



The Adverse Consequences of Early Cannabis Use: Findings from Australasian Research

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1

Introduction

In this talk, I will discuss findings from Australian and New Zealand Research into the adverse consequences of cannabis use.

2

Topics

The research topics I will examine include:

1. The effect of early cannabis use on educational achievement
2. Cannabis and depression
3. Cannabis and psychosis
4. Cannabis and other forms of illicit drug use

3

Sources

The information for this talk comes from two sources:

- [The Christchurch Health and Development Study \(CHDS\)](#).

The CHDS is a longitudinal study of a birth cohort of 1265 children born in 1977 in Christchurch (New Zealand), and who have been studied from birth to 30.

4

Sources

- The Cannabis Cohort Research Consortium (CCRC).

The CCRC is a consortium of five Australian and New Zealand longitudinal studies who have come together to pool their findings on the consequences of cannabis use. This consortium includes the CHDS.

5

Topic 1: Cannabis and Educational Achievement

There has been growing research to suggest that young people who use cannabis in adolescence are at increased risks of school dropout and educational under-achievement. Because of the importance of this topic it was the first issue studied by the CCRC.

6

Cohorts

Three cohorts were used in this study.

- The Christchurch Health and Development Study (CHDS): n=1044
- The Victoria Adolescent Health Cohort Study (VAHCS): n=1518
- The Mater University Study of Pregnancy (MUSP): n=3697

7

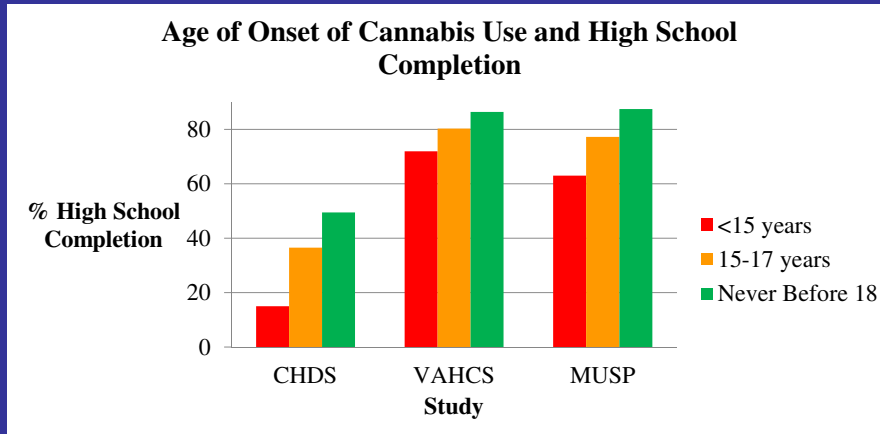
Data

All three cohorts had gathered data on:

- The age of onset of cannabis use
- Attainment of educational qualifications
- Family, social and related background factors

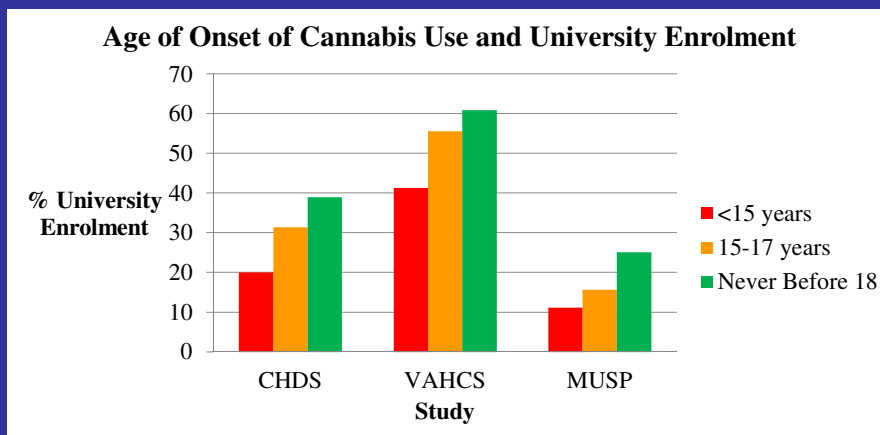
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Cannabis Use and High School Completion



