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## Using the standard THC unit to regulate THC content in legal cannabis markets

*A standardized measure of dose (the standard tetrahydrocannabinol [THC] unit) could offer a simple tool for policy makers to influence purchasing of all cannabis products and reduce harm. The immediate impact of minimum alcohol unit pricing on reducing alcohol purchasing suggests that minimum unit pricing could also be promising for cannabis.*

Hall and colleagues [1] outline three potential strategies for regulating the THC content of cannabis products: (i) banning the sale of high-potency extracts; (ii) setting a cap on the maximum THC

concentration permitted; and (iii) setting higher taxes for more potent cannabis products. Given the evidence that use of higher potency cannabis products is associated with poorer health outcomes [2], each of these strategies holds promise to reduce public health harms in legal cannabis markets.

Targeting cannabis potency is a viable strategy to reduce harm because it has the potential to reduce the dose of THC consumed. However, as Hall and colleagues [1] point out, there is a lack of agreed on threshold for what constitutes a 'high' or 'low' potency product. Given the wide range of different cannabis products available in legal markets [3], policy makers should consider the complexities of developing product-specific policies (e.g. banning certain products and

setting specific potency caps on others) and successfully implementing such policies. Policies based on potency may also be less relevant for some products. For example, a cookie and a gummy bear each containing 10 mg THC might arguably be regulated in the same way despite the gummy bear being a higher potency product.

Cannabis potency can be considered a useful proxy measure for measuring THC dose in research and clinical settings [2]. However, the dose of THC depends not only on the potency of the product, but also on the amount of product used. This means that policies intended to regulate THC content could benefit from targeting THC dose directly rather than product potency alone. Similar principles can be seen from the regulation of alcohol content based on standard alcohol units. For example, depending on the quantity served, a higher strength alcohol product (e.g. vodka, 40% ABV, 25 mL = 1 United Kingdom [UK] alcohol unit) can be less harmful than a lower strength product (e.g. beer, 5.2% ABV, 568 mL = 3 UK alcohol units).

The standard THC unit (5 mg THC, a low dose similar to a standard alcohol unit) could offer a simple and powerful framework for regulating the THC content of all cannabis products [4]. The standard THC unit has the potential to be credible as a meaningful dose among frequent users, while being low enough to minimize the risk of adverse effects of consuming a single unit among naive users [4]. The use of a credible dose for a standard THC unit may be important for consumers and policy makers alike. For example, labelling cannabis products according to the number of standard doses they contain may be easier for consumers to understand than terms such as 'high potency' or 'low potency', particularly for people with limited experience of using cannabis. Variation in labelling requirements for different products (e.g. % THC for flower and extracts, vs mg THC for edibles) may cause confusion for consumers [5] who ultimately require simple, clear and accessible information about THC content.

A promising approach for policy makers could be to set a minimum price per standard THC unit [6]. This could enable a single pricing structure to be applied to the diverse range of cannabis products sold in legal markets. Sales in Washington State have indicated a range of prices for different products (e.g. from USD\$1.62 per standard THC unit in edibles to USD\$0.18 per standard THC unit in 'dabs') [7]. Policy makers might consider that such prices (e.g. USD \$0.18 for a single low dose of THC) might be concerningly low and that raising these through minimum unit pricing would be a viable strategy to reduce drug purchasing and harms.

Previous experiences with alcohol support the viability of minimum unit pricing. In Scotland, the introduction of a minimum price per alcohol unit (GBP£0.50 per UK alcohol unit) in 2018 was followed by an immediate reduction of 1.2 UK alcohol units purchased per week per adult per household [8]. This was driven by the heaviest alcohol consumers who decreased their consumption by 1.9 UK alcohol units

per week. Overall, this indicates that minimum unit pricing could have immediate effects in reducing harm for those who use most heavily and might stand to benefit most from this policy.

International development of alcohol units involved ecological research to set the standard unit according to the size of a typical drink consumed [9]. In contrast, the 5 mg standard THC unit was intended to be lower than the typical level of consumption indicated by ecological studies [4] such as 7 mg THC in Spain [10], 32 mg THC in the Netherlands [11] and 35 mg THC in the United Kingdom [12]. The 5 mg standard THC unit has been endorsed by the United States National Institutes of Health and is now a reporting requirement for investigators funded by these Institutes [13, 14]. However, the dose chosen by policy makers may vary in different jurisdictions, as has been the case for alcohol units. Such decisions may depend on a range of factors such as ecological data, experimental studies, public health considerations and compatibility with existing policy [4].

## KEYWORDS

Harm reduction, lower risk use, minimum unit pricing, price, standard THC unit, taxation

## AUTHOR CONTRIBUTIONS

**Tom Freeman:** Conceptualization (lead); writing—original draft (lead); writing—review and editing (lead). **Valentina Lorenzetti:** Conceptualization (supporting); writing—review and editing (supporting).

## DECLARATION OF INTERESTS

None.

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## Do not let the ideal be the enemy of good enough regulation

*Research on the effectiveness and efficiency of different methods of regulating cannabis potency should be a high priority for public health research that will inform the design of cannabis regulations that minimize public health harms.*

Our article [1] was intended to alert the addictions field to the critical issue of increased cannabis potency as a public health concern, counter the cannabis industry argument that such regulation is unnecessary and canvas some regulatory options. We thank our commentators for their thoughtful responses, which reveal that regulating tetrahydrocannabinol (THC) potency is more complex than it seems at first sight.

Freeman & Lorenzetti highlight consumers’ need for simpler advice on labels, much as standard drinks of alcohol [2]. They have led

consensus projects to define standard doses of THC that could be used in this way. They also make the useful point that regulators need to consider setting minimum unit prices for cannabis, much as those that have been implemented to reduce heavy alcohol consumption in some countries.

Pardal & Wadsworth highlight the fact that the US model of cannabis legalization—a commercialized for-profit market, with minimal regulation of potency and promotion—is not the only model on offer [3]. Uruguay has limited sales to herbal cannabis and capped the THC content of cannabis sold in pharmacies. The Canadian province of Quebec has banned sales of cannabis extracts, limited the sale of edibles and imposed a cap on the THC content of herbal cannabis. The effectiveness of these policies is well worth investigation. The major empirical question is whether the policies will succeed in the longer

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