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A bottle of beer, a glass of wine or a shot of whiskey? Can the rate of alcohol-induced harm be affected by altering the population's beverage choices?

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Abstract

This article summarizes and puts into context the findings from the five articles contained in this thematic issue. The question of interest has been the connection between different beverage types and alcohol-induced harm. The key question is whether policy makers can affect rates of harm by affecting beverage choice. In the discussion, four different potential pathways for such an effect are differentiated. The first is the direct effect of the beverage over and above the effect of the ethanol it contains. The review of results suggests that the size of this effect may be modest, and it is clearly overmatched by cultural factors relating to who chooses to drink which beverage and how. However, even more relevant than the direct effect may be the other three mechanisms, which potentially affect the amounts of alcohol drunk or allow the influencing of drinker groups of interest.

Background

The question of whether different alcoholic beverages are differentially associated with harmful effects has been a recurrent issue in discussions by stakeholders and scholars in the alcohol field. Strong evidence of associations could potentially have substantial consequences for both policymaking and commerce. Of particular political interest is the basic question of whether the rate of harms in a society could be modified by favoring some beverages over others. To some extent, lighter beverages are already favored in one way or another in most countries (by uneven taxation, age limits, differential availability, etc.). Nevertheless, there is rather little research on the differential effects of beverage types on alcohol-related harm, possibly due to methodological and theoretical challenges, but perhaps also partly due to the dogma that total consumption is the ultimate determinant in the long run.

The five articles published in this thematic issue have all approached the question of the connections between beverage type and harms empirically. Each of the studies approached the task in a different way, and their varying epistemological points of departure have led their authors into different paths of reasoning. The articles also illustrate the challenges involved in studying the complex relationships between the consumption of particular alcoholic beverages and their associated harms. Before we proceed to discussing the new findings, we will present a model that serves as a conceptual framework and that gives a context to the empirical results, facilitating the interpretation of the findings.

Effects of preferred beverage types on harms: A conceptual model

Beverage types differ from each other in various ways. Ethanol content may be the most critical ingredient from a public health point of view, but the alcohol content per se is not the only quality of the product that differentiates one beverage from the other. They taste different and have different status values and functions for the drinker. For these reasons, they are chosen to meet different purposes and they are typically preferred by different

groups of people. Because the motivations of drinkers and characteristics of drinking situations affect not only beverage choice but also the quantities of alcohol drunk, there are bound to be complex interconnections between the properties of drinkers and those of drinking situations, beverage choices, amounts consumed and harmful effects. One way of portraying these factors and their potential connections as a simplified conceptual model is presented in Figure 1 (Mäkelä et al. (2007).

The point of departure in this model is that the primary factor affecting the rate of harms is the amount of ethanol consumed. What matters in the amount of ethanol is both the amount consumed per occasion and the total amount consumed over longer periods of time. Further, the amounts drunk depend on the purpose of drinking and the nature of the drinking situation, which vary strongly from one individual to another and from one group of people to another (e.g. young men vs. older women). The same motivational and situational factors that affect the amounts drunk also affect beverage choice – e.g. wine is a more common beverage of choice to drink with a meal than spirits in most cultures. Given all this, the associations between the consumption of certain beverages and harms from drinking may often be due to differences in amounts of ethanol drunk – per occasion or in a longer period of time – between the groups preferring certain beverages, or to other differences between the drinkers rather than the drink. The causal *role of beverage choice* can be hypothesized to be of four kinds, three of which are illustrated by the broken arrows in Figure 1 taken from Mäkelä et al. (2007), with one hypothesis added below. These four hypotheses correspond to the following questions:

1. Is the choice of beverage type directly connected to alcohol-related harm, if the quantity of absolute alcohol consumed and the nature and purpose of the drinking situation is standardized (for example in an experimental setting)? According to this hypothesized effect there are differences relevant to harms to be found in the physical properties of alcoholic beverages other than alcohol content.
2. Does the choice of beverage affect the quantity of absolute alcohol consumed, with motivational and other background factors held constant? This hypothesis presumes that people in similar settings and with the same purpose of drinking tend to drink larger quantities if they choose one beverage than if they choose another one.
3. Can the choice of beverage type influence the purpose or nature of the drinking situation, and thereby the quantities consumed and the level of consequent harm?
4. Given that different groups of drinkers favor different beverage types, can we affect the amounts of alcohol drunk by those groups that are of special interest (e.g. the young or problem drinkers) by disfavoring the beverage type they prefer? The alternative hypothesis would be that their drinking in terms of amounts and patterns would remain unchanged and only the beverage preferences would change. This hypothesis would correspond to an additional broken arrow from Choice of beverage type to Demand in Figure 1.

