Title

Proposition 47: Effects of a California Drug Law Reform on Hospital Visits and Racial and Geographic Disparities in Criminal Justice Involvement

Author

Mooney, Alyssa Clare

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Proposition 47: Effects of a California Drug Law Reform on Hospital Visits and Racial and Geographic Disparities in Criminal Justice Involvement

by
Alyssa Mooney

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Approved:

DocuSigned by:
Maria Glymour
7EEF9BD435A141C...

Maria Glymour
Chair

DocuSigned by:
Torsten Neilands
DocuSigned by:
Meghan Morris
DocuSigned by:
JP Tulsky MD
DC6418DF06EB497...

Torsten Neilands
Meghan Morris
Jacqueline Tulsky

Committee Members

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ABSTRACT

Proposition 47: Effects of a California Drug Law Reform on Hospital Visits and Racial and Geographic Disparities in Criminal Justice Involvement

Alyssa Mooney

Disparate rates of felony drug arrests and convictions across race and geography have implications for inequalities in health and social outcomes linked to criminal justice exposure. California Proposition 47 (Prop 47), passed in 2014, reduced drug possession offenses classified as felonies or wobblers (with prosecutorial discretion to file felony or misdemeanor charges) to misdemeanors. This dissertation examines three effects of Prop 47: 1) whether racial/ethnic disparities in drug arrests declined; 2) whether eliminating prosecutorial discretion for charging drug possession as a felony or misdemeanor reduced geographic disparities in felony convictions; and 3) unintended consequences with regards to drug-related hospital visits. For objective 1: using data on all drug arrests made in California from 2011-2016, we compared the immediate and one year post-policy changes in racial disparities in drug arrests between Whites, Blacks, and Latinos, controlling for secular and seasonal trends. For objective 2: after propensity score matching arrests made in the year after the implementation of Prop 47 to similar arrests in the year prior to Prop 47, we used mixed models to estimate the change in county variance in the probability of felony conviction. For objective 3: Incorporating data on all drug-related hospital visits in California from 2011-2015 with drug arrests data, we use county fixed effects models to estimate expected rates in the 10-months post-policy, and calculate the difference compared to observed rates. We use linear regression to test whether county-level changes in drug arrest rates were associated with changes in drug-related hospital visit rates. In the month following passage, absolute Black-White disparities in monthly felony drug arrests decreased from 81 to 44 per 100,000 and continued to decrease over time. The probability of a felony conviction among those arrested for Prop 47 drug offenses declined by 14 percentage points

(95% CI: -0.16, -0.12), from 0.21 (95% CI: 0.19, 0.24) to 0.07 (95% CI: 0.06, 0.08). Counties with higher felony conviction probabilities pre-Prop 47 declined most, reducing cross-county variance, with no evidence of increases in felony convictions for concurrent offenses. Declines in arrests were not associated with increases in drug-related hospital visits.

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CHAPTER 1: INTRODUCTION

Over seven million Americans had an illicit substance use disorder in 2014 (Center for Behavioral Health Statistics and Quality, 2015), and substance-related disorders excluding alcohol were the primary diagnosis in over 700,000 emergency department visits that year (Moore BJ, Stocks C, Owens PL, 2017). The U.S. has taken an increasingly punitive approach to substance use in recent decades, which has disproportionately affected people of color. Twenty years after the war on drugs was launched in 1986, arrests for drug possession had grown by 150%, and Black-White disparities widened from 3:1 to 5:1 (Mitchell & Caudy, 2015).

The collateral consequences of felony drug convictions are severe. Impacts on parental custody rights, immigration status, and access to professional licensing, employment, health and social benefits, housing, and financial support for higher education may exacerbate racial/ethnic disparities in health and social outcomes (M. Y. Iguchi et al., 2002). Felony convictions also increase the likelihood and length of incarceration for future convictions, exposure to which has negative health effects. Of the 1.5 million jail and prison inmates with substance use disorders, just 11% have received any type of treatment since admission (The National Center on Addiction and Substance Abuse at Columbia University, 2010), and few jails and prisons offer evidence-based strategies like medication-assisted treatment (The National Center on Addiction and Substance Abuse at Columbia University, 2010). Ultimately, incarceration may increase injecting, infectious diseases, and mortality post-release, while disrupting access to health services (Binswanger et al., 2007; DeBeck et al., 2009; Galea & Vlahov, 2002; Genberg, Astemborski, Vlahov, Kirk, & Mehta, 2015). The mental and physical health of partners and children is also affected – incarceration can lead to family break-up and economic strain – with family income declining by 22% during a father's incarceration and 15% following release (Clear, 2008; Western & Pettit, 2010; Wildeman & Wang, 2017). Taken together, criminal justice involvement has been identified as a

significant social determinant of health for an already vulnerable population (Galea & Vlahov, 2002).

Exposure to felony convictions is both profoundly unequal across race/ethnicity, and strikingly prevalent for some: an estimated 8% of all adults and 33% of Black men have a felony conviction (Shannon et al., 2017). Rates of felony disenfranchisement are three to four times higher in predominantly Black communities than predominantly White communities, disadvantaging low-income communities of color and obstructing their impact on public policies that could reduce inequalities (King & Mauer, 2004).

Geographic disparities in the severity of punishment for drug offenses are also stark. Research conducted in 2010 in California found the proportion of arrests for possession of a controlled substance that were charged as felonies varied across California counties from 25 to 100 percent (Berwick, Lindenberg, & Van Roo, 2010). Even after controlling for case characteristics and criminal history, county of residence was a strong predictor of felony filings following arrest (Berwick et al., 2010).

Many states are beginning to reduce criminal penalties for drug possession. While many drug law reforms have focused on marijuana, California passed Proposition 47: The Safe Neighborhoods and Schools Act in 2014, which made more expansive changes by reducing possession of narcotics (Health and Safety 11350), possession of a controlled substance (H&S 11377) and possession of concentrated cannabis (H&S 11357(a)) to misdemeanors, as well as several property offenses. Prior to Prop 47, these offenses were classified as felonies, with prosecutorial discretion to reduce charges to misdemeanors. The aim of Prop 47 was to focus spending on serious offenses in a state with overcrowded prisons, invest the savings to support mental health and substance use disorder treatment, and increase alternatives to incarceration for low-level crimes. Since the passage of Prop 47, five additional states have reduced non-marijuana drug possession penalties, as priorities shift towards reserving incarceration for serious, violent offenses and improving treatment access for substance use disorders.

The following three chapters examine the effects of reducing drug possession to a misdemeanor offense on disparities in criminal justice involvement, and drug-related hospital visits. First, we assess whether racial/ethnic disparities in felony drug arrests declined, and whether shifts away from the policing of substance use overall occurred differentially across race/ethnicity. Second, we investigate whether eliminating prosecutorial discretion for charging drug possession as either a felony or misdemeanor reduced geographic disparities in felony convictions following a drug arrest, or whether the effect was buffered by increases in felony convictions for concurrent or non-Prop 47 felony drug offenses. Third, we use variation in Prop 47's impact on county drug arrest rates to evaluate whether there is evidence that reducing criminal penalties for drug possession had unintended consequences with regards to drug-related hospital visits.

CHAPTER 2: EFFECTS OF PROPOSITION 47 ON RACIAL DISPARITIES IN DRUG ARRESTS

Background

The implementation of current drug policy reveals stark racial disparities. Blacks account for one third of drug arrests, and 46% of drug felony convictions (Human Rights Watch, 2009). The proportion of Black men in prison is six times higher than that of White men (Carson, 2015). Further, Blacks are younger at first arrest and are three times more likely to have multiple arrests than Whites, even after adjusting for drug use and sale (Kakade et al., 2012). Accounting for offense differences, Whites receive drug treatment instead of a felony for a drug-related charge twice as often as Blacks (J. MacDonald, Arkes, Nicosia, & Pacula, 2014). With a higher risk of arrests and prison sentences across the lifespan, Blacks are more vulnerable to accruing criminal records that limit voting rights and opportunities for employment, housing, and education. Furthermore, the negative effect of a criminal record on employment is twice as large for Blacks as for Whites (Pager, Western, & Sugie, 2009). Given the substantial evidence of the impacts of these social and economic factors on health outcomes (Marmot, 2015), disproportionate criminal justice involvement may contribute to Black-White disparities in mental and physical health (Massoglia, 2008).

How were racial disparities in drug arrests affected by the reversal of punitive drug laws in California? Because Prop 47 reduced many drug felonies to misdemeanors, we would expect a reduction in felony drug arrests, which disproportionately affect people of color. Yet, offenses reclassified to misdemeanors could be more subject to racially disparate policing, since there is greater discretion to choose to arrest or issue a warning (Capers, 2016). Following Prop 47, arrests and incarcerated populations declined in California, but effects by race/ethnicity remained unexamined (M. Bird, Tafoya, Grattet, & Nguyen, 2016; Dooley-Sammuli, 2015; M. Lofstrom & Martin, 2015; M. Lofstrom, Bird, & Martin, 2016;

Romano, 2015). This study investigates effects on racial disparities in drug arrests for felonies, misdemeanors, and overall. We also assess whether there was a change in felony drug offenses that were not reclassified by Prop 47.

Methods

Data came from the California Department of Justice's Monthly Arrests and Citations Register (CA DOJ MACR), and annual county-level population estimates (for the denominator in rate calculations) from the American Community Survey. The analytic period included the three years prior to and two years following the passage of Prop 47 on November 4, 2014.

Measures

Outcome: arrests. Drug arrests for adults ages 15-64 were obtained from the CA DOJ MACR for Nov 5, 2011–Nov 4, 2016 and aggregated by month, county, and offense classification. Classification is made at the time of arrest, though the prosecutor has ultimate authority over what charges will be filed, if any. Race-specific county populations ages 15-64 were used as offsets in the models to obtain rates.

Exposure: Proposition 47: The Safe Neighborhoods and Schools Act. Prop 47 passed on November 4, 2014, and was effective immediately. Pre-policy conditions were defined as the period from November 5, 2011 until November 4, 2014. Arrests from November 5, 2014 to November 4, 2016 were considered to occur under policy conditions.

Race/ethnicity: Racial/ethnic groups included in the analysis were White, Black, and Latino, because of concern about elevated arrest rates among Blacks and Latinos, compared to Whites, and because these three groups constitute 95% of drug arrests in the state. Population denominator data from the American Community Survey were exclusively self-report, and included a mixed race option. Arrests (numerator)

data may include self-report or officer's determination, and did not contain a mixed race option. We adjusted population denominators to align with arrests by assuming individuals of two races were classified in arrests approximately half the time in one of their two racial categories. We conducted a sensitivity analysis that assumed all multiracial individuals were classified as "Other" in arrests data and used single race population denominators; results were nearly identical.

Statistical Analysis

We used a time series approach similar to those taken by other studies of policy impacts in the public health literature (Bachhuber, Saloner, Cunningham, & Barry, 2014; Harper & Bruckner, 2017; Livingston, Barnett, Delcher, & Wagenaar, 2017; Santaella-Tenorio et al., 2017; Wagner, Soumerai, Zhang, & Ross-Degnan, 2002). We modeled monthly, county-level drug arrest rates by race/ethnicity with cluster robust standard errors using a poisson specification and county fixed effects. Results can be interpreted as average within-county changes. Total drug arrests, misdemeanor drug arrests, felony drug arrests, Prop 47-affected arrests, and felony drug arrests unaffected by Prop 47 were each modeled separately. Calendar month dummies controlled for seasonal trends, and a continuous linear term for months (1-60) controlled for secular trends. Secular trends were non-linear for felony drug arrests unaffected by Prop 47, so this model included a cubic spline constructed of piecewise third-order polynomials with three pre-policy knots at 9, 18, and 27 months.

We used dummy variables for post-policy months to model the incremental change beyond secular and seasonal trends. Dummies were interacted with race/ethnicity to assess change in disparities. The secular trend term was also interacted with race/ethnicity so each group could differ in its pre-existing time trend.

We calculated change in both absolute and relative differences across race/ethnicity, because relative

differences can increase, even as absolute differences narrow. Relative differences depend on the rate in the reference group (here, Whites); as rates in the reference group decline, a shrinking absolute difference may correspond to a widening relative difference.

To calculate the difference in expected vs. observed counts, we subtracted model-predicted counts from actual arrests during the corresponding period. Confidence intervals were obtained by bootstrapping using 1,000 replications. All analyses were conducted using Stata Version 15.

Results

The study sample consisted of all 58 California counties, with populations aged 15-64 ranging from 727 to 7,036,067 (IQR: 27,677 – 462,581). A total of 1,001,502 drug arrests were made among Blacks, Whites, and Latinos ages 15-64 during the 5-year study period. The three racial/ethnic groups represented 95% of drug arrests in California.

In the following sections we examine first, the reductions in felony drug arrests, which carry the potential for felony convictions and associated collateral consequences. Arrests for the same offenses may still occur, however, under a misdemeanor classification. That said, Prop 47 explicitly aimed to prioritize more serious, violent offenses, so a reduction in all drug arrests could occur, regardless of classification. Thus, we next measure the reduction in drug arrests overall, which reflects the total effect of Prop 47 on exposure to the criminal justice system, after accounting for felony declines, misdemeanor replacement, and changes in enforcement priorities. Last, we dig deeper into the change in all drug arrests, to examine the extent to which reductions related to Prop 47-affected offenses (i.e. newly misdemeanor), vs. offenses unaffected by Prop 47 (i.e. retained felony classification).

