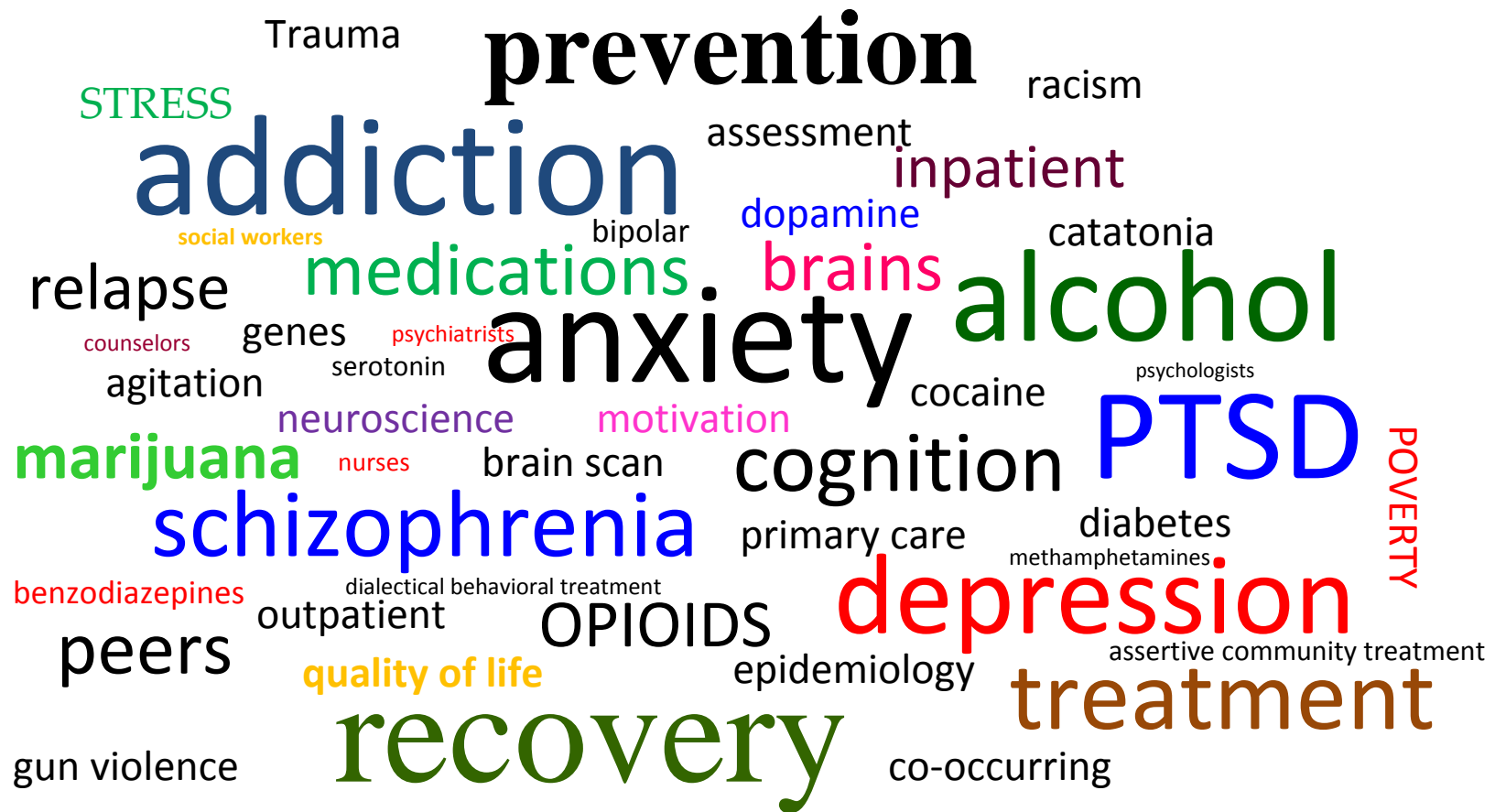


BEYOND MARIJUANA: Social Justice and Health



H. WESTLEY CLARK, MD, JD, MPH
DEAN'S EXECUTIVE PROFESSOR
OF PUBLIC HEALTH
SANTA CLARA UNIVERSITY



Conflict of Interest Statement

I have no conflict of interest to disclose and no financial or other interest associated with the this presentation.

H. Westley Clark, MD, JD, MPH

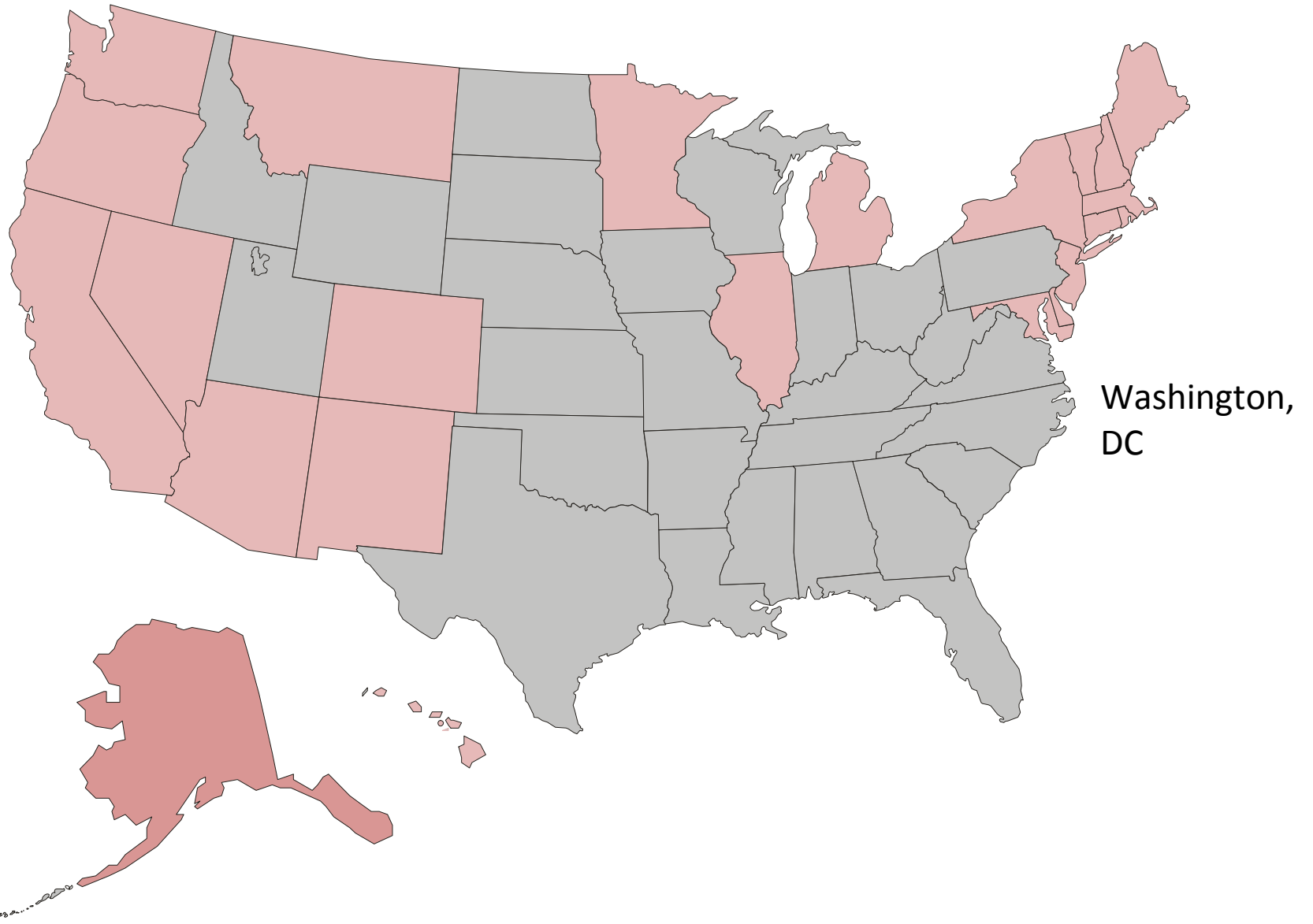


MARIJUANA



Santa Clara
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23 States & DC with Medical Marijuana Laws



Medical Conditions for which some states permit the use of Marijuana

- ALS
- Alzheimer's Disease
- Anorexia
- Anxiety
- Arthritis
- Cachexia
- "Cancer"
- Chemotherapy Side Effects
- Crohn's Disease
- Chronic Pain
- Cirrhosis, decompensated
- Fibromyalgia
- Glaucoma
- Hepatitis C
- HIV/AIDS
- Multiple Sclerosis
- Muscle Spasms, severe
- Muscular Dystrophy
- Nail Patella
- Nausea, severe
- Pancreatitis, severe
- Parkinson's Disease
- PTSD
- Radiation Therapy Side Effects
- Seizure Disorders, including epilepsy
- Spinal Cord Injury
- Traumatic Brain Injury
- Vomiting, Moderate to Severe
- Migraine Headaches



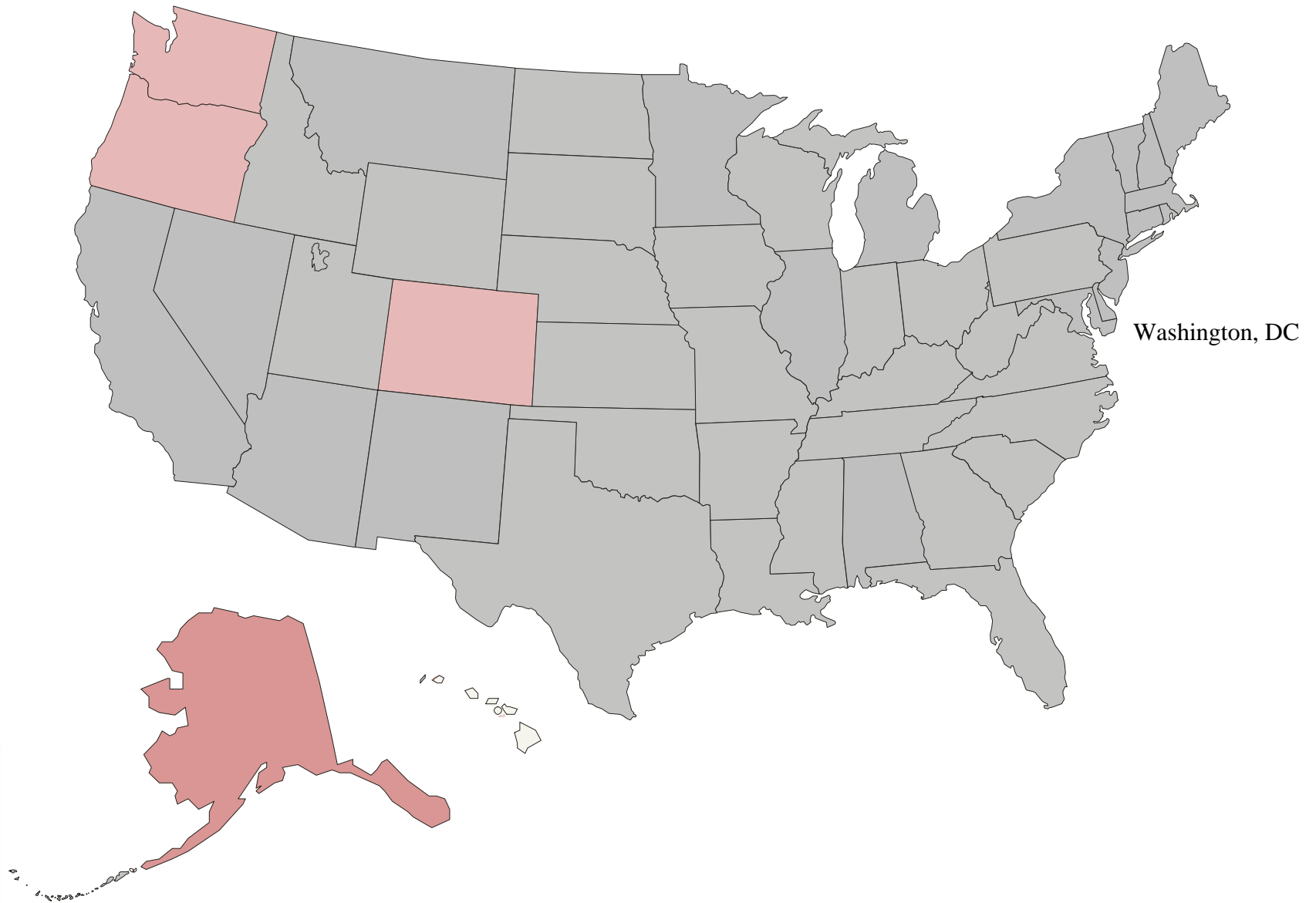
How many Marijuana dispensaries are there in California?

