Denver Office of DRUGSTRATEGY

DENVER THE MILE HIGH CITY

Regulating Substances with a Public Health Approach: Lessons Learned from Alcohol Regulation

Submitted by Vanessa M. Fenley, Denver Office of Drug Strategy

The voters of Colorado approved Amendment 64 on November 6, 2012; Governor Hickenlooper signed a declaration of the vote on December 10, 2012, effectively incorporating Amendment 64 into the Colorado constitution. Now, the Colorado Department of Revenue and local municipalities are looking towards identifying appropriate regulations for managing the growing, manufacturing, and distribution of recreational marijuana.

No other state (other than Washington state where voters approved Initiative 502, a ballot measure comparable to Amendment 64, also on November 6, 2012)and no other country has proposed marijuana laws equivalent to those adopted by Colorado. Although little is known about how marijuana legalization may impact the state of Colorado and its residents (given its unprecedented nature), those guiding the law's implementation can rely on research around the regulations of other legal substances to establish marijuana regulations that may mitigate any negative impact of legalization, primarily the consumption of marijuana by youth under the age of 21.

Although the amendment's campaign was titled "The Campaign to Regulate Marijuana Like Alcohol," and some alcohol regulations may be appropriately applied to marijuana, it is not enough to simply duplicate alcohol's current regulatory structure for marijuana. A primary concern with an approach that tries to perfectly parallel alcohol policy is that alcohol is neither well-regulated nor well-taxed in Colorado. For instance, the beer tax for the state is fourth lowest in the nation and has not been increased since 1976[1]. A general lack of attention among policymakers and the community as well as active lobbying by industry players against the most effective regulations according to public health practices has resulted in correspondingly high rates of underage drinking. Nationwide, around 26% of individuals ages 12 – 20 have used alcohol in the past month; in Colorado, almost 33% of our underage youth have consumed alcohol in the past month[2]. In addition, almost one-quarter of Denver youth started drinking at age 12 or younger[3]. The negative outcomes associated with loose and outdated alcohol regulation should serve as a charge to local and state policymakers to develop marijuana regulations that will effectively deter youth from using marijuana.

A variety of alcohol policies exist, but only some are appropriate for consideration given the similarities and differences between marijuana and alcohol. For instance, keg registration is considered a best practice for alcohol regulation, but does not serve as a policy comparable to any considered for marijuana regulation. Only those with applicability for marijuana regulation are here discussed.

Pricing

Controlling price through taxes and limitations on promotions is widely cited as one of the most effective strategies to reduce rates of alcohol use and abuse. The degree to which price impacts consumption (particularly among underage

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[1] Alcohol Justice. (2011.) Retrieved from http://alcoholjustice.org/campaigns/charge-for-harm/450-neglected-and-outdated-state-beer-taxes.html

[2] National Survey on Drug Use and Health. (November 20, 2012.) State Estimates of Underage Alcohol Use and Self-Purchase of Alcohol: 2008 to 2010. Substance Abuse and Mental Health Services Administration. Retrieved from http://www.samhsa.gov/data/2k12/NSDUH111/SR111StateEstUnderageAlc2012.htm.

[3] Healthy Kids Colorado Survey. (2011). Data available from healthyschools.dpsk12.org.

drinkers or those who drink in excess) is understood with less precision. A recent meta-analysis of 112 studies indicates price elasticities of -0.46 for beer, -0.69 for wine, and -0.80 for distilled spirits[4]. Therefore, a 1% increase in price would result in a .46% reduction in consumption in beer, .69% reduction in consumption of wine, and .80% reduction in consumption for spirits.

The pricing policies with greatest evidence of positive impact are taxation policies. Alcohol excise taxes (at both the federal and state levels) have declined in real dollars (i.e., when controlling for inflation)[5]. In Colorado, the beer tax has not been raised since 1976[6]. This corresponds to a 73% decrease in real value of the excise tax. Federally, excise tax rates on alcohol have not increased since 1991[7], and national associations, such as the Brewers Association, are attempting to further dismantle current excise taxes through federal legislation.

