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HIV Testing, HIV Positivity, and Linkage and Referral Services in Correctional Facilities in the United States, 2009–2013

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Abstract

Background—Because of health disparities, incarcerated persons are at higher risk for multiple health issues, including HIV. Correctional facilities have an opportunity to provide HIV services to an underserved population. This article describes Centers for Disease Control and Prevention (CDC)–funded HIV testing and service delivery in correctional facilities.

Methods—Data on HIV testing and service delivery were submitted to CDC by 61 health department jurisdictions in 2013. HIV testing, HIV positivity, receipt of test results, linkage, and referral services were described, and differences across demographic characteristics for linkage and referral services were assessed. Finally, trends were examined for HIV testing, HIV positivity, and linkage from 2009 to 2013.

Results—Of CDC-funded tests in 2013 among persons 18 years and older, 254,719 (7.9%) were conducted in correctional facilities. HIV positivity was 0.9%, and HIV positivity for newly diagnosed persons was 0.3%. Blacks accounted for the highest percentage of HIV-infected persons (1.3%) and newly diagnosed persons (0.5%). Only 37.9% of newly diagnosed persons were linked within 90 days; 67.5% were linked within any time frame; 49.7% were referred to partner services; and 45.2% were referred to HIV prevention services. There was a significant percent increase in HIV testing, overall HIV positivity, and linkage from 2009 to 2013. However, trends were stable for newly diagnosed persons.

Conclusions—Identification of newly diagnosed persons in correctional facilities has remained stable from 2009 to 2013. Correctional facilities seem to be reaching blacks, likely due to higher incarceration rates. The current findings indicate that improvements are needed in HIV testing strategies, service delivery during incarceration, and linkage to care postrelease.

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At the end of 2013, more than 1.5 million persons were incarcerated in state and federal prisons in the United States, and 731,200 were held in jails.[1] Incarcerated persons are often disproportionately affected by multiple health issues, including HIV and other sexually transmitted diseases (STDs).[2] According to the Bureau of Justice Statistics, the rate of HIV/AIDS among incarcerated persons has declined from 194 per 10,000 in 2001 to 146 per 10,000 in 2010. However, at the end of 2010, 20,093 incarcerated persons were living with HIV/AIDS.[3] Data on Centers for Disease Control and Prevention (CDC)–funded testing in 2006 indicated 0.9% HIV positivity in correctional facilities and 0.7% newly diagnosed HIV-infected persons (new positives).[4] Men aged 25 to 34 years, blacks, Hispanics/Latinos, persons tested in the South, men who have sex with men, and persons who inject drugs are more likely to be HIV infected or new positives.[4–6] New positives in correctional facilities also have reported riskier behavior, including sex with someone other than their main partner, unsafe vaginal/anal sex, and sex with an at-risk partner (i.e., injected drugs, HIV-infected, or men who have sex with men).[5,7]

In addition to disproportionate incarceration rates, minority populations are disproportionately affected by HIV/AIDS. Blacks accounted for 44% of new infections in 2010 and 41.0% of persons living with HIV in 2011.[8,9] Among CDC-funded HIV testing in 2013, 54.9% of all new positives were blacks.[10] Moreover, Hispanic/Latinos accounted for 21.0% of new infections in 2010 and 20.0% of persons living with HIV in 2011.[8,9] Correctional facilities are an important setting to provide HIV testing and service delivery for underserved, vulnerable populations who may be at risk for HIV/STDs.[2,11]

The CDC recommends routine HIV screening in health care settings for persons aged 13 to 64 years, where prevalence is 0.1% or greater.[12] The CDC for HIV testing in correctional medical clinics has recommended that testing be performed unless the person declines (opt-out screening).[13] Some implementation challenges with testing in correctional facilities include privacy, rapid release from jail, lack of resources, feasibility, and costs.[2,14] Recent evidence suggests that opt-out testing and rapid HIV testing are feasible methods to identify persons unaware of their HIV status because results are delivered within 20 minutes. These methods may be beneficial in facilities with short lengths of stay and allow for early initiation of HIV treatment.[2,5–7,14]

