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Reasons for Testing and Clinical and Demographic Profile of Adolescents With Non–Perinatally Acquired HIV Infection

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ABSTRACT

OBJECTIVES. We sought to examine the demographic, clinical, and behavioral characteristics; reasons for HIV testing; and factors that contribute to delays in entry into specialized HIV care after diagnosis of HIV infection among adolescents in an urban clinic in Georgia.

METHODS. All of the data for this study were obtained solely by medical chart review. Demographic, clinical, behavioral, and HIV testing data were abstracted from medical charts of 59 non–perinatally HIV-infected adolescents who were aged 13 to 18 years and entered care at the pediatric and adolescent HIV clinic of a Georgia hospital during 1999–2002. HIV-infected adolescents were compared by demographic, clinical, and behavioral characteristics as well as by circumstances surrounding HIV testing. Recent seroconversion was defined as having a documented negative or indeterminate HIV antibody test (confirmed) or a self-reported negative HIV test (probable) ≤6 months before HIV diagnosis.

RESULTS. Of 59 HIV-infected adolescents, 35 (59%) were female and 56 (95%) were black/African American. Fifteen (25%) had ≥1 sexually transmitted infection when they entered care. All female (vs 38% male) adolescents were infected through heterosexual sexual intercourse; 9 (26%) were pregnant at the time of HIV diagnosis. Adolescents whose HIV was diagnosed at non–health care facilities entered HIV care much later than adolescents whose HIV was diagnosed at health care facilities (median: 108 vs 25 days). Approximately one half of adolescents had $CD4^+$ T-cell counts <350 cells per μL and/or HIV-1 viral loads >55 000 copies per mL at entry into care. Twenty-seven (46%) adolescents had a previous negative HIV test; 7 had confirmed recent seroconversion, and 3 had probable recent seroconversion. Among adolescents with a documented reason for testing, routine medical screening was the most frequent reason for HIV testing; few adolescents were documented as having self-initiated HIV testing.

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Key Words
human immunodeficiency virus type-1, adolescents, sexually transmitted infection

Abbreviations
STI—sexually transmitted infection
ARV—antiretroviral
MSM—men who have sex with men

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CONCLUSIONS. Strategies are needed to implement timely linkage to medical services of adolescents who receive a diagnosis of HIV infection at non–health care facilities and to increase HIV testing, prevention efforts, and recognition of recent HIV infection among sexually active adolescents.

Adolescents constitute a substantial and growing proportion of people with newly diagnosed HIV in the United States. In the 32 states with reporting, the proportion of HIV/AIDS cases that are accounted for by adolescents and young adults aged 13 to 24 increased from 11.3% in 2000 to 12.2% in 2003.[1] The majority of non–perinatally HIV-infected adolescents were exposed to the virus through sexual intercourse. In 2001, HIV/AIDS was the seventh leading cause of death for adolescents and young adults aged 15 to 24 years.[2] In addition, whereas AIDS incidence declined 24% in people aged 25 to 34 years during 1998–2002, it increased 15% in those aged 15 to 24 years during the same period.[3]

Little is known about the epidemiology of HIV infection among adolescents, although a substantial proportion of new HIV cases are among adolescents. Several factors may contribute to the lack of data on HIV infection among adolescents. First, identifying HIV-positive adolescents is challenging because rates of HIV testing among adolescents are low. Second, HIV-positive adolescents often constitute a "hidden" population—a disadvantaged and disenfranchised population that eludes traditional case-finding strategies.[4]

A better understanding of the characteristics of HIV-infected adolescents is needed for the design of strategies to reduce risk for HIV transmission and acquisition among adolescents and to optimize health care for those who have or are at risk for HIV infection. This report describes adolescents who were in care at an HIV clinic of an urban Georgia hospital, where we obtained data on demographic and clinical characteristics, risk behaviors for HIV infection, circumstances of HIV testing, and factors that contribute to delays in entry into HIV care after HIV diagnosis.

