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Time From HIV Infection to Diagnosis in the U.S., 2014−2018

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Abstract

Introduction: Understanding the role of sociologic, structural, and biomedical factors that influence the length of time from HIV infection to diagnosis and reducing the time from infection to diagnosis are critical for achieving the goals of the Ending the HIV Epidemic initiative. In a retrospective analysis, the length of time from HIV infection to diagnosis and its association with individual- and facility-level attributes are determined.

Methods: Data reported by December 2019 to the U.S. National HIV Surveillance System for people with HIV diagnosed during 2014−2018 were analyzed during December 2020. A CD4 depletion model was used to estimate the time from HIV infection to diagnosis.

Results: During 2018, the median time from HIV infection to diagnosis was shortest for those infections diagnosed using the rapid testing algorithm (30.3 days, 95% CI=25.5, 34.5) than those diagnosed using the recommended (41.0 days, 95% CI=39.5, 42.0), traditional (37.0 days, 95% CI=29.5, 43.5), or other (35.5 days, 95% CI=32.5, 38.0) diagnostic testing algorithms. From 2014 to 2018, the time from HIV infection to diagnosis remained stable overall for all testing methods except for the traditional diagnostic testing algorithm. In multivariate analyses, those more likely to have HIV diagnosed closer to the time of infection were younger, were White, had transmission risk factors of injection drug use or heterosexual contact (for female individuals) or male-to-male sexual contact and injection drug use, or had HIV diagnosed at a correctional or screening facility ($p<0.01$).

Conclusions: Providing access to expanded testing, including rapid testing in nonclinical settings, is likely to result in a decrease in the length of time a person is unaware of their HIV infection and thus reduce onward transmission of HIV infection.

INTRODUCTION

To achieve the goal of the Ending the HIV Epidemic (EHE) initiative in the U.S., the HHS developed 4 key strategies, referred to as foundational pillars, to reduce the numbers of new

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infections by 75% within 5 years and by 90% within 10 years.[1] The first pillar—to diagnose HIV as early as possible after infection—aims to make HIV testing simple, accessible, and routine.[2] The current median time from infection to diagnosis in the U.S. is 3 years.[3] In addition, 1 in 4 people with HIV diagnosed in 2016 had the virus for ≥7 years before diagnosis, and an estimated 38% of infections were transmitted from individuals who were not aware of their positive HIV status.[4] To decrease the time from infection to diagnosis, it is crucial to better understand HIV diagnosis delays and to develop more tailored interventions and testing initiatives.[5,6]

There are several factors—sociologic, structural, and biomedical—that influence the time from infection to diagnosis. Disparities in access to medical care and perceived HIV stigma from the community may influence how long it takes before someone with exposure to HIV is tested and receives a diagnosis. To address barriers to early testing, health departments (HDs) and community-based organizations have brought HIV testing to communities most affected by HIV infection. Many of these HD and community-based organization testing venues offer point-of-care rapid tests, which are thought to reduce barriers to testing compared with accessing medical care in a clinical setting.[7,8] The time between infection with HIV and the earliest detection of HIV also varies depending on the type of test used; laboratory-based tests have a shorter window period than point-of-care Clinical Laboratory Improvement Amendments (CLIA)-waived tests.[9] Understanding the role of each of these factors in reducing the time from infection to diagnosis is critical for achieving the goals of the EHE initiative.

As EHE testing initiatives are executed, it is expected that the time between infection and diagnosis will decrease. This improvement can be used as a measure to gauge progress toward meeting the EHE goals. Ideally, there will be no disparity in improvements in the length of time from infection to diagnosis; however, some barriers to testing are more difficult to dismantle, and the improvements will likely differ depending on the patient population and the testing setting (e.g., clinical versus nonclinical). Understanding the magnitude of these disparities and their change over time will help HDs to develop more focused testing programs to ensure shorter delays in HIV diagnoses.

In this report we use CDC's National HIV Surveillance System (NHSS) to conduct analyses to guage disparities and identify needs for tailored testing initiatives. The objectives of this analysis are to determine the time from HIV infection to diagnosis and the association between the length of time from HIV infection to diagnosis and patient- and facility-level attributes, including the testing algorithm used to diagnose HIV infection.