Felony drug arrests across race/ethnicity

Felony drug arrest rates dropped immediately and precipitously for all racial/ethnic groups during the first month, and continued to decrease over time (Figure 2.1).

In the year prior to Prop 47, the proportion of drug arrests that were felonies was highest for Blacks (71%, vs. 61% and 65% among Whites and Latinos, respectively), suggesting that Blacks would have the most to gain from reclassification of drug felonies to misdemeanors. However, Prop 47 did not reclassify all felony drug offenses, only drug possession. In the year before Prop 47 was passed, the proportion of felony drug arrests for offenses that would be reclassified was 73% among Blacks, vs. 86% among Whites and 83% among Latinos. Thus, relative to Whites and Latinos, we would expect a smaller percentage decline in felony drug arrests of Blacks resulting from Prop 47.

Consistent with these predictions, the models adjusted for secular and seasonal trends showed a significant, immediate decline in monthly felony drug arrest rates of 81 (95% CI: -96, -66) per 100,000 among Blacks, compared to declines of 44 among both Whites (95% CI: -48, -40) and Latinos (95% CI: -54, -33) (Table 2.1, section "Felony drug arrests"). As a result, the absolute disparity in Black-White felony arrest rates declined by 37 (95% CI: -52, -22) per 100,000 in the first month, from a difference of 81 per 100,000 in the month pre-passage (95% CI: 59, 103), and continued to decrease over time. Felony drug arrest rates among Whites and Latinos were nearly equivalent in the month pre-passage (1 per 100,000 higher among Latinos) and no difference was evident by one year post-passage.

Though Blacks had the largest decline in absolute felony drug arrest rates, they had the least proportional decline, likely because they had lower proportions of felony drug offenses that were reclassified to misdemeanors by Prop 47. In the first month, felony drug arrests among Blacks declined by 60% (RR: 0.40, 95% CI: 0.35, 0.44), compared to 69% among Whites (RR: 0.31, 95% CI: 0.28, 0.35) and Latinos

(RR: 0.31, 95% CI: 0.23, 0.39). With a larger percentage decline among Whites, the relative Black-White disparity increased by 27% (RR: 1.27, 95% CI: 1.12, 1.42). Though proportional declines in felonies continued to grow over time for all racial/ethnic groups, differences in declines across groups grew as well. By one year post-passage, felony rates among Blacks were 3.09 times higher than those of Whites (95% CI: 2.27, 3.90), compared to 2.16 times higher in the month pre-policy (95% CI: 1.81, 2.51).

The difference in the number of felony arrests made, compared to the number expected based on secular and seasonal trends, was substantial. During the first year of adoption, Prop 47 led to an estimated 51,985 fewer felony arrests among Whites, 15,028 fewer among Blacks, and 50,113 fewer among Latinos (Table 2.2). These represent reductions of 75.9%, 66.1%, and 73.7%, respectively.

Change in drug arrests, overall

As reflected in Figure 2.1, there was a large dip in total drug arrest rates across all racial/ethnic groups during the first two months of Prop 47 implementation, followed by an increase in month three as felony arrests were replaced with misdemeanors. Nonetheless, in the first month, the decrease in felony drug arrests was greater than the increase in misdemeanor drug arrests (Table 2.1, section "Misdemeanor Drug Arrests"), and by month 12, misdemeanor increases remained lower than felony decreases.

We find that by month 12, the absolute Black-White disparity in total drug arrests declined by 24 (95% CI: -44, -3) per 100,000. Reductions among Latinos surpassed those of Whites as well (Table 2.1, section "Total drug arrests"). Percentage declines in total drug arrests across groups ranged from 17-22% by month 12. Differences between groups in proportional declines were not significant, so relative disparities were unaltered.

Based on expected counts given secular and seasonal trends, we estimate that Prop 47 led to 20,460 fewer

arrests of Whites during the first year, 7,079 fewer arrests of Blacks, and 24,231 fewer arrests of Latinos (Table 2.2). These represent reductions of 19.0%, 22.5%, and 23.7%, respectively.

Drug arrests affected and unaffected by Prop 47, across race/ethnicity

Analysis of Prop 47-affected offenses compared the same drug possession offenses, regardless of their classification over time. The percentage decrease in arrests for these offenses ranged across racial/ethnic group from 52-53% in the first month, and 46-51% at 12 months post (Table 2.1, section "Arrests for Prop 47-affected offenses, all classifications").

There was no evidence that felony drug arrests for offenses unaffected by Prop 47 changed in any racial/ethnic group, either immediately or by one year post-passage (Table 2.1, section "Felony drug arrests unaffected by Prop 47").

Discussion

Our analysis of 60 months of county, race, and offense-specific arrest rates in California point to several notable effects of Prop 47. Prop 47 led to substantially fewer drug arrests across all racial/ethnic groups. There was little indication of elevated drug arrest rates in Latinos compared to Whites before or after Prop 47, while the large *absolute* Black-White difference in felony drug arrest rates was reduced. With a higher proportion of felony drug offenses affected by Prop 47 (i.e., possession), Whites had the greatest proportional decline in drug felonies, contributing to an increase in the *relative* Black-White disparity. Prop 47 appears to have led to reductions in arrests for drug offenses overall (misdemeanor and felony), which saw a decrease in the absolute Black-White difference, while relative disparities remained the same.

There has been little study of the impacts of reducing offense severity on racial disparities in criminal justice involvement. In one exception, researchers found that reforming marijuana laws reduced arrests across all racial/ethnic groups, with no change in relative disparities between Blacks and other racial/ethnic groups (Males & Buchen, 2014). This aligns with our finding on Prop 47's effect on total drug arrests, though we find increases in relative disparities for felonies.

Why did reducing the classification of some drug offenses reduce drug arrests overall? Reductions in drug arrests were unlikely a reflection of underlying crime trends – violent and property crime rates increased during this period (California Department of Justice, 2015). Prop 47 was a ballot initiative and law enforcement may be responding to perceptions of public opinion about public safety priorities. In areas with high rates of violent crime, police agencies may welcome a freeing up of resources to focus on these offenses. Officers may use their discretion to opt out of drug arrests and focus on offenses their department prioritizes. The initial drop in total drug arrests followed by the rise in month three suggests officers may also be responding to feedback from the courts regarding how to interpret and act on the legislative change.

Reductions in arrests for all drug offenses may also reflect fluid lines between drug possession and sale. One lieutenant explained to the first author that in his city, sellers typically plead out to possession up to the third arrest, while arrests for possession were used to get information on sellers (California municipal police agency lieutenant, 2017). Reducing possession to a misdemeanor may have diminished tools police and prosecutors used to enforce drug laws, contributing to a de-emphasis on arrests. These impacts warrant further investigation.

While the absolute Black-White disparity in felony drug arrests decreased, the relative disparity increased, in part because of differences in pre-existing felony offense composition by race/ethnicity. Blacks had larger proportions of felony drug offenses unaffected by Prop 47 did not alter, such as sale.

Whether this reflects racial differences in offending, or racial biases and practices in drug law enforcement, cannot be determined from our data, but other studies point to the latter (Beckett, Nyrop, Pfingst, & Bowen, 2005; Beckett, Nyrop, & Pfingst, 2006; Fielding-Miller, Davidson, & Raj, 2016; Mitchell & Caudy, 2015). Prop 47 targeted drug possession, with the aim of decriminalizing substance use disorder. However, distinctions between sale and possession can be murky and influenced by prosecutorial discretion concerning which charges to file. Further study of racial inequalities in drug charges could help to address this unintended effect in California and states considering similar policies.

Implications

Given substantial evidence of the role of social and economic factors in health outcomes (Marmot, 2015), reducing incarceration and felony convictions through policy reform may be a critical component to addressing racial disparities in health. Our findings suggest that reclassifying drug offenses to misdemeanors is an effective approach to decreasing felony arrests across racial/ethnic groups, and absolute differences between Blacks and Whites. However, a full assessment of how reducing criminal penalties affected racial/ethnic disparities in criminal justice involvement must go beyond the stage of arrest, particularly since groups may differ in the prevalence of prior convictions, which affect the likelihood of prosecution. Still, there is clear evidence that on a population level, there were declines in incarceration resulting from Prop 47 (M. Bird et al., 2016; M. Lofstrom et al., 2016), providing an opportunity to evaluate how reducing exposure affects health and associated racial/ethnic disparities, including the health of families and communities most affected by high rates of incarceration.

Regarding more direct health impacts, a core component of Prop 47 was to reinvest savings from reduced incarceration to buttress substance use disorder and mental health treatment, with grants totaling $103 million awarded to 23 city and county agencies in mid-2017 (Board of State and Community Corrections, 2017). Prop 47 generated debate about whether arrestees would lose the incentive to enroll in treatment

without a felony threat, which remains to be evaluated (Chang, Gerber, & Poston, 2015). Alternatively, populations accessing treatment or the proportions entering through voluntary vs. court-referred admissions may change (Hser et al., 2007).

Racial disparities in substance treatment access could be impacted by Prop 47 as well. Blacks and Latinos arrested for drug offenses are more likely than Whites to receive incarceration, rather than drug treatment diversion (Nicosia, Macdonald, & Arkes, 2013). Sentence standardization initiated by Prop 36 in 2001 reduced disparities, but had a greater impact on Latinos than Blacks, perhaps because Blacks had more prior drug and violent offenses that precluded eligibility for diversion. Treatment resources generated by Prop 47 may have more promise for reducing disparities, given broader participant eligibility criteria stipulated in grant requirements ("arrested, charged with, or convicted of a criminal offense, and a history of mental health issues or substance use disorders") (Board of State and Community Corrections, 2017).

Critical questions remain regarding how shifting funds from a criminal justice to a public health approach to substance use disorders will influence treatment enrollment and outcomes for health, well-being, productivity, and public safety. New programs funded by Prop 47 offer opportunities to evaluate these questions, and identify the most effective models for improving public health.

Limitations

In arrests with multiple offenses, only the most severe is included in the dataset. Since Prop 47 reduced the severity of drug possession offenses, one concern is whether some reduction in arrests could be attributed to co-occurring offenses that became comparatively more severe than drug possession post-Prop 47. This could occur only in measures incorporating offenses classified as felonies pre-Prop 47 and misdemeanors post-Prop 47. These would include drug arrests reclassified by Prop 47 and total drug arrests, but would exclude felony drug arrests, misdemeanor drug arrests, and felony drug arrests

unaffected by Prop 47. We used data on juvenile arrests, which contain up to five co-occurring offenses, to estimate possible bias. We found that potential masking was minimal and would not alter findings. Approximately five percent of "drug arrests reclassified by Prop 47" may have been masked post-policy – far less than the 46-51% declines in this category 12 months post-policy. Masking in the "total drug arrests" measure was estimated at three percent, compared to declines of 17-22% at 12-months post-policy.

Data are also event-, rather than person-level. Some arrests may represent the same person, though we minimized this possibility by using monthly rates. We assessed the extent of possible bias by linking individuals on name, date of birth, and jurisdiction for July 2013; just 1.2% were arrested more than once and 0.1% more than twice.

We also lacked data on prior convictions; Prop 47 offenses retain felony classification for individuals with serious and/or violent convictions such as homicide and sexually violent offenses, or convictions requiring registration as a sex offender. The history of more frequent arrests and severe charges among Blacks arrested for drug offenses (Nicosia et al., 2013), may have minimized the effects of Prop 47 on reducing Black-White disparities in felony convictions. Given that other states are pursuing similar policy changes to reduce racial disparities (Woodworth, 2017), this effect should be further explored, and limiting prior record exclusion criterion considered.

Race/ethnicity in arrests data may be based on officers' observations, rather than self-report, in population denominators. This could lead to misclassification of the numerator in arrest rates, though sensitivity analyses indicated findings were robust. We also only analyzed three racial/ethnic groups; though these groups make up 95% of arrests in California, further research could assess disparities and impacts among other populations.

Conclusion

Reducing criminal penalties for drug possession may play an important role in reducing disproportionate felony convictions among Blacks, which in turn may help to narrow racial disparities in health and social outcomes. Disparities at all stages of the criminal justice system that lead to racial variation in arrests and charge composition must be addressed to ensure more equitable drug law reform.

CHAPTER 3: EFFECTS OF PROPOSITION 47 ON GEOGRAPHIC DISPARITIES IN FELONY CONVICTIONS

Background

Justice by geography

The location where a crime is committed may be as important as the characteristics of the crime itself in determining the severity of punishment. Geographic disparities in the outcomes of similar cases are well documented, including variation across counties falling under the same state laws (Ball, 2011; Berwick et al., 2010; J. E. Bowers, 2001; Males & Buchen, 2013; Marion, 1999; Pfaff, 2017b; Phelps & Pager, 2016; Shannon et al., 2017; Verma, 2015). For example, death penalty-eligible cases in Baltimore County were found to be 23 times more likely to result in a death sentence than in a neighboring jurisdiction, with differences attributed to prosecutorial discretion (Ditchfield, 2006). Geographic disparities are evident in the prosecution of less severe offenses as well. In California, people arrested for drug offenses in Kings County were found to be 35 times more likely to receive a prison sentence than those arrested in Contra Costa County (Males & Buchen, 2013).

