

# Monitoring local alcohol prevention in Sweden: Application of Alcohol Prevention Magnitude Measure (APMM)

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## ABSTRACT

**AIMS** – National alcohol policy in Sweden has to a certain extent grown weaker, and there has instead been an increased focus on strengthening local alcohol prevention. Swedish municipalities carry out a variety of alcohol prevention activities, but there is little knowledge of how the magnitude of all these activities has developed over time. One reason for this lack of information is the limitation of tools for monitoring prevention activities locally. The aim of this study is 1) to develop an Alcohol Prevention Magnitude Measure (APMM) based on local data and 2) to analyse the development of local alcohol prevention by using APMM. **DATA** – The APMM is based on 37 different indicators of local prevention. Data derives from web-based surveys comprising all Swedish municipalities and from information on licensed premises at the local level. **RESULTS** – The results reveal that local alcohol prevention in Sweden, as measured by the APMM, has increased generally between 2006 and 2010. The increase is the result of more local policies and activities. **CONCLUSION** – The results indicate that the APMM captures real changes at the local level, as the APMM increased significantly in community intervention municipalities compared to others.

**KEYWORDS** – Alcohol, prevention, municipalities, composite indicator

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## Introduction

Many countries worldwide have adopted prevention policies and programmes to prevent harm from alcohol (World Health Organization, 2011). This is true also for Sweden. Indeed, Sweden has a long history of restrictive alcohol policies and has been ranked as having the second strictest alcohol control policy of 30 studied European countries in 2012, only surpassed by Norway (Karlsson, 2014). Important com-

ponents have been high prices through high levels of alcohol taxation and low physical availability, particularly by high age limits, limited opening hours and a restricted number of outlets. Such components have been shown to be effective in the international literature (Babor et al., 2003). Over time, however, Sweden's restrictive national policy has weakened to a certain extent, partly because of EU

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membership (Andréasson, 2002). Instead, there has been an increased focus on local alcohol prevention as a means of compensating for this change.

The importance of local alcohol prevention has been expressed repeatedly in the Swedish government's national alcohol action plans since 2001, and thus also in the current national strategy (Swedish Government, 2010) for 2011–2015. This has been backed up by considerable resources to be used, among other things, to support the development of local prevention work through, for example, improved coordination, prevention programme development and dissemination of knowledge. In sum, significant efforts have been taken to strengthen local alcohol prevention in Sweden.

Municipalities in Sweden carry out a variety of alcohol prevention activities, such as supervision of licensed premises, information campaigns for parents, activities to prevent illegal sales of alcohol to youth, responsible beverage service programmes (RBS) and media campaigns (Swedish National Institute of Public Health, 2009). There is, however, little knowledge of how the magnitude of these activities varies between municipalities and how they have evolved over time. This study tries to fill this gap by monitoring alcohol prevention in Swedish municipalities over recent years by means of a newly developed composite measure of prevention.

The work presented in this paper has its theoretical base in a systems model for substance use prevention (Holder, 1998). In accordance with this model, effective local prevention needs to focus on system-wide structures and processes and interactions between these. Included in Holder's

model are consumption, retail sales, formal regulation and control, social norms, legal sanctions and social, economic and health consequences (Holder, 1998). A recent evaluation of the impact of community projects on alcohol-related harm found that prevention works best when several sectors of the community are mobilised and a wide spectrum of alcohol preventive efforts have been implemented (World Health Organization, 2012). These findings support a broad approach to monitoring local prevention, which also calls for a comprehensive assessment of local conditions for prevention. This, in turn, requires that data on local community prevention efforts are systematically acquired. Our approach to managing this task is to construct a composite indicator, an Alcohol Prevention Magnitude Measure, based on local data.

There are several advantages in using a composite indicator rather than many individual indicators. For instance, a composite measure is easier to interpret and may summarise multiple dimensions and facilitate communication. Furthermore, it facilitates comparisons of complex dimensions. Composites can however also be misleading if they are poorly constructed or misinterpreted (Organisation for Economic Co-operation and Development, 2008). A main argument against composites is that the weighting process is arbitrary when variables are merged (Sharpe, 2004).

