

Limited Knowledge and Use of HIV Post- and Pre-Exposure Prophylaxis Among Gay and Bisexual Men

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Background: Post-exposure prophylaxis (PEP) is currently recommended after certain high-risk exposures, and pre-exposure prophylaxis (PrEP) is undergoing evaluation in clinical trials. Media reports have suggested substantial levels of community PrEP use despite its unproven effectiveness.

Methods: We conducted a cross-sectional survey of 1819 HIV-uninfected gay/bisexual men in California to assess PEP and PrEP awareness and use.

Results: Overall, 47% reported PEP awareness and 4% ever used PEP. Men who were older than 25 years of age (odds ratio [OR] = 2.2, 95% confidence interval [CI]: 1.5 to 3.1), were white (OR = 2.2, 95% CI: 1.6 to 3.0), had an annual income >\$100,000 (OR = 2.0, 95% CI: 1.2 to 3.4), self-identified as gay/homosexual (OR = 2.4, 95% CI: 1.4 to 4.3), and had unprotected anal sex (OR = 1.8, 95% CI: 1.3 to 2.3) or sex under the influence of a drug (OR = 2.0, 95% CI: 1.5 to 2.7) were more likely to be aware of PEP, whereas speed users (OR = 0.6, 95% CI: 0.4 to 0.9) were less likely to be aware of PEP. Only 16% reported PrEP awareness, and <1% ever used PrEP. Unprotected anal sex (OR = 1.6, 95% CI: 1.1 to 2.3) and sex under the influence of a drug (OR = 1.5, 95% CI: 1.0 to 2.2) were associated with PrEP awareness.

Conclusions: PEP awareness and use were modest and PrEP use was rare among gay/bisexual men in California. Although PrEP is not currently recommended, community education on the availability of PEP is suggested.

Key Words: postexposure prophylaxis, pre-exposure prophylaxis, prevalence

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Antiretroviral therapy has greatly improved the lives of HIV-infected individuals in the United States¹ and globally.² More recently, the use of antiretroviral medications by HIV-uninfected persons as postexposure prophylaxis (PEP) or pre-exposure prophylaxis (PrEP) has been proposed as a strategy to prevent the acquisition of HIV infection.³ PEP refers to antiretroviral medication initiated shortly after a high-risk HIV exposure and continued for a 28-day course. Although randomized controlled trial data on PEP are not available, several studies have established the safety and feasibility of PEP for nonoccupational exposures.^{4,5} In 2005, the Centers for Disease Control and Prevention (CDC) issued recommendations for nonoccupational PEP.⁶ Although gay/bisexual men in the United States are an important target group for this intervention, PEP awareness and use among this population have not been recently assessed.

In contrast, PrEP is an experimental HIV prevention strategy currently being evaluated in clinical trials.⁷ PrEP refers to HIV-negative individuals initiating antiretroviral medication before and during periods of HIV exposure in an attempt to prevent HIV infection. Although studies in macaques have shown that PrEP may be effective in delaying or preventing infection with simian immunodeficiency virus,^{8–13} the safety and efficacy of PrEP have not been established in humans.

Multiple media reports have suggested that gay men have begun to use PrEP at circuit parties and sex clubs, and physicians have started to prescribe PrEP for high-risk patients.^{14,15} Unapproved PrEP use could result in significant individual and community harm, including increased risk behaviors, potential development of antiretroviral resistance, and adverse clinical events.⁷ In 2004, a convenience survey conducted at minority gay pride events showed that 25% of respondents had heard of PrEP and 5% had used PrEP, with use highest in San Francisco (7%).¹⁶ Given the unproven effectiveness of PrEP, those results were concerning and suggested the need for additional data on PrEP awareness and use.

We assessed PEP/PrEP knowledge, beliefs, and use among 4 distinct populations of HIV-uninfected gay/bisexual men in California.

