NATIONAL CENTER FOR HIV/AIDS, VIRAL HEPATITIS, STD, AND TB PREVENTION

Association Between Social Vulnerability, HIV Testing and Positivity, United States, 2020-2022

Wei Song, MBBS, PhD, MSPH; Mesfin S. Mulatu, PhD, MPH; Nicole Crepaz, PhD; Guoshen Wang, MS; Aba Essuon, PhD, MPH, MSW; Mingjing Xia, MBBS, MS

Translation & Evaluation Branch, Division of HIV Prevention, Centers for Disease Control and Prevention

BACKGROUND

- The estimated number of new HIV infections in the United States dropped 12% in 2021 compared to 2017, but the racial and ethnic disparities in HIV infection persist[1]. Community-level factors contributing to social vulnerabilities (e.g., poverty, lack of access to health care and services) may affect HIV outcomes[2].
- This analysis assessed the association between county-level social vulnerability and CDC-funded HIV testing and HIV positivity rates, and whether the association varies by demographic characteristics, testing site type, and Phase I Ending the HIV Epidemic (EHE)[3] jurisdiction status in 2020-2022.

METHODS

Data source

- HIV testing data were submitted to CDC by 60 state and local health departments (HDs) and 119 community-based organizations (CBOs).
- The county-level composite measure of economic, medical, and social vulnerability is captured by the Minority Health Social Vulnerability Index (MHSVI).
- The MHSVI score between 0 and 1 (with higher values indicating greater vulnerability) is used to rank counties as low (MHSVI score: 0-0.3332), moderate (MHSVI score: 0.3333-0.6667), and high (MHSVI score: 0.6668-1).

Analysis

- We analyzed HIV tests conducted and HIV positivity rates by age, gender, race/ethnicity, testing site type, and Phase I EHE jurisdiction status stratified by low, moderate, and high MHSVI scores.
- We calculated rate ratios (RRs) with a 95% confidence interval (CI) to measure relative disparity by comparing county tracts with high vs. low MHSVI scores.

RESULTS

HIV testing by county MHSVI score level

In 2020-2022, CDC-funded HDs and CBOs conducted 4,906,507 HIV tests: 113,721 (2.3%) in low, 583,307 (11.9%) in moderate, and 4,209,479 (85.8%) in high social vulnerability counties (Figure 1).

HIV positivity rates by county MHSVI score level

- HIV positivity rates were 0.5% in low, 0.6% in moderate, and 1.1% in high social vulnerability counties (Table 1).
- HIV positivity rate was higher in high than in low social vulnerability counties (RR=2.12; 95% CI=1.95-2.30) (Table 1).
- The relative disparity in HIV positivity rate was consistently higher in high MHSVI counties than in low MHSVI counties, regardless of age group, gender, race/ethnicity, testing site type, and Phase I EHE jurisdiction status.

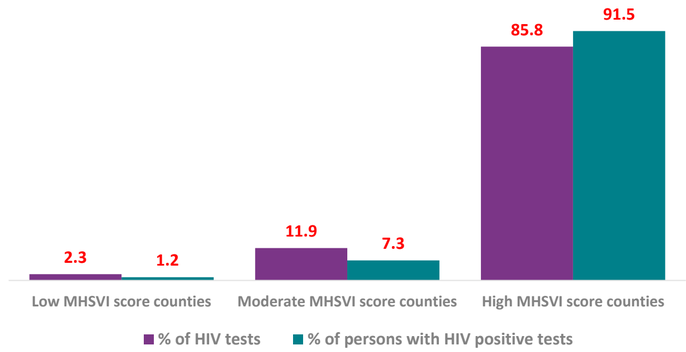
CDC's HIV testing efforts are directed to the most socially vulnerable communities.

Table 1. Associations between county-level HIV positivity and minority health social vulnerability index among CDC-funded HIV testing programs, the United States, 2020-2022

