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# Disparities in the Quality of HIV Care When Using US Department of Health and Human Services Indicators

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**We estimated US Department of Health and Human Services (DHHS)-approved human immunodeficiency virus (HIV) indicators. Among patients, 71% were retained in care, 82% were prescribed treatment, and 78% had HIV RNA  $\leq 200$  copies/mL; younger adults, women, blacks, and injection drug users had poorer outcomes. Interventions are needed to reduce retention- and treatment-related disparities.**

**Keywords.** HIV; quality of care; retention in care; antiretroviral therapy; HIV RNA suppression.

Identifying indicators and monitoring human immunodeficiency virus (HIV) care is an established practice [1–3]. In 2012, the Health Resources and Services Administration put forth clinical quality measures that were endorsed by the National Quality Forum for monitoring HIV care services in the United States. Three of these measures were also approved by the Department of Health and Human Services (DHHS) for

monitoring DHHS-funded HIV services [3]. The indicators are consistent with the Institute of Medicine's recommendations for monitoring HIV services [2] and overlap with indicators from the National Committee for Quality Assurance [1].

The North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD) was identified by the Institute of Medicine as a potential data source to monitor HIV care in the United States [2]. The NA-ACCORD has shown that 3% of all adults living with HIV in the United States are captured in the clinical cohorts of the NA-ACCORD and participants are demographically similar to persons living with HIV in the United States [4]. The objectives of this study were to apply DHHS-approved indicators for retention in HIV medical care, antiretroviral therapy (ART) use, and HIV viral load (VL) suppression [3] and to identify differences in these indicators by age, sex, race/ethnicity, and HIV risk.

## METHODS

### Study Population

The NA-ACCORD is a multisite collaboration of cohort studies of HIV-infected adults in the United States and Canada and is a regional group of the International Epidemiologic Database to Evaluate AIDS. Details on the NA-ACCORD collaboration have been published previously [5]. Cohorts contribute data on patient demographics, prescribed ART, dates of primary HIV clinical visits, clinical diagnoses, vital status, and results of laboratory tests. All data are transferred securely to the NA-ACCORD's central Data Management Core, where they undergo quality control per a standardized protocol before they are combined into harmonized data files. The activities of the NA-ACCORD have been reviewed and approved by the local institutional review boards for each site and at Johns Hopkins School of Medicine.

We conducted a cross-sectional analysis using data contributed by NA-ACCORD US clinical cohorts from 2009; Canadian and interval cohorts were excluded to allow for focus on DHHS indicators for monitoring US HIV clinical care. Ten US clinical cohorts were included with sites in 48 US states (participants hail from all 50 states); Washington, DC; the Virgin Islands; and Puerto Rico (Figure 1).

### Outcomes

We evaluated the following 3 DHHS-defined indicators: retention in care, measured as the percentage of patients with  $\geq 1$  HIV care visit in January 2008–June 2008 and encounters in each of the

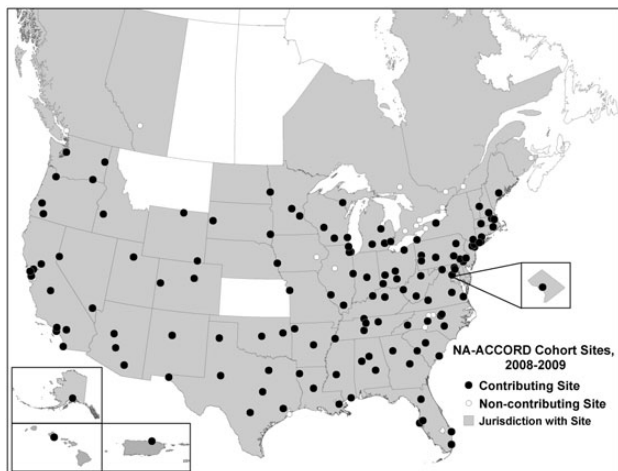
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**Figure 1.** Geographic distribution of sites within the North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD). Cohorts that were noncontributing were either interval cohorts or Canadian cohorts (excluded because the focus of this study was on those in clinical care in the United States) or the cohort does not currently contribute human immunodeficiency virus care visit data to the NA-ACCORD.

next 3 semesters of the 24-month period (1 January 2008–31 December 2009), at least 60 days apart; ART use, measured as the percentage with  $\geq 1$  HIV care visit who were prescribed ART for  $\geq 1$  month in 2009; and VL suppression, measured as the percentage of patients with  $\geq 1$  HIV care visit who had an HIV RNA  $\leq 200$  copies/mL at their last measurement in 2009 [3]. ART was defined as a regimen of  $>3$  antiretroviral agents from at least 2 classes or a triple nucleoside/nucleotide reverse transcriptase inhibitor regimen containing abacavir or tenofovir.

