



# **Summary of Scientific Evidence from the Tobacco Literature, Applied to the Sale of Retail Marijuana Products**

Oregon Public Health Division

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# Acknowledgements

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The OHA Retail Marijuana Scientific Advisory Committee provides scientific input to inform public health recommendations related to retail marijuana in Oregon. The committee examines current data and makes recommendations regarding:

- Minimizing adverse health effects of retail marijuana use, for example recommending the maximum amount of THC in a single serving of edible product, packaging and labeling of marijuana products, and how to reduce negative health effects in vulnerable populations
- Impacts of time, place and manner of retail sale of potentially addictive substances

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## Introduction

In 2014, Oregon voters passed Measure 91, a ballot initiative legalizing the possession of marijuana for recreational use, and to regulate the cultivation, processing, marketing, sale, distribution, taxation and use of marijuana and its derivative products. House Bill (HB) 3400, passed by the Oregon Legislature and signed into law by Governor Kate Brown in June 2015, translates the intent of Measure 91 into Oregon law, setting up the state's legal retail marijuana market.

The Oregon Liquor Control Commission (OLCC) has begun a process to establish the rules and systems that regulate the retail sale of marijuana. The OLCC must consider the statutory mandate, per HB 3400<sup>1</sup>, to prohibit activities that present a "significant risk to public health and safety" when promulgating their rules.

## Approach

This white paper will address marketing, labeling and packaging administrative rule recommendations based on the scientific evidence from other disciplines that can be applied to the retail sale of marijuana products. It takes into consideration that many policy issues faced in marijuana regulation are analogous to those faced in tobacco prevention. The existing tobacco literature establishes that the characteristics of products, including packaging, portion sizes, design, health claims and labeling, strongly influence choices and consumption, particularly among youth.

By enacting scientifically based recommendations, Oregon can set an evidence-based standard for marijuana regulation. These recommendations, if implemented appropriately, are expected to reduce the risk of marijuana initiation and poisonings among children.

## Purpose

The purpose of this paper is to present the strongest prevention options based on the scientific literature and evidence-based experiences from tobacco prevention. This paper does not address the policy considerations, legal restrictions and other implementation challenges that may exist for any of these strategies. For example, the evidence is clear that large, picture warnings are the most effective in conveying the risks of tobacco use to consumers. However, this paper does not identify which messages would be factual and appropriately convey the health risks of marijuana to consumers.

The following recommendations have been identified and determined to be effective based on the tobacco prevention and health behavior science.

**MARKETING RECOMMENDATIONS:**

1. Follow the examples of policies laid out in the national Tobacco Master Settlement Agreement and the Family Smoking Protection Act by prohibiting:
  - Use of cartoon characters;
  - Transit advertising;
  - Billboards and other outdoor advertising (e.g., outdoor stadium signs);
  - Product placement in entertainment media;
  - Branded merchandise;
  - Free product samples;
  - Brand name sponsorships;
  - Gifts to youth in exchange for proofs of purchase.
2. Prohibit magazine advertising using the FDA’s proposed guideline for any publication read by an established threshold of minors (younger than 18 years); or allow only black-on-white text without images or color when minors make up more than 15 percent of the readership.
3. Prohibit outdoor/out-o- home, television and radio advertising.
4. Prohibit all pop-up ads online, mobile ads or apps persons under 21 might download or see.

**PRICE DISCOUNT RECOMMENDATION:**

1. Prohibit coupons, free samples and buy-one get-one discounts.

**HEALTH COMMUNICATIONS/MEDIA CAMPAIGN RECOMMENDATIONS:**

1. Implement broad-based education of the public as a whole, through which youth receive public health messages that are aimed at adults.
2. Include young adults in mass media campaign that seeks to deter youth use of marijuana.

**HEALTH CLAIM RECOMMENDATION:**

1. Prohibit health claims and descriptors.

**LABELING RECOMMENDATIONS:**

1. Require warning labels large enough to be easily noticed and read, and as large as possible.
2. Require warning labels to appear on the front, not sides, of packages.
3. Require warning labels to provide clear, direct and accurate messages about the dangers of marijuana use, including messages about specific health effects.
4. Word messages simply and speak directly to the reader.
5. Require warnings with color pictures.

6. Require warning labels that include graphic images that elicit an emotional response.
7. Require warning labels be rotated regularly to avoid overexposure.
8. Require warning labels to contain the poison control number.

**PACKAGING RECOMMENDATIONS:**

1. Require packages to use a plain font in black and white for product and brand name.
2. Require plain packaging of product.
3. Remove all brand imagery.