METHODS

Data for this analysis were obtained by abstracting medical charts of all non–perinatally HIV-infected adolescents who entered care at the pediatric and adolescent HIV clinic of an urban Georgia hospital from January 1999 through October 2002. HIV-infected adolescents were defined as people who were aged 13 to 18 years and tested HIV positive by licensed HIV enzyme-linked immunosorbent assay diagnostic testing and were confirmed to be positive by Western blot testing. This study was reviewed and approved by the institutional review boards of the participating institutions.

We collected demographic, clinical, behavioral, and HIV-testing data. Demographic data included age, gender, race or ethnicity, and poverty status of the area of residence. Poverty status of the area of residence was determined by matching the zip code of each adolescent's residence to the 2000 US census data on income and poverty.[5] Race or ethnicity was categorized by self-identification within 1 of 4 categories: (1) black/African American; (2) Hispanic; (3) white; or (4) other. Clinical data included $CD4^+$ T-cell count (cells per μL) and plasma HIV-1 viral load (copies per mL) performed within 30 days after entry into HIV care (the lower and upper limits of HIV-1 plasma viral assay were 400 and 750 000 copies per mL, respectively), diagnosed sexually transmitted infections (STIs) at time of entry into HIV care, pregnancy status at the time of HIV diagnosis, reported symptoms suggestive of acute retroviral syndrome (eg, fever, rash, sore throat, headache, myalgia, arthralgia, lymphadenopathy, diarrhea, night sweats, fatigue, flu-like illness) within 6 months of HIV diagnosis, and history of antiretroviral (ARV) therapy at time of entry into HIV care.[6–8]

The behavioral data included self-reported information on sexual activity and intravenous drug use. The HIV-testing data included type of facility that provided the first HIV diagnosis, the reason for HIV testing at the time of diagnosis, the date of entry into HIV care at the adolescent clinic, and the date of the last seronegative HIV antibody test, if there was a previous test.

Definitions

Recent seroconversion was defined as a report of a negative or indeterminate HIV antibody test within 6 months before the positive HIV antibody test. Confirmed recent seroconversion was defined as a documented negative or indeterminate HIV antibody test performed within 6 months before the positive test. Probable recent seroconversion was defined as self-report of a negative or indeterminate HIV antibody test result within 6 months before the positive test without documentation.

Statistical Analyses

All statistical analyses were conducted using SAS 8 (SAS Institute, Cary, NC). Median values were compared between subgroups of HIV-infected adolescents with Wilcoxon rank sum test. The χ^2 test and Fisher's exact 2-tailed test were used to compare categorical data.

RESULTS

From January 1999 through October 2002, 59 HIV-positive adolescents enrolled in care at the adolescent HIV clinic. Of these, 35 (59%) were female, 56 (95%) were black/African American, and 33 (56%) resided in areas of high poverty (Table 1). The mean age at diagnosis of HIV was 16.8 years (range: 13–18; median: 16.9). Among HIV-infected male adolescents, most

TABLE 1 Characteristics of HIV-Infected Adolescents in Care

Characteristics	Male (n = 24)		Female (n = 35)		Total (N = 59)	
	n	%[a]	n	%[a]	n	%[a]
Year of entry						
1999	4	17	6	17	10	17
2000	4	17	13	37	17	29
2001	8	33	10	29	18	31
2002	8	33	6	17	14	24
Race/ethnicity						
African American/black	23	96	33	94	56	95
White	0	0	1	3	1	2
Other	1	4	1	3	2	3
Reside in high poverty areas[b]						
Yes	12	50	21	60	33	56
No	9	38	10	29	19	32
Unknown	3	12	4	11	7	12
Age, mean (range), y	17.0	13–18	16.6	13–18	16.8	13–18
Risk group						
MSM	15	63	NA		15	25
Heterosexual intercourse	9	38	35	100	44	75
Intravenous drug users	0	0	0	0	0	0
Pregnant at time of HIV diagnosis						
Yes	—	—	9	26	9	26
No	—	—	26	74	26	74
$CD4^+$ T-cell count, median (range), cells/μL[c]	503	21–754	389	194–982	446	21–982
HIV-1 viral load, median (range), copies/mL[d]	37 290	<400 to 589 000	22 525	<400 to >750 000	24 080	<400 to >750 000

NA indicates that data were not available
[a] Percentages might not add to 100% because of rounding.
[b] Areas in which >20% of families had income levels below US poverty threshold.
[c] Analysis excluded 6 adolescents whose viral load measurements were not performed within 30 days of entry into care.
[d] Analysis excluded 7 adolescents whose $CD4^+$ T-cell counts were not performed within 30 days of entry into care.

