

Persistent Racial/Ethnic Disparities in AIDS Diagnosis Rates Among People Who Inject Drugs in U.S. Metropolitan Areas, 1993–2007

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ABSTRACT

Objectives. We estimated race/ethnicity-specific incident AIDS diagnosis rates (IARs) among people who inject drugs (PWID) in U.S. metropolitan statistical areas (MSAs) over time to assess the change in disparities after highly active antiretroviral therapy (HAART) dissemination.

Methods. We compared IARs and 95% confidence intervals (CIs) for black/African American and Hispanic/Latino PWID with those of white PWID in 93 of the most populous MSAs. We selected two three-year periods from the years immediately preceding HAART (1993–1995) and the years with the most recent available data (2005–2007). To maximize stability, we aggregated data across three-year periods, and we aggregated data for black/African American and Hispanic/Latino PWID for most comparisons with data for white PWID. We assessed disparities by comparing IAR 95% CIs for overlap.

Results. IARs were significantly higher for black/African American and Hispanic/Latino PWID than for white PWID in 81% of MSAs in 1993–1995 and 77% of MSAs in 2005–2007. MSAs where disparities became non-significant over time were concentrated in the West. Significant differences were more frequent in comparisons between black/African American and white PWID (85% of MSAs in 1993–1995, 79% of MSAs in 2005–2007) than in comparisons between Hispanic/Latino and white PWID (53% of MSAs in 1993–1995, 56% of MSAs in 2005–2007). IARs declined modestly across racial/ethnic groups in most MSAs.

Conclusions. AIDS diagnosis rates continue to be substantially higher for black/African American and Hispanic/Latino PWID than for white PWID in most large MSAs. This finding suggests a need for increased targeting of prevention and treatment programs, as well as research on MSA-level conditions that may serve to maintain the disparities.

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Together, non-Hispanic black people/African Americans (hereafter, black people) and Hispanic or Latino people (hereafter, Hispanic people) are estimated to comprise about half of the population of people who inject drugs (PWID) in the U.S.,¹ but they comprise about three-quarters of PWID who have been diagnosed with acquired immunodeficiency syndrome (AIDS).² Harm-reduction programs are believed to have been partly responsible for reducing human immunodeficiency virus (HIV) transmission among PWID since the 1980s,³ and highly active antiretroviral therapy (HAART) has greatly reduced rates of progression to AIDS.⁴ These benefits, however, may not have spread evenly across racial/ethnic groups and localities. Racial/ethnic disparities in AIDS diagnosis rates may reflect disparities in HIV incidence, progression to AIDS among people who are HIV-positive, and time to diagnosis among people living with AIDS.⁵

From a fundamental cause perspective, racial/ethnic AIDS incidence disparities reflect underlying differences in social conditions and access to resources, including HIV prevention and treatment.⁶ These disparities can include proximal factors, such as access to harm-reduction programs and high-quality health care, and more distal factors, such as risk of incarceration and potential exposure to HIV from living in neighborhoods with high HIV prevalence.⁷ The social conditions that link race/ethnicity to HIV/AIDS risk act through multiple mechanisms, so that attempts to reduce disparities by eliminating one mechanism may fail because other mechanisms remain. The fundamental cause perspective suggests that improvements in treatment and prevention are likely to benefit white people more than black or Hispanic people, potentially maintaining or amplifying disparities over time.^{6,8,9}

Nationally, there is evidence of decline in racial/ethnic disparities in HIV or AIDS diagnosis in the U.S. across risk groups. The magnitude of black-white and Hispanic-white AIDS diagnosis disparities declined significantly from 2000 to 2009, except for adolescent and young adult males (aged 13–24 years).⁵ From 2001 to 2004, the rate of HIV diagnosis declined by 6.8% annually among black people and by 4.7% among Hispanic people, but increased by 1.4% annually among white people.¹⁰ In an analysis of 2007 HIV surveillance data, black-white and Hispanic-white disparities in large urban areas were greatest in the Northeast, South, and Midwest.¹¹ Results of that study suggest that changing HIV disparities may be related to changing trends in HIV incidence by risk category regardless of race/ethnicity, and contacts among risk groups and racial/ethnic groups over time.

Assessing disparities in AIDS diagnoses in specific

geographic areas can help us study the fundamental causes of the disparities. Some of the mechanisms linking race/ethnicity to AIDS act outside of the direct control of individuals. For example, living in an area where HIV treatment is unavailable or is of poor quality can impact everyone in the area who is HIV-positive and is difficult to contend with individually, short of moving to an area with better treatment options. Area-specific AIDS prevalence rates reflect the accumulation of individual risk behaviors, the concentration of HIV in sex and injection networks, the social conditions in the area that affect risk behaviors, and HIV and drug use treatment and prevention programs.^{11,12} By comparing racial/ethnic differences in area-specific AIDS incidence rates across time, we can indirectly assess the system of mechanisms linking race/ethnicity and AIDS risk and identify where conditions are improving or worsening. Concurrently, data on changes in area-level racial/ethnic disparities can be used to more completely identify and understand those mechanisms.

To assess changes in racial/ethnic disparities, we compared new (incident) AIDS diagnosis rates (IARs) for black and Hispanic PWID with those of non-Hispanic white (hereafter, white) PWID in U.S. metropolitan areas over time.

METHODS

To calculate IARs, we obtained yearly data on the number of incident AIDS diagnoses and the number of PWID living with AIDS stratified by racial/ethnic group from 1993–2007 for 94 of the most populous U.S. MSAs. We used the MSA as the unit of analysis because MSAs are likely to reflect social and economic integration among resident injection drug users (IDUs).¹³ MSAs represent socially and economically integrated entities comprising contiguous counties that contain a central city of $\geq 50,000$ people.¹⁴

The AIDS data were drawn from a complete count of new AIDS diagnoses reported to the Centers for Disease Control and Prevention (CDC). They were not subject to sampling error but were subject to random variation and may contain nonsampling error related to incomplete reporting and misclassification of transmission risk or of race/ethnicity. This error can have a greater impact where the data are sparse. Some MSAs in our study reported few AIDS diagnoses among PWID in some years, particularly when stratified by race/ethnicity. To minimize the potential impact of nonsampling error, we compared aggregated data from 1993–1995 (the three years immediately preceding HAART dissemination) with aggregated data from 2005–2007 (the three years with the most recent data).

For each three-year period in each MSA, we calculated diagnosis rates by dividing the number of PWID AIDS diagnoses by the estimated number of PWID at risk for AIDS.

The estimated yearly numbers of PWID of each racial/ethnic group in each MSA have been developed in a series of studies, using multiple data sources to account for difficulties in assessing this hard-to-reach population.^{1,15-19} These sources included data from published national and MSA-specific research studies, and data on HIV counseling and testing, drug treatment, arrests for heroin and cocaine possession, and new AIDS diagnoses, adjusted for HIV prevalence. Although these PWID population estimates show strong consistency with external validators (i.e., deaths due to hepatitis C and drug poisoning), it is important to note that they contain error and may be biased to underrepresent PWID who did not interact with the health-care or criminal justice systems.¹ PWID living with AIDS were excluded from the denominators to calculate IARs for the PWID populations at risk for AIDS. For the purposes of this study, PWID at risk for AIDS could be HIV-infected or HIV-uninfected. We combined black and Hispanic PWID data for most comparisons with white PWID to minimize the exclusion of MSAs with no AIDS diagnoses among black or Hispanic PWID in either time period from the analysis. Hispanic PWID could be of any race.

To facilitate comparisons, we calculated 95% confidence intervals (CIs) for each IAR. For analytic purposes, the number of AIDS diagnoses that actually occurred can be viewed as one of a large series of possible results that could have occurred under the same or similar conditions. As infrequent events, AIDS diagnoses can be considered as occurring in a Poisson-distributed function. Under this assumption, we calculated IAR 95% CIs using standard formulas when there were ≥ 100 diagnoses, and using tabled values when there were < 100 diagnoses.^{20,21} The 95% CIs reflect the range of IARs that could have occurred under the same or similar conditions 95 times out of 100. These CIs are based on estimates that reflect only random variation in the numerator and not error in the denominator PWID population estimates.

