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THE PREVALENCE OF CANNABIS-INVOLVED DRIVING IN CALIFORNIA

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Abstract

Background—Various national surveys suggest that cannabis use is rising nationally, and many States have passed legislation that has potential to increase usage even further. This presents a problem for public roadways, as research suggests that cannabis impairs driving ability.

Methods—Anonymous oral fluid samples and breath tests were obtained from more than 900 weekend nighttime drivers randomly sampled from six jurisdictions in California. Oral fluid samples were assayed for the presence of Schedule I drugs. Drivers also completed information on self-reported drug use and possession of a medical cannabis permit. Data from the 2007 National Roadside Survey (collected using comparable methods) were used as a comparison.

Results—Using the 2010 data, a total of 14.4% of weekend nighttime drivers tested positive for illegal drugs, with 8.5% testing positive for delta-9-tetrahydrocannabinol (THC). THC-positive rates varied considerably among jurisdictions, from a low of 4.3% in Fresno to a high of 18.3% in Eureka. A comparison with the 2007 NRS data found an increase in THC-positive drivers in 2010, but no increase in illegal drugs other than cannabis. Drivers who reported having a medical cannabis permit were significantly more likely to test positive for THC.

Conclusions—Cannabis-involved driving has increased in California since 2007. Nearly 1-in-10 weekend, nighttime drivers tested positive for THC, and in some jurisdictions, the rate was nearly 1-in-5. The possible contribution of cannabis legislation, such as decriminalization and medical cannabis usage, is discussed.

Keywords

Cannabis; drugged driving; impaired driving; medical cannabis; legislation

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CONFLICT OF INTEREST

All authors declare that they have no conflict of interest.

CONTRIBUTORS

All authors contributed to, and have approved, the final manuscript.

ETHICAL APPROVAL

The California survey was anonymous. Informed consent was obtained from all subjects. This study was approved by the Pacific Institute for Research and Evaluation's Institutional Review Board.

1. INTRODUCTION

The use of illicit drugs, particularly cannabis, is on the rise, with higher prevalence rates reported in 2009 than in any year since 2000 (e.g., Substance Abuse and Mental Health Services Administration [SAMHSA], 2010). This prevalence extends to drivers. Cannabis is the most common illicit substance consumed by motorists who report driving after drug use (SAMHSA, 2007), and the drivers in 18% of fatal crashes tested positive for drugs (National Highway Traffic Safety Administration, 2010). The 2007 National Roadside Survey (NRS; Lacey et al., 2009) (which collected and analyzed oral fluid from drivers) reported that 7.7% nighttime weekend drivers tested positive for cannabis.

The combination of cannabis use and vehicle operation is an understudied risk for drivers, as growing literature suggests that cannabis use significantly impairs safe vehicle operation. Delta-9-terahydrocannabinol (THC), the active ingredient in cannabis, has been shown to affect areas of the brain that control the body's movement, balance, coordination, sensations, and judgment (National Institute on Drug Abuse, 2010). Multiple studies suggest that the presence of THC in the blood is associated with an increased risk for crash compared to drug-free controls (e.g., Drummer, 1994; Drummer et al., 2003, 2004; Drummer et al., 2004; Huestis, 2002; Grotenhermen et al., 2005; Mura et al., 2003; Ramaekers et al., 2004; Smiley, 1986, 1999).

The risks associated with drugged driving have the potential to expand considerably, as U.S. state governments introduce policies that increase the public's access to cannabis. One example is the passage of medical cannabis laws, currently enacted in 15 states plus the District of Columbia, whereby individuals can obtain a permit from a licensed physician that will allow them to purchase cannabis to alleviate pain and other symptoms. Other legislative efforts may affect a wider audience. For example, legislation that decriminalizes possession of small amounts may increase the use of cannabis by the public, especially current users, by undermining legal deterrence, and legalization might bring new users to the drug.

The increased availability of cannabis may inadvertently increase its prevalence among drivers and, thus, elevate the potential risk of vehicle crash. Several studies show that cannabis users do not perceive cannabis use as being associated with increased driving risk, even among those who believe that alcohol elevates crash risk (e.g., Danton et al., 2003; McCarthy et al., 2007; Terry and Wright, 2004). Lacking public perception that cannabis increases risk of crash, increases in cannabis use by the public should correspond with increases in cannabis use while driving.

