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Legal Commercial Cannabis Sales in Colorado and Washington: What Can We Learn?

Mark A.R. Kleiman
University of California, Los Angeles Luskin School of Public Affairs

Improving Global Drug Policy: Comparative Perspectives and UNGASS 2016

EXECUTIVE SUMMARY

Key Findings

- Colorado and Washington were the first states to legalize the production and sale of cannabis without a medical recommendation. Oregon and Alaska have followed suit, and additional states will likely do so in coming years.
- The effects of legalization are multi-dimensional, hard to predict, difficult to measure, and dependent on policy details.
- The primary gains from legal availability are likely to be reduced illicit activity and reduced need for enforcement, along with relatively modest revenues.
- The primary losses will involve increased problematic drug use, including use by minors.
- The extent of those gains and losses will probably be sensitive to price.
- Very high prices (substantially above prices in the illicit markets) will likely frustrate the aim of shrinking illegal production and dealing.
- Very low prices—which are technically possible, given how inexpensive it is to produce cannabis under legal conditions—risk accentuating the increase in problematic use.
- Regulatory restrictions on commercial supplies have so far kept the commercial prices above illicit and medical-dispensary levels, although prices have now begun to fall and are predicted to fall rapidly.

Policy Recommendations

- Change federal laws to accommodate state-level policy choices while requiring states to prevent out-of-state exports.
- Regulate the price and product of goods containing tetrahydrocannabinol (THC), with the goal of minimizing problematic behavior.
- Enforce uniform content and labeling requirements for products containing THC.
- Develop non-survey methods for gathering improved data on THC consumption.

Introduction

On November 6, 2012, voters in Washington State and Colorado chose by solid margins—56 and 55 percent "Yes" votes in each state, respectively—to legalize the production and sale of cannabis without a medical purpose for use, and to establish systems of licensed, regulated, and taxed cultivation, processing, and distribution.[1] It is not quite accurate to refer to the resulting systems as "legal marijuana" because under federal law, possession of cannabis remains a misdemeanor, and production and distribution remain felonies. Nonetheless, the Colorado and Washington State systems go beyond current Dutch policy for example, where a published policy of non-enforcement protects limited forms of cannabis retailing but production remains fully illicit.

Thus, there are great expectations about the development of the first state-approved systems of non-medical cannabis production and sale anywhere in the world since the near-universal adoption of the Single Convention on Narcotic Drugs of 1961. Already voters in Oregon, Alaska, and Washington, DC have voted to join Colorado and Washington State. Proponents and opponents of cannabis legalization have rushed forward with strong claims about great success and terrific disaster, respectively, especially in Colorado, where commercial sales began in January 2014, about six months ahead of Washington State.

No doubt there is, and will be, much to learn from both experiments. But it would be wise for advocates and journalists alike to curb their enthusiasm. There is, so far, less to this event than meets the eye, and neither state to date provides any strong basis for claims about the hazards or benefits of making cannabis commercially available. That is so for three reasons:

1. Legalization has been at the state level alone, and the remaining illegality under federal law continues to shape the Colorado and Washington experiences. Full legalization at the national level would present a very different picture.
2. Even before voters approved the creation of licensed commercial systems, both states had wide-open access to cannabis under medical recommendation (with the exception of eastern Washington). This entailed open retailing in highly commercialized "dispensaries" to "patients" who could obtain medical recommendations more or less on demand for a relatively modest fee from physicians specializing in recommendation-writing. Even Washingtonians and Coloradans who did not themselves have a recommendation letter had indirect access to dispensary supplies from those who did, such as through acquaintances or for-profit resellers. Thus, the availability of cannabis to Washington and Colorado residents did not discontinuously increase the day the first commercial stores opened.
3. The legal commercial markets remain underdeveloped and quantity-constrained, with very high—albeit currently falling—prices compared to medical-outlet prices for cannabis of comparable quality, let alone the lower prices available for (generally lower-quality) strictly illegal product. About half of the cannabis legally sold in Colorado goes through the medical system rather than through the commercial system;[2] some additional amount is sold illegally and not recorded. Washington State does not monitor medical cannabis sales, but medical outlets vastly outnumber legal commercial outlets. In each state, commercial sales include a substantial fraction of visitors; if it were pos-

[1] See "November 06, 2012 General Election Results," Washington Secretary of State, November 27, 2012, http://results.vote.wa.gov/results/20121106/Initiative-Measure-No-502-Concerns-marijuana_ByCounty.html; and "2012 Elections Colorado: Amendment 64 – Legalize Marijuana: Election Results," *Denver Post*, http://data.denverpost.com/election/results/amendment/2012/64-legalize-marijuana/.