We considered various methods for assessing change in IAR disparities, including comparing absolute and relative differences in IAR values and ratios.^{22,23} The choice of disparity measurement can affect the interpretation of results.^{23,24} Most absolute change measures (e.g., rate differences) were sensitive to high IARs in the early period so that disparities appeared to decrease simply because the overall rates declined. Conversely, relative measures (e.g., rate ratios [RRs]) were sensi-

tive to small values, so that disparities appeared to vary greatly in MSAs with small but changing numbers of diagnoses.

One method for comparing area-level rates for important differences is to compare CIs for overlap. If the CIs do not overlap, the difference can be considered significant at the 95% level.^{21,25} Comparing IAR CIs for overlap is an absolute comparison that takes into account the precision of the IARs. We chose to focus on the CI overlap method because our main interest was in the frequency of important disparities.

We calculated IARs and their respective 95% CIs for each MSA, time period, and racial/ethnic group. IARs are scaled (multiplied by 10,000) for presentation. To provide information on the magnitude of the disparities, we calculated IAR ratios (relative risks) by dividing the combined black/Hispanic PWID IAR by the white PWID IAR. We compared the frequency of IAR disparities by region (Northeast, South, Midwest, and West) to summarize their geographic distribution.

Data from 93 MSAs were included in the analysis. One MSA (San Juan-Bayamon, Puerto Rico) was excluded because virtually all PWID diagnoses were among Hispanic people. In the 2005–2007 period, racial/ethnic comparisons were not made in two additional MSAs (Ann Arbor, Michigan, and Ventura, California) because no incident AIDS diagnoses were reported among white PWID. IARs for black PWID were not calculated for two MSAs in 2005–2007 because there were no diagnoses reported among them. IARs were not calculated for Hispanic PWID in five MSAs in 1993–1995 and in two MSAs in 2005–2007 for the same reason. IARs for PWID who reported Asian, American Indian/Alaska Native, and Native Hawaiian/other Pacific Islander race/ethnicity were not analyzed because the numbers of diagnoses were too small.

RESULTS

Racial/ethnic group-specific IARs, 95% CIs, and IAR ratios comparing the combined black/Hispanic PWID group with white PWID for both time periods in each MSA are presented in the Table. There were modest declines in IARs among all three racial/ethnic groups in most MSAs. IARs were significantly greater for black/Hispanic than for white PWID in 81% of MSAs (75 of 93) in 1993–1995 and 77% of MSAs (70 of 91) in 2005–2007. Of the 75 MSAs with significant disparities in 1993–1995, disparities remained significant in 65 MSAs in 2005–2007; there were no longer significant disparities in nine MSAs and disparities were not computed in one MSA (Ann Arbor). Of the nine MSAs where there were no longer significant disparities over

Table. AIDS diagnosis rates per 10,000 population and 95% CIs for people who inject drugs, by race/ethnicity, and RRs comparing non-Hispanic black/African American and Hispanic/Latino people who inject drugs with those of non-Hispanic white people who inject drugs: 93 U.S. metropolitan areas, 1993–1995 and 2005–2007

Metropolitan area	Years	Non-Hispanic white Rate (95% CI)	Non-Hispanic black/ African American Rate (95% CI)	Hispanic/Latino Rate (95% CI)	Combined non-Hispanic black/African American/ Hispanic/Latino Rate (95% CI)	RR ^a
Akron, Ohio	1993–1995	2 (0.1, 12.9)	46 (23.9, 80.8)	NC ^b	45 (23.3, 78.9)	19.6 ^c
	2005–2007	10 (3.4, 24.2)	33 (9.0, 84.4)	690 (83.5, 2,491.3)	48 (17.7, 105.1)	4.7
Albany/Schenectady/Troy, New York	1993–1995	121 (92.4, 156.5)	369 (297.4, 440.6)	526 (406.2, 670.8)	418 (354.3, 480.9)	3.4 ^c
	2005–2007	29 (16.7, 45.8)	160 (109.8, 224.1)	65 (38.6, 102.9)	106 (78.6, 138.8)	3.7 ^c
Albuquerque, New Mexico	1993–1995	8 (4.4, 14.8)	39 (8.0, 113.6)	10 (5.6, 16.4)	11 (6.7, 18.0)	1.3
	2005–2007	2 (0.6, 5.9)	50 (13.5, 127.2)	7 (3.3, 12.7)	9 (5.0, 15.4)	4
Allentown/Bethlehem/Easton, Pennsylvania	1993–1995	24 (15.6, 36.1)	72 (41.3, 117.3)	137 (108.5, 170.8)	119 (96.3, 145.5)	4.9 ^c
	2005–2007	15 (8.4, 23.9)	50 (19.9, 102.1)	63 (44.3, 86.8)	60 (43.9, 81.0)	4.1 ^c
Ann Arbor, Michigan	1993–1995	16 (4.5, 41.9)	75 (34.2, 141.8)	417 (50.5, 1,505.1)	88 (43.8, 157.1)	5.4 ^c
	2005–2007	NC ^b	42 (11.4, 106.8)	192 (4.9, 1,071.5)	49 (16.1, 115.4)	NC ^b
Atlanta, Georgia	1993–1995	51 (41.6, 59.6)	359 (335.6, 382.9)	320 (189.8, 506.2)	358 (335.0, 381.8)	7.1 ^c
	2005–2007	8 (5.2, 12.4)	155 (137.2, 172.3)	116 (67.5, 185.4)	152 (135.2, 168.7)	18.5 ^c
Austin/San Marcos, Texas	1993–1995	24 (17.9, 31.5)	200 (169.9, 229.2)	21 (13.7, 31.8)	99 (85.4, 113.0)	4.1 ^c
	2005–2007	13 (7.9, 20.4)	106 (74.6, 146.0)	35 (21.4, 52.7)	61 (46.0, 78.3)	4.6 ^c
Bakersfield, California	1993–1995	19 (12.8, 26.4)	143 (100.9, 195.7)	37 (25.9, 51.1)	60 (46.8, 74.9)	3.2 ^c
	2005–2007	15 (10.2, 21.6)	67 (39.5, 112.3)	39 (27.5, 54.3)	45 (33.8, 59.3)	3.0 ^c
Baltimore, Maryland	1993–1995	61 (51.9, 69.8)	372 (356.9, 386.8)	295 (161.1, 494.5)	371 (356.4, 386.2)	6.1 ^c
	2005–2007	20 (16.5, 23.4)	99 (92.5, 105.9)	30 (13.1, 59.9)	97 (90.6, 103.7)	4.9 ^c
Bergen/Passaic, New Jersey	1993–1995	184 (159.4, 208.0)	791 (713.0, 868.6)	385 (325.1, 443.9)	606 (555.8, 656.3)	3.3 ^c
	2005–2007	26 (17.2, 37.5)	154 (118.4, 197.1)	89 (64.1, 121.1)	120 (96.8, 142.8)	4.6 ^c
Birmingham, Alabama	1993–1995	39 (24.6, 59.4)	191 (142.3, 251.3)	667 (16.9, 3,714.4)	194 (144.7, 254.2)	4.9 ^c
	2005–2007	17 (7.3, 33.1)	50 (31.4, 75.9)	1,053 (127.5, 3,802.5)	54 (34.9, 81.0)	3.2 ^c
Boston, Massachusetts/New Hampshire	1993–1995	93 (86.3, 100.2)	302 (275.9, 329.0)	284 (256.7, 310.5)	293 (274.5, 312.3)	3.2 ^c
	2005–2007	14 (11.8, 15.9)	68 (56.8, 79.5)	42 (35.0, 49.6)	53 (46.3, 58.9)	3.8 ^c
Buffalo/Niagara Falls, New York	1993–1995	66 (47.2, 90.7)	155 (128.4, 182.3)	193 (143.5, 254.8)	164 (140.3, 188.6)	2.5 ^c
	2005–2007	12 (6.4, 21.5)	85 (59.1, 119.3)	50 (28.7, 81.5)	70 (51.7, 91.9)	5.7 ^c
Charleston/North Charleston, South Carolina	1993–1995	66 (39.8, 103.2)	358 (286.8, 441.6)	167 (4.2, 928.6)	353 (283.4, 435.4)	5.4 ^c
	2005–2007	13 (4.9, 29.2)	273 (191.0, 377.6)	148 (17.9, 535.2)	261 (184.8, 358.5)	19.5 ^c
Charlotte/Gastonia/Rock Hill, North Carolina/ South Carolina	1993–1995	28 (18.4, 40.6)	226 (193.2, 258.9)	328 (39.7, 1,184.4)	227 (194.0, 259.6)	8.1 ^c
	2005–2007	10 (4.8, 17.2)	108 (85.9, 133.0)	105 (21.7, 307.6)	108 (86.2, 132.4)	11.2 ^c
Chicago, Illinois	1993–1995	113 (101.5, 125.4)	288 (273.2, 302.7)	293 (259.1, 327.5)	289 (275.3, 302.4)	2.6 ^c
	2005–2007	16 (12.3, 21.1)	115 (104.0, 125.7)	80 (63.7, 99.6)	108 (98.2, 116.8)	6.6 ^c
Cleveland/Lorain/Elyria, Ohio	1993–1995	34 (24.6, 46.6)	64 (51.9, 77.7)	150 (108.3, 201.5)	77 (64.5, 90.0)	2.3 ^c
	2005–2007	10 (5.2, 16.7)	43 (29.7, 59.2)	50 (28.7, 81.7)	45 (33.3, 58.8)	4.6 ^c
Columbus, Ohio	1993–1995	30 (20.8, 41.5)	41 (30.3, 55.1)	59 (7.1, 211.9)	42 (30.8, 55.5)	1.4
	2005–2007	5 (2.0, 10.2)	40 (26.2, 59.7)	84 (10.1, 302.3)	42 (27.7, 61.2)	8.5 ^c
Dallas, Texas	1993–1995	31 (25.2, 35.9)	104 (89.9, 118.6)	66 (44.7, 93.5)	97 (84.4, 109.2)	3.2 ^c
	2005–2007	11 (8.5, 15.0)	35 (27.9, 42.7)	28 (18.0, 41.7)	33 (26.9, 39.1)	2.9 ^c

