

Cannabis: Lessons Learned from Public Health Surveillance in Colorado

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Disclosures

- No funding from the cannabis industry
- Former employee of the Colorado Department of Public Health and Environment
- Voted to legalize medical and recreational cannabis
- Not a cannabis user
- Cannabis agnostic

Why am I talking about Cannabis?



- It all started with methamphetamine...
- Studied exposures of first responders in marijuana grow houses
- Right place at the right time in 2013?
- Seven years at the Colorado Dept of Public Health and Environment
 - “Monitoring Public Health Effects of Legalized Marijuana”
 - Founding Chair, Retail Marijuana Public Health Advisory Committee
 - Co-founded the Colorado Medical Marijuana Research Program

November
2012

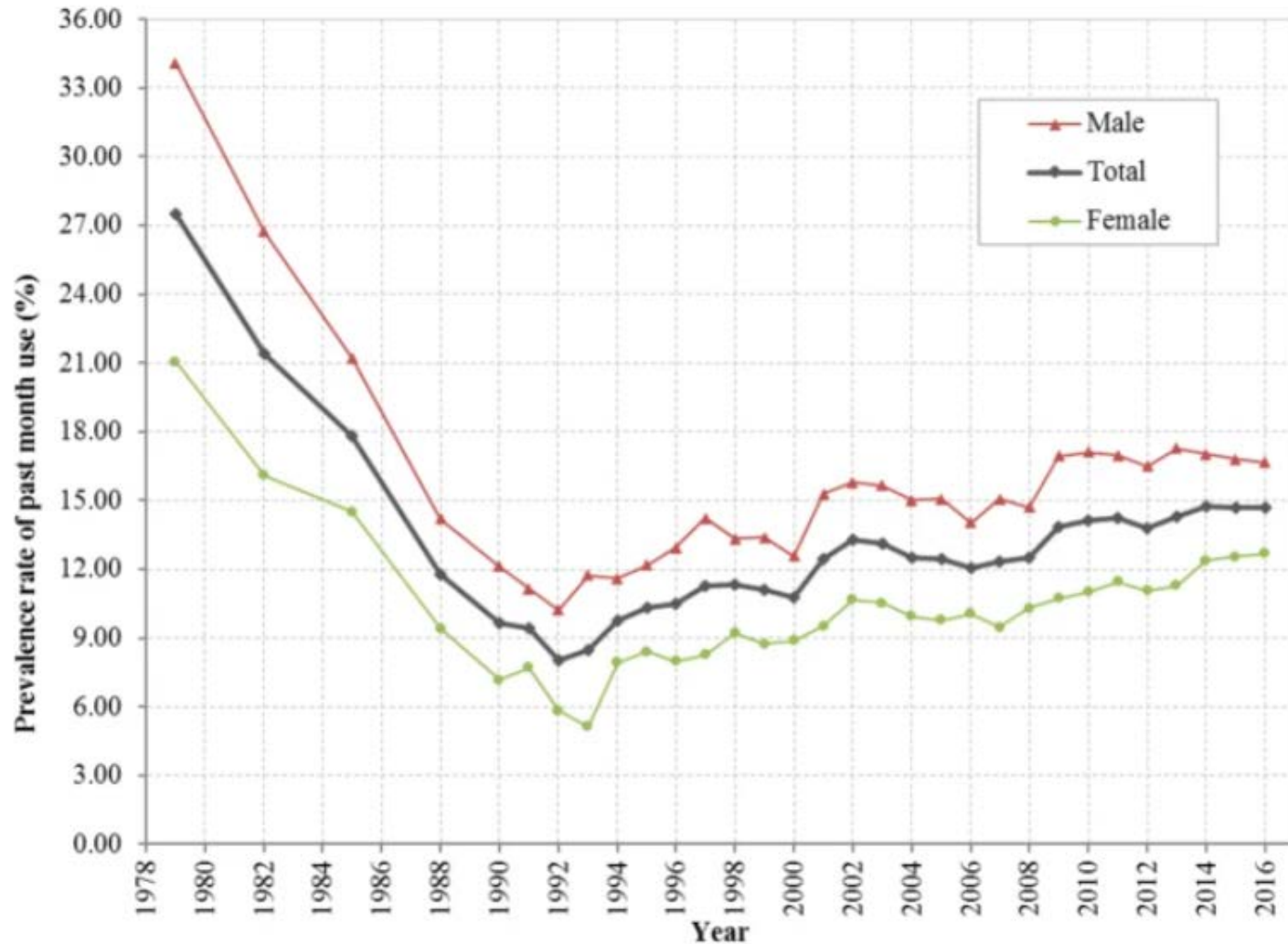




OH WOW!
PARADIGM
SHIFT!

© 1998 THAVES

Is cannabis use a new thing?



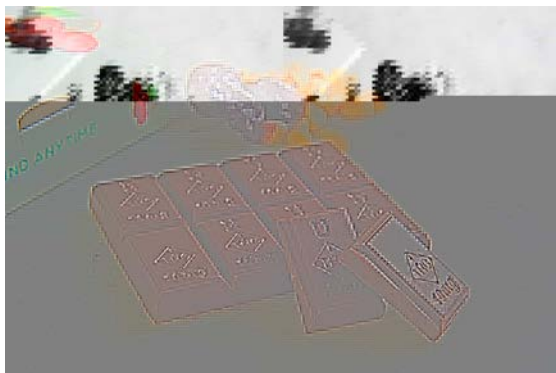
Prevalence rate (%) of current marijuana use among US residents 12 to 25 years of age during 1979–2016, overall and stratified by gender. Derived from data from the 1979–2016 National Survey on Drug Use and Health (NSDUH)

Yu, B., Chen, X., Chen, X. et al. Marijuana legalization and historical trends in marijuana use among US residents aged 12–25: results from the 1979–2016 National Survey on drug use and health. *BMC Public Health* 20, 156 (2020). <https://doi.org/10.1186/s12889-020-8253-4>



Cannabis: Spectrum of Products

- Inhalable
 - Flower/bud (10%-25% THC)
 - Concentrates
 - Vape oils (30%-60% THC)
 - Wax, Shatter (70%-90% THC)
- Oral
 - Tinctures (10 mg THC/dose)
 - Edibles (10 mg THC/dose)





Public Health Responsibilities

1. Create a scientific advisory panel to review literature and emerging science
2. Monitor patterns of use
3. Monitor health concerns
4. Prevention and education
5. Consultative role: Contamination limits and laboratory certification, edibles safety, safe disposal of product and byproducts

Important Surveillance Questions for Public Health

1. Are there changes in the patterns of use among adults?
2. Are adolescents using more?
3. Are there increases in unintentional injuries/illnesses among young children and adults?
4. Are there increases in healthcare encounters related to cannabis use?
5. Can we detect “outbreaks” from contaminated cannabis products?

Why do we want to answer these questions?

