AIDS Care, February 2007; 19(2): 195–202

Routledge
Taylor & Francis Group

Factors associated with use of HIV primary care among persons recently diagnosed with HIV: Examination of variables from the behavioural model of health-care utilization

M. N. ANTHONY[1,2], L. GARDNER[2], G. MARKS[2], P. ANDERSON-MAHONEY[3], L. R. METSCH[4], E. E. VALVERDE[4], C. DEL RIO[5], & A. M. LOUGHLIN[6], FOR THE ANTIRETROVIRAL TREATMENT AND ACCESS STUDY (ARTAS) STUDY GROUP[††]

[1]*Northrop Grumman Information Technology, Atlanta, GA,* [2]*Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, Atlanta, GA,* [3]*Health Research Association, 1111 Las Palmas Ave, Los Angeles, CA,* [4]*University of Miami Miller School of Medicine, Miami, Florida,* [5]*Emory University School of Medicine, Atlanta, GA,* [6]*Boston University School of Medicine and Johns Hopkins Bloomberg School of Public Health* [††]*The investigators participating in the Antiretroviral Treatment and Access Study (ARTAS) are listed in the acknowledgment.*

Abstract

The delay between testing positive for human immunodeficiency virus (HIV) and entering medical care can be better understood by identifying variables associated with use of HIV primary care among persons recently diagnosed with the virus. We report findings from 270 HIV-positive persons enrolled in the Antiretroviral Treatment Access Study (ARTAS). 74% had not seen an HIV care provider before enrolment; 26% had one prior visit only. Based on Andersen's behavioural model of health care utilization, several variables reflecting demographic, healthcare, illness, behavioural, and psychosocial dimensions were assessed and used to predict the likelihood that participants had seen an HIV care provider six months after enrolment. Overall, 69% had seen an HIV care provider by six months. In multivariate analysis, the likelihood of seeing a provider was significantly ($p < .05$) higher among men, Hispanics (vs. non-Hispanic Blacks), those with higher education, those who did not use injection drugs, those with three or more HIV-related symptoms, those with public health insurance (vs. no insurance), and those who received short-term case management (vs. passive referral). The findings support several conceptual categories of Andersen's behavioural model of health services utilization as applied to the use of HIV medical care among persons recently diagnosed with HIV.

Introduction

In 2005, the Centers for Disease Control and Prevention (CDC) estimated that 1,040,000 Americans were living with HIV infection (Glynn, 2005). Of those living with HIV, about 75% or 780,000 are estimated to know they are infected (Fleming et al., 2002) and of these, an estimated 40% delay entering care for more than one year (Samet et al., 1998). CDC has identified linkage to clinical care as a priority and set a strategic goal of increasing the proportion of HIV-infected persons linked to HIV primary care from 50% to 80% (CDC, 2001). Improving linkage to HIV care and treatment directly benefits the HIV-infected person. It is also an important strategy for reducing transmission of HIV, because patients on antiretroviral therapy who have a low viral load are less likely to infect others through sexual behaviour (Quinn et al., 2000; Tovanabutra et al., 2002).

The identification of factors associated with early adoption of HIV clinical care can assist in closing the gap between HIV testing and treatment. Very little is known about the variables that may facilitate or deter entry into clinical care. Previous clinical studies of persons with HIV have shown that minority groups, injection drug users, and those with a low socioeconomic status were least likely to receive optimal antiretroviral therapy or optimal frequency of contact with medical providers (Andersen, 1995; Cunningham et al., 1999; Giordano, et al., 2003). But data on these factors may be biased because of substantial loss to follow up in many studies

Correspondence: M. N. Anthony, Northrop Grumman Information Technology National Center for HIV, STD, and TB Prevention, Division of HIV/AIDS Prevention, Epidemiology Branch, 1600 Clifton Road MS E-45, Atlanta, GA 30333. Tel: (404)639-6259. Fax: (404) 639-6127. E-mail: manthony@cdc.gov

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the views of the Centers for Disease Control and Prevention.

ISSN 0954-0121 print/ISSN 1360-0451 online
DOI: 10.1080/09540120600966182

(Bassetti et al., 1999; Bing et al., 1999; Fairfield et al., 1999; Murri et al., 1999; Sorvillo et al., 1999).

The Antiretroviral Treatment Access Study (ARTAS) was a randomized controlled trial examining whether case management did better than passive referral in durably linking to clinical care persons recently diagnosed with HIV. The ARTAS case management was modeled on a strengths-based approach, rooted in theories of empowerment and self-efficacy (Bandura, 1986; Zimmerman, 1995), in which clients were encouraged to use their own internal strengths and assets to obtain needed resources (Rapp et al., 1998; Saleeby, 1997). The trial found that a significantly higher proportion of case-managed individuals than individuals who received passive referrals visited an HIV clinician at least twice over twelve months (Gardner et al., 2005).

