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HIV Care Outcomes Among Non-US-Born Persons with Diagnosed HIV Infection, 2019

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Abstract

Despite the improvements in HIV care outcomes in the United States (US), non-US-born persons continue to be disproportionately affected by HIV. We analyzed National HIV Surveillance System (NHSS) data on HIV diagnoses, stage 3 (AIDS) at diagnosis, linkage to medical care, and viral suppression for non-US-born persons by region of birth (RoB) reported to the (NHSS) in 2020 to determine care outcomes among this population. Overall, a larger proportion of non-US-born persons received a late-stage diagnosis [stage 3 (AIDS)] classification. Among all non-US-born persons, African-born males, Asian-born females, and persons aged 55 + years had the highest proportions of late-stage diagnosis. Despite a late-stage of diagnosis, a higher proportion of non-US-born persons were linked to medical care and were virally suppressed compared to US-born persons. HIV care outcomes varied by RoB and selected characteristics. Knowing the RoB of non-US-born persons is necessary to identify culturally sensitive approaches for prevention planning and increasing testing activities to ultimately increase early diagnosis in this population.

Keywords

Non-US-born; Immigrants; HIV care outcomes; Region of birth; Viral suppression; Linkage to medical care; Late-stage diagnosis (stage 3, AIDS)

Background

The United States Department of Health and Human Services launched the *Ending the HIV Epidemic in the United States* (EHE) initiative in 2019 with the aim of reducing new

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Declarations

Competing interests The authors have no competing interests to declare relevant to the content of this article.

Ethical Approval This study was deemed not to include human subjects research by the Institutional Review Board at the Centers for Diesease Control and Prevention.

HIV infections in the United States (US) by 90% by 2030. One of the main goals of EHE is to address racial, ethnic, and geographic disparities that have contributed to HIV prevention and care gaps [1]. Among persons living in the US, HIV disproportionately impacts non-US-born communities. In the period of 2010–2017, 19.0% of HIV diagnoses occurred among non-US-born persons [2], who in 2019 were estimated to represent 13.5% of the US population [3]. This disparity is highlighted even further when we consider that approximately one in every four HIV diagnoses among women and girls in the US during the same period were among non-US-born women, even though they represented only 13.7% of all women and girls in the US [4, 5]. Additionally, there is evidence from molecular epidemiologic studies on HIV transmission among non-US-born persons suggesting that most HIV infections among this population, except European-born, occur after immigrating to the US [6]. According to the US Census Bureau, non-US-born persons are the fastest-growing demographic group in the US. Non-US-born persons are projected to grow by 25 million people, from 44 million in 2016 to 69 million by 2060 [7]. Without targeted HIV screening and care initiatives, HIV infections could also increase among this group.

Studies assessing HIV screening and HIV care outcomes among this population have reported for several years that non-US-born persons enter medical care at a far more progressed stage of HIV, with a larger proportion at HIV stage 3 (AIDS) classification at the time of diagnosis than US-born persons [2, 4, 8–10]. Some of the reasons identified for late testing and late entry into HIV care for non-US-born individuals include structural and individual level barriers and challenges to assimilate into their new communities, such as navigating a complex health care system, low access to HIV testing resources, stigma, language barriers, lower education, and low income [11–13]. Far less is known about HIV care outcomes among non-US-born persons. One small study in Massachusetts that did not report country of birth (CoB) found similar levels of engagement in HIV care among non-US-born persons and US-born persons [12]. Another study reported that a higher percentage of non-US-born Black persons were retained in care and achieved viral suppression [10] than US-born Black persons, but no HIV care outcome data have been reported for other non-US-born populations.

Given the aim of EHE of reducing new HIV infections by 90% by 2030, it is important to understand these HIV outcomes among this population to determine what prevention and care initiatives need to be strengthened during the 2020–2030 period. In this analysis, we analyzed HIV surveillance data for persons who received a HIV diagnosis in 2019. We compared proportions of HIV diagnoses, stage 3 (AIDS), and HIV care outcomes [linkage to care, and viral suppression (VS) within 6 months of diagnosis] among non-US-born and US-born persons and compared differences by region of birth (RoB) [14].

Methods

This data collection activity was determined by the Centers for Disease Control and Prevention (CDC) to be a public health surveillance activity and review by CDC's Institutional Review Board was not required. We analyzed data from the National HIV Surveillance System (NHSS) for persons who received a diagnosis of HIV infection in 2019

and were reported to the CDC by December 2020. Data collected by state and local health departments on persons who received a HIV diagnosis are de-identified and sent to CDC. We analyzed data for persons aged ≥ 13 years reported from 45 jurisdictions (Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, the District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming) with complete laboratory reporting of test results associated with HIV infection in 2019.