Different composite alcohol policy measures have been constructed, albeit mostly limited to formal alcohol control at the national level. Examples of such indices are the "Bridging the gap scale" (Karlsson & Österberg, 2007), the "Alcohol

Policy Index” (Brand, Saisana, Rynn, Pennoni, & Lowenfels, 2007) and the “Alcohol Public Health Research Alliance (AMPHORA) alcohol policy scale” (Karlsson, Lindeman, & Österberg, 2012). The most recent composite, the “Alcohol Policy Scale” (Naimi TS et al., 2014), however, addresses state level in the US. In Sweden, there have been some previous attempts to construct and analyse alcohol preventive composites at the local level (Andréasson, Nilsson, & Bränström, 2009; Engdahl & Romelsjö, 2006). This is a relatively new research area with no gold standard for composite measure construction of policy/prevention, but in some cases when national composites on alcohol policies have been constructed, the David and Walsh scale from 1983 has served as a model (Karlsson & Österberg, 2007).

This study monitors the magnitude and development of local alcohol prevention in Sweden over time, using a newly developed composite indicator constructed for this purpose, the Alcohol Prevention Magnitude Measure (APMM). Also discussed are the opportunities and challenges of monitoring local alcohol prevention with the APMM.

## Material and method

### *Indicators and points assigned*

Alcohol prevention comprises national legislation as well as local prevention, where indicators of local prevention can be divided into organisational (structural) indicators and preventive activity indicators. An earlier version of the APMM was based on indicators belonging to one or the other of these two categories of indicators (Andréasson et al., 2009).

During the development of the current

APMM, categories, indicators and the scoring system have been modified and refined. In general, the modifications led to indicators being divided into five categories. The overall score of the composite is a maximum of 100 points. However, the theoretical system model approach remains the same: prevention at the local level needs to target several determinants of consumption and harm and should therefore be measured using several indicators in order to capture a broad spectrum of prevention. Based on prior knowledge and available data, we have selected 37 indicators relating to organisation and activities of local alcohol prevention.

These 37 indicators have been divided into five categories and are assigned points to enable the measuring of the magnitude of prevention. The five categories are; 1) *staff and budget for alcohol prevention*, 2) *municipal alcohol policies*, 3) *supervision and licensed premises*, 4) *cooperation with local actors such as authorities, business and NGOs on alcohol prevention*, 5) *prevention activities and prevention programmes*.

Broadly, effective prevention at the community level requires local policies that restrict availability, and advocacy to gain or maintain support for such restrictive policies (Holder, 1998). Of the five categories in the APMM, two, “policy” and “supervision” address restrictive policy, while two, “cooperation” and “activities” address advocacy (where some indicators contain elements of both). The fifth, “staff and budget” is a prerequisite for all organised activities.

All five categories are deemed important by themselves, but are also assumed to reinforce each other in forming a system

of prevention that affects several different structures, areas and people in the local community. The scoring of indicators in the categories entails that each of the categories can get a maximum of 20 points. The total maximum sum of the five categories taken together is 100 points (five categories times 20 points). It is the sums of these five categories that form the Alcohol Prevention Magnitude Measure (APMM). The five categories are described below, and more detailed information about scoring can be found in Table 1.

- *Staff and budget for alcohol prevention (3 indicators)*. Without staff and budget, little can be accomplished. Indicators in staff and budget reflect positions for alcohol prevention and funding (i.e. alcohol prevention or broader drug prevention which includes alcohol). We have considered it reasonable that a Swedish (median-populated) municipality can have between a half-time and a full-time position for such prevention. An indicator reflecting staff for alcohol prevention has been assigned points accordingly. A second indicator in this category reflects whether a specific person has been designated to coordinate alcohol prevention in the municipality. If there is one, it generates half of the potential maximum score for staff for alcohol prevention. The third and final indicator in this category reflects funding. We consider it important that the municipalities largely fund their own alcohol prevention, as this can be seen as an indication of priority and long-term commitment. The maximum points for municipal financing correspond to the maximum points set for staff for alcohol prevention.