- Very bright spotlight as the first state to legalize and commercialize recreational cannabis use
- Make quick policy decisions to change course to mitigate public health harms
- Targeted prevention and education campaigns to address negative outcomes
- Lawmakers want data

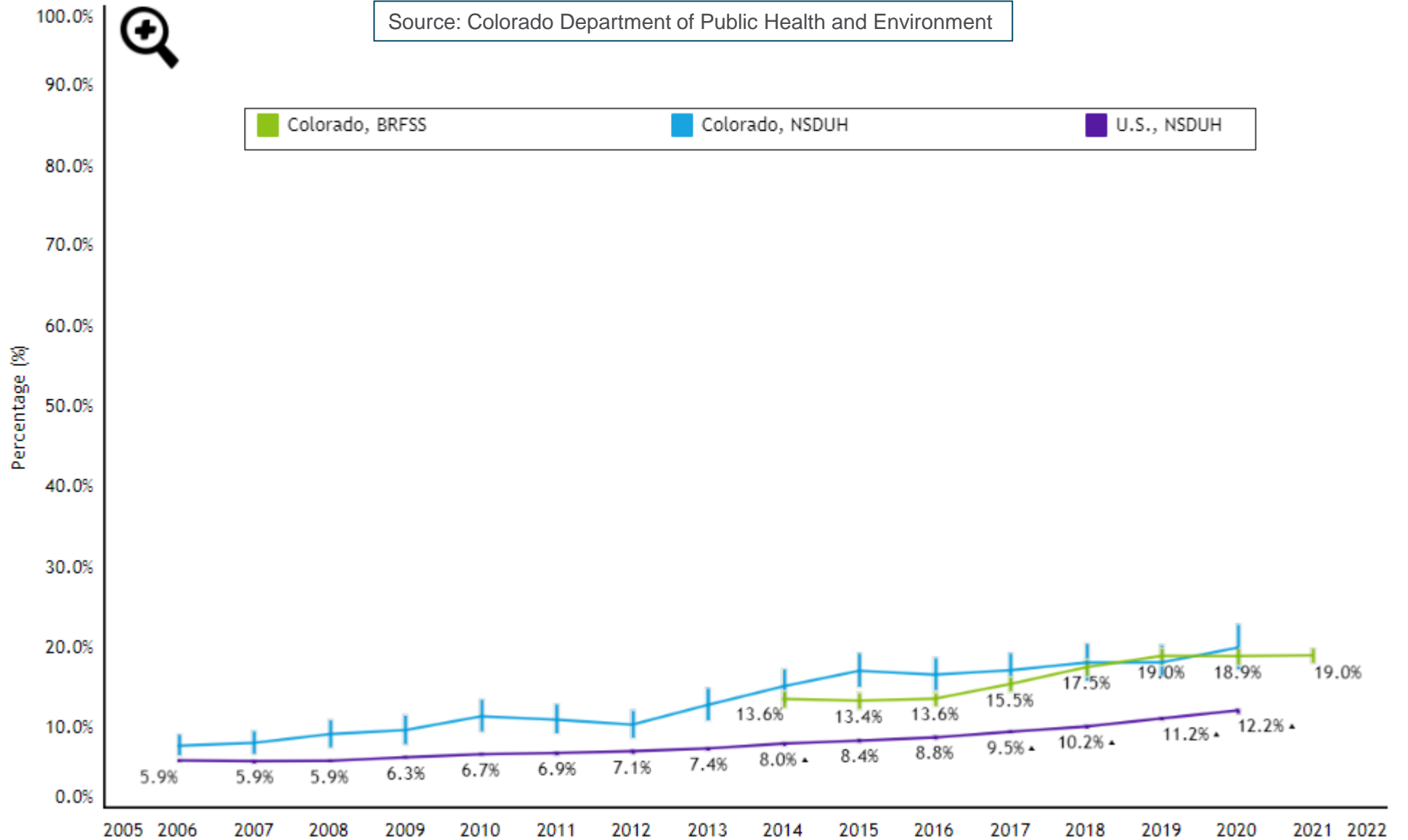
Public Health Surveillance Tools

- Public health surveys
 - Behavioral Risk Factor Surveillance System (BRFSS)
 - National Survey on Drug Use and Health (NSDUH)
 - Healthy Kids Colorado Survey (HKCS)
 - Pregnancy Risk Assessment Monitoring System (PRAMS)
- National Poison Data System
- Emergency Department and Hospital Discharge Data
- “Popular Media” surveillance system

What did we learn
about adult use?

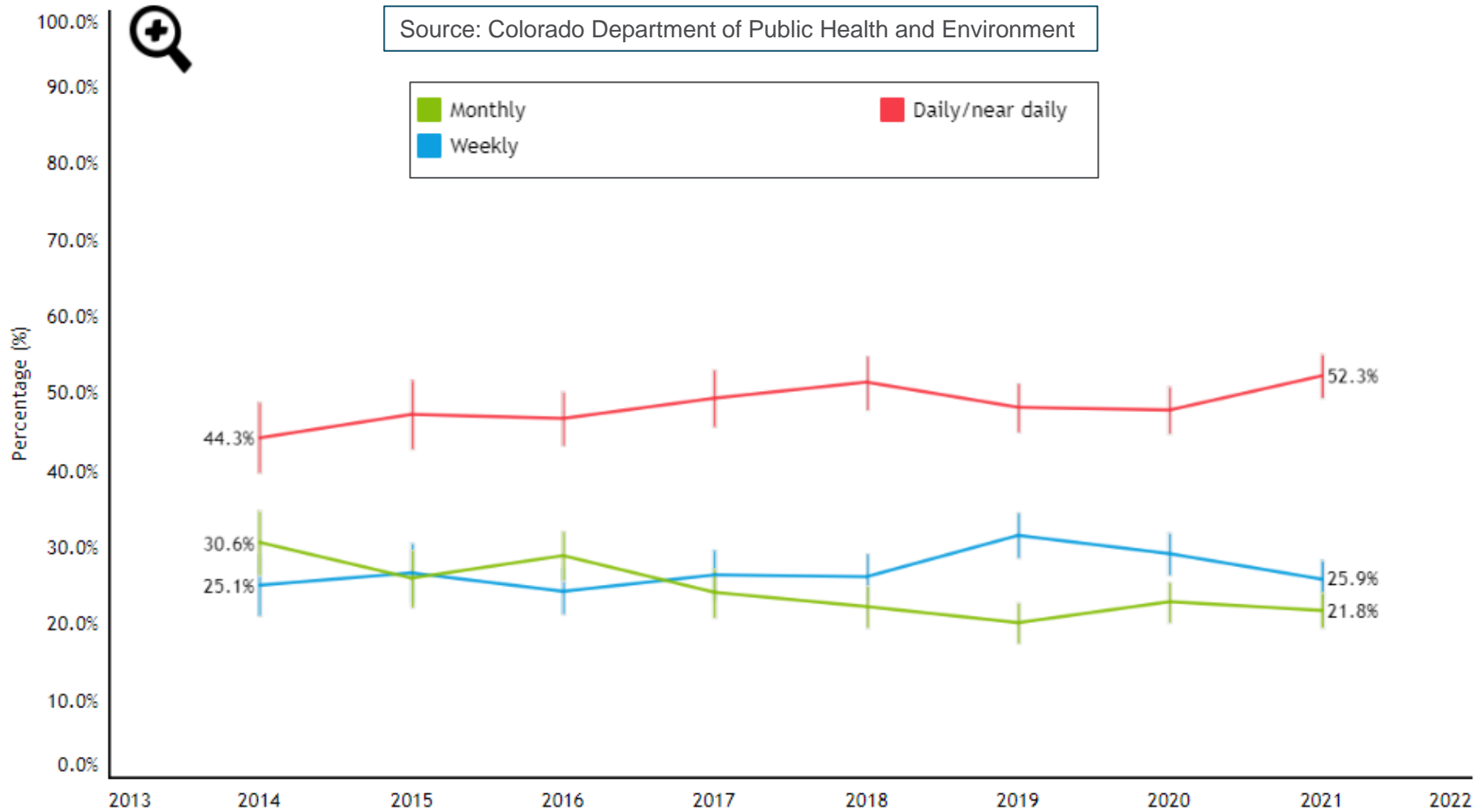
How many
people
use
cannabis?

