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

HIV Time-Space Alerts Among PWID and MSM in the United States, 2018–2021

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BACKGROUND

- The Respond pillar of the *Ending the HIV Epidemic in the U.S.* (EHE) initiative includes activities to identify and review changes in patterns of diagnoses that may indicate clusters or outbreaks of HIV.
- Time-space cluster detection, a method routinely used by CDC and health departments that compares HIV diagnoses in the past year to historical trends, generates "alerts" for review to determine where public health response may be needed to interrupt transmission. Although not all alerts represent clusters or outbreaks, alerts that reoccur may reflect sustained and concerning increases in diagnoses.
- To date, national time-space cluster detection has primarily focused on persons who inject drugs (PWID).

Objective: describe the frequency, characteristics, and reoccurrence of alerts among PWID vs. alerts among men who have sex with men (MSM)

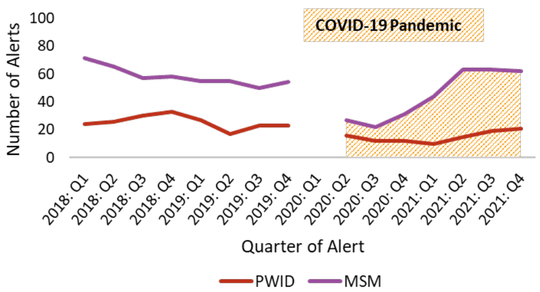
METHODS

- During 2018–2021, CDC analyzed HIV diagnoses from all 50 U.S. states and the District of Columbia as reported to the National HIV Surveillance System.
- Quarterly, for each county, the number of diagnoses during the preceding 12 months for MSM and PWID was compared to the annual mean from the preceding 3 years (for MSM and PWID separately). An alert was generated when the number of diagnoses in the most recent 12 months was >2 standard deviations and >2 diagnoses above the baseline mean.[1]
- Alerting counties were stratified according to the Urban-Rural Classification Scheme for Counties.[2]
- For each county initially alerting during 2018–2019, reoccurrences of alerts in the following 8 quarters were identified.

RESULTS

- During 2018–2021, 308 quarterly alerts among PWID and 777 quarterly alerts among MSM were detected (Fig 1).
- Alerts among PWID occurred in 154 (4.9%) counties, and alerts among MSM occurred in 445 (14.2%) counties (Table).
- Alerts among PWID occurred in a higher percentage of large central metro areas (41.2%) than in other areas (0.3–14.2%). Alerts among MSM occurred in a higher percentage of large fringe (29.1%) and medium (27.4%) metro areas than in other areas (3.7–19.6%).
- Steep declines in alerts, especially among MSM, were associated with the time period immediately following the start of the COVID-19 pandemic (Fig 1). Increases in alerts among MSM, but not PWID, were observed when the annual quarterly average of alerts in 2021 was compared to 2019 (MSM: 8.4% increase, PWID: 27.8% decrease).
- Multiple subsequent alerts were more common among PWID than MSM (Fig 2); 29.9% of counties with alerts among PWID and 19.3% of counties with alerts among MSM had ≥2 subsequent alerts in the following 8 quarters.

Figure 1. Number of Time-Space Alerts*



* Due to the COVID-19 pandemic, a national dataset was not created in Q1 of 2020. Diagnoses among MSM who also inject drugs were excluded from this study.

Expanding national time-space cluster detection criteria to MSM yields nearly *3x as many alerting counties as PWID, however, fewer alerts among MSM reflect sustained increases.*