In an effort to measure the effect of large-scale policy change on drugged driving and in anticipation of California legalizing cannabis, in the summer of 2010, we began conducting roadside surveys at several locations in California to obtain objective data on drivers' drug use. Primarily, this research was to produce estimates of cannabis use (THC) among drivers to establish a baseline in case legislation that would legalize cannabis was passed. Secondarily, we wanted to collect information on medical cannabis permits to determine if possession of such a permit was related to cannabis-involved driving.

The proposition to legalize cannabis in California (Proposition 19) was defeated by a narrow vote (53.8% to 46.2%), although the proposition likely will reappear on the ballot in 2012. Nevertheless, the data collected allowed us to answer some questions regarding drugged driving. Specifically, the objectives of this study were to determine the prevalence of illicit drug use, specifically cannabis, by drivers in California and to compare the rate measured in 2010 with that measured in 2007 as part of the NRS (Lacey, et al., 2009). Additionally, this study began to investigate the potential effect of having a medical cannabis permit and to document the perceived risks of using cannabis in relation to permit-holding and non-permit-holding status.

2. METHODOLOGY

2.1. Site Selection

The 2007 NRS drew its survey jurisdictions from the National Automotive Sampling System/General Estimates System (NASS/GES), which used data from hundreds of thousands of vehicle crashes to identify survey locations that would be representative of the continental United States as a whole. Five of these locations were in California (Contra Costa County, Los Angeles County, Orange County [Anaheim], Ventura County, and the City of San Jose). Within each location, four specific 1-mile square areas were selected at random, and within each area, a specific survey site was chosen. The roadside surveys were stratified by day (Friday and Saturday) and time of night (10 PM – midnight and 1 to 3 AM), with each of the four survey sites assigned to one of the strata (see Lacey et al., 2009, for details).

For this study, we attempted to replicate the 2007 NRS using the same locations. Surveys were conducted in Anaheim (Orange County), Torrance (Los Angeles County), San Rafael (at the border with Contra Costa County), and Bakersfield (near Ventura County). We were unable to recruit cooperating police agencies within San Jose, so Fresno was selected as a replacement. Finally, for geographic balance, we added the city of Eureka, located in northern California. Police participation in the research was obtained at each site. As with the 2007 NRS, data collection at each survey was stratified by day and time of night. Both 2007 and 2010 surveys were collected over multiple weekends in the fall of each respective year.

2.2. Data-Collection Procedures

The procedures for this survey were similar to the 2007 NRS (see Lacey et al., 2009). Survey sites were located in lit parking areas alongside roadways with ample space for vehicles to enter and depart. Survey sites were organized in three to four research bays. A police officer (or officers) was positioned on the roadway outside the interview area to manage traffic and vehicle recruitment, and to help ensure safety. Orange traffic signs that read “Voluntary Survey Ahead” were situated by the roadside several blocks upstream of the survey site to alert drivers to the data-collection activity.

During each survey, after all data collectors were prepared, the police officer would attract the attention of a driver in an oncoming vehicle and wave that vehicle into the survey site. To minimize selection bias, the officer waved the third approaching vehicle into the site until all survey bays were filled. The next approaching vehicle was waved into survey bays as they became vacant. There were no consequences for drivers who ignored the police officer or failed to pull into the survey area as directed. All vehicles that passed the survey sites during data collection were recorded, as were incidences of site evasions and refusals.

As a vehicle pulled into a research bay, the driver was immediately approached by a research assistant, who said, “You have done nothing wrong,” and informed the driver that he or she was selected at random to take part in a survey. All potential participants were informed that the survey was voluntary and anonymous, and that they would earn $20 for taking part.

2.2.1. Roadside Survey Interview—Data collection on consenting drivers involved five primary parts: (a) an oral interview concerning general driving practices, demographics, and drinking history (frequency and quantity); (b) a breath test using a calibrated Intoxilyzer 400™ preliminary breath-test unit (PBT); (c) a pencil-and-paper survey on drug use, as well as on possession of a medical cannabis permit, perceptions of driving risk, and attitudes towards legalizing cannabis; (d) a pencil-and-paper survey on alcohol and drug problems based on the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS) (Grant et al., 1995); and (e) an anonymous oral fluid sample using the Quantisal™ (Immunalysis Corporation, Pomona, California) data-collection kit. However, with the exception of estimating the prevalence of THC combined with alcohol among drivers, this paper does not report on results pertaining to alcohol use.

