

WHAT'S THE RISK?

MARIJUANA USE AND PREGNANCY

MARIJUANA USE AND OPIOIDS

MARIJUANA USE AND TOBACCO

Sue Nelson, EdD

Substance Use Treatment and Prevention

Prevention Coordinators In-Person Meeting

December 5, 2018

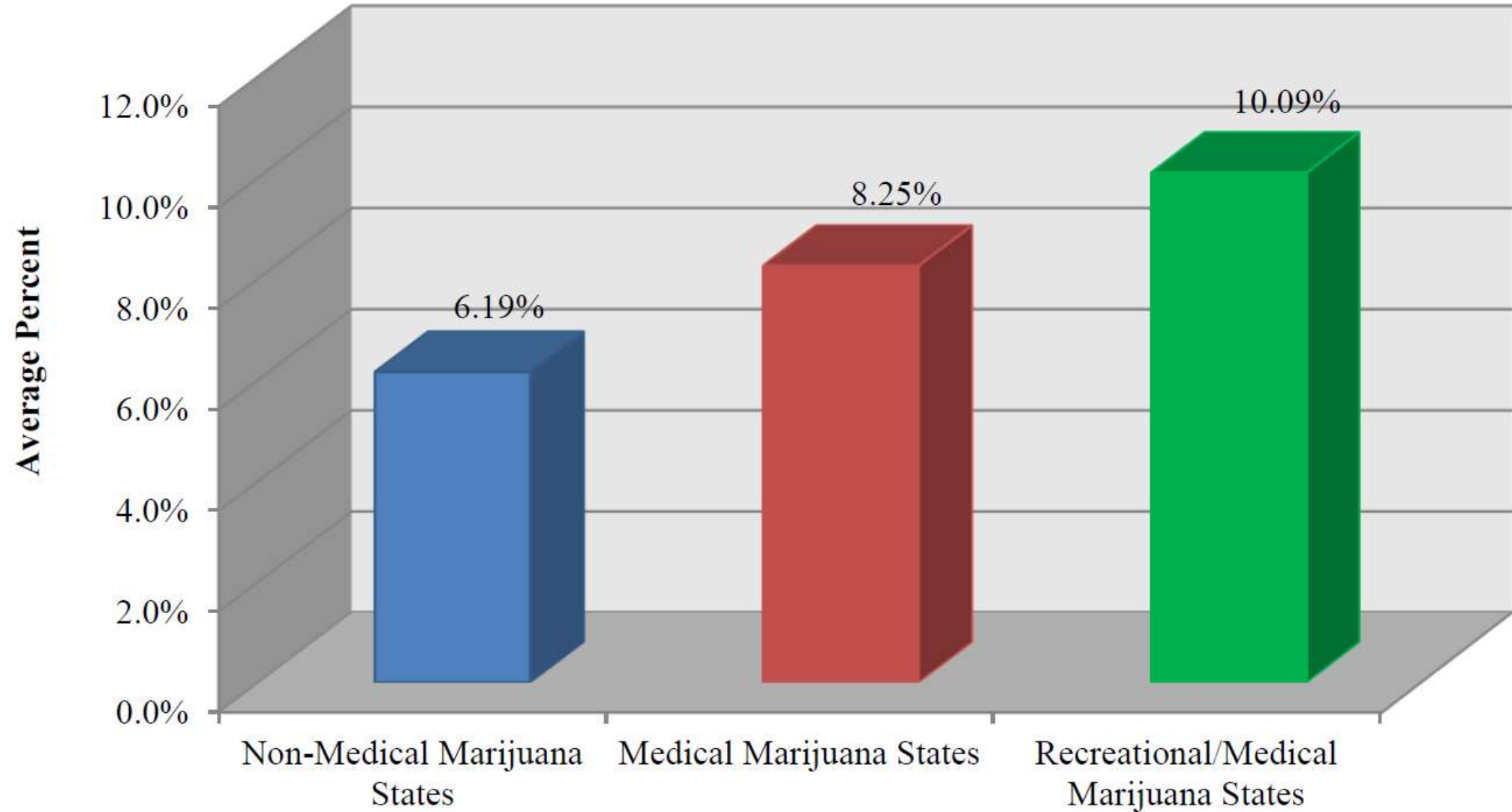


Four primary factors that affect rates of drug use

- PERCEPTION OF RISK
- AVAILABILITY
- PRICE
- SOCIAL NORMS/PUBLIC ATTITUDE

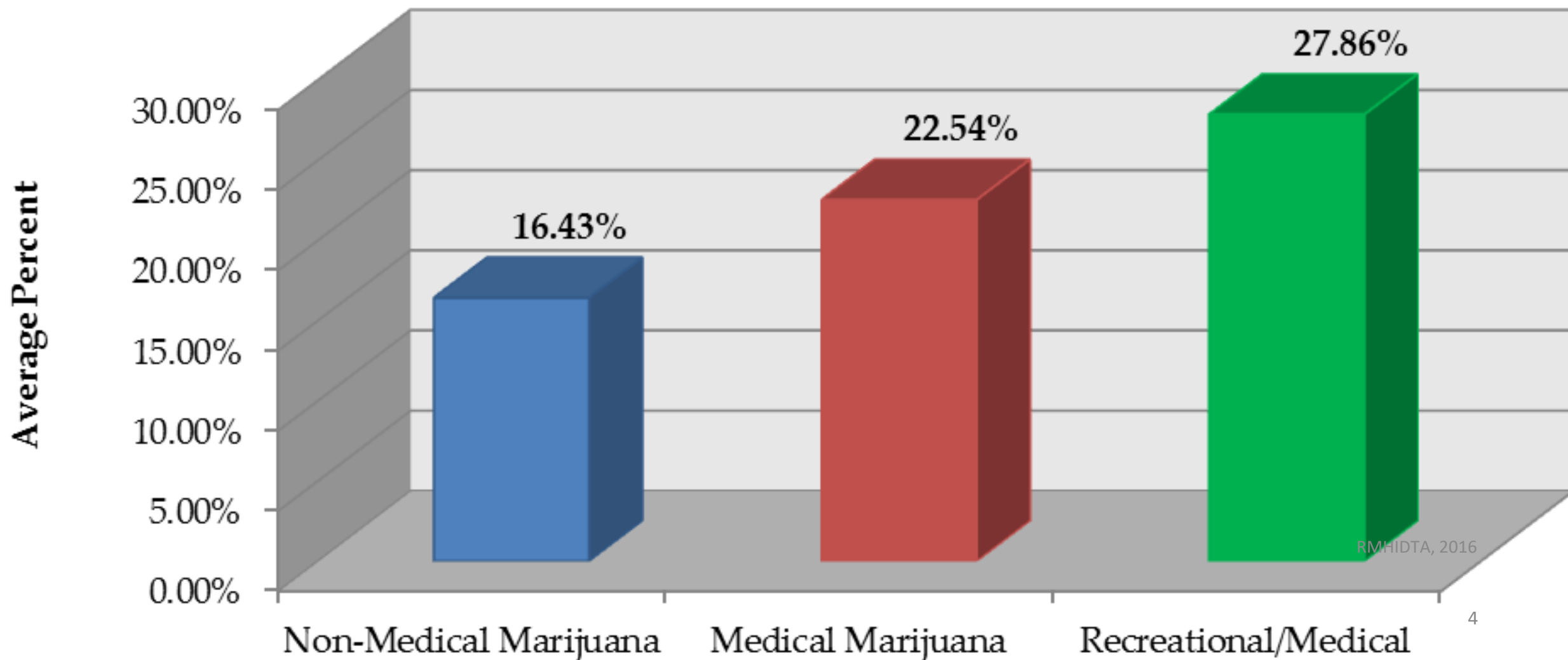


Average Past Month Use Youth Ages 12 to 17 Years Old, 2014/2015

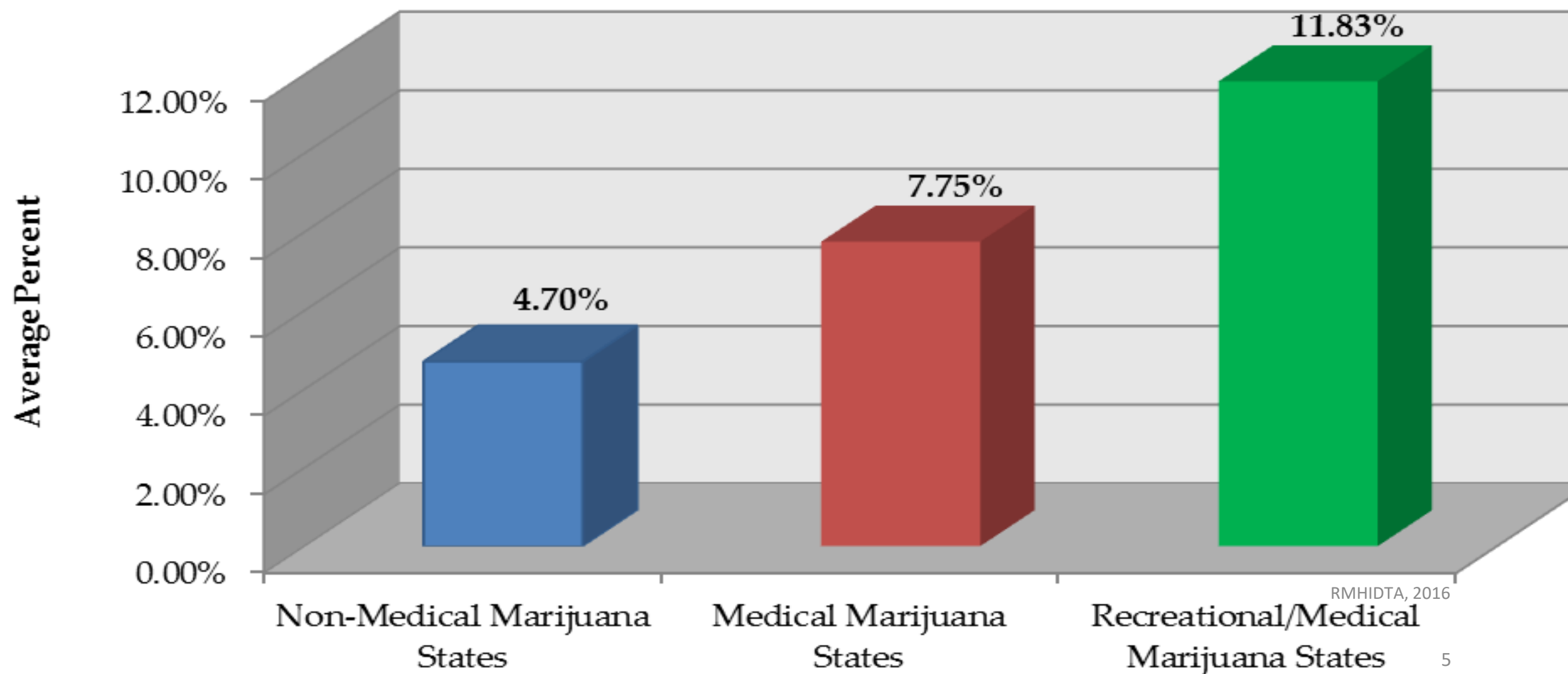


SOURCE: SAMHSA.gov, National Survey on Drug Use and Health 2014 and 2015

Average Past Month Use by 18 to 25 Years Old, 2013/2014



Average Past Month Use by 26+ Years Old, 2013/2014





Feel Better




HUGS

ADULT USE AND
MEDICAL CANNABIS

2035 STOCKTON BLVD.

004364

HOLIDAY PROMOTIONS: BLACK FRIDAY



The poster features a decorative border at the top and bottom with a row of small green plants above and below a band of yellow and green textured material. The main title 'BLACK FRIDAY' is in large, bold, black capital letters, with the word 'green' written in a green cursive font over the 'BLACK' part. Below the title, the date and time 'FRIDAY NOVEMBER 27TH 11AM TO 7PM' are printed in black. The poster lists three main promotion categories in green cursive: 'door buster prizes', 'jackpot gift basket', and 'all-day savings'. Each category has a list of items with asterisk bullet points. A circular logo with a green and yellow geometric pattern and the text 'Peace in Medicine' is on the right. The year '2015' is handwritten in purple at the bottom right.