METHODS

Recruitment and Data Collection

Between February and July 2006, we administered a structured survey on PEP/PrEP awareness, beliefs, and use

to 2 populations of HIV-uninfected gay/bisexual men: (1) SF, a population-based sample of 403 men in the San Francisco Bay Area, and (2) CP, 363 attendees of circuit parties in Palm Springs or San Diego, CA. We also administered brief PEP/PrEP surveys to 2 additional populations: (1) STD, 386 patients seen at the San Francisco City Clinic (SFCC), San Francisco's municipal sexually transmitted disease (STD) clinic, and (2) SAP, a convenience sample of 667 men surveyed by a community-based HIV prevention organization in San Francisco, the STOP AIDS Project (SAP).

To be eligible, men had to be at least 18 years of age, self-report a negative or unknown HIV serostatus, speak English, identify as gay or bisexual, and not have taken a PEP/PrEP survey previously. The SF population also had to reside in 1 of 9 San Francisco Bay Area counties.

SF participants were recruited using a time-venue sampling method¹⁷⁻²² that approximates random cluster sampling and can generate a representative sample of the target population. Monthly sampling frames of venue-specific day and time periods were constructed through random sampling from a universe of venues frequented by gay/bisexual men, including bars, clubs, businesses, organizations, bathhouses, street locations, and other public venues. CP participants were recruited in hotel lobbies, site registration desks, pool parties, or dance events at 2 circuit parties in California (Palm Springs White Party and San Diego Zoo Party). SF and CP eligibility was determined using a brief screening interview. Research staff members were trained on standardized interview techniques and use of handheld computers programmed with interview scripts; skip patterns; and checks for invalid, incomplete, or out-of-range responses. Participants provided verbal informed consent, completed the anonymous 15-minute questionnaire, and received \$25 in compensation.

STD participants were recruited during registration at the SFCC from April to July 2006. All male patients were provided a brief, self-administered, written questionnaire to be completed in the waiting room. The SAP conducts annual convenience surveys in public venues, including clubs, bars, gyms, sex clubs, gay-oriented events, and street intersections.²³ SAP volunteers administered surveys, including PEP/PrEP questions, from January to September 2006.

On survey completion, all respondents received an educational message that PrEP was currently not proven to be safe or effective and was not recommended. The protocols for the SF/CP surveys were approved by the Institutional Review Board at the University of California, San Francisco. The STD and SAP surveys were conducted as public health and programmatic activities, respectively.

Measures

The survey instrument used for the SF/CP populations contained 214 items on demographics, risk behavior, PEP/PrEP awareness and use, and beliefs about PrEP. The STD and SAP surveys included 8 items on PEP awareness and PrEP awareness and use.

We conducted key informant interviews to inform development of PEP/PrEP questions and then refined questionnaires based on focus group discussions with HIV-

uninfected gay/bisexual men and pilot testing among study staff.

Analysis

Data from SF/CP populations were transferred electronically into a database; STD and SAP data were hand-entered. All data were analyzed with SAS version 9.1.3 (SAS Institute, Cary, NC). Primary outcomes of interest included PEP/PrEP awareness and use and PrEP acceptability.

We used descriptive statistics to examine sample characteristics and patterns of PEP/PrEP use. The prevalences of PEP awareness and use, PrEP awareness and use, and PrEP acceptability were calculated with 95% confidence intervals (CIs). Univariate and multivariate logistic regression analyses were restricted to SF and CP populations, because a more comprehensive set of predictor variables was collected on these samples. Interactions between each covariate and population were also assessed. Adjusted odds ratios (ORs) from multivariate logistic models were similar to those found in the univariate models. Therefore, only univariate results are presented.

RESULTS

Participant Characteristics

In the SF group, 6729 individuals were enumerated at 41 events and 759 men were approached for interview. Of 593 men (79%) who completed the eligibility questionnaire, 403 were eligible and completed the questionnaire. Only 1 individual appeared eligible but chose not to complete the survey. Of 407 CP participants who completed the eligibility questionnaire, 363 were eligible, all of whom completed the questionnaire. Of 413 STD participants who completed the survey, 386 met final eligibility criteria. Of 1363 SAP participants who completed the questionnaire, 667 met the eligibility criteria.