**COMBUSTIBLE PRODUCT PACKAGING RECOMMENDATION:**

1. Require combustible marijuana products to be sold in a minimum package size.

**EDIBLE PRODUCT PACKAGING RECOMMENDATION:**

1. Require edible marijuana products to come packaged with a maximum serving size of THC, to minimize the risk of poisonings and accidental use by minors.

## Background

### Parallels to tobacco and other health behaviors

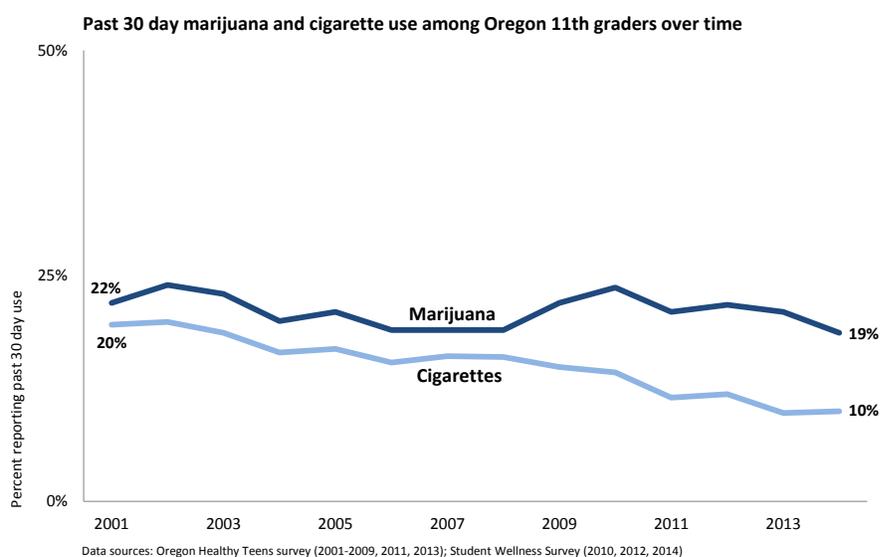
There are several parallels between marijuana and tobacco. Marijuana, like tobacco, is often smoked using a rolled cigarette, a cigar or cigarillo wrapper, or a pipe. The combustion of marijuana, like tobacco, releases carcinogens and toxins. Both nicotine and marijuana consumption is possible through capsules, edibles, liquids, and lotions.<sup>2</sup> Principles from effective tobacco control can also apply to marijuana regulation. Adoption of proven tobacco policies for marijuana regulation will position Oregon to avoid some potential public health risks.

Despite the growing popularity and social acceptance of marijuana, underlying public health concerns remain about its health risks. Tobacco is one of the most well-studied products and has many known adverse health effects.<sup>3</sup> The evidence base is not as robust for marijuana and there is more to learn. However, marijuana smoke is not a risk-free drug. In 2009, the California Environmental Protection Agency (EPA) added marijuana smoke to its list<sup>4</sup> of chemicals “known to the state to cause cancer” and listed 33 unique chemicals in marijuana smoke that are carcinogens.<sup>5</sup> Many of these carcinogens, such as ammonia and hydrogen cyanide<sup>6</sup> also are present in tobacco smoke.<sup>7</sup>

### Youth Use and Appeal

Among Oregon 11th graders, current marijuana use has been consistently higher than current cigarette use. Over time, the difference between marijuana and cigarette use has increased; in 2014, 19 percent of 11th graders used marijuana while 10 percent smoked cigarettes in the past 30 days (Figure 1).

Figure 1.



Use is consistently higher among boys compared to girls (Figure 2). In Oregon, 8th- and 11th-grade reported marijuana use in the past 30 days has remained relatively consistent since 2001 (Figure 3). The prevalence of marijuana use in the past 30 days—a key indicator

of the proportion of people who are current marijuana users—appears to be on the rise after legalization among both youth and adults in Washington, Colorado, and the U.S.A.8 In addition, more Oregon 11th graders report easy access to marijuana than cigarettes (66 percent vs. 58 percent); reports of easy access among 8th graders is similar for marijuana and cigarettes (Figure 4).

Figure 2.

