HIV Prevalence Among Foreign- and US-Born Clients of Public STD Clinics

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A complex set of factors may reduce or enhance immigrant populations' HIV risk compared with that of native-born populations. Foreign-born individuals make up more than 10% of the US population,[1] and the parents of an additional 11% were born in other countries.[2] These immigrants often concentrate in urban HIV epicenters.[1] Despite these realities, efforts to describe the distribution of the US HIV epidemic have largely ignored differences by birth country.

Research among many immigrant groups has shown deficiencies in HIV/AIDS knowledge,[3,4] lack of access to health care,[5,6] and delays in accessing HIV-related testing[7] and care.[8] Furthermore, foreign-born individuals are disproportionately represented among the age groups most at risk for HIV[1] and may emigrate from countries with even more severe HIV epidemics than the United States. Although these factors may increase immigrants' likelihood of acquiring HIV or developing AIDS, little research has been undertaken to identify high-risk immigrant populations. Conversely, the better overall health of foreign-born populations relative to those born in the United States[9–11] indicates the presence of health-promoting factors that may reduce immigrants' HIV risk.

As improvements in HIV medical treatments increase the number of persons living with HIV, limited resources must be used to provide prevention and care services to a growing at-risk and HIV-infected population. Identification of highly affected communities is therefore critical to ensuring that funding and services are efficiently targeted. To assist US policymakers in this process and to enhance understanding of HIV prevalence patterns among at-risk foreign-born individuals, we examined the distribution of HIV infection by birth country among attendees of Los Angeles County sexually transmitted disease (STD) clinics.

Objectives. We examined differences in HIV seroprevalence and the likely timing of HIV infection by birth region.

Methods. We analyzed unlinked HIV antibody data on 61 120 specimens from 7 public health centers in Los Angeles County from 1993 to 1999.

Results. Most (87%) immigrant clients were Central American/Mexican–born. HIV prevalence was similar for US- and foreign-born clients (1.8% [95% confidence interval (CI) = 1.7%, 1.9%] and 1.6% [95% CI = 1.5%, 1.8%], respectively). Seroprevalence was high among sub-Saharan African females and low among Asian/Pacific Islander males and females. For HIV-positive immigrants, the average age at and time since immigration were 20.6 years and 12.3 years, respectively.

Conclusions. The relatively young age at arrival and long time since arrival for HIV-positive foreign-born clients suggest that most were infected after immigration. (*Am J Public Health.* 2002;92:1958–1963)

METHODS

Using data from an unlinked HIV seroprevalence survey of public STD clinic attendees,[12,13] we estimated HIV prevalence by clients' region and country of birth and identified immigrant populations whose HIV prevalence remained elevated above that of US-born clients after control for age and HIV behavioral risk group. We also used these data to estimate mean age, age at immigration, and number of years since immigration, comparing HIV-negative and -positive foreign-born clients by region.

Data

We performed blinded, anonymous HIV antibody testing on leftover sera from specimens drawn for routine syphilis testing of STD clients. STD clinics at 7 Los Angeles County public health centers participated in the serosurvey from January 1993 through October 1995, when a countywide restructuring of services resulted in the closing of 3 of these centers. The remaining 4 centers continued study participation through December 1999 and absorbed much of the closed centers' client load. These 4 centers were located throughout Los Angeles County and handled 50% of the county's total client visits to public STD clinics in 1998 and 1999.

A standardized HIV risk assessment was administered in either English or Spanish to all clients by a public health investigator or clinic nurse and linked to the blinded HIV antibody test result. Confidential HIV testing was also routinely offered to clients at the conclusion of the risk assessment.

In Los Angeles County, STD clinic attendees who have not received a syphilis test in the previous 3 to 6 months are routinely screened for syphilis during their initial visit for a new complaint. During the unlinked HIV seroprevalence study period, client identifiers were removed from the serum specimens after syphilis testing, and the remnant sera were transferred to another laboratory. The specimens were then tested for HIV antibodies by enzyme-linked immunosorbent assay (ELISA). Specimens that were repeatedly reactive by ELISA were confirmed by Western blot assay.[14] Before February 1997, the Centers for Disease Control and Prevention's (CDC's) multisite protocol[13] excluded clients with no recorded visit reason and those indicating HIV testing as their only visit reason. Subsequently, the protocol excluded only individuals who did not receive routine syphilis screening.