(63%) had a history of having male–male sexual intercourse. All of the HIV-infected female adolescents had heterosexual intercourse as their risk factor for HIV infection. Nine (26%) of the HIV-infected female adolescents were pregnant at the time of their HIV diagnosis. None of the adolescents reported intravenous drug use.

Of the 59 adolescents, 27 (46%) had had a negative or indeterminate HIV test result at least once before testing positive, as documented in medical charts or by self-report. Of these 27 adolescents, 10 had tested negative within 6 months before the diagnosis of HIV; this finding indicates recent seroconversion (Table 2). Seven of these adolescents had confirmed recent seroconversion, and 3 others had probable recent seroconversion. All adolescents with confirmed or probable recent seroconversion entered HIV care within 2 months (median: 26 days; range: 7–54 days) of HIV diagnosis. Acute HIV-1 infection, defined as the period from infection to seroconversion, may be diagnosed by the detection of HIV-1 viral genome in the absence of HIV-1 antibodies.[6] Three recent seroconversions were diagnosed during documented acute HIV-1 infection.

Data on immunologic and virologic characteristics of the adolescents were examined. The median $CD4^+$ T-cell count was 446 cell per μL, and the median HIV-1 viral load was 24 080 copies per mL at entry into HIV care at the clinic (Table 1). The median $CD4^+$ T-cell counts and viral loads for male and female adolescents were not significantly different (P = .67 and .45, respectively; Table 1). Table 3 depicts the $CD4^+$ T-cell counts and viral load measurements performed within 30 days after adolescents' entry into care; 7 adolescents did not have $CD4^+$ T-cell count and/or viral load measurements performed within this time frame. Four (8%) of the 52

TABLE 2 Characteristics of Adolescents With Recent Seroconversion in Care

Characteristic	Confirmed (n = 7)	Probable (n = 3)	Total (N = 10)
Gender/risk group			
Male/MSM	1	0	1
Male/heterosexual	3	0	3
Female/heterosexual	3	3	6
Age, median (range), y	17.2 (15–18)	15.3 (13–18)	17.1 (13–18)
Place of diagnosis			
Health care facility	6	3	9
Non–health care facility	1	0	1
Care delay, median (range), d[a]	25 (7–54)	34 (8–40)	26 (7–54)
Acute HIV infection[b]			
Yes	3	0	3
No	4	3	7

[a] Number of days between the date of entry into care at the adolescent clinic and first positive HIV test.
[b] Negative or indeterminate HIV antibody test and a positive HIV polymerase chain reaction test at the time of diagnosis.

TABLE 3 **CD4+ T-Cell Counts and Viral Load Measurements of HIV-Positive Adolescents at Entry Into Care**

CD4+ T-Cell Count, cells per μL	HIV Viral Load, copies per mL		Total
	>55 000	<55 000	
≤200	2	2	4
201–350	7	8	15
>350	9	24	33
Total	18	34	52

Analysis excluded 7 adolescents whose viral loads or CD4+ T-cell count were not performed within 30 days of entry into care.

adolescents had CD4+ T-cell count ≤200 cells per μL and thus received a diagnosis of AIDS. Fifteen (29%) had CD4+ T-cell counts between 201 and 350 cells per μL. Nine (17%) had CD4+ T-cells counts >350 cells per μL associated with HIV-1 viral loads of >55 000 copies per mL. The remaining 24 adolescents had CD4+ T-cell counts >350 cells per μL and HIV-1 viral loads <55 000 copies per mL.