BLACK FRIDAY
FRIDAY NOVEMBER 27TH 11AM TO 7PM

door buster prizes


- * 1st 10 members get a free gram of hash
- * Next 15 members get a free gram of flowers
- * Next 25 members get a cone & lighter gift bag

jackpot gift basket

- * Get 1 raffle ticket for every \$50 spent for a chance to win a gift basket worth \$500

all-day savings

- * Mix & Match buy 3 edibles get the 4th free
- * \$5 off bubble hash
- * \$5 off all 1/8ths
- * \$5 off full melt grams


Peace in Medicine

2015

*“I’m the
Stoner Mom.
I’m here to
show you a
different kind
of stoner.”*



*“Because we
like to get
high too!”*

The Stoner Mom: Responsible Cannabis Lifestyle



MOTHERING MARIJUANA &



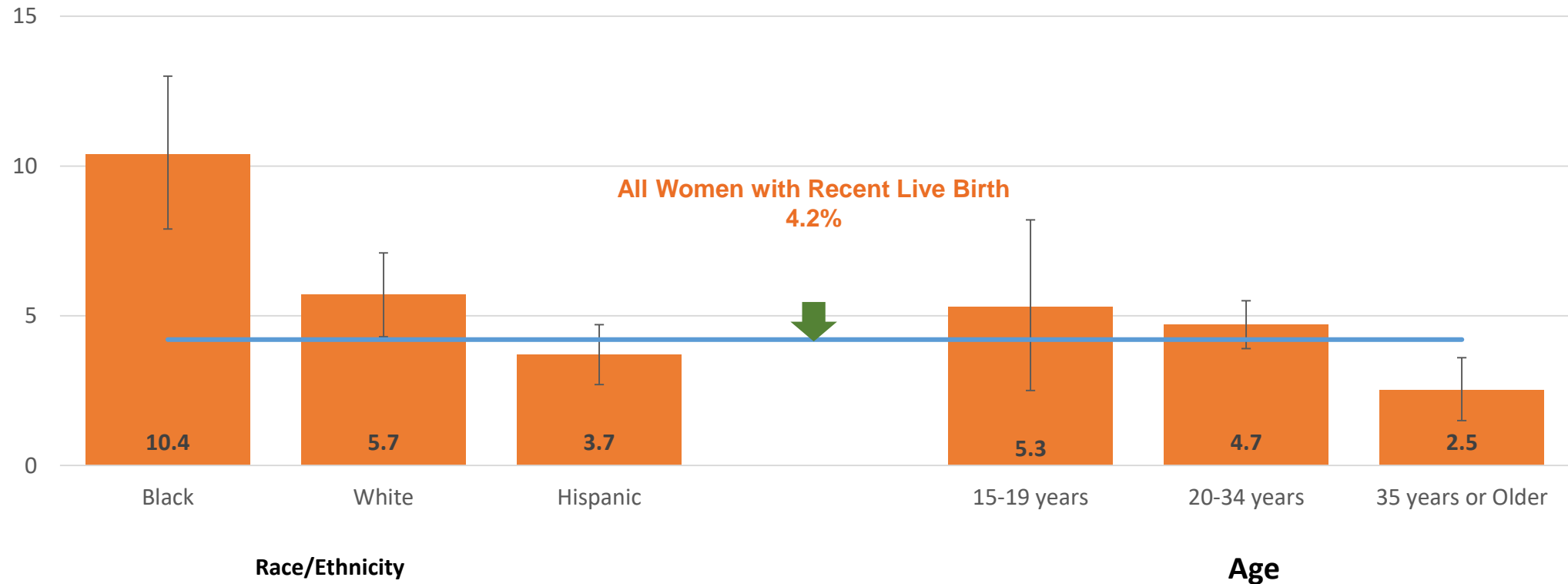
THESTONERMOM.COM

“... kids are back in school. It also means several hours of alone adult time every day, so mama can get back her regular stoner mom work hours.”

Usage During Pregnancy

Self-Reported Use of Cannabis During Pregnancy 2016 Maternal and Infant Health Assessment

Percent of Women Reporting Marijuana Use
During Pregnancy (95% CI)



Source: 2016 Maternal and Infant Health Assessment (MIHA) Data. MIHA estimates are weighted to preliminary California birth certificate data and will differ slightly from MIHA estimates weighted to the final 2016 Birth Statistical Master File. Prepared by: Center for Family Health / Maternal, Child and Adolescent Health Division / Epidemiology, Surveillance and Federal Reporting. 2018.



