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The Interaction of Race and Gender as a Significant Driver of Racial Arrest Disparities for African American Men

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Abstract The mass incarceration of African Americans is both a driver of racial health inequalities in the USA. Systemic social biases which associate African American men with criminality, violence, and as a particular threat to white women may partially explain their overrepresentation in the criminal justice system. We combined data from the Washington, DC Metro Police Department (MPD) and the American Community Survey to test whether neighborhood-level gender, race, and economic makeup were associated with elevated drugrelated arrest disproportions for African American men. We found that African American men were significantly overrepresented in all drug-related arrests across the District, and that this arrest disproportion was significantly higher in neighborhoods that had a higher percentage of white female residents. The association between race and gender was somewhat attenuated, but

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San Diego School of Medicine, Center on Gender Equity and Health, University of California, San Diego, La Jolla, CA, USA not completely eliminated, when we introduced socioeconomic variables to our model. Addressing the social determinants of criminal justice disparities must account for the intersection of race, gender, and economics, rather than considering race in isolation.

Keywords Substance use · Health disparities · Racism · Structural drivers · Incarceration

Introduction

Approximately 50% of African American men are arrested at least once before their 23rd birthday [1], and one in three African American men can expect to be incarcerated at some point in their lifetime [2]. The widespread nature of African American men's exposure to the criminal justice system has been proposed as one potential structural driver of racial health disparities in the USA [3-7] as incarcerated individuals are at heightened risk of infectious disease, stress-related illnesses [8, 9], and disability [3]. Incarceration rates have increased dramatically since the mid-1970s, largely as a result of the War on Drugs announced by President Nixon in 1971 which initiated a massive scale up of police presence in minority communities and aggressive arrest policies for low-level drug use [10–12]. Nominally, this was intended to deter the initiation of substance use and disincentivize ongoing use [11]. However, there is little evidence that a criminal justice approach to substance use is effective for prevention [13–15], nor does incarceration provide a useful pathway to evidence-informed addiction treatment for those in need [14, 16, 17].

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This criminal justice approach to substance use has resulted in large racial disparities in drug-related arrests: African Americans make up approximately 13% of the US population but comprise 39% of those with federal sentences for drug offenses, while white Americans make up approximately 77% of the US population and account for 22% of federal drug sentences [18, 19]. However, white individuals are more likely to report lifetime use of illicit substances than are African Americans (56.5 vs. 50.1% of African Americans), and African Americans are only slightly more likely to report use of illicit substances in past month (12% vs. 10%) [20, 21]. While it is possible that the disparity between incarceration and use is due to racial differentials in types of drug offenses, research suggests that racial bias in drug arrests and sentencing likely plays a larger role [11]. Some attempts have been made in recent years to address these racial disparities; however, current federal rhetoric prioritizes a "law and order" approach, in which arrest and prosecution is given precedence over addressing structural determinants of substance misuse, addic-

tion, or access to evidence-informed treatment [22].

Both an individual's race and the residential demographics of the area in which a police encounter takes place shape their likelihood of arrest [23-25]. African Americans and individuals with low socio-economic status (SES) are also more likely to have discriminatory experiences within the criminal justice system than affluent and/or white individuals [26]. The fact that minorities are more likely to live in low SES neighborhoods may explain at least some of the neighborhood-level disparities in drug arrest patterns between African Americans and whites [27]; however, residents of low SES neighborhoods may be less likely to call the police due to cynicism about social and legal institutions [28]. In a mixed-methods study in Seattle, Beckett et al. found that drug arrests were heavily concentrated in a racially diverse, gentrifying neighborhood rather than in a majority white neighborhood with a larger openair drug market, suggesting that citywide economic concerns may have directed arrest policy more heavily than citizen complaints or the amount of substance use within a given space [29]. Several qualitative studies have found that white women in gentrifying or predominantly white neighborhoods may feel more comfortable relying on police intervention during disputes with their minority neighbors, perhaps in response to cultural narratives which position African American and Hispanic or Latino men as particular threats to white women's safety [24, 25]. Analyses of national level data in the USA also suggests that white women are more likely to seek help from police than are minority women [30].