Percentage of Past 30 Day Marijuana Use among Adults 18 Years and Older Colorado and United States 2006 to 2021



How often do people use cannabis?

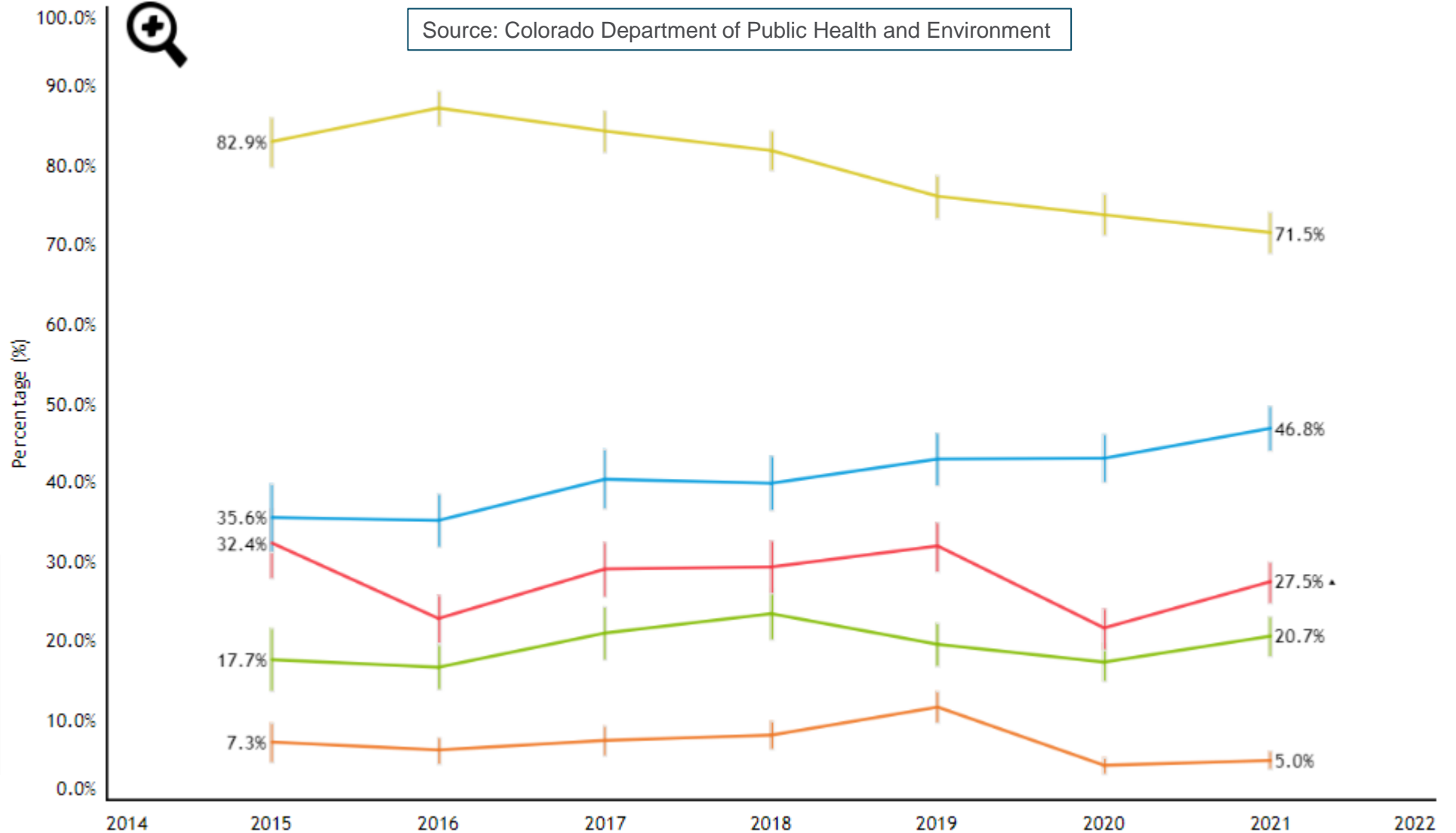
Frequency of Marijuana Use among Adult Marijuana Consumers Colorado 2014 to 2021



How are people using cannabis?

Methods of Marijuana use among Adult Marijuana Consumers Colorado 2015 to 2021

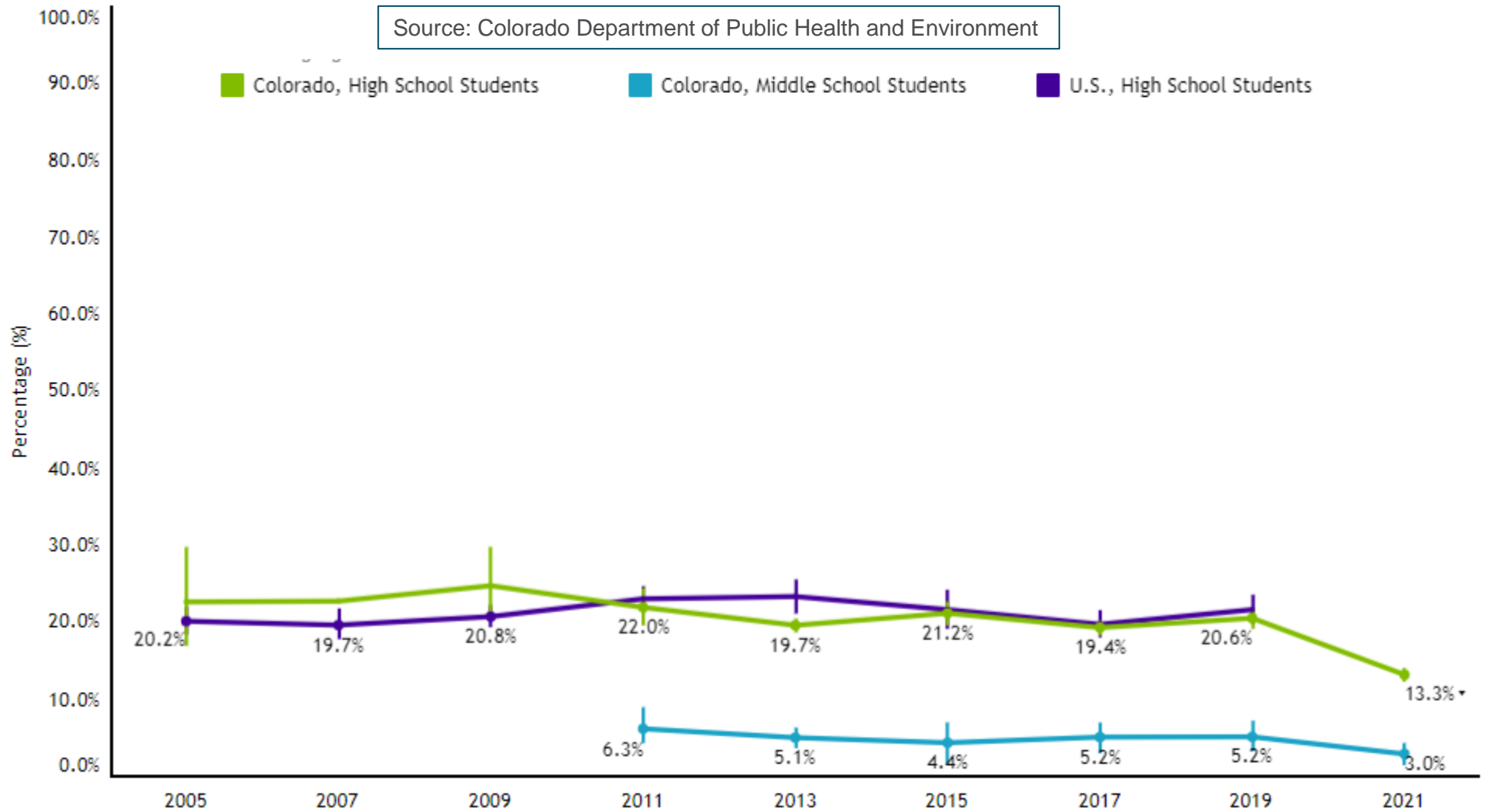
Source: Colorado Department of Public Health and Environment



What did we learn
about adolescent use?