Each sample was diverse with respect to age and race/ethnicity. Demographic and risk characteristics are shown in Table 1. The race/ethnicity distribution for the SF and SAP groups closely reflects those seen in previous surveys of men who have sex with men (MSM) in the San Francisco Bay Area,²⁴⁻²⁶ and STD participants reflect the racial/ethnic distribution of gay/bisexual men seen at the SFCC.²⁷ The CP group was more affluent and reported higher sexual risk and substance use than the SF group.

PEP Awareness and Use

Overall, 849 (47%) of 1819 respondents (95% CI: 44 to 49) reported that they had previously heard of PEP. PEP awareness was highest in the STD population and lowest in the SAP population (56% in the STD group, 47% each in the SF and CP groups, and 41% in the SAP group; $P < 0.001$). In the SF/CP populations, PEP awareness was associated with age older than 25 years, white race/ethnicity, income greater than \$100,000, identifying as gay/homosexual (vs. bisexual), and having seen a medical provider in the past year (Table 2). Men who reported sildenafil use, unprotected anal sex, or sex under the influence of a drug in the past 6 months were more likely to have heard of PEP, whereas methamphetamine users were less

TABLE 1. Demographics and Risk Behavior, by Sample Population

| Characteristics and Risk Behaviors | SF (%) n = 403 | CP (%) n = 363 | STD* (%) n = 386 | SAP* (%) n = 667 | Test of Heterogeneity (P) |
|--|-------------------|-------------------|---------------------|---------------------|------------------------------|
| Median age (y) | 34 | 33 | 34 | 36 | 0.002 |
| Race/ethnicity | | | | | |
| White | 58 | 61 | 63 | 60 | <0.001 |
| African American | 8 | 3 | 8 | 6 | |
| Hispanic/Latino | 18 | 15 | 16 | 18 | |
| Asian | 10 | 14 | 13 | 6 | |
| Other, mixed | 6 | 7 | 1 | 11 | |
| Education level | | | | | |
| ≤High school | 13 | 8 | n/a | n/a | <0.001 |
| Some college | 33 | 25 | n/a | n/a | |
| ≥Bachelor's degree | 54 | 67 | n/a | n/a | |
| Annual pretax income | | | | | |
| <\$20,000 | 25 | 6 | n/a | n/a | <0.001 |
| \$20,000 to \$39,999 | 24 | 16 | n/a | n/a | |
| \$40,000 to \$59,999 | 21 | 24 | n/a | n/a | |
| \$60,000 to \$99,999 | 20 | 29 | n/a | n/a | |
| ≥\$100,000 | 10 | 25 | n/a | n/a | |
| Sexual orientation | | | | | |
| Gay/homosexual | 89 | 94 | 83 | 92 | <0.001 |
| Bisexual | 11 | 6 | 17 | 8 | |
| Health care coverage† | 72 | 89 | n/a | n/a | <0.001 |
| Seen doctor in past 12 mo | 80 | 89 | n/a | n/a | <0.001 |
| Self-reported STD in past 6 mo‡ | 9 | 6 | n/a | 8 | 0.41 |
| Sexual behavior, past 6 mo | | | | | |
| Anal sex | 80 | 89 | n/a | 84 | 0.002 |
| Unprotected anal sex | 37 | 53 | n/a | 37 | <0.001 |
| Serodiscordant unprotected anal sex§ | 13 | 17 | n/a | 3 | <0.001 |
| Total no. anal sex partners, past 6 mo | | | | | |
| 0 | 20 | 11 | n/a | 16 | <0.001 |
| 1 | 30 | 31 | n/a | 36 | |
| 2 to 5 | 32 | 33 | n/a | 33 | |
| 6 to 9 | 5 | 8 | n/a | 5 | |
| ≥10 | 13 | 17 | n/a | 10 | |
| Drug use, past 6 mo | 61 | 71 | n/a | 40 | <0.001 |
| Heavy alcohol use (>4 drinks/d) | 59 | 66 | n/a | 45 | <0.001 |
| Marijuana | 50 | 36 | n/a | n/a | <0.001 |
| Speed/crystal | 12 | 18 | n/a | 7 | <0.001 |
| Cocaine | 16 | 25 | n/a | 13 | <0.001 |
| Poppers | 19 | 26 | n/a | 19 | 0.01 |
| Ecstasy | 15 | 47 | n/a | 10 | <0.001 |
| GHB | 6 | 23 | n/a | 3 | <0.001 |
| Ketamine | 2 | 13 | n/a | 2 | <0.001 |
| Sildenafil | 17 | 30 | n/a | 10 | <0.001 |
| Injection drug use | 1 | 2 | n/a | 1 | 0.33 |
| Sex under influence of any drug¶ | 44 | 55 | n/a | 26 | <0.001 |

*Variables for STD and SAP groups with “n/a” were not collected in the survey.

