

# Co-use of Alcohol & Cannabis: Prevalence & Acute Effects

Alcohol Medical Scholars Program

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## I. Introduction (SLIDE 2)

- A. Substance use & problems are common
- B. Most common are alcohol & cannabis (CB)
  - 1. Alcohol ever used by 86% of US population
  - 2. CB ever used by 50% of US population<sup>1</sup>
- C. Very different drugs, less known about when used together (co-use)
- D. To address this, the lecture will cover: (SLIDE 3)
  - 1. Key definitions & patterns of use
  - 2. Acute effects (CB, alcohol, & their interaction)
  - 3. Recent research in co-use
  - 4. Diagnosis & treatment of co-use

## II. Some key definitions & patterns of use

### A. Alcohol

- 1. What is alcohol? (SLIDE 4)
  - a. Consumed as a beverage (beer, wine, liquor, etc.)
  - b. Chemical name – ethanol
  - c. Most commonly used non-medical substance
  - d. Central nervous system (CNS: [brain]) depressant (i.e. reduces arousal & stimulation)
- 2. Diagnostic DSM-5<sup>2</sup> alcohol use disorder (AUD) criteria: (SLIDE 5)
  - a. DSM-5 American Psychiatric Association criteria:
    - b. 2 + in 12-month period
      - 1'. Drinking more or for longer than intended
      - 2'. Unable to cut down or stop drinking
      - 3'. Spent significant amount of time drinking
      - 4'. Craving (i.e., strong urge to use)
      - 5'. Drinking interferes with obligations
      - 6'. Continue drinking despite relationship problems
      - 7'. Given up/reduced important activities in favor of drinking
      - 8'. Drinking in dangerous situations (e.g., driving)

- 9'. Continue drinking despite physical/psychological problems
- 10'. Tolerance (need to use more to get same effect)
- 11'. Withdrawal (e.g., rebound from usual effects: 2+ days of tremors, nausea, etc.)

## B. Cannabis

### 1. What is cannabis? (SLIDE 6)

#### a. Cannabis sativa plant w/ many chemicals & psychological effects

- 1'. Dried leaves, flower, & stems from CB plant
- 2'. Various modes of use<sup>3</sup>
  - a'. Smoked (e.g., joints, bongs)
  - b'. Taken orally (e.g., foods)
  - b'. Vaporized (e.g., electronic cigarettes)
- 3'. Various products<sup>4</sup>
  - a'. Plant (i.e. flower)
  - b'. Very strong concentrated oil (i.e. concentrates)
  - c'. Edibles (e.g., baked goods, beverages, candy)

#### b. Various CNS (brain) effects (e.g., depressant & hallucinogen)

#### c. Includes many cannabinoids (i.e., chemicals) (SLIDE 7)

- 1'.  $\Delta$ -9 Tetrahydrocannabinol (THC)
  - a'. Responsible for “high”
  - b'.  $\uparrow$  potency (doubled or tripled) in recent years<sup>5</sup>
- 2'. Cannabidiol (CBD)
  - a'. No “high”<sup>6</sup>
  - b'. No abuse potential<sup>7</sup>
  - c'. Some medical benefits<sup>8</sup>

### 2. Cannabis Use Disorder (CUD): DSM-5 criteria same as for AUD<sup>2</sup> (SLIDE 8)

#### a. Myth: CB is not addictive<sup>9</sup>

- 1'. CB withdrawal can occur (e.g.,  $\downarrow$ appetite, insomnia, irritability, depression)<sup>10</sup>
- 2'. CB tolerance can occur<sup>11</sup>
- 3'. Physical brain changes occur in regular users<sup>12,13</sup>
- 4'. 30% of those who use CB develop CUD<sup>14</sup>

#### b. Rates of CUD higher in users of very strong THC-concentrated products<sup>15</sup>

## C. Patterns of use

## 1. Rates of use

### a. Prevalence of alcohol use only<sup>1</sup> (SLIDE 9)

- 1'. Lifetime use: 86% age 18+
- 2'. Past year use: 70%
- 3'. Past month use: 50%

### b. Changes in rates of alcohol use

- 1'. Steady in general population past ~10 years
- 2'. Highest prevalence & most consequences: age 18-25
- 3'. Recent ↑ in specific populations (e.g., women, older adults)<sup>16,17</sup>

### c. Prevalence of CB use only<sup>1</sup> (SLIDE 10)

- 1'. Lifetime use: 50% age 18 -25; 48% of adults 26+
- 2'. Past year use: 35% age 18-25; 13% of adults 26+
- 3'. Past month use: 22% age 18-25; 9% of adults 26+

### d. Changes in rates of CB use

- 1'. Legalization (past 10 years)
  - a'. Recreational use: 11 states + D.C.
  - b'. Medicinal use: 33 states + D.C.
- 2'. ↑ CB use in legal states (for young adults only)
- 3'. ↑ CB use overall in adults age 50+<sup>18</sup>