Causes of justice by geography

State-level criminal justice reforms often leave a great deal of room for interpretation and discretion. There can be a tension between the goals of state legislators enacting criminal justice laws and county-level officials who administer them, leading to highly county-specific implementation (Dooley-Sammuli, 2015; Males & Buchen, 2013; Marion, 1999; Verma, 2015). As an example, mandatory minimum sentencing laws were seen as tough on crime and therefore historically supported by state legislators as a symbolic statement. They were opposed by courts, however, because they increased trial rates and case

processing times, and penalties were considered disproportionately severe (Tonry, 1992). In his review of two centuries of mandatory minimum sentencing laws, Tonry found a long history of courts using devices to circumvent them: prosecutors refused to file charges, plea bargaining was used to reduce charges, and judges refused to convict or ignored the statute and imposed a different sentence (Tonry, 1992; Tonry, 2009). When severe mandatory minimums for drug sale were in place in Michigan, for example, nearly every charge was reduced to possession (Tonry, 1992), while harsh minimums for felony possession during the Rockefeller drug law era in New York were circumvented by reducing charges to misdemeanors or referring defendants to drug courts (J. Bowers, 2007).

Scholars have proposed that differences in local contexts determine how discretionary options are used within locales, producing geographic variation in case dispositions. Specifically, cases are prosecuted in accordance with personal and local principles of proportionality (J. E. Bowers, 2001), local political leanings, resources for prosecution, and community priorities (Percival, 2004). A study of the disparate prosecution of drug possession across California in 2010 is illustrative, and the case to which we will return: charging policies and decisions were influenced by community and judicial attitudes toward the crime and the political and philosophical beliefs of district attorneys and charging deputies (Berwick et al., 2010). Studies of the use of prosecutorial discretion to mitigate or maximize penalties in the context of three strikes laws have also found that more politically conservative environments tend to be more punitive, and counties with a high case flow relative to the budget for prosecution have lower average sentence severities (Marion, 1999; Stuntz, 1997; Sutton, 2013).

Implications of geographic disparities for social and health inequalities

Prosecutors and judges may appropriately use discretion to align a punishment with the characteristics of a case and the local community's priorities for law enforcement. However, unequal application of the law to equivalent cases calls into question the integrity and equity of the law, and can undermine public trust

in law enforcement (Luna, 2012). For example, after controlling for case characteristics, third strike sentences in California were disproportionately imposed upon black defendants, with the largest gaps evident for offenses that could be charged as felonies or misdemeanors at the prosecutor's discretion (Chen, 2008).

These geographic differences may stabilize or exacerbate social and health inequalities. Community principles of proportionality that inform prosecution policies and practices may differ even within a county, and represent those of wealthier suburban populations with political power and the ability to prioritize crime reduction without bearing the costs of punishment (Pfaff, 2017b). Those costs are high. Criminal records, particularly felony convictions, create a broad range of legal and social barriers that persist long after time is served. Restrictions range from the loss of voting rights, parental rights, public benefits that support health and education, employment and occupational licensing, and housing – creating conditions that can in turn impact mental and physical health (Californians for Safety and Justice, 2018; Link & Phelan, 1995).

Associations between the risk of criminal justice exposure and place of residence present the possibility that collateral consequences will be unequally distributed and exacerbate inequalities by race and location (M. Y. Iguchi, Bell, Ramchand, & Fain, 2005; Shannon et al., 2017; Wheelock & Uggen, 2006; Wildeman & Wang, 2017). Considering the significance of criminal history for the severity of punishment for subsequent offenses, including eligibility to receive drug diversion rather than a felony conviction and incarceration, the effects of living in a punitive location are likely to compound over time. Geographic differences in conviction rates also have implications for costs. Punitive charging and sentencing decisions are made by counties but costs are passed on to the state; a felony conviction can receive a sentence to state prison, while county jails and probation supervise those with misdemeanors (Pfaff, 2017a). In essence, the decisions of more punitive counties to impose higher rates of imprisonment are subsidized by less punitive counties (Ball, 2011; Males & Buchen, 2013).

How criminal justice reforms affect geographic disparities

Can criminal justice reforms reduce widespread geographic variation in case outcomes? Studies of the enactment of three strikes laws have found effects are limited, as local officials ignore or bend the laws to fit existing policies and practices, maintaining geographic disparities (J. Austin, Clark, Hardyman, & Henry, 1999; Feeley & Kamin, 1996).

However, mandatory minimum sentencing laws that seek to maximize punishment may affect circumvention differently than reforms that aim to reduce punishment. Little research has evaluated how reforms to reduce punishments affect geographic disparities, a significant evidence gap considering the national trend towards decarceration reforms currently underway. One exception is a study of California's Proposition 36, passed in 2000, which mandated that individuals arrested for non-violent drug offenses receive treatment instead of incarceration. The study found an overall reduction in incarceration for drug possession, but relative differences between counties persisted, and were driven by local ideological dispositions and policy preferences regarding drug use (Percival, 2004).

Proposition 47

Drug law enforcement has been especially susceptible to differential justice by geography in California. Prior to the passage of Prop 47 in 2014, possession of a controlled substance and possession of concentrated cannabis were classified as "wobbler" offenses, which are charged as felonies by default, but provide prosecutors with the discretion to reduce them to misdemeanors. This discretion was introduced through a penal code amendment (17(b)(4)) in 1969 to reduce caseloads at overburdened superior courts responsible for hearing felony cases, by allowing lesser felonies to be adjudicated as misdemeanors in municipal courts at the prosecutor's discretion (Meeker, 1985). Research conducted in 2010 found the proportion of arrests for possession of a controlled substance that were charged as felonies varied across

California counties from 25 to 100 percent (Berwick et al., 2010). Even after controlling for case characteristics and criminal history, county of residence was a strong predictor of felony filings following arrest (Berwick et al., 2010). California law does not dictate how wobblers should be prosecuted, nor does it define the quantity of drug that differentiates possession from sale, the latter of which is always a felony. Charging policies are established by district attorneys and differ across counties; the study found that some simply charged all possession cases as felonies, and others considered the quantity of the drug, prior criminal record, and concurrent charges.

The extant research has found that Prop 47 led to fewer arrests, bookings, and custody time on average for Prop 47 offenses (M. Bird et al., 2016; Mooney et al., 2018), and identified county variation in changes in arrests and jail populations following passage (Dooley-Sammuli, 2015). However, how Prop 47 impacted geographic disparities in the severity of case dispositions has not been investigated. While the reclassification of drug possession offenses to misdemeanors may have reduced county variation in felony convictions for drug possession, felony convictions for concurrent offenses or for drug offenses that remained felonies may have increased in more punitive counties, potentially offsetting a reduction in geographic disparities.

This study will assess the effect of Prop 47 on county variation in felony convictions in two ways. First, we will test whether there was a change in county variation in the probability of a felony conviction for those arrested for drug possession. Within this group, we will examine whether there was an increase in felony convictions for concurrent offenses, which would suggest mitigation of Prop 47's effects. Second, we will assess the change in felony conviction probability for individuals arrested for non-Prop 47 felony drug offenses, such as sale and transport, which may also result in Prop 47 convictions. California law does not specify the amount of drug that differentiates sale from possession, and those arrested for sale might have their charges reduced to possession. If this group of defendants continues to have charges reduced to possession, which is now a misdemeanor, we would see a reduction in their

felony convictions. Yet prosecutors in more punitive counties may use their discretion to buffer this effect. For example, the practice of reducing sale to possession during plea bargaining could decline in these counties, potentially increasing cross-county variation in felony convictions following these arrests.

Methods

Data and variables

We extracted criminal records from the California Department of Justice's (CA DOJ) Automated Criminal History System (ACHS), which records all arrests and corresponding convictions and sentences within California. The analysis includes all Prop 47 arrests (possession of concentrated cannabis, possession of a controlled substance, and possession of narcotics), or non-Prop 47 felony drug arrests, for which the arrest or first court event was within one year prior to or post Prop 47 passage. Arrests including both Prop 47 and non-Prop 47 felony drug offenses concurrently were classified as non-Prop 47 felony drug.

Non-Prop 47 felony drug included an extensive list of offenses, the most common of which were possession of a controlled substance for sale (21.0%; HS 11378), transport of a controlled substance (16.4%; HS 11379), possession of marijuana for sale (14.7%; HS 11359), transport of narcotics (11.0%; HS 11352), possession of narcotics for sale (10.8%; HS 11351), and transport of marijuana (9.1%; HS 11360). Though arrests were also made for offenses such as obtaining prescriptions by fraud, cultivating marijuana, or possession while armed, for simplicity, we will hereafter refer to non-Prop 47 felony drug offenses as sale/transport since these make up the vast majority of arrests.

The dataset is organized in "cycles," each of which holds a collection of related events, including the initial arrest and all subsequent court actions associated with the arrest. Some arrests were coded as

having dispositions in a separate arrest cycle, and could not be linked with their disposition in the available deidentified dataset. We therefore imposed the assumption that the arrest cycle that contained the missing disposition for these arrests was that which contained the next chronological case disposition. A total of 6.1% of Prop 47 drug arrests and 4.4% of non-Prop 47 felony drug arrests were reassigned based on this rule.

After reclassifying concurrent Prop 47 drug and non-Prop 47 felony drug arrests, a total of 327,719 Prop 47 drug arrests and 123,726 non-Prop 47 felony drug arrests occurred during the two-year analytic period. Of the Prop 47 arrests, we excluded .02% (n=54) due to missing county, and .01% (n=39) due to missing gender. We also dropped Sierra and Alpine Counties, which made only 14 and 2 Prop 47 arrests during the analytic period, respectively. Of non-Prop 47 felony drug arrests, we excluded .07% (n=90) due to missing county, and .02% (n=30) due to missing gender. We again dropped Sierra and Alpine Counties, which made five and two arrests of this type, respectively. The remaining sample included 327,610 Prop 47 arrests, ranging from 53 to 65,341 across counties (median: 15,407, IQR: 8,227-31,764), and 123,599 non-Prop 47 felony drug arrests, ranging from 54 to 24,973 across counties (median: 6,638, IQR: 2,173-12,232).

Exposure

Proposition 47: The Safe Neighborhoods and Schools Act. Prop 47 passed on November 4, 2014, and was effective immediately. Pre-Prop 47 conditions were defined as the period from November 5, 2013 until November 4, 2014, and post-Prop 47 conditions from November 5, 2014 to November 4, 2015. Classification of a case as pre or post-Prop is based on the date of the first court event, because Prop 47 is applied based on the date of prosecution, not the date of the offense. Thus, if an arrest occurred pre-Prop 47 but the first court date did not occur until post-Prop 47, the event would be considered post-Prop 47. If an arrest occurred outside of the analytic period but the first court date fell within it, the event was

included in the corresponding year. If the arrest occurred within the analytic period but the first court date was beyond it, the event was excluded. However, if an arrest had no associated court event, we used the date of arrest for classification, as the decision not to prosecute an offense would have been affected by the change in laws. Though the classification of arrests is in fact based on court dates, we will hereafter use the term pre- or post-Prop 47 "arrests" for simplicity.

Outcomes

Felony conviction. Separately for Prop 47 arrests and non-Prop 47 felony drug arrests, we determined whether the event resulted in a felony conviction for any offense associated with the arrest. We used any felony conviction as our primary outcome, because prosecutors have the discretion to consolidate arrest charges into an individual filing, or to alter offenses to negotiate a plea, and the charges prosecutors file may have been affected by Prop 47. For example, it is possible that prosecutors were more likely to file felony charges for non-Prop 47 offenses after passage, to counteract the drop in felonies due to reduced classification of Prop 47 offenses. By defining the outcome as any felony conviction, we attempted to account for possible changes in specific charges filed, and capture the severity of the overall case disposition following the arrest. Arrests with no disposition were assumed not to have been prosecuted.

Statistical Analysis

If Prop 47 shifted law enforcement practices, some individuals arrested during the pre-Prop 47 period might not have been arrested had they committed their crimes during the post-Prop 47 period. To assess the plausibility of such compositional changes in the populations arrested, we first compared pre- and post-policy groups on demographic characteristics, concurrent charges, and criminal histories, separately for Prop 47 offenses and non-Prop 47 felony drug offenses. Pearson's chi-squared tests were used for categorical variables and Wilcoxon rank-sum tests for skewed continuous variables.

In the presence of compositional changes, we cannot estimate the effects of Prop 47 on arrest outcomes for individuals who would only have been arrested under pre-Prop 47 conditions, because a comparable group is not represented in the post-Prop 47 period. Furthermore, estimating the effect of reclassification on individuals unlikely to be arrested under the new laws would be of little value. Therefore, propensity score matching was used to assess the effect of the "treatment on the treated," comparing arrest outcomes only among individuals who were likely to be arrested regardless of the reclassification of offenses. Each individual who was arrested after Prop 47 was matched with an individual who was approximately as likely, given their covariates, to have been arrested after Prop 47 was adopted, but was in fact arrested pre-Prop 47.