Previous research has suggested that disproportionate drug-related arrests of African Americans are strongly correlated with the percentage of white residents who live within a given neighborhood [31]. However, little empirical evidence exists on how a neighborhood's racial, gender, and SES composition may be associated with arrest disparities. Drawing on our previous analyses of drug-related arrests in Washington, DC [31], we conducted a crosssectional analysis using publicly available data to measure the intersection of race and gender at the neighborhood level as predictors of disproportionate drug-related arrest rates for African American men in Washington, DC, and tested the prediction that this association would be attenuated by neighborhood-level economic factors.

Methods

We conducted a cross-sectional study of all drug-related arrests made in the District of Columbia between January 1, 2008 and August 3, 2015. Our unit of analysis was the Police Service Area (PSA), the Washington, DC Metro Police Department's (MPD's) smallest administrative unit. The District is divided into 56 PSAs. While these do not directly correlate to the 131 official neighborhood divisions, they are the smallest geographical unit within which policing policy decisions are made. Each PSA is home to approximately 11,000 residents.

Data Sources

Drug arrest data was accessed via a Freedom of Information Act (FOIA) request filed with the Washington, DC MPD. Each arrest record included the date, location (city block and police service area), primary involved substance, gender, and self-reported race of the arrestee. These arrests were pooled into a single cross-sectional data set, representing approximately 62,000 individual arrest incidents, and aggregated to the PSA level.

We accessed demographic data from the Washington, DC Open Data website (data.dc.gov), which contains information on the total population and racial and gender composition of the District as of April 2012 [32]. Data on unemployment and average family income was sourced from the American Community Survey (ACS), as aggregated by the Neighborhood Info DC project (http://www.neighborhoodinfodc.org/index.html) to the PSA level. ACS data included the absolute number of residents, the absolute number of residents of each race, and the racial and gender breakdown within a variety of geographic administrative units, including the PSA.

ACS and drug arrest data were merged into a single dataset using the PSA as the unique identifier. We calculated the total city population and the total number of African American, white, male, and female residents by adding the total population of each PSA in April 2012. While the total male, female, African American, and white populations were available for each PSA, these data were not further disaggregated to reflect the population of African American males, white males, African American females, or white females. To address this limitation, we inferred the proportion of African American and white male residents within each PSA by multiplying the proportion of male residents within a PSA by the proportion of African American or white residents. To infer the total population of African American and white male residents, we then multiplied this inferred proportion by the total population of the PSA. We did the same to ascertain the proportion and total population of African American and white men in the city as a whole.

Measures

Race/Ethnicity

Washington, DC is home to large immigrant communities from eastern Africa and the Caribbean [33], and, similar to the rest of the USA, racial identification and labels in the District are complex. The MPD allows arrestees to self-identify as "White," "Black," "Hispanic," "Asian," or "Other" while the ACS uses US census racial categories in which individuals can self-identify as "White," "Black or African American," "Asian," "Native American," and/or "Hispanic," and may choose as many racial and ethnic categories as they feel are appropriate to reflect their identity. Throughout this paper, we have chosen to use African American as shorthand for African American/Black, although we acknowledge that this does not fully capture the complexities of racial identity in a city as diverse as Washington, DC.

Arrest Disproportion

Our primary outcome was *arrest disproportion*—a measure of the degree to which a particular demographic group was over- or under-represented among those arrested for drug-related reasons, compared to the residential demographics of the PSA in which they were arrested.

The arrest disproportion was calculated by dividing the total number of African American, white, African American male, or white male individuals arrested for drug-related reasons within a geographic unit by the total number drug-related arrests made within that geographic unit, yielding the proportion of arrests for that group (ranging from 0 to 1.00). We then divided this arrest proportion by the proportion of that group living within the same geographical unit to yield the degree to which a group is disproportionately represented given area residential demographics. For example, the arrest disproportion for African American men in a PSA would be calculated as follows:

- 1. African American male arrest proportion = [total number African American men arrested in PSA] / [total number of arrests in PSA]
- 2. African American male arrest disproportion = [African American male arrest proportion] / [proportion of PSA residents who are African American men]

An arrest disproportion of 1.0 is interpreted to mean that the proportion of individuals arrested is equal to their proportional residential representation in the same geographic area. An arrest disproportion of 2.0 would mean that the proportion of African American or white individuals being arrested in a PSA was twice as high as would be expected given the demographics of that PSA, while a disproportion of 0.50 would mean that the proportion of individuals being arrested within the PSA is half of what would be expected given demographics of the PSA.

