AIDS Behav (2014) 18:S233–S236
DOI 10.1007/s10461-014-0738-7

ORIGINAL PAPER

Using the National HIV Behavioral Surveillance System to Inform HIV Prevention Efforts in the United States

Gabriela Paz-Bailey · H. Fisher Raymond · Amy Lansky · Jonathan Mermin

Published online: 23 March 2014

Abstract The National HIV Behavioral Surveillance system (NHBS) was designed to monitor HIV prevalence and risk factors for infection among higher-risk individuals, i.e., sexually active men who have sex with men who attend venues, injection drug users who injected in the past 12 months, and heterosexuals living in low socioeconomic urban areas. These groups were selected as priorities for behavioral surveillance since they represent the major HIV transmission routes and the populations with the highest HIV burden. NHBS contributes to the nation's program of HIV surveillance by being the only multi-site population-based system that provides estimates on key HIV prevention measures among high-risk HIV-negative individuals, HIV-positive individuals unaware of their infection, and HIV-positive individuals aware of their infection who are in and out of care. Accurate and precise data on the behaviors in these populations are critical for tracking the epidemic, planning effective responses, and monitoring and evaluating those responses. Reports in this supplement illustrate the uses of NHBS data at the national and local level and reflect ongoing efforts to improve the system and methods. As we look to the future, behavioral surveillance remains essential for characterizing and monitoring the burden of HIV infection and sexual and behavioral risks.

Keywords HIV · Behavioral surveillance · MSM · Heterosexuals · IDU

G. Paz-Bailey (✉) · A. Lansky · J. Mermin
Centers for Disease Control and Prevention, 1600 Clifton Rd NE, MS E-46, Atlanta, GA 30333, USA
e-mail: gmb5@cdc.gov

H. F. Raymond
San Francisco Department of Public Health, San Francisco, CA, USA

H. F. Raymond
University of California, San Francisco, San Francisco, CA, USA

Introduction

Since 2003 [1, 2], the National HIV Behavioral Surveillance System (NHBS) has conducted interviews and collected biologic samples from men who have sex with men (MSM) [3], injection drug users (IDU) [4], and heterosexuals [5] in cities with a high prevalence of AIDS. NHBS was designed to monitor HIV prevalence and risk factors for infection among high-risk individuals, i.e., sexually active MSM who attend venues, IDU who injected in the past 12 months, and heterosexuals living in low socioeconomic urban areas. These groups were selected as priorities for behavioral surveillance since they represent the major HIV transmission routes and the populations with the highest HIV burden [6, 7]. Of the estimated new HIV infections in 2010, MSM accounted for 63 % of all new infections, heterosexuals for 25 %, IDU for 8 % and MSM–IDU for 4 % [6, 7]. MSM are the only group among whom new HIV infections have recently increased [7].

Since its release in 2010, the National HIV/AIDS Strategy (NHAS) has guided domestic efforts to address the HIV epidemic [8]. The NHAS sets clear priorities and targets for HIV prevention and care in the United States, and calls on government agencies and their public and private partners to align efforts toward a common purpose [8]. The four goals of NHAS are to: (1) reduce HIV incidence, (2) increase access to care and improve health outcomes for people living with HIV, (3) reduce HIV-

related health disparities and (4) achieve a more coordinated national response to the HIV epidemic through improving collaboration and accountability among agencies and across all levels of government. To advance the prevention goals of NHAS and maximize the effectiveness of current HIV prevention methods, CDC pursues a high-impact prevention approach [9]. This approach increases the impact of HIV prevention efforts by using combinations of scientifically proven, cost-effective, and scalable interventions and by strategically directing resources to populations and geographic areas where the maximum effect on incidence and health equity will be achieved. Effective surveillance data, including behavioral surveillance data, are essential for implementing high-impact prevention [10].

NHBS contributes to the nation's program of HIV surveillance by being the only multi-site population-based system that provides estimates on key HIV prevention measures among high-risk HIV-negative individuals, HIV-positive individuals unaware of their infection, and HIV-positive individuals aware of their infection who are in and out of care. Accurate and precise data on the behaviors in these populations are critical for tracking the epidemic, planning effective responses, and monitoring and evaluating those responses. The objectives of NHBS are to: (1) assess the prevalence of and trends in HIV infection among the populations most affected by HIV in the United States; (2) assess the prevalence and trends in behaviors and social determinants that increase the risk of HIV acquisition and transmission; (3) describe utilization of and trends in HIV testing, linkage to care, antiretroviral therapy, and use of other prevention and care services; and (4) develop, evaluate and strengthen methods for sampling the populations most affected by HIV infection.

A common use of NHBS data is documenting the burden of disease and trends in HIV prevalence among these populations. Changes in HIV prevalence can indicate the success of HIV prevention interventions or reveal lack of progress. The breadth of NHBS data helps to evaluate the extent to which behavior change and changes in service utilization may contribute to changes in prevalence. An NHBS report published in 2012 provided the first estimate of HIV prevalence among IDUs for cities with a high burden of HIV in over 10 years [11]. Recent NHBS data have shown that HIV prevalence has remained stable among MSM from 2008 to 2011 while awareness of HIV-positive status has increased from 56 to 66 % in the same time period [12]. As part of this AIDS and Behavior supplement on the use of behavioral data to inform HIV prevention, Oster et al. [13] evaluated trends in HIV prevalence and past 12 months HIV testing among young MSM in 5 cities The study results showed demonstrated an overall increase in HIV prevalence among MSM ages 23–29 years, driven by an increase in the city of Baltimore, and documented increases in HIV testing in the participating cities [13]. NHBS has also been used to describe prevalence of other sexually transmitted infections such as hepatitis B infection among MSM [14].

