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Policy Approaches for Regulating Alcohol Marketing in a Global Context: A Public Health Perspective

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Keywords

alcohol consumption, alcohol marketing, alcohol policy, globalization, advertising

Abstract

Alcohol consumption is responsible for 3.3 million deaths globally or nearly 6% of all deaths. Alcohol use contributes to both communicable and non-communicable diseases, as well as violence and injuries. The purpose of this review is to discuss, in the context of the expansion of transnational alcohol corporations and harms associated with alcohol use, policy options for regulating exposure to alcohol marketing. We first provide an overview of the public health problem of harmful alcohol consumption and describe the association between exposure to alcohol marketing and alcohol consumption. We then discuss the growth and concentration of global alcohol corporations and their marketing practices in low- and middle-income countries, as well as in higher-income societies. We review the use and effectiveness of various approaches for regulating alcohol marketing in various countries before discussing challenges and opportunities to protect public health.

INTRODUCTION

In 2012, alcohol consumption was responsible for 3.3 million deaths globally, or nearly 6% of all deaths, and 5.1% of disability-adjusted life years (126). Alcohol use contributes to both communicable diseases, such as the transmission of HIV infections and tuberculosis (44, 94, 102), and noncommunicable diseases, such as cancer (13, 90) and liver cirrhosis (95). With the increasing prevalence of drinking in some low- and middle-income countries (LMICs), such as in sub-Saharan Africa and India, the myriad of alcohol-related public health problems, including harms to drinkers and harms to others, may become more severe (16, 43). In places experiencing economic development, global alcohol corporations tend to seek opportunities to expand their consumer base, including through increased use of alcohol marketing strategies that appeal to groups that typically have lower rates of drinking, such as youth and women (9, 39, 57). Similarly, in high-income societies, where alcohol consumption is highly prevalent, such as the United States, Western Europe, and New Zealand, alcohol corporations use innovative techniques to reach new consumers and maintain current drinkers with the development of new products and marketing on the Internet (22, 28, 77).

As shown in **Figure 1**, the growth of transnational alcohol corporations may lead to more widespread use of alcohol marketing and increased audience segmentation and targeting, which lead to increased population-level exposure to alcohol marketing. Exposure to alcohol marketing is associated with earlier drinking initiation among youth and a greater intensity of drinking among those already drinking (2, 55), as well as drinking initiation by groups of previous nondrinkers, including women in many LMICs (39). Alcohol consumption across the life span contributes to alcohol-related harms to drinkers and to others (70, 94). The effects of harmful alcohol consumption span across several sectors of society, such as criminal justice, health care systems, and the economy (99, 113).

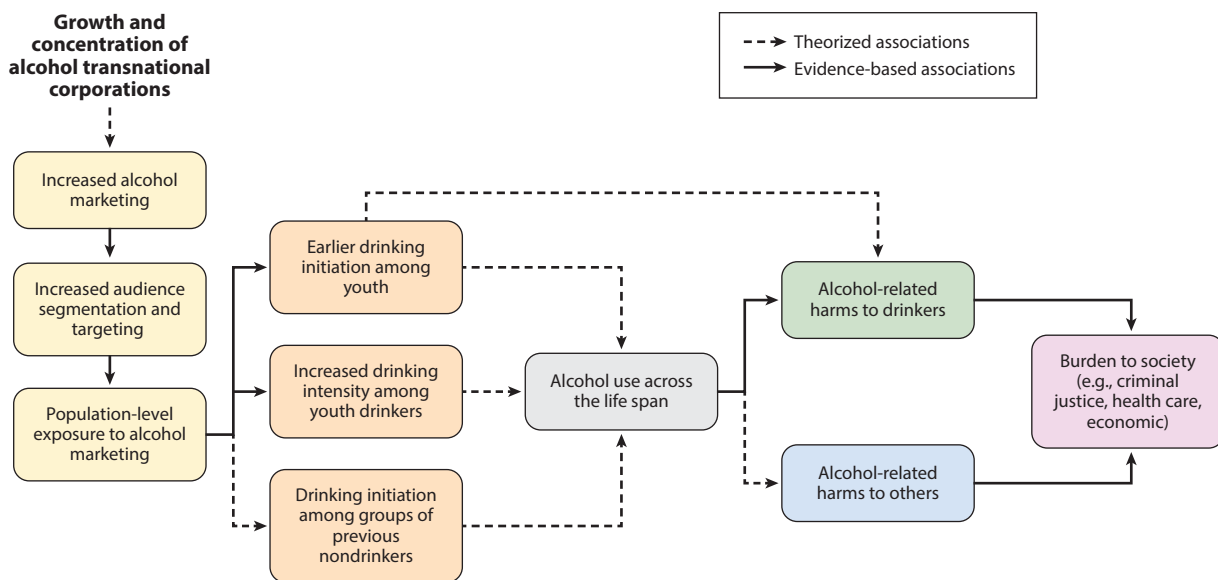


Figure 1

Conceptual framework on the growth of alcohol corporations, exposure to alcohol marketing, and alcohol-related public health problems.

To reduce the burden of harmful alcohol use, the World Health Organization (WHO) has recommended three “best buys,” including enacting and enforcing bans on alcohol advertising, restricting access to alcohol, and increasing alcohol taxes (123, p. 4). These interventions are complementary; comprehensive strategies using a mix of evidence-based interventions have the greatest potential for improving public health (e.g., 6). Although evidence-based, multifaceted approaches are needed to most effectively reduce harmful drinking, this article focuses on one strategy: the marketing of alcoholic beverages. The alcohol industry is not unique in its use of marketing; it is also used by numerous other industries to obtain and retain consumers of their products, such as tobacco, sugar-sweetened beverages, and packaged foods (100, 116).

The purpose of this paper is to discuss policy options for regulating exposure to alcohol marketing. Such policy options are important to consider in the context of the growth of multinational alcohol corporations and alcohol-related harms. We begin with an overview of harmful alcohol consumption as a public health problem and discuss the association between exposure to alcohol marketing and alcohol consumption. In addition, we describe the expansion and concentration of transnational alcohol corporations and their marketing strategies in LMICs, as well as in higher-income societies. We then review the use and effectiveness of different approaches for regulating alcohol marketing in various countries and discuss challenges and opportunities to protect public health.

BURDEN OF ALCOHOL CONSUMPTION

The patterns of alcohol consumption vary widely across regions. For example, in 2010, in the WHO regions of the Americas and Europe, more than 70% of persons aged 15 and older consumed alcohol, whereas smaller proportions of the population consumed alcohol in the regions of the Eastern Mediterranean (7.4%), Southeast Asia (21.7%), and Africa (40.2%) (126). Although investigators have found the prevalence of alcohol use to be lower in regions of Southeast Asia and Africa, among those who drink, total alcohol consumed per capita is higher in these areas relative to all other regions. The high total alcohol consumption per capita among drinkers in these regions suggests a dangerous pattern of high-intensity drinking (i.e., the consumption of large quantities of alcohol per occasion) among those who do drink (126).

