

## Perspectives

# HIV Infection in Adolescents: Epidemiology and Challenges

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*The epidemiology of HIV-1 infection in adolescents and challenges in prevention, testing, and care were discussed at the New York course in March by Donna C. Futterman, MD.*

## Epidemiology

It is estimated that 1 in 4 people with AIDS in the United States acquired HIV-1 infection in adolescence. Current estimates indicate that 50% of persons with HIV infection worldwide acquire infection by age 25 and that 25% of infections in the United States are acquired before age 22; 17% of US AIDS cases are in persons aged 20 to 29 years. The majority of infected adolescents are unaware of their infection status.

Estimates of the frequency of adolescent HIV infection are largely derived from data on AIDS cases and from our understanding that AIDS develops after approximately 10 years of infection. Data on cumulative AIDS cases reported to the Centers for Disease Control and Prevention (CDC) through 1998 indicate that the number of cases begins to peak in the 25- to 29-year age group (Figure 1). In a study of data from 1994 to 1997, data from 25 states with HIV status reporting systems indicate that the 13- to 24-year age group accounted for 653 cases of AIDS (3% of adult cases) and 7200 cases of HIV infection (14% of adult cases). In states without HIV reporting systems, 10,200 AIDS cases in the 13- to 24-year age group were reported. Use of the ratio of HIV infections to AIDS cases in the reporting states suggests a total number of HIV-infected persons in this age group of approximately 100,000.

Infection occurs disproportionately among the black and Hispanic populations. Data from 1997 indicate that black adolescents accounted for 58% of AIDS

cases in the 13- to 19-year age group but represented only 15% of the total US population in this age group. Hispanic adolescents accounted for 25% of AIDS cases but represented 13% of the total population in this age group.

## Exposure Categories and Risk Behaviors

CDC data through 1995 indicate that exposure to blood products was the most common form of transmission in AIDS cases in 13- to 19-year-old men (~40%), primarily representing transmission in people with hemophilia (Figure 2). Homosexual sexual contact, however, accounted for more than 35% of cases in this age group and for 60% of cases in the 20- to 24-year age group and by 1996 was the leading transmission category. In a seroprevalence study conducted by the New York Blood Center in 545 men aged 15 to 22 years, who were randomly surveyed at gay hangouts or nightclubs in Greenwich Village in New York City between December 1997 and September 1998, 12% were found by blinded testing to be HIV-infected, with the rates being highest among black men (18%; odds ratio, 9.1). Risk behaviors were very common, with 92% of 545 reporting having anal sex with a man and 30% to 40% reporting unprotected receptive anal intercourse. In total, 67% reported ever having had sex with a woman.

CDC data on AIDS incidence by gender show that whereas women 25 years or older account for approximately one quar-

ter of cases, women account for half of cases in the 13- to 19-year age group (Figure 3). Data through 1996 indicate that heterosexual contact accounts for more than half of AIDS cases in females in the 13- to 19-year age group and slightly less than half in the 20- to 24-year age group (Figure 2).

The behavioral risks among adolescents and young adults are illustrated by a case investigated in upstate New York in December 1997. In this case, a young man with HIV infection had heterosexual contact with dozens of women, many of whom were infected and many of whom also had multiple sexual partners. This type of sexual network involving contact with partners who are not well known is more common among adolescents than supposed. It is conceivable that many such mini-epidemics have occurred and continue to occur in many areas of the country but are masked in urban settings.

Characteristics of sexual transmission of HIV in young persons have been identified with ongoing study. These include a wide variation in the number of partners among those acquiring infection. In most surveys that have been performed, more than half of young women report having had only 1 sexual partner; thus, prevention counseling stressing reduction in number of sexual partners would appear to be inapplicable in many instances. Further, 75% of females are unaware of partner risk. For young men, for whom sex with men is the leading risk behavior, it is clear that orientation does not equal behavior—ie,

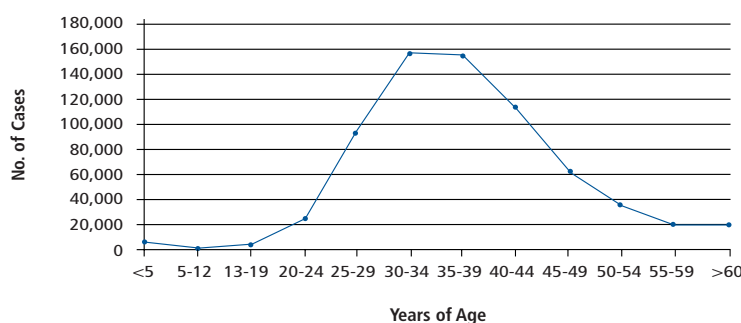


Figure 1. Cumulative AIDS cases by age reported to the Centers for Disease Control and Prevention through 1998. Adapted from the Centers for Disease Control and Prevention.