†Health care coverage included private health insurance or health maintenance organization, Medicaid, Medicare, or Veterans Administration coverage.

‡Self-reported STDs included *Chlamydia*, gonorrhea, syphilis, or other sexually transmitted infections.

§Serodiscordant unprotected anal sex included unprotected insertive or receptive anal intercourse with an HIV-positive sexual partner or a sexual partner with unknown HIV status.

||Drug use for SF/CP groups included use of 1 or more of the following drugs: marijuana, speed/crystal, cocaine, poppers, Ecstasy, GHB, ketamine, and injection drug use. The list of drugs used by the SAP group included all the drugs in the list except for marijuana, because this was not assessed in the SAP survey.

¶Participants were asked whether they had sex while feeling the effects of any of the drugs listed previously in the past 6 months.

GHB indicates γ -hydroxybutyrate; n/a, not available.

TABLE 2. Knowledge of PrEP and PEP in SF and CP Populations (n = 766)*

| Characteristics and Risk Behavior | N | Heard of PEP (%) | PEP Awareness (Univariate OR) | Test of Heterogeneity (P) | Heard of PrEP (%) | PrEP Awareness (Univariate OR) | Test of Heterogeneity (P) |
|---------------------------------------|-----|------------------|-------------------------------|---------------------------|-------------------|--------------------------------|---------------------------|
| Age (y) | | | | | | | |
| 18 to 25 | 153 | 32% | 1.00 | <0.001 | 16% | 1.00 | 0.37 |
| 26 to 35 | 293 | 46% | 1.77 (1.18 to 2.67) | | 17% | 1.08 (0.64 to 1.82) | |
| 36 to 45 | 224 | 54% | 2.51 (1.64 to 3.86) | | 17% | 1.01 (0.58 to 1.77) | |
| >45 | 94 | 57% | 2.77 (1.63 to 4.70) | | 24% | 1.64 (0.87 to 3.09) | |
| Race/ethnicity | | | | | | | |
| White | 452 | 55% | 1.00 | <0.001 | 19% | 1.00 | 0.16 |
| African American | 42 | 54% | 0.95 (0.50 to 1.81) | | 12% | 0.58 (0.22 to 1.53) | |
| Hispanic/Latino | 129 | 34% | 0.43 (0.28 to 0.64) | | 18% | 0.94 (0.56 to 1.56) | |
| Asian | 92 | 27% | 0.31 (0.19 to 0.50) | | 11% | 0.53 (0.26 to 1.06) | |
| Other, mixed | 50 | 40% | 0.55 (0.30 to 1.00) | | 26% | 1.52 (0.77 to 2.98) | |
| Education level | | | | | | | |
| ≤High school | 83 | 41% | 1.00 | 0.02 | 20% | 1.00 | 0.72 |
| Some college | 224 | 41% | 0.97 (0.58 to 1.62) | | 17% | 0.77 (0.41 to 1.46) | |
| ≥Bachelor's degree | 459 | 51% | 1.48 (0.92 to 2.38) | | 18% | 0.84 (0.47 to 1.51) | |
| Annual pretax income | | | | | | | |
| <\$20,000 | 123 | 43% | 1.00 | <0.001 | 13% | 1.00 | 0.30 |
| \$20,000 to \$39,999 | 155 | 41% | 0.89 (0.55 to 1.44) | | 20% | 1.67 (0.87 to 3.22) | |
| \$40,000 to \$59,999 | 173 | 37% | 0.76 (0.48 to 1.23) | | 15% | 1.18 (0.61 to 2.31) | |
| \$60,000 to \$99,999 | 184 | 54% | 1.55 (0.98 to 2.46) | | 18% | 1.52 (0.80 to 2.89) | |
| ≥\$100,000 | 128 | 61% | 2.03 (1.23 to 3.36) | | 22% | 1.87 (0.96 to 3.67) | |
| Sexual orientation | | | | | | | |
| Gay/homosexual | 702 | 49% | 2.44 (1.38 to 4.28) | 0.002 | 18% | 0.93 (0.48 to 1.79) | 0.83 |
| Bisexual | 64 | 28% | 1.00 | | 19% | 1.00 | |
| Seen doctor past 12 mo | 645 | 49% | 1.55 (1.04 to 2.31) | 0.03 | 18% | 1.03 (0.62 to 1.72) | 0.90 |
| Risk behavior, past 6 mo | | | | | | | |
| Speed/crystal use | 111 | 37% | 0.61 (0.41 to 0.91) | 0.04 | 16% | 0.85 (0.52 to 1.38) | 0.81 |
| Sildenafil use | 178 | 58% | 1.42 (1.03 to 1.95) | 0.003 | 19% | 1.00 (0.69 to 1.44) | 0.86 |
| Unprotected anal sex | 338 | 55% | 1.75 (1.31 to 2.34) | <0.001 | 21% | 1.56 (1.08 to 2.27) | 0.02 |
| Sex while high on drug | 377 | 56% | 2.04 (1.53 to 2.72) | <0.001 | 21% | 1.49 (1.02 to 2.16) | 0.04 |
| Study population | | | | | | | |
| SF | 403 | 47% | 1.00 | | 20% | 1.00 | |
| CP | 363 | 47% | 1.00 (0.76 to 1.33) | 0.98 | 16% | 0.76 (0.53 to 1.11) | 0.16 |
| STD past 6 mo (by population)† | | | | | | | |
| SF | 35 | 77% | 4.35 (1.92 to 9.84) | <0.001 | 26% | 1.50 (0.67 to 3.34) | 0.33 |
| CP | 23 | 52% | 1.24 (0.53 to 2.88) | 0.62 | 26% | 2.05 (0.77 to 5.44) | 0.15 |

