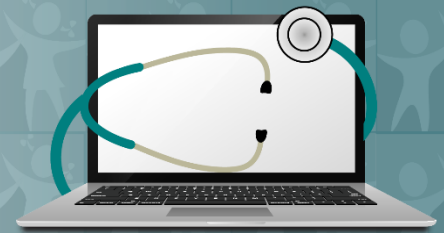




PEHSU NATIONAL CLASSROOM

Pediatric Environmental
Health Specialty Units



www.pehsu.net/nationalclassroom.html



Webinars

Series of scientific webinars that provide a forum for discourse on scientific issues.

Live and On-Demand

Case Conferences
Journal Clubs
Grand Rounds

CE Available



Online Courses

Evidence-based online courses on a variety of children's environmental health topics.

Interactive and Self-Paced

CE Available



Resource Catalog

Fact sheets, journal publications, reports, and other resources for parents, community members, patients and healthcare professionals

Topics included:
Air Quality, Pesticides,
Natural Disasters, BPA,
Mold, Lead, Mercury



Marijuana and Its Impact on Adolescent and Perinatal Populations

G. Sam Wang MD

Assistant Professor of Pediatrics

Section of Emergency Medicine, Medical Toxicology

University of Colorado Anschutz Medical Campus

Children's Hospital Colorado



Acknowledgement/Disclosures

The Pediatric Environmental Health Specialty Units exist across all the Federal regions in the United States and serve to protect the environmental health of children. The PEHSUs typically bring together pediatricians, occupational medicine providers, toxicologists, nurses, and other disciplines such as industrial hygienists to provide an evidence-based approach to children with environmental concerns. Poison Centers often provide call center services and toxicology expertise. The current PEHSU program is divided into East and West groupings with PEHSU-East administrated by the American Academy of Pediatrics (AAP) and PEHSU-West administrated under the American College of Medical Toxicologists (ACMT). Funding for the program is based in the Agency for Toxic Substances and Disease Registry (ATSDR) within the Centers for Disease Control. Each PEHSU must be an academic center, have 24-hour Hotline access, and have capacity to provide medical services as needed.

Disclaimer: This presentation was supported by the American College of Medical Toxicology (ACMT) and funded (in part) by the cooperative agreement award number 1 U61TS000238-01 from the Agency for Toxic Substances and Disease Registry (ATSDR).

Acknowledgement: The U.S. Environmental Protection Agency (EPA) supports the PEHSU by providing partial funding to ATSDR under Inter-Agency Agreement number DW-75-92301301-9. Neither EPA nor ATSDR endorse the purchase of any commercial products or services mentioned in PEHSU publications

- ▣ Royalties from UpToDate
- ▣ CDPHE Med MJ Grant RFA acceptance
- ▣ CDPHE committees:
 - Retail advisory
 - Edible work group
 - Educational campaign

Objectives

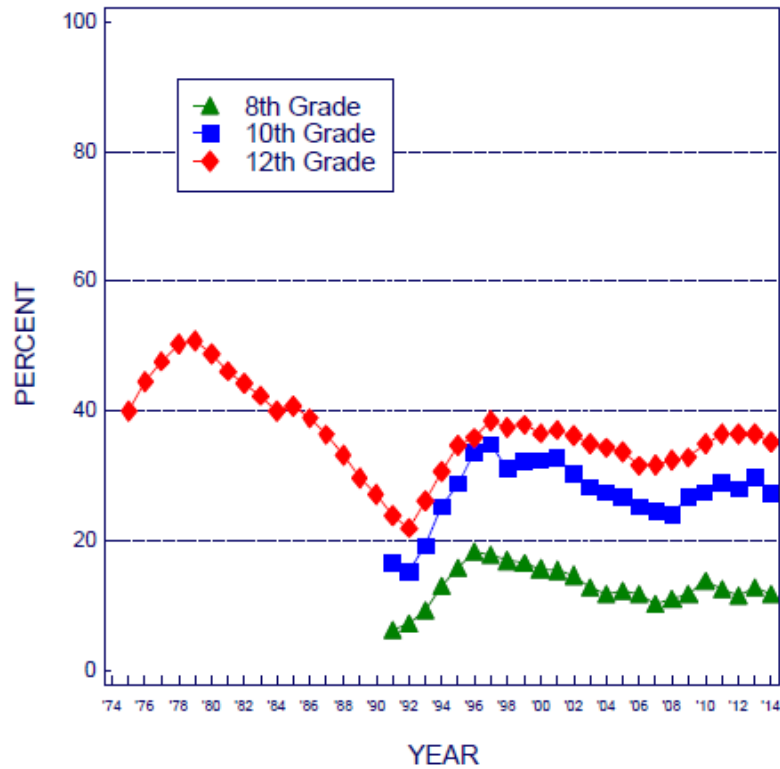
- At the end of the presentation, the participant will be able to:
 - Describe the how marijuana effects the prenatal/breast feeding, and adolescent population
 - Describe how cannabidiol is being used for epilepsy