METHODS

Study Population

The HIV test results data reported to the NHSS through the Electronic HIV/AIDS Reporting System by December 2019 were analyzed. This analysis included people aged ≥13 years with HIV diagnosed during 2014−2018 and who resided in the 50 states and District of Columbia (197,170 people).

Measures

The time from infection to diagnosis was calculated using a well-characterized model estimating the rate of CD4 decline on the basis of the Concerted Action on Seroconversion to AIDS and Death in Europe study.[10,11] Estimates of model parameters for subpopulation groups without identifying HIV subtypes[10] and estimates for specific HIV subtypes[11] have been determined in other studies. This model has been used to estimate the distribution of diagnosis delays among people with diagnosed HIV in the U.S.[5] and to estimate HIV incidence in both the U.S.[12] and Brazil.[13] On the basis of the CD4 decline model requirements, a total of 27,242 (14.0%) people were excluded from this analysis. This included those with a perinatal transmission category (<0.01%), those with no CD4 test result (7.6%), those who had evidence of antiretroviral treatment before the first CD4 test result (5.3%), and those who had a viral load test result <200 before their first CD4 result (1.3%). In addition, the number of individuals with a CD4 test result was weighted to account for those without a CD4 test result. Weighting was based on the year of HIV diagnosis, sex at birth, race/ethnicity, transmission category, age at diagnosis, disease classification, and vital status.[5]

A total of 4 diagnostic testing categories were defined as follows. For the traditional algorithm, the first positive test was any HIV-1 (or combination of HIV-1/2) antibody immunoassay that was not a CLIA-waived rapid test, followed within 30 days by a positive HIV western blot or immunofluorescence assay. A previous positive result from an initial immunoassay was presumed if the first reported result was from a western blot or immunofluorescence assay.[14] For the recommended algorithm, the first positive test was an HIV-1/2 immunoassay that could detect both HIV antigen and antibody and was not a CLIA-waived rapid test, followed within 30 days by a supplemental immunoassay that differentiates between HIV-1 and HIV-2 antibodies. A previous positive result from an initial immunoassay was presumed if the reported first test was a supplemental immunoassay.[15] For the rapid algorithm, the first positive test was a CLIA-waived rapid immunoassay, followed by another positive CLIA-waived rapid immunoassay on the same date or a CLIA-waived rapid test followed by any HIV-1 or HIV-1/2 immunoassay or quantitative HIV-1 nucleic acid test within 30 days.[16] Other test sequences included a sequence of tests that did not fit into the other defined categories of algorithms, such as a single nucleic acid test, or for which the only documentation available to surveillance staff was a physician’s note in the medical record rather than a laboratory report.

Facility types at diagnosis were grouped into 6 categories: (1) inpatient clinical facilities, (2) outpatient clinical facilities, (3) emergency rooms (ERs), (4) screening facilities (nonclinical facilities), (5) other facilities (e.g., laboratory, coroner, or medical examiner or facilities labeled in NHSS as other or unknown or were missing), and (6) correctional facilities.

A substantial proportion of people with HIV infection were reported to the Centers for Disease Control and Prevention (CDC) without an identified risk factor (18.8%). To produce less biased subgroup estimates, multiple imputation was used to redistribute the risk factors when risk factor information was missing from NHSS.[17]

The *time-to-event* variable in this analysis was defined as the time from the estimated date of infection to the date of diagnosis. The date of HIV diagnosis was set as the sample collection date of the first positive test result and not the date of the confirmatory test result date for all individuals with a confirmed HIV diagnosis. Thus, the calculated time from infection to diagnosis was not prolonged if confirmatory testing was delayed.

Statistical Analysis

To examine the extent to which the type of diagnostic testing algorithm was associated with the time from infection to diagnosis and to calculate the median time from infection to diagnosis by each type of algorithm, a Kaplan–Meier analysis was performed.[18] Multivariate Cox proportional hazards regression models were used to estimate the association between the type of diagnostic testing algorithm and the time from infection to diagnosis while controlling for patient and facility characteristics found to be significantly associated with the time to diagnosis in univariate analyses (age group, race/ethnicity, transmission category, region of residence at diagnosis, and facility type at diagnosis).[19,20] The data were right censored if the diagnosis delay was >1 year. Interaction terms between the testing algorithm used to diagnose HIV infection and all other variables included in the multivariate model were also evaluated; no interactions were found.

