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Marketing Marijuana in Colorado

The new gold rush was on. More than 150 years after gold was discovered in Colorado State's Rocky Mountains, Colorado's legalization of recreational marijuana use at the start of 2014 had, within its first six months, created a booming array of as yet small-scale marijuana growers, manufacturers, and retailers (see **Exhibit 1** for photos). By July 1, 2014, 200 licenses to operate retail marijuana shops had been issued,¹ well up from 37 shops² that opened their doors to long lines of eager consumers on January 1, augmenting the preexisting market for medical marijuana in Colorado that counted 501 dispensaries across the state by July 2014.³ Employment in the marijuana industry had nearly doubled, from around 6,000 before recreational shops opened to 11,289 by July 2014.⁴ Recreational marijuana sales contributed nearly \$20 million of the \$25.3 million in state tax revenues generated by marijuana sales in the first six months of 2014,⁵ and the state's budget office expected \$134 million in additional marijuana tax revenues for the year ending June 2015.⁶

Proponents of recreational marijuana use had argued that legalization could generate millions in tax revenue, that money spent on incarcerating thousands of nonviolent offenders found guilty of possession could be redirected elsewhere, and that a regulated market would reduce both marijuana use among teenagers and the flow of funds to criminal drug cartels and their distributors.⁷ Opponents argued that the drug was a public health hazard and worried about children being exposed to it. Teenage usage rates, some argued, were higher in those 23 states that had already legalized medical marijuana.⁸

The federal government and other states would closely scrutinize Colorado's experience as the first U.S. state to make recreational marijuana legal for purchase and consumption.¹ There was much to consider. What were the public health implications of legalizing marijuana for recreational use? What sort of regulation was appropriate and desirable for producers, distributors, retailers, and consumers? How would regulation shape the emergence and growth of this new business sector? How best should businesses market a product still mostly illegal in the rest of the U.S.?

¹ In a separate election on the same date, Washington State citizens also voted to legalize recreational marijuana use in their state, but retail sales did not begin until July 2014.

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The Product and Its Market

Marijuana, the most commonly used illicit substance in the U.S., with 18.9 million average monthly users in 2012,⁹ was derived from the leaves, stems, and flowers of the *Cannabis sativa* and *Cannabis indica* plants. Often referred to by one of its nicknames—pot, grass, or weed, among others—marijuana’s active compounds, THC (tetrahydrocannabinol) and CBD (cannabidiol), were most often ingested either by smoking a marijuana cigarette (a “joint”), or by inhaling marijuana vapors through a water pipe, a vaporizer, or directly via heating marijuana concentrate (“dabbing”). Additionally, drinks and foods such as brownies or candies (“edibles”) could contain THC and CBD, and lotions could deliver them through dermal absorption. However consumed, the THC in marijuana acted by triggering neurotransmitters in the brain, resulting in a “high,” typically described as a period of feelings of happiness and relaxation. Among approximately 20%–30% of users, however, marijuana triggered paranoia and irritability.¹⁰ Some experts believed the different reactions among users were due to different patterns by which marijuana’s secondary active compound, CBD, affected receptors in the brain, but research findings remained inconclusive.¹¹ Among all users, THC temporarily impaired cognitive abilities.¹²

Due to its ability to relieve pain, 23 states and Washington, D.C., had by July 2014 legalized marijuana for medical use as of July 2014 among patients suffering from painful chronic illness (see **Exhibit 2** for additional information on the 23 states).¹³ U.S. medical marijuana users numbered 2.2 million in 2013.¹⁴ Between 2,000 and 4,000 businesses were involved in the legal production of medical marijuana, with total sales estimated at \$1.2 billion to \$1.3 billion in 2013, according to the *Medical Marijuana Business Daily*.¹⁵ ArcView Group, a cannabis industry and investor network, valued the U.S. market for medical marijuana at \$1.53 billion in 2013 and projected 68% growth, to \$2.57 billion, by the end of 2014.¹⁶ New medical marijuana markets opening in Connecticut, Illinois, Massachusetts, and Vermont would generate a collective \$61 million in 2014 sales, ArcView believed. Meanwhile Nevada and Oregon would jointly generate another \$46 million in 2014 sales by converting their loosely regulated medical marijuana markets to state-licensed dispensaries.¹⁷ (**Exhibit 3** shows states that had legalized either medical or recreational marijuana use in 2014. **Exhibit 4** shows expected growth in medical marijuana sales by state in 2013–2014.)

Elsewhere in the U.S., marijuana consumption, production, and sale remained illegal but widespread: marijuana possession accounted for over 650,000 (or 42.4%) of the more than 1.5 million drug arrests nationwide in 2012,¹⁸ and in 2011 exceeded arrests for all violent crimes combined.¹⁹ In contrast, arrests for the possession of heroin, cocaine, and their derivatives combined amounted to 256,000 (16.5%) in 2012.²⁰ The 91,700 arrests for the manufacture and sale of marijuana comprised 6% of 2012 drug arrests.²¹ ArcView estimated the U.S. market for illegal marijuana was worth between \$18 billion and \$30 billion in 2013, but claimed that U.S. sales of legal marijuana would exceed \$10 billion by 2018, anticipating that 14 states would act to legalize recreational marijuana use by 2018.²² In November 2014, voters in Alaska and Oregon would decide whether to legalize the adult consumption, production, and sale of recreational marijuana;²³ District of Columbia voters would decide whether to permit individuals to possess recreational marijuana, give (but not sell) it to others, and grow up to three plants at home.²⁴ Advocates planned to target Arizona, Montana, Massachusetts, and Nevada with 2016 ballot initiatives legalizing recreational marijuana use.²⁵

In the U.S., support had grown for marijuana legalization, to the extent that the *New York Times* in July 2014 ran a series of editorials and opinion pieces advocating legalization.²⁶ A 2013 Gallup poll found that acceptance of legalizing marijuana had doubled over the previous two decades to 58% (see **Exhibit 5** for changing attitudes, 1969–2013). The number of Americans who had reportedly tried

marijuana at some point remained steady at 38%, compared to 34% in 1999, and 33% in 1985.²⁷ Only 7% of respondents considered themselves “current marijuana smokers.”

A similar 2013 poll by Pew Research found that 48% of Americans had tried marijuana at some point, with 12% of the adult respondents using marijuana during the previous year. Of these users, 47% did so “just for fun,” 30% for medical reasons, and 23% cited both.²⁸ A 2013 survey at a Michigan marijuana clinic found that its average medical marijuana user was 41.5 years of age. Half of the customers were at least 50 years of age and 66% were male. Most surveyed users (87%) reported that they sought medical marijuana for pain relief due to spasms, nausea, neurological problems, cancer, glaucoma, or other ailments.²⁹

Legalization policies differed by country. In December 2013, Uruguay became the first country to legalize the cultivation, possession, sale, and transport of marijuana.³⁰ Canada had legalized medicinal marijuana nationwide from 2001.³¹ As of April 2014, Canada had licensed 13 companies as producers and distributors of dried marijuana.³² Barred from making or selling marijuana edibles, extracts, or oils, these companies sold dried marijuana only, and shipped it directly to adult consumers or their designated physicians. No storefronts dispensed the product.³³ In the Netherlands, citizens could grow up to five marijuana plants for recreational use. While technically illegal, Dutch police tolerated the sale of marijuana in coffee shops as long as they did not cause a neighborhood disturbance or sell more than five grams (0.2 ounces) to a customer at a time.³⁴ Israel’s Ministry of Health began a medical marijuana program in 2008 to serve 1,800 patients;³⁵ as of 2014, 19 doctors were certified to prescribe marijuana to over 11,000 patients.³⁶ Unlike more liberal policies in California, for example, where doctors prescribed medical marijuana for ailments including headaches, anxiety, chronic pain, and difficulty sleeping, medical marijuana in Israel was reserved for seriously ill patients for whom pharmaceutical alternatives had failed and death was often near. In addition to cancer patients, those in Israel with Parkinson’s, post-traumatic stress disorder, and even Tourette syndrome could qualify for medical marijuana, but only after a lengthy application process.³⁷

Marijuana’s Impact on Health

Marijuana had several demonstrated medical benefits. A 2006 study at the Scripps Research Institute in California revealed that THC could prohibit an enzyme from speeding up the formation of “Alzheimer’s plaques” in the brain that many researchers considered a sign of Alzheimer’s disease. Virginia Commonwealth University researchers found marijuana effective in controlling spontaneous epileptic seizures; for example, a marijuana strain high in CBD reduced a Florida girl’s grand mal seizures (and occasional heart stoppages) from some 300 per week to 3 per month.³⁸ Other studies had shown that marijuana helped reduce nerve pressure in the eyes of patients suffering from glaucoma and helped relieve pain in patients with anxiety, arthritis, cancer, hepatitis C, HIV/AIDS, multiple sclerosis, and other conditions.^{39,40}

Marijuana also demonstrated several negative effects. THC exacerbated symptoms in schizophrenics and increased the risk of schizophrenia.⁴¹ People under the influence of marijuana performed worse on memory tests and had weakened motor coordination, making vehicle and machinery operation unsafe.⁴² Research had suggested that teenage marijuana use could permanently lower user IQ by up to 8 points among the heaviest users.^{43,44} In 2014, researchers from the Harvard Medical School and Massachusetts General Hospital found that young adults who smoked marijuana demonstrated abnormalities in parts of the brain related to emotion, motivation, and decision making. The level of brain changes directly correlated with the amount of marijuana the

user smoked per week. According to the research team, questions about potential long-term effects remained, especially if the participants used more than one type of drug, as the majority of drug users did.⁴⁵ (**Exhibit 6** summarizes marijuana's effects on the brain.) Researchers believed more studies were necessary to determine whether marijuana posed a major public health risk, but federal legislation banning the drug and marijuana's continuing classification as a Schedule I substance² (along with such drugs as heroin and LSD) made it difficult to gain approval for such studies.

