Running title: The TEASE-16

The development and feasibility of a scale for assessing and evaluating national alcohol control policies

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Abstract

Objective To demonstrate the development and feasibility of a scale to comprehensively assess the adequacy of national alcohol control policies aimed at reducing alcohol consumption and related harms.

Methods The Toolkit for Evaluating Alcohol policy Stringency and Enforcement-16 (TEASE-16) comprehensively assesses level of stringency and enforcement of 16 alcohol control policies. The Toolkit was applied to policy data from nine countries in the Western Pacific Region: Australia, Japan, New Zealand, Singapore, Hong Kong, China, Malaysia, the Philippines, and Vietnam. Correlation and regression analyses were used to examine the relationship between alcohol policy scores and income-based per capita consumption.

Findings Vast differences exist in how alcohol control policies are implemented in the Western Pacific Region. Countries attained a median rating of 56.4 of a possible 100 points, ranging from 24.1 points in the Philippines to 67.5 points in Australia which had the weakest and strongest policy frameworks, respectively. Countries with higher alcohol policy scores had significantly lower per capita consumption. Sensitivity analyses supported the tool's robustness, with countries' scores and rankings remaining relatively stable across different weighting schemes.

Conclusion The TEASE-16 could be used by international and national regulatory bodies and policymakers to inform the design, implementation, evaluation and refinement of effective policies to reduce alcohol consumption and harms.

Introduction

As Babor et al.[1] note, alcohol is no ordinary commodity; whilst it can be source of pleasure for most consumers it is also associated with short- and long-term harms that affect the individual, family, and society. Research suggests that alcohol consumption is a leading risk factor of burden of disease and injury and is estimated to contribute to 9.6% of global disability-adjusted life-years.[2] Fortunately, a range of effective evidence-based policies, including availability and pricing restrictions as well as drinking-driving countermeasures, can protect population health and well-being, save lives, and increase health care savings and productivity.[1,3-5] Across the globe, governments have introduced such policies to stem the adverse effects of alcohol whilst simultaneously aiming to balance individuals' right to consume alcohol in moderation.[1] Indeed, every European country has some form of national alcohol action plan.[3]

However, policy development is only one step: in order to be optimally cost-effective, their degree of stringency and the extent to which they are enforced in practice need to be quantified and reviewed over time.[6] For example, a country may appear to be actively controlling the physical availability of alcohol to young people by introducing a minimum alcohol purchase age, but if the minimum age restriction is set too low (a low level of stringency) and/or local authorities fail to monitor the age verification practices of retailers (poor enforcement), then the ability of this policy to meaningfully reduce risky alcohol consumption and related harms will be relatively weak.

Despite repeated calls from leading international agencies, [3,4,7] including the World Health Organization, for countries to regularly assess, compare, and refine their national alcohol policy frameworks, there is limited guidance on how this should be carried out. A reliable and valid tool quantifying policy stringency and enforcement would: provide a standardized, succinct summary of a country's policy framework; enable meaningful comparisons across countries and jurisdictions (and potentially within countries over time, though this is not the focus of the paper); facilitate investigations of relationships between policies and per capita consumption; highlight areas where policy could be strengthened; and, provide estimates of the impact of policy improvements on per capita consumption to inform the development of effective policy responses. Such a tool has clear national and international public health relevance for informing our limited understanding of how effective policies are in practice and providing recommendations for refining policies.

A small number of scales, dating back to the late 1970s and early 1980s, have been developed to assess alcohol control policies.[8] However, although informative, they suffer from several notable caveats. These include: absence or incomplete assessment of policy enforcement[8-15] (which varies considerably across policies

and countries and is likely to impact the effectiveness of policies[16]); absence of a practical application of the scale to demonstrate feasibility;[11] lack of sensitivity analyses to validate the scales' robustness;[8-13] incomplete assessment of policies and reliance on dated literature[14] (as other commentators have pointed out[16,17]); failure to rank countries according to degree of alcohol control;[13] and, failure to compare alcohol policy scores with per capita consumption[8-13] or omission of income in consumption estimates.[14,15] Since consumption is positively related to income and significant economic differences are likely to exist between countries, the latter is a notable limitation. The present study addresses each of these important gaps. The paper presents the most comprehensive and practical tool to date measure policy stringency and enforcement. Herein, we adopt a universal approach to examine the relationship between a range of alcohol policies and consumption at a particular point in time.

