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Delivery of HIV Transmission Risk-Reduction Services by HIV Care Providers in the United States, 2013

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Abstract

Objectives—Evidence-based guidelines have long recommended that HIV care providers deliver HIV transmission risk-reduction (RR) services, but recent data are needed to assess their adoption.

Methods—We surveyed a probability sample of 1,234 U.S. HIV care providers on delivery of 9 sexual behavior- and 7 substance use-related HIV transmission RR services, and created an indicator of "adequate" delivery of services in each area, defined as performing approximately 70% or more of applicable services.

Results—Providers were most likely to encourage patients to disclose HIV status to all partners since HIV diagnosis (81%) and least likely to ask about disclosure to new sex and drug injection partners at follow-up visits (both 41%). Adequate delivery of sexual behavior- and substance use-related RR services was low (37% and 43%, respectively).

Conclusion—The majority of U.S. HIV care providers may need additional support to improve delivery of comprehensive HIV transmission RR services.

Introduction

Improvements in treatment and a relatively stable number of new infections have resulted in a growing population of persons living with HIV in the United States and an increasing public health need to support HIV-infected persons in reducing behaviors that may transmit HIV to others. Although biomedical approaches to prevention have grown in importance,

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behavioral prevention services are still recognized as necessary and effective components of a combination approach to HIV prevention. Evidence-based federal guidelines for HIV prevention, including the newly published *Recommendations for HIV Prevention with Adults and Adolescents with HIV in the United States,* have long recommended that HIV care providers deliver an array of behavioral prevention services to HIV-infected patients to prevent transmission of HIV[1, 2], and delivery of these services is also recommended as an essential element of quality HIV clinical care[3, 4]. Recommended services include risk screening for sexual risk behaviors, substance use, symptoms of STDs, and current sex and drug injection partners, in addition to provision of risk-reduction (RR) intervention services, which include provider-delivered RR counseling and provision of or referral to intensive RR interventions for those who continue risky behaviors. Moreover, providers are recommended to encourage patients to disclose their HIV status to all sex and drug injection partners since the time of diagnosis and on an ongoing basis, in addition to assisting the patient with partner notification through referral to partner services.

Despite these longstanding recommendations and the efficacy of RR services[2, 5, 6], the available evidence suggests that delivery of prevention services by health care providers is suboptimal. Among a national probability sample of HIV care providers participating in the Medical Monitoring Project (MMP) provider survey in 2009, 66% reported always discussing HIV transmission RR and 35% reported always discussing partner counseling services with patients who were new to HIV medical care[7]. Because studies find that providers are more likely to provide RR services at initial as opposed to follow-up visits[8, 9], delivery of these services to all HIV-infected patients was likely lower. An analysis of MMP patient interview data collected in 2009-2010 found that only 44% of U.S. HIV patients reported having a discussion with a health care provider about HIV/STD prevention[10]. Observational studies of patient encounters have also documented low levels of RR screening and counseling, even when indicators of risk behavior were present[11, 12].

Recent surveys of health care providers have identified provider characteristics (profession, age, race/ethnicity, attitudes towards prevention counseling) and practice characteristics (time allotted to patient visits, number of HIV-infected patients) that are associated with nonadherence to recommendations regarding delivery of prevention services[7, 9, 13]. In most surveys, RR services are either measured by a global question (e.g., how often do you discuss transmission risk-reduction)[7, 13] or a limited number of questions[9, 14]. These shortcomings in measurement limit the ability of these studies to identify which RR services are least often provided—information needed to inform efforts to improve delivery of RR services. Also, most provider surveys have not examined delivery of HIV transmission RR services related to alcohol and drug use or disclosure of HIV status to the partners of persons who inject drugs (PWID), which are key parts of a comprehensive approach to RR. Although one study found that 77% of providers in 7 hospital-based HIV care centers reported asking most or all patients seen in the past month about alcohol use[15], to our knowledge an assessment of provision of more comprehensive substance use-related HIV transmission RR services by clinicians in a wide range of care settings has not been published.

The present study extends the earlier work discussed above[7-9, 11-14] by presenting analyses of more recent data from providers in a variety of clinical settings across the United States and by examining delivery of a broader range of HIV RR services, including those related to alcohol and drug use, which may help to identify specific areas needing improvement. Further, to guide efforts to increase delivery of RR services, we identify provider and practice characteristics independently associated with provision of adequate HIV risk-reduction services in two areas: sexual behavior and substance use.