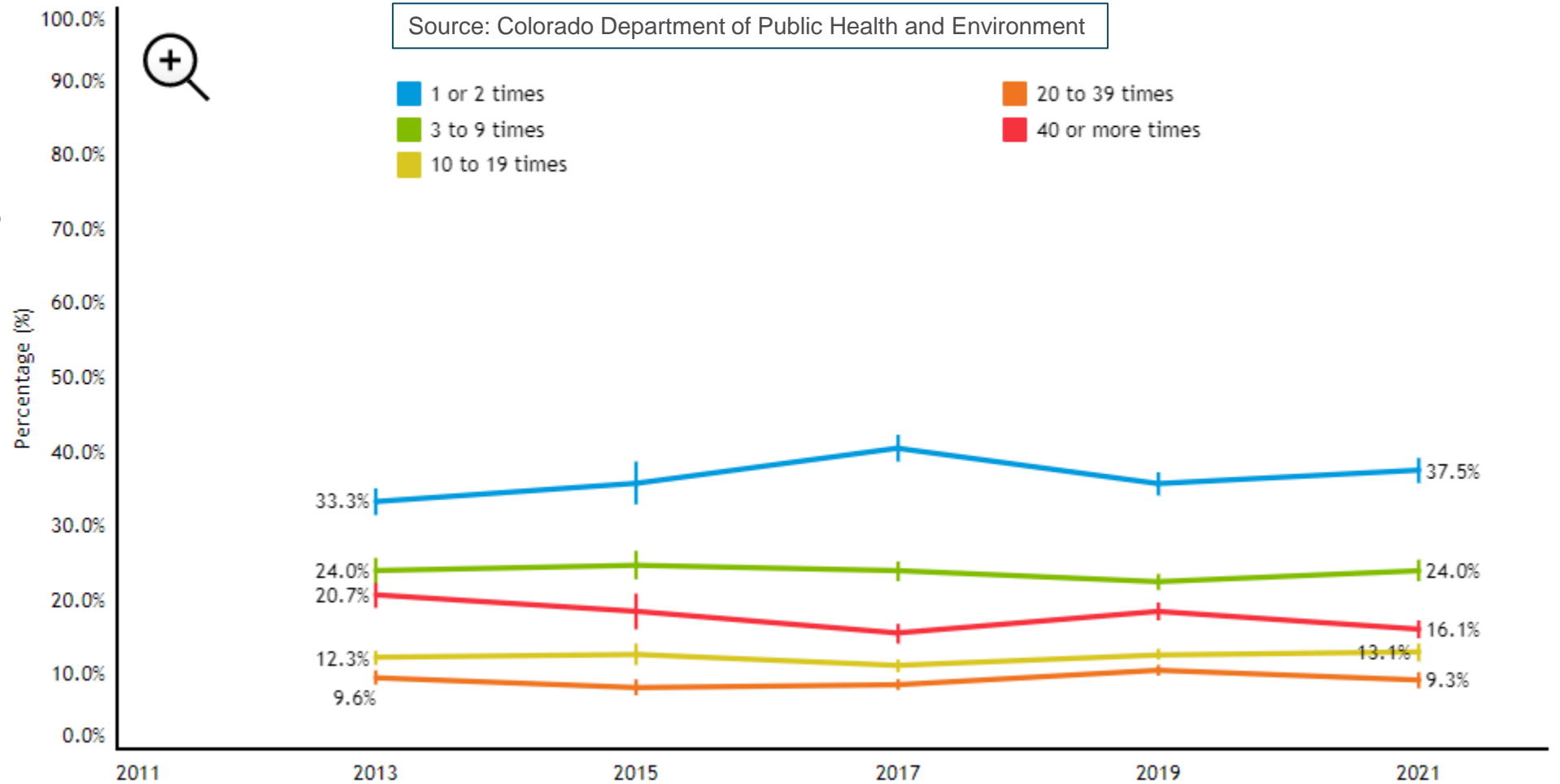
Are more adolescents using?

Percentage of Past 30 Day Marijuana Use among High School & Middle School Students Colorado and United States 2005 to 2021



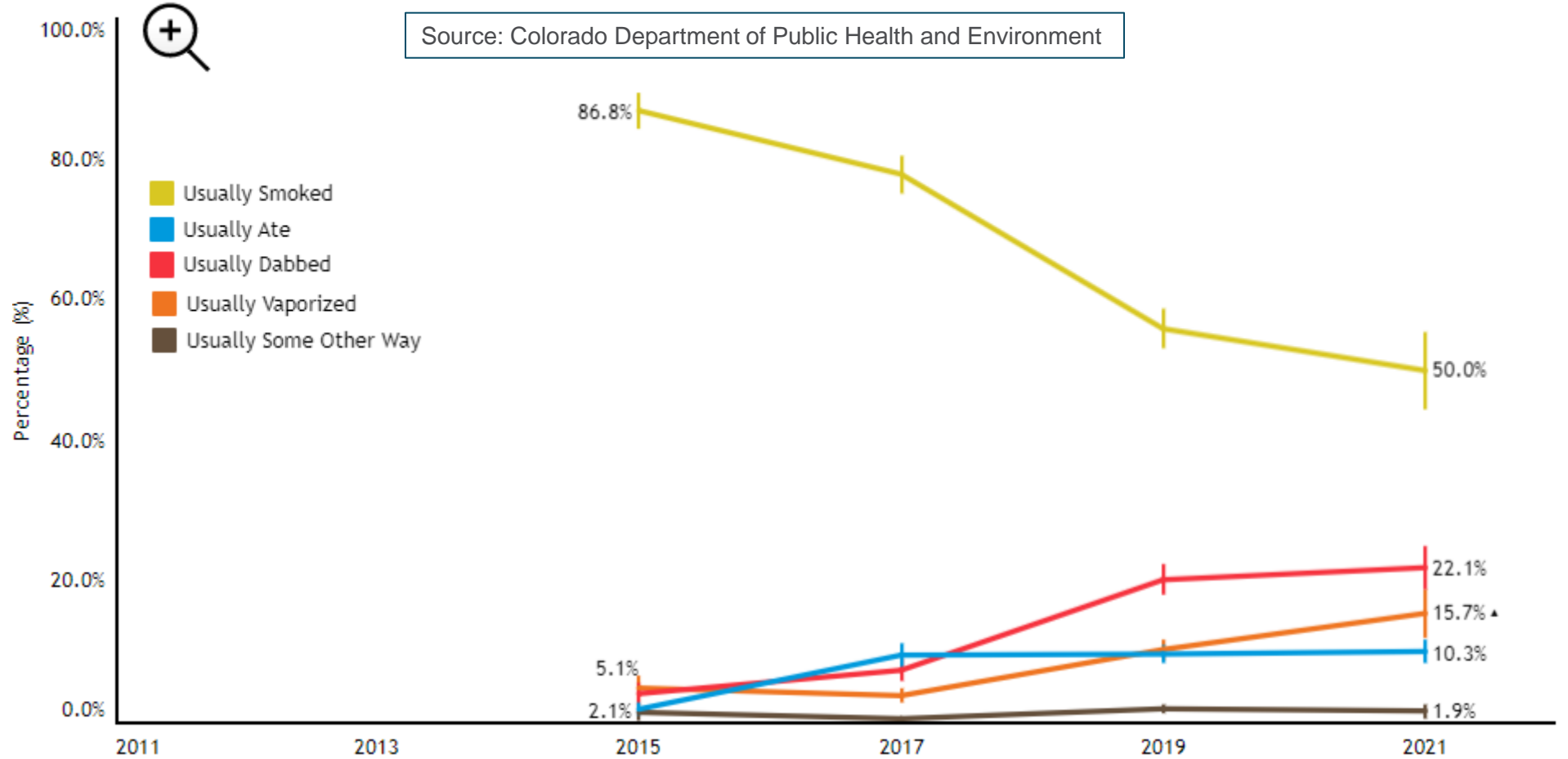
Are adolescents using more often?