*The following covariates were not significant in the univariate model for PEP or PrEP awareness and are not shown in the table: health care coverage; alcohol use (>4 drinks/d); recreational drug use in the past 6 months, including marijuana, heroin, cocaine, poppers, Ecstasy, γ -hydroxybutyrate, or ketamine (each variable was included separately and combined in a composite drug use variable); serodiscordant unprotected anal sex in past 6 months; and total number of anal sex partners.

†Estimates show number (percent) with a self-reported STD and its association with PEP awareness within each study population.

likely to be aware of PEP. We found that having an STD in the past 6 months was associated with PEP awareness only in the SF population but not in the CP population. We tested for this interaction because PEP is currently provided through the SFCC, making the population-specific linkage plausible.

In the SF/CP groups, 32 (4%) of 766 respondents (95% CI: 3 to 6) reported prior PEP use. The number of times that PEP was used ranged from 1 to 2, and the median number of days that PEP was taken was 28 (interquartile range: 7 to 30 days). Of the 32 PEP users, 28 obtained medications from a health care provider, 3 obtained medications from a friend, and 1 had enrolled in a study.

PrEP Awareness and Use

Overall, 296 (16%) of 1819 respondents (95% CI: 15 to 18) reported that they had previously heard of PrEP. PrEP awareness was similar across all groups (20% in the SF group, 16% in the CP and STD groups, and 15% in the SAP group; $P = 0.26$). Sources of PrEP knowledge were assessed in the SF/CP groups. Respondents most commonly heard about PrEP through newspapers/magazines (48%), friends/acquaintances (23%), and the Internet (7%). Only 7% heard about PrEP from a health care provider. For the SF/CP populations, respondents who reported unprotected anal sex or sex under the influence of a recreational drug in the past 6 months were

more likely to have heard of PrEP (see Table 2). Sixty-nine individuals (4%) reported knowing someone who had used PrEP.

