AIDS PATIENT CARE and STDs
Volume 30, Number 3, 2016

DOI: 10.1089/apc.2015.0209

The Dissociation Between Viral Load Suppression and Retention in Care

Daniel J. Feller and Bruce D. Agins, MD, MPH

To the Editor:

Advances in the treatment of human immunodeficiency virus (HIV) have allowed the majority of patients prescribed antiretroviral therapy (ART) to achieve undetectable plasma levels of HIV-RNA.[1] Treatment simplification and improved access to medication has enabled more patients to manage their diagnoses effectively in partnership with their providers, resulting in improved prognosis for survival among people living with HIV (PLWH).[2]

Moreover, clinically stable PLWH can successfully access HIV medication with infrequent engagement and may perceive regular HIV medical visits to be unnecessary.[3] The changing HIV treatment landscape and the continued emphasis on engagement in care warrants a reexamination of the prognostic value of core retention measures for viral load suppression (VLS). Using established quality measures, we analyzed the relationship between retention and VLS in HIV care programs in New York State in 2013.

One hundred and seventy outpatient HIV programs in New York State abstracted data from electronic medical records and paper charts as part of the New York State HIV Quality of Care Program and entered it into eHIVQUAL, a web-based platform.[4] Participating sites include 85 community health centers, 31 drug treatment centers with co-located HIV services, 15 community hospital-based outpatient clinics, and 39 Designated AIDS Centers, which are required to meet certain standards of care (Table 1).

Facilities uploaded a predefined set of clinical and laboratory data obtained from patient medical records into eHIVQUAL. Eligible patients were ≥18 years of age, had at least one HIV medical visit, and were first seen at their respective clinics before the start of the study period (January 1, 2012). Sample sizes were proportional to HIV+ caseload and ensured a 90% confidence interval with an error width ≤16%. Sociodemographic characteristics, including housing status, were assessed via patient interview and abstracted from medical records. Drug abuse was distinguished from nonproblematic drug use, and specific drugs used were elicited. No standardized instrumentation is used to assess behavioral health disorders across NYS healthcare facilities.

During the study period, 82 patients expired and were excluded. We also excluded 480 patients who transferred care to another facility, relocated to a distant geographic area, were incarcerated >90 days, or received ongoing care at a residential care facility.

Retention in care was measured and reported according to the US Department of Health and Human Services and the National Quality Forum as more than one medical visit with a provider with prescribing privileges in each 6-month period of a 24-month measurement period, with a minimum of 60 days between the first medical visit in the prior 6-month period and the last medical visit in the subsequent 6-month period. VLS was defined as having a viral load <200 copies/mL on the last VL test of 2013. Eighty-five records lacked laboratory-testing results and were eliminated from inclusion in the study cohort.

Statistical measures of validity were used to examine the relationship between retention and VLS. The prognostic value of retention for VLS was quantified by logistic regression. Multivariate regression was performed within each retention stratum to examine the independent association between VLS and patient characteristics including age, sex, race, drug use, housing status, and primary insurance.

In New York State, 8213 patients from 170 HIV programs were eligible for inclusion; 79.2% (6507) of patients were retained in care. VLS was observed among 82.1% (6745) of eligible patients on their final laboratory test of 2013. The rate of VLS was higher among patients retained (85.0%) than among patients not retained (70.9%).

Retention in care demonstrated good sensitivity (82.1%) for VLS but poor specificity (19.6%). Similarly, the positive predictive value of retention was high (85.1%), while the negative predictive value was low (29.1%). The prognostic value of retention for VLS was relatively low as indicated by a c-statistic of 0.61.

The likelihood of VLS varied across patient groups (Table 2). Among patients not retained in care, age, gender, housing instability, illicit drug use, and insurance payer were independently associated with the achievement of VLS ($p < 0.05$).

Within a diverse group of HIV programs, retention in care displayed poor prognostic value for VLS. Patients not retained in care had a surprisingly high likelihood of VLS (70.9%) and many (45.8%) had a CD4 count >500. Our findings highlight the potential shortcomings of using core indicators alone to define engagement in care and corroborate emerging reports that patients may achieve VLS without retention in care.[5–8]

Office of the Medical Director, New York State Department of Health (NYSDOH) AIDS Institute, New York, New York.
Parts of the data were presented at the 10th International Conference on HIV Treatment and Prevention Adherence, Miami, FL, on June 28–30, 2015.