Alcohol use is a risk factor for both acute and chronic health conditions, including harms to drinkers as well as harms to others besides the drinker, as shown in **Figure 1**. These risks affect people who drink across the full continuum of alcohol use and are not limited to individuals who have alcohol use disorders (17, 107). Binge drinking (i.e., the consumption of five or more drinks per occasion for men and four or more drinks per occasion for women), which is referred to as heavy episodic drinking in some countries, is a level of alcohol consumption that equates to acute intoxication. Binge drinking is associated with alcohol-related violence and injuries, such as intimate partner violence, falls, and motor vehicle crashes (17, 41, 60, 104). Studies from diverse contexts suggest that the harms related to alcohol consumption by drinkers adversely affect other individuals in society as well, including vulnerable children (40, 69, 71), family and friends (21, 47, 49), and strangers (33, 37, 70). These alcohol-related harms to others extend beyond physical abuse and encompass psychological abuse, financial problems, and reduced feelings of comfort and safety.

In addition to the range of alcohol-related acute harms, alcohol use also contributes to numerous chronic diseases. Alcohol is recognized as a carcinogen by the International Agency for Research on Cancer (54). The consumption of even one alcoholic drink per day increases the risk of various cancers, including cancer of the female breast, liver, oral cavity and pharynx, esophagus (squamous cell carcinoma), larynx, colon, and rectum (13). For many chronic conditions, such

as hypertension (111), stroke (91), and liver cirrhosis (95), the risks are positively associated with increasing quantity of alcohol consumed. Evidence of a potential protective effect of alcohol at low levels of consumption on cardiovascular disease is mixed and widely debated. Although some studies have concluded that moderate alcohol use is associated with protection from cardiovascular disease, critics have argued that the studies do not adequately control for confounding variables, rendering it impossible to conclude whether improved cardiovascular health outcomes are due to moderate drinking or other behavioral and genetic variations (53, 79, 107, 127).

The harmful use of alcohol is an economic burden to societies, including criminal justice costs, health care expenses, and lost productivity. Excessive alcohol use cost the United States \$249 billion in 2010 (99). In Australia, the cost of alcohol use to society was AU\$15.3 (US\$11.3) billion in 2004–2005 (27), and in Thailand, the economic burden was estimated at US\$9,627 million in 2006 (114).

EXPOSURE TO ALCOHOL MARKETING AND ALCOHOL USE

The preponderance of evidence on the relationship between exposure to alcohol marketing and alcohol use focuses on young people under the legal drinking age, which varies across countries but typically ranges from ages 18 to 21 years (126). The best available evidence on the relationship between youth exposure to alcohol advertising and alcohol use comes from experimental and longitudinal studies.

Findings from experimental studies on youth exposure to alcohol marketing and alcohol consumption have been mixed. These studies, which have typically randomized participants into experimental and control groups, exposed the experimental group to alcohol marketing, and then offered a choice of beverages, benefit from randomized controlled designs but face challenges in controlling for the effects of exposure prior to the experiment itself. Engels et al. (35) found that exposure to alcohol portrayals in televised films, with commercial breaks that included alcohol advertisements, led participants to drink more alcohol. Koordeman et al. (65) tested the embedding of alcohol advertisements in commercial breaks in the film *Watchmen*, which contains some drinking behavior, and evaluated alcohol consumption among a group of high weekly alcohol consumers aged 16–28 years (high school and college students). The study found an association between exposure to alcohol commercials prior to the movie in a cinema and alcohol consumption during the show. However, other studies by the same team suggest that drinking acts depicted in the film mediate this relationship (66, 67).

Longitudinal studies on youth exposure to alcohol marketing and alcohol consumption have reached more consistent conclusions. Two systematic reviews, including a combined total of 25 studies, found that young people exposed to alcohol marketing were more likely to initiate drinking or, if already drinking, consume more (2, 55). Youth exposure to alcohol marketing seems to have a cumulative impact such that young people with greater exposure are likely to increase their alcohol use as they age into their mid-twenties, whereas young people with less exposure are likely to reduce their drinking sooner (1). Furthermore, a study of persons aged 15–26 years in the United States found that young people consumed 1% more alcohol for each additional ad seen per month and 3% more alcohol with each additional dollar spent per capita on alcohol advertising in their media market (106).

Studies have also documented associations between exposure to brand-specific alcohol advertising and consumption patterns of underage drinkers. In a study of young adults aged 13–20 years in the United States, the amount of the exposure to alcohol advertising, on a brand-specific basis, was associated with the quantity of alcohol consumed of those brands (80). The same survey showed that among underage drinkers who reported binge drinking, the top 25 alcohol brands

out of 898 brands included in the survey accounted for more than 46% of the brands consumed while binge drinking (81).

Most evidence on the association between exposure to alcohol marketing and drinking comes from high-income countries; however, an emerging body of research documents the effects of alcohol marketing on alcohol use in emerging markets as well. A study of students aged 11–16 years in Zambia found that students who reported ever receiving a free alcoholic drink from a company representative had more than 40% greater odds of reporting drinking to intoxication and experiencing alcohol-related problems (e.g., missing school or fighting) relative to students who had not received one or more free drinks (108). Similarly, in the Philippines, students who reported ever receiving a free alcoholic drink from a company representative had 84% greater odds of reporting drinking to intoxication compared with students who had not received one or more free drinks (109). Filipino students' exposure to alcohol advertisements in newspapers or magazines and at public events (e.g., sporting events or concerts) was also associated with 65% and 50% greater odds of drinking to intoxication, respectively, relative to students without such exposure. Moreover, longitudinal research in Taiwan that followed 2,315 young people found that exposure to alcohol promotion in tenth grade across four forms of media was associated with initiation and persistence of drinking a year later (24).

EXPANSION OF GLOBAL ALCOHOL CORPORATIONS

As shown in **Figure 1**, the growth of global alcohol corporations and concentration of the global alcohol market in the hands of a small number of companies is a public health concern because it may be associated with increased population-level exposure to alcohol marketing. Alcohol oligopolies in many countries permit oligopoly profit taking, which in turn facilitates higher marketing spending and acts as a barrier to entry, thereby preserving the oligopolies (73). Increased marketing activity, in the form of both product development and promotion, can be used to segment and target groups that have historically not consumed much alcohol. In many LMICs, this includes women. A case study of alcohol marketing in Estonia found intentional industry efforts to increase drinking among women (56). Increased marketing of alcopops, flavored vodkas, and other products thought to be attractive to women has coincided in the United States with the narrowing of the gap between men's and women's drinking (64, 77). In India, Diageo, a London-based global alcohol corporation, has explicitly targeted marketing toward women (39). These examples point to the possible impact of increased resources for marketing on drinking in populations other than youth.

Because oligopoly organization plays such a key role in the global shape of alcohol marketing, it is necessary to understand the degree to which that organizational form dominates global alcohol. Two multinational alcohol corporations were among the world's 500 largest companies based on revenue in 2016, according to *Fortune's* Global 500 list (30): Belgium-based Anheuser-Busch InBev (AB InBev) had revenue of \$43,604 million for a rank of 211 and Netherlands-based Heineken had revenue of \$23,208 million for a rank of 459. For comparison, the Philip Morris International tobacco corporation had revenue of \$26,794 million for a rank of 398.

As of 2016, AB InBev sold more than 100 varieties of beer and other alcoholic beverages in more than 100 markets on 6 continents (3). It is the world's largest brewer, accounting for 25% of the global market (74), and its market is soon to be even larger. In late 2016, AB InBev acquired SABMiller (based in the United Kingdom); the completed merger will lead to control of 30% of beer sales worldwide (74).

With pervasive alcohol marketing and sponsorship associated with the expansion of global alcohol corporations in LMICs, many societies have experienced social and cultural shifts, marked

by an increase in the proportion of the population drinking alcohol, increased consumption among drinkers, or both (19, 58, 92). The alcohol industry is attracted to the economic development in emerging markets, as well as to groups that typically have high rates of alcohol abstinence, including women and young people (9, 39, 85, 118). In the following sections, we discuss global alcohol corporations' activities in Africa, Asia, and Latin America, as well as in high-income countries.