Overall, 14 individuals (0.8%, 95% CI: 0.4 to 1.3) reported prior PrEP use. Of the 766 men in the SF/CP groups interviewed with detailed questionnaires, no respondents reported prior PrEP use (upper bound of 95% CI: <0.05). In the STD population, only 1 individual (0.3%, 95% CI: 0 to 1.4) reported prior PrEP use. This individual reported that he had not heard of PrEP, however, and had taken a 30-day course of antiretroviral medication prescribed by his health care provider, raising the possibility that this may have been PEP use rather than PrEP use. In the SAP population, 13 individuals (2%, 95% CI: 1 to 3) reported prior PrEP use (Table 3). Similar to the STD population, it is likely that several of these cases may have represented PEP use rather than PrEP use. For example, 6 of the 13 respondents reported that they had not heard of PrEP, and 4 of 13 reported taking a 30-day course of medication received from a doctor/nurse or from a study; any of these may have been PEP rather than PrEP. Of the 11 individuals reporting a source of PrEP, 6 received medication from their doctor/nurse or a clinic, 3 from a friend/partner, 1 from a study, and 1 from a drug dealer. The average duration of medication use ranged from 1 to 30 days.

Perceptions and Acceptability of PrEP

Current perceptions of PrEP efficacy and future acceptability were assessed in the SF/CP groups. Although half of respondents believed that daily PrEP was not at all or minimally effective in preventing HIV when having unprotected sex, 18% believed that PrEP was somewhat effective, 5% believed that PrEP was very/completely effective, and 27% reported that they did not know. Approximately two-thirds of respondents (67%, 95% CI: 63 to 70) reported that they would use PrEP if it were proven to be safe and effective. Asian race/ethnicity (OR = 2.5, 95% CI: 1.4 to 4.4), recent recreational drug use (OR = 1.5, 95% CI: 1.1 to 2.0), and unprotected anal sex in the past 6 months (OR = 1.4, 95% CI:

1.1 to 2.0) were associated with hypothetical future use of PrEP. In contrast, men older than the age of 35 years (OR = 0.6, 95% CI: 0.5 to 0.8) and those with a college degree (OR = 0.6, 95% CI: 0.3 to 1.0) were less likely to report future PrEP use. Participants were also asked how effective PrEP would have to be before deciding to have anal sex without a condom. Overall, 43% of men stated that PrEP would have to be always effective to engage in unprotected insertive anal sex, and 48% stated that it would have to be always effective to engage in unprotected receptive anal sex. Only 8% reported that they would use PrEP for unprotected insertive anal sex, and 4% reported that they would use it for unprotected receptive anal sex if it were effective half of the time or less.

DISCUSSION

This study measured PEP/PrEP awareness and use among multiple distinct populations of HIV-uninfected gay and bisexual men in California. Overall, PEP knowledge and use were modest, and PrEP use was rare. These samples included a population-based sample of men in the San Francisco Bay Area, 2 higher risk cohorts surveyed at circuit parties in California and the SFCC, and gay/bisexual men surveyed through outreach efforts of a community-based organization in San Francisco.

Despite CDC guidelines for PEP use after high-risk sexual exposures, we found that less than half of gay/bisexual men surveyed reported knowledge of PEP. These findings are not completely surprising, because there have not been recent educational campaigns on PEP availability among gay/bisexual men. Although the likely public health impact of PEP is unknown, gay/bisexual men at risk of HIV infection should be aware of the availability of this potentially useful intervention. Because PEP must be administered within hours after exposure, preexisting knowledge of PEP is critical for its successful implementation. PEP awareness was highest in the STD clinic population, where PEP services were readily available, but 44% of this sample was unaware of PEP. Older,