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that having a “gay identity” is quite different from which sexual behaviors the individual may engage in. In addition, there are high rates of sexual abuse among infected youth, with rates of 25% to 40% having been reported. Further, approximately 20% of infected youth followed in the Montifiore Medical Center Adolescent AIDS Program in the Bronx reported having a parent who is HIV-infected, excluding those who are perinatally infected.

Adolescents are susceptible to acquiring HIV by virtue of a number of factors. Among the behavioral factors is sexual activity; 70% have had sex by the end of high school. Gender power imbalance, particularly between older male and younger female partners, makes it difficult for women to insist on safe sex practices. Biologic factors that put younger women at risk include immaturity of the cervix in adolescence—the single layer of columnar cells is believed to be more vulnerable to transmission than the multiple layers of squamous epithelial cells in the mature cervix. Other sexually transmitted diseases, which facilitate HIV transmission, are frequently asymptomatic in younger women. Male-to-female transmission of virus also appears to be more efficient (although the finding of equivalent transmission efficiency between women and men in developing world settings raises issues regarding the potential biologic explanations for the imbalance). Finally, there are a number of socioeconomic factors that increase susceptibility to HIV infection and other sexually transmitted diseases, including the lack of health care coverage (it is estimated that approximately 25% of teenagers have no coverage), inadequate sex education, and perceived lack of confidentiality in HIV testing and counseling.

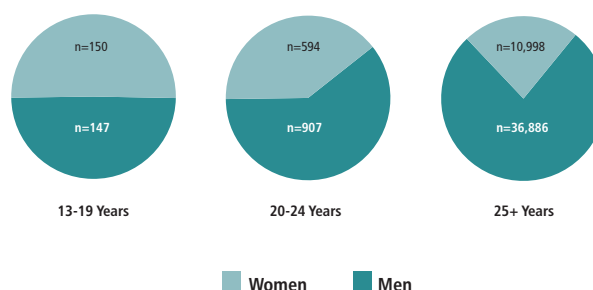


Figure 3. AIDS incidence by gender in cases reported to the Centers for Disease Control and Prevention in 1998. Adapted from the Centers for Disease Control and Prevention.

### Challenges in HIV Care for Adolescents

Among the challenges to be met in addressing HIV infection in adolescents is how to increase risk awareness. It is estimated that one third of individuals currently infected with HIV in this country do not know their infection status and that another third are aware of their infection but are not actively seeking care. These problems are particularly marked among adolescents. New approaches and settings for counseling and testing are needed to increase chances of identifying infected individuals and those at risk. Failure to return for testing results is a major problem in the young age group. Although there is hope that viability of a rapid oral fluid test for HIV infection may enable infection status to be determined at a single visit (the test is currently under investigation), there is also concern that many individuals will then receive only a single counseling session. The ability to perform pretest and posttest counseling at separate visits has been seen as an opportunity for more intensive prevention counseling. Improvements are also needed in link-

ing testing programs to health care. Confidential systems for follow-up have proved to be relatively effective in having adolescents enter and remain in care. Acceptance of and adherence to drug therapy, however, remains a major problem in this age group.

Information on HIV disease progression in adolescents comes from a cohort study conducted by the Adolescent Medicine HIV/AIDS Research Network (AMHARN). These data indicate that there is a high rate of coinfection with other sexually transmitted diseases and that the disease course is similar to that in adults. It was observed, however, that adolescents with hemophilia who acquired infection through infected blood products exhibited a slower course of progression than any other age group. The findings also suggest that adolescents may have more thymic function and thus the potential for immune reconstitution, and therefore may be ideal candidates for early intensive treatment. The impact of puberty on infection course has not yet been defined.

Three major projects in the area of adolescent HIV infection are currently being administered by AMHARN: Project