Africa

The merger between AB InBev and SABMiller will facilitate AB InBev's growth globally and particularly in Africa, where SABMiller makes almost one-third of its profits (48, 63). AB InBev predicts a 16% global volume growth in the beer market by 2025, with a growth rate of 44% in the African region (48), leveraging SABMiller's aspirations to dominate beer sales in Africa (63). Given that the average African has to work between two and six hours to pay for a half-liter of beer (86), SABMiller is keeping the cost of beer low as a long-term strategy for growth (63). The company has also invested more than \$100 million to strengthen brewing capacity in countries such as Ghana, Nigeria, and Zambia (63), facilitating the production of local brews that can be marketed with nation-specific symbolism (86). Global alcohol corporations, such as SABMiller (one of the top ten marketers in African countries), also spend millions on alcohol advertising; in 2010, SABMiller spent US\$74.5 million on advertising in South Africa alone (58).

With societal shifts occurring in alcohol environments in Africa and the development of innovative alcoholic products that draw from African culture, the proportion of the African population abstaining from alcohol is shrinking (85). Diageo has launched innovative products in the African region, including beverages appealing to women. One such beverage is Snapp, which Diageo described as its "first brand in Africa to be developed and marketed exclusively for women, providing a more stylish and sophisticated alternative to beer" and as the "most successful launch of a new brand, ever" (31, p. 191). The industry has also designed sachets and mini liquor bottles to package alcohol that can reach remote rural areas and are also attractive to young people because of their low price and small sizes (34, 78).

The alcohol industry has also been involved in the development of alcohol policies in African countries. A case study of draft national alcohol policies in four sub-Saharan African countries (Lesotho, Malawi, Uganda, and Botswana) suggested that the alcohol industry had a lead role in their development, resulting in proposed policies that served the industry's interests, with a disproportionate focus on economic benefits and a lack of evidence-based population-level interventions for effectively reducing the harmful use of alcohol (14). Alcohol marketing policies in Africa are often not well enforced, and even in countries where alcohol marketing restrictions exist, alcohol ads appear on the radio, billboards, posters, and product displays, in paintings on walls or fences, and with promotional items (29, 85).

Asia

Similar to the African region, several LMICs in Asia, such as India and China, have been affected by globalization, and global alcohol companies are increasingly present in these societies (5, 16). A growing middle class with increasing levels of disposable income to spend on alcohol has been associated with a cultural shift toward greater acceptance of alcohol consumption (39, 92). Diageo's 2016 annual report describes the establishment of "footholds in key emerging markets," including a local whisky in India and baijiu (a clear distilled spirit) in China (32, p. 5). The company expects that alcohol sales in India and Africa will account for nearly half of its global growth.

Latin America

For the reasons mentioned above, the global alcohol industry finds Latin America to be an attractive market, in particular its youth and women, who have a high rate of alcohol abstention, compared with these segments in mature markets such as the United States and Western Europe (18). Although the economies in many Latin American countries are developing, public health systems to regulate and enforce policies for effectively reducing harmful alcohol use remain weak, in the face of more pressing needs to address other imminent health crises (e.g., malnutrition, sanitation, and infectious diseases) (19). These weak alcohol regulatory systems provide economic opportunities for the alcohol industry (18). Alcohol companies fund corporate social responsibility programs all over the world, including in Latin America and the Caribbean, with stated public health and philanthropic objectives (88). However, a content analysis of these corporate social responsibility programs showed that 55% of the 215 activities analyzed had a marketing potential, whereas only 3% were based on scientific evidence of effectively reducing harmful alcohol use (88).

High-Income Countries

Similar to the strategies used in emerging markets, global alcohol corporations also use sophisticated marketing techniques and create innovative alcohol products that appeal to youth and women in high-income countries. With marketing that is attractive to youth (50, 77), ready-to-drink alcoholic beverages, such as Smirnoff malt beverages, Mike's Hard Lemonade, and Bacardi malt beverages, are popular among youth in countries such as the United States and New Zealand (45, 77, 103). Since the late 1990s, the gap between men's and women's drinking in some high-income countries, such as the United States and the United Kingdom, has narrowed; some researchers have attributed the normalization of a culture of heavier drinking among women to alcohol marketing that shows women using alcohol to cope with daily stress (64).

Multinational alcohol corporations have also begun to produce and market "healthier" alcoholic beverages, including gluten-free, vegan, and flavored vodka with real fruit juice instead of high-fructose corn syrup, as an appeal to the growing population of health-conscious drinkers (25). Furthermore, as craft beers have become increasingly popular in many societies, the global alcohol corporations have begun acquiring brewers selling craft beers and creating quasi-craft brands (115). In December 2015, AB InBev acquired three separate craft brewers (112).

Global alcohol corporations continue to grow, and few countries, including both LMICs and developed countries, have effective alcohol marketing regulations in place (126). The alcohol industry's own voluntary marketing codes are routinely violated (82, 83). In the next section, we discuss the varying degrees of effectiveness of frameworks for regulating alcohol marketing used around the world.

USE AND EFFECTIVENESS OF APPROACHES FOR REGULATING ALCOHOL MARKETING

Few coordinated global initiatives to prevent harmful alcohol consumption existed before 2005. In 2005, the 58th World Health Assembly endorsed its Resolution on Public Health Problems Caused by Harmful Alcohol Use (122). In 2010, the 63rd World Health Assembly endorsed the *Global Strategy to Reduce the Harmful Use of Alcohol* (125), referred to as the WHO Global Alcohol Strategy (124), which aims to increase awareness about alcohol-related harms to drinkers and to others, as well as awareness about the economic burden on societies. In addition, the WHO Global Alcohol Strategy provides information on effective alcohol policies and interventions across 10 priority areas, including alcohol marketing, pricing strategies (e.g., increasing alcohol taxes), and

interventions to regulate the availability of alcohol (e.g., reducing the geographic density of places selling alcohol).

Multifaceted approaches, including various evidence-based population-level alcohol policy interventions, will likely yield the greatest public health improvements (6), but here we focus on approaches for regulating alcohol marketing. The WHO Global Alcohol Strategy recommends the use of regulatory or coregulatory frameworks, ideally with a statutory basis, for regulating the content and volume of marketing, direct or indirect marketing in certain or all media, and sponsorship activities that promote alcoholic beverages (124). Evidence suggests that comprehensive alcohol marketing restrictions are a cost-effective strategy for reducing the harmful use of alcohol if they are well enforced (1, 26, 51). A Danish study found that switching from a ban that restricts alcohol marketing that targets children to a comprehensive ban on multiple media types (e.g., television, radio, billboards) had a 100% probability of cost savings (52).

The strength of alcohol marketing policies varies widely across regions and countries (126). The range of policy options for alcohol marketing restrictions includes four main categories: no restrictions, voluntary regulation or self-regulation, partial restrictions (e.g., on content, time and place, or particular audiences), and complete bans. In the following sections, we describe each of these and provide examples of these approaches as implemented in countries around the world.