2.2.2. Drug Analysis and Screening—Oral fluid samples were sent to Immunalysis Corporation for processing. All samples were initially screened using enzyme-linked immunosorbent assay (ELISA) microplate technology. For positive screening results, confirmation was performed using gas chromatography-mass spectrometry (GC/MS) or liquid chromatography-mass spectrometry (LC/MS/MS) technology. All the analytical procedures used to test for the drugs were fully validated according to established protocols. Negative, low-level, and high-level controls were run for each batch, along with calibration standards. The same testing methodologies for assaying oral fluid were used for both the 2007 NRS and the 2010 study.

The drugs tested by bioassay included cannabinoids and the four additional drugs of abuse (listed in Table 1). The method for assaying oral fluid for THC has a limitation of quantification of 1 ng/ml, linearity of 0.5 to 32 ng/mL, intraday precision of 7.1% at 3 ng/mL and 2.9% at 12 ng/mL, and interday precision of 4.9% at 3 ng/mL and 1.6% at 12 ng/mL (6 replications over 5 days).

2.2.3. Key Measures—Key measures used in the analyses were driver demographics (sex, age, race, ethnicity, and education); breath (alcohol) and oral fluid (illicit drugs) test results; self-reported historic drug use; and self-reported possession of a medical cannabis permit. There were two key drug variables: (1) the presence or absence of THC (the active drug only and not metabolites, e.g., THC-TOOC) and (2) the presence or absence of *other* Schedule I illegal drugs (see Table 1) while testing negative for THC.

3. RESULTS

3.1. Driver Participation

A total of 8,585 vehicles were counted driving past the survey sites during data collection. Research staff attempted to recruit 1,784 drivers, although 282 were not qualified for participation (e.g., driving a motorcycle, being aged 15 or younger). Of the remaining 1,502 eligible persons, 297 drivers refused before pulling into a bay. Of the 1,205 drivers who were contacted by data collectors, 1,024 (85.0%) participated in some portion of the survey, and a lower percentage provided an oral fluid sample (74.1%).

Data collectors recorded observable information (estimated age category, gender, race, and ethnicity) of drivers who pulled into the research bays but declined participation. Analyses tested whether refusers differed significantly from participants on these demographic variables. We used generalized linear mixed modeling to predict participation status from observed sex, age, race, and ethnicity, with survey site included as a random variable, and day and time of night included as fixed effects. Participation rate varied significantly as a function of the estimated age and time (p-values < .01). Drivers perceived to be between ages 16 and 20 had the highest overall participation rates (96.2%), followed by drivers thought to be between ages 21 and 34 (90.7%), and last, by drivers thought to be aged 35 or older (83.4%). Participant rates did not vary significantly between Friday and Saturday, but they did differ by time of night ($p < .01$), with higher participant rates during the 10 PM to midnight time block (94.1%) than during the 1 to 3 AM time block (87.8%).

Some analyses described herein also used data from the 2007 NRS sites in California as a comparison. Those 2007 data were collected using basically the same sampling and survey methodology (see Lacey et al., 2009) as the current 2010 study. The data included 683 cases and 454 valid oral fluid samples.

3.2 Participant Demographics

Our sample was predominately male (63.2%) with a median age of 29 (16.5% were aged 20 and younger). The majority of participants were White (60.5%), followed by participants who indicated that their race was Other (13.9%). Asian, Black, multiracial, Pacific Islander, and Native American participants comprised 9.6%, 6.4%, 4.5%, 3.7%, and 1.5% of the remaining sample, respectively. Almost one-third (31.8%) identified themselves as having Hispanic ethnicity.

3.3 Prevalence of Illegal Drugs

First, we examined data from the six jurisdictions (Anaheim, Bakersfield, Eureka, Fresno, San Rafael, and Torrance) where we collected the 2010 data. Generalized linear mixed modeling was used to produce model-estimated prevalence rates for any illegal drug, THC specifically, and for any illegal drug excluding THC (and excluding multidrug results that included THC). For each analysis, day and time were included as fixed sampling effects, and jurisdiction was modeled as a random variable. In addition, we included five driver demographic variables: sex, age, race/ethnicity, educational level, and employment status as covariates. For parsimony, only demographic variables that were statistically significant were retained in the model. The results are presented in Table 2 and described in the following paragraphs.