However, challenges remain along the continuum of care for HIV-infected persons. A recent systematic review found low rates of HIV awareness, linkage and retention in care, and viral suppression among incarcerated populations.[15] Most incarcerated persons spend time in jails only,[16] and turnover and short-release times can frequently disrupt HIV care.[17] Because there is a 40% probability of recidivism, jails can help with continuity of care through effective transitional programs for HIV-infected persons.[15,16,18]

HIV testing in correctional facilities provides an opportunity to target a population at high risk for HIV infection who may not otherwise access health care services. HIV service provision would not only benefit incarcerated persons but also their sexual and drug-using networks.[4,11] Therefore, a better understanding of HIV testing, HIV positivity, and service delivery in correctional facilities is necessary. This article describes CDC-funded HIV testing and HIV-related services in correctional facilities in 2013. The aims are to assess (1)

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HIV testing; (2) identification of HIV-infected persons, including new positives; (3) linkage to HIV medical care; (4) referral to partner services; and (5) referral to HIV prevention services. Demographic characteristics of persons who received HIV-related services in correctional facilities were described. In addition, differences across demographic characteristics on linkage and referral services were analyzed, and trends for HIV testing, HIV positivity, and linkage in CDC-funded correctional facilities from 2009 to 2013 were examined.

MATERIALS AND METHODS

Data Source

Since 2012, the CDC has funded 61 health department jurisdictions, which include the 50 states, District of Columbia, Puerto Rico, US Virgin Islands, and 8 directly funded city/county health departments to provide HIV testing and other HIV prevention activities. Previously, from 2009 to 2011, 59 health departments were funded. HIV testing data are collected locally and submitted biannually to the National HIV Prevention Program Monitoring and Evaluation (NHM&E) system, a secure CDC-supported online reporting system. Data submitted by June 2, 2014, from CDC-funded nonclinical and clinical correctional facilities, were included for 2013 analyses. A nonclinical correctional facility is defined as a penal or correctional facility, prison, jail detention center, community-based rehabilitation center, or any similar institution designed for the confinement or rehabilitation of criminal offenders. A clinical correctional facility is defined as an area within a penal or correctional facility, including prison and adult or juvenile detention facilities, that provides medical or health services.

Measures

Demographics—This included self-reported data on age, sex, and race/ethnicity. Jurisdictions were assigned to the Northeast, South, Midwest, and West, using US Census categorizations.

HIV Testing Events and Receipt of HIV Test Results—HIV testing events included all HIV testing records submitted to the NHM&E system, for which a test technology (conventional, rapid, nucleic acid amplification test, RNA viral load testing, or other) or test result (positive, negative, indeterminate, or invalid) was reported. Data on test technology were categorized as rapid test only, conventional test only (nucleic acid amplification test/RNA or other conventional HIV test), or rapid and conventional. Receipt of HIV test result measured whether persons received results from the initial testing site or obtained results from another agency for at least one test in the testing event.

HIV Positivity—HIV-infected persons included those who tested HIV-positive during the current test event. New positives included those who tested HIV positive during the current test event but self-reported not having a previous HIV-positive test result.

Linkage to HIV Medical Care—Linkage was defined as attendance at first medical appointment for HIV-infected persons. Grantees collect these data in various ways,

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including client self-report, medical records, surveil-lance, or local program data. Linkage was examined for new positives in 2013. Trend analyses from 2009 to 2013 examined linkage for both HIV-infected persons and new positives. In addition, linkage within 90 days and linkage within any time frame (i.e., within 90 days and >90 days) are described.

Referral for Partner Services—Partner services are a set of confidential, voluntary services to help HIV-infected persons notify their sex and drug injection partners of possible HIV exposure, to offer services that can protect the health of partners, and to prevent STD reinfection.[19] Persons who were either referred to or interviewed for partner services were considered referred. Referral for partner services was examined for new positives in 2013.

Referral to HIV Prevention Services—HIV prevention services are defined as any service or intervention directly aimed at reducing risk for transmitting or acquiring HIV infection (e.g. risk-reduction counseling).[20] It excludes HIV posttest counseling and indirect services such as mental health services or housing. Referral to HIV prevention services was examined for new positives in 2013.

Data Analysis Plan

Descriptive statistics examined HIV testing and service delivery in correctional facilities by demographic characteristics. In addition, log binominal analyses assessed differences across demographic characteristics for linkage and referral services. Finally, estimated annual percent change (EAPC) analyses examined trends in HIV testing and service delivery in correctional facilities from 2009 to 2013. Analyses were conducted in SAS, version 9.3.