To demonstrate feasibility and practical value, we applied our tool to countries in the Western Pacific Region (WPR) of the World Health Organization (WHO). Despite rising consumption in the Region,[18] extant alcohol policy tools been largely applied to Europe. Only two previous studies have examined WPR countries, but both focused solely on developed nations. [13,14] In this paper, we: compare the relative strength of national policy frameworks across a range of developed and developing WPR countries using up-to-date policy data; conduct comprehensive sensitivity analyses to demonstrate the tool's robustness; and investigate the relationship between alcohol policy scores (stringency and enforcement combined) and income-based per capita consumption.

Method

The TEASE-16

The Toolkit for Evaluating Alcohol policy Stringency and Enforcement-16 (TEASE-16) builds on previous scales[14] and is the first tool to comprehensively rate and assess both the level of stringency and enforcement of a country's alcohol control policies. As summarized in Table 1, the TEASE-16 comprises five components : (i) five regulatory domains ('domain'); (ii) 16 evidence-based alcohol control policies ('policy topic'); (iii) effectiveness ratings of each policy topic in reducing the adverse effects of alcohol ('effectiveness rating'); (iv) level of stringency ('stringency'); and, (v) level of policy enforcement ('level of enforcement'). Further details on the conceptual framework of the TEASE-16 are provided in Appendix 1.

In terms of selecting policies for examination, as Babor et al.[1] point out, a panoply of diverse policy strategies exist addressing alcohol, ranging from individual therapeutic approaches to community and

population level interventions which impact affordability, availability and accessibility. Following Brand et al.[14] we examined five broad regulatory domains identified in a comprehensive analysis of alcohol policies, sponsored by the World Health Organization.[1] Within these domains, we focused on 16 specific policies that have been implemented in countries around the world and evaluated by experts as being effective in reducing the adverse effects of alcohol.[1] Similar to Brand et al.[14] we excluded: policies which have demonstrated limited effectiveness (e.g., warning labels on alcohol beverages containers); policies relating to treatment of problem drinkers as our study focused on preventive public health strategies; and policies which were not implemented in any of the nine countries under examination (e.g., minimum pricing).

Each policy is rated according to level of stringency and enforcement (see Appendix 1 for more details). Briefly, stringency refers to how strict or liberal a given country implements a policy. For example, minimum legal alcohol purchase ages of 16, 17, 18, 19, or 20+ years reflect increasing stringency regarding availability of alcohol. Enforcement refers to the degree to which the policy is implemented in practice. Enforcement was assessed according to three categories: rarely or poorly enforced/no legislation in place/no enforceable powers; limited/enforced occasionally/enforced when violations are reported or are blatant; or widely enforced. For example, if alcohol retailers, bar staff, nightclub doorman largely fail to ask customers for age verification, level of enforcement is poor for the 'legal alcohol purchase age' policy.

Crucially, while the TEASE-16 builds on Brand et al.'s[14] Alcohol Policy Index scale, the tools are distinguished by a number of significant differences (i.e., policy conceptualization differences, effectiveness rating differences, inclusion of enforcement, development of three alternative weighting schemes combining stringency and enforcement ratings, and the use of income-based per capita consumption estimates). These important and unique elements of the TEASE-16 are discussed in detail in Appendix 1.

[INSERT TABLE 1 HERE]

Scoring and sensitivity analyses

Each of the 16 policy topics is allocated a potential maximum number of points based on the topic's effectiveness in reducing the adverse effects of alcohol. Proportionate points are then allocated according to level of stringency and enforcement. Scores across all 16 policy topics are collated to yield an overall country-specific score ranging between 0 and 100.

To examine the robustness of the TEASE-16, we applied different weighting schemes to each policy topic according to its effectiveness rating and subsequently calculated proportionate point values. We tested alternative weighting methods to circumvent countries from rejecting the TEASE-16 on the grounds that a weighting scheme was unfairly punitive.