- *Municipal alcohol policies (10 indicators)*. An alcohol policy is needed to ensure political support and sustainability in prevention efforts. Research has shown that the presence of an alcohol policy in itself appears to reduce alcohol-related problems (Gliksman, Douglas, Rylett, & Narbonne-Fortin, 1995). Indicators included in this category have been selected in order to capture a broad spectrum of alcohol policies in different areas (such as municipality administration, in schools, among NGOs) but with focus on the municipality as a policy maker. All ten indicators in this category are based on dichotomous data and render points based on presence or absence in the municipality. All ten indicators refer to alcohol policy or broader drug policy that includes alcohol.
- *Supervision and licensed premises (4 indicators)*. Regulations of alcohol availability can have significant effects on both consumption and problems. The number of outlets, opening hours and restrictions on availability are important components to address. If preventive regulations are combined with supervision, they become more effective (Babor et al., 2003). Two indicators in this category reflect alcohol availability and two reflect supervision. The two availability indicators are number of licensed premises to the public (in relation to the population per 10,000 inhabitants 15 years and older) and number of licensed premises with business hours after 1am (in relation to the total number of licensed premises). The two supervision indicators are extent of supervision at premises with regular alcohol

licenses (i.e. the number of supervision divided by the number of public and private licences) and proportion of inspected grocery shops selling beer (i.e. the number of inspected shops divided by the number of shops). The points assigned for each of the four indicators in this category are divided into eleven fixed intervals with an additional increase for each increased interval. The scoring system for this category results in higher scores when municipalities are more restrictive and controlling.

- *Cooperation with local actors such as authorities, business and NGOs on alcohol prevention (10 indicators).* The municipality needs to cooperate with other agencies, as it does not have jurisdiction over a number of important sectors, such as the police authority or health care. Selected indicators of cooperation are intended to capture municipal cooperation on alcohol prevention among authorities, NGOs and local businesses. All ten indicators in this category are based on dichotomous data and render points based on presence or absence in the municipality.
- *Prevention activities and prevention programmes such as drug-free activities, media campaigns, Responsible Beverage Service programmes and parental programmes (10 indicators).* The number and type of preventive activities are important, not only in the actual activities themselves, but also in order to create local public support and mobilisation. The indicators within this category have therefore been selected to monitor a broad spectrum of prevention activities

in different areas. All ten indicators in this category are based on dichotomous data and render points based on presence or absence in the municipality.

The data for all the indicators in the APMM come from two sources at the former Swedish National Institute of Public Health (which is now the Public Health Agency of Sweden). One source is a web-based survey targeting all 290 municipalities in Sweden. The survey comprises three areas, inspections according to the tobacco law, inspections according to the alcohol law and municipal alcohol and drug prevention (such as policy, organisation and prevention activities). Data from inspections according to the alcohol law and municipal alcohol and drug prevention are used in the APMM. Data on inspections according to the alcohol law have been collected since 1998 and data on alcohol and drug prevention since 2001. Over the years, the questionnaires have been revised, and therefore we use 2006 as the starting year. The second data source is a register containing information such as licensed premises and their opening hours. Data used from this register is on municipal level. In this study, we have used data from the surveys and the register for five years (2006–2010), as this was the data we had available at the time when we began our study. There is data available for more recent years, but no APMM has been computed.

#### *Municipalities in analysis, and missing values*

Response rates for the surveys used are generally high, as most municipalities have participated, but there is unfortu-

**Table 1.** Alcohol Prevention Magnitude Measure; categories, indicators, cut off and points.

Category	Indicator	Cut off and points
Staff and budget (Max 20 points)	Number of staff positions for alcohol and/or drug prevention in the municipality <sup>1</sup>	More than two full-time positions = 8p One to two full-time positions = 6p A half-time up to less than a full-time position = 4p Less than a half-time position = 2p No position = 0p
	Funding for alcohol and/or drug prevention is provided in the regular budget of the municipality	Yes all = 8p Almost all = 4p Partly = 2p Not at all = 0p
	A particular alcohol prevention coordinator is designated	Yes = 4p No = 0p
Policy <sup>2</sup> (Max 20 points)	Municipal alcohol policy	Yes = 2p No = 0p
	Years since alcohol policy was adopted	Five or less years ago = 2p More than five years ago = 0p
	Plan for implementation of the municipal alcohol policy	Yes = 2p No = 0p
	Measurable goals in municipal alcohol policy	Yes = 2p No = 0p
	Plan for follow-up in municipal alcohol policy	Yes = 2p No = 0p
	Particular funding set aside to perform activities in municipal alcohol policy	Yes = 2p No = 0p
	The municipality as an employer has an alcohol policy	Yes = 2p No = 0p
	The municipality has a policy for alcohol consumption in public places	Yes = 2p No = 0p
	NGOs are required to have alcohol policy to be eligible for municipal funding	Yes = 2p No = 0p
	The municipality has a policy for alcohol prevention in elementary schools.	Yes = 2p No = 0p
Organised cooperation with authorities (a), business (b), NGOs (c) on alcohol prevention. (Max 20 points)	Police (a)	Yes=2p No=0p
	Health care (a)	Yes=2p No=0p
	Swedish Transport Agency <sup>3</sup> (a)	Yes=2p No=0p
	Other municipalities (a)	Yes=2p No=0p
	County administrative board (a)	Yes=2p No=0p
	Restaurant owners (b)	Yes=2p No=0p
	Entertainment business (b)	Yes=2p No=0p
	Sports associations (c)	Yes=2p No=0p
	Temperance organisations (c)	Yes=2p No=0p
	Religious organisations (c)	Yes=2p No=0p

