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HIV care and treatment of American Indians/Alaska natives with diagnosed HIV infection – 27 states and the District of Columbia, 2012

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Abstract

The objective of this study was to measure linkage to care, retention in care, and suppressed viral load (VL) among American Indians/Alaska Natives (AIs/ANs) aged $\geq$13 years with diagnosed HIV infection. We used national HIV case surveillance data to measure linkage to care, defined as $\geq$1 CD4 *or* VL test $\leq$1 month after HIV diagnosis during 2013; retention in care, defined as $\geq$2 CD4 *or* VL tests $\geq$3 months apart during 2012; and suppressed VL, defined as <200 copies/mL at the most recent VL test during 2012. In 2013, 74.1% of AIs/ANs were linked to care. At year-end 2012, 46.9% of AIs/ANs were retained in care and 45.1% were virally suppressed. A lower percentage of females (41.3%), compared with males (46.5), were virally suppressed. By age group, the lowest percentage of virally suppressed AIs/ANs (37.5%) were aged 13–34 years. To improve individual health and to prevent HIV among AIs/ANs, outcomes must improve – particularly for female AIs/ANs and for AIs/ANs aged 13–34 years. Screening for HIV infection in accordance with Centers for Disease Control and Prevention's testing recommendations can lead to improvements along the continuum of HIV care.

Keywords
Epidemiology, highly active antiretroviral therapy, HIV, North America, prevention

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In response to endemic HIV infection in the United States, the White House developed the National HIV/AIDS Strategy (NHAS), which proposed 'The United States will become a place where new HIV infections are rare and when they do occur, every person…will have unfettered access to high quality, life-extending care, free from stigma and discrimination.'[1] Data from the National HIV Surveillance System (NHSS) are used to measure progress toward NHAS goals[2] and may be used to compare established objectives with HIV care and treatment outcomes among all residents of the US, including American Indians/Alaska Natives (AIs/ANs).

Our study focuses on AIs/ANs because: representatives from AI/AN communities have called on the Centers for Disease Control and Prevention (CDC) to improve the quality of HIV surveillance data and use the data to inform public health action;[3] the US Government assumed a 'trust responsibility' to promote the health status of AIs/ANs in exchange for vast land cessions that undermined the basis of traditional living;[4] and AIs/ANs are among populations at risk but that have a low national burden of HIV, and therefore in need of high-impact prevention to achieve

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NHAS goals (The White House Office of National AIDS Policy,[1] p.19). AIs/ANs are defined as persons having origins in any of the original peoples of North, South, or Central America and who maintain tribal affiliation or community attachment.[5] Because NHSS adheres to the US Office of Management and Budget standards for collection of race data, and NHSS uses US Census data to determine population sizes, we use the term 'AIs/ANs' as defined by the US Census. Rather than using this term, others prefer alternatives including 'Native Americans'.

The HIV Care Continuum Initiative addresses suitable measurements of progress among AIs/ANs toward NHAS goals.[6] The five steps of the continuum are (1) diagnosis of HIV infection; (2) linkage to care; (3) retention in care; (4) prescription of antiretroviral (ARV) treatment; and (5) achievement of viral suppression.[7] Unfavorable measurements at any step in the continuum can negatively affect measurements at successive steps. Indicators of progress in achieving NHAS goals for the care of persons living with diagnosed HIV infection include ≥85% linked to care within one month after diagnosis; ≥90% retained in care; and ≥80% virally suppressed (The White House Office of National AIDS Policy,[1] p.49–57). Measuring and monitoring these outcomes for AIs/ANs are recommended actions of NHAS. Improved linkage to, and retention in, HIV care can lead to viral suppression among AIs/ANs, thereby improving the quality of life for those already infected,[8] and decreasing the number of new infections.[9]

According to the 2010 census, 2.9 million people in the United States indicated their race as AI/AN (alone, not in combination with one or more other races). AIs/ANs represented approximately 1% of the general population, similar to the proportion of persons with HIV reported to NHSS and classified as AI/AN.[5,10] In NHSS, records indicating AI/AN race alone are classified as 'AI/AN' while records indicating AI/AN race in combination with other races are classified as 'multiple races' (CDC,[11] p.4.3). During 2000–2010, the rate of population growth among AIs/ANs (18%) was nearly twice the rate of overall growth of the US population (10%).[5]