Methods

We analyzed data collected from the 2013 MMP Provider Survey, which was conducted in the geographic areas and HIV care facilities sampled for MMP in 2011[16, 17]. The Provider Survey used a complex two-stage sample design, first by selecting 16 states and 1 territory using probability proportionate to size (PPS) sampling, with size based on estimates of the number of AIDS cases. All sampled geographic areas agreed to participate in MMP, including: California, Delaware, Florida, Georgia, Illinois, Indiana, Michigan, Mississippi, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Puerto Rico, Texas, Virginia, and Washington. Second, 622 facilities within these areas were sampled using PPS based on the number of persons receiving care for HIV infection, and 505 of these facilities participated in the Provider Survey (81% crude participation rate). Participating facilities provided a list of 2,208 providers, all of whom were invited to participate in the MMP provider survey. Providers were eligible to participate in the survey if they were physicians, physician assistants or nurse practitioners who had completed their training and provided HIV care (defined as ordering CD4+ T-lymphocyte cell (CD4) count or HIV viral load tests and/or prescribing antiretroviral medications) between January and April 2012. Providers were recruited with a modified version of Dillman's Tailored Design Method[18], which included mailing individualized recruitment packets to all of the providers in participating facilities, with follow-up letters and emails sent at set intervals between June 2013 and January 2014. The recruitment packets included a letter from the Centers for Disease Control and Prevention (CDC) explaining the purpose of the survey, instructions for completing the self-administered survey via paper or a web-based response system, and a $20 cash incentive. The recruitment materials explained the voluntary nature of the survey; written informed consent was not obtained. In all, 2,023 of 2,208 providers were determined to be eligible, and 1,234 of the eligible providers returned surveys (American Association for Public Opinion Research RR3 = 64%[19]) from 391 HIV care facilities. The data were then weighted based on probability of selection, and response propensity adjustments of the design weights were performed to correct for possible nonresponse bias. Nonresponse adjustments were made to the sampling weights based on provider and facility factors associated with nonresponse: provider profession, number of HIV care providers practicing at the facility, facility university affiliation, whether the facility was a private practice or a community health center, and whether the facility had a computerized system for medications or lab results.

The 2013 MMP provider survey instrument consisted of 61 questions and required approximately thirty minutes to complete. For this analysis, we focused on provider-delivered services intended to reduce HIV transmission risk in two areas: sexual behaviors

and alcohol and drug use ("substance use"). Each provider was asked whether they provided each of 9 sexual behavior-related and 7 substance use-related HIV transmission RR services to most or all of their patients (Table 2). We constructed two composite variables indicating "adequate" sexual behavior-related and substance use-related HIV transmission RR service delivery, using a standard of approximately 70% of services delivered[20]. Adequate sexual behavior-related RR was defined as providing at least 7 of 9 sexual RR services for most or all of the provider's patients (or 6 of 8 in the case of providers who did not see patients at initial visits). Adequate substance use-related RR was defined as providing at least 5 of 7 substance use RR services for most or all of the provider's patients (or 4 of 6 in the case of providers who did not see patients at initial visits) among providers seeing persons who inject drugs (PWID). Independent variables were chosen based on prior studies of provider-delivered HIV transmission RR[7, 9, 13], and included age, gender, sexual orientation, race/ethnicity, provider type, years caring for HIV patients, primary care provision, language, number of patients, satisfaction with support services, having sufficient time to see patients, and patient characteristics. Also examined was HIV specialist designation, which was based on meeting criteria established by the HIV Medicine Association[21] or the American Academy of HIV Medicine[22], and utilization of an integrated team, which was defined as multiple clinicians working together to augment the provider visit by providing pre-visit, post-visit, or between-visit contact with HIV-infected patients.

We computed weighted estimates of percentages and associated 95% confidence intervals (CIs) to describe the target population of providers. Rao-Scott chi-square tests were used to test bivariate associations between selected independent variables and the two adequate RR services variables. All independent variables having associations of $p<0.05$ were included in logistic regression models predicting the two dependent variables. Based on examination of frequencies, number of HIV patients was also included in the models to assess whether there was a significant curvilinear association between this variable and the two dependent variables. Prevalence ratios for the independent variables were computed using methods described by Bieler et al[23]. All estimates incorporated the survey weights, and variance estimates were computed using Taylor Series Linearization to reflect the complex features of the MMP provider sample. We used SAS/STAT (Version 9.3, SAS Institute Inc., Cary, NC, USA) and SUDAAN (Version 11, RTI International, Research Triangle Park, NC, USA) procedures for the analysis of complex sample survey data, and considered estimates with a coefficient of variation greater than 0.3 unreliable.

Results

We estimate that the majority of HIV care providers in the United States in 2013 were over age 49 (58%), male (57%), heterosexual (85%), non-Hispanic white (63%), and physicians (medical doctors or osteopaths) (79%) (Table 1). Over half were HIV specialists (58%) and most provided primary care to their HIV-infected patients (83%). About half (50%) were satisfied with the level of support services available in their practice and 54% utilized an integrated team in their practice.

