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Strategies and return-on-investment of implementing alcohol measurement and brief advice in Latin America

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Contents

CHAPTER 1

General Introduction

Alcohol as a public health problem

The consumption of alcohol has been historically embedded in the social contexts of many world cultures, with the first account of alcohol use dating back to the Neolithic times, i.e., 4000 BC (McGovern, 2009). At present, it is estimated that up to 43% of the world's population aged 15 years or older consume alcohol, with a global average consumption of 6.4 litres per capita yearly (WHO, 2022). Over the past decades, a large body of evidence has shown that alcohol has substantial detrimental effects on the consumer's health, currently being the 7th leading risk factor for burden of disease and premature deaths worldwide (Manthey et al., 2019). More specifically, alcohol consumption is causally linked to more than 200 International Classification of Diseases (ICD) disease and injury categories, including communicable diseases such as tuberculosis (Imtiaz et al., 2017), HIV/AIDS (Williams et al., 2016), and non-communicable diseases, such as various cancers (Rumgay et al., 2021), liver disease (Rehm & Shield, 2019), heart disease (Rehm & Roerecke, 2017). This leads to over 5% of the total global burden of disease (GBD 2017 Risk Factor Collaborators, 2018). Moreover, one in 20 deaths is associated with alcohol, worldwide (WHO, 2019). Next to the direct harm to the consumer, alcohol causes substantial harm to others, e.g., increased interpersonal violence, negative impact on foetal health, and traffic accidents (Navarro, Doran et al., 2011; Shield et al., 2020). As a result, alcohol consumption translates into substantial economic costs to societies, mainly through productivity loss and increased expenditures on health care and criminal justice. A recent review estimated the economic costs of alcohol to be around 2.6% of the GDP in a given country (Manthey et al., 2021), however, these costs are probably underestimated due to a lack of clear operationalization of the total harm produced by alcohol consumption (WHO, 2010).

In this context, alcohol control (i.e., efforts to decrease alcohol harm by promoting the reduction or avoidance of alcohol consumption) is one of the priorities on the global public health agenda, with organizations such as the World Health Organization (WHO) and United Nations (UN) pleading for a decrease in alcohol consumption worldwide. For example, the UN's Sustainable Development Goals for 2030 include the reduction of alcohol consumption under the third goal 'Ensure healthy lives and promote well-being for all at all ages' (UN, 2015). Moreover, the NCD (non-communicable diseases) Global Monitoring Framework, which was adopted by WHO's member states in 2013, set the voluntary goal of reducing alcohol consumption by 10% in every country by 2025 as compared to 2010 (WHO, 2013).

A region in which alcohol consumption is expected to increase, rather than decrease, in the coming decade is Latin America (Manthey et al., 2019). This expectation is particularly due to the estimated economic growth in the region, leading to people having more access to alcoholic beverages and more income to purchase them (Collins, 2016). The average alcohol per capita consumption in Latin America is 17.4 g of pure alcohol per day among persons aged 15 years or older, which equals 8 L per year and is above the world average (PAHO, 2020). Around 6% of the deaths and 6% of the burden of disease in Latin America are caused by alcohol (GBD 2016 Alcohol and Drug Use Collaborators, 2018; WHO, 2019), representing the largest alcohol-related disease burden, after Eastern Europe and sub-Saharan Africa. The region also knows an important treatment gap, i.e., people who need help regarding their alcohol drinking do not receive it (Medina-Mora et al., 2021). From a public health perspective, it is, therefore, crucial to implement interventions and policies to manage and reduce the consumption of alcohol.

Alcohol measurement and brief advice

One of the strategies recommended by the WHO to manage and reduce alcohol consumption is through the delivery of alcohol measurement and brief advice by health care providers (e.g., general practitioners and nurses) (WHO, 2021b). This entails that a patient's alcohol consumption is measured during a health care consultation, typically with a short validated questionnaire such as AUDIT-C (The Alcohol Use Disorders Identification Test-Concise) (Bush et al., 1998). Upon detection of alcohol consumption above a pre-established threshold considered risky (e.g., more than 50 grams of alcohol per day), the health care provider offers brief advice to the patient regarding the reduction of drinking. In situations deemed necessary by the health care provider (e.g., when alcohol dependence is suspected), the patient can be referred to specialized treatment, such as a rehab facility. Primary health care is considered an optimal setting for delivering alcohol measurement and brief advice, given that it covers a large part of the population in most countries (Anderson, 1996). Also, heavy drinkers consult their primary health care providers more often than lighter drinkers, providing the opportunity to target the groups in need of alcohol advice or referral to treatment (Fleming et al., 1989). Furthermore, primary health care providers are seen as credible sources by patients regarding advice on alcohol-related issues (Anderson, O'Donnell et al., 2017).

A large body of evidence, covering over 50 clinical trials, has shown that alcohol measurement and brief advice in primary health care settings is clinically effective (Kaner et al., 2018; O'Donnell et al., 2014; Platt et al., 2016). A recent review has indicated that the patients who received alcohol measurement and brief advice drank weekly an average of 20 grams of alcohol less compared to those who did not receive the intervention (Kaner et al., 2018). However, despite this evidence, alcohol measurement and brief advice is not widely implemented in practice (Abidi et al., 2016; Wilson et al., 2011). Common barriers explaining the low adoption of alcohol measurement and brief advice include providers' (perceived) lack of time, training, resources and/or supportive policy environment; along with their concerns that patients will be offended if the subject of alcohol is brought up (Abidi et al., 2016; Nilsen, 2010; Rahm et al., 2015).

To fill this gap between research and practice (i.e., low adoption of the programme despite its proven effectiveness), various studies from the past two decades explored implementation strategies (i.e., methods used to enhance the adoption and maintenance of (health) innovations) in the context of alcohol measurement and brief advice (Nilsen et al., 2006; Thoele et al., 2021; Williams et al., 2011). The main implementation strategies addressed in these studies focused on one of the three following target groups: 1) the health care provider (e.g., training; financial incentives), 2) the patient (e.g., educational materials), and 3) the organization (e.g., assessing readiness to implement the intervention).

A meta-analysis by Keurhorst et al. (2015) showed that, while implementation strategies focusing solely on the health care provider are the most common in implementation research concerning alcohol measurement and brief advice, multi-faceted implementation strategies (i.e., focusing on at least two of the three target groups mentioned above) are, in fact, more effective. Hence, more research is needed regarding the development and effects of multi-faceted implementation strategies that can bolster the adoption and maintenance of alcohol measurement and brief advice, particularly in contexts where it has not been done before, such as Latin America. This is one of the primary goals of this thesis, which will be explained in further details below.

Community support as an implementation strategy

The delivery of community support activities along with an alcohol measurement and brief advice clinical package is a multi-faceted implementation strategy that has been recommended in previous literature (Anderson, 1996; WHO, 2006). Community support refers to a set of actions carried out and focused at a level wider than the individual (e.g., a neighbourhood, workplace, school, municipality) to enhance the (social) environment in which individuals must perform the desired behaviour (e.g., reduce the amount of consumed alcohol, deliver a health intervention). Community support can include a wide range of activities, such as media and outdoor communication campaigns, interpersonal communication, public events, provision of social care services, law enforcement or advertising restrictions (Toomey & Lenk, 2011). The WHO Phase IV 12-country study on the identification and management of alcohol-related problems in primary care (WHO, 2006) concluded, among others, that by embedding alcohol measurement and brief advice into a wider set of community support activities, the views of health care providers about alcohol can be reinforced towards considering it an important subject to discuss during a health care consultation. This is expected to result in increased adoption and implementation of alcohol measurement and brief advice. Despite these theoretical arguments, to date, community support has only been scarcely researched empirically in the context of alcohol measurement and brief advice.

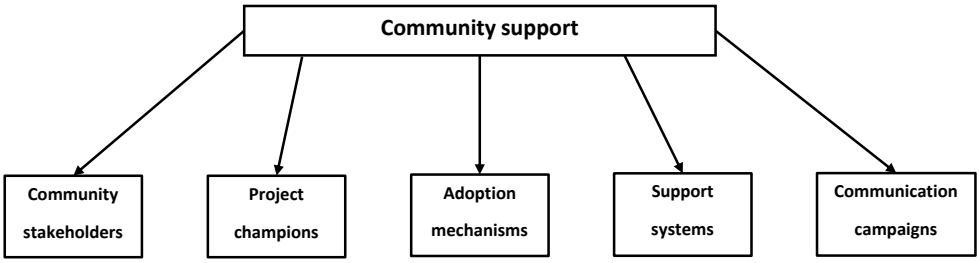
In the wider context of alcohol control, in the past three decades, various studies investigated the effects of community support and community-based interventions. The reasoning for using community-based approaches in alcohol control efforts builds on the idea that alcohol consumption is impacted not only by individual factors, such as a person's predilection to drinking, but also by factors at the social and environmental level which are embedded in communities (Wagenaar & Perry, 1995). For example, the activity of alcohol consumption typically occurs in community settings, e.g., during social gatherings (Thombs et al., 1997), and hence, a decrease in the availability of places where alcohol can be purchased and/or consumed in a community can have a direct impact on the amount and frequency of alcohol consumption. Other community-related factors impacting alcohol consumption include the establishment of a minimum age for buying and drinking alcohol, the enforcement of drinking and driving laws, as well as the existence of social, cultural, and religious norms regarding the acceptability of drinking (Holder, 1998). Therefore, it has been argued that to address the alcohol problem effectively one should tackle community systems and settings that are triggering the consumption of alcohol in the first place.

Various empirical studies have found community-based interventions in the context of alcohol control to contribute to a reduction, albeit modest, in alcohol consumption (Schinke et al., 2004; Slater et al., 2006) and alcohol-related driving incidents (Holder, 2000), as well as to shifting attitudes towards desired alcohol-related behaviours (Casswell & Gilmore, 1989) and ensuring overall acceptability of alcohol interventions (Czech et al., 2010). However, as mentioned earlier, in the specific context of alcohol measurement and brief advice, there is a paucity of studies that have described the specific supportive activities that can be implemented (Anderson et al., 2017). A framework that has been suggested in this context is the *Institute for Healthcare Improvement (IHI) framework for going to scale*

(Barker et al., 2015). This framework puts forward several types of (community) support activities that can be implemented to stimulate the adoption and maintenance of health interventions in new contexts (see Figure 1.1). The proposed activities include: 1) involving community stakeholders and opinion leaders in the developing stage of an intervention, to ensure that the intervention fits in the social, cultural, and organizational context of the new place; 2) involving project champion(s), i.e., persons who advocate the implementation of the intervention and generate support for its adoption; 3) implementing adoption mechanisms, i.e., activities undertaken to stimulate the acceptance of the intervention among the potential implementers; 4) implement support systems, i.e., activities that ensure an encouraging environment for delivering the intervention and reduce potential barriers; 5) regular communication on the topic of the intervention, for example through a communication campaign, that is, organized communication activities, directed at a particular population for a period of time, to achieve a predetermined goal, such as convincing relevant stakeholders to participate in the intervention.

Figure 1.1.

Community support activities suggested within the IHI Framework for going to scale



To our knowledge, such a multi-component package of community support has not been previously applied in research concerning alcohol measurement and brief advice. To fill this literature gap, the first aim of this thesis is to explore the development of a package of community support activities, based on the abovementioned framework, for aiding the implementation of alcohol measurement and brief advice in primary health care settings.

Impact of community support on the delivery of alcohol measurement and brief advice

A subsequent step (after exploring which community support activities can be developed and implemented) is to assess the *impact* of community support on the delivery of alcohol measurement and brief advice. This implies measuring whether health care providers who are exposed to community support indeed deliver alcohol measurement and brief advice to more patients, compared to health care providers who do not receive such support. Two studies (Anderson et al., 2017; Kaner et al., 1999) have explored the effects of one type of supportive action, namely, telephone calls given to health care providers involved in alcohol measurement and brief advice programmes. Kaner and colleagues (1999) found in a UK-based study that supportive telephone calls had a positive impact on the delivery

of alcohol measurement and brief advice in a primary health care setting, over and above training. Also, in a European multi-country study, Anderson and colleagues (2017) found positive results from supportive telephone calls, yet, in that study, the effect of such calls could not be disentangled from the effect of training.

However, there is a lack of empirical research exploring the effects of a multi-component package of community support simultaneously including various activities, channels, sources, and stakeholders (for example based on the abovementioned IHI framework) on the implementation of alcohol measurement and brief advice. Such research is nevertheless essential for informing intervention developers or policymakers on the potential benefit of incorporating community support as an implementation strategy in the deployment of the alcohol control programme. Hence, the second aim of this thesis is to undertake an effect evaluation of a multi-component package of community support on the delivery of an alcohol measurement programme.

Mechanisms of impact of community support on the delivery of alcohol measurement and brief advice

Furthermore, if community support is found to have an impact on the delivery of alcohol measurement and brief advice, it is also essential to know which mechanisms are at play, or, in other words, what are the underlying processes explaining the effects (if any is found). Exploring such mechanisms of behaviour change plays an important role in health promotion, because knowing why and how activities such as community support work (or do not work) is essential both for improving those activities and for informing the development of new health promotion efforts (Boulding et al., 2020).

A theoretical approach used to assess mechanisms of behaviour change, and that can be also employed at explaining the effect of community support on a given behaviour, consists of using socio-cognitive theories. Such theories take into account both personal and socio-structural determinants of health behaviour (Bandura, 1998). The theory of planned behaviour (TPB) (Ajzen, 1991) is a socio-cognitive theory widely used in health promotion research and suggests that behaviour is largely predicted by intention (i.e. a person's conscious plan or decision to exert effort to engage in the behaviour, such as planning to deliver alcohol measurement and brief advice). Intention, in its turn, is predicted by three constructs: 1) attitude (i.e. the degree to which a person has a favourable or unfavourable evaluation of the behaviour of interest, for example providing alcohol measurement and brief advice); (2) subjective norm (i.e. beliefs of other people about providing alcohol measurement and brief advice), and (3) perceived behavioural control, also known as self-efficacy (i.e. perception of the ease or difficulty of providing alcohol measurement and brief advice).

Further explaining socio-cognitive determinants of behaviour, the I-Change Model for behaviour change – a theoretical model integrating several health behaviour theories – proposes that these constructs (i.e., attitude, subjective norms, self-efficacy, intention) are in turn predicted by awareness and its determinants (De Vries, 2017). In the context of community support toward a health intervention such as alcohol measurement and brief advice, this implies that the target group, i.e., health care providers – as the first step of the behavioural chain process – needs to be or become aware of the provision of community

support towards the desired behaviour (along with having knowledge about the behaviour and receiving several cues to engage in it). The model further posits that once awareness is sufficiently high, individuals may start considering to contemplate the factors related to becoming further motivated to perform the behaviour of interest, namely by looking at its advantages and disadvantages (attitude), the beliefs of others (subjective norms), and the situations in which this will be easy or difficult to perform the behaviour (self-efficacy). Next, in the action phase, once the decision to perform the desired behaviour has been taken, important steps towards the actual behaviour consist of preparing plans regarding how to best perform it (preparation plans) and how to cope with eventual challenging situations that may impede the delivery of the behaviour (coping planning).

Various empirical studies have shown that these theoretical frameworks are indeed applicable in the context of the adoption of interventions by health care professionals (Berndt et al., 2013; Côté et al., 2012; Segaar et al., 2006; White et al., 2015). Given the abovementioned gap in empirical evidence regarding the mechanisms of effects of community support in the context of alcohol measurement and brief advice, the third aim of this thesis is to investigate the socio-cognitive mechanisms explaining the effect of community support on the delivery of alcohol measurement and brief advice.

Economic costs of alcohol measurement and brief advice

Next to implementation strategies such as community support, clear information about the required implementation costs is essential for aiding widespread dissemination of alcohol measurement and brief advice (Barbosa et al., 2016). Especially in the more resource-constrained settings (e.g., low- and middle-income settings), this information is crucial (Johnson et al., 2010). A transparent assessment of such costs can provide information regarding whether certain cost categories are obsolete and/or can be replaced for cost savings (for example, costs for printing AUDIT-C questionnaires can be saved in case an electronic device is used).

In many studies, costs of alcohol measurement and brief advice have been operationalized solely as consultation costs, i.e., the costs that come with every new patient receiving the intervention (Bray et al., 2012). These consultation costs typically consist of staff costs (i.e., payment to the health care provider, as a function of salary and time spent on delivering the intervention) and material costs (i.e., any products offered to the patients, e.g., leaflets). However, another type of relevant costs of alcohol measurement and brief advice - which is less often assessed in costing studies - are programme costs (Hoomans & Severens, 2014; Johns et al., 2003). These include costs related to the set-up and adaptation of the intervention (e.g., coordinating the delivery of the intervention in a health care setting, tailoring the materials given to patients), as well as implementation strategies (e.g., community support, training). Such programme costs are essential for the realistic budgeting of health interventions and, therefore, it is important to measure them, also in the context of alcohol measurement and brief advice.

Only a few studies have estimated the costs of alcohol measurement and brief advice in primary health care settings, the majority of which in high-income settings. A review by Bray and colleagues (2012) revealed substantial variations in the costs of alcohol

measurement sessions reported in these studies. These variations were largely driven by factors such as the time spent on each session, the complexity of the programme, and the country where it was implemented. The scarcity and heterogeneity of existing evidence in this field stress the need for detailed and transparent cost assessments of alcohol measurement interventions in various regions of the world, including in the Latin American region. Hence, the fourth aim of this thesis is to assess the consultation and programme costs of implementing alcohol measurement and brief advice in primary health care settings in three Latin American countries, as specified below.