The National Institute on Drug Abuse had stated that, while marijuana dependence was comparable to that of other drugs, long-term effects were less severe. About 11% of marijuana users were "dependent," or addicted, meaning that they were unable to reduce intake and that their drug use interfered with daily life. The percentage of addicted marijuana users was lower than that among other drug users, however. For example, 32% of nicotine users were addicted, followed by heroin and opiate users (23%), cocaine users (17%), and alcohol users (15%).⁴⁶ A University of Michigan survey at one medical marijuana clinic found that returning patrons reported "higher prevalence of lifetime cocaine, amphetamine, inhalant, and hallucinogen use than first time patients."⁴⁷ While not claiming evidence of dependence, survey data on patients' lifetime and recent substance use suggested that approximately 13% of the clinic's patrons reported alcohol usage consistent with addiction.⁴⁸

By comparison, the risks of alcohol and smoking tobacco were well-known. Heavy alcohol use affected how the brain looked and worked; affected mood and behavior; and could cause liver damage, stroke, high blood pressure, and other ailments. Research also showed that moderate alcohol intake could protect healthy adults from developing heart disease.⁴⁹ Tobacco use caused many diseases and increased the smoker's chance of stroke. Smoking tobacco caused more deaths per year than HIV, alcohol use, motor vehicle accidents, firearm-related accidents, and illegal drug use combined.⁵⁰

Legalizing and Regulating Marijuana in Colorado

Colorado voted to legalize the medical use of marijuana late in 2000 for pain relief from cancer, glaucoma, HIV/AIDs, muscle spasms, seizures, severe pain, severe nausea, and cachexia (severe weight loss and muscle atrophy).⁵¹ Individuals who received identification cards (red cards) from Colorado's Department of Public Health and Environment (DPHE) on a physician's recommendation could legally possess two ounces of marijuana and grow up to six marijuana plants for medical purposes, starting in mid-2001.⁵² When caregivers began distributing marijuana for medical purposes to a greater number of patients, usually at discreet retail locations or by home delivery, the U.S. Drug Enforcement Administration encouraged the DPHE to create an informal rule preventing any caregiver from distributing it to more than five patients. In 2007, Sensible Colorado, a nonprofit committed to establishing "sensible and effective drug laws and policies in Colorado,"⁵³ won a lawsuit against the state over what it called an "arbitrary policy." As a result, caregivers could continue to provide marijuana to as many patients as needed it; this paved the way for the dispensary system⁵⁴ established by 2010 legislation that also permitted cultivation centers and the manufacture of medical marijuana edibles.⁵⁵

In 2009, the DPHE tried to reinstate the five-patient limit on medical marijuana distribution. The Board of Health heard testimony from over 300 patients, caregivers, supporters, and opponents

² The 1970 Controlled Substances Act specified five categories, defining Schedule 1 substances most restrictively as those having no accepted medical use but high potential for abuse. (Source: United States Code, Title 21, Section 812, available at www.law.cornell.edu/uscode/text/21/812, accessed August 2014.)

before ultimately rejecting the five-patient limit by one vote. A few months later, U.S. Deputy Attorney General David W. Ogden issued a memorandum stating that the federal government would not prosecute under federal laws medical marijuana patients or caregivers who abided by state law.⁵⁶ The response was dramatic: whereas the DPHE received fewer than 6,000 applications for red cards between 2001 and 2008 inclusive, 2009 alone saw 39,000 new red-card applications, yielding a total of 41,000 cardholders by the year's end. By 2012, 108,000 patients were registered to receive medical marijuana, 94% of whom qualified due to severe pain.⁵⁷

The federal government, which still classified marijuana as an illicit substance, attempted to rein in the use of medical marijuana in 2011. In June 2011, a new Deputy Attorney General issued a memo redefining a caregiver as an individual. (Previously, one dispensary owner claimed to be caregiver to 1,200 patients.⁵⁸) Six months later, in January 2012, the U.S. Attorney General for Colorado ordered all state-approved marijuana retailers within 1,000 feet of a school (at least 50 businesses) to shut down within 45 days.⁵⁹

Nonetheless, 266 licensed dispensaries operated in Colorado in 2012, of which 248 were licensed to serve up to 300 patients each, 12 were licensed to serve up to 500 patients, and 6 had licenses to serve over 500 patients.⁶⁰ Medical marijuana sales in Colorado exceeded \$219 million in 2012, with \$6 million collected in taxes.⁶¹ In 2013, medical marijuana sales exceeded \$386 million and generated nearly \$11 million in taxes.⁶² As of March 2014, there were 110,000 medical marijuana patients in Colorado, about two-thirds of whom were male.⁶³

In February 2012, a voter initiative to legalize the possession of marijuana for recreational use won inclusion on the November election ballot. In November 2012, Colorado and Washington became the first states to vote to legalize recreational marijuana use for those 21 and older, with 55% voter support in Colorado.⁶⁴ At the time of the election, Colorado, Washington, and 15 other states (plus Washington, D.C.), collectively representing 32.5% of the U.S. population, allowed the use of marijuana for medical purposes, as most physicians agreed that it was safe enough to use for temporary pain relief. However, skeptics asserted that “medical marijuana is more about paving the way for [full] legalization than it is about helping the sick. In most states, officials and dispensary-owners conspire in the fiction that customers are all ‘patients’ and shops merely nonprofit ‘co-operatives’. The doctor’s ‘recommendations’ needed to procure marijuana are easy to obtain.”⁶⁵ In California, even an out-of-state resident could receive such a “recommendation,” the term for a marijuana prescription, for about \$100 and an hour’s time on the Venice Beach boardwalk.⁶⁶

Regulation in 2014

Colorado’s vote to legalize recreational marijuana allowed individuals to possess up to one ounce of the drug (specifically, one ounce of THC). State residents could purchase one ounce at a time – enough to fill three dozen or more marijuana cigarettes – but nonresident purchasers were limited to one-quarter of an ounce. Many retailers limited their transactions to one per customer per day,⁶⁷ partly due to the need to remain compliant,⁶⁸ partly due to strong demand and limited initial supply.

Several factors constrained supply. Initially – until January 2016 in Denver and October 2014 for the rest of the state – only licensed medical marijuana dispensaries were eligible to apply for a recreational marijuana license. All dispensaries either converted from medical to recreational marijuana sales or sold medical and recreational marijuana in separate spaces on the same premises.

All retailers were required to produce 70% of the recreational marijuana sold in their stores, and often did so on retail premises, similar to brewpubs that sold their own beer.⁶⁹ The state also required

cameras in all rooms that contained marijuana plants, and required owners and managers to submit to lengthy background checks.⁷⁰

Colorado's "seed-to-sale" tracking system used radio frequency identification technology (RFID) to keep illegal marijuana out of the market.⁷¹ Every medical and retail marijuana plant was issued an RFID number that was entered into the state government's online database. After harvest, leaves and buds were shipped to a retailer with a new RFID tag that also included information on the plant's origins. The objectives were to curtail sales to the black market and to allow Colorado's Marijuana Enforcement Division (MED) to track how much marijuana had been produced. Hundreds of thousands of RFID tags were in place and operative by July 2014. In the case of contamination, the state could track the marijuana that might be at risk. As an MED spokesperson explained, "Our end goal is always public safety."⁷²

Colorado's marijuana policy was implemented and assessed by over eight cabinet-level agencies, coordinated through the state governor's office.⁷³ The Department of Revenue managed medical and retail marijuana applications, licensing, and fees, and its Marijuana Enforcement Division handled marijuana plant RFID tracking and other compliance matters in coordination with local law enforcement. The DPHE maintained the medical marijuana patient registry, conducted public health education and safety programs, and maintained regulatory standards covering such topics as edibles labeling. The Department of Public Safety coordinated with local law enforcement to minimize diversion of Colorado-grown marijuana outside the state. The Department of Transportation maintained records of driving under the influence of marijuana and other drugs. The Department of Agriculture regulated hemp and pesticide use.

Colorado levied a 25% tax (15% excise, 10% sales tax) on the sale of recreational marijuana—but not medical marijuana⁷⁴—on top of the state's standard 2.9% sales tax, making it one of the most heavily taxed products in the state.⁷⁵ The excise tax was not imposed on marijuana edibles. Recreational marijuana was expected to generate \$67 million in tax revenue in 2014 (**Exhibits 7 and 8** show taxes collected during the first six months of 2014).⁷⁶ Some Colorado communities imposed additional taxes and licensing requirements of their own.⁷⁷ Denver's sales tax on recreational marijuana, for example, was an additional 7.32%; its sales tax on medical marijuana was an additional 3.62%.⁷⁸ The retail marijuana store receipt in **Exhibit 9** breaks out state and local taxes as components of the retail price of an edible product and dermal patch.

The first \$40 million in state excise tax generated annually by marijuana sales was dedicated to the state's public school construction budget. Fifteen percent of the 10% sales tax was to be distributed to local governments. Regulatory oversight was expected to consume \$13 million of marijuana tax revenues and involve 70 full-time workers in the year ending June 2014, plus \$10 million and 81 full-time workers in the year ending June 2015. An estimated additional \$2 million would be allocated to substance abuse treatment, \$320,000 to public health, and \$256,000 to law enforcement and public safety during the year ending June 2015, according to February 2014 budget forecasts.⁷⁹

Marijuana-infused food, drinks, candy, and lotions were required to meet the health and safety standards of other food products, but could only be sold in medical dispensaries and retail storefronts. Edibles producers in Denver were subject to food safety inspections by the Denver Department of Environmental Health. Edibles producers in the city were also required to apply for a Marijuana-Infused Products (MIP) license.⁸⁰ Consumption of marijuana edibles that preceded a March 2014 suicide and an April 2014 murder were widely publicized. The deaths helped promote legislative efforts to further distinguish THC-infused edibles from candy and other products otherwise available to children.⁸¹ As of March, edibles manufacturers were under no obligation to

label their products' THC content, and lab testing of a selection of labeled edibles had discovered discrepancies between the labeled and actual THC content.⁸² As a result, neither the amount nor the potency of THC in any given edible was obvious to the consumer, some of whom—including *New York Times* columnist Maureen Dowd⁸³—reported unusually intense reactions.⁸⁴ Moreover, unlike marijuana smoke or vapor, which reached the bloodstream quickly from the lungs, edibles required digestion to reach the bloodstream, and consumers sometimes overate them because their effects were not immediate. In May 2014, Governor John Hickenlooper signed legislation creating a task force that would devise labeling to effectively distinguish THC-infused edibles from uninfused foods, and close the loophole that had previously equated an ounce of marijuana oil—which had higher concentrations of THC—with an ounce of dried marijuana.⁸⁵ In July, state regulators proposed new rules requiring manufacturers to prepackage single-serving edibles and drinks in child-resistant containers rather than rely on retailers to do so after sale. In addition, they proposed limiting the THC in bite-sized edibles to 10 milligrams of the maximum 100 milligrams permitted in any marijuana edible product.⁸⁶

Colorado rules barred marijuana retailers from advertising on television, radio, or in publications where “reliable evidence” existed that “more than 30 percent of the audience is reasonably expected to be under the age of 21.”⁸⁷ As a result, retail marijuana vendors relied on public relations firms for product placement and indirect media mentions (see **Exhibit 10** for an example). In addition, store fronts needed to remain discreet (see **Exhibit 11** for selected storefronts in Boulder).