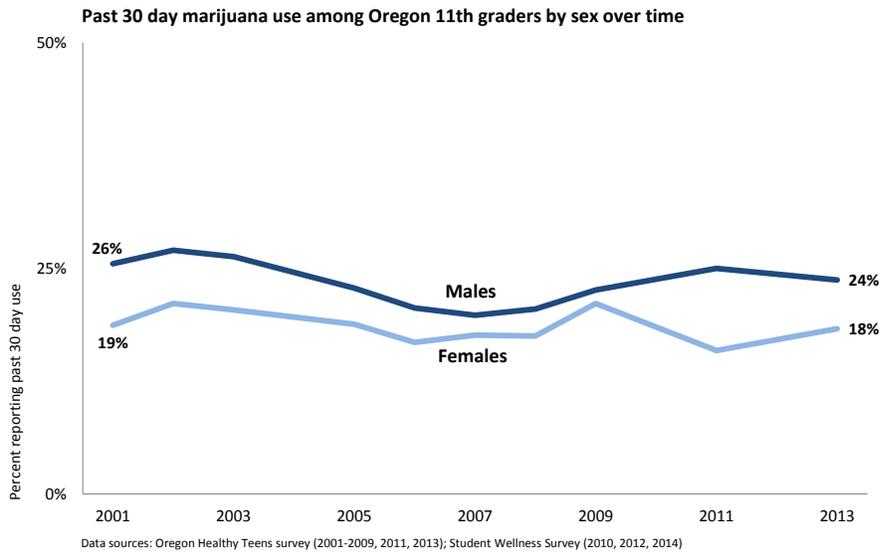


Figure 3.

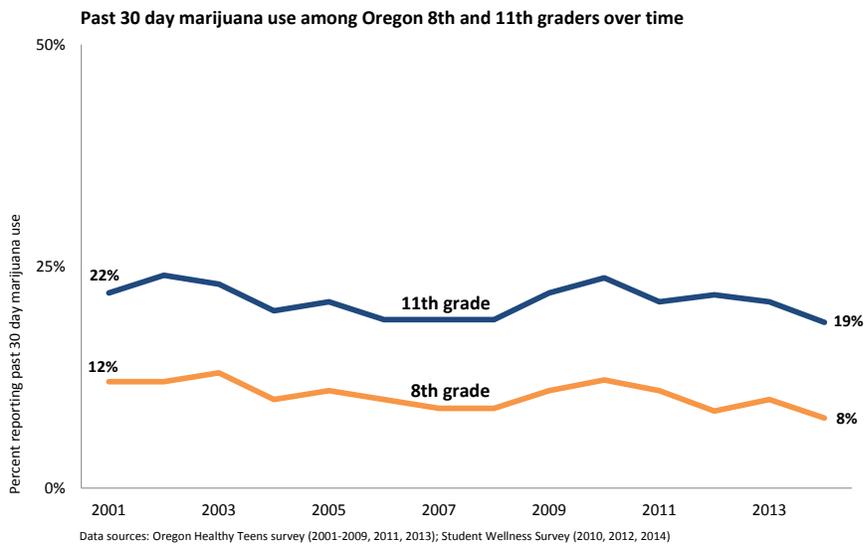
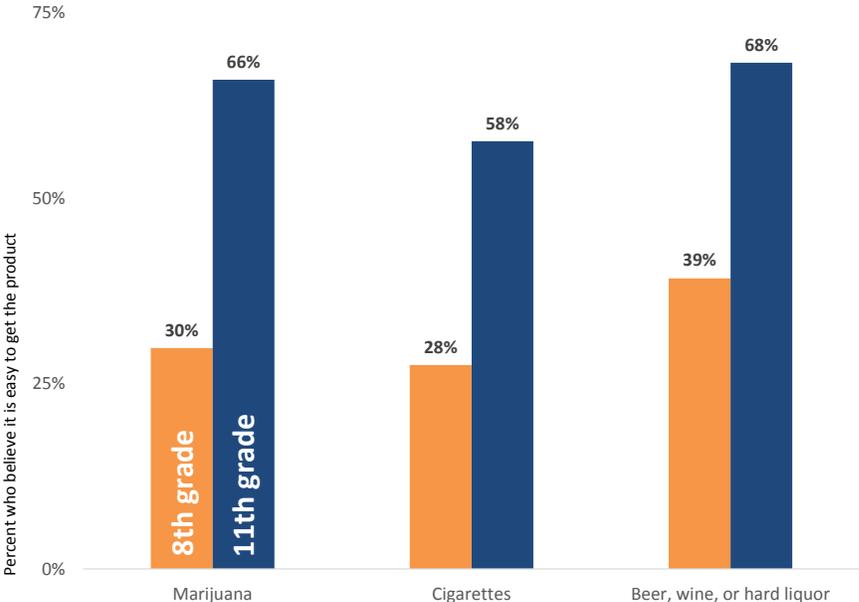


Figure 4.

**Oregon 8th and 11th graders who think it is easy for them to get marijuana, cigarettes, and alcohol**



Data source: Student Wellness Survey 2014

## MARKETING

### Advertising recommendation:

1. Follow the examples of policies laid out in the national Tobacco Master Settlement Agreement<sup>9, 1</sup> and the Family Smoking Protection Act by prohibiting:
  - Use of cartoon characters;
  - Transit advertising ;
  - Billboards and other outdoor advertising (e.g., outdoor stadium signs);
  - Product placement in entertainment media;
  - Branded merchandise;
  - Free product samples;
  - Brand name sponsorships;
  - Gifts to youth in exchange for proofs of purchase.
2. Prohibit magazine advertising using the FDA's proposed guideline for any publication read by an established threshold of minors (younger than 18 years); or allow only black-on-white text without images or color when minors make up more than 15 percent of the readership.
3. Prohibit outdoor/out of home, television and radio advertising.
4. Prohibit all pop-up ads online, mobile ads or apps those under 21 might download or see.