RESULTS

HIV Testing and Receipt of HIV Test Results

In 2013, 3,213,187 CDC-funded HIV testing events were conducted among persons 18 years and older. Of those, 254,719 (7.9%) were conducted in correctional facilities. Puerto Rico and the US Virgin Islands did not submit data from correctional facilities in 2013; therefore, results are from 59 health department jurisdictions. Most HIV testing events in correctional facilities were conducted among persons aged 18 to 29 years (44.2%) and 30 to 39 years (26.5%), males (75.8%), and in the South (46.7%) and Northeast (34.0%). By race/ethnicity, 45.8% of HIV testing events were among blacks, compared with 29.6% among whites and 18.9% among Hispanics/Latinos. Rapid HIV testing was the most commonly used HIV test technology, accounting for 69.6% of testing events (Table 1).

HIV test results were provided for 76.3% of all CDC-funded testing events in correctional facilities. Descriptive analyses revealed that 77.9% of persons aged 40 to 49 years, 77.0% of persons 50 years and older, 78.5% of males, 82.2% of blacks, 98.2% of persons in the Midwest, and 81.0% of persons in the South received their results. Only 64.7% of Hispanic/Latina females received their results, which was relatively lower than other racial/ethnic and sex groups (Table 1).

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HIV Positivity

HIV positivity was 0.9% (2289) in correctional facilities. Persons aged 40 to 49 years (1.6%) and 50 years and older (2.0%), blacks (1.3%), and persons in the South (1.5%) were the groups with the highest percentages of HIV-infected persons. Among all HIV testing events, 0.3% (841) were new positives, and among all HIV-infected persons, 36.7% (841/2289) were new positives. Descriptive analyses revealed that 0.5% of persons aged 40 to 49 years, 0.6% of persons 50 years and older, 0.5% of blacks, and 0.5% of persons in the South were new positives. By race/ethnicity, 0.5% of blacks, 0.2% of Hispanics/Latinos, and 0.2% of whites were new positives (Table 1).

Linkage to HIV Medical Care and Referral Services

Among the 841 new positives, 67.5% were linked to HIV medical care within any time frame after testing. Descriptive analyses revealed that 72.3% of persons 50 years and older, 67.9% of males, and 72.3% of persons in the Northeast were linked within any time frame. Log binomial regression analyses indicated that whites (59.1%) were linked within any time frame significantly less than blacks (69.6%). In addition, persons in the Midwest (32.1%) were linked within any time frame significantly less than persons in the South (67.5%; Table 2).

Among all new positives, 37.9% were linked to HIV medical care within 90 days. Descriptive analyses revealed that 43.8% of persons aged 18 to 29 years, 38.2% of males, 42.2% of blacks, and 66.7% of persons in the West were linked within 90 days. Log binomial regression analyses indicated that persons 50 years and older (33.1%) were linked within 90 days significantly less than persons aged 18 to 29 years (43.8%). In addition, whites (24.7%) were linked within 90 days significantly less than blacks (42.2%). Finally, white males (23.5%) and Hispanic/Latino males (28.3%) were linked within 90 days significantly less than black males (43.8%), and Hispanic/Latina females (70.0%) were linked within 90 days significantly more than black females (35.0%; Table 2).

Approximately half of new positives were referred to partner services. Descriptive analyses revealed that 70.0% of Hispanic/ Latina females and 53.8% of white females were referred to partner services, whereas only 39.1% of Hispanic/Latino males and 38.3% of white males were referred. Log binomial regression analyses indicated that persons aged 30 to 39 years (47.2%), 40 to 49 years of age (41.2%), and 50 years and older (44.6%) were referred to partner services significantly less than persons aged 18 to 29 years (60.2%). Also, Hispanic/ Latino males (39.1%) and white males (38.3%) were referred to partner services significantly less than black males (52.4%). Hispanic/Latina females (70.0%) were referred to partner services significantly more than black females (44.0%). Finally, persons in the Northeast (27.0%) were referred to partner services significantly less than persons in the South (53.1%), whereas those in the West (78.9%) were referred significantly more than those in the South (Table 2).