Colorado residents were allowed to grow marijuana for personal use at home, but were banned from selling it without a license. Adults could grow up to 6 marijuana plants per adult per household (3 mature plants and 3 immature plants), but the number per residence could not exceed 12 plants, no matter how many adults lived there. Cannabis seeds were available for sale from marijuana retailers. Homegrown marijuana could be grown indoors or outdoors, but was to be kept away from children or pets and grown in an enclosed, locked area.⁸⁸ The 2012 vote did not allow consumption in public space or workplaces; marijuana could only be smoked in a private residence with the owner's permission. Medical marijuana patients could assign their individual growing rights to caregivers, some of whom had aggregated the plants of multiple patients to generate “gray market” marijuana cultivation comprising plants that were not covered by the state's RFID tracking program. As a result, state regulators were unsure how much production was being diverted for black market sale but decided that the vast number of small growers was too expensive to investigate.

Until October 2014, only existing medical marijuana dispensaries could open retail premises. They did so either by converting their medical marijuana license to a retail marijuana license, or by adding *separate* retail sales counters/capacity to their existing medical marijuana premises. Until July 1, medical marijuana dispensaries were required to pay an initial license fee to convert to or add a retail license that varied between \$6,500 and \$16,750, depending on the number of plants they would cultivate (see **Exhibit 12** for licensing fees). Application fees were \$500 for a retail license, for a license to cultivate recreational marijuana, and for a license to manufacture marijuana-based products (such as edibles and concentrates) sold for retail sale. Because retailers were required to produce 70% of their own supply, many paid the \$500 application fee twice.⁸⁹

As of August 1, 2014, Colorado had licensed 501 medical marijuana dispensaries, 221 of which held licenses to operate recreational marijuana outlets. The state had also licensed 152 medical edibles makers and 66 retail edibles manufacturers,³ and 732 medical and 293 recreational marijuana cultivators. Because medical marijuana owners initially launched all recreational cultivation and

³ These manufacturers included makers of lotions and similar non-edible products infused with THC.

sales, some overlap in ownership existed. Not all of the licensed establishments were necessarily in operation. Thirteen testing facilities were licensed as well.

In December 2012, one month after Colorado's vote to legalize, President Obama stated that the federal government would not arrest or prosecute recreational or medical marijuana users who followed state law. In August 2013, the U.S. Justice Department confirmed that it would not challenge state laws, as long as the scope of sales did not clash with enforcement priorities such as preventing distribution to minors.⁹⁰

Despite these assurances, marijuana's continued federal illegality caused problems for producers. Banks would not finance marijuana entrepreneurs because they believed it was too risky, hindering many would-be growers. Despite assurance through memos from the U.S. Treasury Department and Justice Department that banks could legally work with pot businesses in states that had legalized the drug, few lenders were willing to do business with them. Banks did not believe they were adequately protected from legal repercussions.⁹¹ "Operating on a memo that is in conflict with the law is just unwise for any business, including financial institutions,"⁹² explained a representative from the Colorado Bankers Association. As a result, Colorado's marijuana industry operated initially almost entirely on a cash basis. Despite June 2014 legislation permitting the creation of financial services cooperatives as an alternative to bank services for Colorado's marijuana businesses, Don Childears, Colorado Bankers Association CEO, stated "We don't think it will do anything other than allow the state to say, 'We've tried everything we can think of and it won't work, so now Congress it is up to you.'"⁹³ Additionally, in May 2014, the U.S. Bureau of Reclamation issued a reminder that legal marijuana growers could not use federal irrigation water on their crops. The bureau maintained power plants, canals, and dams in 17 western states, and delivered water to over 1.2 million acres of land in Colorado and Washington each year.⁹⁴

Further, despite legalization at the state level, local communities were allowed to block the opening of recreational marijuana stores. Colorado Springs, the state's second-largest city, opted to ban marijuana retailers. As of mid-July 2014, 70 Colorado cities had banned recreational marijuana sales, while another 11 had moratoria and temporary bans in place. Recreational marijuana sales were legal in 39 Colorado cities. Colorado counties could also ban or permit recreational marijuana sales in all areas of the county outside city jurisdiction. As of mid-February 2014, 44 Colorado counties had bans or moratoria in place on recreational marijuana sales, while 20 counties permitted retail sales or the conversion of medical to retail stores.⁹⁵ Anti-legalization groups rallied to encourage local towns to ban marijuana retail stores. One opponent said, "Legalization might sound like a good thing in theory, but in reality it means pot shops in your backyard, a brand-new industry targeting kids with candies that are laced with marijuana, and increased costs."⁹⁶

Industry Operations

Estimated Production Costs

In a 2010 working paper published by the Rand Drug Research Policy Center, a researcher from Carnegie Mellon University outlined the estimated production costs of legal cannabis. Estimates matched similar studies conducted in the Netherlands. The author generated a cost estimate for a hypothetical hydroponic (a method of growing plants outside of soil) setup in a 5' x 5' space, with a median planting density of 1.4 plants per square foot. Within this space, the cost of consumables (growing medium and nutrients) was \$300 per harvest. Electricity, with 40 watts per square foot at \$0.14 per kilowatt, cost an estimated \$200 per harvest. Lights, pumps, tubing, shears, and other equipment (apart from light bulbs) cost between \$1,250 and \$1,500; if amortized over four harvests

per year, for five years, the equipment would cost \$60–\$70 per harvest. Costs per harvest of marijuana in a 5' x 5' space would total \$600.⁹⁷

A well-run 5' x 5' space producing four harvests per year could yield up to 10.5 pounds of marijuana, with tangible costs totaling \$225 per pound. If the average moderate marijuana smoker consumed 100 grams of marijuana per year (453.6 grams equaled one pound), a 5' x 5' plot provided enough marijuana for up to 50 smokers per year.⁹⁸

After setup, if a 5' x 5' plot required no more than one hour of work per day to maintain, one full-time employee could maintain a greenhouse with 1,300 square feet of marijuana plants. When grown in greenhouses with natural light, marijuana was much cheaper to produce. (See **Table 1** for a comparison.) A 1,300-square-foot space could yield an estimated 546 pounds per year.⁹⁹

Table 1 Estimated Legalized Marijuana Production Costs, Various Crop Sizes

	5' x 5' indoor hobbyist	In a 1,500-square-foot residential house	1 acre 50% covered with greenhouses
Production Statistics			
Production intensity (lbs./sq. ft. per year)	0.42	0.42	0.21
Square feet cultivated	25	1,300	21,780
Annual pounds produced	10.5	546	4,574
Cost per Pound Produced			
Materials (excluding lighting)	\$150	\$50–\$150	\$50–\$150
Lighting	\$75	\$75	\$0–\$25
Labor	In-kind Donation	\$40	\$10–\$25
Structure/rent	In-kind Donation	\$33–\$132	\$10–\$25
Total cost per pound	\$225 + In-kind	\$200–\$400	\$70–\$215

Source: Adapted from Jonathan P. Caulkins, "Estimated Cost of Production for Legalized Cannabis," Rand Drug Policy Research Center Working Paper, July 2010, www.rand.org/content/dam/rand/pubs/working_papers/2010/RAND_WR764.pdf, accessed June 2014.

Labor costs dominated marijuana processing costs, which involved three stages: harvesting, manicuring, and drying/curing. Harvesting involved trimming the plant near its base, hanging it upside down to it to dry out, and trimming the largest leaves. Manicuring, the trimming of smaller leaves from the bud, was the most labor-intensive step. It could be done manually with scissors, with an automatic trimmer, or mechanically. Manicuring took four to six hours per pound of cannabis with scissors, or one to two hours with an automatic trimmer.¹⁰⁰ Denver's Pink House Blooms paid its trimmers \$11 and up per hour to do the job.¹⁰¹

Producers also faced increasing real estate costs. Warehouse lease rates in Denver jumped to an average of \$4.74 per square foot by March 2014, a 21% increase from two years earlier, as marijuana producers scrambled to find space to grow more product, but a number of marijuana growers were happy if they could find warehouse space at \$17 per square foot, the equivalent of Class C office space.¹⁰² Denver's industrial vacancy rate fell to 3.1% in 2014, the lowest in decades. Each marijuana plant produced, on average, two ounces of marijuana buds, meaning that a 3,000-square-foot building was capable of holding an inventory worth \$500,000, though inventory held by larger warehouses could be in the millions of dollars.¹⁰³ The demand for increased warehouse space

affected the costs of distribution companies and other traditional tenants. “The cost to play here is really tough if you don’t have adequate capital,”¹⁰⁴ a marijuana retailer noted.