In total, four different weighting schemes were used to assign stringency and enforcement points: baseline weighting (weights of 1:2:3 applied to one-star, two-star, and three-star policy topics respectively); heavy weighting (1:3:5); equal weighting (same weight applied to all policy topics); and, country-specific weighting. Country-specific weights were derived for each country in a manner that optimized the country's performance relative to the remaining countries. Known as data envelopment analysis,[19] this technique was implemented in the Excel Solver program.[20] For consistency with the other weighting schemes, weights were constrained to reflect star ratings (i.e. three-star policy topic received a greater weight than a two-star policy topic, a two star policy received a greater weight than a one-star policy). Additional constraints were specified to ensure that the weights were plausible and to avoid instances where a country could be awarded a perfect rating by simply allocating zero weights to policy topics where least stringency was exercised. This included specifying that the minimum and maximum weights should vary by less than a factor of 12 (four times the spread of the baseline weighting scheme).

Further, for each weighting scheme alternative methods for combining stringency and enforcement points were tested. First, equivalent points were allocated to stringency and enforcement ('50:50 combination'). Second, one-quarter of points were assigned to stringency and three-quarters were allocated to enforcement ('25:75 combination'). Effectively, combination methods 1 and 2 generate additive models. Under the third method, multiplicative models were generated whereby stringency ratings were multiplied by the raw enforcement rating divided by three (i.e., the number of enforcement levels) ('multiplicative combination'). In total, we tested 12 alternative weighting methods (four weighting schemes x three methods of stringency-enforcement combination) (for further details see Appendix 2). All calculations were conducted in Microsoft Excel 2010.[20]

Aggregation of ratings

Ratings across the 16 policy topics were aggregated to yield a score ranging from 0 to 100. Based on these scores, countries were ordered by rank.

Alcohol policy data

Research suggests that socioeconomic development is related to the level of risk associated with harmful use of alcohol, meaning that low-income countries have a greater disease burden per unit of alcohol consumption relative to high-income nations.[21] Accordingly, we retrieved policy data from both developed (Australia, Japan, New Zealand, Singapore, Hong Kong) and developing nations (China, Malaysia, Philippines, Vietnam).[22] These nations are economically diverse, geographically widespread, have different epidemiological profiles, and reflect a range of cultural, religious, and social differences in alcohol use.

We obtained current public policy data on stringency and enforcement via consultation of peer-reviewed papers and WHO reports published between 2008 and 2012, as well as government and related public health websites (a full list of references is available from the corresponding author). Where information was unclear or outdated, we verified policies with relevant public health and government officials in the relevant country (August-October 2012). This ensured we included the most up-to-date legislation and that policy topics were correctly weighted. Extensive efforts were undertaken to cross-reference data sources to ensure all policy topics were reliably represented. Complete information was retrieved for all 288 policies of interest (stringency = 16 policy topics x nine countries; enforcement = 16 policy topics x nine countries).

Alcohol consumption

Estimated average percentage alcohol by volume was applied to 2011 alcohol sales data[23-31] in order to convert volumes of alcoholic beverages consumed into pure alcohol. The product was multiplied by 1,000,000 and divided by the population estimate for a given country (obtained via national statistics agency websites and verified by departmental officials). Since consumption is positively related to income,[1] we also applied a measure of gross domestic product dollars - reported in international dollars using purchasing power parity exchange rates - to yield 2011 income-based per capita consumption estimates.[32]

Analysis

We calculated alcohol policy scores using 12 sets of assumptions (four weighting schemes x three methods of combination x one method of aggregation). Each assumption generated an individual country ranking. To facilitate comparisons, we calibrated scores generated under each set of assumptions to yield equivalent ranges. Subsequently, we identified the median rank and overall score from all 12 sets of assumptions for each country, and compared these medians with the corresponding baseline values using either Pearson's or Spearman's

correlation coefficient as appropriate. Additionally, we calculated correlations using extreme values in place of medians to provide a measure of the tool's robustness. To evaluate the relationship between policy score and consumption, a simple linear regression was performed in SPSS v20.[33]

Results

Relative strength of WPR policy frameworks

To compare the comprehensiveness of alcohol control policies in the WPR, points for each country by regulatory domain are presented in Table 2. Countries attained a median rating of 56·4 out of a possible 100 points, ranging from 24·1 (Philippines) to 67·5 (Australia). Overall, countries received a median domain rating of 5·9 out of a possible 28·9 points for policies related to physical availability (20% credit); 3·9 out of a possible 10.5 points for drinking context (38% credit); 18.4 out of a possible 23.7 points for alcohol prices (78% credit); 0.4 out of a possible 2·6 points for alcohol advertising (17% credit); and 23 out of a possible 34·2 points for motor vehicles regulations (66% credit). Low scores indicate scope for strengthening policies. Across all nine countries examined, policies regarding alcohol advertising and physical availability are weak and warrant refinement.

