

Provider barriers to prescribing HAART to medically-eligible HIV-infected drug users

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Abstract We aimed to identify factors associated with a medical provider's resistance to prescribing HAART to medically-eligible HIV-infected illicit drug users. In four US cities, a mailed, self-administered survey queried 420 HIV care providers about patients' characteristics and barriers to care. Adjusted odds ratios (AOR) and 95% confidence intervals (CI) were estimated using logistic regression. Providers identified as resistant to prescribing HAART to medically-eligible HIV-infected illicit drug users were more likely to be non-physicians (AOR = 1.89, 95% CI: 1.04–3.46), to work in populations with a high prevalence of both mental illness (AOR = 2.42; 95% CI: 1.11–5.26) and injection drug use (AOR = 1.82 95% CI: 1.02–3.25) and were deterred from prescribing HAART by patients' limited ability to keep appointments, (AOR = 3.19; 95% CI: 1.39–7.37), alcoholism (AOR = 1.92; 95% CI: 1.04–3.55) and homelessness (AOR = 1.81; 95% CI: 1.07–3.06). Providers working in populations with a high injection drug use prevalence commonly reported higher prevalence of non-injection drug use, alcohol problems and mental illness, and higher antiretroviral therapy refusal rates within their patient populations. Our findings underscore the challenges to providers who treat HIV-infected drug users and suggest that their care and treatment would benefit from on-site drug treatment, mental health and social services.

Introduction

Approximately, one-third of new human immunodeficiency virus (HIV) infections occurring in the USA can be attributed to injection drug use, taking into account both direct transmission of HIV due to the sharing of contaminated injection equipment and indirect transmission through sexual contact and mother-to-child transmission (CDC, 2001). Dual diagnoses of mental illness and substance abuse, in addition to other physical problems, further complicate the lives of illicit drug users and subsequently, their health care (Angelino *et al.*, 2001; Bing *et al.*, 2001; Burnam *et al.*, 2001; Ferrando *et al.*, 1996; Kilbourne *et al.*, 2001; Tyndall *et al.*, 2001). Urban injection drug users (IDUs) often are members of racial/

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ethnic minorities, live below the poverty line, have unstable housing, have minimal or no health insurance and may harbour a distrust of the health care system. Low income, inadequate insurance and inconsistent health care are related to lower antiretroviral (ART) use among IDUs (Andersen *et al.*, 2000; Bamberger *et al.*, 2000; Bangsberg *et al.*, 1997; Celentano *et al.*, 1998, 2001). Despite entitlement programmes, such as Medicaid, the Ryan White CARE Act and the AIDS Drug Assistance programmes (ADAP) that reduce the financial barriers to HIV medical care and treatment for disadvantaged individuals in the USA, a large proportion of medically-eligible, HIV-infected IDUs still receive no or sub-optimal antiretroviral treatment (Celentano *et al.*, 2001; Gange *et al.*, 2002).

HIV-infected IDUs often delay seeking health care until HIV has progressed and treatment is most needed (Cook *et al.*, 2002; Crystal *et al.*, 2001; Gange *et al.*, 2002; Hader *et al.*, 2001; Hsu *et al.*, 2001; Keruly *et al.*, 2002; Lucas *et al.*, 2001; Michaels *et al.*, 1999; Samet *et al.*, 1998; Shapiro *et al.*, 1999; Turner *et al.*, 2000; Tyndall *et al.*, 2001). Sub-optimal use of HAART among IDUs has contributed to excess AIDS and deaths, as well as higher health care costs due to hospitalization (Anderson *et al.*, 2000; HIV Research Network, 2002; Karon, 2001; Paul *et al.*, 2002; Steinbrook, 2001). While illicit drug use is not a contraindication for HAART according to the US Departments of Health and Human Service (DHHS) antiretroviral treatment guidelines (DHHS, 2002), the disparities observed in HAART use, hospitalizations and AIDS deaths among IDUs indicate the treatment needs of this population remain unfulfilled. Efforts must continue to identify factors hindering access to HAART and its use among IDUs, thereby achieving the public health goals of identifying and treating a larger proportion of the HIV-infected population (CDC, 2001).

The extent to which provider or patient characteristics drive disparities in HAART utilization among IDUs remains unclear. Studies of the attitudes and practices of medical care providers who, in part, are accountable for the treatment decisions for IDUs can provide insight into the barriers to their HIV medical care and their unmet service needs. We examined the responses of HIV medical care providers in an effort to identify factors associated with providers' resistance to prescribing HAART to medically-eligible HIV-infected IDUs and to understand the conditions that constrain providers' antiretroviral prescribing practices.