ARTAS collected questionnaire data that may advance understanding of other variables associated with use of HIV primary care among persons recently diagnosed with HIV. These variables can be conceptualized within Andersen's behavioural model of utilization of health-care services (Andersen, 1995; Andersen et al., 2000). The expanded model (Andersen et al., 2000) includes four conceptual categories. 'Traditional predisposing factors' include demographic variables such as age, gender, race/ethnicity, and education. 'Enabling factors' include variables that may facilitate or deter use of medical services (e.g. having medical insurance, having a usual place to obtain medical care). 'Need factors' include presence of illness (e.g. illness symptoms related to HIV disease) or disability which may necessitate visits to care providers. The final category, 'vulnerable predisposing factors', includes psychosocial (e.g. living arrangements that may indicate level of social support), attitudinal (e.g. attitudes, beliefs, and knowledge about HIV and HIV care), and behavioural variables (e.g. drug use, risky sexual practices) that may be associated with increased or decreased likelihood of using health-care services.

We examined these four categories of variables in relation to use of HIV primary care among persons recently diagnosed with HIV who were enrolled in ARTAS.

Methods

The ARTAS enrolment to six-month follow-up was conducted between March, 2001 and May, 2002 in Atlanta, Georgia, Baltimore, Maryland, Los Angeles, California, and Miami, Florida. ARTAS participants were recruited from health department testing centres, sexually transmitted disease (STD) clinics, hospitals and community-based organizations. The study received approval from the Institutional Review Boards at the CDC and the local study sites. Eligibility criteria for enrolment included having been diagnosed with HIV, not under the care of an HIV medical provider, not having previously visited an HIV care provider more than once, not currently taking HIV antiretroviral medications, 18 years of age or older, and able to provide informed consent. 77% of enrolees had been diagnosed with HIV in the prior six months. 74% had not visited an HIV care provider before enrolment; 26% had one prior visit. This paper reports data on the 270 of the 316 respondents who completed the baseline interview and the six-month follow-up assessment (85% follow-up rate).

Measures

The dependent variable, assessed at follow-up, was self-reported attendance at an HIV care provider during the prior six months (yes, no). The baseline survey was used to identify the race/ethnicity, educational level, prior visit to HIV care provider, and randomization status (case managed vs. passive referral) of participants. Those variables were only collected at baseline. The remaining independent variables were from the six-month follow-up survey.

The 'traditional predisposing factors' included demographic variables (age, gender, race/ethnicity, marital status, education). 'Vulnerable predisposing factors' included living arrangements (alone, with spouse/partner/family, with friend/roommate, other [shelter, street, half-way house]); stressful life events (none vs. one or more in the past six months; see Appendix); use of crack cocaine or injected drugs [including heroin, injected cocaine, speedball (injected cocaine and heroin), injected methamphetamine] in the past six months; unsafe sexual behaviours (unprotected anal or vaginal intercourse with HIV-negative/unknown partner in the past 30 days); and a composite variable reflecting knowledge, attitudes, and beliefs (KAB) about HIV and HIV care on 16 items (see Appendix). KAB responses (agreement, disagreement) were coded ('0' or '1') with '1' reflecting positive attitude/belief or correct knowledge. Responses were summed and divided into tertiles for analysis. Regarding 'need variables', we used items similar to those used in other studies (Bozzette et al., 1994; Ickovics et al., 2001) to measure self-reported HIV-related illness symptoms that occurred for more than two weeks in the past six months (see Appendix). Responses were coded into three groups (0, 1–2, 3+ symptoms). Other medical conditions were also measured: in past six months tested positive for hepatitis (A, B, C or D [delta]) or tuberculosis (may not be new infections) or an STD other than HIV. Participants

also reported their general health status (excellent, very good, good, fair, poor). Finally, the 'enabling variables' included whether participants had medical insurance (none, private, or public [Medicaid, MediCAL, Medicare, AIDS drug assistance, Champus, Veteran's insurance]) and whether they had a usual place of care (none, private doctor office/clinic, health department or other community clinic or hospital). The participants' randomization status in ARTAS (case management arm vs. passive referral) was also included as a variable in the analysis.

Statistical analysis

Preliminary analyses revealed no significant differences by intervention arm in any of the independent variables in the analysis. We calculated the percentage who attended an HIV primary care provider in the six-month period between baseline and follow-up for each subgroup described above. Univariate and multivariate logistic regression analyses examined associations with the dependent variable. The multivariate model included all variables regardless of their univariate association with the dependent measure to statistically control for any potential confounding.