[2] Christopher Ingraham, "Colorado's Legal Weed Market: $700 million in sales last year, $1 billion by 2016," *Wonkblog, Washington Post*, February 12, 2015, http://www.washingtonpost.com/blogs/wonkblog/wp/2015/02/12/colorados-legal-weed-market-700-million-in-sales-last-year-1-billion-by-2016/.

sible to measure the market among residents alone, the medical system would probably dominate in both states.

Federal Tolerance and Announced Limits

What is in some ways the most surprising outcome of the Washington State and Colorado experiments was the decision of the federal government to roll with the punch rather than to resist efforts to issue state licenses for federal felonies. That decision has gone largely unremarked; having happened, it seems natural, but it was by no means inevitable. (For example, a different outcome of the 2012 presidential election might have led to a vastly different result. Congress has acted to block the creation of a legal commercial market in Washington, DC.)

In what is now known as the "second Ogden memo," the Justice Department identified eight priority areas for federal enforcement, and suggested—in carefully-hedged language—that in states with sufficiently tight and robustly-enforced controls, federal agencies would not target state-legal activity that did not trespass on those priority areas.[3] Defined enforcement priorities include: sales to minors, gangs and organized crime, interstate traffic, use of cannabis dealing as cover for other criminal activity, violence and firearms, drugged driving and other public health consequences, growing on public lands, and use on federal property.

While some supporters of cannabis prohibition have strongly criticized the decision—"lawless" being among the milder terms employed—most of that criticism ignores both important facts and the text of the Controlled Substances Act (CSA). As a matter of fact, the federal government lacks the capacity to enforce cannabis prohibition without the active cooperation of state and local governments, since the latter makes virtually all cannabis possession arrests, as well as more than 90 percent of all cannabis trafficking arrests. Four thousand Drug Enforcement Administration agents simply cannot replace the drug enforcement efforts of half a million state and local police; and any attempt to do so—even in relatively modest-sized states such as Colorado and Washington—would at the very least require substantial cutbacks in enforcement aimed at dealing in heroin, cocaine, methamphetamine, and prescription opiates. As a matter of law, the CSA commands the Attorney General to cooperate with the states and localities "in suppressing the abuse of controlled substances."[4]

However, the federal government was not entirely helpless in the face of state-level legalization. It could not, without state and local help, have prevented illegal cannabis production and sale from flourishing. But it could, without undue effort, have frustrated the efforts of Colorado and Washington to tax and regulate the cannabis market through the simple (and not very expensive) expedient of seeking injunctions in federal court to bar every applicant for a state cannabis license from acquiring that license or acting under its terms. Since each application evinces on its face the intention to violate federal law, such injunctions should be issued as a matter of course. How elected officials and electorates in Colorado and Washington and in other states would have reacted is a matter for speculation, but it is virtually certain that the federal government could have prevented those states from collecting the revenue that was a prominent element in the policy sold to the voters.

Even if from the federal viewpoint the outcome of such a collision would have been inferior to the outcome achievable by accommodation, the threat would have nonetheless been a potent one, and the federal government could have used that threat to secure more restrictive policies than emerged in either Colorado or Washington.

[3] David W. Ogden (Deputy Attorney General), "Memorandum for Selected United States Attorneys," U.S. Department of Justice, October 19, 2009, http://www.justice.gov/opa/blog/memorandum-selected-united-state-attorneys-investigations-and-prosecutions-states.
[4] Controlled Substances Act, U.S. Code 21 (2012), subchapter 1, part E, section 873 (a), http://www.deadiversion.usdoj.gov/21cfr/21usc/873.htm.

The list of eight federal priorities is an oddly-assorted one, reflecting its origin in an agency concerned with crime rather than health, and with expertise in law enforcement rather than economics. The phase "substance use disorder" does not occur, and no attempt is made to distinguish between casual and problematic cannabis use. Also omitted is the idea of price as a likely driver of changes in consumption and trafficking patterns. An alternative memo might have said explicitly that state-legal activity that allowed prices to fall much below current illicit prices would attract federal attention, and there is reason to think that state regulators might have crafted policies attempting to prevent price declines (for example by placing tight restrictions on production volumes), had that been required in order to stay the hand of federal enforcement.

