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Federal Drug Sentencing and the Overdose Epidemic

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Abstract

Research examining how federal courts have responded to the 21st century overdose crisis is limited, and even less is known about how district exposure to overdoses has shaped federal drug sentences. The current study examines how drug sentence lengths are contextualized by district-level overdose death rates across both substance type and race/ethnicity using federal sentencing data, Centers for Disease Control overdose mortality data, and other data on district social and legal characteristics for the 2015-2020 period. Findings reveal that district overdose death rates (especially involving minorities) are associated with slightly shorter drug sentences, net of other factors. In addition, Black-White and Hispanic-White sentence length gaps in drug cases declined in districts with more overdose deaths in part due to higher White sentence lengths, but mostly because minority sentences became shorter as district overdose mortality rates increased. These results suggest that exposure to the overdose crisis has not resulted in greater punitiveness in drug sentence lengths, and if anything, has been tied to leniency especially for minorities. Implications of these results for research on the 21st century overdose crisis, federal court responses to this crisis (especially across race/ethnicity), and for contextual effects in sentencing are discussed.

Keywords Sentencing · Courts · Drugs · Overdose · Race · Ethnicity

The American opioid epidemic has now spanned more than two decades and generated disastrous consequences for U.S. communities. Between 1999 and 2022, nearly 1 million Americans died from drug overdoses, with more than 100,000 lethal overdoses occurring in peak years (Ahmad et al., 2022). As a result, overdoses have become the leading cause of accidental death in the United States – surpassing

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deaths from automobile and gun accidents (Ahmad & Anderson, 2021; Faust et al., 2021). Despite the opioid epidemic being one of the most serious drug and public health crises in U.S. history, only a small set of noteworthy studies (Testa & Lee, 2021a, b) have examined how federal drug sentencing has been shaped by this crisis.

The limited attention to connections between the overdose crisis and federal drug sentencing is particularly noteworthy for two reasons. First, the federal criminal justice system has had a tumultuous history of responding to drug crises. Notoriously, the federal government led a punitive crusade against crack-cocaine in the 1980s and 1990s, ushering in a series of harsh mandatory minimum penalties that contributed to an era of mass incarceration, especially for Black communities (Alexander, 2010; Pettit & Western, 2004; Stuntz, 2011). More than three decades later, the United States faces another drug crisis in the opioid overdose epidemic. As we discuss in the following sections, the modern drug crisis has affected different populations and is unique in several ways from past drug challenges, making it unclear how criminal courts may have responded to this newer threat to social order.

Second, extant research demonstrates that (a) the impact of the overdose crisis has varied widely across place (overdose death rates are more than 300% higher in some federal districts relative to others) and (b) despite reforms to make federal sentencing uniform across place, district context continues to matter (see Feldmeyer & Ulmer, 2011; Kim et al., 2019; Ulmer et al., 2011). However, few studies have considered these two macro-level lines of inquiry together to assess how wide differences in district exposure to the overdose crisis is (or is not) linked to drug sentencing in federal courts. As we outline below, this is a particularly notable oversight because there are competing theoretical perspectives suggesting that when the overdose crisis hits "close to home," it could lead to either more or less punitiveness in drug sentencing. In addition, these contextual overdose effects could differ depending on (a) the types of substances and (b) the race/ethnicity of those involved in overdose deaths, which is the focus of this study.

Against this backdrop, the goal of this study is to examine the connections between district overdose patterns and federal drug sentencing by addressing two overarching questions. *First, do drug sentence lengths depend on local overdose death rates, the substances involved, and who is overdosing (White, Black, or Hispanic)*? Are drug sentences longer in districts that have experienced greater overdose mortality, and do these effects depend on the substances involved (e.g., opioids versus heroin or cocaine)? Do sentences differ when Whites (versus Black or Hispanic populations) are overdosing at greater rates, and does it depend on the substances responsible for White, Black, and Hispanic overdose deaths?

Second, do these effects of overdose context differ for White, Black, and Hispanic defendants? What types of defendants (in terms of race/ethnicity) have been impacted by these contextual effects, and have some benefitted or been harmed more than others? In other words, do all racial/ethnic groups become more (or less) punished in areas with high overdose exposure, or are these effects exclusive to White, Black, or Hispanic defendants?

To address these research questions, we link federal drug sentencing data for the 2015 to 2020 period to the Centers for Disease Control and Prevention's (CDC) Restricted-Access Multiple Cause of Death (MCOD) Mortality data. Our focus is on

opioids (including, morphine, oxycontin, fentanyl and other substances) and heroin, but we also examine federal drug sentences for crack- and powder-cocaine given their historical importance in federal drug sentencing. In the following sections, we provide a review of research on the overdose epidemic and on drug sentencing in federal courts, noting theoretical reasons why district overdose context may shape federal drug sentencing (overall and across race/ethnicity and substance). We then describe the methods and findings from this analysis and conclude by discussing the implications of our results for theory, policy, and practice.

The Overdose Crisis and Federal Drug Sentencing in the 21st Century

Dating back to the 1980s, federal sentencing research has given extensive attention to punishment for drug offenses. Although it is beyond the scope of this project to review the entire federal drug sentencing literature to date (a task better suited for a meta-analysis or annual review), findings generally indicate that drug penalties have been harsh (especially for minorities; Brennan & Spohn, 2009; Spohn, 2000; Spohn & Sample, 2013; Wu & D'Angelo, 2014). This has particularly been the case for crack-cocaine offenses, which have attracted greater mandatory minimums and other sources of "structural punitiveness" (Alexander, 2010; Gottschalk, 2023; Kautt & Spohn, 2002; Lynch & Omori, 2014; Rose & Clear, 1998).

Although these studies have been foundational, the landscape of drugs in America has shifted since researchers conducted much of this work. The crack-cocaine crisis of yesteryear has faded only to be replaced by a new and even more deadly 21st century drug crisis – the opioid epidemic. This drug crisis is now entering its third decade, during which time overdose death rates (largely, but not entirely, from opioids) have more than quadrupled, rising from 6.1/100,000 to 28.3/100,000 between 1999 and 2020 (CDC, 2022; Hedegaard, et al. 2020). This drug epidemic has evolved insidiously over time, moving from natural and pharmaceutical opioids (oxycodone, morphine, codeine, etc.) to heroin and then to even more lethal synthetic opioids like fentanyl, which can be 50 to 100 times stronger than morphine (CDC, 2022; Feldmeyer et al., 2022a, b; Gottschalk, 2023). All told, this trilogy of opioid waves has led to more deaths than either the HIV or homicide epidemics of the late20th century (Cooper & Smith, 2011; Torian et al., 2011). However, there is surprisingly little research examining how U.S. criminal courts have responded to the overdose crisis.

Testa and Lee (2021a) offer one notable exception, finding that drug sentences became more lenient as the overdose crisis progressed (from 2002 to 2017). Interestingly, however, Testa and Lee (2021a) found that the decline in punitiveness was less pronounced for opioids and other substances that epitomize the newer drug epidemic. Similarly, Lynch and Omori (2014) reported increased leniency in drug sentencing from 1993 to 2009 but noted that these patterns vary across districts and depend on the use of mandatory minimums. In addition, Holmes and colleagues (2024) found that while pharmaceutical opioid cases have received favorable substantial assistance departures, methamphetamine and fentanyl cases have not

benefited to the same degree. These studies have been key to advancing knowledge on sentencing during the 21st century drug crisis. However, given the severity of the overdose epidemic, far more work is needed to gain a complete picture of federal sentencing throughout this crisis.