[INSERT TABLE 2 HERE]

Relationship between alcohol policy score and income-based per capita consumption

Subsequently, we examined the relationship between alcohol policy scores and income-based per capita consumption. A strong, inverse relationship was observed between consumption and alcohol policy scores ($r = -0{\cdot}88$, $p = 0{\cdot}001$) (see Figure 1). A significant model emerged ($F[1,7] = 22{\cdot}88$, $p = 0{\cdot}002$), accounting for 77% of the variance. A change of -0.017 ($p < 0{\cdot}01$) in consumption is associated with a one point increase in alcohol policy score. To exclude price demand influences, we recalculated alcohol policy scores after removing alcohol prices from the model. This resulted in minimal change: $r = -0{\cdot}83$, $p = 0{\cdot}003$. A significant model emerged ($F[1,7] = 15{\cdot}61$, $p = 0{\cdot}006$), accounting for 69% of variance. Based on the slope of the regression line, a one-point increase in alcohol policy score equates to a 1.8% decrease in income-based per capita consumption.

[INSERT FIGURE 1 HERE]

Sensitivity analyses

Sensitivity analyses involved testing several alternative weighting assumptions against the baseline weighting and 50:50 stringency-enforcement combination. The ranking of most countries remained relatively stable across the 12 assumptions tested, with only three countries (Hong Kong, Japan, Malaysia) differing by three positions (see Table 3). This suggests that most countries were not substantially affected by the choice of assumptions used to derive alcohol policy scores. Correlational analyses confirmed that median ranks ($r = 0{\cdot}98$, $p < 0{\cdot}0001$) and ratings ($r = 1{\cdot}0$, $p < 0{\cdot}0001$) differed minimally from baseline values. Indeed, even when baseline ranks and ratings were compared with the extreme corresponding values from the 12 alternative assumptions, correlation coefficients remained high (extreme ranks: $r = 0{\cdot}97$, $p < 0{\cdot}0001$; extreme ratings: $r = 0{\cdot}97$, $p < 0{\cdot}0001$). The negative relationship between median ratings consumption remained robust ($r = -0{\cdot}86$, $p = 0{\cdot}003$). Collectively, these comprehensive sensitivity analyses provide support for the robustness of the TEASE-16 as a measure of policy stringency and enforcement.

[INSERT TABLE 3 HERE]

Discussion

Cross-national studies comparing alcohol policy frameworks and consumption are scarce.[16] In this paper, we developed and applied a scale to facilitate alcohol policy evaluation efforts and address this gap. As part of a cross-sectional analysis, we used the TEASE-16 to compare and evaluate the adequacy of 288 national alcohol policies across nine countries. We found striking variations in how alcohol control policies are implemented in countries in the WPR. Of the nine countries examined, the Philippines had the weakest policy framework and Australia had the strongest. Australia was particularly strong in relation to motor vehicles policies, followed by alcohol pricing policies; alcohol advertising policies weakest domain and may warrant strengthening. Conversely, in the Philippines all regulatory domains were generally weak, particularly drinking context and motor vehicle alcohol control policies.

As mentioned earlier, we used current public policy data from published reports and papers to inform the TEASE-16. Interested readers may contact the corresponding author for a comprehensive list of references and the scoring algorithms are provided in Appendix 1. We are confident that an independent research group could replicate our findings and extend the TEASE-16 to other countries beyond those examined in this paper.

Although the present study utilized the TEASE-16 to evaluate alcohol control policies and consumption at a particular point in time (cross-sectional analysis using a linear function), the tool could be used to evaluate policy changes and consumption within countries over time (longitudinal analysis using a log function). By way of example, under a log function an increase in alcohol policy score for countries with weak policy frameworks would have a greater impact on income-based per capita consumption than those countries who already have a high policy score. Accordingly, as a consequence of targeted policy improvements, an increase of seven points in the Philippines would reduce consumption by of 0.19 litres/$1000 whereas a seven-point increase for Japan would equate to a reduction of only 0.09 litres/$1,000. In other words, this example illustrates that countries with weak alcohol policy frameworks have the potential to make meaningful reductions in consumption if they strengthen policies.