- The California State Board of Equalization report that 1,623 dispensaries had accounts to file taxes in filing year 2014.
- These dispensaries reported \$570 million in taxable income
 - This income generated \$49.5 million in taxes



<https://www.boe.ca.gov/news/marijuana.htm>

4 States & DC Permitting “Recreational” Marijuana



States Exploring the Legalization of Marijuana



2016

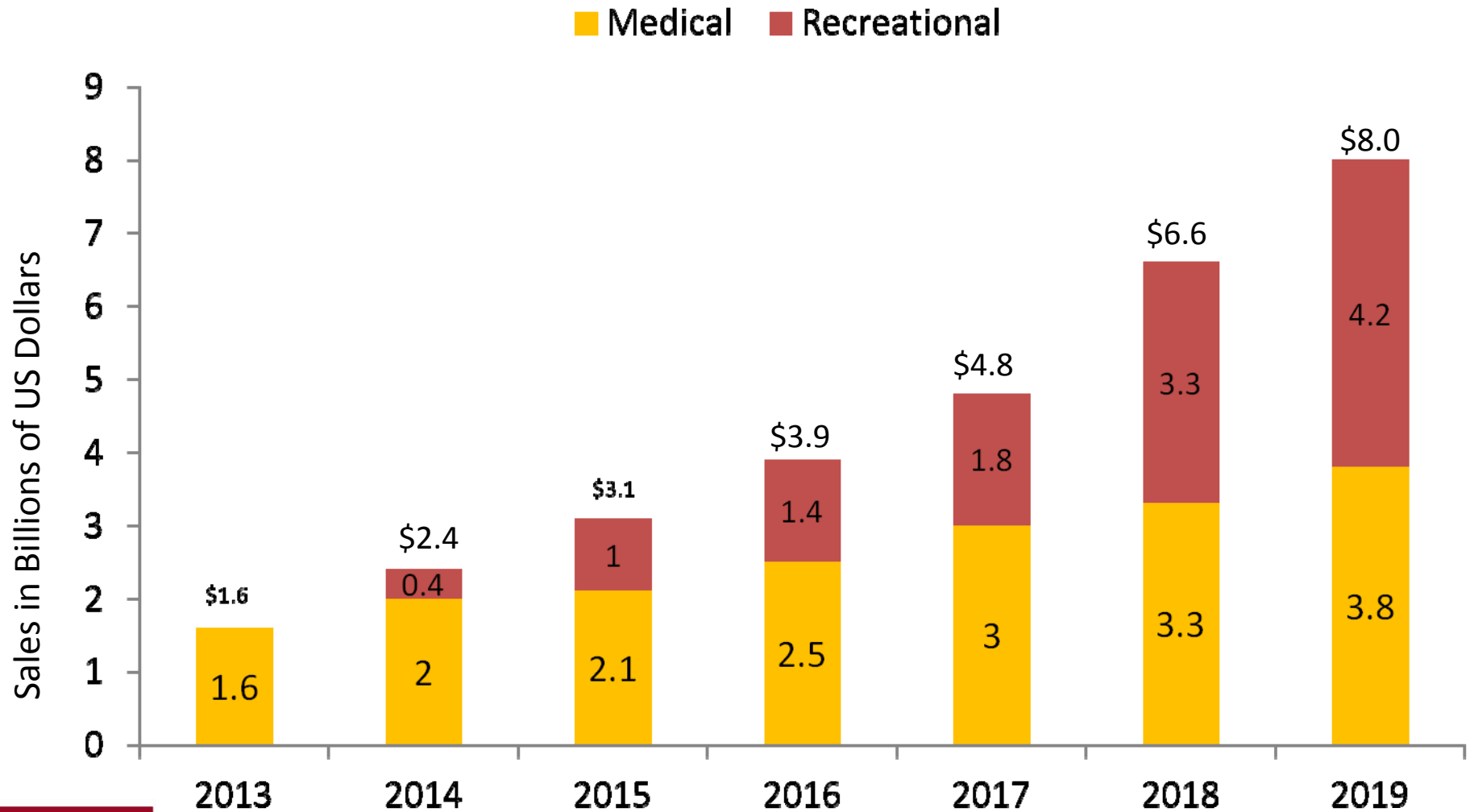
2017

ARE STATES GETTING HOOKED ON DOPE MONEY?



Santa Clara
University

U.S. Marijuana Sales Estimates 2013-2019 in Billions of US Dollars



Money, Money, Money, MONEY!

Cannabis Vs. Other Industries

Industry	Annual Revenue
Beer	\$100 billion
Recreational marijuana*	\$40-\$45 billion
Wine	\$36 billion
Medical marijuana sold by dispensaries**	\$1.9-\$2.1 billion
e-Cigarettes	\$1.5 billion
Recreational marijuana in 2015***	\$800 million - \$1 billion
M&Ms	\$600 million

*Estimate if legalized for general use nationwide

**Estimated medical marijuana sales for 2015

***Estimated recreational marijuana sales in CO and WA State for 2015

Source: *Marijuana Business Daily*, Statista.com

1.5 Marijuana Business Factbook, a division of Anne Holland Ventures Inc.

**Marijuana
Business Daily**

State of Colorado Marijuana Taxes, Licenses, and Fees Transfers and Distribution

	FY2015
Sales Tax Transfer to Marijuana Tax Cash Fund (2.9% Rate)	\$17,930,141
Medical Marijuana	7,146,095
Retail Marijuana	10,784,045
Retail Marijuana Sales Tax (10% Rate)	\$36,906,479
Local Government Distribution (15% of Total)	5,554,118
Marijuana Tax Cash Fund Transfer (85% of Total)	31,473,142
Collections Not Yet Allocated	(120,781)
Retail Marijuana Excise Tax (15% rate)	\$21,390,975
Public School Capital Construction Assistance Fund Transfer	21,368,010
Collections Not Yet Allocated	22,965
Total Marijuana Tax Transfers and Distribution	76,227,595
Total All Marijuana Taxes, Licenses and Fees	\$85,275,371

Washington State Recreational Marijuana Sales 2015

Marijuana Retail Sales	\$327,678,513
Processor Sales	\$147,885,534
Producer Sales	\$15,306,742
Total Sales	\$490,870,789
Excise Tax Collected	\$128,948,915

<http://www.502data.com/>



California's : "Control, Regulate and Tax Adult Use of Marijuana Act" Ballot Initiative for 2016

- Legalizes marijuana and hemp under state law.
- Designates state agencies to license and regulate marijuana industry.
- Imposes state excise tax on retail sales of marijuana equal to 15% of sales price, and state cultivation taxes on marijuana of \$9.25 per ounce of flowers and \$2.75 per ounce of leaves.
- Exempts medical marijuana from some taxation.
- Establishes packaging, labeling, advertising, and marketing standards and restrictions for marijuana products.
- Allows local regulation and taxation of marijuana.
- Prohibits marketing and advertising marijuana to minors.
- Authorizes resentencing and destruction of records for prior marijuana convictions



California's NAACP Endorses: "Control, Regulate and Tax Adult Use of Marijuana Act" Ballot Initiative for 2016



Alice A. Huffman
President
California NAACP

“The current system is counterproductive, financially wasteful and racially biased, and the people of California have repeatedly called for it to be fixed,” Alice Huffman said.

“This measure will ensure that California is not unjustly criminalizing responsible adults while also ensuring that our children are protected while the state receives hundreds of millions of new dollars for vital government and community-based programs.”

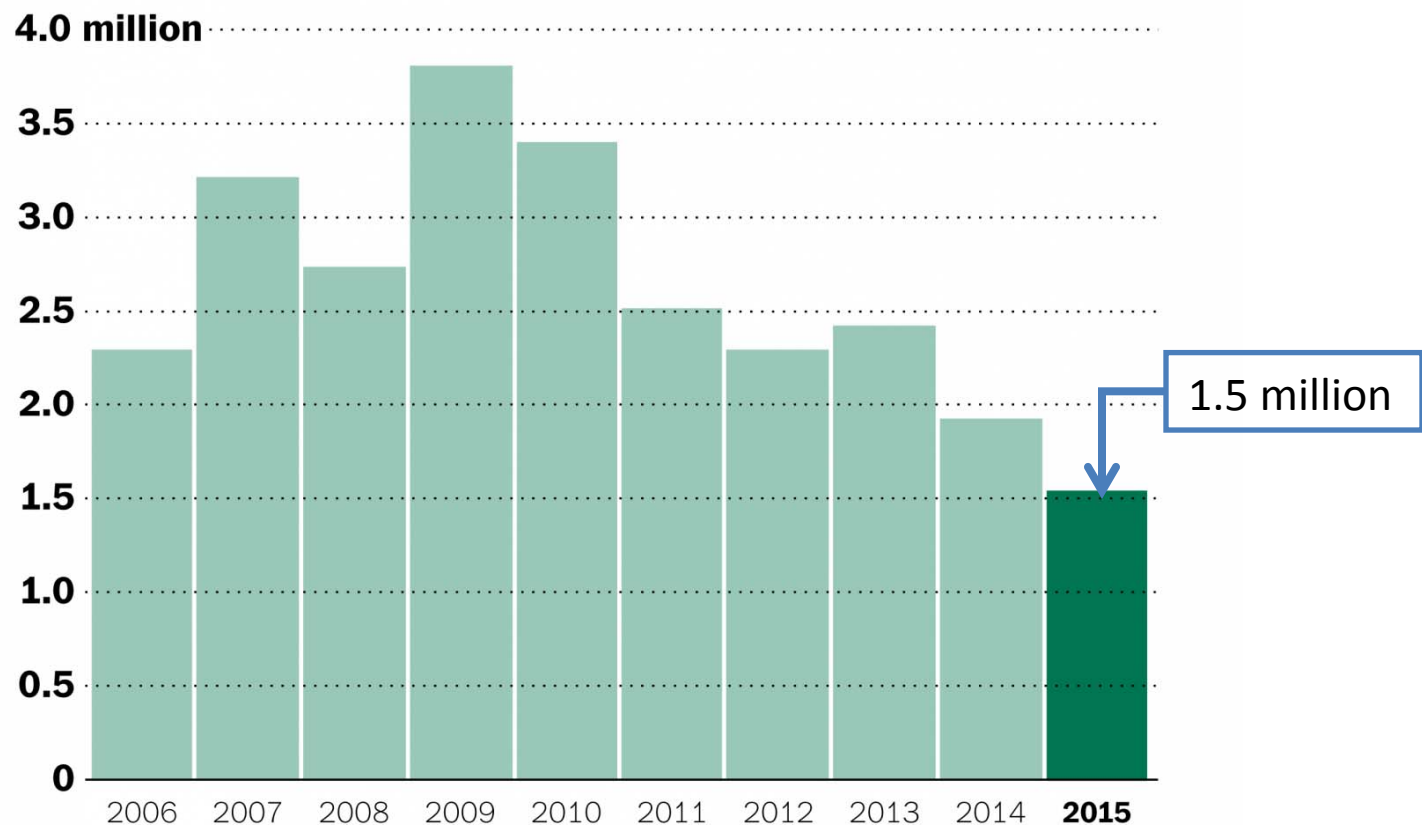
<http://www.sacbee.com/news/politics-government/capitol-alert/article54380595.html#storylink=cpy>



In 2014, California accounted for more than 60 percent of all marijuana plants seized in the United State

Cartel marijuana exports tumble

Marijuana seizures, in pounds, at the southwest border



WAPO.ST/**WONKBLOG**

Source: US Customs and Border Protection

GUN VIOLENCE AND GUN CONTROL: A PUBLIC HEALTH CRISIS



There were 11,208 victims of firearm homicide in 2013. Of these, 5,798 were black men and 644 were black women. Of the total number, 3,430 were white men and 1,064 were white women

Homicide and Race, 2013

57.5%

Of the 11,208 gun homicide victims were black

Black men are **10 TIMES MORE LIKELY**

to be **shot** and **killed** than white men

Black women are more than

3 TIMES MORE LIKELY to be **shot**

and **killed** than white women



http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

Suicide and Race, 2013

93%

Of gun suicide victims are white

White men are **3 TIMES MORE LIKELY**

to be **shoot** and **kill** themselves than black men

White women are more than

4 TIMES MORE LIKELY to **shoot**

and **kill themselves** than black women

Crime in California

Drugs and Arrests in 2014

- In 2014, California data indicate that there were 137,054 people arrested for felony drug offenses.
 - Only 13,300 were for marijuana. This represented 9.7% of the drug felony arrests
- In 2014, there were 92,469 people arrested for misdemeanor drug offenses
 - Only 6,411 were for marijuana. This represented 6.9 % of the drug misdemeanor drug offenses.
- Thus, of the 229,523 drug arrests, marijuana arrests represented 19,711 or 8.6%.

Crime in California

African Americans, Drugs and Arrests in 2014

- In 2014, California data indicate that there were 19,708 African Americans arrested for felony drug offenses.
 - Only 2,460 were for marijuana. This represented 12.5% of the drug felony arrests
- In 2014, there were 9,509 African Americans arrested for misdemeanor drug offenses
 - Only 717 were for marijuana. This represented 7.5% of the drug misdemeanor drug offenses.
- Thus for African Americans of the 29,217 drug arrests, marijuana arrests represented 3,177 or 11%.

Crime in California, California Department of Justice, 2014



Crime in California

Hispanics, Drugs and Arrests in 2014

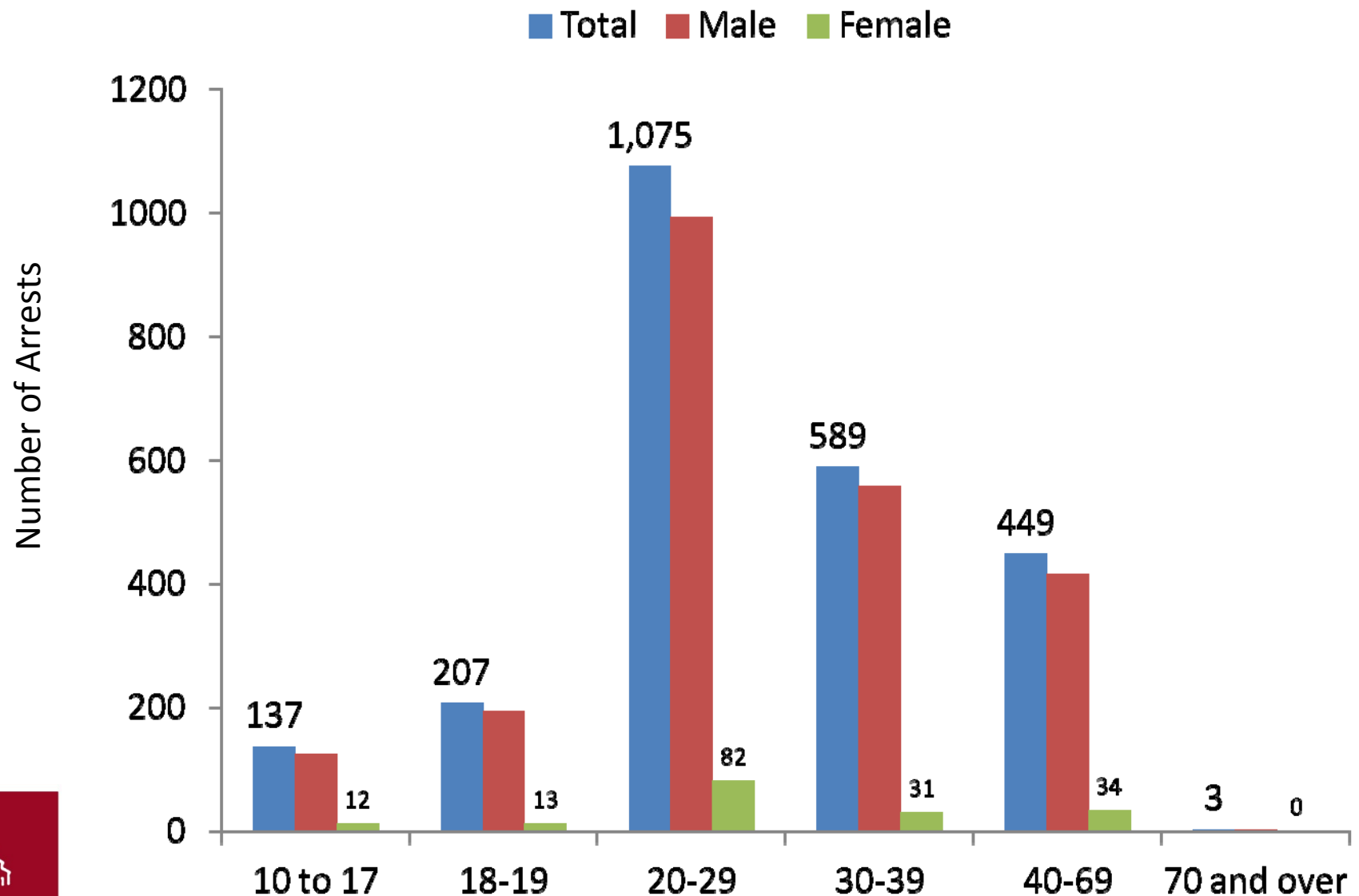
- In 2014, California data indicate that there were 54,157 Hispanics arrested for felony drug offenses.
 - Only 5,247 were for marijuana. This represented 9.69% of the drug felony arrests
- In 2014, there were 36,093 Hispanics arrested for misdemeanor drug offenses
 - Only 3,252 were for marijuana. This represented 9% of the drug misdemeanor drug offenses for Hispanics.
- Thus for Hispanics of the 90,250 drug arrests, marijuana arrests represented 8,499 or 9.4% of the drug arrests.

