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Timing of linkage to care after HIV diagnosis and time to viral suppression

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One of the goals of the National HIV/AIDS Strategy for the United States is to increase access to care and improve health outcomes for people living with HIV [1,2]. A key strategy to achieve this goal is to ensure that people are linked to care soon after they are diagnosed with HIV. Prompt linkage to care after HIV diagnosis allows early initiation of HIV treatment, which is associated with reduced morbidity, mortality and transmission of the virus [3,4]. With the updated HIV Strategy released in 2015, the time for prompt linkage to care has been reduced to 1 month from the 3-month timeframe in the previous indicator; with a target that by 2020, at least 85% of persons who receive a diagnosis of HIV infection are linked to HIV medical care within one month of their HIV diagnosis [1,2].

To assess the benefits of monitoring the new timeframe for linkage to HIV care, we analyzed data from the National HIV Surveillance System to determine the relation of linkage to care within 1 month vs. 3 months with time to viral suppression among persons who received a diagnosis of HIV infection during 2010–2011. Data were available from 14 U.S. jurisdictions with complete reporting of HIV-related laboratory test results during 2010–2013. Linkage to care was defined as 1 CD4 or viral load test result in the specified time period. Kaplan-Meier survival analyses were conducted to determine time to viral suppression (first viral load ≤ 200 copies/mL) and percentage with a suppressed viral load at 12 and 24 months after HIV diagnosis. While surveillance data represent a census of persons living with HIV, we applied the Wilcoxon signed-rank test to assess differences in time to viral suppression between those linked to care within 1 month vs. those linked within 2–3 months as the 14 jurisdictions constitute a convenience sample for the United States.

Among 26,026 persons who received a diagnosis of HIV infection during 2010–2011, 20,572 (79.0%) were linked to care within 3 months after diagnosis. Among these, 81.7% were linked to care within 1 month. Among persons linked to care within 3 months after diagnosis (including those linked within 1 month), the mean time to viral suppression was 15.9 months, with 63.6% achieving viral suppression within 12 months after diagnosis and 75.5% achieving viral suppression within 24 months (Table).

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Among those linked to care within 1 month after diagnosis, the mean time to viral suppression was 15.4 months, with 64.9% and 76.1% achieving viral suppression within 12 months and 24 months, respectively (Table). Among those linked to care within 2–3 months after HIV diagnosis, 58.2% and 72.7% achieved viral suppression within 12 months and 24 months, respectively, which was significantly lower than the percentage with viral suppression among persons linked to care within 1 month ($p < 0.01$). Among those not linked to care within 3 months after diagnosis, 17.0% had a suppressed viral load within 12 months (i.e., 87.0% did not have a suppressed viral load) and 32.7% within 24 months after diagnosis.

The percentage who had a suppressed viral load was higher among persons linked to HIV care within 1 month compared with those linked to care within 2–3 months among all subgroups by sex and race/ethnicity (Table) and age (data not shown). This was also true by transmission category with the exception of persons with infection attributed to injection-drug use. Regardless of the time to linkage to care, however, time to viral suppression was shorter among Hispanics/Latinos and whites compared to blacks/African Americans (Table), older compared to younger persons, and persons with infection attributed to heterosexual or male-to-male sexual contact compared with persons with infection attributed to injection-drug use or male-to-male sexual contact *and* injection-drug use (data not shown).

Prompt linkage to care facilitates initiation of treatment and reduces time to viral suppression. Overall, the difference in time to viral suppression between the two indicators of linkage to care within 1 month vs. within 3 months after HIV diagnosis is small because the majority are linked within 1 month. However, results indicate that linkage within 1 month improves outcomes compared to linkage within 2–3 months and may accelerate mitigation of onward HIV transmission.