Economic returns of alcohol measurement and brief advice

To further stimulate the adoption and maintenance of a health programme in a new context it is highly informative to integrate costing information into full economic evaluations of the programme. An economic evaluation is the systematic appraisal of costs and gains of a project undertaken to determine its relative economic efficiency. Such information is crucial in informing decision-making regarding the adoption of policies (Drummond et al., 2015; Rabarison et al., 2015). Considering that, in any context, health service resources are finite, whereas demands for health care are generally increasing (Wang & Wang, 2021), economic evaluations are needed for ensuring an efficient and equitable resource allocation in health care (Goodacre & McCabe, 2002). In the field of alcohol measurement and brief advice, more than 20 economic evaluations were undertaken in the previous two decades (Angus et al., 2014). The large majority of these studies concluded that alcohol measurement and brief advice is a cost-effective health intervention, in terms of reduced alcohol consumption (Navarro, Shakeshaft et al., 2011), gained QALYs (quality-adjusted life years) (Purshouse et al., 2013; Solberg et al., 2008), and avoided DALYs (disability-adjusted life years) (Cobiac et al., 2009).

However, two literature gaps should be noted with regard to economic evaluations that have been done in the context of alcohol measurement and brief advice. First, the large majority of these studies are based on high-income countries, and hence, the generalizability to other contexts is uncertain, particularly considering the inherent economic differences between high-, medium-, and low-income countries (Chisholm et al., 2004). Second, there is a lack of studies in which health gains are translated into monetary outcomes, whereas such outcomes are particularly helpful for policymakers or those in charge of resource allocation decisions, by allowing for optimal comparability between interventions across domains, also beyond health (Eisenberg, 1989). Economic evaluations using monetary outcomes, commonly called cost-benefit or return-on-investment analyses, are, however, rather difficult to produce in the health field because translating health gains into financial outcomes requires the usage of epidemiological and health service use data that is often not available (Drummond et al., 2015).

As mentioned, in the context of alcohol measurement and brief advice, the available literature on cost-benefit or return-on-investment analyses is scarce. To our knowledge, only three such studies have been done (Fleming et al., 2002; Horn et al., 2017; Mundt et al., 2005). Given this research gap, the fifth and final aim of this thesis is to determine the economic returns of scaling up alcohol measurement and brief advice in primary health care settings, by focusing on the example of Mexico.

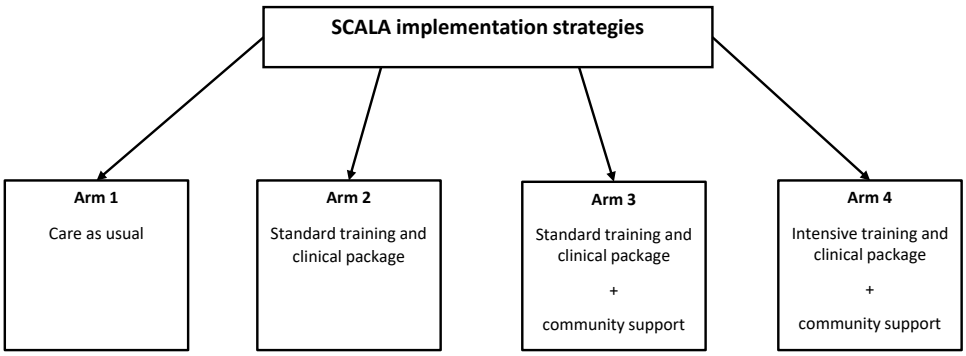
The SCALA study

The research included in this thesis has been conducted as part of the SCALA study (Scale-up of Prevention and Management of Alcohol Use Disorders and Comorbid Depression in Latin America) (Jané-Llopis et al., 2020). SCALA is a quasi-experimental study, which sought to upscale the delivery of alcohol measurement at the municipal level in three Latin American countries, namely Colombia, Mexico, and Peru. The countries were researcher-selected, with the aim to develop and test an alcohol measurement and brief advice programme, and to gain insights for potentially scaling up the programme across a wider area in Latin America, given the shared language and cultural similarities among many countries in the region. The three SCALA countries are relatively large, with Colombia having a population of 50 million inhabitants; Mexico – 125 million inhabitants; and Peru – 33 million inhabitants (Worldometer, 2022). In all three countries, alcohol consumption is in the top 5 causes of morbidity (PAHO, 2020), with risky patterns of drinking, such as heavy episodic drinking, expected to increase by 2030 (Manthey et al., 2019). In terms of public health care systems, about 80-90% of the population is covered by public health care insurance and 80% of the population reported visiting their primary health care centre at least once per year (Garcia-Ramirez et al., 2020; Guanais et al., 2018). These factors indicate both a need and an opportunity in these three countries to develop and implement alcohol measurement and brief advice, to prevent and manage alcohol consumption at the population level.

The SCALA study used a multi-component approach, with the following implementation strategies (as shown in Figure 1.2): 1) provision of standard training combined with a standard clinical package; 2) provision of a more intensive training combined with a longer clinical package; 3) provision of community support (the focus of this thesis). The strategies were compared to a control group with care as usual. In each of the three participating countries, two municipalities were recruited (one with community support, and one without community support), each with nine-ten participating primary health care centres. This resulted in 58 participating primary health care centres. The implementation phase was planned to last 18 months and started in September - October 2019, however, was paused in mid-March 2020, due to the start of the COVID-19 pandemic, which disrupted the primary health care services in the three countries. The implementation was gradually relaunched around January 2021, for another six months, however, the current thesis only focuses on the results from the first phase of implementation.

Figure 1.2.

Implementation strategies in the SCALA research arms



Thesis outline

The second chapter of this thesis describes the development and content of a package of community support actions created with the contribution of local stakeholders in Colombia, Mexico, and Peru. The development process was done in collaboration with the local research teams in the three countries, along with local public health stakeholders. The research question addressed in the second chapter is:

RQ1. ***What community support activities can be developed and implemented in order to stimulate the adoption of alcohol measurement and brief advice?***

In the third chapter of this thesis, a quantitative study explored the effect of a part of the community support actions described in the second chapter, along with socio-cognitive mechanisms explaining the effect. The study has a pre-post quasi-experimental design, using a 5-month longitudinal behavioural measurement of delivery of alcohol measurement in Colombia, Mexico, and Peru. The research questions that the third chapter aims to answer are: RQ2. ***Does community support have an effect on the delivery of alcohol measurement?*** and RQ3. ***What are the socio-cognitive mechanisms explaining the effects of community support on the delivery of alcohol measurement?***

In the fourth chapter of this thesis, the costs of setting up and implementing alcohol measurement and brief advice in primary health care settings of the three Latin American countries were assessed. For this, several data sources were used, such as health care providers, health care managers, and the local research teams, providing information about different cost categories pertaining to consultation costs (e.g., salaries of providers delivering the intervention, material costs) and programme costs (i.e., setting up the intervention, implementation strategies such as training and/or community support). The research question covered in the fourth chapter is:

RQ4. ***What are the consultation and programme costs of implementing alcohol measurement and brief advice in primary health care settings?***

In the fifth chapter, an economic evaluation of the alcohol measurement and brief advice programme implemented in the SCALA project was undertaken, by focusing on the biggest of the three implementation countries, namely Mexico. We employed a return-on-investment approach, whereby both the costs and the gains of the intervention were expressed in financial terms. For this, we modelled the costs and gains of scaling the intervention at the national level, using a retrospective framework of ten years and comparing several implementation scenarios. Both the investments and the returns were considered from a public sector health care perspective, i.e., health care services coordinated and offered by the public sector (e.g., Ministry of Health). The research question addressed in the fifth chapter is:
RQ5. ***What are the economic returns of scaling up alcohol measurement and brief advice in primary health care settings?***

In the sixth and last chapter, the most important findings of this thesis are discussed, along with strengths, limitations, suggestions for further research, implications for practice, and concluding remarks.

CHAPTER 2

Development of community strategies supporting brief alcohol advice in three Latin American countries

Abstract

Brief alcohol advice offered to patients was shown to be a clinically- and cost-effective intervention to prevent and manage alcohol-related health harm. However, this intervention is not yet optimally implemented in practice. A suggested strategy to improve the implementation of brief alcohol advice is through community actions which would enhance the environment in which primary healthcare providers must deliver the intervention. However, there has been scarce research conducted to date regarding which community actions have most influence on the adoption and implementation of brief alcohol advice. The current protocol presents the development of a package of community actions to be implemented in three Latin American municipalities, in Colombia, Mexico and Peru. The community actions were based on the Institute for Health Care Improvement's framework for going to full scale, and include: (i) involvement of a Community Advisory Board, (ii) involvement of a project champion, (iii) adoption mechanisms, (iv) support systems and (v) a communication campaign. By presenting a protocol for developing community actions with input from local stakeholders, this article contributes to advancing the public health field of alcohol prevention by potentially stimulating the sustainable adoption and implementation of brief alcohol advice in routine practice.

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Introduction

Alcohol is the ninth leading risk factor for morbidity and premature death, responsible for over five per cent of mortality worldwide, and more than five per cent of the global burden of disease and injury, including non-communicable diseases (e.g., liver cirrhosis, cardiovascular diseases, cancers), neuropsychiatric conditions, and injuries from violence and road-traffic crashes (Rehm et al., 2009; WHO, 2019). In the three countries addressed in this protocol, alcohol ranks even higher, representing the fourth leading risk factor in Colombia and Peru, and the fifth in Mexico (GBD 2015 Risk Factors Collaborators, 2016). In spite of this evidence, about 80% of heavy drinkers worldwide fail to receive appropriate advice or treatment (WHO, 2008), which highlights the importance of implementing interventions that can increase patients' access to alcohol advice and/or treatment. The purpose of this paper is to present the development of a package of community actions (to be implemented in the three abovementioned Latin American countries), aiming to support primary health care (PHC) providers to adopt and deliver brief alcohol advice to their patients (as explained in more detail below).

PHC is a recommended setting for addressing harmful alcohol drinking, because of the high frequency of encounters between patients and PHC providers and its extensive coverage of the general population (Anderson, 1996). Specifically, assessing a patient's

alcohol consumption using a short validated instrument such as the Alcohol Use Disorder Identification Test-Consumption version (Bush et al., 1998), and providing brief advice to those identified as heavy drinkers, has been shown to be clinically- (Kaner et al., 2018; O'Donnell et al., 2014; Platt et al., 2016) and cost-effective (Anderson et al., 2009; Solberg et al., 2008) in the prevention and management of alcohol-related harm. Despite such evidence, however, these interventions are not yet optimally implemented in practice (Abidi et al., 2016; Johnson et al., 2010; Wilson et al., 2011). Some of the most notable barriers to routine delivery of alcohol advice include: the (perceived) lack of time of PHC providers; the lack of training, resources and/or supportive policy environment; and concerns amongst a substantial number of PHC providers that patients will be offended if the subject of alcohol is brought up, and will not listen to the offered advice (Nilsen, 2010; O'Donnell et al., 2013).

A comprehensive multi-country World Health Organisation (WHO) study of the implementation of brief alcohol advice in PHC suggested that in order to overcome these barriers, it is important to both reframe views of individual health care professionals and patients about alcohol and to embed delivery of brief alcohol advice into a set of wider community actions which would enhance the environment in which PHC providers must deliver the intervention (WHO, 2006). The conclusions of the WHO study build on a long line of work, dating back to the Maudsley Alcohol Pilot Project that was set up in the United Kingdom in the 1970s to make practical recommendations for an improved local response to dealing with drinking problems (Shaw et al., 1978). The project, which subsequently informed the United Kingdom's Royal College of General Practitioners' report on alcohol (Anderson et al., 1986) , was premised on the view that to respond to drinking problems adequately, PHC providers need to be involved, trained, and supported at the community level. Several studies showed empirically that community-based interventions are indeed highly relevant in the context of alcohol prevention, by shifting positive attitudes towards desired alcohol-related behaviours (Casswell & Gilmore, 1989), ensuring overall acceptability of such interventions (Czech et al., 2010), and being potentially cost-effective (Holder, 2000).

Community stakeholders

Shakeshaft and colleagues (2014) argue for the importance of including key community stakeholders (e.g., representatives of the municipal administration) in community-based interventions in the context of alcohol prevention, as this is expected to increase the visibility and acceptability of the intervention. A way of involving such actors in community-based interventions is through Community Advisory Boards (CABs) (Newman et al., 2011; Rahman et al., 2019). A CAB is a group formed of relevant stakeholders (for example, delegates of a regional health department, health care professionals, patient representatives, civil society members) who offer regular advice, feedback and suggestions, and generally represent the views and needs of the community in the implementation of a health programme. In the field of alcohol prevention, CABs may ensure that research methods are culturally appropriate and applicable to the local contexts (Morojele et al., 2006), and may identify and signal potential barriers and facilitators in the implementation of the alcohol-related intervention (Dickerson et al., 2016).

Moreover, the efforts of CABs in the development and maintenance of supportive actions are often strengthened by a project champion, a person who advocates the implementation of a new (health) programme and generates support for its adoption (Markham & Griffin, 1998; Vendetti et al., 2017). In the context of brief alcohol advice, several studies have shown that the involvement of a project champion is an important success factor in the implementation of the programme (Anderson et al., 2017; Gifford et al., 2012), for example by promoting the adoption of the intervention to PHC providers, by ensuring regular communication with the PHC managers and providers in order to foresee and overcome barriers, and by promoting the sustainability and scalability of the intervention.

Community actions

An evidence-based framework that can guide the development of community actions with input from key stakeholders is the Institute for Health Care Improvement's (IHI) framework for going to full scale, developed by Barker and colleagues (2015). This framework illustrates several important types of community actions aimed at enhancing the adoption and scalability of a health intervention, which are briefly outlined below. In the set-up phase of an intervention, they emphasize the importance of implementing a range of adoption mechanisms, that is, carrying out a set of actions that would foster the acceptance and initial implementation of an intervention by the relevant stakeholders. Such adoption mechanisms may include highlighting the simplicity and/or benefits of the innovation to the relevant stakeholders or identifying potential organizational barriers along with solutions to overcome them (Rogers, 2010). Implementing adoption mechanisms is important in the context of alcohol prevention because the topic of alcohol is often linked to stigmatization (Room, 2005), is perceived as a taboo subject to discuss in a medical setting (Mules et al., 2012), and is associated with limited health literacy about its harms (Rundle-Thiele et al., 2017). These can be serious impediments to the adoption of interventions by health care providers. The implementation of adoption mechanisms may help health care providers to overcome these barriers, thereby stimulating them to deliver preventive interventions to their patients.

Further, Barker and colleagues (2015) highlight that throughout the lifecycle of the intervention, various support systems should be implemented. Support systems refer to actions that provide an encouraging environment for delivering the intervention and diminish the implementation barriers. Such actions may include regular performance feedback given to the stakeholders involved or actively offering solutions to encountered barriers throughout the implementation process. Support systems are important in the context of alcohol prevention interventions, especially when such interventions require a continuous involvement of the implementers, e.g., PHC providers. For example, in the context of brief alcohol advice, a common barrier mentioned by PHC providers is the perceived lack of time and managerial support in addressing the topic of alcohol with their patients (Nilsen et al., 2006; Roche & Freeman, 2004), which results in decreased implementation. In such cases, implementers can be helped to overcome the experienced barriers through regularly implemented support systems, as those mentioned above.

Moreover, communication campaigns are often part of community actions aimed at supporting alcohol prevention interventions (Dejong & Atkin, 1995; Elder et al., 2004; Young et al., 2018). Communication campaigns are organized communication activities, directed at a particular population for a period of time, to achieve a predetermined goal, for example convincing relevant stakeholders to participate in an intervention (Rogers, 2010; Snyder, 2007). General advantages of communication campaigns in health promotion activities include the ability to reach large (or targeted) audiences at a relatively low cost per capita (Wakefield et al., 2010). Communication campaigns fit well in the scope of alcohol prevention efforts, for example by promoting awareness at the population level regarding risks of alcohol abuse (Shakeshaft et al., 2014) or encouraging interpersonal communication on the topic of alcohol (Hendriks et al., 2014).

To our knowledge, there has been limited research conducted to date regarding which community actions may impact PHC providers' adoption and implementation of brief alcohol advice. Moreover, no such study has been previously carried out in Latin America. To fill this literature gap, the current paper aims to describe the protocol for the development of a package of community actions to support the implementation of PHC based alcohol interventions in three upper-middle-income countries in Latin America, namely Colombia, Mexico, and Peru. This paper is part of the larger SCALA study that aims to scale-up PHC based prevention and management of alcohol use disorder and depression at the municipal level in the three countries (Jané-Llopis et al., 2020).

Methods and outcomes

SCALA study design and sample

SCALA is a quasi-experimental study rooted in implementation science, which seeks to increase the delivery of evidence-based approaches to the prevention and management of alcohol use disorder and comorbid depression in Colombia, Mexico, and Peru. SCALA will use a multi-component approach to boost implementation, which comprises: locally tailored care pathway, clinical intervention materials (two versions: either standard or more intensive); training sessions (two versions: either standard or more intensive) with PHC providers; and introduction of community actions. The larger SCALA study consists of four arms (arm 1: care as usual; arm 2: implements standard training and clinical package; arm 3: implements standard training and clinical package, *and* community actions; arm 4: implements more intensive training and clinical package, *and* community actions). Implementation will last 18 months. By month 6 of implementation, the non-superiority of arm 4 over arm 3 will be tested. If the difference of the cumulative coverage of patients whose alcohol consumption is measured is less than 10% between the two arms, arm 4 will be replaced by arm 3.