Finally, 45.2% of new positives were referred to HIV prevention services. Descriptive analyses indicated that 51.5% of persons aged 18 to 29 years, 45.5% of males, and 48.7% of whites were referred to HIV prevention services. Log binomial regression analyses indicated

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that persons aged 30 to 39 years (40.6%) and 50 years and older (39.9%) were referred to HIV prevention services significantly less than persons aged 18 to 29 years (51.5%). Also, persons in the Northeast (72.3%) and in the West (70.2%) were referred to HIV prevention services significantly more than persons in the South (35.8%; Table 2).

HIV Testing and HIV Positivity From 2009 to 2013

Trend analyses indicated that the number of HIV testing events in correctional facilities increased from 2009 to 2012 and decreased slightly in 2013. The EAPC increase for the number of HIV testing events between 2009 and 2013 was 2.7% (Fig. 1). The percentage of HIV-infected persons and new positives varied between years. From 2009 to 2013, the EAPC for total HIV positivity increased by 4.4% ($P < 0.001$). Although not statistically significant, the EAPC for new positives between 2009 and 2013 decreased by 2.1% ($P > 0.05$). Overall, identification of new positives remained stable at 0.3% from 2010 to 2013 (Fig. 2).

The EAPC of HIV-infected persons linked to HIV medical care within any time frame increased from 2009 to 2010, decreased in 2011, and increased in 2012 and in 2013. The percentage of HIV-infected persons linked significantly increased by 26.8% ($P < 0.001$) between 2009 and 2013. The percentage of new positives linked to HIV medical care within any time frame increased from 2009 to 2010 but decreased in 2011, resulting in a fairly stable percentage of persons linked between the 3 years. However, the linkage percentages increased considerably in 2012 and in 2013. The EAPC of new positives linked significantly increased by 15.6% ($P < 0.001$) between 2009 and 2013 (Fig. 3).

DISCUSSION

HIV testing and knowledge of HIV status are gateways to services along the HIV continuum of care. Early initiation of and adherence to antiretroviral therapy has substantial medical and prevention benefits for HIV-infected persons by reducing HIV transmission to HIV-negative partners by up to 96%.[21,22] Therefore, it is critical to ensure all HIV-infected persons receive necessary HIV prevention, care, and treatment services. The National HIV/AIDS Strategy[23] has set goals of reducing new HIV infections and having 85% of new positives linked to HIV medical care within 90 days by 2015. In 2013, only 37.9% of new positives in correctional facilities were linked to medical care within 90 days, and 67.5% were linked within any time frame. Percentages for referral to partner services and HIV prevention services also were relatively low at 49.7% and 45.2%, respectively. Linkage and referral percentages should be significantly improved to ensure that HIV-infected persons and their partners have access to HIV prevention and treatment services.

Overall, blacks accounted for 45.8%, and black males accounted for 37.0% of the CDC-funded HIV testing events conducted in correctional facilities. In addition, overall HIV positivity among blacks was highest compared with other racial/ethnic groups. The percentage of new positives also was highest among blacks at 0.5%, although lower than the 1.0% found in a previous study on CDC-funded testing in correctional facilities.[4] These findings are consistent with blacks being disproportionately affected by HIV in the United States.[9,10]

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HIV testing events funded by CDC in correctional facilities increased overall from 2009 to 2012 but decreased in 2013. Although overall HIV positivity increased from 2009 to 2013, the percentage of new positives has remained stable at 0.3% since 2010. This suggests that despite the overall increase in HIV testing, it has become more challenging to identify new positives. For example, a previous study on CDC-funded testing in 2006 found 0.7% new positives.[4] In addition, in comparison to several other CDC-funded site types in 2013, correctional facilities identified a lower percentage of new positives.[24]

The findings have limitations. Type of correctional facility is not a required reporting variable by CDC. Jails have a rapid turnover, whereas prisons have longer incarceration times so testing and HIV-related service delivery may occur more frequently. Because of challenges with ensuring linkage and continuation of services for persons postrelease, data on services provided post-release were likely not reported, leading to missing data. Moreover, the percentage of missing data was high across service delivery indicators. Therefore, results are likely underestimating service delivery and represent the minimum percent achieved. Linkage to HIV medical care within 90 days became a required reporting variable starting in 2012. This may contribute to incomplete data because of the time it may take grantees to update their data systems for reporting. However, there have been significant improvements in data quality each year. In addition, self-report was used to identify new positives. The percentage of new positives is likely an overestimate because of self-report bias and because HIV testing programs often offer incentives for getting tested. Finally, although the sample size is large, this article only represents CDC-funded tests in correctional facilities. Therefore, findings may not be generalizable to all correctional facilities in the United States.