AIs/ANs experience multiple health inequities, including elevated rates of tuberculosis, alcoholism, obesity (and diabetes), commercial tobacco use (and cancer), unintentional injuries, homicide, and suicide.[12–16] During 2005–2010, 79% of AIs/ANs remained alive 36 months after a classification of HIV infection, stage 3 (AIDS) (lowest of all races, and compared with 84% among all race/ethnicity groups combined) (CDC,[17] p.90). Patients with advanced immunosuppression (i.e. infection classified as stage 3 [AIDS][18]) at diagnosis of HIV infection have poorer prognoses than do those at a less severe stage of infection at diagnosis.[19] In 2014, approximately 20% of diagnoses of HIV infection among AIs/ANs were classified as stage 3 (AIDS) (compared with 24% among all race/ethnicity groups combined). By race, a care continuum analysis of women living with diagnosed HIV infection at year-end 2011 showed that AI/AN women had the least favorable viral suppression.[20] Inequities also include high rates of sexually transmitted infections,[21] a surrogate marker of elevated HIV risk in a community and a facilitator of HIV transmission.[22] During 2007–2010, higher chlamydia case rates among AIs/ANs in 10 of 12 (83%) Indian Health Service (IHS) areas and higher rates of infectious syphilis in four (25%) IHS areas were reported compared with rates among all races/ethnicities (Walker et al.,[21] p.488).

Increasing trends in the estimated number of new diagnoses of HIV infection and prevalence among AIs/ANs highlight the importance of achieving care continuum goals for this population. During 2010–2014, the rates of diagnoses among AIs/ANs increased from 7.8 per 100 000 to 9.5 per 100 000 (+22%) in the US (CDC,[17] p.18). By transmission category among AIs/ANs, 65% (142) of diagnoses in 2014 were attributed to male-to-male sexual contact, 21% (46) to heterosexual contact, and 11% (24) to injection drug use (CDC,[17] p.26). By year-end 2013, about 930,000 persons were living with diagnosed HIV infection, and the overall prevalence rate was 295.1 per 100 000 US residents (CDC,[11] p.100). By year-end 2013, nearly 3000 AIs/ANs were living with diagnosed HIV infection, and the prevalence rate was 123.2 per 100,000. The highest prevalence rate was among Blacks/African Americans (1018.1/100,000) and the lowest among Asians (70.9/100,000). As evidenced by the number of new HIV diagnoses, AIs/ANs are becoming vulnerable to HIV infection (CDC,[17] pp.18–21).

Using NHSS case surveillance data statistically adjusted for missing risk factor information,[23] we determined the numbers and percentages of adult and adolescent (aged ≥13 years) AIs/ANs with diagnosed HIV infection who were linked to HIV care, retained in care, and virally suppressed. Our objectives were to measure linkage to care among AIs/ANs with HIV infection diagnosed during 2013 and retention in care and viral suppression among AIs/ANs whose infection had been diagnosed by year-end 2011 and who were living at year-end 2012, and to compare these outcomes with NHAS 2020 goals.

Methods

Because linkage to care is an event expected to happen swiftly after diagnosis and the number of included jurisdictions increased over time, we only measured linkage for the most recent year available (2013). Because retention and viral suppression are events expected to happen from the time of diagnosis until death among persons living with HIV infection, we included all prevalent cases for the most recent year available (2012). To account for delays in lab and death reporting, prevalence estimates lag one year behind estimated number of diagnoses. Data reported to NHSS through December 2014 were used to account for delays in the reporting of laboratory results and deaths.

As of December 2014, 28 jurisdictions (27 states and the District of Columbia) met the following standards for complete reporting of CD4 and viral load (VL) test results to NHSS: the jurisdiction's laws/regulations required the reporting of all CD4 and VL results to the state or local health department; laboratories that perform HIV-related testing for the jurisdiction had reported $\geq$95% of HIV-related test results to the state or local health department; and by 31 December 2014, the jurisdiction had reported to CDC $\geq$95% of all CD4 and VL test results received. The 28 jurisdictions were Alabama, Alaska, Arkansas, California, the District of Columbia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Michigan, Missouri, Nebraska, New Hampshire, New York, North Dakota, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin.

These laboratory data are collected by state and local health department staff as part of routine public health communicable disease surveillance, and transmitted to CDC without personal identifiers (e.g. patient names, social security numbers). The IHS is a major source of healthcare for AI/ANs. However, IHS staff contributed to data collection only indirectly by routine case and lab reporting to public health officials. Of all documents in NHSS, 2% (667,000) originate from IHS facilities.

