

Do cannabis users reduce their THC dose
when they use more potent cannabis
products?

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The US cannabis market after legalisation

- Cannabis potency has increased since legalisation
- More potent cannabis products
 - More potent cannabis flower (16-20%)
 - Cannabis extracts and concentrates (59-90% THC)
- Who uses the more potent products?
 - Younger males adults
 - daily users with a lower socioeconomic status ES
- Do these users titrate their doses of higher THC products
 - Can they titrate?
 - Do they in fact titrate their doses?

Reasons for concern

- Acute harms of cannabis use could potentially increase:
 - Accidents
 - Acute adverse reactions
 - Psychotic symptoms
- Chronic adverse outcomes that could potentially increase:
 - Cannabis dependence
 - Psychosis
 - Depression
 - Cognitive impairment
 - Educational underachievement

Relevant evidence on dose titration

- Experimental laboratory studies of dose titration
- Observational studies of patterns of use of high potency cannabis
- Surveys of cannabis users reports when using high THC cannabis
- Ecological associations between THC content and adverse outcomes

Experimental studies

- Samples of relatively experienced cannabis users
- Under double blind conditions asked to smoke or vape
 - cannabis that differed in THC content and
 - to titrate their doses of cannabis that differed in potency
- These studies report:
 - Fewer, shallower puffs when smoking more potent cannabis
 - In some studies, higher blood THC after using more potent cannabis
 - Self-reported larger effects from more potent cannabis in some studies

Naturalistic observational studies

- Regular cannabis users observed using in their usual surroundings
- Observed when using more and less potent cannabis
 - Obtained self-reports on the effects of cannabis
 - Some studies measured THC levels
- Evidence of incomplete dose titration
 - Different smoking topography when using more potent cannabis
 - No difference in self-reported effects of cannabis
 - But higher THC blood levels when using more potent cannabis

Surveys of cannabis users self-reported behaviour

- Survey of users in San Francisco reported that they titrated doses
 - 2/3 used smaller amounts of more potent cannabis
 - No measures of cannabis effects or observations of behaviour
- Survey of users in Netherlands on how they use more potent cannabis
 - Small group preferred to use lower dose cannabis
 - Younger, more dependent users used more high potency cannabis
 - Older users with long careers of use did not adjust their use

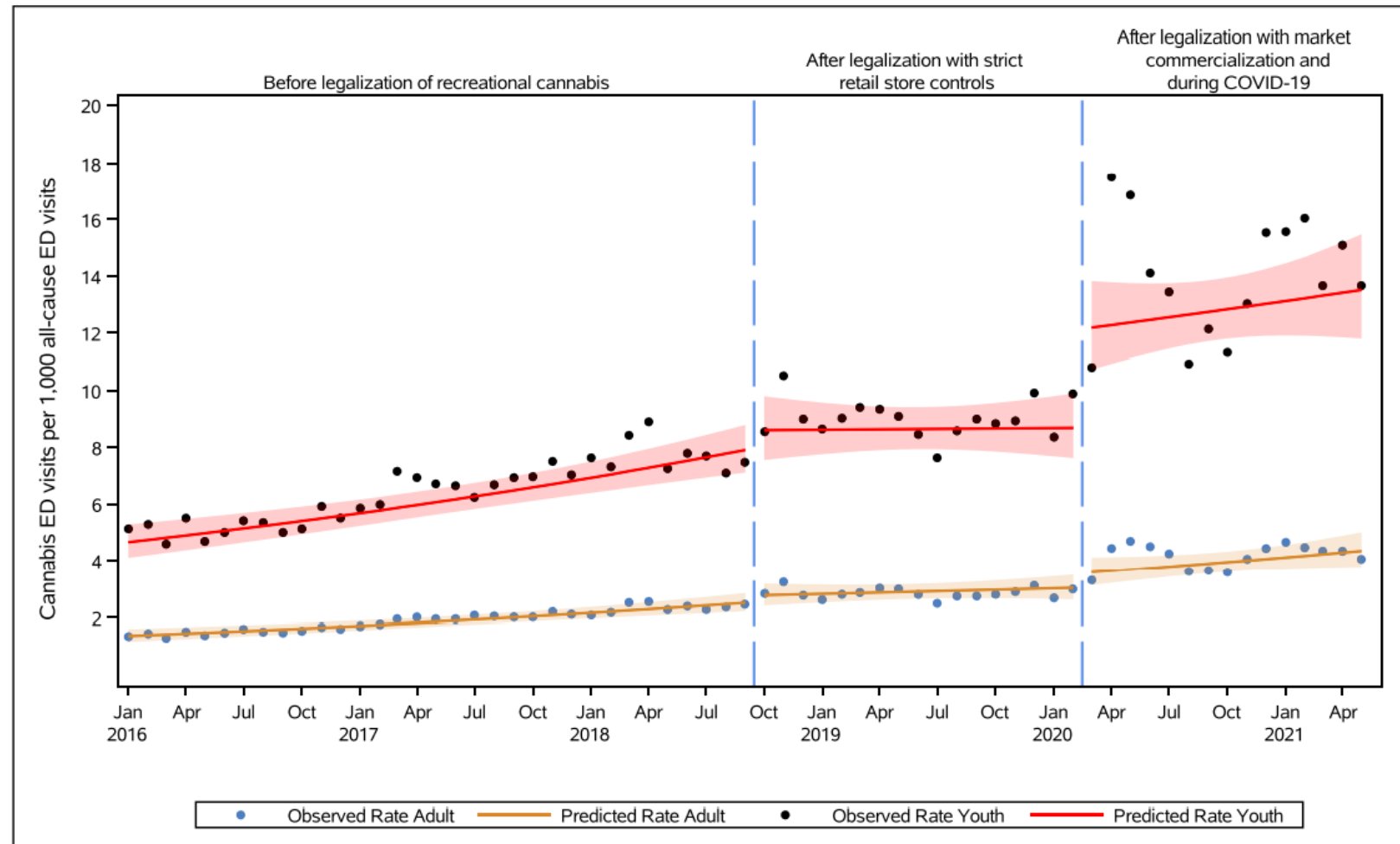
More problems in high potency cannabis users