The federal government has done more than acquiesce in the conduct of the Washington and Colorado programs; it has acted to facilitate the resulting illegal commerce, notably by issuing guidance to financial institutions that contemplates their offering services to cannabis businesses.[5] Whether and to what extent financial institutions will act on that guidance remains to be seen, but the federal intention to prevent the emergence of an all-cash cannabis business is evident.

In sum, the federal response to state-level legalization has been much more accommodating than it might have been, but—in principle, at least—it is conditional on robust and well-enforced regulation at the state level. What is still unknown is whether federal law enforcement would be prepared to move in strongly if a state failed to create and enforce such regulations.

The Feasibility of Creating a Commercial Market More or Less From Scratch

Colorado and Washington were similar in having sufficiently wide-open cannabis supply under quasi-medical auspices, which took a large share of the in-state market away from illicit growers and importers. They were different in that medical outlets in Colorado were state-licensed, somewhat regulated, and required by law to produce most of what they sold; by contrast, the medical marijuana business in Washington consisted of unlicensed retailers, some of which grew their own product while others were supplied by unlicensed growers. Thus, Colorado was able to create a commercial-supply system simply by issuing new licenses to some existing licensees, while Washington had to start more or less from scratch.[6] That meant that commercial stores in Colorado opened about six months before those in Washington, but Washington nonetheless successfully presided over the creation of a new licit cannabis industry. That does not prove that other states can do so as well, but it shows the task is feasible in principle.

In both states, product continues to move off the shelves, even at high prices created by regulation-induced scarcity, with purchases concentrated among high-income consumers, casual users, and out-of-state residents ineligible for medical-marijuana cards.

On the other hand, neither Colorado nor Washington has yet demonstrated that the resulting legal market can displace either a wholly illicit market (which had already been largely displaced in both states by medical availability) or compete with established quasi-medical suppliers operating under looser regulations and lighter tax burdens.

[5] See James M. Cole, "Memorandum for All United States Attorneys: Guidance Regarding Marijuana Related Financial Crimes," U.S. Department of Justice, February 14, 2014, http://www.justice.gov/sites/default/files/usao-wdwa/legacy/2014/02/14/DAG%20Memo%20-%20Guidance%20Regarding%20Marijuana%20Related%20Financial%20Crimes%202%2014%2014%20%282%29.pdf; Financial Crimes Enforcement Network (FinCEN), "Guidance: BSA Expectations Regarding Marijuana-Related Businesses," U.S. Department of the Treasury, February 14, 2014, http://www.fincen.gov/statutes_regs/guidance/pdf/FIN-2014-G001.pdf; and Serge F. Kovaleski, "U.S. Issues Marijuana Guidelines for Banks," *New York Times,* February 14, 2014, http://www.nytimes.com/2014/02/15/us/us-issues-marijuana-guidelines-for-banks.html.

[6] John Walsh, ed., *Q&A: Legal Marijuana in Colorado and Washington* (Washington, DC: Brookings Institution/Washington Office on Latin America, 2013), http://www.brookings.edu/research/papers/2013/05/21-legal-marijuana-colorado-washington; and John Hudak, *Colorado's Rollout of Legal Marijuana is Succeeding: A Report on the State's Implementation of Legalization* (Washington, DC: Brookings Institution / Washington Office on Latin America, 2014), http://www.brookings.edu/~/media/research/files/papers/2014/07/colorado-marijuana-legalization-succeeding/cepmmjcov2.pdf.

In both states, proponents of legalization stressed the importance of focusing scarce law enforcement resources on predatory crime as opposed to cannabis dealing. But some amount of transitional enforcement is needed to suppress the illicit market, which otherwise offers competition to the commercial system. Encouraging law enforcement agencies to fill that role remains a challenge. Officials in Nebraska and Oklahoma complain that imports of Colorado cannabis is a growing problem for their states, and have filed suit in federal court demanding that the commercial system be shut down; the complaint does not provide any data, nor does it specify whether the Colorado material entering those states represents illegal production or diversion from the legal system.[7] The Nebraska/Oklahoma complaint focuses on movement of cannabis on the highways; if prices in Colorado (and Washington State) continue to fall, there is also the possibility that cannabis purchased legally through retail in those states will flow out by mail or parcel services. The Colorado law forbidding retailers to keep customer records—designed as a privacy-protection measure—may make it harder to prevent such "smurfing" operations.