Table 1. Characteristics of Sampled HIV Care Programs

Sample size; mean (range)	48 (24–107)
HIV+ caseload; mean (range)	380 (1–3399)
Location	
New York City	125 (73%)
Rest of state	35 (27%)
Geography	
Urban	160 (94%)
Rural	10 (6%)
Facility type	
Designated AIDS Center	39
Community Health Center	85
Drug Treatment Center	31
Hospital	15
Total	170
$N = 8213$	

Retention and VLS displayed the strongest association amongst members of vulnerable populations. Unretained PLWH <35 years were substantially less likely to achieve VLS than older PLWH with similar levels of engagement. Within the unretained strata, characteristics of low socioeconomic status, including housing instability and enrollment in public insurance, were independently associated with the failure to achieve VLS. Targeted interventions to improve rates of retention among young patients and those with unstable housing or low socioeconomic status would enable access to case management and supportive services addressing common barriers to VLS.

Elevated rates of VLS among certain groups of unretained patients suggest that core indicators may be poorly suited to patients who require less frequent engagement. Whites had the lowest overall rate of retention (77.1%) but the highest rate of VLS (84.8%) and in NYS may face fewer economic barriers to effective self-management, requiring fewer clinical visits.

Table 2. Viral Load Suppression Stratified by Retention in Care Status

	Engaged in care			*Retained in care*		
	N	*% VLS*	*aOR (95% CI)*	N	*% VLS*	*aOR (95% CI)*
Gender						
Male	1074	70.0	Ref	3954	86.3	Ref
Female	620	72.1	1.01 (0.96–1.06)	2551	83.2	0.99 (0.97–1.01)
Transgender	12	58.3	0.96 (0.74–1.24)	43	81.4	0.98 (0.88–1.09)
Age group						
18–24	77	57.1	0.93 (0.83–1.05)	142	75.3	**0.92 (0.86–0.99)**
25–34	246	63.4	Ref	633	83.9	Ref
35–44	386	68.4	1.04 (0.96–1.11)	1254	82.6	0.99 (0.96–1.02)
45–54	651	70.2	1.07 (0.99–1.14)	2459	84.6	1.03 (0.99–1.06)
55–64	299	82.3	**1.18 (1.1–1.28)**	1594	88.0	**1.7 (1.03–1.11)**
65+	47	91.5	**1.28 (1.11–1.47)**	425	88.9	**1.07 (1.03–1.12)**
Race						
White	264	84.8	**1.11 (1.04–1.19)**	886	91.9	**1.06 (1.04–1.09)**
Black	866	69.2	Ref	3061	82.9	Ref
Hispanic	515	66.2	0.98 (0.93–1.03)	2260	84.5	1.01 (0.99–1.03)
A.P.I.	17	70.5	1.03 (0.83–1.28)	103	95.1	**1.1 (1.02–1.18)**
Other	44	77.2	1.09 (0.95–1.25)	197	88.8	**1.05 (1.0–1.11)**
HIV risk factor						
Heterosexual	724	72.6	Ref	3212	83.9	Ref
I.D.U.	260	68.9	0.97 (0.90–1.04)	935	82.2	0.98 (0.95–1.01)
Homosexual	415	69.4	0.97 (0.91–1.04)	1496	89.7	**1.05 (1.03–1.08)**
Unknown	226	72.6	1.02 (0.95–1.10)	625	84.6	1.02 (0.99–1.06)
Other	81	65.4	0.95 (0.85–1.06)	239	83.6	1.02 (0.98–1.08)
Insurance payer						
ADAP	245	75.5	**1.08 (1.01–1.15)**	1054	89.5	**1.05 (1.02–1.08)**
Dual Eligible	78	79.5	1.06 (0.95–1.17)	493	83.8	0.98 (0.94–1.01
Medicaid	966	65.7	Ref	3513	82.0	Ref
Medicare	140	72.8	1.0 (0.93–1.0)	632	86.7	1.01 (0.98–1.04)
Other	37	81.1	1.07 (0.92–1.24)	118	89.8	1.05 (0.99–1.13)
Private	178	88.8	**1.16 (1.07–1.25)**	577	92.4	**1.07 (1.03–1.10)**
Uninsured	62	61.3	0.95 (0.84–1.07)	120	91.7	
Drug abuse						
None	579	75.2	Ref	2755	87.9	Ref
Current	419	63.2	**0.93 (0.88–0.99)**	1296	80.2	**0.93 (0.91–0.96)**
Past	262	68.9	0.96 (0.89–1.02)	1360	85.0	**0.96 (0.94–0.99)**
Undocumented	184	64.8	0.98 (0.93–1.04)	452	82.3	0.98 (0.96–1.01)
Housing status						
Stable	1356	73.6	Ref	5764	86.0	Ref
Unstable	132	53.8	**0.87 (0.81–0.95)**	278	76.6	**0.93 (0.89–0.98)**
Supportive	49	63.3	0.93 (0.82–1.06)	152	78.9	0.95 (0.90–1.0)
Unknown	169	65.1	0.94 (0.87–1.0)	313	77.6	**0.92 (0.89–0.98)**
Total	**1706**	**70.9**		**6507**	**85.0**	