These policies protect youth from tobacco marketing and promotion and thus delay or prevent youth initiation of tobacco use.

### Tobacco evidence

Advertising and promotional activities by tobacco companies, including traditional tobacco marketing as well as internet and digital marketing (e.g., online ads, mobile ads, or apps), have been shown to cause the onset and continuation of smoking among adolescents and young adults.<sup>10</sup> The Surgeon General found this is true whether the advertising is directed at youth or at adults.

A causal link between tobacco advertising and tobacco use has been scientifically established.<sup>11,12,13</sup> Most notably, the National Cancer Institute<sup>14</sup> concluded, "The total weight of evidence demonstrates a causal relationship between tobacco advertising and promotion and increased tobacco use, as manifested by increased smoking initiation and increased per capita tobacco consumption in the population." Advertising exposure for marijuana could have the same impact on youth as exposure to tobacco advertising.

One of the key strategies recommended by the World Health Organization (WHO) is to "enforce bans on tobacco advertising, promotion, and sponsorship."<sup>15</sup> Several countries have eliminated the negative influence by implementing restrictions. These countries

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<sup>1</sup> The Tobacco Master Settlement Agreement is between the state Attorneys General of 46 states, five U.S. territories, the District of Columbia and the five largest tobacco companies concerning the advertising, marketing and promotion of tobacco products. It sets standards for and imposes restrictions on the sale and marketing of cigarettes by participating cigarette manufacturers.

participate in the WHO's global treaty on tobacco use, which requires participating countries to completely ban advertising.<sup>16, 17</sup> International studies have found that these comprehensive advertising restrictions reduce tobacco use.<sup>18, 19, 20</sup>

The Internet has transformed advertising and marketing, especially with youth. Marketers reach across platforms, from mobile devices to personal computers, with highly interactive techniques such as viral video, "gamevertising," polls, contests, and the creation of "avatars," or electronic alter egos, which travel in online digital worlds. Thus, the 2012 Surgeon General's Report recommends addressing the tobacco industry's uses of new media through countering marketing strategies.<sup>21</sup> The Center for Disease Control and Prevention's Guide to Community Preventive Services recommends that health communication strategies include social marketing campaigns.<sup>22</sup>

The Oregon Liquor Control Commission prohibits advertising for alcohol<sup>23</sup> if it contains:

- False or misleading information;
- Claims that the alcoholic beverage has curative or therapeutic effects;
- Claims that any government agency endorses or supports the alcoholic beverage;
- The requirement of purchasing an alcoholic beverage in order to receive a prize or merchandise unless the manufacturer or wholesaler donates the prize or merchandise to a charitable cause or community non-profit entity;
- Material so appealing to minors that it encourages them to purchase, possess, or drink alcoholic beverages;
- A person displayed drinking an alcoholic beverage;
- Material that encourages the use of an alcoholic beverage because of its intoxicating effect;
- Statements or illustrations that an alcoholic beverage causes athletic or artistic success;
- Material that encourages excessive or rapid consumption.

Colorado and Washington State both have adopted recommendations that are stronger than existing restrictions on alcohol advertising. For example, Washington State prohibits advertising within 1,000 feet of the perimeter of a school grounds, playground, recreation center or facility, child care center, public park, library, or a game arcade, or in a public transit vehicle or public transit shelter; or on or in a publicly owned or operated property.

Colorado marijuana advertising rules prohibit:

- Internet videos, radio shows, and podcasts that can't be blocked off from minors;
- All pop-up ads online;
- Mobile ads or apps that anyone under 21 might download or see.

If strong advertising restrictions can reduce the perception that tobacco is accessible, acceptable, and popular among young people, it likely would have the same impact for marijuana.

### Price discount recommendation:

1. Prohibit coupons, free samples, buy-one get-one discounts, etc.

### Tobacco evidence

Exposure to tobacco products and price promotions at the point of sale encourages initiation and discourages cessation. When tobacco products cost more, fewer people use tobacco, fewer initiate tobacco use, and more people quit tobacco use.<sup>24</sup> This is especially true among price-sensitive youth. When the price of tobacco increases by 10 percent, youth use decreases by 7 percent.<sup>25</sup>

The use of price promotions makes cigarettes more affordable to Oregon's youth and young adults. The 2012 U.S. Surgeon General Report showed that, "... the industry's extensive use of price-reducing promotions has led to higher rates of tobacco use among young people."<sup>26</sup>

The Oregon Liquor Control Commission allows coupons for malt beverages, wine and cider. Permitted coupons include:

- Progressive coupons: A larger rebate when progressively more alcohol is purchased (e.g., \$5 for the purchase of one six-pack or bottle but \$12 for two.)
- Cross-promotional coupons: A discount or rebate on food, non-alcoholic beverages or non-food items with or without the purchase of an alcoholic beverage product (e.g., \$1 off tortilla chips with the purchase of a six-pack of Corona beer).