The data on linkage to HIV care were based on persons whose infection was diagnosed during 2013 and who resided in any of the 28 jurisdictions at the time of diagnosis. Linkage to care was measured by documentation of $\geq$1 CD4 (cell count or percentage) or VL test performed $\leq$1 month after HIV diagnosis, including tests performed during the month of diagnosis. Retention in HIV care and viral suppression was measured among persons who resided in any of the 28 jurisdictions at the time of diagnosis, were living with diagnosed HIV infection at year-end 2012, and whose infection was diagnosed by year-end 2011. Retention was defined as $\geq$2 CD4 or VL tests performed $\geq$3 months apart during 2012, and viral suppression was defined as a VL test result of <200 copies/mL at the most recent VL test during 2012 (Hall et al.,[7] p.1339). If multiple VL tests were performed during the same month and could thus qualify as 'most recent,' the highest VL (most severe) was selected. If the numerical result was missing or the result was a logarithmic value, the interpretation of the result (e.g. below limit) was used to determine viral suppression.

For these three outcomes (linkage, retention, and viral suppression), we tabulated results by sex, age group, and transmission category. Selecting the group with the highest percentage linked to care as referent, Chi square tests were used to look for differences by these demographic and behavioral variables. Statistically significant differences would be evident where p values <0.05. The data represent all diagnoses among residents of jurisdictions included in the analyses represented a census of the study population, and include all case and laboratory reports from this subset of the United States. Therefore, inter-group differences for retention and viral suppression were assessed by calculating prevalence ratios (PRs) with 95% confidence intervals (CIs).

CDC promotes nationwide collection of transgender data for HIV surveillance. The NHSS variable *current_gender* is defined as 'The person's current gender identity ... Transgender persons have a gender identity ... that does not match their sex assigned at birth' (CDC,[11] p.3.37). *Two-Spirit* is a modern term used by some AIs/ANs to describe those who do not adhere to traditional gender roles. At least four genders have been observed in some tribes: feminine woman, masculine woman, feminine man, and masculine man.[24] In our study, behavioral data (e.g. male-to-male sexual contact) are from NHSS alone and no attempt was made to tabulate by 'gender' because of variable incompleteness and the less direct association between gender and HIV status compared with transmission category and HIV status.

Results

Linkage to care

Of the 58 persons whose HIV infection was diagnosed during 2013, who resided in any of the 28 jurisdictions at the time of diagnosis, and who were classified as AI/AN in NHSS, 43 (74.1%) were linked to care $\leq$1 month after diagnosis (Table 1). By sex, the lowest percentage linked to care was for females (66.7%, χ^2 p value = 0.38). By age group, the lowest percentage was for those aged 13–34 years at diagnosis (66.7%, χ^2 p value = 0.10 compared with referent 55 + years). By transmission category across genders, the lowest percentage was AIs/ANs whose infections were attributed to heterosexual contact (58.9% for male and 61.4% for female AIs/ANs).

Table 1. Linkage to HIV medical care ≤1 month after HIV diagnosis during 2013 among American Indians/Alaska Natives aged ≥13 years, by selected characteristics – 27 states and the District of Columbia.

Characteristic	No. HIV diagnoses	No. (%)	Chi square *p* value
Sex			
Male	40	31 (77.5)	0.38
Female	18	12 (66.7)	
Age at diagnosis (yrs)			
13–34	33	22 (66.7)	0.10
35–54	19	15 (78.9)	0.22
≥55	6	6 (100.0)	ref
Transmission category[a]			
Male-to-male sexual contact	25	20 (88.2)	ref
Injection drug use, male	5	4 (80.4)	1.00
Male-to-male sexual contact and injection drug use	2	2 (100.0)	0.47
Heterosexual contact,[b] male	7	4 (58.9)	0.24
Injection drug use, female	5	4 (83.0)	0.39
Heterosexual contact,[b] female	13	8 (61.4)	
Total	58	43 (74.1)	

No.: number of diagnoses of HIV infection.

Note: Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. The 28 jurisdictions are Alabama, Alaska, Arkansas, California, the District of Columbia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Michigan, Missouri, Nebraska, New Hampshire, New York, North Dakota, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, 1ashington, West Virginia, and Wisconsin. Linkage to care was defined as having ≥1 CD4 or VL test ≤3 months after diagnosis of HIV infection.