The sexual behavior-related HIV transmission RR services most frequently provided to most or all patients were encouraging patient disclosure of HIV status to all sex partners (81%),

asking patients newly diagnosed with an STD about disclosure of HIV status to sex partners (69%), and asking about HIV disclosure to all sex partners at a patient's initial visit (62%) (Table 2). Asking about HIV disclosure to new sex partners at follow-up visits (41%), offering condoms to sexually active patients (42%), and referring patients to partner services for assistance with notifying sex partners who had not been informed of their exposure to HIV (53%) were the services least likely to be provided to most or all patients. We estimate that 38% of providers offered condoms to few or none of their sexually active patients and 16% referred few or no patients to the health department for assistance with notifying sex partners who had not been informed of their HIV exposure. Screening for sexual risk behaviors and for symptoms of STDs in sexually active patients was only done for most or all patients by a little more than half of providers, and between 20-24% of providers did this for half or fewer of their patients. Examination of our composite variable indicates that adequate delivery of recommended sexual behavior-related RR services to most or all patients was low (37%).

The substance use-related HIV transmission RR services most frequently provided to most or all patients were assessing substance use every 6 months (64%) and encouraging patient disclosure of HIV status to all drug-injecting partners (61%) (Table 3). Asking about HIV disclosure to new drug-injecting partners at follow-up visits (41%), informing PWID about sterile syringe sources (43%), and referral to partner services for drug-injecting partners that have not been informed of their possible exposure to HIV (45%) were the least likely to be provided to most or all patients. We estimate that 24% of providers discussed sources of sterile syringes with few or no patients who shared drug injection equipment and 20% referred few or no patients to the health department to discuss drug-injecting partners that had not been informed of their HIV exposure. Overall, adequate delivery of recommended substance use-related RR services to most or all patients was also suboptimal (43%).

Factors independently associated with providing adequate sexual behavior-related RR services were being a nurse practitioner (adjusted prevalence ratio [aPR] 1.59), having 6-10 years of HIV care experience compared to over 20 (aPR:1.70), providing primary care (aPR: 1.56), and having more than 50% of patients who were men who have sex with men (MSM) (aPR:0.79) (Table 3). Factors independently associated with providing adequate substance use-related HIV RR services were being a nurse practitioner (aPR:1.59) and being an HIV specialist (aPR:1.27), and having more than 50% of patients who were PWID (aPR:1.56) (Table 4).

Discussion

The majority of U.S. HIV care providers may need additional support to improve delivery of comprehensive HIV transmission RR services to their patients. Services provided most consistently were those related to disclosure of HIV status to all sex and drug injection partners since HIV diagnosis and to sex partners at the time of an STD diagnosis, as well as assessment of alcohol and drug use every six months. Providers were least likely to ask patients at follow-up visits if any new sex or drug-injecting partners were notified of possible HIV exposure, to inform PWID about sources of sterile syringes, and to offer

condoms to sexually active patients. The proportion of providers who refer patients to partner services for their sex and drug-injecting partners was also low.

Encouraging disclosure of HIV status to sex and drug-injecting partners at initial evaluations was more common than doing so at follow-up visits, as has been found by others[9]. Follow-up visits are generally allotted less time than initial visits, but we did not find an association between delivering adequate RR services and satisfaction with time spent with either new or established patients, as has sometimes been found by others[13]. Beyond the shorter time allotted to follow-up visits, providers may feel that discussing risk behaviors and HIV disclosure is not needed with patients who have not reported risk behaviors in prior encounters. However, because behaviors are dynamic and people with HIV are living longer, routine delivery of prevention services at follow-up visits is essential.

Delivery of services that require structural supports such as condom provision and information about sources of sterile syringes was also low. Delivery of these services may not entirely be at the discretion of the provider, as condoms and sterile syringes may not be available in all settings. For example, having condoms freely available to patients requires some coordination between the care facility and those who can provide the condoms, such as condom manufacturers or community-based prevention organizations. State and federal laws may affect the availability of syringe exchange and prescription options. However, use of condoms and sterile syringes are effective behavioral interventions that reduce the risk of HIV transmission, and HIV care providers can be instrumental in promoting their use. Although free condoms may also be available from other sources (such as community-based organizations or social venues), health care settings are an important point of access. In 2011, approximately 64% of U.S. HIV-infected patients who received free condoms obtained them from a general health clinic[24].

Consistent with prior work, referral to partner services for both sex and drug-injecting partners was also less frequently delivered[7]. Because health department-delivered partner services can be a cost-effective means of identifying new HIV infections and disrupting HIV transmission chains[2], and early identification of HIV infection and subsequent treatment with ART improves likelihood of treatment success and decreases the risk of onward HIV transmission[25], enhanced efforts to increase provider referral of patients to partner services are warranted. The newly published *Recommendations for HIV Prevention with Adults and Adolescents with HIV in the United States* provides recommendations for clinical providers on strategies to establish infrastructure for HIV partner services[2]. Communicating with providers about partner services from a patient's perspective may also help; evidence suggests that patient acceptability and safety are key factors in provider endorsement of partner services[26].