Participants and power calculations

In each country, there is one intervention municipality and one comparator municipality, each including nine to ten participating PHC centres (PHCCs). Municipal areas are investigator-selected, ensuring comparability among the intervention and control municipal areas in terms of size and socioeconomic characteristics. Sufficient geographical separation between the municipal areas in each country was taken into account, to minimise potential contamination effects of the control municipality from the intervention municipality. PHCCs were invited to join the study, through face-to-face meetings and/or telephone calls, until a minimum of nine PHCCs per municipal area (intervention and control) within each of the three countries were achieved. In the end, 58 PHCCs were recruited, 29 in the intervention municipal areas and 29 in the control municipal areas. All PHCCs are part of the public health care systems in each of the three countries, under the jurisdiction of regional health departments (in all three countries, the national health care systems are comparable, consisting of both public and private health services). Within the control municipal area, 14 PHCCs were randomly allocated to arm 1, and 15 PHCCs - to arm 2. Within the intervention municipal area, 15 PHCCs were randomly allocated to arm 3, and 14 PHCCs - to arm 4. Random allocation was stratified by country and undertaken using Excel random number generator. In total, approximately 600 PHC providers agreed to participate in the study, by signing the informed consent. The number of participating PHCCs (which ultimately determines the sample size of participating PHC providers, who register voluntarily) has been defined based on the primary outcomes in the whole SCALA study (i.e., comparing the proportions of patients who receive brief advice among the study arms). The power calculations are based on the assumptions that the average size of a PHCC included in the study is 15000 adults and the average of consultations is 1500 per month. Based on results from a comparable study in a European setting (Anderson, Kaner, et al., 2017) it is expected that after 12 months of implementation, 3.25% of the registered adult population to have had their alcohol consumption measured in the control condition (arm 1), and 7.5% – in arm 2. For arms 3 and 4, no precise empirical data is available to allow estimations, however, at least 15% of the registered adult population would need to have their alcohol consumption measured in these arms in order to consider the effect of community actions worthwhile. For comparing differences between arms, for a power of at least 80% at a significance level of 5% (Donner & Klar, 2010), 12-15 PHCCs per arm are needed (i.e., 4-5 PHCCs per arm in each country).

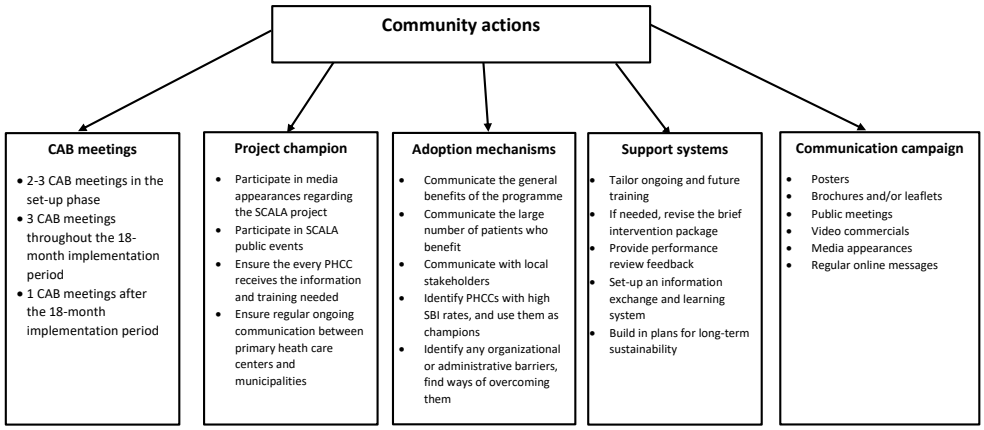
Development of SCALA community actions

Community actions, as provided in study arms 3 and 4, are operationalized through a package of activities that will be implemented in the three intervention municipalities in Peru (Callao), Colombia (Soacha), and Mexico (parts of Mexico City). These actions have been developed based on the IHI framework for going to full scale (Barker et al., 2015), with input from and in collaboration with local stakeholders and the public health experts involved in the project. In the preparation phase, the local research teams in the three countries exchanged ideas and best practices, leading to the development of three comparable community actions plans. The aim of the community actions has been defined

as to increase the support perceived by PHC providers to deliver brief alcohol advice to their patients. In each of the three countries, the planned community actions consist of five blocks (as depicted in Figure 2.1): a) involvement of the CAB; b) involvement of one or more project champions; c) implementation of adoption mechanisms; d) implementation of support systems and e) implementation of a communication campaign. Below, each of these activities is explained.

Figure 2.1.

Overview of the SCALA community actions.



Community Advisory Board

In each intervention municipality, a CAB was formed in the first months of the project, specifically from April to May 2018. The three CABs have comparable compositions, each consisting of 10-12 members representing relevant organisations and/or sectors such as regional health departments, academia, mass media, and non-profit organizations. The core aims of the CABs have been defined as a) to provide input and feedback into the development of the community actions, b) to be involved (when necessary) in the implementation of the community actions, c) to provide suggestions regarding the clinical and training package, and its delivery in PHC, and d) to provide suggestions with regard to any other issues (e.g., organizational barriers) that may arise throughout the implementation period. In line with these aims, before the start of the implementation period, two to three CAB meetings were held in each intervention municipality, to discuss the set-up of the project, the materials used in the intervention, and the planned community actions. Throughout the 18-month implementation period, CAB meetings will take place approximately once in six months (or more often on an 'as needed' basis). In addition, depending on their availability and areas of expertise/experience, it has been agreed that individual CAB members will give advice and feedback during face-to-face meetings, phone calls, and online communication with the local research teams. CAB members will also be directly involved in the implementation of some community actions (e.g., media appearances, participation in public events), as specified below.

In the set-up phase of the project (i.e., before the start of the implementation period), although the three CABs were not directly involved in the selection and recruitment of PHCCs, their support and endorsement towards the project contributed to the PHCCs' managers and PHC providers' openness to participate in the study. Moreover, the CABs provided input towards ensuring that PHC provider priorities will be taken into account in the implementation of the programme. For example, in all three countries, CAB members suggested simplifying the brief alcohol advice pathway in order to deal with providers' (perceived) lack of time to deliver the intervention.

The CAB members also provided feedback on the tailoring of the clinical package materials (e.g., leaflets for patients, guidance materials for the PHC providers) and on the training delivered in the programme, in order to ensure an optimal harmonization with municipal and country realities. Clinical package materials and training programmes were initially developed by research partners in Europe, based on existing formats used in UK and Spain, respectively, and were afterwards translated, tailored, and adapted to each of the three Latin American countries. The final versions of the materials and training structure can be accessed on the project website (scalaproject.eu), with the content of the materials and training being similar in the three countries. Tailoring suggestions from the CAB members referred mostly to concretizing the definitions of standard drinks in the clinical package materials, by including examples of drinks specific to each country (e.g., aguardiente in Colombia, tequilla Mexico, pulque in Peru). Moreover, CAB members made suggestions regarding the key societal problems caused by alcohol in the respective country to be mentioned in the materials, taking into account, among others, gender-related differences and priorities. For example, in Peru, CAB members suggested highlighting the issue of violence against women as one of the core problems caused by alcohol. In Mexico, it was suggested to include examples of alcohol harms specific for men, for example, erectile dysfunctions, and for women, for example, disturbances of the menstrual cycle. In Colombia, it was recommended to emphasize more clearly that alcohol use raises the risk of getting various types of cancers and mental health problems, such as depression and anxiety.

In all three countries, the CABs also gave input regarding institutions to be suggested for help-seeking patients, relevant for each country, and which included: telephone numbers, social media platforms (e.g., Facebook, Whatsapp), and websites. In Colombia, it was additionally suggested to clarify whether the recommended services are free of cost. Moreover, in all three countries, CABs' suggestions regarding adapting the training were, for example, to emphasize strategies for providers in dealing with reluctant patients during a brief alcohol advice session. More specifically, in Colombia, it was suggested to develop video tutorials, in addition to the training, that can be easily accessed by the participating providers whenever they need additional clarifications about the intervention delivery. In Mexico, on the other hand, it was recommended to develop additional printed instructions for providers, for example, a quick guide of the intervention that can be placed on providers' desks. In Peru, it was suggested to add more focus in the training on psychologists and other mental health workers (in addition to the medical health care providers), thereby reflecting the key role of mental health workers in the alcohol prevention domain in the country.

Project champion

One or two project champions were selected in each intervention municipality at the outset of the study. They are CAB members and professionals in (public) health institutions of the intervention municipalities (e.g., representative of the municipal hospital, health advocacy expert). Throughout the implementation period, the project champions will be invited to take on roles such as: a) facilitating agreement within the municipality and health systems on shared goals and metrics; b) assessing and acting on relevant community resources; c) working at the systems level to make relevant practice changes for sustainability; d) supporting PHCCs to access, and manage needed services; e) ensuring regular ongoing communication between PHCCs and municipalities. This will be achieved through regular meetings with the PHCCs throughout the implementation period, regular media appearances, and participation in public events on project-related topics. Moreover, the project champion will offer suggestions for ensuring the sustainability of the intervention at municipal and/or national level.

Adoption mechanisms

Five adoption mechanisms have been included in the package of community actions and will be implemented in each of the three intervention municipalities. First, during the recruitment period and in the first months of implementation, formal and informal meetings will be organized where the local research team and the project champion(s) will communicate to PHC providers and representatives of the PHCCs the simplicity of the programme and its benefits to patients. The reasoning for this adoption mechanism is that a simple health programme is more likely to be adopted than a complex one (Greenhalgh et al., 2008). Second, during formal and informal meetings, in the recruitment period and the first months of implementation, the local research team and the project champion will communicate to PHC providers the large gap between the number of patients who need advice regarding their alcohol use and the number of patients who actually receive it. The potential of the SCALA programme to fill this gap will be emphasized, as it is essential to highlight the advantages of a health programme to increase its success of adoption (Rogers, 2010).

Third, during CAB meetings and regular communication, the local research teams will emphasize to relevant stakeholders (e.g., CAB members, PHCC administration) their important role in promoting brief alcohol advice programmes. The involvement of local stakeholders is important because receiving information from various credible stakeholders regarding an innovation also increases its adoption rate (Brinol & Petty, 2009) through the 'multiple source effect' (Harkins & Petty, 1987). Fourth, PHC providers who have high advice-giving rates will be identified. These PHC providers will be champions who communicate to other providers and communities that 'it can be done'. Successful implementation examples are another important facilitator of the intervention adoption process (Barker et al., 2015). To ensure this, during the baseline measurement period and throughout the implementation period, those PHCCs and PHC providers who advise high proportions of patients will be identified. Subsequently, they will be invited to share their experiences and provide positive messages regarding brief alcohol advice, through regular internal communication, as well as through media appearances. Fifth, organizational issues or administrative policies that act as barriers

will be timely identified, along with ways of overcoming them through discussions with PHC providers on an ongoing basis. Barriers to adopt and implement brief alcohol advice can vary among countries and organizations (Johnson et al., 2010). To ensure accurate identification of such barriers, open questions will be regularly asked of health care providers and CABs' members during formal and informal meetings.

Support systems

Five support systems have been included in the package of community actions and will be implemented in each intervention municipality. First, training packages will be tailored to the local PHC providers' needs, as evidence shows that effective training in the delivery of brief alcohol advice should cover the actual needs of the PHC providers (Seale et al., 2005). Tailoring of training will be based on regular input received from PHC providers and PHCC managers, through informal meetings conducted in the first months of implementation. Second, revisions of the brief advice package will be done, if needed, to ensure that the materials are in line with the needs of the PHC providers and patients. Again, during the first months of the implementation, there will be regular communication with PHC providers to identify whether the intervention packages and the care pathway require any modification.

Third, performance review feedback will be provided to the PHC providers. Feedback is an effective mechanism to promote active and continuous participation in an intervention (Barker et al., 2015). During the 18-month SCALA implementation period, there will be regular feedback given to the PHCCs in the three intervention municipalities on their performance of alcohol advice-giving. Specifically, monthly data on advice-giving rates delivered at each PHCC will be provided to the PHCC managers in either written or face-to-face communication format, by the local research teams. Moreover, positive feedback will be given to high-performing PHCCs and health care providers to encourage and maintain this. PHCCs and PHC providers with lower advice-giving rates will be asked about any improvements and changes that could be introduced to help improve performance.

Fourth, an information exchange and learning system for participating PHC providers will be set-up. Interactive learning platforms allow the exchange of ideas and experiences among adopters and can increase knowledge, skills, and motivation to participate in the intervention (McCannon & Perla, 2009; Schouten et al., 2008). During the SCALA implementation period, a digital learning system will be created, where for example, online project progress messages will be regularly circulated, and through which PHC providers and local stakeholders will be able to exchange ideas and learning to support improved delivery of alcohol advice.

Fifth, plans for long-term sustainability of the SCALA programme will be built-in from the outset, aiming to integrate the intervention in the health system. Timely planning for a health programme's sustainability is crucial for ensuring that the programme has the capability to be maintained after the end of a research project (Gruen et al., 2008). In line with this, the programme's sustainability will be an ongoing agenda item of the CAB meetings, and local research partners will receive input directly from PHC providers and PHCC managers who implement the SCALA protocol (for example, measuring the necessary costs to set-up and implement the intervention, or the possibility to integrate the intervention in the existing public policy plans).

Communication campaign

In each of the three intervention municipalities, a communication campaign will be implemented, aiming to additionally increase the community support received and perceived by PHC providers in the adoption and maintenance phase of the health programme. The main activities of the communication campaign, are specified below and are typically used in health communication campaigns (Snyder, 2007). The activities will be developed locally using input from the CABs and other members of the communities. In all three countries, it has been decided to implement a similar set of six communication activities, following collaboration and exchange of ideas and resources between the three local research teams. Where needed, the content of the communication materials will be adapted to the context of each country, by pilot testing them with members of the CAB, as well as in user panels with providers and/or patients. The six communication campaign activities are as follows (country differences in terms of planned implementation are minimal and specified below).

First, posters will be placed in various public spaces promoting PHC based alcohol advice, addressing the topic of alcohol-related problems and the benefits of discussing this during a PHCC visit. Posters will be strategically placed in areas where their target audience (i.e., PHCC patients, PHC providers) is most likely to frequent, such as the participating PHCCs and at other popular local venues, for example, pharmacies, bus stops, and cafeterias. Second, leaflets and/or brochures about the health risks associated with alcohol, and the benefits of brief alcohol advice will be placed in PHCCs waiting halls. To promote optimum patient reach, leaflets will remain available in the campaign for the entire implementation period (i.e., until month 18). Third, short promotional videos about the benefits of brief alcohol advice will be displayed strategically on screens in the waiting rooms of PHCCs. Fourth, public events about the benefits of brief alcohol advice will be organized. Such public events, in the form of workshops, movie forums, presentations, and public discussion in informal settings (e.g., civic centres, food markets, health fairs, libraries, cafes, and bars) will allow reaching additional segments of the target audience (e.g., PHC providers and/or patients). These will be organized according to the available resources, at least once throughout the implementation period, in each of the three intervention municipalities. Fifth, throughout the implementation period, regular short messages on project-related topics will be sent to participating PHC providers in the three intervention municipalities. Topics of such messages may include relevant research on brief alcohol advice, health problems related to alcohol consumption, suggestions for conversations with patients about alcohol, SCALA success stories, and SCALA public events. The messages will be delivered on channels such as online texting platforms (e.g., *Whatsapp*). Sixth, local media (TV/radio/print) appearances covering the subjects related to the project will be organized as frequently as possible throughout the 18-month implementation period. The planned execution and implementation of these communication campaign activities are similar in the three countries. A noteworthy difference is in Peru where the communication campaign activities will focus (next to the general population of PHC patients) on three specific target populations affected by alcohol (as suggested by the CAB members), namely: a) persons in treatment of tuberculosis, b) persons at risk of sexually transmitted diseases, c) persons in violent families.

Discussion

This paper presents the development protocol of a set of community actions to support PHC providers to deliver brief alcohol advice to their patients. The community actions have been designed using input from various local stakeholders, drawing on IHI Framework for going to full-scale (Barker et al., 2015) and include five key activities: i) involvement of a Community Advisory Board, ii) involvement of a project champion, iii) adoption mechanisms, iv) support systems, v) a communication campaign.

A strength of the protocol is that it has been developed and will be implemented in 'real-life' municipal settings, thus increasing its external validity and enhancing the potential to apply it to other settings and populations (Bryman, 2016). This offers a basis for further exploration of whether community actions are successful in promoting the delivery of brief alcohol advice in PHC. Moreover, the planned implementation period duration of 18 months, which is longer than in typical brief advice implementation studies (Anderson et al., 2017; Funk et al., 2005) will allow detecting long-term effects of the community actions and whether these differ between participating countries. Another strength of the study lies in its focus on implementation research. There is a substantial body of evidence showing that brief alcohol advice in a PHC setting is an effective measure for decreasing alcohol consumption among large segments of the population (Kaner et al., 2018). However, more studies are needed to understand which mechanisms are most effective to increase the likelihood of the adoption and implementation of brief alcohol advice (Nilsen, 2010). The methodology presented in this paper for developing a package of community actions with the involvement of local stakeholders can contribute to advancing the alcohol prevention field and, therefore, prove relevant for public health researchers and practitioners implementing similar interventions in Latin America, as well as in other regions worldwide, given adequate tailoring and adaptation. The presented package of planned community actions has the potential to stimulate the sustainable implementation of a health intervention proven to be effective at reducing alcohol-related harm. Future implementation science studies can benefit from investigating the effectiveness, as well as the implementation process (including barriers and facilitators) of the presented planned community actions, aiding an optimal implementation in different contexts.