No Restrictions or Self-Regulation

In 2012, nearly 40% of the 159 countries that provided information to the WHO on the status of their alcohol marketing policies reported having no restrictions in place (126). Having no restrictions or use of the industry's voluntary, self-regulated alcohol marketing approach is common worldwide, with little change from 2002 to 2012 (38, 126). Data on the use of these approaches globally beyond 2012 were not available at the time of this writing. The self-regulated alcohol marketing codes allow alcohol corporations to voluntarily develop guidelines for their marketing practices (42). However, recent reviews of more than 100 studies of alcohol industry self-regulation suggest that gaps in this self-regulatory approach greatly limit its effectiveness, including in the protection of vulnerable populations such as youth (82, 83). Voluntary, self-regulated alcohol marketing codes often do not cover all types of media (e.g., the Internet or social media), or the codes may exclude sponsorship (e.g., at sporting events) (20, 126). The ineffectiveness of voluntary, self-regulated alcohol marketing is parallel to evidence of the ineffectiveness of self-regulated tobacco marketing prior to the adoption of the Framework Convention on Tobacco Control (96).

Self-regulatory approaches often focus on the content of alcohol advertisements rather than on the placement of or exposure to advertising; multiple studies have documented the ineffectiveness of the content provisions for protecting vulnerable populations (61, 62, 83, 105, 119). In addition, evidence has shown that voluntary restrictions on ad placements are ineffective in preventing the targeting of underage youth (98). Voluntary, self-regulated guidelines may leave open the possibility for varying interpretations of which advertisements constitute code violations; studies have found that alcohol companies interpret the marketing codes differently than public health professionals do (11, 12). Moreover, the industry may also modify the voluntary guidelines, making acceptable the advertisements that did not previously meet the voluntary standards (10).

In many African countries, alcohol marketing is not restricted or the codes are voluntary and self-regulated by the alcohol industry (29, 38), meaning there are no legally binding restrictions on alcohol advertising, product placement, sponsorship, or sales promotion (126). The voluntary, self-regulated codes in Ghana and Uganda do not limit the volume of outdoor advertising nor do they include stipulations about the content of alcohol ads (29). In a study of outdoor alcohol advertising in five African countries, countries with self-regulated alcohol marketing generally had

larger outdoor alcohol advertisements (e.g., billboards and posters) compared with countries that had more alcohol marketing restrictions (29). In addition to using outdoor advertising, alcohol companies also distribute free alcoholic drinks as a strategy to market their products; the studies described above have found that this strategy increases the risks of youth drunkenness and problem drinking (110).

Alcohol marketing in the United States is also primarily self-regulated; however, US youth are exposed to a substantial amount of advertising. From 2005 to 2012, young people under the legal drinking age were exposed to more than 15 billion advertising impressions that were not in compliance with the industry's own code, occurring mostly on cable television (97). Evidence suggests that youth are also exposed to alcohol advertising in digital formats (e.g., on the Internet and social media) (15, 72), with self-reported levels of exposure higher than those of adults (59). Hollingworth et al. (51) modeled the potential impact of a complete ban on alcohol marketing in the United States and concluded that it would be associated with a 16% reduction in alcohol-related years of life lost among young adults who were 20 years old in the year 2000, whereas a partial ban would be associated with a 4% reduction in alcohol-related years of life lost in the same population.

Partial Restrictions

Some countries have partial restrictions on alcohol marketing, such as restrictions on content, time and place, or time and content, although this approach is less prevalent than having no restrictions or voluntary, self-regulatory alcohol marketing codes (126). The strength of these restrictions of alcohol marketing can vary widely by country. Here we discuss strengths and limitations of these policies in countries where relatively comprehensive partial restrictions have been implemented.

A few countries have restrictions against alcohol marketing on broadcast media, such as television and radio. For example, in India, the Press Council of India and the Cable Television Network Act of 1995 ban broadcast alcohol advertising at the national level (93). However, Indians are increasingly exposed to alcohol marketing, as the industry commonly uses surrogate advertising (16), which is a practice of placing the name of alcohol brands on nonalcoholic beverages or placing advertising for the company on nonalcoholic products, such as water or music. Alcohol corporations also sponsor events, sports teams, and airlines using the same name as alcoholic beverages (93).

Gambia also bans alcohol advertising on national television and radio; however, outdoor alcohol ads and print marketing are permitted (29). On television channels in Gambia where alcohol ads are permitted, a health warning message is displayed as well. Despite such restrictions on alcohol advertising in broadcast media, populations are still exposed to alcohol marketing as global alcohol corporations fund and implement branded social responsibility programs, which are seldom evidence based and can serve as a marketing strategy (9, 36, 39).

The French *Loi Évin* provides a model partial ban. It prohibits alcohol advertising on television, in cinemas, at festivals, and as sponsorship (46). Alcohol advertising of drinks with more than 1.2% alcohol by volume is banned on media targeting young people. Some types of alcohol advertising are permitted, such as on the radio at selected hours overnight, on billboards, online, and at points of sale. Alcohol advertising content is restricted to factual product information, and other marketing techniques (e.g., association between alcohol consumption and pleasure or success) are prohibited. Alcohol advertisements must also include a health warning disclaimer (46). Under pressure from the alcohol industry, the French have reduced the restrictiveness of this law since its implementation in 1991. Today, alcohol advertising in France is generally permitted online, and the advertising of regional or cultural drinks is allowed on media where it was previously prohibited, including television and cinemas.

In Finland, a more restrictive alcohol marketing policy went into effect in 2015. The policy extends the hours when alcohol advertising is banned on television and increases alcohol marketing placement restrictions, including a ban on outdoor advertising, except at public events (76). Including alcohol ads in digital games and promoting user interaction, such as liking or sharing, online are also banned (76).

An assessment of alcohol advertising that aired during the televised broadcast of the 2014 Fédération Internationale de Football Association (FIFA) World Cup Tournament in eight countries (including Argentina, Brazil, Canada, Finland, France, Mexico, Spain, and the United States) found that only the countries with stronger alcohol marketing policies (France and Finland) effectively protected young people and vulnerable populations from exposure to alcohol marketing (84).

Complete Bans

Despite the effectiveness of complete bans in reducing exposure to alcohol marketing, such bans are rare, occurring in 10% of the 159 countries that provided information to the WHO about the status of their alcohol marketing policies in 2012 (126). Owing to the influence of Islam, countries with complete alcohol advertising prohibitions cluster in the predominantly Islamic regions of northern Africa and the Middle East (126).

Public health researchers have recently called for global action to prevent the exposure of vulnerable populations to alcohol marketing. They indicated that “the most effective response to alcohol marketing is likely to be a comprehensive ban on alcohol advertising, promotion and sponsorship, in accordance with each country’s constitution or constitutional principles” (7, p. 125). Although several countries have increased the magnitude of the partial restrictions on alcohol marketing, as described in the previous section, few countries have implemented complete bans. South Africa has made an effort to do so. In September 2013, the South African Cabinet moved forward a bill to ban alcohol marketing in the country; however, it has faced delays with strong opposition from the alcohol industry (89).

CHALLENGES AND OPPORTUNITIES FOR REDUCING EXPOSURE TO ALCOHOL MARKETING AND ALCOHOL-RELATED HARM

Several barriers exist in addressing the harmful use of alcohol, which have complicated the implementation of statutory regulation to completely prohibit alcohol marketing. First, global public health funding has been increasingly dominated by philanthropy, and no major philanthropic organization has prioritized alcohol. Second, leaders and countries may lack the political will or public health infrastructure to implement policies found effective in reducing alcohol-related harms, including comprehensive alcohol marketing restrictions (18, 85). Third, there are notable contradictions between alcohol industry efforts and evidence-based strategies to reduce harmful drinking (8, 39). For example, a review of 17 studies identified strategies that the alcohol industry uses to influence marketing regulations, including the promotion of self-regulation and the dissemination of information disputing the evidence on the effectiveness of statutory regulations (101). Case studies in Brazil and four African countries also demonstrate the alcohol industry’s influence in legislative initiatives (14, 118).