We analyzed data on persons born outside the US (non-US-born) and persons born in the US (US-born). US-born included persons born in the US or 6 US dependent areas (America Samoa, Guam, the Northern Mariana Islands, Puerto Rico, the Republic of Palau, and the US Virgin Islands), non-US-born included persons born outside the US and 6 US dependent areas. Analyses on non-US-born persons were further stratified into five RoBs that were based on a person's reported CoB by using the United Nations Standard country or area codes for statistical use [15]. The RoBs were Africa, Asia, the Caribbean, Europe, and Latin America. To compare the differences in HIV care outcomes, we identified and selected the following characteristics: sex at birth (male or female); age at diagnosis in years (13–24, 25–34, 35–44, 45–54, 55+); transmission category (male-to-male sexual contact [MMSC], injection drug use, male-to-male sexual contact *and* injection drug use [MMSC/IDU], heterosexual contact); and population area of residence (metropolitan statistical areas [500,000+], metropolitan areas [50,000–499,999], non-metropolitan areas [< 50,000], and other/unknown) [16].

HIV stage 3 (AIDS) classification at the time of diagnosis was defined as documentation of an AIDS-defining condition or either a CD4 count of < 200 cells/μL or a CD4% of total lymphocytes of < 14 within 3 months after the diagnosis of HIV infection. Linkage to care was determined by documentation of ≥ 1 CD4 (count or percent) or viral load (VL) test performed ≤ 1 month after HIV diagnosis. VS was determined by a VL result of < 200 copies/mL at any time within 6 months of the HIV diagnosis. The analysis compared the percentage of HIV stage 3 (AIDS) within 3 months of diagnosis of HIV infection, percentage of linkage to medical care within 1 month of diagnosis, and VS within 6 months of diagnosis in 2019 among non-US-born persons and between US-born and non-US-born. To account for missing transmission categories, data were statistically adjusted using multiple imputation [17]. All analyses were performed in SAS 9.4.

Results

During 2019, of the 23,585 persons with diagnosed HIV infection that reported CoB, a total of 5,036 (21.4%) non-US-born persons and 18,549 (78.6%) US-born persons were reported to CDC from 45 jurisdictions with complete laboratory reporting (Table 1). Of the 4,578 total females with diagnosed HIV infection, 1,266 (27.7%) were non-US-born persons and 3,312 (72.3%) were US-born persons. Among the 19,007 males with diagnosed HIV, 3,770 (19.8%) were non-US-born persons and 15,237 (80.2%) were US-born persons.

Among the non-US-born persons, 47.9% were born in Latin America, 22.1% Caribbean, 18.2% Africa, 8.3% Asia, and 3.5% Europe. Additionally, countries in each RoB with the highest proportion of HIV diagnoses were Africa: Nigeria 13.4%, Asia: Philippines 24.3%, Caribbean: Haiti 32.0%, Europe: Russia 22.3%, and Latin America: Mexico 40.0% (Data not shown).

Overall, 26.0% of non-US-born persons received a late-stage diagnosis [stage 3 (AIDS)] compared to 19.0% of US-born persons (Fig. 1). The percentage of a late-stage diagnosis among non-US-born persons was highest among Asian-born persons (30.5%). By assigned sex at birth, Asian-born females (32.7%) and African-born males (32.1%) had the highest percent of late-stage diagnosis. Among all non-US-born age groups, the highest percentage of persons who received a late-stage diagnosis were persons aged 55 + years (35.1%). Proportions of late-stage diagnosis were also higher among non-US-born persons across all transmission categories and population areas of residence (Table 1).

Overall, 87.4% of non-US-born persons were linked to care compared to 81.3% of US-born persons. The lowest percentage of non-US-born persons linked to care were European-born persons (82.3%) (Table 2).

Overall, 77.1% of non-US-born persons achieved VS within six months of diagnosis compared to 68.1% of US-born persons. Among non-US-born persons, European-born persons (74.4%) had the lowest percent of VS. Among non-US-born persons living in metropolitan statistical areas, 77.7% had achieved VS compared to 68.7% of US-born persons living in the same areas, while among non-US-born persons living in metropolitan areas 75.7% achieved VS compared to 64.3% of US-born persons living in the same areas (Table 3).

