Incidence and Consistency of Antiretroviral Use Among HIV-Infected Medicaid Beneficiaries With Schizophrenia

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Objective: To investigate the incidence and consistency of antiretroviral (ARV) treatment in the period before the introduction of protease inhibitors among Medicaid beneficiaries in New Jersey who had both the human immunodeficiency virus (HIV) and schizophrenia.

Method: HIV-infected Medicaid beneficiaries were identified using the HIV and acquired immunodeficiency syndrome (AIDS) registries for New Jersey; claims histories were used to identify patients diagnosed with ICD-9-CM schizophrenia and affective psychoses and to examine use of ARV drugs.

Results: Bivariate and multivariate analysis found no difference in the likelihood of receiving ARV drugs between patients with HIV and schizophrenia and HIV-infected patients without schizophrenia. However, once the therapy was initiated, patients with schizophrenia were more consistent users of ARV drugs.

Conclusion: Results do not indicate that HIV-seropositive (HIV+) patients with schizo-phrenia are less adherent to HIV therapies than HIV+ patients without schizophrenia. In our study population, consistency of use was actually higher among HIV+ patients with schizophrenia, perhaps because their multiple diagnoses place them under closer medical scrutiny.

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R ealization of the full therapeutic promise of new antiretroviral (ARV) therapies¹ for the human immunodeficiency virus (HIV) poses challenges to health care providers, who must determine when and how best to provide treatment to individuals with social or behavioral characteristics that may threaten medication adherence.^{2–4} Some patients stop taking their medicine⁵ or decide to

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take it in a way different than prescribed.⁶ Yet without adequate adherence to treatment, the virus may mutate, drug resistance may develop, and, if risky behavior continues, resistant strains of the virus may be transmitted to the uninfected population.

The influence of psychiatric conditions on adherence patterns is poorly understood. Associations have been found between lower medication adherence and psychological factors such as distress and depressive symptomatology,⁷⁻⁹ and, among HIV-infected substance abusers, psychiatric problems have been linked to lower adherence rates.¹⁰⁻¹² Nevertheless, we have located no study examining consistency in use of ARV drugs by the seriously mentally ill, who are among the most challenging patients to treat. A review article¹³ on all U.S. HIV seroprevalence studies with psychiatric patients published in peerreviewed journals through 1996 found that, of the 2873 psychiatric patients tested in these studies, 223 (7.8%) were HIV seropositive (HIV+). Most of these studies have been conducted in institutional, usually inpatient, settings.^{14–24} However, a recent study²⁵ of a statewide, community-dwelling group of HIV-infected Medicaid recipients found that 12.5% were classified as seriously mentally ill, with 5.7% diagnosed with schizophrenia.

In the present study, data are presented on initiation of ARV therapy and the extent to which use is persistent among patients who begin ARV therapy. In the absence of prior studies of this topic, 2 possibilities are explored regarding the impact of schizophrenia diagnosis on initiation of antiviral therapy. One view predicts that health care providers will be relatively feluctant to prescribe ARV drugs, owing to the real or perceived risk of suboptimal adherence. An alternative view predicts that, because patients with HIV and schizophrenia are more likely to be integrated into the health care system through treatment of their psychiatric condition, these patients will be more likely to consistently receive ARV drugs.

METHOD

Data Collection

This study was based on adult Medicaid participants who were diagnosed with HIV or acquired immunodeficiency syndrome (AIDS) in New Jersey between January 1988 and December 1995. Three sources of data were

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combined into client-level files: HIV/AIDS registry data from the New Jersey Department of Health and Senior Services; paid Medicaid claims for medical care and prescription drugs from the New Jersey Department of Human Services, Division of Medical Assistance and Health Services (DMAHS); and the AIDS Community Care Alternatives Program (ACCAP) client profile file from DMAHS.

Paid Medicaid claims. Medicaid claims histories contained all processed claims for services and pharmacy prescriptions provided up to December 1996. To allow for time lags between receiving services, billing, payment, and appearance of paid claims in the computerized database and because vital status information was available as of March 1996, services received through March 29, 1996, were included in the analyses. The claims file provided information on claim type, diagnosis, category of service, dates of service, and actual amount paid by Medicaid for each of the services.

ACCAP files. Some of the New Jersey Medicaid population is enrolled in ACCAP, an HIV-specific Medicaid home- and community-based care waiver program that offers case management and private duty nursing, among other services. Participation in the waiver program was determined by matching the claims file against the centrally maintained administrative ACCAP client profile file.