One specific issue that warrants further investigation is how *local exposure to the overdose crisis has shaped drug punishments*. This is a particularly important question for two reasons. First, the overdose epidemic has not been felt evenly across place, with some federal districts experiencing overdose mortality rates that are more than four times higher than others. For example, the overdose death rate in the Eastern District of Kentucky was 34.57/100,000 from 2014 to 2016, while the overdose death rate in the Northern District of Iowa was only 7.75/100,000 over that same time. Second, drawing from the court communities perspective, federal courts often respond to and are influenced by local (district) context throughout the sentencing process (Eisenstein et al., 1988; Ulmer, 2019). There is now a large body of research which shows that district social and contextual characteristics shape the way that sentences are handed out in federal criminal courts (e.g., Eisenstein et al., 1988; Feldmeyer & Ulmer, 2011; Johnson et al., 2008; Kautt, 2002; Light, 2014; Lynch & Omori, 2014; Ulmer, 2019). Thus, it is plausible that drug sentencing differs depending on the local severity of the overdose crisis, the types of substances involved, and the race/ethnicity of those overdosing. Yet, the precise way these effects operate is unclear, and there are competing theoretical arguments on how district exposure to overdose deaths may shape drug sentencing, which we turn to below.

Overdose Exposure and Punitiveness

On the one hand, districts with higher levels of overdose mortality may apply harsher penalties for drug sentences. The opioid epidemic has contributed to nearly 1 million deaths and an estimated 2.1 million children living with a parent struggling with drug abuse (see Ahmad et al., 2022; Lipari & Van Horn, 2017). In peak years, the U.S. opioid crisis is estimated to have cost as much as $1.02 trillion in healthcare and law enforcement expenses, as well as opportunity costs from lost productivity and human lives (Florence et al., 2016, 2021). In light of these exorbitant social and economic costs, exposure to overdose deaths may lead those closer to the problem to increase punitiveness in an effort to combat the drug crisis. This argument aligns with central tenets of focal concerns theory (Steffensmeier et al., 1998) – namely that when overdoses are high, courtroom actors may perceive drug offenders as particularly threatening to community safety and culpable for the problem (for similar arguments, see Testa & Lee, 2021a). Likewise, this argument would align with the courts as inhabited institutions proposition that courts are made up of individual actors with agency, who respond to local threats and social conditions that they experience in surrounding communities (Ulmer, 2019).

If federal courts do respond with more punitiveness when overdoses are high, this begs the question: do some types of overdoses elicit harsher responses than others? There is reason to believe that overdoses involving substances that epitomize the opioid epidemic (opioids or heroin) will elicit punitive responses more than overdoses for other substances. In addition, the contextual effect of overdose mortality

may differ by the race/ethnicity of those overdosing. Unlike the crack-cocaine epidemic (Alexander, 2010; Tonry, 2015), opioid use and overdose deaths have largely been concentrated among White populations (although this shifted in later years; Furr-Holden et al., 2021). In Donald Black's seminal (1976) book, *The Behavior of Law*, he posits that those higher on the social ladder will be more protected by the law than those lower on the social ladder. Using Black's (1976) framework, high White overdose rates may trigger a response to clamp down on the citizenry and quell the threat, while high Black and Hispanic overdose rates may not trigger that same response. In this way, all overdoses may not be considered equal, and in an opioid epidemic that has been far more "White" than prior drug eras, overdose contextual effects may depend on the race/ethnicity of the deceased.

In addition, our second research question posits that if overdose exposure contributes to harsher drug sentences, this punitiveness may be applied differently to White, Black, and Hispanic *defendants*. Sentences for White drug defendants may be worse in areas with high overdose mortality (and especially more White overdose deaths). After all, the driving narrative surrounding the overdose crisis has framed it as a "White" problem (Hansen & Netherland, 2016; Lopez, 2017; Sun et al., 2023), suggesting that White drug defendants would be the natural targets of any harsh responses to overdose exposure. However, there has rarely been a time in American history where a drug scare has elicited lenient responses toward racial/ethnic minorities (Alexander, 2010; Tonry, 2015). In addition, overdose rates among minorities have begun to increase in later years of the drug epidemic, and sizable shares of synthetic opioids have crossed into the United States from the Southern border (DEA, 2019). As such, punitive responses to overdose deaths may have less to do with White involvement and more to do with longstanding stereotypes linking minorities with drug dealing or trafficking.

Overdose Exposure and Leniency

On the other hand, high overdose mortality exposure may not lead to harsher drug sentences and could even produce greater leniency. In their study of overdose context and federal sentencing, Testa and Lee (2021b, p. 3) offer the "prevalence hypothesis," which states that in places where overdoses and drug offenses take on a greater sense of normalcy, drug sentences will be more lenient. In contrast, when these cases are rare, they may stand out, draw greater attention, and ultimately receive harsher sentences. Such arguments are consistent with courtroom workgroup and court communities perspectives, which suggest that courts tend to develop "going rates" and standard approaches for handling routine cases (Eisenstein et al., 1988; Ulmer, 2019), ultimately leading to harsher sentences in "exotic" cases.

In addition, the overdose epidemic has not generated the same thirst for punitiveness seen in past drug crises. In stark contrast to the "just say no" and "lock them up" responses to prior drug eras (NRC, 2014), the opioid epidemic has often been framed as a public health problem. In fact, in 2017 the Department of Health and Human Services declared the opioid crisis a public health emergency, increasing funding to (amongst other things) primary prevention, treatment, and recovery

support services. Moreover, those who have been up close and personal with the overdose epidemic may be more sympathetic toward drug defendants after seeing the addiction, suffering, and tragedy of this public health disaster first-hand. Drawing from the focal concerns perspective, court actors in these areas may also be more acutely aware of the myriad "practical constraints" that harsh drug sentences carry, such as breaking up families, adding to prison overcrowding, and the limited institutional resources available for drug treatment (NRC, 2014; Tonry, 2015). As a result, places with higher overdose mortality rates may be more in tune with public health pleas and more skeptical of the criminal justice system as a viable response to drug problems, ultimately leading to shorter drug sentences in these areas.

Again, if federal courts are more lenient when overdoses are high, the next logical question is: do all overdoses generate this leniency or just certain types? Deaths from substances that epitomize the opioid epidemic (opioids or heroin) may elicit this leniency more than other types of overdoses. In addition, the overdose problem has been concentrated among White communities, leading some to ask whether softer responses to the opioid crisis are at least in part because of the "White" nature of the problem (Lopez, 2017; Netherland & Hansen, 2016). As such, high White overdoses may strike a protective chord and elicit concerns about public health and practical constraints (especially for opioids) that high Black and Hispanic overdoses do not.

In addition, our second research question asks whether some drug defendants (White versus Black or Hispanic) will reap the benefits of this leniency more than others. If a softer response to the opioid epidemic is really due to the "White" nature of the problem, one would expect to see this leniency mostly for White defendants. In contrast, it is less clear whether Black and Hispanic drug defendants would receive the same type of leniency in districts with higher overdose exposure. If they are seen as less central to the ongoing drug crisis and "not the main problem," they could draw leniency from courts that are more attuned to White overdoses and drug offending. However, as noted earlier, drug crises have not typically led to softer punishments for racial/ethnic minorities (Alexander, 2010; Tonry, 2015), suggesting that any sentencing leniency tied to overdose exposure may not extend to Black and Hispanic defendants.