Several studies have demonstrated a correlation between alcohol price increases and a decrease in prevalence of sexually transmitted infections, an increase in high school graduation and post-high school education attainment, and decreases in alcohol-related disease[8]. Although alcohol and marijuana affect functioning differently (and individual users will differently experience each drug), longitudinal research has also demonstrated negative life outcomes for those under the age of 21 who use marijuana. Taking other confounding variables into account, "increasing cannabis use [is] associated with: declining educational achievement; reduced income at 25; increased welfare dependence; reduced relationship satisfaction; and reduced life satisfaction"[9]. In addition, around 20% of drug-related emergency department visits are attributed to marijuana (compared to 40% for alcohol, 18% for cocaine, and 8% for heroin)[10]. Establishing policies that do not encourage high levels of marijuana use (including establishing appropriate taxation levels) may have comparable impacts to the associated consequences of marijuana use.

The specific figure for an optimal excise tax is relatively unknown. A series of research studies in the late 1980's to mid-1990's attempted to establish the most appropriate figure to off-set the public health costs of drinking, but scholars' estimates ranged from an excise tax of 51% of the net price of the beverage to 106% of the net price[11]. The public health community has had more success in establishing appropriate taxes on tobacco and cigarettes than on alcohol. Currently, state excise taxes on cigarettes are about $.84 per 20-pack[12]; as a point of comparison the state excise tax for beer is $.08 per gallon. To avoid introducing another drug to the market with low prices that may encourage higher levels of consumption, an excise tax rate closer to that of tobacco (although Colorado's tobacco excise tax is still one of the lower rates in the country) should be established. Given these excise taxes are largely a state matter, municipalities should consider other opportunities to better control prices of marijuana through local sales tax rates or other mechanisms.

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[4] Wagenaar, A.C., Tobler, A.L., Komro, K.A. (2009). Effects of beverage alcohol price and tax levels on drinking: A meta-analysis of 1003 estimates from 112 studies. *Addiction 104*(2), 179-190.

[5] Xu, X. & Chaloupka, F.J. (2011). The effects of prices on alcohol use and its consequences. *Alcohol Research & Health, 34*(2), 236-245.

[6] Alcohol Justice. (2011.) Neglected and outdated state beer taxes. Retrieved from http://alcoholjustice.org/campaigns/charge-for-harm/450-neglected-and-outdated-state-beer-taxes.html

[7] Xu, X. & Chaloupka, F.J. (2011). The effects of prices on alcohol use and its consequences. *Alcohol Research & Health, 34*(2), 236-245.

[8] Ibid.

[9] Fergusson, D.M. & Boden, J.M. (2008). Cannabis use and later life outcomes. *Addiction, 103*, 969-976, quote taken from p.974.

[10] Proceedings of the Denver Epidemiology Work Group. (2012). Denver Office of Drug Strategy. Retrieved from http://www.denvergov.org/Portals/692/documents/DEWG%20Proceedings_July2012.pdf

[11] Xu, X. & Chaloupka, F.J. (2011). The effects of prices on alcohol use and its consequences. *Alcohol Research & Health, 34*(2), 236-245.

[12] Colorado Department of Revenue (2013). Division of Taxation. Retrieved from http://www.colorado.gov/cs/Satellite/Revenue/REVX/1177017542076

Accessibility

A primary factor which contributes to the likelihood that a substance will be used and abused is the ease of accessing the drug. Some have argued that regulating marijuana and selling it in stores which are required to check for identification before completing a sale makes the drug less accessible to youth. However, teens most frequently access drugs through social channels, and the more legal opportunities to purchase the drug in the community results in greater opportunities for youth to obtain those drugs through those social networks. To illustrate, around 7% of Denver students who drink purchase their alcohol directly from a retail establishment; a full 50% of students report having someone give it to them or taking it from a store or a home[13]. Similarly, 40% of students who used marijuana report having it given to them; an additional 10% of students reporting getting marijuana from someone with a medical marijuana card[14].