Colorado Producers

In 2014, small and medium-sized firms dominated Colorado’s recreational marijuana market. For example, three of Colorado’s most prominent marijuana firms, OpenVape, Patient’s Choice, and Dixie Elixirs & Edibles, employed 125, 85, and 40 people, respectively.¹⁰⁵ OpenVape made vaporizers and cartridges filled with concentrated marijuana oil for sale in California, Colorado, and Washington states.¹⁰⁶ Patient’s Choice sold the harvest of its two cultivation facilities through four medical and recreational dispensaries.¹⁰⁷ Dixie Elixirs made and marketed 115 marijuana-infused edible products, each labeled to show the THC content.¹⁰⁸

Some believed the existing “merchant-focused” marijuana industry would evolve as the U.S. beer industry had, with small, local players operating alongside national brands. “Micro growers could produce more expensive, artisanal cannabis strains, with larger manufacturers producing more readily available standard varieties,”¹⁰⁹ predicted Jeffrey Miron, an economist at Harvard. The primary obstacle to the emergence of national-level players remained marijuana’s illegal federal status. Many believed that big tobacco producers could enter the marijuana business if federal laws changed to allow recreational marijuana production and nationwide use. Few other existing industries had the combination of national distribution channels, marketing skills, lobbying resources, and the “product design technology to optimize puff-by-puff delivery of a psychoactive drug (nicotine),” stated a 2014 report in the health policy journal *The Milbank Quarterly*.¹¹⁰ According to material in the University of California San Francisco (UCSF) archives, Philip Morris first approached the U.S. government for permission to study marijuana in the 1960s. According to the director of the UCSF Center for Tobacco Control Research and Education, “The only thing they were wrong on is they thought legalization would happen a lot sooner.”¹¹¹ A spokesperson for Altria, parent company to Philip Morris, stated in 2014 that “[o]ur companies have no plans to sell marijuana-based products. We don’t do anything related to marijuana at all.”¹¹²

The potentially lucrative business had already attracted wealthy investors and private equity firms.¹¹³ These included ArcView Group, which connected investors willing to commit a minimum \$50,000 with promising marijuana producers, and Privateer Holdings, a private equity firm that raised \$7 million in 2013 in a Series A round to invest in cannabis companies.¹¹⁴ *High Times* magazine was working to raise \$300 million for the High Times Growth Fund to make private equity investments in marijuana production. According to its owner, “the High Times Growth Fund will help allow people to make a living from it, because the banks are not.”¹¹⁵

Profit margins remained low for many producers, however, due to high startup costs—at least \$100 per square foot for growing space, often twice that¹¹⁶—and a “host of operational headaches and state regulations that a beet farmer could never imagine,”¹¹⁷ as one observer described, including background checks for all managers, and functioning video cameras required in all rooms that contained marijuana plants. Denver’s medical marijuana grower Pink House Blooms, for example, was profitable on sales of \$3 million, but investments necessary to boost its bottom line after recreational legalization were costly. The producer spent \$3 million to improve its converted warehouse to accommodate 2,000 plants. The cost of doing business was also high, including a \$14,000 monthly electricity bill for indoor growing lights (Colorado’s cold winter temperatures and better theft prevention convinced many growers to opt for indoor facilities).¹¹⁸ Labor accounted for up to one-third of production cost.¹¹⁹ Managing workers was difficult, as many had formerly worked in the black market and were not always trustworthy.¹²⁰ Like farmers everywhere, disease and pests

could destroy entire crops. Mildew and spider mites were particular threats to marijuana plants. Mistakes in planting, such as overfertilization, overwatering, or other errors, could ruin a harvest or lower product quality.¹²¹

Marijuana concentrates were the fastest-growing type of cannabis products, produced by condensing marijuana into edible concentrated forms.¹²² Colorado's largest edibles supplier, Dixie Elixirs, was building a 30,000-square-foot facility to boost production and meet rapidly growing demand. Two recreational shops in Denver, LoDo Wellness and Wazee, had had to limit customers to two edible products per day during the first month of legalization.¹²³ Colorado marijuana regulators, in a July 2014 study, noted "significant difficulties tabulating market demand for concentrated and edible marijuana products,"¹²⁴ but planned to conduct a follow-up study in 2015.

Wholesale Producers

Dispensaries responding to higher demand immediately after recreational legalization turned to wholesale producers to fill the 30% of inventory they were allowed to sell without growing it themselves. Many turned to Roberto's List, founded by "cannabusiness entrepreneur" Roberto Lopesino. Roberto's List was an online database that connected dispensaries in need of supply with those who had it. It also tracked prices and trends in marijuana strains.¹²⁵

In the early 2000s, when Lopesino was working at a medical marijuana dispensary, there were no in-house plant growth quotas for dispensaries. When Colorado approved the dispensary model, the wholesale market changed drastically, as dispensaries became responsible for most of their own cannabis supply. Roberto's List was described as "the first ever commodity trading floor for wholesale cannabis."¹²⁶

"There is an inherent deficiency in the supply chain," Roberto said in January 2014. An observer noted, "Too few shops are open, and even with the one-time [license] transfer from medical to recreational, dispensaries haven't been able to grow enough of their own plants to meet 70% of consumer demand."¹²⁷

Marketing

Many medical marijuana patients and other experienced marijuana users had specific marijuana strain preferences or sought specific intended effects, but most recreational users were open to experimentation and had not yet established loyalty to particular strains or brands. The new marijuana market had not yet matured, allowing businesses time to establish and test their brands. One observer noted, "We are starting to see a lot of market segmentation. Some businesses are more sophisticated and more brand development will occur during the next ten years. As the market matures and risks settle down, more companies will develop a solid brand and have a clear vision of their customers and the brand they want."¹²⁸

Leafly.com maintained an extensive online database of 890 marijuana strains and their intended effects to educate users.¹²⁹ Browsers could identify which strain typically made users feel sleepy, talkative, euphoric, happy, or relaxed, or produced other effects. Strains commonly available in Denver marijuana shops included Grape Stomper, a heavy strain with a high THC level (over 20%); Golden Goat, a sweet-tasting strain; and Critical Mass, a fruity-tasting strain with lower THC levels and a relaxing effect.¹³⁰ Prices could vary dramatically. One website publishing marijuana prices across Colorado reported average prices of \$238 per ounce for high-quality marijuana, \$197 for medium quality, and \$227 for low quality, though individual prices reported in Denver alone ranged

between a specious \$10 per ounce for high-quality marijuana to a high \$700 per ounce for medium quality.¹³¹

Intellectual property attorneys encouraged small marijuana businesses to obtain trademarks, though the U.S. Patent and Trademark Office would not yet register cannabis-related products.¹³² In 2014, an intellectual property lawyer stated, “People are establishing strong brand names right now, so it is the ideal time for them to figure out how to protect that.”¹³³ “If you can get the public to ‘accept no substitutes’ for your brand, that’s brand power. Brand loyalty is an extremely powerful force.”¹³⁴ CEO Tripp Keber of Dixie Elixirs & Edibles took this advice seriously. Keber’s products were already sold in 90% of Colorado dispensaries, and he planned to license the Dixie brand, recipes, and methods to companies in other states as well: “We’re building a brand. When the market evolves, and it’s possible to grow beyond state lines, that’s when I put on my intellectual property hat and align myself with the best of the breed. Right now, the marijuana must be cultivated and consumed in the state where it’s licensed. No interstate transport is allowed. I believe that will change. But in the meantime, there is no law against exporting the brand.”¹³⁵

Industry observers believed that as “Big Marijuana” companies established a presence in the market, cannabis brands would target different consumer segments. Some would work to attract customers interested in premium, high-end marijuana. As costs fell, and consumers became more sophisticated, producers were expected to move up the value chain to offer more premium products at higher prices. But, in the U.S. market, consistency of quality was essential, and remained a hurdle for many producers looking to establish brand recognition. For example, the “Sour Diesel” strain purchased at one dispensary often produced a different experience from that purchased at another. Some producers were working to make the product more predictable, to achieve, as one observer described it, “the Bud Light-ification” of marijuana.¹³⁶ Many edibles varied in quality and potency as well, and, furthermore, a study by the *Denver Post* found inconsistencies between the amount of THC printed on a label and the actual amount found in the product.¹³⁷

Ancillary Producers

Ancillary companies provided products and services that assisted with the growing, selling, and consuming of marijuana, but did not produce or sell marijuana themselves. Ancillaries ranged from security companies, consultants, insurance providers, accountants, real estate professionals, vaporizer companies, glassblowers, and more.¹³⁸ Some ancillary businesses sold pipes or other marijuana paraphernalia. Over 80% of ancillary business owners expected to see moderate to double-digit growth in 2014.¹³⁹

In an attempt to maximize profits, many marijuana retailers entered the ancillary business as well by selling vaporizers, vaporizer cartridges, and other similar products.¹⁴⁰ One medical dispensary, reporting only 6% profit margin on revenues of \$4.2 million in 2012, expanded its business and began selling pot-infused brownies, smoke-free dispensers, and other paraphernalia in an attempt boost margins.¹⁴¹ Ancillary products were subject only to the Colorado sales tax, not to the marijuana tax.

Hollywood, California-based Medbox sold patented dispensing machines to licensed medical marijuana dispensaries. The boxes enabled convenient over-the-counter marijuana distribution by dispensing a certain amount of the drug after verifying the patient’s identity with fingerprint scanning. Over 130 Medbox machines were up and running by the end of 2012. Having spiked to \$73.90 in January 2012, at the start of July 2014 Medbox shares had settled back to \$12, up just \$2 from their \$10 per share price in December 2011.¹⁴²

Medical Dispensaries

The proprietor of a midsize Denver dispensary noted in early 2014, “[People] all think we’re making money hand over fist.” He had been in business since 2009 and saw over 50 medical marijuana customers per day, with up to 80 on the weekends. Customers spent, on average, \$65 per visit. His business generated \$100,000 in revenue per month, but most of that revenue was used to cover expenses. Experienced growers were difficult to recruit, and he had gone through five grow managers in four years. High regulatory costs, including city and state applications, licensing, inspection, and permit fees, cost his business between \$15,000 and \$20,000 monthly.¹⁴³ Licensing fees alone cost \$7,000–\$17,250 for recreational sales and \$5,000–\$5,500 to upgrade his medical marijuana sales license to serve a higher number of registered patients.¹⁴⁴ Childproof shopping bags, required by the state, added to costs. He was also spending thousands of dollars in legal and accounting fees to comply with a multiyear federal audit.¹⁴⁵

Retailers

Marijuana retailers did not receive tax breaks awarded to other small business owners. Section 280E of the federal tax code, enacted in 1982, barred tax write-offs for illegal drug activity. “Because of 280E, the effective tax rate for many marijuana businesses is 50% or more,”¹⁴⁶ explained the deputy director of the National Cannabis Industry Association. Marijuana businesses could not write off payroll costs, rent, or other expenses. This led to “extremely thin profit margins.”¹⁴⁷ However, marijuana businesses could write off expenses for non-marijuana products, such as pipes and T-shirts.¹⁴⁸ “The more a marijuana business can broaden its paraphernalia and accessories inventory, the more it can write off as the cost of goods,” an observer explained.¹⁴⁹ Many retail store managers reinvested profits in their business.