### e. Prevalence of concurrent use (i.e., use at same time but effects don't overlap) (SLIDE 11)

- 1'. Higher among men (9%) than women (6%)
- 2'. Current drinkers: 11% use CB in past 12 months
- 3'. Young adult drinkers (18–29), 23% use CB in past 12 months<sup>19</sup>

## 2. Public perception of harm (SLIDE 12)

### a. Higher perception of harm for alcohol versus cannabis

- 1'. 69% perceive risk of harm from heavy-drinking (4/5 drinks for women/men) daily<sup>1</sup>
- 2'. 31% perceive risk of harm from using CB daily (population sample)<sup>1</sup>

### b. CB marketed as health product

### c. Those with lower perceived risk → more co-use of alcohol and CB<sup>20</sup>

## III. Acute effects (SLIDE 13)

## A. Alcohol alone (SLIDE 14)

### 1. Physical effects

#### a. Brain<sup>27,28</sup>

- 1'. Blocks neurons
- 2'. Slurred speech
- 3'. Poor memory
- 4'. Slow reflexes

#### b. Heart<sup>29,30</sup>

- 1'. Irregular heartbeat
- 2'. High blood pressure

### 2. Psychological effects<sup>31,32</sup>

- a. Relaxation (but poor sleep)
- b. Difficulty focusing (e.g., poor decision-making)
- c. Reduced inhibition (e.g., facilitates social interaction)
- d. Reduces coordination (e.g., blurred vision & slowed reflexes)

## B. CB alone (SLIDE 15)

### 1. Physical effects

#### a. Brain<sup>33,34</sup>

- 1'. Acute: altered senses, memory impairment, reaction time
- 2'. Long-term: learning & memory
- 3'. Acute high doses: psychosis (hallucinations, delusions)

#### b. Heart<sup>35</sup> (SLIDE 16)

- 1'. Heart rate ↑ (persists for 3 hours after smoking)
- 2'. Risk of heart attack

#### c. Lungs<sup>36</sup>

- 1'. Similar to tobacco smokers
- 2'. Lung infection & illness (not cancer)
- 3'. Cough

### 2. Psychological effects<sup>37</sup> (SLIDE 17)

- a. Mood (e.g., ↑ relaxation)
- b. Impairs thinking & problem-solving
- c. Both ↓ & ↑ anxiety

## C. Interaction of alcohol & CB (SLIDE 18)

### 1. Lab research- animal

- a. Both activate brain's reward system<sup>41-43</sup>
- b. Motivate desire to use substance
- c. Cross-tolerance (use of alcohol can result in CB tolerance)<sup>42-46</sup>
- d. Same brain system controls liking/wanting of both alcohol & CB<sup>46,47</sup>

### 2. Lab research- human (SLIDE 19)

#### a. Behavioral effects

- 1'. ↑ cognitive (brain) impairment (e.g., poor decision-making)<sup>48,49</sup>
- 2'. ↑ motor (body) impairment (e.g., reaction time)<sup>50,51</sup>
- 3'. ↑ risk for impaired driving<sup>52,53</sup>
  - a'. Low doses of CB = impairment similar to 0.05 breath alcohol (~half legal limit)<sup>54</sup>
  - b'. Alcohol + CB = ↑ driving impairment (compared to either alone)<sup>53,54</sup>
- 4'. Higher dose of THC (compared to placebo) → less drinking<sup>55</sup>
- 5'. Low dose alcohol does not lead to more CB use<sup>56</sup>
- 6'. No lab studies comparing the effect of order in consumption

#### b. Psychological effects (SLIDE 20)

- 1'. ↑ positive mood<sup>57</sup>
- 2'. ↑ negative mood<sup>48</sup>
- 3'. ↑ feelings of intoxication (high & drunk)<sup>58</sup>
- 4'. Adding small dose alcohol ↑ pleasant effects of CB<sup>59</sup>
- 5'. Higher dose of THC (compared to placebo) → less alcohol craving (desire)<sup>55</sup>

#### c. Physical effects (SLIDE 21)

- 1'. ↑ THC in blood when also drinking<sup>59,60</sup>
- 2'. Alcohol blood level not affected when using CB
- 3'. Use of CB + alcohol = unique brain changes compared to use of either alone<sup>61</sup>

### 3. Limitations of lab studies

- a. Lab CB strength (%THC) ↓ than CB used in real-world
- b. Not naturalistic
  - 1'. Standard order of use (alcohol first)
  - 2'. Sterile context (i.e., controlled environment with experimenter watching)
  - 3'. Standard dose (often less than use in the real-world)