Among persons who received a diagnosis of HIV infection in 2013 in 28 U.S. jurisdictions, the most recent data available, 82.1% were linked to care within 3 months and 72.6% within 1 month, which is somewhat higher than what we report for the 14 jurisdictions for 2010 and 2011 combined [5]. For 2013, 13 of the 28 jurisdictions met the 3-months indicator (85% linked to care within 3 months of diagnosis) for the 2015 goal of the National HIV/AIDS Strategy; 1 jurisdiction met the 1-month goal for the Strategy Updated to 2020. Raising the bar for prompt linkage to care supports current guidelines to offer treatment to all persons with HIV to slow disease progression and efforts to control HIV in the United States through treatment as prevention [3,6]. However, while overall efforts are needed to assure that the National Strategy Goals are met, there is also a need for targeted interventions to reduce disparities in linkage to care and viral suppression. Our results mirror earlier findings of longer times to ART initiation and viral suppression among blacks compared with whites, and lower percentages of viral suppression among younger persons living with HIV and persons with infection attributed to injection-drug use compared with their counterparts [5,7–9]. Effective interventions to strengthen linkage to care can include case management, assistance with appointments, and counseling [10].

Our analysis was subject to several limitations. Data were available from 14 U.S. jurisdictions with at least 2 years of follow-up after HIV diagnosis to determine time to

viral suppression after diagnosis; these jurisdictions may not be representative of all persons who received a diagnosis of HIV infection in the United States during the study time period. However, for 2013 a total of 28 U.S. jurisdictions that represented 61% of persons who received a diagnosis of HIV infection that year had sufficient data to determine linkage to care within 1 and 3 months after diagnosis and it is anticipated that data for more jurisdictions will be available in the coming years [5]. As in our analysis, the National HIV/AIDS Strategy Updated to 2020 relies on CD4 and viral load test results reported to HIV surveillance programs to monitor linkage to care [1,2]. While persons with HIV may have care visits that do not result in a CD4 or VL lab test, national treatment guidelines recommend both tests upon entry to care [3]. Data on viral load test results during the follow-up period may be missing for persons who moved to a jurisdiction after HIV diagnosis that did not report viral load test results to national HIV surveillance. However, the percentage of persons who moved during the follow-up time is expected to be small and if persons with unsuppressed viral load moved to another jurisdiction where viral suppression was achieved it may lead to an underestimation viral suppression.

In summary, the majority of persons who receive a diagnosis of HIV infection are linked to care soon after diagnosis. More timely linkage allows earlier initiation of HIV treatment and the benefit of earlier viral suppression to reduce disease progression and potential transmission of HIV to sex or injection-drug use partners. Sustaining ongoing care and treatment, however, remain challenges for persons living with HIV. Among persons living with diagnosed HIV in 2012, 54% received regular HIV care and 50% had a suppressed viral load [5]. Fully implementing current treatment guidelines and effective interventions to support care and treatment adherence are needed to achieve the goals of the National HIV/AIDS Strategy to improve all steps in the continuum of care, including 90% retained in care and 80% having a suppressed viral load [2,3,11].

Disclaimer:

The findings and conclusions in this study are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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TABLE 1.

Time to viral suppression among adults and adolescents with HIV infection diagnosed in 2010 and 2011, 14 U.S. jurisdictions