### HEALTH COMMUNICATIONS/MEDIA CAMPAIGN

#### Educational campaign recommendation:

1. Implement broad-based education of the public as a whole, through which youth receive public health messages that are aimed at adults.
2. Include young adults in mass media campaign that seeks to deter youth use of marijuana.

### Tobacco evidence

Each year the tobacco industry spends billions of dollars advertising and promoting its products.<sup>27,28</sup>

Many studies have shown the powerful effect of this advertising, especially on the decision by young people to begin smoking cigarettes, initiating their subsequent smoking addiction.<sup>29</sup> According to the 2012 Surgeon General's Report, "The evidence is sufficient to conclude that there is a causal relationship between advertising and promotional efforts of the tobacco companies and the initiation and progression of tobacco use among young people." In order to minimize the influence marijuana advertising may have on youth, effective prevention efforts are needed through effective health communications.

Nearly all first use of cigarettes occurs by 18 years of age, with 99 percent of first use by 26 years of age.<sup>30</sup> Because tobacco prevention evidence shows that youth emulate young adults, prevention efforts must focus on both adolescents and young adults.

Health communications have proven to play a role in increasing smoking cessation, reducing smokeless tobacco use, decreasing the likelihood that people will begin smoking cigarettes, and reducing nonsmokers' exposure to secondhand tobacco smoke.<sup>31</sup> These approaches also counter pro-tobacco influences and increase pro-health messages.

### Health claim recommendation

1. Prohibit health claims or descriptors.

Because retail marijuana is for recreational use and the long-term health effects of marijuana are not fully understood, a precautionary approach to limit health claims and descriptors should be applied. Marijuana products should be prohibited from containing any health claim or descriptor, including:

- Implying a product is safer, healthier or less risky than other marijuana products;
- Promote overconsumption;
- Represent that a marijuana product has curative or therapeutic effects.

These claims and descriptors should be prohibited on the label, which could be reviewed during the marijuana package approval process, and should be prohibited in advertisements.

### Tobacco evidence

Claiming less harm or reduced risk of disease from using tobacco products misleads consumers to think that products are safe to use or that certain products are safer than others. Studies show that more than half of smokers incorrectly believe that the terms “light” and “ultra-light” refer to cigarettes that are less harmful to their health.

Marketing, advertising or promotional claims that suggest the tobacco product is safer, healthier or less risky to use include:

- “Safe Smoke Filter”
- “Less Toxic”
- “Organic” or “Natural”
- “Light,” “Low,” or “Mild”

False or misleading claims in the promotion, advertising, distribution or sale of tobacco products are prohibited by the federal Family Smoking Prevention and Tobacco Control Act. Statements that are prohibited by federal law for tobacco include suggestions that a tobacco product is safer, less harmful, contains a reduced level or is free of a harmful substance, or presents a lower risk of tobacco-related disease compared to other tobacco products.<sup>32</sup> The use of “organic” as a descriptor requires an extra warning statement that “No additives in our tobacco does NOT mean a safer cigarette.”<sup>33</sup>

## LABELING:

### Warning label recommendation

1. Require warning labels large enough to be easily noticed and read, and as large as possible.
2. Require warning labels to appear on the front of packages, not the sides.
3. Require warning labels to provide clear, direct and accurate messages about the dangers of marijuana use, including messages about specific health effects.
4. Word messages simply and speaks directly to the reader.
5. Require warnings with color pictures, because text warnings have been proven to be ineffective.
6. Require warning labels that include graphic images that elicit an emotional response.
7. Require warning labels be rotated regularly to avoid overexposure.