Frequency of Marijuana Use among High School Students that Used Marijuana in the Past 30 Days Colorado 2013 to 2021



Are adolescents using differently?

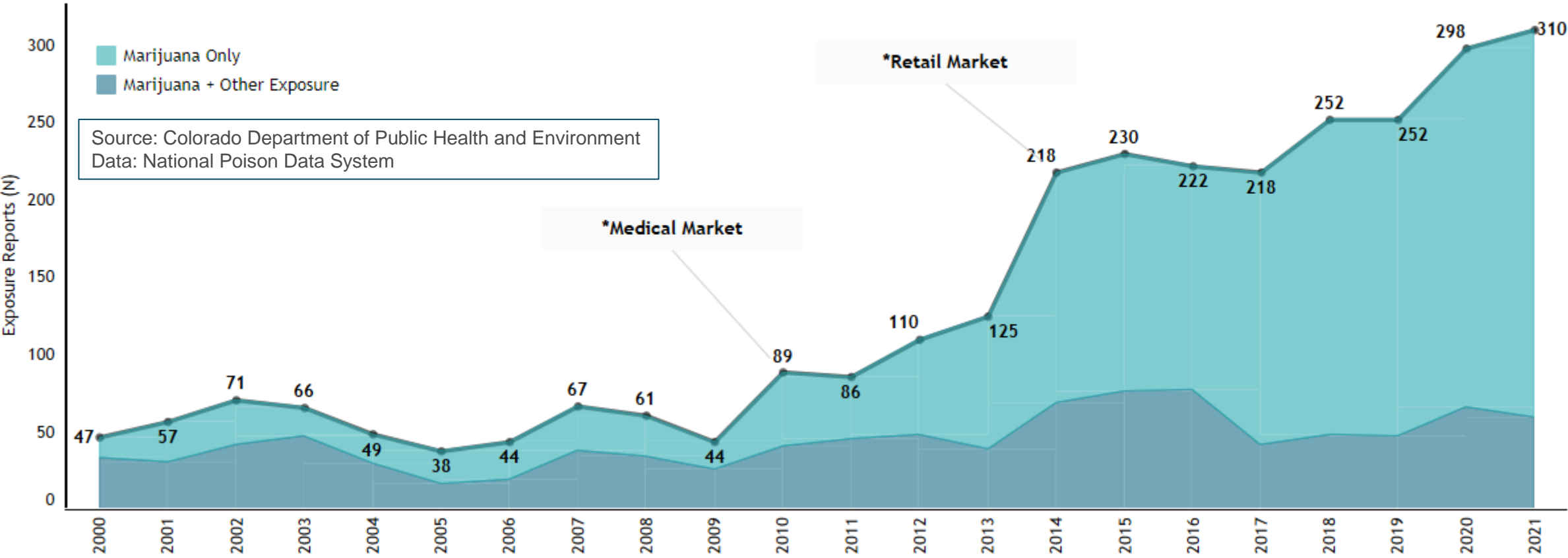
Usual Method of Marijuana Use among High School Students that Used Marijuana in the Past 30 Days Colorado 2015 to 2021



What did we learn
about adverse effects?