Prices are reportedly falling in both states as more commercial production capacity comes online; by one estimate, Colorado commercial prices will fall to medical levels by late this coming winter. In Washington, the outcome of the political struggle over tightening controls on the medical system remains unclear; supporters of commercial availability, even allied with the state senator who sponsored the original medical-marijuana law, lost out last session to an oddly assorted coalition which included medical suppliers, law enforcement agencies disgruntled both about legalization and about the fact that none of the resulting revenues come to them, local officials angling for a bigger share of the tax take, and cultural conservatives.

Local Resistance

State-level cannabis legalization appeals to the principle of subsidiarity: that decisions ought to be made, insofar as practicable, at as local a level as possible. This affords the ability to adjust to variations in conditions and preferences and to allow for trials of various policies. But local governments in some parts of Colorado and Washington are using their power over land use to resist the siting of production facilities and sales outlets within their jurisdictions; this stems from some mix of opposition to legal cannabis and concern about neighborhood effects. Washington allows cities and towns to be "dry" with respect to alcohol, but state authorities and the drafters of the cannabis initiative insist that local officials should not be allowed to interfere with the decision made by the state's voters.

This matters more than it otherwise would because only in-person retail purchase is allowed and delivery services are banned. How this will play out legally and politically remains to be seen.

Concentrates, Edibles, and Associated Risks

Commercial sales, like sales under medical recommendation, have seen a large and growing market share for concentrates ("hash oil," "wax," and "shatter") and for edible and potable preparations: not just the traditional pot brownies but a range of prepared foods and drinks ranging from yogurt smoothies to gummy bears.[8] These emerging product types, still unfamiliar to some of the new consumers brought

[7] See Jack Healy, "Nebraska and Oklahoma Sue Colorado Over Marijuana Law," *New York Times,* December 18, 2014, http://www.nytimes.com/2014/12/19/us/politics/nebraska-and-oklahoma-sue-colorado-over-marijuana-law.html?&assetType=nyt_now.

[8] See Martin Kaste, "Marijuana 'Hash Oil' Explodes in Popularity, and Kitchens," *NPR*, January 10, 2014, http://www.npr.org/2014/01/10/261390781/marijuana-hash-oil-explodes-in-popularity-and-kitchens; Jordan Steffen, "Pot Edibles Were Big Surprise in First Year of Recreational Sales," *Denver Post,* December 26, 2014, http://www.denverpost.com/potanniversary/ci_27174833/pot-edibles-were-big-surprise-first-year-recreational; and Marijuana Policy Group, *Market Size and Demand for Marijuana in Colorado: Prepared for the Colorado Department of Revenue* (Denver, CO: State Government of Colorado, 2014), 9, https://www.colorado.gov/pacific/sites/default/files/Market%20Size%20and%20Demand%20Study,%20July%209,%202014%5B1%5D.pdf.

in by legal commercial availability, turn out to pose a variety of risks and regulatory challenges—along with potential opportunities—for safer and more controllable cannabis use.

Herbal cannabis—the flowers ("bud") and leaves of the plant—is traditionally consumed by smoking; the herbal material is burned in a cigarette ("joint"), pipe, or water-pipe ("bong"), or occasionally in a hollowed-out tobacco cigar ("blunt"). This creates some of the same risks as smoking tobacco because the user is breathing in (and typically trying to hold in the lung for many seconds) a mixture of hot gasses, micro-particulate, and polycyclic aromatic hydrocarbons, some of them demonstrably carcinogenic. For the vast majority of cannabis users, the risks are much smaller than those of tobacco smoking because the number of puffs (even for daily users) is far less than the corresponding number for a frequent tobacco user. Twenty tobacco cigarettes per day is roughly the median smoking habit, while three joints a day would put a cannabis user well into the top quintile of the distribution. Moreover, despite the presence of substantial amounts of carcinogenic chemicals in cannabis smoke, no one has demonstrated increased lung-cancer risks even among heavy cannabis smokers. Overall then, aside from the annoyance of coughing, the throat-and-lung risks of cannabis smoking do not loom large among the harms to users. That said, smoking anything is not a good health habit. By contrast, inhaling ("vaping") cannabis vapor in an e-cigarette or some other device that uses power to heat concentrated material—which does not, properly managed, involve combustion—ought to be reckoned as somewhat safer in terms of respiratory harm.