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Table (continued). AIDS diagnosis rates per 10,000 population and 95% CIs for people who inject drugs, by race/ethnicity, and RRs comparing non-Hispanic black/African American and Hispanic/Latino people who inject drugs with those of non-Hispanic white people who inject drugs: 93 U.S. metropolitan areas, 1993–1995 and 2005–2007

Metropolitan area	Years	Non-Hispanic white Rate (95% CI)	Non-Hispanic black/ African American Rate (95% CI)	Hispanic/Latino Rate (95% CI)	Combined non-Hispanic black/African American/ Hispanic/Latino Rate (95% CI)	RR ^a
Dayton/Springfield, Ohio	1993–1995	25 (13.0, 44.0)	35 (20.7, 55.3)	345 (8.7, 1,921.0)	37 (22.1, 57.4)	1.5
	2005–2007	4 (1.1, 10.5)	17 (6.4, 37.7)	169 (4.3, 944.3)	20 (8.0, 41.0)	4.9
Denver, Colorado	1993–1995	25 (19.9, 32.0)	49 (34.6, 67.7)	21 (14.5, 30.2)	31 (23.9, 39.0)	1.2
	2005–2007	7 (4.1, 9.9)	30 (17.4, 49.5)	29 (18.6, 44.0)	30 (21.2, 40.7)	4.6 ^c
Detroit, Michigan	1993–1995	20 (15.2, 25.5)	157 (144.4, 170.4)	157 (97.4, 240.6)	157 (144.6, 170.2)	7.9 ^c
	2005–2007	11 (8.0, 15.5)	51 (43.4, 58.1)	76 (37.9, 136.0)	52 (44.4, 59.0)	4.6 ^c
El Paso, Texas	1993–1995	15 (6.5, 29.9)	6 (0.2, 36.2)	10 (6.7, 15.1)	10 (6.7, 14.7)	0.7
	2005–2007	9 (0.2, 50.6)	35 (7.2, 102.7)	15 (8.6, 23.7)	16 (9.9, 25.0)	1.8
Fort Lauderdale, Florida	1993–1995	97 (81.2, 112.0)	1,084 (981.5, 1,185.7)	496 (384.3, 629.8)	935 (853.1, 1,017.0)	9.7 ^c
	2005–2007	47 (35.4, 60.6)	634 (523.1, 744.5)	118 (74.0, 178.9)	384 (322.5, 446.3)	8.2 ^c
Fort Worth/Arlington, Texas	1993–1995	31 (25.4, 36.8)	86 (71.0, 100.4)	47 (30.0, 69.7)	76 (64.0, 87.9)	2.4 ^c
	2005–2007	13 (8.9, 17.6)	64 (48.8, 83.5)	23 (12.1, 40.7)	49 (38.4, 62.4)	3.9 ^c
Fresno, California	1993–1995	14 (9.2, 20.7)	145 (110.2, 188.5)	15 (9.9, 21.3)	37 (29.3, 45.2)	2.6 ^c
	2005–2007	9 (5.2, 14.7)	49 (30.9, 74.5)	6 (2.8, 9.9)	14 (9.3, 19.0)	1.5
Gary, Indiana	1993–1995	29 (17.6, 45.6)	48 (32.0, 70.5)	80 (32.3, 165.4)	53 (36.6, 73.8)	1.8
	2005–2007	7 (3.1, 14.0)	19 (9.3, 35.8)	19 (4.0, 56.2)	19 (10.3, 33.2)	2.7
Grand Rapids/Muskegon/Holland, Michigan	1993–1995	24 (12.2, 43.6)	53 (29.7, 87.4)	83 (26.8, 192.9)	58 (35.6, 89.9)	2.3
	2005–2007	12 (4.7, 24.0)	49 (24.7, 88.5)	35 (4.2, 125.4)	46 (24.7, 79.4)	4.0 ^c
Greensboro/Winston-Salem/High Point, North Carolina	1993–1995	14 (7.6, 24.3)	176 (144.0, 207.7)	278 (33.6, 1,003.4)	177 (145.2, 208.7)	12.5 ^c
	2005–2007	7 (2.5, 14.9)	96 (67.1, 133.9)	82 (9.9, 294.9)	95 (67.2, 131.5)	14.0 ^c
Greenville/Spartanburg/Anderson, South Carolina	1993–1995	62 (40.8, 90.1)	222 (167.9, 287.2)	179 (45.9, 994.9)	221 (167.7, 285.4)	3.6 ^c
	2005–2007	14 (6.1, 27.9)	160 (100.1, 241.9)	172 (20.9, 622.8)	161 (103.0, 239.2)	11.3 ^c
Harrisburg/Lebanon/Carlisle, Pennsylvania	1993–1995	51 (33.4, 73.7)	97 (67.7, 133.9)	114 (67.6, 180.3)	102 (76.5, 132.9)	2.0 ^c
	2005–2007	10 (5.2, 18.6)	54 (29.0, 93.1)	63 (32.3, 109.3)	58 (37.6, 85.7)	5.6 ^c
Hartford, Connecticut	1993–1995	141 (118.7, 163.0)	642 (574.8, 709.4)	275 (246.7, 302.5)	380 (352.3, 407.8)	2.7 ^c
	2005–2007	36 (26.6, 48.1)	178 (134.7, 231.6)	86 (69.0, 105.3)	107 (89.6, 124.2)	3.0 ^c
Honolulu, Hawaii	1993–1995	18 (9.8, 30.1)	41 (8.6, 121.3)	104 (41.9, 214.6)	72 (34.4, 131.8)	4.0 ^c
	2005–2007	19 (10.3, 31.6)	14 (0.4, 78.5)	32 (6.7, 94.7)	24 (6.7, 62.6)	1.3
Houston, Texas	1993–1995	31 (26.6, 35.7)	87 (78.8, 94.3)	42 (33.5, 52.9)	76 (69.3, 81.8)	2.4 ^c
	2005–2007	14 (10.7, 18.2)	76 (67.5, 85.1)	40 (31.3, 50.4)	65 (57.9, 71.3)	4.6 ^c
Indianapolis, Indiana	1993–1995	22 (14.7, 32.0)	47 (35.2, 60.4)	NC ^b	45 (34.2, 58.8)	2.1 ^c
	2005–2007	19 (11.4, 28.9)	46 (27.8, 70.3)	45 (9.3, 131.2)	45 (28.8, 68.2)	2.4
Jacksonville, Florida	1993–1995	35 (25.8, 46.4)	224 (191.3, 257.2)	142 (52.1, 308.7)	220 (188.3, 251.9)	6.3 ^c
	2005–2007	27 (18.5, 39.1)	192 (147.7, 248.7)	103 (49.5, 189.8)	170 (131.1, 215.7)	6.2 ^c
Jersey City, New Jersey	1993–1995	288 (252.4, 323.1)	731 (657.6, 803.4)	573 (508.2, 638.6)	653 (603.8, 701.7)	2.3 ^c
	2005–2007	37 (22.2, 57.5)	236 (180.9, 302.4)	156 (120.6, 198.4)	187 (154.2, 218.9)	5.1 ^c
Kansas City, Missouri/Kansas	1993–1995	16 (10.3, 23.1)	67 (45.4, 94.9)	50 (10.3, 145.4)	65 (44.9, 90.7)	4.1 ^c
	2005–2007	16 (9.4, 25.7)	53 (37.7, 72.5)	189 (94.4, 338.2)	63 (46.8, 83.1)	3.9 ^c
Knoxville, Tennessee	1993–1995	15 (7.7, 26.0)	37 (17.9, 68.6)	192 (4.9, 1,071.5)	40 (20.1, 72.0)	2.7
	2005–2007	8 (4.0, 14.3)	113 (58.3, 197.0)	345 (41.8, 1,245.6)	125 (68.2, 209.4)	15.6 ^c