### Tobacco evidence

Warning labels on tobacco products are one way to communicate with smokers. Two-thirds of all smokers indicate that the package is an important source of health information and health knowledge is strongly associated with an intention to quit smoking.<sup>34</sup>

However, the text -only warnings currently placed on the side of cigarette packages in the United States have been shown to be ineffective in communicating the health risks of cigarettes to the public.<sup>35</sup> Larger, picture-based warning labels have been found to be effective and proven to inform smokers about the health hazards of smoking, encourage smokers to quit, and prevent nonsmokers from starting to smoke.<sup>36</sup>

A comprehensive review of the evidence on the impact of tobacco warning labels found that the most effective warning labels:

- Are as large as possible and can be easily noticed and read;<sup>37</sup>
- Are placed on the front of the package;<sup>38</sup>
- Contain clear, direct and accurate messages that speak directly to the consumer and include messages about specific health effects;<sup>39</sup>
- Include color pictures so they are understandable by people with low levels of literacy and help people visualize tobacco-caused diseases;<sup>40</sup>
- Include graphic images that elicit an emotional response;<sup>41</sup>
- Rotate regularly to avoid overexposure.<sup>42</sup>



These characteristics are noticed more, are an important source of health information, increase knowledge about tobacco use harms and perceptions of risk, and promote smoking cessation.<sup>43</sup> In addition, comprehensive warning labels are effective among youth and there is evidence that these prevent smoking initiation. Pictorial warning labels that elicit a strong emotional response are especially effective.<sup>44</sup>

Research suggests that graphic warning labels are particularly effective among youth.

- More than 90 percent of Canadian youth agree that picture warnings on Canadian cigarette packages have provided them with information about the health effects of smoking and make smoking seem less attractive.<sup>45</sup>
- After the introduction of graphic health warnings in Australia, adolescent experimental and established smokers were more likely to think about quitting, and intentions to smoke were lower among those students who discussed the new warning labels.<sup>46</sup>
- A Greek study of adolescents indicates that pictorial warning labels were more effective at informing about the health effects of smoking and preventing initiation than the previous text-only labels. Approximately 84 percent of non-smoking adolescents reported that the proposed EU pictorial labels were more effective than the old EU text labels in preventing smoking initiation.<sup>47</sup>

Theories in social and health psychology, supported by empirical studies, have demonstrated the superiority of using pictures and imagery over text-only messages in health communication.<sup>48</sup> Since the 1950s, many research studies have shown that warnings that demonstrate real-life fearful consequences (“fear appeals”) are effective in motivating health behavior change (e.g., quitting), especially if paired with information about how to avoid the fearful consequences (e.g., where to find help about quitting).<sup>49</sup>

The Food and Drug Administration is considering including poison control numbers on adult-oriented products which pose a poisoning risk to minors (e.g., nicotine containing e-liquid(s), liquid nicotine and other new tobacco products (e.g., dissolvables, lotions, gels, and drinks)).<sup>50</sup> Such a warning could also be considered for marijuana products if appropriate.

## PACKAGING:

### Plain packaging recommendation

1. Require packages to use a plain font in black and white for product and brand name.
2. Require plain packaging of product.
3. Remove all brand imagery.

### Tobacco evidence

Tobacco industry documents show that cigarette packaging and design are among the tools used by tobacco companies to increase sales and attract new users. According to the U.S. Surgeon General's report from 2012: "The cigarette pack itself is a form of marketing, with companies developing packaging designed to attract attention, appeal to specific consumers, reinforce brand identity, or suggest specific product qualities."<sup>51</sup>

Plain or generic packaging of tobacco products is an approach that has been introduced to reduce the appeal of tobacco products, including among youth. Plain packaging requires standardized packaging that has no elements other than the brand name; it must not include any colors, logos, descriptive words and phrases, or distinctive fonts. Promotional elements must not appear on the exterior or the interior of the package, including the product itself (cigarettes, cigarillos, cigars, and smokeless pouches). Plain packaging applies to all forms of tobacco, including smokeless and smoked tobacco. Plain packaging includes carton wrapping, cigarette papers, and carrying cases.

The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) recommends the adoption of plain packaging to decrease smoking initiation and increase cessation.<sup>52</sup>

A systematic review, from the University of Stirling, examined findings from 37 studies that provided evidence of the impacts of plain tobacco packaging.<sup>53</sup> The review found that there is strong evidence to support the propositions set out in the WHO Framework Convention on Tobacco Control relating to the role of plain packaging in helping to reduce smoking rates.

The review found that plain packaging has been shown to:

- Reduce the attractiveness and appeal of tobacco products;
- Increase the noticeability and effectiveness of health warnings and messages;
- Reduce the use of design techniques that may mislead consumers about the harmfulness of tobacco products.

## **Combustible product packaging minimum size recommendation**

1. Require combustible marijuana products to be sold in a minimum package size

### **Tobacco evidence**

According to the Surgeon General<sup>54</sup>, raising the price of tobacco products is one of the most effective strategies for reducing initiation, decreasing consumption, and increasing cessation. One way to achieve a sufficient minimum price to prevent tobacco use among youth is to require that all cigarettes be sold in a package of at least 20. Single cigarette sales, which appeal to minors because of the low cost, are prohibited by Oregon<sup>55</sup> and federal law.<sup>56</sup>

Like tobacco, a single joint costs a fraction of the price of a larger amount of marijuana. Oregon retail marijuana sellers could be required to sell marijuana leaves and flowers by minimum weight; and pre-rolled joints by a minimum number.