#### Demographics Analyzed for Disparities

Potential disparities in the DHHS indicators by age, sex, race/ethnicity, and HIV risk group were analyzed. Race/ethnicity was categorized as non-Hispanic black, non-Hispanic white, Hispanic, and other/unknown. HIV risk group was categorized as men who have sex with men (MSM), injection drug use (IDU), heterosexual contact, and other/unknown. Patients with both sexual and IDU risks were categorized as IDU.

#### Statistical Analysis

$\chi^2$  test statistics were used to determine differences in the indicators by demographic characteristics. Multivariate Poisson regression models with robust variance were used to estimate adjusted prevalence ratios and 95% confidence intervals ([,]); models included age, sex, race/ethnicity, HIV risk group, and cohort. In sensitivity analyses, we excluded the Veterans Aging Cohort Study (VACS) and Kaiser Permanente Northern California (KPNC) because participants in these cohorts were thought to have reduced barriers to accessing care.

## RESULTS

From the participating US clinical cohorts in the NA-ACCORD, 35 324 participants had  $\geq 1$  HIV care visit during January 2008–June 2008, making them eligible for inclusion in the estimation of the retention in care indicator; 38 331 participants had  $\geq 1$  HIV care visit in 2009, making them eligible for inclusion in the estimation of the ART use and VL suppression indicators. Although these groups differed slightly in size, demographics were the same in both groups: 49% of participants were aged  $\geq 50$  years, 83% were male, 45% were black, and 19% were IDUs.

Of participants, 71% were retained in care, 82% were prescribed ART, and 78% had a suppressed VL (Table 1). All 3 indicators were higher in older age groups in unadjusted analyses. Differences in crude proportions existed by age, sex, race/ethnicity, and HIV risk for all 3 indicators, with the exception of no statistically significant difference in retention in care by sex.

After adjustment for sex, race/ethnicity, HIV risk group, and cohort, all 3 indicators were statistically more prevalent in older age groups (Table 1). Females had a 7% higher proportion retained in care and a 6% lower proportion prescribed ART compared with males, but no significant statistical difference in the proportion with VL suppression. Hispanics had a 9% higher proportion retained in care compared with whites; blacks had a statistically significant lower proportion retained in care (3%), prescribed ART (3%), and with VL suppression (9%). IDUs and heterosexuals had an 11% and 4% lower proportion retained in care compared with MSM, respectively. Additionally, IDUs had a 6% lower proportion prescribed ART and a 7% lower proportion with VL suppression compared with MSM. There were no meaningful differences in the results after excluding VACS and KPNC.

## DISCUSSION

In this era of “treatment as prevention,” there is renewed emphasis on achieving VL suppression through the use of ART; adults in HIV care should be the most easily accessible group in which 100% VL suppression could potentially be achieved. Our study, nested in the largest US collaboration of HIV-infected adults, showed 29% of HIV-infected adults in care fail to meet the definition for retention in care, 18% were not prescribed ART, and 22% of adults did not achieve VL suppression; these proportions were higher for younger adults, females, non-whites, and those with IDU and heterosexual HIV risk.

Our estimate of 71% retained in care is higher than the regularly used metaanalysis estimate of 59% [6], which is similar to that used in the cascade of care [7]. To date, there is currently no “gold standard” for measuring the definition of retention in care, but use of the DHHS indicator allows for consistency in

**Table 1. Crude Proportions, Adjusted Prevalence Ratios, and 95% Confidence Intervals for Three Indicators to Monitor Department of Health and Human Services–Funded Human Immunodeficiency Virus Services, the North American AIDS Cohort Collaboration on Research and Design, 2009**