Across countries, a statistically significant negative relationship was observed between alcohol policy score and income-based per capita consumption, meaning that countries with more stringent and/or strongly enforced alcohol control policies evidenced lower consumption rates. Brand et al.[14] similarly observed an inverse relationship between policy score and consumption. Although we recognize that there are many structural and contextual factors that influence the extent and pattern of alcohol consumption (see shortcomings below for further details), we have shown that alcohol consumption levels in different countries (whatever their causes) are also related to the strength of their alcohol policies, controlling for differences in income (Gross Domestic Product [GDP]) and population.

In addition to the need for ongoing social and treatment programs for high-risk individuals and communities that are negatively impacted by alcohol, countries are encouraged by the WHO to regularly assess and refine their policy frameworks.[5,7] The TEASE-16 could be employed by national policymakers and regulatory bodies to identify opportunities to develop or refine their alcohol regulatory framework, and measure the impact of resultant policy changes on consumption. This is particularly important in terms of enforcement which may vary over time. This paper highlights that considerable scope overall exists for strengthening policies in the WPR, particularly in relation to alcohol advertising and physical availability. In this way, the findings are especially timely and complement the aim of the Western Pacific Regional Office to significantly reduce alcohol-related harm in all Member States by 2014 through a coordinated program of national policies and regional collaboration.[7]

The research findings should be tempered by a number of caveats. First, considerable heterogeneity exists in alcohol policies, and cultural and linguistic differences may impact consumption (e.g., informal alcohol

control practices such as no drinking before noon). These regional differences are not captured in the TEASE-16, which measures formal, national alcohol control policies. Nevertheless, although steps were taken to minimize intra-country policy differences where possible, particularly in Australia where considerable heterogeneity exists in alcohol regulations across states and territories. To yield a representative account of Australian alcohol policy, data from all eight jurisdictions was retrieved for each policy topic and the general consensus was used to reflect the national position.

Second, although the TEASE-16 assesses a panoply of alcohol control policies, it does not cover the full spectrum of policies. As Karlsson and Österberg[12] point out, however, to do so would require assessment of over 100 policies and collecting data over multiple countries and time points, rendering the task laborious if not impossible. Accordingly, they argue that shorter tools hold much promise for collecting more reliable and comparative cross-national data; the TEASE-16 is one such tool.

Third and relatedly, it is well recognised in the literature that there is a close relationship between national affluence and alcohol consumption.[34] For this reason, we included income-based per capita consumption estimates in our examination of the link between policy frameworks and consumption. However, the extent and pattern of alcohol consumption are undergirded by a range of determinants in addition to a nation's legal and regulatory framework and affluence.[34,35] These include: (1) socio-economic factors (e.g., level of education, socio-economic status, income, employment status, religious principles and faith, culture); (2) physical environment (e.g., living facilities such as housing); (3) biology and genetics (e.g., physiological response to alcohol, alcohol metabolism, alcohol dependence); (4) access to healthcare services and facilities; and, (5) individual characteristics (e.g., age, sex, mental health status, psychological and social support, personality traits, drinking motives, beliefs and expectancies about alcohol). In the context of the current findings, alcohol policies and national affluence alone are therefore not sufficient to explain differences in consumption patterns. Rather, disparities in consumption patterns may result from a complex interplay of the various structural and contextual factors listed above. In order to design and implement effective policies, it is important to account for this panoply of mitigating factors and adopt a co-ordinated response. This caveat should be taken into account when extrapolating this study's conclusions.

Fourth, the uncontrolled and cross-sectional nature of the data means that a causal relationship between alcohol policy scores and income-based per capita consumption cannot be conclusively inferred. Fifth, as with any new tool of this kind, cross-national analysis will necessarily restrict the sample size due to the considerable burden involving in collecting policy data and cross-referencing sources. Limited sample sizes reduce statistical

power and increase the likelihood of potential bias from outliers. Future studies should extend the TEASE-16 to a large number of countries. That being said, given that the current finding of an inverse relationship between alcohol policy scores consumption remained robust across 12 alternative weighting schemes and parallels the conclusions by Brand et al.[14], who analysed alcohol policies in 30 countries, we are confident that bias is minimal in this study.

