



## Commentary

## Unrecorded alcohol in East Africa: A case study of Kenya

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## ABSTRACT

Alcohol misuse contributes substantially to the global morbidity and mortality burden. Unrecorded alcohol, alcohol that is purchased by means which precludes regulation, represents a substantial proportion of the alcohol consumed in East Africa. In Kenya, homebrew also known as traditional brew, has been linked to several fatalities and hospitalizations. Previously banned, the Kenyan government recently legalized homebrew in an effort to regulate and reduce its harm. Despite legalization, however, homebrew continues to be endemic. In this paper, we examine the scope and harm associated with unrecorded alcohol in Kenya, and discuss current policies and interventions aimed at reducing production and consumption of unrecorded alcohol in the Kenyan context that reflect its culture, politics, environment and resources.

## Alcohol and public health

The harmful effects of excessive alcohol consumption have been linked to unintentional and intentional injury (Chen & Yoon, 2017; Cremonte & Cherpitel, 2014; Korcha et al., 2013), as well as a plethora of leading causes of death and disability, such as ischemic heart disease, ischemic stroke, diabetes, HIV/AIDS, tuberculosis and pneumonia (Baliunas, Rehm, Irving, & Shuper, 2010; Danaei et al., 2009; Rehm et al., 2017; Samokhvalov, Irving, & Rehm, 2010). Alcohol use is a leading key risk factor contributing to Disability Adjusted Life Years (DALYs) worldwide (GBD 2016 Risk Factors Collaborators, 2017). Moreover, there are also significant economic consequences linked to alcohol misuse, such as diminishing financial resources and increased societal and health care costs (Bouchery, Harwood, Sacks, Simon, & Brewer, 2011; Lievens et al., 2017; Sacks, Gonzales, Bouchery, Tomedi, & Brewer, 2015), and reduced work-related productivity and reduced earnings (Thavorncharoensap, Teerawattananon, Yothasamut, & Lertpitakpong, 2009). Globally, alcohol consumption contributes to approximately 5.2% of global burden of disease (Gakidou et al., 2017). Research indicate that the overall burden and harm of alcohol is particularly high in the Sub-Saharan Africa region due to its unique public health context. For example, alcohol is associated with increased risk behaviors associated with leading causes of death such as HIV (Ferreira-Borges, Rehm, Dias, Babor, & Parry, 2016; Kalichman, Simbayi,

Vermaak, Jooste, & Cain, 2008; Roerecke, Obot, Patra, & Rehm, 2008).

Considering the negative health, socio-cultural, and economic impact of alcohol misuse, public health professionals have prioritized so-called “best buys” for prevention, which include increasing alcohol beverage excise taxes, restricting access to retail alcohol beverages and banning or restricting advertising and marketing of alcohol (World Health Organization, 2014). Many of these policies, however, assume alcohol is procured through traditional avenues. For instance, increased taxation on alcohol is inherently tied to point of purchase. Thus, alcohol prevention efforts, and their effectiveness, are influenced by the manner in which alcohol is obtained (i.e., formal or informal means). Formal means of alcohol use comprise of alcohol that is legally purchased where product quality is controlled, regulated, and traceable and as such can be “recorded” (Rehm, Klotsche, & Patra, 2007). Examples include restaurant and bar settings, grocery stores, and convenience stores. For public health practitioners, evidence-based approaches to control, prevent, reduce and restrict access to recorded alcohol are the most feasible to regulate. Strategies such as age restrictions, increasing taxes, reducing alcohol outlet density, and limiting days and hours of sale can be instituted (Campbell et al., 2009; Elder et al., 2007; Hahn et al., 2010; Middleton et al., 2010). Yet, these proven policies are only feasible, and effective, in addressing recorded alcohol use.