Methods

As part of the multi-site Antiretroviral Treatment Access Studies (ARTAS), a survey of HIV medical care providers was conducted between October 2000 and June 2001. The survey targeted physicians, nurse practitioners and physician assistants who provide HIV medical care to disadvantaged, adult, HIV-infected populations within the metropolitan centres of Atlanta, Baltimore, Miami and Los Angeles. The US Centers for Disease Control and Prevention (CDC) Institutional Review Board (IRB), as well as the IRBs at each study site, reviewed and approved the study protocol. Providers who worked in HIV/AIDS speciality clinics and/or at institutions receiving Ryan White Title II funding, US government funding for HIV medical care and related support services, in these cities in 1999 were identified. A self-administered survey and disclosure letter were sent to 526 medical care providers. Providers represented 139 HIV medical care centres, of which 75 (54%) had more than one provider that responded to the survey.

Data were collected on: (1) provider characteristics (age, gender, race, degree, experience treating HIV injection patients); (2) patient population characteristics (HIV patient

population size and the prevalence of depression, mental illness and substance use among HIV-infected patients); (3) providers' perceptions of their patients' barriers to HIV medical care, understanding of HIV treatment and their reasons for not wanting HIV care or treatment; (4) the providers' challenges when caring for drug users and/or prescribing HAART to drug users; and (5) the providers' deterrents to prescribing HAART when clinically indicated.

Most questions in the survey were designed for categorical responses. Questions soliciting providers' opinions or perspectives were classified on a four-point Likert scale, (i.e. strongly agree, somewhat agree, somewhat disagree and strongly disagree). Response categories for questions requiring a provider to estimate a proportion were: 0%, 1–10%, 11–25%, 26–40%, 41–60%, 61–75%, 76–90% and 91–100%. Providers were classified as '*resistant*' to prescribing HAART to medically-eligible drug users if they somewhat disagreed or strongly disagreed with the statement: 'If medically indicated I would prescribe HAART to an HIV-infected patient who has a problem with illicit drug use'. Otherwise, a provider was classified as '*amenable*' to prescribing HAART to an illicit drug user as recommended by the DHHS guidelines.

To further understand an association between the prevalence of injection drug use within a patient population and providers' resistance to prescribing HAART to drug users, we extended our analysis and compared responses from providers who worked in high IDU prevalent populations (HPP providers) to responses from providers who worked in lower IDU prevalent populations (LPP providers). A high IDU prevalent population was classified *a priori* as a patient population comprised of more than 40% IDUs. Patient populations with 40% IDU prevalence or less were classified as lower IDU prevalent populations. With this comparison we aimed to characterize the settings within which providers who serve drug-using populations make treatment decisions, by comparing the frequency of patient population characteristics and provider perceived barriers to HIV medical care across HPP and LPP populations.

Statistical analysis

Frequencies and means were calculated across sub-groups of provider and patient population characteristics. Statistically significant univariate differences were identified by chi-square, *t*-tests and odds ratios. To determine if responses clustered among providers from the same HIV care centers, intra-class correlation coefficients (ICC) were calculated. An ICC of 0.40 or greater indicated an intermediate or greater response cluster (Gordis, 1996). To account for the clustering of provider responses to questions pertaining to illicit drug use, all bivariate and multivariate prevalence odds ratios (ORs) and 95% confidence intervals (CIs) were calculated by logistic regression using generalized estimating equations (GEE) (Diggle *et al.*, 1994).

The ORs and multivariate adjusted odds ratios (AORs) and their 95% CIs were calculated to identify provider characteristics, potential barriers or patient population characteristics associated with providers' resistance to prescribe HAART to medically-eligible HIV-infected illicit drug users. Using the AORs and weighting them by the frequency of providers' responses (ρ) within categories, we calculated the fraction of responses attributed to providers resistance, and likened it to a population-attributable fraction (Mausner *et al.*, 1985), herein referred to as the importance fraction (IF) and calculated as follows:

$$IF = 100 \times [\rho(AOR - 1)/(1 + \rho(AOR - 1))]$$

This fraction was rounded to the nearest factor of ten. The resulting rank ranged from 10 (minimally important) to 100 (high importance). The IF provided a way to rank the importance of a given characteristic or barrier among resistant providers and helps to prioritize potential interventions aimed to improve HAART use among IDU populations.

HPP and LPP provider characteristics and patient population descriptors were compared using bivariate odds ratios. The focus of the analyses were to find setting-, patient- or provider-specific characteristics that may constrain the HAART-prescribing practices of HPP providers compared to LPP providers. Using logistic regression, these factors were adjusted for the effects of provider type (physicians versus non-physician) only. While our ability to model many variables was limited by the small number of HPP providers, we adjusted each association by provider type because it was identified as an important confounding factor in our analyses. Our goal was to create a model that provided insight into the differences within the HIV medical care setting of HPP patients, rather than creating a comprehensive model that best describes HPP providers.

