HIV Prevalence Trends in Selected Populations in the United States

Results from National Serosurveillance, 1993–1997

Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for HIV, STD, and TB Prevention
Division of HIV/AIDS Prevention–Surveillance and Epidemiology
Prevention Services Research Branch
Atlanta, Georgia 30333

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HIV Prevalence Trends in Selected Populations in the United States: Results from National Serosurveillance, 1993–1997 reflects the efforts of the Centers for Disease Control and Prevention, state and local health departments, the U.S. Department of Labor, the U.S. Department of Defense, and the American Red Cross.

Centers for Disease Control and Prevention ..... Jeffrey P. Koplan, MD, MPH
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Monica A. Dale, MPH

Statistics and Data Management Branch ..... W. Meade Morgan, PhD
Chief

John M. Karon, PhD

Janet E. Royalty, MS

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Background

As part of a serosurveillance system to monitor the prevalence of human immunodeficiency virus type 1 (HIV-1) in the United States, the Centers for Disease Control and Prevention (CDC), in collaboration with state and local health departments, conducted standardized anonymous unlinked seroprevalence surveys in selected sentinel sites from 1988 through 1999. In addition, the Department of Labor, the Department of Defense, and the American Red Cross provide CDC with statistical data from routine HIV testing for surveillance purposes.

The objectives of the serosurveillance system are (1) to provide federal, state, and local health officials and the general public with standardized estimates of HIV prevalence among selected populations, (2) to describe the magnitude and changes over time of HIV infection in these populations within regions and within selected demographic and behavioral subgroups, (3) to recognize new or emerging patterns of HIV infection among specific subgroups of the U.S. population, and (4) to assist in directing resources and in targeting programs for HIV prevention and care.

From 1987 through 1999, CDC provided technical and financial assistance to state and local health departments to conduct anonymous unlinked HIV surveys in sentinel sites in selected metropolitan areas. The survey sites serve populations at high risk for HIV infection, such as those at sexually transmitted disease (STD) clinics and drug treatment centers (DTCs). Survey sites also included adolescent medicine clinics, which serve a population at lower risk. Investigators from state and local health departments chose clinics for participation in the surveys on the basis of client demographic and behavioral characteristics, local public health priorities, projected sample size, availability of voluntary counseling and testing, logistical considerations, and ability and willingness of the clinic staff to conduct surveys in accordance with national standardized protocols.

Anonymous unlinked surveys were used because they allow unbiased estimates of HIV infection among selected populations with increased HIV prevalence. Unlike surveys in which HIV prevalence rates are obtained through results that depend on client testing decisions, unlinked surveys are unbiased by self-selection because anonymous specimens from all clients are tested. Several steps were taken to ensure that these surveys were both anonymous and ethical: (1) only residual sera from blood specimens originally collected for routine diagnostic purposes were used in the surveys; (2) before specimens were tested for HIV, all personal identifying information was permanently removed to ensure that neither HIV test results nor survey information could be linked to specific individuals; (3) no interaction with survey participants could take place solely for the purpose of the surveys; thus, the integrity of the studies was in no way compromised and each person's right to privacy was protected; and (4) all clinic sites that conducted unlinked surveys offered voluntary HIV counseling and testing allowing anyone visiting a site the opportunity to learn his or her HIV status and to receive appropriate counseling and referral services.

CDC also monitors HIV prevalence in three populations in which HIV screening is routinely performed. Since 1985, the American Red Cross has provided CDC with HIV test results for blood donors. In addition, the U.S. Department of Defense has provided HIV test results for applicants to the military service since 1985. Beginning in 1987, the U.S. Department of Labor has provided HIV test results for entrants to the Job Corps, a federally funded job training program for disadvantaged youth. As is true of all the unlinked surveys, personal identifiers for participants in these screening programs are not available to CDC.

Results from routine HIV screening of Job Corps entrants, military applicants, and blood donors provide important additional information on the evolving HIV epidemic. Although geographically diverse, each of these groups is disproportionately composed of persons with particular demographic and socioeconomic characteristics. Job Corps entrants comprise young men and women who are educationally or economically disadvantaged. Military applicants and blood donors are low-risk populations because persons with known HIV infection are not accepted into the military and potential blood donors with known HIV infection or risk factors for HIV infection are likely to have self-deferred.

This report complements three previous CDC prevalence reports: (1) *National HIV Prevalence Surveys, 1997 Summary;* (2) *National HIV Serosurveillance Summary, Update–Results through 1993*; and (3) *National HIV Serosurveillance Summary, Results through 1992.* Because fewer clinics were funded by CDC to conduct unlinked surveys from 1993 through 1997 than in earlier years, the number of clinics represented in this report is substantially lower than the number in previous CDC reports. For example, in the earlier CDC report of HIV trends *(National HIV Serosurveillance Summary, Results through 1992)*, data were analyzed from 112 STD clinics in 46 cities, 78 DTCs in 35 cities, and 21 adolescent medicine clinics in 12 cities. This report presents data from 23 STD clinics in 13 cities, 22 DTCs in 14 cities, and 5 adolescent medicine clinics in 3 cities.

Included in this report are summaries of data from January 1993 through December 1997 from the unlinked prevalence surveys[1] conducted in selected STD clinics, DTCs, and adolescent medicine clinics, as well as data from routine HIV screening programs for entrants to the Job Corps, applicants for military service, and first-time blood donors. High-risk populations include men who have sex with men (MSM) and heterosexual patients at STD clinics and injection drug users (IDUs) entering DTCs. Youth populations include patients at adolescent medicine clinics and Job Corps entrants. Low-risk populations include military applicants and blood donors (Table 1).

[1] The unlinked prevalence surveys were discontinued at the end of 1999. Because of the small number of participating clinics in 1998 and 1999, this report includes only data through 1997.

Table 1. Populations Monitored in the National HIV Serosurveillance System, 1993-1997

Population	Method of Monitoring	Location
High-Risk		
Homosexual and bisexual men	Anonymous unlinked survey	23 STD clinics in 13 metropolitan areas (U.S.)
High-risk heterosexual men and women	Anonymous unlinked survey	23 STD clinics in 13 metropolitan areas (U.S.)
Injection drug users	Anonymous unlinked survey	22 drug treatment centers in 14 metropolitan areas (U.S. and Puerto Rico)
Youth		
Adolescent medicine clinic patients	Anonymous unlinked survey	5 adolescent medicine clinics in 3 metropolitan areas (U.S.)
Job Corps entrants	Routine HIV screening	Job Corps residential facilities (U.S. and Puerto Rico)
Low-Risk		
Blood donors	Routine HIV screening	American National Red Cross collection sites (U.S. and Puerto Rico)
Military applicants	Routine HIV screening	Military recruitment centers (U.S. and Puerto Rico)

Collection and Analysis of Data

Standardized protocols and laboratory procedures were used to conduct the unlinked surveys. Because only information that is routinely collected in the medical records or on intake forms could be used, limited information on demographic characteristics and behavioral risks was abstracted. Only clinics that participated in the surveys each year from 1993–1997 are included in the analyses presented here. When sufficient data were available, trends for each surveillance population were compared by region, sex, race/ethnicity, age group, and HIV risk behavior.

In earlier CDC prevalence reports, clinic data were presented as medians and ranges of HIV prevalence rates. For this report, however, rates are presented as means and, for the trends analyses, were standardized to the 1993 population of each survey type by region, sex, race/ethnicity, and age group in order to control for population changes over time. The standardized prevalence rates in this report summarize data from sites and demographic groups among which these rates may vary. Logistic regression was used to evaluate the variation in time trends across sites and demographic groups for MSM and heterosexual men and women tested in STD clinics and among IDUs tested in DTCs. (See Appendix I for details).

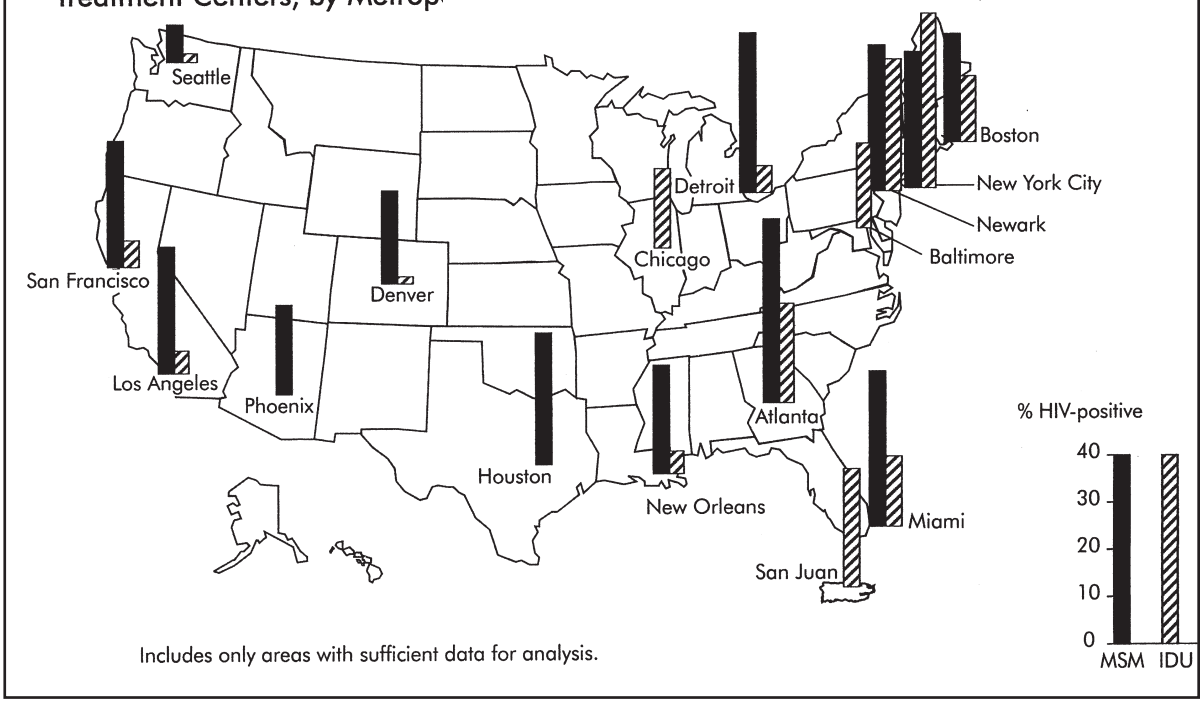
Both for the anonymous unlinked surveys and the routine HIV screening programs included in this report, all seroprevalence rates are expressed as the percentage of persons in each subgroup who had serologic evidence of HIV infection at the time of testing. The participating states and the District of Columbia are divided into four geographic regions (Northeast, Midwest, South, and West) as defined by the U.S. Bureau of the Census (Appendix I). For the regional analyses in this report, data from Puerto Rico are included with the South.

Each of the surveys and screening programs measured HIV seroprevalence, which is used interchangeably with prevalence in this report. Temporal changes in seroprevalence result from an imbalance between the influx and outflow of HIV-infected persons in the population under study. Although the representativeness of each sample population is unknown, collective data from the unlinked clinic surveys and from the screening programs of the Job Corps, the military, and the American Red Cross may indicate geographic and demographic patterns and trends of HIV prevalence.

Summary of Findings

Prevalence data from the serosurveillance system continue to reflect the widespread, yet extremely varied, distribution of HIV infection across demographic and geographic subgroups. From 1993–1997, the highest overall HIV prevalence rates were observed among persons who engage in high-risk sexual behavior, particularly MSM, and among IDUs entering DTCs. In all geographic regions and metropolitan areas, prevalence rates among MSM in participating STD clinics were high (overall unadjusted rate, 26%; range, 8%–39%). In contrast to HIV rates among MSM at STD clinics, prevalence among IDUs entering DTCs during the 5-year period were remarkably diverse by region and by metropolitan area (overall unadjusted rate, 18%; range, 1%–37%). Among heterosexual men and women who attended the STD clinics but who did not inject drugs, the overall unadjusted prevalence rate was 2.3%. In a pattern similar to that for IDUs, prevalence rates for these high-risk heterosexual patients differed greatly by region (0.3%–5.5%) (Figure 1, Tables 2 and 3).

Figure 1. Comparison of HIV Prevalence Among Men Who Have Sex With Men at Sexually Transmitted Diseas)rug Users Entering Drug Treatment Centers, by Metrop(



Includes only areas with sufficient data for analysis.

Table 2. HIV Prevalence Among Patients at Sexually Transmitted Disease Clinics, by Metropolitan Area and Exposure Category, 1993-1997

Metropolitan area (No. of clinics)	Men who have sex with men[a]		Heterosexual men and women[a]	
	Specimens tested (No. HIV-positive)	% HIV-positive[b] (Range)	Specimens tested (No. HIV-positive)	% HIV-positive[b] (Range)
Northeast				
Boston, Massachusetts (1)	205 (47)	23	5,549 (130)	2.3
New York, New York (4)	1,554 (443)	29 (22–31)	27,650 (1,189)	4.3 (2.7–5.0)
Newark, New Jersey (1)	155 (48)	31	11,711 (538)	4.6
Midwest				
Detroit, Michigan (1)	114 (39)	34	13,312 (109)	0.8
South				
Atlanta, Georgia (2)	394 (154)	39 (33–45)	11,718 (238)	2.0 (1.4–2.6)
Houston, Texas (4)	2,364 (666)	28 (26–32)	28,552 (600)	2.1 (1.9–3.7)
Miami, Florida (2)	499 (163)	33 (32.6–32.9)	17,149 (940)	5.5 (3.8–6.7)
New Orleans, Louisiana (1)	153 (35)	23	9,814 (181)	1.8
West				
Denver, Colorado (1)	816 (161)	20	12,852 (46)	0.4
Los Angeles, California (3)	1,629 (445)	27 (24–29)	33,215 (331)	1.0 (0.6–1.4)
Phoenix, Arizona (1)	329 (63)	19	9,892 (33)	0.3
San Francisco, California (1)	3,700 (1,003)	27	11,648 (303)	2.6
Seattle, Washington (1)	681 (53)	8	5,799 (17)	0.3
TOTAL	**12,593 (3,320)**	**26 (8–39)**	**198,861 (4,655)**	**2.3 (0.3–5.5)**

[a] Results from patients whose records indicated they had ever injected drugs were excluded from analyses.

[b] Prevalence rates are unadjusted.

Table 3. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers, by Metropolitan Area and Sex, 1993-1997

Metropolitan area (No. of clinics)	Men		Women	
	Specimens tested (No. HIV-positive)	% HIV-positive[a] (Range)	Specimens tested (No. HIV-positive)	% HIV-positive[a] (Range)
Northeast				
Boston, Massachusetts (2)	1,319 (173)	13 (12–15)	771 (117)	15 (12–15)
New York, New York (4)	6,628 (2,418)	36 (19–41)	2,591 (964)	37 (20–40)
Newark, New Jersey (2)	891 (247)	28 (23–34)	488 (139)	28 (21–40)
Midwest				
Chicago, Illinois (1)	1,606 (289)	18	789 (115)	15
Detroit, Michigan (1)	1,765 (87)	5	668 (51)	8
South				
Atlanta, Georgia (1)	662 (142)	21	164 (28)	17
Baltimore, Maryland (1)	627 (103)	16	398 (84)	21
Miami, Florida (2)	347 (56)	16 (15–17)	163 (20)	12 (6–21)
New Orleans, Louisiana (1)	364 (18)	5	131 (6)	5
San Juan, Puerto Rico (1)	4,156 (1,018)	24	619 (193)	31
West				
Denver, Colorado (2)	1,320 (19)	1 (1–2)	659 (10)	2 (1–2)
Los Angeles, California (2)	2,583 (32)	1 (1.0–1.4)	1,470 (27)	2 (1.8–1.9)
San Francisco, California (1)	2,879 (152)	5	1,512 (99)	7
Seattle, Washington (1)	552 (11)	2	462 (8)	2
TOTAL	**25,699 (4,765)**	**19 (1–36)**	**10,885 (1,861)**	**17 (2–37)**

[a] Prevalence rates are unadjusted.

Among youth populations in the serosurveillance system, HIV prevalence remained low. For patients at the five participating adolescent medicine clinics, the unadjusted clinic prevalence rate for the 5-year study period was 0.4%. Among Job Corps entrants, the overall unadjusted rate in all regions was less than 0.2%.

HIV prevalence was low among military applicants and first-time blood donors, populations in which high-risk persons were likely to have self-deferred. The overall unadjusted prevalence rate from 1993–1997 among military applicants was less than 0.04%. The lowest observed HIV prevalence of all the selected populations in this report was among first-time blood donors; prevalence for this group was 0.027% for men and 0.011% for women.

HIV prevalence continues to differ by race/ethnicity; rates are substantially higher among blacks in nearly every serosurveillance population. For example, overall unadjusted prevalence rates among MSM at STD clinics were 40% among blacks, 26% among Hispanics, and 21% among whites. Among heterosexual patients at these clinics, prevalence for race/ethnicity differed by region but remained relatively high among blacks in all regions. The highest overall prevalence for these high-risk heterosexuals was in the Northeast for blacks (4.3%) and Hispanics (4.0%) (Table 4).