Informal “unrecorded” alcohol, on the other hand, is challenging to regulate. Unrecorded alcohol is considered: (1) alcohol that is illegally

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produced, such as moonshine and/or counterfeit beverages or illegally imported through cross-border smuggling; (2) homebrew/homemade without regulations; (3) not registered where it is consumed, legally imported via duty free shops; or (4) surrogate alcohol, i.e. not intended for consumption such as aftershave (Giesbrecht, Greenfield, Lemmens, & Österberg, 2000; Lachenmeier & Rehm, 2009; Thamarangsi, 2013). Inability to track and control unrecorded alcohol consumption and production represent a major public health challenge as it is incredibly difficult to measure and assess the true scope of unrecorded alcohol production and consumption (Lachenmeier & Rehm, 2009; Lachenmeier, Taylor, & Rehm, 2011). Additionally, unrecorded beverages are non-standardized; thus, estimating the specific amount of alcohol consumed (e.g., “standard drink”) and controlling individual servings is difficult (Musungu & Kosgei, 2015; Papas et al., 2010). As such, the unique burden of unrecorded alcohol use and its associated harms/consequences represent a major public health challenge. Moreover, unrecorded alcohol is generally understudied, epidemiological data is lacking, and little is known about the broader cultural contexts influencing production and consumption.

### Unrecorded alcohol consumption

Worldwide, it is estimated that one fourth of all alcohol consumed is unrecorded (World Health Organization, 2014), with substantially higher proportion of residents in lower and middle income countries consuming unrecorded alcohol compared to those in industrialized countries (Rehm et al., 2014; World Health Organization, 2014). Even though estimates are varied and limited, in some sub-Saharan African countries, unrecorded alcohol is often consumed in greater quantities and more frequently than recorded alcohol (International Center for Alcohol Policies, 2012; Willis, 2002). Approximately 30% of the alcohol consumed in the Africa region is unrecorded (Ferreira-Borges et al., 2016; Ferreira-Borges, Parry, & Babor, 2017). It is estimated that 36% of adults in Kenya consume unrecorded alcohol, which typically falls under the category of homebrew or traditional alcohol (Ministry of Health, 2015). Unrecorded alcohol continues to be a high proportion of the alcohol consumed in Kenya and other Eastern African countries such as Uganda because it is more easily accessible, cheaper, and is tied to cultural and traditional practices (Papas et al., 2010; Swahn, Haberland, & Palmier, 2014).

The specific public health challenges associated with unrecorded alcohol are quite evident despite the limited research available to date (Limaye, Rutkow, Rimal, & Jernigan, 2014; Scott-Sheldon et al., 2014). While there are many forms of alcohol-related harm linked to traditional brew, the most recognized appear because of deaths and hospitalizations following consumption of contaminated or improperly manufactured alcohol. An estimated 7000 Kenyans have died over the past four years as a result of traditional homebrew alcohol consumption (Musungu & Kosgei, 2015; National Council for Law Reporting, 2010). In May 2014 alone, at least 77 people died and 100 were hospitalized in Kenya after consuming homebrew (Gridneff & Eric, 2014). In response to these tragedies, there have been outcries for policies and strategies to minimize the negative impact of unrecorded alcohol in Kenya (Musungu & Kosgei, 2015). Herein, the aim of this commentary is to examine the scope of traditional homebrew in Kenya, to examine current policies in the country, and to weigh the applicability of evidenced based policies and strategies from a public health perspective. Potential intended and unintended consequences of policies and strategies are also discussed.

### Scope of traditional homebrew in Kenya

The process and practices of making and consuming traditional brew differ between Kenya's diverse communities. The beverages vary by formulas, production techniques, and names. Common homebrew traditional beverages include chang'aa (wuruchi or wirgiik) a distilled

spirit made from grains such as millet or bananas; busaa (molotek) which is a maize beer; muratina (kurubu), mnazi (coconut ale) and miti in dawa made of fermented sugar, yeast and herbs (Githinji, 2015; Musungu & Kosgei, 2015; Papas et al., 2010; Takahashi et al., 2017). The types of traditional homebrew in Kenya also vary by geographic region and closely mirror the staple crop grown in the area. For instance, in Eldoret Kenya, the homebrew busaa (maize beer) from corn is most commonly produced, as opposed to chang'aa which is typically made from millet in other areas of the country (Papas et al., 2010).