Prior Research on Overdose Context and Federal Sentencing

As discussed above, there are multiple competing ways in which overdose context could influence federal drug sentencing. Yet almost no research has explored these relationships to date, making it unclear whether, how, and for whom overdose context shapes drug sentencing in federal courts. Testa and Lee (2021b) provide one of the only existing studies that examines how macro-level overdose patterns contextualize federal drug sentences throughout the 21st century overdose crisis. They found that higher state-level overdose death rates (and growth in overdoses) contribute to leniency in federal drug sentences, especially for drug cases that align with the overdose crisis (e.g., opioid cases). While the study by Testa and Lee (2021b) has been instrumental in advancing knowledge on how overdose context shapes federal drug

sentencing, it is the only study to do so, and further work that extends their research is needed. For example, Testa and Lee (2021b) examined total overdose rates but did not examine whether these relationships depend on *who is overdosing* (e.g., White, Black, or Hispanic) and *which substances they are using*. In other words, all overdoses may not be considered equally and, as we argue above, high levels of White overdose mortality (i.e., for opioids and heroin) may elicit different responses than say high rates of Black or Hispanic deaths from crack-cocaine.

Likewise, past research is unclear on which racial/ethnic groups are (a) bearing the brunt or (b) reaping the benefits of these contextual effects. For example, if high overdose mortality is linked to longer sentences, does this occur for all race/ethnic groups or only for some types of defendants? Alternatively, if overdose exposure leads to leniency, is this only for White defendants, or do minority drug defendants also benefit when overdoses are higher? Testa and Lee (2021b) examined how state-level overdoses were related to drug sentencing broadly (not by race/ethnicity). However, given the historical link between federal drug policy and race/ethnicity (Alexander, 2010; Tonry, 2015), exploring ties between overdose deaths and defendant race/ethnicity in federal sentencing is a natural and necessary next step in this line of research.

In light of these questions and gaps in research, the current study seeks to identify how local (district-level) overdose mortality is related to federal drug sentence length outcomes overall and across race/ethnicity.[1] In doing so, our goal is to extend research on drug sentencing and overdose context by addressing two pressing questions:

1. *Do federal drug sentence lengths depend on local overdose rates, who is overdosing (White, Black, or Hispanic), and the substances involved*?
2. *Do these effects of overdose context differ for White, Black, and Hispanic defendants?*

Data and Methods

To address the above research questions, we rely on the USSC Monitoring of Federal Criminal Sentences (MFCS) data series. The MFCS data include all federal felony and serious misdemeanor criminal cases sentenced in federal courts and reported to the USSC between January 1, 2015 and September 30, 2020 (Kitchens, 2019). Due to our primary focus on opioids and heroin (with crack- and powder-cocaine for comparative purposes), we only examine drug cases with focal opioid,

[1] We considered presenting specific hypotheses for each of the potential relationships between overdose context and sentence length outlined above. However, we chose to present them as broader research questions for two reasons. First, accounting for each overdose by substance type by race effect would result in more than 25 separate hypotheses, which would be unwieldy for a journal article. Second, presenting hypotheses makes more sense when there are a small number of clear expectations for the direction and significance of effects, but as we mention in the text, there are multiple competing theoretical arguments for how these effects will operate.

heroin, powder-cocaine, and crack-cocaine offenses.[2] Aligning with past federal sentencing research (Johnson et al., 2008; Light, 2014, 2022; Ulmer & Parker, 2020), we exclude cases with a juvenile defendant and cases in a territory district. This results in a dataset of 45,611 drug cases sentenced across 90 districts between 2015 and 2020.

We account for the clustering of criminal cases within districts using multi-level modeling and include a series of district-level predictors. Of primary interest to this study's goal, we gather information on the number of overdose deaths by geography, race/ethnicity, and substance type from the Centers for Disease Control's (2020) Restricted-Access MCOD mortality data. This dataset is uniquely situated to assess how overdose patterns contextualize federal sentencing because it provides death records of all overdose deaths in the United States based on coroner reports that can be aggregated to federal districts. Information on other district characteristics is drawn from publicly available datasets. A district's number of authorized judgeships, and volume of criminal cases filed, are collected from annual Judicial Business Reports and Federal Judicial Caseload Statistics (Duff, 2019). District racial/ethnic population composition comes from the United States Census Bureau's, (2000) Decennial Census and American Communities Survey 5-year estimates. Political ideology of a district is estimated using voting returns from the MIT Election Data and Science Lab Presidential Election Return Dataset. Similar to past federal sentencing research (Feldmeyer & Ulmer, 2011; Kim et al., 2016; Ulmer & Parker, 2020), we aggregate many of these variables from the county- to district-level to match the MFCS dataset.

Measures

Dependent Variable

The dependent variable in this study is *prison sentence length* (capped at 470 months – the USSC representation of a life sentence; Johnson et al., 2008). Due to positive skew, we use the natural log of sentence length in multivariate regression models. In preliminary analyses, we also explored models of incarceration but elected to focus exclusively on sentence length for several reasons. First, there is limited variation in federal incarceration decisions in these data (about 95% of federal drug sentences included prison). Second, we wanted to allow for a more in-depth analysis of the most analyzed outcome variable in federal sentencing research – sentence length (for similar analyses of sentence length only, see Feldmeyer & Ulmer, 2011; Holmes & Feldmeyer, 2024a; Kim et al., 2015; Light, 2022; Ulmer & Parker, 2020). Given that this analysis covers multiple types of overdoses, racial/ethnic groups, and defendants (and combinations thereof), the presentation of findings are already quite extensive.

[2] In supplemental analyses, we estimated direct effect models that included all drug cases and offenses (rather than only the focal four drug types examined here). These models show some differences in terms of statistical significance (a few effects dropped to marginal significance), but the substantive effects were similar. Higher district overdose mortality rates were associated with shorter drug sentences (result available upon request).

Thus, including another dependent variable would substantially expand the scope and complexity of the current project. However, we acknowledge that extending this analysis to other outcome variables (e.g., departures, pre-sentence adjustments) is an important area for future inquiry.

Case-Level Variables

Our primary interest at the case-level revolves around focal drug type and race/ethnicity. We differentiate between the focal *drug type* (drug in the case which carries the highest base offense level) using an indicator variable for powder-cocaine (reference), crack-cocaine, opioids, and heroin.[3] Defendant *race/ethnicity* is captured using a series of dichotomous variables representing Black, Hispanic, and Other, with White serving as the reference category. We include controls for several additional social-demographic characteristics of defendants, including *sex* (1 = Male; ref. = Female), *age* (years), *age-squared* (years * years; Steffensmeier et al., 1998), *educational attainment* (1 = High School Graduate, Some College, College Graduate; ref. = Less than High School Diploma), and *citizenship status* (1 = Non-U.S. Citizen; ref. = U.S. Citizen).