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Table (continued). AIDS diagnosis rates per 10,000 population and 95% CIs for people who inject drugs, by race/ethnicity, and RRs comparing non-Hispanic black/African American and Hispanic/Latino people who inject drugs with those of non-Hispanic white people who inject drugs: 93 U.S. metropolitan areas, 1993–1995 and 2005–2007

Metropolitan area	Years	Non-Hispanic white Rate (95% CI)	Non-Hispanic black/ African American Rate (95% CI)	Hispanic/Latino Rate (95% CI)	Combined non-Hispanic black/African American/ Hispanic/Latino Rate (95% CI)	RR ^a
Las Vegas, Nevada/Arizona	1993–1995	29 (23.1, 36.0)	193 (155.7, 235.7)	83 (49.9, 129.4)	158 (128.5, 186.6)	5.4 ^c
	2005–2007	13 (9.0, 18.3)	62 (41.9, 88.6)	46 (27.5, 73.4)	55 (40.7, 73.1)	4.2 ^c
Little Rock/North Little Rock, Arkansas	1993–1995	8 (3.5, 14.4)	62 (38.8, 93.7)	NC ^b	61 (38.3, 92.5)	8.1 ^c
	2005–2007	9 (4.2, 17.4)	111 (59.1, 189.8)	150 (30.9, 438.4)	117 (66.7, 189.5)	12.7 ^c
Los Angeles/Long Beach, California	1993–1995	31 (27.0, 34.0)	73 (65.7, 79.9)	29 (26.0, 32.6)	44 (41.1, 47.6)	1.5 ^c
	2005–2007	11 (8.8, 14.0)	30 (24.2, 34.9)	13 (10.3, 14.9)	18 (15.3, 19.9)	1.6 ^c
Memphis, Tennessee/Arkansas/Mississippi	1993–1995	25 (14.4, 41.0)	122 (96.5, 152.3)	96 (2.4, 535.7)	122 (96.3, 151.6)	4.8 ^c
	2005–2007	13 (7.0, 22.4)	104 (76.8, 138.1)	80 (2.0, 445.7)	104 (76.6, 136.8)	7.9 ^c
Miami, Florida	1993–1995	75 (61.4, 88.4)	697 (654.9, 739.5)	252 (220.3, 283.9)	524 (495.1, 552.4)	7.0 ^c
	2005–2007	18 (11.1, 28.8)	623 (533.3, 712.9)	158 (122.7, 199.5)	346 (303.2, 388.3)	18.7 ^c
Middlesex/Somerset/Hunterdon, New Jersey	1993–1995	166 (139.1, 192.7)	733 (637.0, 829.0)	493 (398.7, 587.2)	634 (565.8, 703.0)	3.8 ^c
	2005–2007	17 (9.7, 26.6)	224 (153.5, 316.8)	135 (87.4, 199.3)	174 (131.7, 225.3)	10.5 ^c
Milwaukee/Waukesha, Wisconsin	1993–1995	31 (19.0, 47.0)	92 (69.8, 117.8)	139 (82.6, 220.4)	99 (78.6, 124.1)	3.2 ^c
	2005–2007	4 (1.2, 11.4)	42 (28.2, 60.5)	28 (13.5, 51.8)	37 (26.6, 51.1)	8.4 ^c
Minneapolis/St. Paul, Minnesota/Wisconsin	1993–1995	24 (17.0, 33.3)	81 (59.7, 107.3)	70 (22.7, 163.2)	80 (59.7, 104.3)	3.3 ^c
	2005–2007	7 (3.8, 12.4)	66 (43.7, 95.0)	169 (87.1, 294.4)	80 (57.5, 109.6)	11.1 ^c
Monmouth/Ocean, New Jersey	1993–1995	172 (145.9, 197.3)	492 (426.0, 558.5)	565 (419.3, 744.8)	505 (443.5, 565.7)	2.9 ^c
	2005–2007	21 (13.9, 30.2)	184 (132.1, 249.8)	88 (42.1, 161.6)	152 (112.8, 199.3)	7.3 ^c
Nashville, Tennessee	1993–1995	46 (34.1, 59.8)	147 (118.9, 174.2)	158 (32.6, 461.4)	147 (119.5, 174.2)	3.2 ^c
	2005–2007	13 (8.2, 19.0)	106 (79.2, 139.9)	24 (0.6, 132.0)	100 (74.5, 130.8)	7.8 ^c
Nassau/Suffolk, New York	1993–1995	191 (171.2, 210.9)	808 (727.1, 888.1)	502 (405.0, 600.0)	717 (653.3, 780.3)	3.8 ^c
	2005–2007	16 (10.9, 21.8)	263 (201.7, 335.9)	137 (96.8, 187.8)	195 (157.0, 233.1)	12.5 ^c
New Haven/Meriden, Connecticut	1993–1995	146 (129.3, 162.5)	560 (515.1, 604.3)	214 (187.7, 239.9)	378 (352.4, 402.8)	2.6 ^c
	2005–2007	41 (31.6, 52.0)	368 (299.0, 436.5)	73 (58.6, 86.8)	125 (107.8, 141.3)	3.1 ^c
New Orleans, Louisiana	1993–1995	33 (25.8, 42.2)	116 (101.2, 131.2)	228 (124.9, 383.2)	120 (104.5, 134.5)	3.6 ^c
	2005–2007	19 (13.1, 27.6)	85 (69.3, 103.8)	157 (68.0, 310.3)	88 (71.6, 105.0)	4.6 ^c
New York, New York	1993–1995	281 (269.3, 292.3)	920 (900.7, 939.2)	671 (654.4, 687.0)	795 (782.1, 807.3)	2.8 ^c
	2005–2007	46 (40.8, 51.9)	312 (296.8, 326.4)	97 (91.9, 102.9)	162 (156.5, 168.3)	3.5 ^c
Newark, New Jersey	1993–1995	159 (140.5, 177.4)	967 (927.5, 1,007.2)	337 (299.5, 374.1)	788 (757.7, 818.5)	5.0 ^c
	2005–2007	20 (14.3, 26.6)	392 (353.4, 429.7)	83 (65.6, 102.4)	240 (218.8, 261.5)	12.2 ^c
Norfolk/Virginia Beach/Newport News, Virginia/North Carolina	1993–1995	48 (35.7, 62.7)	154 (132.5, 174.6)	304 (139.0, 577.2)	157 (135.8, 177.8)	3.3 ^c
	2005–2007	12 (6.9, 19.7)	51 (38.4, 67.4)	74 (27.2, 161.4)	53 (40.3, 68.6)	4.4 ^c
Oakland, California	1993–1995	27 (21.7, 33.7)	122 (108.6, 134.8)	33 (23.5, 46.0)	96 (86.3, 106.0)	3.5 ^c
	2005–2007	10 (6.5, 15.8)	33 (25.9, 42.6)	10 (4.9, 18.9)	26 (20.3, 32.3)	2.5 ^c
Oklahoma City, Oklahoma	1993–1995	21 (14.9, 30.0)	80 (42.4, 136.0)	50 (6.0, 179.7)	74 (41.2, 121.5)	3.4 ^c
	2005–2007	12 (6.6, 19.6)	77 (38.4, 137.7)	144 (52.8, 313.2)	92 (53.6, 147.4)	7.8 ^c
Omaha, Nebraska/Iowa	1993–1995	17 (7.9, 33.0)	75 (37.3, 133.7)	96 (11.6, 345.7)	77 (41.2, 132.2)	4.5 ^c
	2005–2007	13 (6.1, 25.5)	94 (40.6, 185.4)	98 (26.7, 251.0)	95 (49.3, 166.6)	7.1 ^c
Orange County, California	1993–1995	38 (31.3, 44.8)	158 (105.8, 226.8)	33 (26.1, 41.3)	42 (34.1, 50.1)	1.1
	2005–2007	19 (13.0, 26.0)	48 (15.7, 112.8)	11 (6.0, 17.1)	13 (8.0, 19.7)	0.7