Characteristics	Low social vulnerability counties			Moderate social vulnerability counites			High social vulnerability counties			Relative disparity measure	Absolute disparity measure
	N of positive	N of tested	Positivity %	N of positive	N of tested	Positivity %	N of positive	N of tested	Positivity %	RRs[a] (High/Low, 95% CI[b])	High% - Low%
Age											
13-24	84	31,022	0.3	508	152,216	0.3	5,985	878,571	0.7	2.51 (2.03-3.12)	0.4
25-34	181	37,190	0.5	1,544	209,642	0.7	16,398	1,363,790	1.2	2.47 (2.13-2.86)	0.7
35-44	140	22,768	0.6	836	117,086	0.7	10,317	842,964	1.2	1.99 (1.68-2.35)	0.6
45-54	94	10,904	0.9	433	56,245	0.8	6,345	507,401	1.3	1.45 (1.18-1.78)	0.4
55-64	64	6,660	1.0	260	32,405	0.8	4,889	390,869	1.3	1.30 (1.02-1.65)	0.3
65+	12	2,231	0.5	62	10,585	0.6	1,529	178,145	0.9	1.60 (0.90-2.82)	0.3
Gender											
Men	471	57,569	0.8	3,046	300,422	1.0	36,377	2,205,535	1.7	2.02 (1.84-2.21)	0.8
Women	94	55,001	0.2	531	273,043	0.2	8,027	1,931,630	0.4	2.43 (1.98-2.98)	0.3
Transgender persons	20	945	2.1	101	8,054	1.3	1,373	48,687	2.8	1.33 (0.86-2.07)	0.7
Race/Ethnicity											
White	216	66,394	0.3	1,183	243,677	0.5	8,302	1,077,868	0.8	2.37 (2.07-2.71)	0.4
Black or African American	260	24,108	1.1	1,480	173,122	0.9	22,024	1,629,371	1.4	1.25 (1.11-1.42)	0.3
Hispanic or Latino	76	13,323	0.6	817	106,221	0.8	13,145	1,127,425	1.2	2.04 (1.63-2.56)	0.6
Other or Multiple Races[c]	18	3,778	0.5	124	25,844	0.5	1,380	173,665	0.8	1.67 (1.05-2.66)	0.3
Population category											
MSM/PWID	52	681	7.6	188	3,566	5.3	2,304	21,809	10.6	1.38 (1.05-1.82)	2.9
MSM	213	8,766	2.4	1,920	66,609	2.9	22,308	536,460	4.2	1.71 (1.50-1.96)	1.7
PWID	38	10,471	0.4	202	37,734	0.5	2,162	119,195	1.8	5.00 (3.63-6.89)	1.5
Heterosexual persons	89	49,453	0.2	728	243,123	0.3	9,512	1,478,357	0.6	3.58 (2.90-4.41)	0.5
Others had sexual contact	5	1,082	0.5	45	8,782	0.5	475	54,344	0.9	1.89 (0.78-4.57)	0.4
No sexual contact nor IDU[d]	35	33,041	0.1	222	85,874	0.3	3,948	526,081	0.8	7.08 (5.08-9.88)	0.6
Test site type											
NHC[e]-HIV test site	39	6,407	0.6	462	44,956	1.0	9,356	542,348	1.7	2.83 (2.07-3.88)	1.1
NHC-others	27	7,323	0.4	760	104,945	0.7	7,471	552,564	1.4	3.67 (2.51-5.35)	1.0
HC[f]-primary care	1	965	0.1	73	7,761	0.9	1,579	93,298	1.7	16.33 (2.30-116.01)	1.6
HC-STD clinic	260	58,562	0.4	1,302	199,103	0.7	8,540	860,423	1.0	2.24 (1.98-2.53)	0.6
HC-emergency department	1	451	0.2	38	6,211	0.6	6,192	556,616	1.1	5.02 (0.71-35.62)	0.9
HC-others	259	39,987	0.7	1,048	220,330	0.5	12,894	1,602,567	0.8	1.24 (1.10-1.40)	0.2
Phase I EHE jurisdiction											
Yes	29	11,649	0.3	1,250	169,251	0.7	36,453	3,002,979	1.2	4.88 (3.39-7.02)	1.0
No	558	102,072	0.6	2,433	414,056	0.6	9,621	1,206,500	0.8	1.46 (1.34-1.59)	0.3
HIV test year											
2020	172	31,390	0.6	1,190	174,933	0.7	11,595	1,076,382	1.1	1.97 (1.69-2.29)	0.5
2021	238	38,648	0.6	1,222	190,797	0.6	16,002	1,481,759	1.1	1.75 (1.54-1.99)	0.5
2022	177	43,683	0.4	1,271	217,577	0.6	18,477	1,651,338	1.1	2.76 (2.38-3.20)	0.7
Total	587	113,721	0.5	3,683	583,307	0.6	46,074	4,209,479	1.1	2.12 (1.95-2.30)	0.6

[a] RRs, rate ratios.
[b] CI, confidence interval.
[c] Includes Asian, American Indian/Alaska Native, Native Hawaiian/other Pacific Islander, and multi-race.
[d] IDU, inject drug use.
[e] NHC, Non-health care settings.
[f] HC, Health care settings.

Figure 1. Percent of HIV tests conducted and percent of persons diagnosed with HIV infection stratified by county MHSVI score level, 2020-2022



CONCLUSIONS

- HIV testing supported by CDC funding, and HIV positivity rates are higher in communities characterized by high levels of social vulnerability.
- These findings suggest that CDC's HIV testing efforts are directed to the most vulnerable communities and are identifying persons with HIV infection.
- Continued monitoring of the association between county-level social vulnerability and HIV positivity rates would provide valuable insight in guiding HIV testing efforts and resource allocation for achieving EHE goals.

LIMITATION

- These results are based on CDC-funded HIV testing data from health departments and CBOs and therefore are not generalizable to all privately and publicly funded HIV testing across the United States.
- The latest county-level MHSVI rankings are only available for 2020. We assume the rankings remained constant from 2021 through 2022.

REFERENCES

1. Centers for Disease Control and Prevention. Estimated HIV incidence and prevalence in the United States, 2017–2021. HIV Surveillance Supplemental Report, 2023; 28 (No.3). Published May 2023. http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html
2. Department of Health and Human Services. Office of Minority Health. Minority health social vulnerability index fact sheet. https://www.minorityhealth.hhs.gov/Assets/PDF/MH%20SVI%20Fact%20Sheet_7.15.2021.pdf
3. Ending the HIV Epidemic in the U.S. (EHE) initiative. https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview/

SCAN HERE FOR MORE INFORMATION

CONTACT INFO
Wei Song
wsong@cdc.gov

CENTERS FOR DISEASE CONTROL AND PREVENTION