Crime in California

Whites, Drugs and Arrests in 2014

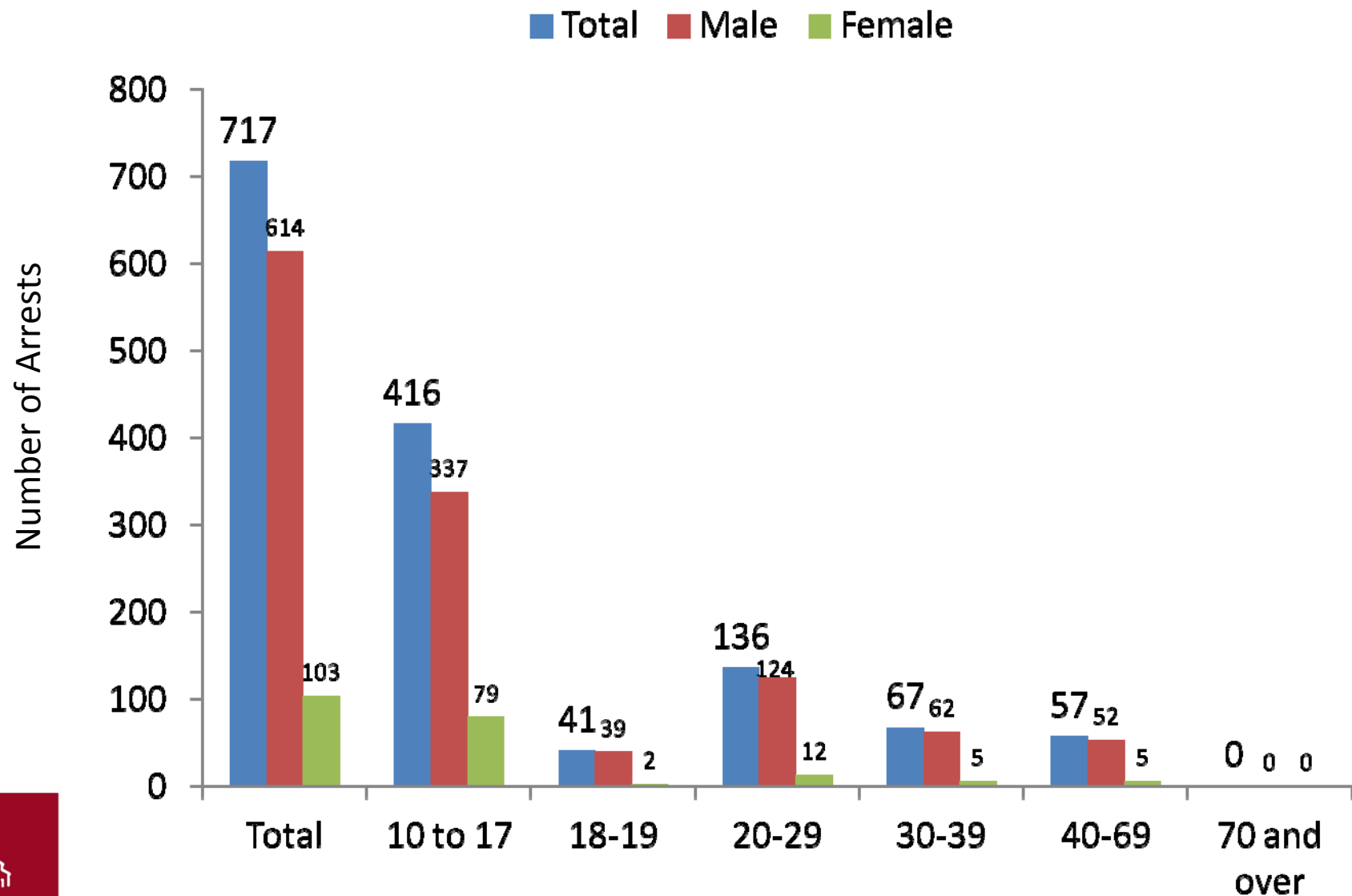
- In 2014, California data indicate that there were 55,468 Whites arrested for felony drug offenses.
 - Only 4,129 were for marijuana. This represented 7.4 % of the drug felony arrests
- In 2014, there were 42,009 Whites arrested for misdemeanor drug offenses
 - Only 2,047 were for marijuana. This represented 4.5% of the drug misdemeanor drug offenses for Whites.
- Thus for Whites of the 97,447 drug arrests, marijuana arrests represented 6,176 or 6.3% of the drug arrests.

Marijuana Felony Arrests for African Americans, by age and gender, 2014: N= 2,460



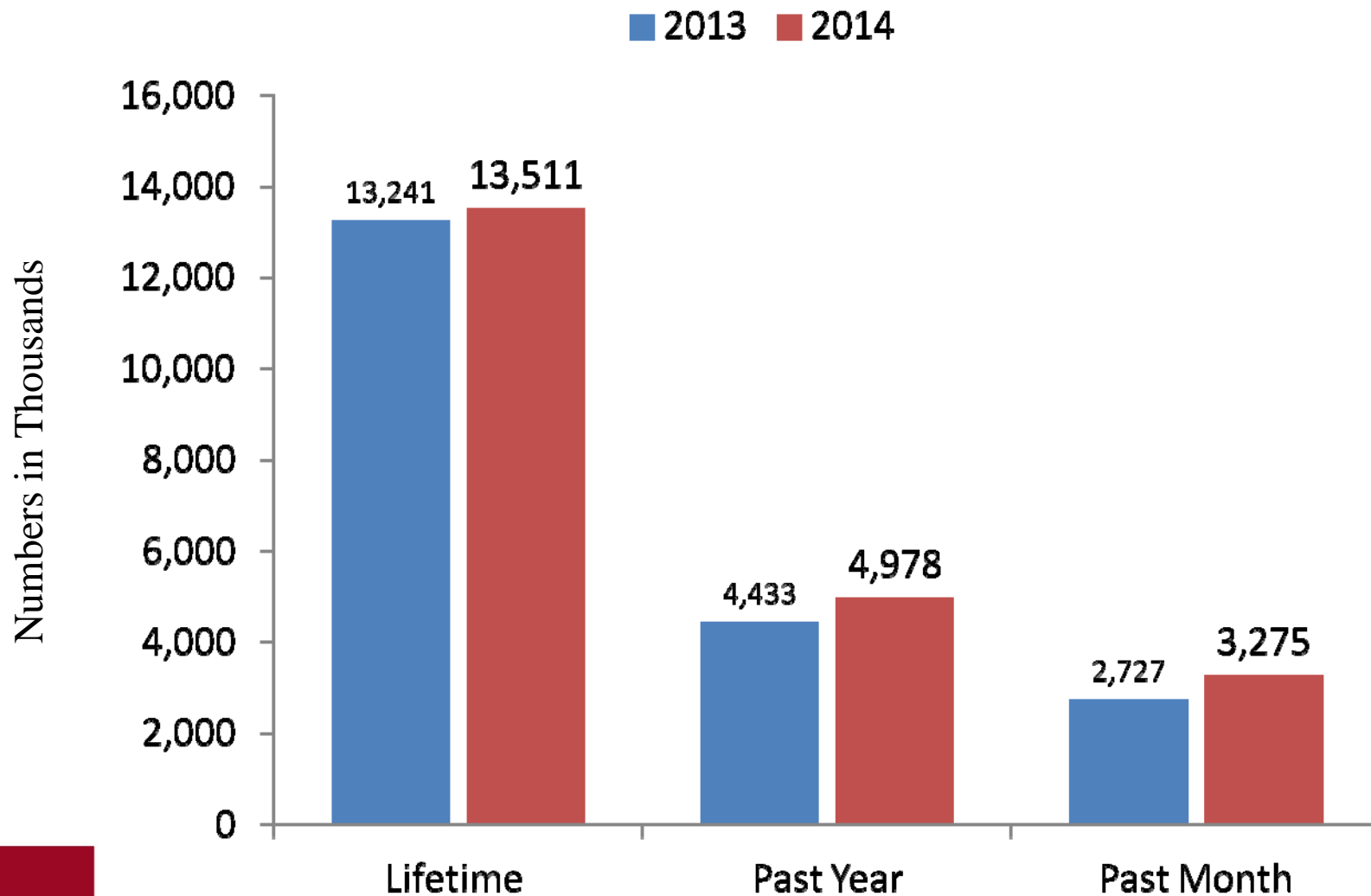
Crime in California, California Department of Justice, 2014

Marijuana Misdemeanor Arrests for African Americans, total, by age and by gender, 2014