Fourth, in light of rapidly developing marketing innovations, all-encompassing alcohol marketing bans are challenging to establish and maintain. As youth are increasingly exposed to alcohol marketing on digital media (15, 120), approaches for regulating alcohol marketing would ideally include all forms of media (e.g., radio, cable television, Internet, and social media). Finally, with

a public health goal of reducing harmful alcohol use among adults rather than promoting total abstinence, justification of public health-oriented alcohol policies is more complex than it has been with tobacco, for instance, for which there is no safe level of consumption (117).

Despite these challenges, opportunities exist for the implementation of comprehensive, statutory regulations restricting alcohol marketing to protect youth and other vulnerable populations. At the country level, a recent technical note from the Pan American Health Organization recommends that nations, to the extent constitutionally feasible, adopt total and comprehensive bans on alcohol marketing, including advertising, promotion, and sponsorship, and designate an independent body to implement, monitor, and enforce such a ban (87). If a total ban is constitutionally infeasible, countries are encouraged to begin with a comprehensive ban and then write into statute minimal exceptions to that ban, an approach similar to that of the French *Loi Évin*.

At the global level, some researchers and professional organizations have called for a binding international treaty to reduce harmful alcohol use and related problems (4, 20, 23), similar to the WHO Framework Convention on Tobacco Control (121). Like its tobacco counterpart, a global Framework Convention on Alcohol Control could be a platform for governments to commit to a minimum set of actions to address issues such as price, taxation, physical availability, and illicit trade as well as the advertising, marketing, and sponsorship of alcohol products (23).

Public health researchers and legal experts posit that an international alcohol marketing code could be developed in a nonbinding form with recommended action for WHO Member States (75). On the basis of existing WHO codes of select consumer products, they propose that an international alcohol marketing code could address the promotion of alcoholic products to the public, advertising at the point of sale, and product labels. The code could be designed to recommend limiting the promotion of alcohol to certain media (e.g., traditional print media but not on the Internet), restrictions on alcohol sponsorship (e.g., at public events such as festivals), and restrictions on the placement of alcohol products in films and television programs (75). There is no consensus in the public health community about whether an international treaty on alcohol marketing or a nonbinding code would be most effective, as both come with advantages and disadvantages. However, either form would assist governments in strengthening their country's alcohol marketing policies to protect vulnerable populations from the adverse impact of alcohol marketing exposure (68).

The WHO Global Alcohol Strategy serves as a platform for the provision of technical support to countries seeking to reduce harmful alcohol consumption; however, it does not function as an international alcohol marketing code or international treaty (124). For the greatest potential impact on reducing harmful alcohol use, countries and jurisdictions may consider more widespread use of comprehensive, evidence-based approaches, including the development and adoption of statutory alcohol marketing regulation that incorporates principles disseminated by the Pan American Health Organization (87) as well as other population-level strategies recommended by the WHO (e.g., increasing alcohol taxes and regulating the density of alcohol outlets) (123, 126).

The harmful use of alcohol is not typically perceived as a health crisis, but it is a leading preventable cause of death and disability. A multifaceted approach for reducing alcohol-related harm—including widespread use of policies that effectively reduce exposure to alcohol marketing by vulnerable populations, increase alcohol taxes, and reduce the physical availability of alcohol—could prevent the deaths of millions of young people and adults each year.

DISCLOSURE STATEMENT

M.B.E. is a health scientist at the Centers for Disease Control and Prevention; however, she contributed to this article entirely in her personal capacity as an approved activity outside of her

federal duties. The contents of this article are solely the responsibility of the authors, and the views expressed do not necessarily represent the official views of the Centers for Disease Control and Prevention or the Department of Health and Human Services. The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

LITERATURE CITED

1. Anderson P, Chisholm D, Fuhr DC. 2009. Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol. *Lancet* 373:2234–46
2. Anderson P, de Bruijn A, Angus K, Gordon R, Hastings G. 2009. Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. *Alcohol Alcohol.* 44:229–43
3. Anheuser-Busch InBev. 2016. *Our markets*. Anheuser-Busch InBev, New York. <http://www.ab-inbev.com/about-us/our-markets.html>
4. APHA (Am. Public Health Assoc.). 2006. *A call for a framework convention on alcohol control*. Policy Statement 200615, Nov. 8. <http://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/07/11/50/a-call-for-a-framework-convention-on-alcohol-control>
5. Babor TF. 2014. The gathering storm: alcohol abuse among the Chinese in Asia, and the public health response. *Malays. J. Chin. Stud.* 3:1–20
6. Babor TF, Caetano R, Casswell S, Edwards G, Giesbrecht N, et al. 2010. *Alcohol: No Ordinary Commodity. Research and Public Policy*. New York: Oxford Univ. Press. 2nd ed.
7. Babor TF, Jernigan D, Brookes C, Brown K. 2017. Toward a public health approach to the protection of vulnerable populations from the harmful effects of alcohol marketing. *Addiction* 112(Suppl. 1):125–27
8. Babor TF, Robaina K. 2013. Public health, academic medicine, and the alcohol industry's corporate social responsibility activities. *Am. J. Public Health* 103:206–14
9. Babor TF, Robaina K, Jernigan D. 2015. The influence of industry actions on the availability of alcoholic beverages in the African region. *Addiction* 110:561–71
10. Babor TF, Xuan Z, Damon D. 2010. Changes in the self-regulation guidelines of US Beer Code reduce the number of content violations reported in TV advertisements. *J. Public Aff.* 10:6–18
11. Babor TF, Xuan Z, Damon D, Noel J. 2013. An empirical evaluation of the US Beer Institute's self-regulation code governing the content of beer advertising. *Am. J. Public Health* 103:e45–51
12. Babor TF, Xuan Z, Proctor D. 2008. Reliability of a rating procedure to monitor industry self-regulation codes governing alcohol advertising content. *J. Stud. Alcohol Drugs* 69:235–42
13. Bagnardi V, Rota M, Botteri E, Tramacere I, Islami F, et al. 2015. Alcohol consumption and site-specific cancer risk: a comprehensive dose-response meta-analysis. *Br. J. Cancer* 112:580–93
14. Bakke Ø, Endal D. 2010. Alcohol policies out of context: drinks industry supplanting government role in alcohol policies in sub-Saharan Africa. *Addiction* 105:22–28
15. Barry AE, Bates AM, Olusanya O, Vinal CE, Martin E, et al. 2016. Alcohol marketing on Twitter and Instagram: evidence of directly advertising to youth/adolescents. *Alcohol Alcohol.* 51:487–92
16. Benegal V. 2005. India: alcohol and public health. *Addiction* 100:1051–56
17. Borges G, Cherpitel C, Orozco R, Bond J, Ye Y, et al. 2006. Multicentre study of acute alcohol use and non-fatal injuries: data from the WHO collaborative study on alcohol and injuries. *Bull. World Health Organ.* 84:453–60
18. Caetano R. 2015. Africa and Latin America: united again. *Addiction* 110:1380
19. Caetano R, Laranjeira R. 2006. A 'perfect storm' in developing countries: economic growth and the alcohol industry. *Addiction* 101:149–52
20. Casswell S. 2012. Current status of alcohol marketing policy—an urgent challenge for global governance. *Addiction* 107:478–85
21. Casswell S, Harding JF, You RQ, Huckle T. 2011. Alcohol's harm to others: self-reports from a representative sample of New Zealanders. *N. Z. Med. J.* 124:75–84