Discussion

Our analysis of data on HIV diagnoses from the year 2019 found non-US-born persons continue to be disproportionately affected by HIV in terms of proportion of total cases and late-stage diagnosis. Our findings indicate that one in every four females and one in every five males with diagnosed HIV infection in the US during 2019, who reported CoB, were non-US-born persons. Likewise, our findings indicate that one in every four non-US-born persons with diagnosed HIV infection were classified as stage 3 (AIDS) at time of diagnosis. When we compared stage 3 (AIDS) at time of diagnosis to previous reports dating back to at least 2010 [10], our data support that disparities between non-US-born persons and US-born persons still persist. This situation is particularly concerning among non-US-born Asians, who have the highest percentage of late-stage diagnosis among non-US-born. Asians, despite the place of birth, also had the highest percentage of late-stage diagnosis in the US and 6 dependent areas in 2019 (24.7%) [18]. Stigma, structural, and individual factors create barriers to care for the Asian community [19], as they do in other minority American populations. Non-US-born Asians are comprised of many nationalities with different cultural identities and continuing specific awareness days such as National Asian and Pacific Islander HIV/AIDS Awareness Day can better reach these communities. Since 2010, Asian immigrants have surpassed Hispanic/Latino persons in terms of new

arrivals to the US and are projected to become the largest immigrant group in the US by 2055 [20], highlighting the importance of increasing HIV prevention efforts among this population is important.

As noted, disparities related to late-stage diagnosis between non-US-born persons and US-born persons exist across all transmission categories for all groups of non-US-born persons, except for those born in Europe. European-born persons likely acquired HIV after migrating to the US [21], making them likely to test and get medical care early in the course of the infection. Overall, in 2019 disparities were observed between non-US-born persons and US-born persons among the two largest transmission categories (heterosexual contact and MMSC). By transmission category, the percentage of late-stage diagnoses among persons whose infection was attributed to heterosexual contact was 29.8% among non-US-born persons and 23.0% among US-born persons. The percentage of late-stage diagnoses among persons whose infection was attributed to MMSC was 23.0% among non-US-born persons and 17.8% among US-born persons. Outreach in community settings, such as cultural festivals, bars, and shelters, etc., sponsored by community-based organizations, can be set up at local events to increase HIV awareness by providing screening among disproportionately affected groups [22].

NHSS data show the disparities that non-US-born population face in the US. The fear of deportation among undocumented non-US-born, language barriers, and HIV stigma can affect whether they seek and receive high-quality health services, including HIV testing, treatment, and other prevention services [23]. However, there are efforts to reduce HIV stigma that support community partnerships. Some of CDC's efforts included awarding $12 million to support the development of state and local EHE programs in the US in 2019, funding the National Alliance of State and Territorial AIDS Directors (NAS-TAD) with $1.5 million per year to support strategic partnerships, community engagement, peer-to-peer technical assistance, planning efforts, and funding the *Let's Stop HIV Together (Detengamos Juntaos el VIH)* campaign. This campaign reduces HIV stigma (estigma), promote HIV testing (prueba), prevention (prevención), and treatment (tratamiento) to meet the cultural needs of Hispanic/Latino people.

Although non-US-born persons are not a monolithic group, in 2016, nearly 55% lived in four states; California, Texas, New York, and Florida [24], and in 2018, 64% lived in 20 major metropolitan areas, where access to resources varied [25]. It is important that health departments in at least these four states include in their EHE testing strategies increased HIV testing efforts for non-US-born persons. This can reduce testing disparities among non-US-born persons.

In terms of the linkage to care and viral suppression findings the story is different. Our data show that once the HIV diagnosis is made, the non-US-born population fares better on these two HIV care outcomes compared to the US-born population. Although more evidence is needed to understand why this is occurring, global public health campaigns on HIV education, knowledge, and advocacy such as the President's Emergency Plan for AIDS Relief (*PEPFAR*) might make the non-US-born population more aware of the importance of linkage to care and viral suppression. Another potential reason could be