Marijuana and Adolescents

Epidemiology

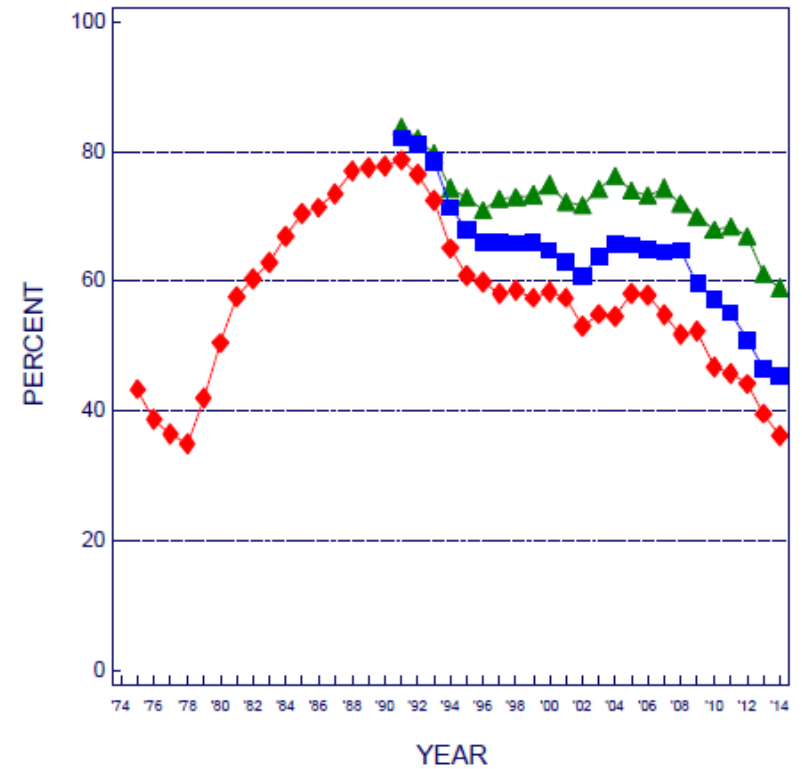
Use

% who used in last 12 months

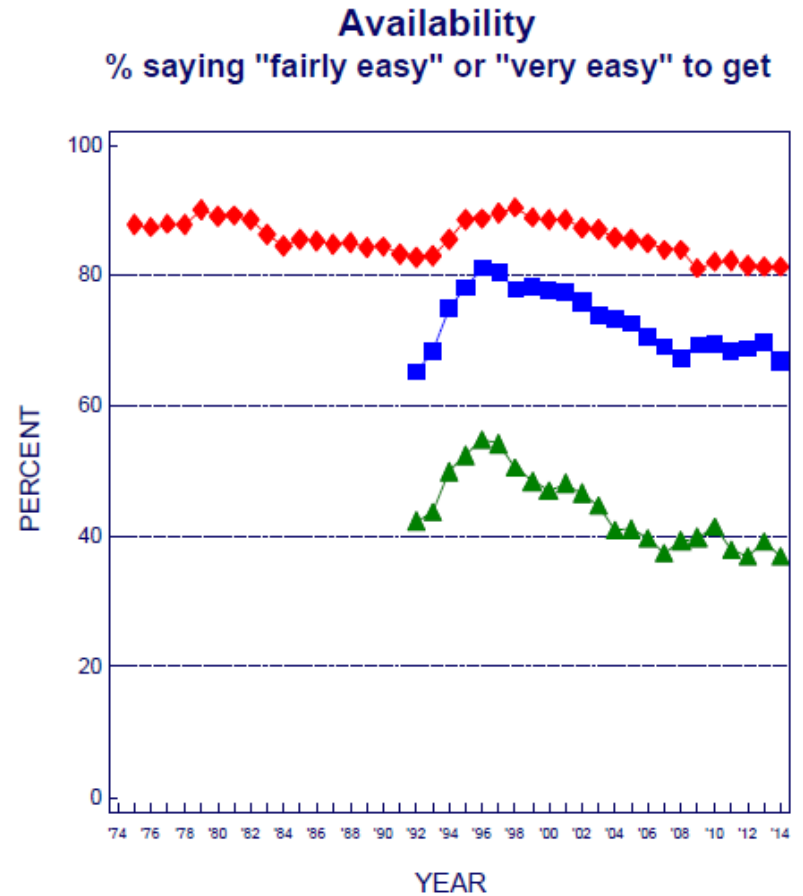
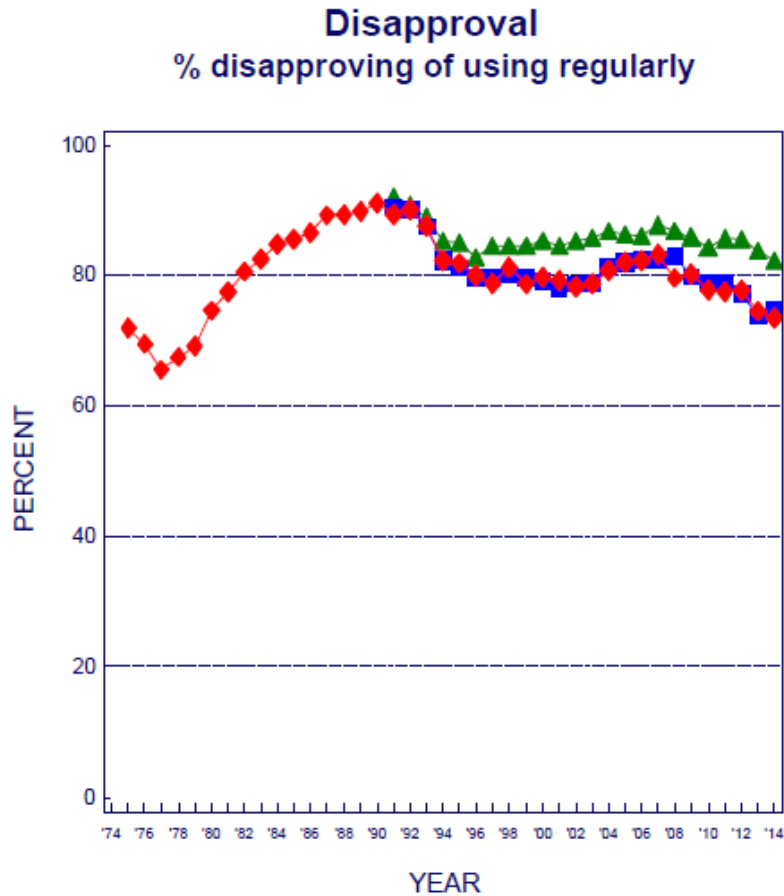


Risk

% seeing "great risk" in using regularly



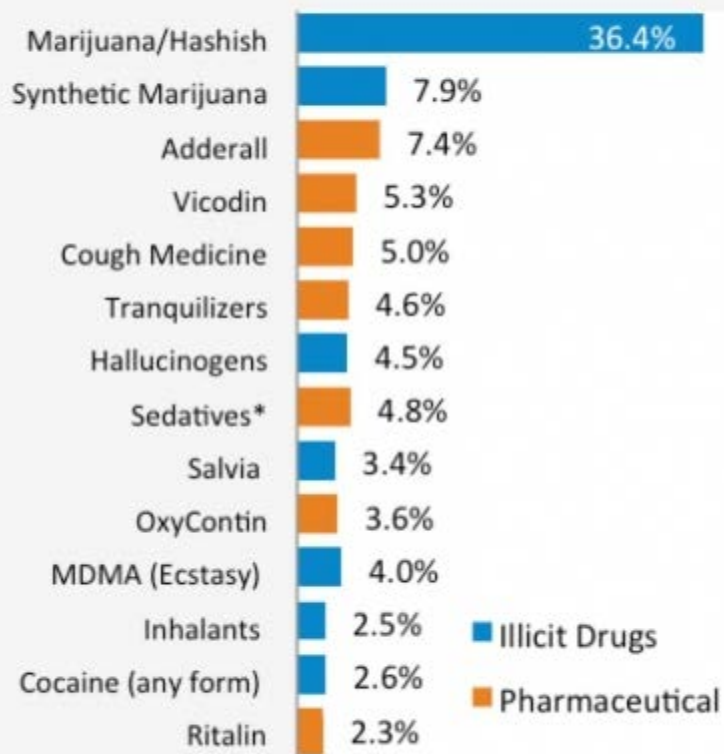
Epidemiology



Source. The Monitoring the Future study, the University of Michigan.