On January 1, 2014, nearly 40 retail marijuana stores opened for business in Colorado, 18 in Denver alone, which was home to 12% of state residents (see **Exhibit 13** for a list of retailers). Indeed, “reflecting limited inventory and pent-up consumer demand,” recreational marijuana prices (including tax) jumped to \$400 an ounce, exceeding the \$200-per-ounce price of medical marijuana, which was not subject to the extra 25% in tax, and the \$155–\$250-per-ounce price for high-grade varieties offered on the illegal market.¹⁵⁰ Denver’s largest edibles supplier sold an expected month’s supply in the first three days of legalization.¹⁵¹ Observers believed that legalization would drive down production costs and ultimately retail prices as more players entered the market.¹⁵² The average retail price of medical marijuana already had dropped 30% in Colorado between 2011 and 2013.¹⁵³

One retailer with four outlets across the state—Colorado permitted the transfer of retail and medical marijuana licenses for \$2,500¹⁵⁴—branded its products as self-cultivated. Sixty percent of the \$3 million in expected 2014 revenues would come from the sale of marijuana; edibles would generate another 40%. Twenty percent of the company’s medical marijuana buyers accounted for 80% of its marijuana sales. The business purchased greenhouse-grown marijuana at \$1,200 per pound and outside-grown marijuana at \$500, selling both at an average retail price of \$4,500 per pound. The business saw about 180 daily transactions, or 1,260 weekly, each with an average ticket of \$48. Half of the recreational marijuana customers were from out of state. The company stocked some 20 marijuana strains, though selection changed frequently and strong demand made it difficult to tell which were most popular. Recreational and medical strains tended to differ from each other also. Recreational buyers experimented more with varied strains than medical users, making purchases once or twice weekly. The company’s grower brand name, MiNDFUL, was well-known across the state, and company ownership was investing in building the brand, though as yet few retail

customers purchased on this basis. Instead, said the owner, product availability was the leading determinant of success; store location was the second.

Consumption

A March 2014 report prepared for the Colorado Department of Revenue calculated total 2014 demand for marijuana of 130.3 metric tons, substantially more than a variety of early estimates. Total supply was estimated at about 77 metric tons, of which 54.8 tons would be sold as medical marijuana and 22.2 tons as recreational marijuana.¹⁵⁵ The report estimated 549,000 adult recreational marijuana consumers among state residents, 485,000 of whom—9% of the state's total 5.36 million residents—consumed marijuana at least once a month. Consistent with research showing that dosages increased with smoking frequency,⁴ Colorado's top 22% of recreational users accounted for 67% of demand.¹⁵⁶ (See **Exhibit 14** for estimated consumption.) The 149,000 marijuana users under age 21 were presumed to purchase marijuana outside the regulated market, in addition to the 53.3-metric-ton gap between regulated supply and demand.¹⁵⁷ Homegrown marijuana would supply an estimated 20.6 metric tons of this gap, the remainder coming from the illegal marijuana market as well as gray-market caregiver cultivation and medical marijuana patient resale of their purchases.¹⁵⁸

Tourist purchases of recreational marijuana were estimated to account for about 40% of total consumption. In 2013, Colorado hosted 64.6 million visitors, who spent a cumulative \$17.3 billion, generating \$976 million in state and local tax revenue.¹⁵⁹ Data reflecting tourist spending on recreational marijuana were not yet available, but anecdotal evidence suggested that legalization was having an impact. Nonresident purchases of recreational marijuana could comprise as much 90% of total sales in Colorado's ski towns (see **Exhibit 15** for tourist demand figures),¹⁶⁰ and some Denver retailers claimed that 80% of their recreational customers were from out of town on the basis of suitcases brought with them.¹⁶¹ Hotels.com reported a 73% year-on-year increase in Denver booking inquiries around the April 20, 2014, Cannabis Cup.¹⁶² Denver room searches were up 37% in the first seven months of marijuana legalization compared with the same period in 2013.¹⁶³ Colorado was reportedly the most popular destination for college spring break in 2014, ahead of warm weather resorts, and applications to Colorado universities were up by one-third.¹⁶⁴ Unlike Coloradans, nonresidents could not qualify for the \$15 red card that permitted medical marijuana purchases.¹⁶⁵ Possibly as a result, recreational marijuana purchases in July 2014 for the first time overtook monthly medical marijuana sales.¹⁶⁶

Growth Prospects

After six months' experience with legal recreational marijuana production and sales, on July 1, 2014, Colorado dropped rules that limited the issuance of retail marijuana licenses to medical marijuana providers, and ended the requirement that recreational sellers, like medical marijuana sellers, grow their own product. Henceforth, any Colorado otherwise-qualified resident could receive a license to sell recreational marijuana, and recreational marijuana companies could choose whether to operate as retailers, producers, or both.¹⁶⁷ As Colorado's experience with recreational marijuana grew and Washington State launched its own initial recreational marijuana sales in July 2014, there was little evidence of resistance to broadening both medical and recreational marijuana use across the

⁴ One study of European users found that daily marijuana users consumed 1.5 grams per day of usage, weekly users 0.8 grams, and monthly users 0.4 grams per day of usage. (Source: Jonathan Caulkins, Matthew Cohen, and Luigi Zamarra, "Estimating Adequate Licensed Square Footage for Production," BOTEC Analysis Corporation, 2013, http://liq.wa.gov/publications/Marijuana/BOTEC%20reports/5a_Cannabis_Yields-Final.pdf, accessed July 2014.)

United States. Neither was there more than anecdotal evidence and estimates of the likely societal and economic impact of the emergent industry. Such evidence included the following points:

- Using 2006 data, economist Jeffrey Miron calculated that decriminalizing marijuana use in Massachusetts, a state with a population of 6.7 million (Colorado's 2013 population was 5.3 million),¹⁶⁸ would result in annual savings of about \$29.5 million in law enforcement resources.¹⁶⁹
- African Americans were 3.7 times more likely than whites to be arrested for marijuana possession.¹⁷⁰
- On a national basis, Miron estimated that legalizing marijuana would save U.S. state and federal governments \$7.7 billion annually in fiscal spending and generate \$2.4 billion in tax revenues nationwide if taxed like all other goods, \$6.2 billion if taxed like alcohol and tobacco.¹⁷¹
- Applying Miron's methodology, the American Civil Liberties Union (ACLU) estimated the annual cost of U.S. marijuana possession enforcement at \$3.6 billion, based on calculations of 2010 U.S. police, judicial, and corrections expenditures. Colorado alone spent \$37.7 million on enforcement against marijuana possession in 2010: \$19.7 million on the police, \$14.3 million on the judicial system, and \$3.7 million on the prison system.¹⁷²
- Farmers in Mexico's Sinaloa State, locus of the country's largest marijuana harvests, said they were no longer planting the crop because its wholesale prices had collapsed from \$100 per kilogram to less than \$25 over the past five years.¹⁷³ A 2012 Mexican study found that U.S. legalization of marijuana could cut Mexican drug cartels' earnings from marijuana sales in the U.S. by up to 30%; a 2010 Rand study suggested that legalization of recreational marijuana in California could cut cartel revenues by 20%.¹⁷⁴
- Since the legalization of recreational marijuana sales, Colorado Children's Hospital had treated nine children, six of whom became critically ill from edible marijuana.¹⁷⁵ Before the legalization of recreational marijuana sales but following the legalization of medical marijuana dispensaries and edibles, 14 children under 12 were treated for marijuana exposure at Colorado's Children's Hospital between October 1, 2009, and year-end 2011. Seven of the 14 had ingested marijuana edibles. Between January 1, 2005, and September 30, 2009, none of the 790 children under 12 admitted to Children's Hospital for accidental ingestion were treated for marijuana exposure.¹⁷⁶
- Marijuana-related incidents accounted for 26% of Coloradans' emergency room (ER) visits in 2011, an increase from 20% of ER visits in 2005. During 2005–2008, the average percentage of ER admissions for marijuana alone was 25% in Colorado but only 18% nationwide. During 2009–2011, these percentages increased to 28% in Colorado and 19.6% nationwide.¹⁷⁷
- In 2011, nearly one in four Boulder County high school students surveyed considered themselves current (once monthly) marijuana users, over three times the 7.64% national rate among 12- to 17-year-olds. Also in 2011, 7.8% of Colorado's high school seniors reported smoking marijuana more than 40 times per month; another 2.9% smoked marijuana between 20 and 39 times per month. Nationwide, 6.6% of high school seniors reported smoking marijuana daily.¹⁷⁸

- Coincident with Colorado's legalization of medical marijuana dispensaries, cultivation, and edibles manufacture, the number of middle and high school students reporting themselves as current users increased between the 2008–2010 and 2010–2012 periods, from about 20.8% to 28.9% of Adams County high school students and from 5.7% to 8.5% of Adams County middle school students.¹⁷⁹
- Consistent with national trends, traffic fatalities in Colorado declined by 6% between 2006 and 2011. However, over the same period, Coloradan traffic fatalities involving drivers testing positive for marijuana alone more than doubled, from 21 to 52 people. Drivers testing positive for marijuana grew from 5% to 13% of total traffic fatalities over this period; drivers testing positive for any drug increased from 16% to 24% of accidents involving traffic fatalities.¹⁸⁰
- The average number of seizures of marijuana transported improperly across state lines from Colorado increased from 52 to 254 between the 2005–2008 and 2009–2011 periods. The average number of pounds of marijuana seized during each period increased from 2,220 pounds to 3,937 pounds.¹⁸¹
- The number of urine samples testing positive for medical marijuana increased in Colorado, from 1.9% in 2012 to 2.3% in 2013.¹⁸² The state's Supreme Court on September 30, 2014, would hear arguments that medical marijuana use should be covered under state law barring worker termination for legal off-duty behavior. As yet, the workplace impact of legalized recreational marijuana use was poorly researched, but 71% of companies made no change to their rules on employee marijuana use after legalization, while 21% of companies tightened their drug policies.¹⁸³ In response, entrepreneurial companies in 2014 marketed kits to enable employees to deliver THC-free urine samples.