For IDUs entering DTCs, the association between HIV prevalence and race/ethnicity differed considerably by region. In the Northeast, unadjusted prevalence rates were higher among IDUs who were black (42%) and Hispanic (38%) than among those who were white (17%). A similar pattern was observed in the South, where rates were higher among black IDUs (20%) and Hispanic IDUs (24%) than among white IDUs (6%). In the Midwest, prevalence was markedly higher among Hispanic IDUs (27%) than among black IDUs (11%) or white IDUs (6%). In the West, prevalence among black IDUs (11%) was considerably higher than among Hispanic IDUs (1%) or white IDUs (2%) (Table 4).

Prevalence was 6 times higher among black adolescent medicine clinic patients (0.6%) than among Hispanic (0.1%) and white patients (0.1%). The overall prevalence of 0.32% among black Job Corps entrants was 4 times that for Hispanics (0.08%) and more than 6 times that for whites (0.05%). Among military applicants, the overall prevalence among blacks (0.15%) was 5 times higher than among Hispanics (0.03%) and 15 times higher than among whites (0.01%) (Table 4).

In general, prevalence was higher among survey participants who were in the older age categories and, with the exception of Job Corps entrants, among those who were male. For most of the surveillance populations included in this report, prevalence by region, race/ethnicity, and age group either decreased or remained stable from 1993–1997.

Table 4. HIV Prevalence by Serosurveillance Population, by Region and Race/Ethnicity, 1993-1997[a]

	% HIV-positive[b]		
	Black	Hispanic	White
Men who have sex with men, STD clinics[c]			
Northeast	41	27	15
South	39	27	25
West	38	26	21
TOTAL	**40**	**26**	**21**
Heterosexual men and women, STD clinics			
Northeast	4.3	4.0	1.5
Midwest[d]	0.8	–	0.0
South	2.1	2.4	2.2
West	1.1	0.9	0.9
TOTAL	**2.8**	**1.8**	**1.2**
Injection drug users, drug treatment centers			
Northeast	42	38	17
Midwest	11	27	6.2
South	20	24	6.8
West	11	0.9	1.6
TOTAL	**22**	**22**	**6.9**
Patients, adolescent medicine clinics[e]	**0.6**	**0.1**	**0.1**
Job Corps entrants			
Northeast	0.31	0.15	0.03
Midwest	0.15	0.06	0.02
South	0.39	0.08	0.08
West	0.16	0.05	0.04
TOTAL	**0.32**	**0.08**	**0.05**
Military applicants			
Northeast	0.25	0.04	0.01
Midwest	0.14	0.01	0.01
South	0.13	0.04	0.02
West	0.16	0.03	0.02
TOTAL	**0.15**	**0.03**	**0.01**

[a] Race/ethnicity data not available for blood donors.

[b] Prevalence rates are unadjusted.

[c] Data not presented for Midwest because of small numbers.

[d] Data not presented for Hispanics in the Midwest because of small numbers.

[e] Not analyzed by region because of small numbers.

HIV Prevalence Among Selected Populations

High-Risk Populations

Patients at Sexually Transmitted Disease Clinics

Because STD clinics provide comprehensive HIV prevalence data for MSM and high-risk heterosexual patients who attend these clinics, they are important sites for evaluating HIV prevention programs and for monitoring emerging patterns and trends in the HIV epidemic. These STD clinics, most of which are supported by state or local health departments, generally provide services to low-income patients in urban areas. They serve large numbers of persons at increased risk for HIV infection because the patients typically have engaged in unprotected sex or other high-risk behaviors, such as sex with multiple partners. Persons at the greatest risk of acquiring HIV infection sexually are also those at risk of acquiring other STDs; thus, surveys in STD clinics provide useful information on the sexual transmission of the HIV epidemic among high-risk persons.

Depending on the number of patients visiting a particular clinic, the survey period for data collection ranged from 6 weeks to 1 year. The survey included serum specimens from patients who had not visited the clinic either during the preceding 3 months (applies to data collected from 1993–1996) or since the current survey period (beginning in 1997) and who had blood drawn for routine clinical purposes other than HIV testing, usually for serologic syphilis testing. Through 1996, specimens were excluded from patients who attended the clinics for (1) follow-up visits for diseases that had been diagnosed during the current survey period, (2) HIV testing and counseling only, or (3) for treatment of HIV infection. Beginning in 1997, the eligibility criteria were modified to include specimens from all patients who had not previously attended the clinic during the current survey period and for whom a routine blood test was ordered. Specimens from clients who attended the clinics only for HIV testing were included if blood had been drawn at that visit for routine purposes other than for HIV testing.

Men whose medical records indicated that they had ever had homosexual or bisexual contact were classified as MSM. Men who were not classified as MSM and all women were classified as heterosexual. It is important to recognize that misclassification of even a few MSM as heterosexual men would probably increase the observed prevalence among the men classified as heterosexual.

Patients whose records indicated injection drug use were excluded from the analyses for MSM and heterosexual men and women so that we could better analyze the sexual transmission of HIV. Of course, misclassifying IDUs as persons who do not inject drugs would most likely increase the observed HIV prevalence among heterosexual patients and, to a lesser extent, among MSM.

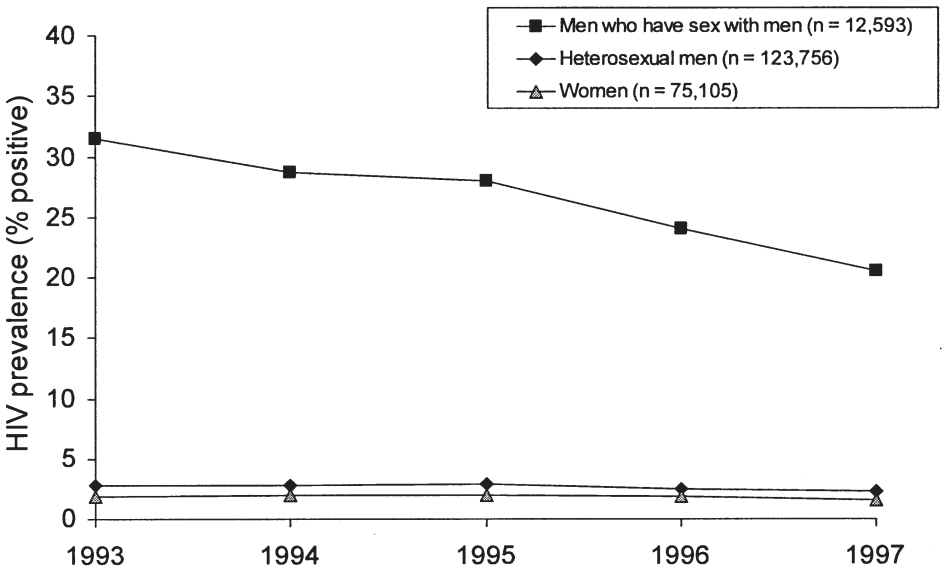
To control for changing populations over time, we standardized data for the trends analyses to the 1993 STD clinic population by sex (for heterosexuals), region, race/ethnicity (black, Hispanic, white), and age group (<25 years, 25–34 years, and ≥35 years). Therefore, all HIV prevalence rates for the STD clinic trends analyses are presented as adjusted rates, standardized to the population of MSM or heterosexual men and women at the clinics in 1993.

This report includes only data from clinics that (1) collected data for each year of the 5-year survey and (2) reported at least 500 total eligible specimens or 200 eligible specimens from MSM collected during a survey period and tested according to CDC protocol. The criteria for inclusion in this report were met by 23 STD clinics in 13 metropolitan areas. From January 1993 through December 1997, serum specimens from 12,593 MSM and 198,861 heterosexual men and women were tested. Unadjusted HIV prevalence rates from STD clinics in all metropolitan areas combined for the 5-year survey period were 26% (range, 8%–39%) among MSM and 2.3% (range, 0.3%–5.5%) among heterosexual men and women (Table 2).

Men Who Have Sex With Men

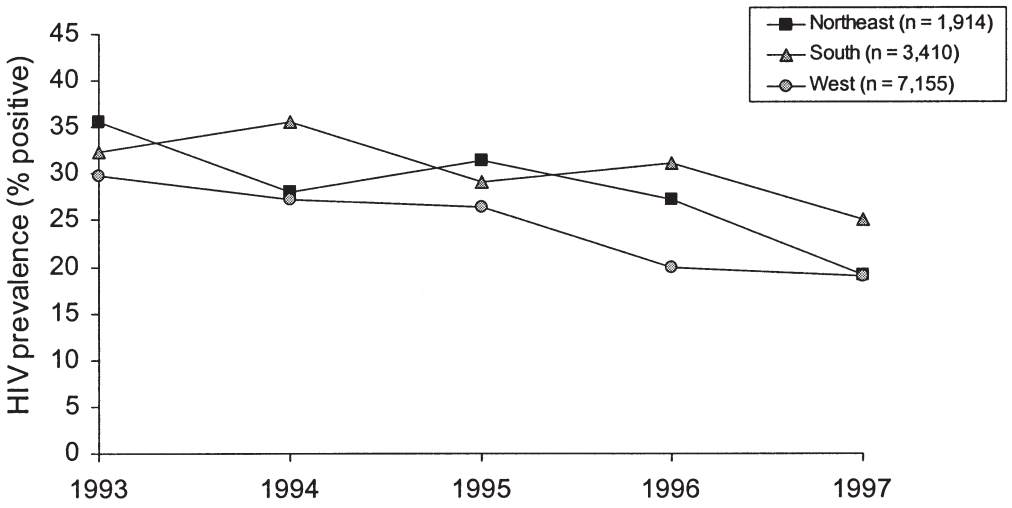
Overall standardized HIV prevalence rates decreased among MSM at STD clinics from 32% in 1993 to 21% in 1997 (Figure 2). Although HIV prevalence was high among MSM in all regions, there were downward trends in the Northeast, the South, and the West. (Annual data for MSM in the Midwest are not included because the numbers of MSM tested per year were too small for meaningful analysis). In 1993, prevalence among MSM was 36% in the Northeast, 32% in the South, and 30% in the West. Prevalence in the same clinics in 1997 was 19% in the Northeast, 25% in the South, and 19% in the West (Figure 3).

Figure 2. HIV Prevalence Among Patients at Sexually Transmitted Disease Clinics, by Sexual Orientation, 1993–1997



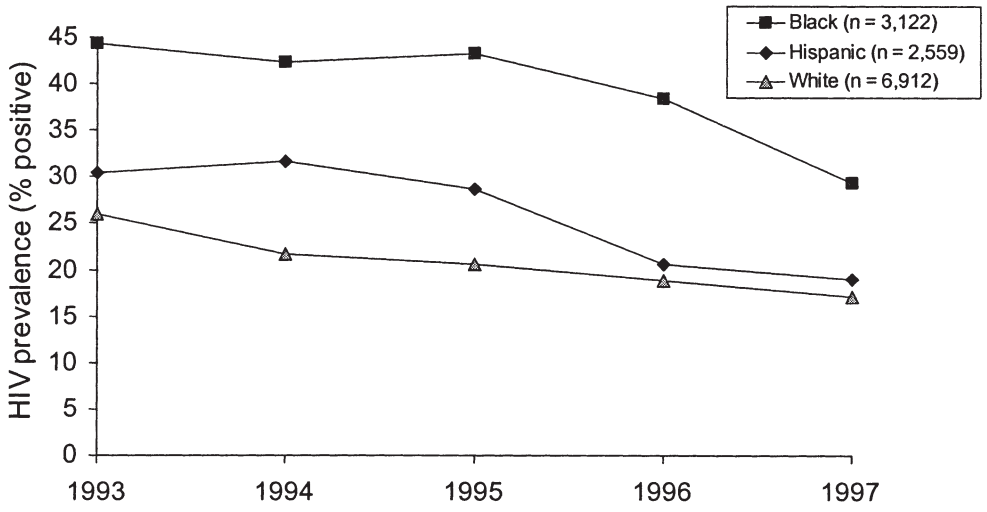
Note. Standardized to 1993 STD clinic population by region, race/ethnicity, and age group.

Figure 3. HIV Prevalence Among Men Who Have Sex With Men at Sexually Transmitted Disease Clinics, by Region, 1993–1997



Note. Standardized to 1993 STD clinic population by race/ethnicity and age group. Midwest not included because of small numbers.

Figure 4. HIV Prevalence Among Men Who Have Sex With Men at Sexually Transmitted Disease Clinics, by Race/Ethnicity, 1993–1997



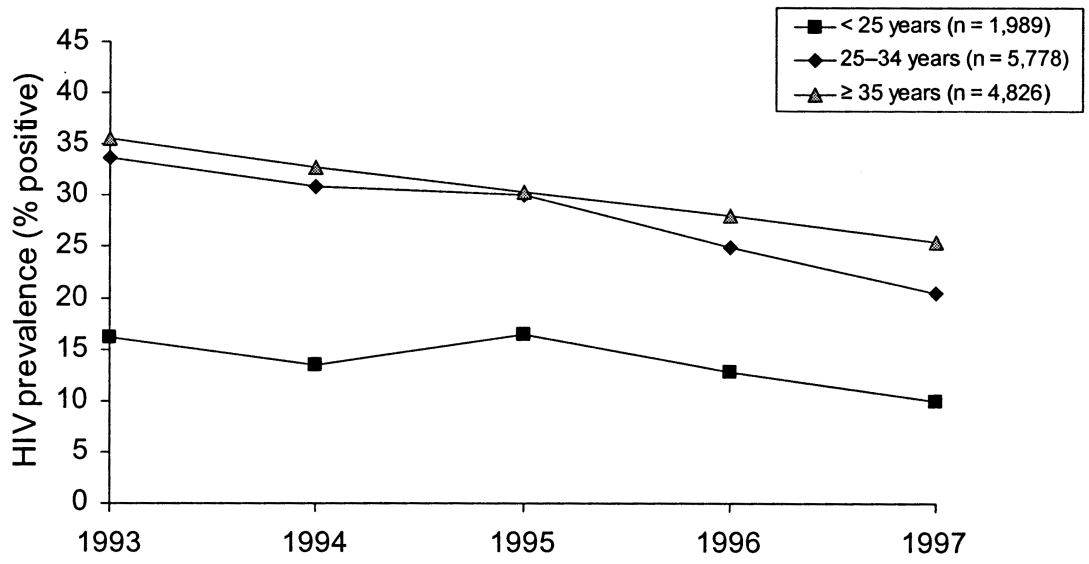
Note. Standardized to 1993 STD clinic population by region and age group.

The highest observed prevalence of any group included in this report was among black MSM at STD clinics. The overall standardized prevalence for this group was stable at 42% to 44% from 1993 through 1995 and then decreased significantly to 29% in 1997. There was a downward trend for Hispanic MSM with rates decreasing from 30% in 1993 to 19% in 1997. Although prevalence rates were higher among Hispanic MSM than among white MSM for each of the 5 years, rates for the two groups were similar by 1997 (Figure 4).

Although overall HIV prevalence for white MSM decreased from 1993 to 1997, the trends varied among the 12 clinics with sufficient data for analysis by individual clinic. Although not statistically significant, prevalence rates were relatively stable in one of these clinics and tended to increase in one other clinic. For the remaining 10 clinics, prevalence declined (Appendix I). For the combined analysis, standardized HIV prevalence rates for white MSM decreased from 26% in 1993 to 17% in 1997 (Figure 4).

Prevalence was markedly higher among MSM who were 25 years of age or older than among those who were younger. However, there were downward trends among MSM in all age groups. Prevalence decreased among MSM who were 35 years of age or older, from 36% in 1993 to 26% in 1997, and decreased among those who were 25–34 years, from 34% in 1993 to 20% in 1997. Overall prevalence decreased from 16% in 1993 to 10% in 1997 among MSM who were under 25 years old (Figure 5).

Figure 5. HIV Prevalence Among Men Who Have Sex With Men at Sexually Transmitted Disease Clinics, by Age Group, 1993–1997

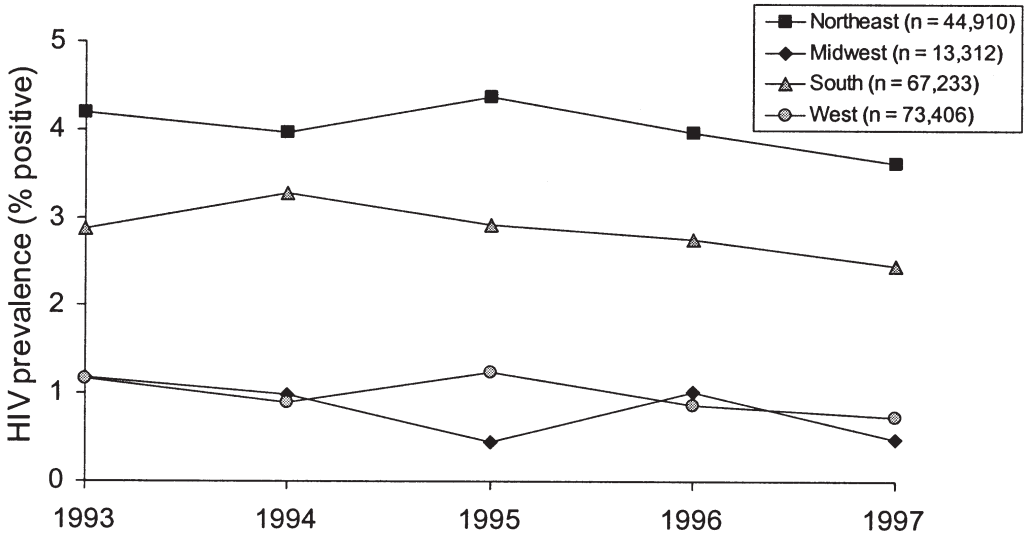


Note. Standardized to 1993 STD clinic population by region and race/ethnicity.