The negative consequences of consuming traditional homebrew have been directly associated with production practices, such as inadequate distilling processes or the adulteration of the beverages. Additives such as methanol, higher ethanol, car battery acid and other substances are added to increase potency and hasten the brewing or distilling process (Carey, Kinney, Eckman, Nassar, & Mehta, 2015). The cost of homebrew is also an influential factor fueling Kenyan consumption of homebrew (Papas et al., 2010). As an example, a glass of chang'aa, also known as “kill me quick” for its high potency, can cost as low as 5 Kenyan shillings (0.1 U.S. dollars) which is significantly lower than the price of a bottle of beer, 100 Kenyan shillings (1 U.S. dollar) (Dixon, 2010; Hibbert, 2013).

In addition to costing less, homebrew typically also has higher levels of alcohol by volume. For instance, the average serving of the chang'aa drink was found to be equal to 2 standard drinks by the U.S. standards and 3.5 drinks by the standards in Great Britain. Similarly, a serving of the busaa was comparable to 1.3 drinks by the U.S. standards and 2.3 drinks by Great Britain standards (Papas et al., 2010). Thus, “getting drunk” essentially costs much less when drinking homebrew. With the substantially lower cost of homebrew compared to recorded alcohol, those with limited means and in low socio-economic status make up the highest proportion of consumers of unrecorded brews such as chang'aa and busaa (Bodewes, 2010; Carey et al., 2015; Mutisya & Willis, 2009).

Culture and traditions are also major influencers of alcohol drinking behavior in Kenya. Homebrew consumption is an integral part of social and religious events, such as wedding celebrations, genital circumcisions, funerals, as well as a feature of recreational events and entertainments, such as sports competitions and music concerts (Willis, 2002). Even though homebrew is commonly used by a large proportion of Kenyans and also linked to meaningful cultural and traditional customs that have been passed down for generations, relatively little is known about homebrew use. Specifically, there is a paucity of research providing insight into the specific prevalence and context of homebrew use, risk factors for use, and/or production, distribution or consumption leverage points for prevention efforts. To the best of our knowledge, only one study has examined consumption of unrecorded alcohol and recorded alcohol despite unrecorded alcohol being the most prevalent type of alcohol consumed in Western Kenya (Takahashi et al., 2017). Thus, more empirical research is needed to better understand unrecorded alcohol in Kenya and guide public health intervention. Given the dynamic and complex nature of unrecorded brew in Kenya, and its ties to traditions and socio-economic context, ethnographic research may provide unique insights which could be leveraged for policy recommendations.

### A brief primer on homebrew alcohol policies in Kenya

The history of alcohol policy development in Kenya dates back to 1897 when policies restricted the consumption, manufacturing, and sale of “native intoxicating liquors” and traditional fermented brews (De Smedt, 2009). These policies sought to discourage “disruptive drinking” behaviors as well as prevent negative outcomes associated with alcohol consumption. In particular, policy makers were concerned that alcohol use and abuse would lead to lack of participation in wage labor, as the public sector and white settler agriculture depended on available labor for rapid expansion (Ambler, 1991).

Policies restricting alcohol production and sales have continued to

be modified over the years. In 1980, almost 100 years since the initial alcohol policies, the Changa'aa Prohibition Act banned the sale, manufacture, consumption and possession of traditional drinks and spirits given these drinks accounted for 36.5% of alcohol consumption in the country (Carey et al., 2015). Even after legislation outlawed this form of unrecorded alcohol, chang'aa and other homebrews continued to pose major public health threats as they contributed to cases of deaths and blindness (Gayle, 2014; Leposo, 2010).