Naturally, the model in Figure 1 is by no means either complete or absolute, and there are some additional arrows that could be added, for example back from “Harmful effects” up to “Demand” and “Alcohol policy”. Nevertheless, Figure 1 efficiently demonstrates some basic relationships that the researcher has to take into consideration when approaching the issue of harms from drinking different types of beverages. Such basic conjectures will affect choice of study design and will inevitably affect the interpretations made about associations found in empirical studies.

Pathways, research and policy

In the research literature, the different pathways of the effects of beverages have seldom been explicitly considered. In many studies on the effects of beverage types, pathway (1) has been the explicit or implicit focus of interest, even if pathways (2), (3) and (4) could in principle be even more important mechanisms for the harmful or protective effects of beverage types.

In controlled experiments, the experiment conditions efficiently rule out differences in both motivations for drinking and the amounts drunk. In the case of alcohol, experiments can only be used to study short-term effects or effects on animals. A quite extensive experimental Finnish study on the effects of distilled versus brewed beverages conducted by Takala et al. discussed these limitations already back in 1957 (Takala et al. 1957). At the time the researchers expressed positivistic hopes regarding future “objective personality tests” or “miniature life-situation tests” (p.. 185) that would help overcome some of the methodological concerns.

Long-term effects on humans have typically been studied using observational epidemiological designs. In them, the control for the drinking of other beverages is done via statistical adjustment. This is not as efficient a method for disentangling the separate effect of the different beverages as controlled experiments are, because most people do not consume only one beverage type, and because those who prefer one beverage type differ in many respects from those who prefer another beverage type. A considerable strength of the observational designs, in addition to the possibility of studying long-term effects, is that the “true effect” from a policy-maker’s point of view is not limited to pathway (1). Whatever the mechanism, if a policy strategy results in a reduced rate of problems, it tends to please the policy maker.

Affecting beverage choices in a population by conscious alcohol policies is relatively straightforward. However, the net effects of those policies on alcohol-related harm may not be as straightforward as could be thought by simply looking at associations between beverage types and harms. If the association between a given beverage type and the prevalence of harm is merely due to individual variation in the motivational and situational factors of drinking, then it is likely that when a policy successfully manages to reduce the consumption of that beverage type, this will be at least partly counterbalanced by increased consumption of other beverage types.

A good illustration of a real-life substitution response to alcohol policy is when fortified wines were removed from ration cards in Finland back in 1952 and the availability of fortified wines was thereby considerably increased (Österberg 2011). At the time, when people were arrested for drunkenness the main beverage they had drunk was either observed or asked and then recorded by the authorities. In 1951, the number of wine drinkers arrested per 1000 liters of alcohol consumed in wine was less than 10 while for vodka it was 22. But two years later, the corresponding rates were 27 and 13. So, had policy makers only looked at the figures from 1953 they might have (erroneously) concluded that wine is a more dangerous beverage than spirits. What needs to be borne in mind, then, is that the observed associations between beverage types and harm result from the responses of the people who grow up in the given drinking culture to the circumstances that happen to prevail at that historic point in time, in that particular setting.

However, even if substitution effects may potentially lessen the intended effects of policies directed at problems associated with one beverage type, marked effects may still be achieved sometimes. For example, when the Australian government raised the taxes on alcopops, the result was a sharp decrease in alcopop purchasing, some increase in other

beverage purchasing, but an overall decrease in consumption (Chikritzhs et al., 2009). Also evidence from economic studies lends support to the idea that substitution is likely to be partial but not complete: cross-price elasticities for different beverage types in comparison to own-price elasticities are small and unsystematic (Österberg 1995).

More generally, then, the conceptual model helps us understand why we expect differences in the association between beverage types and harms from drinking across time and cultures. There are wide cultural variations in norms and values related to the consumption of different beverages. Also, availability of different beverages is restricted or favoured in different ways in different countries and cultures. Together, these variations in the restrictions, norms and values result in wide differences regarding who will drink which beverages, in what kind of situations, and in what quantities. Therefore, the associations with harms are expected to vary as well. All in all, policy intentions, responses to policies, the drinking culture, actual behaviour and the level of harms all form a circuit in which the factors will affect each other.