non-US-born persons have higher proportions of persons who have more advanced HIV infection when diagnosis is made so they may be more likely to get into care immediately than US-born. Also, there could be community-based organizations that work specifically with non-US-born populations to get them care and support. Our linkage to care data indicate that non-US-born populations with diagnosed HIV infection in 2019 had surpassed the 85% linkage to care objective of the National HIV/AIDS Strategy (NHAS) 2020 [26]. However, more progress needs to be made to achieve the 95% linkage to care EHE target and updated NHAS 2022–2025 objective [27]. The current EHE strategy uses the NHAS 2022–2025 targets to monitor progress towards these HIV care outcomes. Only Asian-born and European-born females reported lower linkage to care percentages than their US-born counterparts, but because of the small numbers of females with diagnosed HIV infection from these two regions, our data should be interpreted with caution. Similarly, disparities in terms of linkage to care and viral suppression appear to exist among European-born individuals and US-born for some age and transmission categories. (Tables 2 and 3) These disparities need to be further explored. The fact that one in almost four cases among European-born persons come from individuals born in Russia, and the HIV epidemic in Russia continues to expand [28] primarily among persons who inject drugs, could mean that our data are identifying an early warning signal, especially considering that the US is going through an ongoing opioid epidemic [29].

We acknowledge some limitations of using HIV surveillance data. First, the analysis was limited to 45 US jurisdictions with complete laboratory reporting during one year of data analysis; these may not be representative of all non-US-born persons living with diagnosed HIV infection in the US during the study period. Second, the CD4 and viral load test results might have been underreported to HIV surveillance programs, which can make it difficult to monitor HIV care outcomes. Third, some transmission categories and population areas of residence have small cell sizes which make the results difficult to interpret. Fourth, diagnoses were included only for individuals with complete CoB data. Individuals with missing data on CoB were excluded from the analysis, therefore there may be under representation of proportions by people's RoB. Despite these limitations, these data serve as a benchmark as this is the first study that reports HIV clinical outcomes from US and 6 dependent areas on non-US-born persons with diagnosed HIV infection and by region of birth.

Conclusion

As previously mentioned, studies assessing HIV screening among non-US-born persons have reported a much larger proportion of HIV stage 3 (AIDS) at diagnosis than US-born. Our findings indicate that in 2019, the overall percentage of stage 3 (AIDS) at time of diagnosis among non-US-born individuals continues to be higher than among US-born persons. States and major metropolitan areas where significant numbers of non-US-born persons live may need to increase their HIV testing efforts among this community to meet EHE objectives. Monitoring the proportion of HIV diagnoses and care outcomes by RoB among the non-US-born population is important in reducing HIV infections, informing HIV prevention services, and helping gauge progress towards national goals among this highly vulnerable population.

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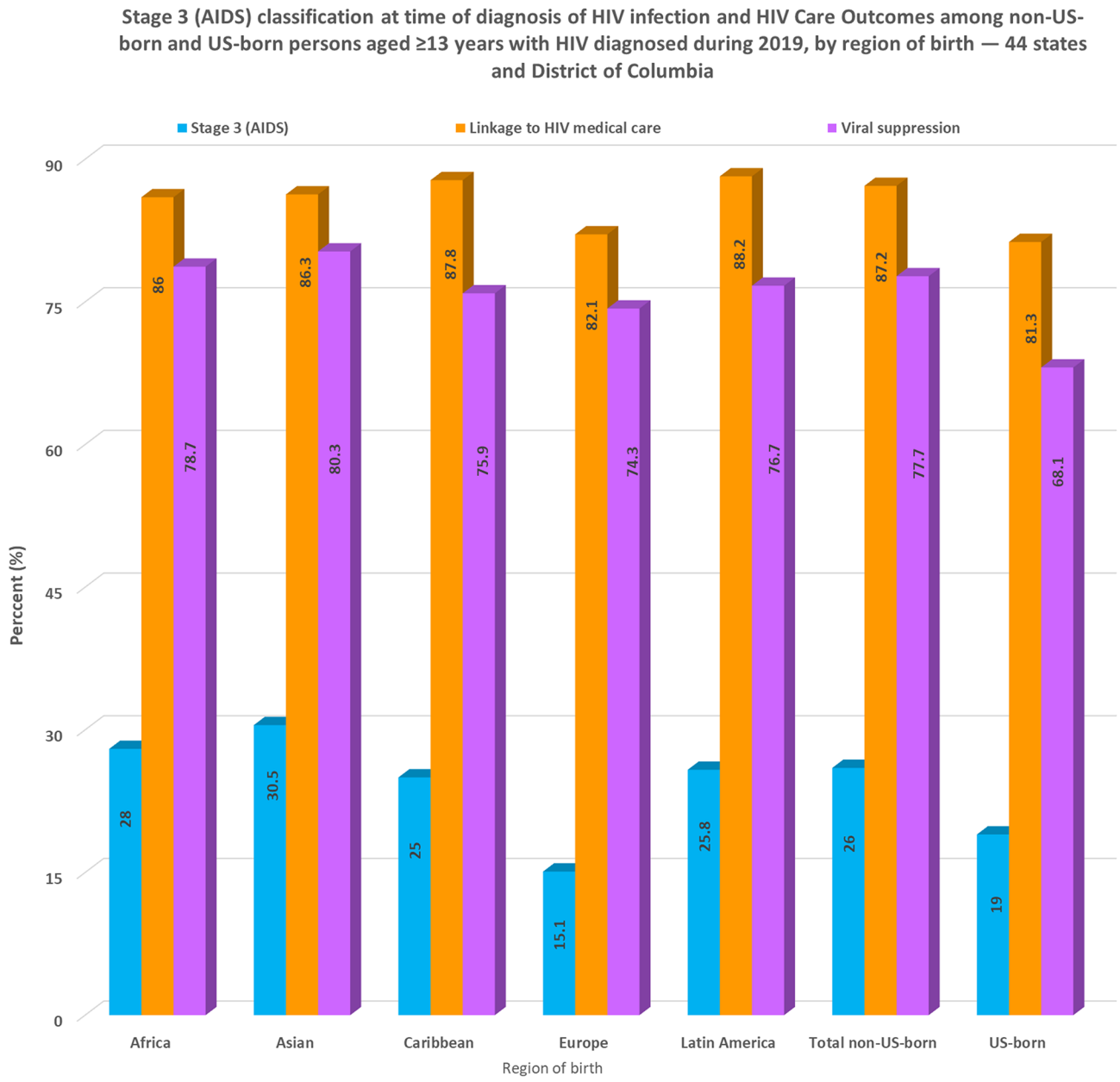