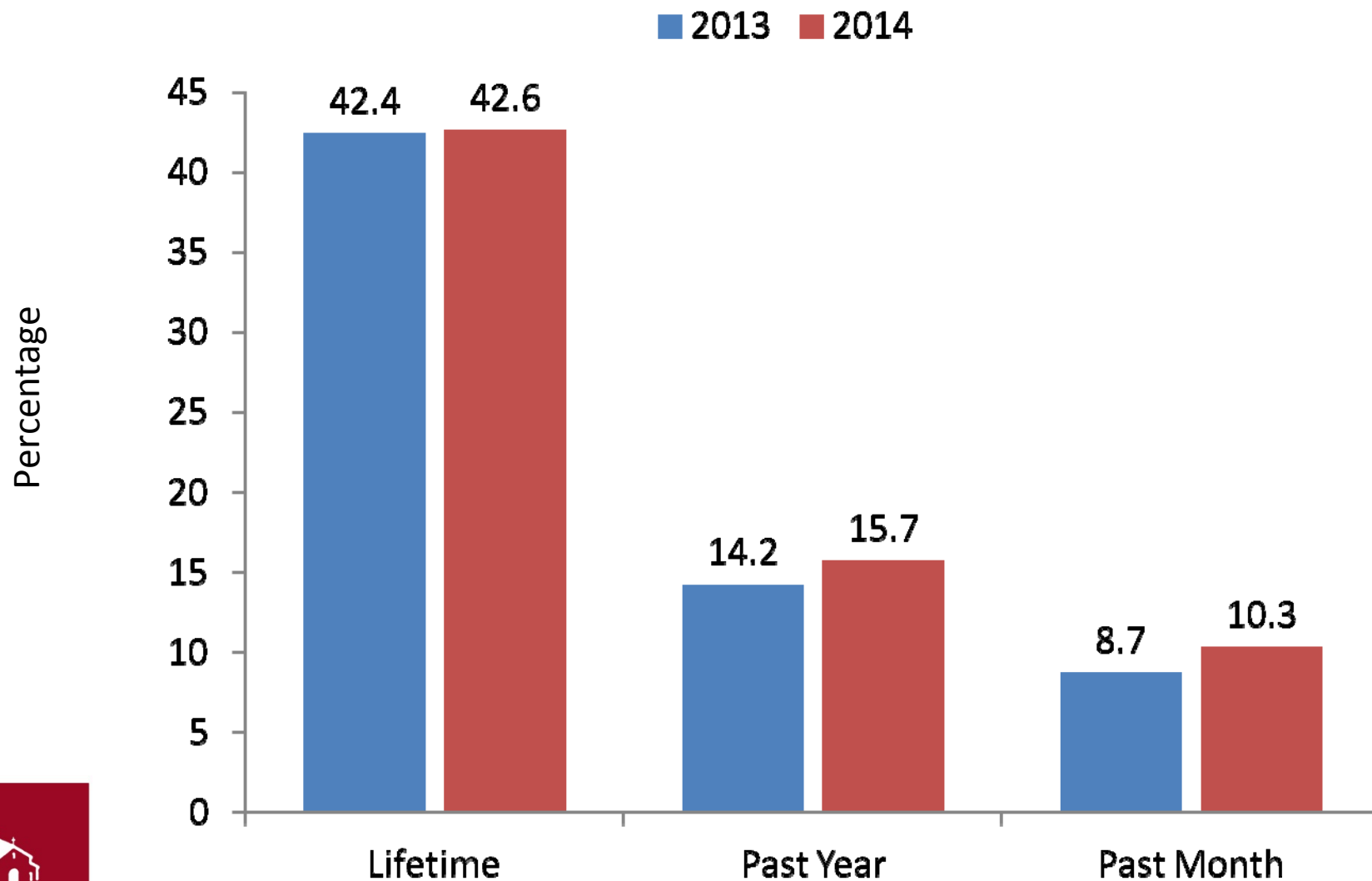


Crime in California, California Department of Justice, 2014

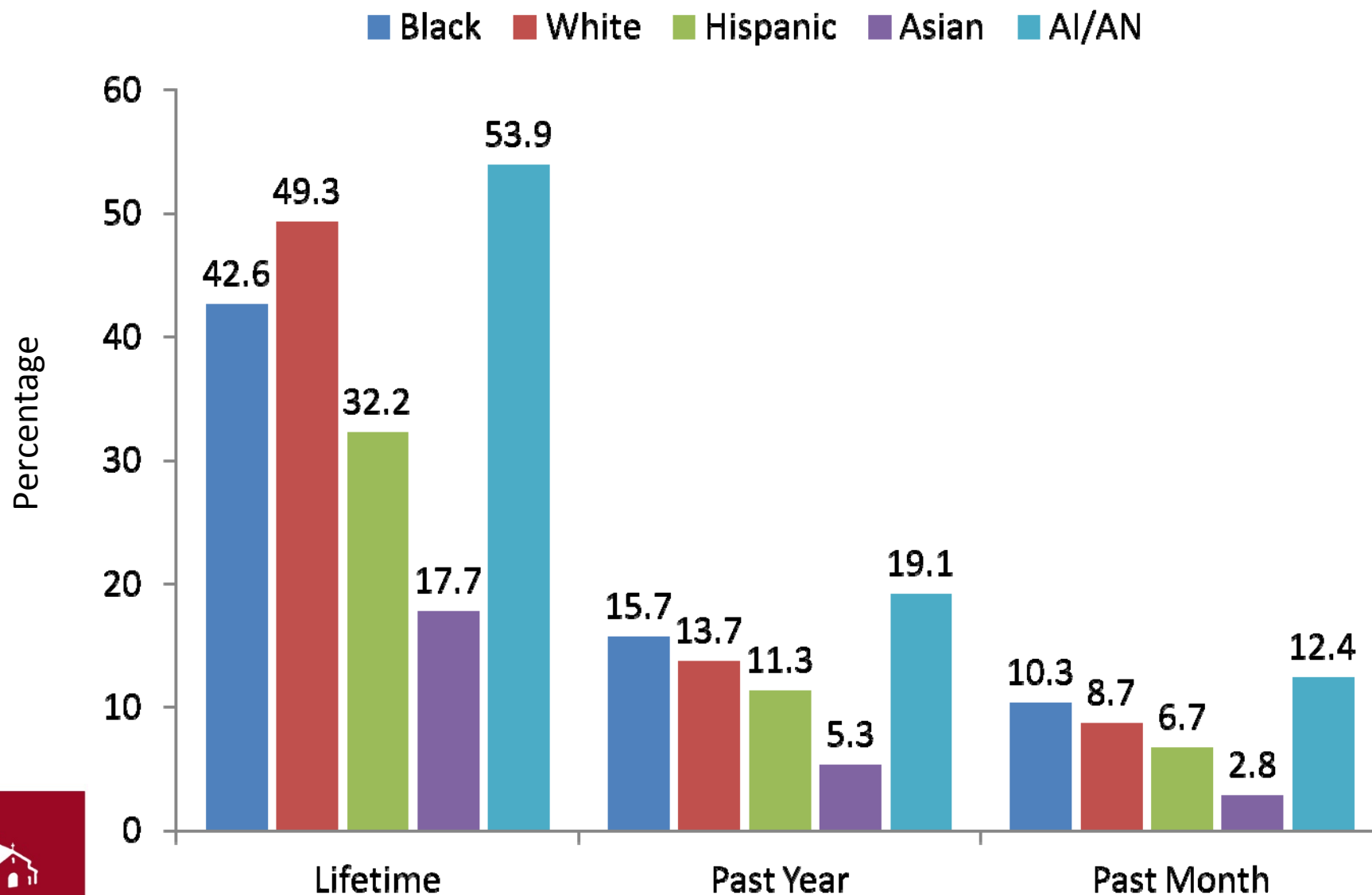
Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 12 or Older: Numbers in Thousands, 2013 and 2014



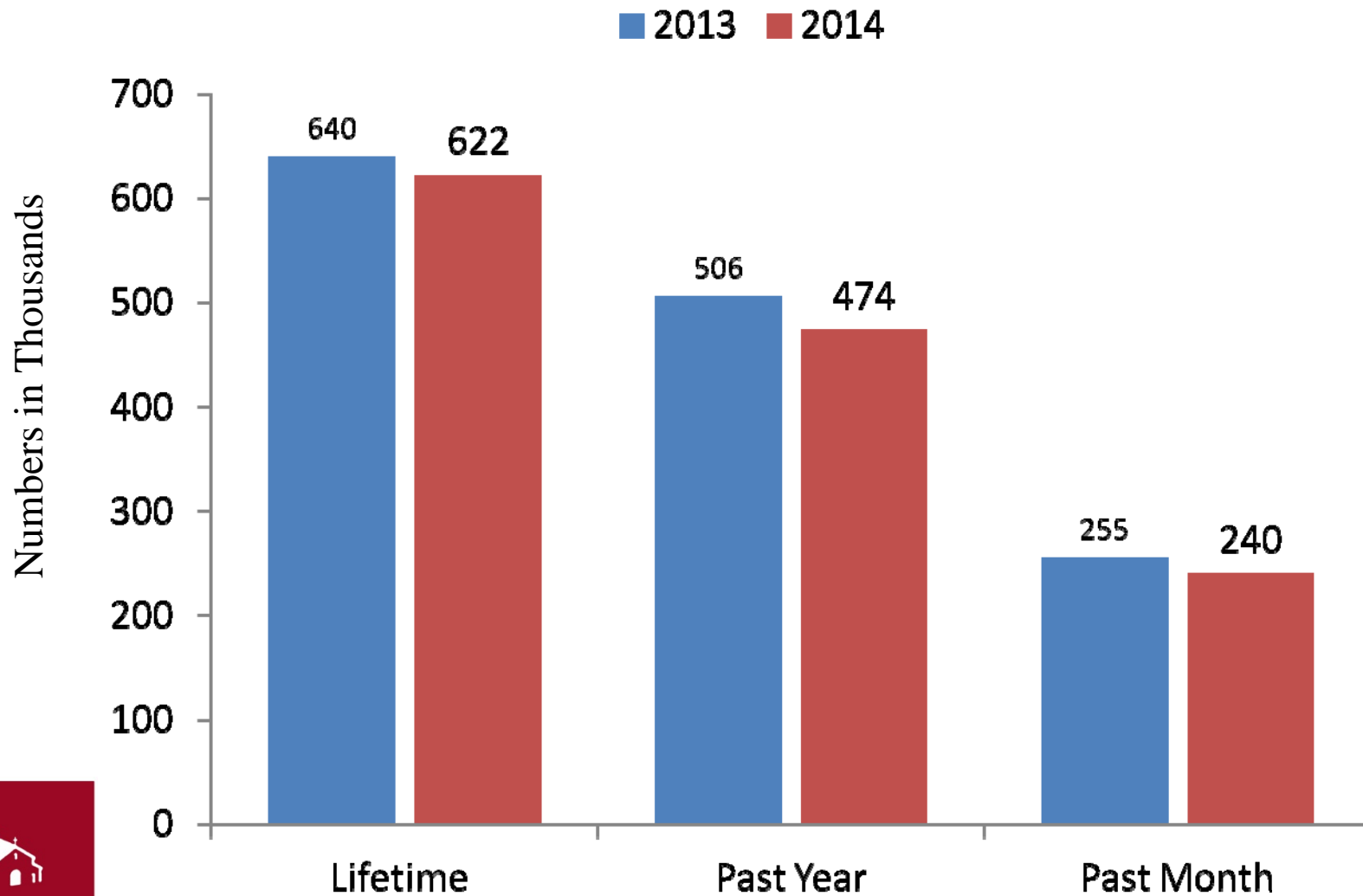
Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 12 or Older: Percentages, 2013 and 2014



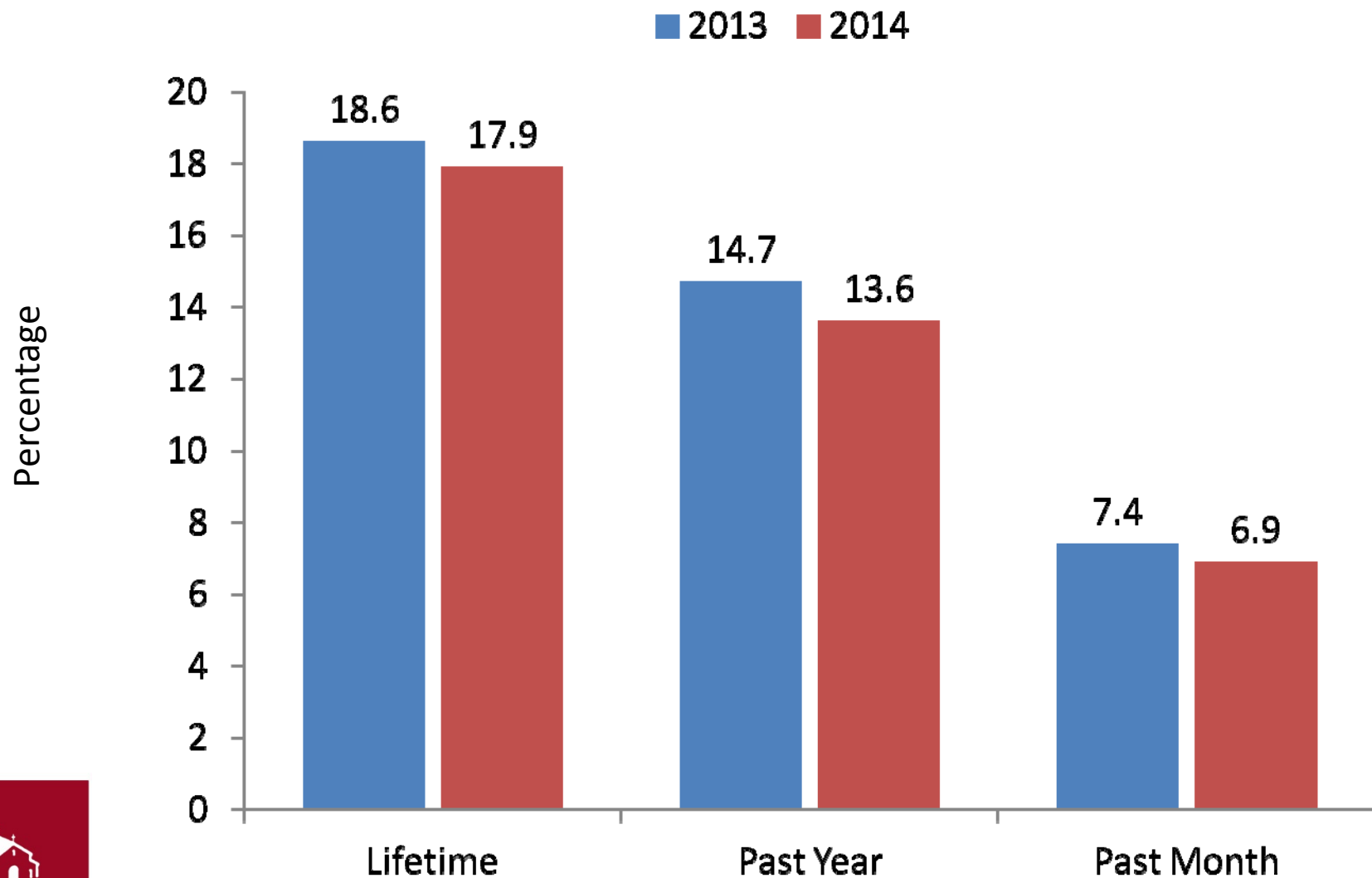
Marijuana Use in Lifetime, Past Year, and Past Month by Race or Ethnicity, Aged 12 or Older: Percentages, 2014



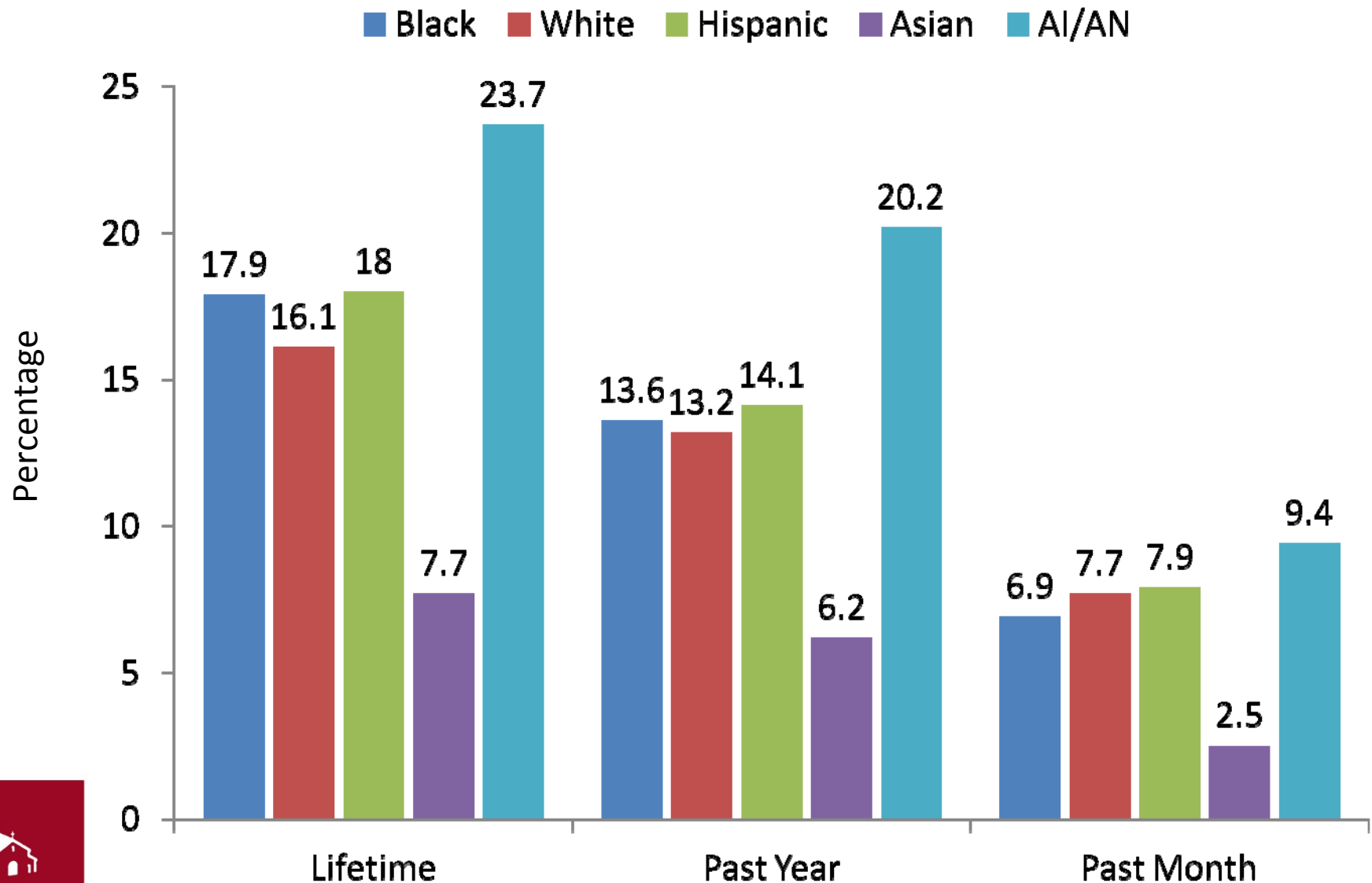
Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 12 to 17: Numbers in Thousands, 2013 and 2014