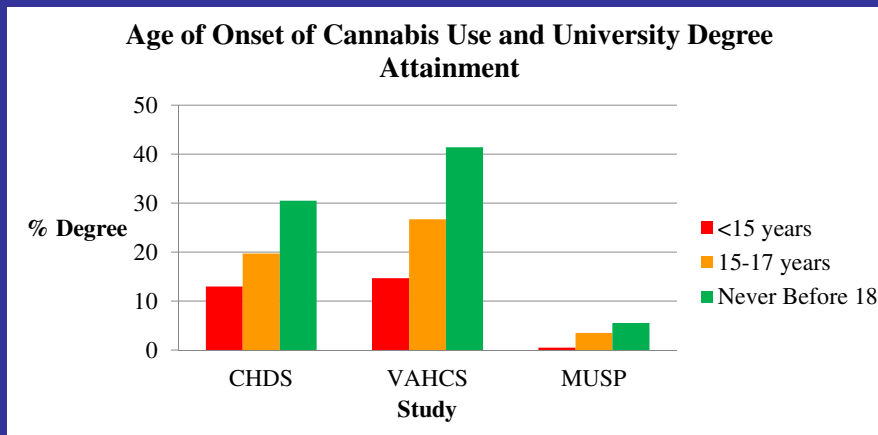
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Cannabis Use and University Enrolment



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Cannabis Use and University Degree Attainment



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Conclusions

The preceding findings show that despite between study variations in the way in which educational achievement was measured, all studies find that early use of cannabis was associated with reduced participation in education.

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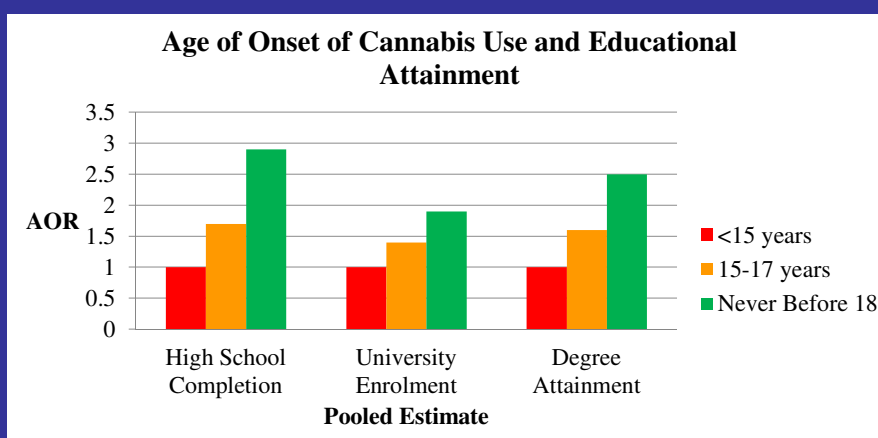
Covariate Adjustment

To take account of the effects of family, social and related background, the associations between age of onset of cannabis use were adjusted for a wide range of prospectively measured confounding factors. These factors spanned:

- Family socio-demographic background
- Behavioral adjustment in childhood
- Intelligence and school performance prior to 15

13

Cannabis Use and Educational Attainment: pooled adjusted odds ratios (AOR)



14

Conclusions

The above analysis shows that when data were pooled across studies there was evidence of a robust and general tendency for the age of onset of cannabis use to be related to educational attainment: the earlier the age of use, the poorer the educational attainment. This conclusion holds after extensive adjustment for sources of confounding.

15

Possible Pathways Linking Cannabis Use to Reduced Educational Achievement

First, it may be proposed that the association reflects effects of cannabis use on neurophysiological processes relating to cognition and motivation.

An alternative explanation is that the use of cannabis may introduce the young person to peer group contexts which encourage school dropout and educational under-achievement.

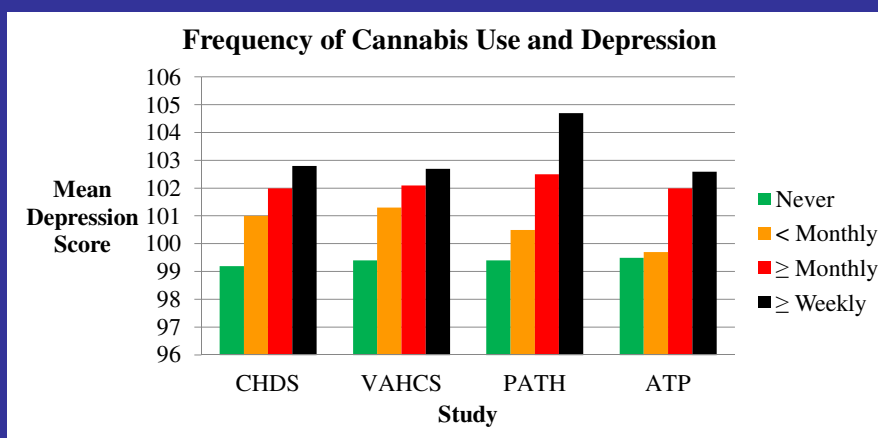
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Topic 2: Cannabis and Depression