As the associations are so strongly dependent on the time, culture and context, drawing conclusions from associations revealed by empirical studies is not straightforward. An association between the consumption of one beverage type and increased problems simply shows that a larger than average number of problems is concentrated among the drinkers of the given beverage. This association may be due to the fact that the beverage has more harmful effects per liter of ethanol (pathway 1), or it can also be that the drinkers of this beverage come to drink more (pathways 2–3), or that problem-prone drinkers prefer the beverage in question (selection effect/pathway 4). Whether policies restricting a beverage type will be effective depends on the actual balance between the pathways and on the extent to which lessened consumption of one beverage will be compensated for by increased consumption of other beverages.

Is there a differential effect of beverage type per se?

In the literature on differences between beverage types on harm there is most evidence about the effect of the beverage types per se, i.e. about pathway 1 in Figure 1. In their review of the empirical research on pathway (1), Mäkelä et al. (2007, p. 622) concluded:

> All in all it can be concluded that by far the single most important factor with respect to alcohol-related harm is the quantity of ethyl alcohol consumed at one sitting and in the longer term. The choice of beverage type has only marginal significance on top of this effect. However it seems that the volume of spirits sales is a more crucial factor than sales of other alcoholic beverages with respect to fatal alcohol poisonings, and there is quite persuasive evidence that spirits have a greater effect on aggressive behaviour than beer and wine. As for [coronary heart disease], the scientific verdict is still out on whether wine has a greater protective effect than other alcoholic beverages, and on whether spirits are more likely to cause certain cancers.

There are substantial variations betweens societies in rates of fatal alcohol poisonings; in countries of the former Soviet Union, for instance, the high rates of this (Zaridze et al., 2009) make it a substantial consideration in policy. For cancer, a later IARC monograph (2010, p. 1278) concluded that the epidemiological evidence showed little indication that the carcinogenic effects depend on the type of alcoholic beverage.

In experimental studies it has been found that the effect of alcohol on aggression differs by strength of beverage (Roine et al. 1993). When results such as this are applied to real life, another complicating factor is that alcoholic beverages are not always drunk in the strength

at which they are bought in the store. Instead, they are drunk with mixers and hence diluted. In one study it was found that in one-half of the drinking occasions when spirits were drunk in Finland in 1992, they were diluted to strengths comparable to wine or milder (Simpura et al. 1996). Also in the US, when the alcohol concentration of mixed spirits drinks was measured in a sample of bars and restaurants it was found that the average strengths were mostly similar to wine (Kerr et al., 2008). This may indicate that the differences between beverage types may in real life be even smaller than in experimental studies. However, spirits drink strength is clearly more variable than beer or wine, as some drinkers will consume undiluted spirits and off-premise drinkers can mix to their own taste. This self-titration aspect of mixed spirits drinks could have important dynamic consequences if heavier drinkers increase the strength of their drinks over time while maintaining their rate of drinking, as a response to tolerance, for example. An additional finding in the US drink content study was that shots of spirits served in bars and restaurants contained less alcohol than mixed drinks, suggesting that the establishments recognized a greater potential for intoxication from this style of drinking (Kerr et al., 2008)

All, in all, Mäkelä et al.'s(2007) overall conclusion remains generally true: it is the ethanol consumed at one sitting and in the longer term which mainly counts, with beverage type having only a marginal effect. However, the form in which the alcohol is consumed will have an influence particularly in societies where there are patterns of extreme intoxication and a cultural association of intoxication with violence. It should also be mentioned that these conclusions primarily concern western-type commercial beverages – beer, cider, wine and spirits – and do not take account of the effects of other substantial ingredients which may be present in the beverage, whether in home- and craft-brewed beverages in low-income countries or in the form of caffeine and other psychoactive constituents in commercial combination products.

Are some beverage types likely to be consumed in larger quantities than others?

Now turning to evidence about pathway 2 in Figure 1, it can be noted that whether some beverage types more easily end up being consumed in larger quantities than others is bound to depend on the drinking culture. Nevertheless, it is safe to assume that universally the easiest and quickest way of consuming large amounts of alcohol, carrying it around and drinking it without causing attention, is to consume it in the form of distilled spirits. Spirits provide the fastest, most effective and dependable way of getting drunk for those who wish to achieve that end. Conversely, even with the same intentions the state of drunkenness achieved when consuming mild beverages might often end up at a less intensive level.