We found suboptimal levels of screening for sexual risk behaviors and for STDs among sexually active patients. This concurs with findings of low levels of STD screening among U.S. HIV patients[27]. Some providers may not be comfortable discussing sex with their patients[28], but tools exist that may help providers enhance their skills in these areas. For example, “Ask, Screen, Intervene” and “Partnership for Health” are two interventions that provide courses, continuing education opportunities, and other materials to facilitate their

implementation by clinicians[29, 30]. Increasing service delivery in this area is essential because provider-delivered risk counseling can be effective in reducing sexual risk behaviors among HIV-infected persons[2, 5, 6].

Nurse practitioners were independently more likely to provide adequate sex and substance use-related HIV transmission RR services to their patients. Although the role of nurse practitioners in delivery of HIV care has not been studied extensively, studies suggest that nurse practitioners provide similar quality HIV care as physicians[31]. In addition, several studies have indicated that nurse practitioners have similar primary care outcomes as physicians, but outperform physicians in measures of consultation time, patient-follow-up and patient satisfaction[32]. This analysis supports the key role of nurse practitioners in delivering comprehensive prevention services for HIV-infected persons and helps inform the debate regarding the future role of nurse practitioners in the delivery of HIV care[33]. As the number of HIV-infected persons needing care grows annually, nurse practitioners may play an essential role in delivering needed HIV transmission RR services.

Having more than 50% MSM patients was independently associated with lower delivery of sexual behavior-related RR. This finding concurs with patient-level data in which MSM report lower receipt of prevention counseling than other groups[10]. Enhanced efforts to improve this gap may be needed, as the risk of sexual transmission of HIV is substantially higher for MSM who engage in anal intercourse[34]. Although biomedical prevention strategies such as Treatment as Prevention and pre-exposure prophylaxis (PrEP) may hold great promise for populations disproportionately affected by HIV such as MSM, they will not supplant the need for continued delivery of RR services. An estimated 38% of HIV-infected persons receiving medical care in 2011 had at least one unsuppressed viral load test result over the prior year[16], which indicates a continued need for behavioral strategies to decrease risk of HIV transmission among sexually active persons and PWID in this group. Also, the success of PrEP as a prevention strategy may depend on expanding provider education and training programs so that all at-risk persons have access to PrEP. An analysis of 2013 MMP Provider Survey data found that only an estimated 26% of U.S. providers who care for HIV-infected and non-HIV-infected patients reported ever prescribing PrEP[35].

That providers who also deliver primary care are more likely to deliver sexual behavior related RR is encouraging, and may indicate the complementary nature of HIV and primary care training. As the Institute of Medicine notes, as HIV-infected persons are living longer, there is an increased need for primary care skills among HIV care providers in order to meet their patients' health needs[36]. As the Affordable Care Act provides funding to community health centers to enhance HIV care and treatment services, a growing number of HIV-infected persons may receive care from primary care providers and NPs, which may enhance delivery of RR services.

Having more than 50% PWID as patients was independently associated with delivery of substance use-related HIV transmission RR services, which may reflect the increased expertise and comfort with discussing substance use that comes with seeing larger numbers of patients for whom these services may be relevant. Also, providers who see many PWID may have more confidence in their ability to identify those in need of these services.

Meeting HIV specialist criteria was also associated with being more likely to deliver substance use related HIV transmission RR services. Although HIV specialist certification differs somewhat from credentialing through certification programs, given the recent debate about the value of maintaining certification programs and the difficulty in demonstrating their effect on quality of care[37], this finding may warrant further exploration.