22. Casswell S, Maxwell A. 2005. Regulation of alcohol marketing: a global view. *J. Public Health Policy* 26:343–58
23. Casswell S, Thamarangsi T. 2009. Reducing harm from alcohol: call to action. *Lancet* 373:2247–57
24. Chang FC, Lee CM, Chen PH, Chiu CH, Miao NF, et al. 2014. Using media exposure to predict the initiation and persistence of youth alcohol use in Taiwan. *Int. J. Drug Policy* 25:386–92
25. Chaudhuri S. 2016. Booze makers court consumers with ‘healthier’ drinks. *Wall Street Journal* July 24. <http://www.wsj.com/articles/booze-makers-court-consumers-with-healthier-drinks-1469392485>
26. Chisholm D, Rehm J, Van Ommeren M, Monteiro M. 2004. Reducing the global burden of hazardous alcohol use: a comparative cost-effectiveness analysis. *J. Stud. Alcohol* 65:782–93
27. Collins DJ, Lapsley HM. 2008. *The Costs of Tobacco, Alcohol and Illicit Drug Abuse to Australian Society in 2004/05*. Canberra: Dep. Health Ageing, Commonw. Aust.
28. de Bruijn A, Engels R, Anderson P, Bujalski M, Gosselt J, et al. 2016. Exposure to online alcohol marketing and adolescents’ drinking: a cross-sectional study in four European countries. *Alcohol Alcohol.* 51:615–21
29. de Bruijn A, Ferreira-Borges C, Engels R, Bhavsar M. 2014. Monitoring outdoor alcohol advertising in developing countries: findings of a pilot study in five African countries. *Afr. J. Drug Alcohol Stud.* 13:13–29
30. DeCarlo S, ed. 2016. Fortune Global 500. *Fortune*. <http://beta.fortune.com/global500/list>
31. Diageo. 2013. *Diageo Annual Report 2013*. London: Diageo. https://www.diageo.com/pr1346/aws/media/1479/diageo_ar_2013_lo-res_master_final.pdf
32. Diageo. 2016. *Diageo Annual Report 2016*. London: Diageo. https://www.diageo.com/pr1346/aws/media/1199/diageo_annual_report_2016_interactive__7_.pdf
33. Diep PB, Knibbe RA, Giang KB, De Vries N. 2015. Secondhand effects of alcohol use among students in Vietnam. *Glob. Health Action* 8:25848
34. Drasher M. 2014. Packet alcohol delivers a serious hangover in Sierra Leone. *Vice News*, May 31. <https://news.vice.com/article/packet-alcohol-delivers-a-serious-hangover-in-sierra-leone>
35. Engels RC, Hermans R, van Baaren RB, Hollenstein T, Bot SM. 2009. Alcohol portrayal on television affects actual drinking behaviour. *Alcohol Alcohol.* 44:244–49
36. Esser MB, Bao J, Jernigan DH, Hyder AA. 2016. Evaluation of the evidence base for the alcohol industry’s actions to reduce drink driving globally. *Am. J. Public Health* 106:707–13
37. Esser MB, Gururaj G, Rao GN, Jayarajan D, Sethu L, et al. 2016. Harms from alcohol consumption by strangers in five Indian states and policy implications. *Drug Alcohol Rev.* 36:682–90
38. Esser MB, Jernigan DH. 2014. Assessing restrictiveness of national alcohol marketing policies. *Alcohol Alcohol.* 49:557–62
39. Esser MB, Jernigan DH. 2015. Multinational alcohol market development and public health: Diageo in India. *Am. J. Public Health* 105:2220–27
40. Esser MB, Rao GN, Gururaj G, Murthy P, Jayarajan D, et al. 2016. Physical abuse, psychological abuse, and neglect: evidence of alcohol-related harm to children in five states of India. *Drug Alcohol Rev.* 35:530–38
41. Esser MB, Wadhvaniya S, Gupta S, Tetali S, Gururaj G, et al. 2016. Characteristics associated with alcohol consumption among emergency department patients presenting with road traffic injuries in Hyderabad, India. *Injury* 47:160–65
42. Fed. Trade Comm. 2014. *Self-Regulation in the Alcohol Industry: Report of the Federal Trade Commission*. Washington, DC: Fed. Trade Comm. <https://www.ftc.gov/system/files/documents/reports/self-regulation-alcohol-industry-report-federal-trade-commission/140320alcoholreport.pdf>
43. Ferreira-Borges C, Dias S, Babor T, Esser MB, Parry CD. 2015. Alcohol and public health in Africa: Can we prevent alcohol-related harm from increasing? *Addiction* 110:1373–79
44. Fisher JC, Bang H, Kapiga SH. 2007. The association between HIV infection and alcohol use: a systematic review and meta-analysis of African studies. *Sex Transm. Dis.* 34:856–63
45. Fortunato EK, Siegel M, Ramirez RL, Ross C, DeJong W, et al. 2014. Brand-specific consumption of flavored alcoholic beverages among underage youth in the United States. *Am. J. Drug Alcohol Abuse* 40:51–57