[a]Data have been statistically adjusted to account for missing transmission category.

[b]Heterosexual contact with a person known to have, or to be at high risk, for HIV infection.

Retention in care and viral suppression

Of the 1175 persons whose HIV infection was diagnosed by year-end 2011, who resided in any of the 28 jurisdictions at the time of diagnosis, who were living with HIV infection at year-end 2012, and who were classified as AI/AN in NHSS, 551 (46.9%) were retained in care, and 530 (45.1%) were virally suppressed (Table 2). Among those retained in care, the lowest percentages by transmission category were for AIs/ANs whose infection was attributed to injection drug use (42.0% for male and 44.7% for female AIs/ANs). There were no statistically significant differences among subgroups in retention.

Among the 530 AIs/ANs who were virally suppressed, the percentage of females (41.3%) was lower than the percentage of males (46.5%) (PR = 0.87 [95% CI = 0.78, 0.96]). By age group, the lowest percentage was for those aged 13–34 years at year-end 2012 – 37.5% (PR = 0.75 [95% CI = 0.65, 0.87] using the ≥55 age group as referent). As shown by upper and lower bounds of the 95% CIs that did not include 1.0, there were statistically significant differences in suppression by sex and by age.

Discussion

Linkage to care measurements for all AIs/ANs with HIV infections diagnosed in 2013 in 27 states and DC (74.1%) fell short of the NHAS 2020 goal of ≥85%. By transmission category and sex, the lowest linkage measurement was for AIs/ANs with infections attributable to heterosexual contact (about 60%). While small numbers yielded no statistical differences in PRs, thereby making inferences difficult, these results suggest that linkage to care should be strengthened for AIs/ANs whose only risk factor is heterosexual contact. In 2012, less than half of AIs/ANs with diagnosed HIV infection were retained in care and were virally suppressed, far short of the year 2020 national goals of 90% and 80%, respectively.[1] Nearly 50% of AIs/ANs living with diagnosed HIV infection and aged 35–54 years at year-end 2012 were virally suppressed, while less than 40% of AIs/ANs aged 13–34 years had achieved this important outcome. These results suggest that efforts to attain viral suppression should be strengthened for all AIs/ANs, and that special attention should be directed to AIs/ANs aged 13–34 years. Differences in viral suppression, by sex, suggest that efforts should also be strengthened for female AIs/ANs.

Using the same methods and geographic scope as herein, the CDC reported a linkage measurement for Whites (77.5) similar to that for AIs/ANs (CDC,[25] p.33). Retention in care for Whites (54.7%) and viral suppression (56.3%) measurements were higher than those for AIs/ANs. Across racial/ethnic groups, the percentage virally suppressed was lowest among Blacks (44.2%) and second lowest among AIs/ANs (45.1%). These results suggest that efforts to link AIs/ANs to care are becoming successful while much work remains to achieve viral suppression targets.

Prescription of ARV treatment

Increasing prescription of, and adherence to, the latest ARV regimens may increase viral suppression among all subpopulations, including AIs/ANs.[8] While HIV-related laboratory results must be reported by providers of surveillance data to public health officials in the 28 jurisdictions, ARV use history data are not required. At the time of our study ARV was a variable

Table 2. Retention in HIV medical care and viral suppression among American Indians/Alaska Natives aged ≥13 years with HIV infection diagnosed by year-end 2011 and living at year-end 2012, by selected characteristics – 27 states and the District of Columbia.

Characteristic	No. (%)	≥2 CD4 or VL tests,[a] No. (%)	PR (95% CI)	VL of <200 copies/mL, No.[b] (%)	PR (95% CI)
Sex					
Male	863 (73.4)	402 (46.6)	ref	401 (46.5)	Ref
Female	312 (26.6)	149 (47.8)	1.03 (0.89, 1.17)	129 (41.3)	0.87 (0.78, 0.96)
Age group, year-end 2012					
13–34	208 (17.7)	88 (42.3)	0.96 (0.77, 1.20)	78 (37.5)	0.75 (0.65, 0.87)
35–54	762 (64.9)	373 (49.0)	1.11 (0.94, 1.32)	361(47.4)	1.11 (1.01, 1.21)
≥55	205 (17.4)	90 (43.9)	ref	91(44.4)	ref
Transmission category[b]					
Male					
Male-to-male sexual contact	546 (46.5)	253 (46.4)	ref	262 (48.0)	ref
Injection drug use	100 (8.5)	42 (42.0)	0.90 (0.71, 1.16)	39 (39.0)	0.93 (0.79, 1.09)
Male-to-male sexual contact and injection drug use	134 (11.4)	69 (51.5)	1.11 (0.92, 1.34)	65 (48.5)	1.06 (0.94, 1.20)
Heterosexual contact[c]	77 (6.6)	36 (47.2)	1.02 (0.79, 1.31]	32 (42.1)	0.90 (0.76, 1.08]
Female					
Heterosexual contact[c]	189 (16.1)	97 (51.5)	ref	82 (43.4)	ref
Injection drug use	111 (9.4)	50 (44.7)	0.87 (0.68, 1.11)	45 (40.5)	0.96 (0.79, 1.17)
Total[d]	1175 (100.0)	551 (46.9)		530 (45.1)	

