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Measures of Retention in HIV Care Interact with Age To Impact Clinical HIV Outcomes

B Yehia[1], P Rebeiro[2], K Althoff[2], S Gange[2], H Samji[3], M Horberg[4], S Napravnik[5], and K Gebo[2]
for the North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD) of IeDEA
University of Pennsylvania[1], Johns Hopkins University[2], British Columbia Centre for Excellence in HIV/AIDS[3], Kaiser Permanente Mid-Atlantic States[4], University of North Carolina[5]

Baligh Yehia, MD

1021 Blockley Hall
423 Guardian Drive
Philadelphia, PA 19104
byehia@upenn.edu

Background

- Retention in care is a key step in the HIV care continuum, associated with initiation of ART, decreased mortality, and reduced HIV transmission.

- Multiple studies indicate that patients retained in HIV care are more likely to achieve viral suppression than those not engaged in HIV care.

- However, it is unclear how retention in care interacts with age to impact viral suppression. Understanding this relationships may assist in designing interventions to improve HIV care and outcomes.

Methods

- Serial cross-sectional analyses using data from the North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD), a multisite collaboration of HIV cohort studies in U.S. and Canada.

- 17,044 HIV-infected adults (age ≥18 years) newly enrolled in care at 13 clinical cohorts in the U.S. and Canada between 2006 and 2010.

- Patients contributed only one year of data during their first full calendar year of observation (subsequent to their year of entry into the cohort).

- 4 measures of retention were calculated for each patient in this year:
  1) US Department of Health and Human Services (DHHS): ≥1 visit in each half (Jan-Jun and Jul-Dec) of the year;
  2) US National HIV/AIDS Strategy (NHAS): ≥2 visits separated by ≥90 days in the year;
  3) 6-month gap: ≥6 months between sequential visits in the year, with retention defined as no gap; and
  4) 3-month visit constancy: no. of 3-month intervals with ≥1 visit.

- Viral suppression, HIV RNA ≤200 copies/mL at the last measure in the year, was the outcome of interest. Sensitivity analyses were conducted classifying individuals with missing HIV RNA data as "not suppressed".

- To evaluate if the association between retention and viral suppression differed by age group (18-39, 40-49, 50-59, and ≥60 years old), Poisson regression with an interaction term between age and each measure of retention was used. All models adjusted for sex, race, HIV risk factor, initial CD4 count, use of ART, and calendar year.

Table 1. Sample Characteristics

Characteristic	N=17,044 (%)
Age (years)	
18-39	6,821 (40%)
40-49	5,826 (34%)
50-59	3,259 (19%)
≥60	1,138 (7%)
Sex	
Male	13,764 (81%)
Female	3,289 (19%)
Race/Ethnicity	
White	6,244 (37%)
Black	7,101(42%)
Hispanic	2,143 (13%)
Unknown	1,364 (8%)
HIV Risk Factor	
MSM	6,789 (40%)
Heterosexual	4,591 (27%)
IDU	1,850 (11%)
Unknown	3,409 (22%)
First CD4 Count in Year	
<350 cell/mm^3	7,511 (44%)
350-499 cell/mm^3	3,669 (22%)
≥500 cell/mm^3	4,321 (25%)
Missing	1,534 (9%)
Use of ART	
No	7,590 (45%)
Yes	9,454 (55%)
Calendar Year	
2006	3,719 (22%)
2007	3,510 (21%)
2008	3,611 (21%)
2009	3,346 (20%)
2010	2,858 (16%)
DHHS Retention Measure	
Retained	12,571 (74%)
Not Retained	4,473 (26%)
NHAS Retention Measure	
Retained	15,198 (89%)
Not Retained	1,846 (11%)
6-Month Gap Measure	
Retained (No Gap)	14,481 (85%)
Not Retained (Gap)	2,563 (15%)
3-Month Visit Constancy	
1	2,901 (17%)
2	3,586 (21%)
3	4,806 (28%)
4	5,751 (34%)
Viral Suppression	
Yes	8,259 (48%)
No	7,119 (42%)
Missing	1,666 (10%)

Figure 1. Unadjusted Proportion of HIV-Infected Persons with Viral Suppression by Retention Measure and Age Group