#### IV. Recent research in co-use (SLIDE 22)

##### A. Population survey data (SLIDE 23)

1. ↑ consumption among co-users<sup>19</sup>
  - a. Alcohol consumption versus alcohol only users
  - b. CB consumption versus CB only users
2. ↑ consequences<sup>62-64</sup>
  - a. Driving-related consequences
  - b. Social & academic consequences
  - c. Psychiatric comorbidity (more than one illness)
3. More problems for simultaneous (i.e., effects overlap) versus concurrent users<sup>19</sup> (SLIDE 24)
  - a. Shown in studies of young adults<sup>19</sup> and adolescents<sup>64</sup>
  - b. Examples of increased problems:
    - 1'. Drunk driving
    - 2'. Psychosocial problems
  - c. Poorer self-control from CB use may lead to more drinking
  - d. No. of drinks = best predictor of problems with simultaneous use<sup>65,66</sup>
4. Young adults use together for “cross-faded” effects (i.e., a more intense intoxication)<sup>67</sup> (SLIDE 25)
  - a. 25% of college students report simultaneous use (past year)<sup>68</sup>
  - b. 75% of college student users of alcohol and CB report simultaneous use (past year)<sup>69</sup>

##### B. Naturalistic studies/data “in-the-moment” (SLIDE 26)

1. Methods for studying substance use in the real-world
  - a. Web-based surveys: log in anywhere to answer surveys
  - b. Ecological momentary assessment (EMA): report on your experiences in the moment
2. Impact of co-use on naturalistic drinking (mixed evidence) (SLIDE 27)
  - a. ↑ in alcohol consumption & consequences (complementary)
    - 1'. Daily CB use → heavy drinking (5+ drinks)/day
      - a'. One study found this in Veterans<sup>70</sup>
      - b'. Another study in college students<sup>71</sup>
    - 3'. More weekly CB = more alcohol consequences<sup>71</sup>
    - 4'. Longitudinal studies show heavy CB use → heavier drinking<sup>72</sup>
  - b. ↓ in alcohol consumption (substitution)
    - 1'. Daily CB use = less drinks

2'. Using CB first in a day = less drinks<sup>73</sup>

3. Group differences (SLIDE 28)

a. Some medicinal CB users drink less:

1'. Those who use CB more

2'. Those employed

3'. Those with more medical conditions<sup>74</sup>

b. Those with AUD drink more when using CB<sup>70</sup>

c. College students with hx of alcohol use drink more when using CB<sup>71</sup>

4. Role of context (SLIDE 29)

a. Environment

1'. Young adults in states with legalization use more<sup>69</sup>

2'. Parental monitoring reduces simultaneous use<sup>66</sup>

b. Peers: ↑ use of alcohol & CB in those with peers who use<sup>75</sup>

V. Diagnostic & treatment effects (SLIDE 30)

A. Co-use linked with ↑ rates of AUD & CUD (SLIDE 31)

1. AUD rates higher among CB users (40%)

2. National data: 60% of those with CUD, also AUD<sup>76</sup>

3. CB users who drink- more likely to have a CUD

4. Co-use (with heavy drinking) more common in those with AUD<sup>70</sup>

B. CB on alcohol treatment effects<sup>77-80</sup> (SLIDE 32)

1. ↑ return to drinking after treatment

2. More drinking overall

3. ↑ risk of physical consequences

4. Each day of CB use → 4 to 5 fewer days of alcohol abstinence

D. CB as treatment for AUD (SLIDE 33)

1. Some report CB as effective replacement strategy<sup>81</sup>

2. Minimal empirical evidence

3. Animal studies suggests CBD (no “high”) may be effective<sup>82</sup>

C. Alcohol on CB treatment effects – very limited data

D. Evidence-Based Treatments for AUD + CUD (SLIDE 34)

1. Few studies directly targeting both

2. Reduced CB use = reduced drinking<sup>83</sup>

3. Very little evidence for pharmacotherapy in CB treatment<sup>84</sup>

4. Single study: ↓ CB use in those treated for AUD with fluoxetine<sup>85</sup>

E. Several behavioral interventions effective for both (SLIDE 35)

1. Motivational Interviewing (guiding participants toward change)<sup>86</sup>

2. Cognitive Behavioral Therapy (talk therapy focused on unhelpful thoughts and behaviors)<sup>87</sup>

3. Contingency Management (abstinence-based voucher system)<sup>88,89</sup>

F. Summary of Diagnosis and Treatment (SLIDE 36)

1. Co-use is associated with increased rates of AUD and CUD

2. There is poor evidence for cannabis use as an effective replacement for alcohol use

3. There are very few studies examining pharmacotherapy for comorbid AUD and CUD

4. There are several evidence-based behavioral interventions (talk therapy) for AUD and CUD

VI. Conclusions (4 take-home points) (SLIDE 37)

A. Co-use of alcohol & CB is common

B. Co-use leads to increased impairment/intoxication

C. Co-use increases risk for consequences

D. Co-use linked with higher rates of diagnoses & poorer treatment outcomes



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