3.3.1. Any Illegal Drugs—A total of 111 drivers in the sample tested positive for one or more of the illegal drugs listed on Schedule I (see Table 1), equaling a model estimated 14.4% (± 5.0) of weekend nighttime drivers. Positive test results did not vary significantly by day of week (Friday versus Saturday) or time block (early versus late). Neither did illegal drug use vary as a function of the driver’s age, race/ethnicity, or education level. Only the driver’s occupational status, $F(2, 804) = 9.5$, $p < .01$ significantly predicted positive drug-use results. Drivers who were employed or who were students each had lower illegal drug prevalence rates (9.2% and 13.3%, respectively) than did drivers who were unemployed (23.4%, $p < .01$). The difference in prevalence between students and unemployed participants was not statistically significant.

3.3.2. THC and THC Combined with Alcohol—Eighty-two drivers tested positive for THC. Neither day nor time significantly predicted positive THC results, nor was any demographic variable significantly related to THC prevalence. Overall, a model estimated 8.5% (± 4.2) tested positive for THC. There were very few cases (n = 13) where drivers tested positive both for THC and for alcohol (equivalent to 1.3% (± 0.9)).

3.3.3. Illegal Drugs, sans THC—Twenty-nine drivers tested positive for Schedule I illegal drugs but not THC, including 21 drivers testing positive for club stimulants alone (e.g., amphetamines, methamphetamines, or ecstasy), 5 drivers testing positive for cocaine alone, 1 driver driving testing positive for heroin alone, and 2 drivers testing positive for more than one class of illegal drug. The overall prevalence rate was a 2.4% (± 2.3). Illegal drug use did not vary significantly by day, but it did by time block, $F(1, 804) = 4.6$, $p < .05$, with higher rates observed during the early block (4.0%) relative to the later block (1.5%).

Among demographic variables, only driver occupation predicted positive test results, $F(2, 804) = 11.0$, $p < .01$. Prevalence rates for employed persons and students were significantly lower (1.2% and 1.5%, respectively) than for unemployed persons (7.8%) ($p < .01$).

3.4. Prevalence of THC by Jurisdiction

In Table 3, we present prevalence rates of THC among drivers for each jurisdiction. The analyses treated jurisdiction as a fixed, rather than random effect, and estimated THC rates for each. These analyses controlled for day and time block (no other demographic variable was statistically significant in this fixed effects model). The analyses revealed essentially two discrete categories of THC positive results, with roughly 4 to 6% of drivers from Anaheim, Bakersfield, Fresno, and Torrance testing positive for THC, and rates 3 to 4 times greater in Eureka and San Rafael.

3.5. Prevalence of THC over Time

Four of the jurisdictions used in the 2010 survey were drawn from the same jurisdictions as were used in the 2007 NRS (Anaheim/Orange County, Bakersfield/Ventura County, San Rafael/Contra Costa County, and Torrance/Los Angeles County). Data from Fresno and Eureka (for which there was not a comparable match in 2007) were excluded from these analyses. The datasets were combined, and THC prevalence rates were computed separately for each year. Although the 2007 NRS collected blood in addition to oral-fluid samples, for this study, our analysis included only drug results based on oral fluid. All data were unweighted.

Day and time block were included as fixed effect variables, and for the overall estimate, jurisdiction was included as a random variable. This analysis also included driver age and occupation, the only two demographic variables to significantly predict THC results in this model. Assuming a one-tailed test (predicting an increase in THC-positive drivers), the analyses revealed significantly higher THC rates in 2010 than in 2007, $F(1, 963) = 3.01$, $p < .05$. However, there was no comparable change for other illegal drugs (excluding THC) ($p = .98$). Analyses by individual jurisdiction reveal higher rates in 2010 than 2007 for each jurisdiction. Table 4 shows these results. Importantly, the participation rates in the 2007 NRS were equal to or higher than they were for the 2010 survey; thus, it is unlikely the higher THC prevalence rates in 2010 are due to a greater willingness for drug-involved drivers to take part in the research.