We also include several measures to control for legal and case processing factors. We control for between-group differences in case severity using *presumptive sentence,* the minimum number of months of incarceration called for by the sentencing guidelines (capped at 470 months). Presumptive sentence incorporates offense severity, criminal history, and any offense- or case-related adjustments that the court applies before the determination of the sentence (e.g., safety valve provision, acceptance of responsibility, role in the offense). Given recent work which argues for using the more front-end base offense level variable as the primary measure of offense severity (Hofer, 2019; Holmes & Feldmeyer, 2024b; Light, 2022), we ran supplemental models incorporating base offense level as the primary legal control. Substantive findings from the base offense level and presumptive sentence models were nearly identical, suggesting that the estimated effects apply across both (a) the sentencing process as a whole (base offense level approach) and (b) the finite point between the calculation of the guidelines and the ordering of the sentence (presumptive sentence approach; see Holmes & Feldmeyer, 2024b). In light of past research showing that criminal history has an added effect on punishment, above and beyond its contribution to presumptive sentence, we utilize a series of dummy variable indicators for guideline *criminal history category* (Holmes & Feldmeyer, 2019; Ulmer, 2000). In addition, we use indicator variables (1 = Yes) to signify whether a case

[3] Opioid cases include all cases with a focal drug type that is an opioid or derivative (except heroin), including multiple forms of natural (e.g., oxycontin, morphine, etc.) and synthetic opioids (e.g., fentanyl). We explored the possibility of examining fentanyl separately but were unable to do so because of data limitations. The data contained fewer than 200 total fentanyl cases annually up to 2018, with only 2807 total cases occurring from 2015 to 2020. More importantly, several districts sentenced zero fentanyl cases over the entirety of the study period, including the District of Wyoming, Middle District of Alabama, and Middle District of Louisiana. As such, we were unable to examine fentanyl sentences separately but encourage future research to do so as additional cases become available.

was subject to a *mandatory minimum*, received a *government sponsored departure*, had *multiple counts of conviction*, was settled via *trial*, or had a defendant *detained pre-sentencing*. *Sentencing year* is entered as a series of dichotomous variables to control for the time-period in which a case was disposed (ref. = 2015).

District-Level Variables

Our primary variables of interest at the district-level are 2015 *overdose death rates* per 100,000 residents, overall and disaggregated by substance type and race/ethnicity (Black, White, and Hispanic). This results in a variety of district-level overdose measures that capture district *total overdose death rates* (all substances and groups), district *substance-specific overdose death rates* (opioids, heroin, cocaine, and crack for all groups), and district *racial/ethnic-specific overdose death rates* (by substance type). To add stability to measures and minimize the impact of single-year fluctuations in overdose deaths, we use three-year averaged rates around 2015 (2014 to 2016).[4]

We also include a series of district-level controls that have often been related to district sentencing patterns (Kim et al., 2016; Light, 2014; Ulmer & Parker, 2020; Ulmer et al., 2010). Drawing from research on racial/ethnic threat (Blalock, 1967; Feldmeyer & Cochran, 2018), measures of *percent Black change* and *percent Hispanic change* are drawn from the U.S. Census Bureau and represent the change in a district's Black (and Hispanic) population percentage from 2000 to 2015. We include squared terms for these measures to account for curvilinear effects of racial/ethnic population composition. In supplemental analyses, we replaced measures of district racial/ethnic change with static measures of racial/ethnic composition (e.g., percent Black, percent Hispanic), which produced similar findings, especially regarding district overdose context (results available upon request). Research has shown that court size and caseload are commonly related to sentencing outcomes (see Feldmeyer & Ulmer, 2011; Johnson et al., 2008). Thus, we measure *court size* as the average number of authorized judgeships in a district in 2015. Similar to prior research (Tillyer & Hartley, 2016; Ulmer et al., 2010), *caseload pressure* is operationalized as the average number of criminal filings divided by authorized judgeships from 2014 to 2016 (multiplied by 10 in regression models for interpretation). *Political conservatism* is measured as the percent of district votes cast for Donald Trump in the 2016 election.

[4] Overdose rates were calculated based on an individual's county of residence and aggregated to the district level. Overdose death counts were based on underlying death codes following categorizations used in CDC calculations and prior research (e.g., Hedegaard et al., 2019; Rudd et al., 2016): overdose, X40 to X44, X60 to X64, X85, and Y10 to Y14. Specific substances were identified using the following codes: heroin, T40.1; natural and semisynthetic opioids, T40.2; methadone, T40.3; synthetic opioids excluding methadone, T40.4; and cocaine, T40.5. Notably, the MCOD data do not provide a specific "crack" code, and instead include it in cocaine counts.

Analytic Approach

As noted earlier, our analysis centers around two broad research questions. *First*, how do local overdose patterns contextualize drug sentencing in federal criminal courts? Related to this, does it depend on who is overdosing (Black, White, versus Hispanic overdose deaths) and what substances they are using (opioids, heroin, cocaine, or crack)? *Second*, do these contextual effects differ depending on the race/ethnicity of the defendant?

To address these research questions, we first provide descriptive statistics (Table 1) to show the case-level and district-level characteristics of our sample (Table 2). Turning to the multivariate analyses, we begin by estimating a multilevel ordinary least squares (OLS) regression model including all case-level and district-level controls and regressing *total district overdose rate* (not disaggregated by substance or race/ethnicity) on sentence length (Table 3).[5] To address our first research question, we build on this baseline model by assessing how substance-specific district overdose rates (overall and across race/ethnicity) are related to sentence lengths for federal drug cases (Tables 4 and 5 To address our second research question, we examine cross-level interactions to identify how the effects of defendant race/ethnicity on sentence length outcomes differ depending on the district overdose context – overall, across overdose substance type, and across race/ethnicity of the deceased (Table 6).[6] All slopes that varied randomly across districts were allowed to vary randomly in regression models (i.e., all variables except age-squared and education). Sets of district overdose variables were entered into models one substance at a time to avoid potential collinearity problems. However, all models are shown in the same tables to ease presentation of findings. Collinearity diagnostics indicated that VIF scores for all variables were below standard cutoff points (4.0) (Wooldridge, 2010).

Findings

Descriptive Statistics

Table 1 shows the descriptive statistics of the analytic sample. Among federal opioid, heroin, crack-, and powder-cocaine cases, the average prison sentence length was 70 months (SD = 64.44). Most cases involved powder-cocaine (40%), followed by heroin (30%), crack-cocaine (18%), and then opioids (13%). It is noteworthy that despite the ongoing opioid epidemic, opioids account for a relatively small share of the federal drug caseload. In addition, Table 2 shows the number of cases sentenced

[5] Significant variance in sentence length existed at both the case- and district-level, suggesting the need for multi-level models. Interclass correlation coefficients (ICC's) showed that 91% of variance in sentence length lies at the case level and 9% lies at the district level. All case-level variables were grand-mean centered to allow for compositional effects. All case-level variables that had random variation across districts were modeled as such.

[6] We ran supplemental models including a Heckman correction term for selection bias. We do not include those results because of collinearity between the inverse mills ratio and legal factors (see Bushway, Johnson, and Slocum 2007; Feldmeyer et al., 2015), but the effects in those models were generally similar to those presented here.