It is also important to acknowledge some key limitations. Although the development of the package of community actions was done based on input provided by local CABs, the project's design and resources did not allow for a systematic needs assessment from the PHC provider and patient perspective regarding the supportive actions. As a result, some community actions may need to be changed or adapted during the implementation period. Any such changes and/or adaptations to the community actions plans will be monitored and documented throughout the 18-month implementation period. Another limitation is that, in the SCALA study, PHC providers in the control municipality may be still exposed to (some of the) community actions implemented in the intervention municipality. For example, they may be exposed to a media appearance about the project. Again, exposure of PHC providers to the community actions will be closely measured in both the control group and in the intervention groups, which will allow us to detect and (if needed) control statistically for any contamination between study arms.

Conclusion

This paper describes the development and planned implementation of a package of community actions to support the delivery of brief alcohol advice in PHC in Colombia, Mexico, and Peru. The paper contributes to a better understanding of community actions which can be effective in supporting PHC providers to adopt brief alcohol advice in routine practice in Latin America, as well as in other regions. By improving our understanding of factors that can lead to increased delivery of brief alcohol advice in Latin America specifically, the community actions described in this protocol have the potential to support future efforts to scale-up PHC based alcohol prevention activities in this region, leading to substantial public health benefits.

CHAPTER 3

Effect of community support on the implementation of primary health care-based measurement of alcohol consumption

Abstract

Alcohol measurement delivered by health care providers in primary health care settings is an efficacious and cost-effective intervention to reduce alcohol consumption among patients. However, this intervention is not yet routinely implemented in practice. Community support has been recommended as a strategy to stimulate the delivery of alcohol measurement by health care providers, yet evidence on the effectiveness of community support in this regard is scarce. The current study used a pre-post quasi-experimental design in order to investigate the effect of community support in three Latin American municipalities in Colombia, Mexico, and Peru on health care providers' rates of measuring alcohol consumption in their patients. The analysis is based on the first 5 months of implementation. Moreover, the study explored possible mechanisms underlying the effects of community support, through health care providers' awareness of support, as well as their attitudes, subjective norms, self-efficacy, and subsequent intention toward delivering the intervention. An ANOVA test indicated that community support had a significant effect on health care providers' rates of measuring alcohol consumption in their patients ($F(1,259) = 4.56$, $p = .034$, $\eta p2 = .018$). Moreover, a path analysis showed that community support had a significant indirect positive effect on providers' self-efficacy to deliver the intervention ($b = .07$, $p = .008$), which was mediated through awareness of support. Specifically, provision of community support resulted in a higher awareness of support among health care providers ($b = .31$, $p < .001$), which then led to higher self-efficacy to deliver brief alcohol advice ($b = .23$, $p = .010$). Results indicate that adoption of an alcohol measurement intervention by health care providers may be aided by community support, by directly impacting the rates of alcohol measurement sessions, and by increasing providers' self-efficacy to deliver this intervention, through increased awareness of support.

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Introduction

Worldwide about three million deaths are caused by alcohol every year, making alcohol consumption one of the leading preventable risk factors for physical, mental, and social harms. Alcohol is causally linked with over 200 diseases, such as cardiovascular diseases, liver cirrhosis, and various cancers (Shield, K. et al., 2020). As in the case of smoking, alcohol not only affects the health and well-being of the individual drinker but also impacts adversely on their families, communities, and society as a whole, e.g., through increased interpersonal violence, traffic accidents, injuries, or productivity loss (WHO, 2019). Notably, one of the nine targets in the NCD Global Monitoring Framework is a 10% relative reduction in harmful alcohol use by 2025 in comparison with 2010 (WHO, 2013).

In 2018, the World Health Organization (WHO) launched the SAFER alcohol control initiative, which entails five cost-effective strategies to combat harmful alcohol use (WHO, 2018). One of these strategies is the facilitation of patients' access to alcohol measurement and brief advice, meaning that health professionals should be actively involved in detecting and managing patterns of alcohol use in their patients. A recommended setting for this strategy is primary health care (PHC), where the patient's alcohol consumption can be measured by a PHC provider (e.g., physician, nurse, hereafter: provider) during a regular consultation (Anderson, 1996). However, in spite of consistent empirical evidence showing that this programme is efficacious (Kaner et al., 2018; O'Donnell et al, 2013; Platt et al., 2016), and cost-effective (Anderson et al., 2009; Solberg et al., 2008), alcohol measurement is still not widely implemented in practice (Abidi et al., 2016; Johnson et al., 2010; Wilson et al., 2011). An important barrier encountered by providers in adopting and delivering this intervention is the (perceived) lack of support in this regard, e.g., from their managers, colleagues, as well as from their patients (Kokole et al., 2021; Nilsen, 2010; O'Donnell et al., 2018). A strategy repeatedly recommended to overcome this barrier is the provision of supportive actions, i.e., activities aimed at enhancing the environment in which providers must deliver the intervention (Anderson et al., 1986; Shaw et al., 1970; WHO, 2006). However, to date few studies have explored the impact of supportive actions in this context (for examples, see: Anderson et al., 2017; Kaner et al., 1999). Kaner and colleagues (1999) found in their UK-based study that supportive actions (operationalized as fortnightly telephone calls to providers) had a positive impact on the delivery of alcohol measurement in a PHC setting, over and above training. Anderson and colleagues (2017) also found positive results of supportive actions (operationalized as telephone calls, as well), in a European multi-country study, however, in their study the effect of the supportive actions could not be disentangled from that of the training.

Barker and colleagues (2015) offer an evidence-based model for increasing support in the health field, synthesizing ten areas of supportive actions deemed essential for the successful adoption, maintenance, and scale-up of a health intervention. The first five of these areas of supportive actions focus on the adoption of a health intervention (hereafter: adoption mechanisms); the other five areas focus on the maintenance of the intervention (hereafter: support systems). As such, Barker's model aligns with previous theories and frameworks that highlight the importance of both these aspects in the sustained implementation of health interventions (Rogers, 2010). According to Barker and colleagues, the adoption mechanisms should focus on: 1) positive characteristics of the intervention (e.g., effectiveness, simplicity, congruity with the existing organizational culture); 2) involvement of leadership (e.g., in raising awareness or in the broad adoption of the intervention); 3) communication (e.g., interpersonal or mediatic messages demonstrating the value of the intervention to the leadership and implementers), 4) policy (e.g., regulatory or administrative policies that foster the adoption of the intervention; 5) culture of urgency and persistence (e.g., ensuring that the intervention responds to an existing need and/or solves a problem). Support systems should focus on: 1) human capability for scale-up (e.g., delivering sufficient training, share stories of success and challenge); 2) infrastructure for scale-up (e.g., considering whether new tools, communication systems, and key personnel

are needed); 3) data collection and reporting systems (e.g., tracking implementation data and providing performance feedback); 4) learning systems (e.g., mechanisms and platforms for sharing knowledge, tools, ideas, and experiences among the implementers); 5) design for sustainability (e.g., if needed, adapting the intervention so that it can be maintained after the end of the project).

In the international SCALA study, we drew on the model developed by Barker and colleagues (2015) to design and evaluate the impact of supportive actions developed together with local community stakeholders (henceforth: community support) on alcohol measurement in a PHC setting, in three Latin American countries (Jané-Llopis et al., 2020). Interim results are reported elsewhere (Anderson et al., 2021) and show that when analysing changes at the level of the PHC centres (PHCCs), no effects were found of community support on provision of the intervention. A possible reason for the lack of effects was the shorter implementation time of the SCALA project than initially planned (5 months vs. 18 months), due to COVID-19 restrictions. As community support is generally expected to have a cumulative effect over time, it may therefore be premature to conclude that it does not lead to increased implementation of alcohol measurement and brief advice over time. However, another reason for the lack of observed effects could be that the unit of analysis in the study of Anderson et al. (2021) was PHCCs as a whole, meaning we were unable to detect differences amongst providers working in the same PHCC. This is potentially of value because providers working in the same PHCC may perceive the community support differently, based on individual differences and socio-cognitive characteristics (Jacobs et al., 2015; Kelly et al., 2017). In the current study, we use data from the SCALA study to explore the impact of community support on the delivery of alcohol measurement but we changed the unit of analysis from the PHCC level to the provider level, thereby focusing on individual provider performance rather than PHCCs. Additionally, it is worth exploring the effects that community support can have on socio-cognitive predictors of the desired behaviour. An increased understanding of not only whether but also how community support may influence behaviour is crucial for the further development and adaptation of effective community support. A robust theoretical framework that can be used to test the effects of community support on health behaviours and/or adoption and implementation of a health intervention is the theory of planned behaviour (TPB) (Ajzen, 1991; McDermott et al., 2015). This theory proposes that (health) behaviour is largely predicted by behavioural intention (i.e., a person's conscious plan or decision to exert effort to engage in the behaviour), which at its turn is explained by three socio-cognitive factors: 1) attitude (i.e., the degree to which a person has a favourable or unfavourable evaluation of the behaviour of interest), 2) subjective norms (i.e., the belief about whether most people around the person approve or disapprove of his/her behaviour), and 3) perceived behavioural control, also widely known as self-efficacy (i.e., perception of the ease or difficulty of performing the behaviour of interest; hereafter: self-efficacy).

Community support can influence the attitudes towards the behaviour by highlighting the benefits and superiority of the intervention through personal, interpersonal, or mediated communication (Cialdini et al., 1981; Southwell & Yzer, 2007). Subjective norms can be influenced by community support through the involvement of leaders, managers, and/

or peers as message sources, thereby promoting and popularizing widespread support for the intervention (Aarons et al., 2018). Self-efficacy can be influenced by community support through messages that particularly address the person's confidence that he/she can perform the behaviour or by giving performance feedback, which then translates into increased confidence to (continue to) perform the behaviour (Ellen et al., 1991).

Furthermore, other more elaborate theoretical models suggest that the effect of (health) persuasion efforts, including community support, on a person's socio-cognitive beliefs (e.g., attitude, subjective norms, self-efficacy) is mediated through the person's awareness of these activities (McGuire, 1985; De Vries, 2017). In other words, in order for a person to change his/her beliefs and subsequent intention regarding a behaviour, as a result of being exposed to community support, the person needs to be aware that he/she was given support.

The aim of the current study is to explore whether delivery of community support has an effect on increasing alcohol measurement rates delivered by providers in primary health care settings, as well as what are possible mechanisms underlying such an effect. To account for possible confounding effects of training (which was given to a part of the participating providers), only those providers who received training (standard and/or more intensive) were included in the current analyses, as explained in more detail below. The study puts the following hypotheses forward: *H1: Provision of community support, over and above standard training, leads to increased rates of alcohol measurement sessions delivered by PHC providers. H2(a-e): Provision of community support, over and above standard or more intensive training, leads to a) increased awareness of support by PHC providers, which consequently leads to more positive or stronger: b) attitudes; c) subjective norms; d) self-efficacy, subsequently resulting in a higher e) intention to deliver alcohol measurements to their patients.*

Methods

Study design, participants, and procedure

The current study is part of the larger quasi-experimental SCALA study (Jané-Llopis et al., 2020), which tests the effectiveness of several strategies to improve the implementation of an alcohol measurement programme in three Latin American countries: Colombia, Mexico, and Peru. Specifically, in each of the three countries, two municipalities are compared: one intervention municipality (in which community support was provided) and one control municipality. The municipalities were selected by the local researchers and, in each country, were comparable in terms of socio-demographic characteristics, size, and geographical location. Randomized selection of the municipal areas was not possible because of the need to obtain approval of participation from the respective municipal authorities.

Within the three control municipalities, which did not receive community support, in total 14 PHCCs were randomly allocated to a no-training condition (arm 1), and 15 PHCCs to receive standard training to implement a standard clinical package (arm 2). Within the three intervention municipalities, in which community support was provided, in total 15 PHCCs were randomly allocated to receive standard training to implement a standard

clinical package (arm 3), and 14 PHCCs to receive more intense training to implement a more intense clinical package (arm 4). Randomization was done using a random number generator in Excel. A study flow of the SCALA study, adapted for analyses in the current paper, is shown in Figure 3.1.

For testing hypothesis 1, providers participating in study arm 2 and 3 were included, to ensure optimal comparability among the groups. In total, in these arms, 291 providers completed the baseline measurements and recorded the consultations in which they delivered alcohol measurement, on tally sheets, throughout the five-month implementation period. For testing hypothesis 2, which involves longitudinal analyses, all providers in the intervention municipality were included in the analyses (so also those in arm 4). In total, in these arms, 139 providers completed the follow-up questionnaire before data collection had to be stopped at month 5 of implementation due to the COVID-19 lockdown in the participating countries.

Intervention

SCALA community support was operationalized as a package of activities, planned in each of the three intervention municipalities (Solovei et al., 2021). The first phase of the community support (see Figure 3.2) – which is the focus of the current study – was implemented during the set-up phase (approximately two months) and the first five implementation months. The community support activities were developed locally, with input from and in collaboration with local stakeholders, project champions (i.e., persons who advocate the implementation of the new intervention and generate support for its adoption), and public health experts involved in the project. Moreover, in each intervention municipality, a community advisory board was formed, which held several meetings in the set-up phase of the project, to provide input for, among others, the development of plans for community support. The implemented community support activities (see Table 3.1) were comparable in the three implementation municipalities and included five adoption mechanisms and five support systems, based on the abovementioned recommendations of Barker and colleagues (2015). SCALA adoption mechanisms were: 1) communicating to providers and representatives of the PHCCs the simplicity of the programme and its benefits to patients; 2) communicating to providers the large gap between the number of patients who need advice regarding their alcohol use and the number of patients who actually receive it; 3) involving local stakeholders in promoting alcohol measurement; 4) using examples of other provides who are successful at delivering alcohol measurement; 5) identifying organizational barriers and ways to overcome them. SCALA support systems were: 1) tailoring and adapting training packages, if needed; 2) tailoring and adapting clinical package, if needed; 3) offering performance review to providers; 4) giving providers the opportunity to exchange experiences and ideas regarding the programme; 5) discussing sustainability plans of the programme. Additionally, a communication campaign was planned and prepared in each intervention municipality which, however, could not be fully implemented due to restrictions related to the COVID-19 pandemic.

Figure 3.1.

SCALA study flow based on the analyses in the current study

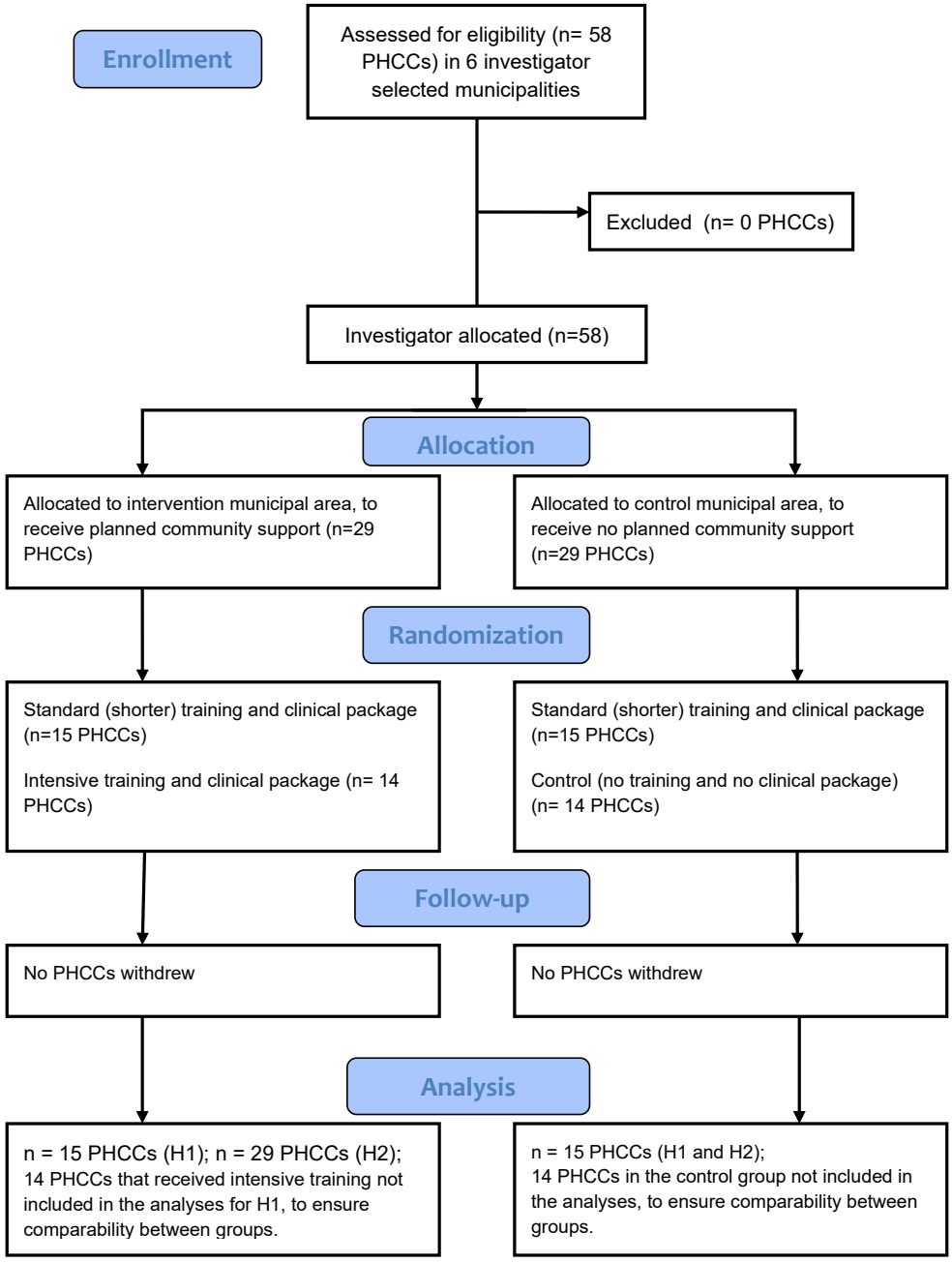


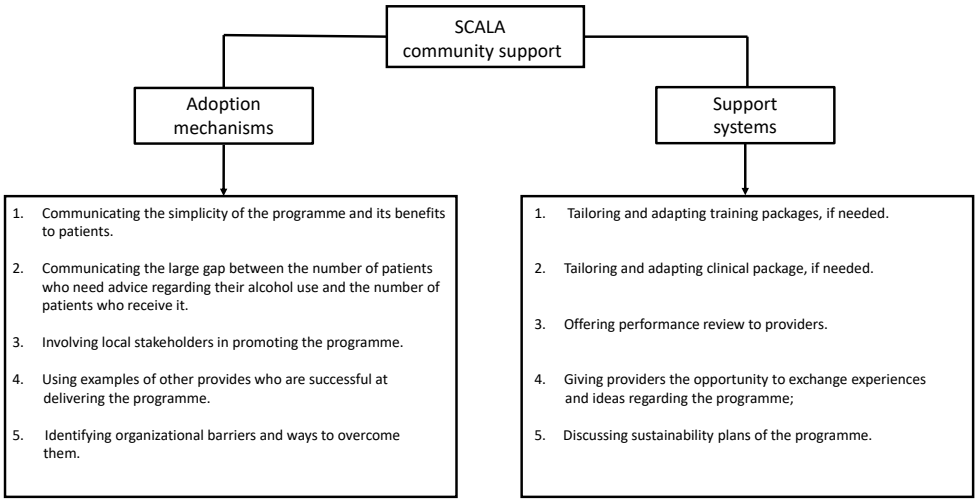
Table 3.1.

