



Leveraging Big Data to Understand and Improve Continuity of Care Among HIV-Positive Individuals with Criminal Charges in North Carolina

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Introduction

- Little is known about the impact of having criminal charges on HIV outcomes.
- We sought to understand the relationship between having criminal charges and viral suppression among people living with HIV (PWH) in North Carolina (NC).

Aims

- Describe characteristics of PWH in NC charged in criminal court.
- Assess the longitudinal association between being charged in court and viral suppression, adjusting for demographic, legal, and HIV-specific factors.

Methods

- We linked NC criminal court records to the state's confidential HIV records (both 2017-2020) to assess HIV viral suppression (viral load [VL] <200 copies/ml) in the periods immediately before initiation of charges—which are typically initiated with arrest—and after disposition of charges.
- We described characteristics of people charged in the NC criminal court from 2017 – 2020 and compared characteristics by known HIV status at the time of the charges.
- We examined pre-post percent of PWH with viral suppression, using the VL most immediately preceding charge initiation and proceeding charge resolution. Only PWH who were diagnosed at least 12 months prior to charges and had 12-months of post-charge follow-up were included in the analysis. PWH who had no VL during the pre- or post- 12-month period were coded as unsuppressed.
- For participants who contributed time-at-risk in both the pre-post periods, we implemented logistic regression using generalized estimating equations (GEE) to compare the proportion of viral suppression pre-post criminal charges, adjusting for other demographic (age, race, sex), HIV-specific (transmission category), and legal system factors (duration of charge days). Only participants with a single non-overlapping charge period were included.

Results: Baseline Characteristics

Table 1: Baseline characteristics of people charged in North Carolina criminal court by known HIV status, 2017-2020

	Non-HIV (n=2.4 million)	HIV (n=9,534)
	n (col%)	
Sex¹		
Male	1,685,236 (69.4)	7,516 (78.8)
Female	741,926 (30.5)	2,026 (21.1)
Race		
White	1,067,557 (43.9)	1,860 (19.5)
Black	894,930 (36.8)	7,353 (77.1)
Hispanic	330,205 (13.6)	133 (1.4)
Other	136,594 (5.6)	188 (2.0)
Discrete periods of non-overlapping charge days		
1	2,251,747 (92.7)	8,969 (94.1)
2	157,972 (6.5)	549 (5.8)
3 or greater	19,567 (0.8)	16 (0.2)
HIV transmission group		
MSM		4,306 (45.2)
Unknown		2,712 (28.4)
Heterosexual contact		1,367 (14.3)
IDU		722 (7.6)
MSM & IDU		358 (3.8)
Other		69 (0.7)
	median (IQR)	
Age (years)	36 (27-47)	41 (29-51)
Days with unresolved charges	37 (1-129)	68 (1-209)

1. Data missing for 200 non-HIV participants and 1 PWH. Abbreviations: MSM, men who have sex with men; IDU, intravenous drug use; IQR interquartile range

Results

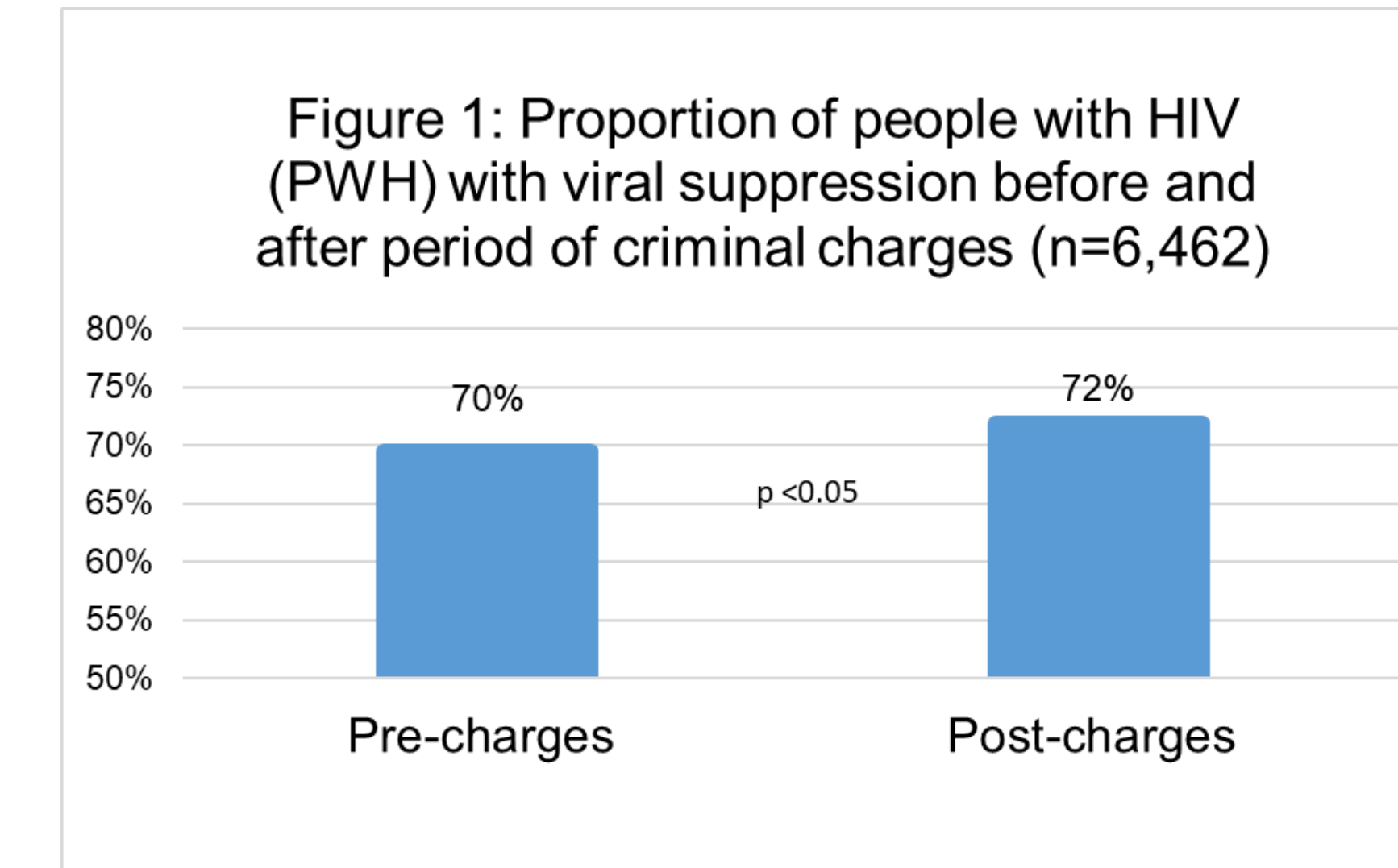
- A large number (n=9,534) of PWH in NC experienced criminal charges during 2017-2020. Compared to those without HIV, PWH had significantly longer median days of unresolved charges (68 vs 37 days, $p < 0.01^1$).
- In an unadjusted comparison, a larger proportion of PWH experienced viral suppression in the period following criminal charges compared to the pre-charge period (72% vs 70%, $p < 0.05^2$) (Figure 1).
- When adjusting for demographic, HIV-specific, and legal factors, the period following resolution of criminal charges was associated with an increased odds of viral suppression (adjusted odds ratio [aOR] 1.12; 95% confidence interval [CI] 1.08-1.17) compared to the period prior to charges (Table 2).
- Factors negatively associated with viral suppression included Black race (aOR 0.71; 0.62-0.82), HIV acquisition via heterosexual contact (aOR 0.72; 0.60-0.86) and intravenous drug use (IDU) (aOR 0.51; 0.41-0.63) compared to men who have sex with men (MSM) (Table 2).