Centers for Disease Control and Prevention guidance recommends that HIV testing in correctional facilities be offered both upon entry and before release as part of routine care.[2,13] However, because of varying policies and limited resources, implementation varies by state, county, and facility.[25] A recent study found that only 19% of prisons and 35% of jails provide opt-out testing. In addition, less than 20% followed CDC's recommendations regarding discharge planning services.[26] To reduce new HIV infections, it is important to test and treat, as indicated, populations at high risk for HIV. In 2006, an estimated 14% of HIV-infected persons had contact with a correctional facility.[16] This provides an opportunity to link underserved HIV-infected persons into HIV medical care and other prevention services before they return to their communities and sexual and drug-using networks. However, previous research suggests that it is challenging to retain HIV-infected persons who receive services while incarcerated in HIV care and other prevention services postrelease.[15,27,28] They may not adhere to their HIV medications, discontinue treatment, and/or engage in high risk behavior that may increase HIV transmission.[27,28] Other factors that may contribute are poor access to health care upon release, substance use, mental health issues, unstable housing, and unemployment.[11,13,27,29–31]

Routine HIV testing and provision of HIV-related services in correctional facilities have important public health implications. Efforts should be made to increase opt-out testing and improve the continuum of care postrelease.[15] Transitional programs beyond case management could facilitate HIV medical care and other prevention services postrelease.

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Collaboration between prisons and community-based organizations may ensure continuation of services.[13,32] Incarcerated persons with HIV are a vulnerable and underserved population. Providing HIV-related services will not only benefit their health but also the health of the communities to which they return. Various cost-effective and feasible program-matic models that consider the unique policy and economic factors of HIV testing and provision of HIV-related services in correctional facilities and postrelease should be evaluated.

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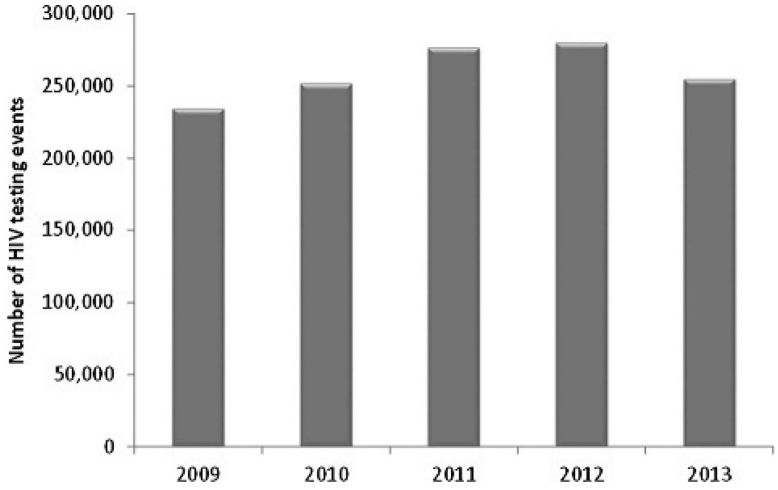

Figure 1.

Number of CDC-funded HIV testing events in correctional facilities in the United States, 2009–2013.

