

Marijuana: Reality and Science

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Chairman

The Institute on

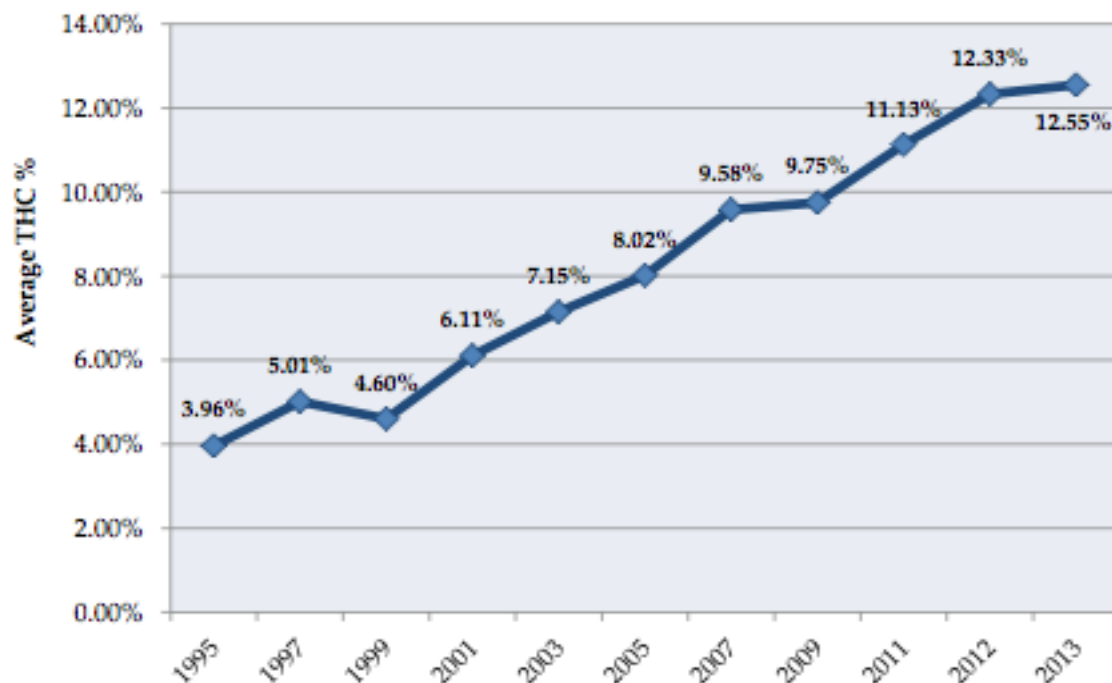
Global Drug Policy

Marijuana

- Impurity-over 500 substances, 66 cannabinoids
- Resembles tobacco in constituents.
- High THC concentrations 2-30%
- 1/2 life 5-7 days

THC Potency

**Potency Monitoring Program - Average
THC Percent DEA-Submitted Cannabis
Samples 1995 - 2013**



SOURCE: Potency Monitoring Program, Quarterly Report Number 123, National Center for Natural Products Research (NCNRP) at the University of Mississippi, under contract with the National Institute on Drug Abuse.

Complications of Marijuana Use

Cognitive Changes

- Attention
- Concentration
- Decision-making
- Inhibition
- Impulsivity
- Working memory
- Verbal fluency
- Concept formation and planning

Structural Change on MRI

- 48 marijuana users
- Abnormal Gray Matter volume
- Abnormal Orbitofrontal Cortex
- Part of the reward network of the brain
- Cumulative deleterious effect on OFC

Filbey et al

Proceedings of the National Academy of Sciences,
2014;111:16913-16918

Structural Damage to Brain

- 59 users 33 controls
- Ave age 33, Ave use 15 yrs, started 16.7 yo
- Ave joints /mo=147
- Ave life joints 25922
- Demonstrated axonal connectivity impairment in hippocampus, splenium of corpus callosum, commissural fibers