Category	Indicator	Cut off and points
Supervision and licences (Max 20 points)	Number of regular alcohol licences to the public per 10,000 inhabitants (15+)	$0 \leq x \leq 2.5 = 5p$ $2.5 < x \leq 5 = 4.5p$ $5 < x \leq 7.5 = 4p$ $7.5 < x \leq 10 = 3.5p$ $10 < x \leq 12.5 = 3p$ $12.5 < x \leq 15 = 2.5p$ $15 < x \leq 17.5 = 2p$ $17.5 < x \leq 20 = 1.5p$ $20 < x \leq 22.5 = 1p$ $22.5 < x \leq 25 = 0.5p$ More than 25=0p
	Proportion of licensed premises to the public closing later than 01:00am <sup>†</sup>	0=5p $0 < x \leq 0.05 = 4.5p$ $0.05 < x \leq 0.10 = 4p$ $0.10 < x \leq 0.15 = 3.5p$ $0.15 < x \leq 0.20 = 3p$ $0.20 < x \leq 0.25 = 2.5p$ $0.25 < x \leq 0.30 = 2p$ $0.30 < x \leq 0.35 = 1.5p$ $0.35 < x \leq 0.40 = 1p$ $0.40 < x \leq 0.45 = 0.5p$ $0.45 < x \leq 1 = 0p$
Supervision and licences	Extent of supervision at licensed premises (public + private)	More than 1.8=5p $1.6 < x \leq 1.8 = 4.5p$ $1.4 < x \leq 1.6 = 4p$ $1.2 < x \leq 1.4 = 3.5p$ $1 < x \leq 1.2 = 3p$ $0.8 < x \leq 1 = 2.5p$ $0.6 < x \leq 0.8 = 2p$ $0.4 < x \leq 0.6 = 1.5p$ $0.2 < x \leq 0.4 = 1p$ $0 < x \leq 0.2 = 0.5p$ 0=0p
	Proportion of inspected grocery shops selling alcohol (beer)	More than 0.9=5p $0.8 < x \leq 0.9 = 4.5p$ $0.7 < x \leq 0.8 = 4p$ $0.6 < x \leq 0.7 = 3.5p$ $0.5 < x \leq 0.6 = 3p$ $0.4 < x \leq 0.5 = 2.5p$ $0.3 < x \leq 0.4 = 2p$ $0.2 < x \leq 0.3 = 1.5p$ $0.1 < x \leq 0.2 = 1p$ $0 < x \leq 0.1 = 0.5p$ 0=0p

Category	Indicator	Cut off and points
Activities (Max 20 points)	Arranging drug-free activities (e.g. school dances, concerts etc.)	Yes=2p No=0p
	Information to parents (leaflets, brochures, etc.)	Yes=2p No=0p
	Active work with media advocacy in order to increase awareness about alcohol and/or drugs	Yes=2p No=0p
	Activities to limit illegal sales to youth (e.g., information campaigns or police intervention)	Yes=2p No=0p
	Activities to enforce age limits for alcohol sales <sup>5</sup>	Yes=2p No=0p
	Responsible beverage service (RBS)	Yes=2p No=0p
	Parental programme (with educated instructors) on alcohol and drugs in grades 6–9	Yes=2p No=0p
	Group activities for children of substance misusing parents <sup>6</sup>	Yes=2p No=0p
	Activity for traffic sobriety, in addition to police efforts	Yes=2p No=0p
	Brief intervention in primary health care	Yes=2p No=0p
Sum	Maximal sum=100 points (Policy + Staff and budget + Supervision and licence + Cooperation + Activities)	

<sup>1</sup> Points assigned are based on a mean value of position points for adjusted and not adjusted for population size. This is because small municipalities score higher when positions of staff are in relation to population size and large municipalities score higher when population size is ignored.