As a result of failure to regulate and prevent fatalities and injuries from homebrew, the “Mututhos Laws”, Kenya Supplement bill was passed in September 2010 in an attempt to regulate manufacturing of unrecorded alcohol. The bill introduced requirement for homebrews to be “manufactured, packed, sold or distributed” in glass bottles (National Council for Law Reporting, 2010). The bill was later amended in 2014 (National Council for Law Reporting, 2014) to emphasize “hygienic packaging and labeling of traditional alcoholic drinks” and introduce penalties for adulterating homebrew (National Council for Law Reporting, 2014). Despite the harsh financial penalty for adulterating alcohol (10 million Kenya Shillings; equivalent to \$100,000), enforcement is unable to control homebrew production and consumption and homebrew batches continue to cause methanol poisoning and other associated harms (Carey et al., 2015).

In addition to the harsh financial penalties, brewers are also required to seek approval for production from the Kenya Revenue Authority (KRA) as well as from police, health, and a committee that consists of police officers, representatives from The National Campaign Against Drug Abuse Authority (NACADA) and the Kenya Bureau of Standards (The National Campaign Against Drug Abuse Authority (NACADA, 2014). The costs of seeking formal approval for brewing is both time consuming and costly, is estimated at about 400,000 Kenyan Shillings (\$3844), an exorbitant cost for an average brewer. These regulatory costs are far and above the average costs associated with building a new brewing den, which is about 8000 Kenyan Shillings (\$77) (Mutegi, 2011).

### Are traditional alcohol countermeasures applicable in Kenya?

In Kenya, current alcohol production countermeasures have yet to make substantial inroads in preventing the manufacturing, distribution, and consumption of unrecorded alcohol or its harm (The National Campaign Against Drug Abuse Authority. (NACADA, 2011). Acknowledging the health impacts of unrecorded alcohol, the World Health Organization (WHO) recently recommended; (1) quality control in production and distribution, (2) regulation of sales by introducing traditional alcohol into the markets and taxation system, (3) enforcement through tax stamps, (4) developing tracking systems, (5) encouraging the exchange and cooperation of information between authorities, and (6) warning the public of contaminants and health threats brought on by illicit brew (World Health Organization, 2011). Other recommendations also include traditional countermeasures that may apply to homebrew in Kenya including, lowering alcohol excise taxes, banning toxic substances commonly used to adulterate alcohol, as well as creating a monopoly (Lachenmeier et al., 2011). These countermeasures, however, may not be applicable in the context of homebrew in Kenya for several reasons.

Lowering alcohol excise taxes in order to compete with the low prices of unrecorded alcohol has been found to have unintended consequences such as increasing consumption (Lachenmeier et al., 2011; Mäkelä & Österberg, 2009; Wagenaar, Tobler, & Komro, 2010), and therefore may lead to unintended consequences if applied in Kenya. For the recorded alcohol industry, lowering excise taxes is favorable as it boosts production of lower cost alcohol products targeting at low-income consumers (Botha, 2009). For public health though, lowering taxes has been shown to increase consumption of alcohol (Mäkelä & Österberg, 2009) resulting in increased morbidity and mortality for alcohol related health issues (Babor, 2010; Wagenaar et al., 2010). For

the government, lower taxes are also an unfavorable option as they reduce revenue collected from sales (Nordlund & Österberg, 2000). For Kenya, a country plagued with limited sources of revenue and tax revenue (Chapman, Gakuru, & de Klerk, 2003; Transparency International, 2016), lowering taxes may result in both increasing consumption as well as decreased revenue.

Banning toxic compounds has also been used as a method to control the content of homebrew especially for substances such as methanol (Anderson, Chisholm, & Fuhr, 2009; Lachenmeier et al., 2011; Okaru et al., 2017). Banning compounds would require a substantial increase in resource allocation for monitoring and policing the manufacturing of homebrew, a major challenge that requires commitment in both funds and manpower. The current bill only requires brewers use glass containers to serve homebrew (National Council for Law Reporting, 2014), overlooking the main threat of contamination of the brew from adulteration. An alternative to banning the addition of compounds would be to institute high purchase taxes on the products used in the manufacturing process. Introducing such taxes may result in a decrease in purchases for brewers, an increase in homebrew prices for consumers and may reduce the overall consumption of homebrew. However, given that alcohol can be manufactured from a range of ingredients, this strategy may not be feasible or particularly impactful as it can easily be circumvented.