Stage 3 (AIDS) classification at time of diagnosis of HIV infection was measured by a documentation of an AIDS-defining condition or either a CD4 count of <200 cells/μL or a CD4 percentage of total lymphocytes of <14.
Linkage to HIV medical care was measured by a documentation of ≥1CD4 (count or percentage) or viral load tests performed ≤1 month after HIV diagnosis during 2019.
Viral suppression within 6 months of diagnosis is defined as having a viral load result of <200 copies/mL within 6 months of HIV diagnosis during 2019.

Fig. 1.

Stage 3(AIDS) classification at time of diagnosis of HIV infection and HIV Care Outcomes of non-US-born and US-born persons aged ≥ 13 years with HIV diagnosed during 2019, by region of birth – 44 states and District of Columbia

Table 1

Stage 3 (AIDS)[a] at time of HIV diagnosis during 2019 among non-US-born and US-born persons aged ≥ 13 years, by region of birth[b] and selected characteristics — 44 states[c] and the District of Columbia, United States, 2019

Characteristics	Africa			Asia			Caribbean			Europe			Latin America			Total non-US-born			US-born		
	Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)	
	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%
Sex at birth																					
Female	524	131	25.0	55	18	32.7	352	85	24.1	36	9	25.0	299	74	24.7	1,266	317	25.0	3,312	626	18.9
Male	393	126	32.1	361	109	30.2	762	193	25.3	143	18	12.6	2,111	548	26.0	3,770	994	26.4	15,237	2,899	19.0
Age at diagnosis (yr)																					
13–24	82	19	23.2	61	13	21.3	121	16	13.2	13	1	7.7	325	38	11.7	602	87	14.5	4,313	334	7.7
25–34	196	44	22.4	131	33	25.2	285	51	17.9	64	6	9.4	910	211	23.2	1,586	345	21.8	6,803	1,057	15.5
35–14	270	87	32.2	106	33	31.1	252	65	25.8	52	9	17.3	668	190	28.4	1,348	384	28.5	3,222	777	24.1
45–54	192	56	29.2	75	29	38.7	220	62	28.2	32	7	21.9	360	123	34.2	879	277	31.5	2,341	734	31.4
≥55	177	51	28.8	43	19	44.2	236	84	35.6	18	4	22.2	147	60	40.8	621	218	35.1	1,870	623	33.3
Transmission category[d,e]																					
Male-to-male sexual contact	195	52	26.7	312	88	28.2	535	104	19.4	120	14	11.7	1,854	436	23.5	3,016	694	23.0	12,262	2,178	17.8
Injection drug use	30	12	40.0	15	6	40.0	27	9	33.3	4	1	27.5	49	20	40.8	125	48	38.5	1,426	289	20.3
Male	11	5	45.5	11	5	45.5	15	7	46.7	3	0	0	36	16	44.4	76	33	43.6	756	186	24.6
Female	19	7	36.8	4	1	25.0	12	2	16.7	1	1	100.0	13	4	30.8	49	15	30.6	670	103	15.4
Male-to-male sexual contact with injection drug use	5	1	20.0	10	6	60.0	9	2	22.2	5	1	20.0	38	12	31.6	67	22	32.8	886	141	15.9
Fleterosexual contact[f]	676	185	27.4	76	27	35.5	543	163	30.0	48	11	22.9	465	153	32.9	1,808	539	29.8	3,952	910	23.0
Male	177	64	36.2	26	10	38.5	203	80	39.4	14	3	21.4	181	83	45.9	601	240	39.9	1,317	389	29.5
Female	499	121	24.2	50	17	34.0	340	83	24.4	34	8	23.5	284	70	24.6	1,207	299	24.8	2,635	521	19.8
Population area of residence																					

