

Vital Signs: Estimated Percentages and Numbers of Adults with Indications for Preexposure Prophylaxis to Prevent HIV Acquisition — United States, 2015

Dawn K. Smith, MD¹; Michelle Van Handel, MPH¹; Richard J. Wolitski, PhD¹; Jo Ellen Stryker, PhD¹; H. Irene Hall, PhD¹; Joseph Prejean, PhD¹; Linda J. Koenig, PhD¹; Linda A. Valleroy, PhD¹

Abstract

Background: In 2014, approximately 40,000 persons in the United States received a diagnosis of human immunodeficiency virus (HIV) infection. Preexposure prophylaxis (PrEP) with daily oral antiretroviral medication is a new, highly effective intervention that could reduce the number of new HIV infections.

Methods: CDC analyzed nationally representative data to estimate the percentages and numbers of persons in the United States, by transmission risk group, with indications for PrEP consistent with the 2014 U.S. Public Health Service's PrEP clinical practice guideline.

Results: Approximately 24.7% of sexually active adult men who have sex with men (MSM) (492,000 [95% confidence interval {CI} = 212,000–772,000]), 18.5% of persons who inject drugs (115,000 [CI = 45,000–185,000]), and 0.4% of heterosexually active adults (624,000 [CI = 404,000–846,000]), had substantial risks for acquiring HIV consistent with PrEP indications.

Conclusions: Based on current guidelines, many MSM, persons who inject drugs, and heterosexually active adults have indications for PrEP. A higher percentage of MSM and persons who inject drugs have indications for PrEP than heterosexually active adults, consistent with distribution of new HIV diagnoses across these populations.

Implications for Public Health Practice: Clinical organizations, health departments, and community-based organizations should raise awareness of PrEP among persons with substantial risk for acquiring HIV infection and their health care providers. These data can be used to inform scale-up and evaluation of PrEP coverage. Increasing delivery of PrEP and other highly effective HIV prevention services could lower the number of new HIV infections occurring in the United States each year.

Introduction

In 2014, approximately 40,000 persons in the United States received a diagnosis of human immunodeficiency virus (HIV) infection (1). Since 2010, several randomized, placebo-controlled clinical trials have reported that with high medication adherence (measured by detectable blood drug levels), daily oral antiretroviral preexposure prophylaxis (PrEP) reduced new HIV infections by 92% among MSM (2), 90% among

heterosexually active men and women in HIV-discordant couples (3), and 73.5% among persons who inject drugs (4). In 2014, CDC published the U.S. Public Health Service's clinical practice guideline for PrEP (5). Since 2014, open-label studies and demonstration projects conducted among MSM in the United States have reported that high adherence is achievable in community-based PrEP delivery, and effectiveness is similar to or better than that in clinical trials (6,7). As a result,



the National HIV/AIDS Strategy Updated to 2020 calls for the scale-up of the delivery of PrEP and other highly effective prevention services to reduce new HIV infections (8).

PrEP is a complementary strategy to other effective HIV prevention methods, including early diagnosis and treatment of HIV infection to achieve viral suppression and consistent condom use. A randomized controlled trial demonstrated that antiretroviral treatment reduces HIV transmission to HIV-discordant heterosexual sex partners by 93% (9). PrEP can reduce the risk for HIV infection among HIV-negative persons with sexual or injection exposures from partners who are among the estimated 70% of HIV-infected persons in the United States who are not virally suppressed and are at high risk for transmitting infection (10), including persons with undiagnosed HIV infection, persons with diagnosed infection who are not receiving treatment, and persons receiving treatment who are not virally suppressed. The combined protective effect of treatment and PrEP has recently been demonstrated in an open-label study with HIV-discordant couples in Africa (11). This report estimates the percentages and numbers of adults in the United States with indications for PrEP consistent with the 2014 U.S. Public Health Service's PrEP guideline.

Methods

Data from national population-based surveys were analyzed to estimate the percentages and numbers of persons with indications for PrEP in each of three transmission-risk populations: MSM, heterosexually active adults, and persons who inject drugs. The prevalence of surveyed behaviors most closely related to those described as indications for PrEP in the 2014 guideline (6) were used to define the size of the target populations (Table 1).

The number of men aged 18–59 years not known to be HIV-positive who reported sex with a man in the past 12 months was derived from National Health and Nutrition Examination Survey (NHANES) data from 2007–2008, 2009–2010, and 2011–2012 combined.* The number of these MSM reporting sex with two or more men in the past 12 months and any condomless sex or sexually transmitted infections in the past 12 months was used to calculate the percentage of HIV-negative sexually active adult MSM with behavioral indications for PrEP use. This percentage was weighted as recommended for NHANES data using current population estimates† of the population of men aged 18–59 years to yield an estimate of the number of U.S. MSM with indications for PrEP. Estimates of MSM with indications for PrEP did not consider injection risk.