The uses of NHBS data go beyond describing burden of disease. Behavioral data from NHBS delve into why and how certain groups may be affected by HIV and identify contextual and behavioral factors that contribute to increased HIV risk. For example, after early NHBS data documented marked racial/ethnic disparities among MSM [15], additional analysis of NHBS data explored hypotheses for this disparity, ultimately identifying differences in knowledge of partner HIV status and use of antiretroviral therapy [16]. Moreover, NHBS data allow for assessing the relationship between structural factors—such as homelessness, poverty and lack of insurance—and HIV risk. In this supplement Magnus et al. [17], present the association between being homeless and HIV prevalence among heterosexual women in Washington DC Similarly, Ivy et al. [18] explored the importance of structural factors, partner characteristics and individual behaviors in increasing the risk of HIV infection among African American women. Similar analyses have been published previously among IDU [19]. Two papers included in this supplement explore risk among IDU. Noor et al. [20] use latent class analysis to examine patterns of HIV risk including drug and sexual activity among IDU in Houston and identifies three distinct classes representing different levels of HIV risk. Broz and colleagues [21] compare HIV sero-prevalence and risk behaviors between younger and older IDU and conclude that although younger IDU have lower HIV prevalence, their behaviors place them at increased risk of HIV infection and could lead to a rapid spread in this susceptible population.

Behavioral and service utilization data from NHBS can help explain differences in prevalence of infection by city. For this reason, study instruments and survey methods are standardized across all cities and years. NHBS can help communities and program planners propose and develop initiatives that are intended to focus on breaking the links in the chain of transmission in a particular city or group. Other papers also provide examples on how NHBS helps identify specific groups at particularly high HIV risk, such as the analysis of dual sexual and injection risk among IDU in New York City [22].

NHBS data have been used to monitor utilization of HIV testing and, among persons who are HIV infected, linkage to care, antiretroviral therapy, and use of other prevention services. A report from NHBS among MSM found high HIV prevalence (7 %) among self-reported HIV-negative men recently tested. Furthermore, of HIV-infected MSM unaware of their infection, 45 % had tested in the past

12 months. Given the high prevalence of HIV infection among MSM who had been tested recently, the authors suggested that sexually active MSM might benefit from more frequent HIV testing (e.g., every 3–6 months) [23]. NHBS data can also be used to understand why coverage of testing and other interventions is not optimal. This issue presents analyses on factors associated with testing and the use of other prevention strategies in New York [24, 25], San Francisco [26], New Orleans [27], Washington DC [28] and Denver [29]. With the increasing emphasis on the continuum of care, NHBS data can help monitor linkage to care among HIV-diagnosed individuals and coverage of antiretroviral therapy. In this supplement Paz-Bailey et al. [30] explore predictors of delayed linkage to care, not currently being in care, and not being on ART among HIV-infected MSM. To illustrate the use of NHBS for program planning, German et al. [31] summarize how key HIV indicators in NHBS are directly or indirectly related to local (and national) HIV prevention priorities and discuss how NHBS can be used for local HIV prevention planning.

Finally, NHBS is one of the largest data collection systems using specialized methods for reaching "hidden" populations, such as respondent-driven sampling (RDS) and venue-based sampling (VBS). The breadth and depth of NHBS provides unique opportunities to develop, evaluate, and strengthen such relatively new sampling methods. NHBS data have been used to test the theoretical relationship between homophily (the extent to which respondents prefer to recruit those similar to themselves) and design effects. In an early RDS paper, Heckathorn hypothesized that standard error of RDS estimates would increase at an accelerating rate with homophily [32]. Using data from NHBS, Wejnert et al. [33] found that the data matched the theory. Research published in this supplement and elsewhere has also been done to evaluate the reproducibility and representativeness of RDS [34, 35] and venue-based sampling [36] for ongoing behavioral surveillance among MSM and IDU.

NHBS has become a model application of HIV behavioral surveillance methods. NHBS operations manuals [37] have been used and adapted in countries in Latin America and Africa for integrated behavioral and biological studies. The NHBS questionnaire has served as a basis for study instruments in the United States and abroad.

As we look to the future, behavioral surveillance remains essential for characterizing and monitoring the burden of HIV infection and sexual and behavioral risks. It can also be used to describe steps on the continuum of care such as diagnosis, linkage, and ART use, and utilization of prevention and care services in the United States. Behavioral surveillance systems such as NHBS, offer a compelling and powerful approach to informing prevention, and increasingly care and treatment, especially in populations at highest risk for HIV acquisition.

Reports in this supplement illustrate the uses of NHBS data at the national and local level and reflect ongoing efforts to improve the system and methods in order to enhance critical surveillance system features of usefulness, timeliness, representativeness, and reproducibility [10]. Together with federal, state, and local partners, CDC continues to use data from NHBS to inform the design, delivery, and evaluation of prevention and care services. Including NHBS data in the High Impact Prevention framework helps better target resources to the populations and geographic areas with high burden of disease to achieve greater impact with every federal dollar spent.

Acknowledgments We would like to thank the authors and anonymous reviewers for their invaluable contribution to the CDC NHBS supplement.

Conflict of interest The authors declare no conflicts of interest.

Disclaimer The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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