The fetal oxygen supply

- Maternal crack cocaine, heroin, tobacco, and marijuana all cause vasoconstriction that restricts the fetal oxygen supply.
- Marijuana can remain in the body for up to 30 days, prolonging fetal exposure.
- Smoking marijuana produces as much as 5 times the amount of carbon monoxide as does cigarette smoking, possibly altering fetal oxygenation.

Is it safe during pregnancy?

- Use during pregnancy is associated with
 - increased risk for stillborn births.
 - increased startles and tremors, high pitched cries, and decreased responses to stimuli in newborns.
 - inattention and impulsivity at age 10.
 - academic underachievement, especially spelling and reading.
 - lower school performance and memory abilities than children not exposed.
 - decreased attentiveness, visual memory and problem solving skills.
 - early onset of use in offspring.
 - frequency of use at age 14.
 - increased marijuana use at age 22.
 - changes in the placenta.
- Infants exposed to second-hand marijuana smoke have twice the possible risk of SIDS as unexposed babies.

National Academy of Sciences, 2014; Varner, et al., 2014; Behnke, 2013; NIDA, 2011; Reece-Stremtan, 2015; Goldschmit et al., 2012, Rocky Mountain HIDTA, 2013; Sonon et al., 2015; Carter et al., 2016

PCE- Prenatal cannabis exposure: What issues have been studied?

- Premature birth
- Stillborn births
- Congenital birth defects
- SGA- Small for Gestational Age
 - Weight below the 10th percentile for the gestational age
 - 90% catch up by age 2
 - FTT and hypoglycemia risk
- LBW- birthweight less than 2500 g (5lb 8oz) regardless of gestational age
 - One third of LBW babies are SGA
- NICU admissions
- Neonatal death
- SIDS
- Neurodevelopment

The 2012 Australian Hayatbakhsh study

- 24,874 women 2002-2006 at a Brisbane hospital
- 26% reported ever using
- 9.5% had used regularly before pregnancy
- 2.6% current use at their first visit
- Tobacco, alcohol, other illicit drugs controlled for
- Found LBW, preterm labor, SGA and NICU admissions for ever used regularly
- What percent of the following are attributable to regular use?
 - 2.5% of LBW
 - 1.5% of preterm delivery
 - 2.7% of NICU admissions could be prevented if women did not use during pregnancy

The 2015 Warshak study

- 6468 women adjusted for age, race, BMI and no prenatal care
- Ruled out tobacco use
- Marijuana users who didn't use tobacco
 - No increase in fetal abnormalities and preterm delivery
 - Increased risk of SGA
 - Increased risk of NICU admission

Metz and Strickrath: 2015 Meta analysis of 615 articles

- The effect on nausea and vomiting in pregnancy is unknown.
- Marijuana affects the use of anesthesia during pregnancy.
- Possible increase of stillbirths, preterm births and SGA.
- Current research is sparse and unclear about the relationship between use and congenital birth defects.
- Dopamine receptors were reduced in the amygdalas of fetuses exposed to use, especially in boys.
- Age 10- children exposed during pregnancy had decreased attention, more hyperactivity and impulsivity.
- Ages 10 and 14 lower reading and spelling performance, especially with use during the first trimester.
- Earlier substance use and greater duration of use when exposed in utero.

The 2016 Gunn meta analysis

- Seven databases up to April 2014 were reviewed and 24 studies analyzed
- LBW was related to use.
- Babies of users were more likely to be placed in the NICU than babies of non-users.
- Babies of women who used were more likely to be anemic.

The Conner meta analysis, 2016

- Database search of 6 databases up to August 2015 with 31 included studies
 - 16 of the studies were from the 80s and 90s, potency was less than 5%
 - 3 were from 2000 to 2005 when potency was 5 to 8%
 - 12 were 2006 on, when potency was 9 to 15+%
- All studies found a higher risk for LBW than for non-users without adjusting for tobacco use (15.4% vs 10.4%)
- All but one study found a higher risk for PTD than for non-users without adjusting for tobacco use (15.3% vs 9.6%)
- However, when they adjusted for tobacco use, they did not find a relationship.
- However, women who used at least weekly during pregnancy were at significantly higher risk compared to nonusers for
 - LBW- 11.2% vs 6.7%
 - PTD – 10.4% vs 5.7%

