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Wide Variability In Potency Plagues Medical Marijuana Edibles, JAMA Study

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Let's say that your child has a form of epilepsy that doesn't respond well to any FDA-approved medications, or the side effects are too severe. The doctor then recommends an edible, herbal medicine. She says that your child should take one serving, but it might take two, or ten, or twenty. "We don't really know how much," she says.

If your pharmacist said the same thing about a nighttime cold medicine – take one measuring cup, but you might need the whole bottle – you'd wouldn't be too confident in the quality of the medicine.

Well, this is the current situation with edible cannabis products that are taken for medical purposes, according to [a paper published this morning](#) in *JAMA: The Journal of the American Medical Association*.

A study from researchers at Johns Hopkins University and the University of Pennsylvania shows that the active chemicals in edible cannabis products can vary from 1% to 155% the amount listed on the product label.

And of the 75 products analyzed, only 17% contained the labeled amount of THC (allowing for minor statistical variations). Another 23% contained more than what was listed on the label while 60% had less THC than labeled.



Card-carrying medical marijuana patients sample the brownies at Los Angeles' first-ever cannabis farmer's market at the West Coast Collective medical marijuana dispensary, in Los Angeles, California on July 4, 2014. Photo credit: FREDERIC J. BROWN/AFP/Getty Images

Edible marijuana-infused products – baked goods, beverages, and candy or chocolate – are popular with both medical and recreational users in states that allow their sale. About one-fifth of medical users depend on edibles nationwide, while nearly half of Colorado's recreational sales have been for the products. While alleviating the need to smoke the plant material, edible products suffer from erratic absorption and delayed time to the onset of medicinal effects. Hence, aiming to start with a standardized, verified dose is an important step in predictable clinical treatment and research validity.

The researchers recruited physician-authorized buyers to purchase representative products from medical marijuana dispensaries in San Francisco, Los Angeles, and Seattle. The researchers then had an analytical testing laboratory determine the amount of active cannabinoids in each product. They focused on THC, the primary active component of cannabis, and CBD, or cannabidiol, another plant chemical with medicinal properties that complement those of THC. Research with a standardized cannabis extract product undergoing U.S. clinical trials, [Sativex](#) (GW Pharmaceuticals), indicates that a 1:1 ratio of THC to CBD is most desirable medical indications such as the muscle spasticity of multiple sclerosis. (By the way, Sativex oromucosal spray has been launched in 15 countries, including the UK, Spain, Italy, and Germany, and approved in another 12.)

The most prominent problem was that products contained far less THC than advertised – an average of 47% less than indicated on the label. But some products contained almost no THC. At the other end of the spectrum, those products with more THC averaged 28% more than the labeled amount. A buyer was more likely to find a substandard product when purchased in Los Angeles while products with more THC than labeled were more likely to be found in Seattle.

These findings aren't surprising given what's been seen with recreational marijuana edibles. After his personal experience with a substandard edible product, Ricardo Baca, editor of *The Denver Post's* marijuana publication, *The Cannabist*, sent out 13 edible products for analysis by a Denver laboratory, finding that some products labeled as containing 100 milligrams of THC [contained as little as 0.2 to 5 milligrams](#). (Somewhat off-topic, *The Cannabist* is a fascinating example how a major regional newspaper sought to apply solid journalistic principles to the coverage of a state's new recreational marijuana industry.)

But those marijuana-infused products are not intended for medical purposes. Today's published study shows that quality-control standards for medical cannabis products should be as stringent as for other medicines. Currently, consumers run the random risk of getting little or no medicine, the right amount, or one-and-a-half times as much medicine. Moreover, the products were much more highly enriched for THC than cannabidiol—a median ratio of 36:1.

While no products from Colorado were tested, the state did enact [edible product testing and labeling standards](#) in February 2015.

But what disturbs me philosophically is that many patients who turn to marijuana when nothing else works – say, for nausea and vomiting of cancer chemotherapy – are being treated unethically and duped into thinking that an edible product contains an adequate amount of medicine. We don't tolerate it for prescription or OTC drugs, and we shouldn't tolerate it for medical marijuana products.

This study has some obvious limitations, many of which were acknowledged by the study authors. Only a small sample of cities, dispensaries, and products are represented in this study relative to those sold in the District of Columbia and the 23 states permitting medical marijuana sales, so these data cannot necessarily be generalized to the entire product category across the U.S., although the researchers studied three of the largest cannabis markets in the country.

The study was supported by internal funds from Johns Hopkins University but the analytical costs were born by Werc Shop Laboratories and two co-authors are employed by the company in California and Washington. In addition to providing cannabis analysis in states where it's legally permitted, [the company](#) offers more broad testing for plant compounds (phytochemicals) in herbal medicines and dietary supplements.

Today's June 23/30 double issue of *JAMA* contains several other articles on medical marijuana, including a comprehensive review of clinical evidence for cannabis in specific therapeutic areas.

Vandrey R, Raber JC, Raber ME, Douglass B, Miller C, and Bonn-Miller MO. Cannabinoid dose and label accuracy in edible medical cannabis products. *JAMA* 2015; 313: 2491-3. doi: [10.1001/jama.2015.6613](https://doi.org/10.1001/jama.2015.6613)

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