<sup>2</sup> Policy often refers to alcohol and/or drugs.

<sup>3</sup> Swedish Transport Agency 2010. Swedish Road Administration 2009–2006.

<sup>4</sup> Opening hours have been calculated for 2006–2009 (due to frequent missing data) by using data from 2010. During 2010 missing data were highly reduced due to frequent reminders from SNIPH.

<sup>5</sup> And serving, 2006.

<sup>6</sup> Other activities instead of group activities in 2006 and 2007.

nately internal missing data that limit the use of data. Therefore, only municipalities that had data for at least 80% of the indicators in the composite for all five years (2006–2010) are included in the analysis in order to gain stable data to facilitate comparison over time. Furthermore, the three major municipalities of Stockholm, Göteborg and Malmö, which all consist of several city districts, are excluded, for the questionnaire was not adapted to municipalities with such districts until 2011. In total there are 189 municipalities (65.2%) included in the analysis; all Swedish counties are represented; and the municipalities included in the analysis account for 63% of the Swedish population. In the forthcoming analyses of these municipali-

ties, missing values have been replaced with values from the previous year. The only exception is missing values for 2006, which have been replaced with values from 2007, as there are no data available before 2006. It should also be mentioned that we have studied all municipalities (except Stockholm, Göteborg and Malmö) regardless of the extent of missing values. SAS base (version 9.3) has been used to perform the statistical analyses.

This study was approved by the regional ethical review board in Stockholm.

#### *Internal consistency and validation of the Alcohol Prevention Magnitude Measure*

Internal consistency: Standardised Cronbach alpha was calculated for the com-



posite measure and for all five categories for all years to establish internal consistency of the composite. The total sum of the APMM (based on 37 indicators) has acceptable values of Cronbach alpha over the years (.77 on average), indicating good reliability. However, this must be considered with caution, as the alpha values can depend on the number of indicators (37) included in the analysis and also on underlying correlations among subsets of indicators (Field & Miles, 2010). If different categories of indicators should be deleted from the APMM, it is only the deletion of supervision and licence (four indicators) that slightly increases the mean average of alpha over the years to approximately .79. When analysing Cronbach alpha in categories, they turned out to be more or less inappropriate from a strictly alpha value point of view, but from a theoretical point of view they are considered appropriate.

**Validation:** Several community intervention projects have been implemented in Sweden between 2006 and 2010 in order to strengthen local alcohol and/or drug prevention and reduce harm. The community intervention projects are called the *Six community trial* (2003–2006), *Three times Three* (2006–2009), *Small municipalities project* (2006–2010) and *Local development with ambitions* (2009–2010). These projects are characterised by governmental financial support, and in conjunction with this, different requirements have been set up for participating municipalities. Examples of requirements are updated drug policy, steering group for drug prevention, a drug prevention coordinator, inventory of the drug situation and an implementation plan for drug prevention. Results from earlier evaluations of community inter-

vention projects (Allebeck, Guldbrands-son, Boman, & Heinemans, 2012; Grundh, 2011; Jakobsson, 2011; Swedish National Institute of Public Health, 2008) show indications of improved structures, as well as higher priority and activity for drug prevention. Therefore, it might be expected that the APMM values would increase in intervention municipalities compared to other municipalities without such intervention projects. Such significant increase would support the hypothesis that the composite measure is sensitive to real changes on the local level.