Table 1 Descriptive statistics of federal drug cases and districts, 2015 – 2020

Case-Level (n = 45,626)			District-Level (n = 90)		
Variables	Mean/%	SD	Variables	Mean	SD
Sentence Length (months)	70.10	64.44	Total Overdose Rate	17.73	7.26
Focal Drug Type			White Total Overdose Rate	19.06	7.71
Cocaine	39.55%	-	Black Total Overdose Rate	16.14	10.18
Opioid	12.51%	-	Hispanic Total Overdose Rate	7.43	5.61
Crack	17.72%	-	Opioid Overdose Rate	8.50	6.46
Heroin	30.22%	-	White Opioid Overdose Rate	9.31	6.73
Race/Ethnicity			Black Opioid Overdose Rate	6.74	6.91
White	12.86%	-	Hispanic Opioid Overdose Rate	4.89	4.70
Black	44.00%	-	Heroin Overdose Rate	3.87	3.04
Hispanic	41.75%	-	White Heroin Overdose Rate	3.97	3.06
Other race	1.39%	-	Black Heroin Overdose Rate	4.15	4.62
Male	87.81%	-	Hispanic Heroin Overdose Rate	2.25	2.40
Age	36.60	10.28	Cocaine Overdose Rate	2.19	1.83
Education			White Cocaine Overdose Rate	1.82	1.66
< High school	40.04%	-	Black Cocaine Overdose Rate	5.23	4.46
High school graduate	38.45%	-	Hispanic Cocaine Overdose Rate	1.18	1.53
Some college	18.05%	-	% White Population	75.37	13.15
College graduate	3.47%	-	% Black Population	12.92	11.25
Non-Citizen	23.15%	-	% Hispanic Population	11.72	11.63
Presumptive Sentence	95.62	78.11	% Black Population Change	0.35	1.82
Criminal History			% Hispanic Population Change	3.71	2.03
Category 1	43.94%	-	Caseload Pressure	126.22	106.12
Category 2	11.87%	-	Court Size	7.40	5.67
Category 3	15.75%	-	% Conservative	50.25	12.10
Category 4	8.67%	-			
Category 5	5.01%	-			
Category 6	14.76%	-			
Mandatory Minimum	56.02%	-			
Government-Sponsored Departure	34.57%	-			
Multiple Convictions	22.88%	-			
Trial	3.11%	-			
Pre-Sentence Detention	80.25%	-			
Year					
2015	18.07%	-			
2016	17.75%	-			
2017	17.89%	-			
2018	17.75%	-			
2019	18.65%	-			
2020	9.88%	-			

Percentage shown (and standard deviation omitted) for dichotomous case-level variables

Abbreviations: SD = standard deviation, < = less than

Table 2 Number of federal drug cases by substance type and year

Year	Opioid	Heroin	Cocaine	Crack	**Total**
2015	782	2526	3329	1605	**8242**
2016	677	2624	3357	1437	**8095**
2017	739	2588	3450	1387	**8164**
2018	962	2427	3297	1411	**8097**
2019	1538	2393	3099	1480	**8510**
2020	1010	1223	1507	763	**4503**
Total	**5708**	**13781**	**18039**	**8083**	**45611**

for each drug type annually throughout the 2015 to 2020 study period. Turning to defendant characteristics, most defendants were either Black (44%) or Hispanic (42%), with smaller shares of White (13%) defendants. The majority of defendants were male (88%), had a high school diploma or less education (78%), and were U.S. citizens (77%). The average age of defendants was 37 years (SD = 10.28). Looking at case processing characteristics, the average presumptive sentence was 96 months (SD = 78.11), and defendants typically had a minor criminal history (44% in Category 1). Moreover, most cases were subject to mandatory minimums (56%), did not obtain a government-sponsored departure (65%), had one conviction at sentencing (77%), were settled via plea (97%), and had defendants who were detained pre-sentencing (80%).

In terms of district-level measures, the average district population was 75% White, 13% Black, and 12% Hispanic. In addition, districts generally had a stable Black (+0.35%) but rising Hispanic (+3.71%) population from 2000 to 2015. On average, 50% of district voters cast ballots for Donald Trump in the 2016 election. The average district disposed of 126.22 cases per authorized judgeship and had about 7.4 authorized judgeships in 2015. Turning to our overdose variables, the average district overdose death rate was 17.73 per 100,000 residents. This overdose mortality rate was largest for opioids (8.50 per 100,000 residents), followed by heroin (3.87 per 100,000 residents) and cocaine (2.19 per 100,000 residents). As noted earlier, these overdose mortality patterns varied considerably across districts, with some districts having overdose death rates below 10 per 100,000 and others having rates above 30 per 100,000.[7]

Multivariate Analysis – Main Overdose Effects

Table 3 provides a multi-level OLS regression model examining the contextual impact of total overdose mortality rate (all substances and racial/ethnic groups combined) on sentence length. After accounting for case- and district-level controls,

[7] The Southern District of West Virginia had an extremely high overdose rate compared to other districts (almost 3 times the district mean). Thus, we re-ran all analyses without this district and found similar results to those presented here, indicating that district overdose mortality was linked to greater leniency in sentence lengths.

Table 3 Multilevel Ordinary Least Squares (OLS) regression model – overall effects

Case-Level ($n = 45{,}611$)			District-Level ($n = 90$)		
Variables	b	SE	Variables	b	SE
Focal Drug Type (ref. = Cocaine)			Overdose Rate	-0.004*	0.002
Opioid	0.059*	0.028	% Black Change	-0.004	0.008
Crack	-0.005	0.020	% Black Change Squared	0.003**	0.001
Heroin	0.021	0.016	% Hispanic Change	-0.065**	0.021
Race/Ethnicity (ref. = White)			% Hispanic Change Squared	0.005**	0.002
Black	0.125***	0.021	Caseload Pressure	-0.12e-04	0.000
Hispanic	0.072**	0.022	Judgeships	0.005*	0.002
Other	0.088	0.054	Conservatism	0.006***	0.001
Male	0.442***	0.028			
Age	0.018***	0.003			
Age-Squared	-2.38e-04***	0.000			
Education (ref. = < High school)					
High school graduate	-0.004	0.009			
Some college	-0.040**	0.014			
College graduate	0.041	0.035			
Non-citizen	-0.035	0.018			
Base Offense Level	0.094***	0.002			
Criminal History (ref = Cat. 1)					
Category 2	0.409***	0.022			
Category 3	0.523***	0.020			
Category 4	0.669***	0.019			
Category 5	0.845***	0.021			
Category 6	1.281***	0.027			
Government-Sponsored Departure	-0.573***	0.038			
Multiple Convictions	0.312***	0.020			
Trial	0.395***	0.028			
Presentence Detention	0.539***	0.045			
Mandatory Minimum	0.296***	0.019			
Year (ref. = 2015)					
2016	-0.002	0.017			
2017	0.034	0.018			
2018	0.017	0.019			
2019	-0.069***	0.016			
2020	-0.157***	0.030			
Constant	3.665***	0.100			

^ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Abbreviations: n = sample size, b = unstandardized regression coefficient, SE = standard error, ref = reference, < = less than, Cat. = category

districts with higher overdose mortality rates doled out significantly (but only slightly) shorter average drug sentences than districts with lower overdose mortality rates. To illustrate, the average sentence in a district with a total overdose mortality rate of 21 per 100,000 (the 75th percentile) was about 0.60-months shorter than the average sentence in a district with a total overdose mortality rate of 13 per 100,000 (the 25th percentile), holding all factors at their mean. This suggests the answer to the first part of our initial research question (*do drug sentences depend on local overdose rates?*) is that increased exposure to overdose mortality does predict leniency, but only slightly so.

In terms of other district-level controls, districts with more authorized judgeships and higher concentrations of politically conservative residents were more punitive. Moreover, districts with growing Hispanic populations gave out shorter average sentences, but once Hispanic population growth reached a tipping point, that mitigating influence tapered off. At the case-level, cases with focal opioid offenses received about 5% [EXP(0.051)] longer sentences than cases with focal powder-cocaine offenses, net of controls. However, cases involving other drug types (crack-cocaine, heroin) did not have significantly different sentence lengths from powder-cocaine cases. Black and Hispanic defendants received 13% and 7% longer sentences than comparable White defendants, respectively. Male defendants received about 56% longer sentences than similar female defendants, and age had a curvilinear relationship with punitiveness (i.e., the youngest and oldest defendants were treated more leniently). Defendants with higher presumptive sentences and criminal history categories (up to a point) received longer sentences. Moreover, cases without a government sponsored departure (versus those with one), settled via trial (versus plea), with multiple convictions (versus one), with a defendant detained pre-sentencing (versus in custody), and subject to mandatory minimums (versus not) received longer average sentences. In addition, the dummy variables for year indicate that drug sentences became shorter over time.