Results

The majority of the participants were non-Hispanic Black (56%), male (70%), single/never married (62%), and without either public or private medical insurance (66%). Twenty-one percent had not gone to high school. Nearly 50% were between the ages of 26 and 39 years; 41% were 40 years or older. Behaviourally, 28% reported that they had engaged in unprotected anal or vaginal intercourse with an HIV-negative/unknown partner in the past 30 days. In the past six months, 10% had injected an illicit drug and 20% had used crack cocaine (see Table I for data on the other variables).

Overall, 69% of the participants had seen an HIV care provider in the six months after enrolling in the study. The percentage varied significantly with several variables, and the findings of the multivariate model (described below) confirmed almost all of the unadjusted results (Table I). Of the 'traditional predisposing variables' (i.e. demographic factors), Hispanics were four times as likely as non-Hispanic Blacks to have seen a care provider. A somewhat larger percentage of non-Hispanic Whites than non-Hispanic Blacks had seen a provider but the difference was not significant in either the unadjusted or adjusted models. It should be noted that there were only 21 white persons in the sample. Participants with minimal education (less than high school experience) were about one-third as likely to see a care provider as those with more education, and, by about the same margin, women were less likely than men to have seen a provider. Of the 'vulnerable predisposing factors', participants who injected illicit drugs were one-fourth as likely as non-IDUs to see a care provider. Use of crack cocaine, which was significant in the unadjusted analysis, was rendered non-significant in the multivariate model, presumably due to its close association with injection drug use. Of the 'need variables', seeing a care provider was nearly six times as likely among those who had experienced three or more HIV-related symptoms for more than two weeks in the past six months than among those who did not experience any symptoms. Those who had hepatitis (vs. not) were more than twice as likely to have seen an HIV care provider. Of the 'enabling factors', those with public medical insurance were four times as likely as those without any medical insurance to have seen a care provider. Only thirteen participants reported that they had private medical insurance, thus precluding a reliable analysis of that subgroup. In unadjusted analysis, participants who had visited an HIV care provider (one time) before they enrolled in the study were significantly more likely to have seen a provider after enrolment, but this finding became non-significant in the multivariate model. Finally, participants who received the case management intervention were nearly four times as likely to have seen a care provider as those who received a passive referral.

Discussion

Among persons recently diagnosed with HIV, attendance at an HIV care provider six months after enrolment was associated with several variables. Having medical insurance was a very strong enabling factor associated with seeing an HIV provider. This finding is consistent with results of other studies. The HIV Cost and Utilization Survey (HCSUS) found that having no medical insurance, compared to Medicaid insurance, was related to a delay of greater than three months from HIV diagnosis to first HIV medical care (Turner et al., 2000).

Only 34% of the participants in ARTAS reported that they had any form of medical insurance, and of them the overwhelming majority had public insurance. This low percentage probably stemmed from the locations in which recruitment was conducted (e.g. publicly funded HIV testing sites, health department STD clinics, and large public hospitals), which traditionally have a disproportionate number of uninsured clients. Because health insurance is a potentially modifiable factor from a policy or legislative standpoint, our findings emphasize how important expansion of insurance coverage is in promoting HIV medical care in the US. Medicaid

Table I. Univariate and multivariate[1] odds ratios of variables associated with seeing an HIV primary care provider within six months after enrolling in the ARTAS study, US, 2001–2002.