Many adolescents were tested for other STIs at or near the time of entry into HIV care. Testing for other STIs was not performed uniformly on all adolescents at clinic entry. However, there was evidence that many had STIs in addition to HIV at or near the time of entry into the adolescent HIV clinic. Results of testing for chlamydia, gonorrhea, syphilis, and hepatitis A indicate that at least 15 (25%) of the adolescents were positive for ≥1 of these infections. Of the 26 adolescents who were tested for chlamydia, 7 (27%) female adolescents were positive. Of 30 adolescents who were tested for gonorrhea, 9 (30%) were positive (3 male and 6 female). Serologic testing for syphilis was the most common STI test performed; 3 (7%) of the 44 adolescents who were tested for syphilis received a diagnosis of syphilis on the basis of confirmatory reactive tests. Five adolescents received a diagnosis of 2 STIs in addition to HIV; 3 female adolescents received a diagnosis of gonorrhea and chlamydia, and 2 adolescents (1 male and 1 female) received a diagnosis of gonorrhea and syphilis. Serologic testing for acute hepatitis A was performed in 9 adolescents (8 male and 1 female). One male adolescent who self-reported in the category of men who have sex with men (MSM) tested positive.

Data on the reasons that adolescents received the most recent HIV test were available in 37 (63%) of the medical charts. Routine screening procedures were the most frequent reason for testing (22 of 37 adolescents); 8 of 9 female adolescents who were pregnant at the time of HIV diagnosis were tested as part of routine prenatal screening. Five adolescents, including 1 who was pregnant at the time of HIV diagnosis, were tested as part of medical screening procedures for detention centers. In addition, 9 adolescents were tested as part of military (n = 2), Job Corps (n = 2), immigration (n = 2), blood bank (n = 2), or child protective services (n = 1) medical screening procedures. Seven adolescents were tested when they presented for care with symptoms or illnesses associated with HIV/AIDS; 4 had symptoms that later were determined to be associated with HIV acute retroviral syndrome. Also, 4 adolescents requested testing because of concern over their engagement in high-risk behaviors or desire to know their HIV status. The remaining 4 adolescents with information available on reason for testing were tested for a variety of other reasons, including advice of a family member, during hospitalization for trauma, as part of care for another STI, and as part of care after a sexual assault. The reason for HIV testing was not available in the medical charts of 22 adolescents, but these youths did not differ significantly by gender, age, race, poverty status, risk group, or previous testing history from adolescents with documented reasons for HIV testing (data not shown).

Most (80%) adolescents were tested and received a diagnosis at health care facilities. However, 11 (19%) were tested at non–health care facilities, including detention facilities, blood banks, Job Corps, and the military. Factors that were associated with delayed entry into medical care were compared for subgroups of adolescents (Table 4). The 9 women who were pregnant at the time of their HIV diagnosis did not enter care at the adolescent HIV clinic until after delivery of their infant and completion of HIV-specialized obstetric care. Therefore, these adolescents were excluded from the analysis of delays in entry into HIV care after HIV diagnosis. Two adolescents were excluded from the analysis because the

TABLE 4 **Median Time Between HIV Diagnosis and Entry Into Care by Selected Characteristics**

	n	Median, d	P
Testing facility[a,b]			
Health care	37	25	<.05
Non–health care	9	108	
High poverty[a,c]			
Yes	26	28	.79
No	15	32	
Risk group male			
MSM	15	28	.70
Heterosexual	9	27	
Age, y[a]			
<17	22	28	.64
≥17	26	31	
Gender[a]			
Male	24	28	.41
Female	24	33	
Previous HIV test[a]			
Yes	23	35	.23
No	25	23	
Symptoms[a]			
Yes	24	23	.22
No	24	32	

[a] Analysis excluded 9 adolescents who were pregnant at the time of diagnosis and 2 whose dates of diagnoses were unknown.
[b] Analysis excluded 2 adolescents whose testing facility was unknown.
[c] Analysis excluded 7 adolescents whose area of residence was unknown.

date of HIV diagnosis was unknown. Among the remaining 48 adolescents, 77% entered care at the HIV clinic within 2 months of HIV diagnosis; the median delay was 29 days (range: 0–796 days; data not shown). Adolescents who received a diagnosis at non–health care facilities entered care significantly later (median: 108 days) than those who received a diagnosis at health care facilities (median: 25 days; $P = .04$; Table 4). Time to entry into care did not differ significantly by poverty status, risk group, age, gender, history of a previous HIV test, or report of symptoms associated with acute retroviral syndrome within 6 months of diagnosis. Because this adolescent HIV clinic prioritizes new referrals and provides an appointment within 1 week of receiving a referral, it is unlikely that delays in care of >7 days are associated with appointment delays.