Economic and regulatory forces would likely determine the balance between recreational marijuana's costs and benefits. Although about 80% of Coloradans had access to recreational marijuana, existing supply would likely not meet Colorado's booming demand until capital investment grew to facilitate sufficient cultivation. However, marijuana's continued federal status as an illegal drug limited state-level industry to all-cash transactions and ruled out scale economies on a national level, discouraging needed investment. Other regulatory constraints remained in place, too: federal funds for research into the health impact of marijuana would remain unavailable until it could be reclassified from a Schedule 1 to a Schedule 2 controlled substance. The absence of trademark protection made it costly to invest in branding. Marijuana producers and retailers would remain disadvantaged by their inability to deduct business expenses. In short, regulation would throttle the recreational marijuana industry despite its legalization at the state level. Profits would wither as expansion remained effectively blocked.

Others saw in marijuana a great business opportunity with nationwide potential, a fount of unbridled product innovation, at least until the potential entry of and consolidation by the global tobacco industry. "It's going to take us months—maybe years—to reach the demand that's out there. And while it's frustrating that won't happen faster, the public should be proud of how we are doing this,"¹⁸⁴ said Michael Elliott, executive director for the Medical Marijuana Industry Group. What was missing, one observer enthused, was:

The vast commercial sweet spot. The swath of America that Starbucks identified/exploited/invented: people who aren't already into your product but could be, if the product were sold to them in the right way. No one seems dedicated to figuring out how to appeal to those of us who think weed smokers are people who listen to twenty-eight-minute songs by Phish or make videos of their cats eating chicken pot

pie or normally watch the same *SportsCenter* seven times in a day. No one has yet begun to market the product itself, or the *experience* of shopping for it. The way Starbucks marketed coffee as a lifestyle, or Apple branded “devices” as the handbags of a new generation.¹⁸⁵

Exhibit 1 Images from the Colorado Marijuana Industry

Marijuana Plants



Source: Wikimedia User "Chmee2,"
[http://commons.wikimedia.org/wiki/File:Cannabis_sativa_plant_\(4\).JPG](http://commons.wikimedia.org/wiki/File:Cannabis_sativa_plant_(4).JPG), accessed October 2014.



Source: Wikimedia User "Ryan Bushby,"
http://commons.wikimedia.org/wiki/File:Macro_cannabis_bud.jpg, accessed October 2014.

Marijuana Edibles



Source: Matthew Staver/The New York Times/Redux.



Source: LA Medical Delivery Edibles, 2013,
www.lamedicaldelivery.com/strains/currently-available-strain-selection/edibles/, accessed September 2014.

Exhibit 1 (continued)

Marijuana Strains



Source: Alex Dobuzinskis, "Colorado Attorney General Casts Doubt on Taxes for Legalized Pot," Reuters, November 9, 2012, www.reuters.com/article/2012/11/09/us-usa-marijuana-legalization-idUSBRE8A807120121109, accessed June 2014.

Menu Board



Source: Jack Healy, "In Colorado, No Playbook for New Marijuana Law," *New York Times*, November 29, 2012, www.nytimes.com/2012/11/30/us/colorado-authorities-look-way-forward-on-marijuana.html?_r=0, accessed June 2014.

Medical Marijuana Dispensary



Source: Matthew Staver/*The New York Times*/Redux.

Indoor Marijuana Grow: A worker tends to a medical marijuana crop at Prairie Plant Systems, a federally licensed medical marijuana producer in Canada.



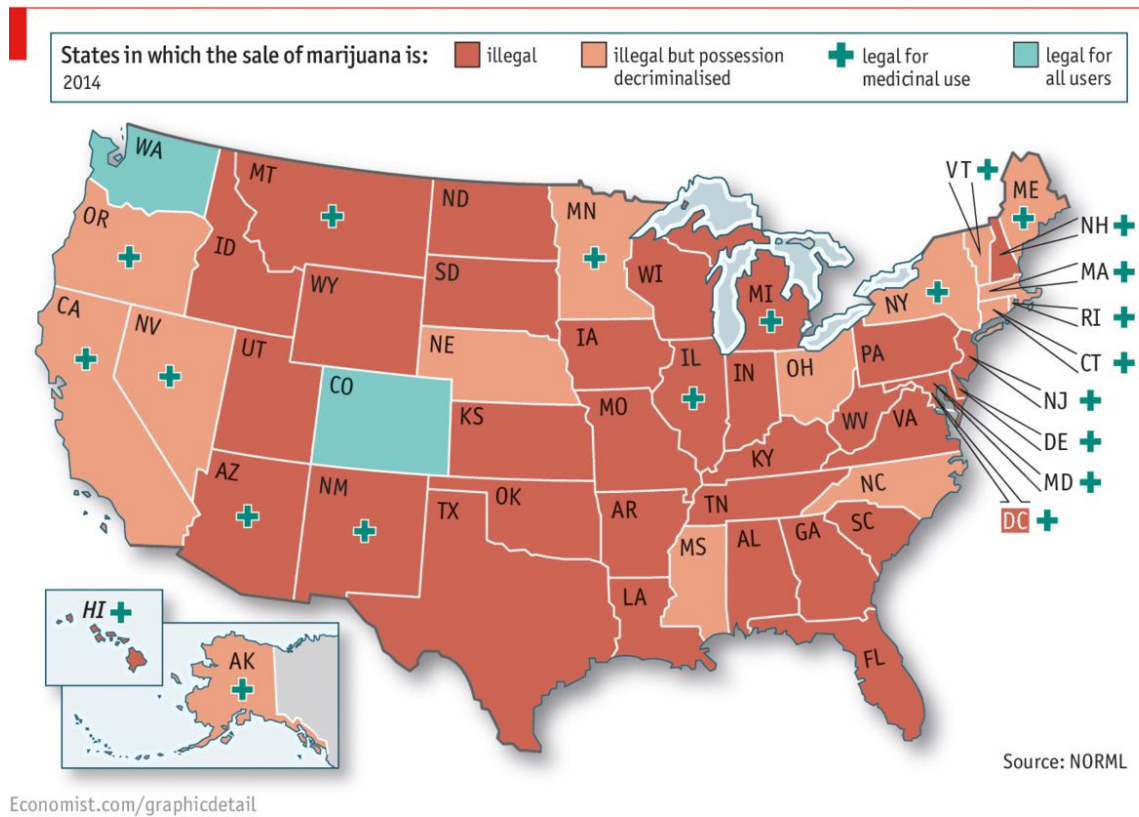
Source: Gloria Galloway, "Commercial Growers Favour New Medical Pot Scheme," *The Globe and Mail*, June 25, 2013, www.theglobeandmail.com/news/national/commercial-growers-favour-new-medical-pot-scheme/article12819446/, accessed September 2014.

Exhibit 2 States Allowing the Use of Medical Marijuana, as of July 2014

State	Year Passed	How Passed (Yes Vote)	Fee	Possession Limit	Accepts other states' registry ID cards?
1. Alaska	1998	Ballot Measure 8 (58%)	\$25/\$20	1 oz usable; 6 plants (3 mature, 3 immature)	No
2. Arizona	2010	Proposition 203 (50.13%)	\$150/\$75	2.5 oz usable; 0-12 plants	Yes
3. California	1996	Proposition 215 (56%)	\$66/\$33	8 oz usable; 6 mature or 12 immature plants	No
4. Colorado	2000	Ballot Amendment 20 (54%)	\$15	2 oz usable; 6 plants (3 mature, 3 immature)	No
5. Connecticut	2012	House Bill 5389 (96-51 House, 21-13 Senate)	\$100	One-month supply (exact amount to be determined)	No
6. DC	2010	Amendment Act B18-622 (13-0 vote)	\$100/\$25	2 oz dried; limits on other forms to be determined	No
7. Delaware	2011	Senate Bill 17 (27-14 House, 17-4 Senate)	\$125	6 oz usable	No
8. Hawaii	2000	Senate Bill 862 (32-18 House; 13-12 Senate)	\$25	3 oz usable; 7 plants (3 mature, 4 immature)	No
9. Illinois	2013	House Bill 1 (61-57 House; 35-21 Senate)	TBD	2.5 ounces of usable cannabis during a period of 14 days	No
10. Maine	1999	Ballot Question 2 (61%)	No fee	2.5 oz usable; 6 plants	Yes
11. Maryland	2014	House Bill 881 (125-11 House; 44-2 Senate)	TBD	30-day supply, amount to be determined	No
12. Massachusetts	2012	Ballot Question 3 (63%)	\$50	60-day supply for personal medical use	unknown
13. Michigan	2008	Proposal 1 (63%)	\$100/\$25	2.5 oz usable; 12 plants	Yes
14. Minnesota	2014	Senate Bill 2470 (46-16 Senate; 89-40 House)	\$200/\$50	30-day supply of non-smokable marijuana	No
15. Montana	2004	Initiative 148 (62%)	\$75	1 oz usable; 4 plants (mature); 12 seedlings	No
16. Nevada	2000	Ballot Question 9 (65%)	\$100	1 oz usable; 7 plants (3 mature, 4 immature)	Yes
17. New Hampshire	2013	House Bill 573 (284-66 House; 18-6 Senate)	TBD	Two ounces of usable cannabis during a 10-day period	Yes
18. New Jersey	2010	Senate Bill 119 (48-14 House; 25-13 Senate)	\$200/\$20	2 oz usable	No
19. New Mexico	2007	Senate Bill 523 (36-31 House; 32-3 Senate)	No fee	6 oz usable; 16 plants (4 mature, 12 immature)	No
20. New York	2014	Assembly Bill 6357 (117-13 Assembly; 49-10 Senate)	\$50	30-day supply non-smokable marijuana	No
21. Oregon	1998	Ballot Measure 67 (55%)	\$200/\$60	24 oz usable; 24 plants (6 mature, 18 immature)	No
22. Rhode Island	2006	Senate Bill 0710 (52-10 House; 33-1 Senate)	\$75/\$10	2.5 oz usable; 12 plants	Yes
23. Vermont	2004	Senate Bill 76 (22-7) HB 645 (82-59)	\$50	2 oz usable; 9 plants (2 mature, 7 immature)	No
24. Washington	1998	Initiative 692 (59%)	No fee	24 oz usable; 15 plants	No

Source: "23 Legal Medical Marijuana States and DC," Medical Marijuana Pros and Cons, July 31, 2014, <http://medicalmarijuana.procon.org/view.resource.php?resourceID=000881>, accessed June 2014.

