

# It is premature to expand access to medicinal cannabis in hopes of solving the US opioid crisis

*There is very weak evidence to support the claim that expanding access to medical cannabis will reduce opioid overdose deaths in the United States.*

All human beings are susceptible to confirmatory bias, in that we are inclined to uncritically accept evidence that accords with our pre-existing beliefs [1]. A good example is the preparedness of some researchers to accept weak evidence that increased access to medical cannabis in the United States has reduced opioid overdose deaths in that country [2].

The evidence for this hypothesis is very weak: ecological studies showing a correlation over time between the passage of medical cannabis laws and decreasing opioid overdose death rates in US states [3]. There would no doubt have been a much more critical response to these studies if they had found that opioid overdose deaths increased at a faster rate in states with medical cannabis laws.

Ecological studies share two fundamental weaknesses: (1) they do not show directly that it is increased medical cannabis use in these states that has reduced opioid use in individuals and (2) they have limited capacity to control for the effects of important differences in the characteristics of states with and without medical cannabis laws that may explain the trends.

The first is an inherent weakness of all ecological studies. It is why they are accorded so little weight in evaluating evidence for causal hypotheses [4]. Ice cream sales and the number of drownings are correlated positively, but eating ice cream does not cause drownings. Rather, sales of ice cream are higher in the warmer summer months when more people go swimming.

Some better-controlled studies have shown that the relationship between medical cannabis laws and opioid overdose deaths persists when controlling, as best they can using state-level data, for differences between states that do and do not have medical cannabis laws. These have included state differences in: income, population, education and ethnicity, prescription monitoring programmes that aim to reduce access to opioids and naloxone distribution for onlookers to reverse opioid overdoses [5–7].

No studies so far, however, have controlled for the effects of several policies that are likely to affect opioid overdose deaths for the better or worse. The former includes increased access to methadone- and buprenorphine-assisted treatment for opioid dependence [8], both of which are likely to reduce overdose risk. The latter includes public policies that are likely to increase overdose deaths; namely,

increased imprisonment of opioid users because their risk of overdose death increases dramatically after they leave prison [9].

The lower rate of increase of opioid deaths in states with medical cannabis laws could be explained if the latter policies were correlated with whether or not a state had passed medical cannabis laws. It is plausible that they are, because politically conservative US states are less likely to pass medical cannabis laws, less likely to provide medication-assisted treatment for opioid dependence and more likely to imprison opioid users.

Those who favour a causal explanation of the available ecological studies have attempted to bridge the evidence gap by appealing to the plausibility of their hypothesis [2]. They note that cannabis has an exceedingly low risk of producing a fatal overdose compared to opioids and that cannabinoids have been shown to reduce pain in controlled clinical trials. They cite surveys of self-selected medical cannabis patients in Canada and the United States who report substituting cannabis for opioids.







The low risk of overdose from cannabinoids is well established but their analgesic efficacy is modest, as shown in a recent systematic review [10]. Epidemiological studies of large samples of chronic pain patients have found that those who use cannabis do not use lower opioid doses than opioid users who do not use cannabis [11]. A recent analysis of two waves of the US National Epidemiologic Survey on Alcohol and Related Conditions found that people who reported cannabis use at baseline were more (not less) likely to have an opioid use disorder 3 years later. This was also true among cannabis users who reported moderate to severe pain and opioid use at baseline [12].

Given these limitations of the evidence, it is premature to recommend the expansion of access to medical cannabis as a policy to reduce opioid overdose risks in the United States and Canada. The premature adoption of this could displace policies for which there is far better evidence of effectiveness in reducing opioid overdose deaths; namely, increasing access to methadone- and buprenorphine-assisted treatment for opioid dependence; reducing rates of imprisonment for opioid possession and low-level dealing; and distributing naloxone to users and family members to reverse opioid overdoses.

## Declaration of interests

None.

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## References

- Nickerson R. S. Confirmation bias: a ubiquitous phenomenon in many guises. *Rev Gen Psychol* 1998; **2**: 175–220.
- Lake S., Milloy M. Legal weed: an accidental solution to the opioid crisis? *The Conversation* 2017, August 14. Available at: <http://theconversation.com/legal-weed-an-accidental-solution-to-the-opioid-crisis-81603> (accessed 28 November 2017) (Archived at [www.webcitation.org/6vIxRc4uK](http://www.webcitation.org/6vIxRc4uK)).
- Bachuber S., Cunningham B. Medical cannabis laws and opioid analgesic overdose mortality in the United States, 1999–2010. *JAMA Intern Med* 2014; **174**: 1668–73.
- Finney J. W., Humphreys K., Harris A. H. What ecologic analyses cannot tell us about medical marijuana legalization and opioid pain medication mortality. *JAMA Intern Med* 2015; **175**: 655–6.
- Pardo B. Do more robust prescription drug monitoring programs reduce prescription opioid overdose? *Addiction* 2016; **112**: 1773–83.
- Powell D., Pacula R. L., Jacobson M. Do medical marijuana laws reduce addictions and deaths related to pain killers? National Bureau of Economic Research Working Paper Series no. 21345. Cambridge, MA: National Bureau for Economic Research; 2015.
- Smart R. Essays on the effects of medical marijuana laws. PhD, Department of Economics, University of California at Los Angeles, 2016. Available at: <http://www.escholarship.org/uc/item/7842d9b4> (accessed 28 November 2017) (Archived at <http://www.webcitation.org/6vIxwTrEZ>).
- Sordo L., Barrio G., Bravo M. J., Indave B. I., Degenhardt L., Wiessing L. *et al.* Mortality risk during and after opioid substitution treatment: systematic review and meta-analysis of cohort studies. *BMJ* 2017; **357**: j1550.
- Merrall E. L., Kariminia A., Binswanger I. A., Hobbs M. S., Farrell M., Marsden J. *et al.* Meta-analysis of drug-related deaths soon after release from prison. *Addiction* 2010; **105**: 1545–54.
- Nugent S. M., Morasco B. J., O'Neil M. E., Freeman M., Low A., Kondo K. *et al.* The effects of cannabis among adults with chronic pain and an overview of general harms: a systematic review. *Ann Intern Med* 2017; **167**: 319–31.
- Degenhardt L., Lintzeris N., Campbell G., Bruno R., Cohen M., Farrell M. *et al.* Experience of adjunctive cannabis use for chronic non-cancer pain: findings from the Pain and Opioids IN Treatment (POINT) study. *Drug Alcohol Depend* 2015; **147**: 144–50.
- Olsson M., Wall M. M., Liu S. M., Blanco C. Cannabis use and risk of prescription opioid use disorder in the United States. *Am J Psychiatry* 2017; <https://doi.org/10.1176/appi.ajp.2017.17040413>.