In cases where clients made multiple visits to any of the study clinics (25% of total visits), we included only the initial visit for the

study period. This approach helped to prevent duplication, ensure independence of observations, and prevent possible bias resulting from associations between repeat attendance and birth country. We used categories from the 1997 Joint United Nations Program on HIV/AIDS *Report on the Global HIV/AIDS Epidemic*[15] to group foreign countries and territories into regions. We subdivided Latin America into Central America/Mexico and South America and grouped countries not included in the report according to geography. "US-born" refers only to those clients born in the 50 states. We performed all analyses with SAS (SAS Institute Inc, Cary, NC).

Analyses

We reported the total number of clients from each region, the percentage who were HIV positive, and the accompanying 95% confidence intervals (CIs). To evaluate whether regional differences in prevalence reflected differences in the age- and risk-group composition of clients, we used multiple logistic regression to examine HIV-1 antibody status by birth region separately for males and females. We controlled for age (<25 years, $25-34$ years, $35-44$ years, $45-54$ years, ≥55 years) and behavioral risk group (men who reported ever having sex with men, men who reported only having sex with women, and persons who reported ever injecting drugs) in the analysis comparing clients from each region with those born in the United States. (The adjusted odds ratios (AORs) presented in Table 2 use the antilogs of coefficient estimates from these regressions.)

Finally, to evaluate whether HIV infection likely preceded or followed immigration, we examined HIV-positive and -negative clients within each birth region by comparing average current age, number of years in the United States, and age at immigration to the United States.

RESULTS

Between January 1993 and December 1999, 63393 eligible, nonduplicated clients visited 1 of the 7 clinics and received syphilis testing and an unlinked HIV test result. Information on country of birth was missing, not legible, or not classifiable for 3.6%. Of the remaining 61120 clients, 38% (n=23310) were foreign-born, and 62% (n=37810) were US-born (Table 1).

The largest percentage of foreign-born clients (87%, n=20208) were from Central America/Mexico. Fewer than 700 clients were born in each of the other regions. In descending order by total client number, the 11 birth countries contributing the largest numbers of foreign-born clients were Mexico, El Salvador, Guatemala, Honduras, Belize, Nicaragua, Jamaica, the Philippines, Peru, North Korea, and Cuba. Mexican-born clients (n=234) made up 62% of the foreign-born and 22% of the total HIV-positive clients seen. HIV prevalence among persons born in US territories (but categorized with foreign-born clients; n=209) was 2.4% (95% CI= 0.3%, 4.5%). These clients were from the West Indies/Caribbean (81%) and East Asia/ Pacific Island (19%) regions.

Foreign-born clients (mean age=29.8 years; 42% female) were similar in age and sex distribution to US-born clients (mean age=28.7 years; 38% female). They were far more likely to be Hispanic (87%, n=20197) than were US-born clients (14%, n=5416), who were predominately non-Hispanic Black (75%, n=28290). HIV prevalence among clients born outside of the United States (1.6%; 95% CI=1.5%, 1.8%) was similar to that of US-born clients (1.8%; 95% CI= 1.7%, 1.9%).

TABLE 1—Demographic Factors, HIV Prevalence, and Confidential HIV Test Acceptance Among US- and Foreign-Born Public STD Clinic Attendees: Los Angeles County, 1993–1999 (n = 61 120)

	US-Born	Foreign-Born
Birth region, no., % HIV+ (95% CI)		
Caribbean/West Indies	. . .	618; 2.9 (1.6, 4.2)
Central America/Mexico	. . .	20 208; 1.6 (1.4, 1.8)
East Asia/Pacific Islands	. . .	383; 0.5 (0.0, 1.2)
Europe/former USSR	. . .	519; 1.7 (0.6, 2.9)
North Africa/Middle East	. . .	121; 3.3 (0.0, 6.5)
Sub-Saharan Africa	. . .	316; 2.2 (0.6, 3.8)
South/Southeast Asia	. . .	574; 0.7 (0.0, 1.4)
South America	. . .	436; 1.6 (0.4, 2.8)
United States	37 810; 1.8 (1.7, 1.9)	
Total foreign-born		23 310;[a] 1.6 (1.5, 1.8)
Age, y		
Mean (SD)	28.6 (10.1)	29.8 (9.5)
Median (interquartile range)	26 (21–34)	28 (23–35)
Sex, %		
Male	62	58
Female	38	42
Racial/ethnic group, %[b]		
Asian/Pacific Islander	0.6	3.1
Black/non-Hispanic	75.0	5.8
Hispanic	14.0	87.0
Native American/Alaskan Indian	0.2	0.0
Other	0.4	1.2
White/non-Hispanic	9.1	3.1
Confidential HIV test acceptance, % (95% CI)	68.4 (68.0, 68.9)	76.5 (75.9, 77.0)

Note. CI = confidence interval; STD = sexually transmitted disease.
[a] Includes 135 clients not classified into regions because they were born in Canada (n = 63), Australia (n = 13), New Zealand (n = 4), or an incorrectly coded country (n = 55).
[b] Undetermined/unknown race for 0.09% of foreign-born and 0.62% of US-born clients.