A second area in which the CCRC has conducted research has been in the area of cannabis and depression. This work involved bringing together data from four cohorts: The CHDS; VAHCS; The Australian Temperament Study (ATP); The Personality and Total Health Study (PATH). All of these studies have collected longitudinal data on cannabis use and depression.

17

Mean Depression Scores: pooled over data collection waves



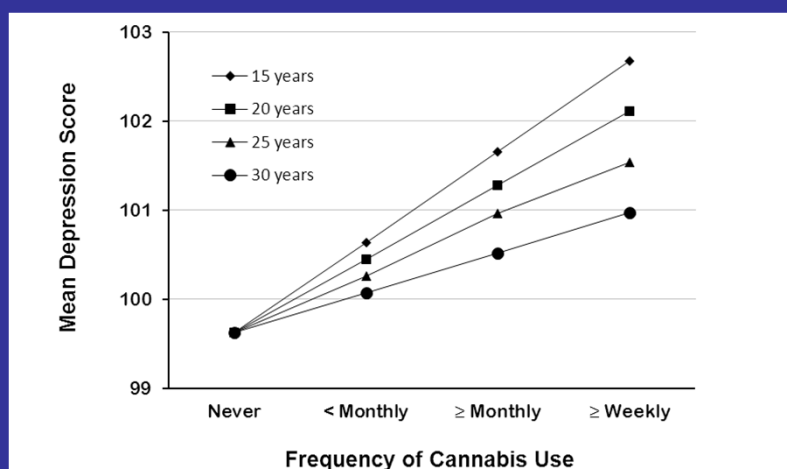
18

Controlling for Confounding

Because all studies had repeated measures of both cannabis and depression it was possible to control the associations between these variables for non-observed fixed sources of confounding through the use of fixed effects regression. This analysis showed the presence of clear associations between rates of depression and cannabis use, which varied with age.

19

Figure 1. Estimated associations between frequency of cannabis use and mean depression scores at selected ages (15, 20, 25, 30 years) after adjustment for fixed sources of confounding



20

Interpretation of Evidence

The findings shown in Figure 1 clearly suggest the presence of dose/response relationships between cannabis use and depression, with the impact of cannabis varying with age. There are several explanations for these findings.

21

Interpretation of Evidence (Cont.)

The first is that the use of cannabis increases risks of depression as a result of the effects of cannabis on the individual's biology or lifestyle. Alternatively, it could be suggested that those who are depressed use cannabis to self-medicate and reduce the risks of depression. The CCRC study was unable to resolve these issues of causal direction.

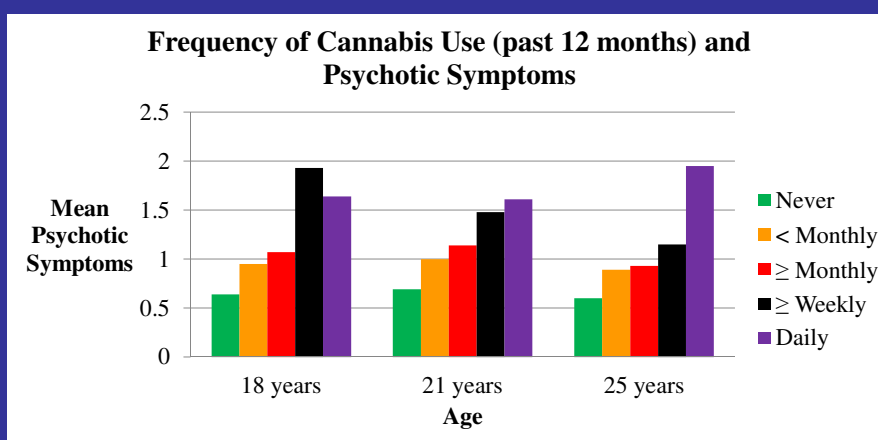
22

Topic 3: Cannabis and Psychosis: Findings from the CHDS

An issue which has been of long-standing interest concerns the associations between cannabis use and the development of psychosis or psychotic symptoms. As part of the CHDS we have investigated this issue.