We generated propensity scores using a logit model predicting the log odds that an arrest occurred during the post-Prop 47 vs. pre-Prop 47 period. Predictors included all available demographic variables, and concurrent arrest and criminal history variables likely to affect the arrest disposition. These consisted of age, gender, race/ethnicity; county and calendar month of arrest; any concurrent arrest, separately for felony or misdemeanor classifications: property, violent, sex, weapons, and other; whether the arrest included a probation or parole violation; number of prior arrests; prior arrest for a Prop 47 drug offense (0, 1, 2 or more); a measure of the severity of conviction history (no prior convictions, misdemeanors only, one prior felony, multiple prior felonies); dummies for types of prior felony convictions, including drug, property, violent, sex, weapons, and other; any prior prison sentence and any prior jail sentence. For sale/transport arrests, we also include whether there was a concurrent Prop 47 drug offense. To accommodate non-linearities in age and the number of prior arrests, we use restricted cubic splines with five knots at equally spaced percentiles of each variable's distribution. Propensity scores were estimated separately for arrests for Prop 47 and sale/transport offenses.

Using within-county one-to-one matching without replacement, post-Prop 47 arrestees were matched on the logit of their propensity score to pre-Prop 47 arrestees, within a maximum of 0.2 of the standard deviations of the logit of the propensity score (P. C. Austin, 2011). For Prop 47 drug arrests, 5.6% of the post-Prop 47 group was dropped due to insufficient matches. For sale/transport arrests, 7.8% of the post-Prop 47 group was dropped. Covariate balance across propensity-score matched treatment and control groups was checked to assess the adequacy of the propensity score models. Standardized mean differences in all covariates were less than 5% in both samples.

Models

For each arrest category, we used a set of mixed logit models to examine the variance in county probabilities of felony conviction pre- and post-Prop 47 among propensity score matched samples. First, we specified the model to include county-specific random intercepts and random coefficients for the policy effect with an unstructured covariance structure. This generated an estimate of the covariance of pre-Prop 47 mean felony conviction probability with Prop 47 effects on conviction probability, which would indicate whether counties with higher pre-Prop 47 means declined to a greater degree, thus reducing variance in the outcome.

Second, models were specified such that counties had separate random intercepts for pre- and post-Prop 47 periods, which generated an estimate of the variance in county probability of felony conviction in each period. We used a likelihood ratio test to compare the fit of this model using an exchangeable covariance structure, which restricts the variance in pre and post intercepts to be equal, to one with an unstructured covariance structure, which allows the variance to differ pre- and post-Prop 47 implementation, as a test of the change in county variance. The latter model is the most flexible and was used to generate the policy effects on the marginal probabilities of felony conviction.

For county-specific estimates of outcomes pre vs. post-Prop 47, we generated empirical Bayes estimates of county random pre- and post-Prop 47 implementation intercepts from the models with unstructured covariance and calculated the linear combinations of fixed and random effects corresponding to pre- and post-Prop 47 periods. We also used fixed effects models with county dummy variables, interacted with the pre-post Prop 47 variable to generate marginal probability estimates of within-county pre-post change.

Sensitivity analysis

A large proportion of arrests had no disposition (31.9% pre and 36.4% post for Prop 47 arrests, and 31.6% pre and 36.0% post for non-Prop 47 felony drug arrests). We assumed these cases were either never presented to the district attorney or the district attorney did not file charges, and therefore assigned an outcome of no conviction. We compared case characteristics for those with and without dispositions and found support for this assumption. Those without dispositions were less severe cases, and therefore less likely to result in conviction. For example, a larger proportion had no concurrent arrests (Prop 47 arrests: 46.8% of those without dispositions had no concurrent arrests, vs. 28.2% of those with dispositions; Sale/transport arrests: 39.4% vs. 25.2%, respectively). They were also less likely to have concurrent felony arrests (Prop 47 arrests: 13.1% of those without dispositions had concurrent felony arrests vs. 18.3% with dispositions; Sale/transport arrests: 19.9% vs. 24.7%, respectively).

It is possible, however, that some of these cases resulted in convictions and the disposition was never reported by the court. We therefore conducted a sensitivity analysis that assumed the most severe extreme: that all sale/transport cases with missing dispositions received a felony conviction, and that all Prop 47 cases with missing dispositions received felony convictions if they occurred in the pre-Prop 47 period or if they included a concurrent felony arrest in the post period. Prop 47 arrests without concurrent felony arrests in the post period are unlikely to have received a felony conviction, since the Prop 47 offense was at that point classified as a misdemeanor.

Results

Characteristics of individuals arrested

Changes in the outcomes of Prop 47 arrest events must be considered in the context of potential changes in the composition of arrestees (Table 3.1). When comparing the full sample prior to propensity score matching, a greater fraction of post-Prop 47 arrest events had concurrent arrests of other types (70.6%, vs. 61.8% pre-Prop 47), suggesting a decline in arrests when drug possession was the sole offense. Post-Prop 47 arrestees also appeared to differ in terms of criminal histories, with more prior arrests (median = 13, vs. 11 in the pre-Prop 47 group). The propensity score matched sample had better covariate balance. For sale/transport arrests, pre and post groups were much more similar (Table 3.2). Though they were not compared statistically, we find the population arrested for these offenses appears quite different from those arrested for Prop 47 drug offenses. Prop 47 offenders had more numerous but lower level prior arrests and convictions. Racial differences were notable as well, with larger racial disparities among sale/transport arrests (Black arrestees constituted 18.5% and 17.8% of all sale/transport arrests pre and post, respectively, vs. 12.7% and 11.9% for Prop 47 drug arrests).

A reduction in the probability of felony conviction

Tables 3.3 and 3.4 display conviction outcomes by arrest type, using the propensity score matched samples. The likelihood of any conviction showed small declines in both those arrested for Prop 47 offenses (39.1% to 35.6%) and those arrested for sale/transport (43.0% to 40.6%).

After Prop 47 was adopted, Prop 47 drug convictions declined in both those arrested for Prop 47 drug offenses and those arrested for sale/transport. For those arrested for sale/transport, the decline in convictions overall was approximately equal to the decline in Prop 47 convictions. Although for the Prop 47 group, the percentage point decline in Prop 47 convictions (-5.2; 95% CI: -7.1, -3.4) was slightly larger than the decline in overall convictions, suggesting that it may have become more common to convict these arrestees of other crime categories.

The question then becomes, which type of convictions replaced the Prop 47 convictions, if any, and did these replacements counteract potential reductions in felony convictions for Prop 47 offenses? Looking first at the Prop 47 group, there was a 14 percentage point decline in felony convictions (-14.2; 95% CI: -16.5, -11.9), from 21.2% to 6.9%. This approximates the percentage point decline in felony Prop 47 convictions (-15.1; 95% CI: -17.8, -12.5), suggesting felony convictions for other concurrent offenses did not increase. This is corroborated by the break-down of convictions for other offenses, which shows increases in convictions for misdemeanor drug (specifically Prop 47 – though increases in Prop 47 misdemeanor convictions did not fully replace the drop in Prop 47 felony convictions) and misdemeanor "other" categories, but not felony offenses (Table 3.5). For example, the most common concurrent felony offense was felony property, present for 9.9% and 9.8% of Prop 47 drug arrests in pre and post periods, respectively. Yet the proportion of arrestees who received convictions for felony property offenses did not rise: 2.5% pre and 2.1% post.

The probability of felony convictions also declined for those arrested for sale/transport offenses (34.0% to 26.9%; Table 3.3). Declines appear to be driven by declines in the fraction of these arrestees who were ultimately convicted of felony Prop 47 offenses. The likelihood of any felony conviction in this group declined 7.1 percentage points, approximately the drop seen in the proportion convicted of a Prop 47 felony with no other felony drug conviction (7.3 percentage points). In contrast, no significant change

occurred in felony convictions for sale/transport, suggesting prosecutors did not pursue more convictions for these offenses as a means to maintain prior levels of felony drug convictions post-Prop 47.

A reduction in the variance in felony conviction probability across counties

With regard to Prop 47 arrests, pre and post estimates for each county (Figures 3.1 and 3.2) suggest counties where felony convictions were more likely pre-Prop 47 were reduced towards zero to a greater degree, such that post-Prop 47 outcomes were more similar across counties. Mixed models with random pre-Prop 47 intercepts, random coefficients for the policy effect, and an unstructured covariance structure allowing for a correlation between intercept (pre-Prop 47 level) and slope (Prop 47 associated change) random effects, showed a significant, negative covariance between random effects (-0.19, 95% CI: -0.33, -0.05; Table 3.6). Aligning with the pattern depicted in Figure 3.2, this suggests counties where felony convictions were more likely in the pre-period also declined more towards the less punitive counties, reducing the variance across counties.

The reduction in county differences is corroborated by variance estimates from models with county-specific random intercepts for the pre and post periods (Table 3.6). We find a larger variance in county random intercepts in the pre-Prop 47 period (variance in log odds: pre: 0.39, 95% CI: 0.24, 0.63, vs. post: 0.22, 95% CI: 0.14, 0.37). The likelihood ratio test comparing an exchangeable covariance structure as a nested model indicated that the unstructured covariance structures which allowed pre- and post-Prop intercept variances to differ, was a better fit to the data ($p=0.02$).

To put this in concrete terms, of the 56 California counties, prior to the policy the most punitive county had a conviction probability of .38 (95% CI: .32, .45), whereas the least punitive county had a conviction probability of .04 (95% CI: .03, .05). After Prop 47 was adopted, the most punitive county had a

conviction probability of .19 (95% CI: .15, .23) whereas the least punitive county had a conviction probability of .02 (95% CI: .02, .03).

Another way to conceptualize these results is in terms of how discrepant the statewide probability of felony conviction was from the least punitive county pre-Prop 47, and the extent to which that discrepancy changed post-Prop 47. Prior to Prop 47, the statewide probability of felony conviction was 17 percentage points higher than the least punitive county (95% CI: 14, 21), meaning 81% (95% CI: 74%, 88%) of statewide felony convictions following Prop 47 drug arrests would not have occurred if prosecuted in the least punitive county. Whereas after Prop 47, the statewide probability was just 3 percentage points higher than the least punitive county prior to passage (95% CI: 1%, 5%).

There was also significant variation across counties in the likelihood of felony conviction following a sale/transport arrest (Figure 3.3), ranging from 0.05 in Merced County (95% CI: 0.03, 0.07) to 0.51 (95% CI: 0.38, 0.64) in Calaveras County in the pre-Prop 47 period. However, mixed model results indicated the significant variance in the pre-Prop 47 period (variance in log odds: 0.28, 95% CI: 0.19, 0.43), did not decline post-Prop 47 (Table 3.6). This suggests that, while people arrested for sale/transport were less likely to ultimately get a felony conviction after Prop 47 was adopted, this effect did not vary substantially across counties, and no county showed an increase in felony conviction probability for sale/transport arrests. In other words, it does not appear that more punitive counties altered plea bargaining practices for sale/transport arrests to retain pre-Prop 47 levels of felony convictions, as this would have resulted in an increase in variance in felony conviction probabilities for this category of arrest.

Findings aligned with sensitivity analyses (Table 3.7) that assumed all cases with missing dispositions received felony convictions (except Prop 47 drug arrests in the post period, which were assumed to receive a felony conviction if there was a concurrent felony arrest).

Discussion

In this study of the change in felony convictions in California counties after Proposition 47 reduced criminal penalties for drug possession, we found significant declines in the likelihood of a felony conviction following arrests for Prop 47 drug offenses and non-Prop 47 felony drug offenses (sale/transport). Prior to Prop 47, dramatic geographic inequalities in probability of felony convictions after drug possession arrests prevailed between counties, and these geographic inequalities were substantially reduced after adoption of Prop 47. The reduction in felony convictions aligns with reports from the Judicial Council of California on reductions in felony filings following Prop 47 passage (Judicial Council, 2016), while providing new evidence that reductions led to declines in geographic disparities in felony convictions for drug arrests.

By holding county-specific case characteristics constant across time, this study identified a reduction in the excess variation that was attributable to county practices. This impact likely reflects that Prop 47 eliminated prosecutorial discretion for how drug possession can be charged. While previous research has found that the county-specific interpretation and implementation of reforms tends to reinforce the pre-existing prosecution and sentencing practices within the county (J. Austin et al., 1999; Feeley & Kamin, 1996; Verma, 2015), results from the current study do not indicate counties attempted to mitigate the effects of Prop 47 with felony filings for concurrent offenses, or reducing plea bargaining for sale offenses.

Several factors could explain why Prop 47 led to reductions in geographic disparities in case outcomes, when other reforms have not. Prop 47 was a voter initiative, and considering the influence of community priorities for law enforcement on charging policies and decisions, prosecution practices may be more responsive to these types of reforms. Secondly, Prop 47 called for reduced criminal penalties, whereas prior studies have evaluated reforms like three strikes laws which maximize punishment. Maximizing

punishment is costly, whereas reducing it can assuage overburdened courts. Therefore, we may be more likely to see change resulting from reforms that call for lesser criminal penalties, and especially when that call comes from the public.