DISCUSSION

All 59 adolescents in this study reported sexual activity as the risk factor for HIV infection. The majority (35) were female. Most (63%) of the male adolescents identified themselves as MSM. Among young men aged 13 to 24 years, 63% of new AIDS cases that were reported in 2000 in the United States were among MSM; among young women of the same age, 77% of new AIDS cases that were reported in 2000 resulted from heterosexual activity.[9] Similarly, with regard to reported HIV infection, female adolescents accounted for 80% of heterosexually acquired HIV infections in our study population and 89% among people aged 13 to 19 years from 1999 to 2002 in 29 US states with systems for HIV reporting.[10]

Several factors may contribute to the predominance of female rather than male individuals among heterosexually acquired HIV infections in adolescents. First, the odds of male-to-female transmission of HIV are greater than the odds of female-to-male transmission because of the large surface area of the vagina and the higher concentration of HIV in semen than in vaginal fluids.[11] Second, the male partners of female adolescents are frequently older than the female adolescents and belong to a higher prevalence age cohort of HIV-infected individuals. As a corollary, female adolescents with older partners tend to have far higher risk for unprotected intercourse and pregnancy.[12,13] Consistent with this finding, Kaestle et al[14] analyzed a nationally representative survey of adolescents and found that ~46% of female adolescents had male partners who were ≥2 years older. Third, MSM in our study and in national surveillance reports include homosexual as well as bisexual male individuals; thus, transmission from MSM to female sex partners is an increasingly recognized risk. Among participants in the Supplement to HIV/AIDS Surveillance project, a multisite project that was conducted through 12 state and local health departments from 1995 to 2000, investigators found that 34% of 1582 HIV-infected black MSM reported having sex with women as well as men.[15] Finally, because of pregnancy and gynecologic concerns, female individuals may use the health care system more and, consequently, have more opportunities for testing as part of routine medical care, such as prenatal screenings.[16] This final hypothesis is supported by our observation that 26% of female adolescents in our study were pregnant at the time of HIV diagnosis. This high rate of pregnancy is consistent with other reports (1) of high rates of pregnancy among HIV-infected female adolescents who seek HIV care and (2) of a pregnancy rate that was much higher for younger (aged 15–24 years) HIV-infected female individuals than for older HIV-infected women (aged ≥25 years).[17–19] The high proportion of female adolescents who are pregnant at the time of enrollment into HIV care suggests that many became aware of their HIV-positive status only because they sought prenatal care.

We observed that routine medical screenings, including prenatal screening, were the most frequent reasons for HIV testing of adolescents; few adolescents were tested as a result of self-initiated requests for HIV testing. Similarly, in a large observational cohort study by Murphy et al[20] that evaluated HIV testing patterns among 387 HIV-infected and at-risk youths who received primary health care, the majority of youths (53.1% of the HIV-infected and 66.1% of the uninfected) reported being tested on the suggestion of a health care provider.[20] Among those study participants, the main reason for HIV testing was the concern about having contracted HIV through sexual behavior (73% of the HIV-infected youths indicated this as a reason). In addition, the recommendation of a health care professional was also a prominent reason for seeking an HIV test. Furthermore, among HIV-infected adolescents, in multivariate analysis, feeling sick was the only factor that was significantly associated with an increased frequency of HIV testing. Regarding the venue for HIV testing, in contrast to our study, these researchers found that the majority (72%) of adolescents were most recently tested at sites that provided anonymous or confidential HIV testing.[20] Their result compared with the current study may reflect differences in availability and use of confidential testing in different locales.