Research evidence exists mainly on associations between heavy drinking or amounts drunk at a time, on the one hand, and beverage choice on the other. These associations are more likely to reflect an influence of drinking pattern on beverage choice rather than an influence of beverage choice on drinking pattern, i.e. there is likely to be a selection effect to beverage choice groups by drinking pattern. In the US, survey studies on the associations between beverage type and drinking levels indicate that spirits is proportionaly more popular with the heaviest drinkers as compared to lighter drinkers, although beer makes up more of their consumption volume (Kerr & Greenfield, 2007). Beer has also been found to be most associated with binge drinking and underage drinking (Rogers & Greenfield, 1999). In Sweden in the early 1990s, beer accounted for the highest proportion of alcohol consumed among the heaviest male drinkers, followed by spirits, whereas for women, wine and beer accounted for larger shares than spirits (Kühlhorn, 1998). In a Finnish study (Mäkelä et al. 2007), heavy drinkers drank a slightly higher proportion of all their consumption in the form of spirits compared to other drinkers.

The association between beverage type and the amounts drunk per occasion may differ from the association between beverage type and the average amount drunk over time. This was the case at least in the aforementioned Finnish study (Mäkelä et al., 2007), in which beverage choice had a very strong association with the amounts drunk per occasion but only a weak association with heavy drinking over a longer period. The more alcohol was drunk per occasion, the higher the proportion of it which was drunk in the form of spirits: on drinking occasions when fewer than 7 drinks were consumed, the proportion of spirits was 17%, while it was 34% for occasions when 13 or more drinks were drunk and 45% for occasions when 20 or more drinks were drunk. This increase in the share of spirits was mostly at the expense of wine, the share of which decreased with the increasing number of drinks drunk per occasion. In the same study, it was found that the popularity of wine was the greatest among older people, women, and those with high income, a result which has been found also elsewhere (Groenbaek et al. 2000). These are groups that would be expected to get into less trouble from drinking whatever beverage they prefer drinking.

The results of the five new studies put into context

Each of the five new studies presented in this thematic issue addresses the relationship between beverage choice and harms from drinking, but all from different points of departure and using different types of data. In Room et al.'s study (2011), individual-level cross-sectional data from 19 different countries were used to investigate whether there was evidence that either beer, wine or spirits preference was systematically more closely associated with self-reported personal and social consequences of drinking. According to the results, there was no general pattern that would hold across cultures. In a number of societies, wine drinking was less associated with trouble than beer or spirits, but this was not always the case. Between beer and spirits, there was little difference in general. Controlling by gender and age reduced some relationships to be below significance, but by no means all. This study illuminates the strong effect of cultural factors on the association between given beverages and reported harms. Whatever independent effect there may be for the beverages per se over and above the effect of ethanol consumption, it is dwarfed when compared to the effects of cultural factors that have an impact on the type of drinkers that choose each beverage and on the situations and quantities in which the given beverages are consumed.

Ramstedt & Boman's (2011) cross-sectional individual-level analysis was restricted to one country, which allowed for a more comprehensive analysis of the interrelationships between beverage choice, drinking habits, characteristics of drinkers and self-reported harms from drinking. Using beverage-specific consumption to predict the number of self-reported harms from drinking, Ramstedt and Boman showed that the consumption of strong beer and cider/alcopops were stronger predictors than spirits, which in turn was a stronger predictor than wine and the weaker "folk beer". Adjusting for background factors and binge drinking greatly diminished the differences, i.e. the greater risk associated with these beverages could partly be attributed to differences in the demography of the drinkers and in drinking patterns. A merit of the study is that it showed that some beverages are drunk in a more harmful way (large amounts, to intoxication), and thus play a more harmful role in the Swedish drinking culture, which is valuable information for Swedish policy makers. The lesser link to harm for the weaker "folk beer" compared to strong beer also indicates that the strength of beer may be an important aspect to be targeted through alcohol policies elsewhere as well as in Sweden.