Results

Four hundred and twenty (79.8%) of 526 providers responded to the survey. Seventy-five per cent of these were physicians, while 25% were either a nurse practitioner or a physician's assistant. In these US cities, non-physicians are accountable to a supervising physician, yet have autonomy in HAART prescribing and patient care management and often independent patient populations. Compared to physicians, non-physician providers were more likely to be female (80.6% versus 34.4%, $p = 0.001$) and were more likely to have cared for HIV-infected patients for less than five years (36.0% versus 17.0%, $p = 0.001$), respectively. Non-physicians were also more likely to have a higher prevalence of both injection and non-injection drug use in their HIV-infected patient populations, compared to physicians. Therefore, provider type was considered an important confounding factor in all multivariate analyses.

No statistical difference existed for any unmet service need when comparing providers who were resistant versus amenable to prescribing HAART to illicit drug users or when comparing HPP providers and LPP providers. Yet, greater than 90% of all providers reported a need for drug and alcohol treatment (90.7%), social work services (91.2%), nutrition services (91.2%) and health education (90.0%) in their clinical care setting.

Correlates of providers' resistance to prescribing HAART to illicit drug users

One hundred providers (24%) in our survey were categorized as resistant to providing HAART to HIV-infected drug users despite medical eligibility, whereas 316 (76%) were categorized as amenable providers. Non-physicians and female providers were two times more likely to be categorized as resistant providers (Table 1). No other provider characteristic, such as age, race, years of experience, or size of patient population was associated with being a resistant provider.

Current injection drug use, alcoholism, a perceived inability to keep appointments and being homeless were more likely to deter resistant providers from prescribing HAART in bivariate analysis (Table 1). Resistant and amenable providers were similar in their reporting of other potential deterrents to prescribing HAART, including readiness to take treatment (81.9% overall), unstable living situation (43.8% overall), inability to fill prescriptions (40.7% overall), limited ability to adhere to treatment (40.7% overall) and mental illness (36.6% overall). Thirteen (13%) resistant providers versus two (0.6%) amenable providers reported

Table 1. Correlates of provider resistance to prescribe HAART to illicit drug users.

| | Inclination toward prescribing HAART to an illicit drug user | | | <i>p</i> [*] | Odds ratios [†] OR (95% CI) | Multivariate odds ratios [†] AOR (95% CI) |
|---|--|---|--|-----------------------|---|---|
| | Total population No. (%) | Resistant (<i>n</i> = 100) No. (%) | Amenable (<i>n</i> = 316) No. (%) | | | |
| Provider characteristic | | | | | | |
| Degree (type) | | | | | | |
| MD | 314 (75.5) | 65 (65.0) | 249 (78.8) | | Reference | Reference |
| NP/PA | 102 (24.5) | 35 (35.0) | 67 (21.2) | 0.005 | 2.03 (1.18–3.49) | 1.89 (1.04–3.46) |
| Gender | | | | | | |
| Male | 227 (54.6) | 38 (38.0) | 189 (59.8) | 0.001 | Reference | |
| Female | 189 (45.4) | 62 (62.0) | 127 (40.2) | | 2.32 (1.40–3.84) | |
| Age (years grouped) | | | | | | |
| 25–44 | 194 (46.6) | 48 (48.0) | 146 (46.2) | 0.753 | Reference | |
| 45+ | 222 (53.4) | 52 (52.0) | 170 (53.8) | | 0.89 (0.58–1.39) | |
| Race | | | | | | |
| White | 255 (62.7) | 57 (57.6) | 198 (64.3) | 0.441 | Reference | |
| Black | 61 (15.0) | 18 (18.2) | 43 (14.0) | | 1.40 (0.76–2.60) | |
| Other | 91 (22.4) | 24 (24.2) | 67 (21.8) | | 1.26 (0.70–2.29) | |
| Years caring for HIV patients | | | | | | |
| > 8 yrs | 236 (56.7) | 48 (48.0) | 188 (59.5) | 0.075 | Reference | |
| 5–8 yrs | 90 (21.6) | 23 (23.0) | 67 (21.2) | | 1.26 (0.67–2.38) | |
| 0–4 yrs | 90 (21.6) | 29 (29.0) | 61 (19.3) | | 1.81 (0.95–3.44) | |
| Size of HIV-infected patient population | | | | | | |
| > 74 | 251 (60.3) | 57 (57.0) | 194 (61.4) | 0.835 | Reference | |
| 50–74 | 33 (7.9) | 8 (8.0) | 25 (7.9) | | 1.07 (0.51–2.27) | |
| 25–49 | 49 (11.8) | 12 (12.0) | 37 (11.7) | | 1.07 (0.42–2.75) | |
| < 25 | 83 (20.0) | 23 (23.0) | 60 (19.0) | | 1.35 (0.79–2.28) | |