Our analysis is subject to several limitations. First, we did not assess delivery of every possible sexual behavior- and substance use-related RR service, for example delivery of more intensive behavioral RR interventions. However, we assessed a wide range of basic services that capture the minimum standard for provider-delivered RR. Second, our estimates of delivery of RR services are self-reported and may be subject to recall and social desirability bias. However, our findings concur with studies using direct observation methods, which have also found low rates of provision of these services[11, 12]. Third, we did not measure the quality or quantity of services delivered, so we cannot determine whether the delivery of services by providers was adequate to meet the patients' needs. For example, while Drainoni and colleagues[28] found that almost all providers they surveyed discussed risk behaviors and transmission with their HIV-infected patients, most did not routinely probe for the reasons for risk behaviors and thus missed opportunities to provide effective counseling to reduce these behaviors. Fourth, we were unable to fully assess delivery of RR services by provider race/ethnicity because the numbers of black and Hispanic providers were low, leading to unstable estimates with wide confidence intervals. Future surveys could oversample non-white providers to address this limitation. Fifth, the MMP Provider Survey is designed to produce national estimates, but participating states may be able to generate locally representative estimates. Such analyses may be useful for evaluating the adequacy of local RR services and determining what changes are needed to improve the delivery of these services. Sixth, in some care settings provision of selected prevention services may be performed by non-clinical staff, and thus providers may not provide the service so as not to be duplicative. However, provider-delivered RR has been found to be especially effective in reducing risk behavior[5], and provider awareness of patient risk behavior is essential for providing quality medical care, for example for determining need for STD screening[2-4]. Finally, while we chose to use a threshold of approximately 70% of services delivered for our composite measures, it is important to acknowledge that all services we examined are recommended by federal guidelines[2]. Despite this, we did not choose a threshold of 100% of services delivered because, as mentioned above, some services examined (e.g., condom provision, referral to partner services) require structural supports that are not entirely within the control of the provider. Also, because 100% delivery (or “all-or-nothing”) measures are sensitive to the number of items included in the composite measure, a 70% threshold has been suggested as an alternative measure of clinical quality[20]. Because all services examined are recommended by federal guidelines, we decided to give all services equal weight in the construction of our composite measures.

Despite biomedical advances in prevention strategies, supporting behavior change through RR services remains an essential component of an effective combination approach to HIV prevention. The recent publication of the updated federal recommendations for HIV prevention with persons with HIV[2] provides an opportunity to refocus efforts on these important services. The HIV-infected population is growing as a result of a stable number of

annual new infections and increasingly effective treatments that reduce mortality. Further, as our national efforts to move individuals along the continuum of care result in increases in numbers of HIV-infected persons engaged in medical care, it is crucial that we ensure that providers of HIV care are aware of recommended prevention services and that they are provided with adequate training and support to assess and address HIV transmission risks among their patients. This analysis presents evidence that comprehensive transmission RR services are not delivered by a majority of providers to most of their patients, and identifies specific services that are in need of enhancement, such as RR at follow-up visits and referral to partner services. CDC has compiled a list of existing resources to support implementation of federal guidelines for HIV prevention (http://www.cdc.gov/hiv/prevention/programs/pwp/resources.html) and will continue to monitor delivery of these services through provider surveys and other efforts to ensure that all persons with HIV are receiving needed services to prevent onward transmission and improve their health.

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Table 1

Provider and practice characteristics—2013 Medical Monitoring Project (MMP) Provider Survey, United States (n=1,234)

	n	wt. %	95% CI
Provider characteristics			
Age (years)			
< 40	211	18	13-22
40-49	326	24	21-27
50-59	453	38	32-45
60+	204	20	15-25
Gender			
Male	620	57	50-63
Female	585	43	37-50
Sexual orientation			
Heterosexual or straight	980	85	81-89
Gay, lesbian, or bisexual	221	15	11-19
Race / ethnicity			
White, non-Hispanic	783	63	56-70
Black, non-Hispanic	89	11^	4-18
Hispanic or Latino	158	11^	4-18
Other	179	16	11-21
Provider type			
ID board certified physician	564	45	37-52
Non-ID board certified physician	380	35	28-42
Nurse Practitioner	217	15	10-20
Physician Assistant	63	5	3-8
Years caring for HIV patients			
0-5 years	231	18	13-22
6-10 years	196	18	14-22
11-20 years	428	36	32-40
21+ years	365	29	25-33
HIV specialist			
No	369	42	36-49
Yes	865	58	51-64
Provides primary care for HIV-infected patients			
No	128	17	12-22
Yes	1094	83	78-88
Communicates in another language in addition to English to provide medical care			
No	694	61	54-69
Yes	519	39	31-46
Number of patients			
0-20 patients	103	15	10-21

	n	wt. %	95% CI
21-50 patients	186	20	14-25
51-200 patients	479	39	34-44
200+ patients	437	26	20-32
Practice characteristics			
Satisfaction with support services			
Less than satisfied or very satisfied	552	50	45-56
Satisfied or very satisfied	667	50	44-55
Has sufficient time for new patients			
Sometimes or never	329	24	20-28
Always or usually	877	76	72-80
Has sufficient time for established patients			
Sometimes or never	329	25	21-29
Always or usually	894	75	71-79
Percentage of patients who are non-white			
0-50%	304	38	25-51
> 50%	907	62	49-75
Percentage of patients who are women			
0-50%	1153	94	90-97
> 50%	60	6	3-10
Percentage of patients who are men who have sex with men (MSM)			
0-50%	650	52	42-63
> 50%	563	48	37-58
Percentage of patients who are persons who inject drugs (PWID)			
0-50%	1178	97	93-100
> 50%	35	3^	0-7
Practice utilizes an integrated team			
No	339	46	37-54
Yes	874	54	46-62

CI, 95% confidence interval; ID, infectious diseases;

^CV is greater than 0.30, estimate may be unreliable.