A noteworthy finding in this study was that people drinking several beverages had a higher risk than those drinking only one beverage type. This finding for Sweden finds an echo in the results by Room et al. (2011) that drinkers who did not have a predominant choice of alcoholic beverage showed the highest rate of problems in a number of societies. In

Ramstedt and Boman's analysis, the most detrimental drinking patterns and the highest risk of harms were seen among those who drank strong beer, cider/alcopops and spirits in various combinations. Even after statistically controlling for the level and pattern of drinking, there remained an excess risk compared to the drinkers of other beverages, suggesting that the excess risk was not only due to drinking patterns. Then again, there may be residual confounding at play, i.e. had error-free measurement of all aspects of drinking patterns been available, more of the excess risk among the drinkers of strong beer, cider/alcopops and spirits could have been explained. It may well be that the preference for these beverage types is a good measure for an intoxication-orientated drinking style, perhaps even better than the traditional measures relating to the frequency of intoxication and/or binge drinking. An additional potential explanation for the findings is that selection effects to beverage choice group may include selection not only by drinking patterns, but also among drinkers: the Swedes most prone to trouble-making may tend to drink these beverage types.

The starting point of Ramstedt and Boman was to test the widespread notion that spirits is the most harmful beverage type in Sweden, and their main conclusion was that their data gave little support for that idea. In considering this finding it is important to remember that in Sweden the current policies in many ways regulate spirits much more strictly than other beverages. If the beverages had been treated equally, the results might have shown a closer association between spirits drinking and harms. In other words, on the basis of the findings we cannot rule out the historic Swedish idea of spirits as the most harmful beverage type, as it is possible that the resulting policies, which still regulate spirits the most, successfully manage to restrain the harmful effects of that beverage.

Mäkelä's (2011) analysis is also restricted to one country only, looking at trends over time. The aim in the design of this study was to avoid the confounding effects of self-selection into beverage choice categories by various factors relating to the drinker, the drinking situation and the time-varying properties of beverages such as price and availability. The strategy was to avoid the comparison of beverage choice groups altogether. Instead, the paper examined whether the observed history followed the expected development had the assumptions behind the 1960's "mild policy line" held true. The assumption and the reasoning behind this policy was that a change to milder beverages would lead to a moderation of drinking patterns and hence to less harm, at least per liter of alcohol consumed. The study shows that there was indeed a shift to milder alcoholic beverages, but both total consumption and harms increased. The results do not lend strong support to the idea that the modification of beverage choices would have resulted in less harmful drinking patterns or a systematically lower level of harms per liter of alcohol consumed, even if some of the changes examined did point in this direction. Rather, the policy strategy to favor mild beverages – co-influenced by other societal developments – seems to have lowered the threshold for women to drink and developed their drinking patterns in a more harmful direction. A similar picture is drawn in the Swedish study (Ramstedt & Boman 2011). On the other hand, the results also showed that the same amounts of alcohol per occasion are now drunk less speedily than they used to be drunk, which can be seen as some kind of sign of a moderation of drinking habits. All in all, this particular case study suggests that policy makers cannot trust that, by steering the population's consumption from strong to mild beverages, the nature of drinking occasions and the quantities drunk would automatically also change to more moderate approaches to drinking alcohol.

The paper by Landberg (2011) is similar to Mäkelä's (2011) as a longitudinal analysis of the development in one country, this time Sweden. However, Landberg explicitly examines the aggregate-level temporal association between per capita consumption of different beverage types and harm rates, and particularly whether spirits drinking has had an effect on harms over and above the effect of total consumption. According to the results, spirits consumption

has had the closest temporal correlation with harms in Sweden. However, when total consumption was controlled, the proportion of spirits did not show a significant impact on harms, other than for liver cirrhosis among men.

The study concentrates on answering the overall societal-level question of whether the rate of harms is systematically higher when there is an increase in the consumption of one beverage or another, or whether the rate of harms is systematically associated with the proportion of total consumption that is consumed in the form of spirits. This type of time series analysis will to some extent automatically remove the problem of self-selection to beverage choice groups by personality and situational factors. Yet, a part of the selection effect remains: wine drinkers are more often women, older and wealthier (Mäkelä et al. 2007), which probably means that a one liter increase in per capita consumption due to wine results in a lesser increase in harm rates than a corresponding increase due to beer, if that is drunk by young men with a lower level of socioeconomic protective factors and with a stronger proneness to risk-taking. Perfect elimination of selection effects is only possible in experimental settings, which have their own problems. However, as was discussed in connection with the framework presented above, from the point of view of alcohol policy, the exact mechanism through which harms are reduced is not the key issue. Even if the underlying reason is that problem-prone population groups choose spirits, Swedish policy makers will be interested in learning that in their society changes in the rate of harms have been most closely correlated with changes in the consumption of spirits.