Heterosexual Men and Women

Overall unadjusted prevalence rates were less than 2% among women and less than 3% among heterosexual men at the participating STD clinics for each year of the 5-year survey period (Figure 2). Because the HIV prevalence rates and trends were similar for women (regardless of sexual orientation) and for heterosexual men, we included both populations in the analysis of heterosexual patients. There were strong regional variations in standardized HIV prevalence for this group: approximately 4% in the Northeast, 3% in the South, and 1% in the West and the Midwest. Prevalence decreased slightly over time in all regions (Figure 6).

Figure 6. HIV Prevalence Among Heterosexual Patients at Sexually Transmitted Disease Clinics, by Region, 1993–1997

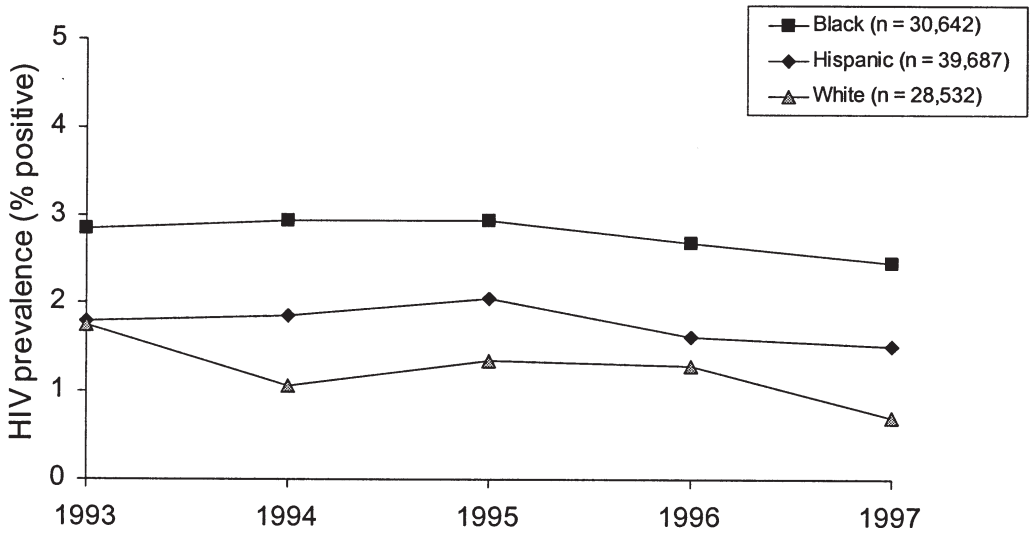


Note. Standardized to 1993 STD clinic population by sex, race/ethnicity, and age group.

Prevalence among heterosexual patients at the STD clinics was highest among blacks, followed by Hispanics and whites. For black heterosexual patients, overall standardized prevalence was approximately stable at 2.9% from 1993–1995 and then decreased slightly to 2.4% in 1997. Rates for Hispanics increased slightly from 1.8% in 1993 to 2.1% in 1995 and then decreased to 1.5% in 1997. For whites, prevalence decreased from 1.7% in 1993 to 1.1% in 1994, remained approximately stable through 1996, and then decreased to 0.7% in 1997 (Figure 7).

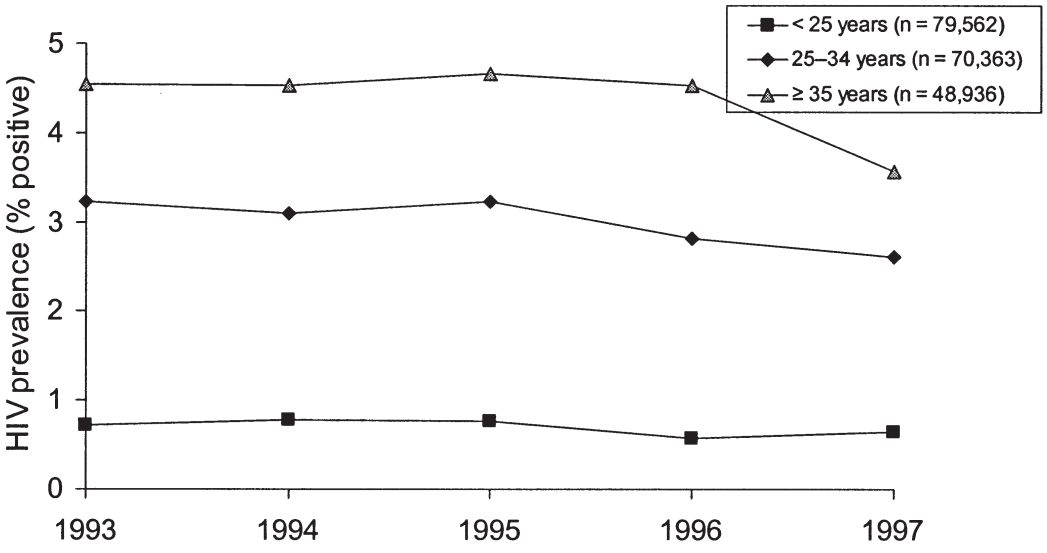
As was true of prevalence among MSM, prevalence among heterosexual clinic patients was much higher among patients who were 25 years of age or older than among those who were younger. Among heterosexual men and women who were at least 35 years old, prevalence ranged from 4.5% and 4.7% from 1993 through 1996 and then decreased to 3.6% in 1997. For those 25–34 years of age, prevalence was stable at 3.2% from 1993–1995 and then decreased to 2.6% in 1997. For those younger than 25 years, prevalence during the study period remained stable at less than 1% (Figure 8).

Figure 7. HIV Prevalence Among Heterosexual Patients at Sexually Transmitted Disease Clinics, by Race/Ethnicity, 1993–1997



Note. Standardized to 1993 STD clinic population by region, sex, and age group.

Figure 8. HIV Prevalence Among Heterosexual Patients at Sexually Transmitted Disease Clinics, by Age Group, 1993–1997



Note. Standardized to 1993 STD clinic population by region, sex, and race/ethnicity.

The data from the STD surveys probably resulted in overestimations of the prevalence of HIV among all MSM and all heterosexuals because these clinics serve persons whose sexual behavior has put them at high risk for exposure to various STDs, including HIV infection. In addition, the participating clinics may not have been representative of all STD clinics in the United States, and the patients of these public clinics may not be representative of all patients at STD clinics. Therefore, the HIV prevalence rates among the STD clinic patients in these surveys cannot be generalized to all MSM or to all heterosexual patients or even to all patients at STD clinics. In addition, some of the patients who were classified as heterosexual could have been MSM or IDUs who did not disclose these behaviors. Because the prevalence rates for patients classified as heterosexual could be greatly elevated if MSM or IDUs were misclassified, prevalence rates among heterosexual patients should be interpreted with caution.

Injection Drug Users Entering Drug Treatment Centers

The transmission of HIV infection associated with injection drug use occurs directly through the sharing of drug injection equipment or indirectly through sexual and perinatal transmission from HIV-infected IDUs. Drug users entering treatment, typically an older population than patients at STD clinics, are an easily accessible subgroup of drug users. Unlinked prevalence surveys make use of remnant serum specimens that are routinely obtained as part of the medical assessment.

The DTC unlinked prevalence surveys included specimens from eligible clients who (1) entered treatment for illicit drug use, including use of prescription drugs for nonprescribed purposes, at least once during the past 12 months and (2) had a routine blood test performed for clinical purposes other than for HIV testing. Persons for whom alcohol was the only drug used within the past 12 months were not eligible for the survey. Only specimens from eligible clients who reported ever having injected drugs were included in the analyses for this report. To control for changing populations over time, data for the trends analyses were standardized to the 1993 population of IDUs entering the participating DTCs by region, sex, race/ethnicity (black, Hispanic, white), and age group (20–29 years, 30–39 years, and ≥40 years).

Only the data from centers that collected at least 35 eligible specimens from IDUs for each year of the survey period were analyzed. Data from 22 DTCs in 14 metropolitan areas were included in this report. Most of the persons in the study population were seeking methadone treatment for heroin addiction. Of the 22 DTCs, 14 were primarily methadone maintenance or methadone detoxification centers, 5 were therapeutic community programs or drug-free programs, 2 offered methadone detoxification and drug-free programs, and 1 offered treatment for cocaine use.

During the study period, 36,584 eligible specimens from IDUs entering these 22 DTCs were tested according to CDC protocol. Overall unadjusted prevalence for male IDUs entering participating treatment centers in all metropolitan areas was 19%, ranging from 1% in Denver and Los Angeles to 36% in New York City; for female IDUs, unadjusted prevalence was 17%, ranging from 2% in Denver and Los Angeles to 37% in New York City (Table 3).

Prevalence among IDUs entering DTCs differed markedly by region. In 1993, HIV prevalence among these IDUs was 39% in the Northeast, 28% in the South, 10% in the Midwest, and 3% in the West. By 1997, standardized prevalence rates had decreased to 28% in the Northeast and 17% in the South. Prevalence rates in the Midwest and the West remained approximately stable (Figure 9).

Overall prevalence was slightly higher among male IDUs than among female IDUs and declined for both groups during the study period. The 1993 prevalence rate for male IDUs was 22% in 1993 and 15% in 1997; for female IDUs, the rate was 18% in 1993 and 14% in 1997 (Figure 10).

Among IDUs entering treatment, there was substantial regional variation in HIV prevalence by race/ethnicity. In the Northeast, prevalence was high among IDUs in each race/ethnicity group, particularly among blacks and Hispanics. Among black IDUs, standardized prevalence rates remained approximately stable from 1993 (46%) through 1997 (40%). Rates decreased steadily among Hispanic IDUs, from 44% in 1993 to 31% in 1997. Among white IDUs, rates decreased from 1993 (24%) through 1995 (13%) and then remained stable through 1997 (Figure 11).

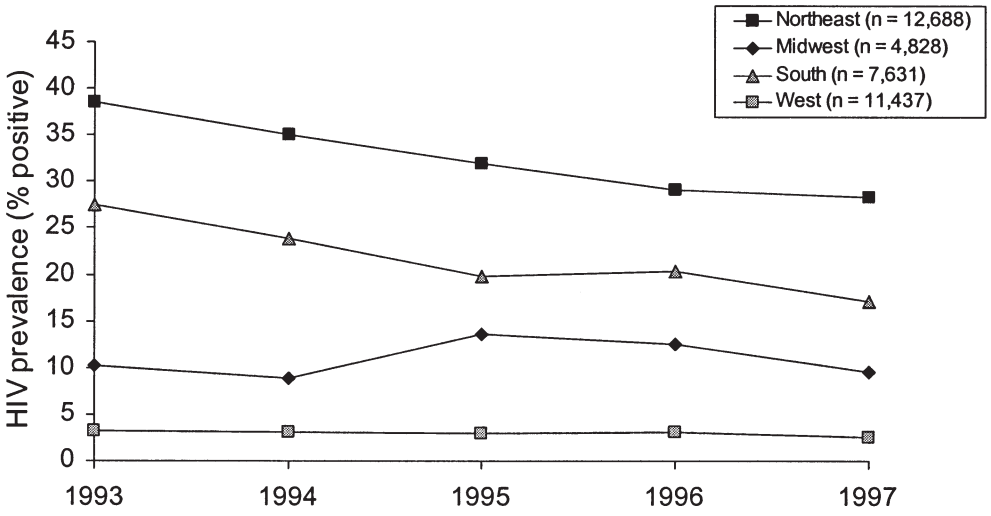
HIV prevalence was also high among black and Hispanic IDUs in the South. For each year of the survey period, except 1996, prevalence was higher among Hispanics in the South than among blacks. Although rates among Hispanics decreased steadily, from 32% in 1993 to 18% in 1997, this decline was primarily the result of a significant decline in one DTC in San Juan. Among blacks, prevalence decreased from 25% in 1993 to 16% in 1995, increased to 24% in 1996, and then decreased to 16% in 1997. Rates among whites varied from 1993 through 1995 (between 3% and 8%) and then increased from 3% in 1995 to 11% in 1997 (Figure 12).

In the Midwest, the highest prevalence for IDUs entering treatment was among Hispanics. Prevalence for this group was 32% in 1993, decreased to 19% in 1995, and then increased to 31% in 1997. These fluctuations are probably due to the small number of Hispanics who attended the participating DTCs in the Midwest. Prevalence among black IDUs in the Midwest increased from 9% in 1993 to 14% in 1995 and then decreased to 9% in 1997. Among white IDUs, prevalence was relatively stable at 5% to 8% through 1996 and then decreased from 8% in 1996 to 4% in 1997 (Figure 13).

In the West, prevalence among IDUs entering treatment was substantially higher for blacks than for Hispanics or whites. Prevalence among black IDUs was stable at 10% to 13% for the 5-year period. Rates among Hispanic IDUs and white IDUs in the West were stable at 2% or less for each year (Figure 14).

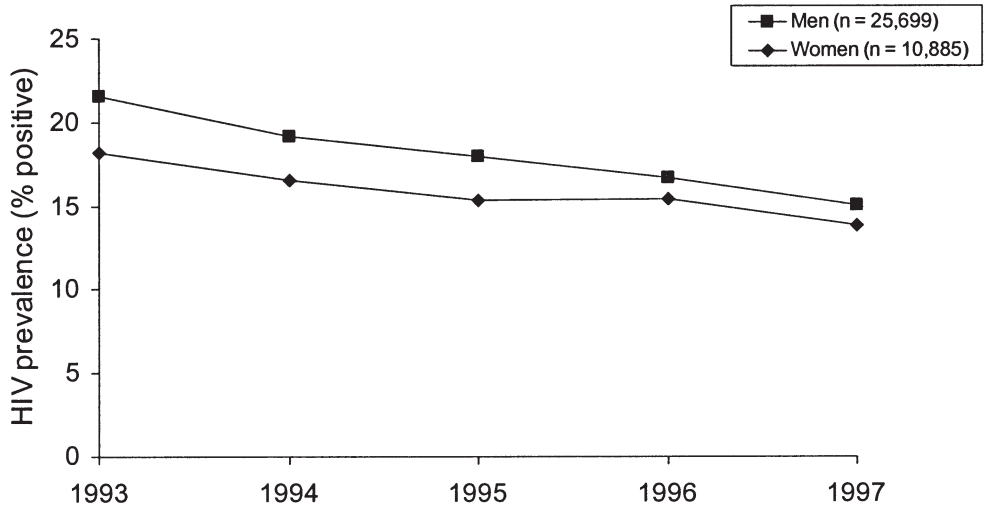
HIV prevalence was higher among IDUs who were 30 years of age or older than among those who were younger. Among IDUs who were at least 40 years old, prevalence declined slightly, from 20% in 1993 to 17% in 1997. For those who were 30–39 years old, prevalence decreased from 23% in 1993 to 15% in 1997. For those who were 20–29 years old, prevalence decreased from 15% in 1993 to 7% in 1997 (Figure 15).

Figure 9. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers, by Region, 1993–1997



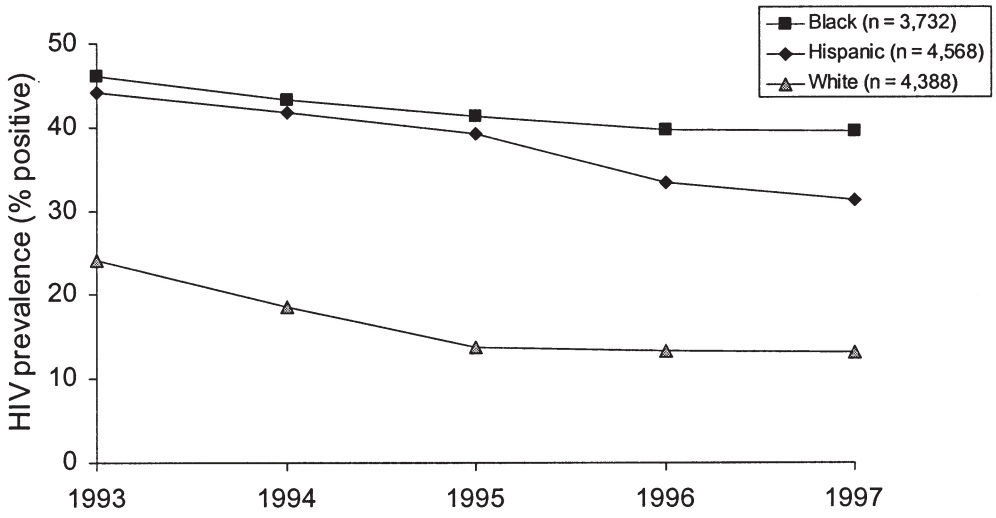
Note. Standardized to 1993 clinic population by sex, race/ethnicity, and age group.