On the other hand, cannabis concentrates contain far higher tetrahydrocannabinol (THC) concentrations than herbal cannabis, and even compared with the high-THC and low-cannabidiol (CBD) product—a combination which may itself enhance risk—that is typical of medical and commercial retail sales.[9] This may pose heightened danger of over-intoxication leading to dysphoria, anxiety, and, in the extreme, panic or even psychotic symptoms, which sometimes lead to emergency department visits, though only very rarely to observable lasting harm. (It is plausible, though not empirically demonstrated, that whatever risk cannabis poses of triggering long-term mental illness in susceptible individuals is enhanced at higher doses.)

Whether higher THC concentrations lead to greater risks depends on several factors. The first is how skilled consumers are at "titrating" their consumption by inhaling some amount, waiting a minute or two, introspecting to determine their intoxication level compared to some target, and stopping or continuing accordingly. If consumers were experts at titration, higher concentrations might lead to only modestly greater risks of over-intoxication while reducing the impact on the throat and lungs. However, the evidence in hand suggests that even experienced users are not very good at titration; at least, given more potent cannabis, they do not seem to consume much less of it. Moreover, the maximum intensity of the cannabis experience depends not only on the total quantity of the active agents consumed, but also on the rate of change of concentration in the brain; a single "hit" containing 10 milligrams (mg) of THC might have a far more profound impact than 10 mg taken in over a couple of minutes in a dozen puffs.

That applies with special force to the most extreme vaporization technique, "dabbing." This involves using a blowtorch to get a piece of metal (e.g., a nail) red-hot, and then dropping a substantial bit of solid concentrate on the heated object to be flash-vaporized, with all of the vapor inhaled at once. "Dabbing" seems to be a practice of users who enjoy showing off

[9] Delta-9 tetrahydrocannabinol (THC) is the primary intoxicant in cannabis, providing the characteristic "high," and THC content is the standard measure of cannabis potency. Cannabidiol (CBD) does not produce intoxication and may act to "buffer" some of the effects of THC; in particular, while THC generates anxiety, panic, and, in extreme cases, even psychotic episodes in some users, CBD appears to be anxiolytic and anti-psychotic. Over time, the THC content of cannabis has been rising and the CBD content has been falling; that may account for the increasing incidence of reported cannabis problems. Whether commercialization will continue, accelerate, or even reverse those trends remains to be seen.

their consumption—like college students chugging bottles of vodka—and of those who have built such a tolerance to THC that ordinary smoking or vaporization no longer produces the desired "high." (As one long-term user is supposed to have exclaimed after his first dabbing experience, "Oh my god! After twenty-five years, *I'm stoned again!*") While some dabbers seem to enjoy the experience, others have adverse reactions; some even pass out. Consistent dabbing seems to be a formula for building a high tolerance, with enhanced risk of substance use disorder, though that phenomenon has yet to be studied clinically. It seems likely that dabbing will prove to be a fad, but the validity of that reassuring prediction cannot be assured.

On the other hand, the process of assaying concentrates for their content of various active molecules is far more straightforward than the comparable process for herbal material; any given batch of concentrate, if properly manufactured, should be more or less homogeneous chemically. This is not true of a batch of herbal material, or even material from a single plant. Moreover, the process of smoking and holding the smoke in one's lungs is necessarily imprecise, while vaporization devices could be designed to deliver measured amounts of vapor. A user breathing in a measured quantity of a concentrate of known chemical composition could easily control his or her intoxication level by regulating the number of puffs, just as an alcohol drinker can count drinks. It will be important to observe the development of the relevant technologies, labeling practices, and consumer habits, and to consider regulatory and public information approaches to fostering practices of safer and more controlled cannabis use.

Edibles and potables face comparable, though technically different, opportunities and problems. In principle, the slow onset of action from swallowing cannabinoids could provide a gentler experience than taking them in by lung; testing and labeling could allow consumers to control their dosage of active agents and thereby control their intoxication level. In practice, that process has proven more difficult.