The study results reviewed and presented by Kerr & Ye (2011) answer questions similar to those posed by Landberg, but the evidence comes from a number of time series studies carried out in the US. According to the results, spirits were found to be more strongly related to, or the only beverage type with a significant detrimental association with, cirrhosis, IHD and head and neck cancer mortality. Spirits sales, along with beer, were also implicated in motor vehicle accident mortality and homicde. Finally, all three beverage types, i.e. wine in addition to beer and spirits, were found to be associated with suicide mortality, but spirits more systematically than others. A reversed, protective association was shown for spirits on stomach cancer, presumably due to its beneficial effect on Helicobacter pylori bacteria. Similarly, a reversed, protective association was found for beer and wine with respect to heart disease (IHD), while the result for spirits consumption was the opposite. These opposite results are likely at least partly to reflect the findings that protective effects against IHD may be limited to regular drinkers, while intermittant heavy drinking is especially harmful (Roerecke & Rehm, 2010). The observed opposite associations could result from beer and wine drinkers' more moderate drinking patterns compared to spirits drinkers in the relevant, older age groups. Hence, differential effects of the beverage types per se is not required to obtain these differential temporal associations, but such differential effects cannot be ruled out, either. European estimates also suggest that spirits is more often implicated as the beverage most closely associated with rates of harm, even if results implicating other beverage types have also been reported (for more details, see Kerr & Ye 2011 and Ramstedt & Boman 2011 in this issue).

The importance of cultural factors as a differentiator of beverage-specific effects also arose in the discussion by Kerr & Ye (2011). They present a new analysis of motor vehicle accident mortality where per capita consumption of both beer and spirits are associated with mortality rates, but the strength and significance of these relationships differ by region of the country and time period. They also review a study of US homicide rates which found that for white Americans spirits was the beverage type associated with homicide, while among non-whites it was beer (Parker & Cartmill, 1998). These studies illustrate how different findings on harmful effects of specific beverages can be brought together and serve as a

springboard for theorizing on both specific relationships and more general factors in beverage-specific harm.

Conclusions

Are some beverages more harmful and/or drunk in more harmful ways than others? If that is the case, what can restrictions of these products lead to? The five studies have efficiently demonstrated that posing the question of which type of alcohol beverage is most harmful from a public health perspective will inevitably lead us further into some crucial questions for the study of harms caused by alcohol use. The evidence reviewed here showed that there are few if any straight-forward or universal answers to the questions posed.

There are a few types of problems where spirits, when consumed in concentrated form, seem to have a special association with harm. The most unarguable of these is overdose or poisoning; it is very difficult to die of an overdose of 2.8% beer, but not so hard with a beverage with 40% ethanol content. Particularly where there is a strong cultural association of alcohol and violence, spirits also seem to be particularly implicated. On the other side of the spectrum, wine often shows up with less harm per liter of ethanol, particularly where drinking it is associated with meals. But there does not seem to be any universal relationship between type of beverage and harm; counter instances can always be found for the general trends, and cultural effects clearly outweigh the effects of beverage types per se.

Does this mean that, from a public health perspective, policymakers should forget about differential regulation and taxation by type of alcoholic beverage? Our argument is that the answer to this is “no”. Taxes and availability are two of a relatively few effective levers available to national policymakers to affect levels and patterns of drinking in a population. And differential regulation and taxation of beverage types clearly affects the consumption of those beverages. Raising a tax on or regulating the availability of a particular type of beverage may also affect the overall level of alcohol consumption, as well as more sharply affecting the consumption of that particular beverage type (e.g., Chikritzhs et al., 2009).