Brain 2012;135:2245-2255

Poor Life Outcomes with Pot

- Never used cannabis vs daily before age 17
Increased odds of :
 - later cannabis dependence (17.95, 9.44–34.12),
 - use of other illicit drugs (7.80, 4.46–13.63),
 - suicide attempt (6.83, 2.04–22.90).
- Reductions in:
 - high- school completion
 - degree attainment

Neuropsychological Decline

- 1037 individuals
- Pot use at 18,21,26,32,38 y/o
- Neuropsych testing at 13 before pot and 38
- Broad Neuropsychological decline across all domains even controlling for education
- 10% (101-91) IQ difference between never and persistent user.
- 6-point IQ decline age 13-38 w/ persistent use

PTSD and Marijuana Use

- 2000 participants in VA treatment programs
- Non-users had significantly less symptoms
- Prior users who quit had less symptoms
- Users had higher levels of violence,
- New users had higher levels of violence and also turned more to other drugs
- Commented: “Most people assume things based on their own experience... People assume that there aren’t a lot of risks.....there really are”

Wilkinson

Yale University December 2014

Presented to the AAAP

Sexual Assault/ Victimization

- Alcohol and Marijuana predict violence.
Kraanen Journal of Substance Abuse Treatment 46 (2014) 532–539
- Marijuana-associated partner aggression
Moore Clinical Psych Review 28 (2008) 247-274
- College Drug Use and Partner Violence
Nabors Journal of Interpersonal Violence 25(6) 1043–1063
- Dating Aggression by Adolescents
Reyes Journal of Adolescence 37 (2014) 281–289

Depression

- Depressive responses measured
- Lower doses= Serotonin agonist
- Higher doses= Serotonin suppressant
- Effect was the Medial Prefrontal Cortex

J Neuroscience 2007;27:11700-11711

Marijuana and Psychosis

- Early cannabis use is associated with psychosis-related outcomes in young adults. The use of **sibling pairs** reduces the likelihood that unmeasured confounding explains these findings. Further support for the hypothesis that early **cannabis** use is a risk-modifying factor for **psychosis**-related outcomes in young adults.

■ *Arch Gen Psychiatry*. 2010;67(5)

Marijuana and Bipolar Illness

- 166 first-episode bipolar I disorder patients.
- Cannabis and alcohol associated with the first episode of mania

Bipolar Disorder 2008;10:738-741

Newborn Effects

- Birthweight
- Length
- Head Circumference
- Abnormal Development
- Neurological Irritability