Characteristics	Africa			Asia			Caribbean			Europe			Latin America			Total non-US-born			US-born		
	Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)		Total	Stage 3 (AIDS)	
	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%
Metropolitan statistical areas (500,000+)	817	227	27.8	375	114	30.4	1,039	255	24.5	158	22	13.9	2,158	550	25.5	4,547	1,168	25.7	14,489	2,638	18.2
Metropolitan area (50,000–499,999)	58	16	27.6	26	6	23.1	54	18	33.3	14	3	21.4	152	47	30.9	304	90	29.6	2,523	526	20.8
Nonmetropolitan area (< 50,000)	32	12	37.5	11	5	45.5	18	5	27.8	6	2	33.3	82	23	28.0	149	47	31.5	1,267	321	25.3
Other/unknown	10	2	20.0	4	2	50.0	3	0	0	1	0	0	18	2	11.1	36	6	16.7	270	40	14.8
Total	**917**	**257**	**28.0**	**416**	**127**	**30.5**	**1,114**	**278**	**25.0**	**179**	**27**	**15.1**	**2,410**	**622**	**25.8**	**5,036**	**1,311**	**26.0**	**18,549**	**3,525**	**19.0**

[a] Opportunistic illness or CD4 + T-lymphocyte count<200 cells/μL or < 14% percentage (i.e., AIDS-defining condition)

Note. Stage of disease at time of HIV diagnosis is based on the first CD4 test performed or documentation of an AIDS-defining condition ≤ 3 months after a diagnosis of HIV infection. Data are based on residence at time of diagnosis. Data not provided for states and associated counties that do not have laws requiring reporting of all CD4 and viral loads, or that have incomplete reporting of laboratory data to CDC. Areas without laws: Idaho and New Jersey. Areas with incomplete reporting: Kansas, Kentucky, Pennsylvania, Vermont, and Puerto Rico

[b] Based on the United Nations, Methodology Standard country, or area codes for statistical use (M49). https://unstats.un.org/unsd/methodology/m49/overview,1999

[c] Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming

[d] Data have been statistically adjusted to account for missing transmission category; therefore, values may not sum to subtotals and total

[e] Includes persons whose infection was attributed to hemophilia, blood transfusion, perinatal exposure, or whose risk factor was not reported or not identified

[f] Heterosexual contact with a person known to have, or with a risk factor for, HIV infection

Table 2

Linkage to HIV medical care within 1 month of diagnosis during 2019 among non-US-born and US-born persons aged ≥ 13 years, by region of birth[a] and selected characteristics — 44 states[b] and the District of Columbia, United States, 2019