Untested and unlabeled (or inaccurately tested and labeled) products delivered to naïve consumers are likely to lead to some untoward incidents. However limited the titration capacity of smokers, the rapidity of onset of drug effects after inhalation does give them some ability to control their high. Moreover, the duration of intoxication is unlikely to exceed three or four hours. By contrast, swallowing rather than inhaling THC and the other active agents in cannabis creates subjective effects that typically do not begin until after 45 minutes or longer and then continue to build for a similar period, reaching a maximum at one to two hours after ingestion and continuing for as much as six to ten hours before dissipating.[10]

This creates a trap for an inexperienced user (such as, notoriously, New York Times columnist Maureen Dowd), who might wait half an hour, notice no effect, and then double up, or wait until the first—relatively mild—effects are felt, decide that the first dose was inadequate and take a supplemental dose before the first dose has reached its peak effect. Even worse, consumers of sweetened edibles might find subsequent doses tempting because of the food cravings ("the munchies") typical of cannabis intoxication.

The feeling of over-intoxication (which in the extreme can seem like the onset of permanent madness) can be quite terrifying; Dowd's description of lying on a hotel bed for eight hours, desperately thirsty but too afraid to get out of bed to get a cup of water, is far more amusing to read about (for the hard of heart) than it must have been to experience.[11] Sometimes the resulting behavior is catastrophic, as was tragically evident when an international student at a Wyoming university, while visiting Denver, consumed an entire cookie

[10] Alice G. Walton, "Is Eating Marijuana Really Riskier Than Smoking It?" *Forbes*, June 4, 2014, http://www.forbes.com/sites/alicegwalton/2014/06/04/is-eating-marijuana-really-riskier-than-smoking-it/; and Steven Wishnia, "Smoke vs. Snack: Why Edible Marijuana Is Stronger Than Smoking," *Daily Beast,* June 13, 2014, http://www.thedailybeast.com/articles/2014/06/13/smoke-vs-snack-why-edible-marijuana-is-stronger-than-smoking.html.

[11] See Maureen Dowd, "Don't Harsh Our Mellow, Dude," *New York Times*, June 3, 2014, http://www.nytimes.com/2014/06/04/opinion/dowd-dont-harsh-our-mellow-dude.html?_r=0.

intended to contain multiple doses of THC and then jumped or fell to his death.[12]

Again, in principle, testing and labeling could reduce the extent of these problems, and it is to be expected that their frequency will decrease as consumers accumulate direct and vicarious experience. So far, however, producers of edibles have found it difficult to ensure either homogeneity within batches—even within individual packages—or consistency across batches. That problem is harder to solve with solid foods as opposed to liquids; however, solids are easier to package, or clearly subdivide, into single-dose units—for example, by scoring a chocolate bar into squares. To achieve the same end with potables would require customers to measure out portions. Both Colorado and Washington are in the process of defining a dosage unit or "serving size," and are expected to converge on 10 mg.

Another risk of edibles—again, especially sweets—is that they may be attractive to very young children, who may have a very bad time with the resulting intoxicated experience. Such incidents appear to be infrequent compared to incidents of young children consuming over-the-counter and prescription drugs (e.g., acetaminophen), but remain problematic. While requirements for child-resistant and child-aversive packaging might reduce their frequency, some amount of unintended exposure by toddlers and young children is inevitable.

Edibles and potables also face sets of regulatory requirements in addition to the rules the state chooses to place on cannabis products generally. To date, the Food and Drug Administration has not stepped in to enforce its rules against the addition of untested and unapproved additives to foods, but it could do so at any time. Moreover, edible and potable producers will have to meet the rather strict rules imposed, though not always vigorously enforced, by state health departments about the conditions under which food for commercial sale is produced.

Managing the Quasi-Medical Sector

As already noted, before commercial legalization, Colorado and western Washington had well-developed production and retailing of cannabis for residents with medical recommendations. Arguably, the justification for those systems largely disappears under commercial availability; indeed, the testing and labeling requirements, which are tighter for commercial than for quasi-medical vendors, arguably make the commercial product more suitable than the "medical" product for the minority of medical-recommendation holders who are actually attempting to manage disease symptoms rather than merely to get around the cannabis laws. (The argument on the other side is that some, though not many, of the medical outlets are run by sincere and knowledgeable people, more willing and more able than the clerks in commercial cannabis stores to give good advice about product choice and dosage.)