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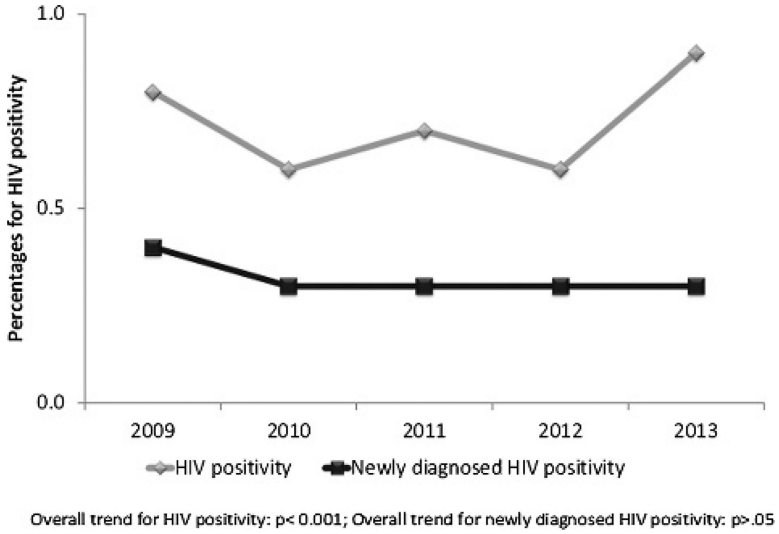

Figure 2.

Percentages of HIV-infected and newly diagnosed HIV-infected persons in correctional facilities in the United States, 2009–2013.

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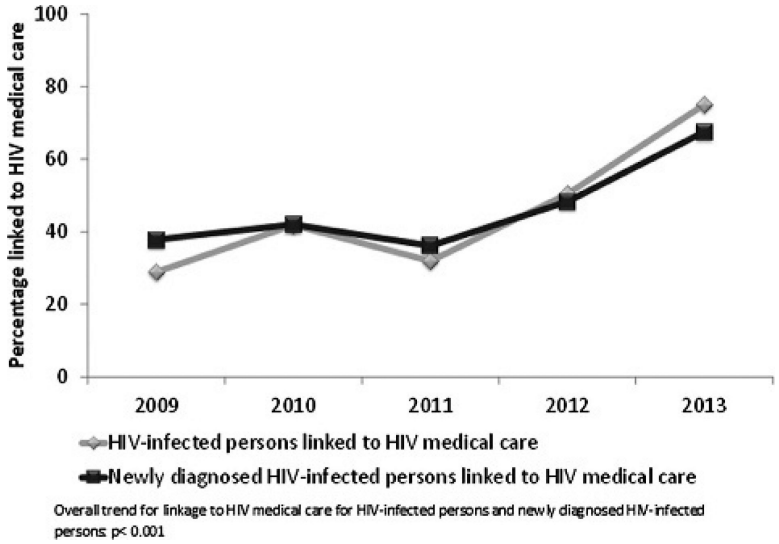

Figure 3.

Percentages of HIV-infected and newly diagnosed HIV-infected persons linked to HIV medical care within any time frame in correctional facilities in the United States, 2009–2013.

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TABLE 1

HIV Testing and HIV Positivity Among Persons in Correctional Facilities by Demographic Characteristics in the United States, 59 CDC-funded Health Department Jurisdictions, 2013