* Available at <http://www.cdc.gov/nchs/nhanes.htm>; 2007–2008 data includes men aged 20–59 years.

† Available at http://www.cdc.gov/nchs/data/series/sr_02/sr02_161.pdf and http://www.cdc.gov/nchs/data/nhanes/analytic_guidelines_11_12.pdf.

The number of persons aged ≥ 18 years who reported in the National Survey on Drug Use and Health (NSDUH) (2013)[§] having injected any assessed drug during the past 12 months and used a needle that had previously been used by another person was used to yield an estimate of the number of U.S. persons who inject drugs with indications for PrEP use. The estimate for persons who inject drugs did not consider sexual risk or HIV infection status.

The number of men and women aged 18–59 years not known to be HIV-positive was derived from NHANES data from 2007–2008, 2009–2010, and 2011–2012 combined and was used to calculate the percentage of HIV-negative adults among NHANES respondents. This percentage was weighted, as recommended for NHANES data, using current population estimates of the population of men and women aged 18–59 years to yield an estimate of the number of HIV-negative adults. Next, National Survey of Family Growth data (2011–2013)[¶] were analyzed to identify the number of men and women aged 18–44 years who reported sex with two or more opposite sex partners and either of the following: 1) sex with an HIV-infected partner; or 2) any condomless sex in the last 4 weeks and sex with a high-risk partner in the past 12 months. High-risk partners were defined as persons who inject drugs or (for women) male partners known to also have sex with men (behaviorally bisexual). The percentage of heterosexually active adults aged 18–44 years with behavioral indications for PrEP use in the National Survey of Family Growth was multiplied by the estimated number of HIV-negative adults aged 18–59 years from NHANES to yield an estimate of the number of heterosexually active adults in the United States with indications for PrEP. Estimated heterosexually active adults with indications for PrEP did not consider injection risk. Bisexual men were assessed by indications for both MSM and heterosexually active adults and added to the populations for which PrEP indications were met.

Results

An estimated 24.7% of MSM (492,000 [95% confidence interval {CI} = 212,000–772,000]) without HIV infection aged 18–59 years who reported sex with a man in the past year have indications for PrEP (Table 2). An estimated 18.5% of persons aged ≥ 18 years who inject drugs (115,000 [CI = 45,000–185,000]) have indications for PrEP. An estimated 0.4% of heterosexually active adults aged 18–59 years (624,000 [CI = 404,000–846,000]) have indications for PrEP. Among these heterosexually active adults,

[§] Available at <http://www.samhsa.gov/data/population-data-nsduh>.

[¶] Available at <http://www.cdc.gov/nchs/nsfg.htm>.

TABLE 1. Indications for preexposure prophylaxis (PrEP) based on the 2014 U.S. Public Health Service guideline and method for estimating the number of persons with indications using national-level surveys, by transmission risk group — United States, 2015

Transmission risk group	Indications for PrEP in the 2014 guideline	Method to estimate number of persons with indications for PrEP
Men who have sex with men (MSM)*	Adult man Without acute or established HIV infection Any male sex partner in past 6 months Not in a monogamous partnership with a recently tested, HIV-negative man AND at least one of the following Any anal sex without condoms (receptive or insertive in past 6 months) Any sexually transmitted infection diagnosed or reported in past 6 months Is in an ongoing sexual relationship with an HIV-positive partner	Man aged 18–59 years Not known to be HIV-positive Sex with two or more men in past 12 months AND at least one of the following Any reported condomless sex in past 12 months Sexually transmitted infection diagnosis in past 12 months HIV status of partners could not be established
Heterosexually active adults†	Adult person Without acute or established HIV infection Any sex with opposite sex partners in past 6 months Not in a monogamous partnership with a recently tested HIV-negative partner AND at least one of the following‡ Infrequently uses condoms during sex with one or more partners of unknown HIV status who are known to be at substantial risk of HIV infection (person who injects drugs or bisexual male partner) Is in an ongoing sexual relationship with an HIV-positive partner	Man or women aged 18–59 years Not known to be HIV-positive Sex with two or more opposite sex partners in past 12 months AND at least one of the following Any reported condomless sex in last 4 weeks AND sex with a partner who injects drugs OR, for females, sex with a bisexual male sex partner in past 12 months Sex with partner reported to be HIV-positive
Persons who inject drugs¶	Adult person Without acute or established HIV infection Any injection of drugs not prescribed by a clinician in past 6 months AND at least one of the following Any sharing of injection or drug preparation equipment in past 6 months Been in a methadone, buprenorphine, or suboxone treatment program in past 6 months Risk of sexual acquisition	Man or women aged ≥18 years HIV status could not be determined Any injection of heroin, methamphetamine, stimulants, or cocaine in past 12 months AND at least one of the following Reported injecting with a needle used by someone else before them (other drug preparation equipment not included) Medication-based treatment history could not be assessed Assessed using sexual risk indications above

* Source: National Health and Nutrition Examination Survey (NHANES).