### **Edible product packaging recommendation:**

1. Set a maximum serving size of THC for a package of marijuana edibles to reduce the likelihood of children being poisoned.

### **Child protection rationale**

Child-resistant limited servings maximize protections for children from marijuana poisoning. Because child-resistant packing increases the time it takes for a child to open a package, child resistant single servings, when feasible, would minimize the amount of marijuana a child could access by defeating a single package. Having limited (or single) serving size per package also would minimize the risk of a child being poisoned by consuming a marijuana edible from a partially opened package or a package that has been taken out of the original child-resistant container. Packages that contain more than a single serving could also make it unclear to a user how much of an edible product is appropriate to consume to minimize health risks.

### **Washington and Colorado experience**

The majority of the available tobacco literature is for combustible products. Additionally, because tobacco and nicotine are not typically consumed as an edible product, there are no tobacco-related recommendations for packaging of edibles. However, there is an opportunity to build upon the experiences in Washington and Colorado, including poisonings. There is also relevant scientific evidence on health behaviors that provides guidance.

A report on cannabis consumption<sup>57</sup> issued last year by the Colorado Department of Revenue found that "there is a slow but steady shift away from the traditional method of consuming marijuana—smoking it—to new delivery methods." This shift is evidenced by the new ways in which users can ingest this drug other than by smoking it. These include capsules, vaporization, edibles, liquids and suppositories.<sup>58</sup>

Edibles are popular with consumers. Nearly 5 million edible marijuana products were sold in the first year of retail marijuana sales in Colorado<sup>59</sup>, accounting for 45 percent of total marijuana sales in the state.<sup>60</sup>

### Washington and Colorado rules

Once marijuana edibles are removed from their packaging, they become indistinguishable from other food for both children and adults.

Washington State and Colorado administrative rules both require “child resistant packaging in accordance with Title 16 C.F.R 1700 of the Poison Prevention Packaging Act” or other applicable rules, including that they must be packaged in heavier plastic and “be heat sealed with no easy-open tablet, dimple, corner, or flap as to make it difficult for a child to open and as a tamperproof measure.” Both states also require that marijuana products be placed in a container that is child-resistant or place the container in an external “exit package” that is child resistant.” Colorado recently proposed new rules requiring liquid marijuana products to be limited to single-serve packaging (defined as 10 milligrams of THC) and an octagon stop-sign shape with the letters “THC” to be on individual edible items, not just the package label.<sup>61</sup>

### Poisonings

Poisonings have been attributed to marijuana edibles.<sup>62</sup> Between 2005 and 2011, the rate of poison center calls for unintentional pediatric marijuana exposure in children aged 9 years and under more than tripled, increasing from 3.9 calls per 1 million population in 2005 to 14.8 per 1 million in 2011, in states that decriminalized marijuana before 2005.<sup>63</sup>

Rocky Mountain Poison and Drug Center received 151 calls for marijuana exposure in 2013, the first year of retail marijuana sales in Colorado. That was up from 88 calls in 2013 and 61 in 2012.<sup>64</sup>

Calls to the Washington Poison Center for marijuana exposures increased by more than half, from 158 in 2013 to 246 last year.<sup>65</sup>

Calls involving children nearly doubled in both states between 2013 and 2014, to 48 in Washington involving children aged 12 or years or younger<sup>66</sup>, and to 45 in Colorado involving children 8 years or younger.<sup>67</sup>

In March 2014, the Colorado Department of Public Health and Environment reviewed autopsy and police reports to assess factors associated with the death of a 19-year old man after he consumed an edible marijuana product. The autopsy, performed 29 hours after time of death, found marijuana intoxication as a chief contributing factor.<sup>68</sup>

### Health behavior evidence

Edible marijuana products generally are made with large amounts of highly palatable ingredients such as sugar, salt and fat, and resemble foods that are attractive to children such as brownies, cookies, candies, chocolate, and soda.

However, food content is not the only variable that affects consumption.<sup>69</sup> Evidence shows that the amount of pre-packaged food a person consumes is driven by the size of the single food item<sup>70</sup> and by the size of the package.<sup>71</sup> Individuals increase their intake when consuming larger food items by weight compared to small food items (e.g., candies weighing 4 g versus candies weighing 2 g).<sup>72</sup>

Moreover, people consume more out of large packages than out of small,<sup>73</sup> independent of the perceived taste<sup>74</sup> or food quality.<sup>75</sup> For example, the amount of potato chips consumed increases as the package size increases.<sup>76</sup> Container size, independent of portion size, influences the amount consumed.<sup>77</sup>

Selecting and consuming large portions may also be the result of "unit bias."<sup>78</sup> In this case, people think that a single package is the appropriate and optimal amount to consume, yet the package actually contains more servings than appropriate for a single eating occasion. Due to unit bias, people are unaware of consuming more than is appropriate.

