



Linkage to HIV Care in the VA Healthcare System

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Abstract

Background: Timely linkage to HIV care after diagnosis is critical for achieving optimal health outcomes from antiretroviral therapy (ART). The National HIV/AIDS Strategy seeks to improve linkage to care in the US from 65% to 85% by 2015. Our objective was to examine rates and predictors of linkage to care in VA, one of the largest HIV providers in the US.

Methods: Retrospective cohort study, using the Clinical Case Registry (a national VA database of all HIV-infected veterans who received care at all VA facilities), including veterans identified with HIV in the VA for the first time (VA HIV date) from 1/1998 through 12/2008. The VA HIV date was the earliest VA date of: HIV ICD-9 code, antiretroviral medication (ART) prescription, positive HIV antibody or Western blot test, CD4 count, or HIV viral load (VL). Age, sex, race/ethnicity, first VA CD4 count, and prior outpatient VA use were abstracted. Transfer to VA care with viral suppression (VS) was defined as first ART within 30 days of VA HIV date and VL<500c/mL before/within 30 days of ART. Linkage to care was defined as a clinic visit in an Infectious Diseases, Internal Medicine, or Primary Care clinic (as appropriate in each facility) within 90 days of VA HIV date. Multivariate logistic regression models of linkage were constructed.

Results: 20,363 veterans were identified; 97.3% male; 35.1% white, 50.1% black, 5.3% Hispanic, and 8.9% other/unknown race/ethnicity; mean age 47.2 years (SD 10.5); median first CD4 cell count 315 (IQR 132, 522); 10.7% were transfers with VS. Overall, 75.7% linked to HIV care. Transfers with VS were more likely to link to care (91.9% vs. 73.8%; p<0.001); other variables were statistically significant predictors but absolute differences in linkage were ≤6%. In multivariate analysis, predictors of linkage were age, race/ethnicity, year of VA HIV date, prior VA outpatient visits, and baseline CD4 cell count, but only transfer with VS had an adjusted OR>2 (3.65 [3.1, 4.3]; p<0.0001).

Conclusions: Linkage to HIV care within the VA, where both HIV care and medications are readily available, is below goal. VA will need effective interventions to increase access to HIV care and linkage to care to meet the National HIV/AIDS Strategy goal. These interventions should target all HIV-infected veterans with the possible exception of transfers with suppressed VL, since no readily clinically available characteristics or CD4 cell count was a clinically useful predictor of linkage to care.

Background

- Timely linkage to HIV care after diagnosis is critical for achieving optimal health outcomes from antiretroviral therapy (ART).^{1,2}
- The National HIV/AIDS Strategy seeks to improve linkage to care in the US from 65% to 85% by 2015.³
- The VA system is one of the largest single providers of HIV care in the US.⁴
- Our objective was to examine rates and predictors of linkage to care in VA.
- We particularly wanted to identify patients who should be targeted for extra support, since that is the next phase of this research.

Methods

- **Design:** Retrospective cohort study.
- **Data source:** Clinical Case Registry (CCR), a national VA database of all HIV-infected veterans who received care at all VA facilities; each case is locally validated as HIV-positive.^{4,5} CCR data were linked with VA Vital Status file for dates of death, and VA outpatient (OPC) and inpatient (PTF) administrative files to augment race data.
- **Time frame:** Persons identified in VA with HIV between January 1998 and December 2008, with follow-up through December 2009.
- **Facility level variables:** We included variables representing facility size, academic affiliation, rural-suburban-urban location, emergency care ratio, and others. While many were statistically significant predictors of linkage, the results were internally inconsistent and none were clinically meaningful. Facility characteristic results are not presented.
- **Analysis:** Chi-squared analysis and multivariate logistic regression were used to compare persons who linked to persons who did not link.

Methods

- **VA HIV date:** the date of identification of HIV-positive status in the VA, defined as the earliest of the following:
 - HIV Elisa or EIA positive; WB test done; HIV VL done; CD4 cell count done; ART prescribed; HIV ICD-9 code assigned to patient
- **Linkage to care:** Completed clinic visit in the Infectious Disease, Internal Medicine or Primary Care Clinic within 90 days of VA HIV date, using the following rule:
 - If HIV identified at a VA facility in which >75% of all outpatient visits for HIV-infected veterans are in the Infectious Diseases clinic, then only Infectious Diseases clinic visits count for linkage to care.
 - If HIV identified at a VA facility in which ≤75% of all outpatient visits for HIV-infected veterans are in the Infectious Diseases clinic, then any Infectious Diseases, Internal Medicine, and Primary Care clinic visit counts for linkage to care.
- **Transfers to VA with viral suppression (VS):** Prescription of ART within 30 days of first HIV date and VL<500 within 30 days of first ART date
- **Confirmatory analyses:** Due to missing laboratory data and potential confounding, three analyses were conducted: with all lab variables and using “missing” categories; dropping participants with missing lab data; and not using any lab variables.