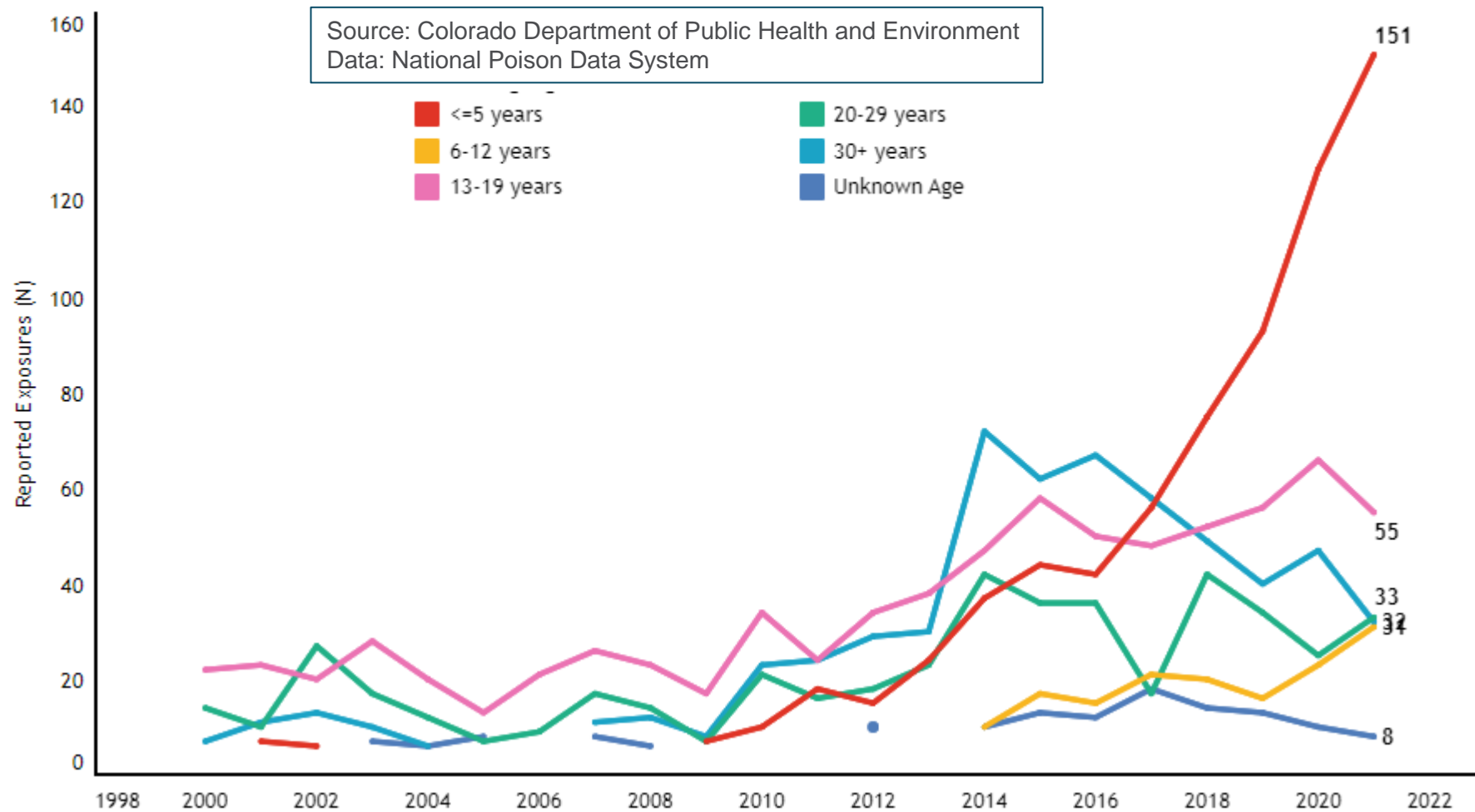
Calls to the Poison Center

Annual Frequency of Reported Marijuana Exposures, Colorado 2000-2021



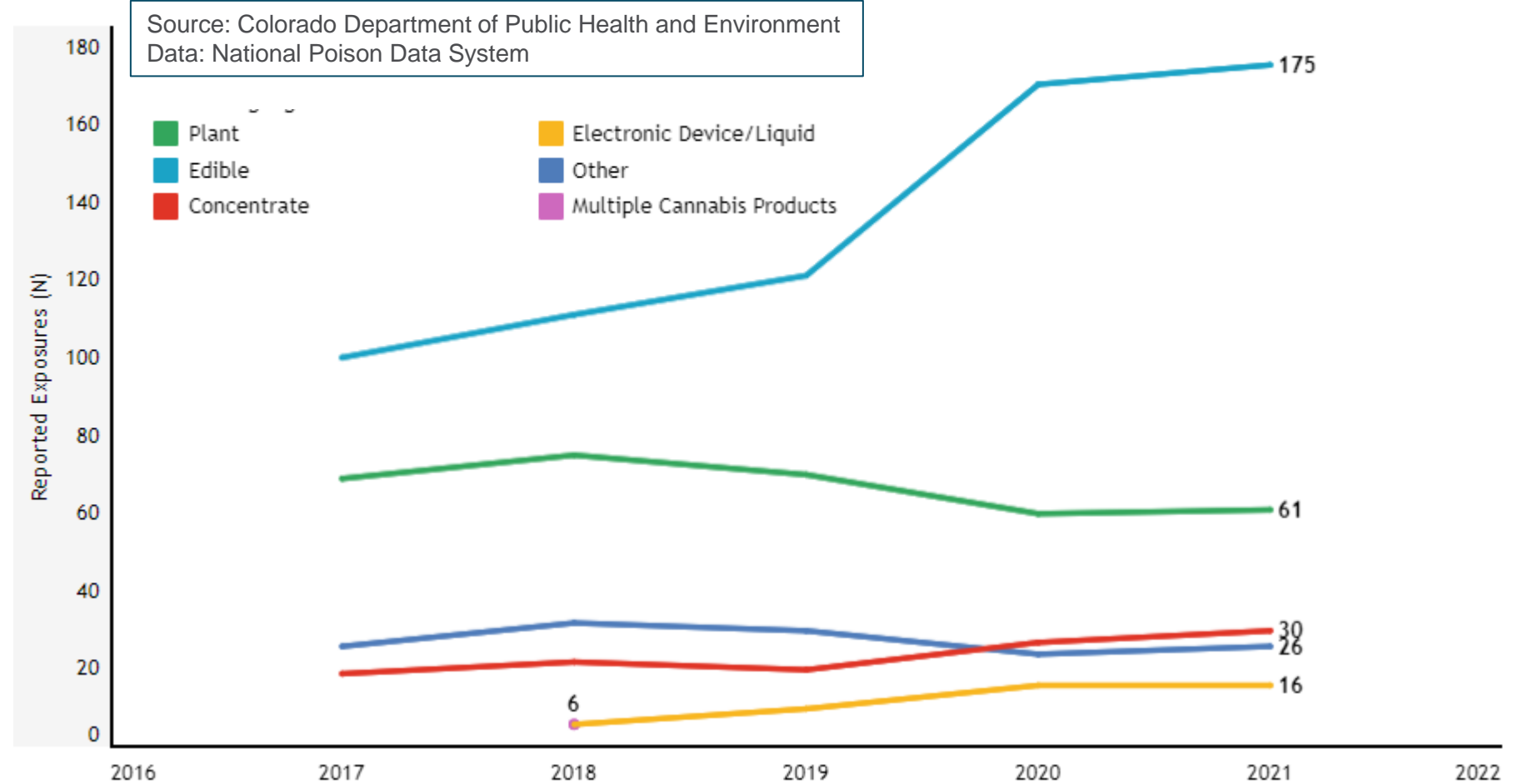
Are there differences in adverse effects by age?

Annual Frequency Reported of Marijuana Exposures by Age, Colorado 2000 to 2021



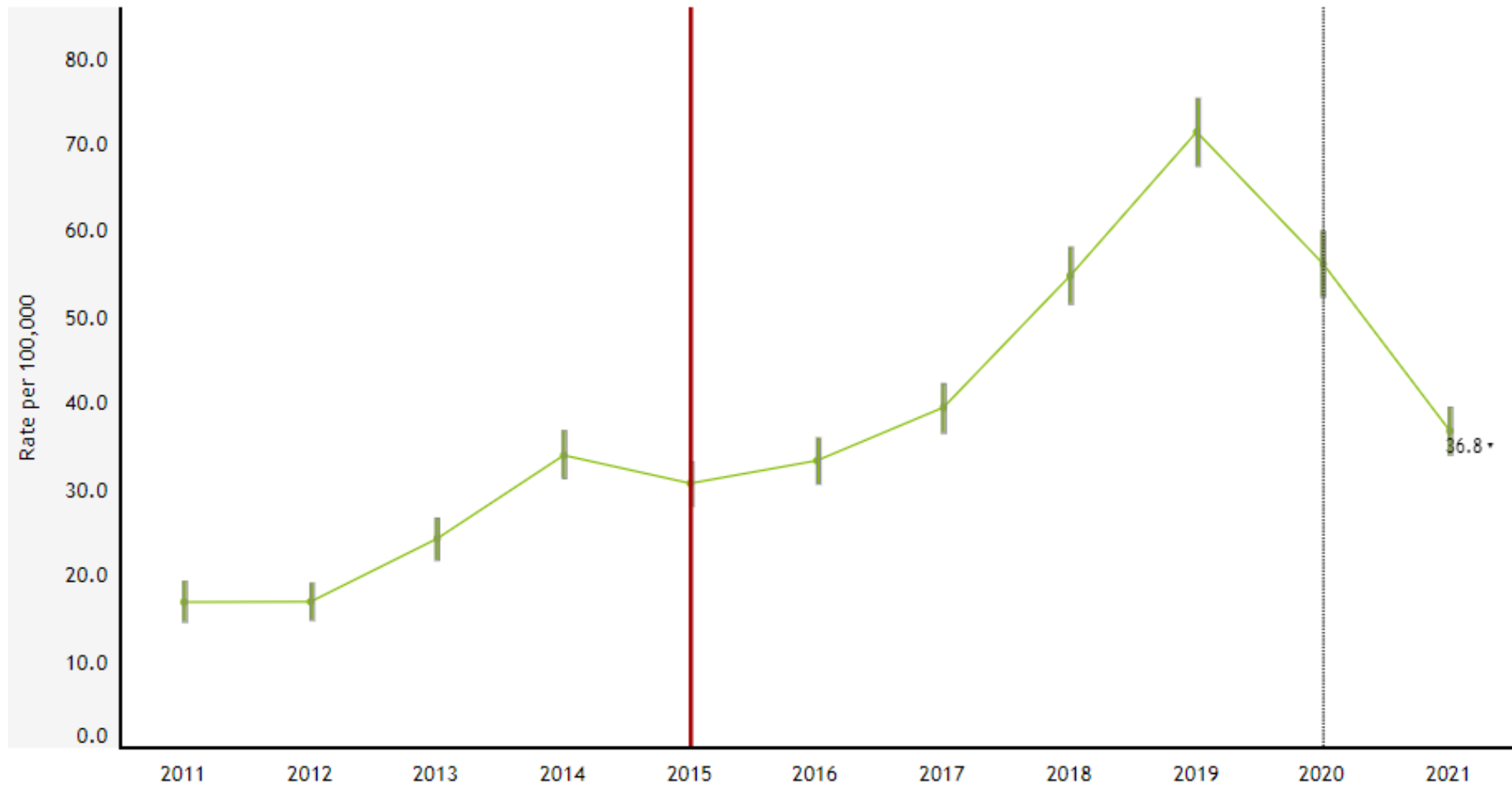
Are there differences in adverse effects by product type?