3.6. Medical Cannabis

Only a fraction of participants reported owning a medical cannabis permit (N = 36); however, permit holders were significantly more likely (38.9%) than nonpermit holders (7.5%) to test positive for THC, $F(1, 848) = 25.6$, $p < .01$. This analysis controlled for stratification variables and for driver age and race, and included jurisdiction as a random variable. Even when the data were limited to drivers who reported using cannabis within the past month, the permit holders still had significantly higher THC prevalence rates than did nonpermit holders (61.1% versus 26.2%), $F(1, 102) = 8.2$, $p < .01$.

3.7. Cannabis Use and Perceived Driving Risk

Our roadside survey data corroborated the findings of earlier studies that people do not associate cannabis use with an increase in driving risk. As part of the survey, participants were asked whether *that day* they had taken any medications or drugs that might affect their driving. Of the 82 participants who tested positive for THC, only 2 (2.5%) reported using THC. Unclear is how much these results were affected by the drivers underreporting their cannabis use or by their perceptions that cannabis does not impair their driving. However, when we limit the analysis to drivers who both reported using cannabis in the past 24 hours and tested positive for THC, only 1 of 33 (3.0%) indicated having taken a drug that impaired their driving. Of drivers who indicated using cannabis in the past 2 hours, only 1 in 21 (4.8%) indicated that they had consumed a substance that impaired their driving skills.

4. DISCUSSION

Our survey produced four key findings. First, we found that more than 14% of the participating weekend nighttime drivers on California's roads were using an illegal drug, and nearly 9% tested positive for the active ingredient in cannabis. Second, we found substantial variation among jurisdictions in terms of THC prevalence. The percentage of drivers using cannabis increased from 4.9% to 7.8% between the 2007 and 2010 surveys. Our third finding was drivers with medical cannabis permits were considerably more likely than were nonpermit holders to test positive for THC – even among recent users. Fourth, drivers who tested positive for THC did not think they had taken anything that affected their driving. The prevalence of cannabis mixed with alcohol was very low.

In considering the results of this study, keep in mind the limitations of the exploratory nature of our research. Our data are based on surveys at only six locations in the state and are limited to weekend nights between 10 PM and 3 AM. Approximately 15% of the drivers we approached refused to participate in our survey, and 25% refused to provide an oral fluid sample. Hypothetically, if current drug users are less likely to volunteer for the study, then our results likely underestimate the scope of the problem. Finally, although we used highly sensitive drug analysis procedures, our biological samples were based on saliva, not blood, which generally is accepted as providing the most precise results (e.g., Grotenhermen et al., 2005). Importantly, however, we used the same methods of assaying oral fluid throughout all phases of the study.

Nevertheless, the results of our research suggest that the current prevalence of cannabis use by Californian drivers is not substantially higher than the national level of 7.7% measured by the 2007 NRS. However, it appears that cannabis use is increasing among drivers on California roads. It is not clear from our research what might account for this increase. National self-report surveys suggest recent increases in cannabis use, and analysis of crash fatalities reveals a national increase in THC-positive drivers among fatal crash victims (NHTSA, 2010). The size of these increases, however, falls considerably short of what we observed between 2007 and 2010.

Few drivers who tested positive for THC indicated that they had taken any substance that might impair their driving—even if they admitted in self-reports to recent use of cannabis. This finding dovetails with other studies that suggest cannabis users do not perceive cannabis to be impairing. This has potential implications for growth in drugged driving rates. Lacking perceptions that cannabis use increases driving risk, it is reasonable to expect drugged driving to increase at a rate as fast as or faster than the use of cannabis in general.

4.1. Medical Cannabis and Potential Conflicts

We speculate that policy changes that increase the availability of cannabis or reduce legal deterrence (such as decriminalization) may contribute to the rising prevalence rates of THC-involved driving. Although our research did not allow us to determine conclusively whether medical cannabis programs contributed to elevated THC rates among drivers, it is worth considering the potential conflicts that might arise from the limited legalization or decriminalization of cannabis use across multiple levels of society. Medical cannabis laws provide for individuals with permits to possess and use cannabis for legitimate medical reasons. However, state law may not have provided a practical and legal means of obtaining the drug Additional conflicts may arise as physicians are placed in the position of administering a drug, such as cannabis, to holders of *permits* (as is done in California) rather than via the more formal process of prescriptions.