46. Gallopel-Morvan K, Spilka S, Mutatayi C, Rigaud A, Lecas F, Beck F. 2017. France's Évin Law on the control of alcohol advertising: content, effectiveness and limitations. *Addiction* 112(Suppl. 1):86-93
47. Giesbrecht N, Cukier S, Steeves D. 2010. Collateral damage from alcohol: implications of 'second-hand effects of drinking' for populations and health priorities. *Addiction* 105:1323-25
48. Goodman LM. 2016. Budweiser's battle for beer market dominance hinges on the U.S. *Newsweek*, Nov. 3. <http://www.newsweek.com/2016/11/11/budweiser-merger-beer-market-516396.html>
49. Greenfield TK, Karriker-Jaffe KJ, Giesbrecht N, Kerr WC, Ye Y, Bond J. 2014. Second-hand drinking may increase support for alcohol policies: new results from the 2010 National Alcohol Survey. *Drug Alcohol Rev.* 33:259-67
50. Hastings G. 2009. "They'll drink bucket loads of the stuff": an analysis of internal alcohol industry advertising documents. Memo. AL 81, Alcohol Educ. Res. Council, London
51. Hollingworth W, Ebel BE, McCarty CA, Garrison MM, Christakis DA, Rivara FP. 2006. Prevention of deaths from harmful drinking in the United States: the potential effects of tax increases and advertising bans on young drinkers. *J. Stud. Alcohol* 67:300-8
52. Holm AL, Veerman L, Cobiac L, Ekholm O, Diderichsen F. 2014. Cost-effectiveness of preventive interventions to reduce alcohol consumption in Denmark. *PLOS ONE* 9:e88041
53. Holmes MV, Dale CE, Zuccolo L, Silverwood RJ, Guo Y, et al. 2014. Association between alcohol and cardiovascular disease: Mendelian randomisation analysis based on individual participant data. *BMJ* 349:g4164
54. IARC (Int. Agency Res. Cancer). 2012. *Personal Habits and Indoor Combustions*. Vol. 100 E: *A Review of Human Carcinogens*. Lyon, France: IARC
55. Jernigan D, Noel J, Landon J, Thornton N, Lobstein T. 2017. Alcohol marketing and youth alcohol consumption: a systematic review of longitudinal studies published since 2008. *Addiction* 112(Suppl. 1):7-20
56. Jernigan DH. 2000. *Cultural vessels: alcohol and the evolution of the marketing-driven commodity chain*. PhD Diss., Univ. Calif., Berkeley
57. Jernigan DH. 2009. The global alcohol industry: an overview. *Addiction* 104(Suppl. 1):6-12
58. Jernigan DH, Babor TF. 2015. The concentration of the global alcohol industry and its penetration in the African region. *Addiction* 110:551-60
59. Jernigan DH, Padon A, Ross C, Borzekowski D. 2017. Self-reported youth and adult exposure to alcohol marketing in traditional and digital media: results of a pilot survey. *Alcohol Clin. Exp. Res.* 41:618-25
60. Jewett A, Shults RA, Banerjee T, Bergen G. 2015. Alcohol-impaired driving among adults—United States, 2012. *MMWR* 64:814-17
61. Jones SC, Hall D, Munro G. 2008. How effective is the revised regulatory code for alcohol advertising in Australia? *Drug Alcohol Rev.* 27:29-38
62. Jones SC, Lynch M. 2007. Non-advertising alcohol promotions in licensed premises: Does the Code of Practice ensure responsible promotion of alcohol? *Drug Alcohol Rev.* 26:477-85
63. Kell J. 2015. Here's how SABMiller plans to tap into Africa's nascent beer market. *Fortune*, March 10. <http://fortune.com/2015/03/10/sabmiller-africa-beer-market>
64. Kindy K, Keating D. 2016. For women, heavy drinking has been normalized. That's dangerous. *Washington Post*, Dec. 23. https://www.washingtonpost.com/national/for-women-heavy-drinking-has-been-normalized-thats-dangerous/2016/12/23/0e701120-c381-11e6-9578-0054287507db_story.html?utm_term=.51fac654a9a0
65. Koordeman R, Anschutz DJ, Engels RC. 2011. Exposure to alcohol commercials in movie theaters affects actual alcohol consumption in young adult high weekly drinkers: an experimental study. *Am. J. Addict.* 20:285-91
66. Koordeman R, Anschutz DJ, Engels RC. 2012. The effect of alcohol advertising on immediate alcohol consumption in college students: an experimental study. *Alcohol Clin. Exp. Res.* 36:874-80
67. Koordeman R, Anschutz DJ, Engels RC. 2014. The effect of positive and negative movie alcohol portrayals on transportation and attitude toward the movie. *Alcohol Clin. Exp. Res.* 38:2073-79
68. Landon J, Lobstein T, Godfrey F, Johns P, Brookes C, Jernigan D. 2017. International codes and agreements to restrict the promotion of harmful products can hold lessons for the control of alcohol marketing. *Addiction* 112(Suppl. 1):102-8

69. Laslett A-M, Ferris J, Dietze P, Room R. 2012. Social demography of alcohol-related harm to children in Australia. *Addiction* 107:1082–89
70. Laslett AM, Room R, Ferris J, Wilkinson C, Livingston M, Mugavin J. 2011. Surveying the range and magnitude of alcohol's harm to others in Australia. *Addiction* 106:1603–11
71. Margolis LH, Foss RD, Tolbert WG. 2000. Alcohol and motor vehicle-related deaths of children as passengers, pedestrians, and bicyclists. *JAMA* 283:2245–48
72. McClure AC, Tanski SE, Li Z, Jackson K, Morgenstern M, et al. 2016. Internet alcohol marketing and underage alcohol use. *Pediatrics* 137:e20152149
73. McGowan R. 1997. *Government Regulation and the Alcohol Industry: The Search for Revenue and the Common Good*. Westport, CT: Greenwood
74. McGrath M. 2016. The world's largest food and beverage companies 2016: Chocolate, beer and soda lead the list. *Forbes*, May 27. <http://www.forbes.com/sites/maggiemcgrath/2016/05/27/the-worlds-largest-food-and-beverage-companies-2016-chocolate-beer-and-soda-lead-the-list/>
75. Mitchell AD, Casben J. 2016. Trade law and alcohol regulation: what role for a global alcohol marketing code? *Addiction* 112(Suppl. 1):109–16
76. Montonen M. 2015. *Strengthening regulation of online alcohol advertising: a case study from Finland*. Natl. Inst. Health Welfare (THL), Helsinki. https://ec.europa.eu/health/alcohol/docs/ev_20150922_co03_en.pdf
77. Mosher JF. 2012. Joe Camel in a bottle: Diageo, the Smirnoff brand, and the transformation of the youth alcohol market. *Am. J. Public Health* 102:56–63
78. Mwele JK. 2009. *Perceived impact of packaging on alcohol consumption: a case of the University of Nairobi students*. MA Thesis, Univ. Nairobi. <http://erepository.uonbi.ac.ke/handle/11295/13267>
79. Naimi TS, Brown DW, Brewer RD, Giles WH, Mensah G, et al. 2005. Cardiovascular risk factors and confounders among nondrinking and moderate-drinking U.S. adults. *Am. J. Prev. Med.* 28:369–73
80. Naimi TS, Ross CS, Siegel MB, DeJong W, Jernigan DH. 2016. Amount of televised alcohol advertising exposure and the quantity of alcohol consumed by youth. *J. Stud. Alcohol Drugs* 77:723–29
81. Naimi TS, Siegel M, DeJong W, O'Doherty C, Jernigan D. 2015. Beverage- and brand-specific binge alcohol consumption among underage youth in the U.S. *J. Subst. Use* 20:333–39
82. Noel JK, Babor TF. 2017. Does industry self-regulation protect young people from exposure to alcohol marketing? A review of compliance and complaint studies. *Addiction* 112(Suppl. 1):51–56
83. Noel JK, Babor TF, Robaina K. 2017. Industry self-regulation of alcohol marketing: a systematic review of content and exposure research. *Addiction* 112(Suppl. 1):28–50
84. Noel JK, Babor TF, Robaina K, Feulner M, Vendrame A, Monteiro M. 2017. Alcohol marketing in the Americas and Spain during the 2014 FIFA World Cup Tournament. *Addiction* 112(Suppl. 1):64–73
85. Obot IS. 2013. Alcohol marketing in Africa: not an ordinary business. *Afr. J. Drug Alcohol Stud.* 12:63–73
86. Onitsha K. 2014. SABMiller in Africa: the beer frontier. *Economist*, May 31. <http://www.economist.com/news/business/21602999-long-established-african-firm-went-global-only-find-fastest-growing-market-was-its>
87. PAHO (Pan Am. Health Organ.). 2017. *Background on Alcohol Marketing Regulation and Monitoring for the Protection of Public Health*. Tech. Note PAHO/NMH/17-003. Washington, DC: PAHO
88. Pantani D, Peltzer R, Cremonese M, Robaina K, Babor T, Pinsky I. 2016. The marketing potential of corporate social responsibility activities: the case of the alcohol industry in Latin America and the Caribbean. *Addiction* 112(Suppl. 1):74–80
89. Parry C, London L, Myers B. 2014. Delays in South Africa's plans to ban alcohol advertising. *Lancet* 383:1972
90. Parry C, Patra J, Rehm J. 2011. Alcohol consumption and non-communicable diseases: epidemiology and policy implications. *Addiction* 106:1718–24
91. Patra J, Taylor B, Irving H, Roerecke M, Baliunas D, et al. 2010. Alcohol consumption and the risk of morbidity and mortality for different stroke types—a systematic review and meta-analysis. *BMC Public Health* 10:258
92. Prasad R. 2009. Alcohol use on the rise in India. *Lancet* 373:17–18
93. Public Health Found. India. 2013. *Alcohol Marketing and Regulatory Policy Environment in India*. New Delhi: Public Health Found. India