We calculated four arrest disproportion statistics, one each for (1) all African American individuals, (2) all white individuals, (3) African American men, and (4) white men. An arrest disproportion statistic was constructed for each group across the District as a whole and within each of the 56 PSAs.

PSA Racial and Gender Composition

We constructed two binary variables to describe the predominant racial group in each PSA: one if a PSA was predominantly African American (coded "1" if the 60" if it each of arrest disponent each of arr

PSA was predominantly African American and "0" if it was not) and a second if a PSA was predominantly white (coded 1 if the PSA was predominantly white and 0 if it was not). PSA gender breakdown was measured using a continuous variable reflecting the percentage of female residents within that PSA.

Interaction Terms

We used two separate continuous by binary interaction terms to assess how the intersection of neighborhoodlevel race and gender was associated with arrest disproportion: (1) the percentage of female residents in a PSA by whether a PSA was predominantly white and (2) the percentage of female residents in a PSA by whether a PSA was predominantly African American.

PSA Socio-Economics

Average family income and unemployment at the PSA level were assessed using the ACS 2010–2014 5-year estimates. The ACS measures average household income as "the total cash income from all sources for all family members," adjusted to the consumer price index [34]. Unemployment rates were measured as the percentage of individuals over 16 years old who were unemployed at the time of the survey and had been looking for work in the previous 4 weeks [34]. Both average family income and unemployment were assessed as continuous variables.

Analyses

We first used univariate and bivariate statistics to describe the basic demographic makeup of each PSA and test differences in arrest disproportion, gender distribution, and PSA-level socio-economic status by predominant racial group in each PSA. To determine the possibility of an interaction between the racial and gender makeup of a PSA, we tested the size and association of the linear relationship between arrest disproportions and the percentage of female residents in a PSA within majority African American and majority white PSAs.

We then built three successive multivariate models to test our hypothesis that the interaction of PSA-level race and gender composition would be significantly associated with arrest disproportion, and that this relationship would be attenuated by PSA-level socio-economics. Each multivariate model was run four times, once for each of arrest disproportion outcome (all African American individuals, all white individuals, African American men, and white men). In model A, arrest disproportion was regressed onto the percentage of female residents and predominate racial group within a PSA. In model B, we added an interaction term between PSA predominant racial group and the percentage of female residents. In model C, we added PSA average income and unemployment rate to assess whether this interaction was attenuated by PSA-level socio-economics.

Ethics

This study was reviewed by the Institutional Review Board at the University of California, San Diego and determined not to be human subject research.

Results

As of the 2010 US Census the 56 PSAs across Washington DC were home to just over 600,000 residents, of whom 51% identified as African American or Black and 38% as white. Fifty-three percent of DC residents were female. Thirty-eight PSAs were predominantly African American, and 18 were predominantly white. PSA demographic descriptors are shown in Table 1. Predominantly African American PSAs had significantly higher percentages of female residents (53.5% vs. 51.1%, p = 0.02), higher unemployment (16.6% vs. 4.9%, p < 0.001%), and significantly lower average household income (\$76,567 vs. \$200,123, p < 0.001).

Between January 1, 2008 and August 3, 2015 61,693 drug-related arrests were recorded. A plurality of these (43%) were related to marijuana, although this decreased from an annual average of 44% in the years 2008–2014 (range 35–51%), to 15% in the approximately 13 months following marijuana decriminalization in July of 2014. After marijuana, the most common drug-related arrests were for crack-cocaine (20.5%), unknown substances (11.3%), heroin (9.0%), and cocaine (8.2%).

Ninety percent of all individuals arrested for drugrelated reasons were African American. Across the entire District, the disproportion of African American arrests was 1.77, meaning that African American individuals were arrested approximately 77% more than would be expected given the demographics of the District (Table 1). Mean African American arrest disproportion across PSAs was 2.87 (range 0.94–16.09), compared to a mean arrest disproportion of 0.89 for white individuals (range 0.06–6.16). For African American men, the arrest disproportion was more pronounced: The citywide disproportion of arrest for African American men was 3.18 and ranged from 1.71 to 27.57 across all PSAs, with a mean PSA-level arrest disproportion of 5.2. Predominantly white PSAs had significantly higher arrest disproportions for all African American individuals and for African American men (p < 0.001).