	Distribution on variable n (%)	Seen HIV provider in past 6 months n/N (%)	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Traditional Predisposing Variables				
Race/Ethnicity				
White (non-Hispanic)	21 (8)	16/21 (76)	1.95 (0.68, 5.62)	1.07 (0.22, 5.10)
Hispanic	78 (29)	65/78 (83)	3.05 (1.55, 6.02)*	4.13 (1.47, 11.5)*
Other	18 (7)	10/18 (56)	0.76 (0.28, 2.04)	0.77 (0.17, 3.41)
Black (non-Hispanic)	153 (56)	95/153 (62)	1.00	1.00
Age group				
26 to 39 years	131 (48)	89/131 (68)	0.81(0.33, 11.97)	1.52 (0.44, 5.30)
40 years or older	110 (41)	76/110 (69)	0.85 (0.34, 2.11)	1.81 (0.47, 6.96)
25 years or younger	29 (11)	21/29 (72)	1.00	1.00
Gender				
Female	79 (30)	50/79 (63)	0.70 (0.40, 1.21)	0.41 (0.17, 0.96)*
Male	191 (70)	136/191 (71)	1.00	1.00
Education				
8th grade or lower	55 (21)	33/55 (60)	0.60 (0.32, 1.11)	0.36 (0.14, 0.92)*
Any High school or higher	213 (79)	152/213 (71)	1.00	1.00
Marital status				
Single/never married	166 (62)	111/166 (67)	0.61 (0.25, 1.52)	0.40 (0.11, 1.51)
Separated/divorced	49 (18)	31/49 (63)	0.52 (0.19, 1.46)	0.40 (0.09, 1.73)
Common law	20 (7)	18/20 (90)	2.74(0.51, 14.82)	1.60 (0.19, 13.3)
Widow	5 (2)	3/5 (60)	0.46 (0.06, 3.30)	1.28 (0.09, 17.9)
Married	30 (11)	23/30 (77)	1.00	1.00
Vulnerable Predisposing Variables				
Correct knowledge/positive attitudes & beliefs				
Low (4-11)	80 (30)	52/80 (65)	0.71 (0.36, 1.40)	0.59 (0.23, 1.52)
Middle (12-13)	113 (42)	79/113 (70)	0.89 (0.47, 1.69)	0.72 (0.30, 1.70)
High (14-16)	76 (28)	55/76 (72)	1.00	1.00
Stressful life events				
Yes	153 (57)	106/153 (69)	1.04 (0.62, 1.75)	1.27 (0.59, 2.71)
No	116 (43)	79/116 (68)	1.00	1.00
Injection drug use[2] in past 6 months				
Yes	28 (10)	13/28 (46)	0.35 (0.16, 0.77)*	0.27 (0.09, 0.84)*
No	241 (90)	172/241 (71)	1.00	1.00
Crack cocaine use in past 6 months				
Yes	54 (20)	30/54 (55)	0.48 (0.26, 0.89)*	1.03 (0.42, 2.56)
No	215 (80)	155/215 (72)	1.00	1.00
Unprotected anal/vaginal intercourse with HIV-neg/unknown partner(s) in past 30 days				
No	195 (72)	138/195 (71)	1.36 (0.77, 2.39)	1.14 (0.52, 2.50)
Yes	75 (28)	48/75 (64)	1.00	1.00
Living arrangements				
Alone	58 (22)	36/58 (62)	0.99 (0.46, 2.14)	1.17 (0.37, 3.73)
w/ spouse/partner/family	107 (40)	77/107 (72)	1.56 (0.77, 3.12)	1.39 (0.51, 3.73)
w/friend/roommate	50 (18)	38/50 (76)	1.92 (0.82, 4.51)	1.68 (0.55, 5.16)
Other	53 (20)	33/53 (62)	1.00	1.00
Need Variables				
Tested positive for hepatitis in past 6 months (may not be new infection)				
Yes	55 (21)	39/55 (71)	1.13 (0.53, 2.17)	2.77 (1.07, 7.18)*
No	211 (79)	144/211 (68)	1.00	1.00
Tested positive for sexually transmitted diseases (other than HIV) in past 6 months				
Yes	27 (10)	17/27 (63)	0.75 (0.33, 1.71)	0.71 (0.22, 2.24)
No	242 (90)	168/242 (69)	1.00	1.00

Table I (*Continued*)

	Distribution on variable n (%)	Seen HIV provider in past 6 months n/N (%)	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Tested positive for tuberculosis in past 6 months (may not be new infection)				
Yes	17 (6)	14/17 (82)	2.20 (0.61, 7.86)	4.55 (0.64, 32.5)
No	253 (94)	172253 (68)	1.00	1.00
Self-rated health status				
Excellent	57 (21)	41/57 (72)	1.10 (0.25, 4.78)	2.98 (0.31, 8.6)
Very good	78 (29)	57/78 (73)	1.16 (0.28, 4.92)	4.09 (0.49, 33.9)
Good	81 (30)	53/81 (65)	0.81 (0.19, 3.38)	1.60 (0.21, 12.46)
Fair	42 (16)	27/42 (64)	0.77 (0.17, 3.43)	1.29 (0.16, 10.25)
Poor	10 (4)	7/10 (70)	1.00	1.00
HIV-related symptoms in past 6 months				
1-2 symptoms	115 (42)	77/115 (67)	1.16 (0.66, 2.04)	1.01 (0.45, 2.30)
3 or more symptoms	56 (21)	46/56 (82)	2.63 (1.18, 5.83) *	5.97 (1.88, 19.0) *
No symptoms	99 (37)	63/99 (64)	1.00	1.00
Enabling Factors				
Visit to HIV care provider before enrolment				
1 visit before enrolment	70 (26)	57/70 (81)	2.35 (1.20, 4.59)*	2.20 (0.89, 5.40)
No visits before enrolment	195 (74)	127/195 (65)	1.00	1.00
Usual place of care				
Private doctor office/clinic	29 (11)	24/29 (83)	2.71 (0.95, 7.73)	2.67 (0.60, 11.9)
Public or health dept. clinic	90 (33)	64/90 (71)	1.39 (0.75, 2.57)	1.90 (0.80, 4.54)
Other	54 (20)	36/54 (67)	1.13 (0.56, 2.27)	1.37 (0.50, 3.78)
No usual place of care	97 (36)	62/97 (64)	1.00	1.00
Medical insurance				
Private insurance	13 (5)	7/13 (54)	0.65 (0.21, 2.02)	0.44 (0.09, 2.17)
Public insurance	76 (29)	62/76 (82)	2.47 (1.28, 4.76)*	4.05 (1.64, 9.99)*
No insurance	176 (66)	113/176 (64)	1.00	1.00
Case management intervention				
Case management	135 (50)	105/135 (78)	2.33 (1.37, 3.97)*	3.80 (1.80, 8.01)*
Passive referral	135 (50)	81/135 (60)	1.00	1.00