TABLE 2—Crude HIV Prevalence and Adjusted Associations of Birth Region With HIV Seroprevalence Among Male and Female Public STD Clinic Attendees: Los Angeles County, 1993–1999 (n = 60 849[a])

Birth Region	Female Clients			Male Clients		
	N	Crude % HIV+	AOR[b] (95% CI)	N	Crude % HIV+	AOR[b] (95% CI)
Caribbean/West Indies	158	0.6	0.84 (0.12, 6.10)	458	3.7	1.10 (0.66, 1.80)
Central America/Mexico	8657	0.4	0.54 (0.36, 0.81)	11 462	2.5	0.92 (0.79, 1.10)
East Asia/Pacific Islands	193	0.0	[c]	186	1.1	0.36 (0.08, 1.50)
Europe/former USSR	161	0.6	0.94 (0.13, 6.80)	355	2.0	0.55 (0.25, 1.20)
North Africa/Middle East	23	0.0	[c]	98	4.1	1.60 (0.60, 4.50)
Sub-Saharan Africa	87	5.7	8.60 (3.40, 22.00)	229	0.9	0.27 (0.06, 1.10)
South/Southeast Asia	233	0.4	0.69 (0.09, 5.00)	340	0.9	0.26 (0.08, 0.82)
South America	171	0.6	0.84 (0.12, 6.10)	262	2.3	0.60 (0.26, 1.40)
All foreign-born[d]	9737	0.4	0.68 (0.37, 1.30)	13 471	2.5	1.30 (1.00, 1.60)
United States	14 326	0.6	1.00	23 315	2.6	1.00

Note. AOR = adjusted odds ratio; CI = confidence interval; STD = sexually transmitted disease.
[a]Information on sex was missing or discrepant for 271 clients.
[b]No HIV-positive clients in strata.
[c]AOR from multiple logistic regression of HIV seropositivity on birth region, controlling for age and behavioral risk group (i.e., men who reported ever having sexual intercourse with men, men who reported only having sexual intercourse with women, and persons who reported ever injecting drugs).
[d]Birth region not classified for 135 foreign-born clients.

Birth Region and HIV Status: Bivariate Analyses

As shown in Table 1, overall HIV prevalence was highest among clients from North Africa/Middle East (3.3%; 95% CI=0.0%, 6.5%) and the Caribbean/West Indies (2.9%; 95% CI=1.6%, 4.2%) and lowest among clients from East Asia/Pacific Islands (0.5%; 95% CI=0.0%, 1.2%). With the exception of clients born in sub-Saharan Africa, HIV prevalence was consistently higher among males than among females (Table 2). Relatively high prevalences were seen among males from North Africa/Middle East (4.1% HIV positive) and the Caribbean/West Indies (3.7% HIV positive) and among sub-Saharan African females (5.7% HIV positive). However, all prevalence estimates were imprecise in these small foreign-born subgroups. HIV prevalences among US-born males and females were 2.6% (95% CI=2.4%, 2.8%) and 0.6% (95% CI=0.5%, 0.7%), respectively.

Birth Region and HIV Status: Multivariate Analyses

As seen in Table 2, the association between being HIV positive and being born in sub-Saharan Africa remained strong for females after control for age and behavioral risk group (OR=8.6; 95% CI=3.4, 22.0). For males who emigrated from North Africa/Middle East, positive associations remained but were weak and imprecise. Males from all other regions except the Caribbean/West Indies had notably lower odds of infection than did US-born males. Central American/Mexican–born females had lower odds of infection than did US-born females (OR=0.54; 95% CI=0.36, 0.81).

Current Age, Age at Migration, and Years Since Migration

HIV-positive clients were on average older than HIV-negative clients, whether born in the United States (mean age=33.6 vs 28.5 years) or elsewhere (mean age=32.7 vs 29.8 years) (Table 3). Foreign-born HIV-positive clients were older when they immigrated by approximately 1.3 years (95% CI=0.3, 2.0) and had spent an average of 1.8 more years (95% CI=1.0, 2.7) in the United States compared with their HIV-negative counterparts (12.3 vs 10.4 years). The median number of years since immigration was 12.3 for HIV-positive foreign-born clients. Only 16% had immigrated within the previous 3 years.