Sixth and relatedly, although efforts were undertaken to assess a range of diverse WPR countries, caution should be exercised in extrapolating the findings beyond those countries examined. Seventh, enforcement is a critical component of policy evaluation; however, its measurement presents a challenge due to the difficulty in securing objective data. In this study, enforcement data was retrieved and verified by several relevant departmental officials in the relevant countries and cross-referenced with statistics where possible in order to minimize bias.

Finally, whilst this paper established that the TEASE-16 is a feasible tool for assessing the adequacy of national alcohol control policies, questions about its reliability and validity remain. Specifically, whilst comprehensive sensitivity analyses provided support for reliability of policy scores under different weighting schemes, test-retest reliability has not been established. As mentioned earlier, the TEASE-16 is well suited to establishing test-retest reliability through assessing improvements or changes in policy over time. Similarly, the validity of the TEASE-16 has not been thoroughly examined. We are confident that the tool demonstrates content validity (i.e., that it measures a wide range of alcohol control policies), face validity (it does appear to adequately measure alcohol control policies) and criterion validity (our results are broadly consistent with those from a previous measure[14]), but its construct validity (e.g. using factor analysis) has not been assessed. Examining both the test-retest reliability and the construct validity of the TEASE-16 would be promising lines of future enquiry.

Although a number of shortcomings exist with quantitative tools of this kind, as noted earlier, the benefits are compelling. First, the TEASE-16 provides an updated, state-of-the art empirical synopsis of formal, national policies across several countries. Second, by reducing a vast amount of data into a single, succinct figure and highlighting policy areas of weaknesses, the tool is especially useful for facilitating communication with the general public, public health advocates, and policymakers. Third, the TEASE-16 overcomes limitations of previous tools of this kind by including: complete assessment of all policies, income in per capita consumption estimates, and a comprehensive measure of enforcement. Fourth, this paper represents the first application of a tool of this type to a wide range of countries in the WPR.

Adding to earlier statements on future research, whereas we adopted a universal approach in this study by examining the relationship between a range of alcohol policies and per capita consumption, further work should utilize the TEASE-16 to conduct a more nuanced examination of the relationship between targeted policies (e.g., drink driving countermeasures) and specific outcomes (e.g., number of alcohol-related accidents and fatalities, drink driving prosecutions).

In summary, this paper presents the first empirical tool to comprehensively assess policy stringency and enforcement and is the first to compare policies in a diverse range of WPR countries. Countries with more stringent and/or strongly enforced alcohol control policies have significantly lower consumption rates. Policies are thus effective in practice but work remains. To continue making significant inroads into reducing risky alcohol consumption and related harms, efforts could be targeted towards strengthening weak policies, such as alcohol advertising.

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Department of Trade and Industry. Vietnam: Vietnamese Embassy Australia; Vietnam National Administration of Tourism, Ministry of Culture, Sports and Tourism; Ministry of Home Affairs Vietnam.

Conflicts of interest

None declared.

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Table 1. **Components of the Toolkit for Evaluating Alcohol policy Stringency and Enforcement-16 (TEASE-16)**

Domain	Policy topic	Effectiveness rating	Stringency	Level of enforcement
Physical availability				
	Legal alcohol purchase age	***	16 years 17 years	Rarely or poorly enforced/no legislation in place/no enforceable powers
			18 years 19 years	Limited/enforced occasionally/enforced when violations are reported or are blatant
			20+ years	Widely enforced
	Alcohol server liability for damages caused by actions of patrons	**	No	Rarely or poorly enforced/no legislation in place/no enforceable powers
			Yes	Limited/enforced occasionally/enforced when violations are reported or are blatant
				Widely enforced
	Government monopoly of alcohol retail sales	**	None	Rarely or poorly enforced/no legislation in place/no enforceable powers
			Partial government monopoly	Limited/enforced occasionally/enforced when violations are reported or are blatant
			Full government monopoly	Widely enforced
	Restrictions on density of outlets	**	None	Rarely or poorly enforced/no legislation in place/no enforceable powers
			On wine only On wine and spirits	Limited/enforced occasionally/enforced when violations are reported or are blatant
			On wine, spirits, and beer	Widely enforced
	Hours and days of sale restrictions	**	None	Rarely or poorly enforced/no legislation in place/no enforceable powers
			On hours or days	Limited/enforced occasionally/enforced when violations are reported or are blatant
			On both hours and days	Widely enforced
Drinking context				