Figure 10. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers, by Sex, 1993–1997



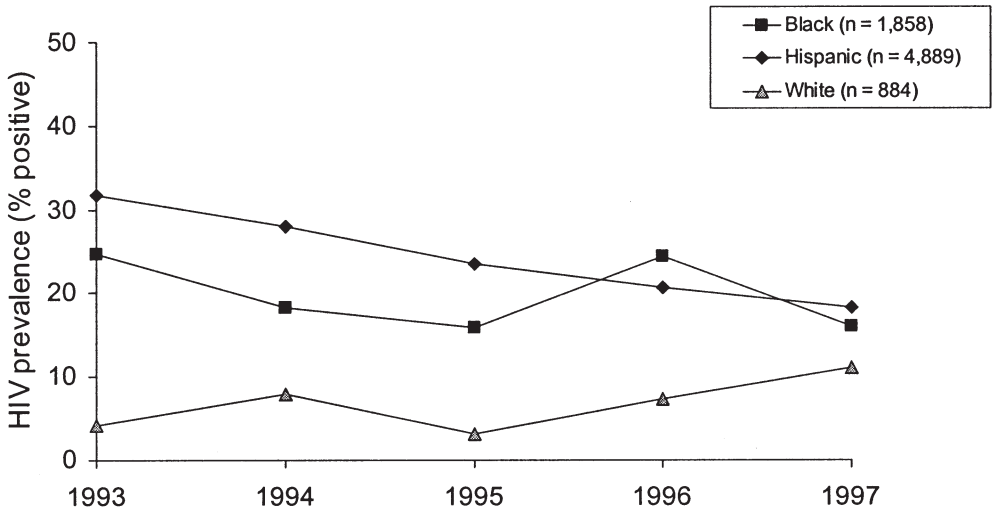
Note. Standardized to 1993 clinic population by region, race/ethnicity, and age group.

Figure 11. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers in the Northeast, by Race/Ethnicity, 1993–1997



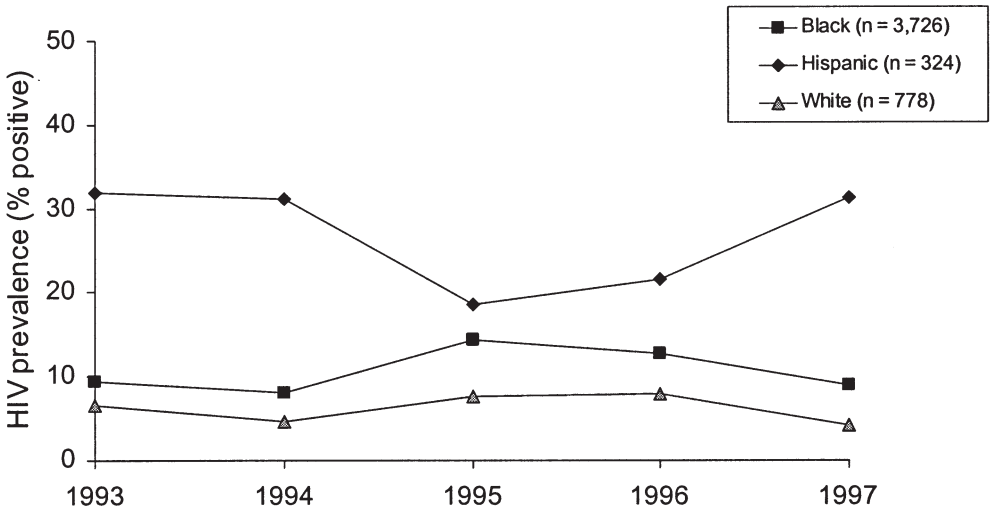
Note. Standardized to 1993 clinic population by sex and age group.

Figure 12. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers in the South, by Race/Ethnicity, 1993–1997



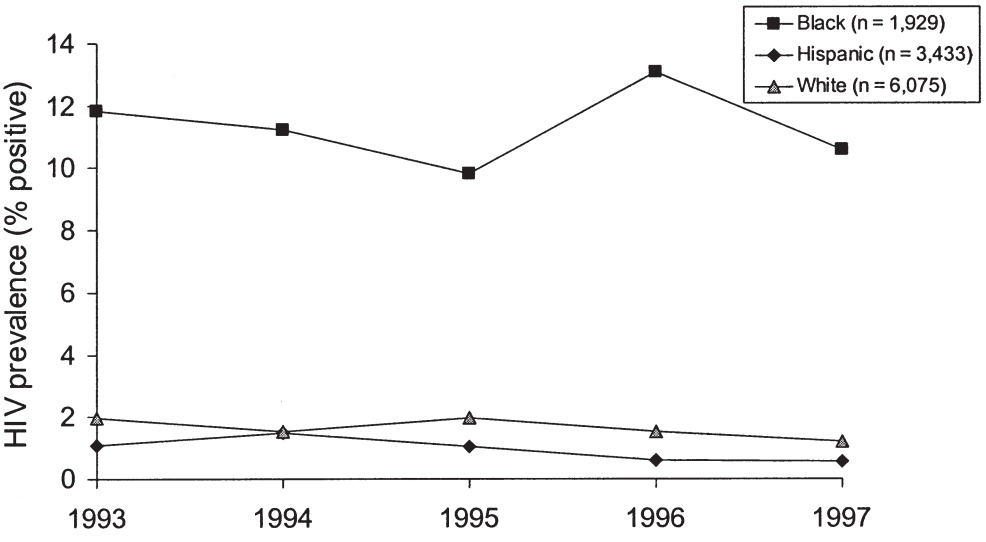
Note. Standardized to 1993 clinic population by sex and age group.

Figure 13. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers in the Midwest, by Race/Ethnicity, 1993–1997



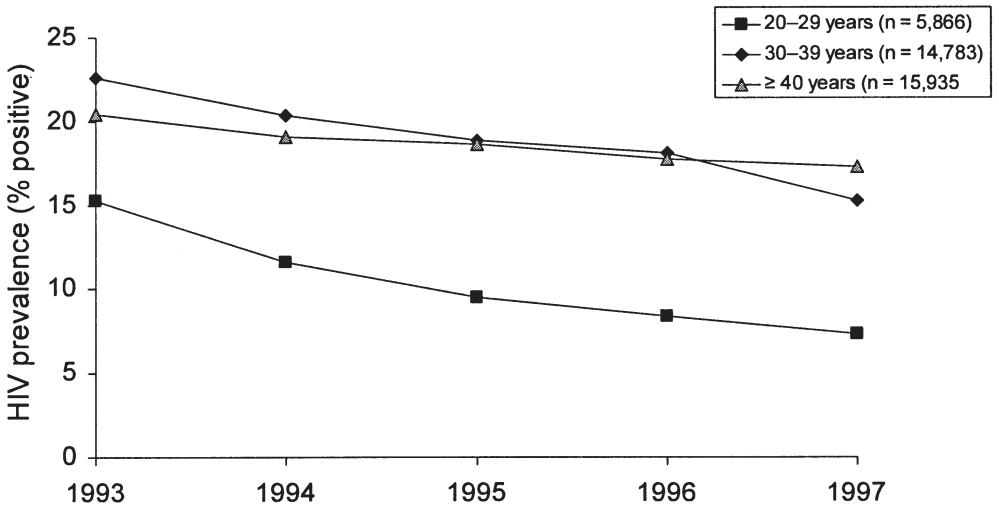
Note. Standardized to 1993 clinic population by sex and age group.

Figure 14. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers in the West, by Race/Ethnicity, 1993–1997



Note. Standardized to 1993 clinic population by sex and age group.

Figure 15. HIV Prevalence Among Injection Drug Users Entering Drug Treatment Centers, by Age Group, 1993–1997



Note. Standardized to 1993 clinic population by region, sex, and race/ethnicity.

The prevalence rates obtained from this survey may not represent HIV infection rates for all IDUs entering treatment programs, and they may not reflect HIV prevalence among IDUs who were not in treatment. Nearly all of the IDUs in the surveys were in treatment for heroin addiction; therefore, results cannot be generalized to IDUs who inject other drugs. Although the populations of IDUs in treatment and IDUs not in treatment overlap at any given time, drug use and sexual risk behaviors in these two groups may differ. A comparison of IDUs entering DTCs and IDUs at STD clinics in seven metropolitan areas shows that, in general, HIV prevalence is higher among the IDUs in drug treatment (Table 5). Because DTCs are likely to serve an older population of IDUs whose drug use has been consistent and long-term, the DTC population is more likely to be HIV-positive, especially in cities where HIV prevalence among IDUs is high.

Table 5. HIV Prevalence Among Injection Drug Users at Drug Treatment Centers and Heterosexual Injection Drug Users at Sexually Transmitted Disease Clinics, by City, 1993–1997[a]

	Drug treatment centers		STD clinics[b]	
	No.	Prevalence, %[c]	No.	Prevalence, %[d]
Atlanta	826	20.6	220	15.5
Denver	1,979	1.5	614	1.6
Detroit	2,433	5.7	127	3.7
Los Angeles	4,053	1.5	591	2.7
New York	9,219	36.7	835	25.9
Seattle	1,014	1.9	446	0.9
San Francisco	4,391	5.7	726	6.7

[a] Includes only cities that tested ≥100 specimens from at least one drug treatment center and at least one STD clinic.

[b] Men who reported they had sex with men were excluded from the analysis of injection drug users in STD clinics.

[c] Unadjusted prevalence rates.

[d] STD clinic population adjusted to the racial composition (white vs. Hispanic or black) of the drug treatment center population for each city.

Youth Populations

Patients at Adolescent Medicine Clinics

HIV prevalence rates among adolescents are likely to reflect recent infections because of the limited time since they began the high-risk behaviors that led to infection. Clinics specifically serving adolescents and young adults are of special interest because they serve a population that may not be seen at other health care facilities. These clinics offer a wide range of services, including family planning, physical examinations, prenatal care, counseling, STD treatment, and general medical care. Of the five adolescent medicine clinics in three metropolitan areas that collected data each year from 1993–1997, four were hospital-based and one was community-based.

Eligible patients were those aged 13–24 years who initially visited the clinic during the survey period and from whom a blood specimen had been drawn as part of routine clinic procedures. Patients who visited the clinic for HIV testing, for treatment of HIV infection, or for follow-up were excluded from the survey.

During the study period, 23,886 specimens from five adolescent medicine clinics in three metropolitan areas (Baltimore, Houston, and New York City) were collected and tested according to the CDC protocol. HIV prevalence was low among patients at these clinics. The overall clinic prevalence rate was 0.4% (range, 0.2%–0.5%). Rates were the same for male and female patients (0.4%) and were approximately the same among patients 13–19 years of age (0.4%) and those 20–24 years of age (0.5%). Rates were higher among black patients (0.6%) than among Hispanic and white patients (0.1%) (Table 6). Trends analyses were not conducted because of the small

Table 6. HIV Prevalence Among Youth at Adolescent Medicine Clinics, 1993-1997

	No. of centers	Specimens tested (No. HIV-positive)	% HIV-positive[a] (Range)
Age, years			
13 - 19	5	19,678 (73)	0.4 (0.3 - 0.6)
20 - 24	5	4,208 (23)	0.5 (0.0 - 0.8)
Race/ethnicity			
Black	5	14,889 (83)	0.6 (0.4 - 0.8)
Hispanic	4	7,209 (10)	0.1 (0.0 -0.2)
White	4	1,283 (1)	0.1 (0.0 - 0.4)
Sex			
Female	5	20,109 (81)	0.4 (0.2 - 0.5)
Male	5	3,777 (15)	0.4 (0.0 - 0.7)
TOTAL	**5**	**23,886 (96)**	**0.4 (0.2 - 0.5)**

[a] Prevalence rates are unadjusted.

number of HIV-positive patients at the participating adolescent medicine clinics. Data from these surveys provide important HIV prevalence information for the survey population in a given clinic. However, those prevalence rates cannot be generalized to all adolescents and young adults in the surrounding areas.

Job Corps Entrants

The Job Corps, administered by the U.S. Department of Labor, is an occupational training program for socially and economically disadvantaged out-of-school youth from rural and urban areas in all 50 states and U.S. territories. Data sent to CDC from the Department of Labor provide a system for monitoring the HIV epidemic in this population, which may be at higher risk for HIV infection than are adolescents and young adults in the general population.

The Job Corps recruits high school dropouts or high school graduates who need additional education or training so that they can obtain and hold jobs. Although no one is excluded from the Job Corps because of sexual orientation or history of illicit drug use, applicants with current drug addictions or serious medical or behavioral problems and those on supervised probation or parole are not accepted into the program. All entrants residing at Job Corps centers during training are counseled and tested for HIV within the first two days of residency. Entrants who test positive for HIV are allowed to continue as residential trainees, and they receive medical care and social support.

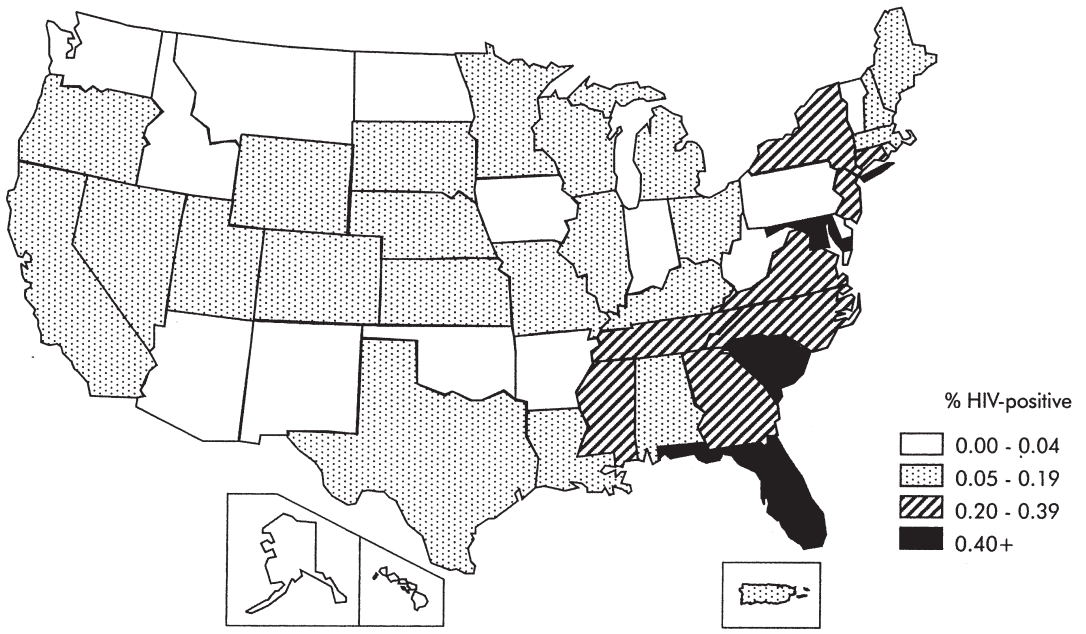
The analyses in this report include Job Corps entrants in the United States and Puerto Rico who were 16–21 years of age when they entered the program. For the trends analyses, data were standardized to the 1993 population of Job Corps entrants by region, sex, race/ethnicity (black, Hispanic, white, American Indian/Alaska Native, and Asian/Pacific Islander), age group (16–17, 18–19, and 20–21 years), and metropolitan statistical area (MSA). During the study period, 253,932 specimens from Job Corps entrants were tested for HIV. The largest group of entrants was composed of blacks (49%), followed by whites (31%), Hispanics (15%), American Indians/Alaska Natives (4%), Asians/Pacific Islanders (2%), and unreported (less than 1%). The entrant's reported home state is the basis for the state-specific rates in this report (Figure 16).

HIV prevalence rates for all Job Corps entrants during the 5-year period were 0.32% among blacks, 0.08% among Hispanics and American Indians/Alaska Natives, 0.05% among whites, and 0.02% among Asians/Pacific Islanders (Figure 17).

HIV prevalence rates for Job Corps entrants fluctuated from 1993–1997 in all regions. However, rates were higher for entrants in the South and the Northeast than for those in the Midwest and the West: in 1997, prevalence was 0.26% in the South, 0.20% in the Northeast, 0.11% in the Midwest, and 0.01% in the West (Figure 18).