The results of this study underscore the concern about the low rate of HIV testing among at-risk adolescents; thus, there are numerous infected youths who do not know their status and are not in care. Other investigators have found that adolescents, even those who engage in behaviors that put them at risk for HIV infection, rarely seek HIV testing. A survey of 567 sexually active Massachusetts adolescents, by Samet et al,[21] found that only 22% had had HIV testing and that fewer than one half of the tested adolescents initiated the request for testing. The majority of adolescents in that survey were tested as a result of routine medical screenings, similar to the reasons cited in this study. Moreover, a national survey of adolescents on HIV/AIDS that was conducted by the Kaiser Family Foundation in 2000 found that only 27% of teens who were aged 15 to 17 years and reported being sexually active also reported having been tested for HIV.[22] Higher rates of HIV testing have been observed among adolescents who engage in riskier behaviors. However, HIV testing rates in these at-risk populations are still lower than the rates observed in comparable adult populations. Povinelli et al,[23] examining trends and predictors of HIV testing among 501 bisexual and homosexual male adolescents and young adults who were aged 13 to 21, found that although 71% of adolescents reported 1 or more risk factors for HIV infection, fewer than half (45%) had been tested for HIV. This rate of testing is lower than the HIV testing rates observed in surveys of US adult male homosexual and bisexual populations (68–82%).[24,25] Similar trends have been observed among female adolescents. Smith et al[26] found that among the predominantly (93%) female adolescent and young adult (aged 13–22) population that attends family planning clinics, at least 78% reported engaging in HIV-related risk behaviors such as having sex without a latex condom, but only 45% requested HIV testing. Conversely, in a study of homeless and low-income women who were aged 18 to 55 in Los Angeles, 83% of women reported having been tested for HIV.[27]

Once adolescents in our study had a diagnosis of HIV, most of them promptly entered HIV care. Seventy-seven percent enrolled in care within 2 months of diagnosis (median: 29 days). A study that was performed in 2000 and 2001 among HIV-infected adults at the same hospital also reported a median delay of 1 month; 57% of the adults entered care within 3 months of diagnosis.[28] However, we noted considerable delay in entry into HIV care after diagnosis for some adolescents. Of concern, we found that adolescents who received a diagnosis at non–health care facilities entered care later than those who received a diagnosis at health care facilities. Our finding is in contrast to the findings of Turner et al,[29] who examined delayed medical care after diagnosis in 2 larger national probability samples of 1540 and 1960 HIV-infected people. In that study, the odds of >3 months' delay in entry into HIV care after HIV diagnosis were not significantly greater for people who were tested in a nonmedical setting than for those who were tested in a medical setting. Eichler et al[28] observed that HIV-infected adults who received posttest counseling and a medical referral entered care significantly earlier than patients who did not receive these services. In that study, patients who were counseled by a posttest counselor or social worker were significantly more likely to pursue medical care and take ARV agents than were those who were counseled by a physician or a nurse. This finding suggests that testing in a medical setting alone did not guarantee entry into care. However, neither of these studies restricted the analysis to adolescents. The study reported here is the first study, to our knowledge, to examine delay in entry into care by type of testing facility among adolescents.

ARV therapy is recommended for patients with $CD4^+$ T-cell counts <200 cells per μL. In addition, there is evidence to support the benefits of initiation of ARV therapy in patients with $CD4^+$ cell counts of 200 to 350 cells per μL or increased plasma HIV RNA (>55 000 copies per mL).[30] Thus, on the basis of immunologic and virologic characteristics alone, approximately one half of adolescents in our study were eligible for ARV treatment at the time of entry into HIV care following the national recommendations at the time of clinic entry.[30] This large proportion of adolescents who may benefit from ARV treatment at entry into care reinforces the importance of early entry into care after HIV diagnosis for this adolescent population.