Medical Excuse Marijuana

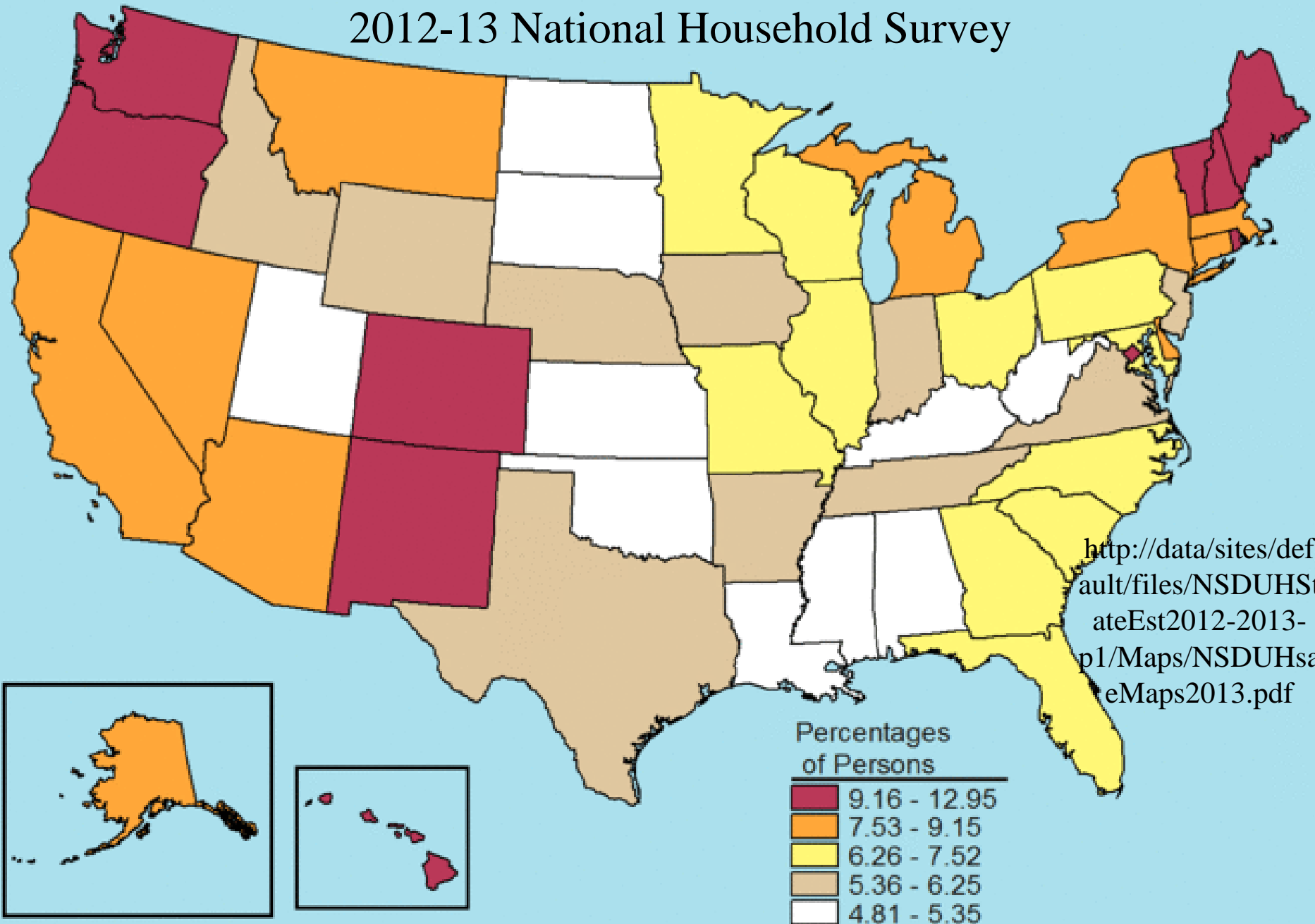
No compelling evidence that there is a significant group of untreated or inadequately treated patients.

Pro-marijuana lobby getting its
“nose under the tent”