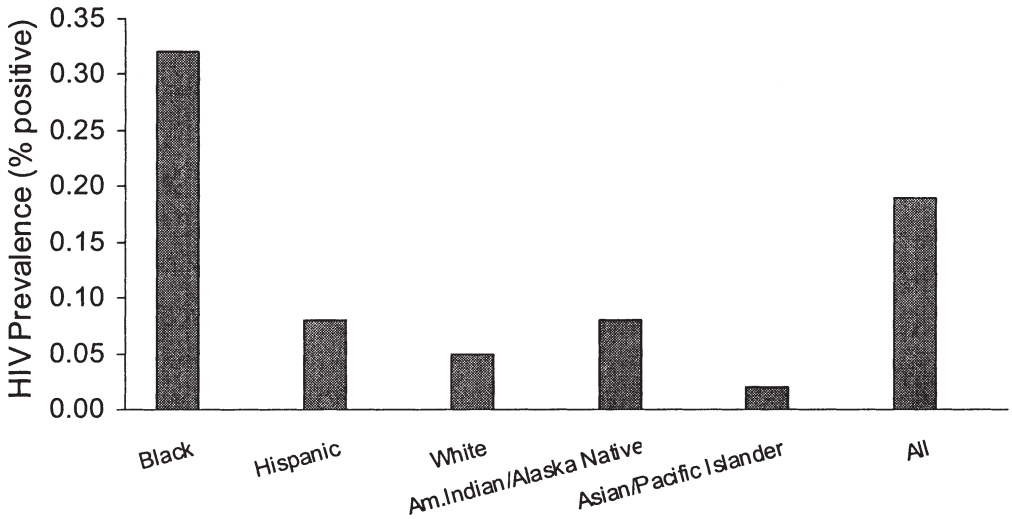
Although prevalence rates were similar in 1993 and 1994 for male entrants (0.22% and 0.17%, respectively) and female entrants (0.23% and 0.17%, respectively), they decreased during the 5-year period among men but increased among women. By 1997, prevalence among these women (0.27%) was more than twice that of the men (0.12%) (Figure 19).

Figure 16. HIV Prevalence Among Job Corps Entrants, by State of Residence, 1993-1997



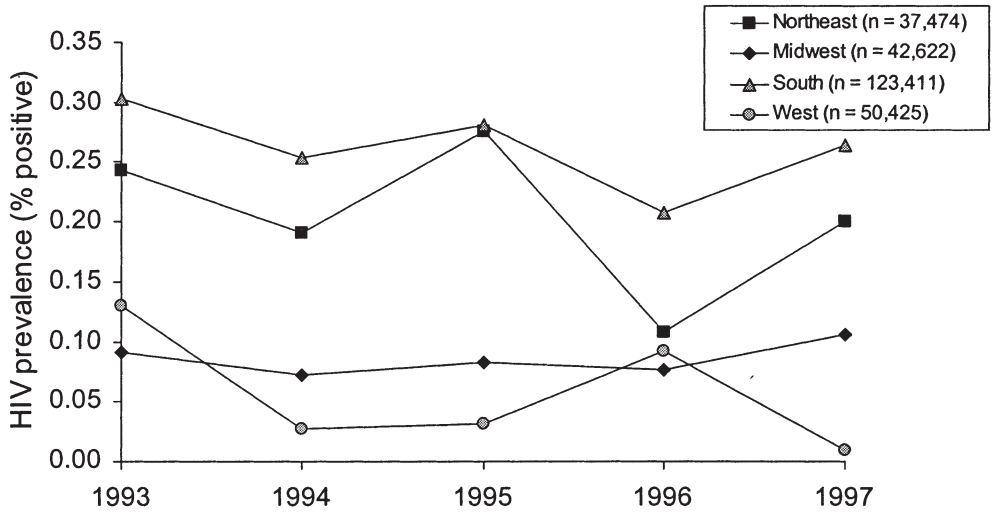
Source of data: U.S. Department of Labor.

Figure 17. HIV Prevalence Among Job Corps Entrants, by Race/Ethnicity, 1993–1997



Source of data: U.S. Department of Labor

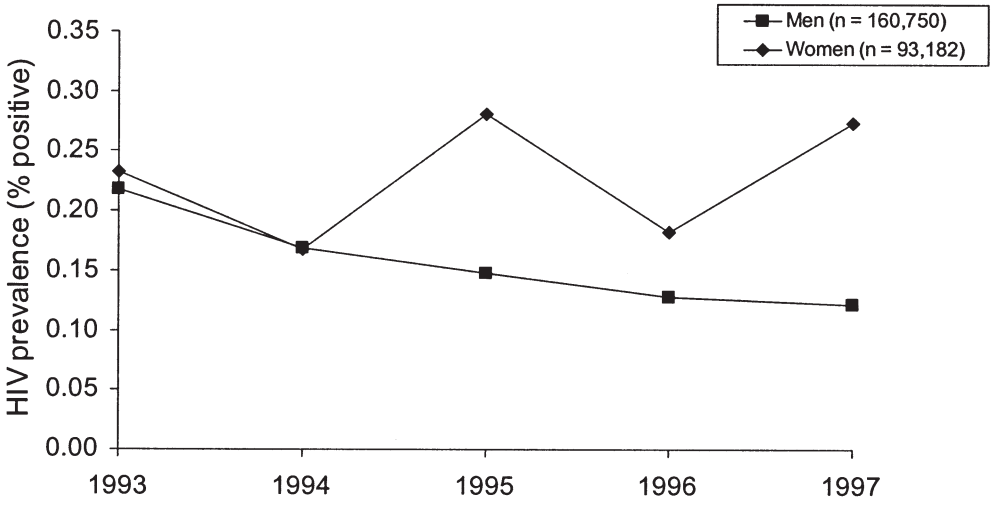
Figure 18. HIV Prevalence Among Job Corps Entrants, by Region, 1993–1997



Note: Standardized to 1993 population of Job Corps entrants by sex, race/ethnicity, age group, and metropolitan statistical area.

Source of data: U.S. Department of Labor.

Figure 19. HIV Prevalence Among Job Corps Entrants, by Sex, 1993–1997



Note. Standardized to 1993 population of Job Corps entrants by region, race/ethnicity, age group, and metropolitan statistical area.

Source of data: U.S. Department of Labor.

Prevalence was considerably higher among black male and black female Job Corps entrants than among those who were Hispanic or white. Prevalence decreased among black men, from 0.34% in 1993 to 0.21% in 1997. Rates among Hispanic men decreased from 0.27% in 1993 to 0.02% in 1995 and then increased to 0.11% in 1997. After an increase among white men, from 0.05% in 1993 to 0.09% in 1994, rates decreased steadily to 0.02% in 1997 (Figure 20).

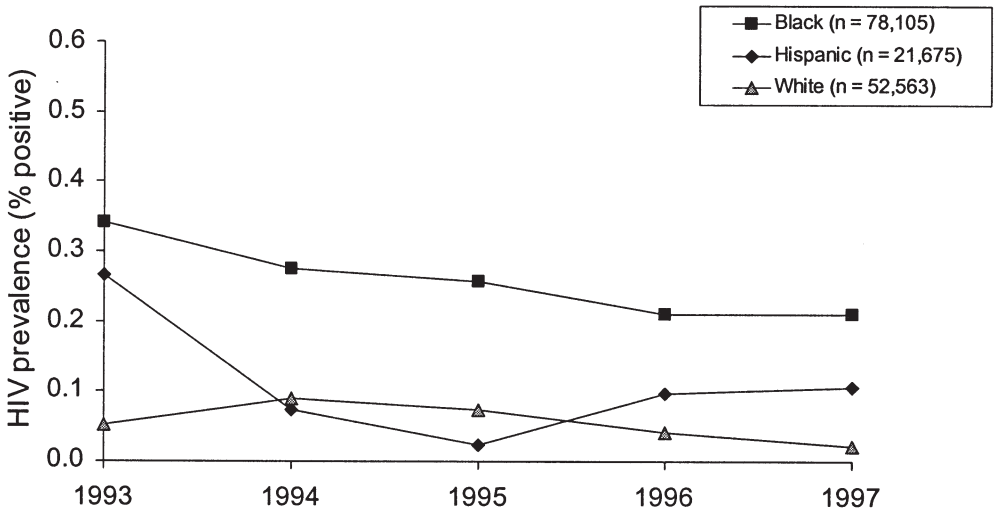
The highest prevalence rates among Job Corps entrants were those for black women. During 1993–1997, prevalence in this group varied between 0.29% in 1994 and 0.52% in 1995 and 1997. Rates for Hispanic and white women were much lower, ranging from 0% to 0.07% during the survey period (Figure 21).

Prevalence rates were higher among men who were 20-21 years of age than among those who were younger. For the age group 20-21 years, prevalence among men decreased from 0.50% in 1993 to 0.25% in 1997. For the age group 18-19 years, rates varied between 0.22% in 1994 and 0.09% in 1996; among the youngest group (16-17 years), rates decreased from 0.14% in 1993 to 0.05% in 1997 (Figure 22).

Among female Job Corps entrants in all age categories, prevalence rates fluctuated between 0.12% and 0.30% during the survey period and showed no decline and little difference by age group (Figure 23).

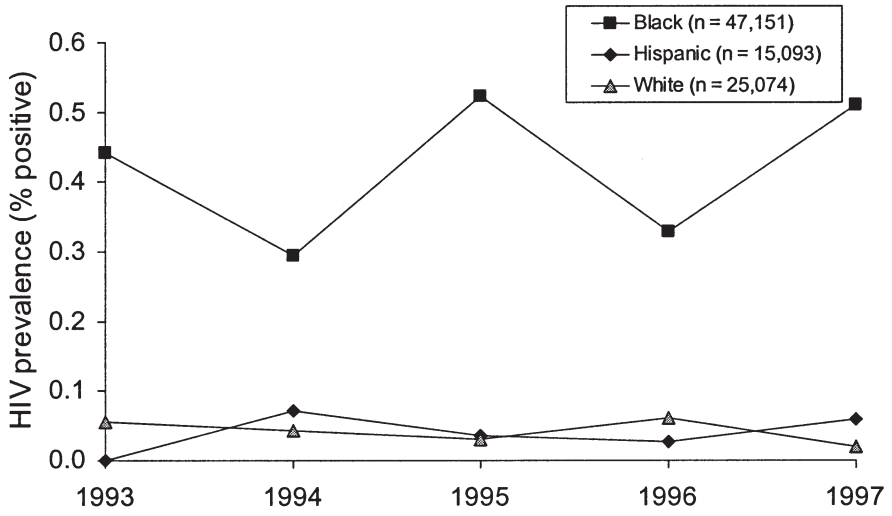
Because HIV testing is routine and HIV-positive youth receive medical care, self-selection for enrollment in the program could either decrease or increase the number of HIV-infected entrants. Although Job Corps entrants may not fully represent the larger population of disadvantaged youth in the United States, the data from these surveys can provide important national information that can be used for planning HIV prevention programs for disadvantaged out-of-school youth.

Figure 20. HIV Prevalence Among Male Job Corps Entrants, by Race/Ethnicity, 1993–1997



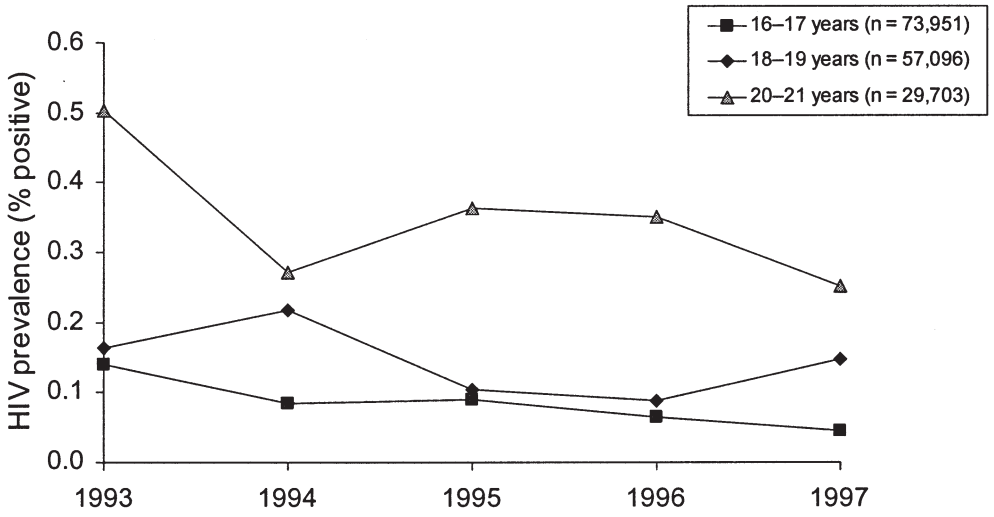
Note. Standardized to 1993 population of Job Corps entrants by region, age group, and metropolitan statistical area.
Source of data: U.S. Department of Labor.

Figure 21. HIV Prevalence Among Female Job Corps Entrants, by Race/Ethnicity, 1993–1997



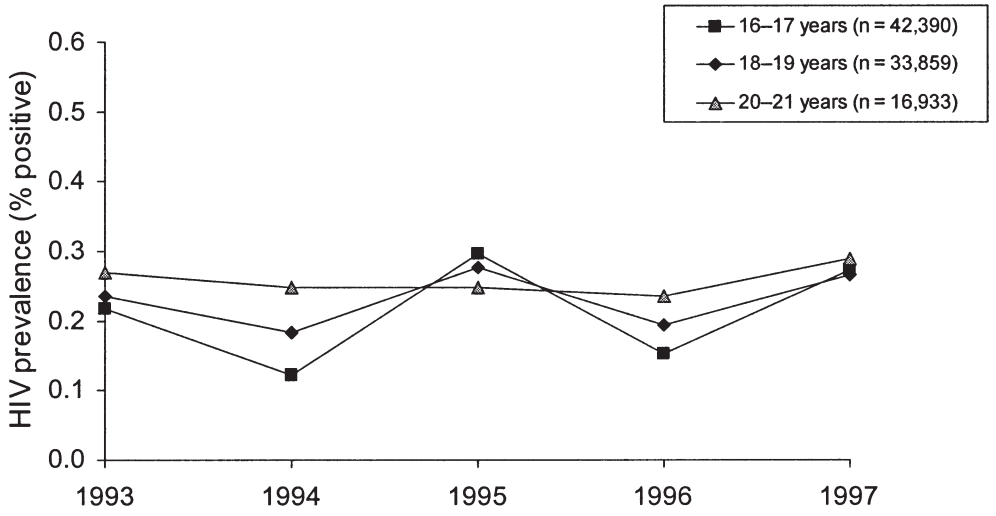
Note. Standardized to 1993 population of Job Corps entrants by region, age group, and metropolitan statistical area.
Source of data: U.S. Department of Labor.

Figure 22. HIV Prevalence Among Male Job Corps Entrants, by Age Group, 1993–1997



Note: Standardized to 1993 population of Job Corps entrants by region, race/ethnicity, and metropolitan statistical area.
Source of data: U.S. Department of Labor.

Figure 23. HIV Prevalence Among Female Job Corps Entrants, by Age Group, 1993–1997



Note. Standardized to 1993 population of Job Corps entrants by region, race/ethnicity, and metropolitan statistical area.
Source of data: U.S. Department of Labor.

Low-Risk Populations

Military Applicants

Since October 1985, all persons applying for active duty or reserve military service, the service academies, or the Reserve Officer Training Corps have been screened for HIV infection as part of the entrance medical evaluation. After removing all personal identifiers, the Department of Defense provides quarterly HIV screening results and information on sex, race/ethnicity, and age to CDC for surveillance purposes. No information is available on behavioral risk factors for HIV infection. All military applicants must have high school diplomas or the equivalent. Because of the large number of male and female applicants from all areas of the country, this population provides valuable information about the HIV epidemic, particularly among segments of the population in groups other than those at recognized high risk.

In the past, military applicants were informed by recruiting officials that drug use and homosexual activity were grounds for exclusion from the military. However, a new policy by which applicants would not be asked about homosexual activity was implemented in July 1993. Military applicants who test positive for HIV infection are informed of their test results and counseled by a physician. HIV-positive applicants are excluded from military service.

Prevalence rates were standardized to the 1993 population of military applicants by region, sex, race/ethnicity (black, Hispanic, white, American Indian/Alaska Native, Asian/Pacific Islander), age group (16–19, 20–24, 25–34, and ≥35 years), and MSA. For the 1993–1997 survey period, 1,714,215 specimens from military applicants were tested for HIV antibody. Most of the military applicants were whites (68%), followed by blacks (19%), Hispanics (9%), Asians/Pacific Islanders (2%), American Indians/Alaska Natives (1%), and unreported (1%). The applicant's reported home state is the basis for the state-specific rates (Figure 24).