Clients from sub-Saharan Africa diverged from these patterns, having immigrated at older ages and having spent fewer years in the United States relative to all other groups. HIV-positive sub-Saharan Africans were on average 5.0 years younger (95% CI for difference=−11.0, 0.9) than HIV-negative sub-Saharan Africans, had spent an average of 5.3 fewer years in the United States (95% CI for difference=−10.0, −0.5), and had moved to the United States when they were almost 4 years older than the average for foreign-born STD clients overall. The females had immigrated more recently than had the males, and those who tested HIV positive had lived in the United States for a notably shorter time period (mean=1.6 years).

DISCUSSION

This investigation is particularly relevant to urban areas that, like Southern California, have large and growing immigrant populations. An estimated 36% of Los Angeles County's residents are foreign-born,[16] and the county's immigrant population has more than doubled since the start of the AIDS epidemic.[17] Of the large Hispanic and Asian/Pacific Islander populations residing in Los Angeles County, 51% and 67%, respectively, were born outside the United States, as were significant proportions of the non-Hispanic White (13%) and Black (3.4%) populations.[16]

TABLE 3—Mean Current Age, Age at Immigration to United States, and Years in United States Among HIV-Positive and HIV-Negative Public STD Clinic Attendees, by Birth Region: Los Angeles County, 1993–1999 (n = 61 120)

Birth Region	HIV+, %	HIV−, %	Difference, %	95% CI for Difference
Caribbean/West Indies, mean y				
Current age	35.7	33.8	1.9	−3.60, 7.3
Age at immigration to US	20.5	20.2	0.3	−5.00, 5.6
Years in US	15.6	13.5	2.2	−2.80, 7.1
Central America/Mexico, mean y				
Current age	32.4	29.4	3.0	1.90, 4.0
Age at immigration to US	20.7	19.1	1.5	0.50, 2.6
Years in US	12.0	10.3	1.8	0.90, 2.6
East Asia/Pacific Islands, mean y				
Current age	34.0	31.1	2.9	−13.00, 19.0
Age at immigration to US	29.5	17.5	12.0	−6.70, 31.0
Years in US	4.5	13.4	−8.9	−21.00, 3.7
Europe/former USSR, mean y				
Current age	35.1	31.7	3.4	−3.80, 11.0
Age at immigration to US	17.1	21.1	−3.9	−13.00, 4.9
Years in US	16.3	10.5	5.8	−1.80, 13.0
North Africa/Middle East, mean y				
Current age	38.5	30.2	8.3	0.54, 17.0
Age at immigration to US	18.8	18.8	0.1	−9.70, 9.8
Years in US	19.8	11.4	8.4	−0.30, 17.0
Sub-Saharan Africa, mean y				
Current age	27.4	32.4	−5.0	−11.00, 0.9
Age at immigration to US	24.1	23.7	0.5	−5.20, 6.2
Years in US	3.3	8.6	−5.3	−10.00, −0.5
South/Southeast Asia, mean y				
Current age	30.5	31.0	−0.5	−12.00, 11.0
Age at immigration to US	16.8	18.4	−2.4	−16.00, 11.0
Years in US	13.0	12.1	0.9	−8.30, 10.0
South America, mean y				
Current age	36.1	33.5	2.7	−6.00, 11.0
Age at immigration to US	21.4	21.9	−0.4	−8.60, 7.7
Years in US	14.7	11.6	3.1	−4.10, 10.0
All foreign-born, mean y				
Current age	32.7	29.8	2.9	1.90, 3.9
Age at immigration to US	20.6	19.3	1.3	0.30, 2.3
Years in US	12.3	10.4	1.8	1.00, 2.7
United States, mean y				
Current age	33.6	28.5	5.1	4.40, 5.9

Note. CI = confidence interval; STD = sexually transmitted disease; US = United States; USSR = United Soviet Socialist Republics.

Our findings suggest a need to ensure that HIV prevention and treatment interventions reach African and possibly Caribbean and Middle Eastern immigrant communities, because they appear to be most heavily affected by HIV, and Central American/Mexican immigrant communities, because their populations are large and growing. Although Mexican-born clients were not more likely than US-born clients to be infected with HIV, they

contributed more foreign-born HIV-positive clients than all other countries combined, and Central American–born clients were second-highest in terms of numbers of both foreign-born clients and of HIV-positive clients contributed. Furthermore, large populations of at-risk and HIV-positive Hispanic immigrants reside in the US Southwest and many eastern US cities.[18]