Table 1 (Continued)

| | Inclination toward prescribing HAART to an illicit drug user | | | <i>p</i> * | Odds ratios [†] OR (95% CI) | Multivariate odds ratios [†] AOR (95% CI) |
|--|---|---|--|------------|---|--|
| | Total population No. (%) | Resistant (<i>n</i> = 100) No. (%) | Amenable (<i>n</i> = 316) No. (%) | | | |
| Deterrents to provider prescribing HAART | | | | | | |
| Current injection drug use | 223 (53.7) | 83 (83.8) | 140 (44.3) | 0.001 | 6.31 (3.56–11.2) | |
| Alcoholism | 173 (41.7) | 59 (59.6) | 114 (36.1) | 0.001 | 2.45 (1.42–4.22) | 1.92 (1.04–3.55) |
| Limit ability to keep appointments | 254 (61.2) | 74 (74.7) | 180 (57.0) | 0.002 | 2.17 (1.32–3.60) | 3.19 (1.39–7.37) |
| Being homeless | 170 (41.0) | 55 (55.6) | 115 (36.4) | 0.001 | 2.12 (1.36–3.29) | 1.81 (1.07–3.06) |
| Patient barriers to HIV medical care specified by providers HIV care interferes with continuation of illicit drug habits. | 219 (53.2) | 63 (63.6) | 156 (49.8) | 0.016 | 1.68 (1.09–2.59) | |
| Proportion of HIV-infected population with a problem of: | | | | | | |
| Injection drug use | | | | | | |
| < 25 | 334 (80.3) | 71 (71.0) | 263 (83.2) | 0.012 | Reference | Reference |
| 26–40 | 38 (9.1) | 11 (11.0) | 27 (8.5) | | 1.48 (0.81–2.70) | |
| 41+ | 44 (10.6) | 18 (18.0) | 26 (8.2) | | 2.32 (1.25–4.29) | 1.82 (1.02–3.25) |
| Non-injection drug use | | | | | | |
| < 25 | 271 (65.3) | 60 (60.0) | 211 (67.0) | 0.398 | Reference | |
| 26–40 | 69 (16.6) | 18 (18.0) | 51 (16.2) | | 1.14 (0.62–2.10) | |
| 41+ | 75 (18.1) | 22 (22.0) | 53 (16.8) | | 1.39 (0.76–2.56) | |
| Alcohol problem | | | | | | |
| < 25 | 280 (67.5) | 59 (59.0) | 221 (70.2) | 0.098 | Reference | |
| 26–40 | 71 (17.1) | 23 (23.0) | 48 (15.2) | | 1.65 (1.01–2.68) | |
| 41+ | 64 (15.4) | 18 (18.0) | 46 (14.6) | | 1.33 (0.76–2.35) | |
| Mental illness [‡] | | | | | | |
| < 25 | 285 (83.3) | 62 (74.7) | 223 (86.1) | 0.009 | Reference | Reference |
| 26–40 | 30 (8.8) | 8 (9.6) | 22 (8.5) | | 1.22 (0.63–2.39) | |
| 41+ | 27 (7.9) | 13 (15.7) | 14 (5.4) | | 2.83 (1.47–5.46) | 2.42 (1.11–5.26) |
| Depression [§] | | | | | | |
| < 25 | 252 (60.7) | 63 (63.0) | 189 (60.0) | 0.124 | Reference | |
| 26–40 | 81 (19.5) | 13 (13.0) | 68 (21.6) | | 0.61 (0.32–1.13) | |
| 41+ | 82 (19.8) | 24 (24.0) | 58 (18.4) | | 1.24 (0.70–2.19) | |

Table 1 (Continued)

| | Inclination toward prescribing HAART to an illicit drug user | | | <i>p</i> [*] | Odds ratios [†] OR (95% CI) | Multivariate odds ratios [‡] AOR (95% CI) |
|--|--|---|--|-----------------------|---|---|
| | Total population No. (%) | Resistant (<i>n</i> = 100) No. (%) | Amenable (<i>n</i> = 316) No. (%) | | | |
| Proportion of patients that receive drug treatment (if needed) | | | | | | |
| < 25 | 352 (85.2) | 75 (75.8) | 277 (88.2) | 0.007 | Reference | |
| 26–40 | 34 (8.2) | 12 (12.1) | 22 (7.0) | | 1.86 (0.80–4.29) | |
| 41+ | 27 (6.5) | 12 (12.1) | 15 (4.8) | | 2.83 (1.21–6.58) | |

^{*}*p*-value for the univariate chi-square test; [†]Calculated by logistic regression, using generalized estimating equations (GEE) with a logit link, binary distribution and exchangeable correlation structure. Multivariate OR were adjusted for all other variables in the final logistic model; [‡]mental illness was defined as mental illness other than depression that impaired daily activity; [§] depression is defined as depression that impaired daily activity; *Note.* Statistical analyses were performed using SAS 8.0 software (SAS institute, Cary, NC) and STATA 6.0 (Stata Corporation, College Station, Texas).

that they would be resistant to prescribing Bactrim to HIV-infected patients who demonstrate a problem with illicit drug use (OR = 23.4, 95% CI = 5.63–97.2). A similar proportion of resistant and amenable providers (33.5% overall) indicated that they would be reluctant ‘to see an HIV-infected patient who was high or intoxicated’.