¹ Wilcoxon-rank sum test, ² Chi-squared test

Table 2: Association of HIV viral suppression contrasting pre-post charge periods among PWH with single period of criminal charges 2017-2020 (n=6,427)

Characteristic	Adjusted OR (95% CI)
Criminal Charge Group	
12 months pre charge	Reference
12 months post charge	1.12 (1.08-1.17)*
Age (years)	
18-29	Reference
30-39	1.11 (0.96-1.28)
40-49	1.74 (1.49-2.03)*
50-59	2.26 (1.92-2.67)*
60-69	2.48 (1.93-3.18)*
70 and older	1.86 (0.94-3.64)
Race/Ethnicity	
White	Reference
Black	0.71 (0.62-0.82)*
Hispanic	1.27 (0.76-2.13)
Other	0.80 (0.54-1.19)*
Sex	
Male	Reference
Female	1.06 (0.92-1.22)
HIV Transmission Category	
MSM	Reference
Heterosexual	0.72 (0.60-0.86)*
IDU	0.51 (0.41-0.63)*
MSM and IDU	0.63 (0.36-1.17)
Other	0.65 (0.36-1.17)
Duration of Charge (days)	
0-99	Reference
100-199	1.25 (1.09-1.45)*
200-299	1.13 (0.95-1.35)
300 and greater	0.90 (0.77-1.06)

* p value <0.05. Abbreviations: PWH, people living with HIV; OR, odds ratio; CI, confidence interval; HIV, human immunodeficiency virus; MSM, men who have sex with men; IDU, intravenous drug use



Discussion

- This preliminary work represents the largest study to date of PWH experiencing criminal charges and serves as an important first step in understanding the relationship between HIV care and criminal charges.
- PWH are charged for longer periods of time than others (median of 68 days vs 37 days). Our findings raise questions about whether PWH have access to legal services and whether they could benefit from medical-legal practice models of care.
- In the context of other risk factors for sub-optimal HIV suppression, the resolution of criminal charges was statistically associated with improvement in the proportion of PWH with viral suppression. The mild improvement in viral suppression following periods of criminal charges was unexpected, but this may reflect a period of greater stability than the period precipitating charges. It is interesting that those with criminal charges overall had a higher proportion of viral suppression compared to PWH in NC (66% in 2020). The mechanisms behind this are unclear.
- Factors negatively associated with viral suppression among PWH with criminal charges included Black race, HIV acquisition via heterosexual contact, and IDU compared to MSM. Prior data has shown that Hispanic PWH in NC have lower rates of viral suppression compared non-Hispanic PWH¹. We did not find this association. There are some differences in race and ethnicity documentation between the court data and the state's HIV records, however use of either data source for ethnicity did not show an association between Hispanic race and viral suppression in our study.

Future Directions

- We plan to conduct a sub-analysis to examine whether the type of charges and incarceration impact our finding.

References

1. North Carolina Department of Health and Human Services. HIV Care Outcomes in North Carolina, 2020. <https://epi.dph.ncdhhs.gov/cd/stds/figures/2020-HIV-CareOutcomes-Final.pdf>

Limitations

- Only NC data are available in the court and HIV records, prohibiting the analysis of charge or viral load data generated outside the state.
- PWH with criminal charges may represent a population with more available HIV data compared to those without criminal charges.
- By coding PWH without a VL result as unsuppressed, we may be underestimating rates of suppression

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