Results

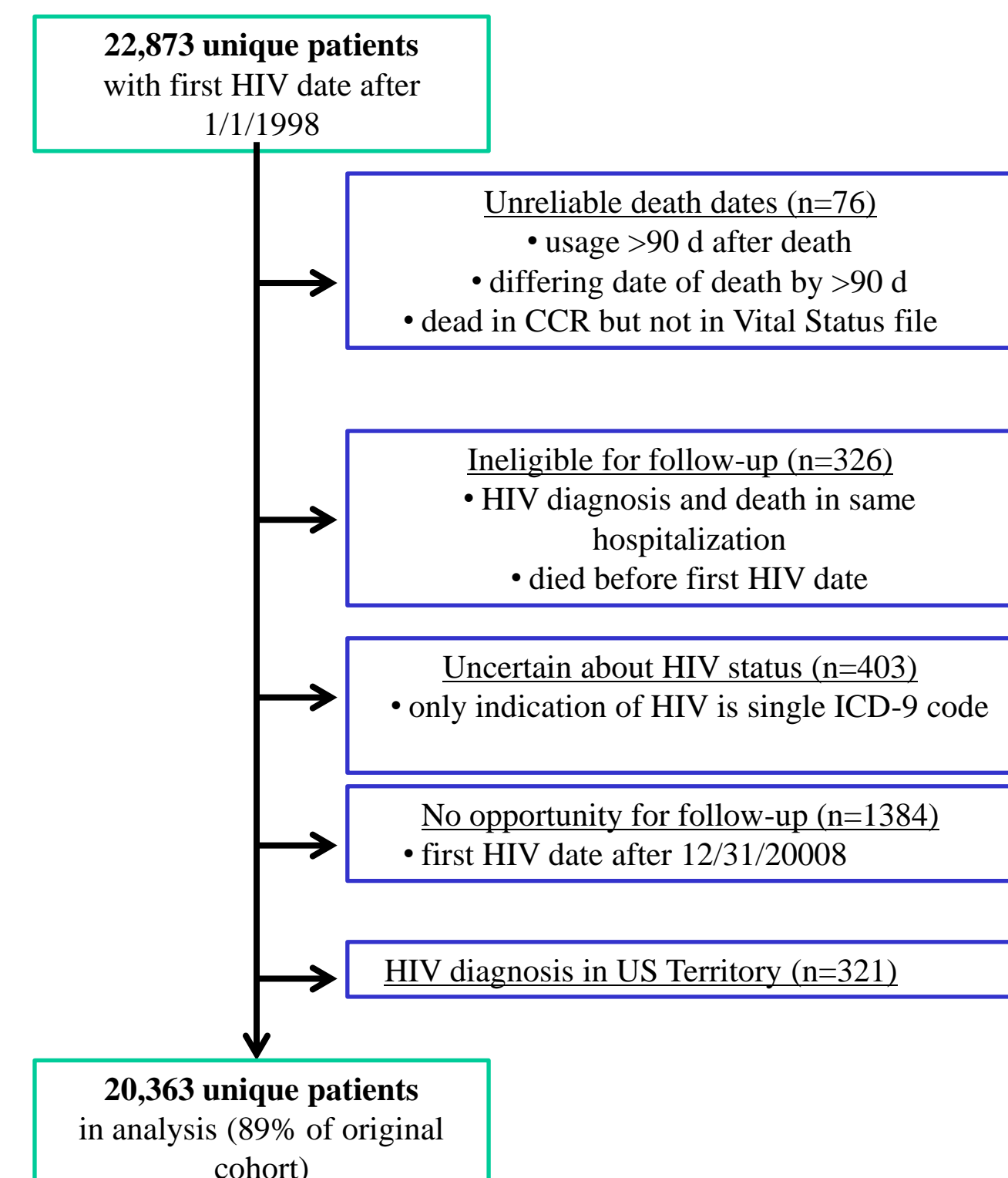


Figure 1: Defining the Cohort

Table 1: Baseline Characteristics and Linkage to HIV Care

	All n = 20,363 (%)	Linked to Care (%)	Not Linked to Care (%)	P-value
All Patients	100	75.7	24.3	n/a
Sex				.32
Females	2.8	74.0	26.0	
Males	97.3	75.8	24.2	
Race				<.0001
Black	50.8	75.7	24.3	
White	35.1	77.8	22.2	
Hispanic	5.3	78.0	22.0	
Other, unk.	8.9	66.4	33.7	
Age				.001
<40	22.4	77.9	22.1	
40-49	37.4	75.0	25.0	
50 and above	40.4	75.2	24.8	
CD4 cell count (first)				<.0001
≤ 200	32.5	79.9	20.1	
200 - 500	36.0	78.6	21.4	
> 500	25.7	77.0	23.0	
Done, result missing	2.2	68.0	32.0	
Never done	5.5	30.7	69.3	
HIV viral load (first)				<.0001
Transfer w VS	10.7	91.9	8.1	
< 500	18.3	67.0	33.0	
500 - 100,000	43.0	79.3	20.7	
> 100,000	20.2	82.8	17.2	
Done, result missing	0.5	73.4	26.6	
Never done	7.3	33.2	66.8	
Hospitalized in year before HIV date				.03
None	98.8	75.8	24.2	
1 or more	1.2	69.8	30.3	
Outpatient visits in year before HIV date				<.0001
None	39.1	74.0	26.0	
1 or more	60.9	76.9	23.1	
Year of first HIV				<.0001
1998 - 2000	31.4	72.0	28.1	
2001 - 2004	38.7	77.0	23.1	
2005 - 2008	29.9	78.2	21.9	