Citywide arrest disproportion was 0.15 for all white individuals and 0.32 for white men. The arrest disproportion was slightly higher in predominantly African American PSAs for all white individuals (1.14 vs. 0.36, p = 0.01) and for white men (1.90 vs. 0.65, p =0.02), although the arrest disproportion was still below 1.00 in nearly all PSAs. (More details on the influence of neighborhood racial makeup and arrest disproportion are available elsewhere [31].)

Multivariate regression results are shown in Table 2 and Fig. 1. In model A, higher arrest disproportions were significantly associated with predominantly white PSAs for all African American individuals (b = 5.32, p < 0.001) and for African American men (b = 9.91, p < 0.001). Predominantly African American PSAs were not significantly associated with arrest disparities for white individuals, but a higher percentage of female residents in predominantly Africa American PSAs was associated with a significant increase in arrest disparity for all white individuals (b = 0.15, p = 0.001), with a stronger relationship for men (b = 0.27, p = 0.001). The percentage of female residents in a PSA was not significantly associated with African American arrest disproportion.

For model B, we added a continuous by binary interaction term to examine association of the percentage of female residents in predominantly white and predominantly African American neighborhoods with racial arrest disproportion. The percentage of female residents was significantly associated with elevated arrest disproportion for African American individuals in predominantly white neighborhoods, but had no effect on arrest disparities in non-predominantly white neighborhoods. Conversely, a higher percentage of female residents in predominantly African American neighborhoods was associated with higher arrest disproportions for white individuals, but the relationship was not statistically significant in non-predominantly African American neighborhoods. The effect was most pronounced for African American men in predominantly white neighborhoods (b = 0.88, p < 0.001). For all African American individuals, the disproportion of drug-related arrests was 0.7 units higher with each percentage increase in female residents in predominantly white PSAs (b = 0.37, p = 0.003). For all white individuals in predominantly white PSAs, the arrest disproportion increased by 0.25 units (p < 0.001) for each percentage increase in the number of female residents, and the arrest disparity for white males increased by 0.45 units for each percent increase in female residents (p < 0.001).

In the final model, model C, we added neighborhood level unemployment and household income. These economic variables attenuated the interaction between race and gender in all four groups. The association between the percentage of female residents and arrest disparities was still significant for white individuals and white men in predominantly African American PSAs, although the effect size was smaller than in model B. The effect of percentage of female residents on arrest disparities for African American men in majority white PSAs was also smaller, and the relationship between the percentage of female residents and arrest disparities was no longer significant for all African American individuals in majority white PSAs (Fig. 1). Higher levels of unemployment were not associated with higher arrest disparities for African American individuals; however, higher unemployment levels did increase arrest disproportions for all white individuals (b = 0.08, p = 0.003) and white men (b = 0.12, p = 0.014). Conversely, PSAs with higher average incomes also had higher arrest disproportions for African American individuals (b = 0.02, p = 0.014) and African American men (b = 0.03, p =0.040), although the relationship was not significant for white individuals or white men.

Discussion

In a cross-sectional examination of all drug-related arrests made in Washington, DC between January 1, 2008 and August 3, 2015, we found that a PCA's demographic makeup had a significant association with the racial disproportion of drug-related arrests. Building on previous research which has found that African Americans face higher disproportions of drug arrest in predominantly white neighborhoods, these analyses demonstrated that more female residents in predominantly white