† Sources: NHANES and National Survey of Family Growth.

‡ Behaviorally bisexual men were assessed for both MSM and heterosexual risk indications.

¶ Source: National Survey on Drug Use and Health.

157,000 (CI = 62,000–252,000) are men, and 468,000 (CI = 274,000–662,000) are women.** Overall, an estimated 1,232,000 adults (CI = 661,000–1,803,000) have substantial risk for HIV acquisition, for whom PrEP and other effective prevention methods are indicated.

Conclusions and Comments

Among adult MSM aged 18–59 years in the United States who report sexual activity in the past year, approximately 25% have indications for PrEP to prevent HIV acquisition, compared with approximately 18% of persons who inject drugs and 0.4% of heterosexually active adults. The high percentage of MSM with PrEP indications is consistent with the high number of new HIV infections among MSM. The high percentage of persons who inject drugs with PrEP indications reflects the relatively high percentage who report using a needle after it was used by another injector. The low percentage and high

** Does not sum to 624,000 because of rounding.

absolute number of heterosexually active adults is a reflection of the large heterosexually active U.S. population and the low rate of new HIV diagnoses in these adults. The actual risk for acquiring HIV infection for each of these transmission risk groups differs based on efficiency of transmission routes and likelihood of exposure to HIV.

The large percentage of persons at substantial risk for acquiring HIV infection in some transmission risk groups demonstrates a continuing need for access to, and use of, a broad range of high-impact, clinic-based HIV prevention services that includes increased access to PrEP. These services include 1) regular HIV testing for all persons at substantial risk and their sexual or injection partners, and access to early antiretroviral treatment for persons with HIV infection to achieve viral suppression; 2) regular screening and treatment for sexually transmitted infections for persons with sexual risk when indicated, male and female condom access, and brief risk-reduction counseling to promote consistent condom use; and 3) for persons with injection risk, access to medication-assisted

TABLE 2. Estimated percentages and numbers of adults with indications for preexposure prophylaxis (PrEP), by transmission risk group — United States, 2015

Transmission risk group	% with PrEP indications*	Estimated no.	(95% CI)
Men who have sex with men, aged 18–59 yrs [†]	24.7	492,000	(212,000–772,000)
Adults who inject drugs, aged ≥18 yrs [‡]	18.5	115,000	(45,000–185,000)
Heterosexually active adults, aged 18–59 yrs [§]	0.4	624,000	(404,000–846,000)
Men**	0.2	157,000	(62,000–252,000)
Women	0.6	468,000	(274,000–662,000)
Total	—	1,232,000	(661,000–1,803,000)

Abbreviation: CI = confidence interval.

* Percentage of all estimated persons in each transmission risk group and demographic subset with PrEP indications.

[†] Based on 2007–2012 National Health and Nutrition Examination Survey (NHANES) data, weighted as recommended using current population estimates. Risk factors used to define PrEP indications included two or more male sex partners and at least one of the following: any condomless sex or sexually transmitted infection diagnosis in past 12 months.

[‡] Based on 2013 National Survey on Drug Use and Health. Risk factors used to define PrEP indications included injection of heroin, methamphetamine, stimulants, or cocaine, and injecting with a needle used by someone else before them.

[§] Based on 2011–2013 National Survey of Family Growth and 2007–2012 NHANES data, weighted as recommended using current population estimates. Risk factors used to define PrEP indications included two or more opposite sex partners and at least one of the following: sex with an HIV-positive partner; or any condomless sex in the last 4 weeks and sex with a male who injects drugs or bisexual male (females only) in last 12 months.

** The relative standard error for males was 30.09%.

treatment or referral for behavioral treatment of addiction, and access to clean injection equipment for those continuing to inject. Delivering PrEP in conjunction with other effective prevention services and associated preventive health care (e.g., hepatitis B vaccination and hepatitis B or C treatment when indicated) can be expected to reduce incident HIV infections and other preventable adverse health consequences for persons at risk.