Community mobilization programs to increase public awareness or and prevent alcohol problems	**	No	Rarely or poorly enforced/no legislation in place/no enforceable powers
		Yes	Limited/enforced occasionally/enforced when violations are reported or are blatant
			Widely enforced
Mandatory bar staff and management training to better manage aggression	**	No	Rarely or poorly enforced/no legislation in place/no enforceable powers
		Yes	Limited/enforced occasionally/enforced when violations are reported or are blatant
			Widely enforced
Alcohol prices			
Beer price index	***	0-0·29	Rarely or poorly enforced/no legislation in place/no enforceable powers
		0·30-0·59	
		0·60-0·89	Limited/enforced occasionally/enforced when violations are reported or are blatant
		0·90+	Widely enforced
Wine price index	***	0-0·9	Rarely or poorly enforced/no legislation in place/no enforceable powers
		1·0-1·9	
		2·0-2·9	Limited/enforced occasionally/enforced when violations are reported or are blatant
		3·0+	Widely enforced
Spirit price index	***	0-2·9	Rarely or poorly enforced/no legislation in place/no enforceable powers
		3·0-5·9	
		6·0-8·9	Limited/enforced occasionally/enforced when violations are reported or are blatant
		9·0+	Widely enforced
Alcohol advertising			
Level of restrictions imposed on the majority of alcohol advertising mediums	*	No restrictions	Rarely or poorly enforced/no legislation in place/no enforceable powers
		Industry self-regulation	
		Partial statutory restrictions	Limited/enforced occasionally/enforced when violations are reported or are blatant
		Ban	Widely enforced
Motor vehicles			
Frequency of random breath testing	***	Never	Rarely or poorly enforced/no legislation in place/no enforceable powers
		Rarely	
		Occasionally	Limited/enforced occasionally/enforced when violations are

		Often	reported or are blatant
		Very often	Widely enforced
Legal blood alcohol concentration limit – adults (mg/dl)	***	0·08+	Rarely or poorly enforced/no legislation in place/no enforceable powers
		0·03-0·07	Limited/enforced occasionally/enforced when violations are reported or are blatant
		0-0·02	Widely enforced
Legal blood alcohol concentration limit – youth (mg/dl)	***	0·04+	Rarely or poorly enforced/no legislation in place/no enforceable powers
		0·02-0·03	Limited/enforced occasionally/enforced when violations are reported or are blatant
		0-0·01	Widely enforced
Number of mandatory penalties for exceeding the legal blood alcohol concentration limit	**	No penalty	Rarely or poorly enforced/no legislation in place/no enforceable powers
		Fine Penalty points License suspension/ disqualification	Limited/enforced occasionally/enforced when violations are reported or are blatant
		Imprisonment	Widely enforced
		Other	
Graduated licensing for young drivers	**	No	Rarely or poorly enforced/no legislation in place/no enforceable powers
		Yes	Limited/enforced occasionally/enforced when violations are reported or are blatant
			Widely enforced

Price index refers to the retail price (including alcohol taxes) for a standard size beverage container, adjusted for a country's standard of living (see Method for further details). Star ratings reflect the effectiveness of policy topics in reducing the adverse effects (limited, moderate, or high)

Table 2. **Point breakdown of alcohol policy scores by regulatory domain according to the Toolkit for Evaluating Alcohol policy Stringency and Enforcement-16 (TEASE-16)**

Country	**Rank**	**Physical availability**	**Drinking context**	**Alcohol prices**	**Alcohol advertising**	**Motor vehicles**	**Overall rating**
		(28·9)	(10·5)	(23·7)	(2·6)	(34·2)	(100)
Australia	1	11·2	5·3	18·4	0·4	32·2	67·5
Singapore	2	14·5	5·3	23·7	0·4	20·5	64·4
New Zealand	3	3·9	3·9	23·7	0·4	30·3	62·3
Hong Kong	4	10·5	5·3	17·8	1·5	23	58·1
Japan	5	5·9	3·9	21·1	0·4	25·0	56·4
Malaysia	6	9·6	3·9	23·7	2	16·6	55·8
China	7	5·9	0	17·8	0	26·4	50·1
Vietnam	8	5·9	7·9	11·8	2·6	13·6	41·8
Philippines	9	5·9	0	17·8	0·4	0	24·1
Median		**5·9**	**3·9**	**18·4**	**0·4**	**23**	**56·4**