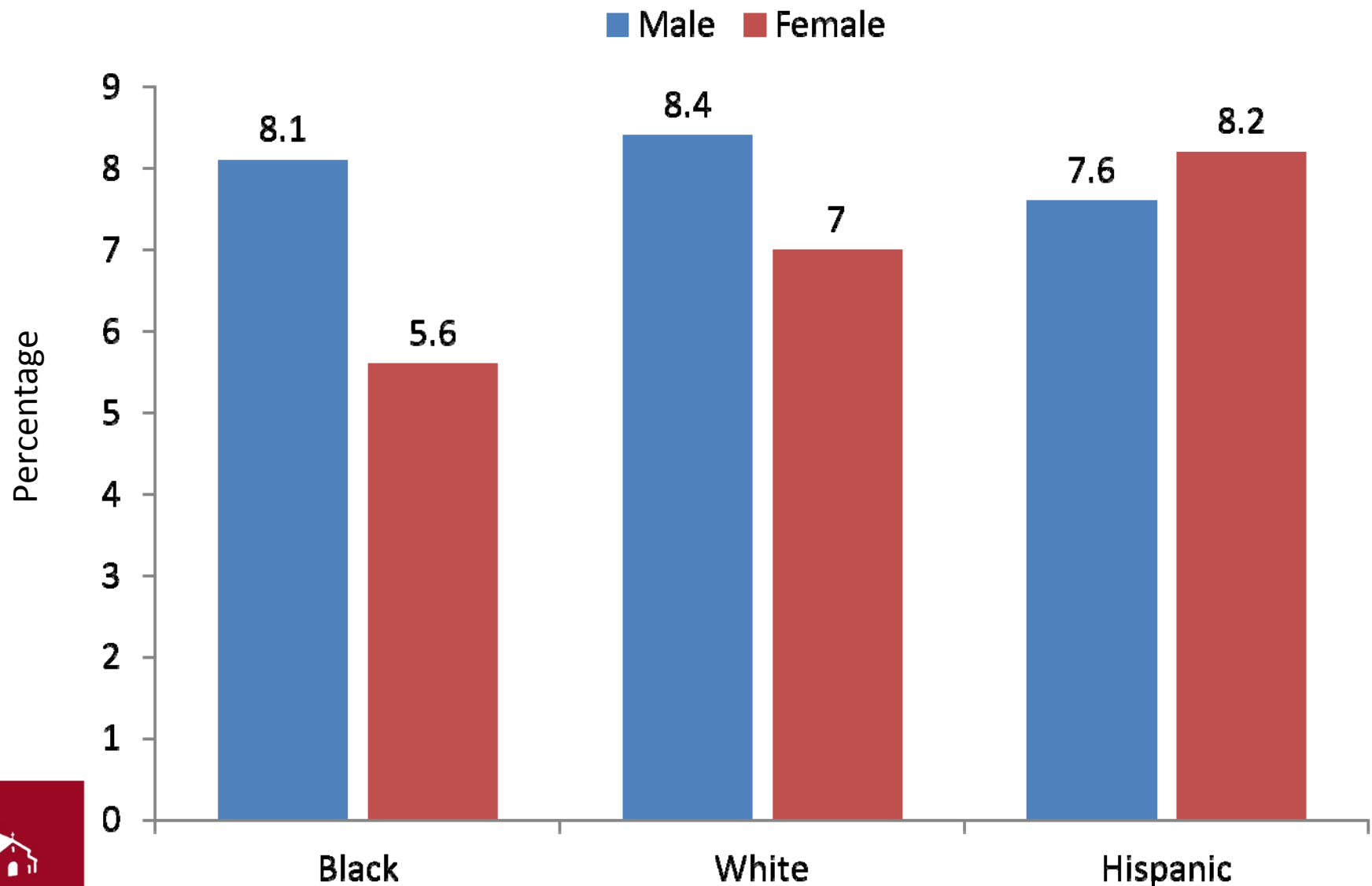
Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 12 to 17: Percentages, 2013 and 2014



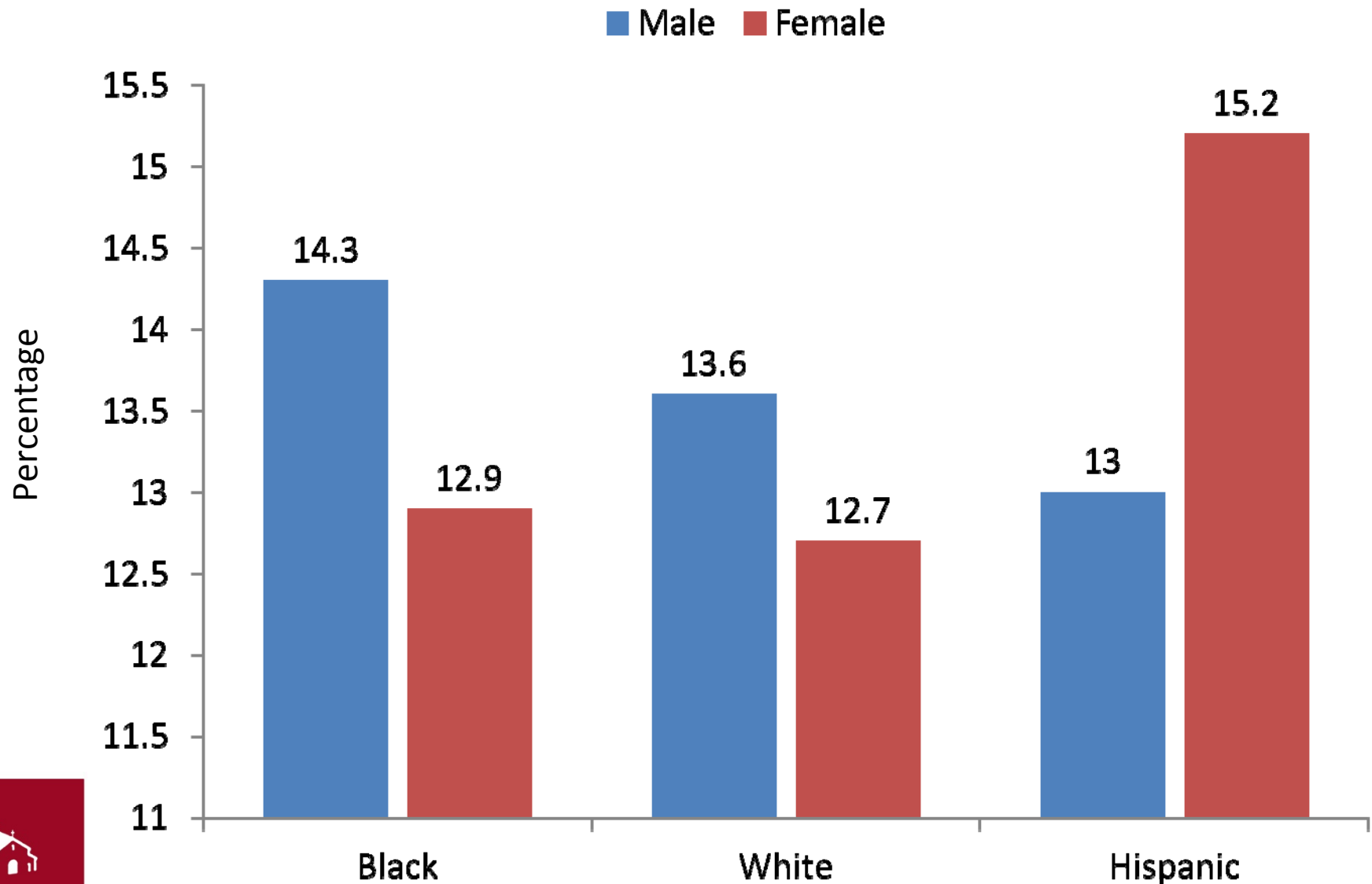
Marijuana Use in Lifetime, Past Year, and Past Month by Race or Ethnicity, Aged 12 to 17: Percentages, 2014



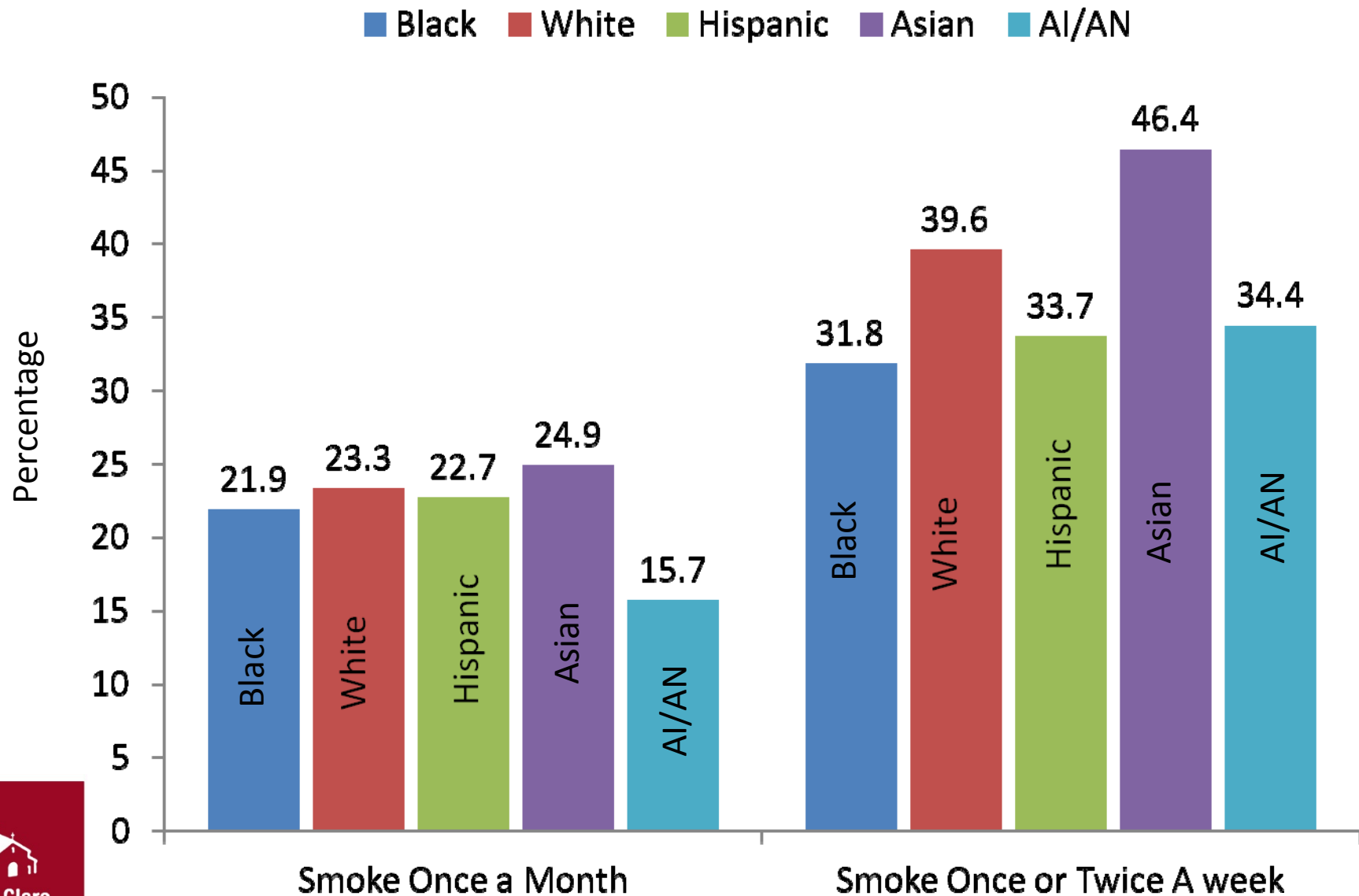
Marijuana Use Past Month by Gender & Race or Ethnicity, Aged 12 to 17: Percentages, 2014



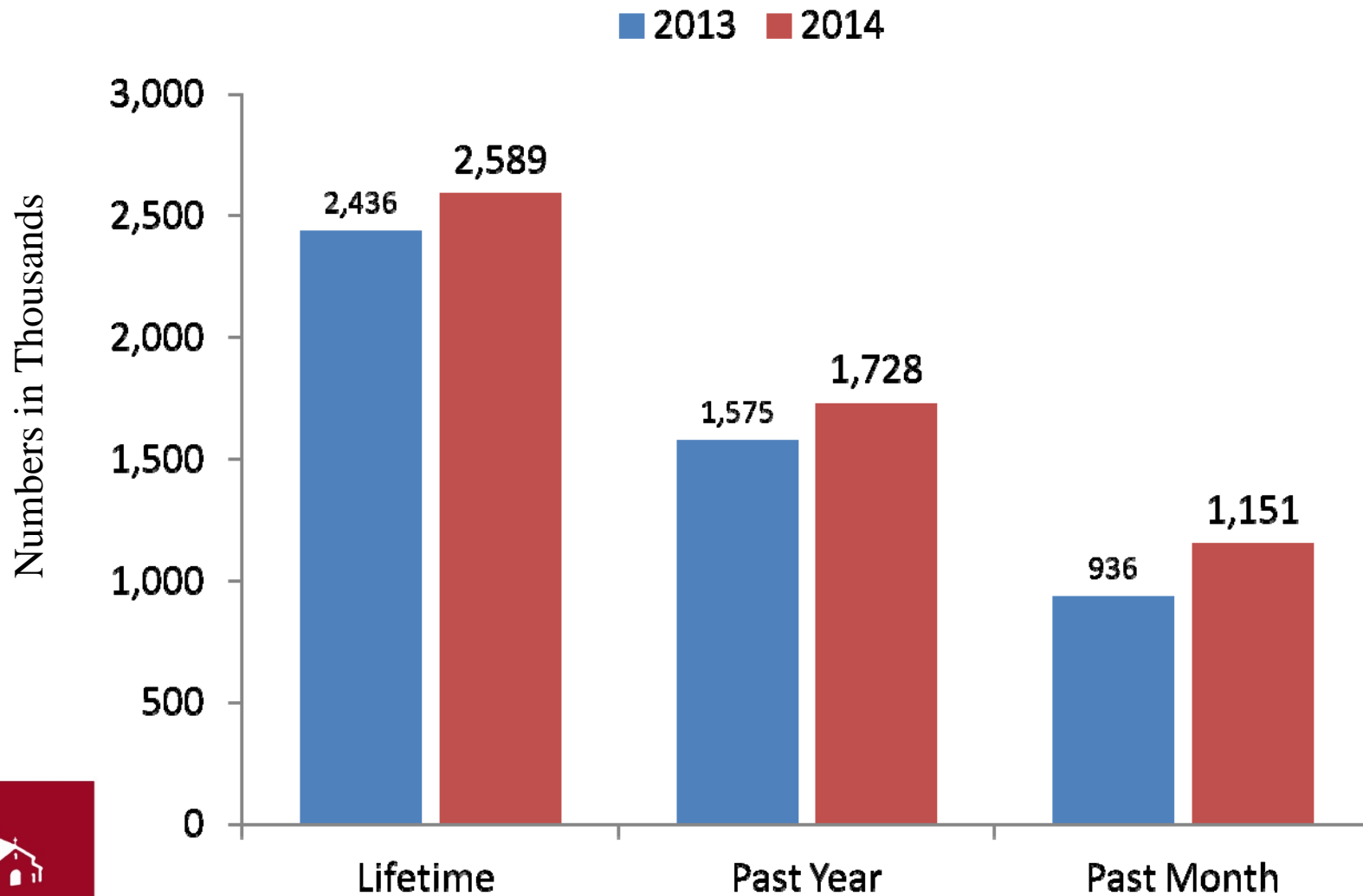
Marijuana Use Past Year by Gender & Race or Ethnicity, Aged 12 to 17: Percentages, 2014