23

Associations Between Cannabis Use and Psychotic Symptoms (18, 21, 25)



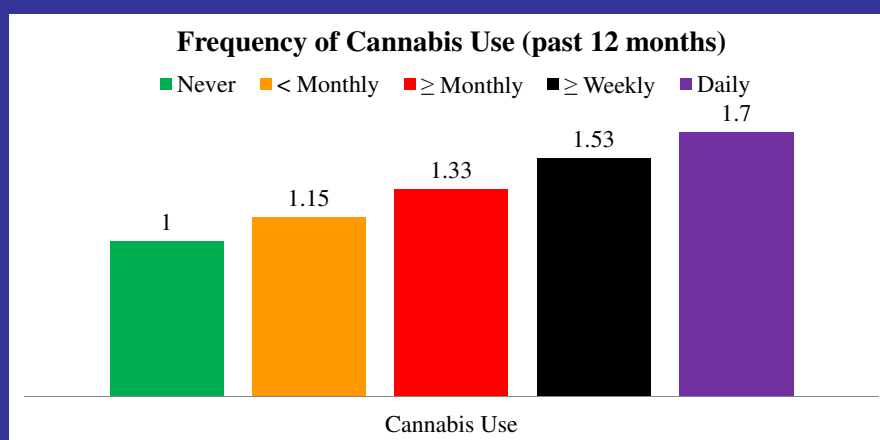
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Covariate Adjustment

To take account of confounding, we used a technique known as fixed effects regression to adjust for non-observed fixed sources of confounding.

25

Adjusted Associations Between Cannabis Use and Psychotic Symptoms



26

Evidence in Favor of a Causal Link

- 1) Association: All studies of general population samples have found increased rates of psychosis/psychotic symptoms amongst cannabis users.
- 2) Dose/Response: Increasing use is associated with increasing risk.
- 3) Resilience to Confounding: In all studies associations between cannabis and psychosis/psychotic symptoms have persisted following control for confounding.

27

Evidence in Favor of a Causal Link (Cont.)

- 4) Control for Reverse Causality: All studies to date have found that the association cannot be explained by reverse causation in which psychosis leads to the use of cannabis.
- 5) Measurement: Associations have been found using both diagnoses of psychosis and scale score measures of psychotic symptoms.

28

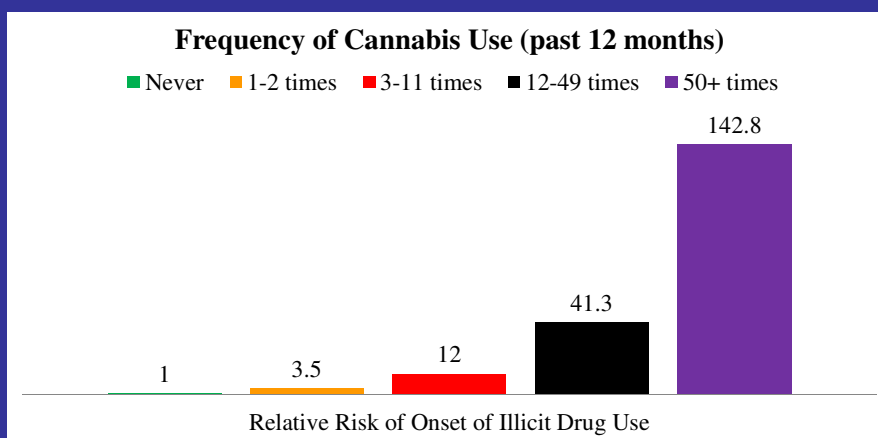
Topic 4: Cannabis and Other Illicit Drug Use

A prominent debate in the literature on cannabis concerns the extent to which cannabis acts as a “gateway drug” which encourages the use of other illicit drugs. This issue was examined in a CHDS paper published in 2005.

By the age of 21, nearly 70% of the CHDS cohort had reported the use of cannabis and 26.3% reported using other illicit drugs.