TABLE 3. Characteristics of 13 Men Who Reported Prior PrEP Use in SAP Population

| Age (y) | Race/Ethnicity | Heard of PrEP | Heard of PEP | Average No. Days Used PrEP | No. Days Used in Past 6 Mo | Source of Medication |
|---------|-----------------|---------------|--------------|----------------------------|----------------------------|-------------------------|
| 31 | White | Yes | Yes | 14 | 3 | HIV ⁺ friend |
| 28 | Other | Yes | Yes | 2 | 0 | Partner |
| 22 | White | No | No | 1 | 1 | HIV ⁺ friend |
| 24 | Multiracial | Yes | Yes | 1 | 1 | Clinic |
| 23 | White | Yes | Yes | 7 | 7 | Doctor/nurse |
| 39 | White | Yes | Yes | 15 | 0 | Doctor/nurse |
| 33* | Multiracial | Yes | No | Missing† | 14 | Drug dealer |
| 40 | White | Yes | Yes | 30 | 0 | Doctor/nurse |
| 46 | White | No | Yes | 30 | 0 | Enrolled in study |
| 23 | White | No | Yes | Missing | Missing | Missing |
| 36 | Latino/Hispanic | No | Yes | Missing | Missing | Missing |
| 33 | White | No | Yes | 30 | Missing | Doctor/nurse |
| 40 | Other | No | Yes | 30 | Missing | Doctor/nurse |

*This respondent did not answer the PrEP use question but answered items on number of days PrEP was used in the past 6 months and source of PrEP.

†Missing denotes responses that were left blank on the survey.

more affluent, and riskier men were generally more likely to have heard of PEP. Given low overall awareness, we propose that general educational campaigns for gay/bisexual men are needed but that particular attention should be paid to disseminating information to younger men, men of color, those with lower income, and methamphetamine users. Community-based educational initiatives have been effective in increasing PEP awareness in the past, as knowledge of PEP among gay men in San Francisco increased from 54% to approximately 70% shortly after a community-wide PEP outreach campaign in 1998.²⁸

Contrary to media reports and the prior survey on PrEP,^{14–16} PrEP awareness was modest in our survey populations and PrEP use was rare. PrEP use was reported only in the STD and SAP populations, where survey instruments did not clearly distinguish PEP from PrEP, as was done in the SF/CP populations. The discrepancy between our results and those of the 2004 minority gay pride survey¹⁶ may reflect differences in survey instruments (including confusion between PrEP and PEP) or population differences. In follow-up surveys conducted by the CDC, PrEP use was reported by <1% of MSM surveyed in 2005 to 2006.²⁹ These results support our conclusion that PrEP use is currently uncommon among HIV-uninfected gay/bisexual men.

Although less than one-fifth of men surveyed had heard of PrEP, most of those who had heard about PrEP had done so through the media or friends. This highlights the importance of accurate media reporting on PrEP. Public health messages should emphasize that PrEP use is not currently recommended and should await clinical trial data on its safety and efficacy.^{30,31}

Approximately two-thirds of gay/bisexual men in our study stated that they would be willing to take a daily antiretroviral pill if it were proven safe and effective. Men reporting risky behaviors such as unprotected anal sex and drug use were more likely to know about PrEP and to anticipate using it if it were proven safe and effective. These findings suggest that higher risk gay/bisexual men, a likely target population for PrEP use, would in fact be willing to use PrEP. PrEP would need to be integrated into existing prevention strategies, however, rather than replacing them.

A number of study limitations should be acknowledged. First, most of our surveys were interviewer administered, and social desirability bias could have altered responses. We attempted to minimize underreporting by emphasizing to SF, CP, and SAP participants that their responses were anonymous. Second, because of logistic and operational reasons, different interview techniques were used for the SF/CP, STD, and SAP populations. To increase comparability of data among the different populations, a unified set of core questions was included in all surveys. Third, our results may not be generalizable to gay/bisexual men residing outside California and may change over time as new information become available. Finally, we did not include HIV-infected individuals in our survey; thus, we do not have data on PEP/PrEP use before seroconversion or on whether HIV-infected persons are sharing antiretrovirals with HIV-uninfected partners.

We recommend that additional research on the best modalities for expanding PEP knowledge and promoting

appropriate use of PEP among gay/bisexual men be undertaken. Such research should take into account current available resources for risk reduction counseling and existing prevention services. In contrast, our findings of rare PrEP use are reassuring and suggest that resources do not need to be directed at this time to address unapproved PrEP use among gay/bisexual men. Given the widespread availability of antiretroviral medication for HIV treatment in the United States, however, PrEP use should continue to be monitored until data on its safety and efficacy become available.

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