Among the more interesting findings of this study was that a substantial portion of the adolescents (17%) seroconverted within 6 months of diagnosis. The period early in infection is potentially a time during which there is high probability of HIV transmission to others.[31,32] As previously noted, HIV testing is relatively uncommon among adolescents.[22] Thus, the substantial number of adolescents who seem to have became infected within 6 months of a negative HIV test result is troubling. The potential for a negative test result to have a "disinhibiting" effect, defined as activation and facilitation of behaviors that normally are suppressed by various controlling influences (in this case, concern about their behaviors resulting in HIV infection), continues to be a concern in HIV voluntary counseling and testing.[33]

Adolescents account for one quarter of the 15 million STIs that occur in the United States each year.[34] Thus, it is not surprising that the prevalence of STIs other than HIV was high among adolescents in our study; at the time of entry into HIV care, ≥15 adolescents had tested positive for ≥1 STIs, including chlamydia, gonorrhea, syphilis, and hepatitis A. Although sexual activity is not the predominant mode of transmission of hepatitis A, this disease was included among the STIs in this study because investigation of epidemic hepatitis A in an MSM population indicated that hepatitis A had been sexually transmitted in this population.[35] The prevalence of STIs reported in this study may not adequately estimate the actual prevalence in the study population, because testing for STIs was not performed uniformly on all adolescents at the time of the HIV diagnosis. Because it is possible that those who were symptomatic may have been more likely to be tested, the proportion of positive tests may overestimate prevalence. Conversely, because of the asymptomatic nature of many STIs, some cases may have been missed.

This study is subject to several limitations. Analysis was performed on data that were abstracted from medical charts in which information was not systematically recorded, resulting in some missing or unknown data. Because the study population included only adolescents who entered HIV care, the results of the analysis are not generalizable to the entire population of HIV-infected adolescents in this community, especially those with the greatest barriers to HIV testing and entry into HIV care. The study population is small, and relatively few (19%) adolescents were tested at non–health care facilities, limiting our ability to study the impact of diagnosis in these facilities. Moreover, because of the small sample size, some true differences among subgroups of HIV-infected adolescents may not have been detected. Data collection was restricted to 1 large health care facility in 1 state, so the results may not be generalizable to adolescents who are in HIV care at other facilities or in other states. By using HIV testing data, our analysis retrospectively identified adolescents who had recent seroconversion; this method resulted in a definition of recent seroconversion that had a high specificity but a low sensitivity. Because many adolescents had no previous or recent history of HIV testing, their time from exposure to seroconversion could not be estimated easily. Thus, the proportion of recent seroconverters in the population may have been underestimated. Conversely, previous testing information for adolescents who were classified as probable recent seroconverters was based on self-report. Some adolescents may have inaccurately recalled their testing history as being within 6 months, negative, or indeterminate, resulting in their misclassification as probable recent seroconverters. Others, who may have had such a history and not recalled it, also may have been misclassified. Studies that have examined the validity of self-reported history of STIs may be extrapolated to suggest that the most likely reason for misclassification would be the lack of reporting or the underreporting of HIV positivity among HIV-positive adolescents. For instance, Harrington et al,[36] in their assessment of the validity of self-reported STIs among black female adolescents, found that 28 days after STI testing, most (98.8%) of adolescents with a negative test result accurately reported that result, but only 74% of adolescents with a positive test result accurately reported the result. Similarly, examining self-reported STI history within 1 year of STI testing, Clark et al[37] also found that there a was high rate (90%) of accurate reporting of STI test results among adolescents with a history of negative STI tests. However, they found that among adolescents with a positive history of STIs, 69% reported no STI history and another 15% underreported the number of STIs in their medical history.

Early entry into medical care of HIV-infected individuals may have benefits for both the individual and public health.[38] Early entry into care is associated with improved prognosis as a result of appropriate use of ARV therapies and prophylaxis for opportunistic infection.[39] Moreover, early diagnosis and entry into medical care provides opportunities to reduce HIV transmission, through education and treatment of HIV and comorbidities (eg, STIs) that promote HIV transmission.[40] However, many HIV-infected individuals, particularly disadvantaged youths, enter medical care late, resulting in missed opportunities to reduce HIV-related morbidity and HIV transmission.[41] The results of this study indicate that, because so many adolescents are recent seroconverters, efforts to increase HIV testing, strengthen referral-to-care procedures, and focus on prevention of HIV infection among at-risk adolescents who test negative may be particularly beneficial for reducing HIV transmission as well as improving the quality of life for HIV-infected adolescents.

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