Resistant providers were more likely to report working in patient populations with a higher prevalence (>40%) of co-morbid conditions, such as injection drug use, mental illness, and moderate to higher prevalence (>25%) of alcoholism (Table 1). Resistant providers were more likely to report that patients refuse treatment because ‘HIV care interferes with continuation of [their] illicit drug habit’ (OR = 1.68, 95% CI = 1.25–4.29) (Table 1).

In the final multivariate logistic regression model, provider resistance to prescribing HAART to medically-eligible drug users was associated with being a non-physician (AOR = 1.89, 95% CI = 1.04–3.46); being deterred by a perceived inability of patients to keep appointments (AOR = 3.19, 95% CI = 1.39–7.37), alcoholism (AOR = 1.92, 95% CI = 1.04–3.55) and homelessness (AOR = 1.81, 95% CI = 0.07–3.06). Furthermore, provider resistance was also associated with working in populations with a high prevalence (>40%) of both mental illness (AOR = 2.42, 95% CI = 1.11–5.26) and injection drug use (AOR = 1.82, 95% CI = 1.02–3.25).

To prioritize the competing factors that contributed to provider resistance, we determined that being deterred by a patient’s limited ability to keep appointments (IF = 60), alcoholism (IF = 30) or homelessness (IF = 30) were most important followed by having higher prevalence of mental illness (IF = 10) and IDU (IF = 10) in the patient population.

Characteristics associated with high IDU prevalence in HIV-infected populations

Compared to physician respondents, non-physician providers were 2.7 times more likely to be HPP providers. Examining the association of injection drug use prevalence to the prevalence of other co-morbid conditions, HPP providers reported a higher prevalence of non-injection drug use ($p = 0.001$), alcohol problems ($p = 0.001$), depression ($p = 0.001$) and mental illness other than depression ($p = 0.001$) within their HIV-infected patient populations (Table 2). After adjusting for provider type, HPP providers were also more likely to work with populations with high prevalence (>40%) of non-injection drug use (AOR = 4.16, 95% CI = 1.70–9.64) and alcohol problems (AOR = 5.47, 95% CI = 2.45–12.2), and were more likely to report patient populations with moderate (26–40%) and high (>40%) prevalence of mental illness (AOR = 2.42, 95% CI = 1.04–5.66 and AOR = 4.12, 95% CI = 0.75–22.7, respectively) (Table 2). Compared to LPP providers, HPP providers were four times more likely to indicate that greater than 40% of their current patients refused antiretroviral therapy (Table 2).

Substance abuse (OR \gg 1), mental health problems (OR = 2.37), lack of social support (OR = 1.64), patients’ denial about HIV status (OR = 1.68), patients’ not seeking care until symptomatic (OR = 1.58) and the perception that HIV care interferes with continuation of drug habit (OR = 2.84) were barriers to HIV medical care that were reported more often by HPP providers compared to those working in LPP settings (Table 2). Only substance abuse (OR \gg 1) and mental health problems (AOR = 2.04, 95% CI = 1.07–3.88) remained as statistically important barriers to HIV medical care after adjusting for provider type (Table 2).

We also noted that an inadequate utilization of drug treatment, defined as less than 25% of patients receiving needed drug treatment, was reported by 44% of HPP providers and 90% of LPP providers ($p = 0.001$). Compared to LPP providers, HPP providers were, respectively,

Table 2. Comparison of responses among providers from high IDU prevalent (> 40%) and lower IDU prevalent HIV-infected patient populations.