Perceived Great Risk of Harm Associated with Marijuana Use among Persons 12 -17 by Race or Ethnicity: Percentages, 2014

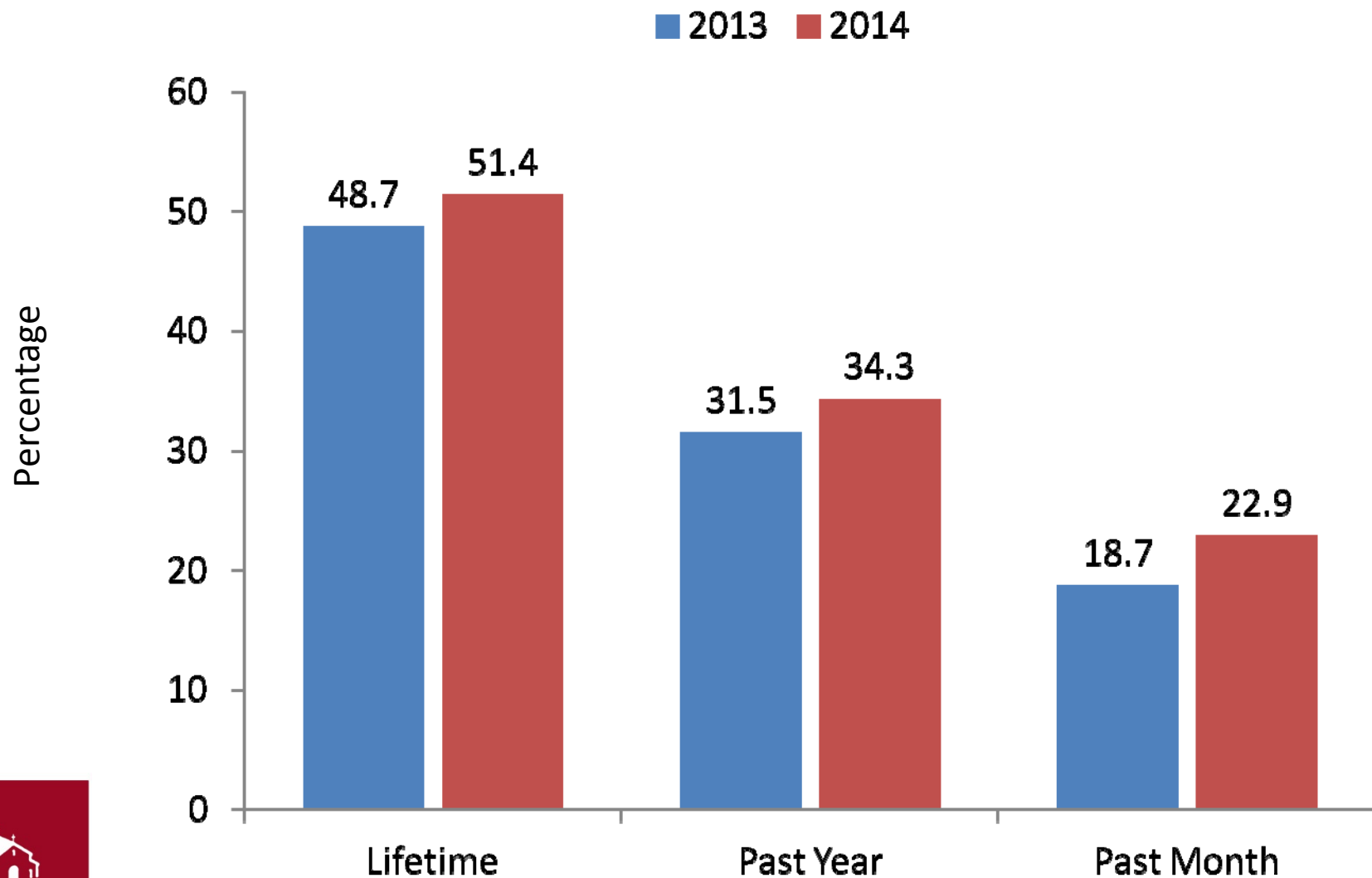


Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 18 to 25: Numbers in Thousands, 2013 and 2014

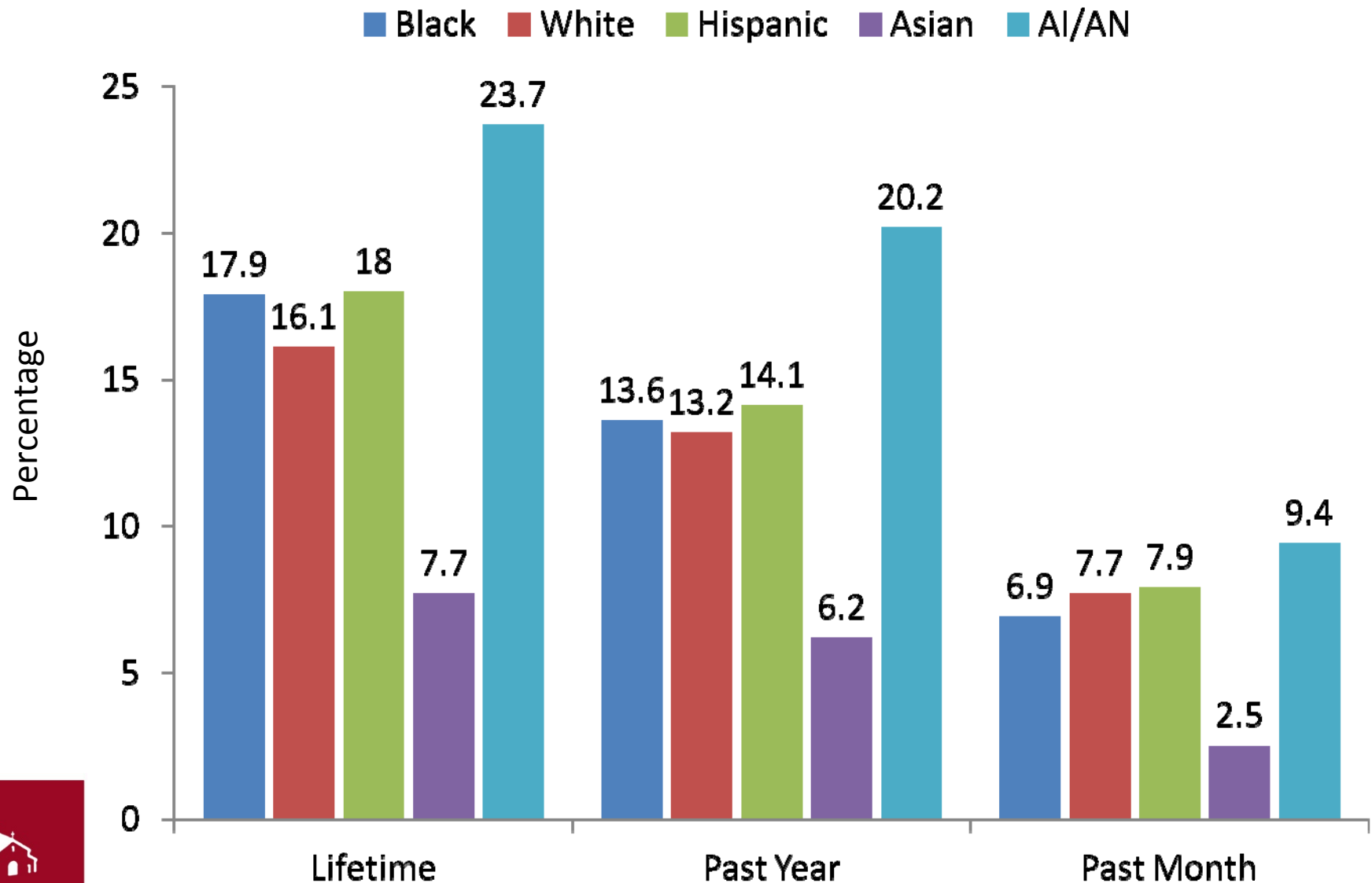


National Survey on Drug Use and Health, 2015

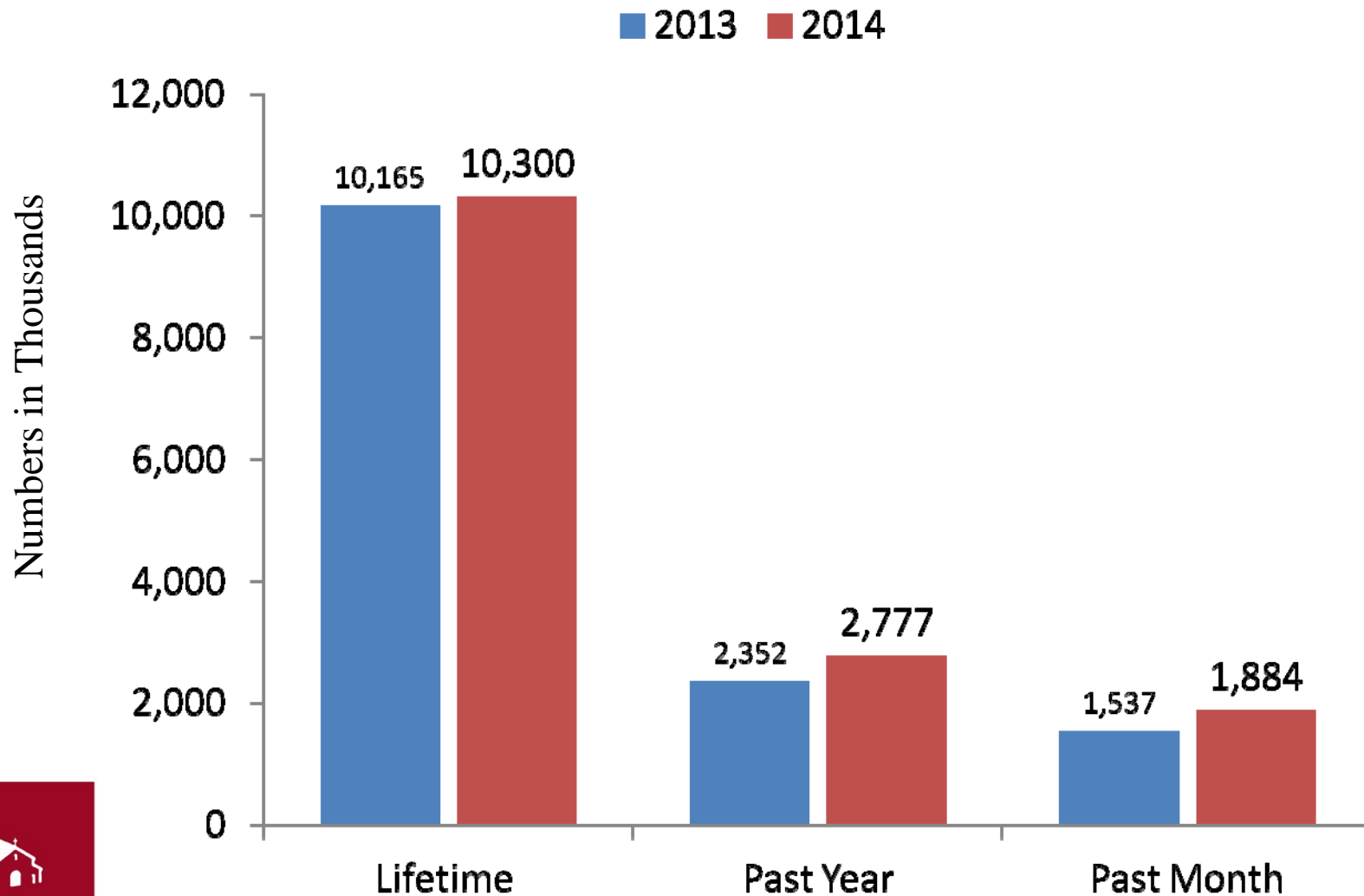
Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 18 to 25: Percentages, 2013 and 2014