Monitoring the Futures Study

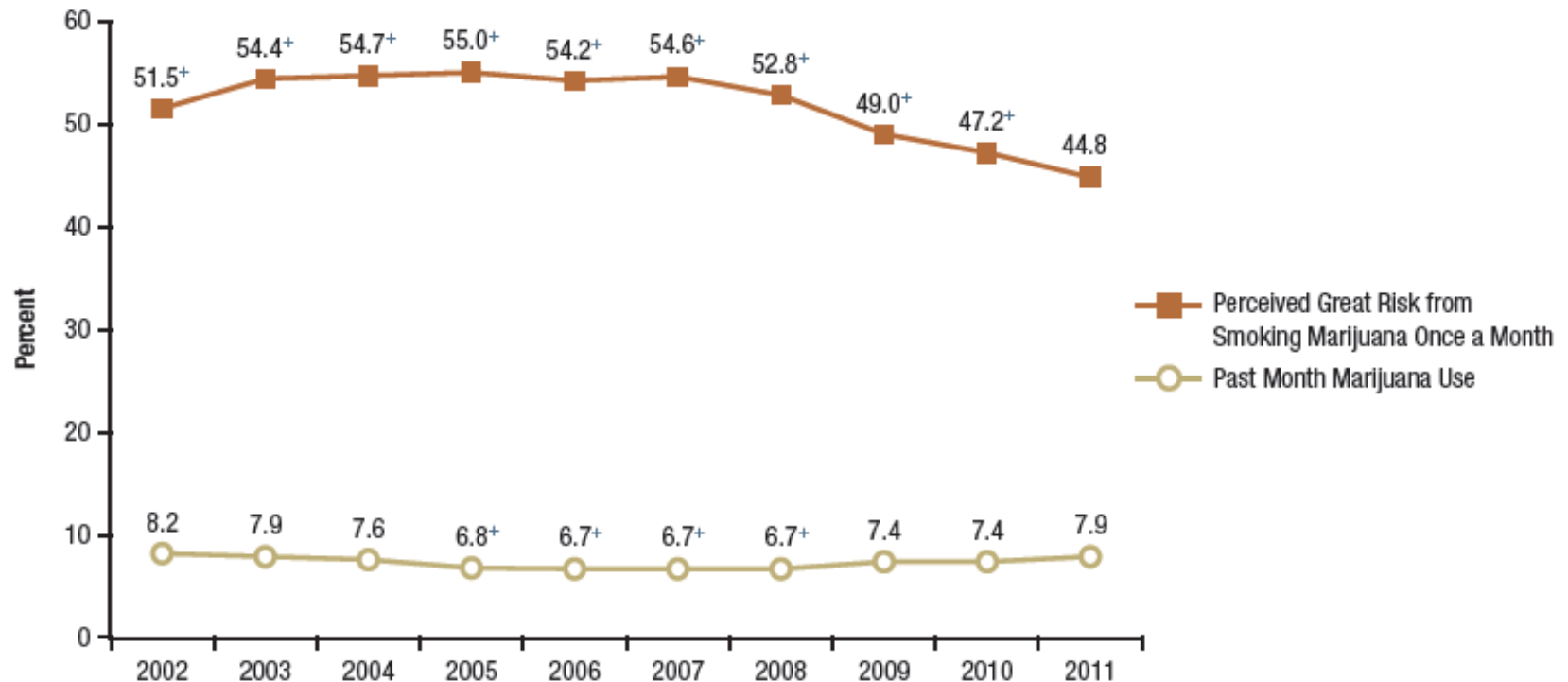
Past-Year Use of Various Drugs by
12th Graders (Percent)



SOURCE: University of Michigan, 2013 Monitoring the Future Study

Substance Abuse and Mental Health Services Administration (SAMSHA)

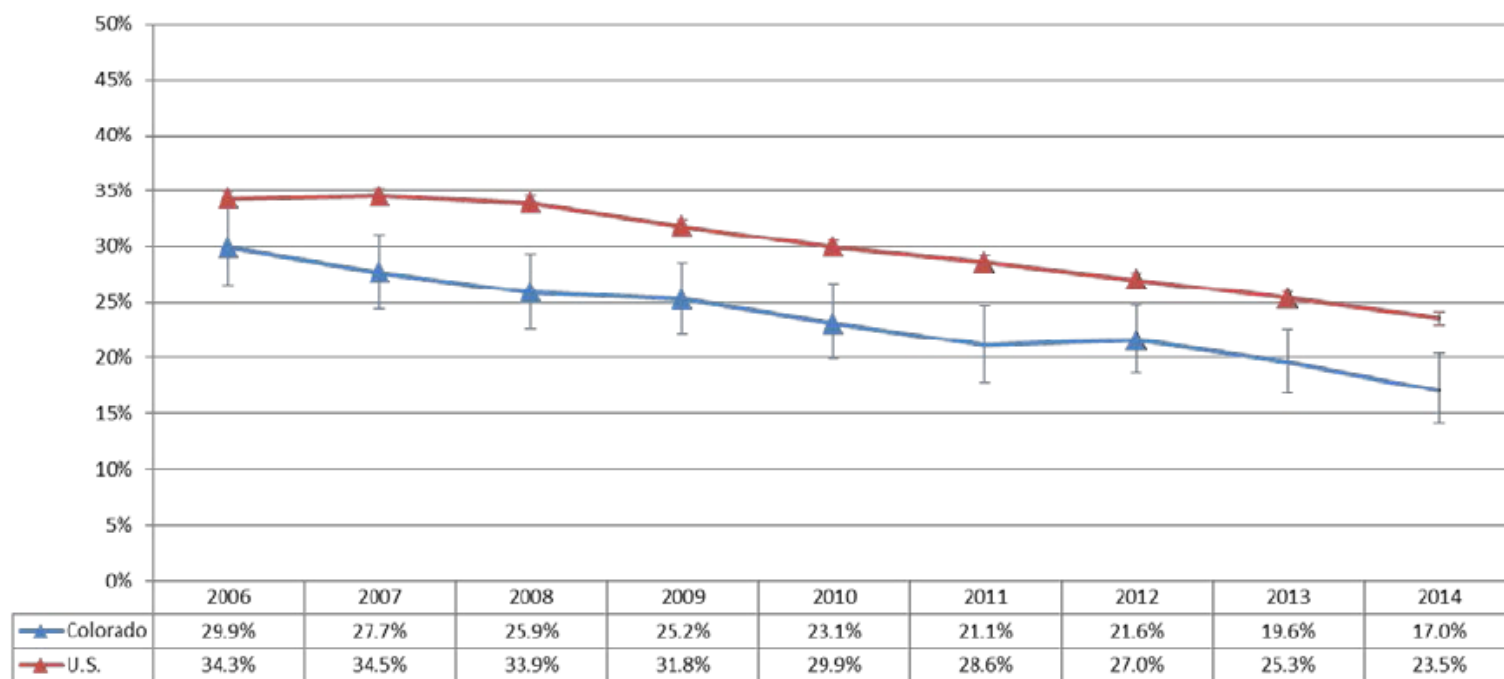
Figure 3. Trends in Perception of Great Risk from Smoking Marijuana Once or Twice a Week and Past Month Marijuana Use among Adolescents Aged 12 to 17: 2002 to 2011



⁺ Difference between estimate and estimate for 2011 is statistically significant at the .05 level.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Surveys on Drug Use and Health (NSDUHs), 2002 to 2011 (revised March 2012).