Community support activities implemented in the first five months of implementation

Community support activities	Colombia	Mexico	Peru
Adoption mechanisms	1. The benefits for patients and simplicity of the intervention were emphasized in face-to-face meetings with PHCC managers and providers. 2. In implementation month 3, in face to face meetings with providers, the number of patients whose alcohol consumption was measured was communicated to providers. 3. A local university became engaged in the project and provided input on adaptations of the intervention. 4. In implementation month 3, in a face to face meetings with providers, the highest screening rates per PHCC were highlighted. 5. Organizational issues are monitored through discussions with PHCC, no substantial issues have been identified.	1. The benefits for patients and simplicity of the intervention have been emphasized in face-to-face meetings with PHCC managers and providers. 2. In face to face meetings with providers, the large number of patients that can benefit if alcohol measurement and brief advice are implemented in the PHCC was reaffirmed. 3. A poster presentation held at an Annual Research Meeting of the National Institute of Psychiatry; a presentation about the role of alcohol measurement and brief advice was held on the National Day against Harmful use of Alcoholic Beverages 2019. 4. Informing PHCCs about the percentage of alcohol measurements carried out by each PHCC, on a monthly basis. 5. Organizational issues were monitored through discussions with PHCCs, no substantial issues were identified.	1. Collaboration with the Mental Health Program of the Ministry of Health, in order to promote the adoption of the program in the implementation municipality. 2. The large number of patients who benefit from the project is communicated to providers, focusing on three subgroups with higher alcohol risk in the intervention municipality: a) persons in treatment of tuberculosis, b) persons at risk of sexual transmitted diseases, c) persons in violent families. 3. In order to engage the municipality, 35 community promoters have been trained in methods for working in alcohol prevention. 4. Lists were created for each PHCC using WhatsApp To promote the identification of champions. 5. Organizational issues are monitored through discussions with PHCCs; one issue identified is that providers seem very busy.
Support systems	1. Training packages were slightly shortened, in order to fit into the PHCCs' schedules and rules of attendance of providers. 2. One formal meeting was organized in the first two months of implementation to identify difficulties regarding the brief intervention and the care pathway. It was identified that providers still needed support to get used to the exact pathway. In response, three short support videos were created, about how to fill in the tally sheets, how to mark the boxes and what is the needed material to be delivered for each case 3. Meetings for feedback with providers were held every two months, in which the alcohol measurement rates were communicated. Recognitions in the form of symbolic incentives (5$ vouchers) were given to the 8-9 providers with the highest measurement rates. 4. Informal exchange of experiences among participating providers. 5. Mentions of the programs' potential sustainability during meetings with PHCC managers and providers.	1. Materials and activities of the training sessions (i.e. role playing, presentations and analysis of the videos) were adjusted to the needs of each PHCC. 2. Face to face meetings with providers, during which they agreed that no additional tailoring was needed. 3. Reporting each month to PHCCs' the number of alcohol measurements; informing the PHCCs every three months on the progress of the global project. Recognitions in the form of certificates were given to the PHCC and the most outstanding suppliers each quarter. 4. Exchange of experiences via video calls, among participating providers. 5. Mentions of the programs' potential sustainability during meetings with PHCC managers and providers. Continuous communications maintained with the municipal health authorities to promote the application of alcohol measurement and brief advice.	1. Additional materials were provided for any providers who did not have previous information about the program. 2. Face to face meetings with providers, during which they agreed that no additional tailoring was needed. 3. Reporting each month to PHCCs the number of alcohol measurements. 4. Informal exchange of experiences among participating providers 5. Exploring the option of involving Community Mental Health Services, who could train other Centres in the future.

Figure 3.2.

SCALA community support implemented in the first 5 months of implementation.



Questionnaire

The items of the variables *awareness, attitude (evaluative beliefs), subjective norms, self-efficacy,* and *intention* were formulated by the research team specifically for the purpose of this study, in order to correspond to the SCALA intervention and the implemented community support. To ensure the content validity, all items were pretested, prior to the start of the intervention, with a group 10-12 providers in each of the three countries.

Independent variable

Provision of community support – determined by the assignment to a specific study arm - was coded as a binary variable (1 = community support delivered; in PHCCs from the intervention municipality) or absent (0 = community support not delivered; in PHCCs from the control municipality).

Mediators

Awareness was measured as an index with 10 items, e.g., "I read or heard that alcohol screening and brief advice is simple to deliver.", "I read or heard that alcohol screening and brief advice can help a large number of patients.", "I read or heard about doctors or nurses who were screening and advising many of their patients.", "I was told the number of patients that I am screening and advising." (yes =1, no = 0), based on the ten adoption mechanisms and support systems specifically implemented in the project. The score was calculated as the sum of the separate actions, ranging from 0 to 10 (M = 7.45, SD = 2.53). Cronbach's alpha could not be calculated, given that the item was measured as an index, rather than scale.

Attitude was measured in two ways. First, the shortened version of the Alcohol and Alcohol Problems Perception Questionnaire (hereafter: SAAPPQ domain) measured providers' attitudes towards delivering brief alcohol advice (Anderson & Clement, 1987) using

a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree) developed. The scale includes ten items, for example: “I feel I have the right to ask patients questions about their drinking when necessary”, “I feel I can appropriately advise my patients about drinking and its effects” or “in general, it is rewarding to work with drinkers”. The score of the SAAPPQ domain was calculated as the average of the ten items (three items were reversed). A higher mean indicated a more positive attitude toward delivery of alcohol measurement and brief advice (*M* = 4.86, *SD* = .62; α = .80).

The second way to measure attitude was with three items measuring evaluative beliefs (hereafter: evaluative beliefs domain), referring to the statement “When I ask my patients about their alcohol consumption…”, for example, “it improves contact with my patients”, “it improves the care of my patients” (1 = completely disagree, 5 = completely agree. A higher mean indicated a more positive attitude toward the delivery of alcohol measurement (*M* = 3.85, *SD* = .63; α = .67).

Subjective norms were measured with two items: “My colleagues believe that I should ask my patients how much alcohol they drink” and identically for “my managers” (1 = completely disagree, 5 = completely agree). A higher mean indicated stronger perceived social norms the delivery of alcohol measurement (*M* = 3.04, *SD* = .90; α = .75).

Self-efficacy was measured with four items, referring to the statement “In your daily practice, how difficult or easy do you find…”, for example, “explaining risks to health from different levels of alcohol consumption” or “Providing patients with ideas and practical advice on how to cut down”, (1 = very difficult, 5 = very easy). A higher mean indicated a stronger self-efficacy to deliver alcohol measurement and brief advice (*M* = 3.55, *SD* = .66; α = .79).

Intention was measured by one statement: “I intend to ask my patients how much alcohol they drink” (1 = completely disagree, 5 = completely agree). A higher mean indicated a higher intention to deliver alcohol measurement (*M* = 4.12, *SD* = .69).

Dependent variable

Alcohol measurement rates were measured as the proportion of patients whose alcohol consumption was measured by the provider (i.e., numerator) out of the total number of consultations delivered by the provider, throughout the 5-month month implementation period (i.e., denominator). The alcohol measurements were done using the AUDIT-C questionnaire (Bush et al., 1998) and depending on the patients’ score (below or above the 8-point cut-off), could be followed or not by brief advice and/or referral to treatment. Each alcohol measurement session was recorded by the provider on a separate paper tally sheet, collected afterwards by the research team. The score of the alcohol measurement rates could range from 0 (i.e., none of the consulted patients had their alcohol consumption measured) to 1 (all of the consulted patients had their alcohol consumption measured) (*M* = .49, *SD* = .12).

Demographics

Age of provider was assessed in years and ***gender*** of provider was assessed with three answer categories (1= female; 2 = male; 3 = other).

Data analysis

For testing H1 a one-way ANOVA was used, with alcohol measurement rate as the dependent variable and provision of community support as the independent variable. The country variable was also included as a predictor in the model, to account for possible interaction effects. Age and gender did not differ significantly in the two groups, and were, therefore, not included as covariates. The intraclass correlation value of 0.01 at PHCC level indicated that multilevel analyses were not necessary to account for the nested nature of the data.

For testing H2 a path analysis was used, in the program AMOS 26. The model tested the direct effect of providing community support on providers' awareness of support. Moreover, a mediation effect was tested on the three socio-cognitive variables (attitude, subjective norms, and self-efficacy), and subsequently on intention, all being measured at the same time, during months 4 and 5 of implementation, i.e., January-February 2020. Error terms between endogenous variables were allowed to correlate freely among themselves. The significance of all indirect effects was assessed using bootstrapping (Kline, 2011). The baseline measurements of attitude, subjective, self-efficacy, intention were added as predictors of the respective follow-up constructs. It should be mentioned that the relationship between intention and alcohol measurement rates could not be tested in the path model, because of the lack of sufficient behavioural data assessed after the measurement of intention due to the COVID-19 lockdown. Moreover, interactions per country could not be tested because of the limited sample size.

Results

Sample characteristics

For H1, i.e., testing whether the provision of community support leads to increased rates of alcohol measurement sessions delivered by PHC providers, of the 291 providers included in the analysis, 53 were from Colombia, 100 from Mexico, and 138 from Peru. The average age of the respondents was 41.35 years (*SD* = 12.36), with 80.1% being women and 19.9% - men. The professions were as follows: doctor (37.1%), nurse (16.8%), nurse technician (7.9%), psychologist (11.0%), social worker (9.3%), midwife (5.8%), or other professions (12%).

For H2, i.e., testing whether provision of community support leads to a) increased awareness of support by PHC providers, which consequently leads to a more positive or stronger: b) attitude; c) subjective norms; d) self-efficacy, subsequently resulting in a higher e) intention to deliver brief alcohol advice, of the 139 participants included in the analysis, 47 were from Colombia, 33 from Mexico, and 59 from Peru. The average age of the respondents was 40.15 years (*SD* = 12.12), with 75.5% being women and 15.5% - men. The professions were as follows: doctor (37.4%), nurse (13.7%), nurse technician (14.4%), psychologist (5.8%), social worker (11.5%), midwife (3.6%) or other professions (13.7%). For more details regarding the sample characteristics in the control and intervention groups, see Table 3.2.

Table 3.2.

Descriptive information regarding the age, gender, and profession of the participating providers in the control and intervention groups

	Sample hypothesis 1 (total 291 providers)		Sample hypothesis 2 (total 139 providers)	
	Without community support	With community support	Without community support	With community support
Age	*M* = 42.62, *SD* = 12.50	*M* = 39.82, *SD* = 12.06	*M* = 43.34, *SD* = 12.72	*M* = 37.52, *SD* = 11.01
Gender	Women (80%), Men (20%)	Women (79 %), Men (21%)	Women (74%), Men (26%)	Women (76%), Men (24%)
Professions	Doctor (35%), nurse (14%), nurse technician (11%), psychologist (14%), social worker (9%), midwide (6%), other (11%).	Doctor (39%), nurse (20%), nurse technician (5%), psychologist (7%), social worker (10%), midwide (6%), other (13%).	Doctor (42%), nurse (11%), nurse technician (6%), psychologists (18%), social worker (7%), midwide (6%), other (10%).	Doctor (34%), nurse (16%), nurse technician (5%), psychologists (12%), social worker (16%), midwide (1%), other (16%).

Does community support improve alcohol measurement rates?

Provision of community support had a significant small effect on alcohol measurement rates ($F(1,259) = 4.56$, $p = .034$, $\eta_p^2 = .018$). As hypothesized (H1), providers in the intervention municipal areas where community support was delivered had higher rates of alcohol measurement sessions ($M = .06$, CI = .00 to 1.00), compared to providers in PHCCs where community support was not delivered ($M = .03$, CI = .00 to .49). In other words, 6% of the patients consulted by providers who received community support had their alcohol consumption measured, as compared to 3% of the patients consulted by the providers in the control group. A significant effect was also found from the control variable, i.e., country, on the alcohol measurement rates ($F(2, 259) = 4.11$; $p = .017$, $\eta_p^2 = .031$). Posthoc analyses showed that the alcohol measurement rates were significantly lower in Peru, compared to Mexico ($p = .008$, $M_{difference} = .05$, $SE = .02$), but not between the other country pairs. Moreover, no interaction effect was found between the provision of community support and the country variable, indicating that H1 is supported and that, in all three countries, the provision of community support led to an increase, albeit small, of the alcohol measurement rates.

Mechanisms through which community support influences behavioural intention

For H2, the model fit was evaluated with three indicators: chi-square (should be not significant), RMSEA (should be smaller than .05), and CFI (should be higher than .95) (Kline, 2011). The model was identified and had an acceptable model fit ($\chi 2\ (17) = 24.36$, $p = .110$, RMSEA = .06 and CFI = .98), allowing to proceed to hypothesis testing. The correlation matrix is included in Annex 3.1.

All significant results are shown in Figure 3.3, with standardized coefficients. Demographics variables (i.e., age, gender) did not vary significantly between the intervention and control groups,

and were not included as control variables in the model. The results revealed a positive direct effect of provision of community support on awareness of support (b = .31, p < .001). This means that providers in the intervention municipality were more aware of the provided support, compared to providers in the control municipalities. Subsequently, awareness of support had a positive direct effect on providers' self-efficacy (b = .23, p = .010). The higher the awareness of support actions of providers, the higher their self-efficacy to deliver alcohol measurement to their patients. Against expectations, no effect was found of awareness of supportive actions on providers' attitudes, subjective norms, nor intention.

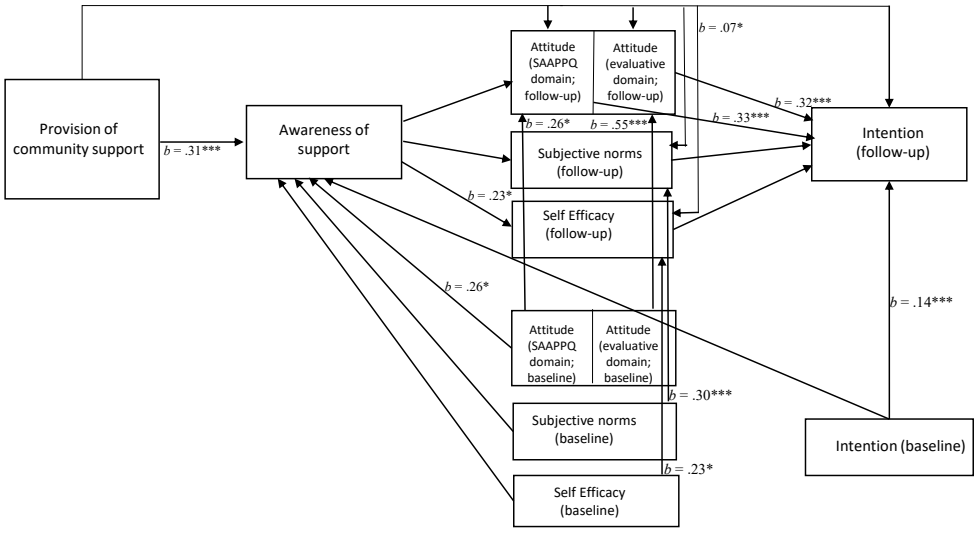
Both measured domains of attitude had a positive direct effect on intention (b = .33, p < .001 and b = .32, p < .001, respectively). The more positive providers' attitudes towards implementing alcohol measurement, the stronger their intention to deliver the intervention to their patients.

No direct effects were found from provision of community support on intention, nor on any of three mediators: attitude, subjective norms, and self-efficacy. However, results showed an indirect effect of provision of community support on self-efficacy (b = .07, p = .008). This means that community support did influence providers' self-efficacy to deliver alcohol measurement; however, this effect was fully mediated through the awareness of support.

Controlling for effects of the baseline values of the attitude, subjective norms, and self-efficacy on awareness at follow-up revealed only a positive effect of providers' baseline attitudes (SAAPPQ domain) on the awareness of support (indicating that a more positive initial attitude led to a higher awareness of support). No other effects of the baseline variables were found on awareness of support. This adds confidence to the direction of the abovementioned found effects, namely that awareness of support influences self-efficacy, rather than the other way around.

Figure 3.3.

Significant relationships identified in the path analysis model.