94. Rehm J, Baliunas D, Borges GLG, Graham K, Irving H, et al. 2010. The relation between different dimensions of alcohol consumption and burden of disease—an overview. *Addiction* 105:817–43
95. Rehm J, Taylor B, Mohapatra S, Irving H, Baliunas D, et al. 2010. Alcohol as a risk factor for liver cirrhosis: a systematic review and meta-analysis. *Drug Alcohol Rev.* 29:437–45
96. Richards JW Jr., Tye JB, Fischer PM. 1996. The tobacco industry's code of advertising in the United States: myth and reality. *Tob. Control* 5:295–311
97. Ross CS, Brewer RD, Jernigan DH. 2016. The potential impact of a “no-buy” list on youth exposure to alcohol advertising on cable television. *J. Stud. Alcohol Drugs* 77:7–16
98. Ross CS, Ostroff J, Jernigan D. 2014. Evidence of underage targeting of alcohol advertising on television in the United States: lessons from the Lockyer v. Reynolds decisions. *J. Public Health Policy* 35:105–18
99. Sacks JJ, Gonzales KR, Bouchery EE, Tomedi LE, Brewer RD. 2015. 2010 national and state costs of excessive alcohol consumption. *Am. J. Prev. Med.* 49:e73–79
100. Sadeghirad B, Duhaney T, Motaghipisheh S, Campbell NR, Johnston BC. 2016. Influence of unhealthy food and beverage marketing on children's dietary intake and preference: a systematic review and meta-analysis of randomized trials. *Obes. Rev.* 17:945–59
101. Savell E, Fooks G, Gilmore AB. 2016. How does the alcohol industry attempt to influence marketing regulations? A systematic review. *Addiction* 111:18–32
102. Schneider M, Chersich M, Neuman M, Parry C. 2012. Alcohol consumption and HIV/AIDS: the neglected interface. *Addiction* 107:1369–71
103. SHORE and Whariki Res. Cent. 2012. *Social Supply of Alcohol to Young People in Taranaki and Mangere*. Shore and Whariki Res. Cent., Sch. Public Health, Massey Univ., Auckland
104. Smith GS, Branas CC, Miller TR. 1999. Fatal nontraffic injuries involving alcohol: a metaanalysis. *Ann. Emerg. Med.* 33:659–68
105. Smith KC, Cukier S, Jernigan DH. 2014. Regulating alcohol advertising: Content analysis of the adequacy of federal and self-regulation of magazine advertisements, 2008–2010. *Am. J. Public Health* 104:1901–11
106. Snyder LB, Milici FF, Slater M, Sun H, Strizhakova Y. 2006. Effects of alcohol exposure on youth drinking. *Arch. Pediatr. Adolesc. Med.* 160:18–24
107. Stockwell T, Zhao J, Panwar S, Roemer A, Naimi T, Chikritzhs T. 2016. Do “moderate” drinkers have reduced mortality risk? A systematic review and meta-analysis of alcohol consumption and all-cause mortality. *J. Stud. Alcohol Drugs* 77:185–98
108. Swahn MH, Ali B, Palmier JB, Sikazwe G, Mayeya J. 2011. Alcohol marketing, drunkenness, and problem drinking among Zambian youth: findings from the 2004 Global School-Based Student Health Survey. *J. Environ. Public Health* 2011:497827
109. Swahn MH, Palmier JB, Benegas-Segarra A, Sinson FA. 2013. Alcohol marketing and drunkenness among students in the Philippines: findings from the nationally representative Global School-Based Student Health Survey. *BMC Public Health* 13:1159
110. Swahn MH, Palmier JB, Kasirye R. 2013. Alcohol exposures, alcohol marketing, and their associations with problem drinking and drunkenness among youth living in the slums of Kampala, Uganda. *ISRN Public Health* 2013:948675
111. Taylor B, Irving HM, Baliunas D, Roerecke M, Patra J, et al. 2009. Alcohol and hypertension: gender differences in dose-response relationships determined through systematic review and meta-analysis. *Addiction* 104:1981–90
112. Taylor K. 2016. The battle between Big Beer and craft brewers is getting ugly. *Business Insider*, Feb. 11. <http://www.businessinsider.com/big-beer-vs-craft-beer-battle-gets-ugly-2016-2>
113. Thavorncharoensap M, Teerawattananon Y, Yothasamut J, Lertpitakpong C, Chaikledkaew U. 2009. The economic impact of alcohol consumption: a systematic review. *Subst. Abuse Treat Prev. Policy* 4:20
114. Thavorncharoensap M, Teerawattananon Y, Yothasamut J, Lertpitakpong C, Thitiboonsuwan K, et al. 2010. The economic costs of alcohol consumption in Thailand, 2006. *BMC Public Health* 10:323
115. Tuttle B. 2015. Big Beer's 5-point plan to crush the craft beer revolution. *Time Money*, Oct. 16. <http://time.com/money/4073371/anheuser-busch-sabmiller-craft-beer/>
116. Tye JB, Warner KE, Glantz SA. 1987. Tobacco advertising and consumption: evidence of a causal relationship. *J. Public Health Policy* 8:492–508

117. US DHHS (Dep. Health Hum. Serv.). 2014. *The Health Consequences of Smoking—50 Years of Progress. A Report of the Surgeon General*. Atlanta, GA: US DHHS, Cent. Dis. Control Prev.
118. Vendrame A. 2017. When evidence is not enough: a case study on alcohol marketing legislation in Brazil. *Addiction* 112:81–85
119. Vendrame A, Pinsky I, e Silva RS, Babor T. 2010. Assessment of self-regulatory code violations in Brazilian television beer advertisements. *J. Stud. Alcohol Drugs* 71:445–51
120. Winpenny EM, Marteau TM, Nolte E. 2014. Exposure of children and adolescents to alcohol marketing on social media websites. *Alcohol Alcohol.* 49:154–59
121. WHO (World Health Organ.). 1999. *Towards a WHO Framework Convention on Tobacco Control*, WHA Resolut. 52.18, World Health Assem., 52nd Assem., WHO Doc. A52/7, WHO, Geneva
122. WHO (World Health Organ.). 2005. *Public-Health Problems Caused by Harmful Use of Alcohol*, WHA Resolut. 58.26, World Health Assem., 58th Assem., WHO Doc. A58/18, WHO, Geneva
123. WHO (World Health Organ.). 2010. *Global Status Report on Noncommunicable Diseases*. Geneva: WHO
124. WHO (World Health Organ.). 2010. *Global Strategy to Reduce the Harmful Use of Alcohol*. Geneva: WHO
125. WHO (World Health Organ.). 2010. *Global Strategy to Reduce the Harmful Use of Alcohol*, WHA Resolut. 63.13, World Health Assem., 63rd Assem., WHO Doc. A63/13, WHO, Geneva
126. WHO (World Health Organ.). 2014. *Global Status Report on Alcohol and Health*. Geneva: WHO
127. Zhao J, Stockwell T, Roemer A, Naimi T, Chikritzhs T. 2017. Alcohol consumption and mortality from coronary heart disease: an updated meta-analysis of cohort studies. *J. Stud. Alcohol Drugs* 78:375–86



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