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Table (continued). AIDS diagnosis rates per 10,000 population and 95% CIs for people who inject drugs, by race/ethnicity, and RRs comparing non-Hispanic black/African American and Hispanic/Latino people who inject drugs with those of non-Hispanic white people who inject drugs: 93 U.S. metropolitan areas, 1993–1995 and 2005–2007

Metropolitan area	Years	Non-Hispanic white Rate (95% CI)	Non-Hispanic black/ African American Rate (95% CI)	Hispanic/Latino Rate (95% CI)	Combined non-Hispanic black/African American/ Hispanic/Latino Rate (95% CI)	RR ^a
Orlando, Florida	1993–1995	57 (44.3, 73.2)	455 (386.5, 522.8)	262 (211.7, 319.9)	360 (316.6, 403.1)	6.2 ^c
	2005–2007	28 (20.9, 37.1)	246 (199.4, 292.7)	83 (64.1, 104.7)	139 (118.5, 159.7)	4.9 ^c
Philadelphia, Pennsylvania/New Jersey	1993–1995	58 (52.2, 64.1)	255 (242.1, 268.4)	203 (181.6, 224.6)	243 (232.0, 254.6)	4.2 ^c
	2005–2007	18 (15.0, 20.6)	161 (146.7, 175.3)	62 (51.1, 72.7)	121 (111.3, 130.4)	6.8 ^c
Phoenix/Mesa, Arizona	1993–1995	29 (23.2, 33.8)	156 (110.6, 214.6)	38 (26.6, 53.2)	63 (49.4, 79.3)	2.2 ^c
	2005–2007	14 (10.5, 17.2)	28 (19.6, 38.8)	29 (21.7, 37.8)	29 (22.9, 35.1)	2.1 ^c
Pittsburgh, Pennsylvania	1993–1995	25 (18.0, 33.2)	72 (58.3, 86.6)	271 (124.0, 514.6)	77 (62.6, 91.4)	3.1 ^c
	2005–2007	4 (2.4, 7.4)	38 (25.5, 53.9)	33 (0.8, 184.5)	38 (25.5, 53.4)	8.5 ^c
Portland, Oregon/Vancouver, Washington	1993–1995	16 (12.5, 19.8)	15 (8.2, 26.4)	45 (22.4, 80.4)	22 (14.2, 32.9)	1.4
	2005–2007	8 (6.0, 11.6)	5 (1.1, 15.6)	8 (1.7, 24.1)	6 (2.4, 14.1)	0.8
Providence, Rhode Island/Fall River/Warwick, Massachusetts	1993–1995	98 (80.4, 115.9)	339 (269.5, 421.8)	479 (364.3, 617.2)	387 (322.7, 450.8)	3.9 ^c
	2005–2007	16 (10.4, 23.7)	129 (82.6, 191.8)	85 (49.4, 135.7)	106 (76.1, 143.8)	6.6 ^c
Raleigh/Durham/Chapel Hill, North Carolina	1993–1995	27 (15.5, 42.6)	149 (124.4, 173.0)	100 (2.5, 557.2)	148 (124.1, 172.3)	5.6 ^c
	2005–2007	11 (5.3, 20.4)	132 (100.3, 170.8)	151 (65.0, 296.9)	134 (103.7, 170.6)	12.1 ^c
Richmond/Petersburg, Virginia	1993–1995	31 (18.3, 50.4)	128 (108.8, 146.2)	136 (28.0, 396.7)	128 (109.1, 146.2)	4.1 ^c
	2005–2007	11 (5.1, 21.1)	47 (34.2, 63.3)	104 (28.5, 267.4)	49 (36.4, 65.5)	4.5 ^c
Riverside/San Bernardino, California	1993–1995	40 (33.5, 46.2)	148 (119.0, 176.7)	25 (19.8, 31.3)	47 (40.3, 54.1)	1.2
	2005–2007	19 (14.1, 25.3)	88 (62.3, 119.8)	13 (8.6, 18.4)	25 (19.5, 31.8)	1.3
Rochester, New York	1993–1995	121 (95.6, 151.9)	415 (358.4, 470.8)	436 (353.2, 519.3)	422 (375.1, 468.2)	3.5 ^c
	2005–2007	23 (14.1, 34.9)	284 (220.3, 359.6)	40 (23.9, 63.8)	125 (100.3, 154.9)	5.5 ^c
Sacramento, California	1993–1995	21 (16.5, 27.2)	76 (57.9, 97.2)	13 (6.7, 23.9)	44 (34.5, 55.6)	2.1 ^c
	2005–2007	11 (7.5, 16.8)	9 (3.3, 19.4)	4 (0.9, 12.3)	6 (3.0, 12.3)	0.6
St. Louis, Missouri/Illinois	1993–1995	21 (14.9, 28.6)	45 (35.4, 56.7)	235 (76.2, 547.8)	48 (37.7, 59.3)	2.3 ^b
	2005–2007	7 (3.6, 12.3)	52 (39.9, 66.7)	24 (0.6, 136.2)	51 (39.3, 65.4)	7.3 ^c
Salt Lake City/Ogden, Utah	1993–1995	24 (16.9, 31.8)	89 (47.3, 152.1)	61 (33.5, 102.7)	72 (47.4, 104.8)	3.1 ^c
	2005–2007	4 (2.2, 8.0)	NC ^b	14 (5.1, 30.4)	7 (2.4, 14.5)	1.5
San Antonio, Texas	1993–1995	22 (15.0, 30.6)	63 (46.0, 84.9)	18 (13.3, 22.8)	26 (20.7, 30.7)	1.2
	2005–2007	38 (22.7, 60.6)	12 (6.6, 21.3)	22 (16.0, 29.8)	19 (14.1, 24.3)	0.5
San Diego, California	1993–1995	31 (25.2, 35.9)	72 (55.7, 90.5)	34 (26.5, 42.3)	45 (37.9, 52.7)	1.5 ^c
	2005–2007	14 (9.9, 18.3)	29 (16.8, 46.2)	13 (8.9, 19.1)	17 (12.2, 22.2)	1.2
San Francisco, California	1993–1995	44 (38.4, 49.6)	232 (208.8, 254.3)	70 (55.7, 87.6)	168 (152.6, 182.8)	3.8 ^c
	2005–2007	19 (15.3, 24.3)	33 (25.8, 40.6)	18 (10.6, 29.1)	29 (23.1, 34.9)	1.5
San Jose, California	1993–1995	22 (16.3, 29.3)	78 (53.5, 110.4)	23 (14.7, 33.4)	38 (28.5, 48.8)	1.7
	2005–2007	23 (12.8, 37.7)	7 (0.2, 37.8)	18 (9.3, 31.5)	16 (8.5, 27.3)	0.7
Sarasota/Bradenton, Florida	1993–1995	49 (33.6, 68.5)	343 (242.5, 470.3)	106 (21.8, 308.7)	294 (211.2, 399.3)	6.0 ^c
	2005–2007	7 (3.3, 12.8)	61 (29.2, 111.8)	30 (6.3, 88.8)	49 (26.3, 84.5)	7.1 ^c
Scranton/Wilkes-Barre/Hazleton, Pennsylvania	1993–1995	53 (33.5, 79.2)	252 (134.4, 431.7)	1,688 (899.0, 2,887.1)	439 (286.9, 643.5)	8.3 ^c
	2005–2007	24 (12.6, 40.6)	621 (297.9, 1,142.3)	870 (105.3, 3,141.2)	652 (337.0, 1,139.2)	27.5 ^c