PR: prevalence ratio; ref: referent; VL: viral load; No.: number of AIs/ANs living with diagnosed HIV infection.

Note: Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. The 28 jurisdictions are Alabama, Alaska, Arkansas, California, the District of Columbia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Michigan, Missouri, Nebraska, New Hampshire, New York, North Dakota, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin.

[a] Two or more CD4 or VL tests performed ≥3 months apart during 2012.

[b] Data have been statistically adjusted to account for missing transmission category.

[c] Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

[d] Total includes 18 AIs/ANs (12 female and 6 male) whose transmission category was classified as 'other,' a category that includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.

with many missing values in NHSS. Therefore, we did not attempt to measure the fourth step of the continuum – prescription of ARV.

Historical trauma

Vulnerability of AIs/ANs to excess morbidity and mortality in the early 21st century is attributable distally to traumatic experiences endured for over 500 years. AIs/ANs numbered at least tens of millions before the 16th century; by 1890 the race had nearly vanished, having been reduced to less than 200,000 souls.[26–31] Introduction of infectious disease by European colonialists to the original inhabitants of the Americas, not battlefield success, drastically reduced the number of AIs/ANs.[32] Before President Nixon (1969–1974),[33] official government policy toward AIs/ANs induced suffering.

'... Many of the tribes targeted for termination and relocation to reservations suffered extensive trauma and loss, including loss of culture and identity, traditional healing practices, self-esteem, and social structure while experiencing an increase in alcohol and substance abuse, morbidity, and mortality' (American Indian Relief Council,[34] p.3). Terms used to describe the cross-generational impact of distress in populations include 'historical trauma', the term used most often by AI researchers. This impact of distress is described as a complex trauma inflicted collectively on the members of a population with a specific group identity or affiliation – ethnicity, nationality, religion, etc. The impact of multiple traumatic events in a community that spans generations can result in adverse psychological and social outcomes. It is possible that changes in gene expression have been amplified in populations that have experienced the stressors of unresolved trauma.[35–37] The earliest diagnosis of HIV infection among AIs/ANs was reported in 1982,[17] adding HIV to the list of epidemics faced over time by the now burgeoning AI/AN population.

Preventing HIV infections

AIs/ANs with diagnosed HIV infection might not seek care after diagnosis, remain in care, or achieve viral suppression for various reasons. Substance use disorders in general, and alcohol use in particular, are of concern because of their association with risk-taking behaviors and nonadherence to treatment regimens.[38–40] AIs/ANs (as well as Blacks/African Americans and Hispanics/ Latinos) experience higher rates of binge drinking and alcohol abuse and dependence (Caetano et al: pp.110–111).[12] A 2011 national survey reported binge drinking (defined as consuming, on any occasion, $\geq$4 alcoholic drinks [women] and $\geq$5 drinks [men]) 'intensity' was highest among AIs/ANs (8.4 drinks per episode).[13] In a nationally representative sample of patients taking ARV medications, the percentage of patients adhering to their treatment regimens declined as alcohol use increased; the authors concluded that screening and treatment for mental health and substance use are needed to improve adherence.[40] Prevention and treatment of substance use and mental disorders appear first in CDC's guidance to reduce HIV, STDs, and other infections among persons who use illicit drugs (e.g. cannabis, cocaine, heroin, hallucinogens, inhalants, and prescription drugs used for nonmedical purpose).[38]