Figure 26. Perception of great risk for using marijuana once a month, 12–17 years old, 2006–2014: NSDUH

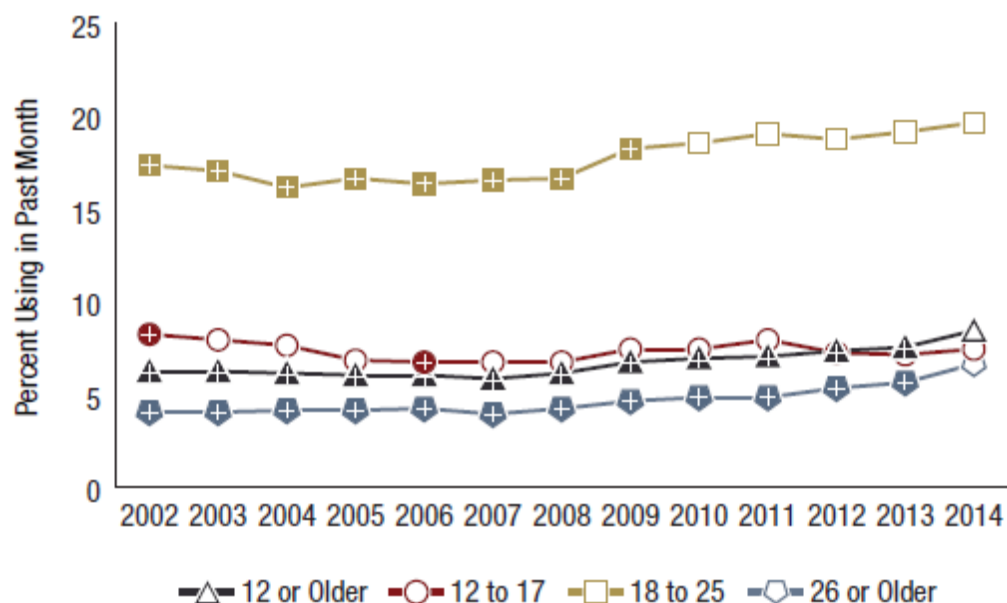


▲ indicates a statistically significant difference from 2014 with at least a $p < .05$

Note: The 95% confidence intervals are represented by the bars above and below the estimate for each year. These indicate that 95 times out of 100 the true value should fall within that range.

Source: Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health, <http://www.samhsa.gov/data/population-data-nsduh>, retrieved 12/17/2015.

Figure 3. Past Month Marijuana Use among People Aged 12 or Older, by Age Group: Percentages, 2002-2014



+ Difference between this estimate and the 2014 estimate is statistically significant at the .05 level.

Figure 3 Table. Past Month Marijuana Use among People Aged 12 or Older, by Age Group: Percentages, 2002-2014

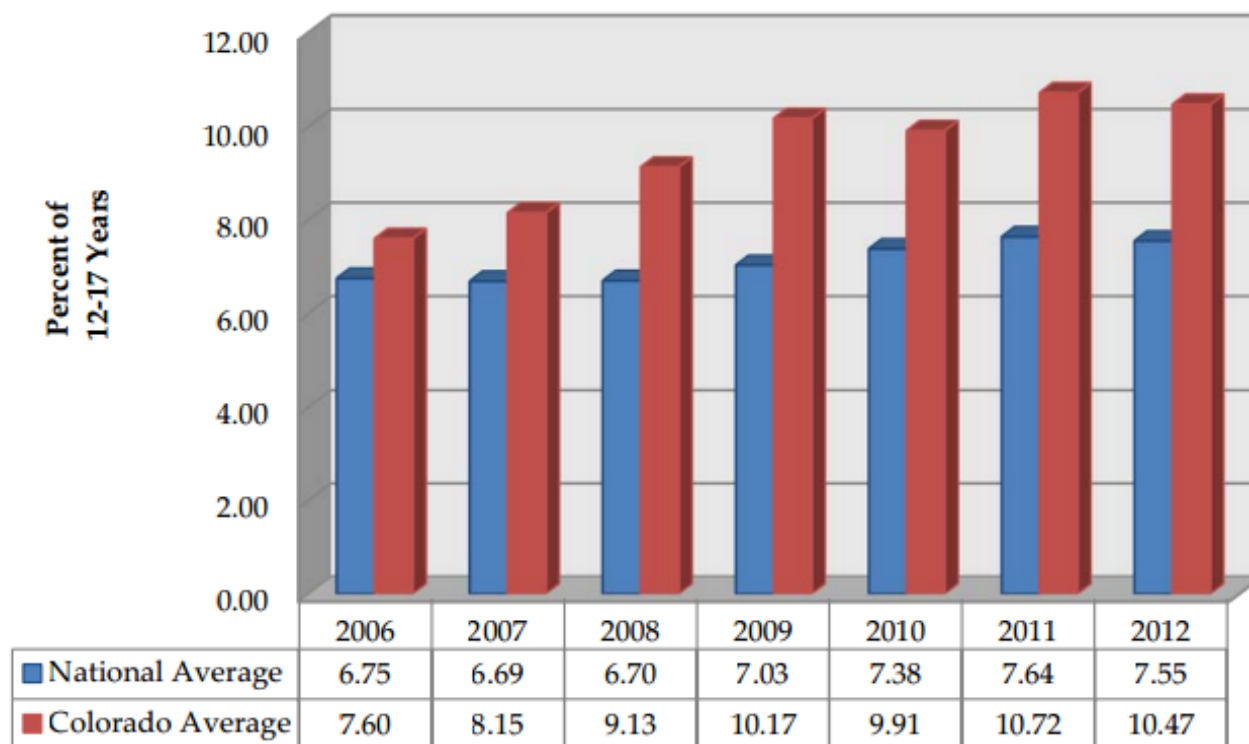
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
12 or Older	6.2 ⁺	6.2 ⁺	6.1 ⁺	6.0 ⁺	6.0 ⁺	5.8 ⁺	6.1 ⁺	6.7 ⁺	6.9 ⁺	7.0 ⁺	7.3 ⁺	7.5 ⁺	8.4
12 to 17	8.2 ⁺	7.9	7.6	6.8	6.7 ⁺	6.7	6.7	7.4	7.4	7.9	7.2	7.1	7.4
18 to 25	17.3 ⁺	17.0 ⁺	16.1 ⁺	16.6 ⁺	16.3 ⁺	16.5 ⁺	16.6 ⁺	18.2 ⁺	18.5	19.0	18.7	19.1	19.6
26 or Older	4.0 ⁺	4.0 ⁺	4.1 ⁺	4.1 ⁺	4.2 ⁺	3.9 ⁺	4.2 ⁺	4.6 ⁺	4.8 ⁺	4.8 ⁺	5.3 ⁺	5.6 ⁺	6.6

+ Difference between this estimate and the 2014 estimate is statistically significant at the .05 level.