Note. P-values smaller than 0.001 are indicated by ***, p-values smaller than 0.05 are indicated by *.

Discussion

This study aimed to assess the effectiveness of community support for bolstering the delivery of an alcohol measurement intervention in a PHC setting. We found a small positive effect of community support on providers' rates of alcohol measurement delivery, accounting for about 3% more patients receiving alcohol measurements, as compared to the control group. In interpreting this effect, it is important to take into account that the absolute proportion of patients receiving alcohol measurement in the community support group was small in absolute terms (i.e., 6% of the total patients receiving consultations), and the found effect of community support was of low magnitude. However, taking into account the low baseline alcohol measurement rates registered before the launch of the intervention (which were of approximately 1% of the patients receiving consultations), and considering that the provision of community support was stopped prematurely because of the COVID-19 lockdown, these results suggest that the implementation of a full package of community support (e.g., more meetings with providers, implementation of a communication campaign) throughout a longer period of time could in fact lead to stronger effects on the desired behaviour and its socio-cognitive predictors.

Our study is, to the best of our knowledge, the first to show an effect of a relatively complex package of community support on alcohol prevention in primary health care, implemented over the course of several months, in addition to provider training. In contrast to our previous findings (Anderson et al., 2021), where effects of community support were not found, the present analysis focuses on effects at provider level, rather than at PHCC level. This focus at provider level may explain the difference in results, by allowing us to detect differences amongst implementers at the start of the adoption process. As the diffusion of innovations theory proposes (Rogers, 2010), an intervention will likely first be adopted by fewer persons (i.e., early adopters), before an effect can be observed in the majority of the members of an organization. By analysing the effects at the provider level, implementers and managers can gain valuable insights regarding how to stimulate the adoption and implementation of brief alcohol advice in early phases.

Moreover, our results showed that the delivery of community support helped to increase providers' self-efficacy to deliver alcohol measurement, but this effect was fully mediated through providers' awareness of support. This finding gives further underpinning to the observed effect of community support on alcohol measurement rates. This means that in order for community support to influence providers' self-efficacy, they need to be aware of this support, in line McGuire's Communication-Persuasion Model (1984). The community support activities implemented in the current study, before the pause of implementation due to the COVID-19 restrictions, mostly focused on overcoming barriers and promoting facilitators for the delivery of the intervention at the organizational and provider level (as shown in Table 3.1). Perception of barriers and facilitators are indeed expected to impact self-efficacy beliefs (Craig et al., 2015; Maibach et al., 1991), in line with the results of the current study.

No effects of the community support actions on attitudes, subjective norms, and intention were found. Theoretical explanations for this lack of effects may be that persuasive outcomes such as attitude, subjective norms, and intention generally need a longer time

to be changed (Belch & Belch, 2015). Future studies in this area would likely benefit from a longer implementation period to enable the assessment of the effects of community support that may appear over time. Moreover, community support that focuses more explicitly on increasing attitudes, subjective norms, and intentions, for example using targeted communication campaigns or public events (Rice & Atkin, 2012), should be implemented and evaluated.

One of the limitations of this study is that some participants in the control condition may have been exposed to some community support, for example in informal discussions during training. Although observations of the training sessions suggest that this has not happened in our project, in future studies it is important to limit potential contaminations of the control condition by assessing the separate effects of community support without the delivery of training. Moreover, the assessment of the alcohol measurement via paper tally sheets, self-completed by the providers, could have led to less accurate results and/or data loss, as compared to, for example, an automatic electronic registration of the alcohol measurements in an online system. Also, although the interclass correlation coefficient did not indicate significant variations at PHCC level, differences in the fidelity of the intervention's implementation in different PHCCs could have had an impact on the results (Dusenbury et al., 2003). Another limitation is that by agreeing to participate in the study, the providers possibly already had a relatively high intention to deliver the intervention. This may have, on the one hand, led to ceiling effects that suppressed the potential impact of community support on intention, and on the other hand, made the study less representative for providers who are not inclined to participate in such an intervention. Future studies should explore more in-depth the various motives of providers who are unwilling to deliver alcohol measurement, along with successful recruitment strategies. Finally, it should be noted that, due to the COVID-19 contingencies in participating municipalities, the planned community support could not be fully implemented (for example, the planned communication campaigns were not implemented). For similar reasons, the sample size is smaller at follow-up due to the abrupt pause in data gathering, which may have been an obstacle in finding more significant effects (Kline, 2011).

An important strength of the study lies in its ecological validity, due to the implementation in a real municipal setting, where the intervention was delivered over several months. This adds confidence to the generalizability of our results, beyond the controlled experimental setting. Moreover, the pre-post quasi-experimental design, with the delivery of community actions as an independent variable, arguably allowed us to detect independent effects of community support, over and above training, increasing the internal validity of the research.

In conclusion, adoption of a health intervention by health care providers may be aided by community support, by directly impacting the rates of alcohol measurement sessions, and by increasing providers' self-efficacy to deliver this intervention, through increased awareness of support. These results are relevant for researchers and practitioners in the field of alcohol control, but also in other health promotion areas.

Annex 3.1.

Means, standard deviations and correlations between the variables included in path analysis model.

	Mean	SD	Delivery of community support	Awareness of support (follow-up)	Attitude (Evaluative beliefs; baseline)	Attitude (Evaluative beliefs; follow-up)	Attitude (SAAPPQ; baseline)	Attitude (SAAPPQ; follow-up)	Subjective norms (baseline)	Subjective norms (follow-up)	Self-efficacy (baseline)	Self-efficacy (follow-up)	Intention (baseline)	Intention (follow-up)
Delivery of community support	.56	.50	1											
Awareness of support (follow-up)	7.45	2.53	.291**	1										
Attitude (Evaluative beliefs - baseline)	3.72	.63	-.109	-.058	1									
Attitude (Evaluative beliefs – follow-up)	3.86	.63	.002	.076	.557**	1								
Attitude (SAAPPQ - baseline)	4.78	.62	-.121	.133	.556**	.349**	1							
Attitude (SAAPPQ– follow-up)	4.86	.62	.008	-.006	.376**	.433**	.391**	1						
Subjective norms (baseline)	3.26	.96	.060	.108	.125	-.100	.145	.062	1					
Subjective norms (follow-up)	3.05	.90	-.010	.048	-.151	-.250**	-.004	.101	.389**	1				
Self-efficacy (baseline)	3.33	.87	.098	.136	.103	-.112	.123	.039	.410**	.355**	1			
Self-efficacy (follow-up)	3.55	.66	-.024	.223*	.130	.138	.112	.286**	.101	.262**	.240**	1		
Intention (baseline)	3.94	.69	.085	-.017	.467**	.280**	.348**	.333**	.316**	.093	.188*	.100	1	
Intention (follow-up)	4.12	.79	,076	.140	.322**	.535**	.380**	.512**	.047	-.121	.013	.180*	.337**	1

Note. *P*-values smaller than .01 are indicated by **, *p*-values smaller than .05 are indicated by *.

CHAPTER 4

Costs of an alcohol measurement intervention in three Latin American countries

Abstract

Alcohol measurement in health care settings is an effective intervention for reducing alcohol-related harm. However, in many countries, costs related to alcohol measurement have not yet been transparently assessed, which may hinder its adoption and implementation. Costs of an alcohol measurement programme in three upper-middle-income Latin American countries were assessed via questionnaires and compared, as part of the quasi-experimental SCALA study. Additional to the intervention costs, the costs of three implementation strategies: standard training and clinical package, intensive training and clinical package, and community support, were assessed and subsequently translated into costs per additional alcohol measurement session. Results demonstrated that costs for one alcohol measurement session ranged between Int$ 0.67 and Int$ 1.23 in Colombia, Int$ 1.19 and Int$ 2.57 in Mexico, and Int$ 1.11 and Int$ 2.14 in Peru. Costs were mainly driven by the salaries of the health professionals. Implementation strategies costs per additional alcohol measurement session ranged between Int$ 1.24 and Int$ 6.17. In all three countries, standard training and a clinical package may be a promising implementation strategy with a relatively low cost per additional alcohol measurement session.

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Introduction

Alcohol use is one of the leading preventable risk factors for health and social harms, causing an estimated three million deaths worldwide each year (Chrystoja et al., 2021). More than 200 disease and injury categories are either partly (e.g., various cancer subtypes, ischemic heart disease, liver cirrhosis, and traffic injury) or entirely (e.g., alcohol-use disorders and foetal alcohol syndrome) caused by alcohol (Shield et al., 2020). This includes negative social consequences, which go beyond the health care sector, such as interpersonal violence, self-harm, vandalism, criminality, and work-related losses of productivity (GBD 2016 Alcohol and Drug Use Collaborators, 2018). A recent review found that the costs associated with alcohol constitute around 2.6% of the GDP (95% CI: 2.0% to 3.1%) in middle- and high-income countries, including health care and criminal justice costs, as well as losses in productivity (Manthey et al., 2021). Latin America is a region with a relatively high magnitude of alcohol-attributable disease burden, with around 6% of the deaths and 6% of DALY's in the region caused by alcohol (Shield et al., 2020). In the three countries addressed in this paper, alcohol consumption is a top-five leading cause of mortality and premature death (GBD 2015 Risk Factors Collaborators, 2016). Manthey and colleagues —before the COVID-19 pandemic—estimated an increase in overall alcohol consumption in the region from 2018 to 2030 (Manthey et al., 2019). Therefore, it is crucial to implement interventions and policies to prevent and manage alcohol-related harm from a public health perspective.

The World Health Organization's (WHO) SAFER alcohol control initiative entails five cost-effective strategies to combat alcohol-related harm (WHO, 2021). One of these strategies is facilitating population-level health service access to the measurement of alcohol consumption, and delivering brief advice and treatment to individuals identified as at risk. Measurement of alcohol consumption (henceforth: alcohol measurement) is the assessment of a patient's alcohol consumption by a health care provider (henceforth: provider), typically using a standard questionnaire, for example, AUDIT-C (Bush et al., 1998). The alcohol measurement can be either positive, meaning that the patient scores above a certain predetermined threshold for hazardous drinking, or negative, i.e., the patient scores under the respective threshold. As recommended in several guidelines on this matter (Mann et al., 2017; NICE, 2016), patients with positive alcohol measurements should receive brief advice from the provider immediately after the alcohol measurement session. This is a time-limited effort in which the health care professional provides information and advice aimed at increasing the patient's motivation to avoid or reduce alcohol use, thus reducing the negative health consequences associated with it (Babor et al., 2007). Patients at risk may also receive a referral to treatment, such as to an inpatient/outpatient treatment or supportive services if the patient shows clear signs of (mental) health problems caused by his/her alcohol use.

Substantial evidence indicates that alcohol measurement in health care settings is an (cost-) effective strategy to prevent and manage alcohol-related health harm (Anderson et al, 2009; Kaner et al., 2018). However, in many regions of the world, this intervention is not yet widely adopted as routine practice (O'Donnell et al., 2014). One key barrier to its widespread implementation refers to the lack of insights regarding how costly the implementation of such a programme may be (Johnson et al., 2010). In settings of more limited resources, detailed assessments of the costs needed to implement a health programme may be of particular importance. Moreover, a detailed and transparent cost assessment may be relevant in the budgeting process of public health policies or in decisions regarding cutting certain cost components in order to save costs (Barbosa et al., 2016). In addition, some cost components may be irrelevant in certain contexts (e.g., printing costs that are not needed in a web-based intervention). Additionally, a transparent cost assessment can be used as a basis for economic evaluations of the intervention in different settings, potentially demonstrating whether the intervention may result in cost-effective health gains (e.g., through decreased mortality and avoided loss of productivity).

Only a few studies have estimated the costs of alcohol measurement programmes, with some substantial differences among various contexts (Babor et al., 2007; Bray et al., 2012). A review by Bray and colleagues (2012) reported costs of alcohol measurement sessions varying as much as between USD 0.51 (Zarkin et al., 2003) and USD 93 (Neighbors et al., 2010). These substantial variations were largely driven by the time spent on each session, the complexity of the intervention and the country where it is implemented. The scarcity and heterogeneity of existing evidence in this field stress the need for detailed and transparent cost assessments of alcohol measurement interventions in various regions of the world. Moreover, programme costs related to different implementation strategies (e.g., provision of training or community support) are also often less transparently assessed (Johns et al., 2003)

Based on this, the current paper aims to provide an assessment and comparison of the following costs in three upper-middle-income Latin American countries, namely Colombia, Mexico, and Peru: (1) consultation costs of one alcohol measurement session in primary health care (PHC) settings; and (2) programme costs of three implementation strategies (specified in the next section), including the costs per additional alcohol measurement session.

Methods

Study Design

The costs associated with the set-up and implementation of an alcohol measurement programme were collected as part of the "Scale-up of Prevention and Management of Alcohol Use Disorders and Comorbid Depression in Latin America" (SCALA) study (Jané-Llopis et al., 2020). SCALA is a quasi-experimental implementation science study, which seeks to upscale the delivery of alcohol measurement at the municipal level in Colombia, Mexico, and Peru, through a multi-component approach. Specifically, the following implementation strategies are included in the SCALA study: (1) provision of standard training combined with standard clinical package, e.g., clinical pathway and support materials (henceforth: standard training and clinical package); (2) provision of a more intensive training combined with a longer clinical package (henceforth: intensive training and clinical package); and (3) provision of community support. The strategies were compared to a control group, i.e., care as usual (Anderson et al., 2021; O'Donnell et al., 2021). In each of the three participating countries, two municipalities were recruited (one without community support, and one with community support, see Table A1 for more information), each with 9–10 participating PHC centres (PHCC). This resulted in 58 participating PHCCs, spread over four study arms, using clustered randomisation. The implementation phase was planned to last 18 months and started in September–October 2019; however, it was paused mid-March 2020, due to the COVID-19 pandemic, which disrupted the PHC services in the three countries. Data included for this analysis relates, therefore, to the first five implementation months of SCALA.

Implementation strategies

The implementation strategies (see Table A2) were executed as follows: participants in arm 1 (care as usual) received a booklet describing a pathway for delivering alcohol measurement and subsequent interventions and paper tally sheets with the AUDIT-C questionnaire (three items), which providers could use to deliver the intervention (for more information, see www.scalaproject.eu). No other support materials and activities were offered. Participants in arm 2 received training (consisting of one session) before the implementation, in which they were trained to deliver alcohol measurement and subsequent interventions using the same pathway as in arm 1. Additionally, a booster session of one hour was planned to be given to providers; however, this could not be implemented in all PHCCs, due to the COVID-19 lockdown, and was therefore not included in the current costs assessment.

PHCCs in arm 3 (intervention municipality) received the same training and clinical package materials as in arm 2, and community support aimed at helping the adoption and implementation of the intervention. The community support consisted, among others, of regular performance feedback and support given by the project team to the providers during every implementation month (see Table A3). Community support also included (indirect) support from a community advisory board (CAB). The CAB was created in each intervention municipality, consisting of 10–12 relevant stakeholders for the public health domain, and met two times in Peru and three times in Colombia and Mexico throughout the set-up and implementation phase of the project (Solovei et al., 2021).

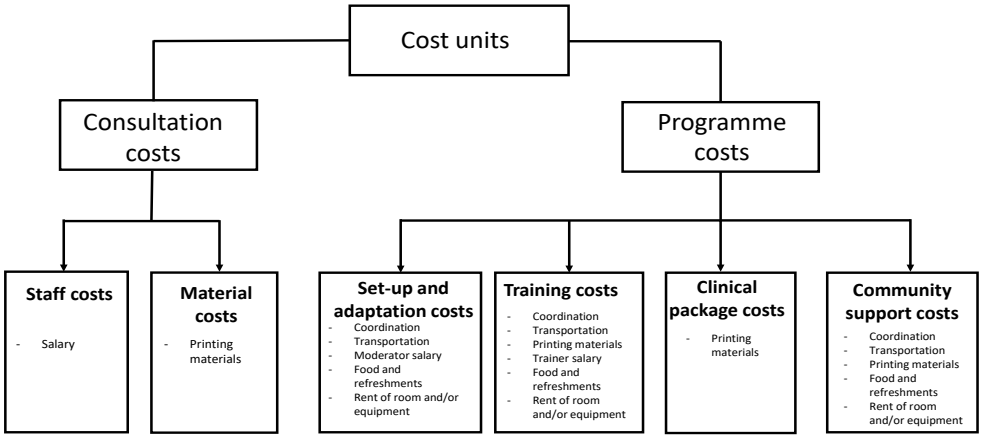
In arm 4 (intervention municipality), PHCCs received the same community support as in arm 3, along with more intensive training and clinical package than arms 2 and 3. The more intensive training consisted of one additional training session of 2 hours in Mexico and Peru, and in Colombia of 30 additional minutes added to the main session, compared to the standard training (arm 3). The more intensive clinical package consisted of administrating the full AUDIT questionnaire (10 items) during the alcohol measurement sessions rather than AUDIT-C (for more information, see www.scalaproject.eu).

Costs identification, measurement, and valuation

In a cost analysis it is important to identify, measure, and value activities. For this study, cost units were identified from existing literature and based on discussions with the local research teams and/or local PHC managers (see Figure 4.1). The final list of identified cost units is operationalised in Table 4.1 and Table A3 and is explained later in this paper. A health care system perspective was used, meaning that the costs related to the implementation of the intervention were assessed (i.e., costs of the resources used in the set-up and delivery of brief alcohol advice) rather than the full societal cost of the intervention. Research-related costs, such as the time needed by the research team to explain the procedures of the study and to recruit PHCCs, or the time needed by providers to fill in questionnaires, were not included in the assessment.

Figure 4.1.

Cost units identified, measured, and valued in the SCALA project.