Study Population

The study population comprised individuals with HIV/ AIDS who participated in New Jersey Medicaid between January 1, 1988, and March 29, 1996. Additional inclusion criteria were an age of 18 years or older at the time of HIV/AIDS diagnosis and receipt of Medicaid services after diagnosis of HIV/AIDS for at least 180 days. Beneficiaries who met these criteria totaled 7744.

Measurement of Use of ARV Drugs

Use of ARV drugs was measured using pharmacy claims. National Drug Codes were used to identify ARV drugs in use during the observation period, which included 5 nucleoside analogue reverse transcriptase inhibitors: didanosine (ddI), zalcitabine (ddC), lamivudine (3TC), stavudine (d4T), and zidovudine. Respondents were classified as users and nonusers of ARV treatment based on receipt of at least 1 prescription for an ARV drug. Persistent use of ARV treatment was measured in terms of the proportion of time taking ARV drugs. Among users of ARV drugs, the total number of days represented by filled prescriptions was divided by the length of the observation period to determine proportion of time taking ARV drugs for each individual. Details of the methods used to perform these calculations are documented elsewhere.²⁶

Diagnostic Criteria

Patients with a diagnosis of schizophrenia and patients with a diagnosis of affective psychoses were identified with the International Classification of Diseases, 9th Revision, Clinical Modification diagnosis codes recorded in the Medicaid claims. The classification algorithm and procedures used were based on the work of Lurie and colleagues²⁷ and were designed to yield a conservative definition of schizophrenia, with few false-positives. Details are described elsewhere.²⁵ The current study focuses on patients with at least 1 service utilization event subsequent to diagnosis of HIV or AIDS.

Demographic Characteristics

Information on demographic characteristics such as gender, race, and county of residence at diagnosis was obtained from New Jersey's HIV/AIDS registry. Race/ethnicity was characterized as white, African American, or Hispanic. In multivariate analyses, white was used as the comparison group. Because the effects of age are quite likely to be nonlinear, the following categories of age at HIV/AIDS diagnosis were used: under 50 years of age (the reference group in multivariate models) and 50 years and older. Geographical areas of New Jersey vary widely in HIV/AIDS prevalence and in the extent to which the health care system has responded to the demands of AIDS care. The highest-prevalence area of the state for HIV/ AIDS is the 5-county area nearest to New York City, comprising Essex, Hudson, Passaic, Bergen, and Union counties. Proximity to New York City was included in the analyses as a covariate.

Mode of Transmission

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Exposure category was based on drug use history as reported in the New Jersey HIV/AIDS registry, and patients were classified as either injection drug users with HIV/AIDS or non-injection drug users with HIV/AIDS.

Other Covariates

Based on vital status as of March 1996, respondents were classified as living or deceased. Access to the homeand community-based services provided by ACCAP is associated with different patterns of service utilization, since waiver participants have access to various in-home care services that are not available to traditional Medicaid enrollees.²⁸ Therefore, waiver status was also used as a covariate in all analyses. The recent introduction of highly active ARV treatment, combined with aggressive use of prophylactic therapies for opportunistic infections, has extended the life expectancy of HIV-infected individuals.^{29,30} This has enabled more Medicaid beneficiaries with HIV to survive the waiting period for Medicare eligibility and to become dually eligible for Medicare and Medicaid.³¹ Medicare participation may provide broader access to health care providers such as office-based physicians. Therefore, Medicare coverage was included as a covariate in the study. Medicare coverage was assessed based on information from each Medicaid eligibility file.

Statistical Methods

In the bivariate analysis, patients diagnosed with schizophrenia with affective disorder and with neither diagnosis were compared on incidence of use of ARV drugs, and significance was tested with chi-square statistics. The statistical significance of bivariate subgroup differences in mean proportion of time using ARV drugs was evaluated with t tests. Simple logistic regression was used to predict the probability of use of ARV drugs. The results are presented as odds ratios (with 95% confidence intervals). To estimate the effects of various covariates such as gender and race on proportion of time using ARV drugs, ordinary least squares regression was employed.

RESULTS

Table 1 presents bivariate data on ARV prescriptions during the study period for the schizophrenia group and the other groups. Overall, 5.7% (N = 444) of all patients in the sample were identified as individuals with schizophrenia. A majority of all recipients (68.8%) had at least 1 prescription of an ARV drug during the study. The bi-

variate analysis indicated that a slightly higher proportion of patients with schizophrenia (71.8%) were prescribed ARV drugs than were patients without schizophrenia or affective psychoses (68.3%). However, the difference was not statistically significant. Among patients with at least 1 ARV prescription, those with schizophrenia showed a higher proportion of enrollment time on treatment with ARV drugs than those without schizophrenia or affective psychoses (0.40 vs. 0.34) (Table 2). In logistic regressions that controlled for clinical and sociodemographic characteristics, we found no difference in the probability of initiating ARV treatment between patients with schizophrenia and other HIV+ patients. By contrast, the greater consistency of use of ARV drugs by patients with schizophrenia was statistically significant, after controlling for clinical and sociodemographic characteristics (Tables 3 and 4).