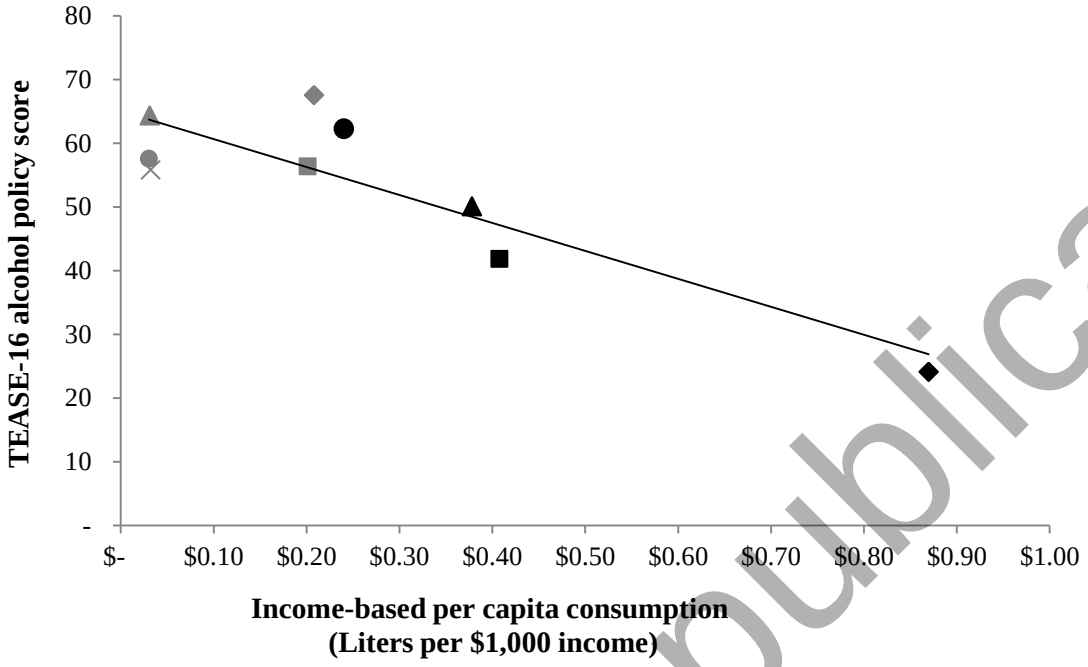
Numbers in parentheses reflect the full points available for a given regulatory domain. Median values for each domain and the overall median value are presented beneath the awarded points.

Table 3. **Sensitivity analysis of the Toolkit for Evaluating Alcohol policy Stringency and Enforcement-16 (TEASE-16)**

Country	Ranks			Scores		
	Baseline	Median	Range	Baseline	Median	Range
Australia	1	1	1-2	67·5	62·2	36-83
Singapore	2	3	2-4	64·4	56·7	30-80
New Zealand	3	3	1-3	62·3	56·3	32-74
Hong Kong	4	5	4-7	58·1	51·8	24-73
Japan	5	4	3-6	56·4	50·7	26-65
Malaysia	6	6	4-7	55·8	49·9	25-71
China	7	7	5-7	50·1	46·7	22-58
Vietnam	8	8	8-9	41·8	39·1	11-56
Philippines	9	9	8-9	24·1	20·9	8-26

In total, we tested 12 alternative weighting methods (four weighting schemes x three methods of stringency-enforcement combination). The baseline model generated ranks and scores. The remaining models generated medians and ranges.

Fig. 1. **Relationship between alcohol policy scores for nine WPR countries and per capita alcohol consumption according to the Toolkit for Evaluating Alcohol policy Stringency and Enforcement-16 (TEASE-16)**



Key: = Australia; = China; = Hong Kong; = Japan; = Malaysia; = New Zealand; = Philippines; = Singapore; = Vietnam.