The measuring of cost units was conducted through three main sources: the local research team, the PHCC managers, and the participating providers. The local research team received a question list to specify the time and costs spent on various activities. The PHCC managers (i.e., *n* = 18 in Mexico, *n* = 20 in Colombia, *n* = 20 in Peru) gave information about the providers' salaries. Providers (*n* = 53 in Colombia, *n* = 25 in Mexico, *n* = 75 in Peru) gave information about how much time they spent on average delivering alcohol measurement, brief advice, and referral to treatment. For costs valuation, the local prices and costs were converted to International Dollars (Int$), using the purchasing power parity (PPP) exchange rates (1Int$ = 1349.01 COP; 1Int$ = 9.31 MXN; 1Int$ = 1.74 PEN), to allow for easier inter-country comparison of costs (World Bank, 2021b).

Consultation costs

Consultation costs refer to the direct costs arising from delivering the intervention to a new patient and include staff costs and material costs. Staff costs were calculated by multiplying the average hourly salary of the provider (see Table A4) by the average amount of time used for an alcohol measurement session, brief advice session, and referral to treatment session. The range of providers delivering the intervention in the three countries included mainly GPs and nurses, as well as social workers, psychologists, and other professions. First, the number of alcohol measurement sessions delivered by each different profession was assessed, per country, and then these proportions were used to calculate the average staff costs per alcohol measurement session, accounting for variations in staff costs. Material costs were assessed by multiplying the number of pages used for a session with the costs for printing one page. Finally, consultation costs were calculated as the sum of staff costs and material costs, per session.

Programme costs

Programme costs refer to the costs incurred outside the point of delivery of the intervention to beneficiaries. In SCALA, the programme costs include the set-up and adaptation costs, and the costs of the three implementation strategies that were carried out: standard training and clinical package, intensive training and clinical package, and community support.

Set-up and adaptation costs refer to costs incurred between the decision to implement the intervention and the start of its delivery (including the delivery of the implementation strategies). The identified set-up costs included coordinating PHCCs' and providers' participation in the SCALA intervention. Adaptation costs included the costs of adjusting and tailoring the clinical package materials to the local contexts. In SCALA this was conducted in each country with two user panels: one with a group of 10 health care providers and one with 10 patients. Identified costs included user panel coordination, transportation, food and refreshments, printing materials, moderator salary, technical equipment, and materials adaptation coordination. Research-related costs, e.g., the coordination of data collection and survey completion, were not included in the general start-up and adaptation costs, as these do not apply to the actual implementation of the intervention.

The costs of the three implementation strategies were identified and assessed as follows. For both (i) standard training and clinical package and (ii) intensive training and clinical package, cost units included coordination of the training, transportation for participants and/

or organisers, food and refreshments, training materials, technical equipment, trainer salary, and printing clinical package materials. For community support, the identified cost units include coordination of CAB meetings, food and refreshments, materials, venue rent, transportation, and coordination and implementation of supportive actions. These costs were measured through questionnaires filled in by the three local research teams.

The costs of coordinating and/or delivering the abovementioned activities (i.e., PHCC participation, user panels, training sessions, CAB meetings, and supportive actions) were assessed by multiplying the average hourly wage of the implementers with the time spent by them in preparing and/or delivering each activity. The costs of printing materials were assessed by multiplying the number of double-sided pages used for a session with the costs for printing one double-sided page. Transportation and venue rent costs were assessed per activity, and food and refreshment costs were assessed per portion.

Costs per additional alcohol measurement session

The costs for each implementation strategy were divided by the number of providers participating in the respective study arm, and, subsequently, by the average number of additional alcohol measurement sessions delivered by each provider. The number of additional sessions per implementation strategy was assessed through comparison to the study arm in which the implementation strategy was not implemented, i.e., arm 2 vs. arm 1, for standard training and clinical package; arm 3 vs. arm 2 for community support; and arm 4 vs. arm 3 for intensive training and clinical package.

Costs per 10,000 alcohol measurement sessions in SCALA

Additionally, we estimated the costs for 10,000 alcohol measurement sessions in each SCALA arm, using the three abovementioned implementation strategies. The number of 10,000 alcohol measurement sessions was identified as a relevant cost indicator for potential policy implementation and scale-up. For these estimations, the period (i.e., number of years) that would be needed to achieve this number was calculated per SCALA arm, based on the existing alcohol measurement numbers assessed in the five months of implementation.

Based on these estimated periods, the number of activities related to each implementation strategy that would have to be implemented was assessed, along with the respective costs (see Table A5). This allowed considering both fixed costs (i.e., which do not depend on the number of delivered consultations) and variable costs (i.e., which change depending on the number of delivered consultations). The programme costs were estimated in each country based on the existing number of recruited PHCCs and participating providers in each study arm, as specified in Table 4.2. Specifically, for the standard training and intensive training implementation strategies, it was estimated that booster sessions of one hour would be given annually to the participating providers. The cost of a booster session was estimated based on the standard training cost units, correspondingly. For community support, it was estimated that one CAB meeting would be organised annually and that supportive actions would be implemented monthly. Finally, the programme costs, including the set-up costs (corresponding to the number of participating PHCCs in each country and arm) and adaptation costs, were added to the (care as usual) consultation costs of 10,000 alcohol measurements.

Statistical testing

The statistical significance of differences between countries (within the same arm) and between arms (within the same country) was tested using confidence intervals for two variables assessed at the provider level: (1) the number of delivered alcohol measurement sessions per provider, and (2) the number of minutes spent on these sessions. Confidence intervals were calculated in SPSS 26 with the function 'explore', at a 95% confidence level and were compared. Statistical significance of tested differences was indicated by a lack of overlap of the compared confidence intervals. Differences in unit costs and total costs of the programme cost components (i.e., set-up and adaptation, training, community support) were not tested for significance. These costs were assessed at the country level and did not include sufficient variability to allow for statistical tests.

Results

Consultation costs

In all three countries, providers spent on average between 1.6 and 4.8 min for a standard alcohol measurement session (using AUDIT-C), a brief advice session, and a referral to treatment session. Countries showed differences in the professions of providers who gave the intervention. In Colombia and Mexico, over 60% of the sessions were given by GPs, followed by nurses (in Colombia) and psychologists (in Mexico), whereas in Peru a third of the sessions were given by midwives and a third by psychologists, followed by nurses, nurses technicians, and GPs (each under 5%). The average costs of the three types of sessions (alcohol measurement, alcohol measurement and brief advice, and alcohol measurement and referral to treatment), including the costs of the paper tally sheet used to apply the AUDIT-C questionnaire for the alcohol measurement, were, respectively: Int$ 1.19 (CI: 0.97; 2.54), Int$ 2.57 (CI: 2.09; 4.17), and Int$ 1.84 (CI: 1.51; 3.34) in Colombia; Int$ 0.67 (CI: 0.27; 1.04), Int$ 1.62 (0.58; 2.63), and Int$ 1.23 (0.41; 2.01) in Mexico; and Int$ 1.11 (CI: 1.07; 1.15), Int$ 2.14 (CI: 2.05; 2.24), and Int$ 1.45 (CI: 1.38; 1.52) in Peru (see Table 4.1). The overlaps in confidence intervals show that the differences are not statistically significant between the three countries.

Table 4.1.

Costs units, quantities, and prices of brief alcohol advice sessions.

Unit	Operationalization	Quantity			Unit cost			Costs (Int$)		
		Col	Mex	Per	Col	Mex	Per	Col	Mex	Per
Alcohol measurement session	Minutes spent by provider to measure alcohol use in a new patient, using the AUDIT-C questionnaire.	4.3 (CI:3.46; 5.13)	2.43 (CI:0.75; 4.1)	4.73 (CI:4.54; 4.93)	Int$ 15.69 per hour	Int$ 13.77 per hour	Int $12.76 per hour	1.12 (CI:0.90; 1.34)	0.57 (CI:0.17; 0.94)	1.01 (CI:0.97; 1.05)
Brief advice session	Minutes spent by provider to deliver a brief advice session to a patient.	5.26 (CI:4.27; 6.25)	4.14 (CI:1.35; 6.94)	4.85 (CI:4.59; 5.12)				1.38 (CI:1.12; 1.63)	0.95 (CI:0.31; 1.59)	1.03 (CI:0.98; 1.09)
Referral to treatment session	Minutes spent by provider to deliver a referral to treatment session to a patient.	2.50 (CI:1.94; 3.06)	2.43 (CI:0.63; 4.22)	1.60 (CI:1.46; 1.74)				0.65 (CI:0.54; 0.80)	0.56 (CI:0.14; 0.97)	0.34 (CI:0.31; 0.37)
Alcohol measurement material	Number of double-sided pages used for the AUDIT-C tally sheet, for each new patient whose alcohol consumption is measured.	1	1	1	Int$ 0,07 per page	Int$ 0,1 per page	Int$ 0,1 per page	0.07	0.10	0.10
Consultation cost alcohol measurement session	Costs incurred for every new patient whose alcohol consumption was measured, who did not receive subsequent interventions (staff costs + materials).							1.19 (CI:0.97; 2.54)	0.67 (CI:0.27; 1.04)	1.11 (CI:1.07; 1.15)
Consultation cost alcohol measurement & brief advice session	Costs incurred for every new patient whose alcohol consumption was measured and received brief advice (staff costs + materials).							2.57 (CI:2.09; 4.17)	1.62 (CI:0.58; 2.63)	2.14 (CI:2.05; 2.24)
Consultation cost alcohol measurement & referral to treatment session	Costs incurred for every new patient whose alcohol consumption was measured and received referral to treatment (staff costs + materials).							1.84 (CI:1.51; 3.34)	1.23 (CI:0.41; 2.01)	1.45 (CI:1.38; 1.52)

Programme costs

Set-up costs (in each country calculated for 15 PHCCs that were not in the control arm) were Int$ 2242.5 in Colombia, Int$ 1711.25 in Mexico, and Int$ 1803.10 in Peru. Adaptation costs of the clinical package materials, including two user panels in each country, were Int$ 1332.15 in Colombia, Int$ 1286.02 in Mexico, and Int$ 1308.45 in Peru (see Table A6 for detailed cost units). As mentioned earlier, these costs were assessed at the country level, and therefore the difference between them could not be tested for statistical significance.

Standard training average costs for one provider were: Int$ 31.70 in Colombia, Int$ 36.15 in Mexico, and Int$ 38.68 in Peru (see Table A6 for detailed cost units). In all three countries, in the five months following the training, providers in arm 2 delivered on average more alcohol measurement sessions per month, namely: 2.65 (CI: 0.61; 4.84) in Colombia, 1.64 (CI: 0.61; 2.53) in Mexico, and 1.37 (CI: 0.60; 1.70) in Peru, as compared to providers arm 1, who received no training. The overlap between the confidence intervals shows that these differences are not statistically significant between the three countries. Including the costs for the clinical package materials used in each alcohol measurement session (i.e., informative leaflets), the average costs of this implementation strategy per additional session were: Int$ 2.68 (CI: 1.61; 10.66) in Colombia, Int$ 4.96 (CI: 3.40; 12.35) in Mexico, and Int$ 6.17 (CI: 5.06; 13.37) in Peru.

Intensive training average costs for one provider were Int$ 36.47 in Colombia, Int$ 63.01 in Mexico, and Int$ 64.14 in Peru. The substantially lower costs in Colombia are primarily due to the shorter format of the intensive training used there, as mentioned above (i.e., one session in Colombia vs. two sessions in Mexico and Peru, see Table A6). In the next five months following the intensive training, trained providers delivered on average more alcohol measurement sessions per month in Mexico (2.46 more sessions per provider; CI: 1.13; 3.71), while no statistically significant difference was noted in Colombia, which is indicated by the fact that the confidence interval includes zero (0.11 more sessions per provider; CI: –2.62; 5.95). In Peru, providers delivered on average fewer alcohol measurement sessions per month compared to those who received standard training (–1.89 sessions per provider; CI: –3.78; –0.01). Confidence intervals also demonstrate that this difference in direction is statistically significant between Mexico and Peru, but not between the other country pairs. The average costs of this implementation strategy per additional session were Int$ 2.90 (CI: 2.08; 5.77) in Mexico.

The average cost of one CAB meeting was Int$ 717.44 in Colombia, Int$ 833.71 in Mexico, and Int$ 605.68 in Peru. The average cost of one month of supportive actions (including set-up, planning, and implementation) delivered to the participating PHCCs in the intervention municipality (n = 9 in Mexico, n = 10 in Colombia, n = 10 in Peru) was Int$ 358.50 in Colombia, Int$ 205.35 in Mexico, and Int$ 144.25 in Peru. The higher costs in Colombia are primarily due to the larger amount of hours spent to implement the supportive actions (see Table A6). In Colombia, in the five months during which community support was given, providers in the PHCCs in arm 3 that received community support, delivered on average 11.02 more alcohol measurement sessions per provider per month (CI: 4.21; 15.03), compared to arm 2, without community support. There were no statistically

significant differences in Mexico (0.88 additional sessions per provider, CI: –0.04; 1.86) and Peru (0.53 additional sessions per provider, CI: –0.35; 1.44). The average costs of community support per additional alcohol measurement session were Int$ 1.24 (CI: 0.91; 3.24) in Colombia.

Cost estimations for measuring the alcohol consumption of 10,000 patients in the SCALA research settings are depicted in Table 4.2. They show that, while the standard training and clinical package implementation strategy (arm 2) was estimated to be the cheapest in all three countries, in Colombia and Mexico the strategy would require a longer period to reach the number of 10,000 alcohol measurements, as compared to the community support strategy. The intensive training and clinical package strategy was estimated to be the most expensive strategy in all three countries, with a longer corresponding implementation period in Colombia and Peru to achieve 10,000 alcohol measurements (compared to the other two strategies). In Mexico, the intensive training and clinical package strategy was estimated to lead to 10,000 alcohol measurements in a shorter time than the other two strategies.

Table 4.2.

Estimated costs per 10,000 patients whose alcohol consumption would be measured in one study arm.

	Nr. of alcohol measurement sessions delivered in 5 months of SCALA implementation, and nr. of participating providers and PHCCs, per study arm.			Period within which 10,000 alcohol measurement sessions would be delivered in one SCALA study arm			Programme and consultation costs for 10,000 alcohol measurement sessions(Int$)		
	Col	Mex	Per	Col	Mex	Per	Col	Mex	Per
Standard training and clinical package	446 (30 providers in five PHCCs)	590 (54 providers in five PHCCs)	846 (70 providers in five PHCCs)	9.34 years	7.06 years	4.92 years	20082.85	22177.18	25474.28
Community support (in SCALA combined with standard training and clinical package)	1830 (26 providers in five PHCCs)	922 (59 providers in five PHCCs)	566 (40 providers in five PHCCs)	2.27 years	4.51 years	7.36 years	24654.26	27474.40	34103.66
Intensive training and clinical package (in SCALA combined with community support)	1222 (17 providers in five PHCCs)	1313 (47 providers in four PHCCs)	258 (50 providers in five PHCCs)	3.40 years	3.17 years	16.14 years	37506.26	30360.53	74414.28

Discussion

This paper aimed to assess the consultation costs of delivering alcohol measurement sessions in PHC settings in three Latin American countries, along with the programme costs of three implementation strategies aiming to support the implementation of this intervention: (1) standard training and clinical package, (2) intensive training and clinical package, and (3) community support, including the costs of these implementation strategies per additional alcohol measurement session.

Results indicate that one of the main factors determining the consultation costs is the profession of the providers delivering the intervention. Specifically, when the intervention was largely delivered by GP's the average salaries were higher than when the intervention was delivered more often by nurses or social workers. Another factor determining the costs is the time spent for certain components of the intervention, such as providing an alcohol measurement session, as also demonstrated in previous studies (Babor et al., 2007; Bray et al., 2012). For a more accurate estimation of consultation costs in international settings, it is therefore important to take into account the type and proportions of PHC professionals who would take up the delivery of alcohol measurement, along with the amount of time such sessions would last. Moreover, it is also important to consider that not only the costs, but also the overall uptake, implementation, and effectiveness of the intervention may largely depend on the type of professional who delivers it (Wamsley et al., 2018).

Regarding the implementation strategies assessed in the current study, some differences in unit costs in the three countries were noticed. For example, the costs of CAB meetings in Mexico were higher than in Colombia and Peru, e.g., due to larger transportation and materials costs. In addition, noticeably, the community support intervention in Colombia resulted in a higher number of additional alcohol measurement sessions, and, correspondingly, in a lower cost per additional alcohol measurement session. This may be due to a more intensive collaboration with the providers who received community support in Colombia. For example, specific barriers encountered by providers in Colombia were tackled more effectively with community support activities, e.g., through creating video tutorials responding to the specific needs of the providers (for more information, see www.scalaproject.eu).

Due to the premature stop in data collection as a result of the COVID-19 pandemic, which started in all three countries by end of implementation month 5, we could not assess in more detail the further implementation of the community support. We expect community support activities to have a cumulative effect over months of implementation and in SCALA, the community support activities were designed to be implemented for a period of 18 months, prior to the COVID-19 pandemic. Thus, it could be that the stronger effects of community support in Mexico and Peru would have manifested only after the observed 5 months period, and as such, the costs per additional alcohol measurement session would be smaller than estimated in this paper. Future studies could benefit from collecting data throughout a longer implementation of community support.

In addition to impeded program implementation and health care delivery, the COVID-19 pandemic has also been linked to reduced alcohol consumption (Manthey et al., 2022). During this public health emergency, resources have been prioritised for more

pressing health care issues than for preventive measures. In light of the scarcity of health care resources and economic losses, the implementation of routine alcohol measurement in PHC practice seems to be of even lower importance than before the pandemic. Standard training and clinical package had relatively similar costs in the three countries and led to more alcohol measurement sessions, compared to care as usual, in all three countries. Intensive training and clinical package, on the other hand, was substantially cheaper in Colombia, as compared to Mexico and Peru, due to the shorter training format implemented in the country. As the intensive training and clinical package is a more expensive implementation strategy, compared to the standard training and clinical package (due to larger consultation and programme costs), it is, therefore, recommended to carefully consider the type and intensity of training as implementation strategies, based on needs and preferences in local contexts.