Some countries have created government monopolies in an effort to curb development and consumption of unrecorded alcohol (Lachenmeier et al., 2011). In the case of Germany, the government's monopoly bought alcohol from home brewers, irrespective of quality, then purified it and subsequently introduced it to the markets (Lachenmeier et al., 2011). Creating a monopoly in the Kenyan context would be challenging. First, the government would have to allocate a budget dedicated to both buying and also the testing and purification of homebrews. The current Alcohol Control Act does not allocate funding for NACADA the agency tasked with controlling substance abuse in the country (National Council for Law Reporting, 2014). Second, government monopolies in Kenya have a history of financial difficulties. For example, Mumias sugar, the government's monopoly on sugar production, continues to struggle with its fiscal management (Marabu, 2012; Wanyande, 2001). Table 1 summarized policy options of unrecorded alcohol and their applicability to Kenya.

### Opportunities for public health intervention?

It is clear that unrecorded alcohol in Kenya is consumed by a large proportion of drinkers, has a long tradition of use in cultural and religious events, yet results in a range of adverse health consequences. As such, it is imperative that any policies and interventions that seek to address homebrew consumption, distribution, and/or production align with the cultural context of the community. Fortunately, research has shown that there are several potential intervention targets in the actual process of making homebrews (Carey et al., 2015). First, brewers typically use contaminated water from sources such as rivers. Second, containers used throughout the process were recycled receptacles such as oil drums and bug repellent cans that are susceptible to erosion. Third, containers were left uncovered to ferment, leaving opportunities for contamination. Finally, brewers purposefully introduced toxins and additives to create more potent brews (Carey et al., 2015). Opportunities to prevent contamination of homebrew could include regulating the brewing process by introducing brewing kits that would include water purification equipment and clean and easy to maintain brewing containers that include lids to avoid contamination. Moreover, these kits need to include clear guidelines on specific ingredients that cannot be added to adulterate the alcohol. Finally, there needs to be regular testing of the alcohol potency and toxicity to ensure its safety. As such, a brewing kit to approved brewers may reduce several of the health concerns and toxic agents present in current homebrew. However, for this intervention to be feasible and scalable, it is imperative that these

**Table 1**  
Policy options of unrecorded alcohol and their applicability to Kenya.

Policy Recommendation	Intended Consequence	Unintended Consequence	Application to Kenya
Lowering alcohol excise taxes	Competition between low priced recorded brews and unrecorded alcohol. Result- lower demand for low cost unrecorded brews.	Increase in consumption of alcohol resulting increased morbidity and mortality for alcohol related health issues.	Lowering taxes may result in both increasing consumption of alcohol as well as decreased tax revenue.
Banning or taxing toxic compounds	Decrease in purchase for brewers, an increase in homebrew prices for consumers thus reducing overall consumption.	Requires substantial resources (both funding and manpower) allocation for monitoring and policing.	Banning compounds or instituting high purchase taxes on the products used in the manufacturing process may increase prices and reduce demand. May easily be circumvented as brewers typically use local products.
Creating a government monopoly	Government monopoly involves buying alcohol from home brewers, irrespective of quality, then purifying and subsequently introducing it to the markets	Endorsement and sale of a substance that increases disease risk poses ethical dilemma for the government.	Government would have to allocate a budget dedicated to both buying, testing, and purification of homebrews

kits are affordable to potential brewers to ensure use and uptake, a recommendation previously made by Carey et al. (2015).