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Table (continued). AIDS diagnosis rates per 10,000 population and 95% CIs for people who inject drugs, by race/ethnicity, and RRs comparing non-Hispanic black/African American and Hispanic/Latino people who inject drugs with those of non-Hispanic white people who inject drugs: 93 U.S. metropolitan areas, 1993–1995 and 2005–2007

Metropolitan area	Years	Non-Hispanic white Rate (95% CI)	Non-Hispanic black/ African American Rate (95% CI)	Hispanic/Latino Rate (95% CI)	Combined non-Hispanic black/African American/ Hispanic/Latino Rate (95% CI)	RR ^a
Seattle/Bellevue/Everett, Washington	1993–1995	17 (13.1, 21.2)	45 (33.4, 59.0)	67 (37.6, 110.9)	49 (37.5, 61.7)	2.9 ^c
	2005–2007	6 (4.3, 9.0)	18 (11.7, 27.1)	7 (1.4, 19.2)	15 (10.0, 22.1)	2.4 ^c
Springfield, Massachusetts	1993–1995	89 (69.7, 112.6)	366 (294.7, 448.3)	244 (208.6, 280.4)	276 (242.7, 308.4)	3.1 ^c
	2005–2007	15 (8.7, 23.3)	61 (34.4, 101.2)	55 (41.9, 70.9)	56 (44.1, 70.5)	3.8 ^c
Stockton/Lodi, California	1993–1995	15 (9.0, 24.6)	50 (30.1, 78.0)	15 (6.8, 28.2)	28 (18.9, 41.1)	1.9
	2005–2007	9 (4.7, 15.9)	18 (10.2, 30.0)	2 (0.2, 6.7)	9 (5.2, 14.3)	1
Syracuse, New York	1993–1995	97 (69.2, 133.1)	286 (223.8, 360.2)	578 (409.3, 793.9)	347 (281.8, 411.3)	3.6 ^c
	2005–2007	36 (19.3, 61.9)	191 (121.3, 287.1)	100 (40.3, 206.6)	158 (106.5, 225.4)	4.4 ^c
Tacoma, Washington	1993–1995	20 (12.9, 28.4)	74 (45.8, 113.1)	74 (32.1, 146.5)	74 (49.6, 106.4)	3.8 ^c
	2005–2007	10 (5.4, 16.0)	22 (8.1, 48.0)	19 (2.3, 67.3)	21 (9.1, 41.5)	2.2
Tampa/St. Petersburg/Clearwater, Florida	1993–1995	52 (43.2, 60.2)	265 (227.7, 303.2)	271 (205.6, 350.0)	267 (233.5, 299.9)	5.2 ^c
	2005–2007	21 (16.3, 25.9)	448 (361.7, 533.7)	88 (62.2, 120.7)	214 (178.5, 248.8)	10.3 ^c
Toledo, Ohio	1993–1995	8 (1.7, 23.5)	35 (16.2, 67.1)	NC ^b	30 (13.6, 56.4)	3.7
Tucson, Arizona	2005–2007	4 (0.5, 13.5)	25 (6.9, 64.8)	NC ^b	20 (5.5, 51.5)	5.4
	1993–1995	18 (11.4, 25.7)	67 (39.6, 105.7)	19 (11.1, 29.7)	29 (20.5, 40.6)	1.7
Tulsa, Oklahoma	2005–2007	6 (3.7, 9.8)	21 (6.7, 48.0)	21 (11.8, 33.6)	21 (12.8, 31.6)	3.4 ^c
	1993–1995	15 (8.6, 25.5)	101 (48.5, 185.9)	96 (11.6, 347.3)	100 (51.8, 175.1)	6.5 ^c
Ventura, California	2005–2007	11 (6.1, 18.0)	185 (98.7, 317.1)	28 (0.7, 156.1)	132 (72.3, 222.0)	12.1 ^c
	1993–1995	29 (16.5, 46.7)	23 (0.6, 126.6)	13 (6.2, 23.8)	13 (6.7, 24.1)	0.5
Washington, D.C./Maryland/Virginia/ West Virginia	2005–2007	NC ^b	NC ^b	7 (2.4, 17.4)	7 (2.3, 16.5)	NC ^b
	1993–1995	48 (40.8, 55.7)	465 (442.3, 487.9)	372 (260.5, 514.9)	463 (440.1, 485.0)	9.6 ^c
West Palm Beach/Boca Raton, Florida	2005–2007	7 (5.3, 10.2)	279 (259.0, 298.9)	100 (68.7, 141.7)	260 (241.9, 278.3)	34.9 ^c
	1993–1995	45 (35.5, 57.1)	628 (540.9, 715.4)	243 (162.7, 348.8)	523 (454.8, 590.5)	11.5 ^c
Wichita, Kansas	2005–2007	24 (14.5, 36.7)	571 (403.8, 783.2)	229 (114.4, 410.0)	428 (316.3, 565.3)	18.0 ^c
	1993–1995	22 (9.5, 43.2)	35 (9.5, 89.1)	60 (1.5, 331.6)	38 (12.3, 88.5)	1.7
Wilmington/Newark, Delaware/Maryland	2005–2007	9 (2.8, 20.2)	34 (4.1, 121.4)	72 (8.8, 261.8)	46 (12.5, 117.6)	5.3
	1993–1995	51 (36.6, 69.8)	659 (586.8, 730.9)	350 (207.5, 553.5)	629 (562.4, 696.4)	12.3 ^c
Youngstown/Warren, Ohio	2005–2007	12 (6.6, 18.9)	240 (192.3, 294.7)	5 (0.1, 30.4)	162 (130.4, 199.3)	13.9 ^c
	1993–1995	10 (1.2, 34.7)	84 (44.5, 142.9)	NC ^b	78 (41.6, 133.6)	8.1 ^c
2005–2007	6 (1.6, 15.4)	68 (31.0, 128.7)	NC ^b	59 (26.8, 111.2)	9.8 ^c	