If genuine patients are to be exempt from the excise taxes on commercial cannabis, this could be managed without maintaining an entire parallel distribution system, but simply through assigning them the sort of "tax-exempt" numbers used by non-profits and public agencies to avoid paying ordinary sales taxes. But the problem remains of how to divide the genuine patients from the non-medical users and resellers who currently hold medical-marijuana cards in Colorado and who currently have medical recommendations in Washington. When the decision to recommend or not involves granting or denying an individual legal access to what may be a medically useful substance, some physicians will choose to err on the side of over-inclusion rather than under-inclusion, and regulators who try to strictly enforce limits on such recommendations have to worry about denying important palliative care to some people who are genuinely suffering. After commercial legalization—when the only question is whether a given individual will enjoy a tax exemption or have to pay full freight

[12] Kieran Nicholson, "Man Who Plunges from Denver Balcony Ate 6x Recommended Amount of Pot Cookie," *Denver Post*, April 17, 2014, http://www.denverpost.com/news/ci_25585976/man-who-plunged-from-denver-balcony-ate-6.

—the balance of harms shifts in a way that justifies much greater stringency. (In either instance, there is a strong case for requiring recommending physicians to establish quantity limits similar to those in a conventional prescription. This would both prevent the development of problematic use patterns by the patient, and interfere with the illegal business of buying cannabis products under medical recommendation and then reselling them to those with no such recommendation. But that is not the current practice.)

Tightening medical availability in conjunction with commercial availability seems justified, then, both as a public-health measure and as a revenue protection measure. But there has yet to be any such tightening in Colorado or Washington, due in part to the political muscle of the "medical marijuana" industry, which has total revenues in the nine figures in each state. To date, the commercial sales networks in those states are production-capacity-constrained and charge prices substantially higher than the medical outlets, and legal commercial sales remain small relative to medical sales for now. When the commercial outlets are capable of handling current consumer demand at competitive prices, the question of whether to rein in the medical marijuana sector may become a contentious one. In Colorado, where the commercial sector started out as an offshoot of the medical sector, the issue has yet to prove salient. The prospects for a taxed and strictly regulated commercial sector are not especially bright if it has to continue to compete with a largely untaxed and only loosely regulated medical sector.

Dogs That Did Not Bark in the Nighttime

While it is far too early to judge the effects of adding legal commercial cannabis to widely available medical marijuana, we do have some information on the effects of virtual legalization under the medical guise in Colorado and western Washington. Crime did not dramatically increase or decrease. Auto accidents did not dramatically increase or decrease. Alcohol sales did not dramatically increase or decrease.

Long-term commercial availability may well have different, and larger, effects than medical availability, especially if prices are allowed to fall below even the relatively low levels in the Colorado and Washington medical markets. But the lack of any large detectable effects, good or bad, from quasi-legalization should start to put bounds on the size of the effects to be expected from full legalization.

Things to Watch

- **Price**: Jonathan Caulkins of Carnegie Mellon University has estimated that commercial production could bring the pre-tax price of the cannabis in a joint down from around four dollars today to around 1 percent of that level, roughly the price of a teabag.[13] The potential effects on consumption would be dramatic. Production controls and taxes can be used to prevent such drastic price decreases; whether they will be implemented remains to be seen. The experience in the Netherlands suggests that commercial availability without a price decrease has only limited impacts on the level of consumption. Very low prices risk a large upsurge in use by minors, as well as in heavy use, which unlike the total number of consumers of marijuana, has risen approximately sevenfold over the past two decades in the United States, according to unpublished calculations by Caulkins from data in the National Survey on Drug Use and Health. Low prices in any one state also risk the development of an out-of-state export trade. Price may well be the most important wild card in the cannabis legalization deck.
- **Production and trafficking patterns**: How quickly and completely will legal commercial sales displace illegal production and export?

[13] Jonathan P. Caulkins, *Estimated Cost of Production for Legalized Cannabis*, RAND Working Paper WR-764-RC (Santa Monica, CA: RAND Corporation, 2010), http://www.rand.org/pubs/working_papers/WR764/.

Will there be substantial leakage from licit production to untaxed sale or export? In Colorado, will legal home-growing gain market share, and will it be used as a cover for illicit enterprise? If Oregon legalizes at a tax rate much lower than Washington's, will interstate traffic in licitly-sold material develop?