Characteristic	Linkage to care	No.	%	Months from diagnosis to first suppressed viral load ^a			p-value ^b
				Mean	12 %	24 %	
Total	Within 1 month	16,801	64.6	15.4	64.9	76.1	
	Within 2–3 months	3,771	14.5	18.1	58.2	72.7	<.0001
	Within 3 months	20,572	79	15.9	63.6	75.5	NA
	Not linked to care	5,454	21	34.0	17.0	32.7	NA
Sex							
Male	Within 1 month	13,261	64.1	15.6	64.6	75.9	
	Within 2–3 months	2,980	14.4	18.4	56.9	72.3	<.0001
	Within 3 months	16,241	78.6	16.1	63.2	75.2	NA
	Not linked to care	4,433	21.4	33.5	16.4	32.8	NA
Female	Within 1 month	3,540	66.1	14.8	65.8	77.1	
	Within 2–3 months	791	14.8	16.1	63.0	73.9	<.0001
	Within 3 months	4,331	80.9	15.2	65.3	76.6	NA
	Not linked to care	1,021	19.1	34.1	19.5	32.2	NA
Race/ethnicity							
Black/African American	Within 1 month	7,432	60.8	17.6	58.9	71	
	Within 2–3 months	1,809	14.8	19.2	54.4	68.3	<.0001
	Within 3 months	9,241	75.6	18	58	70.5	NA
	Not linked to care	2,976	24.4	34.7	16.1	30.9	NA
Hispanic/Latino	Within 1 month	3,797	66.5	14.1	69.1	79.1	
	Within 2–3 months	783	13.7	15.9	63.8	77.3	<.0001
	Within 3 months	4,580	80.2	14.5	68.2	78.8	NA
	Not linked to care	1,134	19.8	32.8	16.6	31.3	NA
White	Within 1 month	4,497	68.9	13.4	69.5	81.2	
	Within 2–3 months	959	14.7	16.7	60.7	77	<.0001
	Within 3 months	5,456	83.6	14	68	80.4	NA
	Not linked to care	1,068	16.4	31.4	19.5	37.8	NA
Age at diagnosis							
13–24	Within 1 month	3,219	56.8	18.2	57	70.1	
	Within 2–3 months	966	17	20.2	51	67.1	<.0001
	Within 3 months	4,185	73.8	18.7	55.6	69.4	NA
	Not linked to care	1,484	26.2	33.7	15.6	32.5	NA
25–34	Within 1 month	4,620	62.1	16.2	62.9	74.6	
	Within 2–3 months	1,151	15.5	18.3	57.3	72.3	<.0001
	Within 3 months	5,771	77.6	16.6	61.8	74.1	NA
	Not linked to care	1,670	22.4	33.4	15.5	31.1	NA

Characteristic	Linkage to care	No.	%	Mean	Months from diagnosis to first suppressed viral load ^a		p-value ^b
					12	24	
					%	%	
35–44	Within 1 month	3,987	67.8	14.5	67.7	78.4	
	Within 2–3 months	804	13.7	15.9	62	75.7	<.0001
	Within 3 months	4,791	81.5	14.9	66.8	78	NA
	Not linked to care	1,089	18.5	34	16.9	31.8	NA
45–54	Within 1 month	3,359	70.1	13.5	69.7	79.8	
	Within 2–3 months	611	12.8	16.1	63.1	76.6	<.0001
	Within 3 months	3,970	82.9	14	68.6	79.3	NA
	Not linked to care	821	17.1	31.1	19.7	36.7	NA
>=55	Within 1 month	1,616	72	13.3	70.1	80.1	
	Within 2–3 months	239	10.6	13.6	67.2	77.6	<.001
	Within 3 months	1,855	82.6	13.6	69.7	79.8	NA
	Not linked to care	390	17.4	32.7	25	34.1	NA
Transmission category							
Male-to-male sexual contact	Within 1 month	9,119	65.2	15.1	65.7	77.2	
	Within 2–3 months	2,143	15.3	18	57	72.6	<.0001
	Within 3 months	11,262	80.5	15.7	64	76.3	NA
	Not linked to care	2,734	19.5	32.2	17.4	36.2	NA
Injection drug use	Within 1 month	692	63.4	17.5	60	70.4	
	Within 2–3 months	140	12.8	16.8	61.3	73.9	0.228
	Within 3 months	832	76.3	17.5	60.2	71	NA
	Not linked to care	259	23.7	33.4	16	29.9	NA
Male-to-male sexual contact and injection drug use	Within 1 month	444	63.9	16.3	60.4	74.1	
	Within 2–3 months	130	18.7	18.8	51.1	75.8	<.01
	Within 3 months	574	82.6	17	58.3	74.5	NA
	Not linked to care	121	17.4	31.2	19.1	37.8	NA
Heterosexual contact	Within 1 month	2,428	65.9	14.4	66.1	78	
	Within 2–3 months	600	16.3	17.1	59.1	72.7	<.0001
	Within 3 months	3,028	82.2	15	64.7	77	NA
	Not linked to care	655	17.8	31.5	20.2	37.2	NA

N = 26,026

^aSuppressed viral load defined as < 200 copies/mL.^bWilcoxon test of equality over strata 1 months vs. 2–3 months.