To reduce the social accessibility of alcohol, more attention has been given in recent years to implementing social host ordinances. These ordinances hold individuals accountable for establishing an environment permitting minors to use alcohol (regardless of whether the charged individual provided the alcohol or whether anyone was injured as a result of the alcohol consumption). Those states which have adopted social host civil liability laws record lower rates of binge drinking and of drinking and driving[15]. While ordinances have focused specifically on underage drinking parties, these may still serve as an option for discouraging adults from creating an environment that is permissive of any youth substance use, regardless of drug.

While youth most frequently obtain their drugs of choice from other individuals, often family or friends, other avenues exist that can make accessing drugs easier. For instance, cigarette vending machines have been more heavily restricted and even banned in some locations. In addition, home delivery services for alcohol are currently permitted in Colorado. Ensuring that any marijuana purchased is done so only via a trained individual and not a machine, over the phone, or online will aid in establishing expectations for adult-only consumption of marijuana.

It is expected that the state will impose similar penalties on marijuana retail establishments as alcohol retail establishments regarding sales to minors. However, loopholes exist in the implementation of those penalties which diminish the impact of the penalty as well as the perceived importance of selling only to those of age. For instance, if an alcohol retail establishment's license is suspended, in some cases establishments split up those suspensions so that their doors are shut on days of the week in which sales are already low. Ensuring that penalties are implemented in a way to fully discipline those establishments who ignore laws around sales to minors is an important enforcement component of a regulatory structure. In addition, ensuring resources are available to monitor these establishments and conduct compliance checks regularly (as well as to respond to tips from the community regarding retail outlets selling to minors) is critical. While the research is limited, what studies have been conducted indicate that compliance checks are a promising way to reduce alcohol-related issues among youth[16] and establishing rigorous schedules for compliance checks on marijuana outlets is favored.

Outlet Density

Although youth typically access drugs through social channels, the density of retail outlets impacts usage rates as well as other social indicators. In the case of alcohol outlet density, by having more alcohol available within a particular

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[13] Healthy Kids Colorado Survey. (2011). Data available from healthyschools.dpsk12.org.

[14] Ibid.

[15] Wagoner, K. G., Fancisco, V. T., Sparks, M. Wyrick, D., Nichols, T., & Wolfson, M. (2012). A review of social host policies focused on underage drinking parties: Suggestions for future research. *Journal of Drug Education, 42*(1), 99-117.

[16] Wagenaar, A.C., Lenk, K.M., & Toomey, T.L. (2005). Policies to reduce underage drinking: A review of the Recent Literature. *Recent Developments in Alcoholism,* Galanter, M. (ed.), p.275-297.

geographical region, more alcohol is available to adults to provide to underage youth[17]. A review of the literature indicates that areas of higher alcohol outlet density are associated with increased alcohol consumption, higher rates of violent crimes, and higher rates of interpersonal violence[18]. The outcomes of using marijuana are different from alcohol, and it is undetermined how issues of marijuana outlet density may impact use rates or other social indicators. Still, given the greater the volume of a drug available to any in the community, the greater the availability of that drug to youth accessing it through social channels, establishing guidelines for gauging and restricting marijuana outlet density should be considered in the initial development of marijuana regulations.

Currently, state statutes exist to try to prevent areas from developing an undue concentration of alcohol outlets. As written, these regulations do not clearly or prescisely identify what is an appropriate concentration of outlets, in what geographic area, and how this is proactively managed (including whether state or local officials actively monitor concentration of outlets in particular areas). Establishing clear guidelines to prevent the undue concentration of marijuana outlets and incorporating that factor into all licensing hearings will assist in limiting the prevalence of marijuana in neighborhoods and corresponding social access for youth.

Marketing and Advertising

Unlike some other commodities, alcohol advertising appears to have a cumulative effect in that "youth reporting greater amounts of exposure to alcohol advertising over the long term drank more than youth who saw fewer ads"[19]. In alignment with these findings, cities are examining options for banning alcohol advertising (specifically in certain circumstances, such as on publicly-owned and publicly-controlled property). In addition, to align with the city-wide ban on medical marijuana advertising, similar restrictions on marijuana advertising should be considered.