	All PSAs $n = 56$	Predominantly white PSA n = 18	Predominantly African American PSA n = 38	Difference between predominantly white and predominantly African American PSAs		
	Mean (SD) Range	Mean (SD) Range	Mean (SD) Range	Difference in means (<i>p</i> value)		
Disproportion African American arrests	2.87 (3.08) 0.94–16.09	6.31 (3.47) 2.09–16.09	1.25 (0.32) 0.94–2.10	5.07 (<0.001)		
Disproportion white arrests	0.89 (1.11) 0.06–6.16	0.36 (0.23) .09–0.91	1.14 (1.27) 0.06–6.16	- <i>0.08</i> (0.01)		
Disproportion African American male arrests	5.19 (5.63) 1.71–27.57	11.42 (6.44) 3.68–27.57	2.25 (0.46) 1.71–3.52	<i>9.17</i> (<0.001)		
Disproportion white male arrests	1.50 (1.97) 0.09–10.43	0.65 (0.45) 0.15–1.75	1.90 (2.27) 0.09–10.43	- 1.25 (0.02)		
% white residents	32.27 (30.15) 0.61–85.33	71.77 (12.66) 49.78–85.33	13.55 (12.61) 0.61–37.67	58.22 (< 0.001)		
% African American residents	57.53 (34.00) 3.46–97.50	14.80 (11.89) 3.46–39.56	77.77 (18.57) 38.92–97.50	- <i>62.97</i> (< 0.001)		
% Female residents	52.71 (3.42) 43.3–59.1	51.13 (3.77) 44.40–57.30	53.46 (3.02) 43.30–59.10	- 2.32 (0.02)		
% Unemployed	12.84 (8.17) 2.3–33.0	4.85 (1.83) 2.30–7.80	16.62 (7.20) 4.80–33.0	- 11.77 (<0.001)		
Average family income	116,281 (71,729) 38,160 – 336,739	200,123 (61,382) 130,285-336,739	76,567 (29,621) 38,160 – 152,011	<i>123,556</i> (< 0.001)		

Table 1 Arrest disproportion and descriptive statistics across Police Service Areas (PSAs)

*Statistically significant differences in italic

neighborhoods are significantly associated with elevated disproportionate drug arrests for African Americans, particularly African American men, and this relationship is only somewhat attenuated by the consideration of PSA-level unemployment and household income.

In the USA, the criminalization of African American men has frequently been justified by positioning them as a potential threat to white women [35], despite the fact that the majority of gender-based and intimate partner violence is intraracial [36]. Homicides and sexual assaults of white women by African American men tend to receive more severe criminal punishments than other racial and gender combinations of victim and perpetrator [36], and African American men are more likely to be perceived by both law enforcement and in the popular media as inhuman, superhuman, or even "bestial" [35, 37]. Historical incidents such as the 1955 murder of Emmett Till, who allegedly whistled at a white woman—who later admitted she had lied about the encounter—and the 1989 trial of the Central Park 5 exemplify this pattern [35], as does current political rhetoric positioning immigrants of color as potential "rapists" [38] and emphasizing the murder of white women at the hands of migrants [39–41]. The latter also echoes legislation from the nineteenth century in which the moral threat of "opium dens" to white women's virtue was used to pass anti-Chinese and anti-immigrant legislation [36].

Our study suggests that this cultural narrative is still in play, and may still influence policing outcomes. The percentage of female residents had different effects on arrest disproportion depending on neighborhood racial majority. Predominantly African American neighborhoods had significantly higher percentages of female residents (53% vs. 51%), which may be a reflection of the ways in which mass incarceration and premature death systematically remove African American men from their communities [7]. As a result, African American women may be more familiar with the adverse

	Model A: arrest disproportion by percent PSA residents female			Model B: interaction between PSA percent female and racial majority				Model C: interaction of race and gender, adjusting for PSA-level economics				
	AA	White	AA men	White men	AA	White	AA men	White men	AA	White	AA men	White men
Model-adjusted R^2	0.60	0.29	0.61	0.28	0.65	0.36	0.68	0.35	0.68	0.44	0.70	0.39
Predominantly white PSA	5.32 *_ **		9.91***		- 18.22*		- 40.36**		- 3.35		- 17.13	
Predominantly AA PSA		0.42		0.60		- 9.01*		- 17.32*		- 5.51		- 11.23
% PSA female	0.11	0.15***	0.32*	0.28***	-0.08	0.04	-0.09	0.08	0.04	0.04	0.12	0.08
Race × gender interaction					0.45**	0.20*	0.96***	0.34*	0.12	0.10	0.44	0.21
$PSA \ge 50\%$ white × % female					-0.08		0.88***		0.41		0.56*	
PSA < 50% white × % female					0.37**		-0.09		0.16		0.12	
$PSA \ge 50\% AA \times \%$ % female						.24***		0.43***		0.14*		0.29**
PSA < 50% AA × %female						.04		0.08		0.53		0.08
% Unemployed									-0.004	0.07**	-0.03	0.11*
Average family income (per \$1000 increase)									0.02*	0.001	0.03*	0.001