Exhibit 3 Marijuana Laws by U.S. State, 2014



Source: "Pot Luck," *The Economist*, July 10, 2014, www.economist.com/blogs/graphicdetail/2014/07/daily-chart-9, accessed July 2014. © Reproduced by permission of The Economist Intelligence Unit.

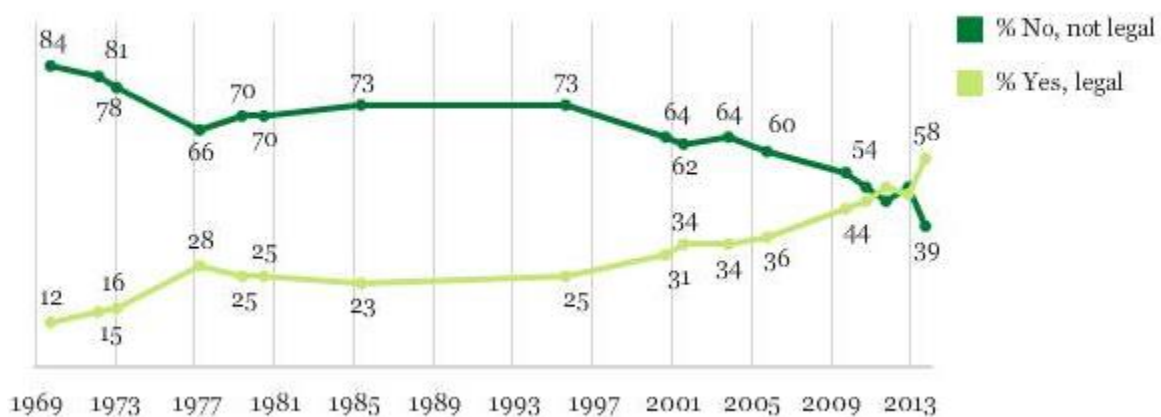
Exhibit 4 Projected Growth of Marijuana Sales by State, 2013–2014

State	2013	2014e	Estimated 2014 Retail Sales per Capita, Aged 18 and Above
California	\$1,000,000,000	\$1,100,000,000	\$37.71
Colorado	\$260,000,000	\$620,000,000	\$153.83
Washington	\$60,000,000	\$270,000,000	\$50.23
Michigan	\$59,000,000	\$63,000,000	\$8.24
Oregon	\$30,000,000	\$35,300,000	\$11.49
Arizona	\$27,000,000	\$135,000,000	\$26.95
New Mexico	\$8,500,000	\$9,800,000	\$6.21
Nevada	\$3,000,000	\$9,760,000	\$4.58
Rhode Island	\$1,305,000	\$1,805,000	\$2.16
Maine	\$1,300,000	\$1,800,000	\$1.69
New Jersey	\$500,000	\$1,250,000	\$0.18
Washington, D.C.	\$40,000	\$250,000	\$0.47
Illinois	\$0	\$2,550,000	\$0.26
Connecticut	\$0	\$2,100,000	\$0.75
Vermont	\$0	\$800,000	\$1.59
Massachusetts	\$0	\$56,000,000	\$10.56

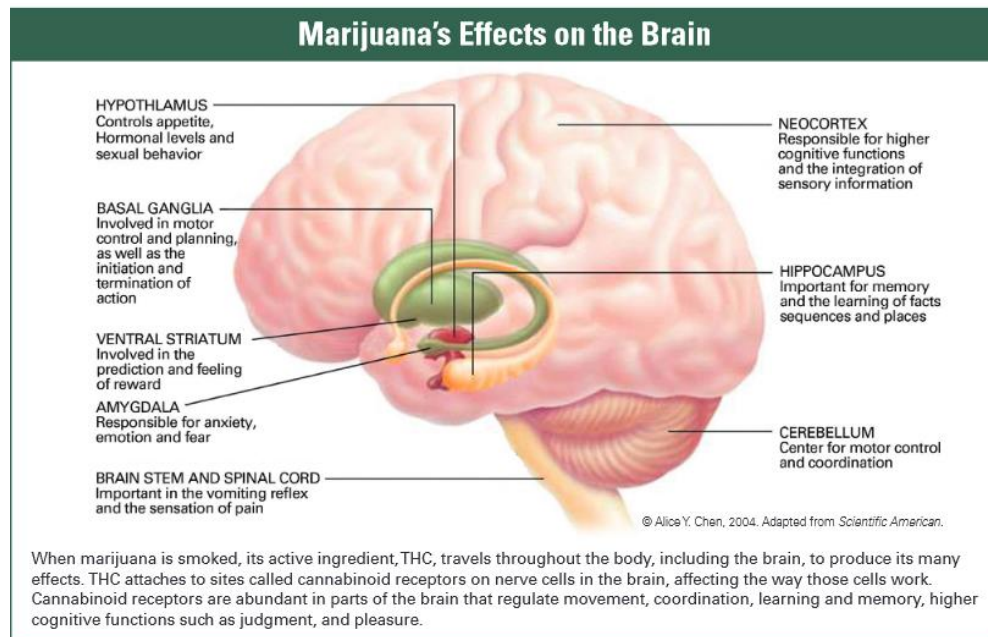
Source: Calculated from market size estimates in "The State of Legal Marijuana Markets: Executive Summary," ArcView Market Research, 2nd ed., November 2013, p. 9. Population data from U.S. Census Bureau, <http://quickfacts.census.gov/qfd/index.html>, accessed October 2014.

Exhibit 5 Changing U.S. Attitudes toward Marijuana Legalization, 1969–2013

Do you think the use of marijuana should be made legal, or not?



Source: Art Swift, "For First Time, Americans Favor Legalizing Marijuana," Gallup Politics, October 22, 2013, www.gallup.com/poll/165539/first-time-americans-favor-legalizing-marijuana.aspx, accessed August 2014. Copyright © 2013 Gallup, Inc. All rights reserved. The content is used with permission; however, Gallup retains all rights of republication.

Exhibit 6 Marijuana's Effects on the Brain

Consequences of Marijuana Abuse

Acute (present during intoxication)

- Impairs short-term memory
- Impairs attention, judgment, and other cognitive functions
- Impairs coordination and balance
- Increases heart rate
- Psychotic episodes

Persistent (lasting longer than intoxication, but may not be permanent)

- Impairs memory and learning skills
- Sleep impairment

Long-term (cumulative effects of chronic abuse)

- Can lead to addiction
- Increases risk of chronic cough, bronchitis
- Increases risk of schizophrenia in vulnerable individuals
- May increase risk of anxiety, depression, and amotivational syndrome*

*These are often reported co-occurring symptoms/disorders with chronic marijuana use. However, research has not yet determined whether marijuana is causal or just associated with these mental problems.

Source: U.S. Department of Health and Human Services, National Institute on Drug Abuse, "Marijuana," October 2002, revised July 2012, pp. 3, 5, www.drugabuse.gov/sites/default/files/mjrrs_2.pdf, accessed June 2014.

Exhibit 7 Colorado State Marijuana Tax, Licensing, and Application Fee Revenues, Transfers, and Distributions, January-June 2014

(In dollars)	January	February	March	April	May	June	Year to Date
Total marijuana tax, licensing, and application fee revenues	3,519,756	4,092,575	4,980,992	5,273,355	5,715,707	6,522,085	30,104,470
<i>License and application fee revenues</i>							
Medical marijuana	592,661	857,615	902,995	761,687	940,028	1,547,853	5,602,839
Retail marijuana	496,361	754,165	794,045	622,587	867,178	1,040,363	4,574,699
	96,300	103,450	108,950	139,100	72,850	507,490	1,028,140
<i>Tax revenues</i>							
State sales tax (2.9% rate, 100% transfer to Marijuana Cash Fund)	2,927,095	3,234,960	4,077,997	4,511,668	4,775,679	4,974,232	24,501,631
Medical marijuana	1,330,209	1,460,429	1,569,405	1,559,710	1,569,454	1,530,968	9,020,175
Retail marijuana	913,519	1,022,176	999,900	919,982	927,330	830,861	5,613,768
	416,690	438,253	569,505	639,728	642,124	700,107	3,406,407
Retail marijuana sales tax (10% rate)	1,401,568	1,434,916	1,898,685	2,217,607	2,070,577	2,473,627	11,496,980
Distributed to local governments (15% of total)	210,269	212,674	285,215	330,057	315,356	368,231	1,721,802
Transferred to Marijuana Cash Fund (85% of total)	1,191,534	1,210,786	1,613,861	1,864,829	1,787,025	2,086,648	9,754,683
Collections not yet allocated	(236)	11,455	(391)	22,722	(31,804)	18,747	20,493
Retail marijuana excise tax (15% rate)	195,318	339,615	609,907	734,351	1,135,648	969,637	3,984,476
Transferred to Public School Capital Construction Assistance Fund	195,286	339,531	609,887	732,406	1,135,718	963,551	3,976,379
Transferred to Marijuana Cash Fund	-	-	-	-	-	-	-
Collections not yet allocated	32	84	20	1,945	(70)	6,086	8,097

Source: Compiled from Colorado Department of Revenue, "Colorado Marijuana Tax Data," <http://www.colorado.gov/cs/Satellite/Revenue-Main/XRM/1251633259746>, accessed August 2014.

Note: Excludes local government taxes, licensing, and fee revenues from marijuana.