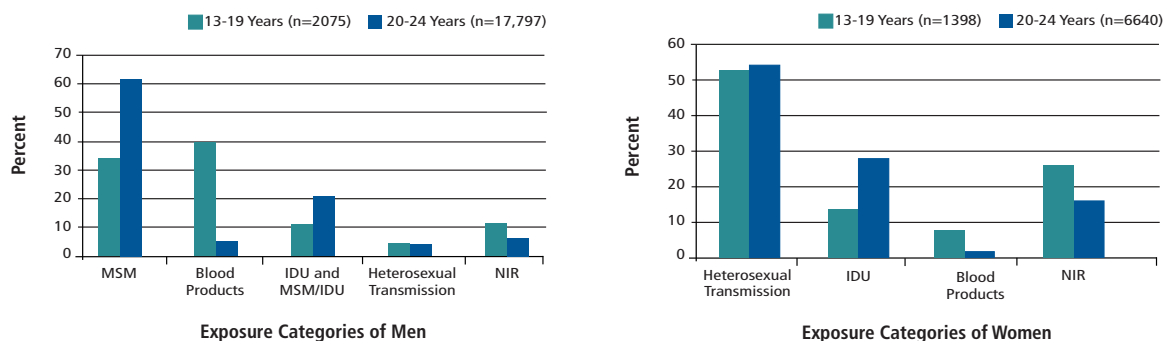


Figure 2. HIV exposure categories in men (left) and women (right) in 13- to 19- and 20- to 24-year age groups in AIDS cases reported to the Centers for Disease Control and Prevention through 1998. MSM indicates men who have sex with men; IDU indicates injection drug use; NIR indicates no identified risk. Adapted from the Centers for Disease Control and Prevention.

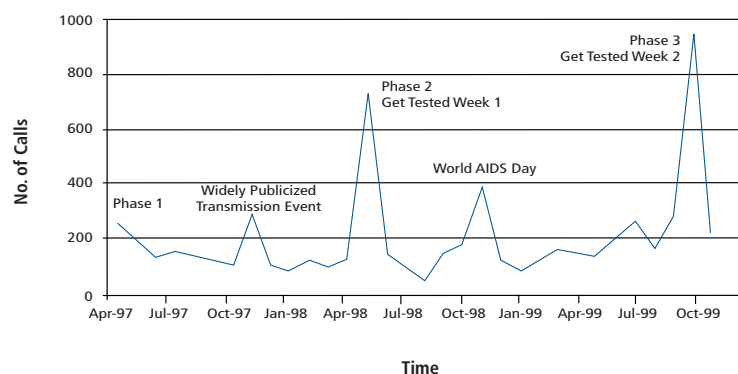


Figure 4. Number of telephone calls to Project ACCESS hotline from 1997 to 1999. Courtesy of Donna C. Futterman, MD.

REACH, an observational study; Project TREAT, an initiative promoting adherence to medical treatment; and Project ACCESS, a social marketing initiative promoting counseling and testing. Project TREAT focuses on staging individuals according to their level of treatment readiness according to Prochaska's stages of change model and supports adherent behavior through a number of measures, including practice trials with vitamins. The project adopts the philosophy that adolescents are ideal targets for early intervention since they have been infected relatively recently in most cases. Treatment is based on adult guidelines, with the Tanner staging of puberty used to judge appropriate dosing. The project also adopts the philosophy that the best regimen is the regimen that will be adhered to, using the motto "keep it simple and safe" (KISS).

Project ACCESS was established in New York City and has since been initiated in 5 additional cities. The goal of the project is to identify HIV-infected youth and link them to health care by normalizing HIV counseling and testing among sexually active youth and encouraging routine counseling and testing by health care providers. Unlike many prevention programs, the program seeks to reinforce the role of HIV counseling and testing in prevention. The current ACCESS social marketing program is entitled "HIV. Live with it. Get tested." The program advertising for the New York initiative uses euphemisms for sexual activity used by the target age group, such as "gettin' busy." Other project components consist of youth leadership, including peer outreach workers and spokespeople; "Get tested! Week," which facilitates media focus and community organizing; and use of new testing technologies—eg, oral testing that will permit testing in nonmedical sites. In 1999, the

New York project had 120 community partners and 70 testing sites. A meeting organized by ACCESS in 1999 brought approximately 500 youth together to talk about HIV at the Apollo Theater in Harlem. Overall, between 1997 and 1999, the New York program hotline has received 6600 calls, and at least 200 youth have been tested for HIV infection. As shown in Figure 4, numbers of calls increased dramatically in association with the wide publicity of the upstate New York case mentioned above, World AIDS Day, and the program's 2 "Get tested! Week" initiatives during this period.

Overall, it is believed that the approach to prevention in adolescents should follow a harm reduction model. Elements of a safer sex continuum should be emphasized, including abstinence, "outercourse" (masturbation or other sex without exchange of body fluids), and barrier methods. Other components of risk reduction in this age group should include emphasis on partner negotiation and decision making and the continuum from abstinence to safer sex.

Policy issues to be confronted in improving prevention, identification, and treatment efforts include those related to development of realistic prevention programs that include counseling and testing; outreach initiatives and linkage to health care; and development of youth-centered programs that address the issues of confidentiality and parent notification, appropriate treatment, and peer and psychological support. Access to funding for prevention and treatment programs is, of course, a major policy issue.

## Suggested Reading

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