As in many urban areas,[18,19] the Hispanic population of Los Angeles County experiences multiple challenges in accessing HIV services and prevention messages. Hispanics compose the largest racial/ethnic group in Los Angeles County[20]; however, more than half do not speak English fluently,[21] and an estimated 46% lack medical insurance.[22] More than 60% of foreign-born Hispanics have an annual household income of less than $25 000,[16] and local research indicates that HIV-infected foreign-born Hispanics generally are diagnosed with AIDS sooner after their HIV diagnosis than are US-born Hispanics or non-Hispanic Whites (personal communication, D. Fearman-Johnson, MPH, July 2002). Together with our findings, these data underscore the importance of HIV-related programs and prevention messages in Spanish and employing culturally competent Spanish-speaking health care providers.[7] Researchers and local health care providers have also noted a need for translators and other services for immigrants who speak languages other than Spanish, particularly indigenous Asian[23] and Central American[24] languages.

Our findings regarding age at and years since immigration are consistent with those of Decosas and Adrien, whose review of migration and HIV suggests that immigrants are placed at elevated HIV risk more often by conditions and circumstances in the countries to which they immigrate than by conditions and circumstances in their home countries.[25] HIV-positive clients from all but 2 regions had immigrated in their late teens or very early 20s and had lived in the United States for an average of 12 years. The median time between HIV infection and AIDS diagnosis in untreated cases is 10 to 12 years,[26–28] and the largest proportion of documented AIDS cases are reported in persons aged 30 through 39 years,[29] generally indicating HIV

infection during the clients' 20s. We therefore suggest that most of the HIV-positive STD clients in our study were infected after immigration to the United States. Noting that 64% of the foreign-born Hispanics had lived in the United States for more than 10 years, the authors of an interview survey of reported AIDS cases in Los Angeles arrived at a similar conclusion.[30]

We caution, however, that immigrants often travel back and forth between the United States and their birth countries,[31] where they might also become infected. Conditions that increase new immigrants' HIV risk include financial instability, relationship disruption, and unequal sex ratios resulting from sex-segregated migration patterns.[25] These factors can lead to increased partner changes, prostitution, and substance use, as well as inadequate access to health care.[25]

In contrast to the other foreign-born clients in our study, clients born in sub-Saharan Africa had immigrated at older ages and had spent fewer years in the United States. These divergent patterns probably resulted from the US Immigration Act of 1990, which fueled large increases in African immigration during the 1990s.[32] Given the extensive HIV/AIDS epidemic in sub-Saharan Africa,[15] it seems reasonable to assume that a majority of the HIV-positive clients from this region were infected in their countries of origin. Such an assumption is especially likely for female clients from the region, who tended to have emigrated more recently than their male counterparts. This factor may explain the elevated female : male HIV seropositivity ratio we observed.

Our study has several limitations. Because they are based on data collected from a highly selective population—public STD clinic clients—our findings may not generalize to other immigrants or to US-born individuals. Persons attending publicly funded STD clinics are likely to be young, people of color, uninsured, and poor.[33,34] Undocumented immigrants are also likely to be overrepresented in this setting; a local study found them less likely than legal residents to have access to other sources of health care.[35]

We were unable to examine other, potentially important aspects of immigration status. For example, we did not collect information on parents' or grandparents' birthplace for US-born clients or on acculturation level (i.e., level of adaptation and exposure to US cultural norms). Second- and third-generation immigrants often live in the same areas[2] and participate in many of the same social and sexual networks as first-generation immigrants[36]; therefore, their HIV risk may be closer to that of foreign-born persons than to that of other US citizens. Finally, although we were able to prevent duplication over time within clinics, in most cases we could not prevent duplication across clinics. However, the physical distances between the clinics studied can be quite substantial in Los Angeles County, where an overcrowded and incomplete bus and rail system provides inadequate public transportation.

Despite these limitations, the relative prevalences of HIV infection we identified across birth regions were generally consistent with research in other settings.[37–39] The numbers of HIV-positive STD clients contributed by each country also mirrored the relative numbers of AIDS cases in foreign-born residents reported to the Los Angeles County AIDS case registry.[30]

Although foreign-born STD clinic clients were not more likely than US-born clients to be HIV positive, immigrants are overrepresented among the poor and uninsured,[19] and elevated HIV prevalences in some foreign-born subgroups suggest that specific immigrant populations warrant special attention. Research to identify factors that elevate some immigrants' HIV risk and to evaluate whether HIV services meet the needs of the nation's large and growing foreign-born population will help target and maximize disease control efforts. ∎

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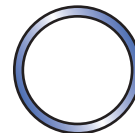*This article was accepted January 31, 2002.*

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