Implications

Reducing variation in the likelihood of a felony conviction for two equivalent cases mitigates inequalities in criminal justice exposure due to unequal applications of the law. However, requiring that all drug possession offenses be prosecuted as misdemeanors also suggests that cases with different characteristics are now being treated more similarly. A defendant can still be convicted of a felony for concurrent felony offenses, so it is the effect of criminal history on case outcomes which we would expect to be minimized post-Prop 47. Criminal history is strongly associated with race/ethnicity, which may reflect biases and practices in drug law enforcement (Beckett et al., 2005; Beckett et al., 2006; Fielding-Miller et al., 2016; Mitchell & Caudy, 2015), while increasing the severity of punishment for subsequent drug offenses (Berwick et al., 2010; J. MacDonald et al., 2014; Schlesinger, 2007). There is evidence Prop 47 in fact reduced the effect of criminal histories in San Francisco, where prior to Prop 47, racial disparities in case dispositions and sentencing were attributable to more extensive pretrial detention and criminal histories among black defendants (J. MacDonald & Raphael, 2017). When Prop 47 reclassified drug possession offenses to misdemeanors, these characteristics had lesser effects on case outcomes, and racial disparities declined. Further research could assess whether findings from San Francisco apply statewide.

There are also implications for substance use disorder treatment. Prop 47 generated $103 million in savings in the first year, awarded through grants to counties to increase access to substance use disorder and mental health treatment, and education (Board of State and Community Corrections, 2017). Counties with few felony convictions pre-Prop 47 may have had greater support for and availability of drug diversion options which allow dismissal of charges for successful drug treatment completion. However,

Prop 47 generated concerns that without the possibility of a felony conviction, the incentive to engage in treatment would be removed (Chang et al., 2015). Prior research has suggested that, as compared to volitional substance users, individuals with more severe substance use disorders tend to fail to meet the court's conditions for diversion and ultimately receive harsher termination sentences (J. Bowers, 2007). If this were the case, it would be logical that this group would opt out of diversion options now that the sentence for drug possession is less severe. Whether this is the case, and if so, understanding successful strategies counties have developed to increase access to needed treatment through other routes, would be valuable.

Limitations

CA DOJ's Statewide Automated Criminal History System (ACHS) data is the most comprehensive data source available for studying criminal justice policy changes in the state, and has been used in significant studies of Prop 47, as well as other reforms such as Prop-36, which increased drug diversion following arrest (M. Bird, Lofstrom, Martin, Raphael, & Nguyen, 2018; J. MacDonald & Raphael, 2017; J. MacDonald et al., 2014). While the use of ACHS to capture the outcomes of all arrests in the state is a strength of this study, ACHS also faces the quality challenges typical of large administrative datasets, as CA DOJ must rely upon consistent and timely reporting from 58 counties.

Though courts and law enforcement agencies are mandated to report within 30 days of final case dispositions and the CA DOJ's policy is to update the data system within 90 days of receipt, a substantial portion of arrests did not contain dispositions. We assumed that these arrests without dispositions were not prosecuted for the primary analysis. However, if cases with no dispositions in fact include some felony convictions, and felony conviction missingness is associated with county, it could contribute to some of the geographic variation in convictions. The analysis of change in variation across time could be biased if felony conviction missingness differed within counties in the year pre- vs. post-Prop 47. There

are several pieces of evidence that provide some reassurance. First, missing dispositions were more likely in the post period, which we would expect to occur if missing dispositions were indicative of no conviction, since the classification of drug possession offenses was reduced. Second, cases with missing dispositions were less severe in terms of concurrent offenses, which would correspond with lower likelihood of felony conviction. Third, the sensitivity analysis assuming that cases with missing dispositions had resulted in felony convictions did not alter findings.

The impact of the study design on the potential for bias should be considered. By comparing events just within the year before and after Prop 47, we attempted to limit the effect of time trends in felony convictions, though some reduction in felony convictions could be attributed to a pre-existing trend towards leniency for drug possession. That said, the large and immediate reduction in felony convictions across nearly all counties is unlikely to have occurred in the absence of the policy change.

Conclusions

A voter initiative that reduced and standardized offenses classifications for drug possession points to the potential for sentencing reforms to mitigate geographic disparities in case outcomes.

CHAPTER 4: EFFECTS OF PROPOSITION 47 ON DRUG-RELATED HOSPITAL VISITS

Background

Leading up to and following the passage of Prop 47, there was substantial debate about potential unintended consequences of reducing criminal penalties for all drugs in California. For example, reductions in incarceration for drug offenses may lead to growth in the number of people with SUDs and other behavioral health conditions in the community. Increases in the needs of community members may not be adequately met by available community-based services (Lamb & Weinberger, 2014).

One criticism of Proposition 47 was the possibility that it would reduce treatment previously accessed in the context of drug diversion programs (Chang et al., 2015). Drug diversion programs offer eligible individuals with drug-related arrests the option to attend drug treatment in lieu of incarceration, and to have charges dismissed if treatment is completed (Belenko, Hiller, & Hamilton, 2013). Some research suggests diversion programs have had success in reducing substance use and recidivism, and legally-mandated treatment can provide an important opportunity for linkage to care (Belenko et al., 2013). For those with misdemeanor offenses the opportunity to divert a felony charge and/or incarceration is incentive to enroll into drug diversion programs. Prop 47 may remove this incentive by altering the alternative choice from a felony to a misdemeanor, with the maximum penalty likely to be a short jail sentence and misdemeanor probation. Those arrested post-Prop 47 may prefer this option to drug diversion programs that dictate lengthy terms of treatment with strict conditions for completion, and the possibility of more severe penalties if conditions are not met.

Although fewer may access drug diversion options, there are also reasons to hypothesize reducing criminal penalties may minimize harms to substance users. Some evidence suggests that incarceration may exacerbate substance use (DeBeck et al., 2009; Genberg et al., 2015). Jails and prisons rarely offer

harm reduction strategies such as methadone maintenance; forced withdrawal lowers post-release treatment engagement by seven-fold (Rich et al., 2015), and may cause increased risk of injecting drugs after incarceration (DeBeck et al., 2009; Genberg et al., 2015). The break or change in substance use due to time incarcerated reduces one's tolerance, contributing to the high risk of overdose in the first two weeks post-release (Binswanger et al., 2007; Merrall et al., 2010).

Taken together, it is uncertain how reducing drug possession penalties would affect rates of overdose. Media reports in 2015 and 2017 suggested Prop 47 led to upticks in drug-related ED visits among individuals who would have been treated or incarcerated prior to the policy change (Saslow, 2015; Webster, 2017), though a statewide study has not been conducted to date. As other states increasingly enact similar changes in drug laws, it is critical to better understand the health implications. This study assesses whether there was a change in SUD-related hospital visits statewide, following the reduction in criminal penalties for drug possession in California. We also evaluate whether county-level arrest rate changes associated with Prop 47 predict county-level changes in SUD-related hospital visits.

Methods

Data and variables

We extracted monthly SUD-related hospital visits (all outpatient ED and inpatient admissions) in California from October 5, 2011 – September 4, 2015, as collected by the Office of Statewide Health Planning and Development. These months were generated such that the analytic period began after the start of California's Public Safety Realignment (Assembly Bill 109), the post-Prop 47 period could begin on the first effective date of November 5, 2014, and no visits after September 30, 2015 were included. The ICD-9-CM coding system underwent major changes when it shifted to the ICD-10-CM system on

October 1, 2015, and we anticipated a period of unreliable coding in the early months of this shift. The study therefore uses only the ICD-9-CM coding system.

Exposure

Proposition 47: The Safe Neighborhoods and Schools Act. Prop 47 passed on November 4, 2014, and was effective immediately. Pre-policy conditions were defined as the period from October 5, 2011 until November 4, 2014. Visits from November 5, 2014 to September 4, 2015 were considered to occur under policy conditions.

Outcome

All visits with a SUD-related condition (excluding alcohol) as the principal diagnosis among patients ages 15-64 were included. These comprised the following ICD-9-CM codes: amphetamines dependence (304.40-304.43), nondependent amphetamine abuse (305.70-305.73), cannabis dependence (304.30-304.33), nondependent cannabis abuse (305.20-305.23), cocaine dependence (304.20-304.23), nondependent cocaine abuse (305.60-305.63), poisoning by cocaine (968.5), adverse effects from cocaine (E938.5), hallucinogen dependence (304.50-304.53), nondependent hallucinogen abuse (305.30-305.33), poisoning by hallucinogens/psychodysleptics (969.6), accidental poisoning by hallucinogens/psychodysleptics (E854.1), adverse effects from hallucinogens (E939.6), opioid dependence (304.00-304.03), combinations of opioids with any other (304.70-304.73), nondependent opioid abuse (305.50-305.53), poisoning by opium (965.00), poisoning by heroin (965.01), poisoning by methadone (965.02), poisoning by other opiates and related narcotics (965.09), heroin poisoning (E850.0), adverse effects from heroin (E935.0), sedatives/hypnotics/anxiolytic dependence (304.10-304.13), nondependent sedative/hypnotic/anxiolytic abuse (305.40-305.43), drug withdrawal (292.0), drug-induced psychotic disorder with delusions (292.11), drug-induced psychotic disorder with hallucinations (292.12), pathological drug intoxication (292.2), drug-induced delirium (292.81), drug-

induced persistent dementia (292.82), drug-induced persistent amnestic disorder (292.83), drug-induced mood disorder (292.84), drug-induced sleep disorders (292.85), other drug-induced mental disorder (292.89), unspecified drug-induced mental disorder (292.9), other specified drug dependence (304.60-304.63), combinations excluding opioids (304.80-304.83), unspecified drug dependence (304.90-304.93), other mixed or unspecified drug abuse (305.90-305.93), or drug dependence complicating pregnancy/childbirth/puerperium (648.30-648.34).

Though they made up just 14.7% of all SUD-related visits, we restricted the analysis to principal diagnoses, considered to be chiefly responsible for the hospital visit, to reduce the possibility of finding a spurious increase in visits attributable to the rise in insurance coverage through the Affordable Care Act (ACA) in 2014. Insurance coverage may alter the volume of hospital visits for other conditions, during which additional drug-related diagnoses may also be identified and captured as secondary diagnoses. We aggregated visits by month, gender-age, and race/ethnicity. Rate denominators came from the American Community Survey's five-year 2015 population estimates broken down by age group, gender, and race/ethnicity (United States Census Bureau / American FactFinder).

Statistical Analysis

To evaluate whether changes in SUD-related hospital visits were attributable to Prop 47, we assessed whether county-level changes in drug arrest rates were associated with county-level changes in SUD-related hospital visit rates. The measure of change for both variables was defined as the difference in the observed and expected rates during the ten months post-policy period, for each county and gender-age group. To estimate expected rates, we modeled monthly county rates with cluster robust standard errors using a Poisson specification and county fixed effects, stratifying models by gender-age group. Calendar month dummies controlled for seasonal trends, and a continuous linear term for months (1-60) controlled for secular trends. A binary variable indicated whether the period was pre- or post-policy. To project post-

policy rates based on pre-policy trends, we created duplicate observations but set the post-policy binary variable to zero, such that model predictions were based on how trends were expected to proceed in the absence of the policy. We then calculated the model-predicted rate for the 10-month post-policy period, and subtracted it from the observed rate. Linear regression was used to model the effect of a reduction of 100 drug arrests per 100,000 on the SUD-related hospital visit rate in each county or county grouping during the 10-month post-policy period. All analyses were conducted in Stata version 15.

Counties with small populations were grouped by region, replicating the groupings created by the Office of Statewide Health Planning and Development (Office of Statewide Health Planning and Development, 2010). Groups included North Central (Lake, Colusa, Glenn), Foothills (Amador, Calaveras, Tuolumne, Mariposa), Central Coast (Monterey, San Benito), North Coast (Humboldt, Del Norte, Mendocino), North (Siskiyou, Tehama, Trinity), North East (Lassen, Modoc, Nevada, Sierra, Plumas), and East Central (El Dorado, Alpine, Inyo, Mono).

Results

A total of 285,575 SUD-related hospital visits occurred in California from October 5, 2011 – September 4, 2015 among individuals ages 15-64, approximately one third of which resulted in an inpatient admission (Table 4.1). Rates were higher among males, particularly White males ages 15-24, than other groups. Though drug types were not mutually exclusive (16.1% of visits with an SUD-related principal diagnosis were associated with multiple drugs mentioned in other diagnoses), opioids were coded in the largest proportion of visits (40.6%), followed by amphetamines (28.8%). Visits coded with opioids were also most likely to include multiple drugs (31.6%), while no visits for amphetamines had multiple drugs listed.

Change in county arrest rates vs. change in county SUD-related hospital visit rates by age and gender

Changes in statewide SUD-related hospital visits could be attributable to a variety of factors unrelated to Prop 47. Since the immediate effect of Prop 47 was to reduce drug arrest rates, if changes in hospital visits were related to Prop 47, counties with greater reductions in drug arrests would be expected to experience greater changes in hospital visits.

Table 4.2 displays the median observed vs. expected county drug arrest and SUD-related hospital visit rates per 100,000 in the 10 months post-policy, by gender-age group. We find that median county drug arrest rates declined in every group, with the greatest declines among males ages 15-24 (median: -327; IQR: -463, -221). Median increases in SUD-related hospital visit rates were also greatest in this population (median: 26; IQR: 4, 50), which reflects findings from the statewide analysis. However, results from the linear regression of county changes in SUD-related hospital visits on county changes in drug arrest rates indicates associations were non-significant for every age and gender group, including males ages 15-24 (Table 4.3). Though the confidence interval included zero, the direction of the effect was the reverse of what was expected: among males ages 15-24, a decline of 100 per 100,000 drug arrests was associated with a decline of 8 per 100,000 SUD-related hospital visits (95% CI: -20, 5; p-value: 0.241).