Annual Frequency Reported of Marijuana Exposures by Product Type, Colorado 2016 to 2021



What did we learn
about healthcare
encounters?

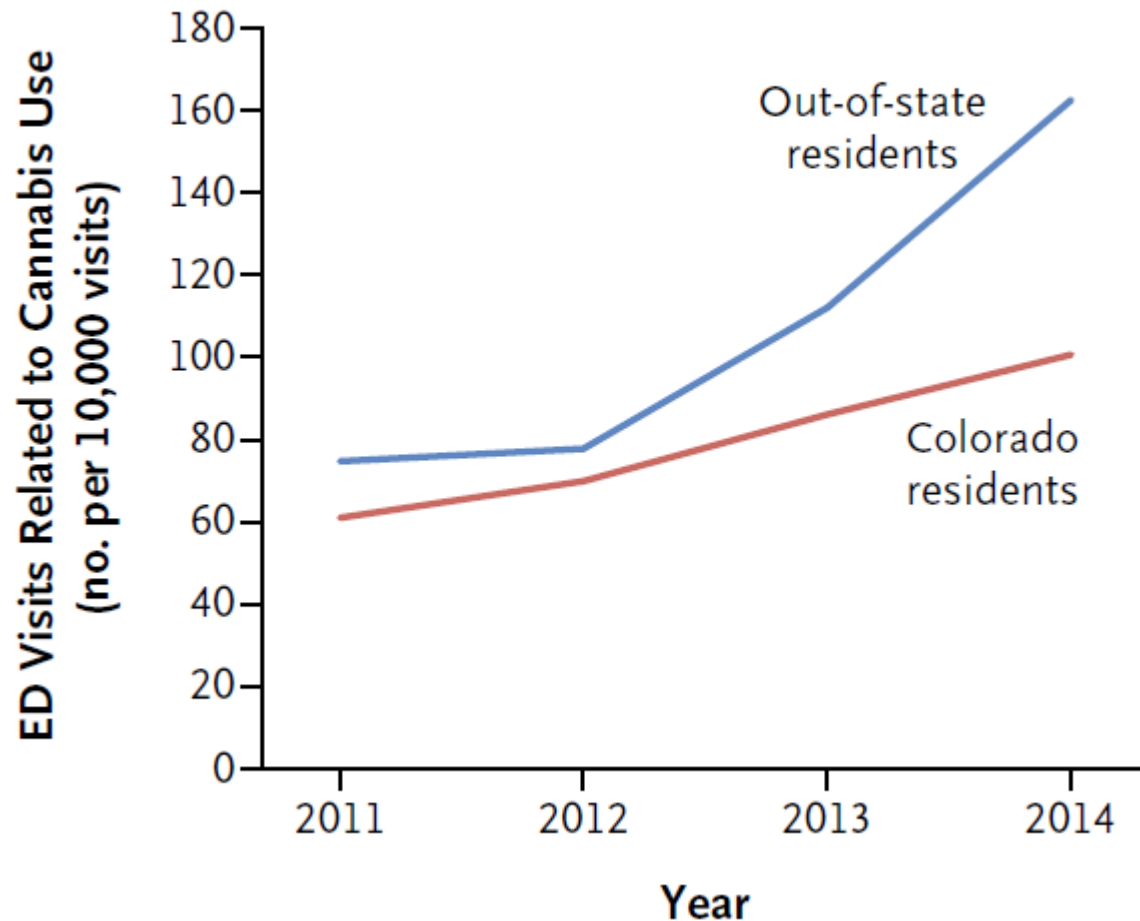
Annual Emergency Department Discharge Rate Marijuana Poisoning Billing Codes per 100,000 Discharges Colorado 2011 to 2021



Source: Colorado Department of Public Health and Environment
Data: Colorado Hospital Association

Can patient demographics tell us anything?

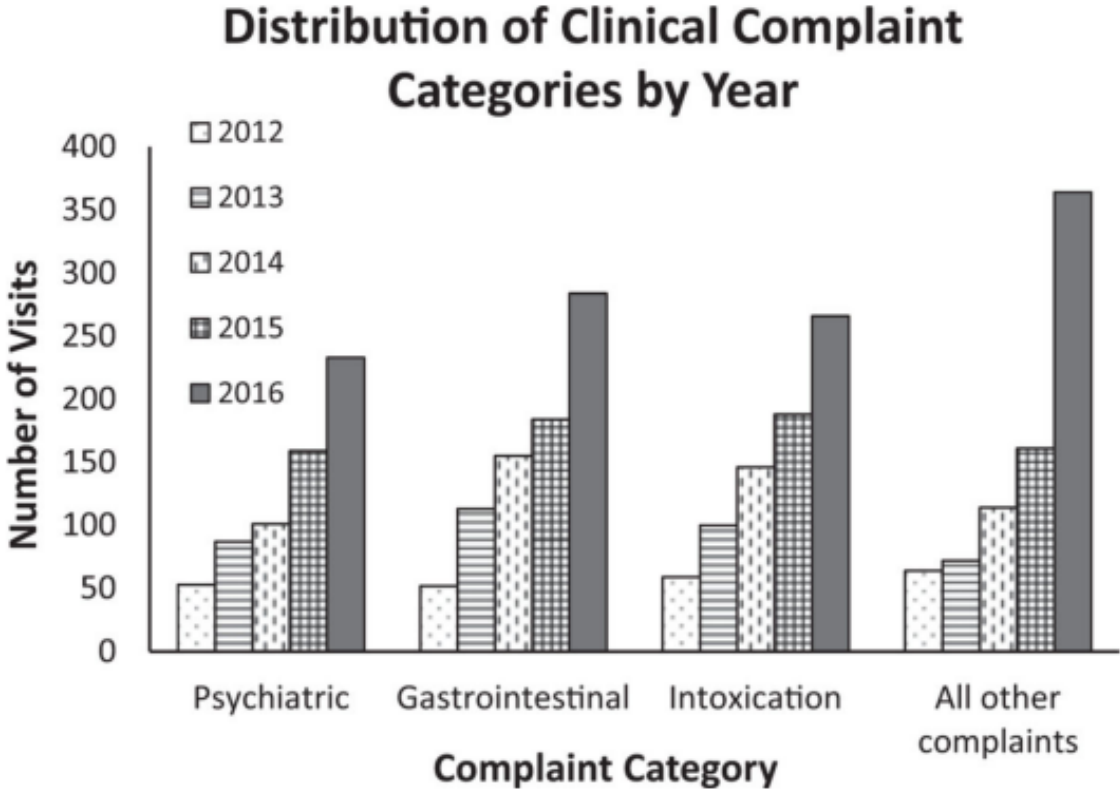
B Statewide



A screenshot of an NPR article page. The top navigation bar includes the NPR logo, 'CPR News', and links for 'SIGN IN', 'NPR SHOP', and 'DONATE'. Below the navigation bar are links for 'NEWS', 'CULTURE', 'MUSIC', 'PODCASTS & SHOWS', and 'SEARCH'. The main content area features a 'Shots' logo with a syringe icon and the text 'HEALTH NEWS FROM NPR'. The article title is 'Colorado Pot Tourists Are More Apt To Land In The ER Than Locals', categorized under 'PUBLIC HEALTH'. The article is dated 'February 24, 2016 · 5:12 PM ET' and is by 'Angus Chen'.