Table 2: Multivariate Results and Sensitivity Analyses

	Adj. OR of Failure to Link to Care (95% CI)		
	With All Lab Categories	Drop 'Missing' Categories	No Lab Variables
Sex (compared to male)			
Females	1.06 (0.86, 1.30)	1.00 (0.80, 1.25)	1.15 (0.94, 1.39)
Race (compared to White)			
Black	1.18 (1.10, 1.28)*	1.20 (1.10, 1.30)*	1.13 (1.05, 1.22)*
Hispanic	1.00 (0.85, 1.18)	1.01 (0.85, 1.20)	1.00 (0.85, 1.17)
Other, unk	1.40 (1.23, 1.58)*	1.41 (1.22, 1.62)*	1.84 (1.65, 2.07)*
Age (compared to <40)			
40-49	1.11 (1.02, 1.22)*	1.10 (1.00, 1.21)	1.20 (1.10, 1.31)*
50 and above	1.06 (0.97, 1.17)	1.04 (0.95, 1.15)	1.24 (1.14, 1.36)*
CD4 cell count (first; compared to ≤ 200)			
200 - 500	1.04 (0.95, 1.14)	1.02 (0.93, 1.12)	n/a
> 500	1.10 (1.00, 1.22)	1.06 (0.96, 1.18)	n/a
Done, result missing	1.51 (1.22, 1.88)*	1.45 (1.16, 1.83)*	n/a
Never done	2.85 (2.36, 3.44)*	n/a	n/a
HIV viral load (first; compared to <500)			
Transfer w VS	0.19 (0.16, 0.22)*	0.19 (0.16, 0.22)*	n/a
500-100,000	0.54 (0.49, 0.59)*	0.53 (0.49, 0.58)*	n/a
> 100,000	0.44 (0.39, 0.49)*	0.43 (0.38, 0.48)*	n/a
Done, result missing	0.79 (0.51, 1.22)	0.80 (0.52, 1.23)	n/a
Never done	2.26 (1.92, 2.67)*	n/a	n/a
Hospitalized in year before HIV date (compared to none)			
1 or more	1.36 (1.01, 1.83)*	1.27 (0.92, 1.76)	1.43 (1.08, 1.90)*
Outpt visits in yr before HIV date (compared to none)			
1 or more	0.86 (0.80, 0.93)*	0.88 (0.82, 0.95)*	0.85 (0.80, 0.91)*
Year of first HIV (compared to 1998 - 2000)			
2001 - 2004	0.76 (0.70, 0.82)*	0.74 (0.68, 0.80)*	0.74 (0.68, 0.80)*
2005 - 2008	0.67 (0.61, 0.73)*	0.62 (0.56, 0.68)*	0.69 (0.64, 0.75)*

*P value <.05.

Discussion

- Linkage to HIV care in the VA, where both HIV care and medications are readily available, has improved over time, but remains below goal.
 - Results are consistent with data from a recent meta-analysis.⁶
- Demographic characteristics were statistically significant predictors of linkage to care, including age, race, and prior VA use.
 - Older veterans had more delayed linkage to care.⁷
 - Black veterans had more delayed linkage to care.^{8,9} Whether these delays caused disparities in outcomes is currently under study.
 - Persons who were recent users of VA outpatient care before identification of HIV infection linked more successfully to HIV care.
- None of these characteristics, however, predicted linkage well enough to justify excluding any sub-population from interventions promoting linkage
 - Between 70 and 80% of all persons linked to care, regardless of demographic characteristics (see Table 1).
- Laboratory data predicting successful linkage include higher viral load and lower CD4 cell count. Persons entering VA care on ART with suppressed VL are between 2 and 5 times more likely to link to care than other patients.
 - Laboratory data are difficult to interpret and may be of limited utility in predicting linkage and targeting interventions:
 - The fact that the labs were done may be both a marker of successful linkage to care and a predictor of linkage to care.
 - Results may not be available at the time persons seek to enter care, when interventions would need to be deployed.
- Limitations: Care outside the VA system is not accounted for.

Conclusions

- Linkage to HIV care within the VA, where both HIV care and medications are readily available, is below goal.
- Effective interventions will be needed to increase access to HIV care and linkage to care to meet the National HIV/AIDS Strategy goal.
- No readily available demographic characteristic or CD4 cell count predicted linkage with sufficient magnitude to be clinically useful.
- Interventions to improve linkage to care in the VA should target all HIV-infected veterans, with the possible exception of transfers with suppressed VL.

References and Acknowledgements

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