

# Cannabis and Health

Module 2

Lecture 4: History of Products and Formulations

# Modes of Administration

- Medicinal users implement many available modes of administration for cannabis
- Inhalation remains most popular: 84.1%
  - Pipes (31.9%), bongs (19.4%), Joints/blunts (16.5%), or vaporized (16.3%)
- Oral/Edibles (8.5%)
  - Mostly tinctures, edibles (8%)
- Concentrates (6.4%)
- Topical (0.6%)

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**Cannabis and  
Cannabinoid Research**

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ORIGINAL RESEARCH

Open Access

## A Cross-Sectional Survey of Medical Cannabis Users: Patterns of Use and Perceived Efficacy

Michelle Sexton,<sup>1,\*</sup> Carrie Cuttler,<sup>2</sup> John S. Finnell,<sup>3</sup> and Laurie K. Mischley<sup>4</sup>

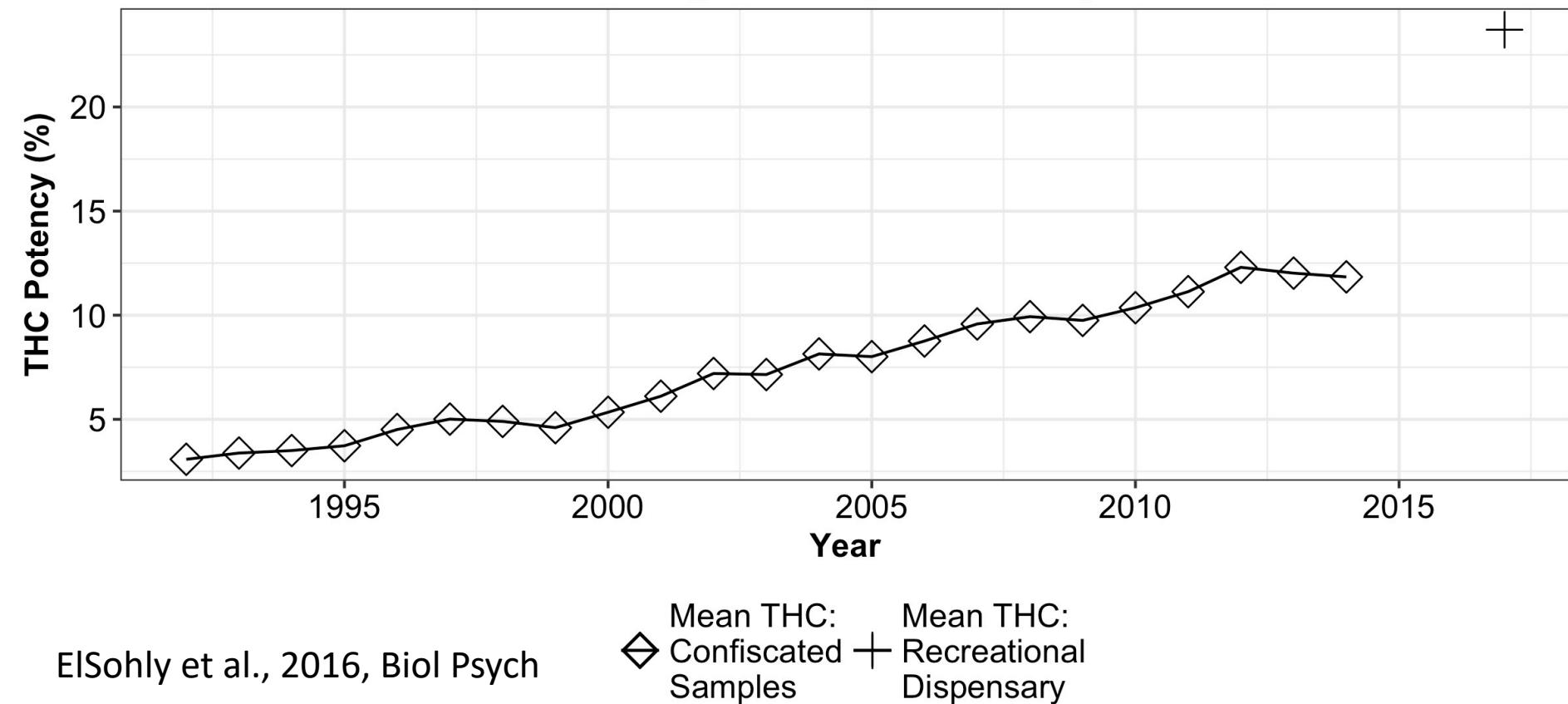
# Flower (“Bud”)