## Results

The validation (see table 2) shows that intervention municipalities increased their APMM values compared to municipalities not included in intervention projects. This indicates that the composite measure is sensitive to real changes on the local level. The intervention municipalities in *Small municipalities* and *Three times three* were (because of their similar intervention periods) used as one comparison group (N=25) and were compared with the municipality group (N=137), which includes municipalities that have not participated in any of the other community intervention projects; see table 2. The Wilcoxon two-sample test (one-sided test,  $p < .05$ ) revealed that the APMM values have increased more in the group of intervention municipalities compared to other municipalities between 2006 and 2010. The higher increase in APMM values among these 25 intervention municipalities is explained by significant increases in policy, activity staff and budget. Similar results appear when comparing the APMM values of *Local development with ambitions*

**Table 2.** Total sum of the Alcohol Prevention Magnitude Measure (max=100 points) among municipal intervention projects and other municipalities, years 2006–2010.

Year	Six community Trial	Small municipalities	Three times three	Local development with ambitions	Other municipalities (not included in intervention projects)
	2003–2006* (N=5)	2006–2010* (N=19)	2006–2009* (N=6)	2009–2010* (N=22)	(N=137)
	(Points)	(Points)	(Points)	(Points)	(Points)
2006	70.20	58.05	55.25	54.68	57.49
2007	75.70	63.32	58.67	58.52	59.36
2008	72.40	69.00	62.00	58.86	61.07
2009	65.70	64.68	61.67	61.70	61.71
2010	64.40	67.66	63.83	64.77	60.66

\* Intervention period.

(N=22) (which started in 2009) with other municipalities (N=137) from the year 2008 to 2010. The APMM increased significantly among these 22 municipalities compared to other municipalities and this is explained by significantly increases in activity, cooperation, staff and budget. There was no significant change in supervision and license between interventions (N=22, N=25) and others (N=137).

In terms of all 189 municipalities, analyses reveal that the total sum of the Alcohol Prevention Magnitude Measure (see table 3) has increased significantly from 2006 to 2010 among Swedish municipalities in general (N=189) (Wilcoxon signed rank test =3237.5, median=4.5,  $p<.05$ ). At the same time, the difference between the municipalities' APMM points has decreased, as shown by reduced dispersion, coefficient of variation 21.70 (2006), 19.54 (2010) and standard deviation 12.47 (2006), 12.12 (2010). Overall, more municipalities are carrying out more alcohol prevention in 2010 than in 2006, and this is mainly due to more comprehensive policies (Wilcoxon signed rank test =1763, median=2,  $p<.05$ ) and more local preven-

tion activities (Wilcoxon signed rank test =3671.5, median=2,  $p<.05$ ).

Of all 189 municipalities in this study, 62% increased their APMM values (+10.5 points, median) and 36% decreased their values (−7.0 points, median) from 2006 to 2010. Two percent had the same APMM values in 2010 as in 2006.

The validation of the APMM (see table 2) showed that intervention municipalities had increased their APMM values significantly compared to municipalities which had not taken part in community intervention projects. However, these non-intervention municipalities (N=137) also increased their APMM values significantly from 2006 to 2010 (Wilcoxon signed rank test,  $p<.05$ ), and these results can also be attributed to policies and activities.

All category values are significantly ( $p<.05$ ) correlated (Spearman) with the APMM total value (the correlation coefficients refer to the year 2010). Cooperation and activities are the categories that have the highest correlation with the APMM (.76 and .68 respectively) followed by policy (.60), staff and budget (.53) and supervision and licence (.28). A majority of the

**Table 3.** Total sum of the Alcohol Prevention Magnitude Measure (max=100 points) and category values (max=20 points) among municipalities, years 2006–2010.

Year	N	Staff and budget	Policy	Cooperation	Supervision and licence	Activities	Alcohol Prevention Magnitude Measure	
		(Points)	(Points)	(Points)	(Points)	(Points)	(Points)	(SD)
2006	189	11.87	11.46	12.03	10.41	11.71	57.49	12.47
2007	189	12.29	11.57	12.92	9.98	13.30	60.07	12.59
2008	189	12.21	12.35	12.89	10.64	13.85	61.94	12.85
2009	189	12.28	12.51	12.72	10.56	14.05	62.11	11.58
2010	189	12.22	12.71	12.24	10.43	14.43	62.04	12.12

five individual categories are significantly correlated with each other. Staff and budget correlate significantly with cooperation (.37) and activities (.22). Cooperation and activities correlate significantly with each other (.58). Policy is significantly correlated with cooperation (.29) and activities (.17). However, the supervision and licence category does not significantly correlate with any other category.