DISCUSSION

No evidence was found that Medicaid patients with schizophrenia are disadvantaged in the likelihood of use

Table 1. Percentage of Adult M	Iedicaid	Recipients	With	HIV/AIDS	Using
Antiretroviral Drugs ^a		•			0

	No Diagnosis			
	of Schizophrenia		Affective	
	or Affective	Schizophrenia	Psychoses	All Diagnosis
	Psychoses	Diagnosis	Diagnosis	Groups
Characteristic	(N = 6757)	(N = 444)	(N = 543)	(N = 7744)
Gender				
Male	71.4	72.3	79.0	71.9
Female	64.4	71.3	67.1	65.0
Race/ethnicity				
White	74.4	74.1	77.8	74.7
African American	65.8	70.3	67.9	66.2
Hispanic	70.9	78.2	76.1	71.6
Risk group				
Injection drug user	71.5	72.6	77.3	72.0
Non-injection drug user	67.1	74.4	69.1	67.6
Age at primary diagnosis				
Under 50 y	68.1	72.1	73.7	68.7
50 y and older	72.1	66.7	50.0	70.8
Vital status as of March 29, 1996				
Decedents	72.2	79.6	80.0	73.0
Nondecedents	67.3	70.8	71.1	67.8
County of residence at diagnosis				
Near New York City ^b	69.2	74.5	75.9	69.9
Other New Jersey counties	66.3	65.1	68.2	66.4
Primary diagnosis				
AIDS	76.7	87.9	83.5	77.7
HIV	50.2	51.8	51.9	50.5
Waiver program participation				
Participant	76.5	87.1	80.0	77.1
Nonparticipant	67.0	70.7	71.4	67.5
Medicare coverage				
Yes	77.4	77.5	78.6	77.5
No	65.0	69.3	69.7	65.5
All patients, N (%)	4616 (68.3)	319 (71.8)	395 (72.7)	5330 (68.8)

^aAbbreviations: AIDS – acquired immunodeficiency syndrome, HIV = human immunodeficiency virus. Based on adult Medicaid participants in New Jersey aged 18 years and over who received Medicaid services between January 1988 and March 1996 and were enrolled in Medicaid for at least 180 days after diagnosis of HIV/AIDS.

^bIncludes the Essex, Hudson, Passaic, Bergen, and Union counties of New Jersey. $p \le .05$.

of ARV drugs. Contrary to the stereotype of the noncompliant psychiatric patient, we found that patients with schizophrenia used ARV drugs more consistently than other patients. Patients with schizophrenia may enjoy some modest advantage because they benefit from the greater involvement with health care providers required by their chronic psychiatric illness. Some of previous studies in other areas have produced similar findings. For example, Broers et al.¹² found that former drug users, including injection drug users, receiving methadone were started on zidovudine treatment more often and complied better with treatment than active drug users. We can speculate that because patients with schizophrenia are linked more closely to the medical care system, they benefit from closer monitoring and support. A better understanding of the processes at work requires detailed observational data.

Claims-based data are not without their limitations, and findings should be interpreted with caution. The measures of use of ARV drugs were based on filled prescriptions, with no measure of actual use. The study also

	No Diagnosis of Schizophrenia or Affective	Schizophrenia	Affective Psychoses	All Diagnosis
Characteristic	(N = 4616)	(N = 319)	(N = 395)	(N = 5330)
Gender				
Male*	0.37	0.40	0.35	0.37
Female	0.31	0.40	0.30	0.31
Race/ethnicity				
White	0.38	0.46	0.36	0.38
African American	0.34	0.39	0.29	0.34
Hispanic	0.32	0.34	0.35	0.32
Risk group				
Injection drug user	0.35	0.41	0.33	0.35
Non-injection drug user	0.35	0.39	0.33	0.35
Age at primary diagnosis				
Under 50 y*	0.34	0.39	0.32	0.34
50 y and older	0.42	0.51	0.40	0.42
Vital status as of March 29, 1990	5			
Decedents	0.36	0.39	0.34	0.36
Nondecedents	0.34	0.40	0.32	0.34
County of residence at diagnosis				
Near New York City ^b	0.35	0.38	0.34	0.35
Other New Jersey counties	0.34	0.46	0.31	0.34
Primary diagnosis				
AIDS*	0.36	0.45	0.34	0.37
HIV	0.28	0.30	0.29	0.28
Waiver program participation	55			
Participant	0.39	0.47	0.41	0.39
Nonparticipant	0.34	0.39	0.31	0.34
Medicare coverage				
Yes	0.39	0.45	0.37	0.39
No*	0.33	0.37	0.30	0.33
All patients ^c	0.34	0.40	0.33	0.35