Characteristics	Africa			Asia			Caribbean			Europe			Latin America			Total non-US-born			US-born		
	Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care	
	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%
Sex at birth																					
Female	524	455	86.8	55	43	78.2	352	301	85.5	36	26	72.2	299	260	87.0	1,266	1,085	85.7	3,312	2,645	79.9
Male	393	334	85.0	361	316	87.5	762	677	88.8	143	121	84.6	2,111	1,866	88.4	3,770	3,314	87.9	15,237	12,442	81.7
Age at diagnosis (yr)																					
13–24	82	67	81.7	61	55	90.2	121	108	89.3	13	8	61.5	325	286	88.0	602	524	87.0	4,313	3,420	79.3
25–34	196	164	83.7	131	119	90.8	285	251	88.1	64	50	78.1	910	800	87.9	1,586	1,384	87.3	6,803	5,508	81.0
35–14	270	238	88.1	106	86	81.1	252	221	87.7	52	45	86.5	668	599	89.7	1,348	1,189	88.2	3,222	2,638	81.9
45–54	192	162	84.4	75	65	86.7	220	191	86.8	32	30	93.8	360	310	86.1	879	758	86.2	2,341	1,962	83.8
≥55	177	158	89.3	43	34	79.1	236	207	87.7	18	14	77.8	147	131	89.1	621	544	87.6	1,870	1,559	83.4
Transmission category[c,d]																					
Male-to-male sexual contact	195	164	84.1	312	275	88.1	535	483	90.3	120	102	85.0	1,854	1,640	88.5	3,016	2,664	88.3	12,262	10,100	82.4
Injection drug use	30	25	83.3	15	13	86.7	27	24	88.9	4	2	50.0	49	42	85.7	125	106	84.8	1,426	1,081	75.8
Male	11	9	81.8	11	10	90.9	15	13	86.7	3	1	33.3	36	31	86.1	76	64	84.2	756	581	76.9
Female	19	16	84.2	4	3	75.0	12	11	91.7	1	1	100.0	13	11	84.6	49	42	85.7	670	500	74.6
Male-to-male sexual contact with injection drug use	5	4	80.0	10	9	90.0	9	8	88.9	5	4	80.0	38	31	81.6	67	56	83.6	886	713	80.5
Heterosexual contact[e]	676	587	86.8	76	62	81.6	543	461	84.9	48	37	77.1	465	408	87.7	1,808	1,555	86.0	3,951	3,173	80.3
Male	177	153	86.4	26	22	84.6	203	172	84.7	14	13	92.9	181	161	89.0	601	521	86.7	1,317	1,034	78.5
Female	499	434	87.0	50	40	80.0	340	289	85.0	34	24	70.6	284	247	87.0	1,207	1,034	85.7	2,634	2,139	81.2
Population area of residence																					

Characteristics	Africa			Asia			Caribbean			Europe			Latin America			Total non-US-born			US-born		
	Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care		Total	Linkage to Care	
	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%
Metropolitan statistical areas (500,000+)	817	701	85.8	375	323	86.1	1,039	916	88.2	158	132	83.5	2,158	1,906	88.3	4,547	3,978	87.5	14,489	11,832	81.7
Metropolitan area (50,000–499,999)	58	53	91.4	26	22	84.6	54	45	83.3	14	9	64.3	152	137	90.1	304	266	87.5	2,523	2,048	81.2
Nonmetropolitan area (< 50,000)	32	29	90.6	11	10	90.9	18	15	83.3	6	6	100.0	82	71	86.6	149	131	87.9	1,267	1,002	79.1
Other/unknown	10	6	60.0	4	4	100.0	3	2	66.7	1	0	0	18	12	66.7	36	24	67.8	270	205	75.9
Total	**917**	**789**	**86.0**	**416**	**359**	**86.3**	**1,114**	**978**	**87.8**	**179**	**147**	**82.3**	**2,410**	**2,126**	**88.2**	**5,036**	**4,399**	**87.4**	**18,549**	**15,087**	**81.3**

Note. Data are based on residence at time of diagnosis. Data not provided for states and associated counties that do not have laws requiring reporting of all CD4 and viral loads, or that have incomplete reporting of laboratory data to CDC. Areas without laws: Idaho and New Jersey. Areas with incomplete reporting: Kansas, Kentucky, Pennsylvania, Vermont, and Puerto Rico

[a] Based on the United Nations, Methodology Standard country, or area codes for statistical use (M49). https://unstats.un.org/unsd/methodology/m49/overview,1999

[b] Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming

[c] Data have been statistically adjusted to account for missing transmission category; therefore, values may not sum to subtotals and totals

[d] Includes persons whose infection was attributed to hemophilia, blood transfusion, perinatal exposure, or whose risk factor was not reported or not identified

[e] Heterosexual contact with a person known to have, or with a risk factor for, HIV infection

Table 3

HIV viral suppression within 6 months of diagnosis during 2019 among non-US-born and US-born persons aged ≥ 13 years, by region of birth[a] and selected characteristics — 44 states[b] and the District of Columbia, United States, 2019