SAMSHA

- Youth (ages 12 to 17 years) Past Month Marijuana Use, 2014
- 7.4% ~ 1.8 million used in past month
- Colorado:
 - Average for youth – 12.6% (up from 11.2%)
 - 1st in the nation
 - 14th in the nation (2006)

Youth (Ages 12 to 17 Years) Past Month Marijuana Use National vs. Colorado



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

Healthy Kids Colorado Survey

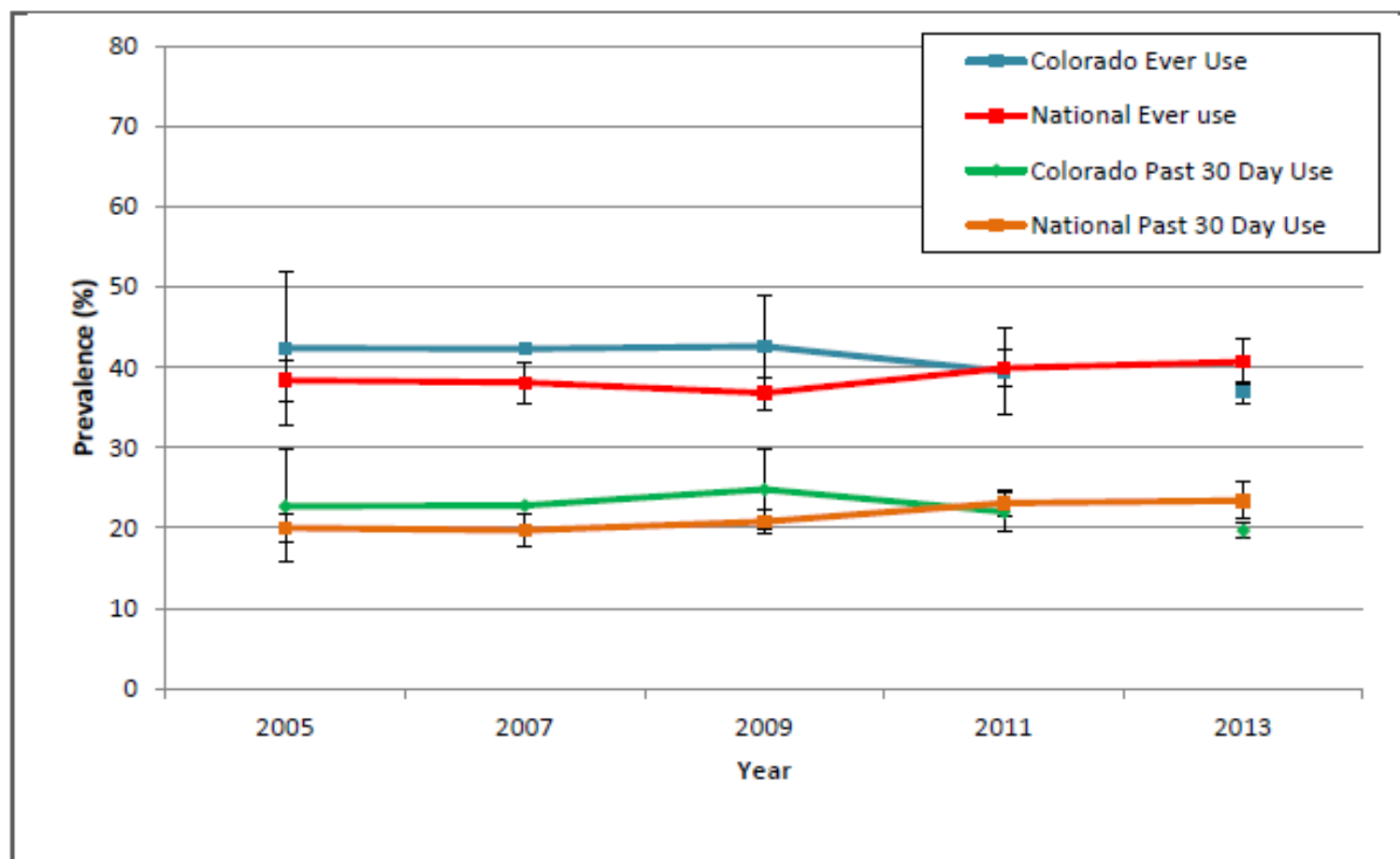
Colorado High School Pot Use	2009	2011	2013
Past Month	25 percent	22 percent	20 percent
Ever	45 percent	39 percent	37 percent

(Healthy Kids Colorado Survey)

National High School Pot Use	2009	2011	2013
Past Month	20.8 percent	23.1 percent	23.4 percent
Ever	36.8 percent	39.9 percent	40.7 percent

(Youth Risk Behavior Survey)

Figure 1. Marijuana Use among High School Students – U.S.* and Colorado**, 2005-2013

