What Do We Know About The Adverse Health Effects of Cannabis Use?

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Reasons for Community Concern About Cannabis Use

• A “new” recreational drug that is widely used
  • by adolescents and young adults
  • during an important psychosocial transition

• Associations between regular cannabis use and:
  • Use of other illicit drugs
  • Educational underachievement
  • Psychoses and schizophrenia
  • Depression and poor mental health

Lifetime cannabis use (%) among Australians 20-29 years
Age of 1st cannabis use by birth cohort
(Source: Degenhardt, Hall and Lynskey, 2000)

Life time cannabis use in Australia, 2010

Past year cannabis use in Australia, 2010
A False, Forced Policy Choice

EITHER
• Cannabis use is harmless and
  • hence should be legalised (or decriminalised)

OR
• Cannabis use is harmful and
  • hence should continue to be prohibited

Polarised Views on Harms of Cannabis Use

• 1. Cannabis use can harm young people’s health
  • VS
• 2. Cannabis use is harmless (or less harmful than alcohol)

• Evidence on harms refracted through these views:
  • Supporters of prohibition cite evidence for 1
  • Reformers reject 1 and cite harms of current policy

Assessing the Adverse Health Effects of Cannabis Use

• Cross sectional associations with adverse psychosocial outcomes
  • Raise suspicions that need to be tested
• Require longitudinal studies to separate any effects of cannabis from those of:
  • other drug use (alcohol, tobacco and stimulants)
  • users’ cognitive ability, personality, psychosocial risk
• Comparative assessments for evidential consistency
  • How does the evidence compare with other drugs?
Acute Health Effects

- anxiety, dysphoria, panic, paranoia
  - especially among naive users
- cognitive and psychomotor impairment
- psychotic symptoms
  - high doses of THC
  - vulnerability?

Accidental Injury

- Impaired performance on
  - complex psychomotor tasks & simulated driving
- Reduced risk taking: awareness of impairment
- Problems with epidemiological evidence
  - measurement of impairment
  - confounding of cannabis and alcohol
- Recent epidemiological studies and meta-analyses
  - RR of accident ~ 2 if users drive within 1 hr of use
  - Risk larger if drivers also use alcohol, as many do

Effects of Chronic Cannabis Use in Young People

- Dependence
- Use of other illicit drugs
- Educational achievement
- Psychosis
Cannabis Dependence

- Epidemiological studies
  - ECA and NCS 4% lifetime
  - NSMHWB 2% past year
- Perceived to be a problem
  - by a minority who are dependent
  - few of whom seek treatment
- But more users are seeking help to stop
  - in Australia, Netherlands, & USA
  - withdrawal symptoms common in these users

Risks and Consequences

- Risks of developing dependence
  - 9% of lifetime users (NCS study)
  - 33% of past year 5+ users in NSMHWB
  - 33-50% of daily users
- Fewer consequences than alcohol & opioid dependence:
  - respiratory symptoms
  - impaired memory
  - poor work performance
  - partner disapproval

A Gateway Drug?

- Common sequence of drug involvement
  - alcohol & tobacco precede cannabis &
  - cannabis use precedes heroin & other drug use
- < 5% of cannabis users use “harder” drugs
- But risk is much higher for cannabis users
  - who begin in mid teens and use > weekly
  - ~ 50-100 more likely to use other illicit drugs
The Gateway Hypothesis: Current Status

- Gateway pattern strong and consistent:
  - Temporal order of cannabis and other drug use
  - RR of illicit drug use in early & regular users
- Partially explained by common causes:
  - Selective recruitment & genetic vulnerability
- Some support for a causal role of:
  - Peer affiliation & drug markets
- Pharmacological sensitization?
  - Suggestive animal evidence

Educational Performance

- Cross sectional studies in high school populations
- Cannabis use correlated with:
  - Poor school performance
  - Absenteeism
  - Early school drop out
- Which is cause and which effect?
  - Are poor school performers more likely to use?
  - Does cannabis use impair school performance?
  - Or both?

Educational Performance

- Longitudinal studies in New Zealand & USA
  - cannabis use correlated with school drop out
- Studies show poor school performers are
  - more likely to use cannabis
  - affiliate with anti-social cannabis-using peers
- Cannabis probably makes a small direct contribution because:
  - associations persist after statistical control
  - long term use appears to reduce IQ by mid 30s
- School policies may worsen things
  - expulsion & ostracism
Cognitive Impairment?

- Problem users report impairment
  - but no gross cognitive impairment
- More subtle effects on attention
  - related to duration & frequency of use
- Significance uncertain

Cognitive Impairment in Adolescents?