Notes:
[1]The adjusted odds ratios are based on a multivariate model in which all variables were included in the equation. *$p < .05$.
[2]Injected drugs include heroin, cocaine, speedball (injected cocaine and heroin), and injected methamphetamine.

is the leading payer for HIV medical care, but coverage for non-disabled adults is limited to pregnant women and families that earn an income less than a State-specified percentage below the poverty level (Weil, 2003). Because many unmarried adults are not eligible for Medicaid, HIV-infected persons may delay care until they meet the HIV disability criteria qualifying them for this benefit. For HIV, disability requires presence of serious opportunistic illnesses or chronic conditions. These restrictive eligibility criteria place a large burden on the Ryan White Care Act which serves as a safety net for individuals not eligible for Medicaid. The Institute of Medicine has recommended a standard set of income criteria and a uniform benefits package to be part of a new federally financed HIV comprehensive care programme to replace HIV care administered by Medicaid (Institute of Medicine, 2004).

Approximately 20% of participants reported at the follow-up assessment that they had experienced three or more HIV-related symptoms for more than two weeks in the prior six months; 42% reported one or two symptoms. We do not know participants' stages of disease, nor do we know exactly when they became infected with HIV, but it is likely that many were infected several months or years before enrolling in the study. Studies conducted during the HAART era have found that 25–50% of patients enter care with AIDS-defining conditions, CD4 cell counts below 200/mm^3, or will die within 12 months of initial HIV diagnosis (Castilla et al., 2002; CDC, 2003; Chadborn et al., 2005; Girardi et al., 2004; Johnson et al., 2003; Wiewel et al., 2004). Importantly, we found that self-reported HIV-related symptoms were strongly associated with seeing a care provider. We used a simple checklist similar to that used in previous studies (Ickovics et al., 2001) and it was useful in identifying those who were more likely to enter care. One might be tempted to explain this finding by arguing that some persons with symptoms may have had AIDS-defining conditions and were eligible for

Medicaid which increased their access to health care. But the association between symptoms and seeing a provider was significant after statistically controlling for public medical insurance coverage. Participant's subjective rating of heath status (excellent, very good, good, fair, poor) was not a significant predictor.

Injection drug users were less likely than non-users to have seen an HIV provider six months after enrolment. This finding was independent of the other variables in the model. Similar results have been observed in other studies (Celentano et al., 2001; Cunningham et al., 1999; Turner et al., 2000). Not all of the IDUs were out of care however. Unmeasured variables may help account for why some IDUs saw an HIV care provider whereas other IDUs did not. A greater percentage of IDUs who saw a provider may have been linked to drug treatment programmes, social services, or needle exchange programmes that facilitated access to care or otherwise motivated the IDUs to enter care. This possibility deserves attention in future research.

Two demographic variables should be mentioned. Hispanics were more likely than non-Hispanic Blacks to have seen an HIV care provider after enrolling in the study. This difference may be partially accounted for by structural or environmental factors. Many of the Hispanics were recruited in a Hispanic section of Los Angeles at an HIV care facility where they received their HIV-positive test results. Proximity to and familiarity with this facility may have increased their likelihood of returning to that clinic for medical care. This structural feature (i.e. recruitment site located within a care facility) was not present at the locations where non-Hispanic Blacks were recruited into the study. Finally, women were less likely than men to have seen an HIV care provider. Any number of unmeasured variables (e.g. situational barriers, care-giving and family responsibilities, fear about being stigmatized) may account for this gender difference and should be examined in future work.