Table 2. Mean Proportion of Enrollment Time on Treatment With Antiretroviral Drugs Among Users of Antiretroviral Drugs^a

^aAbbreviations: AIDS = acquired immunodeficiency syndrome, HIV = human immunodeficiency virus. Based on adult Medicaid participants in New Jersey aged 18 years and over who received at least 1 prescription for antiretroviral drugs between January 1988 and March 1996 and were enrolled in Medicaid for at least 180 days after diagnosis of HIV/AIDS.

^bIncludes the Essex, Hudson, Passaic, Bergen, and Union counties of New Jersey. $p \le .05$.

^cSignificant differences in proportion of enrollment times on treatment with antiretroviral drugs between patients with schizophrenia and patients with affective psychoses were found ($p \le .05$). * $p \le .05$.

Table 3. Logistic Regression on Use of Antiretroviral Drugs $N = 7744$) ^a	;

Mental Illness	Odds Ratio	95% Confidence Interval
Schizophrenia	1.15	(0.91 to 1.45)
Affective psychoses	1.11	(0.90 to 1.38)
Reference (neither diagnosis)		

^aAmong adult Medicaid recipients in New Jersey aged 18 years or older who received services between January 1988 and March 1996 and were enrolled in Medicaid for at least 180 days. The regression includes intercept and controls for gender, race/ethnicity, risk group, age at primary diagnosis, vital status as of March 29, 1996, county of residence at diagnosis, primary diagnosis, waiver status, Medicare coverage, and number of months of follow-up. Table 4. Ordinary Least Squares Regression on the Proportion of Enrollment Time in Which Patients Took Antiretroviral Drugs (N = 5330)^a

Mental Illness	Coefficient Sta	ndard Error
Schizophrenia	0.06*	0.02
Affective psychoses	-0.02	0.02
Reference (neither diagnosis)		

^aAmong adult Medicaid recipients in New Jersey aged 18 years or older who received at least 1 prescription for antiretroviral drugs between January 1988 and March 1996 and who received services from and were enrolled in Medicaid for at least 180 days. The regression includes intercept and controls for gender, race/ethnicity, risk group, age at primary diagnosis, vital status as of March 29, 1996, county of residence at time of diagnosis, primary diagnosis, waiver status, and Medicare coverage.

*p ≤ .05.

lacked laboratory measures such as CD4 cell counts to control for illness stage. Reliance on diagnostic codes in claims to define patients with schizophrenia is also a limitation, although studies that compare administrative data files with medical record diagnoses report excellent agreement for major psychiatric disorders^{32,33} and associ-

ated secondary diagnoses.³⁴ The only published validity study²⁷ reports few false-positives.

An important advantage of a claims-based examination of this topic is the ability to follow patients across sites. The poverty, social marginality, and complex care needs of HIV-infected people with schizophrenia, many of whom abuse drugs, make this group difficult not only to serve with the existing fragmented treatment system³⁵ but also difficult to recruit and retain in longitudinal studies. Observation of patients at a given clinical site may underestimate consistency of use of ARV drugs, because researchers are unable to follow those who drop out of treatment at the site under study only to reappear elsewhere in the system.

Since these data derive from the period prior to the introduction of protease inhibitor therapies, they cannot be directly generalized to current practices. Instead, they are important because they provide valuable baseline information on access and adherence potential for ARV drugs. First, if confirmed with other, more direct measures of adherence, the finding that HIV-infected patients with schizophrenia maintain levels of adherence to ARV therapy comparable or superior to other HIV-infected patients encourages a decidedly more optimistic picture of the potential benefit of ARV drugs for even highly disabled psychiatric patients. Second, because these data identify access and adherence levels achieved in the absence of the complicating considerations associated with protease inhibitor therapy, they provide a basis for comparison, so that divergence from the reported patterns found in the period after protease inhibitor introduction can plausibly be associated with distinctive issues raised by the use of protease inhibitor therapies by patients with HIV and schizophrenia.

Drug names: didanosine (Videx), lamivudine (Epivir), stavudine (Zerit), zalcitabine (Hivid), zidovudine (Retrovir).

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