Premature birth- less than 37 weeks

- Hayatbakhsh, 2012- controlled for tobacco and found a relationship
- Metz and Strickrath, 2015- a possible relationship
- Warshak, 2015- no relationship
- Conner, 2016, found women who smoked both marijuana only weekly or marijuana and tobacco were at increased risk
- NAS, 2017- some studies say yes, others no

Stillbirths

- Varner, 2014- Between March 2006 and September 2008 at 59 hospitals in the Stillbirth Collaborative Research Network- 663 stillbirths and 1900 live births
 - They did blood tests for the mother and the umbilical cord
 - 94% of stillbirths tested positive for an illegal drug, and marijuana was most common
 - Tobacco use: a 1.8 to 2.8 times greater risk of stillbirth based on dosage
 - Women who quit smoking between their first and second pregnancy reduce their risk to the same level as nonsmokers in the second pregnancy
 - Marijuana use: 2.3 times greater risk of stillbirth
 - Secondhand smoke and stillbirth: 2.1 times greater risk
- Warshak, 2015- No relationship
- Metz and Strickrath, 2015- Possible relationship

Congenital birth defects

- Metz and Strickrath, 2015- unclear
- Merlob, 2017- A small increased risk for some birth defects may be associated with early pregnancy use
- Melis, 2017- there is an association possibly due to a neuronal basis of vulnerability at the molecular and cellular level
- US Birth Defects Prevention Center, March of Dimes- significantly increased risk for anencephaly when exposed during the first month of gestation

IUGR, SGA

- Hayatbakhsh, 2012- ruled out tobacco and found a relationship
- Warshak, 2015- clearly ruled out tobacco use and found a relationship
- The 2015 Metz and Strickland meta analysis- a relationship is possible

Low birth weight (LBW)

- Carbon monoxide and elevated carboxyhemoglobin blood levels may be up to 5 times higher after smoking marijuana cigarettes than tobacco.
- Hayatbakhsh, 2012- Study of 25,000 women found LBW, SGA, and more likely to be admitted to the NICU even after controlling for tobacco and other drugs.
- Gunn's 2016 meta analysis found a relationship
- Conner's 2016 meta analysis found a relationship for weekly users during pregnancy
- NAS, 2017- "There is substantial evidence of a statistical association between cannabis smoking and LBW of offspring."
 - One good systematic review- Gunn in 2016.
 - Fergusson, 2002- independent of tobacco use, $p = <.005$.

NICU admissions

- Hayatbakhsh, 2012- found a relationship
- NAS, 2017- reported a relationship
 - The 2016 Gunn study found a relationship
 - The 2015 Warshak study found a relationship

Neonatal death

- Neonatal death- infant death within 28 days of birth
 - Metz, 2017, Eunice Shriver study – Stillbirth Collaborative Research Network
 - After controlling for tobacco and other drugs, 14% of marijuana users had neonate deaths compared to 4.5% of non-users
 - Due to infections- 9.8% users vs 2.4% non-users
 - Neurological issues- 1.4% vs .3%
 - NICU admissions not statistically significant (16.9% users vs 9.5% nonusers)

Neurobehavioral teratology: the impact of PNE to a foreign agent on the CNS and behavior

- Harm caused by the toxic agent is related to several factors
 - The individual's genetic makeup
 - Fetal and postnatal environment
 - Dosage
 - Developmental stage of the fetus at the time of exposure
- CNS injury may result in behavioral impairments rather than physical birth defects
- PNE to the CNS may affect fetal, neonatal, infant and child development

THC and the CNS

- In adults THC interferes with the endocannabinoid signaling system that modulates synaptic neurotransmitter release that
 - Regulate motor control, memory and other brain functions
- Embryonic CNS development
 - 16-22 days post conception
 - The neural plate and neural tube are established- the basic platform for the forebrain, midbrain and hindbrain
- US National Birth Defects Prevention Center
 - Significant increased risk for anencephaly when the fetus is exposed to marijuana in the first month of gestation- only when the neural tube is closing

Potential neurodevelopmental interference

- CNS development begins about day 16 of gestation
 - The endocannabinoid system begins at the same time as the CNS
 - The endocannabinoid system appears to be significantly involved in the formation of
 - Neural circuitry, including neuronal genesis and migration
 - Axon and dendrite growth
 - Formation of the synapses (neuronal connections)