29

Association between Frequency of Cannabis Use and Illicit Drug Use



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Association between Frequency of Cannabis Use and Illicit Drug Use

These findings suggest the presence of very strong associations between cannabis use and the onset of other illicit drug use.

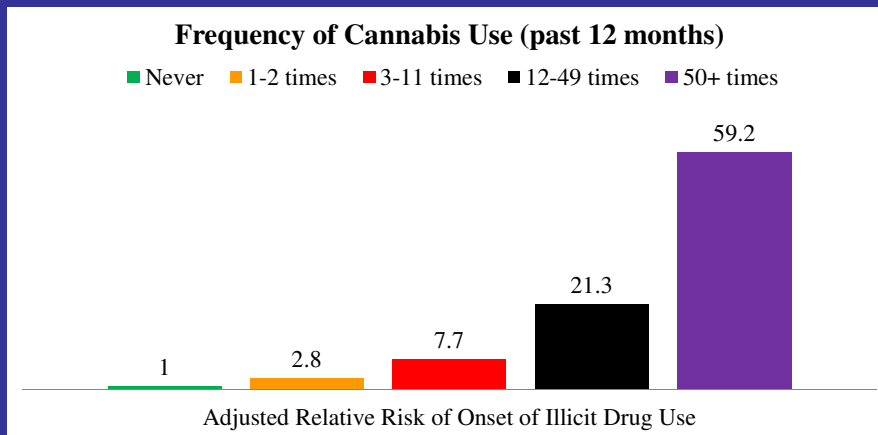
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Correction for Covariates

To take account of possible confounders, the association between cannabis use and other illicit drug use was adjusted for a wide range of covariate factors spanning childhood and adolescent circumstances.

32

Covariate Adjusted Results



33

Conclusions

Even following extensive adjustment for confounding, the use of cannabis was strongly associated with an increased risk of using illicit drugs. These findings clearly suggest the possibility of causal associations in which the use of cannabis encourages the use of other illicit drugs.

34

Pathways Linking Cannabis Use to Illicit Drug Use

There are a number of possible explanations of the linkages between cannabis use and illicit drug use.

- These associations could reflect underlying neurological processes in which the use of cannabis makes the individual more susceptible to the use of other drugs.

35

Pathways Linking Cannabis Use to Illicit Drug Use (Cont.)

- The association could reflect processes of social learning in which experience with one drug is used as a model for the use of other drugs.
- The association could arise because of social processes in which those using cannabis have greater access to other illicit drugs as a result of greater contact with drug users and dealers.

36

Conclusions

Over the last 30 years, views of the harmful effects of cannabis have changed dramatically. In the 1970s cannabis was widely depicted as a harmless drug. With the accumulation of research evidence it is now clear that cannabis has adverse effects on a wide range of adverse outcomes.

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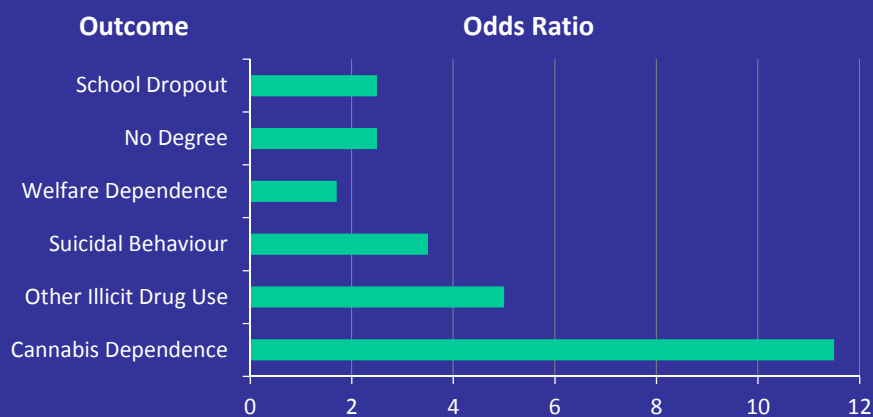
Adverse Outcomes of Heavy Cannabis Use

1. Impaired educational achievement
2. Increased risks of welfare dependence
3. Increased risks of mental health problems
4. Increased risks of illicit drug use
5. Increased risks of motor vehicle accidents
6. Increased risks of impaired lung function

These findings raise important questions about the social and legal regulations of the use of cannabis.

38

Early (Prior to 17) Cannabis Use and Outcomes to Age 25



39

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44