Kim HS, Hall KE, Genco EK, Van Dyke M, Barker E, Monte AA. Marijuana Tourism and Emergency Department Visits in Colorado. N Engl J Med. 2016 Feb 25;374(8):797-8.

What do these “healthcare encounters” mean?

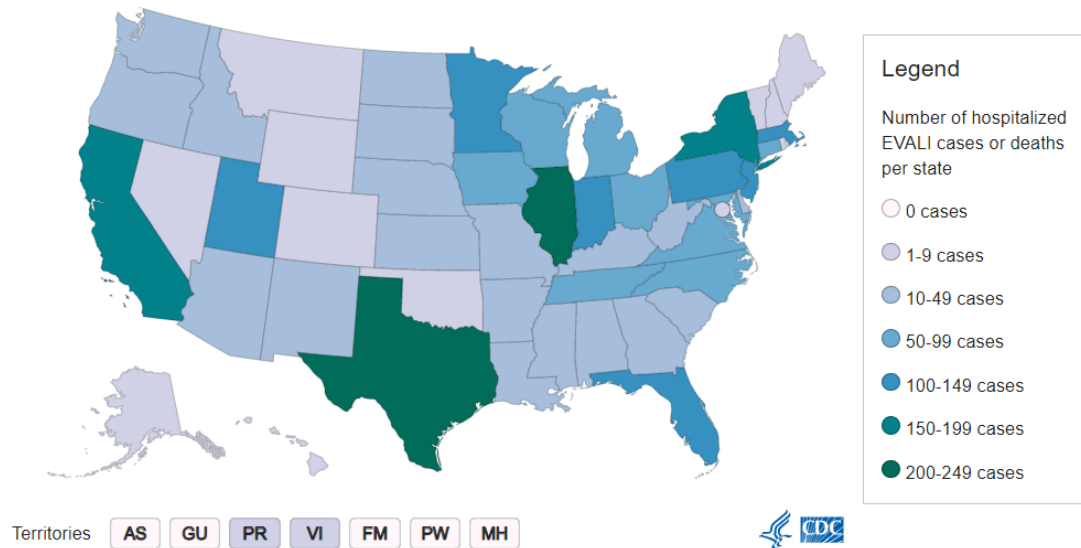


Shelton SK, Mills E, Saben JL, Devivo M, Williamson K, Abbott D, Hall KE, Monte AA. Why do patients come to the emergency department after using cannabis? Clin Toxicol (Phila). 2020 Jun;58(6):453-459.

Can we detect an
“outbreak”?

Outbreak: E-Cigarette or Vaping Product Associated Lung Injury (EVALI)

Number of Hospitalized EVALI Cases or Deaths Reported to CDC as of February 18, 2020



- Severe shortness of breath with lung infiltrates
- 2,807 hospitalized
- 68 deaths

Reportable Condition in Colorado since 2018

Any other disease, syndrome or condition that is known or suspected to be related to an exposure to a toxic substance, prescription drug, over-the-counter medication or remedy, controlled substance, environmental media or contaminated product that results in hospitalization, treatment in an emergency department, or death, and is:

- a) Suspected of being a cluster, outbreak or epidemic,
- b) A risk to the public due to ongoing exposure,
- c) At an increased incidence beyond expectations,
- d) Due to exposure to food, environmental media (including water, air, soil or sediment), or other material, such as marijuana products, that is contaminated by a toxic substance, hazardous substance, pollutant or contaminant,
- e) A case of a newly-recognized or emerging disease or syndrome,
- f) Related to a healthcare setting or contaminated medical devices or products, such as diverted drugs, or
- g) May be caused by, or related to, a suspected intentional or unintentional release of chemical or radiological agents.

- Hospitalization, ED Visit, or death suspected to be related to a contaminated product
- Reportable by physicians

“Popular Media” Surveillance

☰ THE DENVER POST

Man who plunged from Denver balcony ate 6x...



NEWS

Man who plunged from Denver balcony ate 6x recommended amount of pot cookie


The New York Times

Don't Harsh Our Mellow, Dude



By [Maureen Dowd](#)

June 3, 2014

 Give this article



 722

The caramel-chocolate flavored candy bar looked so innocent, like the Sky Bars I used to love as a child.

What have been the impacts of surveillance?

- Policy/regulation changes
 - Universal symbol
 - Individual serving packaging
 - Vape oil additive restrictions
- Prevention/education
 - Edible education
 - Tourist campaign
 - Pregnant/lactating women campaign
 - Safe storage campaign



What are the strengths of public health surveillance?

- Solid data on population use over time from well-established surveys with robust sample sizes
- Access to time-sensitive data systems (NPDS, Syndromic surveillance) to identify widespread adverse outcomes related to product use
- Health department infrastructure to identify large, severe, or unusual outbreaks

What are the weaknesses of public health surveillance?

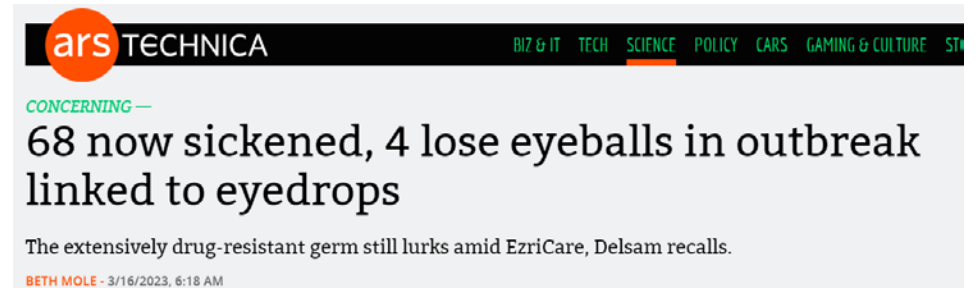
- Time lag – mostly retrospective surveillance
- Lack of granularity from surveys and administrative data
- Administrative hospital data designed for billing not surveillance
- Inability to identify moderately sized outbreaks with less severe health outcomes

How can we improve surveillance?

- Electronic medical records WITH standardized cannabis use intake questions including frequency of use and method of use
- Centralized and required reporting of adverse effects
 - Contact number on all product labels
 - Required reporting from product manufacturers
- Specialized surveys focused on cannabis users

What worries me?

- Long-term
 - Strong association between adverse mental health effects and cannabis use
 - Unknown effects of vape devices
 - Unknown effects of long-term heavy use
 - Unknown effects of heavy use of high THC products
- Short-term
 - Adverse effects from product contamination (microbial and pesticides)



Questions?

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