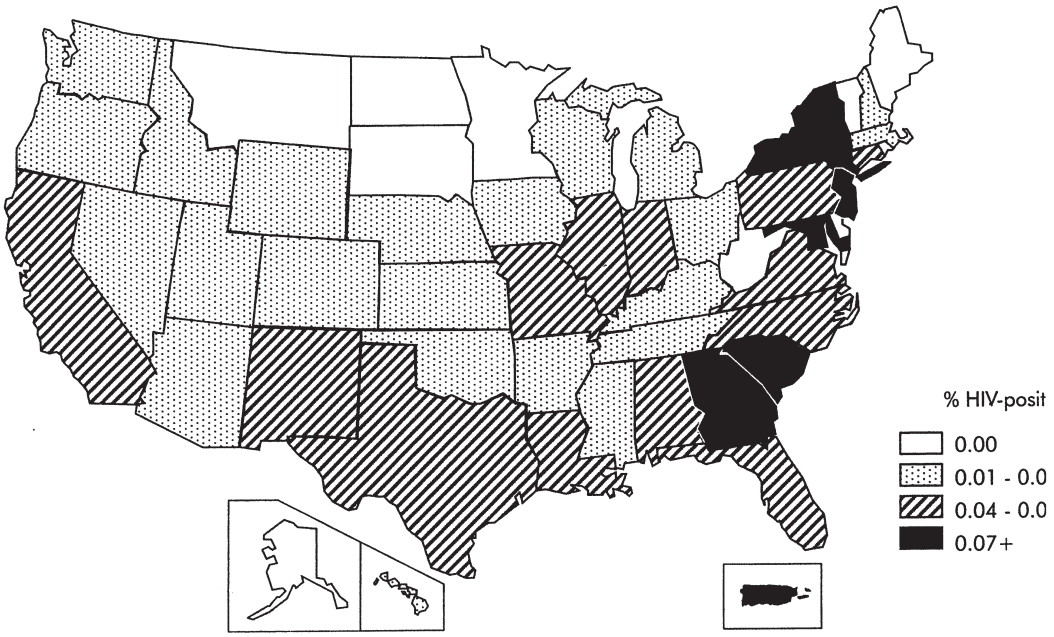
Overall unadjusted HIV prevalence for military applicants was 0.17% among blacks, 0.04% among Hispanics, 0.02% among whites, and 0.01% among American Indians/Alaska Natives and Asians/Pacific Islanders (Figure 25).

Although estimated HIV prevalence was low among military applicants in all regions, rates were consistently higher in the Northeast and the South than in the West and the Midwest. In the Northeast, rates increased from 0.05% in 1993 to 0.07% in 1995 before decreasing to 0.04% in 1997. Rates decreased in the other regions from 1993 to 1997: 0.06% to 0.04% in the South, 0.05% to 0.03% in the West, and 0.03% to 0.01% in the Midwest (Figure 26).

For male military applicants, overall prevalence was 0.05% in 1993, remained stable at 0.04% from 1994 through 1996, and then decreased to 0.03% in 1997. For women, prevalence increased from 0.04% in 1993 to 0.05% in 1994 before decreasing to 0.02% in 1997 (Figure 27).

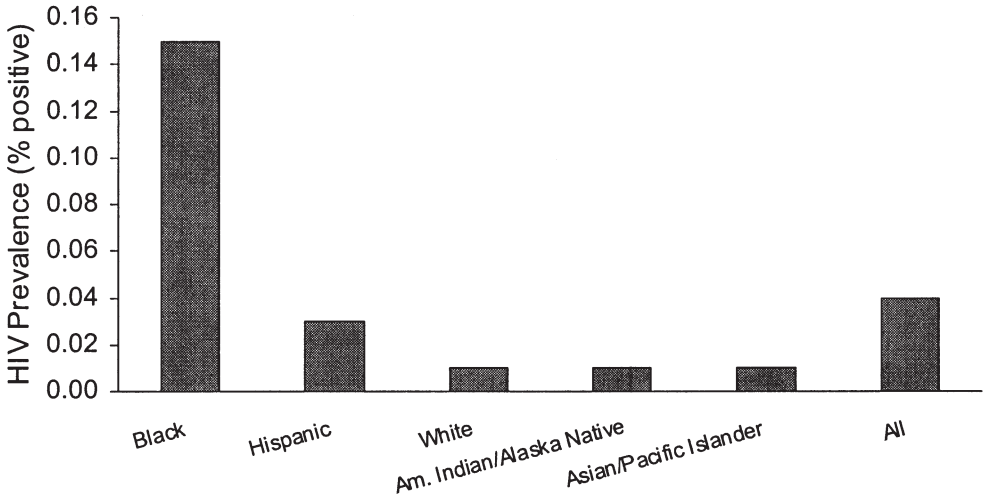
Although there were downward trends during the survey period for male and female black military applicants, prevalence rates were markedly higher among black applicants of both sexes than among those who were Hispanic or white. Prevalence decreased among black men from 0.20% in 1993 to 0.13% in 1997 and among black women from 0.12% in 1993 to 0.05% in 1997 (Figures

Figure 24. HIV Prevalence Among Military Applicants, by State of Residence, 1993-1997



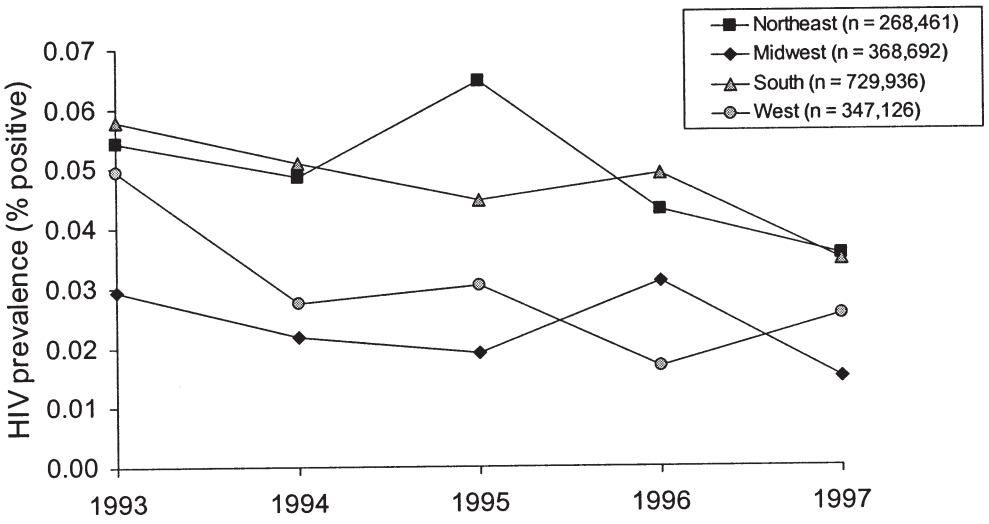
Source of data: U.S. Department of Defense.

Figure 25. HIV Prevalence Among Military Applicants, by Race/Ethnicity, 1993–1997



Source of data: U.S. Department of Defense.

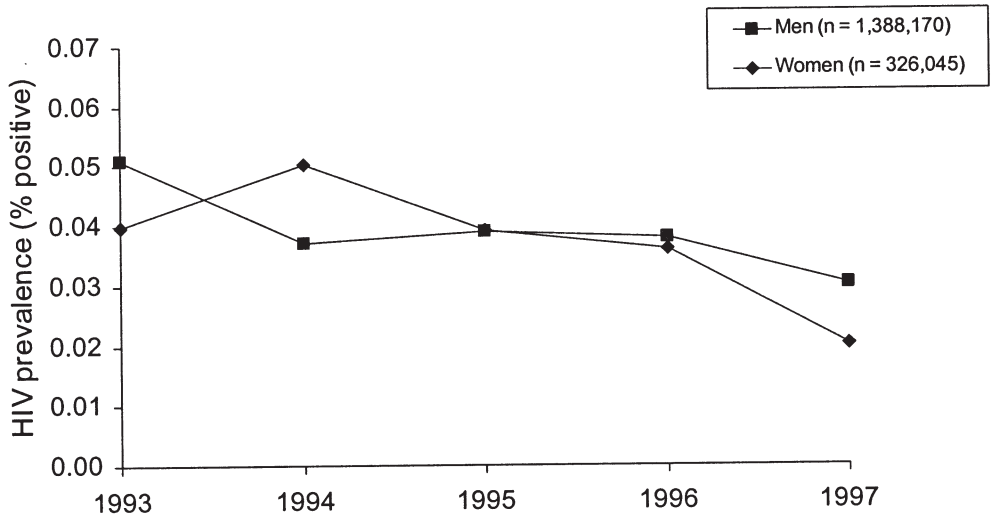
Figure 26. HIV Prevalence Among Military Applicants, by Region, 1993–1997



Note. Standardized to 1993 population of military applicants by sex, race/ethnicity, age group, and metropolitan statistical area.

Source of data: U.S. Department of Defense.

Figure 27. HIV Prevalence Among Military Applicants, by Sex, 1993–1997



Note. Standardized to 1993 population of military applicants by region, race/ethnicity, age group, and metropolitan statistical area.

Source of data: U.S. Department of Defense.

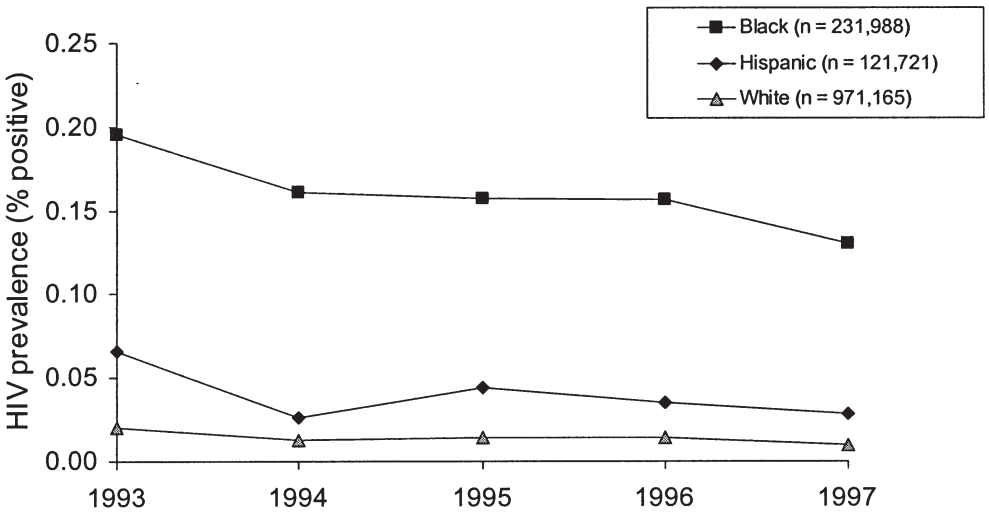
28 and 29). Prevalence among Hispanic men decreased from 0.07% in 1993 to 0.03% in 1994 and then remained stable through 1997. Among white men, rates were low at 0.02% or less during the survey period (Figure 28). Rates were also low (0.02% or less) and stable for Hispanic women and white women (Figure 29).

Prevalence rates among male military applicants who were at least 25 years of age were consistently higher than among those who were younger. However, prevalence declined between 1993 and 1997 from 0.22% to 0.11% among male applicants who were 25–34 years and from 0.21% to 0.15% among those who were 35 years of age or older. Rates among male applicants who were 20–24 years old decreased from 0.06% in 1993 to 0.03% in 1997. Among the youngest age group (16–19 years) rates were stable at 0.02% or less (Figure 30).

Overall prevalence was very low among female military applicants. During 1993–1997, rates among those who were 25–34 years of age ranged from 0.03% to 0.11%. For female applicants who were 20–24 years of age, rates increased slightly between 1993 (0.05%) and 1995 (0.07%) before decreasing to 0.02% in 1997. For the youngest group of women (16–19 years) rates decreased from 0.04% in 1993 to 0.01% in 1997 (Figure 31). Data for women who were 35 years of age or older are not presented because of small numbers.

Because applicants who are HIV-positive or who use drugs are not accepted into the military, self-selection bias among persons in high-risk categories is likely. Therefore, MSM, IDUs, and others who were aware or suspected that they were infected with HIV are likely to be under-represented in the population of military applicants.

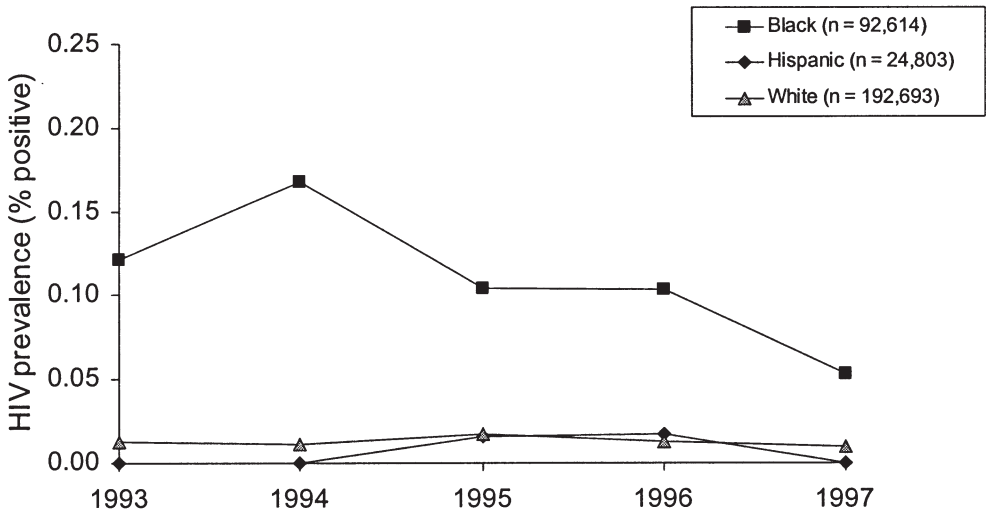
Figure 28. HIV Prevalence Among Male Military Applicants, by Race/Ethnicity, 1993–1997



Note. Standardized to 1993 population of military applicants by region, age group, and metropolitan statistical area.

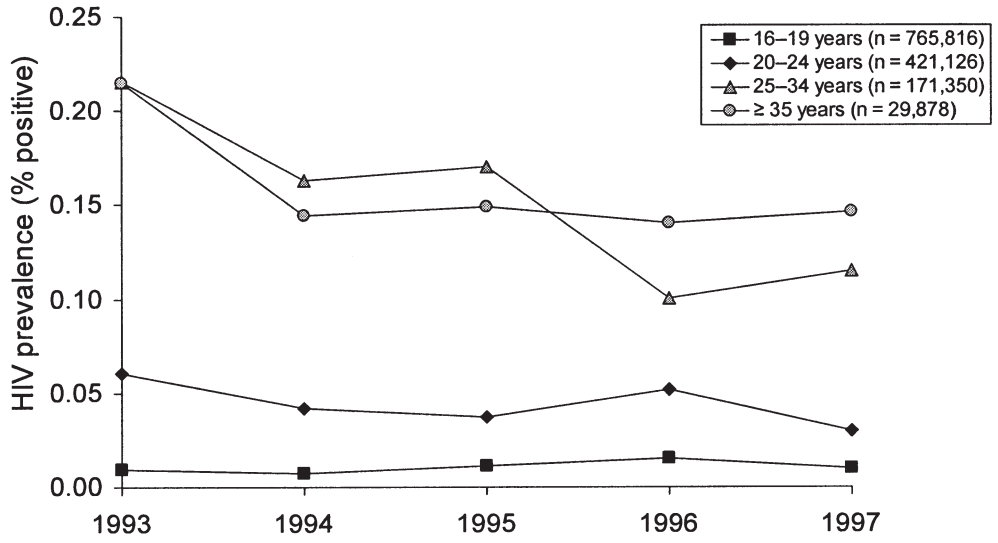
Source of data: U.S. Department of Defense.

Figure 29. HIV Prevalence Among Female Military Applicants, by Race/Ethnicity, 1993–1997



Note. Standardized to 1993 population of military applicants by region, age group, and metropolitan statistical area.

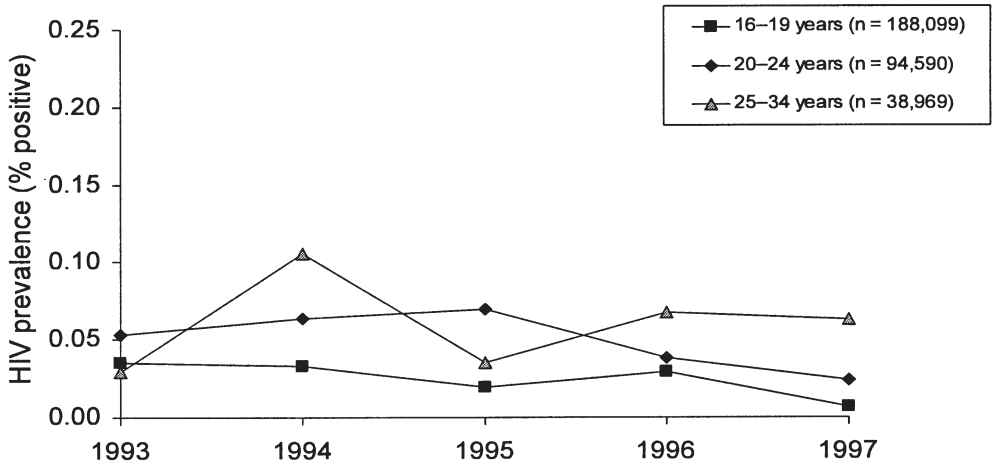
Figure 30. HIV Prevalence Among Male Military Applicants, by Age Group, 1993–1997



Note. Standardized to 1993 population of military applicants by region, race/ethnicity, and metropolitan statistical area.