National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme

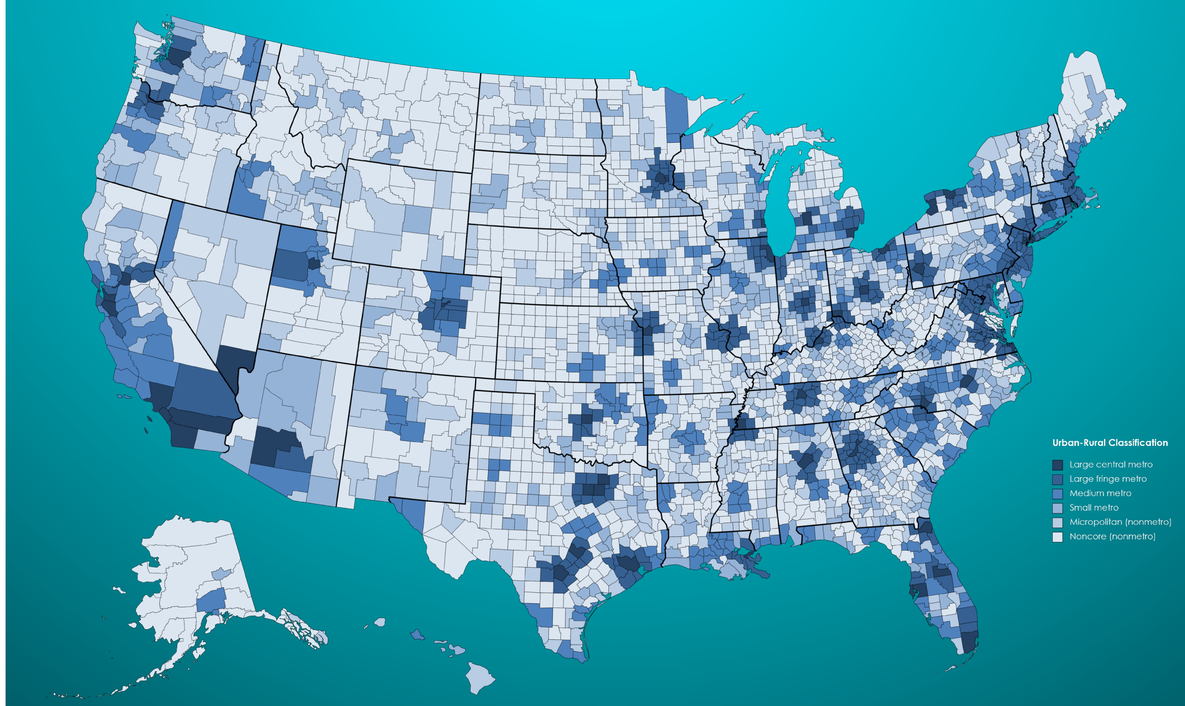
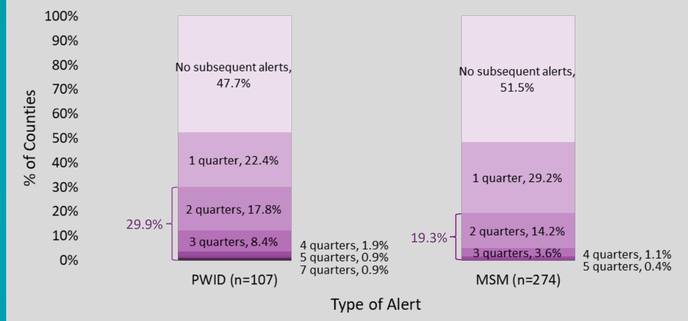


Table. Occurrence of County-Level Time-Space Alerts, by National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme,* 2018–2021

	Total counties	Counties with alerts among PWID		Counties with alerts among MSM	
	N	n	row %	n	row %
Total	3144	154	4.9%	445	14.2%
Large central metro	68	28	41.2%	9	13.2%
Large fringe metro	368	40	10.9%	107	29.1%
Medium metro	372	53	14.2%	102	27.4%
Small metro	358	19	5.3%	70	19.6%
Micropolitan (nonmetro)	641	10	1.6%	107	16.7%
Noncore (nonmetro)	1337	4	0.3%	50	3.7%

* Large central metro: central counties in metropolitan statistical area (MSAs) of ≥1M population. Large fringe metro: non-central counties in MSAs of ≥1M. Medium metro: counties in MSAs of 250,000–999,999. Small metro: counties in MSAs of <250,000. Micropolitan (nonmetro): counties in micropolitan statistical areas of 10,000–49,999 population. Noncore (nonmetro): counties not in micropolitan statistical areas.

Figure 2. Number of Quarters Subsequently Alerting by Type of Alert



CONCLUSIONS

- The frequency and geographic distribution of alerts among PWID and MSM differed during 2018–2021. Occurrence of alerts among PWID in >41% of large central metro areas is concerning, as it might suggest expanding HIV transmission among PWID in these urban areas.
- Trends in alerts were impacted near the start of the COVID-19 pandemic; a contributing factor is likely declines in HIV testing.[3,4] However, alerts among MSM recovered and surpassed pre-pandemic levels.
- Our study is limited in generalizability due to the COVID-19 pandemic. Continued assessment of alerts, including reoccurrence, is necessary.
- A lower percentage of alerts among MSM reoccur, suggesting that increases detected typically are not sustained. The current time-space cluster detection criteria might identify increases that are more likely to be sustained among PWID than among MSM. Additional work is needed to refine time-space cluster detection criteria for MSM or to prioritize additional investigation of detected alerts.

References: [1] Fitzmaurice AG, Linley L, Zhang C, Watson M, France AM, Oster AM. Novel Method for Rapid Detection of Spatiotemporal HIV Clusters Potentially Warranting Intervention. *Emerg Infect Dis.* 2019;25(5):988-991. doi:10.3201/eid2505.180776 [2] National Center for Health Statistics, Centers for Disease Control and Prevention. NCHS Urban-Rural Classification Scheme for Counties. Published June 1, 2017. www.cdc.gov/nchs/data_access/urban_rural.htm#2013_Urban-Rural_Classification_Scheme_for_Counties [3] Patel D, Williams WO, Wright C, et al. HIV Testing Services Outcomes in CDC-Funded Health Departments During COVID-19. *JAIDS J Acquir Immune Defic Syndr.* 2022;91(2):117-121. doi:10.1097/QAI.0000000000003049 [4] Hoover KW, Zhu W, Gant ZC, et al. HIV Services and Outcomes During the COVID-19 Pandemic - United States, 2019-2021. *MMWR Morb Mortal Wkly Rep.* 2022;71(48):1505-1510. doi:10.15585/mmwr.mm7148a1

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