Of particular concern for public health advocates is the potential for a major marijuana industry to develop in the same fashion (or even by the same companies) as big tobacco and big alcohol. Tobacco companies are documented to have intentionally advertised to youth consumers (for instance, through well-known cartoon characters like Joe Camel) and to alter the ingredients in cigarettes to encourage greater consumption (for example, by making the cigarettes burn faster or by prohibiting the cigarettes from being extinguished and relit). In addition, alcohol companies have saturated communities of color with alcohol advertising to encourage greater consumption among particular populations. For instance, research has found that neighborhoods with primarily Latino residents are exposed to five times more alcohol advertising than those in which residents are predominantly white[20]. In addition, alcohol advertisements are more concentrated in magazines that are geared toward an African-American audience (such as *Ebony*)[21].

Tobacco companies have also historically created products that would make smoking more appealing to a younger audience (such as candy cigarettes). In recent years, alcohol companies have released sweetened, fruity, high-alcohol-content beverages (called alco-pops) that mimic sodas, energy drinks, and other sweetened beverages in look and taste. Communities have rallied against such products specifically because these products are often most appealing to the

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[17] Reboussin, B.A., Song, E.Y., & Wolfson, M. (2011). The impact of alcohol outlet density on the geographic clustering of underage drinking behaviors within census tracts. *Alcoholism: clinical and Experimental Research, 35*(8), 1541-1549.

[18] Campbell, C.A., Hahn, R.A., Elder, R., Brewer, R., Chattopadhyay, S., Fielding, J., Naimi, T.S., Toomey, T., Lawrence, B., & Middleton, J.C. (2009). The effectiveness of limiting alcohol outlet density as a means of reducing excessive alcohol consumption and alcohol-related harms. *American Journal of Preventative Medicine, 37*(6), 556-569.

[19] Snyder, L.B., Fleming Milici, F., Slater, M., Sun, H., & Strizhakova, Y. (2006). Effects of alcohol advertising exposure on drinking among youth. *Archives of Pediatrics and Adolescent Medicine, 160,* 18-24.

[20] Alaniz, M.L. (1998). Alcohol availability and targeted advertising in racial/ethnic minority communities. *Alcohol Health & Research World, 22*, 286-289.

[21] Cui, G. (2000). Advertising alcoholic beverages in African-American and women's magazines: Implications for health communication. Howard Journal of Communications, *11*(4), 279-293.

youngest drinkers (specifically those under the age of 21). Edibles containing marijuana are permitted for consumption, production, sale, and purchase in Amendment 64's language. Ensuring they are packaged in a way that is not additionally appealing to youth and that is easily identifiable by parents and other adults (rather than mimicking the packaging of candy or edible products without marijuana) is recommended.

While many comparisons drawn between marijuana and alcohol compare the marijuana industry to Colorado's microbrewery community (in which advertising is generally low and few products have explicit appeal for youth in the same way as alco-pops), nothing prohibits the development of a powerful and profit-driven industry to emerge with marijuana. If this happens, our ability as a community to alter regulations to protect our well-being will be diminished as the industry's interests become the status quo.

Other Considerations

Several other policies with the potential to have a positive public health impact are worthy of consideration when establishing regulations for recreational marijuana consumption and sales. First, many buildings and areas have adopted smoke-free policies, particularly in public, enclosed spaces. If policies refer specifically to tobacco smoke, smoking marijuana may not be explicitly prohibited. This is particularly problematic in spaces such as apartment buildings in which one resident's use can impact the air quality of others. Efforts should be made to incorporate all smoked products and drugs into existing smoke-free policies.

Alcohol is regulated in part based on the product's proportion of alcohol content, or proof. Given Amendment 64 was branded as "The Campaign to Regulate Marijuana Like Alcohol," it is worth examining opportunities for differently licensing and regulating marijuana with different strengths of THC, comparable to different regulations for 3.2 beer as compared to "full-strength" beer or liquor. Even in the Netherlands, a country touted as having relatively liberal cannabis laws, marijuana containing greater than 15% THC is classified as a hard drug, as compared to lesser strength marijuana classified, regulated, and enforced as a soft drug[22].