^aRR comparing the AIDS diagnosis rate for non-Hispanic black/African American and Hispanic people who inject drugs combined with the rate for non-Hispanic white people who inject drugs

^bCould not be computed because no diagnoses were reported in one or more groups or time periods

^cStatistically significant difference between non-Hispanic black/African American and Hispanic people who inject drugs combined and non-Hispanic white people who inject drugs at the $p \leq 0.05$ level by non-overlap of CIs

AIDS = acquired immunodeficiency syndrome

CI = confidence interval

RR = rate ratio

NC = not calculable

time, the change reflected a reduction in IARs for black/Hispanic relative to white PWID in seven MSAs: Fresno, California; Honolulu, Hawaii; Sacramento, California; Salt Lake City-Ogden, Utah; San Diego, California; San Francisco, California; and Tacoma, Washington. The change in Akron, Ohio, reflected a greater increase in IARs for white PWID relative to the increase for black/Hispanic PWID, while the change in Indianapolis, Indiana, reflected a wider CI for black/Hispanic PWID in 2005–2007. Of the 18 MSAs where IARs were not significantly different between black/Hispanic and white PWID in 1993–1995, IARs were significantly different in five MSAs in 2005–2007 (an IAR was not computed for Ventura). These changes reflected an increase in IARs for black/Hispanic PWID in Columbus, Ohio, and Knoxville, Tennessee, and a greater decrease for white than for black/Hispanic PWID in Denver, Colorado; Grand Rapids/Muskegon/Holland, Michigan; and Tucson, Arizona.

IAR ratio values comparing the combined black/Hispanic PWID group with white PWID were mostly quite large across both time periods, although the highest values tended to be in MSAs with relatively fewer diagnoses. In MSAs where black/Hispanic IARs were significantly higher than those for white PWID in 1993–1995, IAR ratios were above 2.0 in 97% and above 10.0 in 5% of the MSAs. In MSAs where black/Hispanic IARs were significantly higher than those for white PWID in 2005–2007, IAR ratios were above 2.0 in 98% and above 10.0 in 28% of the MSAs.

We also compared black and Hispanic PWID IARs separately with white PWID IARs across time. IARs for black PWID were significantly greater than those for white PWID in 85% of MSAs (79 of 93) in 1993–1995 and in 79% of MSAs (71 of 90) in 2005–2007. IARs for Hispanic PWID were significantly greater than those for white PWID in 53% of MSAs (47 of 88) in 1993–1995 and in 56% of MSAs (50 of 89) in 2005–2007.

Comparisons can be made across groups, time, and/or MSAs. For example, it can be seen that in the Miami, Florida, MSA, the IAR ratio increased because IARs decreased for white PWID by 76% between time periods, but decreased for the combined black/Hispanic group by only 34%. By comparing their respective CIs, IARs were significantly lower in 2005–2007 compared with 1993–1995 for the combined black/Hispanic group, as well as for white and Hispanic PWID, but not for black PWID.

As shown in Figure 1, in 1993–1995, significant differences between black/Hispanic and white PWID IARs were more frequent in the Northeast (21 of 21 MSAs, 100%) and South (29 of 32 MSAs, 91%) than in the Midwest (12 of 18 MSAs, 67%) or West (13 of

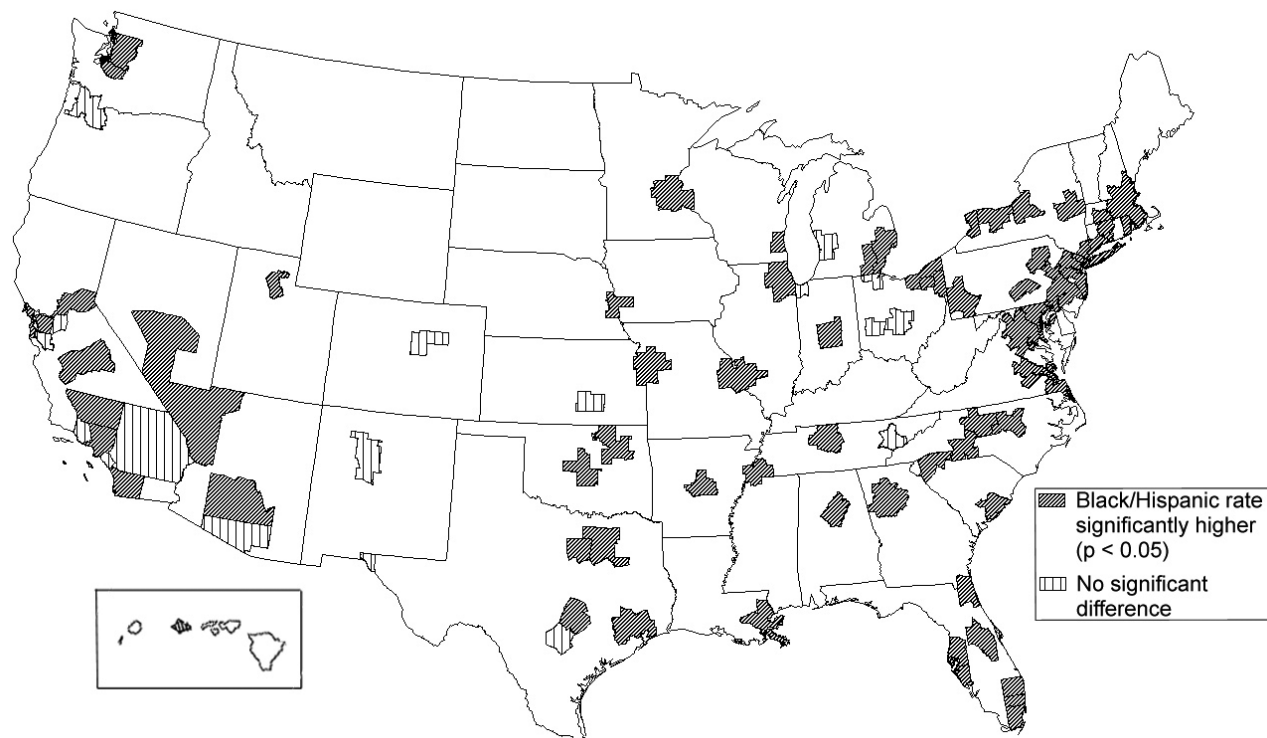
22 MSAs, 59%). As shown in Figure 2, in 2005–2007, they were also more frequent in the Northeast (21 of 21 MSAs, 100%) and South (30 of 32 MSAs, 94%) than in the Midwest (11 of 17 MSAs, 65%) or West (eight of 21 MSAs, 38%). All seven of the MSAs in which significant IAR differences in the early time period became non-significant in the later time period, reflecting reduced black/Hispanic IARs relative to white IARs, were in the West. Of the five MSAs in which non-significant IAR differences in the early time period became significant in the later time period, reflecting increased black/Hispanic IARs relative to white IARs, two were in the South, two were in the West, and one was in the Midwest.

DISCUSSION

AIDS diagnosis rates continue to be substantially higher for black and Hispanic PWID than for white PWID in most large MSAs more than a decade after the introduction of HAART. In seven MSAs, IARs for the combined black/Hispanic PWID group declined more rapidly than for white PWID, resulting in IARs that were no longer significantly different. All seven were located in the West; five were in California and one each was in Hawaii and Utah. Research is needed to determine the extent to which the IAR ratio reductions in these MSAs reflected changes in trends in HIV incidence by risk category and mixing between risk groups and/or effects of interventions, such as harm-reduction services, other HIV prevention efforts, or HAART utilization. For the remaining 86 MSAs, there was little or no reduction in disparities relative to white PWID. National trends showing declining racial/ethnic disparities in AIDS or HIV diagnosis overall may provide limited information regarding the trends for PWID and may mask MSA-specific trends. The lower frequency of significant differences in Hispanic-white comparisons than in black-white comparisons in both time periods is partly a function of the wider CIs for Hispanic IARs, resulting from the smaller size of Hispanic PWID populations—and fewer concomitant diagnoses—in many MSAs.