Scientific approaches to allopathic medicine focus primarily on treating diseases and physical conditions. In traditional healing systems, the focus is on promoting balance and health physically, mentally, spiritually, and emotionally.[41] In the HIV disease context, 'Traditional healing can be very powerful for American Indians living with HIV. It can restore a sense of connection . . .'.[42] Clinicians providing HIV care for AI/AN may incorporate traditional healing into their practices, or by supporting patients' pursuit of complementary care. From the reverse perspective, one may also as a traditional healer and trained clinician *incorporate into traditional healing* modern practices (e.g. routine VL testing, ARV treatment).[43]

Because social determinants of health – such as stigma, discrimination, poverty, low educational attainment, unemployment, unstable housing, lack of health insurance, and medical treatment copays – affect outcomes, they represent important lines of inquiry for interventions.[44] Stigma and silence related to male-to-male sexual contact is a barrier to HIV prevention among AIs/ANs. Understanding behaviors of and reaching out to Two-spirit males is crucial to preventing HIV infection among AIs/ANs, because male-to-male sexual contact accounts for 84% of new diagnoses among male AIs/ANs in 2014 (about equal to male US residents overall) (CDC,[17] pp.28–29). Reducing stigma associated with male to male sexual contact may increase receptiveness of AI/AN communities to increase HIV testing and facilitate open discussion among community members and between members and their health care providers.

Programs that deliver care and treatment of HIV infection among AIs/ANs, such as those at urban Indian health centers and IHS facilities, might strengthen linkage and retention efforts to help achieve better HIV care continuum outcomes than reported to date. Risk reduction, testing, treatment, and viral suppression are crucial for HIV prevention. NHAS calls for intensifying HIV prevention efforts in the communities where HIV is most heavily concentrated. One of its recommended actions is using '. . . the HIV care continuum to characterize the burden of disease and apply high-impact prevention strategies for . . . AI/ANs' (The White House Office of National AIDS Policy,[1] p.19). Effective HIV prevention tools used by CDC and partners encompass biomedical, behavioral, and structural interventions, public health strategies, and social marketing.[45,46] Tingey and colleagues developed programs to address sexual risk taking for AI/AN adolescents, countering the '. . . potential for widespread transmission of HIV . . .'[47] An intervention delivered through a community-based camp was found to be feasible and acceptable with strong retention.[48] US Department of Health and Human Services guidelines call for swift initiation of ARV treatment after diagnosis of HIV infection, regardless of level of immunosuppression.[8] Given that an estimated 720 (19%) AIs/ANs were living with undiagnosed HIV infection at year-end 2012, increasing diagnostic testing remains critical to improve measurements of the first step of the continuum – diagnosis of HIV infection (CDC,[25] p.54).

To promote early identification of HIV infection and improve outcomes, CDC recommends routine voluntary HIV screening for persons aged 13–64 years and more frequent screening (at least annually) for those at high risk, such as men who have sex with men and persons who inject drugs.[49] CDC leads a national campaign called *Doing It!*, a new national HIV testing and prevention campaign that encourages all adults to know their HIV status.[45] For persons with newly diagnosed HIV infection, swift linkage to care and retention in care are essential to achieve viral suppression.[8]

Our study is subject to several limitations. First, our results may not be representative of the entire United States because geographic scope was limited to jurisdictions that reported complete laboratory data to CDC. Data from these 28 jurisdictions represent less than one-third of diagnoses during 2013 among AIs/ANs aged $\geq$13 years and less than half of prevalent infections at year-end 2012 among AIs/ANs aged $\geq$13 years (CDC,[17] pp. 18–21, 91–95). Second, our study population may not be captured with sufficient accuracy because many persons of AI/AN ancestry alone or in combination with other races are sometimes misclassified in surveillance data.[50,51] Third, a substantial proportion of cases of HIV infection are reported to CDC without an identified risk factor. We applied statistical adjustments for missing risk-factor information; multiple imputation was used to assign a set of plausible values to each missing transmission category to generate estimates at the population level.[23] Fourth, underreporting of cases and incomplete reporting of lab results may have resulted in underestimates of case counts. Fifth, NHSS data on ARV history are becoming increasingly complete, timely, and accurate. However, at the time of our study ARV data were unsuitable for analysis.

Conclusions

To achieve the goals of NHAS (improve individual health, minimize further HIV transmission, and reduce HIV-related disparities), the percentages of AIs/ANs with HIV who are linked to HIV care, retained in care, and virally suppressed must increase. Interventions to improve engagement in care, to support retention in care, and to increase adherence to treatment are needed for all AIs/ANs – in particular, female AIs/ANs and AIs/ANs aged 13–34 years.

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