The Adverse Consequences of Cannabis Use: Summary of Findings from the Christchurch Health & Development Study

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Introduction

In this talk, I will present a summary and overview of the findings of the Christchurch Health and Development Study on the adverse consequences of cannabis use in the following areas of functioning:

- Educational achievement
- Psychosis
- Major depression
- Other illicit drug use
- Motor vehicle collisions

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, who have been studied on 22 occasions from birth to the age of 30. At 30, a total of 987 cohort members were studied, with this cohort representing 80% of the surviving cohort.

Cannabis Research in the CHDS

In the early 1990s, research was initiated into the development and consequences of cannabis use. This research now spans the period from mid-adolescence to adulthood and has resulted in 38 papers on cannabis use and its consequences.

These papers have examined the following topics: cannabis dependence, educational achievement, psychotic symptoms, illicit drug use, depression, suicidal behaviours, driver risks.

Cannabis Use and Educational Achievement

	Age of onset of cannabis use			
Outcome	**<15 years**	**15-17 years**	**Never Before 18**	**p**
High school completion	**15.0%**	**36.5%**	**49.5%**	**<.001**
University enrolment	**20.0%**	**31.4%**	**39.0%**	**<.001**
Degree attainment	**13.0%**	**19.7%**	**30.5%**	**<.001**

Cannabis Use and Educational Achievement (Adjusted Results)

	Age of onset of cannabis use			
Outcome	**<15 years**	**15-17 years**	**Never Before 18**	**p**
High school completion	**1**	**1.9**	**3.7**	**<.001**
University enrolment	**1**	**1.5**	**2.1**	**<.001**
Degree attainment	**1**	**1.6**	**2.5**	**<.001**

Cannabis Use and Educational Achievement – Pooled Results from 3 Australasian Studies

	Age of onset of cannabis use			
Outcome	**<15 years**	**15-17 years**	**Never Before 18**	**p**
High school completion	**1**	**1.7**	**2.9**	**<.001**
University enrolment	**1**	**1.4**	**1.9**	**<.001**
Degree attainment	**1**	**1.6**	**2.5**	**<.001**

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.

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

	Frequency of Cannabis Use (Past 12 Months)					
Age	Never	Less Than Monthly	At Least Monthly	At Least Weekly	Daily	p
18 years	0.64 (598)	0.95 (242)	1.07 (82)	1.93 (70)	1.64 (33)	<.0001
21 Years	0.69 (538)	1.00 (215)	1.14 (100)	1.48 (94)	1.61 (64)	<.0001
25 Years	0.60 (559)	0.89 (232)	0.93 (76)	1.15 (81)	1.95 (55)	<.0001

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.

Adjusted Associations Between Cannabis Use and Psychotic Symptoms

Frequency of Cannabis Use (Past 12 Months)					
Never	Less Than Monthly	At Least Monthly	At Least Weekly	Daily	p
1	1.15 (1.06-1.25)	1.33 (1.13-1.56)	1.53 (1.20-1.95)	1.77 (1.28-2.44)	<.0001

Evidence in Favour 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.