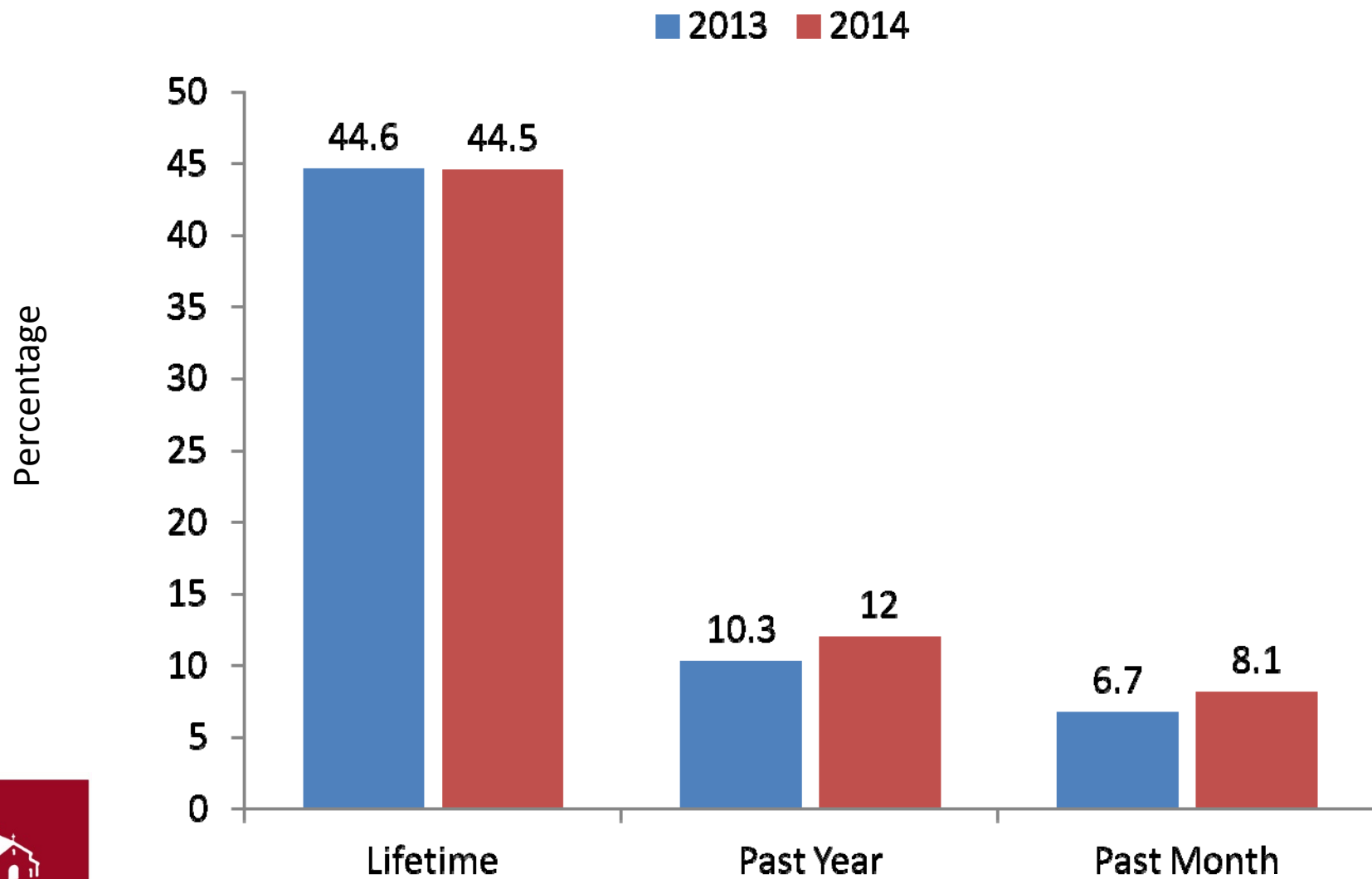
Marijuana Use in Lifetime, Past Year, and Past Month by Race or Ethnicity, Aged 18 to 25: Percentages, 2014



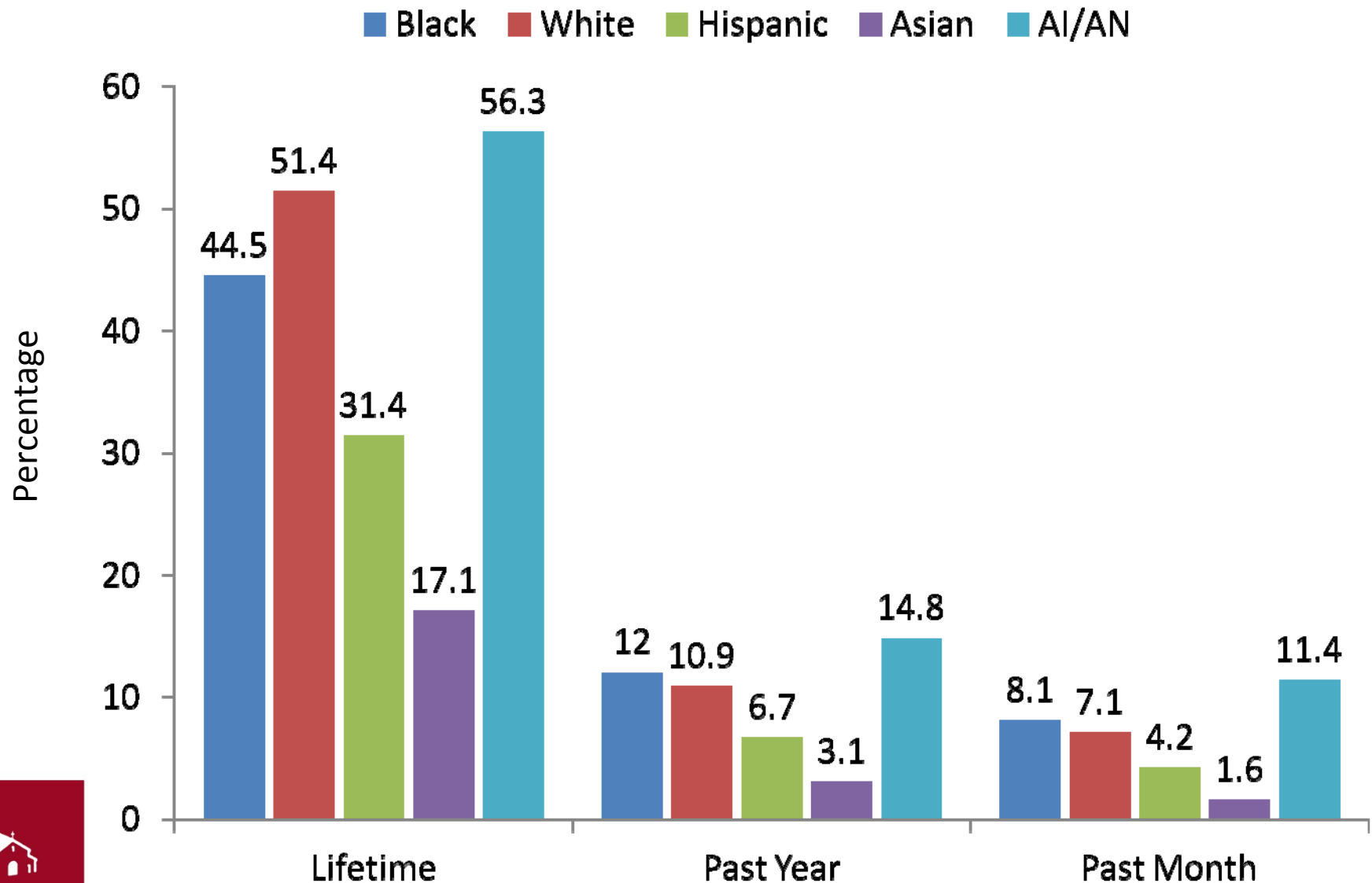
Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 26 or Older: Numbers in Thousands, 2013 and 2014



Marijuana Use in Lifetime, Past Year, and Past Month among Blacks, Aged 26 or Older: Percentages, 2013 and 2014



Marijuana Use in Lifetime, Past Year, and Past Month by Race or Ethnicity, Aged 26 and Older: Percentages, 2014



The influence of potentially traumatic household characteristics on blunt use among Black youth

- Black males who reported having a non-residential father were more likely to report lifetime blunt use than Black males who lived with their fathers.
- This relationship was not present among females.
- There were no significant relationships between the presence or absence of a mother in the household and blunt use among Black males or females.

LaTric Montgomery & Dy'an Marinos, *Journal of Prevention & Intervention in the Community* 2016, V:44(2):101-111



Parental Support, Mental Health, and Alcohol and Marijuana Use in National and High-Risk African-American Adolescents

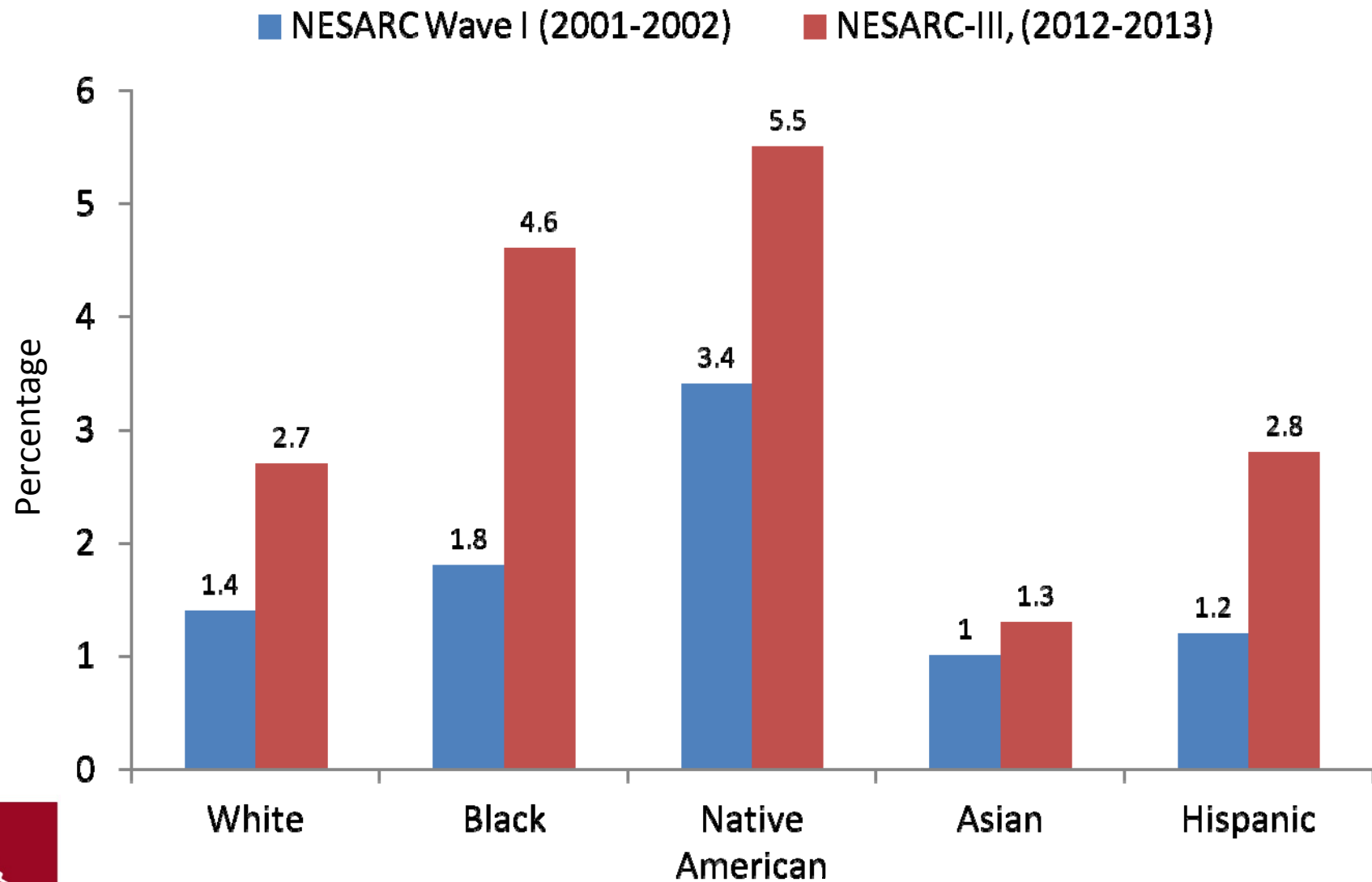
- Adolescents who feel more supported by their parents have lower levels of conduct problems, and those who have lower levels of conduct problems, use less alcohol and marijuana.
- Parental support is protective against mental health problems and alcohol and marijuana use even in families that face high levels of familial and contextual risk.
- Thus, parental support is an important target for preventive interventions with African-American adolescents, including high-risk samples.



Racial discrimination, socioeconomic position, and illicit drug use among US Blacks

- Past-year discrimination was associated with higher odds for illicit drug use and frequent illicit drug use in the past year.
- Respondents who reported discrimination in public settings; in encountering institutions, including obtaining a job or on the job, when getting admitted to a school or training program, when interacting with the courts or police, and when obtaining housing; from being called a racist name; and from being pushed, shoved, or threatened were all at higher odds of past-year illicit drug use than those not reporting discrimination.
- Only discrimination in encountering institutions was associated with higher odds for frequent illicit drug use. In addition, a dose–response relationship was observed between the number of discrimination settings and past-year illicit drug use, although not for frequent use.