RESULTS

During 2014, the median time to diagnosis was 43.0 months (95% CI=42.0, 44.0); during 2018, the median time from infection to diagnosis was 39.5 months (95% CI=38.5, 40.5). Overall, there was no decrease in the time from infection to diagnosis during 2014−2018; the estimated annual percentage change (EAPC) was −1.9 (95% CI= −4.6, 0.8) (Table 1).

The median time from infection to diagnosis varied by the algorithm used to diagnose HIV infection; people with HIV diagnosed during 2018 using the rapid testing algorithm had the shortest median time from infection to diagnosis (30.3 months, 95% CI=25.5, 34.5) than people with HIV diagnosed using the traditional algorithm (37.0 months, 95% CI=29.5, 43.5), those diagnosed using the recommended diagnostic testing algorithm (41.0 months, 95% CI=39.5, 42.0), and those diagnosed using other diagnostic testing algorithms (35.5 months, 95% CI=32.5, 38.0) (Table 1). In addition, during 2014–2018, the median time from infection to diagnosis decreased for people with HIV diagnosed using the traditional algorithm (EAPC=−7.7, 95% CI=−10.3, −5.1), but the median time was stable for those with HIV diagnosed using the recommended (EAPC=−1.3, 95% CI=−3.9, 1.3) and rapid (EAPC=−1.5, 95% CI=−4.8, 1.9), or other (EAPC=−1.9, 95% CI=−4.7, 1.0) diagnostic testing algorithms (Table 1).

Overall, 35.9% of people with HIV received their diagnosis within 1 year of infection. The percentage of those whose infection was diagnosed within 1 year varied by the algorithm used to diagnose HIV infection. People with HIV diagnosed using the rapid testing algorithm had the highest percentage of those receiving a diagnosis within 1 year (38.2%) than individuals whose HIV infection was diagnosed using other diagnostic testing algorithms, those diagnosed using the traditional algorithm, and those diagnosed using the recommended algorithms (38.1%, 34.7%, and 35.4%, respectively) (Table 2).

In the multivariate analysis, people more likely to have HIV diagnosed closer to the time of infection were those with HIV diagnosed using other diagnostic testing algorithms (compared with those diagnosed using the recommended testing algorithm), were younger, were White (compared with Black or African American), had a transmission category of male-to-male sexual contact/injection drug use (IDU), were female with transmission category of IDU or heterosexual contact (compared with a risk factor of male-to-male sexual contact), or received a diagnosis of HIV infection in a correctional or screening facility (compared with receiving HIV diagnosis in an outpatient clinical facility) (Table 2). People less likely to have HIV diagnosed closer to the time of infection were those with HIV diagnosed using traditional diagnostic testing algorithms (compared with diagnosis using the recommended testing algorithm), who were Hispanic or Latino or other (compared with Black or African American), who had a transmission category of male heterosexual contact (compared with those who had a risk factor of male-to-male sexual contact), who resided in the Midwest (compared with those in the South), or who received a diagnosis of HIV infection in an inpatient facility, ER, or other facility type. Finally, people whose HIV infection was diagnosed using the rapid algorithm were not more likely to receive their diagnosis closer to the time of infection; this univariate difference was explained by other patient and diagnosing facility characteristics included in the multivariate analyses.

The use of the diagnostic testing algorithms varied by the diagnosing facility. Screening facilities used rapid algorithms more frequently than other facilities (Table 3). Among HIV infections diagnosed using a rapid testing algorithm, 47.3% occurred at a screening facility, compared with 11.9% at inpatient clinical facilities, 31.2% at outpatient clinical facilities, 2.5% at ERs, 2.3% at correctional facilities, and 4.7% at other facilities.