	HIV Testing Events*		Test Technology†						HIV Test Results Received†		HIV-infected Persons†		Newly Diagnosed HIV-infected Persons†	
			Rapid Only		Conventional Only		Rapid and Conventional							
Demographic Characteristics	**n**	**(Col%)**	**n**	**(%)**	**n**	**(%)**	**N**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
Age groups, y														
18–29	112,526	(44.2)	77,618	(69.0)	34,448	(30.6)	222	(0.2)	84,963	(75.5)	552	(0.5)	274	(0.2)
30–39	67,440	(26.5)	46,947	(69.6)	20,187	(29.9)	188	(0.3)	51,500	(76.4)	608	(0.9)	212	(0.3)
40–49	39,849	(15.6)	28,341	(71.1)	11,257	(28.2)	161	(0.4)	31,057	(77.9)	636	(1.6)	199	(0.5)
50+	24,527	(9.6)	17,564	(71.6)	6,805	(27.7)	119	(0.5)	18,876	(77.0)	482	(2.0)	148	(0.6)
Sex														
Male	192,994	(75.8)	137,095	(71.0)	54,992	(28.5)	540	(0.3)	151,442	(78.5)	1,833	(0.9)	672	(0.3)
Female	60,990	(23.9)	39,813	(65.3)	20,906	(34.3)	147	(0.2)	42,586	(69.8)	442	(0.7)	165	(0.3)
Race/Ethnicity and sex														
White	75,403	(29.6)	49,063	(65.1)	26,053	(34.6)	98	(0.1)	54,804	(72.7)	380	(0.5)	154	(0.2)
White men	51,796	(20.3)	33,496	(64.7)	18,112	(35.0)	62	(0.1)	37,944	(73.3)	293	(0.6)	115	(0.2)
White women	23,499	(9.2)	15,501	(66.0)	7,899	(33.6)	36	(0.2)	16,788	(71.4)	87	(0.4)	39	(0.2)
Black or African American	116,691	(45.8)	89,105	(76.4)	26,824	(23.0)	509	(0.4)	95,864	(82.2)	1,570	(1.3)	543	(0.5)
Black or African American men	94,191	(37.0)	73,295	(77.8)	20,276	(21.5)	412	(0.4)	78,948	(83.8)	1,265	(1.3)	441	(0.5)
Black or African American women	22,359	(8.8)	15,714	(70.3)	6,508	(29.1)	92	(0.4)	16,811	(75.2)	295	(1.3)	100	(0.4)
Hispanic or Latino	48,263	(18.9)	31,611	(65.5)	16,568	(34.3)	69	(0.1)	36,072	(74.7)	266	(0.6)	112	(0.2)
Hispanic or Latino men	37,065	(14.6)	24,836	(67.0)	12,164	(32.8)	53	(0.1)	28,809	(77.7)	219	(0.6)	92	(0.2)
Hispanic or Latina women	11,123	(4.4)	6,715	(60.4)	4,389	(39.5)	16	(0.1)	7,200	(64.7)	47	(0.4)	20	(0.2)
Region														
Northeast	86,630	(34.0)	62,442	(72.1)	23,576	(27.2)	125	(0.1)	59,004	(68.1)	335	(0.4)	159	(0.2)
Mdwest	10,670	(4.2)	9,015	(84.5)	1,629	(15.3)	25	(0.2)	10,478	(98.2)	37	(0.3)	28	(0.3)
South	118,941	(46.7)	77,850	(65.5)	40,571	(34.1)	517	(0.4)	96,297	(81.0)	1,808	(1.5)	597	(0.5)

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	HIV Testing Events*		Test Technology†						HIV Test Results Received†		HIV-infected Persons†		Newly Diagnosed HIV-infected Persons†	
			Rapid Only		Conventional Only		Rapid and Conventional							
Demographic Characteristics	**n**	**(Col%)**	**n**	**(%)**	**n**	**(%)**	**N**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
West	38,478	(15.1)	28,036	(72.9)	10,415	(27.1)	27	(0.1)	28,679	(74.5)	109	(0.3)	57	(0.1)
Total	254,719	(100.0)	177,343	(69.6)	76,191	(29.9)	694	(0.3)	194,458	(76.3)	2,289	(0.9)	841	(0.3)

*The percentages for HIV testing events are column percentages.

†The denominator of the percentages for test technology, HIV test results received, HIV-infected persons, and newly diagnosed HIV-infected persons is HIV testing events.

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TABLE 2

Linkage to HIV Medical Care, Referral to Partner Services, and Referral to HIV Prevention Services Among Newly Diagnosed HIV-infected Persons in Correctional Facilities by Demographic Characteristics in the United States, 59 CDC-funded Health Department Jurisdictions, 2013