- Adolescents at special risk
  - early users at risk of very heavy daily use
- Importance of educational achievement
- Poor school performers at high risk of using
- Chronic intoxication impairs learning

Cannabis & Schizophrenia

- Cannabis dependence & schizophrenia
  - in the general population: RR ~2
  - in clinical populations RR ~ 4
- Cannabis use probably exacerbates disorder
  - Evidence from prospective studies
  - Reduced compliance or specific drug effect?
- Can its use precipitate schizophrenia?
  - Evidence from large longitudinal studies
  - Biological plausibility: provocation in patients
Prospective Evidence
(Zammit et al, 2003)
• 27 year follow up of Swedish cohort (50,000)
  • better register coverage
  • statistical control for more variables
  • covered most of the risk period for the disorder
• Replicated earlier findings:
  • RR = 3 for diagnosis & dose response relationship
  • Persisted after statistical adjustment
  • For whole period but weakened with time
  • AR of cannabis for schizophrenia: 13%

Other evidence
• New Zealand birth cohorts:
  • Dunedin (Arsenault et al, 2002) N = 759
  • Christchurch (Fergusson et al, 2003) N=900
    – Both found that cannabis use
      • Predicted psychotic symptoms RR ~ 2
      • Stronger prediction for early onset cannabis use
• Dutch cohort: Van Os et al (2002) 4 year follow up
  • 4848 young Dutch adults
  • increased risk of symptoms & disorders
  • Attributable risk: 13%; 50% for more severe cases
• German cohort: Henke et al (2004) 4 year follow up
  • N = 2437 German adolescents
  • Cannabis use predicted psychotic disorders
  • Stronger for those with a history of psychotic symptoms

Cannabis and Schizophrenia:
Summary
• Reasonable evidence that
  • cannabis use exacerbates schizophrenia
• Consistent evidence that:
  • cannabis use can precipitate schizophrenia
  • Five longitudinal studies in 3 countries
    • consistent RR ~ 2 and AR ~ 13%
• Biological plausibility
  • Cannabinoid-dopamine interaction
  • Provocation studies
Cannabis and Depression and Suicide

- Correlation with depression RR ~ 1.6
  - Cross sectional surveys
  - Longitudinal studies
- Correlation with suicide risks in some studies
- Less clarity re
  - Adequacy of control for confounding
  - Direction of relationship: cause or effect?
- Requires attention in cannabis dependent

Cannabis and other mental disorders

- Associations between cannabis disorders and
  - Bipolar disorder
  - Conduct disorders
  - Anxiety disorders
- Nature of relationships less clear
  - Cross-sectional studies, often in clinical populations
  - Fewer longitudinal studies
- Probably worsen outcomes of treatment
  - Should screen for cannabis disorders and treat

Health Effects of Chronic Use

- Reproductive effects
- Respiratory risks
- Cancer risks
- Cardiovascular risks
Reproductive Risks of Regular Cannabis Use During Pregnancy

- Poorer outcomes most consistently
  - Low birth weight and prematurity
- Interpretation uncertain because:
  - Measurement issues: often relies on self-report
  - Cannabis use confounded by: other drug use, low SES,
- Less clear about other adverse effects:
  - Birth defects?
  - Cognitive impairment in offspring?
  - Cancer risk in offspring?
- Prudent to discourage use during pregnancy

Respiratory Effects of Cannabis Smoking

- Cannabis primarily smoked
  - Smoke similar to tobacco smoke
- Epidemiological and clinical evidence of:
  - Increased cough, sputum, wheeze
  - Histopathological changes in MT smokers
  - Impaired immunological responses
  - Increased health service use for respiratory symptoms
- Conflicting evidence on respiratory function
  - Some studies show impaired function
  - Recent studies of long term users have failed to do so

Respiratory Cancers

- Causes for concern
  - Composition of cannabis smoke
  - Histopathological changes
  - Case series of cancers in young adults
  - Evidence of mutational changes in lung tissue
- Conflicting epidemiological evidence
  - Mixed findings from case-control studies
  - Positive findings confounded by tobacco smoking
Cardiovascular Risks

- THC potent stimulant of CVD system
  - Increases heart rate acutely
  - Complex effects on BP
- Tolerance develops in regular users
- More concern re CVD risks in older users
  - Case-crossover study
  - Lab studies in patients with angina
- Smoking as method of use major risk factor?
  - Risks reduced by vaporisers and oral use?

Overall Assessment of Harms

- On current patterns of use
  - Cannabis has a
    - Small to moderate public health impact
    - Certainly much less than alcohol & tobacco
    - Or heroin and methamphetamine
  - With exception of MVA:
    - harms of cannabis use experienced by regular users

Cannabis Potency

- In US consistent increases in THC content
  - Doubling of average THC content
- Similar findings in Europe in 2000s
  - Markets dominated by regular users
- Confounded by changes in patterns of use
  - earlier initiation and heavier use
- Roles of declining CBD vs increasing THC
Potential Effects of Increased Potency

• For occasional users:
  • More dysphoria & psychotic symptoms?
  • higher rates of discontinuation?
  • higher rates of accidental injury?

• For regular users:
  • lower respiratory risk, if users titrate dose
  • higher risk of dependence?
    – especially among adolescents
  • more cognitive impairment?

High Risk Groups

• Adolescents
  • with a history of poor school performance
  • who initiate early

• Pregnant women

• Persons with pre-existing conditions
  • cardiovascular
  • respiratory
  • psychiatric
  • alcohol & other drug dependence

What Do We Still Need to Know?

• More about adverse effects
  • on adolescents and adult health

• More about effects of increased THC and CBD
  • Do users titrate their doses?
  • Is CBD protective?

• Better health responses to:
  • MVA risks e.g. roadside drug testing?
  • Dependence e.g. better treatment and education
  • Psychosis and depression
  • Effects on adolescent development
  • Respiratory effects of smoking vs vaporisers