Overdose Effects Across Substance and Race/Ethnicity

Above, we find evidence that district exposure to lethal overdoses contributes to slightly shorter drug sentences, net of other factors. However, it remains unclear whether this relationship varies by (a) the types of substances driving overdose mortality rates and (b) the racial/ethnic makeup of overdose deaths in these areas. To address these questions, Table 4 shows overdose mortality effects disaggregated by the types of substances involved in overdose deaths. Here we find that higher district opioid, heroin, and cocaine overdose mortality rates are all negatively associated with sentence length. Substantively, a district which ranked in the 75th percentile of heroin, cocaine, and opioid overdose mortality meted out 0.57-, 0.52-, and 0.33-month shorter sentences than districts ranked in the 25th percentile of heroin, cocaine, and opioid overdose mortality, respectively. Thus, the (slight) negative association between overdose mortality and sentence length shown in Table 3 appears to extend across overdose substance types.

Table 4 Main district-level effects: overdose rates by substance type

Variables	b	SE
Total Overdose Rate	-0.004*	0.002
Opioid Overdose Rate	-0.002	0.002
Heroin Overdose Rate	-0.008*	0.004
Cocaine Overdose Rate	-0.007	0.008

^ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001

All models include the full set of control variables shown in Table 3. District overdose variables were entered sequentially into models, one substance at a time, to avoid potential collinearity problems. They are shown in a single table here to ease presentation of results

Abbreviations: b = unstandardized regression coefficient, SE = standard error

Table 5 goes one step further, breaking down overdose mortality effects by race/ethnicity of overdose deaths. Across virtually all overdose substance types, districts exposed to higher rates of Black and Hispanic overdose deaths meted out shorter average sentences. Again, however, these main effects are small. When the effect size was the largest (Hispanic cocaine overdoses), a district with a

Table 5 Main district-level effects: overdose rates partitioned by race/ethnicity

Variables	b	SE
Total		
White Overdose Rate	0.002	0.002
Black Overdose Rate	-0.005***	0.001
Hispanic Overdose Rate	-0.005*	0.002
Opioid		
White Overdose Rate	0.006*	0.003
Black Overdose Rate	-0.008***	0.002
Hispanic Overdose Rate	-0.006*	0.003
Heroin		
White Overdose Rate	0.004	0.006
Black Overdose Rate	-0.005^	0.003
Hispanic Overdose Rate	-0.015*	0.006
Cocaine		
White Overdose Rate	0.026*	0.012
Black Overdose Rate	-0.012***	0.003
Hispanic Overdose Rate	-0.023*	0.009

^ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

All models include the full set of control variables shown in Table 3. District overdose variables were entered sequentially into models, one substance at a time, to avoid potential collinearity problems. They are shown in a single table here to ease presentation of results

Abbreviations: b = unstandardized regression coefficient, SE = standard error

Hispanic overdose death rate in the 75th percentile doled out only about 0.78-month shorter sentences than a district with a Hispanic cocaine overdose death rate in the 25th percentile. By contrast, when White overdose mortality rates were high, districts did not seem to respond with more leniency (the estimated effects were actually positive despite failing to reach significance). For example, in areas where White heroin overdose rates were 5.6 per 100,000 (the 75th percentile) defendants received about 0.9-month longer sentences than in areas where White heroin overdose rates were 1.6 per 100,000 (the 25th percentile). Taken together, if only examining significance tests one would conclude that federal sentencing responses are markedly different based on (a) overdose exposure and (b) who is overdosing. However, after looking more closely at the magnitude of these effects it becomes clear that districts have been relatively consistent in their sentencing practices in the face of high and low overdose exposure. That said, it is noteworthy that Black and Hispanic overdose deaths (rather than White deaths) are linked to greater sentencing leniency to the degree that these effects exist, which conflicts with what theory and research might predict (a point we return to in the discussion section).

Overdose Effects across Defendant Race/Ethnicity

Thus far, results have shown that district overdose mortality is associated with shorter sentences, but these effects are relatively small. This leads to our second research question: *Do these effects of overdose context differ for White, Black, and Hispanic defendants?* The findings above show that district overdose death rates, and primarily Black and Hispanic overdoses, are associated with slightly shorter drug sentences. However, it is unclear whether minority defendants receive this discount or whether it is White defendants who receive the shorter sentences in these areas. To address these questions, Table 6 presents cross-level interactions between defendant race/ethnicity (at level 1) and overdose mortality rates (at level 2).

The main effects of race/ethnicity in Table 6 show that Black ($b = 0.125$, $p < 0.001$) and Hispanic ($b = 0.072$, $p < 0.01$) defendants are disadvantaged in drug sentence lengths overall compared to Whites, net of other factors. However, the cross-level interactions show that these Black and Hispanic disadvantages vary by district overdose mortality exposure. Specifically, Table 6 shows that greater exposure to overdose deaths, and especially to Hispanic overdoses, contributes to smaller Black-White and Hispanic-White sentence length gaps. Substantively, these effects indicate that in districts with White overdose rates of 14 per 100,000 (25th percentile) Black defendants receive about 1.65 month longer sentences than comparable White defendants, but in districts with White overdose rates of 24 per 100,000 (75th percentile) Black defendants receive about 0.92 month longer sentences than similar White defendants (holding sentence length at its mean). Similarly, in places where Hispanic overdose rates are 3 per 100,000 (25th percentile) Hispanic defendants receive about 1.99-month longer sentences than comparable Whites, but in places with Hispanic overdose rates

Table 6 Cross-level interactions between race/ethnicity (Level 1) and race/ethnic-specific overdose rates (Level 2)

Variables	Black		Hispanic	
	b	SE	b	SE
Total				
Main effects *(case-level effects shown in* Table 3*)*	*0.125****		*0.072***	
White Overdose Rate	-0.005$^{\wedge}$	0.002	-0.006*	0.003
Black Overdose Rate	0.001	0.002	0.002	0.002
Hispanic Overdose Rate	-0.013***	0.003	-0.013***	0.003
Opioid				
White Overdose Rate	-0.001	0.003	-0.003	0.006
Black Overdose Rate	-1.88e-04	0.003	0.003	0.008
Hispanic Overdose Rate	-0.012**	0.004	-0.013*	0.006
Heroin				
White Overdose Rate	-0.006	0.006	-0.009	0.009
Black Overdose Rate	0.003	0.004	0.010	0.010
Hispanic Overdose Rate	-0.019*	0.008	-0.030**	0.010
Cocaine				
White Overdose Rate	0.026$^{\wedge}$	0.014	0.010	0.018
Black Overdose Rate	-0.008*	0.004	0.001	0.008
Hispanic Overdose Rate	-0.048***	0.015	-0.035$^{\wedge}$	0.021

$^{\wedge}$ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Main case-level effects are drawn from Table 3 and presented here for ease of interpretation

All models include the full set of control variables shown in Table 3. District overdose variables were entered sequentially into models, one substance at a time, to avoid potential collinearity problems. They are shown in a single table here to ease presentation of results

Abbreviations: b = unstandardized regression coefficient, SE = standard error

of 10.32 per 100,000 (the 75th percentile) the Hispanic-White gap in sentence length is 0.77-months (holding sentence length at its mean).[8]

While these cross-level interactions are informative, they do not tell us if this racial/ethnic convergence across place is due to (a) White sentences increasing when overdose mortality is high or (b) minority sentences decreasing when overdose

[8] To illustrate how these numbers were calculated, a Black defendant could expect to receive a 2.34% longer sentence than a White defendant in a district with a White overdose morality rate of 14 per 100,000. Meanwhile, a Black defendant could expect to receive a 1.31% longer sentence than a White defendant in a district with a White overdose morality rate of 24 per 100,000. To calculate the Black-White difference between these two places we held sentence length at its grand mean and calculated the difference for districts in the 25th and 75th percentile.