With oral ingestion of marijuana, it generally takes at least one to two hours for THC levels in the blood to peak, whereas with smoking, blood THC levels peak within five to 10 minutes.<sup>79, 80</sup> This delay in absorption with oral ingestion may prompt users to consume more because they do not initially get the effect they were anticipating. The length of time during which an individual is intoxicated is much longer with edible marijuana than it is when the drug is smoked.<sup>81</sup>

This evidence suggests that single or smaller serving size packaging for edible marijuana products may decrease the likelihood of over-consumption.

## Conclusion

Measure 91 and HB 3400 set up a regulatory framework that allows for administrative rules that can reduce the dangers posed by marijuana products to the public's health. The scientific evidence supports the recommendations in this document as steps to reduce the adverse impact of marijuana on public health.

## Comparison of Existing Tobacco and Marijuana (Colorado & Washington) Advertising Regulations

Tobacco Master Settlement Agreement	FDA Family Smoking Protection and Tobacco Control Act	Washington State Marijuana Advertising Rules	Colorado Marijuana Advertising Rules
<ul style="list-style-type: none"> <li>· Prohibits the use of cartoon images in advertising.</li> <li>· Prohibits industry payment to promote tobacco products in movies, TV shows, live performances, commercial films and videos, or video games, unless the audience or viewers are in an adult-only facility.</li> <li>· Prohibits non-tobacco merchandise (e.g., caps, T-shirts) with tobacco brand-name logos, except at brand-name sponsored events.</li> <li>· Permits corporate-name sponsorship of sporting and cultural events and limits each company to brand-name sponsorship of one event per year (which may not include concerts, team sports, events with significant youth audience, or events with underage contestants).</li> <li>· Prohibits public transit advertising, and prohibits outdoor billboard advertising in arenas, stadiums, shopping malls, and arcades. Permits such advertising at brand-name sponsored events.</li> <li>· Permits poster-sized advertising (up to 14 sq. ft.) on or outside retail establishments.</li> </ul>	<ul style="list-style-type: none"> <li>· Limits advertising in publications with significant youth readership to a black-on-white, text-only format.</li> <li>· Limits advertising in audio format to words with no music or sound effects; limits advertising in video format to static, black-on-white text.</li> <li>· Prohibits the marketing, licensing, distribution, or sale of all non-tobacco items and services identified with a cigarette or smokeless tobacco brand name (e.g., promotional T-shirts and caps).</li> <li>· Prohibits gifts, credits, and coupons linked to the purchase of tobacco products.</li> <li>· Prohibits brand-name sponsorship of sporting and other cultural events, but permits corporate-name sponsorship of such events.</li> <li>· Prohibits the use of a non-tobacco trade or brand name as a tobacco product trade or brand name, unless that tobacco product trade or brand name was on both a tobacco product and a non-tobacco product sold in the United States on Jan. 1, 1995.</li> </ul>	<ul style="list-style-type: none"> <li>· Prohibits advertising or illustrations that are false or misleading.</li> <li>· Prohibits advertising that promotes overconsumption.</li> <li>· Prohibits advertising that represents that a marijuana product has curative or therapeutic effects.</li> <li>· Prohibits advertising that depicts a child or may be appealing to children.</li> <li>· Limits each retail licensed premises to one sign identifying the retail outlet by the licensee's business name or trade name that is affixed or hanging in the windows or on the outside of the premises that is visible to the general public from the public right of way.</li> <li>· Prohibits signs larger than 1,600 square inches.</li> <li>· Prohibits advertising within 1,000 feet of the perimeter of a school grounds, playground, recreation center or facility, child care center, public park, library, or a game arcade, or in a public transit vehicle or public transit shelter; or on or in a publicly owned or operated property.</li> </ul>	<ul style="list-style-type: none"> <li>· Prohibits mass media, including TV, billboards, radio and print ads, visible to audiences that might include 30% or more minors.</li> <li>· Prohibits Internet videos, radio shows, and podcasts that can't be blocked off from minors.</li> <li>· Prohibits all pop-up ads online.</li> <li>· Prohibits fliers or leaflets handed out or distributed to anyone in public – including on cars and door-to-door flier drops.</li> <li>· Prohibits mobile ads or apps that anyone under 21 might download or see.</li> <li>· Prohibits signage or sponsorships at events where 30% or more of the audience — or passersby who could see the signage — might be minors.</li> <li>· Prohibits any ads run on media outside of Colorado, including tourism publications.</li> </ul>

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