At the community level, local governments must deal with regulations for controlling the distribution of legalized cannabis (In California, method of distribution is determined locally). Less clear is whether any locality can outlaw the distribution of medical cannabis, given legality at the state level. Further complications in regulation arise when considering that users may travel from localities without outlets to localities with more permissive distribution systems.

In addition to issues arising within states, there is potential for conflict between the states and the federal government. Although federal laws regarding cannabis use have not changed to accommodate state medical cannabis laws, there has not yet been strong action by Federal authorities to pursue individuals whose actions are clearly in conformity with existing state laws.

Finally, there is potentially a growing problem with state laws prohibiting impaired driving. Traditionally, when impaired-driving cases go to court, the prosecution is required to demonstrate that the impairing substance was present in the body of the driver in sufficient quantity to cause impairment (e.g., a BAC ≥ .08 g/dl). The exact quantity of THC required to produce driving impairment is still open to debate. In the 15 states that have passed drug *per se* laws (Lacey et al., 2010), 13 have provisions specifying it is an offense to drive with any measureable amount of a potentially impairing drug. As noted by Grotenhermen et al. (2005), however, such zero-tolerance *per se* laws could result in the conviction of heavy cannabis users who smoked or consumed the drug more than 24 hours earlier. Although most states have not yet enacted such laws, the White House Office of National Drug Control Policy (ONCDP) established the passage by the states of drug per se laws as a priority in its 2010 National Drug Control Strategy plan. Obviously, the passage of such per se laws will increase the conflict between states' medical cannabis laws and their impaired-driving laws.

4.2. Future Considerations

There is a strong need to educate the public that combining cannabis and driving can be hazardous, and to communicate that state laws provide officers with a mechanism for arresting drivers when there is evidence of driving impairment. In addition to increased public awareness of current impaired-driving laws, police officers may need to modify their enforcement efforts to apprehend cannabis-impaired drivers based on medical cannabis legislation. California, with its large driving population and growing tolerance towards cannabis use, appears to offer an unusually good opportunity to study these issues.

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Table 1

Minimum Drug Detection Concentrations

	Minimum Concentration Oral Fluid (ng/ml)[a]		
Drug Class	**Screen**	**Confirm**	**Common Names**
Cocaine *(Cocaine, benzoylecgonine)*	20	8	Cocaine (e.g., crack or coke)
Opiates *(6-AM, codeine, morphine hydrocodone, hydromorphone)*	40	10	Heroin Morphine or Codeine (e.g., Tylenol® with codeine)
Amphetamine/ Methamphetamine *(MDMA, MDA, MDEA, Ephedrine, Pseudoephedrine)*	50	50	Speed, Crank, Crystal Meth, Ecstasy
Cannabinoids *(THC, THC-COOH[THCA])*	4	2	Marijuana (e.g., pot, hash, weed)
Phencyclidine	10	10	PCP (e.g., angel dust)

[a]Nanograms per milliliter

Table 2

Prevalence of Drug-Involved Driving

Drug	Estimate (95% CI)[a]
Any Illegal Drug	14.4% (± 5.0)
THC	8.5% (± 4.2)
THC with Alcohol	1.3% (± 0.9)
Illegal Drugs (without THC)	2.4% (± 2.3)

[a]Confidence Interval

Table 3

Tetrahydrocannabinol (THC) Prevalence Rates by Jurisdiction

Jurisdiction	Estimate (95% CI)[a]
Anaheim	6.0% (± 3.2)
Bakersfield	6.3% (± 4.2)
Eureka	18.3% (± 7.1)
Fresno	4.3% (± 4.1)
San Rafael	15.5% (± 6.2)
Torrance	6.3% (± 4.2)

[a]Confidence Interval

Table 4

Changes in Tetrahydrocannabinol (THC) Prevalence between 2007 and 2010

Jurisdiction	2007	2010[a]
THC	4.9% (± .032)	7.8% (± .039)
Anaheim	*3.7%*	*5.6%*
Bakersfield	*4.3%*	*6.2%*
San Rafael	*8.7%*	*15.4%*
Torrance	*3.7%*	*5.2%*
Illegal Drugs, sans THC	3.3% (± .026)	3.3% (± .023)

[a]2010 estimates for individual sites vary slightly from those displayed in Table 3 because the composition of the random variable (i.e., fewer jurisdictions, but additional data per jurisdiction) changed from the prior analysis.