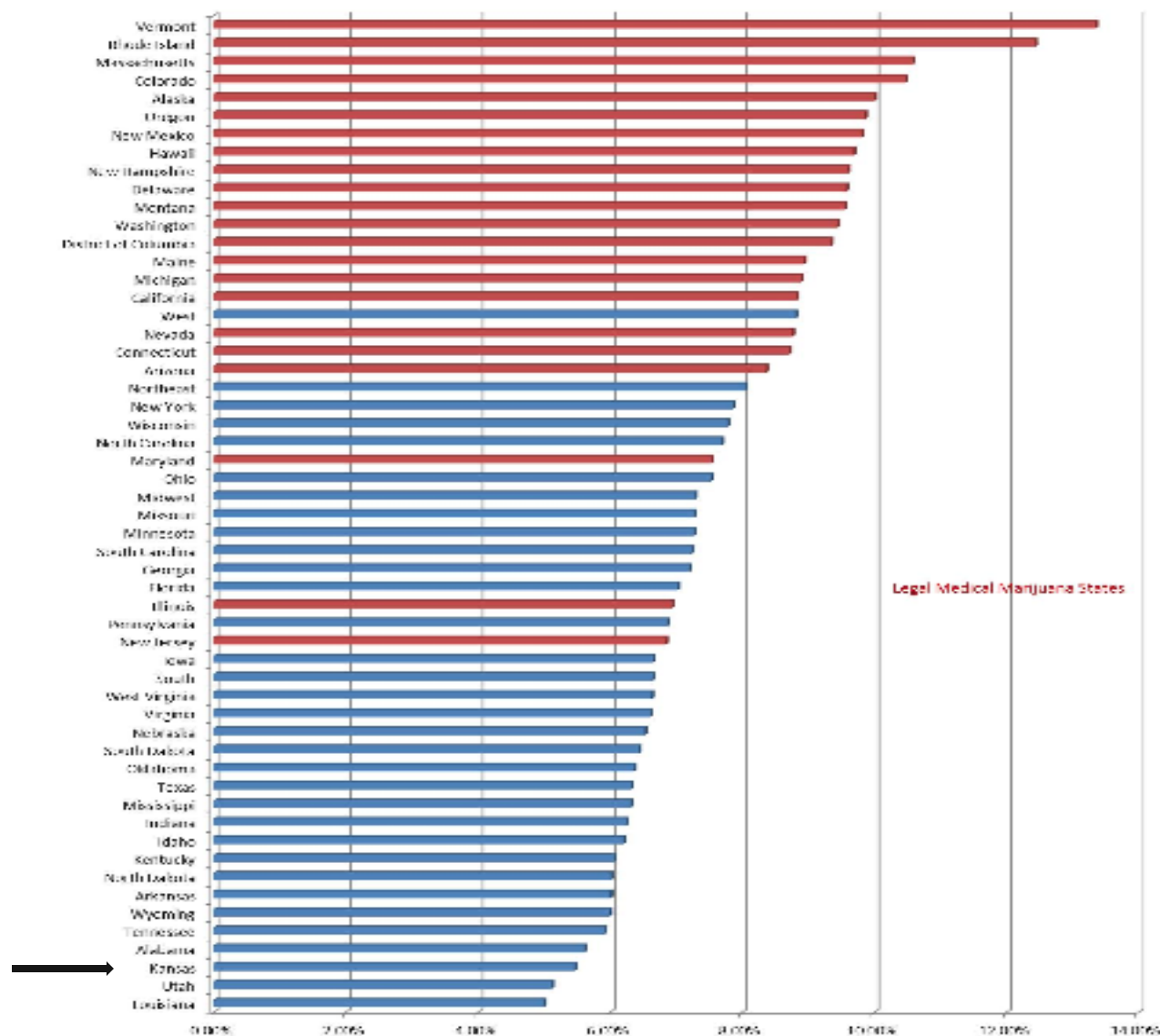
Scientific Status of Medical Excuse Marijuana

- Specific Cannabinoids may be useful and worth studying
- Smoking problematic/ Doses unpredictable
- Legislative processes bypass the FDA and jeopardize the public
- Oral THC (Marinol) is readily available
- New products such as Sativex and Epidiolex are on the horizon/ Also Investigational New Drug Applications