	Newly Diagnosed HIV-Infected Persons	Linkage to HIV Medical Care within Any Time Frame*			Linkage to HIV Medical Care within 90 days*			Referral to HIV Partner Services*			Referral to HIV Prevention Services*		
Demographic Characteristics	**No.**	**No.**	**(%)**	**PR† (95% CI)**	**No.**	**(%)**	**PR† (95% CI)**	**No.**	**(%)**	**PR† (95% CI)**	**No.**	**(%)**	**PR† (95% CI)**
Age groups, y													
18–29	274	179	(65.3)	Referent	120	(43.8)	Referent	165	(60.2)	Referent	141	(51.5)	Referent
30–39	212	144	(67.9)	1.04 (0.92–1.18)	76	(35.8)	0.82 (0.65–1.02)	100	(47.2)	0.78 (0.66–0.93)	86	(40.6)	0.79 (0.65–0.96)
40–49	199	134	(67.3)	1.03 (0.91–1.17)	70	(35.2)	0.80 (0.64–1.01)	82	(41.2)	0.68 (0.56–0.83)	91	(45.7)	0.89 (0.73–1.07)
50+	148	107	(72.3)	1.11 (0.97–1.26)	49	(33.1)	0.76 (0.58–0.99)	66	(44.6)	0.74 (0.60–0.91)	59	(39.9)	0.77 (0.62–0.97)
Sex													
Male	672	456	(67.9)	Referent	257	(38.2)	Referent	330	(49.1)	Referent	306	(45.5)	Referent
Female	165	110	(66.7)	0.98 (0.87–1.11)	60	(36.4)	0.95 (0.76–1.19)	84	(50.9)	1.04 (0.88–1.23)	72	(43.6)	0.96 (0.79–1.16)
Race/Ethnicity													
Black	543	378	(69.6)	Referent	229	(42.2)	Referent	277	(51.0)	Referent	242	(44.6)	Referent
Hispanic or Latino	112	82	(73.2)	1.05 (0.93–1.19)	40	(35.7)	0.85 (0.65–1.11)	50	(44.6)	0.88 (0.70–1.09)	47	(42.0)	0.94 (0.74–1.19)
White	154	91	(59.1)	0.85 (0.74–0.98)	38	(24.7)	0.59 (0.44–0.78)	65	(42.2)	0.83 (0.68–1.01)	75	(48.7)	1.09 (0.91–1.32)
Race/Ethnicity and sex													
Male													
Black	441	305	(69.2)	Referent	193	(43.8)	Referent	231	(52.4)	Referent	200	(45.4)	Referent
Hispanic or Latino	92	67	(72.8)	1.05 (0.92–1.21)	26	(28.3)	0.65 (0.46–0.91)	36	(39.1)	0.75 (0.57–0.98)	37	(40.2)	0.89 (0.68–1.16)
White	115	69	(60.0)	0.87 (0.74–1.02)	27	(23.5)	0.54 (0.38–0.76)	44	(38.3)	0.73 (0.57–0.94)	55	(47.8)	1.05 (0.85–1.31)
Female													
Black	100	72	(72.0)	Referent	35	(35.0)	Referent	44	(44.0)	Referent	41	(41.0)	Referent
Hispanic or Latino	20	15	(75.0)	1.04 (0.79–1.38)	14	(70.0)	2.00 (1.35–2.96)	14	(70.0)	1.59 (1.11–2.29)	10	(50.0)	1.22 (0.74–2.01)
White	39	22	(56.4)	0.78 (0.58–1.06)	11	(28.2)	0.81 (0.46–1.42)	21	(53.8)	1.22 (0.85–1.76)	20	(51.3)	1.25 (0.85–1.84)
Region													
South	597	403	(67.5)	Referent	225	(37.7)	Referent	317	(53.1)	Referent	214	(35.8)	Referent
Northeast	159	115	(72.3)	1.07 (0.96–1.20)	47	(29.6)	0.78 (0.60–1.02)	43	(27.0)	0.51 (0.39–0.66)	115	(72.3)	2.02 (1.75–2.33)

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Demographic Characteristics	Newly Diagnosed HIV-Infected Persons No.	Linkage to HIV Medical Care within Any Time Frame* No.	(%)	PR† (95% CI)	Linkage to HIV Medical Care within 90 days* No.	(%)	PR† (95% CI)	Referral to HIV Partner Services* No.	(%)	PR† (95% CI)	Referral to HIV Prevention Services* No.	(%)	PR† (95% CI)
Midwest	28	9	(32.1)	0.48 (0.28–0.82)	9	(32.1)	0.85 (0.49–1.48)	13	(46.4)	0.87 (0.58–1.31)	11	(39.3)	1.10 (0.68–1.76)
West	57	41	(71.9)	1.07 (0.90–1.26)	38	(66.7)	1.77 (1.43–2.18)	45	(78.9)	1.49 (1.27–1.73)	40	(70.2)	1.96 (1.60–2.39)
Total	841	568	(67.5)		319	(37.9)		418	(49.7)		380	(45.2)	

*The denominator for the percentages for linkage to HIV medical care, referral to partner services, and referral to HIV prevention services is newly diagnosed HIV-infected persons.

†Unadjusted prevalence ratio.