Source of data: U.S. Department of Defense.

Figure 31. HIV Prevalence Among Female Military Applicants, by Age Group, 1993–1997



Note. Standardized to 1993 population of military applicants by region, race/ethnicity, and metropolitan statistical area.. Data for women >=35 years of age excluded because of small numbers.

Source of data: U.S. Department of Defense.

Blood Donors

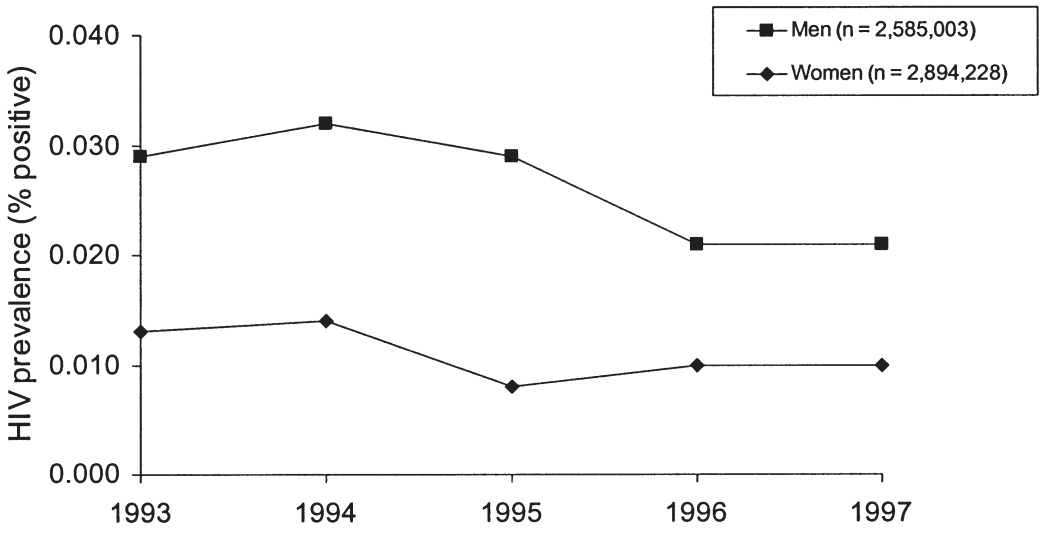
The prevalence of HIV infection in the highly selected population of blood and plasma donors is presumably lower than in the general population because of the policy of actively discouraging donations from persons at increased risk. In an attempt to reduce donations from persons at high risk for HIV infection, verbal screening of prospective donors for HIV risk factors and the request that persons with such risk factors refrain from donating began in 1983. Since early 1985, blood centers have screened all donated units for HIV. HIV-infected units are eliminated from the donor pool, and blood centers decline future donations from persons whose earlier donations tested positive for HIV infection. In a further attempt to ensure a safe blood supply, testing procedures for HIV and other blood-borne infections have been progressively strengthened and now include testing for HIV-1 and HIV-2 antibodies, as well as for HIV-1 p24 antigens.

Approximately 8 million people voluntarily donate 14 million units of blood (including approximately 700,000 autologous units) annually in the United States. HIV prevalence trends can best be determined from first-time blood donors, who represent approximately 20% of all donations. Since 1985, the American Red Cross, which collects approximately half of the voluntary donations in the United States, has provided CDC with routine HIV screening results for their blood donations.

Although prevalence was very low among first-time American Red Cross blood donors, rates were higher among men than among women. After a slight increase from 1993 to 1994 among men, prevalence then decreased from 0.032% in 1994 to 0.021% in 1997. Among women, prevalence was relatively stable (0.010% to 0.014%) during the 5-year period (Figure 32).

The policy of discouraging donations from persons at risk for HIV infection through high-risk sexual or drug behaviors means that a significant increase in the number of HIV-infected blood donations could indicate a new or emerging pattern of HIV transmission. Blood collection agencies have progressively strengthened their exclusion procedures for potential donors at increased risk for HIV infection. Also, as the availability of HIV counseling and testing has increased, more at-risk persons have learned their HIV infection status, reducing the likelihood that infected persons would donate. Thus, the declining HIV prevalence among first-time blood donors may not reflect the underlying HIV infection trends in the population at large.

Figure 32. HIV Prevalence Among American Red Cross First-Time Blood Donors, by Sex, 1993–1997



Source of data: American Red Cross

Interpretation and Discussion of Findings

The data in this report provide estimates of HIV prevalence for specific subsets of the population of the United States from 1993–1997. Because national population-based estimates of HIV prevalence have not been available since the Survey of Childbearing Women was discontinued in 1995, we can only estimate HIV infection in the general population. MSM attending public STD clinics are not representative of all MSM, IDUs in treatment are not representative of all IDUs, and Job Corps entrants are not representative of all youth. In addition, military applicants and blood donors are not representative of the general population because of self-exclusions for both groups and the further exclusions, based on risk behaviors, of potential blood donors. However, trend data are less subject to bias, and although there may be limitations to extrapolations from one group to another, the general declines in seroprevalence in nearly all groups suggest that prevention efforts have met with some success.

Changes in the composition of the survey populations complicate interpretations of HIV prevalence trends. Although prevalence rates were adjusted to the 1993 populations to control for demographic characteristics in the selected populations that may have changed over time, other changes in the composition of the population under study may have influenced the observed trends. For example, changes in referral and access patterns may affect estimates of prevalence, regardless of the underlying prevalence among all persons served by a particular venue. Also, because of the nonrandom selection of STD clinics and DTCs, results cannot be generalized to other populations not served by these venues. However, the consistency of the collective trends suggests patterns and temporal changes in HIV infection.

The overall patterns of HIV seroprevalence data from 1993–1997 suggest that HIV prevalence continues to decrease or to remain stable in the populations included in this report. Overall prevalence did not increase in any sentinel population. Despite these encouraging findings, prevalence remained high among MSM and IDUs and was substantially higher among blacks than among whites in all populations included in this report. In addition, prevalence increased among certain subgroups, particularly female Job Corps entrants. Considering the young ages of this population, prevalence was high, especially among black women.

Patterns in the HIV epidemic among adults in the United States are primarily influenced by three interrelated subepidemics among groups at risk for HIV infection: MSM, IDUs, and heterosexual persons. STD clinic surveys provide information about HIV infection among MSM. Overall HIV prevalence was higher among MSM at STD clinics (26%) than among any of the other survey populations. Prevalence for these MSM was high in all metropolitan areas, ranging from 8% in Seattle to 39% in Atlanta. However, overall prevalence among MSM decreased steadily from 1993–1997. Although prevalence was lower among younger MSM, the 1997 standardized prevalence rate of 11% among those in the youngest age group (< 25 years) indicates that new infections continue to occur. This is consistent with the results of other recent studies showing high numbers of new infections among young MSM.

Because the STD clinic-based HIV surveys were conducted among persons at high risk for other STDs, it is difficult to generalize results from these surveys to other MSM and heterosexual persons for two reasons. First, the observed HIV prevalence among MSM and heterosexual patients at STD clinics was probably higher than the overall prevalence among similar groups in the general population. Also, the observed decreases in HIV prevalence could have underestimated true decreases among all MSM and heterosexual patients because persons who had changed their behaviors to lower their risk for STDs, including HIV, would have been less likely to attend STD clinics.

Overall seroprevalence among IDUs entering treatment programs (19%) was the second highest of the populations in the surveys. In contrast to prevalence among MSM, prevalence among these IDUs differed greatly by region, ranging from 2% or less in Denver and Los Angeles to 37% in New York City. During the survey period, prevalence decreased or remained relatively stable among most subgroups of IDUs. A notable exception to the pattern of decreasing prevalence was white IDUs in the South, among whom prevalence increased more than threefold, from 3.2% in 1993 to 11.1% in 1997.

Because IDUs in treatment programs are typically older than those not in treatment and therefore have had more time to acquire HIV infection, the prevalence rates obtained from these surveys could be overestimates of HIV infection in the entire population of IDUs. On the other hand, if IDUs who are not in treatment programs engage in high-risk behaviors more frequently than those who enter treatment, as some studies suggest, the HIV prevalence rates in this report may underestimate HIV infection among all IDUs. However, recent interview-based incidence studies at many of the participating DTCs have shown continued high rates of sharing of needles and other drug injection equipment as well as high rates of risky sexual behaviors.

The HIV epidemic among heterosexual men and women is influenced by persons who inject drugs or who have heterosexual contact with IDUs, MSM, or other persons at high risk of HIV infection. HIV prevalence among heterosexual men and women at the STD clinics was substantially lower than that among MSM and IDUs at the STD clinics and IDUs entering drug treatment programs. Among high-risk heterosexual patients at STD clinics who reported no male same-sex contact and no injection drug use, overall prevalence for the 5-year period was 2.3%.

Overall prevalence rates among youth attending adolescent medicine clinics and those entering the Job Corps remained low (0.4% or less). However, considering the young ages of these populations, prevalence was high, especially among young disadvantaged women entering the Job Corps. These women, particularly those who were black, were infected with HIV at younger ages and at higher rates than men. The high prevalence rates among these women could be due to several factors, including lack of knowledge or lack of skills in negotiating condom use and early sexual intercourse with older men who are more likely than young men to be infected with HIV.

HIV prevalence was higher among men than among women in the lowest-risk populations – military applicants and blood donors. However, prevalence in both populations remained very low, probably because of the self-exclusion of persons with known risk for HIV infection. HIV prevalence among female first-time blood donors in 1997 was only 0.010%. Because of stricter exclusion criteria for potential blood donors and better availability and awareness of HIV counseling and testing, the declining HIV prevalence trends among first-time blood donors may not be representative of a downward trend in the general population.

It is difficult to make inferences from the serosurveillance data about prevalence among heterosexuals in the general population. First, because HIV prevalence among MSM and IDUs is high, the misclassification of only a few of these persons could greatly increase the measured prevalence among persons classified as heterosexual patients who did not inject drugs. Second, a large percentage of the population is at risk for HIV infection through heterosexual contact although the level of risk differs greatly, depending on factors such as practiced sexual behaviors, social mixing patterns, choice of partners, and HIV prevalence in the community. Thus, it is difficult to generalize data from heterosexual men and women in the sentinel populations included in this report.

Strong geographic heterogeneity in HIV prevalence rates was observed among heterosexual patients at STD clinics, IDUs entering DTCs, Job Corps entrants, and military applicants. Although the reasons for this geographic diversity are not clear, HIV prevalence has been higher among all of these populations in the Northeast and the South since CDC began the serosurveillance system in 1988. These regional variations reflect the large differences in the effect of the HIV epidemic in different areas of the United States.

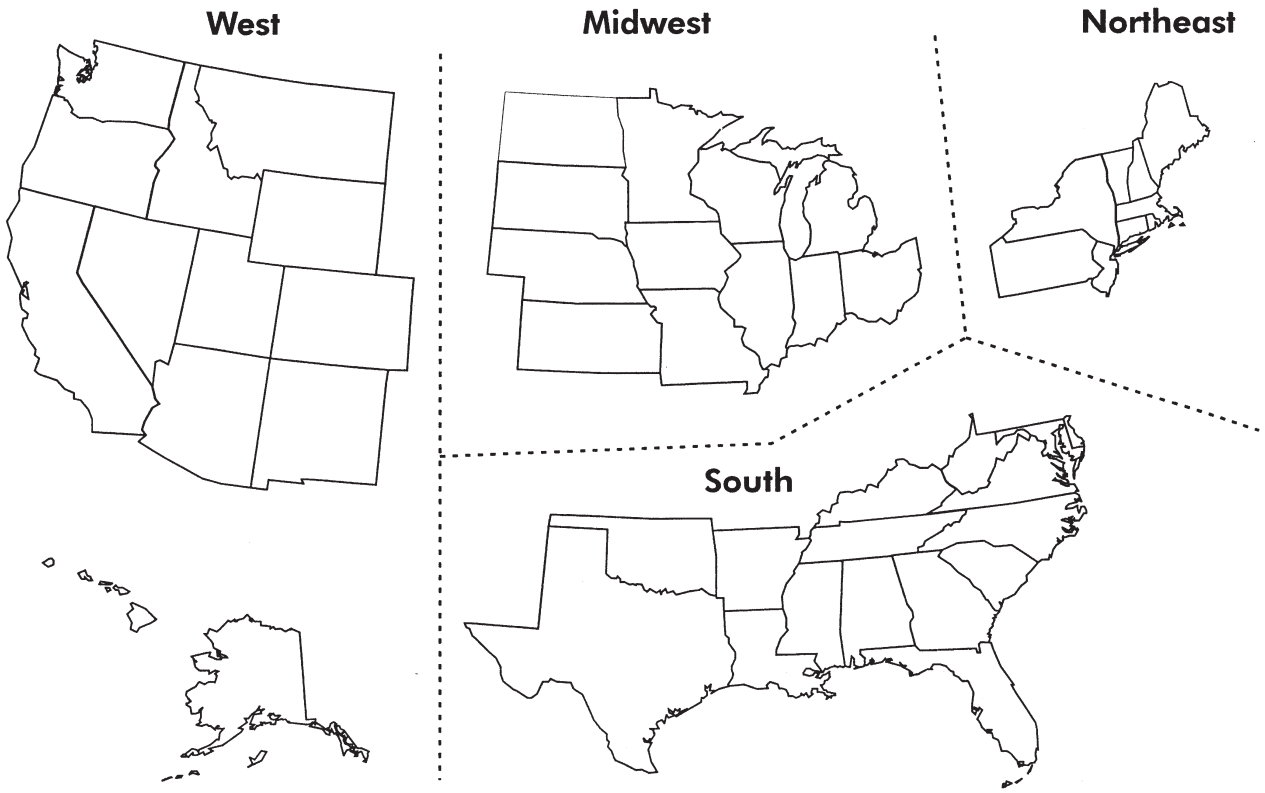
One of the most striking observations from these surveys is the marked race/ethnicity differences in HIV prevalence. In nearly all of the populations, prevalence was substantially higher among blacks than among whites. Although data from Hispanics were less consistent, prevalence among Hispanics was lower than among blacks and slightly higher than among whites in most populations. The exception was among IDUs in the Midwest and South, where prevalence was almost always higher for Hispanics than for blacks. The marked disparities by race and ethnicity suggest that social mixing patterns within racial and ethnic groups are important determinants of HIV transmission risk.

Even though the groups in the surveys are not representative of the general population of the United States, the consistency of findings of continuing overall decreasing or stable prevalence across surveys and geographic areas is encouraging, especially where the younger groups show decreases in prevalence. Stable HIV prevalence over time indicates that the number of HIV-positive persons entering a given population is approximately equal to the number of HIV-positive persons leaving the population. There are several possible explanations for stable or decreasing prevalence. The most optimistic is that HIV infection in the population and HIV incidence actually have decreased because of education and interventions for at-risk persons. A decrease in seroprevalence, however, does not exclude high rates of new infections. It is possible that as more persons were voluntarily tested for HIV and became aware of their serostatus, those with HIV infection have been less likely to have entered the populations under study. Also, changing referral or access patterns could have affected the number of HIV-positive persons who visited a given clinic.

HIV incidence estimates for specific risk groups are desirable so that prevention programs can be better targeted and evaluated. In the past, incidence was difficult and expensive to measure because multiple specimens from one person over time were needed to show a change from a seronegative test result to a seropositive test result. This "cohort" approach introduced significant biases related to a person's decisions to be tested for HIV. For example, to be included in the cohort, persons must have volunteered to undergo HIV testing more than once during the survey period. Differential losses related to HIV status would result in bias associated with loss to follow-up. In an effort to better measure incidence, CDC has developed an accurate, inexpensive technology that can distinguish recent infections from longstanding infections by using a single specimen from each person; thus, estimates of HIV incidence that are not biased by testing decisions can be determined.

The HIV epidemic has slowed from a period of rapid growth (approximately 150,000 new infections per year) during the mid-1980s to late 1980s to a more stable epidemic (estimated at approximately 40,000 new infections per year) since the mid-1990s. A renewed national resolve is needed to further reduce the number of new infections and to ensure that people with HIV/AIDS have access to testing, care, and treatment so that they can live longer, healthier lives. A key component to this effort is surveillance. Although AIDS surveillance has given us valuable information in the past, the natural history of HIV infection has changed because of more effective treatments that can lengthen the time between HIV infection and the development of AIDS. Thus, surveillance of new HIV infection (incidence) is crucial for determining the current state of the epidemic and allowing agencies to mobilize and target populations where HIV transmission is still occurring. To reduce the number of new HIV cases per year, complacency must be abandoned, and new and innovative approaches must be explored.

Appendix I. Geographic Regions of the United States



West
Alaska
Arizona
California
Colorado
Hawaii
Idaho
Montana
Nevada
New Mexico
Oregon
Utah
Washington
Wyoming

Midwest
Illinois
Indiana
Iowa
Kansas
Michigan
Minnesota
Missouri
Nebraska
North Dakota
Ohio
South Dakota
Wisconsin

South
Alabama
Arkansas
Delaware
District of Columbia
Florida
Georgia
Kentucky
Louisiana
Maryland
Mississippi
North Carolina
Oklahoma
South Carolina
Tennessee
Texas
Virginia
West Virginia

Northeast
Connecticut
Maine
Massachusetts
New Hampshire
New Jersey
New York
Pennsylvania
Rhode Island
Vermont

Source: U.S. Bureau of the Census.