Although we had no HAART data available for this study, we speculate based on studies of individuals that systematic differences in HAART use by race/ethnicity and/or by MSA may have influenced our results. For example, racial/ethnic IAR disparities may be related to lower access to and/or adherence to HAART among HIV-infected black and Hispanic people compared with white people.²⁶ Black and Hispanic PWID have been found to progress to AIDS more rapidly following HIV diagnosis than white PWID,²⁷ due in part to

Figure 1. Disparities in AIDS diagnosis rates comparing non-Hispanic black/African American and Hispanic/Latino people who inject drugs with non-Hispanic white people who inject drugs: 93 U.S. metropolitan areas, 1993–1995



AIDS = acquired immunodeficiency syndrome

late HIV diagnosis,²⁸ lower ART adherence, and poorer HIV care management.²⁶ Studies have shown HAART to be about as effective among PWID as among non-PWID,^{29,30} so research on HIV treatment overall may be useful for understanding HIV treatment for PWID. Recent cohort data suggest that, of HIV-infected people overall, those who reside in the South and those who are nonwhite have more HIV-related medical events and later HAART initiation.³¹

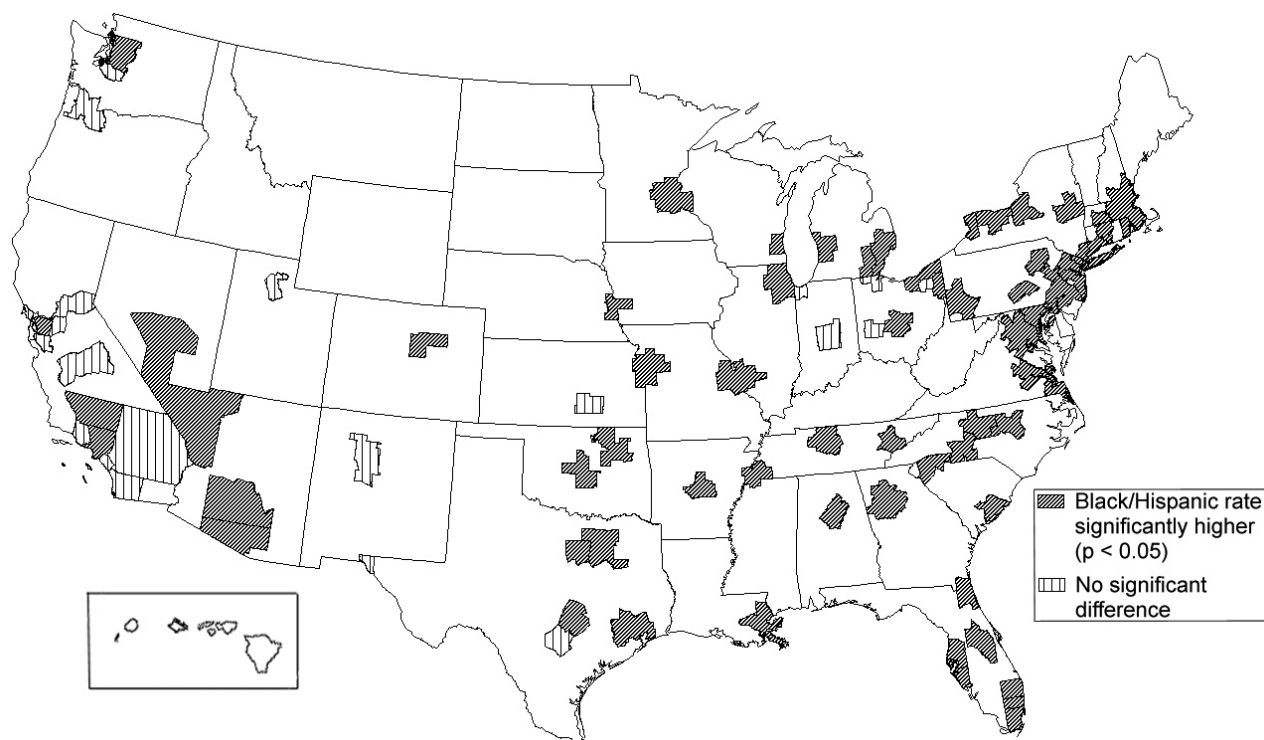
Because our outcome represents both infection with HIV and progression to AIDS, other factors beyond HAART may also be important. Recent research has found overall AIDS diagnosis rates in localities to be correlated with the racial/ethnic composition of the population and potential social determinants of health, including the proportion of the population that is unmarried and the population density, possibly reflecting HIV transmission through sexual networks.³²

Social determinants of health, believed to underlie racial/ethnic disparities, have received increasing attention by the U.S. Department of Health and Human Services since 1985,^{33–36} and eliminating HIV disparities has been an overarching goal of CDC since at least

2001.^{37–39} The National HIV/AIDS Strategy, released by the White House in 2010, includes reducing HIV-related disparities as one of its major goals.³⁹ Efforts have included working with local health departments and community leaders to promote counseling and testing, increasing treatment for sexually transmitted diseases, publishing guidelines and recommendations, sponsoring scientific meetings and research, promoting the diffusion of effective behavioral prevention interventions, and establishing the Enhanced Comprehensive HIV Prevention Planning project in 12 jurisdictions with the greatest HIV burden.^{40–43} This critical work acknowledges the multiple mechanisms underlying the disparities and the need for comprehensive prevention and treatment strategies.⁴¹ The data from this study can be used to indirectly assess associations over time with the MSA-level presence of HIV prevention and treatment programs and policies for PWID, and targeting of prevention and treatment programs for black and Hispanic PWID.

Our results are consistent with fundamental cause theory in the sense that, despite these efforts, IARs remained substantially higher for black and Hispanic

Figure 2. Disparities in AIDS diagnosis rates comparing non-Hispanic black/African American and Hispanic/Latino people who inject drugs with non-Hispanic white people who inject drugs: 91 U.S. metropolitan areas, 2005–2007



AIDS = acquired immunodeficiency syndrome

PWID than for white PWID in the vast majority of MSAs. Research is needed to determine the extent to which differences in previously identified mechanisms linking race/ethnicity to AIDS diagnosis among PWID can be addressed more effectively, or whether more basic differences in social conditions must be considered, such as those related to residential segregation and policing practices.^{7,44–46}

Limitations

Because our data were aggregated at the MSA level, the potential mechanisms underlying the observed disparities should not be assumed to have operated in the same way at the individual level. The method of comparing CIs for overlap is a conservative test of significant difference. Some differences may have been statistically significant by other tests even when the CIs overlapped.²¹ At the same time, our error calculations did not account for error in the estimated numbers of PWID at risk for AIDS in the denominators; thus, they may have overestimated the number of significant differences. The overall results may underestimate racial/ethnic disparities in 2005–2007 because we excluded

two MSAs that reported no new diagnoses among white PWID but did report new diagnoses among black and/or Hispanic PWID.

CONCLUSIONS

Black and Hispanic PWID continue to be diagnosed with AIDS at significantly higher rates than white PWID in most large MSAs. Achieving equality in health outcomes among racial/ethnic subpopulations is an important goal of public health.^{33,36,47} Therefore, greater efforts are needed in more MSAs to eliminate IAR disparities. The limited decline in disparities suggests a need for increased targeting of PWID HIV prevention and treatment programs^{48–50} and a need for research on MSA-level conditions that may convey an increased risk of HIV infection and/or progression to AIDS for black or Hispanic PWID.⁴⁴ These conditions may include economic conditions; policing practices; harm-reduction and other HIV education and prevention programs; health-care utilization, including HIV testing and HAART; as well as trends in population age structure, residence, immigration, HIV risk networks, and mixing.^{49,51–53}

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