DISCUSSION

Using data reported to NHSS, the time from infection to diagnosis, overall, remained unchanged during 2014–2018 and ranged from 40 to 43 months. Earlier reports found improvements in the diagnosis delay through 2015.[5,6] However, New York City found a stagnation in the improvement in the diagnosis delay from 2011 to 2015.[6] The early improvements in the time from infection to diagnoses may be attributed to large-scale testing initiatives, such as those initiated in New York City in 2008, 2010, and 2014[21]; to CDC expansion of testing initiative in select jurisdictions during 2007–2010[22]; and to the updated recommendations from CDC in 2006 for routine testing for HIV in healthcare settings.[23] In corroboration of these improvements, the National Health Interview Survey showed increases among adults who report having ever tested for HIV during this time period.[24]

During 2017, for infections diagnosed using the traditional algorithm, the median time from infection to diagnosis was shorter than during 2018, and the number of infections diagnosed using the traditional algorithm was smaller than in earlier years. The downward trend in the use of the traditional testing algorithm is consistent with the implementation of the HIV laboratory-based testing recommended algorithm in 2014. Additional studies are needed to determine the reason for the shorter diagnosis delay noted in 2017, but it may be due to the nature of the diagnosing facilities that continued to use laboratories that performed the traditional algorithm. In multivariate analyses, people whose HIV infection was diagnosed

using the other algorithms were more likely to have HIV diagnosed closer to the time of infection. It is possible that these cases were misclassified because some negative or indeterminate results from supplemental HIV antibody tests were not reported to the HD. Those with missing negative test reports were likely those who had acute HIV infection.

People with HIV diagnosed in screening facilities were more likely to receive a diagnosis sooner after infection, regardless of the testing algorithm. Screening facilities were also more likely to conduct rapid testing. It may be that individuals with HIV diagnosed using rapid tests had a shorter time from infection to diagnosis because a higher proportion of rapid tests were used in screening facilities than in other facility types. HIV screening facilities have fewer barriers to navigate and are easier to access and are useful for people who might not be willing or able to access medical services in clinical settings.[7,8,25,26] Often, they also offer HIV prevention services (e.g., pre-exposure prophylaxis and nonoccupational post-exposure prophylaxis) to populations needing ongoing preventive HIV care, thereby facilitating the opportunity for more frequent HIV testing. Of note, although rapid tests have a lower sensitivity than the laboratory-based recommended algorithm, particularly during early and acute HIV infection when rapid tests are more likely to have false-negative results,[27] the use of the rapid algorithm has been shown to increase the likelihood of linkage to care within 90 days after diagnosis.[28]

The time from infection to diagnosis varied by region of residence at diagnosis. This may reflect access to HIV testing and prevention services. As shown in a previous study, the proportion of people who ever tested for HIV and the frequency of testing varied by locale and, in particular, by those locals included in the first wave of the EHE initiative.[29]

Correctional facilities diagnose HIV earlier after infection than outpatient and inpatient clinical facilities. This may be a result of mandatory or opt-out HIV testing practices in state and federal prisons.[30] Routinely offering HIV screening in inpatient and outpatient healthcare settings, including during screening at intake into correctional facilities, and efforts to identify and rescreen those with ongoing risk for HIV at least annually could shorten the delay in HIV diagnosis.[3,4]

The time from infection to diagnosis also varied by transmission category. People who are of a transmission category of IDU were more likely to receive a diagnosis sooner after infection than those who are of other HIV transmission categories. Recently, there has been a higher focus on HIV testing among those who inject drugs because of IDU-related outbreaks[31] and because of the HIV prevention programs and interventions tailored toward people with IDU risk factors, such as the expansion of syringe exchange programs by community-based organizations.[32] These programs appear to be achieving success in diagnosing clients closer to their time of infection.

Limitations

This study had several limitations. First, some negative or indeterminate results from supplemental HIV antibody tests used as part of the recommended algorithm may not have been reported to the HD because reporting of such results by laboratories or healthcare providers to the HD may not have been required by reporting laws or regulations. As

a result, some algorithms could have been misclassified in the other diagnostic testing algorithms category, leading to undercounting of those in the recommended algorithm category and overcounting of those in the other diagnostic testing algorithm category. Second, test results from nonclinical settings that do anonymous testing or do not report results to the HD are not represented in NHSS, potentially leading to undercounting of those in the rapid testing algorithm category. Third, the accuracy of the calculated time from infection to diagnosis is dependent on the accuracy of the CD4 decline model and on the assumption of linearity based on a decline of CD4 values from a European cohort and applied to people with HIV diagnosed in the U.S.[10,33,34]