- Preferred for rapid onset and immediate feedback to titrate dose.
- Levels of use vary for medical users
  - Less than 1 g per week (12%)
  - 3–5 g per week (32%)
  - 28+ g (1+ ounce) per week (9%)
- Strain preferences also vary
  - Hybrid (indica/sativa) is most preferred (45%)
  - High CBD is also common (41%)



# Flower: Changes in Potency

Changes in Flower Potency



EISohly et al., 2016, Biol Psych

Mean THC:  
Confiscated Samples

Mean THC:  
Recreational Dispensary

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4987131/>

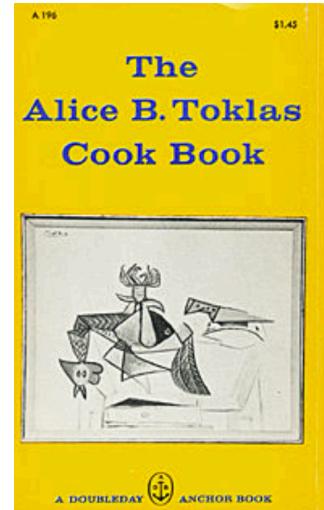
# Tinctures

- An alcoholic extract of cannabis
  - Made by soaking dried flowers in ethanol, allowing cannabinoids to dissolve
  - Can bake/dry cannabis before soaking to change molecular makeup and increase the amount of THC in the preparation
- Incorporated into medical treatments early on
  - Tetanus (Miller, 1845)
  - Alcohol withdrawal (Tyrell, 1867)
- Drug policies have been more lenient for tinctures
  - Used to produce specific extracts (e.g., Sativex oral spray)



# Edibles

- Edible cannabis documented early (1000 BCE)
  - Bhang: an edible preparation of cannabis in India
- Modern interest in edibles attributed to Alice Toklas
  - Published a cook book in 1954 that included a recipe for "Hashish Fudge"
    - "easy to whip up on a rainy day" and can bring a flood of thoughts on "many simultaneous planes"
- Legal markets now include many edibles
  - Gummies, chocolates, drinks, etc.
  - Varying ratios of THC and CBD



# Sub-lingual

- “Under the tongue”,
  - Pharmacological route of administration, by which substances diffuse into the blood (through tissue under the tongue)
- Benefits
  - Bypass first-pass metabolism
  - Less harmful respiratory effects (vs. smoking)
  - More accurate dosing (nothing lost in extraction or first-pass metabolism)
  - Less cost for equivalent amount of dosing
- Challenging to deliver cannabinoids (poorly water-soluble)
  - Sublingual sprays used can deliver THC and CBD in a readily dissolved form

# Concentrates

- Goes by many names (dabs, budder, shatter, wax)
- Much higher potency than standard flower
  - Typically 70%-80% THC, up to 95%
- Primary benefits are cost/efficiency and less need to smoke/inhale (due to higher potency)
- Rapidly increasing in popularity
  - Concentrate sales more than doubled in 2016
  - State-market sales were 18% of sales for flower in 2015, jumped to 38% of sales for flower in 2016