Exhibit 8 Medical and Retail Marijuana Sales Taxes Collected, by County, June 2014**Medical Marijuana Sales Tax**

County	Medical marijuana sales tax (2.9%)	Share of total receipts	County's share of Colorado medical marijuana stores	County's share of Colorado population
Adams	\$12,144	1.5%	1.0%	8.91%
Arapahoe	\$28,959	3.5%	2.1%	11.52%
Boulder	\$63,803	7.7%	6.2%	5.89%
Chaffee	\$2,939	0.4%	0.6%	0.35%
Clear Creek	\$2,747	0.3%	0.8%	0.17%
Denver	\$378,415	45.4%	41.1%	12.33%
Eagle	\$3,903	0.5%	1.7%	1.00%
El Paso	\$158,300	18.4%	19.2%	12.43%
Fremont	\$11,845	1.4%	1.2%	0.88%
Garfield	\$11,069	1.3%	2.3%	1.09%
Gilpin	\$1,269	0.2%	0.6%	0.11%
Jefferson	\$49,197	5.9%	4.5%	10.47%
La Plata	\$16,104	1.9%	1.4%	1.01%
Larimer	\$32,545	3.9%	3.5%	6.00%
Montezuma	\$5,352	0.6%	1.0%	0.49%
Pitkin	\$2,363	0.3%	1.4%	0.33%
Pueblo	\$8,823	1.1%	3.5%	3.06%
San Miguel	\$2,035	0.2%	0.8%	0.15%
Summit	\$5,031	0.6%	1.2%	0.54%
Weld	\$13,084	1.6%	1.0%	5.12%
Remainder of State*	\$20,933	2.5%	5.6%	18.06%
Totals	\$830,861	100.00%	100.0%	100.00%

Source: Calculated from Colorado Department of Revenue, "State of Colorado Medical Marijuana State Sales Tax by County, June 2014 Sales Reported in July," www.colorado.gov/cs/Satellite/Revenue-Main/XRM/1251633259746, accessed August 2014. Colorado population data from U.S. Census Bureau, <http://quickfacts.census.gov/qfd/states/08000.html>, accessed August 2014. Store location by county data calculated from Colorado Department of Revenue, Marijuana Enforcement Division, "MED Licensed Medical Marijuana Centers," September 2, 2014, www.colorado.gov/cs/Satellite/Rev-MMJ/CBON/1251592985115, accessed September 2014.

Note: *Remainder of state consists of Alamosa, Archuleta, Costilla, Grand, Gunnison, Lake, Mesa, Moffat, Montrose, Ouray, Park, Saguache, Sedgwick, and Teller counties.

515-009

Marketing Marijuana in Colorado

Exhibit 8 (continued)

Retail Marijuana Cash Fund Sales Tax					
County	Retail marijuana sales tax (2.9%)	Retail marijuana additional sales tax (10%)	Share of total receipts	County's share of Colorado retail stores	County's share of Colorado population
Boulder	\$77,019	\$226,390	10.9%	9.8%	5.89%
Clear Creek	\$11,442	\$33,740	1.6%	4.0%	0.17%
Denver	\$366,377	\$1,064,140	51.3%	51.4%	12.33%
Garfield	11,409	33,354	1.6%	2.9%	1.09%
Gilpin	\$5,234	\$13,132	1.3%	1.7%	0.11%
Jefferson	\$40,723	\$122,852	5.9%	5.2%	10.47%
Pitkin	\$9,296	\$27,410	1.3%	1.7%	0.33%
Pueblo	\$50,988	\$125,155	6.3%	3.5%	3.06%
San Miguel	\$9,295	\$42,728	1.9%	2.3%	0.15%
Summit	\$19,959	\$58,323	2.8%	2.9%	0.54%
Weld	\$22,550	\$67,600	3.2%	2.3%	5.12%
Remainder of State**	\$75,816	\$271,825	12.5%	12.1%	
Totals	\$700,107	\$2,086,648	100.0%	100.0%	100.00%

Source: Calculated from Colorado Department of Revenue, "State of Colorado Retail Marijuana Tax Generated by County, June 2014 Sales Reported in July," www.colorado.gov/cs/Satellite/Revenue-Main/XRM/1251633259746, accessed August 2014. Colorado population data from U.S. Census Bureau, <http://quickfacts.census.gov/qfd/states/08000.html>, accessed July 2014. Store location by county from Colorado Pot Guide, "Where to Buy Marijuana in Colorado: Retail Store Guide," September 3, 2014, <https://www.coloradopotguide.com/where-to-buy-marijuana/>, accessed September 2014.

Note: **Remainder of state consists of Adams, Gunnison, Lake, Larimer, Ouray, Park, and Routt counties.

Exhibit 9 Receipt Showing Retail Marijuana Taxes, September 2014

Out of State
1

Receipt / Tax Invoice

Invoice #: S214570
Sep 8, 2014 14:22:29
Served by: Anna Leigh on Station 2

1 Sweet Grass 10mg Cookies / Snickerdoodle	@ 4.00	4.00
1 Patch - CBD 10mg	@ 20.00	20.00
Subtotal		\$19.69
Tax (6 taxes)		\$4.31
City of Boulder		\$0.70
RTD		\$0.22
Boulder County		\$0.16
CO State		\$0.57
CO State RMB		\$1.97
City of Boulder RMB		\$0.69
TOTAL		\$24.00
Cash		\$40.00
Change		(\$16.00)
TO PAY		\$0.00

CUSTOMER COPY

Source: Casewriters.

Exhibit 10 Marijuana Dispensary Collateral Attached to Magazine



Source: Casewriters.

Exhibit 11 Boulder Colorado Marijuana Dispensary Storefronts

Native Roots: Basement Location



Native Roots: Storefront Signage



Native Roots: Front Door



Native Roots: Roadway Signage



Fresh Baked Dispensary



Source: Casewriters.

Exhibit 12 Retail Marijuana Store Licensing Fees, January–July 2014

Plant Count	Initial and Annual Renewal License Fees
Up to 3,600	\$6,500: \$3,750 marijuana store + \$2,750 cultivation facility
Up to 6,000	\$11,500: \$8,750 marijuana store + \$2,750 cultivation facility
Up to 10,200	\$16,750: \$14,000 marijuana store + \$2,750 cultivation facility
Manufacturers of edibles and THC-infused products	\$2,750

Source: Compiled from Colorado Department of Revenue, “Medical Marijuana Business Converting to or Adding Retail Marijuana Establishment,” July 2014, www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadname1=Content-Disposition&blobheadname2=Content-Type&blobheadvalue1=inline%3B+filename%3D%22MED+Medical+Conversion+to+Retail+Marijuana+Business+Fees%2C+July+1%2C+2014+.pdf%22&blobheadvalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1252007504209&ssbinary=true, accessed August 2014.

Exhibit 13 Colorado Marijuana Retailers Licensed to Open on January 1, 2014

Store Name	City	Store Name	City
High Country Healing	Alma	LoDo Wellness	Denver
Alternative Medical Supplies	Black Hawk	Medicine Man Denver	Denver
Alpenglow Botanicals	Breckenridge	Mile High Medical Cannabis	Denver
Breckenridge Cannabis Club	Breckenridge	The Shelter	Denver
Organix	Breckenridge	Milagro Wellness Healing	Dumont
Annie's Tobacco Emporium	Central City	Bud Med/Patient's Choice	Edgewater
Green Grass Alternative Medicine	Central City	Northern Lights Cannabis Co.	Edgewater
3D Cannabis Center	Denver	Serene Wellness	Empire
CitiMed	Denver	Bioenergetic Healing Center	Frisco
Dank Colorado	Denver	Cloud 9 Caregivers	Garden City
Denco	Denver	Evergreen Herbal Remedies	Idaho Springs
Denver Kush Club	Denver	The Kine Mine	Idaho Springs
Evergreen Apothecary	Denver	BotanaCare	Northglenn
The Clinic Colorado	Denver	Marisol Therapeutics	Pueblo
The Green Solution (2 locations)	Denver	The Greener Side	Pueblo
The Grove	Denver	High Country Healing	Silverthorne
The Haven	Denver	Alpine Wellness	Telluride
The Healing House Denver	Denver	Telluride Bud Company	Telluride
The Health Center	Denver	Telluride Green Room	Telluride
Kindman	Denver		

Source: Compiled from Laura Keeney, “List of Recreational Marijuana Shops in Colorado,” *The Cannabist*, January 3, 2014, www.thecannabist.co/2014/01/03/list-recreational-marijuana-shops-colorado/2033; Tom McGhee and John Ingold, “A List of Colorado Recreational Marijuana Stores Open on Jan. 1,” *Denver Post*, December 27, 2013, www.denverpost.com/news/ci_24805230/list-colorado-recreational-marijuana-stores-open-jan-1, both accessed July 2014.

Exhibit 14 Colorado Estimated Marijuana Consumption, June 2014

Frequency of Monthly Use	Share of Users	Share of Demand	Usage Amounts ('000 grams)		
			Low	Middle	High
Less than once	29.2%	0.3%	240	361	721
1–5 times	24.5%	3.3%	2,625	4,039	5,756
6–10 times	7.5%	2.7%	2,138	3,289	4,686
11–15 times	3.2%	1.9%	1,476	2,271	3,237
16–20 times	5.8%	4.7%	3,728	5,735	8,172
21–25 times	8.1%	20.2%	19,888	24,478	29,067
26–31 times	21.8%	66.9%	66,007	81,240	96,472
Total	100.0%	100.0%	96,103	121,412	148,112

Source: Adapted from Miles K. Light, Adam Orens, Brian Lewandowski, and Tock Pickton, “Market Size and Demand for Marijuana in Colorado,” The Marijuana Policy Group report prepared and published by the Colorado Department of Revenue, July 9, 2014, p. 2, <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadname1=Content-Disposition&blobheadname2=Content-Type&blobheadvalue1=inline;+filename=%22Market+Size+and+Demand+Study,+July+9,+2014.pdf%22&blobheadvalue2=application/pdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1252008574534&ssbinary=true>, accessed August 2014.

Note: One million grams equals one metric ton; a single marijuana cigarette assumes one half-gram of marijuana content.

Exhibit 15 Tourist Demand for Recreational Marijuana in Colorado Ski Towns

County Type	County Name	County Communities	Resident Population	Percentage Increase in Sales
Tourist Counties	Summit	Breckenridge, Keystone, Arapahoe Basin, Copper Mountain	28,970	162%
	San Miguel	Telluride	7,910	174%
	Clear Creek	Loveland	9,005	108%
	Gilpin	None/casino area	5,562	141%
Urban Counties	Denver	None	649,481	19%
	Jefferson	None	549,643	15%

Source: Miles K. Light, Adam Orens, Brian Lewandowski, and Todd Pickton, “Market Size and Demand for Marijuana in Colorado,” Colorado Department of Revenue, March 25, 2014, Table 12, p. 22, www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadname1=Content-Disposition&blobheadname2=Content-Type&blobheadvalue1=inline%3B+filename%3D%22Market+Size+and+Demand+Study%2C+July+9%2C+2014.pdf%22&blobheadvalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1252008574534&ssbinary=true, accessed July 2014.

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