Cannabis: Lessons Learned from Public Health Surveillance in Colorado

Mike Van Dyke, Ph.D.
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

Amendment 64
Legalize Marijuana

Reporting: 30%
Yes: 53% (887,957)
No: 47% (796,194)

State House District 42
Fields: 10,648 (72%)
Donald: 4,145 (28%)

Electoral Vote
Obama: 172
Romney: 184
OH WOW! PARADIGM SHIFT!
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)

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)
JUST SAY NO TO DRUGS

START LOW, GO SLOW.
DON'T OVER-DO IT WITH EDIBLES.
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?
How often do people use cannabis?

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

Source: Colorado Department of Public Health and Environment

- Monthly
- Weekly
- Daily/near daily

Percentage (%)
How are people using cannabis?

Source: Colorado Department of Public Health and Environment
What did we learn about adolescent use?
Are more adolescents using?
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

Source: Colorado Department of Public Health and Environment
Are adolescents using differently?

Source: Colorado Department of Public Health and Environment
What did we learn about adverse effects?
Calls to the Poison Center

Annual Frequency of Reported Marijuana Exposures, Colorado 2000-2021

Source: Colorado Department of Public Health and Environment
Data: National Poison Data System
Are there differences in adverse effects by age?
Are there differences in adverse effects by product type?
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?

![Graph showing ED visits related to cannabis use](image)

What do these “healthcare encounters” mean?

Can we detect an “outbreak”?
Outbreak: E-Cigarette or Vaping Product Associated Lung Injury (EVALI)

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

Don’t Harsh Our Mellow, Dude

By Maureen Dowd

June 3, 2014

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)