25th: ((3.719–3.808)/|3.808|) = .0234 * 70.10 = 1.647.

75th: ((3.735–3.785)/|3.785|) = .0131 * 70.10 = 0.9209.

mortality is high. To better understand these relationships, Fig. 1 presents the White, Black, and Hispanic expected logged sentence length values estimated from select models shown in Table 6.

Looking first at Fig. 1a, we find that the smaller racial/ethnic sentence length gap in areas more exposed to White overdose mortality was driven by both (a) slightly longer White drug sentences and (b) slightly shorter Black and Hispanic sentences. In contrast, Fig. 1b shows that the narrowing racial/ethnic sentence length gap in areas more exposed to Hispanic overdose mortality was almost entirely driven by *shorter* sentences for Black and Hispanic defendants, not longer sentences for Whites. Specifically, Fig. 1b shows that Black and Hispanic sentences are each

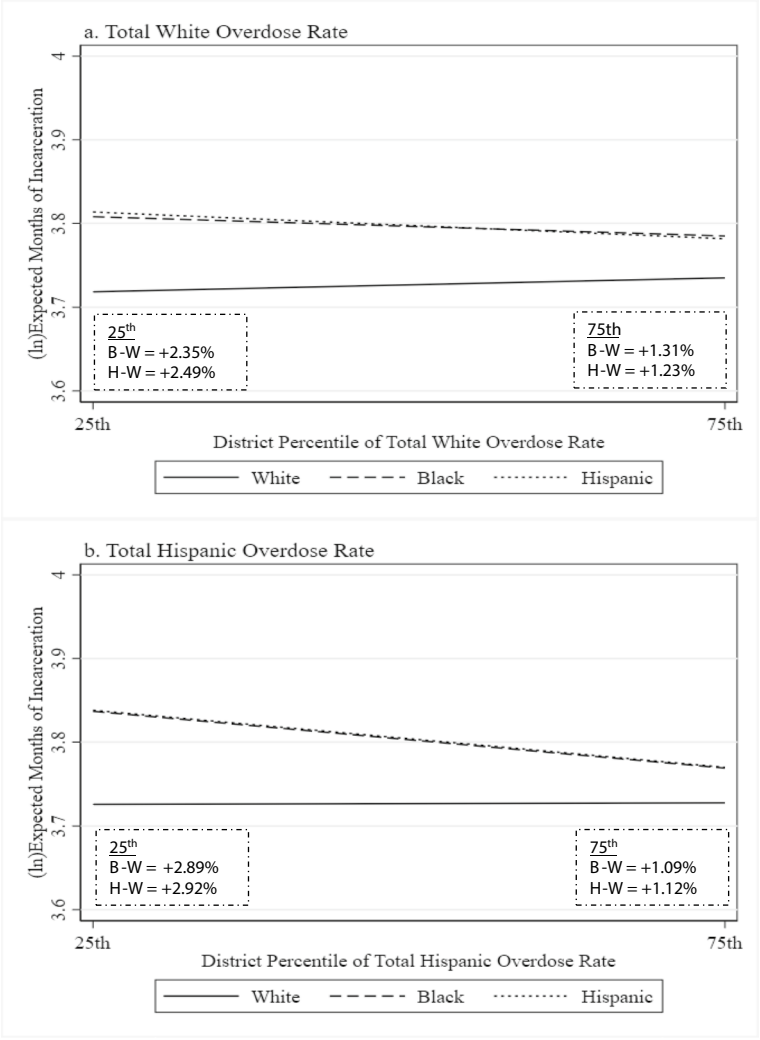

Fig. 1 Select cross-level interaction plots depicting racial/ethnic disparities across low and high district overdose mortality districts

about 2.9% longer than sentences for similarly-situated White defendants in districts with fewer overdose deaths (25th percentile of overdoses). However, Black and Hispanic drug sentences both decline with rising district overdose rates and are only about 1.1% longer than sentences for similar White defendants in districts at the 75th percentile of overdoses. We replicated these plots for all racial/ethnic and substance overdose mortality combinations (available upon request) and detected a similar picture – minority sentences were shorter and White sentences remained generally stable as Hispanic overdose rates increased.[9] In sum, Table 6 and Fig. 1 show that exposure to White and Hispanic overdoses are linked to greater racial/ethnic equity in sentencing (net of controls). However, in areas of high White overdoses this convergence is partially driven by increased White punitiveness, while in areas of high Hispanic overdoses this convergence is driven by increased leniency towards minorities.

Discussion

The United States is now entering the third decade of the opioid crisis, with no signs that overdose deaths are abating. Despite the overdose epidemic being one of the worst public health crises of the 21st century, social science research has paid remarkably little attention to how punishment patterns have been shaped by exposure to this crisis (for notable exceptions see Testa & Lee, 2021a, b). This gap is especially noteworthy given (a) the federal governments' tumultuous history of punitive drug sentencing, (b) wide differences in overdose mortality across federal districts, and (c) persistent evidence that district context shapes criminal sentencing in federal courts (see Feldmeyer & Ulmer, 2011; Kim et al., 2019; Ulmer et al., 2011). Against this backdrop, the goal of this study was to assess how local overdose patterns contextualize federal drug sentences overall as well as across substance type and race/ethnicity.

Our analysis focused on two key research questions. Our first research question asked *do federal drug sentences depend on local overdose rates, the substances involved, and who is overdosing (White, Black, or Hispanic)*? Results showed that districts with higher overdose death rates tend to dole out (slightly) shorter sentences, especially when district overdose deaths involve Black and Hispanic populations. Our second research question asked *do these effects of overdose context differ for White, Black, and Hispanic defendants?* Results showed that Black-White and Hispanic-White sentence length gaps in drug cases declined in districts with more overdose deaths in part due to higher White sentence lengths, but mostly because minority sentences became shorter as district overdose mortality rates increased.

[9] In supplemental analyses, we ran models focusing exclusively on opioid and heroin cases (two substance types that epitomize the recent opioid epidemic) and similarly found that sentences for opioids and heroin were significantly shorter in places with higher overdose death rates for these substances (but with fewer significant interactions by race/ethnicity) (results available upon request).

Implications

These findings offer several important implications for theory and research on drugs, courts, and contextual effects in sentencing. First, the results presented here show little indication that exposure to overdose deaths has led to harsher sentences in drug cases (overall or across substance type and race/ethnicity). Instead, when effects were significant, districts with greater overdose mortality gave out (slightly) more lenient drug sentences, suggesting that courts may be sympathetic to the consequences of the opioid epidemic. This provides a stark contrast to the harsh federal response to the crack era of the 1980s and 1990s (Alexander, 2010; Tonry, 2015). To date, the federal government has not targeted opioids with mandatory minimums to the same extent as crack-cocaine (e.g., opioids were subject to mandatory minimums about 30% of the time in our analytic sample, compared to over 50% for all other drug types; see Gottschalk, 2023). In addition, opioid sentences pale in comparison to what crack-cocaine sentences were at the height of the crack scare (NRC, 2014). As the opioid epidemic persists, there may be mounting political pressure to "do something" about the crisis by enacting legislation and ramping up penalties in federal courts for opioid offenses. However, our findings indicate that federal courtroom actors on the ground have not increased punitiveness and have instead opted for leniency when exposed to the pains of the overdose crisis. Given that this is the current practice in federal courts, political or legislative efforts to ratchet up punishment would clearly be out of step with the types of sentences federal judges (and prosecutors via plea agreements) have been enacting in places most affected by overdoses.