Table 2

Prevalence of HIV transmission risk-reduction services—2013 MMP Provider Survey, United States

	n	wt. %	95% CI
Sexual behavior-related HIV risk-reduction services (n=1,214) *			
Ask about any new sexual partners and number and gender of partners and assess ongoing risk behaviors every 6 months			
Most or all	669	54	47-61
More than half	289	25	21-29
About half	98	7	5-10
Less than half	110	9	7-12
Few or none	48	4	2-5
Ask about symptoms of STDs since the last visit in sexually active patients			
Most or all	627	54	49-59
More than half	304	22	18-25
About half	124	9	7-11
Less than half	108	12	8-16
Few or none	48	3^	1-6
Provide safer sex counseling at each visit for patients with ongoing risky sexual behaviors or detectable viral load			
Most or all	734	59	54-65
More than half	276	25	21-28
About half	105	7	5-9
Less than half	78	6	4-9
Few or none	21	3^	1-4
Offer condoms to sexually active patients			
Most or all	627	42	34-49
More than half	179	11	8-13
About half	50	3	2-4
Less than half	71	6	4-9
Few or none	279	38	30-47
Ask patients during their initial evaluation if all sexual partners since time of diagnosis have been notified of possible HIV exposure			
Most or all	704	62	56-69
More than half	220	18	13-22
About half	67	5	3-8
Less than half	104	7	5-10
Few or none	102	8	5-11
Ask patients during their follow-up visits if any new sexual partners have been notified of possible HIV exposure since their last visit			
Most or all	461	41	33-48
More than half	251	19	15-22
About half	128	11	7-14
Less than half	180	15	12-19
Few or none	190	15	11-19

	n	wt. %	95% CI
Ask patients with newly diagnosed syphilis, gonorrhea, chlamydia, trichomoniasis (in women only) and HSV-2 if all sex partners have been informed of possible HIV exposure			
Most or all	828	69	63-76
More than half	193	14	11-17
About half	60	4	2-6
Less than half	74	7^	2-12
Few or none	52	6	3-8
Encourage patients to disclose their HIV status to all sex partners since the time of their diagnosis			
Most or all	938	81	77-84
More than half	150	11	8-13
About half	49	3	2-5
Less than half	43	3	2-4
Few or none	29	3	1-4
Refer patients to health department to discuss sex partners who have not been informed of their exposure and to arrange for their notification and referral for HIV testing			
Most or all	558	53	45-60
More than half	193	14	9-19
About half	78	6	4-9
Less than half	135	11	7-15
Few or none	235	16	12-19
Adequate sexual behavior-related risk-reduction services			
Yes	432	37	29-45
No	750	63	55-71
Substance use-related HIV transmission risk-reduction services (n=1,207)[§]			
Assess use of alcohol, recreational drugs, illicit drugs, and elicit injected drugs every 6 months			
Most or all	788	64	57-71
More than half	249	23	17-29
About half	82	7	5-9
Less than half	55	4	2-6
Few or none	33	2^	1-3
Ask injection drug users during their initial evaluation if all injection partners have been informed of possible HIV exposure			
Most or all	560	58	49-66
More than half	160	17	10-25
About half	71	7	5-9
Less than half	88	7	4-11
Few or none	135	11	8-14
Ask injection drug users at follow-up visits if any new injection partners have been informed of possible HIV exposure since their last visit			
Most or all	404	41	32-50
More than half	221	21	17-25
About half	80	9	6-12
Less than half	130	14	8-20
Few or none	178	15	12-19

	n	wt. %	95% CI
Encourage patients to disclose their HIV status to all injection partners since the time of their HIV diagnosis			
Most or all	598	61	53-68
More than half	172	17	13-21
About half	57	5	2-8
Less than half	82	8^	3-14
Few or none	124	9	7-12
Refer patients to health department to discuss drug injection partners who have not been informed of their exposure and to arrange for their notification and referral for HIV testing.			
Most or all	403	45	39-51
More than half	165	16	12-20
About half	71	6	4-8
Less than half	119	14	9-19
Few or none	253	20	15-24
For patients who abuse alcohol or drugs, make referrals for appropriate specialty services			
Most or all	775	57	50-63
More than half	250	23	19-28
About half	78	10	5-14
Less than half	49	5	2-8
Few or none	47	5	2-8
Inform patients who share drug injection equipment about sources of sterile syringes (e.g., pharmacies, syringe programs, legal prescription in some states)			
Most or all	480	43	37-48
More than half	176	18	13-24
About half	67	6	5-8
Less than half	89	9	6-12
Few or none	199	24	18-30
Adequate substance use-related risk-reduction services			
Yes	403	43	35-51
No	552	57	49-65

CI, 95% confidence interval;

*Adequate sexual behavior-related risk-reduction was defined as performing at least 7 of 9 sexual behavior-related risk-reduction activities for most or all patients who met certain characteristics (6 of 8 services for providers who did not see patients for initial visits).