Discussion

This study of the effects of Prop 47 on SUD-related hospital visits in California suggests that a reduction in drug arrests was not associated with an increase in hospital visits. Evidence shows that increasing the severity of sanctions for drug offenses historically did not affect use (Ramirez & Crano, 2003), though research on the health effects of easing drug laws has been generally limited to marijuana. This body of literature suggests that medical marijuana legalization had no effect on marijuana initiation or DSM-IV dependence/abuse among users (Cerda, Wall, Keyes, Galea, & Hasin, 2012; Hasin et al., 2015; Wall et

al., 2011; Wall et al., 2016), and reduced opioid-related hospital admissions with no impact on marijuana-related hospitalizations (Bachhuber et al., 2014; Shi, 2017). Studies of the impacts of legalizing marijuana for recreational use show greater divergence and potentially negative health effects, with increases in emergency department visits, hospitalizations, and regional poison control center calls linked to marijuana exposure (Wang et al., 2017), and mixed findings regarding effects on adolescent use and perceived harmfulness across states (Cerdá et al., 2017; Williams & Bretteville-Jensen, 2014).

Legalization, however, is distinct from reducing criminal penalties, with different mechanisms through which use could be altered. For example, though legalization may have a similar effect as reducing criminal penalties on minimizing arrests and incarceration associated with the drug, it also increases access to the drug. Legalization may garner media attention that increases public awareness of the reform, in turn potentially reducing perceptions of risks associated with the drug or generating drug use tourism (Kim et al., 2016). Reclassifying drug offenses, in contrast, may go relatively under the public radar, which could correspond with a lesser effect on public perceptions or use patterns.

Regardless of public awareness of the reform, there is clear evidence that arrests and incarceration dropped as a result of Prop 47 (M. Bird et al., 2016). This study indicates reducing drug arrests did not alter SUD-related hospital visits on a population level. Findings would be bolstered by further research that examines the effect of shorter sentences in addition to reduced arrest rates, and that investigates changes in individual trajectories through the criminal justice system, access to treatment, and outcomes. While individual-level studies would offer a stronger assessment of the association between the exposure and outcome of interest, causal inference in such studies would be challenged by the likelihood that police and prosecutors shifted focus to individuals with more severe criminal histories post-policy. Such a shift would itself be worth exploring; if the individuals no longer getting arrested are those with a lower risk of hospital visits, then it may help to explain why the drop in arrests had little effect on hospital visit rates. In any case, it is imperative to gain insight into whether and how individuals at greatest risk of negative

health outcomes from substance use are being engaged in services within the new policy environment, including best practices for counties' use of Prop 47 savings to increase treatment access.

Limitations

This study was limited by a brief post-policy time period of 10 months; continued monitoring will help to shed light on the full impact of the policy, particularly after Prop 47 county grants are invested in treatment. Though reductions in drug arrests were not associated with a rise in hospital visits, it is plausible that other measures of change in criminal justice involvement attributable to Prop 47, such as time incarcerated, may have different effects that could be explored. Finally, hospital visits do not provide a comprehensive picture of the effects of drug law reforms on substance use and corresponding outcomes. Further research might examine reported use, SUD treatment access, criminal justice involvement among substance users, and measures of well-being such as employment, housing, mental health, and familial bonds.

Conclusion

Reducing criminal penalties for drug possession is unlikely to have affected SUD-related hospital visits on a population level. Further research is needed to examine impacts on an individual level, as well as the full range of health impacts of similar reforms now being replicated across the country.

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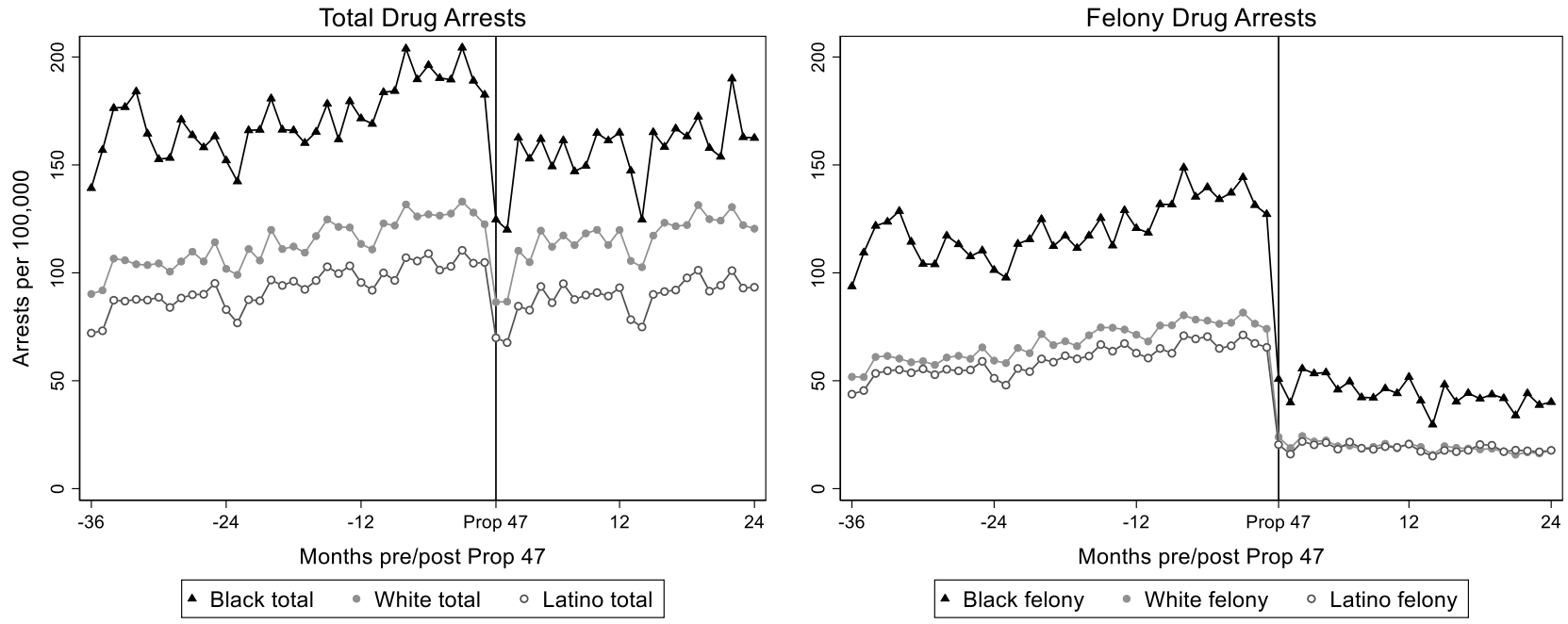
Figure 2.1. Observed monthly total drug and felony drug arrest rates per 100,000 in California from 2011-2016



Total drug arrests n=457,703 among Whites, n=132,869 among Blacks, n=410,930 among Latinos.

Figure 3.1. Probability of felony conviction among those arrested for Prop-47 drug offense pre- and post-Prop-47, classifying counties by pre-Prop-47 probability quartiles in both periods

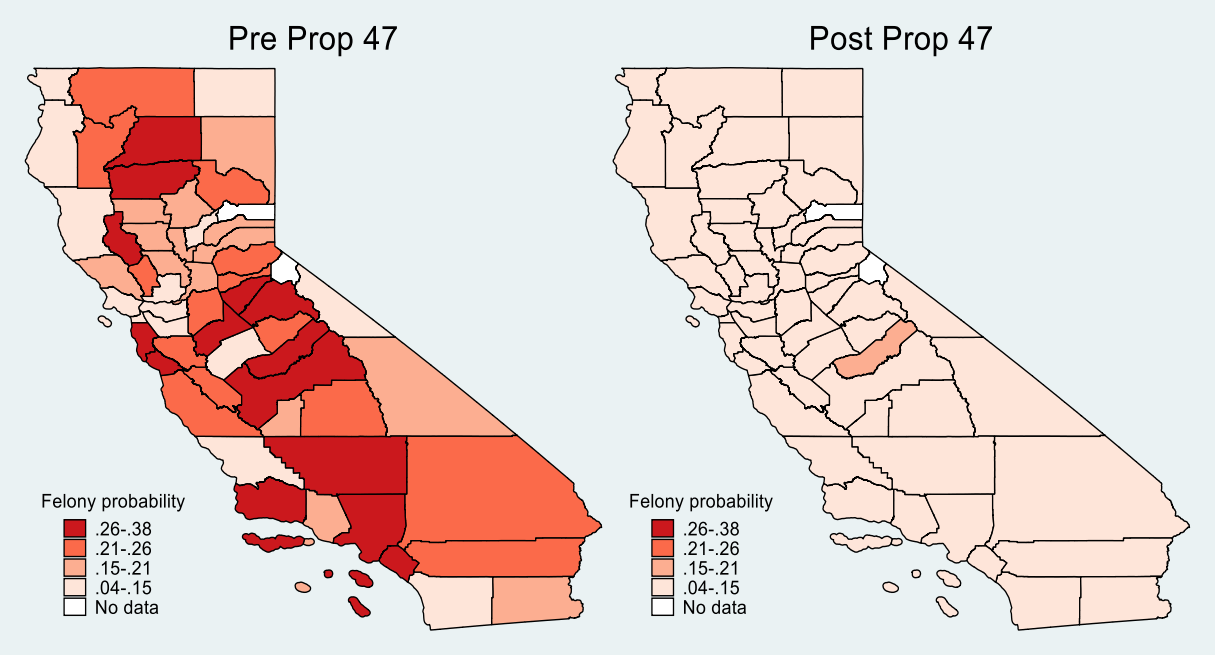


Figure 3.2. County estimates of probability of felony conviction following a Prop-47 drug arrest, one year pre- and one year post-Prop-47 passage

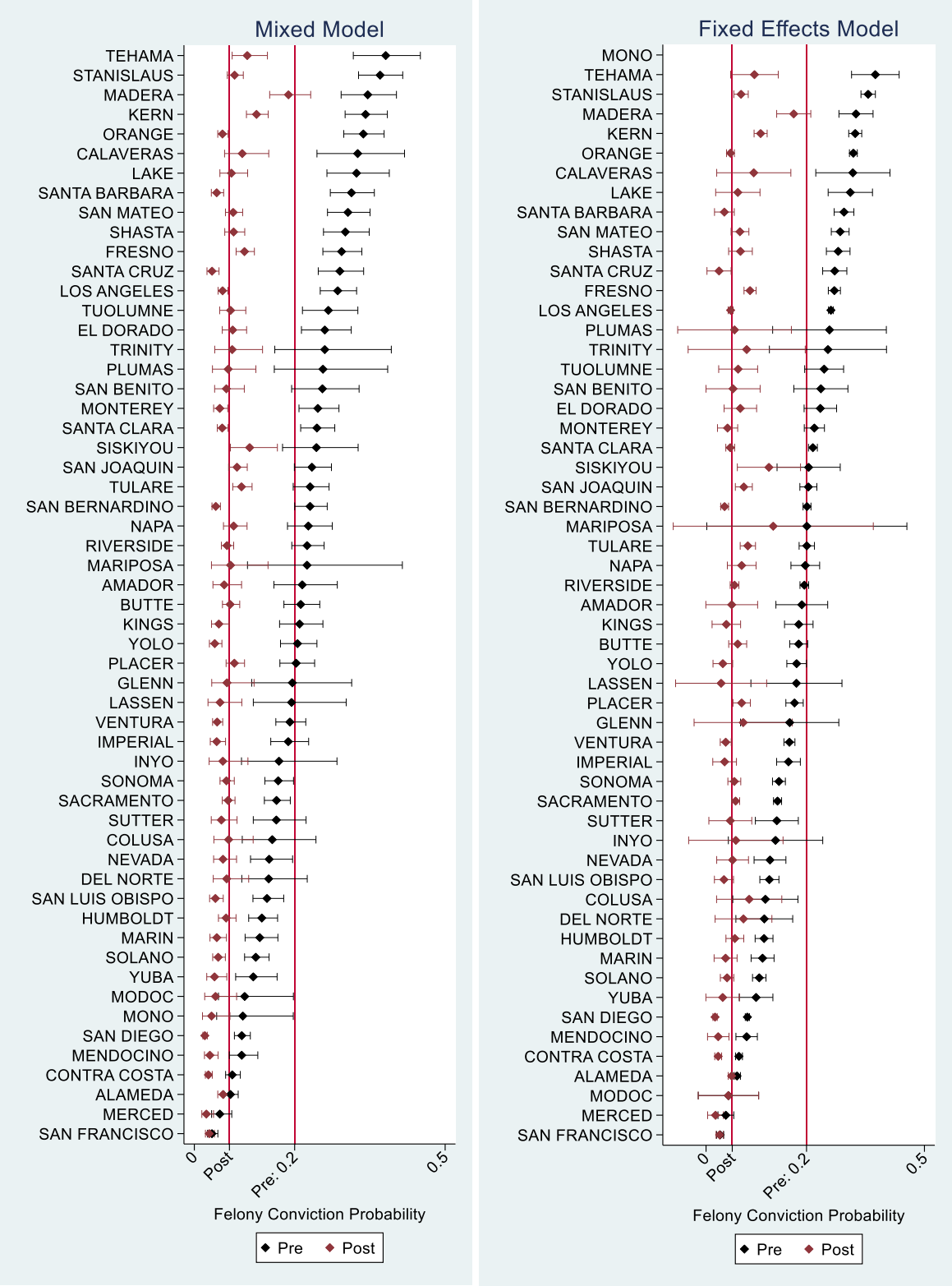


Figure 3.3. County estimates of likelihoods of felony conviction following a non-Prop-47 felony drug (sale/transport) arrest, one year pre- and one year post-Prop-47 passage