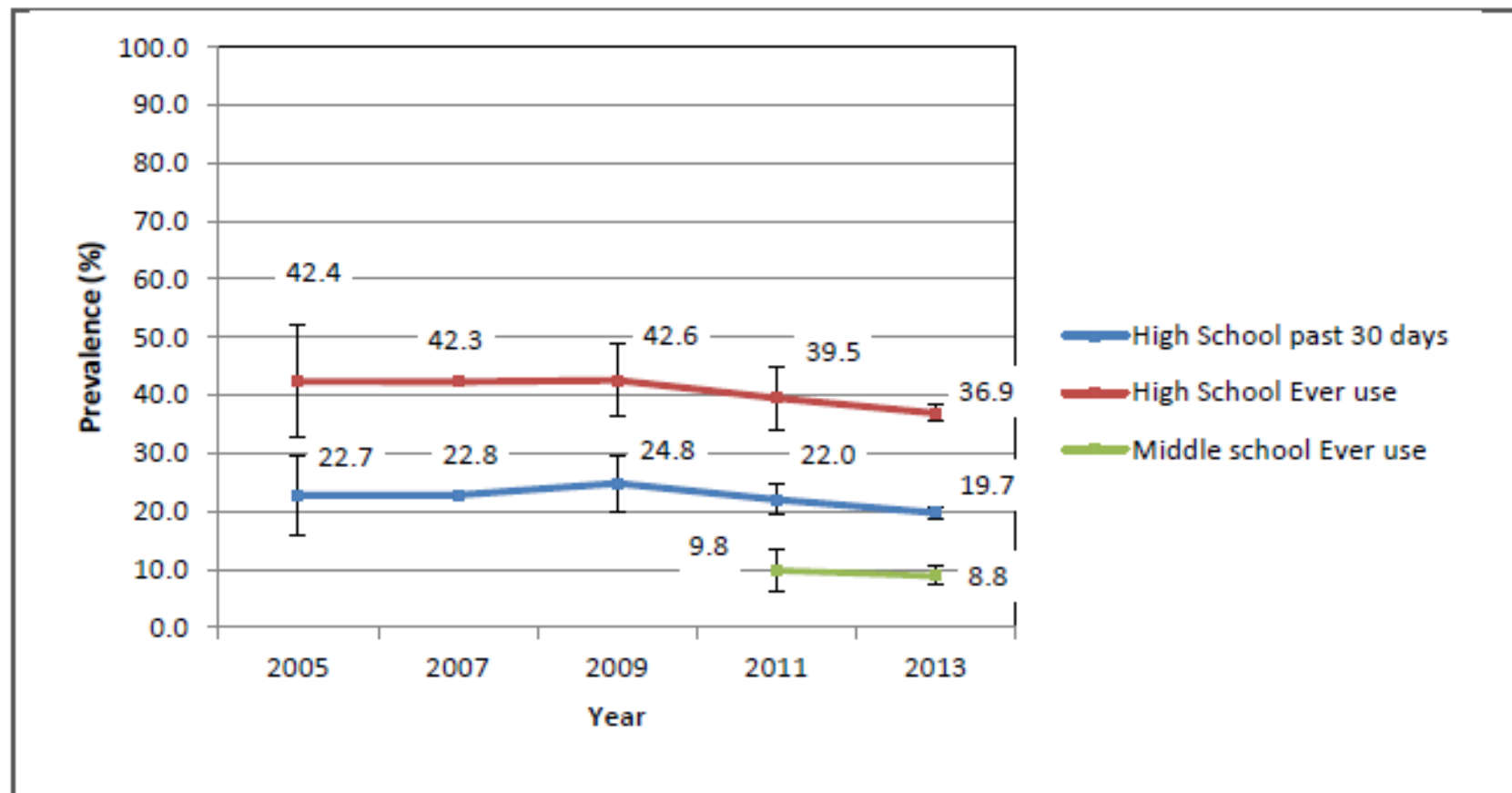


*Data source: Youth Risk Behavioral Survey prevalence estimates.

** Data source: Healthy Kids Colorado Survey prevalence estimates.

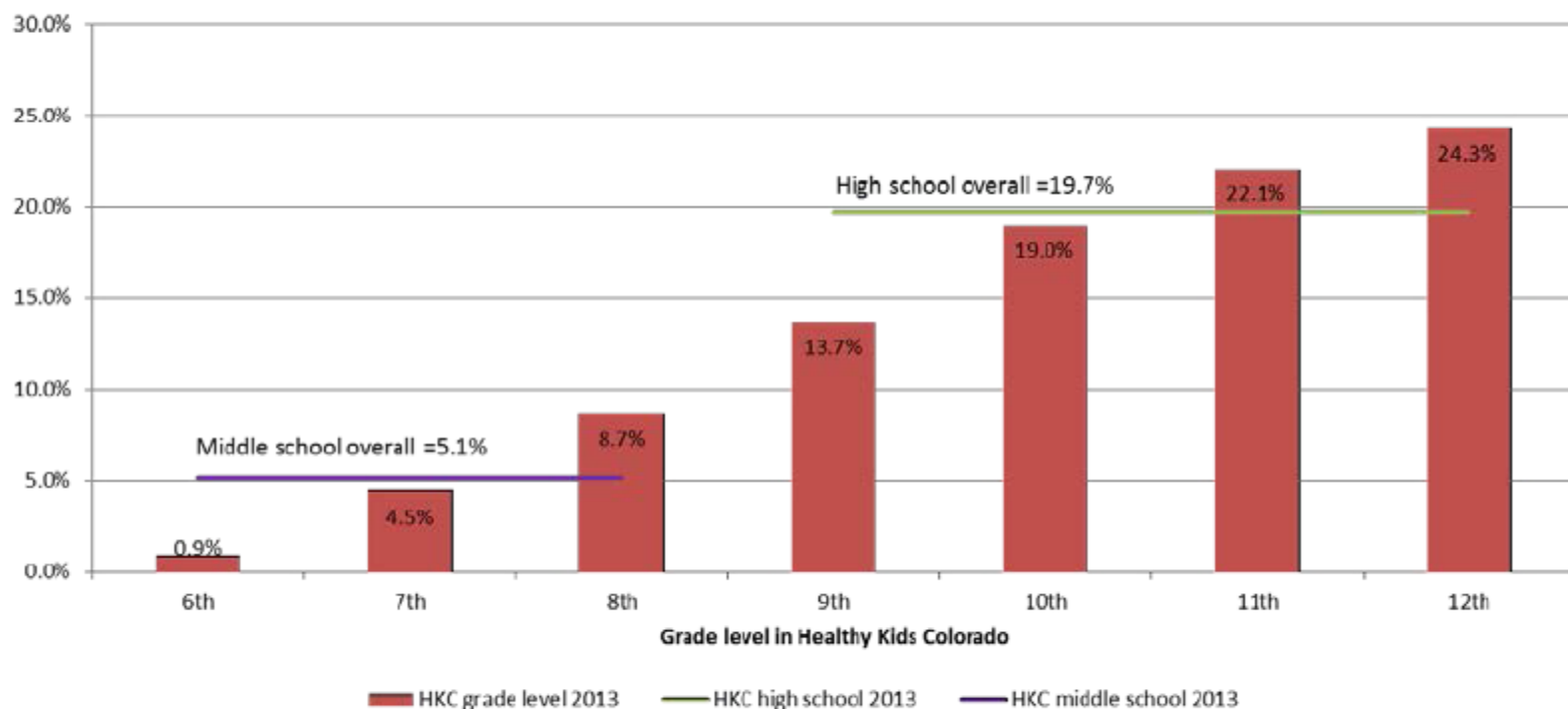
***The 2007 estimates are unweighted and therefore no confidence intervals are calculated.

Figure 2. Marijuana Use among Students in Colorado 2005-2013



*Middle School current use only 2013. The 2007 estimates are unweighted and therefore no confidence intervals are available. Data source: YRBS data 2005 to 2009, HCKS data 2011, 2013

Figure 21. Past 30-day marijuana use, by grade level, 2013: HKCS



Source: Colorado Department of Public Health and Environment, Healthy Kids Colorado Survey, http://www.chd.dphe.state.co.us/topics.aspx?q=Adolescent_Health_Data.

Table 2. Marijuana offenses and offense rates in Colorado, 2012–2014

	Total marijuana offenses				Marijuana offenses per 100,000 population			
	2012	2013	2014	% change 2012-2014	2012	2013	2014	% change 2012-2014
Age group								
Total	19,346	9,784	10,814	-44%	373	186	202	-46%
Offense type								
Possession	18,278	9,068	9,983	-45%	352	172	187	-47%
Producing	434	176	331	-24%	8	3	6	-26%
Sales	612	500	474	-23%	12	9	9	-25%
Smuggling	22	40	26	18%	0	1	0	15%
Age group								
10 to 17 years old	4,886	4,522	5,158	6%	394	362	409	4%
18 to 20 years old	5,237	3,365	3,363	-36%	2,331	1,473	1,466	-37%
21 years or older	9,049	1,781	2,214	-76%	243	47	57	-76%
Gender								
Male	15,344	7,788	8,428	-45%	591	295	315	-47%
Female	3,926	1,935	2,337	-40%	152	74	87	-42%

Note: Race/ethnicity of suspect is not captured accurately for offenses and is not reported in this table.

Source: Colorado Bureau of Investigation, National Incident-Based Reporting System data.