Restricting sales to only Colorado residents is one approach to limiting potential negative effects of marijuana use by those visiting from out of state. There are more marijuana-related emergency department visits than any other drug excluding alcohol[23], and many of these visits are likely attributed to naïve users who are unfamiliar with the effects of marijuana. While high potency THC marijuana has always existed, indoor grows better enable growers to control for conditions and create strains that more consistently produce high THC content marijuana. Overall, marijuana grown in the state of Colorado is considered some of the best (i.e., strongest) in the nation and may result in adverse consequences for individuals using the drug, particularly if they are unaccustomed to using strong marijuana, as in the case of individuals who may be visiting from other states with less potent (or much higher prices for the potent) marijuana.

Consideration for effects on alcohol consumption

It is expected that under new state law, retail prices for marijuana will decline and consumption will increase, although the degree to which is unknown[24]. Also unknown is the effect on rates of alcohol consumption. While rates of morbidity indicators for marijuana are high, alcohol consistently ranks first in virtually every measure of morbidity and mortality.

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[22] Soft Drugs. (2012). Government of the Netherlands. Retrieved from http://www.government.nl/issues/alcohol-and-drugs/drugs/soft-drug-policy

[23] Proceedings of the Denver Epidemiology Work Group. (2012). Denver Office of Drug Strategy. Retrieved from http://www.denvergov.org/Portals/692/documents/DEWG%20Proceedings_July2012.pdf

[24] Caulkins, J.P., Kilmer, B., MacCoun, R.J., Pacula, R.L., & Reuter, P.H. (2012). Design considerations for legalizing cannabis: Lessons inspired by analysis of California's Proposition 19. *Addiction, 107*(5), 865-871.

Whether the two drugs will be used as complements to one another, or whether we will see a substitute effect whereby some will choose to use marijuana rather than alcohol now that both are permitted for adult consumption affects use rates for both drugs.

Another unknown effect of marijuana legalization may be the effects on alcohol outlet density. While the effects of high alcohol outlet density (such as higher rates of violent crime and of interpersonal violence) are well-documented, the effects of marijuana outlet density are unknown. Whether the presence of marijuana outlets (particularly in areas where they may be more heavily concentrated) affects the density of alcohol outlets and has any effects on other social indicators is yet to be discovered.

At the adolescent level, Denver youth who consume alcohol tend to be those who also consume marijuana. For example, 51% of Denver students who drank alcohol in the past 30 days also used marijuana in that time frame, compared to only 8% of non-drinkers[25]. For individuals under the age of 21, ensuring regulations are established for both alcohol and marijuana that discourage use will be beneficial for their and the community's health and well-being.

[25] Healthy Kids Colorado Survey. (2011). Data available from healthyschools.dpsk12.org.

Request: We would like any updated information your office has compiled on marijuana use by young people in Denver and the impact this has had on their lives (ie., health, school participation, emergency room visits,etc).

Note: Prepared by Candace Cadena, Evaluation Coordinator, Denver Office of Drug Strategy, Denver Human Services on March 11, 2013. The following prevalence and indicator data are mostly what I work with in regard to youth. Unless otherwise cited, the information is drawn from the Denver Public Schools 2011 Healthy Kids Colorado Survey (local), the statewide 2011 HKCS (state), and the CDC's Youth Risk Behavior Survey (national). The "impact" data you requested would take more time to dig up. Although we look at various indicators (e.g., ED visits, hospital discharges, treatment data) in the Denver Epidemiology Work Group, we do not have the data on hand for youth specifically for most of those variables. Most of that analysis is possible, but it would take more time to request and analyze.

Prevalence

- Behind alcohol, marijuana continues to be the most used substance among Denver youth.
- In 2011, almost 1/3 of Denver youth grades 6-12 reported having used marijuana in their lifetime.
- Among high school students, the state and national lifetime marijuana use rates were even at 40%, while Denver's towered at 47%. Denver's lifetime use rate exceeds state and national levels at every grade 9-12 (no middle school data available at the state or national level).
- We see a similar pattern among high school youth reporting past 30-day use of marijuana, with Denver's rate of 28% higher than state and national rates of 22% and 23%, respectively.
- We do not have reliable trend data yet to look at youth marijuana use trends over time in Denver, though with support and funding, Denver Public Schools plans continue to administer the HKCS every other year to gather this information. The first district-wide effort in 2011 collected and analyzed over 16,000 student surveys from Denver.