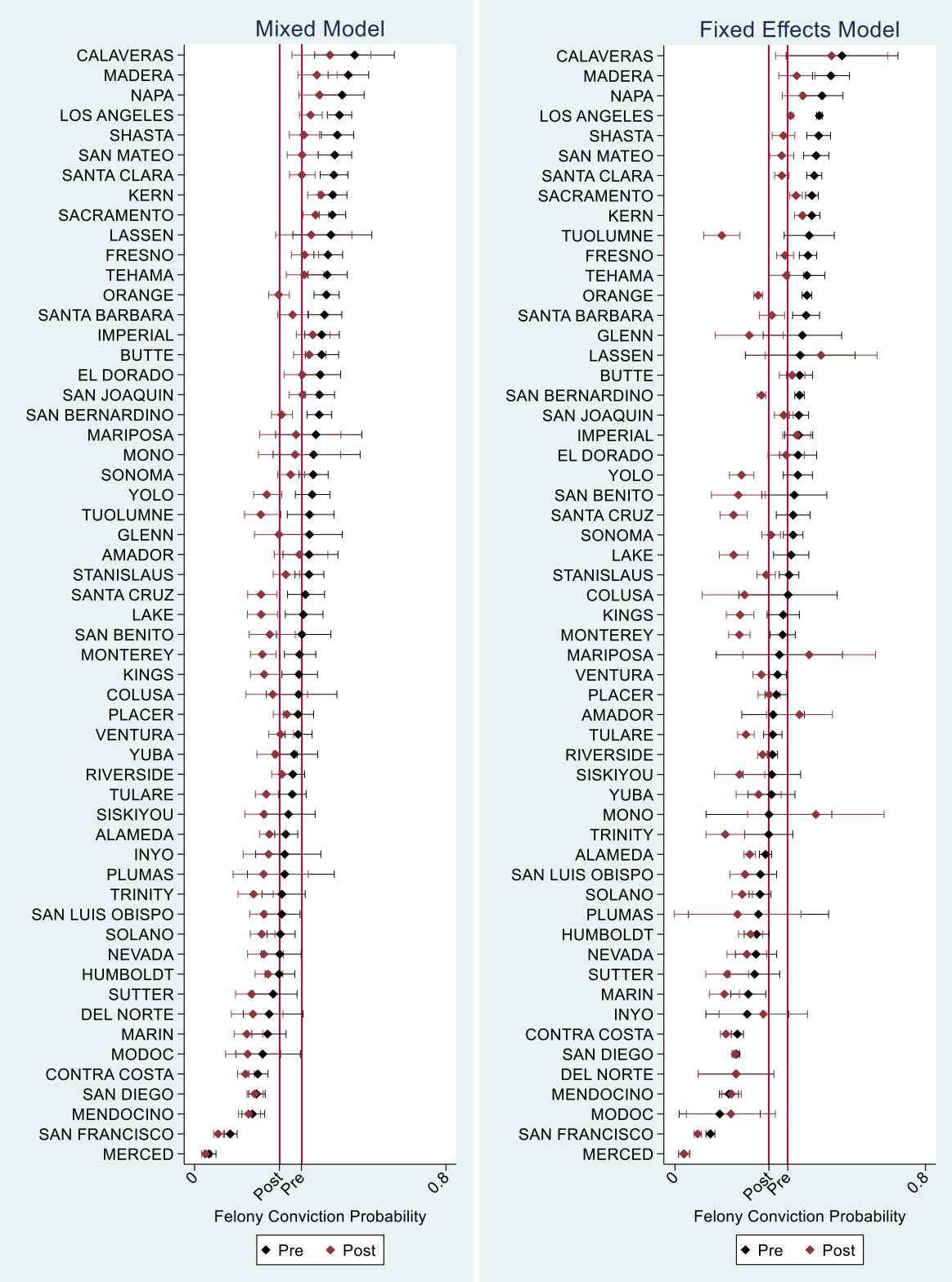


Table 2.1. Prop 47 Effects on Monthly Drug Arrest Rates per 100,000 in all 58 CA Counties from 2011-2016

Arrest Type	Pre-post rate difference (RD) (95% CI)	Racial difference in pre-post RD (95% CI)	Pre-post rate ratio (RR) (95% CI)	Racial difference in pre-post RR (95% CI)
Felony drug arrests				
Immediate effect				
White	-44 (-48, -40)	Reference	0.31 (0.28, 0.35)	Reference
Black	-81 (-96, -66)	-37 (-52, -22)	0.40 (0.35, 0.44)	1.27 (1.12, 1.42)
Latino	-44 (-54, -33)	0 (-10, 10)	0.31 (0.23, 0.39)	0.98 (0.79, 1.18)
1-year post policy				
White	-59 (-64, -54)	Reference	0.23 (0.19, 0.27)	Reference
Black	-100 (-121, -80)	-41 (-61, -22)	0.35 (0.29, 0.41)	1.53 (1.21, 1.85)
Latino	-55 (-65, -46)	3 (-7, 14)	0.26 (0.21, 0.31)	1.14 (0.96, 1.32)
Total drug arrests				
Immediate effect				
White	-28 (-34, -22)	Reference	0.71 (0.67 0.75)	Reference
Black	-57 (-72, -42)	-29 (-44, -13)	0.70 (0.65, 0.76)	0.99 (0.91, 1.07)
Latino	-29 (-39, -18)	-1 (-11, 10)	0.70 (0.62, 0.78)	0.98 (0.87, 1.08)
1-year post policy				
White	-19 (-29, -9)	Reference	0.83 (0.76, 0.91)	Reference
Black	-43 (-65, -22)	-24 (-44, -3)	0.80 (0.72, 0.89)	0.97 (0.86, 1.07)
Latino	-24 (-36, -12)	-5 (-16, 6)	0.78 (0.69, 0.87)	0.94 (0.85, 1.02)
Misdemeanor drug arrests				
Immediate effect				
White	13 (8, 19)	Reference	1.39 (1.18, 1.59)	Reference
Black	27 (16, 37)	13 (7, 20)	1.48 (1.22, 1.75)	1.07 (0.96, 1.18)
Latino	14 (8, 21)	1 (-3, 4)	1.45 (1.22, 1.68)	1.05 (0.97, 1.13)
1-year post policy				
White	35 (28, 42)	Reference	1.87 (1.59, 2.15)	Reference
Black	61 (41, 82)	26 (9, 43)	1.97 (1.45, 2.48)	1.05 (0.84, 1.26)
Latino	29 (21, 38)	-6 (-12, 0.2)	1.79 (1.52, 2.07)	0.96 (0.89, 1.03)

	Pre-post rate difference (RD) (95% CI)	Racial difference in pre-post RD (95% CI)	Pre-post rate ratio (RR) (95% CI)	Racial difference in pre-post RR (95% CI)
Drug arrests reclassified by Prop 47				
Immediate effect				
White	-23 (-27, -20)	Reference	0.47 (0.44, 0.51)	Reference
Black	-40 (-46, -34)	-17 (-22, -11)	0.48 (0.43, 0.53)	1.01 (0.91, 1.11)
Latino	-23 (-28, -19)	0 (-5, 5)	0.47 (0.44, 0.51)	0.96 (0.83, 1.08)
1-year post policy				
White	-28 (-33, -22)	Reference	0.54 (0.48, 0.60)	Reference
Black	-53 (-72, -34)	-26 (-42, -9)	0.49 (0.41, 0.58)	0.91 (0.79, 1.03)
Latino	-28 (-33, -23)	-1 (-8, 7)	0.51 (0.46, 0.57)	0.95 (0.84, 1.05)
Felony drug arrests unaffected by Prop 47				
Immediate effect				
White	0 (-1, 1)	Reference	0.98 (0.88, 1.07)	Reference
Black	-8 (-20, 3)	-8 (-20, 4)	0.83 (0.65, 1.02)	0.85 (0.63, 1.07)
Latino	-1 (-3, 0.2)	-1 (-3, 1)	0.91 (0.82, 1.01)	0.93 (0.80, 1.07)
1-year post policy				
White	0 (-2, 1)	Reference	0.97 (0.85, 1.08)	Reference
Black	-6 (-23, 11)	-6 (-22, 11)	0.89 (0.63, 1.16)	0.93 (0.68, 1.17)
Latino	-1 (-3, 2)	0 (-2, 2)	0.95 (0.83, 1.08)	0.99 (0.86, 1.11)

Table 2.2. Observed vs. Expected Arrests in California in the First Year of Prop 47 (Nov 2014-Oct 2015)

Arrest type	Observed N	Expected N	Difference N (95% CI)	% Change (95% CI)
Felony drug arrests				
White	16,498	68,483	-51,985 (-80,459, -32,391)	-75.9% (-71.7, -79.5%)
Black	7,700	22,728	-15,028 (-29,994, -6,902)	-66.1% (-59.3, -70.9%)
Latino	17,914	68,027	-50,113 (-96,181, -24,837)	-73.7% (-68.4, -76.9%)
Total drug arrest				
White	87,406	107,866	-20,460 (-36,180, -11,306)	-19.0% (-13.5%, -25.3%)
Black	24,354	31,433	-7,079 (-16,082, -1,469)	-22.5% (-6.7%, -30.8%)
Latino	78,199	102,430	-24,231 (-43,743, -12,179)	-23.7% (-16.5%, -28.5%)

Table 3.1. Arrest characteristics in total and propensity score matched samples, for Prop 47 drug arrests

	Prop 47 Drug Arrest			
	Total Sample		Propensity Score Matched	
	Pre (N=187,356)	Post (N=140,254)	Pre (N=132,457)	Post (N=132,457)
Demographics				
Age, median (IQR)	43.0 (35.0, 54.0)	44.0 (36.0, 54.0)	44.0 (36.0, 54.0)	44.0 (36.0, 54.0)
Male	76.2%	77.1%	76.9%	76.6%
Race/ethnicity				
White	44.4%	45.8%	45.5%	45.5%
Black	12.7%	11.9%	12.1%	12.2%
Hispanic	38.0%	37.1%	37.1%	37.1%
Other	5.0%	5.2%	5.2%	5.2%
Concurrent arrests for other arrest types				
Any	61.8%	70.6%	69.3%	68.9%
Prop-47	-	-	-	-
Felony				
Any	15.5%	17.9%	17.6%	17.4%
Property	8.9%	9.9%	9.9%	9.8%
Violent	2.5%	3.2%	3.0%	3.0%
Weapons	2.4%	2.9%	2.8%	2.7%
Sex	0.2%	0.2%	0.2%	0.2%
Other	4.0%	4.7%	4.6%	4.5%
Misdemeanor				
Drug, non Prop-47	30.2%	34.6%	34.8%	33.0%
Property	3.7%	6.7%	4.4%	6.3%
Violent	4.7%	5.9%	5.6%	5.5%
Weapons	1.0%	1.4%	1.2%	1.4%
Sex	0.4%	0.4%	0.4%	0.3%
Other	23.7%	27.7%	26.8%	26.5%
Probation or parole violation	9.1%	9.0%	9.3%	9.2%
Prior arrests				
Prior arrests, Median (IQR)	11.0 (5.0, 22.0)	13.0 (5.0, 24.0)	12.0 (5.0, 23.0)	12.0 (5.0, 23.0)
Prior Prop-47 arrest				
0	26.6%	23.7%	24.7%	24.7%
1	15.9%	14.5%	14.8%	15.0%
2+	57.5%	61.8%	60.5%	60.2%

Prop 47 Drug Arrest

	Total Sample		Propensity Score Matched	
	Pre (N=187,356)	**Post (N=140,254)**	**Pre (N=132,457)**	**Post (N=132,457)**
Prior Convictions				
No convictions	10.5%	9.2%	9.7%	9.6%
Misdemeanors only	28.3%	30.5%	30.1%	29.9%
1 prior felony	27.1%	28.2%	27.8%	27.8%
2+ prior felonies	34.1%	32.1%	32.4%	32.7%
Prior felony convictions				
Drug, non Prop-47	14.0%	14.2%	13.1%	14.6%
Property	29.7%	31.4%	31.1%	30.9%
Violent	11.4%	12.6%	12.2%	12.1%
Weapons	6.5%	7.0%	6.9%	6.8%
Sex	1.1%	1.2%	1.2%	1.2%
Other	12.7%	13.6%	13.5%	13.4%
Prior Sentences				
Prison	16.0%	16.4%	16.5%	16.4%
Jail	65.8%	68.6%	67.6%	67.4%

Note: Criminal histories pertain to arrests, convictions, and sentences within California. Events outside the state are not recorded in the CA DOJ dataset.