Impact models indicate that 50% coverage and modest adherence to PrEP by high-risk MSM in the United States could reduce new infections among MSM by 29% over 20 years (12). Impact models of PrEP use by heterosexually active adults in Botswana, where levels of viral suppression among HIV-infected persons equivalent to U.S. National HIV/AIDS Strategy 2020 goals have already been achieved, estimate that PrEP use could reduce new infections by at least 39% over 10 years (13). Early ecologic evidence of the combined effectiveness of expanded treatment and PrEP provision on reducing new HIV infections has been reported in San Francisco (14).

The findings in this report are subject to at least four limitations. First, estimates for MSM are limited to persons aged 18–59 years. Second, estimates for heterosexually active adults applied National Survey of Family Growth data for respondents aged 18–44 years to estimates of HIV-negative adults aged 18–59 years from NHANES, which might overestimate the number of persons with PrEP indications. Third, not all

U.S. Public Health Service PrEP guideline indications could be directly matched with variables reported in the surveys analyzed. This might have underestimated the percentages and numbers for some transmission risk groups and overestimated others to an unknown degree. Fourth, an estimate of HIV-discordant monogamous couples could not be calculated using nationally representative data.

State and local health departments, community-based organizations, and health care providers should become informed about the indications for and delivery of PrEP so that it becomes available to persons at substantial risk for HIV acquisition. In a 2015 national survey of health care providers, 34% had not heard of PrEP (DocStyles, unpublished data, 2015). Increasing the number of persons with indications for PrEP who are offered it and providing support services to maintain these persons in PrEP care with high adherence will help reduce the number of new HIV infections.

The U.S. Department of Health and Human Services is supporting a range of programmatic and research efforts to incorporate scale-up of PrEP awareness and access into high-impact HIV prevention services. CDC provides funding and technical assistance to 1) inform the broader community about PrEP and how to access it, 2) identify HIV-uninfected persons with indications for PrEP and link them to PrEP care, 3) address disparities in knowledge of PrEP and access to it, and 4) provide training and support to clinicians regarding how to effectively provide PrEP with periodic HIV testing and sexually transmitted infection diagnosis and treatment (15). In addition, CDC supports efforts to improve early diagnosis and linkage to and retention in HIV medical care for persons with HIV infection to increase rates of viral suppression. CDC also is working with state and local health departments to develop methods to monitor PrEP coverage among persons for whom it is indicated and to assess the quality of HIV prevention care provided. Evidence of increasing use is available from limited analyses but comprehensive data on uptake of PrEP nationwide are not yet available (16–18). Efforts also are under way to increase the number of persons receiving prescriptions for PrEP medication and associated health care with coverage by most public and private health insurers and to increase access to medication and copay assistance programs (19). Estimating the percentage and size of the populations to be reached can assist health departments scale up PrEP availability and use, inform evaluation of coverage, and assess its contribution to reducing new HIV infections.

A substantial number of MSM, persons who inject drugs, and heterosexually active adults have indications for PrEP. Efforts to increase knowledge of and access to PrEP should accompany efforts to increase early diagnosis and treatment of persons with HIV infection to achieve the prevention benefits

of viral suppression. Reducing disparities in access to clinical care for the prevention and treatment of HIV infection can accelerate achieving the National HIV/AIDS Strategy 2020 goal for reducing the number of new HIV infections in the United States.

¹Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC.

Corresponding author: Dawn K. Smith, dsmith1@cdc.gov, 404-639-5166.

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Key Points

- An estimated one in four (492,000; 95% CI: 212,000–772,000) sexually active HIV-negative adult men who have sex with men (MSM) have indications for PrEP consistent with those defined in the 2014 U.S. Public Health Service preexposure prophylaxis (PrEP) clinical practice guideline.
- An estimated one in five (115,000; 95% CI: 45,000–185,000) HIV-negative persons who inject drugs have indications for PrEP.
- An estimated one in 200 (624,000; 95% CI: 404,000–846,000) HIV-negative heterosexually active adults have indications for PrEP.
- An estimated 1,232,000 (95% CI: 661,000–1,803,000) adults in the United States have substantial risk for acquiring human immunodeficiency virus (HIV) infection.
- Persons at substantial risk for HIV infection and their health care providers need to be aware of daily oral PrEP as one of several highly effective HIV prevention methods available to them.
- Reducing the number of new HIV infections in the United States can be accelerated by increasing 1) the number of persons living with HIV infection who receive diagnoses and treatment to achieve viral suppression 2) the number of persons at substantial risk for acquiring HIV infection who use PrEP, and 3) the use of other prevention strategies.
- Additional information is available at <http://www.cdc.gov/vitalsigns>.

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