§Adequate substance use-related risk-reduction was defined as performing 5 of 7 substance use-related risk-reduction activities for most or all patients who met certain characteristics (4 of 6 services for providers who did not see patients for initial visits; providers with no intravenous drug using patients were excluded).

^CV is greater than 0.30, estimate may be unreliable.

Table 3

Associations between provider and practice characteristics and the provision of adequate sexual behavior-related HIV transmission risk-reduction services--2013 Medical Monitoring Project (MMP) Provider Survey, United States. (N=1,214)

	Adequate sexual behavior-related HIV transmission risk-reduction services (n = 432)							
	n	**wt. row %**	**CI**	**Rao-Scott x^2 *P* value**	**PR**	**CI**	**aPR**	**CI**
Provider characteristics								
Age (years)								
< 40	79	42	27-58					
40-49	103	31	22-41					
50-59	156	40	28-52					
60+	82	31	23-40					
Gender								
Male	189	32	22-41	*	0.73 *	0.55-0.97	0.97	0.78-1.22
Female	238	43	34-52		Ref.		Ref.	
Sexual orientation								
Heterosexual or straight	359	38	30-47					
Gay, lesbian, or bisexual	64	27	18-36					
Race/ethnicity								
White, non-Hispanic	247	33	25-41					
Black, non-Hispanic	46	55	29-82					
Hispanic or Latino	71	47	30-63					
Other	63	32	18-46					
Provider type								
ID board certified physician	171	29	23-36	**	Ref.		Ref.	
Non-ID board certified physician	124	38	24-52		1.31	0.93-1.84	1.06	0.77-1.45
Nurse Practitioner	112	57	50-64		1.97 **	1.58-2.46	1.59 **	1.25-2.01
Physician Assistant	21	30 ^	10-49		1.02	0.52.1.99	0.79	0.41-1.54
Years caring for HIV patients								
0-5	88	42	27-58	*	1.60	0.99-2.59	1.37	0.88-2.12
6-10	73	51	33-69		1.93 **	1.35-2.76	1.70 *	1.12-2.58
11-20	155	35	27-43		1.31	0.95-1.81	1.15	0.83-1.59

	Adequate sexual behavior-related HIV transmission risk-reduction services (n = 432)							
	n	wt. row %	CI	Rao-Scott x^2 *P* value	PR	CI	aPR	CI
21+	111	27	18-36		Ref.		Ref.	
HIV specialist								
No	119	35	22-47					
Yes	313	39	31-46					
Provides primary care for HIV-infected patients								
No	31	21	10-32	**	Ref.		Ref.	
Yes	401	40	32-48		1.88**	1.13-3.13	1.56*	0.97-2.51
Communicates in other language in addition to English to provide medical care								
No	222	33	24-43	*	Ref.		Ref.	
Yes	207	43	35-50		1.28*	1.00-1.63	1.12	0.88-1.42
Number of patients								
0-20	34	40	22-57		0.89	0.58-1.36	1.03	0.71-1.50
21-50	56	30	20-39		0.66**	0.48-0.92	0.88	0.61-1.28
51-200	160	34	23-45		0.75	0.53-1.07	0.86	0.63-1.18
201+	174	45	36-54		Ref.			
Practice characteristics								
Satisfaction with support services								
Less than satisfied or very satisfied	182	34	22-45					
Satisfied or very satisfied	245	40	33-47					
Sufficient time for new patients								
Sometimes or never	111	39	29-49					
Always or usually	312	36	26-45					
Sufficient time for established patients								
Sometimes or never	98	34	23-45					
Always or usually	333	38	29-47					
Percentage of patients non-white								
0-50%	80	26	18-34	**†	Ref.		Ref.	
More than 50%	344	43	35-50		1.64**	1.24-2.17	1.17	0.86-1.58
Percentage of patients who are women								

	Adequate sexual behavior-related HIV transmission risk-reduction services (n = 432)							
	n	**wt. row %**	**CI**	**Rao-Scott x^2 *P* value**	**PR**	**CI**	**aPR**	**CI**
0-50%	403	36	28-44					
More than 50%	23	44^	15-73					
Percentage of patients who are men who have sex with men (MSM)								
0-50%	241	43	35-51	**	Ref.		Ref.	
More than 50%	185	30	22-38		0.71**	0.56-0.90	0.79*	0.63-1.00
Percentage of patients who persons who inject drugs (PWID)								
0-50%	415	37	29-45					
More than 50%	11	39	31-48					
Utilizes integrated team								
No	89	31	19-42	*	Ref.		Ref.	
Yes	342	42	35-50		1.36	0.95-1.96	1.09	0.80-1.48

Wt. weighted; CI, 95% confidence interval; PR, prevalence ratio; CI, 95% confidence interval; aPR, adjusted prevalence ratio; Ref., referent ID, infectious diseases;

^CV is greater than 0.30, estimate may be unreliable;

**p<0.01,

*p<0.05;

significance levels for PRs and aPRs were obtained from pairwise comparisons, based on the average marginal predictions.