CONCLUSIONS

From 2014 to 2018, <36% of all new diagnoses were estimated to have occurred within 1 year of infection. This underscores the critical need to expand HIV testing and treatment in the U.S. HIV testing initiatives should be locally tailored, especially for groups who have a longer time from infection to diagnosis: young people, high-risk heterosexual male individuals, Black or African Americans and Hispanics/Latinos, and people living in the Midwest. Because promising approaches are implemented to expand HIV testing and to increase the testing frequency, the length of time from infection to diagnosis should decrease. Promising approaches include routinizing HIV screening in healthcare settings, providing expanded access to rapid testing in nonclinical settings, expanding HIV self-testing programs, expanding social network–based HIV testing to reach under-served or marginalized populations, and developing peer-led digital communications.[35–39] NHSS can be used to provide data to locally tailor these testing initiatives in the various regions of the U.S. and to monitor and evaluate the expected decrease in the time a person is unaware of their positive HIV status.

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Table 1.

Median Time From HIV Infection to Diagnosis During 2014–2018—U.S.

			Diagnostic algorithm							
	Overall		Traditional[a]		Recommended[b]		Rapid[c]		Other[d]	
Diagnosis year	Months (95% CI)	*n*	Months (95% CI)	*n*	Months (95% CI)	*n*	Months (95% CI)	*n*	Months (95% CI)	*n*
2014	43.0 (42.0, 44.0)	35,194	47.5 (45.5, 49.5)	11,348	43.5 (42.0, 45.0)	15,181	35.0 (32.5, 38.0)	2,622	37.5 (35.0, 40.5)	6,043
2015	41.0 (40, 42)	34,917	42.0 (39.5, 44.0)	5,299	42.0 (40.5, 43.0)	21,954	30.0 (27.5, 36.0)	1,930	41.0 (38.0, 43.0)	5,734
2016	41.0 (39.5, 42.0)	34,146	42.5 (39.0, 46.0)	3,173	42.0 (40.5, 43.0)	23,448	34.5 (30.5, 40.5)	1,857	38.0 (35.0, 40.5)	5,688
2017	40.0 (39.0, 41.0)	32,822	31.5 (27.0, 35.0)	1,904	41.5 (40.0, 43.0)	24,270	34.5 (31.0, 39.0)	1,738	37.5 (34.5, 40.5)	4,910
2018	39.5 (38.5, 40.5)	30,849	37.0 (29.5, 43.5)	1,068	41.0 (39.5, 42.0)	23,810	30.3 (25.5, 34.5)	1,534	35.5 (32.5, 38.0)	4,437
EAPC	−1.9 (−4.6, 0.8)		**−7.7 (−10.3, −5.1)**		−1.3 (−3.9,1.3)		−1.5 (−4.8, 1.9)		−1.9 (−4.7,1.0)	

Note: Boldface indicates statistical significance ($p<0.05$). Information is based on data on data from CDC's NHSS reported through December 2019 among persons aged ≥13 years.

[a]The first positive test was HIV-1 IA, followed within 30 days by a western blot or immunofluorescence assay.

[b]The first positive test HIV-1 IA that could detect both HIV antigen and antibody, followed within 30 days by a supplemental IA that could detect HIV antibodies and differentiate between HIV-1 and HIV-2 antibodies.

[c]The first positive test was a CLIA waived, rapid IA, followed by another positive CLIA waived, rapid IA, on the same day or the first positive test was a CLIA waived, rapid IA, followed within 30 days by a positive HIV diagnostic test (not CLIA waived).

[d]A sequence of tests that do not fit into the other types of defined algorithms or a diagnosis documented by a physician.

CDC, Centers for Disease Control and Prevention; CLIA, Clinical Laboratory Improvement Amendments; EAPC, estimated annual percentage change; NHSS, National HIV Surveillance System.

Table 2.

Likelihood of Diagnosis Within 1 Year After HIV Infection During 2014−2018—U.S.