| | Prevalence of injection drug use | | <i>p</i> * | Odds ratio [†] OR (95% CI) | Adjusted odds ratio [†] AOR (95% CI) |
|--|----------------------------------|----------------------------------|------------|--|---|
| | High (> 40%) (<i>n</i> = 45) | Low (≤ 40%) (<i>n</i> = 375) | | | |
| | No. (%) | No. (%) | | | |
| Provider characteristics | | | | | |
| Provider type | | | | | |
| NP/PA | 19 (42.2) | 84 (22.4) | 0.003 | 2.68 (1.48–4.85) | – |
| MD | 26 (57.8) | 291 (77.6) | | Reference | – |
| Proportion of HIV-infected patient population with problem of: | | | | | |
| Non-injection drug use (%) | | | | | |
| < 25 | 14 (31.1) | 259 (69.4) | 0.001 | Reference | Reference |
| 26–40 | 10 (22.2) | 59 (15.8) | | 2.30 (0.79–6.65) | 1.98 (0.69–5.66) |
| 41+ | 21 (46.7) | 55 (14.7) | | 5.05 (2.32–11.0) | 4.16 (1.79–9.64) |
| Alcohol problem (%) | | | | | |
| < 25 | 14 (31.1) | 268 (71.8) | 0.001 | Reference | Reference |
| 26–40 | 9 (20.0) | 62 (16.6) | | 1.71 (0.69–4.20) | 1.48 (0.67–3.29) |
| 41+ | 22 (48.9) | 43 (11.5) | | 6.33 (2.78–14.4) | 5.47 (2.45–12.2) |
| Mental illness‡ (%) | | | | | |
| < 25 | 14 (41.2) | 273 (88.1) | 0.001 | Reference | Reference |
| 26–40 | 8 (23.5) | 22 (7.1) | | 3.09 (1.44–6.62) | 2.42 (1.04–5.66) |
| 41+ | 12 (35.3) | 15 (4.8) | | 4.85 (0.91–25.8) | 4.12 (0.75–22.7) |
| Depression§ (%) | | | | | |
| < 25 | 17 (37.8) | 238 (63.8) | 0.001 | Reference | Reference |
| 26–40 | 11 (24.4) | 70 (18.8) | | 1.67 (1.03–2.71) | 1.40 (0.82–2.40) |
| 41+ | 17 (37.8) | 65 (17.4) | | 2.16 (0.80–5.78) | 1.79 (0.69–4.60) |
| Proportion of the population that refused antiretroviral treatment | | | | | |
| < 25 | 40 (88.9) | 357 (96.2) | 0.067 | Reference | Reference |
| 26–40 | 3 (6.7) | 10 (2.7) | | 2.18 (0.85–5.62) | 2.43 (1.01–5.89) |
| 41+ | 2 (4.4) | 4 (1.1) | | 4.80 (1.41–16.2) | 4.00 (1.23–13.0) |
| Patient barriers to HIV medical care specified by providers: | | | | | |
| Substance abuse problems | 45 (100) | 319 (86.0) | 0.007 | I Ψ | I Ψ |
| Mental health problems | 44 (97.8) | 307 (82.5) | 0.008 | 2.37 (1.27–4.39) | 2.04 (1.07–3.88) |
| Lack of social support | 42 (93.3) | 299 (80.6) | 0.036 | 1.64 (0.79–3.40) | 1.69 (0.80–3.57) |

Table 2 (Continued)

| | Prevalence of injection drug use | | <i>p</i> [*] | Odds ratio [†] OR (95% CI) | Adjusted odds ratio [†] AOR (95% CI) |
|--|----------------------------------|----------------------------------|-----------------------|--|---|
| | High (> 40%) (<i>n</i> = 45) | Low (≤ 40%) (<i>n</i> = 375) | | | |
| | No. (%) | No. (%) | | | |
| Denial about HIV status | 43 (95.6) | 307 (82.5) | 0.025 | 1.68 (0.98–2.87) | 1.46 (0.89–2.38) |
| HIV interferes with drug habit | 35 (77.8) | 188 (50.7) | 0.001 | 2.84 (1.10–7.33) | 2.67 (0.98–7.28) |
| Not seeking care until symptomatic | 31 (68.9) | 186 (49.7) | 0.015 | 1.58 (0.71–3.53) | 1.34 (0.60–3.00) |
| Proportion of patients that receive drug treatment (if needed) (%) | | | | | |
| < 25 | 20 (44.4) | 334 (90.0) | 0.001 | Reference | Reference |
| 26–40 | 12 (26.7) | 22 (6.0) | | 4.46 (2.05–9.71) | 3.50 (1.48–8.26) |
| 41+% | 13 (28.9) | 15 (4.0) | | 8.90 (3.76–21.1) | 8.64 (3.79–19.7) |

^{*}*p*-value for the univariate chi-square test; [†]Calculated by logistic regression, using generalized estimating equations (GEE) with a logit link, binary distribution, and exchangeable correlation structure. Adjusted ORs were adjusted for providers type only; [‡]Mental illness was defined as mental illness other than depression that impaired daily activity; [§] Depression is defined as depression that impaired daily activity; ^ψ I or infinity indicates that 100% of providers within high IDU prevalent providers indicated that substance abuse was a problem, the ratio of odds had a zero in the denominator, resulting in a very large odds ratio.

Note. Statistical analyses were performed using SAS 8.0 software (SAS institute, Cary, NC) and STATA 6.0 (Stata Corporation, College Station, Texas).

3.5 and 8.6 times more likely to report that 26–40% and greater than 40%, respectively, of their current patients received their needed drug treatment.