Table 3.2. Arrest characteristics in total and propensity score matched samples, for Non-Prop 47 Felony Drug (Sale/Transport) Arrests

	Non-Prop-47 Felony Drug (Sale/Transport) Arrest			
	Total Sample		Propensity Score Matched	
	Pre (N=63,402)	Post (N=60,197)	Pre (N=55,528)	Post (N=55,528)
Demographics				
Age, median (IQR)	43.0 (35.0, 53.0)	43.0 (35.0, 53.0)	43.0 (35.0, 53.0)	43.0 (35.0, 53.0)
Male	81.1%	81.4%	81.5%	81.3%
Race/ethnicity				
White	36.8%	36.7%	36.0%	36.0%
Black	18.5%	17.8%	18.4%	18.5%
Hispanic	38.2%	38.4%	38.7%	38.7%
Other	6.6%	7.1%	6.9%	6.8%
Concurrent arrests for other arrest types				
Any	70.5%	69.4%	68.6%	68.4%
Prop-47	25.1%	18.9%	19.5%	20.4%
Felony				
Any	23.1%	23.2%	22.7%	22.2%
Property	7.6%	7.1%	7.2%	7.2%
Violent	3.5%	3.6%	3.5%	3.4%
Weapons	7.3%	8.0%	7.5%	7.0%
Sex	0.2%	0.2%	0.2%	0.2%
Other	9.5%	9.3%	9.2%	9.1%
Misdemeanor				
Drug, non Prop-47	14.5%	13.6%	13.4%	13.2%
Property	2.1%	2.9%	2.0%	2.8%
Violent	4.5%	4.5%	4.4%	4.3%
Weapons	1.9%	2.1%	1.9%	1.9%
Sex	0.2%	0.2%	0.2%	0.2%
Other	20.9%	20.4%	20.3%	20.1%
Probation or parole violation	8.7%	8.1%	8.2%	8.3%
Prior arrests				
Prior arrests, Median (IQR)	8.0 (2.0, 18.0)	9.0 (3.0, 19.0)	8.0 (2.0, 18.0)	8.0 (2.0, 18.0)
Prior Prop-47 arrest				
0	65.8%	63.5%	65.2%	66.6%
1	8.5%	8.1%	8.2%	8.3%
2+	25.7%	28.4%	26.6%	25.1%

	Non-Prop-47 Felony Drug (Sale/Transport) Arrest			
	Total Sample		Propensity Score Matched	
	Pre (N=63,402)	Post (N=60,197)	Pre (N=55,528)	Post (N=55,528)
Prior Convictions				
No convictions	17.6%	16.9%	17.5%	17.9%
Misdemeanors only	22.3%	21.8%	22.1%	22.4%
1 prior felony	27.2%	28.1%	27.7%	27.5%
2+ prior felonies	32.9%	33.2%	32.7%	32.3%
Prior felony convictions				
Drug, non Prop-47	37.1%	38.4%	37.5%	38.1%
Property	23.7%	24.7%	23.9%	23.3%
Violent	11.0%	11.7%	11.3%	10.9%
Weapons	8.4%	9.1%	8.7%	8.3%
Sex	1.0%	0.9%	0.9%	0.9%
Other	11.7%	12.4%	11.8%	11.4%
Prior Sentences				
Prison	18.6%	19.0%	18.7%	18.3%
Jail	57.0%	58.4%	57.3%	56.4%

Table 3.3. Conviction outcomes in propensity score matched samples for Prop 47 drug arrests

	Prop 47 Drug Arrest		
Conviction	**% Pre (N=132,457)**	**% Post (N=132,457)**	**Difference (95% CI)**
Any conviction	39.1	35.6	-3.5 (-5.3, -1.7)
Prop 47 drug (felony or misdemeanor)	24.5	19.3	-5.2 (-7.1, -3.4)
Felony	21.2	6.9	-14.2 (-16.5, -11.9)
Non-Prop 47 drug	0.6	0.5	-0.1 (-0.2, 0)
Prop 47 drug	15.9	0.8	-15.1 (-17.8, -12.5)
Prop 47 is sole felony drug	15.9	0.8	-15.1 (-17.8, -12.5)

Model: County-specific random intercepts for pre and post policy, unstructured covariance.

Table 3.4. Conviction outcomes in propensity score matched samples for non-Prop 47 felony drug (sale/transport) arrests

	Non-Prop 47 Felony Drug (Sale/Transport) Arrest		
Conviction	**% Pre (N=55,528)**	**% Post (N=55,528)**	**Difference (95% CI)**
Any conviction	43.0	40.6	-2.4 (-4.0, -0.7)
Prop 47 drug (felony or misdemeanor)	10.7	7.5	-3.3 (-4.2, -2.4)
Felony	34.0	26.9	-7.1 (-8.7, -5.4)
Non-Prop 47 drug	22.2	21.5	-0.7 (-2.2, 0.7)
Prop 47 drug	8.1	0.4	-8.1 (-9.3, -6.9)
Prop 47 is sole felony drug	7.5	2.7	-7.3 (-8.5, -6.1)

Table 3.5. Conviction types in propensity score matched samples

	Prop-47 Drug Arrest		Non-Prop-47 Felony Drug (Sale/Transport) Arrest	
Conviction	**Pre (N=132,457)**	**Post (N=132,457)**	**Pre (N=55,528)**	**Post (N=55,528)**
Any conviction	38.9%	35.7%	42.9%	40.3%
Prop-47 drug (felony or misdemeanor)	25.2%	18.9%	9.9%	6.7%
Felony	22.6%	5.7%	35.9%	28.6%
Drug	18.6%	1.2%	32.2%	24.3%
Non-Prop-47	0.4%	0.3%	25.0%	23.9%
Prop-47	17.5%	0.6%	7.8%	0.4%
Prop-47 is sole felony drug	17.5%	0.6%	7.0%	0.3%
Property	2.5%	2.1%	1.7%	1.4%
Violent	0.5%	0.6%	0.8%	0.7%
Weapons	0.6%	0.6%	2.0%	2.0%
Sex	<1%	0.1%	<1%	0.1%
Other	1.2%	0.9%	1.9%	1.8%
Misdemeanor				
Drug	12.8%	21.5%	4.7%	8.4%
Non-Prop-47	5.5%	5.7%	2.6%	2.5%
Prop-47	7.9%	18.4%	2.2%	6.3%
Property	1.6%	2.3%	0.7%	0.8%
Violent	1.7%	1.8%	1.4%	1.2%
Weapons	0.4%	0.6%	0.5%	0.5%
Sex	0.1%	0.1%	0.1%	<1%
Other	35.2%	37.1%	25.9%	27.0%
Sentences				
Jail	26.9%	27.4%	30.3%	29.7%
Jail for Prop-47 offense	12.3%	12.5%	6.0%	4.8%
Prison	3.2%	1.7%	7.4%	6.4%
Prison for Prop-47 offense	1.6%	0.1%	0.8%	<0.1%

Table 3.6. Multilevel and fixed effects models for probability of felony conviction pre- and post-Prop-47. Multilevel models include arrests clustered by county and allowing for county level variation in effects of policy.

	Prop-47 Drug Arrest (N=264,914)		Non-Prop-47 Felony Drug (Sale/Transport) Arrest (N=111,056)	
	Mixed model	**Fixed effects model***	**Mixed model**	**Fixed effects model**
Felony conviction	Probability (95% CI)	Probability (95% CI)	Probability (95% CI)	Probability (95% CI)
Pre-Prop-47	0.21 (0.19, 0.24)	0.23 (0.22, 0.23)	0.34 (0.31, 0.37)	0.36 (0.36, 0.36)
Post-Prop-47	0.07 (0.06, 0.08)	0.06 (0.06, 0.06)	0.27 (0.25, 0.29)	0.29 (0.28, 0.29)
Pre-Post Change	-0.14 (-0.16, -0.12)	-0.17 (-0.17, -0.17)	-0.07 (-0.09, -0.05)	-0.07 (-0.08, -0.07)
Variance Components	Variance in log odds (95% CI)		Variance in log odds (95% CI)	
Model 1				
Covariance of policy effect and pre-policy intercept	-0.19 (-0.33, -0.05)	-	-0.02 (-0,06, 0.02)	-
Model 2				
Pre-policy intercept	0.39 (0.24, 0.63)	-	0.28 (0.19, 0.43)	-
Post-policy intercept	0.22 (0.14, 0.37)	-	0.29 (0.19, 0.44)	-

Model 1: County-specific random intercepts for pre-policy and policy effect, unstructured covariance.
Model 2: County-specific random intercepts for pre- and post-policy, unstructured covariance. LR test comparing exchangeable covariance as nested model p=0.02 for Prop-47 arrests and p=0.90 for non-Prop-47 felony drug (sale/transport) arrests.
*Fixed effects model excludes Mono County, which could not be estimated. N=264,846.

Table 3.7. Sensitivity analysis* of multilevel and fixed effects models for probability of felony conviction pre- and post-Prop-47. Multilevel models include arrests clustered by county and allowing for county level variation in effects of policy.

	Prop-47 offense (N=264,914)		Non-Prop-47 Felony Drug (Sale/Transport) Arrest (N=111,056)	
	Mixed model	**Fixed effects model****	**Mixed model**	**Fixed effects model**
Felony conviction	Probability (95% CI)	Probability (95% CI)	Probability (95% CI)	Probability (95% CI)
Pre-Prop-47	0.52 (0.48, 0.56)	0.54 (0.54, 0.54)	0.66 (0.62, 0.69)	0.68 (0.68, 0.68)
Post-Prop-47	0.12 (0.11, 0.13)	0.11 (0.10, 0.11)	0.61 (0.58, 0.65)	0.64 (0.64, 0.64)
Pre-Post Change	-0.39 (-0.43, -0.35)	-0.44 (-0.44, -0.43)	-0.04 (-0.06, -0.03)	-0.04 (-0.05, -0.04)
Variance Components	Variance in log odds (95% CI)		Variance in log odds (95% CI)	
Model 1				
Covariance of policy effect and pre-policy intercept	-0.33 (-0.52, -0.15)	-	-0.02 (-0,06, 0.02)	-
Model 2				
Pre-policy intercept	0.42 (0.27, 0.65)	-	0.32 (0.22, 0.47)	-
Post-policy intercept	0.12 (0.08, 0.18)	-	0.31 (0.21, 0.45)	-

Model 1: County-specific random intercepts for pre policy and policy effect, unstructured covariance.
Model 2: County-specific random intercepts for pre and post policy, unstructured covariance. LR test comparing exchangeable covariance as nested model p<.001 for Prop-47 arrests and p=0.85 for non-Prop-47 felony drug (sale/transport) arrests.
*Sensitivity analysis assumes all cases with missing dispositions received a felony conviction, with the exception of Prop-47 drug arrests during the post period. For these arrests, we assume only missing disposition cases with a concurrent felony arrest received a felony conviction, since Prop-47 offenses were misdemeanors at that time.
**Fixed effects model excludes Mono County, which could not be estimated. N=264,846.

Table 4.1. Characteristics of hospital visits in California with a SUD-related primary diagnosis, October 5, 2011 - September 4, 2015 (N=285,575)

Visit Characteristics	N	Percent
Hospital admission (vs. outpatient)	98,563	32.6
Drug type (not mutually exclusive)		
Opioids	115,857	40.6
Amphetamines	82,237	28.8
Cannabis	39,957	14.0
Sedatives	17,260	6.0
Cocaine	16,806	5.9
Hallucinogens	9,320	3.3
Patient Characteristics	**N**	**Median monthly rate per 100,000**
Gender and age		
Female		
15-24	27,044	21.3
25-44	45,972	17.8
45-64	33,717	14.8
Male		
15-24	51,394	38.0
25-44	82,769	30.8
45-64	44,679	20.1
Race/ethnicity (among males 15-24)		
White	25,829	62.8
Black	4,074	46.7
Hispanic	16,936	26.7
Asian/Pacific Islander	1,218	7.0

Table 4.2. Median difference in observed vs. expected county drug arrest and SUD-related hospital visit rates in the 10 months post-Prop 47

Gender and age	County change in drug arrests per 100,000 Median (IQR)	County change in drug-related hospital visits per 100,000 Median (IQR)
Female		
15-24	-97 (-183, -60)	14 (-19, 32)
25-44	-119 (-246, -48)	1 (-17, 19)
45-64	-63 (-88, -27)	4 (-12, 19)
Male		
15-24	-327 (-463, -221)	26 (4, 50)
25-44	-270 (-511, -173)	1 (-26, 39)
45-64	-133 (-233, -40)	0 (-18, 14)

Table 4.3. Association between county change in arrests and county change in SUD-related hospital visits in the 10 months post-Prop 47

Decline of 100 per 100,000 in county drug arrests	Rate difference in county SUD-related hospital visits per 100,000 (95% CI)	P-value
Males		
15-24	-6 (-13, 2)	0.148
25-44	0 (-4, 5)	0.914
45-64	1 (-6, 9)	0.737
Females		
15-24	-8 (-20, 5)	0.241
25-44	-6 (-12, 1)	0.075
45-64	11 (-9, 30)	0.267

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