What the studies tend to show is that there is little that is special about the physical form of the types of beverage themselves which differentiates them on harm (other than for overdose). But there are big differences in a population in who drinks how much of which type of beverage, and in the customs around the consumption of that beverage. Therefore, by affecting the consumption of given beverage types, policy makers can affect the corresponding groups of drinkers and customs – in particular, changing consumption of a beverage type may be a way to affect key drinker groups and the customs that are most hazardous to public health. One key group is heavy problem drinkers. Their consumption is likely to be affected favorably by regulation of the availability and taxation of the beverage they favor, which in many instances is the beverage that is the cheapest source of ethanol. Even if they switch to some extent from what was the lowest-priced beverage (in terms of cost per unit of ethanol) to another beverage which is now the lowest priced, there may be some policy gains along the way, both from the rise in the minimum price and from the fact that some of them will cut down along the way, as cross-price elasticities are not 1.0 (Österberg 1995). In this light, the different demographics of the consumers of different beverage types are not an argument against using differential taxes. On the contrary, there is actually an argument for increasing the tax on whatever the most problematic drinkers choose to drink precisely because they are choosing to drink it. What such a perspective points to is a relatively flexible attitude to alcohol taxation, where the differences between the tax levels of different beverages are adjusted periodically in the light of changing patterns in the population. However, trade agreements such as the European Union common market arrangements may make such policy decisions difficult or impossible.

One factor to take into consideration in setting tax levels is the inherent production and distribution costs of the different beverage types. What matters the most for consequences to public health and social harm is the retail price per liter of ethanol, rather than the amount of tax. Because the costs per liter of ethanol for manufacturing, packaging and transporting are significantly lower for spirits than for milder alcoholic beverages, an equal rate of taxes would tend to make spirits the cheapest source of ethanol. The closer link of spirits than of other beverage types to overdoses, as well as the closer temporal links to different types of harm in the USA (Kerr & Ye (2011) and Sweden (Landberg 2011), suggest that this might be a result better to be avoided.

Favoring some type of beverage in order to steer consumption in an intended direction has turned out to have the risk of unintended adverse consequences. If favoring one beverage leads to an increase in overall consumption, i.e. the effect is addition rather than substitution, then the most likely result is an overall increase in the rate of harms (Mäkelä 2011). This also suggests that policy makers in spirit-drinking countries like present-day Russia cannot solely rely on pathways 2–4 in our conceptual model -- that by affecting beverage choice the policy would also necessarily change the nature of drinking occasions and the quantities drunk to favor more moderate approaches to drinking. It is unfortunately easier to import new drinking contexts and customs related to new beverages than to make these replace old beverages and customs.

References

Chikritzhs TN, Dietze PM, Allsop SJ, Daube MM, Hall WD, Kypri K. The “alcopops” tax: heading in the right direction. Med J Australia. 2009; 190:294–295. [PubMed: 19296808]

Groenbaek M, Tjønneland A, Johansen D, Stripp C, Overvad K. Type of alcohol and drinking pattern in 56,970 Danish men and women. European Journal of Clinical Nutrition. 2000; 54(2):174–176. [PubMed: 10694790]

International Agency for Research on Cancer IARC & World Health Organization WHO. Monographs on the Evaluation of Carcinogenic Risks to Humans. Vol. 96. Lyon: IARC; 2010. Alcohol Consumption and Ethyl Carbamate.

Kerr WC, Greenfield TK. Distribution of alcohol consumption and expenditures and the impact of improved measurement on coverage of alcohol sales in the 2000 National Alcohol Survey. Alcohol Clin Exp Res. 2007; 31(10):1714–1722. [PubMed: 17651465]

Kerr WC, Patterson D, Koenen MA, Greenfield TK. Alcohol content variation of bar and restaurant drinks in Northern California. Alcohol Clin Exp Res. 2008; 32(9):1623–1629. [PubMed: 18616674]

Kerr WC, Ye Y. Beverage-specific mortality relationships in US population data. Contemporary Drug Problems. 2011; 00:000–000.

Kühlhorn, E. Svenska alkoholvanor i ett förändringsperspektiv. In: Kühlhorn, E.; Björk, J., editors. Svenska alkoholvanor i förändring. Stockholm: Sober Förlag; 1998. p. 49-80.

Landberg J. Harm per liter – Effects of the transition to beverages with lighter alcohol content in Sweden 1950–2001. Contemporary Drug Problems. 2011; 000:000–000.

Mäkelä P. Has the boozing Finn been tamed? Changes in the relationships between drinking, intoxication and alcohol-related harm in Finland in the past 40 years. Contemporary Drug Problems. 2011; 00:000–000.

Mäkelä P, Mustonen H, Österberg E. Does beverage type matter? Nordic Studies on Alcohol and Drugs. 2007; 24(6):617–631.

Österberg, E. Do alcohol prices affect consumption and related problems?. In: Holder, HD.; Edwards, G., editors. Alcohol and public policy: evidence and issues. Oxford: Oxford University Press; 1995. p. 145-163.