The findings of the ARTAS case-management intervention have been described in detail elsewhere (Gardner et al., 2005). Short-duration case management (2 to 5 encounters with a case manager) can significantly improve linkage to HIV care among disadvantaged persons. Importantly, this type of short-duration case management can be implemented at the discretion of public health authorities if the resources permit. Well-defined linkage programmes other than ARTAS have been used in a few communities in the US (Cunningham, 2005; Walensky et al., 2005). A cost-effectiveness analysis of the relative merits of allocating counselling, testing and referral services indicated that additional dollars would best be used to improve referral and linkage compared to using resources to increase the number tested (Walensky et al., 2005). The merits of increased referral and linkage were found to be most evident in populations with a lower prevalence of HIV.

The study was not without limitations. The sample was not randomly selected and was not constructed to statistically represent any specific population. Participants were recruited from publicly funded HIV/STD testing sites, health clinics, and hospitals serving persons predominately of lower socioeconomic status. They were recently diagnosed with HIV and had little or no prior experience with HIV care services. Thus, caution must be used in generalizing the findings to a wider population of HIV-positive persons. Further, our outcome measure focused on use of care services during a six-month period following enrolment in the study. The associations we observed may not apply to longer-term utilization of care services.

Despite these limitations, using the behavioural model of health-care utilization (Andersen et al., 2000) to conceptualize the analysis revealed that use of HIV care services among recently diagnosed HIV-positive persons was associated with traditional predisposing variables (race/ethnicity, education, gender), vulnerable predisposing variables (injection drug use), need factors (HIV-related symptoms, having had other medical conditions such as hepatitis), and enabling factors (public health insurance, short-term case management). Innovative solutions that would provide a well-defined approach to linking disadvantaged HIV-infected persons to care and a uniform package of primary care insurance coverage are urgently needed.

Acknowledgements

The ARTAS study group consists of the authors and Dr. Scott D. Holmberg, Dr. Stephanie L. Sansom, Dr. Ramses Sadek, Zaneta Gaul and Christopher S. Krawczyk from the Centers for Disease Control and Prevention; Sonya Green, Maribel Barragan, Dr. Wayne Duffus, Dr. Michael Leonard, Christine O'Daniels, Catherine Abrams, Felicia Berry, Valerie Hunter, Howard Pope, and Giselle C. Hicks from the Emory University School of Medicine, Division of Infectious Diseases; Dr. Steffanie Strathdee, Steven Huettner, Matt Woolf, Ovedia Burt, and Janet Reaves, from the Johns Hopkins Bloomberg School of Public Health; Dr. Peter Kerndt, Bobby Gatson, Brandon Schmidt, Norma Perez, Amy Chan, Lawrence Fernandez, Jr., Shannon Curreri, Eric Valera, Stella Gutierrez, from Health Research Association; Dr. Clyde McCoy, Dr. Gordon Dickinson, Dr. Toye Brewer, Dr. Orlando Gomez, Brad Wohler-Torres, Lauren Gooden, Dr. Wei Zhao, Faye

Yeomans, and Yolanda Davis Camacho from the University of Miami School of Medicine; Dr. Harvey A. Siegal, Richard C. Rapp, Teri L. Rust, and Dr. Jichuan Wang, from the Wright State University School of Medicine.

References

Andersen, R.M. (1995). Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behaviour*, Mar 36, 1–10.

Andersen, R., Bozzette, S., Shapiro, M., St. Clair, P., Morton, S., et al. (2000). Access of vulnerable groups to Antiretroviral Therapy among persons in care for HIV disease in the United States. *Health Services Research*, *2*, 389–416.

Antela, A. (2001). Access to antiretroviral therapy in HIV-infected drug users. *AIDS*, *15*, 1727–28.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice Hall.

Bassetti, S., Battegay, M., Furrer, H., Rickenbach, M., Flepp, M., Kaiser, L., et al. (1999). Why is antiretroviral therapy (HAART) not prescribed or discontinued? *Journal of Acquired Immune Deficiency Syndromes*, *21*, 114–19.

Bing, E., Kilbourne, A., Brooks, R., Lazarus, E., & Senak, M. (1999). Protease inhibitor use among a community sample of people with HIV disease. *Journal of Acquired Immune Deficiency Syndromes*, *20*, 474–80.

Bozzette, S.A., Hays, R.D., Berry, S.H., & Kanouse, D.E. (1994). A perceived health index for use in persons with advanced HIV disease : derivation, reliability, and validity. *Medical Care*, *32*, 716–31.

Centers for Disease Control & Prevention, MMWR Weekly (2003) Late versus early testing of HIV – 16 sites, United States, 2000–2003. *Morbidity and Mortality Weekly Report*, *52*, 581–86.