# CANNABIS CONCENTRATES



**CRUMBLE**  
Dried oil with a honey-comb like consistency



**BADDER/BUDDER**  
Concentrates whipped under heat to create a cake-batter like texture



**SHATTER**  
A translucent, brittle, & often golden to amber colored concentrate made with a solvent



**DISTILLATE**  
Refined cannabinoid oil that is typically free of taste, smell & flavor. It is the base of most edibles and vape cartridges



**CRYSTALLINE**  
Isolated cannabinoids in their pure crystal structure



**DRY SIFT**  
Ground cannabis filtered with screens leaving behind complete trichome glands. The end-product is also referred to as kief



**ROGIN**  
End product of cannabis flower being squeezed under heat and pressure



**BUBBLE HASH**  
Uses water, ice, and mesh screens to pull out whole trichomes into a paste-like consistency



# Topicals

- Variety of products (lotions, salves, oils, sprays, etc.)
- Psychoactive high is not experienced (medicinal advantage)
  - Cannabinoids do not reach the blood
- Is it possible that topicals provide localized relief?
  - Particularly with respect to inflammation?



# Product Examples



# Extraction Methods

- Edibles, concentrates, topicals (anything other than flower) requires an extraction method to get trichomes off of plant material and to get the THC and CBD isolated and concentrated from the trichomes
- Butane Hash Oil (BHO)
  - Uses butane as a solvent
  - Produces 80-90% concentration
  - Caution - may contain traces of butane, pesticides, or other unhealthy ingredients/contaminants.

# Extraction Methods

- Supercritical CO<sub>2</sub>
  - CO<sub>2</sub> is much safer for operator and does not have risk of contaminants from a solvent like butane
- Ethanol
  - Uses ethanol as a solvent
  - Safer than butane
  - May be better at preserving terpenes
- Bubble Hash
  - No solvents and no risk
  - Uses freezing and ice cold water to separate trichomes from plant material
  - Less effective/efficient (40-50% potency vs. 70-90%)

