.40	1.02	-0.32	0.36	-0.04

Categorical Demographic & Behavioral Characteristics	Tracking and Feedback on Sexual Behavior			Tracking and Feedback on Alcohol & Drug Use ‡			Health-Related App Features		
	AOR	95% CI	AOR†	AOR	95% CI	AOR†	B	SE	β
Serious, open or casual	0.75	0.43-1.31	0.75	0.83	0.45-1.55	0.93	-0.19	0.20	-0.04
HIV Status (Ref: HIV-negative)									
HIV-positive	0.70	0.35-1.40	0.70	0.86	0.40-1.83	0.95	-0.52*	0.24	−0.1
Don't know	0.93	0.49-1.79	0.93	1.17	0.59-2.32	1.05	-0.48	0.58	-0.07
Engaged in Condomless Anal Sex (Past 6-months; Ref: No)									
Yes	1.29	0.83-2.00	1.29	1.06	0.65-1.73	1.03	0.21	0.16	0.07
Engaged in Group Sex (Past 12-months; Ref: No)									
Yes	1.76*	1.13-2.74	1.76	1.50	0.92-2.44	1.21	0.29	0.16	0.08
Model Statistics									
F-test (df)	$F(23, 471) = 37.2$*			$F(22, 464‡) = 33.1$			$F(23, 471) = 2.4$***		
Adj-R^2 (or Psuedo R^2)	0.06			0.06			0.06		

*Notes: p 0.05

**p 0.01

***p 0.001

†Standardized AOR reported

‡$n = 487$ because of perfect prediction of "don't know" geography.