Additionally, more than 80% of unretained patients ≥55 years achieved VLS. The observed heterogeneity in rates of VLS reflects a recognized limitation in the core set of HIV measures, which do not account for individual care plans.[6,7]

Clinical indicators endorsed by the IOM and DHHS are based solely upon attended visits, which permit comparison across clinics and jurisdictions. Moreover, some patients with well-managed infections may perceive retention in care to be an undue burden.[3] In order to retain patients who achieve durable VLS in long-term care, less frequent monitoring may be appropriate.[9] In the face of competing priorities, providers and patients may communicate electronically in lieu of clinical visits.[10]

Several limitations should be considered. We did not use the explicit eligibility criteria of the US Department of Health and Human Services retention performance measure, which prevents direct comparison.[11] Patients may have been misclassified as unretained if they also received care from clinics not in our data. While the study cohort was large and sampled at random, patients at smaller clinics were more likely to be included in the study cohort.

Using a 24-month measure of retention in care, we observed a substantial number of patients not retained who paradoxically achieved VLS. The limited prognostic value of retention as a predictor of VLS affirms the consensus that there is no 'gold standard' measure, and that the use of multiple, complementary indicators may be preferable to relying on just one.[6,7] While alternative missed visit measures may have more prognostic value for treatment outcomes, these measures are not amenable to standardization and comparison on a jurisdiction-wide basis.[7] Because of the need to evaluate jurisdiction-wide progress toward national goals, the use of visit frequency measures will likely continue and require stratification on patient level criteria.[12] The limitations of standardized reporting measures may become increasingly apparent as the prognosis of PLWH improves and more patients achieve durable VLS with less frequent monitoring. Personalized measures of retention in care may be an appropriate response to the changing care landscape.

Author Disclosure Statement

The authors received no compensation, and have no conflicting financial interests.

References

1. Doshi RK, Milberg J, Isenberg D, et al. High rates of retention and viral suppression in the US HIV safety net system: HIV care continuum in the Ryan White HIV/AIDS Program, 2011. Clin Infect Dis 2015;60:117–125.
2. Nachega JB, Mugavero MJ, Zeier M, Vitória M, Gallant JE. Treatment simplification in HIV-infected adults as a strategy to prevent toxicity, improve adherence, quality of life and decrease healthcare costs. Patient Pref Adherence 2011;5:357–367.
3. Castel A, Tang W, Peterson J, et al. Sorting through the lost and found: Are patient perceptions of engagement in care consistent with standard continuum of care measures? J Acquir Immune Defic Syndr 2015;69:S44–S55.
4. Institute NYSDoHA. eHIVqual Sampling Methodology. 2014; Available at: <https://www.ehivqual.org/scripts/eHQ%20Sampling%20Methodology_2012%20and%202013%20Adult%20Reviews.pdf> (Last accessed November 6, 2014).
5. Cohen SM, Hu X, Sweeney P, Johnson AS, Hall HI. HIV viral suppression among persons with varying levels of engagement in HIV medical care, 19 U.S. jurisdictions. J Acquir Immune Defic Syndr 2014;67:529–527.
6. Mugavero MJ, Westfall AO, Zinski A, et al. Measuring retention in HIV care: The elusive gold standard. J Acquir Immune Defic Syndr 2012;61:574–580.
7. Mugavero MJ, Westfall AO, Cole SR, et al. Beyond core indicators of retention in HIV care: Missed clinic visits are independently associated with all-cause mortality. Clin Infect Dis 2014;59:1471–1479.
8. Yehia BR, Rebeiro P, Althoff KN, et al. The impact of age on retention in care and viral suppression. J Acquir Immune Defic Syndr 2015;68:413–419.
9. Gill VC, Krentz HB. Patient perspectives on leaving, disengaging, and returning to HIV Care. AIDS Patient Care STDS 2015;29:400–407.
10. Catalani C, Philbrick W, Fraser H, Mechael P, Israelski DM. mHealth for HIV treatment and prevention: A systematic review of the literature. Open AIDS J 2013;7:17–41.
11. Services USDoHaH. HIV/AIDS Bureau Performance Measures. 2013.
12. Lubelchek RJ, Finnegan KJ, Hotton AL, et al. Assessing the use of HIV surveillance data to help gauge patient retention-in-care. J Acquir Immune Defic Syndr (1999). 2015;69:S25–S30.

Address correspondence to:
Bruce D. Agins, MD, MPH
NYSDOH AIDS Institute
90 Church St, 13th Floor
New York, NY 10007-2919

E-mail: bruce.agins@health.ny.gov