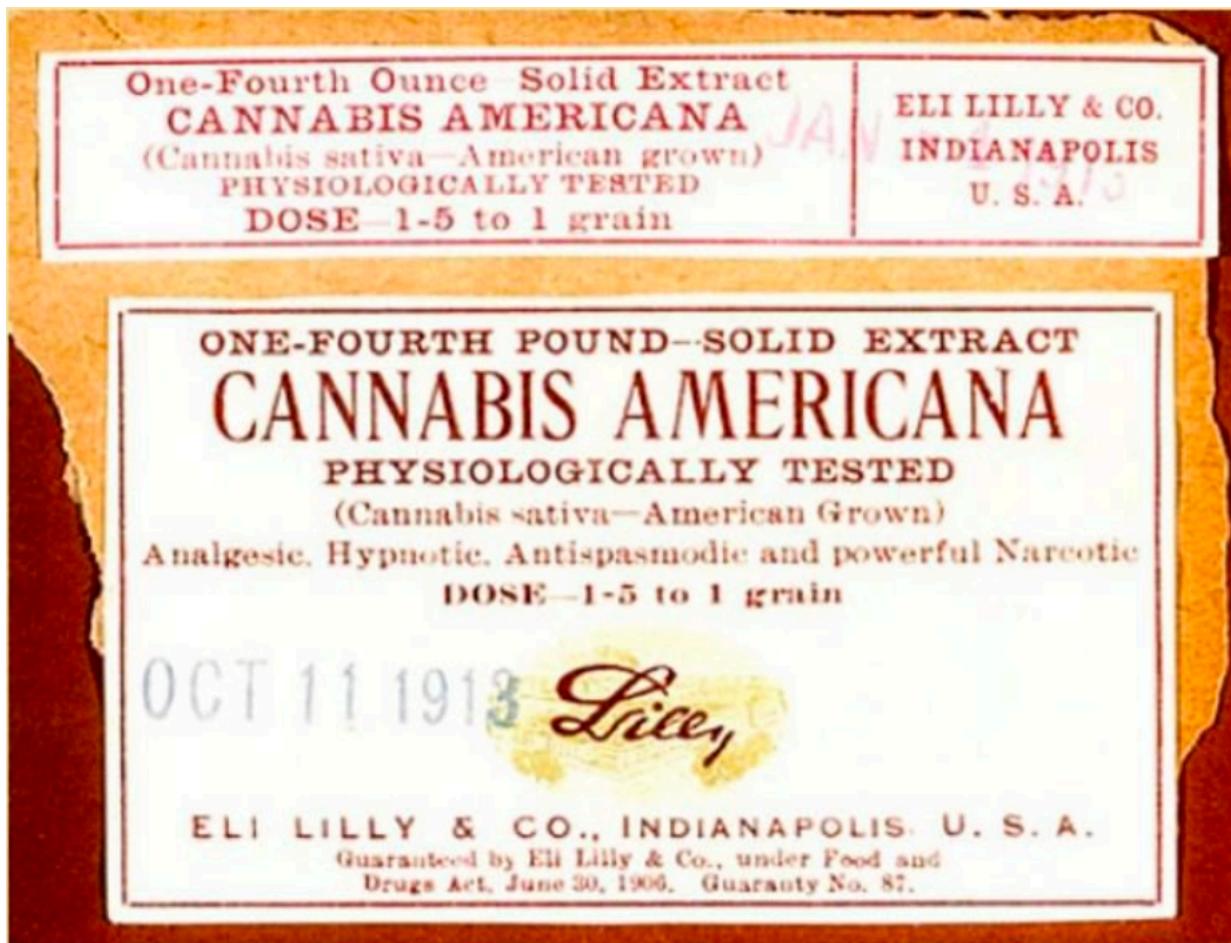
# Pharmaceuticals: Sativex

- GW Pharmaceuticals was issued a license to cultivate cannabis for the manufacturing of Sativex in the UK
- A cannabis extract – approved as a mouth spray for:
  - Each spray delivers a dose of 2.7 mg THC, 2.5 mg CBD
- Has received empirical support for medical use
  - Multiple Sclerosis (neuropathic pain, Spasticity, overactive bladder)
  - Two Phase-III NIH Studies for MS supporting its use
  - Meta-analysis (2009) found large variation in effectiveness
  - Ongoing studies for cancer pain

# Pharmaceuticals: Epidiolex

- In the United States, a CBD drug with FDA approval for treating epilepsy disorders.
  - Schedule V classification (non-Epidiolex CBD is Schedule I)
  - Despite a Schedule V classification, each state must still legalize its use.
  - In 2018, WHO recommended that it remain unscheduled

# Pharmaceutical Grade Products



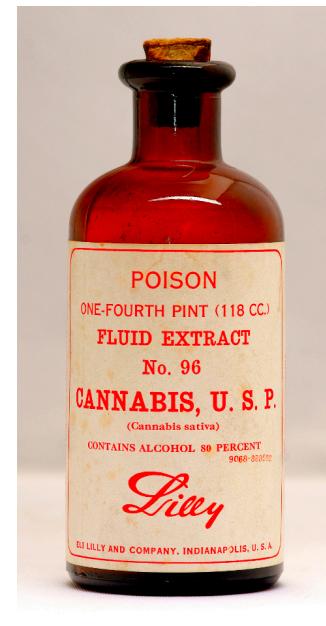
# Pharmaceutical Grade Products



Back to the future?

GW 2009

Lilly 1909



# Summary

- Type of products: flower, concentrate, edible, topical, sub-lingual
- Hundreds/thousands of different products from different companies
- Consumers need to know what is in the product and how it was produced
- Regulation and reliable testing is essential for this
- Advantage of FDA regulated pharma products (GW Pharma, Tilray, others) is regulation – disadvantage is cost and takes control away from consumer/patient

# Discussion

- What are questions that you would want to ask before buying these products (pretend you are a cancer patient)?
- Do you need to ask these questions about sativex and epidiolex?
- Why is regulation super important?
- Do we need concentrate products > 70% THC?