Characteristics	Africa			Asia			Caribbean			Europe			Latin America			Total non-US-born			US-born	
	Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression	
	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%
Sex at birth																					
Female	524	419	80.0	55	40	72.7	352	259	73.6	36	26	72.2	299	226	75.6	1,266	970	76.6	3,312	2,203	66.5
Male	393	303	77.1	361	294	81.4	762	587	77.0	143	107	74.8	2,111	1,623	76.9	3,770	2,914	77.3	15,237	10,434	68.5
Age at diagnosis (yr)																					
13–24	82	61	74.4	61	53	86.9	121	92	76.0	13	7	53.8	325	257	79.1	602	470	78.1	4,313	2,965	68.7
25–34	196	155	79.1	131	110	84.0	285	229	80.4	64	43	67.2	910	701	77.0	1,586	1,238	78.1	6,803	4,626	68.0
35–4	270	215	79.6	106	85	80.2	252	184	73.0	52	44	84.6	668	523	78.3	1,348	1,051	78.0	3,222	2,166	67.2
45–54	192	151	78.6	75	57	76.0	220	166	75.5	32	26	81.3	360	263	73.1	879	663	75.4	2,341	1,605	68.6
≥55	177	140	79.1	43	29	67.4	236	175	74.2	18	13	72.2	147	105	71.4	621	462	74.4	1,870	1,275	68.2
Transmission category[c,d]																					
Male-to-male sexual contact	195	159	81.5	312	255	81.7	535	427	79.8	120	93	77.5	1,854	1,458	78.6	3,016	2,392	79.3	12,262	8,582	70.0
Injection drug use	30	23	76.7	15	11	73.3	27	20	72.2	4	1	30.0	49	28	57.1	125	83	66.2	1,426	793	55.6
Male	11	9	81.8	11	8	72.7	15	11	70.7	3	0	0	36	19	52.8	76	47	61.6	756	428	56.6
Female	19	14	73.7	4	3	75.0	12	9	74.2	1	1	100.0	13	9	69.2	49	36	73.3	670	365	54.5
Male-to-male sexual contact with injection drug use	5	4	80.0	10	9	90.0	9	7	81.1	5	3	60.0	38	26	68.4	67	49	73.6	886	567	64.0
Fleterosexual contact[e]	676	528	78.1	76	58	76.3	543	391	72.0	48	33	68.8	465	333	71.6	1,808	1,343	74.3	3,952	2,676	67.7
Male	177	127	71.8	26	21	80.8	203	142	69.9	14	9	64.3	181	118	65.2	601	417	69.4	1,317	845	64.2
Female	499	401	80.4	50	37	74.0	340	249	73.3	34	24	70.6	284	215	75.7	1,207	926	76.7	2,635	1,831	69.5
Population area of residence																					

Characteristics	Africa			Asia			Caribbean			Europe			Latin America			Total non-US-born			US-born	
	Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression		Total	Viral Suppression	
	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%
Metropolitan statistical areas (500,000+)	817	645	78.9	375	299	79.7	1,039	797	76.7	158	119	75.3	2,158	1,671	77.4	4,547	3,531	77.7	14,489	9,959	68.7
Metropolitan area (50,000–499,999)	58	49	84.5	26	22	84.6	54	37	68.5	14	8	57.1	152	114	75.0	304	230	75.7	2,523	1,622	64.3
Nonmetropolitan area (<50,000)	32	21	65.6	11	11	100.0	18	10	55.6	6	6	100.0	82	53	64.6	149	101	67.8	1,267	869	68.6
Other/unknown	10	7	70.0	4	2	50.0	3	2	66.7	1	0	0	18	11	61.1	36	22	61.7	270	187	69.3
Total	**917**	**722**	**78.7**	**416**	**334**	**80.3**	**1,114**	**846**	**75.9**	**179**	**133**	**74.4**	**2,410**	**1,849**	**76.7**	**5,036**	**3,884**	**77.1**	**18,549**	**12,637**	**68.1**

Note. Data are based on residence at time of diagnosis. Data not provided for states and associated counties that do not have laws requiring reporting of all CD4 and viral loads, or that have incomplete reporting of laboratory data to CDC. Areas without laws: Idaho and New Jersey. Areas with incomplete reporting: Kansas, Kentucky, Pennsylvania, Vermont, and Puerto Rico

[a] Based on the United Nations, Methodology Standard country, or area codes for statistical use (M49). https://unstats.un.org/unsd/methodology/m49/overview,1999

[b] Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming

[c] Data have been statistically adjusted to account for missing transmission categories; therefore, values may not sum to subtotals and total

[d] Includes persons whose infection was attributed to hemophilia, blood transfusion, perinatal exposure, or whose risk factor was not reported or not identified

[e] Heterosexual contact with a person known to have, or with a risk factor for, HIV infection