Appendix II. Technical Notes for Statistical Analyses: Sexually Transmitted Disease Clinics and Drug Treatment Centers

Background

The standardized HIV prevalence rates in this report may vary across sites or demographic groups. Therefore, statistical tests were performed to determine whether it was valid to summarize these rates by combining sites. We used logistic regression to evaluate the variation in trends among sites and demographic groups for MSM tested in STD clinics, heterosexual patients tested in STD clinics, and IDUs tested in drug treatment programs. If the prevalence rates were uniform across sites and subgroups, then summary indicators of the trends in HIV prevalence rates were valid. For each risk group, we evaluated the variation in trends among the three principal racial/ethnic groups (blacks, Hispanics, and whites), three age groups, sex (for heterosexual men and women and for IDUs), and test site. In addition, for IDUs, we evaluated variation among the four U.S. geographic regions.

Methods

We first evaluated variation in trends among sites within each racial/ethnic group. Additionally, for heterosexual patients and IDUs, we evaluated variation in trends between men and women. For each such group, we included only sites with a total of at least 40 HIV tests and at least 8 HIV-positive test results from 1993–1997. Because we ran multiple tests across each site and multiple tests within sites, we chose a significance level of $p < 0.01$ instead of a significance level of $p < 0.05$. We fit two logistic regression models to the proportion of persons with HIV infection. The first model included main effects for year of test (YOT) (continuous), site, age group, and sex (for heterosexual patients and IDUs). The second model included additional terms representing the interaction between YOT and site. We used a likelihood ratio test to determine whether there was a significant interaction between site and YOT. If this test result was significant, we concluded that the time trend was not the same at all sites for this racial/ethnic group.

Similarly, we used likelihood ratio tests to determine whether there was a significant interaction between age group and YOT and (for heterosexual patients and IDUs) whether there was a significant interaction between sex and YOT. In addition, for each racial/ethnic group and each site, we fit logistic regression models with main effects for YOT, age group, and (for heterosexual patients and IDUs) sex to determine whether there was a significant trend at any site.

Thus, for MSM tested at STD clinics, each racial/ethnic group included in the initial model had main effects for YOT, site, age group, and the interaction of YOT with site. For heterosexual patients tested at STD clinics, each race/ethnicity group in the initial model had main effects for YOT, site, age group, sex, and the interaction of YOT with site. For IDUs tested at DTCs, each race/ethnicity group in the initial model had main effects for YOT, region, site, age group, sex, and the interaction of YOT with site.

Results

MSM at STD Clinics

Black MSM. Of the 23 STD clinics included in this report, 21 had sufficient data to analyze individual clinic trends for black MSM. The results of this analysis showed no significant variation among clinics, indicating that it was valid to combine all clinics for the trends analysis. Although prevalence was relatively stable in 5 of the 21 clinics (2 in Atlanta and 1 each in Houston, Los Angeles, and Miami) that met the criteria for separate analysis, there was a decreasing trend for black MSM when all 21 clinics were combined. The tests for age group by YOT interaction were not significant; thus, the trends over time were similar for the three age groups.

Hispanic MSM. The criteria for analysis by individual clinic for Hispanic MSM were met by 11 STD clinics. The test for clinic by YOT interaction was not significant, indicating that the combined clinic trends analysis was valid. There was an overall decreasing trend when the clinics were combined, primarily as a result of significant downward trends in two clinics (New York City and San Francisco). Prevalence was relatively stable in the other nine clinics. Because of small numbers in many of these clinics, there was not sufficient power to determine significant decreases.

However, the age group by YOT interaction was significant. Further analysis showed that two clinics (Houston and San Francisco) were the determinants of this interaction. In both these clinics, there were years during which no persons in the age group "under 25 years" tested HIV-positive. Trends were similar for the other clinics across the three age groups.

White MSM. For white MSM, the trends varied among the 12 clinics with sufficient data for analysis by individual clinic ($p = 0.005$), primarily because of 1 clinic each in Houston (where rates were stable) and Phoenix (where rates tended to increase). In general, for each of the other 10 clinics, prevalence tended to decrease over time. For the combined analysis, there was an overall significant downward trend when Houston and Phoenix were excluded, as well as when these two clinics were included. The trends across the three age groups did not vary.

Heterosexual Patients at STD Clinics

For the entire sample of heterosexual patients, the sex by YOT interaction was not significant, indicating that trends in HIV prevalence were the same for heterosexual men and women at the clinics. This finding eliminates the need to analyze separate trends for these men and women. In addition, the age group by YOT interaction was not significant. This finding makes it possible to estimate a valid combined indicator of the trend across the age groups.

Black Heterosexual Patients. Of the 23 STD clinics included in this report, 22 met the criteria for analysis by individual clinic for black heterosexual men and women. The site by YOT interaction was not significant. Although trends were relatively stable for black heterosexual patients in the analyses by individual clinic, the one exception was a Houston clinic in which HIV prevalence declined significantly ($p = 0.006$).

Hispanic Heterosexual Patients. The criteria for analysis by individual clinic for Hispanic heterosexual patients were met by 18 STD clinics. The site by YOT interaction was not significant. Although HIV prevalence declined significantly at one clinic in Los Angeles ($p = 0.008$), rates were stable for the other clinics.

White Heterosexual Patients. Of the 23 STD clinics included in this report, only 10 met the criteria for analysis by individual clinic for white heterosexual patients. For these 10 clinics, the site by YOT interaction was marginally significant ($p = 0.08$), indicating that trends among clinics are generally consistent. With the exception of a significant downward trend in one Los Angeles clinic ($p = 0.004$), none of the clinics showed a significant decline when analyzed separately. However, when the 10 clinics were combined, there was a significant downward trend.

IDUs Entering Drug Treatment Programs

Across the entire sample of IDUs entering drug treatment programs, the interaction of sex and YOT was not significant, indicating that the trends in HIV prevalence were the same for male IDUs and female IDUs. This finding eliminated the need to analyze trends separately for men and women. In addition, the interaction of age group and YOT was not significant. This finding made it possible to estimate a valid overall indicator of the trend across all age groups. The interaction of region and YOT was significant, indicating that trends differed by region. Further analyses showed no significant interactions between site and YOT within regions, indicating that it was valid to combine DTCs for the regional trends analyses.

Northeast. Eight of the 22 DTCs included in this report were located in the Northeast region. Of these, data were sufficient for analyses by individual clinic in seven DTCs for black IDUs, eight DTCs for Hispanic IDUs, and seven DTCs for white IDUs. Overall prevalence for these clinics decreased in the Northeast for each race/ethnicity group from 1993–1997. There were significant downward trends for blacks in one Newark DTC; for Hispanics in one Newark DTC, three New York City DTCs, and the Puerto Rico DTC; and for whites in one Newark DTC and one New York City DTC.

South. Of the six participating DTCs located in the South, the criteria for inclusion in the individual analyses were met for blacks at four DTCs, for Hispanics at three DTCs, and for whites at three DTCs. When these DTCs were combined, there was a significant downward trend. However, analyses by race/ethnicity group showed that the decrease was not an overall result; the only significant decline was among Hispanics. Rates were relatively stable for these DTCs with the exception of the one in San Juan, where there was a significant downward trend ($p = 0.001$).

Midwest. Only two of the DTCs included in the report were located in the Midwest. One DTC had sufficient data for individual analysis for white IDUs; sufficient data were available from both DTCs for blacks and for Hispanics. When the DTCs were combined, HIV prevalence rates were stable, and no significant trends were found in the individual analyses.

West. Six participating DTCs were in the West. The criteria for analysis by individual clinic were met for blacks at one DTC, for Hispanics at two DTCs, and for whites at five DTCs. Prevalence rates were stable, and no significant trends were found in the individual analyses.

Appendix III. Anonymous Unlinked Surveys

Background

When anonymous unlinked HIV serosurveys were initiated by CDC in 1988 to document the extent of the epidemic in the United States, information about HIV epidemiology was limited. The surveys were conducted at sentinel sites throughout the country to characterize more fully the leading edge of the epidemic. Participating clinic settings have included STD clinics, DTCs, adolescent and young adult clinics, women's reproductive health clinics, tuberculosis clinics, sentinel hospitals, clinics serving homeless populations, clinics in correctional facilities, and newborn screening programs. Data from these surveys have provided important information on national and regional HIV prevalence trends within groups defined by age, race/ethnicity, and HIV risk behavior. These data have been instrumental in describing populations with the highest need for preventive services and future care.

Until the mid-1990s, AIDS case surveillance was the best measure of the magnitude and direction of the HIV epidemic because the time between infection with HIV and the development of AIDS was believed to be relatively consistent. However, since the introduction of new medical treatments that can delay the progression of HIV disease, AIDS case surveillance has not been as representative of HIV epidemiology. Because the characteristics of this delayed progression are variable, AIDS case reporting is much less useful in estimating HIV incidence or monitoring trends in the epidemic. The limitations of AIDS case surveillance have increased the need for accurate estimates of HIV incidence. Recently developed technology that can distinguish recent HIV infections from longstanding infections with the use of a single specimen has led to the ability to conduct cross-sectional serosurveys of HIV incidence. Because incidence is indicative of recent infection, it is an important epidemiologic measure for allocating resources and evaluating prevention programs.

Uses of Anonymous Survey Data

Anonymous serosurvey data have been used for the following purposes: (1) to provide national and local estimates of the number of persons living with HIV infection; (2) to develop evidence to assist in making decisions on the allocation of resources for prevention activities through HIV prevention community planning; (3) to assist in projecting the number of people who may benefit from HIV-related care and treatment; and (4) to advocate HIV prevention activities such as voluntary testing and counseling services, treatment services, education, safe practices for health care workers, and applied public health research.

An important advantage of anonymous unlinked surveys is that they markedly reduce participation bias in seroprevalence and seroincidence estimates. Numerous studies in different risk populations have shown that HIV prevalence estimates obtained from consented testing underestimate HIV prevalence by differing degrees. This underestimate could occur either because high-risk persons who do not want to know their serostatus or persons who know they are HIV-positive are less likely to participate in voluntary testing. Because testing behavior may differ considerably in racial and ethnic, socioeconomic, and behavioral risk groups, anonymous serosurveys are especially important in providing data that are representative of specific subgroups of the population.

Principles of Anonymous Unlinked Surveys

Methods

Unlinked surveys use residual sera from blood specimens originally collected for routine clinical purposes. There is no contact between persons whose specimens are included in the surveys and the investigators conducting the surveys. Before the specimens are tested for HIV, demographic and risk information is abstracted from routine medical records and intake forms, and then linked to the residual specimens through a unique study number. After the permanent removal of all personal identifiers, residual specimens, which otherwise would be discarded, are anonymously tested for antibodies to HIV. Neither the HIV test results nor the information obtained from medical records and intake forms can be linked to specific persons (Figure 33).

Residual specimens collected for routine medical purposes are tested for HIV type-1 (HIV-1) antibodies by using an HIV-1 or HIV-1/HIV-2 enzyme immunoassay screening kit licensed by the Food and Drug Administration (FDA). Sera that are reactive according to the manufacturer's instructions are retested in duplicate by using fresh samples from the original unlinked specimen. Repeatedly reactive sera are tested with a Western blot assay licensed by the FDA. Software provided to the sites by CDC automatically generates Western blot interpretations from recorded band patterns according to the recommendations of the Association of Public Health Laboratories and CDC.

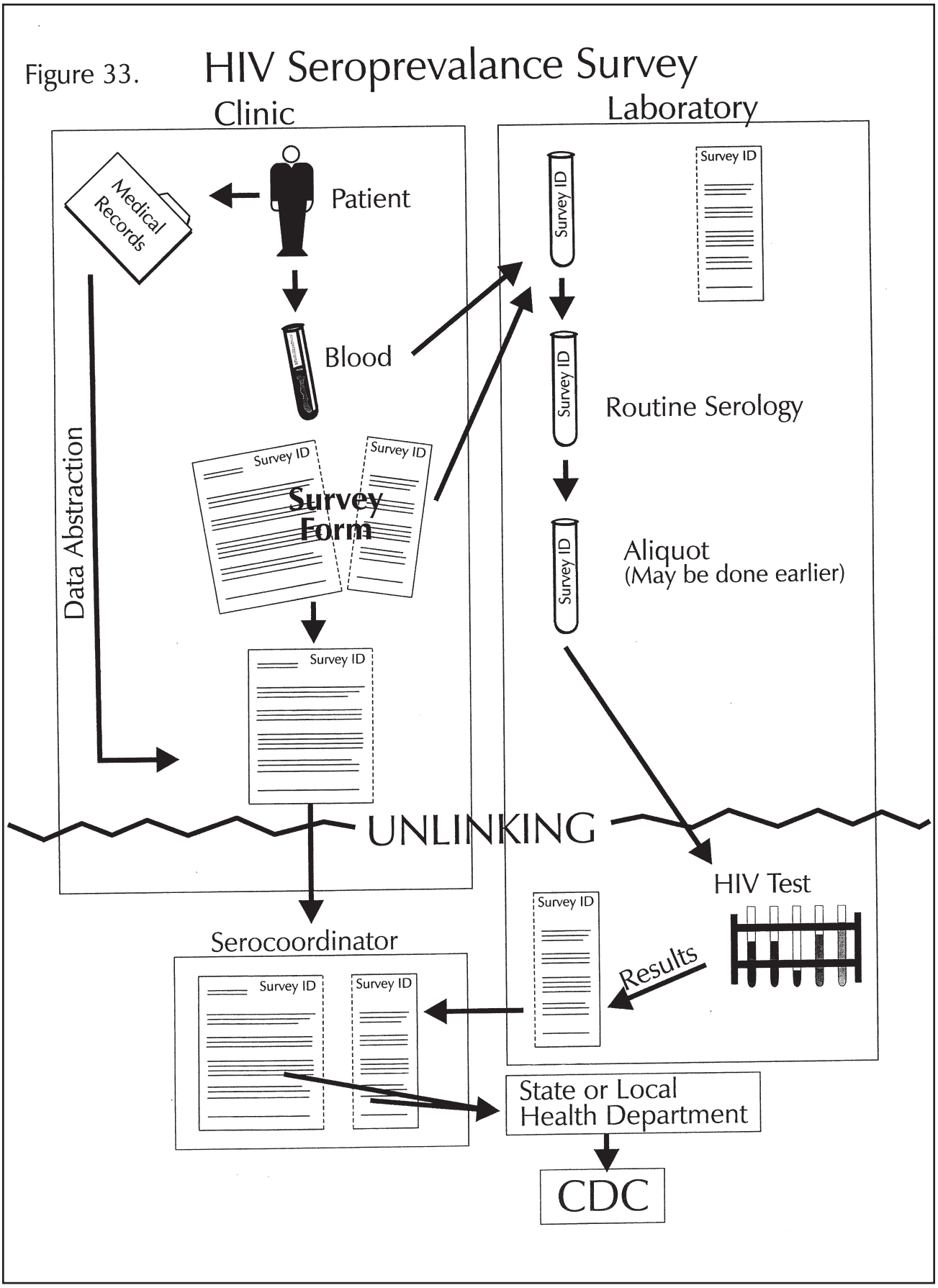
Ethical considerations

The Office for Human Research Protections, to which the Secretary of Health and Human Services has delegated the protection of the rights and welfare of human research subjects, has determined that anonymous unlinked surveys are ethical if no interaction takes place with the survey participant solely for the purpose of the surveys and if information that may inadvertently identify a person is not retained. In June 1998, the Office of the Director of CDC and the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention, convened an external panel to conduct an ethical review of HIV anonymous unlinked surveys to address the ethics of these surveys since the introduction of effective therapies. The members of the panel considered the unlinked surveys both ethical and necessary to provide unbiased, accurate data on the current status and direction of the HIV epidemic in specific populations and also to provide reliable information for prevention planning and the allocation of resources.

State and local health departments consult with, and submit their protocols for approval to, their local institutional review boards before conducting the surveys. Protocols for the unlinked surveys are submitted annually to the CDC Institutional Review Board for review and approval.

The results of anonymous unlinked HIV testing can provide data that can be used to estimate HIV infection in a given population but give no information on individuals. The CDC surveys discussed in this report were conducted in settings that directly provided (or offered referral for) voluntary counseling and testing and provided other referral services. Therefore, each person in the survey had the opportunity to learn his or her HIV status and receive appropriate counseling and referral services.

Figure 33.


HIV Seroprevalance Survey
Clinic
Laboratory
Medical Records
Patient
Blood
Survey ID
Survey Form
Data Abstraction
Routine Serology
Aliquot
(May be done earlier)
UNLINKING
HIV Test
Results
Serocoordinator
State or Local Health Department
CDC

Suggested Readings

General

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