- Higher rates of psychoses in users of higher potency cannabis
 - Di Forti et al, 2014
- More symptoms of dependence in users of high potency cannabis
 - Chan et al (2017)
- More psychological distress in users of high potency cannabis
 - Freeman and Winstock (2015)
- Potency a cause or an effect e.g. a user preference?

Ecological associations between cannabis potency and problems

- Cannabis potency in Netherlands and treatment entrants for cannabis dependence (Freeman et al, 2018):
 - Incidence increased as potency of cannabis flower increased
 - Incidence decreased when flower potency decreased below 15%
- Cannabis potency and ED attendances in Ontario (Myran et al, 2022)
 - Prevalence increased as access to cannabis extracts increased
- Limitations: not individual level data so causal inferences uncertain

Ontario, Canada ED visits for adults and youth following loosening of strict regulations on number of retail stores



Source: Myran, D. T., Pugliese, M., Tanuseputro, P., Cantor, N., Rhodes, E., & Taljaard, M. (2022). The association between recreational cannabis legalization, commercialization and cannabis-attributable emergency department visits in Ontario, Canada: an interrupted time-series analysis. *Addiction*.

A provisional synthesis of the evidence

- In laboratory studies users can titrate when asked to do so
 - But adjustment may be incomplete
- Too few naturalistic studies to assess if users do in fact titrate their THC doses
- Suggestive survey evidence that users may not fully titrate their doses:
 - users of higher potency cannabis report more symptoms of cannabis dependence, psychoses and distress
 - Ecological associations between population use of higher potency cannabis and treatment seeking for dependence and psychoses
- Too few studies of uncertain relevance to new cannabis products
- Better data on the role of cannabis potency should be a public health priority

What sort of research do we need?

- More laboratory and observational studies with larger samples
 - Of higher potency cannabis flower, oils and concentrates
 - In more naturalistic settings
 - Measuring THC doses received by users
- Large scale surveys of consumers of different cannabis products
 - Characteristics of users
 - How they use these products
 - Measures of tolerance and cannabis dependence
 - Indicators of cognitive performance
 - Symptoms of depression and anxiety
 - Performance in everyday life

Policy implications

- Do we have to wait for better research before responding?
- Who bears the burden of proof?
 - Should the cannabis industry show that these products do not increase harm?
 - Must policy makers show that more potent cannabis do increase harm?
- Arguments for more restrictions on higher potency products:
 - Not what the WA and other US citizens voted for in legalising cannabis
 - If we regulate cannabis like alcohol, stricter policies are required:
 - 90% ethanol is not allowed be sold
 - States restrict where spirits can be sold
 - Governments impose higher taxes on higher alcohol beverages

Regulatory options

- A ban on the sales of high potency cannabis extracts:
 - Concerns: DIY cannabis extraction and fires and residues
 - Illicit production and supply of concentrates
- A cap on the THC content of legal cannabis products:
 - Where should the level of THC be set?
 - Costs for producers and regulators in enforcing the cap
 - Illicit production and supply of cannabis concentrates
- Graduated cannabis taxes based on THC content
 - Like alcohol taxes
 - Regulatory costs similar to labelling requirements

Key references cited

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