Variables	Diagnosed within 1 year after infection *n* (%)	Univariate analysis Hazard ratio (95% CI)	Multivariate analysis Hazard ratio (95% CI)
Diagnostic testing algorithm category			
Traditional[a] (*n*=22,792)	7,904 (34.7)	0.98 (0.96, 1.00)	**0.96 (0.94, 0.99)**
Recommended[b] (ref) (*n*=108,663)	38,436 (35.4)	—	—
Rapid[c] (*n*=9,681)	3,693 (38.2)	**1.08 (1.05, 1.12)**	1.00 (0.96, 1.03)
Other[d] (*n*=26,792)	10,203 (38.1)	**1.08 (1.06, 1.11)**	**1.13 (1.10, 1.15)**
Age group, years			
13–24 (ref) (*n*=37,416)	14,589 (39.0)	—	—
25–34 (*n*=56,797)	22,145 (39.0)	1.00 (0.98, 1.02)	0.99 (0.97, 1.01)
35–44 (*n*=32,252)	10,978 (34.0)	**0.86 (0.84, 0.89)**	**0.87 (0.85, 0.89)**
45–54 (*n*=25,452)	7,784 (30.6)	**0.77 (0.75, 0.79)**	**0.78 (0.76, 0.80)**
≥55 (*n*=16,011)	4,740 (29.6)	**0.74 (0.72, 0.77)**	**0.78 (0.75, 0.80)**
Race/ethnicity			
Black/African American (ref) (*n*=71,831)	25,138 (35.0)	—	—
Hispanic/Latino[e] (*n*=41,836)	14,169 (33.9)	**0.96 (0.95, 0.98)**	**0.97 (0.95, 0.99)**
White (*n*=43,536)	17,423 (40.0)	**1.16 (1.13, 1.18)**	**1.21 (1.18, 1.23)**
Other (*n*=10,725)	3,506 (32.7)	**0.93 (0.90, 0.96)**	**0.93 (0.90, 0.96)**
Transmission category[f]			
Male-to-malesexual contact (ref) (*n*=111,630)[g]	39,435 (35.3)	—	—
Injection drug use—male (*n*=5,494)[g]	1,857 (33.8)	0.95 (0.91, 1.00)	1.04 (0.99, 1.09)
Injection drug use—female (*n*=4,371)[g]	1,742 (39.9)	**1.14 (1.09, 1.19)**	**1.22 (1.17, 1.28)**
Male-to-male sexual contact/injection drug use (*n*=6,206)[g]	2,637 (42.5)	**1.22 (1.18, 1.27)**	**1.17 (1.13, 1.22)**
Heterosexual contact—male (n=13,223)[g,h]	3,717 (28.1)	**0.78 (0.76, 0.81)**	**0.91 (0.87, 0.94)**
Heterosexual contact—female (*n*=26,818)[g,h]	10,798 (40.3)	**1.16 (1.13, 1.18)**	**1.30 (1.27, 1.32)**
Other - male (*n*=87)[g]	23 (26.2)	0.73 (0.48, 1.09)	0.90 (0.60, 1.36)
Other - female (*n*=99)[g]	28 (28.5)	0.80 (0.55, 1.15)	0.87 (0.60, 1.26)

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Variables	Diagnosed within 1 year after infection *n* (%)	Univariate analysis Hazard ratio (95% CI)	Multivariate analysis Hazard ratio (95% CI)
Region of residence at diagnosis			
Northeast (*n*=25,462)	8,810 (34.6)	**0.96 (0.94, 0.98)**	1.01 (0.99, 1.04)
Midwest (*n*=22,556)	7,999 (35.5)	0.99 (0.96, 1.01)	**0.96 (0.93, 0.98)**
South (ref) (n=86,490)	31,060 (35.9)	—	—
West (*n*=33,420)	12,367 (37.0)	**1.03 (1.01, 1.05)**	**1.03 (1.00, 1.05)**
Facility type at diagnosis			
Inpatient clinical (*n*=28,269)	5,936 (21.0)	**0.53 (0.52, 0.55)**	**0.54 (0.53, 0.56)**
Outpatient clinical (ref) (*n*=78,173)	29,670 (38.0)	—	—
Emergency room (*n*=3,377)	992 (29.4)	**0.76 (0.71, 0.81)**	**0.77 (0.72, 0.82)**
Screening[i] (*n*=30,042)	13,018 (43.3)	**1.16 (1.13, 1.18)**	**1.16 (1.13, 1.18)**
Correction (*n*=4,895)	2,379 (48.6)	**1.31 (1.26, 1.37)**	**1.31 (1.26, 1.37)**
Other (*n*=23,172)	8,241 (35.6)	**0.93 (0.91, 0.96)**	**0.93 (0.91, 0.95)**
Total (167,928)	60,236 (35.9)		