Center for Disease Control and Prevention, HIV Prevention Strategic Plan through 2005. (2001). http://www.cdc.gov/hiv/pubs/prev-strat-plan.pdf.

Celentano, D., Galai, N., Sethi, A., Shah, N., Strathdee, S., Vlahov, D., & Gallant, J. (2001). Time to initiating highly active antiretroviral therapy among HIV-infected injection drug users. *AIDS*, *15*, 1707–15.

Chadborn, R., Baster, K., Delpech, V., Sabin, C., Sinka, K., Rice, B., & Evans, B. (2005). No time to wait: how many HIV-infected homosexual men are diagnosed late and consequently die? *AIDS*, *19*, 513–20.

Cunningham, W.E., Andersen, R.M., Katz, M.H., Stein, M.D., Turner, B.J., Crystal, S., et al. (1999). The impact of competing subsistence needs and barriers on access to medical care for persons with human immunodeficiency virus receiving care in the United States. *Medical Care*, *37*, 1270–81.

Cunningham, Terry. Electronic mail correspondence. January 2005.

Fairfield, K., Libman, H., Davis, R., Eisenberg, D., & Phillips, R. (1999). Delays in protease inhibitor use in clinical practice. *Journal of General Internal Medicine*, *14*, 395–401.

Fleming, P.L., Byers, R. H., Sweeney, P.A., Daniels, D., Karon, J.M., & Janssen, R.S. (2002).

HIV Prevalence in the United States in 2002. Abstract 11 (pp. 56). IX Conference on Retroviruses and Opportunistic Infections. Seattle, Washington.

Gardner, L. I., Metsch, L. R., Anderson-Mahoney, P., Loughlin, A.M., del Rio, C., Strathdee, S., et al. (2005). Efficacy of a brief case management intervention to link recently diagnosed HIV-infected persons to care. *AIDS*, *19*, 423–31.

Giordano, T.P., White, A.C. Jr, Sajja, P., Graviss, E.A., & Arduino, R.C. et al. (2003). Factors associated with the use of highly active antiretroviral therapy in patients newly entering care in an urban clinic. *Journal of Acquired Immune Deficiency Syndromes*, *32*, 399–405.

Girardi, E., Aloisi, M., Arici, C., Pezzotti, P., Serraino, D., Balzano, R., et al. (2004). Delayed presentation and late testing for HIV: demographic and behavioral risk factors in a multicenter study in Italy. *Journal of Acquired Immune Deficiency Syndromes*, *36*, 951–59.

Glynn, M. & Rhodes, P. (2005). Estimated HIV prevalence in the United States at the end of 2003. 2005 National HIV Prevention Conference, Atlanta, GA, June 12–15, Abstract T1-B11-13 (p. 85).

Henry J. Kaiser Family Foundation (1999). *Medicaid and HIV/AIDS Policy: A basic primer*. KFF report Number 2136 (Henry J. Kaiser Family Foundation, Inc, Menlo Park, CA).

Ickovics, J., Hamburger, M., Vlahov, D., Schoenbaum, E., Schuman, P., et al. (2001). Mortality, CD4 cell count decline and depressive symptoms among HIV-seropositive women. *Journal of the American Medical Association*, *285*, 1466–74.

Institute of Medicine (2004). *Public financing and delivery of HIV/AIDS care: Securing the legacy of Ryan White*. Washington D.C.: National Academies Press. pp. 153.

Johnson, D., Sorvillo, F., Wohl, A., Bunch, G., Harawa, N., Carruth, A., Castillon, M., & Jimenez, B. (2003). Frequent failed early HIV detection in a high prevalence area: implications for prevention. *AIDS Patient Care and STDs*, *17*, 277–82.

Justice, A., Holmes, W., Gifford, A., Rabeneck, L., Zackin, R., Sinclair, G., et al. (2001). Development and validation of a self-completed HIV symptom index. *Journal of Clinical Epidemiology*, *54*, S77–S90.

Krawczyk, C.S., Gardner, L.I., Wang, J., Sadek, R., Loughlin, A.M., et al. (2003). Antiretroviral Treatment and Access Study Group. Test-retest reliability of a complex human immunodeficiency virus research questionnaire administered by an Audio Computer-assisted Self-interviewing system. *Medical Care*, Jul, 41, 853–58.

Laine, C., Hauck, W., & Turner, B. Outpatient patterns of care and longitudinal intensity of antiretroviral therapy for HIV-infected drug users (2002). *Medical Care*, *40*, 976–95.

Murri, R., Fantoni, M., Del Borgo, C., Izzi, I., Visonà, R, et al. (1999). Intravenous drug use, relationship with providers, and stage of HIV disease influence the prescription rates of protease inhibitors. *Journal of Acquired Immune Deficiency Syndromes*, *22*, 461–66.