Discussion

Taking the lead from the results concerning resistant providers, interventional priorities to improve HAART readiness should focus on the drug-using patient's ability to keep appointments, concurrent drug and alcohol use and housing. Our findings are consistent with other research that suggests that HAART is under-prescribed to persons with an IDU history, who are homeless or have mental illness or depression (Bangsberg *et al.*, 1999; Celentano *et al.*, 1998, 2001; Crystal *et al.*, 2001; Fairfield *et al.*, 1999; Hsu *et al.*, 2001; Murri *et al.*, 1999; Sambamoorthi *et al.*, 2000; Strathdee *et al.*, 1998; Turner *et al.*, 2001a). In this study, providers who were resistant to providing HAART to medically-eligible drug users were 23 times more likely to resist prescribing PCP prophylaxis to an illicit drug user. Other researchers have demonstrated that IDUs are less likely to receive opportunistic infection prophylaxis as well as HAART (Gardner *et al.*, 2002; Shapiro *et al.*, 1999). Thus, improvements in HIV medical care must extend beyond the difficulties of prescribing HAART to include the wider spectrum of medical care for HIV-infected IDUs.

In our study population, non-physician providers were more likely than physicians to be resistant to prescribing HAART therapies to IDUs. Also, they were more likely to serve vulnerable populations, such as substances users, and to have fewer years of HIV care experience. HIV speciality care has been associated with increased HAART use (Chaisson *et al.*, 1995; Gardner *et al.*, 2002; Kitahata *et al.*, 1996; Turner *et al.*, 2001b). Strathdee *et al.* (1998) showed medical providers with less experience treating HIV-infected patients were less likely to prescribe ART to medically-eligible IDUs in Vancouver, Canada. Conversely, Fairfield *et al.* (1999) did not find an association between provider experience and HAART-prescribing practices for IDUs in Boston, Massachusetts. Unmeasured characteristics of the non-physician provider and their role in HAART prescribing, as well as characteristics of the health care system serving vulnerable populations, may influence the association between provider type, experience and patient population. Therefore, improving medical speciality training alone is unlikely to have a large impact on the treatment disparities in HIV-infected, drug-using populations.

Instead, our findings suggest that solutions to diminishing disparities in HIV care for IDUs may arise from helping providers address the social barriers to health care and competing health care needs. In our study, providers with patient populations with high prevalence of injection drug use specified that substance use and mental health were important barriers to HIV care. They indicated that patients' denial of their HIV status, struggles with ongoing drug habits and delays in seeking health care were obstacles to treatment. We showed that high IDU prevalent HIV-infected patient populations had greater burdens of non-injection drug use, alcoholism, depression and other mental illness. We cannot conclude that all drug users suffer from these co-morbid conditions; yet we presume that the providers' treatment decisions for IDUs are constrained by both the patients' substance abuse history and other destabilizing life conditions.

Research has shown that there remains an unmet need for services to stabilize the lives of HIV-infected persons, especially the homeless, IDUs, alcoholics and/or the mentally ill (Bangsberg *et al.*, 1997; Burnam *et al.*, 2001; Crystal *et al.*, 2001; Cunningham *et al.*, 1999; Fairfield *et al.*, 1999; Katz *et al.*, 2000), and that HIV care for difficult populations is enhanced by better supportive care such as case management and adherence counselling

(Crystal *et al.*, 2001; Katz *et al.*, 2001). This sentiment was reiterated by more than 90% of providers surveyed, who stated that drug and alcohol treatment, social work services and nutrition and health education remain as unmet health care needs for their patient populations.

Previous studies have shown that IDUs receiving substance abuse treatment, such as methadone treatment, were more likely to have received HIV care and ART more often than IDUs who are not in drug treatment (Antela, 2001; Bassetti *et al.*, 1999; Celentano *et al.*, 2001; Knowlton *et al.*, 2001; Mannheimer *et al.*, 1999; Moatti *et al.*, 2000; Rompalo *et al.*, in press; Sambamoorthi *et al.*, 2000; Strathdee *et al.*, 1998; Turner *et al.*, 2001a). In our survey, it appears that populations with high IDU prevalence had more available and accessible substance abuse treatment, yet an unmet need remains. A majority of HPP providers reported that less than 40% of patients requiring substance abuse treatment accessed such treatment. An even larger substance abuse treatment gap exists for patients in communities with lower IDU prevalence, given that 90% of LPP providers reported that one-quarter of their patients with a substance abuse need had accessed addiction treatment.

We do not suggest that the medical provider alone determines utilization of HIV therapies. However, the patient characteristics reported by resistant providers, such as current injection drug use, alcoholism, homelessness and a limited ability to keep appointments, may lead to more provider decisions to delay or not prescribe HAART to IDUs. Most providers stated that patient readiness to take treatment was important to their treatment decisions. Furthermore, a majority of providers surveyed indicated that unstable lifestyle, limited ability to fill prescriptions and limited ability to adhere to treatment and the complication of mental illness were important factors in their determining treatment.