[Advertising Disclaimer »](#)

Pediatrics

October 2015, VOLUME 136 / ISSUE 4

High School Students' Use of Electronic Cigarettes to Vaporize Cannabis

Meghan E. Morean, Grace Kong, Deepa R. Camenga, Dana A. Cavallo, Suchitra Krishnan-Sarin

Article

Figures & Data

Info & Metrics

Comments

 [Download PDF](#)

Abstract

BACKGROUND AND OBJECTIVES: Electronic cigarette (e-cigarette) use is increasing rapidly among high school (HS) students. Of concern, e-cigarettes can be used to vaporize cannabis, although use rates among adolescents are unknown. We evaluated lifetime rates of using e-cigarettes to vaporize cannabis among all lifetime e-cigarette users (27.9%), all

Cannabis Vaporization

- Vaporizing cannabis using ecigarettes was common: e-cigarette 18.0%, cannabis 18.4%, dual users 26.5%.
- Hash oil and wax infused with THC, and using portable electronic vaporizers to vaporize dried cannabis leaves.
- There is significant concern for the use of “alternative” methods of marijuana (including edibles and vaporizers).

Adolescent Use

- More likely to have impaired cognitive and academic abilities after 28 days of abstinence
 - Pope 2003, Medina 2007, Bolla 2002, Hopper 2014
- Less likely to graduate high school
 - Fergusson 2003, 2008, Horwood 2010

Adolescent Use

- More likely to be addicted to other illicit drugs after adolescence
 - Swift 2012, Fergusson 2006, 2000
- Psychotic symptoms or disorders like schizophrenia (risk with higher concentrated THC)
 - Fergusson 2005, Zammit 2002, Arseneault 2004
- Quitting have lower risks of negative cognitive and mental health outcomes
 - Swift 2012

Limited or Mixed Evidence

- Limited
 - Lower IQ after short abstinence
 - College achievement
- Mixed
 - Anxiety
 - Depression
 - Suicidal thoughts or attempts

Prenatal and Breastfeeding Exposure

WIC

- 10-week administration of survey
- 3,137 clients had an on-site WIC appointment at the TCHD primary or satellite WIC clinics.
- 1,749 were completed resulting in an overall 60.2% response rate.
 - 1,308 (74.8%) surveys were completed in English
 - 441 (25.2%) were completed in Spanish

Table 2. Proportion of WIC mothers by age who were ever, current, or past marijuana users

Survey respondents - WIC mothers	Ever users ¹ [§]	Current users ¹	Past users ¹ [§]
WIC mothers \leq 30 years	12.0%	7.4%	4.6%
WIC mothers > 30 years	5.7%	4.0%	1.7%

¹Percent of WIC mothers in the age group

[§]Statistically significant difference between older and younger WIC mothers

Table 3. Timing of marijuana use during most recent pregnancy among ever, current, or past marijuana users

Survey respondents - WIC mothers	Ever users ¹	Current users ¹	Past users ¹
Used marijuana during pregnancy	10.9%	35.8%	4.5%
Used marijuana since the baby was born	9.6%	41.1%	1.6%
Used marijuana while breastfeeding	3.0%	13.7%	<1%

¹Percent of WIC mothers in the marijuana user group

Table 4. Reason for marijuana use ⁵

Survey respondents - WIC mothers	Ever users	Current users	Past users
To help with depression/anxiety/stress	35%	63%	28%
To help with pain	29%	60%	21%
To help with nausea/vomiting	23%	48%	17%
For fun/recreation	59%	39%	65%
Other reason	16%	14%	16%

⁵Other reasons (write in response) included: sleep, cancer, seizures, migraines, and increase appetite. A couple of direct quotes from respondents were:

“To help with nausea and vomiting in first trimester of pregnancy”

“All the reasons above and plus when I was pregnant, it helped me want to eat

Breastfeeding

- Biological evidence shows that THC is present in the breast milk of women who use marijuana.
- Biological evidence shows that infants who drink breast milk containing THC absorb and metabolize the THC.
 - Perez-Reyes, M. and M.E. Wall, *Presence of delta9-tetrahydrocannabinol in human milk*. N Engl J Med, 1982. 307(13): p. 819-20.

Effects of maternal use during pregnancy and breastfeeding

- Decreased IQ scores
 - Day 1994, Goldschmidt 2000
- Attention problems
 - El Marroun 2011, Noland 2005, Goldschmidt 2000
- Decreased growth
 - Cornelius 2000, Fried 1999.
- Decreased cognitive function and academic ability
 - Willford 2010, Fried 2003, Smith 2004.

Limited, Insufficient, or Mixed Evidence

Limited

- Stillbirth
- SIDS
- Depression
- Delinquent behavior
- VSD

Insufficient

- Psychosis
- Future marijuana use

Mixed

- Preterm
- LBW/SGA
- Motor development

Second Hand Smoke

Respiratory Effects

- Same carcinogens in marijuana smoke as tobacco smoke
 - Moir 2008, Lee 1976, Sparacino 1990, Gieringer 2004.
- Associated with chronic bronchitis with cough/wheeze/sputum
- Pre-malignant lesions in airways
 - Fligiel 1997.
- Acute use improves airflow, while heavy use increases airflow obstruction
 - Tashkin 1973, 1974, 1975, 1987, 1976, Aldington 2007, Hanxoc 2010.
- No data on second hand smoke risks

Insufficient or Mixed Evidence

- Insufficient
 - Emphysema
 - Respiratory infections
- Mixed
 - COPD
 - Lung cancer

Marijuana Exposure in Children Hospitalized for Bronchiolitis

- 1 mo – 2 yo
- Jan 2013 – April 2014 with bronchiolitis
- Parents completed questionnaire
- Of children identified been exposed to marijuana smokers, 16% had trace amounts of THC metabolites
- 21% vs 10% before and after legalization



COLORADO
Department of Public
Health & Environment

[Home](#)[Services & information](#)[Boards & commissions](#)[Divisions](#)[Concerns & emergencies](#)[Data](#)[News](#)

Retail Marijuana Public Health Advisory Committee

[Back to other boards and commissions](#)

We established the Retail Marijuana Public Health Advisory Committee per CRS 25-1.5-110. The committee meets regularly, and all meetings are open for public attendance and comment.

<https://www.colorado.gov/pacific/cdphe/retail-marijuana-public-health-advisory-committee>

Medical Use of Marijuana in Pediatrics

Dr. Sanjay Gupta: Why I changed my mind on weed - CNN.com - Windows Internet Explorer provided by Childrens Hospital Colorado I

http://www.cnn.com/2013/08/08/health/gupta-changed-mind-marijuana/

Search: cnn gupta marijuana

Dr. Sanjay Gupta: Why I changed my mind on we...