Synthetic cannabinoids- K2/spice studies in mice a stronger impact than THC

Volkow, 2017, JAMA

Neurological development

- Metz and Strickrath, 2014- “a concerning pattern of altered neurodevelopment with early, heavy maternal use of marijuana.”
- Richardson, 2016-
 - Use perturbs the ECSS (endogenous cannabinoid signaling system) which is active from the early embryonic stage.
 - strong recommendation to not use.
- Chasnoff, 2017- marijuana targets the cannabinoid receptors, disrupts migration, differentiation and synaptic communication in the developing neurotransmitter system, which affects cognitive and emotional functioning.
- Elsevier- THC crosses the placenta and is secreted in breast milk causing disruption to fine tune molecular signaling pathways and neurodevelopmental programs.
- Melis, 2017- use results in changes at the molecular level in the amygdala, nucleus accumbens, thalamus and ventral striatum.
 - It also impacts dopamine receptors, which may contribute to the child developing an SUD.
 - Pregnancy use impacts DNA.

Dispensaries recommendations about first trimester use

- A mystery caller contacted 400 Colorado dispensaries and found
 - 69% recommended treated morning sickness with marijuana
 - 51% recommended edibles, 38% recommended smoking
 - 65% based their recommendation on personal opinion
 - 36% said it is safe during pregnancy
 - Only 31.8% suggested talking to their health care provider

Dickson, 2018

Medical marijuana and morning sickness

- Dr. Andra Smith, University of Ottawa- “Yes, it might make the morning sickness subside but at what cost? The long-term consequences may well be far more damaging than the short-term relief.”
- Seattle Times, 2017- “In the end, whether a mom-to-be considers a puff of pot or a sip of wine, I have to ask one question: Given what we know, and more importantly, what we don’t, why take the risk?”



Breastfeeding and use

- Brown, 2018- Babies had reduced muscular tonus, poor sucking, growth delay and restriction.
- Baker, 2018- THC peaked in one hour after smoking and THC continued to be in the milk at four hours. smoked a preweighed joint from a single dispensary, then breast milk analyzed for THC at 20 min, 1,2, and 4 hours after smoking.
- NAS, 2017- Prenatal exposure is a confounding variable

October 2017- ACOG recommends the following:

- “Before pregnancy and in early pregnancy, all women should be asked about their use of tobacco, alcohol, and other drugs, including marijuana, and other medications used for nonmedical reasons.
- Women reporting marijuana use should be counseled about concerns regarding potential adverse health consequences of continued use during pregnancy.
- Women who are pregnant or contemplating pregnancy should be encouraged to discontinue marijuana use.
- Pregnant women or women contemplating pregnancy should be encouraged to discontinue use for medicinal purposes in favor of an alternative therapy for which there are better pregnancy-specific safety data.
- There are insufficient data to evaluate the effects of use on infants during lactation and breastfeeding, and in the absence of such data, marijuana use is discouraged.

Marijuana use and other drugs

- A 2017 study of 30,000 Americans three years after an opioid Rx:
 - Marijuana users were more than twice as likely to abuse prescription opioids.
- The CDC found that marijuana users are three times more likely to become addicted to heroin.
- Marijuana use predicted continued opioid Rx one year after injury.
- Users have reduced odds of cocaine, alcohol and polysubstance use abstinence after inpatient treatment for substance use disorders.
- Twin studies and longitudinal have found a relationship between regular use and the use of other illicit drugs.

Do marijuana states have lower rates of Rx drug misuse?

The 2015 National Survey on Drug Use and Health-
57,000 respondents

When you look only at people who take prescription drugs, people that use medical marijuana are twice as likely to report non-medical Rx drug use than non-users

Medical marijuana is positively associated with non-medical Rx drug use.

Caputi, 2018

Are individuals who use marijuana more likely to be opioid dependent?

- The more an individual used non-medical marijuana in their teen or young adults years, the more likely they are to have an opioid use disorder.
- Cocaine use and marijuana use, but not alcohol use, is a positive predictor of an opioid use disorder.

Tobacco and Marijuana- the Reverse Gateway

- There is a relationship between marijuana use and
 - initiating cigarette smoking among nonsmokers
 - tobacco smokers have more difficulty stopping cigarette smoking
 - former smokers who use marijuana are more likely to begin smoking cigarettes again.

Comments & Questions

sue.nelson@hhs.sccgov.org