The APMM total values for the year 2010 are strongly related to values from earlier years (2009, 2008, 2007 and 2006) according to regression analysis ( $p < .05$ ,  $R^2$ , ranging and decreasing from .45 for the year 2009 to .11 for the year 2006).

The activity category is of special importance, as it includes specific preventive efforts that in different ways reach out to the citizens in the local community. Figure 1 shows the percentage of municipalities that used the different prevention interventions monitored within the activity category in 2006 and in 2010.

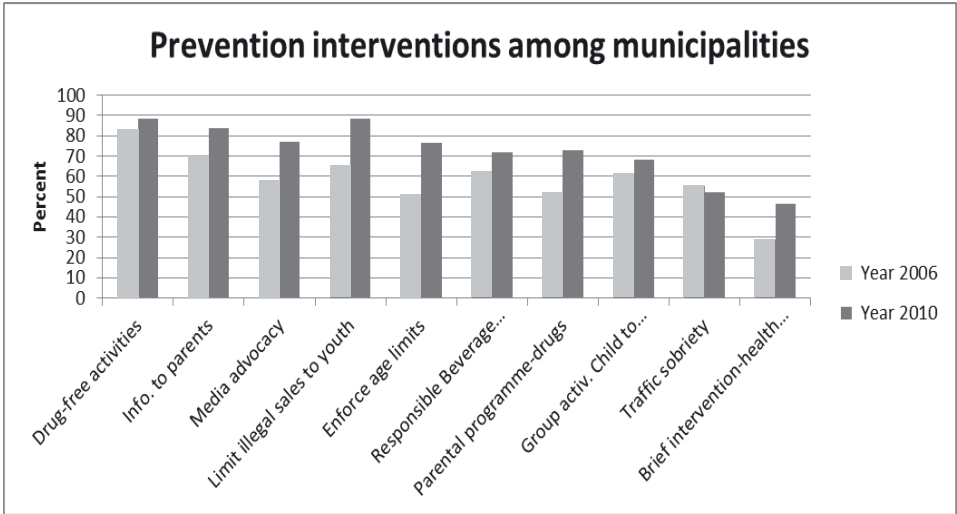
All prevention interventions, except traffic sobriety in addition to police efforts, were carried out in more municipalities in 2010 than in 2006. The greatest increase in percentage is to be found in the number of municipalities employing efforts to enforce age limits for alcohol sales

to youths (+25%), followed by actions to limit illegal sales to youths (+23%). Arranging drug-free activities and efforts to limit illegal sales of alcohol to youths are the most common activities among the 189 municipalities in 2010.

It should be mentioned that we have experimented with relative scoring of the categories in order to assess what would happen to the sum of the APMM, if category scores were modified in various ways. This has been done by assigning several different weights to category scores to enable categories to have different maximum points in relation to each other, but still with 100 points as the maximum sum. We have then calculated the correlations between the total sum of the present APMM and the total sums of these (11) alternative composites for the year 2010. All correlations (Spearman) turned out to be high (approximately .75–.95) and statistically significant ( $p < .05$ ), which reveals that most municipalities that score highly on the total sum of the APMM in its present form are likely to score highly even if the relative importance of the categories are changed in some ways.

Finally, it should be noted that we replicated the main analysis for all municipalities (except Stockholm, Göteborg and

**Figure 1.** Municipal (N=189) percentages of prevention interventions in 2006 and 2010.



Malmö) regardless of the extent of missing values. However, we used the same procedure for replacement of missing values as described in the method section. The analysis revealed that the total APMM points (based on 287 municipalities) increased significantly (Wilcoxon signed rank test = 4667, median 3.5,  $p < .05$ ) from 53.0 points in 2006 to 56.2 points in 2010. In the APMM subcategories it was policy (based on 270 municipalities) and activity (based on 264 municipalities) which increased significantly. This implies that the results we report based on our selected sample of municipalities (N=189) appear to be generally viable.