SET EDITION: U.S. | INTERNATIONAL | MÉXICO | ARABIC

TV: CNN | CNNi | CNN en Español | HLN

CNN Health

Sign up | Log in

POWERED BY Google

Home | TV & Video | CNN Trends | U.S. | World | Politics | Justice | Entertainment | Tech | **Health** | Living | Travel | Opinion | iReport | Money | Sports

Why I changed my mind on weed


By **Dr. Sanjay Gupta**, CNN Chief Medical Correspondent
updated 8:44 PM EDT, Thu August 8, 2013

SHARE THIS

f t g+ in

Recommend 521k

Print
Email
More sharing



Click to play

Dr. Sanjay Gupta: I've tried marijuana

STORY HIGHLIGHTS

• Dr. Sanjay Gupta says we have

(CNN) -- Over the last year, I have been working on a new documentary called "Weed." The title "Weed" may sound cavalier,

Done

Internet | Protected Mode: On

100%

Marijuana stops child's severe seizures

By **Saundra Young**, CNN

updated 4:51 PM EDT, Wed August 7, 2013

SHARE THIS



Recommend 266k

Print

Email

More sharing



Charlotte Figi had her first seizure when she was 3 months old. Over the next few months, the girl, affectionately called Charlie, had frequent seizures lasting two to four hours, and she was hospitalized repeatedly.

Charlotte's Web

HIDE CAPTION

1 2 3 4 5 6 7 8 9 10



Internet | Protected Mode: On



100%

Animal Evidence

- Multiple animal studies describe anticonvulsant properties of cannabidiol
 - Izquierdo I. effect of cannabidiol and of other cannabis sativa compounds on hippocampal seizure discharges. Psychopharmacologia. 1973;28(1):95-102.
 - Carlini EA et al. Letter: Cannabidiol and Cannabis sativa extract protect mice and rats against convulsive agents. J Pharm Pharmacol. 1973 Aug; 25(8):664-5.
 - Cox B et al. The anticonvulsive activity of cannabinoids in seizure sensitive gerbils. Proc west Pharmacol Soc. 1975; 18:154-7.
 - Consroe P et al. Cannabidiol-antiepileptic drug comparisons and interactions in experimentally induced seizures in rats. J Pharmacol Exp Ther. 1977 Apr;201(1):26-32.
 - Turkanis SA et al. An electrophysiologic analysis of the anticonvulsant action of cannabidiol on limbic seizures in conscious rats. Epilepsia. 1979 Aug;20(4):351-63.

Newer Studies

- Jones NA et al. Cannabidiol displays antiepileptiform and antiseizure properties in vitro and in vivo. J Pharmacol Exp Ther. 2010 Feb; 332(2):569-77.
- Hill TD et al. Cannabidivarin rich cannabis extracts are anticonvulant in mouse and rat via CB 1 receptor-independent mechanism. Br J Pharmacol. 2013 Oct; 170(3):679-92.

Parental Reports

- Porter, BE. Report of a parent survey of cannabidiol-enriched cannabis use in pediatric treatment-resistant epilepsy. Epilepsy Behav. 2013 Dec;29(3):574-7.
- Survey presented to parents belonging to a Facebook group dedicated to sharing info about the use of CBD for seizures.
- 19 responses, 2 (11%) reported complete seizure freedom, 8 (42%) reported a 80% reduction, 16 (84%) reported a reduction in seizure frequency, 6 (32%) reported 25-60% reduction

Recent Abstract

- Geede M, Maa E. Whole Cannabis Extract of High Concentration Cannabidiol May Calm Seizures in Highly Refractory Pediatric Epilepsies. American Epilepsy Society 67th meeting Dec 2013.
- Real Oil (Charlotte's Web) CBD ratio of 16:1
- 11 of 13 parents interviewed: 4 Doose, 2 Dravet, 1 Lennox-Gastaut, 1 metachromic leukodystrophy, 1 cortical dysplasia, 2 idiopathic epilepsy. Ave 10 AED's.
- 100% reported reduction in weekly frequency of motor type seizures, 5 of 11 are seizure free.

Cochrane Review

- Gloss D, Vickrey B. Cannabinoids for epilepsy. Cochrane Database System Rev 2012 Jun 13;6.
- 4 randomized reports
- Total of 48 patients, used cannabidiol as the treatment agent (1 abstract, 1 letter to the editor).
 - Anti-epileptic drugs were continued in all.
 - No details of randomization.
 - No comparisons between control and treatment groups.
 - All low quality.
 - None of the patients in the treatment groups suffered adverse effects.
- No reliable conclusions can be drawn at present regarding the efficacy of cannabinoids as a treatment for epilepsy.
 - The dose of 200 to 300 mg daily of cannabidiol was safely administered to small numbers of patients, for generally short periods of time, and so the safety of long term cannabidiol treatment cannot be reliably assessed.

Recent Research

- A pharmaceutical grade cannabidiol is being trialed for treatment of pediatric epilepsy..
- 2015 American Epilepsy Society annual meeting.
 - 23 patients with treatment-resistant epilepsies, average age of 10 years, demonstrated 39% of patients had a greater than 50% reduction in seizures with a median reduction of 32% after 3 months of therapy.
 - Seizure freedom occurred in 3 of 9 Dravet patients and 1 of 14 patients with other forms of epilepsy.
 - Adverse effects were mostly mild or moderate: somnolence, fatigue, AED level increases, decreased appetite, weight gain, diarrhea, increased appetite and weight loss.
 - A subset of patients experienced an increase in clobazam concentrations that was thought to be causing sedation and required a dose adjustment.

<http://www.gwpharm.com/LGS%20Orphan%20Designation.aspx>.

https://www.aesnet.org/sites/default/files/file_attach/AboutAES/PressReleases/cannabis%20release%20final.pdf. American Epilepsy Society 69th Annual Meeting. December 3-5, 2015.

Other Medical Uses in Pediatrics

- Spasticity
- Chronic Pain
- Anorexia
- Neuro-oncology
- Inflammatory Bowel Disease

Summary

- Adolescent population vulnerable, need continued surveillance to evaluate impact of legalization
- More data needed on prenatal and breastfeeding exposures
- Concern for second hand smoke exposure
- More rigorous studies need to be performed to evaluate any medical benefits



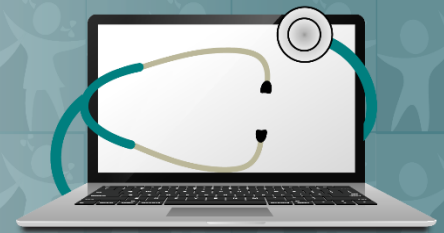
Questions?

George.Wang@childrenscolorado.org



PEHSU NATIONAL CLASSROOM

Pediatric Environmental Health Specialty Units



www.pehsu.net/nationalclassroom.html



Webinars

Series of scientific webinars that provide a forum for discourse on scientific issues.

Live and On-Demand

Case Conferences
Journal Clubs
Grand Rounds

CE Available



Online Courses

Evidence-based online courses on a variety of children's environmental health topics.

Interactive and Self-Paced

CE Available



Resource Catalog

Fact sheets, journal publications, reports, and other resources for parents, community members, patients and healthcare professionals

Topics included:
Air Quality, Pesticides,
Natural Disasters, BPA,
Mold, Lead, Mercury