Table 4

Associations between provider and practice characteristics and the provision of adequate substance use-related HIV transmission risk-reduction services--2013 Medical Monitoring Project (MMP) Provider Survey, United States. (N=1,207)

	Adequate substance use-related HIV transmission risk-reduction services (n = 403)							
	n	**wt.row %**	**CI**	**Rao-Scott x^2 *P* value**	**PR**	**CI**	**aPR**	**CI**
Provider characteristics								
Age (years)								
< 40	64	45	28-63					
40-49	100	43	32-53					
50-59	154	41	27-56					
60+	71	44	33-55					
Gender								
Male	189	40	32-48					
Female	209	49	39-59					
Sexual orientation								
Heterosexual or straight	326	44	36-52					
Gay, lesbian, or bisexual	66	42	28-55					
Race/ethnicity								
White, non-Hispanic	237	43	36-51					
Black, non-Hispanic	37	40	18-62					
Hispanic or Latino	58	40	25-55					
Other	64	44	26-61					
Provider type								
ID board certified physician	168	37	27-46	**	Ref.		Ref.	
Non-ID board certified physician	116	41	31-52		1.13	0.84-1.53	0.99	0.76-1.31
Nurse Practitioner	95	62	53-70		1.68 **	1.30-2.18	1.59 **	1.24-2.04
Physician Assistant	21	44	26-62		1.21	0.73-2.01	1.04	0.63-1.70
Years caring for HIV patients								
0-5	73	52	38-65					
6-10	68	41	20-61					
11-20	146	47	36-58					

	Adequate substance use-related HIV transmission risk-reduction services (n = 403)							
	n	wt.row %	CI	Rao-Scott x^2 *P* value	PR	CI	aPR	CI
21+	111	34	25-43					
HIV specialist								
No	100	36	28-44	*	Ref.		Ref.	
Yes	303	47	38-56		1.29*	1.02-1.64	1.27*	1.04-1.55
Provides primary care for HIV-infected patients								
No	32	34	18-50					
Yes	371	45	37-52					
Communicates in other language in addition to English to provide medical care								
No	198	39	29-49	*	Ref.		Ref.	
Yes	203	49	42-57		1.28	0.98-1.67	1.19	0.93-1.53
Number of patients								
0-20	22	52	27-78		1.06	0.63-1.79	1.30	0.78-2.17
21-50	52	37	25-49		0.75	0.54-1.03	0.89	0.67-1.19
51-200	160	39	29-48		0.78*	0.64-0.96	0.90	0.72-1.12
201+	159	50	40-59		Ref.			
Practice characteristics								
Satisfaction with support services								
Less than satisfied or very satisfied	181	39	28-50					
Satisfied or very satisfied	218	46	38-54					
Sufficient time for new patients								
Sometimes or never	93	44	32-56					
Always or usually	299	42	34-50					
Sufficient time for established patients								
Sometimes or never	86	45	33-58					
Always or usually	314	42	35-50					
Percentage of patients non-white								
0-50%	85	40	27-52					
More than 50%	310	45	36-53					
Percentage of patients who are women								
0-50%	379	43	35-52					

	Adequate substance use-related HIV transmission risk-reduction services (n = 403)							
	n	**wt.row %**	**CI**	**Rao-Scott x^2 *P* value**	**PR**	**CI**	**aPR**	**CI**
More than 50%	18	35^	5-66					
Percentage of patients who are men who have sex with men (MSM)								
0-50%	229	46	36-55					
More than 50%	168	40	30-49					
Percentage of patients who persons who inject drugs (PWID)								
0-50%	379	42	34-50	**	Ref.		Ref.	
More than 50%	18	65	50-81		1.55**	1.15-2.08	1.56	1.16-2.09
Utilizes integrated team								
No	88	34	25-42	**	Ref.		Ref.	
Yes	312	50	41-58		1.48**	1.16-1.89	1.21	0.98-1.49

Wt. weighted; CI, 95% confidence interval; PR, prevalence ratio; CI, 95% confidence interval; aPR, adjusted prevalence ratio; Ref., referent ID, infectious diseases;

^ CV is greater than 0.30, estimate may be unreliable;

** p<0.01,

* p<0.05;

significance levels for PRs and aPRs were obtained from pairwise comparisons, based on the average marginal predictions.