Contributing Factors

Ease of Access. Students who used marijuana in the last 30 days were much more likely to report easy access (88%) compared to abstainers (35%) according to the 2011 DPS HKCS.

Percent of Denver students by grade in 2011 who reported "easy" or "sort of easy" access to marijuana

Grade	6th	7th	8th	9th	10th	11th	12th
Percent	12	23	39	53	63	69	76

When DPS students were asked how they obtained the marijuana they usually obtained the marijuana they used in the past 30 days, the most common answer was "Someone gave it to me" (40%).

About half of high school seniors report knowing someone with a medical marijuana license/card. Among all students, those who had used marijuana in the past 30 days were much more likely to know someone with a medical marijuana license/card than those who had not (80% vs. 36%).

Parental Attitudes Favorable to Use. Students who used marijuana were much more likely to report that their parents did not think it was wrong, or they thought it was only a little bit wrong (31% vs. 4%).

Perception of Risk. Students who used marijuana in the past 30 days were much more likely to perceive low risk to regular marijuana use (75% vs. 32% among abstainers).

Percent of Denver students by grade in 2011 who perceive little to no risk of regular marijuana use

Grade	6th	7th	8th	9th	10th	11th	12th
Percent	27	31	37	43	48	51	51

The Monitoring the Future Study (Institute for Social Research, University of Michigan), which surveys students in 8th, 10th, and 12th grades across the country, reports that nationally the percentage of high school seniors who thought there was a great risk of harm from regular marijuana use decreased from 57.9% in 2006 to 44.1% in 2012—the lowest level since 1979. For reference, the local HKCS (2011) showed that only 19% of DPS high school seniors perceived great risk to using marijuana regularly. [1]

The principal investigator of the MTF study noted that "one important variable that has been a lead indicator of use—namely the amount of risk teenagers perceived to be associated with marijuana use—continued its sharp decline in 2012 among teens, which would suggest further increases in use in the future."[2] Dr. Robert DuPont, the first Director of the National Institute on Drug Abuse (NIDA), suggests that "the recent legalization of marijuana use . . . in Colorado and Washington State, and the legalization of 'medical' marijuana in 18 states and the District of Columbia will lead to further decreases in youth perception of risk from harm"[3]

Treatment Admissions (statewide)

Statewide, excluding alcohol, marijuana is by far the most reported primary drug of choice for adolescents entering substance abuse treatment for the first time.[4]

Percent of treatment admissions aged 17 & Under from 2008 through first half of 2011

Time Period	1H2008	2H2008	1H2009	2H2009	1H2010	2H2010	1H2011
% Marijuana	33.4	36.3	35.6	37.2	37.4	37.2	40.4
% Other Opioids	0.9	1.4	1.6	3.5	3.6	3.5	5.6
% Heroin	0.0	1.1	1.7	0.9	2.2	1.8	3.6
% Meth	1.0	2.1	1.1	2.0	1.7	1.9	1.8
% Cocaine	2.8	2.4	1.8	1.8	1.6	1.8	1.6

[1] For reference, the local HKCS survey (2011) showed that **32% of Denver Public School seniors** had used marijuana in the past 30 days. The data reported here from the Monitoring the Future study put past 30-day marijuana use of high school seniors at **23% nationally** in 2012. Another national survey, the Youth Risk Behavior Survey (on which the HKCS is based), put this figure at **28% nationally** in 2011.

[2] http://www.monitoringthefuture.org/pressreleases/12drugpr.pdf

[3] Institute for Behavioral Health, University of Michigan, 2012, as cited in CESAR Fax Vol. 22, Issue 2, Jan. 14, 2013.

[4] From the Drug/Alcohol Coordinated Data System (DACODS), prepared by Kristen Dixion, Division of Behavioral Health (DBH), Colorado Department of Human Services