Note: Boldface indicates statistical significance ($p<0.05$). Information is based on data from CDC's NHSS reported through December 2019 among persons aged ≥13 years.

[a]The first positive test was HIV-1 IA, followed within 30 days by a western blot or immunofluorescence assay.

[b]The first positive test HIV-1 IA that could detect both HIV antigen and antibody, followed within 30 days by a supplemental IA that could detect HIV antibodies and differentiate between HIV-1 and HIV-2 antibodies.

[c]The first positive test was a CLIA waived, rapid IA, followed by another positive CLIA waived, rapid IA, on the same day or the first positive test was a CLIA waived, rapid IA, followed within 30 days by a positive HIV diagnostic test (not CLIA waived).

[d]A sequence of tests that do not fit into the other types of defined algorithms or a diagnosis documented by a physician.

[e]Hispanic/Latino may be of any race; all other racial/ethnic groups shown are persons not known to be Hispanic/Latino.

[f]Data have been statistically adjusted to account for missing transmission category; therefore, values may not sum to column subtotals and total.

[g]Data are presented on the basis of sex at birth.

[h]Heterosexual contact with a person known to have or to be at high risk for HIV infection.

[i]Screening facilities include blood bank or plasma centers, drug treatment centers, family planning clinics, HIV case management agencies, HIV counseling and testing sites, insurance screening, STD clinics, other screening facilities, and screening facilities unknown.

CDC, Centers for Disease Control and Prevention; CLIA, Clinical Laboratory Improvement Amendments; NHSS, National HIV Surveillance System; STD, sexually transmitted disease.

Table 3.

Use of the Diagnostic Testing Algorithm in Different Facility Types During 2014–2018—U.S.

	Diagnostic testing algorithm				
Facility type at diagnosis	**Traditional,[a] *n* (%)**	**Recommended,[b] *n* (%)**	**Rapid,[c] *n* (%)**	**Other,[d] *n* (%)**	**Total, *n* (%)**
Inpatient clinical	3,681 (16.2)	18,387 (16.9)	1,155 (11.9)	5,046 (18.8)	28,269 (16.8)
Outpatient clinical	8,960 (39.3)	54,706 (50.3)	3,019 (31.2)	11,488 (42.9)	78,173 (46.6)
Emergency room	259 (1.1)	2,550 (2.4)	246 (2.5)	322 (1.2)	3,377 (2.0)
Screening	5,747 (25.2)	17,357 (16.0)	4,583 (47.3)	2,355 (8.8)	30,042 (17.9)
Correction	512 (2.3)	3,471 (3.2)	221 (2.3)	691 (2.6)	4,895 (2.9)
Other	3,633 (15.9)	12,192 (11.2)	457 (4.7)	6,890 (25.7)	23,172 (13.8)
Total	22,792 (100.0)	108,663 (100.0)	9,681 (100.0)	26,792 (100.0)	167,928 (100.0)

Note: Table distribution $p<0.01$. Information is based on data from CDC's NHSS reported through December 2019 among persons aged ≥13 years.

[a]The first positive test was HIV-1 IA, followed within 30 days by a western blot or immunofluorescence assay.

[b]The first positive test HIV-1 IA that could detect both HIV antigen and antibody, followed within 30 days by a supplemental IA that could detect HIV antibodies and differentiate between HIV-1 and HIV-2 antibodies.

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[d]A sequence of tests that does not fit into the other types of defined algorithms or a diagnosis documented by a physician.

CDC, Centers for Disease Control and Prevention; CLIA, Clinical Laboratory Improvement Amendments; NHSS, National HIV Surveillance System.