Second, our findings also hold important implications for research on contextual effects in sentencing. If one focuses only on *significance levels* and asterisks in tables, our findings clearly indicate that drug sentences are shorter in areas with greater overdose mortality. This would suggest that federal court responses to the opioid epidemic have not been "one size fits all" across districts. In addition, the significant district effects seen here align with prior studies showing that context matters and that sentencing is not uniform across federal districts, even though it is supposed to be (Kim et al., 2016; Light, 2014; Lynch & Omori, 2014; Ulmer et al., 2010). However, if one focuses on *substantive effects,* our findings tell a different story and indicate that exposure to overdose mortality plays a relatively small role in federal sentencing. Specifically, the substantive results show that drug sentence lengths in high versus low overdose districts (net of other factors) often differ by less than a month. Given the vast differences in district overdose mortality (as much as 300% differences across districts), this type of consistency if quite noteworthy. Moreover, given the decades of federal reforms aimed at creating consistency across districts, these small substantive contextual effects could be interpreted as "good news" and signs that district uniformity in sentencing (at least in terms of overdose context) may be getting closer than once thought.

In addition, a broader implication of this "significance versus substantive" comparison is that the traditional approach of relying on statistical significance only (e.g., Holmes & Feldmeyer, 2024b; Wu & D'Angelo, 2014) can overemphasize

the "real world" impact of contextual effects and exaggerate subtle differences in sentencing across locales. Afterall, research has consistently shown that the vast majority of sentencing variation lies at the case-level (Light, 2014; Kim et al., 2019). In light of these considerations and findings, we urge researchers to give renewed focus to both the statistical and the substantive impact of contextual effects on sentencing.

We do note that the effects of district overdose context reported here are smaller than those offered by the only other sentencing study to assess contextual effects of overdose mortality (Testa & Lee, 2021a). This is likely due to several differences in methodology and analytic approach. This analysis is conducted at the district-level (rather than the state-level) and disaggregates overdose type by both substance type and race/ethnicity of the deceased (rather than using total state overdose patterns). In addition, Testa and Lee (2021a) compared overdose effects at the 5th versus 95th percentiles (instead of the 25th versus 75th percentiles). When we take the same approach and compare districts at the extremes, we also find larger differences in sentence lengths between the highest and lowest overdose districts. However, given the vast majority of districts are not at the extremes, we opted to use closer comparisons to illustrate the common types of contextual effects seen across districts.

A third and final implication of this study is that our findings contribute to a pressing conversation about the racialized nature of the overdose crisis and the response of institutions entrusted to protect social order. To date, researchers and commentators have often pointed to the "White" nature of the opioid crisis as a key reason it has been cast as a public health problem rather than a crime problem (as in the crack era, Gottschalk, 2023; Quinones, 2015; Shachar et al., 2020). As such, one might expect that White overdoses would trigger leniency mostly for White defendants – but we do not find that. As shown in Fig. 1, White defendants were slightly worse off in districts with more White overdose deaths. In contrast and somewhat surprisingly, we found that minority defendants actually received slightly more leniency in areas where minorities (especially Hispanics) have higher overdose death rates. These findings suggest that, in contrast to prior drug crises, exposure to the overdose crisis has not led to greater minority disadvantages in sentence length decisions. However, there is a need to examine these effects across other decision points, as highlighted below. In addition, these findings suggest a need for more nuanced consideration of the ways in which the opioid epidemic has impacted minority communities. Fentanyl has expanded the reach of the opioid epidemic beyond White populations (Furr-Holden et al., 2021; Hedegaard et al., 2019). In this study, we use data from 2015 to 2020, which was well into the third phase of the opioid epidemic when fentanyl was ravishing White, Black, and Hispanic communities alike. It is possible that district responses to the overdose epidemic during this time frame are wholly different than responses in the early 2000s (when opioids were concentrated among White populations). Thus, future research is needed that examines how responses to the opioid epidemic have changed over time and especially across race/ethnicity as the opioid epidemic has impacted more groups.

Future Research, Limitations, and Conclusions

Although this study offers one of the only existing analyses to date examining how local (district) exposure to the opioid overdose crisis shapes drug sentencing across race/ethnicity and substance type, much more research is needed along this line of inquiry. Drawing from Baumer's (2013) call for research, studies are needed that examine the mechanisms and cumulative impact of overdose exposure on federal sentencing outcomes. Given the complexity of this analysis, we focus on one decision point (sentence length), but it is unclear how local overdose context impacts other courtroom decisions and decision makers. Do prosecutors apply leniency in their charging decisions in the face of heightened overdose mortality? How do law enforcement responses differ in places with heightened drug mortality, which ultimately shape the flow of cases coming before federal and state benches? The current study offers an important step towards understanding how federal courts have responded to the overdose crisis, but additional work is needed to provide a more complete picture of these relationships and their mechanisms.

Related to this, questions remain about why district overdoses (especially for minorities) may be linked to greater leniency, to the degree that these effects are significant. It may be that areas with higher exposure to overdose mortality are more receptive to public health pleas (versus criminalization) (Hargan, 2017). It could be that courtroom actors in high overdose areas are more acutely aware of the sobering social costs of long drug sentences (Gottschalk, 2023; NRC, 2014). Moreover, it is possible that courtroom actors are responding to "lessons learned" from the crack era and are actively seeking to impose softer sanctions in light of the consequences and costs of the earlier "drug war" (especially for minorities). This may be more likely given that their hands are not bound by mandatory minimums to nearly the same degree as in other drug offenses. However, our data do not permit direct tests of these mechanisms, requiring further (especially qualitative) research to unpack these explanations.

Research that builds on this work and looks beyond federal courts to examine how the overdose crisis has shaped drug sentencing in state courts is also essential. The local drug landscape may carry even more weight in state courts, where county-to-county variation in drug context is more pronounced than across federal districts. In addition, state courts have a much wider array of options for processing drug cases (e.g., intermediate punishments, drug courts, probation) compared to the federal system, where nearly all drug convictions result in prison sentences.

As the overdose crisis has shifted and continues to change, there is a need to examine these relationships for other specific substances, like fentanyl. Due to data limitations, we were not able to separately examine different types of opioids (other than heroin). However, given the rapid and deadly rise in fentanyl overdoses leading up to and beyond 2020, examining sentencing and overdose patterns specifically for this substance is an important area for future research.

Clearly, many questions remain about how the criminal justice system has responded to the opioid epidemic and the broader overdose crisis. However, the current study provides important contributions toward this goal by showing how federal

sentence length decisions are shaped by overdose contexts, overall and across substances and race/ethnicity. Our findings suggest that despite wide variation in district overdose exposure, federal courts have by-and-large responded with similar drug sentence lengths and, if anything, have shown slightly greater leniency when faced with greater overdose deaths (especially for minorities). Notably, this provides a sharp contrast to the heavy-handed federal response against minorities seen in the 20th century drug war and suggests a need for a more nuanced consideration of the role that race/ethnicity plays in 21st century drug sentencing.

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