Quinn, T.C., Wawer, M.J., Sewankambo, N., et al. (2000). Viral load and heterosexual transmission of human immunodeficiency virus type 1. *New England Journal of Medicine*, *342*, 921–29.

Rapp, R.C., Siegal, H.A., Li, L., & Saha, P. (1998). Predicting postprimary treatment services and drug use outcomes: a multivariate analysis. *American Journal of Drug and Alcohol Abuse*, *24*, 603–15.

Rothman, K., & Greenland, S. (1998). *Modern Epidemiology: second edition*. Lippencott-Raven publishers. Philadelphia, pp. 257.

Sacks, S. (2000). Co-occurring mental and substance use disorders: promising approaches and research issues. *Substance Use and Misuse*, *35*, 2061–93.

Saleebey, D. (1997). The Strengths Perspective in Social Work Practice, Second Edition. Longman Publishers. New York.

Samet, J.H., Freedberg, K.A., Stein, M.D., Lewis, R., Savetsky, J., Sullivan, L., et al. (1998). Trillion virion delay: Time from testing positive for HIV to presentation for primary care. *Archives of Internal Medicine*, *158*, 734–40.

Sorvillo, F., Kerndt, P., Odom, S., Castillon, M., Carruth, A., & Contreras, R. (1999). Use of protease inhibitors among persons with AIDS in Los Angeles County. *AIDS Care*, *11*, 147–55.

Tovanabutra, S., Wongtrakul, J., Sennum, S., et al. (2002). Male viral load and heterosexual transmission of HIV-1 subtype E in northern Thailand. *Journal of Acquired Immune Deficiency Syndromes*, *29*, 275–83.

Turner, B., Cunningham, W., Duan, N., Andersen, R., Shapiro, M., et al. (2000). Delayed medical care after diagnosis in a U.S. national probability sample of persons infected with human immunodeficiency virus. *Archives of Internal Medicine*, *160*, 2614–22.

Walensky, R., Losina, E., Malatesta, L., Barton, G., O'Connor, A, et al. (2005). Effective HIV case identification through routine HIV screening at urgent care centers in Massachusetts. *American Journal of Public Health*, *95*, 71–73.

Walensky, R., Weinstein, M., Smith, H., Freedberg, K., & Paltiel, D. (2005). Optimal allocation of testing dollars: the example of HIV counseling, testing and referral. *Medical Decision Making*, May/June, 25, 321–29.

Weil, A. (2003). There's something about Medicaid. *Health Affairs*, *22*, 13–30.

Wiewel, E., Bennani, Y., Ramaswamy, C., Sackoff, J.E., & Torian, L.V. (2004). High prevalence and late diagnosis of HIV among black men aged 40-54 in New York City. The XV International AIDS Conference, July 11, abstract MoPeC3506. Bangkok, Thailand.

Zimmerman MA. Psychological empowerment: issues and illustrations (1995). *American Journal of Community Psychology, 23*, 581–99.

Appendix

Illness symptoms occurring for more than two weeks in the past six months

- Diarrhoea or loose stools
- Big problems with memory or concentration that interfered with your normal, every day activities
- A fever of 100 degrees Fahrenheit or more
- Swollen Lymph nodes (swollen glands) in any location
- A yeast infection of the mouth (thrush)
- An unexpected weight loss of 10 pounds or more that lasted for more than a month

Stressful life events in the past six months

- Any household members had trouble with the law or been taken to court
- Any of your children been taken away
- You been fired or laid off from a job
- You been incarcerated/jailed
- You been evicted or asked to leave your housing
- You been a victim of a violent crime (such as a rape or assault)
- You been physically abused by a household member or a partner

Knowledge, attitudes, and beliefs about HIV disease and care

- HIV can kill you if left untreated
- I want to be active in making decisions about my HIV care
- I do not need medical care and HIV medicines until I get very sick
- A high Viral Load is bad for my health
- Missing doses of my HIV medicine will not harm my health
- A high CDC (T-cell) count is good for my health
- I do not want to start taking HIV medicines because they will do me more harm than good
- I do not want to take HIV medicines because I am waiting for something better to come along
- Doctors would rather not treat people who become infected through drug use
- Doctors are less likely to give new HIV medicines to people who get infected through drug use
- The government hasn't tested the new HIV medicines long enough to be sure they are safe
- If my viral load is too low to measure I don't need to use a condom
- Doctors want to start all people with HIV on HIV medications, even if they do not need them
- Most people don't benefit from taking HIV medicines
- Most of my questions were answered in post-test counselling
- It is safer to use natural remedies than to take HIV medicines.