PERSPECTIVE

Policy with a dab of science

Regulatory changes are needed to support crucial research on cannabis in the United States, says **Jahan Marcu**.

Imagine conducting a clinical trial and then being unable to publish the results. For cannabis researchers in the United States, that is often the sad reality. Although the US Food and Drug Administration (FDA) has approved several single-agent drug preparations that comprise purified or synthetic cannabinoids, medical-cannabis products are prohibited by federal law. Under this regime, it is impossible to get approval for a phase II trial or beyond, and there are tight limitations on publishing cannabis-related clinical data. About one-quarter of the US population live in parts of the country where cannabis can be purchased legally as easily as beer, yet research on what they are consuming is highly restricted. Adding to the frustration is a growing body of evidence that points to potential medical benefits of cannabis.

The first cannabis-based drug to win FDA approval — Epidiolex, a formulation of purified cannabidiol (CBD) — is now being used to treat children with rare forms of epilepsy. The company that developed it, GW Pharmaceuticals in Histon, UK, has a pipeline of other cannabis-related drugs for a number of conditions, including neuropathic pain and autism. A 2017 report by the US National Academies of Sciences, Engineering, and Medicine further highlights the impact of cannabis on health, including some potential medical benefits (see go.nature.com/2k82lho).

That report also speaks to the challenges that are associated with conducting cannabis-related research. Cannabis remains classified as a schedule 1 substance in the United States, which means it has been deemed to have "no currently accepted medical use" and a "high potential for abuse". (The opioid heroin is also listed under schedule 1.) Researchers' access to schedule 1 substances is tightly controlled, and the cannabis that is authorized by the federal government for research use is not representative of that which is being commercially consumed. The University of Mississippi in Oxford is the sole source of cannabis for research in the country, and the drug's distribution is stymied by a lack of funding and slow bureaucratic processes.

Legal restrictions make research untenable in other ways, too. A 2017 study of the pharmacological properties of cannabis, for instance, included only the chemistry of the products used, and not how they affected participants (M. A Lewis *et al. Planta Med.* **84**, 225–233; 2018). At least three studies that provide crucial information about cannabis products on the market, and that were conducted legally in the US states where the research was done, might have violated federal law. Several studies of cannabis in Jamaica that were carried out by visiting teams of US-based researchers were also conducted without protection from the law (V. Rubin & L. Comitas in *Ganja in Jamaica* Ch. 4, 36–62; De Gruyter, 1975). Under Jamaican or US laws, such studies could have been shut down by the authorities; materials and research instruments might have been confiscated; and participants and researchers ordered to cease and desist or be arrested.

Fortunately, there are promising signs of change. The US Agricultural Improvement Act of 2018 removes CBD derived from hemp (cannabis containing less than 0.3% tetrahydrocannabinol (THC), the main psychoactive compound in cannabis) from schedule 1. This means that registration with the US Drug Enforcement Administration is no longer required to conduct research using hemp. Presumably clinical and basic research will therefore become completely legal in US states that permit the production and sale of hemp-derived CBD. The FDA's position on CBD in foods and dietary supplements, however, remains uncertain. And although researchers are still hampered in their ability to study THC, the US surgeon-general, Jerome Adams, has implied his support for the re-evaluation of cannabis's scheduling.

In September 2018, the Drug Enforcement Administration permitted the University of California, San Diego, to import cannabinoid capsules from Tilray, a medical-cannabis producer in Nanaimo, Canada. Although it was a victory for clinical research, even this minor development required two years of jumping through regulatory hoops.

When it comes to research funding, things are looking brighter. The state of Colorado has made funding available from tax revenue from cannabis sales. And Pennsylvania is enabling state-licensed cannabis operators to work with universities on clinical research — a model that other US states could follow.

There seems to be a trend developing for philanthropists and other private funders to support important cannabis research. In April 2018, the University of California, San Diego, received a US$4.7-million gift from the Ray and Tye Noorda Foundation in Lindon, Utah, to study CBD as a treatment for severe autism. The following month, Harvard University in Cambridge, Massachusetts, announced a research partnership with Atlas Biotechnologies in Edmonton, Canada, that would help to fund a new cannabis institute. The International Research Center on Cannabis and Mental Health in New York City, which I co-founded in 2017 with clinical social worker Jan Roberts, was launched with a grant from New York University. The centre aims to provide curricula for universities that will train the next generation of cannabis researchers.

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Although these developments are encouraging, cannabis policy still needs to evolve. A few things that do not work well should be phased out, including the excessively detailed labelling of cannabis products, a cap on the THC percentage that is permitted in such products and overzealous drug-awareness campaigns and messaging. These measures have had the opposite of their intended effects. The priority should be to facilitate research, which will help to inform education and policy agendas as the cannabis industry takes root.

Incremental progress is being made in pursuing policies that support crucial medical research that might unearth discoveries that could benefit millions of people and protect public health, in both the United States and abroad. Here's to a dab of optimism about what the future could hold. ■

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