Past-Year Prevalence of DSM-IV Marijuana Use Disorder (Abuse or Dependence) by Race or Ethnicity, 2001-2013

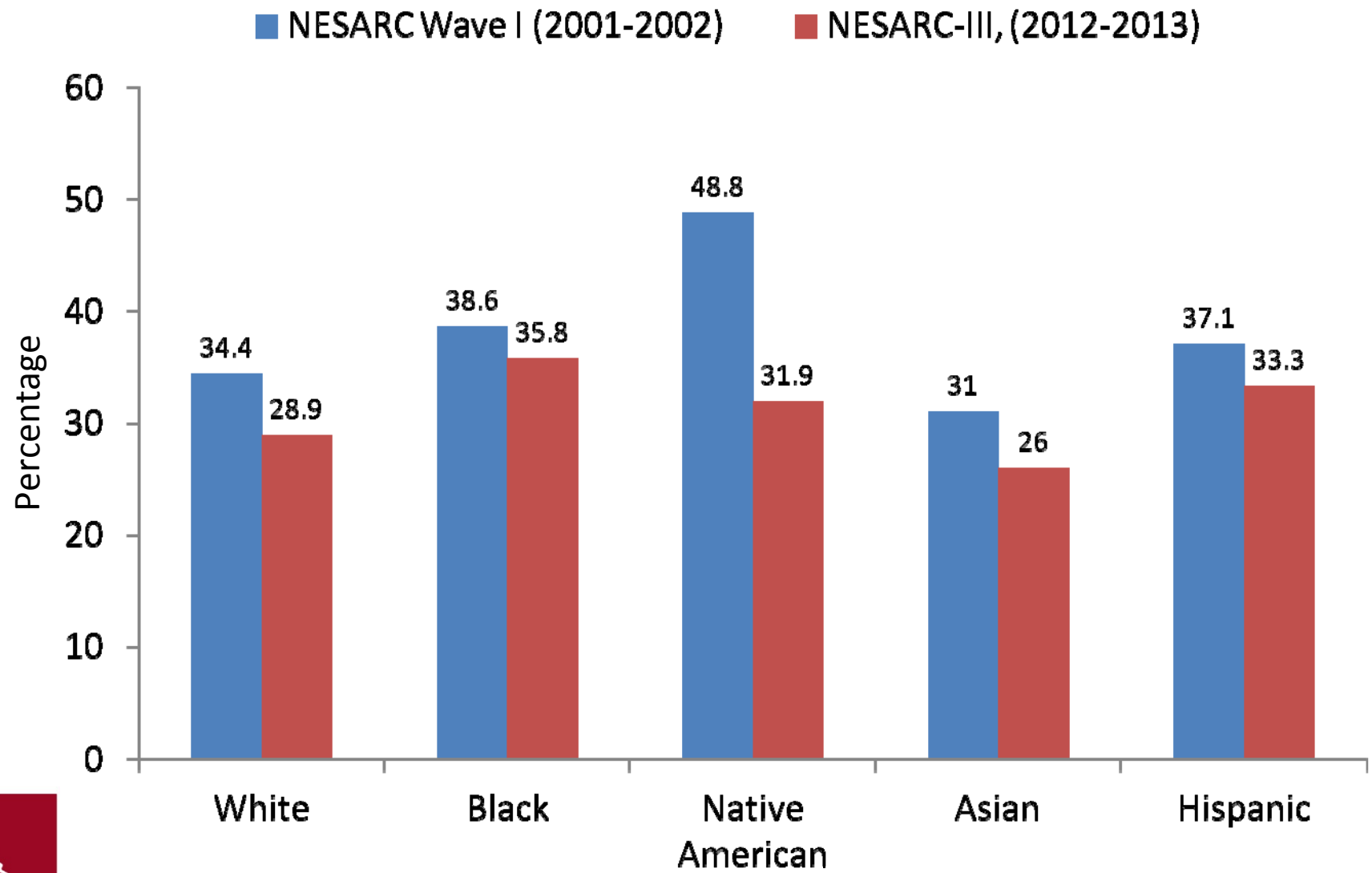


Black and Hispanic individuals showed increases in the prevalence of marijuana use and marijuana use disorders

- The explanation may lie in the widening income gap between white and black and Hispanic individuals during and after the 2008 recession, possibly leading to increased minority stress and demoralization and substance use as a coping mechanism.
- Increasing economic disparity of black and Hispanic individuals relative to white individuals may also have exacerbated neighborhood environmental factors (neighborhood disorder, violence, and visible drug sales) that increase the risk of adolescent marijuana use and may also apply to adults.



Past-Year Prevalence of DSM-IV Marijuana Use Disorder (Abuse or Dependence) by Among Past-Year Marijuana Users by Race or Ethnicity, (2001-2013)



MARIJUANA IN TRANSITION





2015 HIGH TIMES US Cannabis Cup Denver: Highest THC Strains



Primus by Green Tree
Medicinals – THC 24.6%



Cali Kush Farms Emperor
Cookie Dough by Greenwolf
LA – THC 31.1%



Chem D.O.G. by Next
Harvest – THC 32.13%



DaVinci OG by Greenwolf
LA with Ghost Crow –
THC 25.82%



Ghost Train Haze by
Greenman Cannabis –
THC 25.74%



Veganic Strawberry Cough by
Private Stock for Buds and
Roses – THC 28.31%



<http://www.hightimes.com/read/2015-high-times-us-cannabis-cup-denver-highest-thc-strains>

Marijuana Edibles



What's the Message?



DABS

- Dabs are concentrated doses of cannabis that are made by extracting THC and other cannabinoids using a solvent like butane or carbon dioxide, resulting in sticky oils also commonly referred to as wax, shatter, budder, and butane hash oil (BHO).
- It's possible to extract non-psychoactive compounds like CBD, THC is what's behind the potent effects of dabs, making them the fastest and most efficient way to get really, really medicated.
- Terpenes, or the aromatic oils that give cannabis flavor, can also be extracted, although it can be difficult to preserve these volatile compounds in the extraction process.

DAB TOOLS



DABBERS: The dabber is specialized for the task of scooping and dabbing hash oil or wax onto the nail of the oil rig



OIL RIG:
An oil rig is a water pipe designed to smoke concentrates

CONCENTRATE CONTAINER: a container to store the cannabis extract



TORCH: a small blow torch used to heat the nail for smoking marijuana concentrates or extracts

NAIL: The nail fits on the oil rig and is where the extract is dabbed.



<http://dailydabs420.com/2014/11/18/essential-dab-tools/>

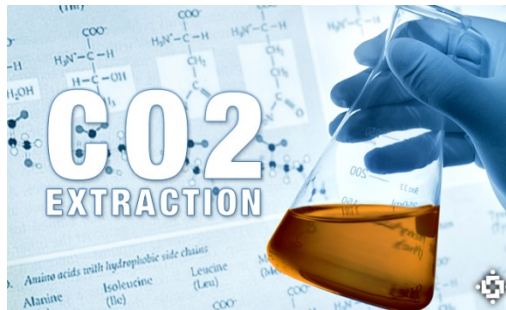
MARIJUANA CONCENTRATES



Kief



Rosin Technique



CO₂ Oil



Water Hash



Butane Hash Oil



<http://www.thecannabist.co/2015/06/19/marijuana-concentrates-kief-bho-water-hash-co2-oil-wax-shatter/36386/>

THC CONTENT OF VARIOUS MARIJUANA CONCENTRATION METHODS

Product	Production	THC Content
Kief	Trichomes broken away from the dried plant material via specialized filtering screens	20-60%
Rosin	Dried buds, trim, or lower-grade water hash/kief heated quickly between parchment sheets with hair straightener	50-70%
CO2 Oil	Carbon dioxide compressed at high pressures to strip oils	50-75%
Water Hash	Plant material mixed with cold water and ice, then break off the now-brittle trichome heads	50-80%
Butane Hash Oil	Butane is pressurized in a vessel and washed over plant material	60-90%

A Little Dab May Do You In

- Because of the super-concentrated power of butane hash oil (BHO), it may be possible to “overdose” on cannabis.
- While not lethal, taking more than a reasonable dose of dabs can lead to uncomfortable highs and, in some cases, passing out.
- There have been reports of more intense withdrawal symptoms for dabbers, but the information is limited.

Marijuana Overdose

- racing heart, agitation, tenseness
- mild to severe anxiety
- panic attacks at very high doses (usually oral) or in sensitive users
- headaches
- dizziness, confusion
- paranoia (generally only in inexperienced users)

Marijuana

Routes of Administration

- | Most often smoked
 - onset of effects within several minutes
 - effects may last approximately 2 hours
- | May be taken orally
 - onset of effects in 30+ minutes
 - effects may last 3-5 hours
 - variable absorption of THC in digestive system

Marijuana Absorption & Metabolism Kinetics

Smoking marijuana as a hand-rolled joint varies from the size of a cigarette to larger, often with tobacco added to assist burning. A typical joint contains between 0.5 and 1.0 grams of cannabis with varying THC content between 5 and 150 mg (or between 1% and 15% THC)

Only a small amount of smoked cannabis (e.g., 2 to 3 mg of available THC) is required to produce a brief pleasurable “high” for the occasional user.

- A water pipe known as a “bong” may be used because the water cools the hot smoke and loss of the drug through side stream smoke is decreased. Cigars may be hollowed out and filled with marijuana; this is known as “blunts.”
- E-Cigarette Vaporizers with marijuana are showing increased popularity
- Smokers generally inhale and hold their breath, which increases absorption of the THC by the lungs.



Marijuana Absorption & Metabolism Kinetics

- Marijuana and hashish may be taken orally via food products. This includes cookies, brownies, cakes or candy. However, the onset of the psychoactive effects is slow (about an hour) and absorption is erratic.
- THC is metabolized to the active metabolite, 11-OH-THC, which is rapidly converted to conjugated 11-*nor*-9-carboxy-THC (THCCOOH), which is inactive but serves as the primary urinary marker for detecting cannabis use. However, Because oral doses are processed by the liver before entering the bloodstream to the brain, oral THC produces high levels of the metabolite 11-hydroxy-THC, while smoked marijuana does not

Marijuana

Relative Addiction Liability

- Clinical and epidemiologic evidence indicates that a cannabis dependence syndrome occurs in heavy, chronic users of cannabis, as exhibited by a lack of control over their cannabis use and continued use despite adverse personal consequences.
- Female cannabis users were more likely than male users to develop cannabis dependence
- In animal studies, cannabis is self-administered and acts via the same brain reward circuitry as do other drugs of abuse



CANNABIS USE DISORDER

DSM-V

A problematic pattern of cannabis use leading to clinically significant impairment or distress, as manifested by at least two criteria of 11 Criteria That Fit into The Following Four Groupings within a 12-month period:

1. Impaired Control
2. Social Impairment
3. Risky Use
4. Pharmacological



MARIJUANA

TOLERANCE AND RECEPTOR PHARMACODYNAMICS

- Tolerance develops to the pharmacologic effects of cannabinoids in a variety of animal species, including pigeons, rodents, dogs, monkeys, and rabbits.
- Tolerance develops to antinociception, anticonvulsant activity and catalepsy, depression of locomotor activity, hypothermia, hypotension, corticosteroid release, ataxia in dogs, and schedule-controlled behavior. The precise mechanism of tolerance is unknown

Time Course of Effects of Marijuana

- Onset 0-10 minutes
- Coming Up 5-10 minutes
- Plateau 15-30 minutes
- Coming Down 45-60 minutes
- After Effects 30-60 minutes

DSM-5 Cannabis Intoxication Diagnostic Criteria

- A. Recent Use of cannabis.
- B. Clinically significant problematic behavioral or psychological changes (e.g., impaired motor coordination, euphoria, anxiety, sensation of slowed time, impaired judgment, social withdrawal) that developed during or shortly after, cannabis use.
- C. Two (or more) of the following signs or symptoms, developing within 2 hours of cannabis use:
 - 1. Conjunctival injection
 - 2. Increased appetite
 - 3. Dry mouth
 - 4. Tachycardia
- D. The signs or symptoms are not attributable to another medical condition and are not better explained by another mental disorder, including intoxication with another substance.

Effects of Marijuana

- Positive Mood
- Relaxation
- Increased awareness of senses
- Nausea
- Coughing, asthma, upper respiratory problems
- Increased appetite
- Psychomotor slowness
- Mouth dryness
- Psychological Dependence

MARIJUANA TOXICITY/ADVERSE EFFECTS PSYCHOMOTOR EFFECTS

- Marijuana dose-dependently impairs a variety of psychomotor functions, including object distance and shape discrimination, reaction time, information processing, perceptual motor coordination, motor performance, signal detection, tracking behavior, and slowed time perception.
- The effects are generally larger, more consistent, and of increased persistence in difficult tasks that involve sustained attention.



MARIJUANA TOXICITY/ADVERSE EFFECTS BEHAVIORAL EFFECTS

Cannabis use has been associated with an “amotivational syndrome.” However, there is little rigorous scientific evidence to support its existence. Most studies have been narrow in scope and with small sample sizes.

- An increased risk of quitting high school and increased job turnover in young adults has been shown, but such studies fail to account for the initial aspirations and goal orientation of the study participants.



MARIJUANA TOXICITY/ADVERSE EFFECTS COGNITIVE EFFECTS

- Cannabis use is associated with subtle decreases in cognition and memory via alterations in memory, attention, and integration of complex information.
- Acute cognitive impairments following use of cannabis include loss of concentration and short-term memory and goal-directed activities.



MARIJUANA
TOXICITY/ADVERSE EFFECTS
PSYCHIATRIC PROBLEMS

- Numerous large, prospective, longitudinal studies suggest that use of cannabis increases the risk for schizophrenia, worsens symptoms, and is associated with a poorer prognosis, effects related to the dose of drug and other risk factors.
- In addition, persons with genetic vulnerability to psychoses or a previous psychotic episode, as well as those who initiate cannabis use in early adolescence, are particularly prone to the development of schizophrenia

REMINDER

The finding that cannabis use is associated with an elevated risk of schizophrenia has captured considerable attention from mental health professionals and the media alike. However, only a very small minority of individuals who use the drug will develop psychotic symptoms.



Translational Psychiatry (2016) 6, e738;
doi:10.1038/tp.2015.219; published online 16 February 2016

Cannabis Use and Risk of Other Psychiatric Disorders

- In a general population, cannabis use is not associated with any mood or anxiety disorder.
- On the other hand, cannabis use is associated with an increased incidence and prevalence of alcohol and drug use disorders, including nicotine dependence.



Carlos Blanco et al, JAMA Psychiatry , February, 2016

Marijuana

Drug-Drug Interactions

- Cannabis use usually precedes involvement with other drugs such as stimulants. There are no rigorous evidence or known neurobiologic basis for a “gateway” effect of cannabis smoking.

There may be an effect that springs from the increased opportunity of cannabis users to associate with users of other types of drugs or the group peer pressure to use other drugs.

- A combination of THC and alcohol may result in increase levels of THC due to ethanol-induced increases in THC absorption, resulting in enhanced subjective effects on mood.
- There may be a propensity for THC to increase drug seeking in those who are particularly sensitive to addictive behaviors.

The Effects of Marijuana Exposure on Expiratory Airflow

- The study then demonstrates that current smokers are more likely to report recent symptoms of respiratory illness, but have little clinically significant associated changes in spirometry.
- Furthermore, it demonstrates that moderate cumulative lifetime marijuana use, up to 20 joint-years, is not associated with deleterious changes in spirometric measures of lung health.
- Although greater than 20 joint-years of cumulative marijuana exposure was associated with a twofold-increased odds of an FEV1/FVC less than 70%, this was the result of an increase in FVC, rather than a disproportional decrease in FEV1 as is typically associated with obstructive lung diseases.



DSM-5 Cannabis Withdrawal Diagnostic Criteria

- A. Cessation of cannabis use that has been heavy and prolonged (i.e., usually daily or almost daily use over a period of at least a few months.)
- B. Three (or more) of the following signs and symptoms develop within approximately 1 week after Criterion A:
 - 1. Irritability, anger, or aggression
 - 2. Nervousness or anxiety
 - 3. Sleep difficulty (e.g., insomnia, disturbing dreams)
 - 4. Decreased appetite or weight loss\
 - 5. Restlessness
 - 6. Depressed mood
 - 7. At least one of the following physical symptoms causing significant discomfort: abdominal pain, shakiness/tremors, sweating, fever, chills, or headache
- C. The signs or symptoms in Criterion B cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- D. The signs or symptoms are not attributable to another medical condition and are not better explained by another mental disorder, including intoxication with another substance.



hclark@scu.edu