- **Consumer preferences among products**: Will the market shares of edibles and concentrates continue to rise? Will very-high-THC, very-low-CBD products continue to dominate the market? To what extent does the form of taxation (ad valorem, per ounce of herbal material, or per milligram of THC) shape the distribution of market shares across product types?
- **Consumer habits and customs**: Can consumers learn to use edibles safely? Is "dabbing" a transient fad, or a long-term menace? What will happen to norms of use frequency in various subcultures? Will the modal cannabis use experience continue to include intoxication, or will customs develop that are equivalent to having a single glass of wine or beer socially?
- **Effects on other drug use**: There is now some evidence that medical marijuana tends to decrease opiate use and related problems. Whether that effect is verified by additional studies, and whether commercial availability has the same or accentuated effects, will be important in evaluating the net costs or benefits of legalization. Effects on alcohol use—where the stakes are even higher—remain unknown. These are partly questions to be addressed scientifically, and partly the potential targets of policy interventions yet to be developed.
- **Heavy use and use by minors**: How do these patterns change? How much will commercial availability to all adults increase access for minors, and to what extent can prevention efforts offset that effect? Does heavy use remain dominated by population subgroups with poor economic prospects?
- **Social and health outcomes**: There is now evidence that cannabis availability can depress college grade-point averages.[14] Attention should therefore be focused on educational outcomes, including outcomes in high school and even in middle school. The development of substance use disorder is another outcome that might take several years to measure. Long-term health consequences (e.g., respiratory disease) are worth monitoring, though by their nature we will know very little about them for a decade or more.
- **Ancillary issues**: Will the cannabis industry find financial services firms willing to provide credit card processing and checking accounts, in order to obviate the problem of managing bundles of cash? What happens to rules and enforcement mechanisms for cannabis use by schoolchildren, employees, and offenders under criminal justice supervision? How do parents respond if there is an upsurge of use by minors (e.g., what happens to sales of home drug-testing kits)?

Policy Recommendations

This section draws extensively on the author's Washington Monthly essay "How Not to Make a Hash Out of Cannabis Legalization."[15]

- Change federal law to accommodate state-level policy choices while requiring states that choose to legalize to take effective steps to limit out-of-state exports, in particular by preventing sharp price decreases.

[14] See Amelia M. Arria et al., *The Academic Opportunity Costs of Substance Use During College: A Brief Report from the Center on Young Adult Health and Development* (College Park, MD: Center on Young Adult Health and Development, University of Maryland, 2013), http://www.cls.umd.edu/docs/AcadOppCosts.pdf.

[15] For additional analysis, see Mark A. R. Kleiman, "How Not to Make a Hash Out of Cannabis Legalization," *Washington Monthly*, March/April/May 2014, http://www.washingtonmonthly.com/magazine/march_april_may_2014/features/how_not_to_make_a_hash_out_of049291.php?page=all.

- Manage prices using either taxes (based on THC content rather than weight or value) or production restrictions (perhaps through a production-quota auction). This will limit both the problem of illegal export and also minimize the trend toward a higher prevalence of problematic cannabis use.
- Allow home delivery alongside, or even instead of, retail outlets in order to minimize neighborhood effects and the resulting local opposition.
- Require all products to be tested and labeled with their chemical content. Establish a standard "dose unit" (perhaps 10 mg of THC) and require that each package clearly indicate the number of dosage units.
- Require that edible and potable products be packaged in single-dose units.
- Allow, or even require, consumers to establish personal monthly purchase quotas (again measured in units of THC), and require retailers to enforce those quotas as a "nudge" strategy to encourage temperate use of the drug.
- Develop non-survey methods (such as analyzing sewage or collecting hair samples from barbershops and hair-styling establishments) to measure aggregate THC consumption.

Conclusion

The only reasonably safe answer to the question, "Has cannabis legalization in Washington and Colorado been a success?" is the answer Chou En-lai is supposed to have given when Henry Kissinger asked about the Chinese view of whether the French Revolution had been a good thing: "We think it's too soon to tell." It is incumbent on the scholarly community to curb the enthusiasm of journalists, politicians, and advocates on both sides of the debate for jumping to hasty conclusions. But there will be much to learn. Some of that learning will require novel sophisticated measurement and analytic designs. But much of it will reflect the wisdom of Yogi Berra: "Sometimes you can see a lot by just looking."

Mark A.R. Kleiman is Professor of Public Policy in the University of California, Los Angeles Luskin School of Public Affairs. He is the editor of the Journal of Drug Policy Analysis*, the organizer of the group blog* The Reality-Based Community *(samefacts.com) and a member of the Committee on Law and Justice of the National Research Council. His books include* When Brute Force Fails: How to Have Less Crime and Less Punishment *(Princeton University Press 2010), named one of the 10 Best Books of 2009 by* The Economist.

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