The literature suggests that some IDU patients weigh their own ability to adhere to treatment against the extent of their drug habit, fears and health beliefs, and subsequently refuse HAART despite a provider's recommendation (Altice *et al.*, 2001; Bassetti *et al.*, 1999; Gerbert *et al.*, 2000). Our findings support this and show that HPP providers were more likely to report that clients refused ART. One interpretation of our findings is that resistant providers who reported 'the interference of HIV care and treatment with the IDUs continued drug habit' as the motivation for refusing to prescribe ART, may in fact be reflecting the IDUs' preference. Altice *et al.* (2001) noted that imprisoned HIV-infected IDUs refused treatment or missed ART doses because of their belief that combining ART with illicit drugs would be potentially harmful. Compared to the HAART barriers, alcohol, drug and mental health problems; patient refusal to take ART itself was the lowest-ranking barrier. Nonetheless, research is needed to investigate whether HAART acceptance among drug users can be enhanced with supportive services, such as patient education, side effect management and institutional interventions to foster social support.

We acknowledge some limitations of our data and inferences. First, our survey queried providers about their patients, as well as their care practices and challenges when providing care within their principally disadvantaged, urban, HIV-infected population. However, we did not ask providers to specify their problems when treating any one specific population, such as drug users. We examined provider responses and discussed associations between HPP versus LPP providers and co-morbidity rates or provider-reported patient needs. While we could not conclude directly that the drug users in their population had these needs, we aimed to describe the environment in which providers who treat drug user populations make their treatment decisions. Second, while we did ask providers about their feelings toward prescribing HAART to an illicit drug user, we did not query them about the source of their resistance. Instead, we measured population-, patient- and provider-specific correlates to the providers' resistance. We showed that resistant providers have characteristics in common and

highlighted providers' concerns about stability of patients' lifestyle which were important to their treatment decisions. We believe this information provides clues as to the conflicts medical providers confront when prescribing HAART to drug-using patients who require treatment.

Public policy implications

To combat the continued disparity in HIV medical care and HAART use among drug users, the medical community and society as a whole must broaden their concept of what constitutes acceptable, accessible and useful medical care for drug-using populations and the communities in which they live (Sherer, 1998). Entitlements and financial assistance provide a partial solution, since barriers persist in the presence of third-party reimbursement (Strathdee *et al.*, 1998). Outreach and case management are successful gateways to existing HIV medical care and services (Crystal *et al.*, 2001; Katz *et al.*, 2001), yet the disjointed services have not met all needs presented by IDU populations who face a myriad of barriers to regular treatment, namely transportation, child care, competing health needs and the previously described life instabilities (Cunningham *et al.*, 1999). The model of HIV care established in the early HIV/AIDS epidemic which served mostly MSMs (men who have sex with men) who differ from IDUs in terms of socio-economic status, race/ethnicity, education and geographic locations may not be adequate to serve the drug-using populations and who remain marginalized from HIV health care.

HIV medical care targeting drug-using populations needs to engage individuals earlier into sustained medical care in order to address the stability of the patients prior to the time when HAART is medically indicated (Bangsberg *et al.*, 1999; Sollitto *et al.*, 2001). Our research and that of others (Angelino *et al.*, 2001; Burnam *et al.*, 2001; Celentano *et al.*, 2001; Clarke *et al.*, 2000; Gerbert *et al.*, 2000; Kilbourne *et al.*, 2001; Knowlton *et al.*, 2001; Laine *et al.*, 2001; Lucas *et al.*, 2001; Mannheimer *et al.*, 1999; Moatti *et al.*, 2000; O'Connor *et al.*, 1994) indicates that HIV care centres serving populations with high rates of drug use would benefit from on-site drug and alcohol treatment, and mental health services. Case management and outreach services are necessary services to address treatment barriers such as housing, social support and socio-economic needs. These centres also facilitate HAART readiness through education, as well as provide patients with assistance in keeping appointments, filling prescriptions and adhering to treatments. Furthermore, a coordinated system of directly observed HAART could be made available to the sub-group of HIV-infected IDUs at greatest risk of low adherence (Bangsberg *et al.*, 2001; Clarke *et al.*, 2000; Mitty *et al.*, 1999, 2002; Stenzel *et al.*, 2001; Tyndall *et al.*, 2001).

Health care policy makers must find ways to facilitate the use of medical care within HIV health care of vulnerable populations, such as drug users. Providers inform us by their actions, as well as their responses that the integration of health care including substance abuse treatment, mental health services and case management would benefit the HIV care of an illicit drug user. Such an approach would improve provider confidence in prescribing treatment for IDUs, which in turn may lead to increased HAART use and improved health outcomes among injection drug users.

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