Österberg E. The effects of favoring lower alcohol content beverages: four examples from Finland. Nordic Studies on Alcohol and Drugs. 2011 in press.

Parker RN, Cartmill RS. Alcohol and homicide in the United States, 1934 –1995, or one reason why U.S. rates of violence may be going down. Journal of Criminal Law and Criminology. 1998; 88(4):1369–1398.

Ramstedt M, Boman U. Is spirits really more harmful than wine and beer?-a survey based analysis of Sweden today. Contemporary Drug Problems00. 2011:000–000.

Roerecke M, Rehm J. Irregular heavy drinking occasions and risk of ischemic heart disease: a systematic review and meta-analysis. American Journal of Epidemiology. 2010; 171(6):633–644. [PubMed: 20142394]

Rogers JD, Greenfield TK. Beer drinking accounts for most of the hazardous alcohol consumption reported in the United States. Journal of Studies on Alcohol. 1999; 60(6):732–739. [PubMed: 10606483]

Roine RP, Gentry RT, Lim RT Jr, Helkkonen E, Salaspuro M, Lieber CS. Comparison of Blood Alcohol Concentrations After Beer and Whiskey. Alcoholism: Clinical and Experimental Research. 1993; 17(3):709 – 711.

Room R, Ferris J, Bond J, Greenfield T, Graham K. Differences in trouble per literof different alcoholic beverages – A global comparison with the GENACIS dataset. Contemporary Drug Problems. 2011; 00:000–000.

Simpura J, Paakkanen P, Mustonen H, Metso L, Kiianmaa K. The Beverage Alcohol Concentration at Intake and Estimated Blood Alcohol. Nordisk Alkoholtidskrift. 1996; 13(English Suppl):43–50.

Takala, M.; Pihkanen, TA.; Markkanen, T. The effects of distilled and brewed beverages. A Physiological, Neurological, and Psychological Study. Helsinki: The Finnish Foundation for Alcohol Studies; 1957.

Zaridze D, Maximovitch D, Lazarov A, Igitov V, Boroda A, Boreham J, Boyle P, Peto R, Boffetta P. Alcohol Poisoning is a main determinant of recent mortality trends in Russia: evidence from a detailed analysis of mortality statistics and autopsies. International Journal of Epidemiology. 2009; 38(1):143–153. [PubMed: 18775875]

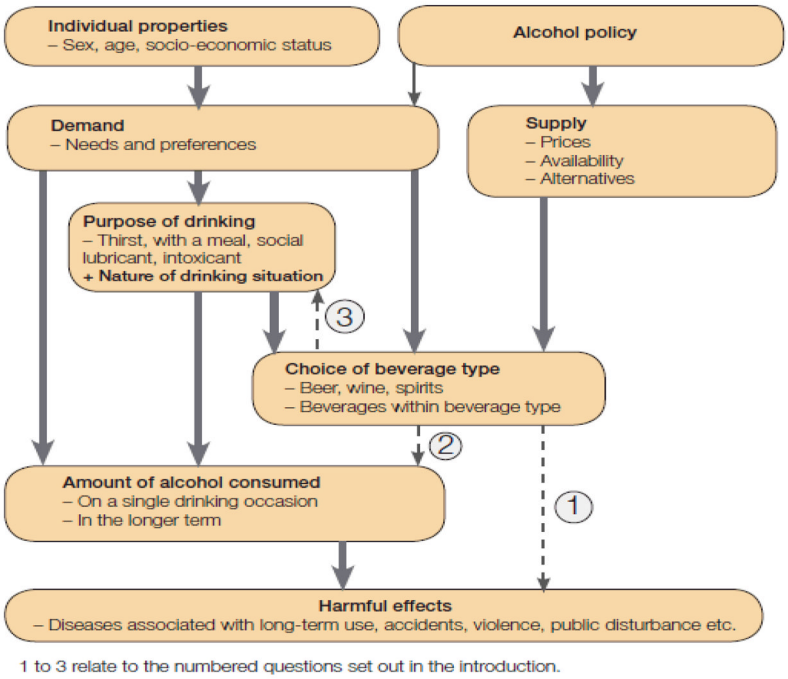

Figure 1.

A simplified model of the wider context of connections between beverage type and harms from drinking[1].

[1]Source: Mäkelä et al. 2007