Characteristics	Retained in Care (N = 35 324)				Antiretroviral Therapy Use (N = 38 331)				Suppressed ( $\leq 200$ copies/mL) HIV Viral Load (N = 38 331)			
	%	P Value	aPR <sup>a</sup>	95% CI	%	P Value	aPR <sup>a</sup>	95% CI	%	P Value	aPR <sup>a</sup>	95% CI
Overall	71%	...	...	...	82%	...	...	...	78%	...	...	...
Age												
<40 y	59%	<b>&lt;.001</b>	ref	...	76%	<b>&lt;.001</b>	ref	...	69%	<b>&lt;.001</b>	ref	...
40–49 y	69%		<b>1.17</b>	<b>(1.14, 1.20)</b>	85%		<b>1.12</b>	<b>(1.10, 1.13)</b>	77%		<b>1.12</b>	<b>(1.10, 1.14)</b>
50–59 y	74%		<b>1.26</b>	<b>(1.23, 1.29)</b>	83%		<b>1.12</b>	<b>(1.10, 1.15)</b>	79%		<b>1.16</b>	<b>(1.14, 1.18)</b>
$\geq 60$ y	80%		<b>1.34</b>	<b>(1.31, 1.38)</b>	82%		<b>1.10</b>	<b>(1.08, 1.12)</b>	84%		<b>1.22</b>	<b>(1.20, 1.24)</b>
Sex												
Male	71%	.15	ref	...	83%	<b>&lt;.001</b>	ref	...	78%	<b>&lt;.001</b>	ref	...
Female	70%		<b>1.07</b>	<b>(1.04, 1.10)</b>	80%		<b>0.94</b>	<b>(.92, .96)</b>	73%		0.99	(.97, 1.01)
Race/ethnicity												
White	72%	<b>&lt;.001</b>	ref	...	83%	<b>&lt;.001</b>	ref	...	82%	<b>&lt;.001</b>	ref	...
Black	71%		<b>0.97</b>	<b>(.96, .99)</b>	81%		<b>0.97</b>	<b>(.96, .98)</b>	73%		<b>0.93</b>	<b>(.92, .94)</b>
Hispanic	72%		<b>1.09</b>	<b>(1.06, 1.11)</b>	86%		1.01	(.99, 1.03)	78%		1.01	(.99, 1.03)
Other <sup>b</sup>	64%		<b>0.94</b>	<b>(.91, .98)</b>	80%		0.98	(.96, 1.00)	82%		0.99	(.96, 1.01)
HIV risk												
Men who have sex with men	68%	<b>&lt;.001</b>	ref	...	86%	<b>&lt;.001</b>	ref	...	81%	<b>&lt;.001</b>	ref	...
History of injection drug use	72%		<b>0.89</b>	<b>(.86, .92)</b>	79%		<b>0.94</b>	<b>(.93, .96)</b>	74%		<b>0.93</b>	<b>(.91, .95)</b>
Heterosexual	69%		<b>0.96</b>	<b>(.94, .99)</b>	80%		1.01	(.99, 1.03)	74%		<b>0.97</b>	<b>(.95, .99)</b>
Other <sup>b</sup>	74%		<b>0.91</b>	<b>(.88, .94)</b>	81%		1.01	(.99, 1.09)	79%		<b>0.97</b>	<b>(.94, .99)</b>

Abbreviations: aPR, adjusted prevalence ratio; CI, confidence interval; HIV, human immunodeficiency virus.

<sup>a</sup> Prevalence ratios are adjusted for all variables in the table as well as cohort.

<sup>b</sup> Those with an unknown race/ethnicity or HIV risk are also included in this category.

**Bold** signifies statistical significance ( $P < .05$ ).

this measurement [8]. The indicator may need to be modified, however, to reflect changes in clinical practice with less-frequent (ie, once per year) clinical visits for stable, suppressed patients. Disparities in retention existed, with lower retention in younger adults, males, and those with IDU or heterosexual HIV risk, suggesting the need for programs specifically targeting these groups.

Overall, 18% of adults were not prescribed ART. Females were less likely than males to be prescribed ART but were previously shown to have a higher mean CD4 count at presentation for care in the NA-ACCORD [9]. In the current study, 41% of women had at least 1 CD4 measurement  $<350$  cells/mm<sup>3</sup> in 2009, of whom 80% were prescribed ART; 49% of men met this CD4 threshold for HIV treatment initiation, of whom 79% were prescribed ART. Younger adults, blacks, and IDUs also had lower proportions prescribed ART in adjusted analyses. Identifying the drivers of these disparities and translation into programmatic efforts is necessary to increase the proportion prescribed ART in these groups.

Almost a quarter of the individuals with at least 1 visit in 2009 were not suppressed; of these individuals, 69% were prescribed ART. In adjusted analyses, those who were younger, black, or with IDU or heterosexual HIV risk were more likely to have a detectable viral load. Assuming assortative mixing, this is consistent with national surveillance data that show younger adults and blacks have the highest incidence rates of HIV infection [10]. Differences in viral suppression are likely to play a role in disparities of HIV incidence. For example, a higher prevalence of detectable viral load among black MSM likely contributes to the increase in odds of HIV infection if one has a black partner [11].

Although these DHHS-approved measures are similar in concept to the steps depicted in the cascade of care [7] and the continuum of care [12, 13], proportions cannot be directly compared as the concepts and the denominators are not the same. Another important limitation to our study is the lack of distinction in active vs. former IDU. Finally, enrollment criteria in the NA-ACCORD includes  $\geq 2$  HIV primary care visits in 12

months that are >90 days apart among patients in clinical cohorts. Thus, our study population is enriched with those who successfully linked into care.

Our study provides empiric data on 3 DHHS-approved indicators from the large and diverse NA-ACCORD using clinical HIV cohort population data. The disparities found highlight the need for additional research to determine the drivers of these disparities and the need for programs tailored by age, race/ethnicity, and HIV risk to improve retention, ART use, and VL suppression. Prioritization of program efforts could be guided by targeting the characteristic with the largest differences in all outcomes: young adults (aged <40 years). Our results suggest that continued efforts are needed to optimize these measures among patients who have successfully linked into HIV care.

## Notes

**Disclaimers.** The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention (CDC).

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K. N. A. and P. R. had full access to all data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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**AIDS Link to the IntraVenous Experience:** Gregory D. Kirk.

**Adult AIDS Clinical Trials Group Longitudinal Linked Randomized Trials:** Constance A. Benson, Ronald J. Bosch, and Ann C. Collier.

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