**Discussion**

To our knowledge, this is the first time that a composite measure of local alcohol prevention is applied in order to study the magnitude of prevention at the local level over time in a country. And as has been shown in the results section, alcohol prevention measured by the Alco-

hol Prevention Magnitude Measure has increased generally in Sweden between 2006 and 2010. Furthermore, the APMM increased significantly in those municipalities where special efforts have been undertaken to strengthen the local alcohol and drug prevention compared to others. This suggests that the composite measure works and is sensitive to real changes at the local level. However, it has not been possible to validate the APMM values for the *Six community trial* in relation to other municipalities, as APMM data only extend as far back as 2006 and the *Six community trial* was implemented between 2003 and 2006. Despite this, the APMM values for this intervention are nevertheless interesting, for they display high values one year (2007) after project termination (2006) and thereafter a gradual decrease. This may be considered a reasonable APMM development due to (possibly) lower priority after intervention termination.

A possible explanation for the overall increase of the APMM could be the rela-

tively large resources spent on local drug prevention within the framework of the government's national alcohol action plan for 2006–2010. It seems also that the specific community intervention projects that have been implemented have contributed to the overall increase in the APMM.

In the APMM subcategories, there has been an increase in policies as well as in activities. The reason why the category supervision and licensing have not increased may be related to municipal preferences for softer interventions, and it seems that supervision and licensing are carried out separately from the other categories. Regarding the category of staff and budget, one possible explanation for the relatively stable values might be that the municipalities do not have enough financial resources to further strengthen the area. Why the extent of cooperation has not increased over time is unclear.

During a period when alcohol prevention has increased in Sweden, the per capita alcohol consumption (15+) has fallen by approximately 7%, from 10.1 litres of pure alcohol in 2006 to 9.4 litres in 2010 (Leifman & Trollidal, 2014). As has been mentioned, the increase in prevention can be mainly attributed to increases in policy and activities, while the other categories of prevention are relatively stable over time. This raises the question of the importance of local mobilisation in relation to consumption development. Future analyses will show if and how the composite measure and its categories relate to alcohol consumption and harm. Future analyses will also need to include the impact of national alcohol policies affecting the economic and physical availability of alcohol. The APMM should be seen as a project with

a potential for additional improvement as the work progresses, especially in the light of its relation to harm.

It should be pointed out that the APMM is developed within the specific conditions that are present in Sweden, including the Swedish municipal system and a generally comprehensive alcohol policy on both the national and the local level. This implies that generalisation to other countries is uncertain, but all mapping systems ought to consider some cultural adaptation. Thus, the tool used to collect data must be flexible enough to pay attention to and to discern cultural differences. Still, we believe that the basic assumptions in our approach are valid in many countries, i.e. a mapping tool (e.g. web-based) directed to the right executive level where decisions of prevention are made (e.g. communities, regions) and with a focus on several dimensions, including the infrastructure for long-term prevention as well as actual prevention activities. Furthermore, many of the actual prevention activities assessed are not culturally limited, such as measures to restrict the availability of alcoholic beverages and drunk driving.

An important aspect of the APMM's construction is that previous research suggests that availability (i.e. licence and supervision category) is more important for the reduction of harm than the other categories in the composite and therefore this category should possibly be awarded more points than the other categories. However, how much more important this category is remains unclear and hence our unconditional analysis of the composite and its categories. A further complication is that the data for indicators is mostly dichoto-

mous, providing no information about the dose of the interventions. Even if more detailed data was available, it would still be hard to weigh indicators (or categories) against each other. One reason for this is that indicators touch upon different target groups/arenas and thus, in the end, different alcohol problems, which makes scoring more complex. A reasonable approach seems to be assigning points to indicators in categories, so that categories sum up equally to enable simple analysis of the magnitude of prevention. Also, as shown in the result section, most municipalities that score high on the total sum of the APMM in its present form are likely to score high, even if the relative importance of the categories are changed in some way.

## Conclusion and suggestions for further work

The APMM is a tool for monitoring the development of local alcohol prevention, and the outcome of the APMM is a magnitude measure of alcohol prevention. It is preferable that the categories are reported separately as well as in combination in order to understand the development of prevention best. As is clear from our work, category weightings and relative scoring of indicators remain major challenges for

composite measures of alcohol prevention on local level.

Our results indicate that local alcohol prevention measured by the APMM has increased over a five-year period in Sweden. However, an increase in prevention is not necessarily synonymous with reductions of alcohol-related harm, which is the primary purpose of prevention. Thus, the next step in this project is to examine the association between alcohol-related harm and the magnitude of prevention on the local level.

**Declaration of interest** None.

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