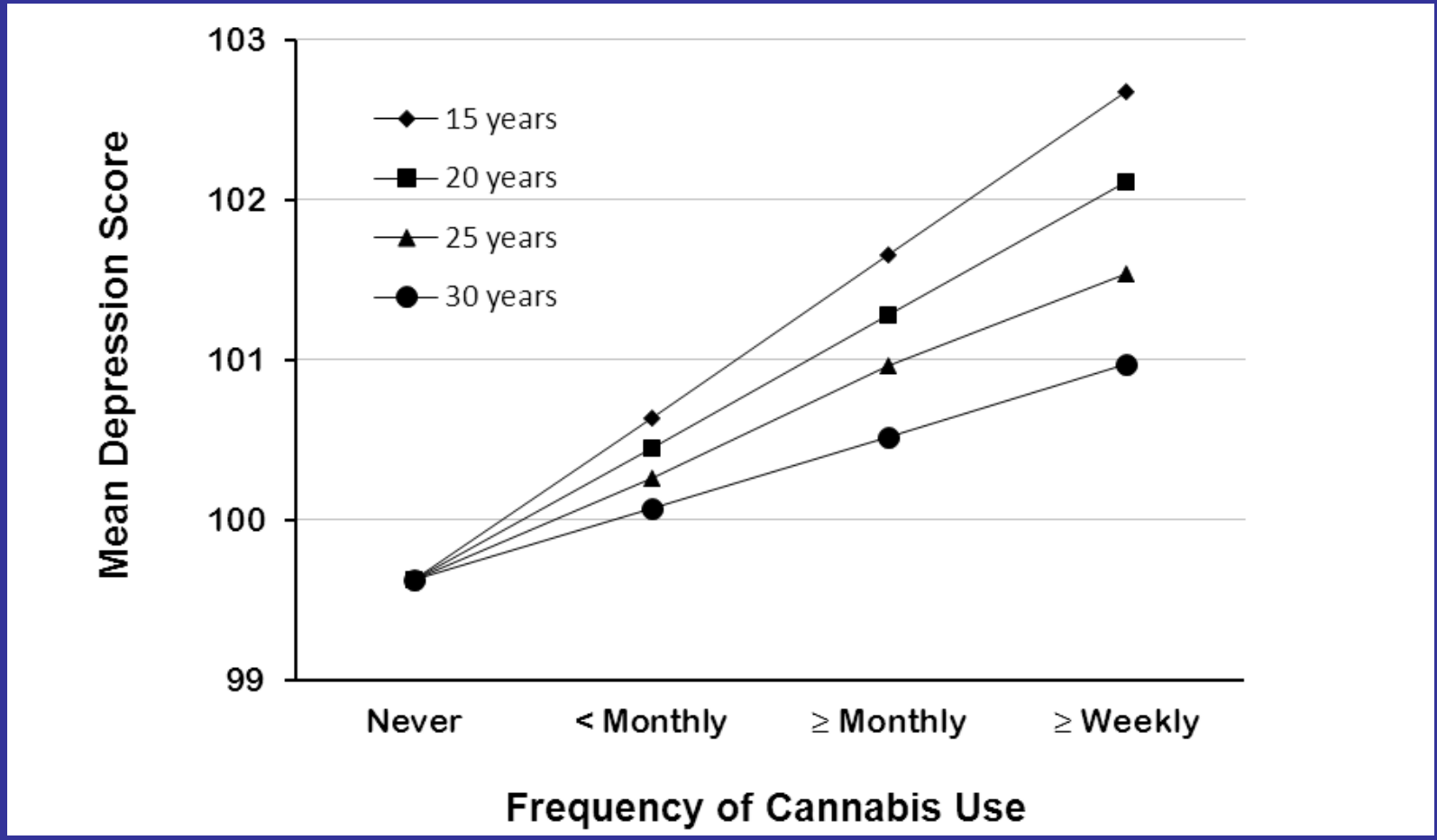
Evidence in Favor of a Causal Link (Cont.)

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.

Cannabis Use and Depression

	Frequency of Cannabis Use				
	Never	< Monthly	≥ Monthly	≥ Weekly	p
Mean depression score	**99.2**	**101.0**	**102.0**	**102.8**	**<.001**

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



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.

Association between Frequency of Cannabis Use and Illicit Drug Use

	Frequency of Cannabis Use in Past Year				
	Never	1-2 times	3-11 times	12-49 times	50+ times
Relative Risk of Onset of Illicit Drug Use	**1**	**3.5**	**12.0**	**41.3**	**142.8**

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

Covariate Adjusted Results

	Frequency of Cannabis Use in Past Year				
	Never	1-2 times	3-11 times	12-49 times	50+ times
Adjusted Relative Risk of Onset of Illicit Drug Use	**1**	**2.8**	**7.7**	**21.3**	**59.2**

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.

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.

Cannabis Use and Motor Vehicle Collisions (21-25)

	Frequency of Cannabis Use in Past Year				
	Never	1-10 times	11-20 times	20+ times	p
RR unadjusted	**1**	**1.30**	**1.43**	**2.25**	**<.0001**
RR adjusted	**1**	**1.12**	**1.25**	**1.40**	**<.10**

Conclusions

There is now strong and growing evidence that the heavy use of cannabis may be associated with increased risks of adverse outcomes in a number of areas of functioning, including:

- Educational achievement
- Mental health (psychosis; depression)
- Other illicit drug use
- Motor vehicle collisions

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