2012-13 National Household Survey

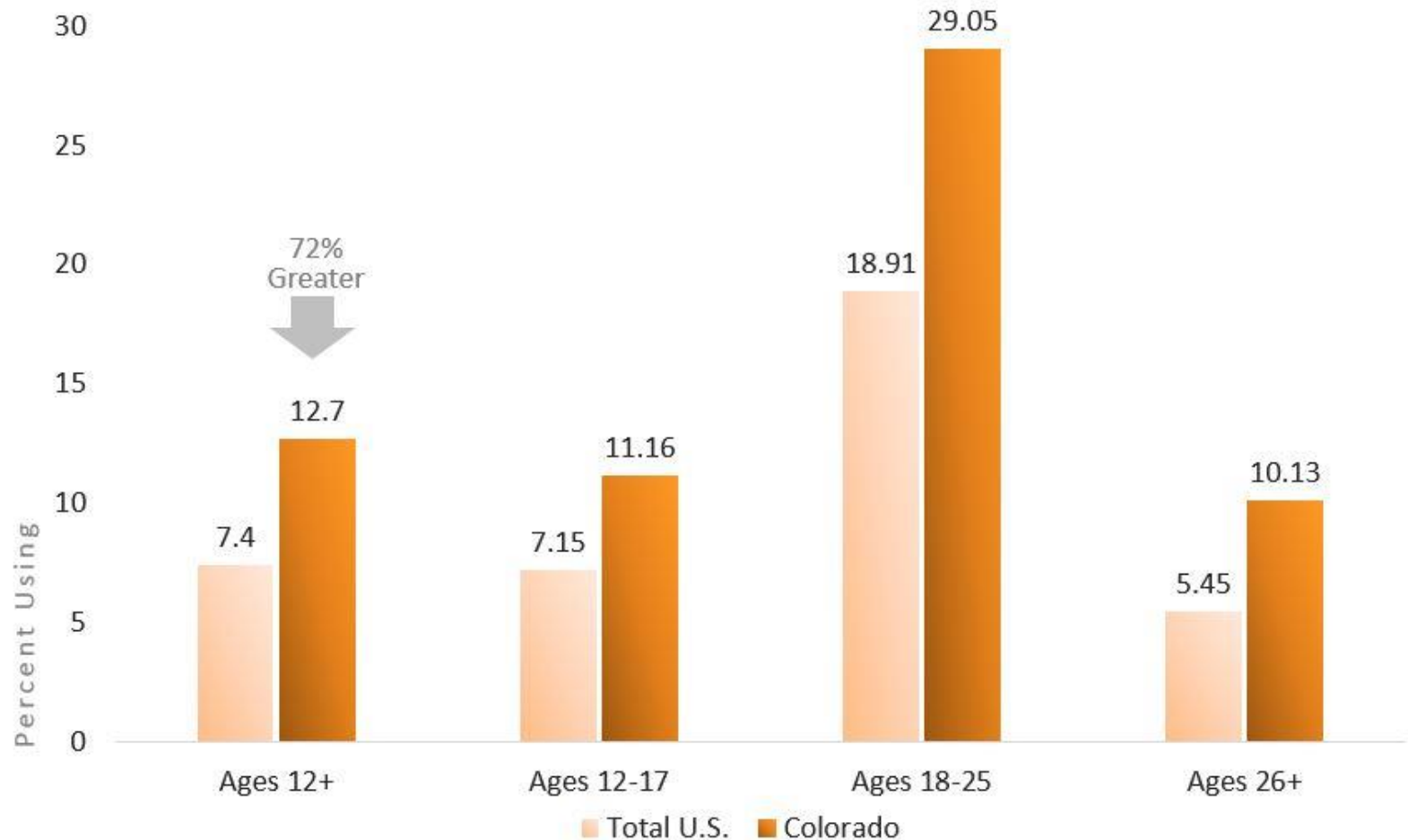


Past Month Usage by 12 to 17-Year-Olds in Medical Marijuana States, 2012



SOURCE: SAMHSA.gov, National Survey on Drug Use and Health, 2013

U.S. vs Colorado Past-Month Marijuana Use, 2013



National Survey on Drug Use and Health,
2013 released Jan 2014 SAMHSA

Marijuana and Fatal Crashes California 2008

- Five years following medical excuse marijuana dispensaries 1240 fatal crashes compared to 631 for the five years prior
- 8.3% of fatal single vehicle crashes
- 5.5% fatal passenger crashes
- Use rate estimated at 16-20%
- Rivals alcohol as top cause of fatalities

Marijuana and Fatal Crashes Colorado Since Dispensaries

| | Fatal crashes THC | Ave Percent THC |
|------|-------------------|-----------------|
| 2006 | 21 | 2.9 |
| 2007 | 23 | 2.9 |
| 2008 | 31 | 4.4 |
| 2009 | 37 | 5.7 |
| 2010 | 42 | 7 |
| 2011 | 52 | 8.9 |