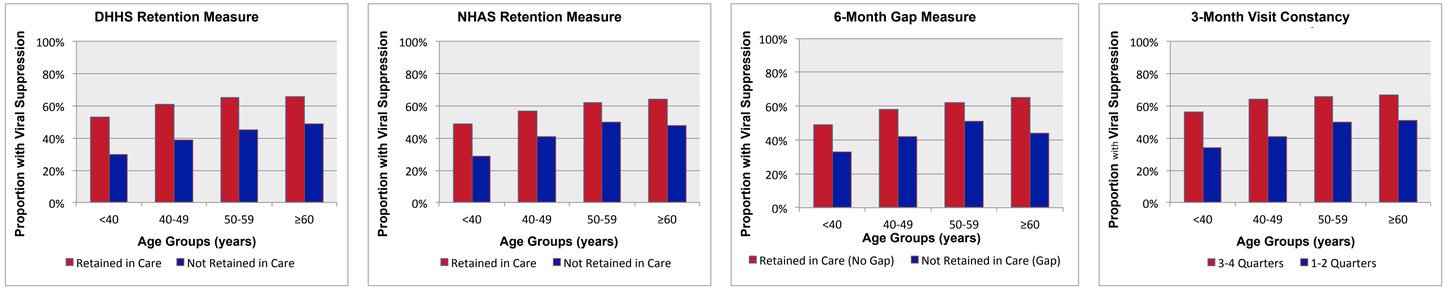


Table 2. Adjusted Prevalence Ratio (APR) for the Outcome of Viral Suppression for Each Retention Measures by Age Group (Adjusted)

	18-39 years old APR (95% CI)	**40-49 years old** APR (95% CI)	**50-59 years old** APR (95% CI)	**≥ 60 years old** APR (95% CI)
DHHS Retention Measure				
Not Retained	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]
Retained	**1.27 (1.09-1.47)**	1.05 (0.90-1.22)	0.91 (0.74-1.12)	1.00 (0.63-1.56)
NHAS Retention Measure				
Not Retained	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]
Retained	**1.22 (1.11-1.34)**	1.07 (0.97-1.19)	0.99 (0.87-1.13)	0.97 (0.75-1.25)
6-Month Gap Measure				
Not Retained (Gap)	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]
Retained (No Gap)	**1.20 (1.07-1.35)**	1.11 (0.98-1.26)	0.96 (0.81-1.14)	1.09 (0.74-1.60)
3-Month Visit Constancy				
1	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]	1.00 [Ref]
2	**1.19 (1.03-1.37)**	0.98 (0.84-1.14)	1.02 (0.83-1.25)	1.02 (0.68-1.52)
3	**1.30 (1.14-1.49)**	1.12 (0.97-1.28)	1.00 (0.83-1.20)	0.95 (0.65-1.38)
4	**1.43 (1.26-1.64)**	1.12 (0.98-1.28)	1.02 (0.85-1.22)	1.01 (0.70-1.45)

HIV-1 RNA values were missing for 1,666 individuals, who were excluded from primary analyses. In sensitivity analyses categorizing this group as "not suppressed", the associations between all retention measures and viral suppression were significant in the 2 lowest age groups (18-39 and 40-39).

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Conclusions & Implications

- For each retention measure:
  1) the older the individuals, the greater the probability of viral suppression (Figure 1);
  2) patients who were retained in care had a higher probability of viral suppression than those not retained in care (Figure 1);
  3) the difference in the effect of retention in care on viral suppression was greatest for the youngest (aged 18-39) vs. older age groups (Table 2).

- Black race (vs. White), Heterosexual or IDU risk (vs. MSM), lack of ART during the year, and entering care in earlier years were all significantly associated with lower likelihood of viral suppression (results not shown).

- Prior research indicates that younger adults have lower rates of ART compliance than older individuals.

- Maintaining a continuous relationship with a provider may improve ART adherence in this population, and explain why retention is more strongly associated with viral suppression in younger adults.

- These findings, from a large multisite cohort collaborative, have valuable implications for improving the health of younger HIV-infected adults, demonstrating the importance of retention in care among younger populations.