Table 2 Linear regression of arrest disproportion on (A) PSA race and gender, (B) interaction of race and gender, and (C) interaction of race and gender adjusting for PSA-level unemployment and average family income

*Statistically significant differences in italic

* $p \le 0.05$; ** $p \le 0.01$; *** $p \le 0.001$

consequences of calling on the criminal justice system and more reluctant to do so if they think it may result in the arrest or incarceration of an African American man [28]. We did find that the percentage of female residents in predominantly African American neighborhoods was associated with higher arrest disproportions for white individuals and white men, suggesting that if a primary mechanism in the link between the percentage of female residents in a PSA and arrest disparities is women contacting the police, then African American women may feel less reluctance about doing so for white individuals than African Americans.

In predominantly white PSAs, the overall percentage of female residents was the single largest predictor of disproportionate drug arrests for African American men. There are several possible explanations for this. First, DC has a relatively large proportion of single white women (72% of white women in the city are unmarried, compared to 51% nationally [42]) who may be more likely to move into recently gentrified neighborhoodsheightened police presence is a common strategy to "clean up" these neighborhoods and attract new residents, frequently resulting in the displacement of racial minorities [24, 43, 44]. Second, white women may feel more comfortable requesting police intervention than African American women, either because they are more likely to believe that engaging the criminal justice system will result in a fair outcome [30, 45], or because they are more likely to perceive African American men as personally threatening [35]. Third, police officers may be more likely to intervene or arrest an African American man in neighborhoods where more white women are present as a result of deeply rooted historical patterns in which the protection of white femininity has often served as a justification for state sanctioned violence and control of African Americans [46, 47].

At the neighborhood level, racial majority, income, and unemployment were all highly correlated—majority African American neighborhoods had significantly higher levels of unemployment and significantly lower



A: Arrest disproportion by percent PSA residents female

B: Interaction between PSA percent female and racial majority



C: Interaction of race and gender, adjusted for PSA-level economics



Fig. 1 Intersection of PSA race, gender, and economic makeup on drug arrest disparities among African American and white men

levels of income. However, when racial majority was held constant, white arrests approached demographic parity in PSAs with higher unemployment rates. Conversely, while neighborhood unemployment rates were not associated with African American arrest disparities, higher neighborhood income was. Other research has found that the intersection of class and race may be an important determinant of how individuals experience the criminal justice system [48]. In particular, affluent white Americans may feel more invested in a criminal justice system that they feel serves to protect their interests as the dominant social group [49], while white Americans who are working class, poor, or otherwise lower social status may be more likely to experience negative police interactions [48].

Our study should be considered in the light of certain limitations. Using disaggregated data with the absolute number of African American and white men would be preferable to inferring these numbers. However, we feel that our inferred proportions were reasonable approximations. The most likely flaw with this method would be a systematic overestimation of African American male residents within each PSA, as African American men are more likely to be missing from their communities than white men due to mass incarceration. This overestimation of the African American male population would most likely bias our results towards a more conservative estimate of African American men's arrest disproportion. Additionally, while we report on the number of arrests in each PSA, we do not know the frequency with which individuals were arrested, nor whether individuals arrested were residents or visitors to each PSA. We also cannot know the number of arrests which are due to police calls vs. police surveillance, nor can we know if individuals who initiated police calls were residents or visitors to the PSA. Despite these limitations, our findings are consistent with qualitative literature and historical reviews of the criminal justice system. Future research that utilizes primary data collected for the purpose of understanding the association between neighborhood level characteristics and arrest disproportion is necessary to corroborate our findings and move the evidence-base forward.

Conclusion

Historic cultural narratives which position African American men as a threat to white women may increase African American men's vulnerability to aggressive policing in spaces where they are more likely to come into contact or conflict with white women. The vulnerability which white, wealthy, and female spaces create for African American men may limit their ability to move freely without fear of potentially deadly police contact, which may increase neighborhood-level segregation and decrease African American men's access to economic opportunities in non-majority African American neighborhoods. The US Department of Justice's renewed emphasis on "law and order" approaches to drug use will likely further restrict and punish these men disproportionately. Policy interventions designed to address these inequities will be most effective if they consider the intersection of race, gender, and economics, rather than each of these three factors alone.

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