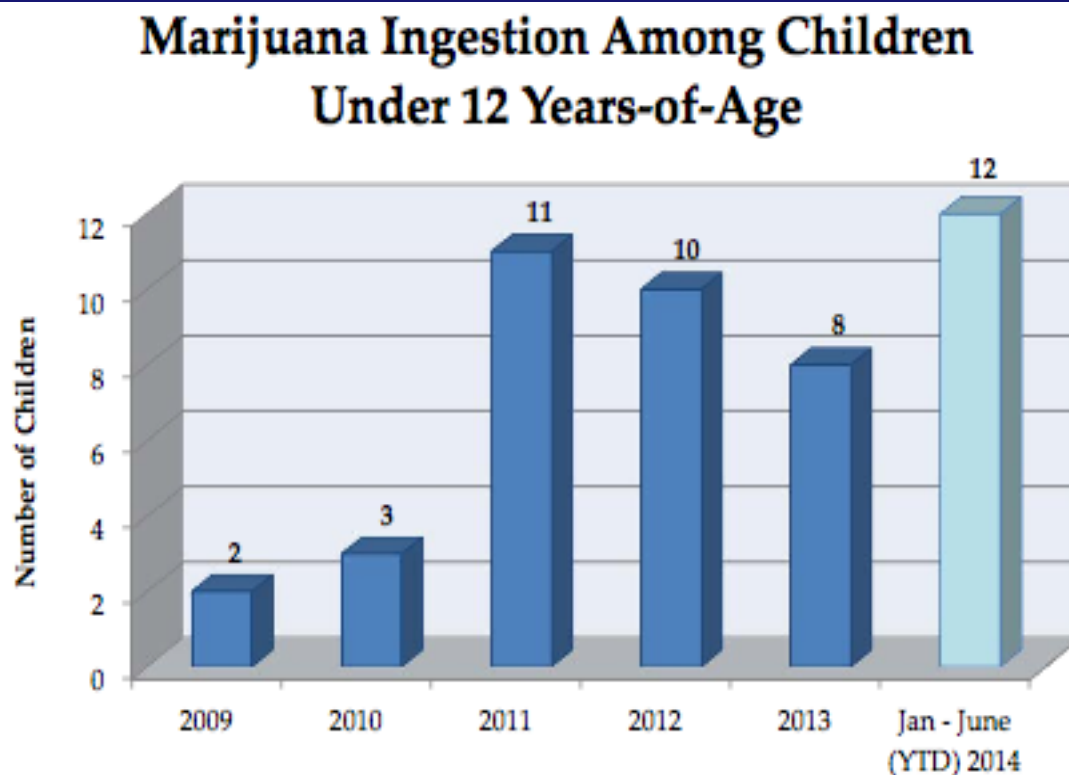
Marijuana and Crime

All reported Denver crime

(compare Jan-June 2013 to Jan-June 2014)

- Person Crime ↑ 18.1%
- Property Crime ↑ 8%
- All Offenses ↑ 114.9%

Child Marijuana Poisonings



SOURCE: Dr. George Sam Wang, pediatric emergency physician, Children's Hospital Colorado, July 8, 2014

Who is Actually Using Medical Excuse Marijuana?

- Under 34 -- 45.4%
- Under 54 (most pain age older) 84%
- For Pain 82%
- For Anxiety 37%
- For Depression 26%
- For Nausea 27%
- For Appetite 37.7%

Pain Summary

- Summary of literature on pain/ quality of studies generally marginal
- Mostly discussing oral or synthetic cannabinoids
- May be useful as an adjunct particularly for neuropathic pain
- As solo agent, Effective doses undefined.

Current Opinion in Anaesthesiology 2005, 18:424–427

Cannabinoids in MS meta-analysis

- All studied were non-smoked
- Cannabinoids difficult to work with
- Adverse effects not related to dose
- Little benefit for spasticity-poss as add-on
- Evidence on tremor weak
- Evidence on pain moderate
- Problems with psychoactivity

Practical Issues/ Regulation

- What marijuana will be allowed, what strengths, and who pays for it?
- Who produces the marijuana?
- Is marijuana purity assured?
- Is the caregiver licensed and in good standing with regulatory agencies?
- Does the caregiver demonstrate formal training or experience in addiction and in the administration of dangerous drugs?