While the Kenya Alcoholic Drinks Control Bill acknowledges the dangers of alcohol (National Council for Law Reporting, 2014), the policies set forth by the bill are clearly insufficient. Simply stating that alcohol, specifically homebrew, should be served in glass containers is not adequate to address the key issue, which is the content of the alcohol that is being sold. Motivated by increasing profits from consumers whose demand depends on low prices, home brewers have been found to increase potency by adding substances such as formaldehyde, sisal juice, fertilizers, alkaline battery content, and methanol (Carey et al., 2015; Dixon, 2010). As such, the most dangerous part of the brewing process is the addition of substances to make the brew more potent as customers tend to prefer brewers with reputations of having highly concentrated alcohol (Carey et al., 2015). Banning known substances used to adulterate home brew is one option (Lachenmeier et al., 2011). Another recommendation would be high taxation of items known to be used in the brewing process as well as items used to adulterate the alcohol such as methanol (Dixon, 2010). This recommendation, however, may be limited as some products used in the brewing process are locally sourced which would make regulating access difficult. Second, the legalization of homebrew not only acknowledges that the government recognizes homebrew is deeply entrenched in the culture and traditions, but also provides a window of opportunity for strategies that may better fit the situation. Working with local and county governments to unionize home brewers to make themselves accountable for quality control may be a viable option. At the county government level, such intervention may be feasible and could be contextualized to fit the needs of the community. Taxation of the products, regulation and oversight by local governments may create an effective system for checks and balances.

The National Campaign Against Drug Abuse Authority (NACADA), although explicitly mentioned in the alcohol bill (National Council for Law Reporting, 2014) as the authority to address alcohol related challenges, is strapped for resources, as the bill does not allocate specific funding for the organization. The organization therefore has been restricted to publishing reports and creating public service announcements. Boosting's NACADA's resources both financial and technical support, will result in increased efforts and opportunities to address and coordinate efforts nationwide. Educating producers on how to produce safe beverage as well as educating consumers on the risks of consuming homebrew are two key recommendations to address the homebrew crisis.

## Conclusion

Current legislation is not sufficient and does not align with the specific challenges of the scope of unrecorded alcohol and harm in Kenya. The Kenyan government may consider working closely with

stakeholders such as county governments and brewers to determine best approaches to combat the morbidity and mortality from contaminated homebrew. While research in this area is limited, in other countries such as Malawi, stakeholder perception and policy recommendations were obtained (Limaye et al., 2014) which is a critically important step in guiding the future direction of informal alcohol production and homebrew specifically. Moreover, while not specifically addressed in this commentary, women tend to comprise the majority of those making homebrew (Holtzman, 2001; Limaye et al., 2014). These hard-working women usually choose this line of work because of limited opportunities for schooling and because they have limited skills to seek other opportunities to support themselves and their families. As such, policies that seek to reduce and improve the manufacturing of homebrew need to consider the issue of gender and women empowerment in addition to providing other economic opportunities for women as a strategy to address this specific issue (Limaye et al., 2014).

Additionally, research on the scope and context for the consumption of homebrew and other informal alcohol is lacking, not only in Kenya but in the East African region which share many of the concerns and experiences observed in Kenya and that are addressed in this commentary. Clearly, research is needed to better highlight the prevalence and risk factors for homebrew consumption by the overall population but also vulnerable subgroups such as those that are HIV positive and children. Research needs to assess more specifically the feasibility of targeting the recommended intervention points in the manufacturing process of homebrew and the circumstances of the women who brew the alcohol, in order to provide new strategies to make the homebrew less toxic. Finally, boosting funding and resources to the National Campaign Against Drug Abuse Authority (NACADA) should be an obvious priority in order to expand cultural centered approaches and health education strategies to reduce consumption of unrecorded alcohol nationwide. Overall, homebrew consumption and production cannot be easily addressed via “best buys” means which public health entities employ to offset recorded alcohol consumption. Novel, multi-pronged approaches that consider cultural context and traditions are needed, along with recognition of the vast array of factors and stakeholders impacting the growing public health concern of the homebrew proliferation and consumption in Kenya and East Africa.

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