A strength of this study is that it is based on an implementation science approach, which allows realistic costs to be taken into account. The analyses are based on real-life data, adding confidence in their validity and allowing the costs to be assessed per additional patients, whose alcohol use is measured in the different implementation strategies. Moreover, by transparently presenting the main cost categories and showing a comparison between three countries, the study can be used as a basis for budgeting costs of similar interventions in other countries, by adjusting the cost units according to the national/local contexts.

A limitation of this study is that the effects of the tested implementation strategies may need a longer time to unfold than it was possible to assess in our research. Moreover, possibly, alcohol interventions can have negative short-term impact, e.g., creating productivity losses (e.g., patients take more time off as a result of referrals), which may only pay-off in the long run. Future research may broaden perspectives and include all societal costs relevant to alcohol consumption (for an overview of all relevant costs categories, see Carr et al., 2021). In addition, the estimated costs (e.g., salaries) are based on the implemented SCALA project and may, therefore, vary within the three countries at national level, for example, as a result of a different uptake of the intervention by different professions. Finally, overhead costs (e.g., administrative, transaction, or building maintenance costs) are not included in the current cost assessment, as they could not be disentangled from the research-related costs. Future research may benefit from a thorough assessment of overhead costs.

Conclusion

To conclude, staff costs are an important component of the costs of an alcohol measurement programme, being largely driven by the type and proportion of the professions of providers delivering the intervention and the time spent on the sessions. Regarding the costs of implementation strategies, the standard training and clinical package is the cheapest of the three analysed implementation strategies and may lead, in all three countries, to additional patients whose alcohol consumption is measured, compared to care as usual. On the other hand, more complex and expensive implementation strategies, such as the intensive training and clinical package, or the provision of community support (along with the training and clinical package) may also potentially result in additional alcohol measurement sessions; however, this depends on the country where the strategy is implemented. Therefore, for optimal budgeting efforts of alcohol measurement programmes, increased attention should be paid to the local characteristics of the contexts where the intervention is implemented, thereby contributing to generating evidence for decision making in public health policies.

Table A1.

Alcohol measurement related activities and materials offered to participants in different study arms

SCALA study arms			
Arm 1 **Care as Usual**	**Arm 2** **Standard Training and clinical package**	**Arm 3** **Community support**	**Arm 4** **Intensive Training and clinical package**
Participants received: - a booklet describing a pathway for delivering alcohol measurement and subsequent interventions; - paper tally sheets with the AUDIT-C questionnaire (3 items) which could be used by providers to deliver the intervention; - no other support materials and activities were offered.	Participants received: - a booklet describing a pathway for delivering alcohol measurement and subsequent interventions; - paper tally sheets with the AUDIT-C questionnaire (3 items) which could be used by providers to deliver the intervention; - training (one session) before the start of the implementation, in which they were trained to deliver alcohol measurement and subsequent interventions using the same pathway as in arm 1; - patient leaflets (2 double-sided pages) to be offered to patients receiving brief advice.	Participants received: - a booklet describing a pathway for delivering alcohol measurement and subsequent interventions; paper tally sheets with the AUDIT-C questionnaire (3 items) which could be used by providers to deliver the intervention; - training (one session) before the start of the implementation, in which they were trained to deliver alcohol measurement and subsequent interventions using the same pathway as in arm 1; - patient leaflets (2 double-sided pages) to be offered to patients receiving brief advice; Community support was offered to participating PHCC, in the form of supportive actions (e.g., regular feedback offered to providers) and CAB meetings.	Participants received: - a booklet describing a pathway for delivering alcohol measurement and subsequent interventions ; paper tally sheets with the AUDIT questionnaire (10 items) which could be used by providers to deliver the intervention; - one training (two sessions in Mexico and Peru, one session in Colombia, which was longer that in the other arms) before the start of the implementation, in which they were trained to deliver alcohol measurement and subsequent interventions using a longer pathway than in arm 1; - patient leaflets (2 double-sided pages) to be offered to patients receiving brief advice; Community support was offered to participating PHCC, in the form of supportive actions (e.g., regular feedback offered to providers) and CAB meetings.

Table A2.

SCALA community support implemented in the three intervention municipalities until end of implementation month 5.

Community support activity	**Colombia**	**Mexico**	**Peru**
CAB meetings	Two CAB meetings setting up the Municipal Actions Plan for the community actions intervention	Two CAB meetings setting up the Municipal Actions Plan for the community actions intervention	One CAB meeting setting up the Municipal Actions Plan for the community actions intervention
Adoption mechanisms	1. The benefits of the SCALA project have been emphasized in face-to-face meetings with Centre managers and providers. 2. In implementation month 3, in a face to face meetings with providers, the number of screened patients was communicated. 3. A local university became engaged in the project. 4. In implementation month 3, in a face to face meetings with providers, the highest alcohol measurement rates per Centre were highlighted. 5. Organizational issues are monitored through discussions with Centres, no substantial issues have been identified.	1. During the training sessions, the benefits of implementing the alcohol measurement and brief advice in the Centre for patients, providers and the community have been highlighted. 2. In the training sessions, the large number of patients that can benefit if alcohol measurement and brief advice are implemented in the Centre was reaffirmed. 3. A poster presentation was held at an Annual Research Meeting of the National Institute of Psychiatry; a presentation about the role of alcohol measurement was held on the National Day against Harmful use of Alcoholic Beverages 2019. 4. Informing Centres about the percentage of alcohol measurement sessions carried out by each Centre is done on a monthly basis. 5. Organizational issues are monitored through discussions with Centres, no substantial issues have been identified.	1. Collaboration with the Mental Health Program of the Ministry of Health, in order to promote the adoption of the program in the implementation municipality. 2. The large number of patients who benefit from the project was communicated to providers, focusing on three subgroups with higher alcohol risk in the intervention municipality: a) persons in treatment of tuberculosis, b) persons at risk of sexual transmitted diseases, c) persons in violent families. 3. In order to engage the municipality, 35 community promoters have been trained in methods for working in alcohol prevention. 4. Lists were created for each Centre using WhatsApp to promote the identification of champions. 5. Organizational issues are monitored through discussions with Centres; one issue identified is that providers seem very busy.
Support systems	1. Training packages were slightly shortened, in order to fit into the Centres' schedules and rules of attendance of providers. 2. One formal meeting was organized in the first two months of implementation to identify difficulties regarding the brief advice and the care pathway. 3. Meetings for feedback with providers held every two months, in which the alcohol measurement rates are communicated.	1. Materials and activities of the training sessions were adjusted to the needs of each Centre. 2. Reporting each month to Centres the number of alcohol measurement sessions; informing every three months Centres on the progress of the global project	1. Additional materials have been added for new providers who did not have previous information about the program. 2. Reporting each month to Centres the number of alcohol measurement sessions. 3. Exploring the option of involving Community Mental Health Services, who could train other Centres in the future.

Table A3.

Units, quantities, and costs of implementation strategies.

Unit	Unit operationalization	Quantity			Unit Cost (Int$)			Costs (Int$)		
		Col	Mex	Per	Col	Mex	Per	Col	Mex	Per
Set-up and adaptation costs										
Coordination of PHCC participation	Hours spent to coordinate participation of one PHCC.	10 hours	10 hours	10 hours	14.95 per hour	11.41 per hour	12.02 per hour	149.50	114.08	120.21
Coordination User Panel	Hours spent to coordinate and organize one User Panel.	20 hours	20 hours	20 hours	14.95 per hour	11.41 per hour	12.02 per hour	299.00	228.17	40.41
Food and Refreshments	Food and refreshments in one user panel with 10 participants, including moderator and organizer.	12 portions	12 portions	12 portions	2.59	4.51	6.89	31.13	54.14	82.66
Materials	Number of materials used during one user panel with 10 participants.	10 sets	10 sets	10 sets	1.48 per set	3.65 per set	3.10 per set	14.83	36.52	31.00
Remuneration moderator User Panel	Number of hours spent by the moderator to prepare and deliver one user panel with 10 participants.	4 hours	4 hours	4 hours	14.95 per hour	11.41 per hour	12.02 per hour	59.80	45.63	48.08
Transportation	Transportation used for one user panel with 10 participants, including moderator and organizers.	One transport ation service	One transport ation service	One transporta tion service	37.06	107.42	71.76	37.06	107.42	71.76
Adaptation of materials based on feedback	Hours spent to implement adaptation and tailoring of the clinical package materials.	30 hours	30 hours	30 hours	14.95 per hour	11.41 per hour	12.02 per hour	448.50	342.25	360.62
Total set-up costs	Costs for coordinating the participation of 15 PHCCs in arms 2, 3, and 4.							2242.50	1711.25	1803.10

Total costs adaptation materials	Costs for two User Panels and further adaptation of the clinical package materials.							1332.15	1286.02	1308.45
Standard training and clinical package										
Training coordination	Number of hours spent to coordinate one training session with 15 participants.	20 hours	20 hours	20 hours	14.95 per hour	11.41 per hour	12.02 per hour	299.00	228.17	240.41
Participants materials	Number of materials used during one training session with 15 participants.	15 sets	15 sets	15 sets	2.59 per set	5.37 per set	5.74 per set	38.92	80.57	86.11
Remuneration trainer	Number of hours spent by the trainer to prepare and deliver one training session with 15 participants.	3 hours	4 hours	4 hours	18.82 per hour	20.41 per hour	16.19per hour	56.46	81.64	64.75
Food and refreshments (one training)	Food and refreshments in one training session with 15 participants, including trainer and organizer.	17 portions	17 portions	17 portions	2.59 per portion	4.51 per portion	6.89 per portion	44.11	76.70	117.11
Transportation (one training)	Transportation used for one training session with 15 participants, including trainer and organizers.	One transport ation service	One transport ation service	One transporta tion service	37.06	75.20	71.76	37.06	75.20	71.76
Total costs for one standard training								475.55	542.27	580.14
Total costs for one trained provider (standard training)								31.70	36.15	38.68
Clinical package materials for alcohol measurement	Number of double-sided pages used in the standard clinical package for each new patient whose alcohol consumption is measured.	2 double-sided pages	2 double-sided pages	2 double-sided pages	0.15 per double - sided page	0.27 per double-sided page	0.26 per double-sided page	0.30	0.54	0.52
Intensive training and clinical package										
Total costs for one intensive training	Total costs for one intensive training consisting of one session in Colombia and two sessions in Mexico and Peru.							547.09	1050.22	881.99

Total costs for one trained provider (intensive training)								36.47	63.01	64.14
Additional costs intensive training per provider (compared to standard training)	Additional costs, per provider, spent to provide intensive training (over and above standard training).							6.50	30.01	21.11
Additional time full AUDIT	Additional number of minutes spent to measure the alcohol consumption of a new patient, with the full AUDIT (over and above AUDIT-C).	3.75 minutes	2 minutes	5 minutes	15.69 per hour	13.77 per hour	12.76 per hour	0.98	0.46	1.06
Additional alcohol measurement material	Number of additional double-sided pages used for the full AUDIT assessment, for each new patient whose alcohol consumption is measured (as compared to care as usual).	1	1	1	0,07 per page	0,1 per page	0,1 per page	0.07	0.10	0.10
Community support										
CAB coordination and moderation	Number of hours spent to prepare and coordinate one CAB meeting.	35 hours	35 hours	35 hours	14.95 per hour	11.41 per hour	12.02 per hour	523.25	399.29	420.72
Venue rent	Venue rent for one CAB meeting.	1 conferenc e hall	1 conferenc e hall	none	111.19	268.56	--	111.19	268.56	0.00
Food and refreshments	Food and refreshments used in one CAB meeting.	12 portions	12 portions	12 portions	2.59 per portion	4.51 per portion	9.57 per portion	31.13	54.14	82.66
Materials	Amount of materials used in one CAB meeting.	10 sets	10 sets	10sets	1.48 per set	3.65 per set	3.05 per set	14.80	32.52	30.54

Transportation	Transportation used for one CAB meeting.	One transportation service	One transportation service	One transportation service				37.06	75.20	71.76
Total cost one CAB meeting	Total costs for one CAB meeting.							717.44	833.71	605.68
Set-up supportive actions	Amount of hours spent to set-up and prepare supportive actions for 1 municipality, including 10 PHCCs.	40 hours	40 hours	40 hours	14.95 per hour	11.41 per hour	12.02 per hour	598.00	456.33	480.83
Coordination & implementation supportive actions	Amount of hours spent to implement supportive actions for one municipality including 10 PHCCs, during 1 month.	20 hours	10 hours	10 hours	14.95 per hour	11.41 per hour	12.02 per hour	299.00	171.12	120.21
Total cost supportive actions (1 municipality, 5 months)	Total costs of implementing supportive actions in 1 municipality including 10 PHCCs.							1495.00	855.62	601.03
Total costs community support	Total costs of 5 months of community support in 1 municipality, consisting of two CAB meetings in Colombia and Mexico, one CAB meeting in Peru; and five months of supportive actions.							2929.88	2523.04	1206.72

Tabel A4.

Period within which 10,000 alcohol measurement sessions would be delivered in one SCALA study arm and corresponding number of implementation activities.

	Col	Mex	Per
Standard training and clinical package	9.34 years Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - One training in the first implementation year for 13 trained providers. - Eight boosters (one per following implementation year) for 13 trained providers.	7.06 years Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - Three trainings in the first implementation year for 44 trained providers - Eighteen boosters (one per following implementation year) for 44 trained providers.	4.92 years Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - Four trainings in the first implementation year for 61 trained providers - Twelve boosters (one per following implementation year) for 61 trained providers.
Community support (in SCALA combined with standard training and clinical package)	2.27 years Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - Two trainings in the first implementation year for 21 trained providers. - Two boosters (one per following implementation year) for 21 trained providers. - Three CAB meetings (two in the first year and one per following implementation year) -Set-up and implementation of supportive actions for 5 PHCCs	4.51 years Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - Three trainings in the first implementation year for 45 trained providers. - Nine boosters (one per following implementation year) for 45 trained providers. - Five CAB meetings (two in the first year and one per following implementation year) - Set-up and implementation of supportive actions for 5 PHCCs	7.36 years Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - Two trainings in the first implementation year for 34 trained providers. - Twelve boosters (one per following implementation year) for 34 trained providers. - Seven CAB meetings (one per implementation year) - Set-up and implementation of supportive actions for 5 PHCCs

	3.40 years	3.17 years	16.14 years
Intensive training and clinical package (in SCALA combined with community support)	Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - One intensive training (one session) in the first implementation year for 17 trained providers. - Two boosters (one per following implementation year) for 15 trained providers. - Fours CAB meetings (two in the first year and one per following implementation year). -Set-up and implementation of supportive actions for 5 PHCCs.	Activities: - Start-up for four PHCCs and adaptation of clinical package materials. - Three intensive trainings (two sessions each) in the first implementation year for 50 trained providers. - Six boosters (one per following implementation year) for 38 trained providers. - Fours CAB meetings (two in the first year and one per following implementation year). - Set-up and implementation of supportive actions for 5 PHCCs.	Activities: - Start-up for five PHCCs and adaptation of clinical package materials. - Three intensive trainings (two sessions each) in the first implementation year for 41 trained providers. - Forty-five boosters (one per following implementation year) for 41 trained providers. - Fours CAB meetings (two in the first year and one per following implementation year) - Set-up (40 hours) and implementation of supportive actions for 5 PHCCs (15 hours monthly).

CHAPTER 5

Improving alcohol management in primary health care in Mexico: a return-on-investment analysis

Abstract

Alcohol measurement in primary health care is an effective strategy to decrease alcohol consumption at population level. However, there is relatively scarce evidence regarding its economic returns in non-high-income countries. The current paper aims to estimate the return-on-investment of implementing an alcohol measurement programme in Mexican primary health care settings.

Empirical data was collected in a quasi-experimental study, from 17 primary health care centers in Mexico City regarding alcohol measurement delivered by 145 health care providers. This data was combined with data from a simulation study for a period of 10 years (2008 to 2017). Economic investments were calculated from a public sector healthcare perspective as clinical consultation costs (salary and material costs) and programme costs (set-up, adaptation, implementation strategies). Economic return was calculated as monetary gains in the public sector healthcare, estimated via simulated reductions in alcohol consumption, dependent on population coverage of alcohol interventions delivered to primary health care patients.

Results showed that scaling up an alcohol measurement programme in Mexico over a 10-year period would lead to positive ROI values ranging between 21% in scenario 4 (CI: -8.6%, 79.5%) and 110% in scenario 5 (CI: 51.5%, 239.8%). Moreover, over the 10-year period, up to 16,000 alcohol-related deaths could be avoided as a result of implementing the programme. In conclusion, alcohol measurement implemented at national level in Mexico may lead to substantial financial gains from a public sector healthcare perspective.

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Introduction

Alcohol consumption is resulting in sizeable health and economic losses globally (Manthey et al., 2021; Shield et al., 2020). While absolute levels of alcohol consumption remain highest in high-income countries, the most pronounced increases in recent years were registered in low- and middle-income countries (Manthey et al., 2019). Moreover, the same level of alcohol consumption results in a larger health burden in countries with lower life expectancy and economic wealth (Shield, K. & Rehm, 2021).

In the Americas, alcohol consumption has remained relatively stable in recent years and was estimated to have caused about 5% of all deaths in 2016 (WHO, 2019). In Mexico, alcohol consumption is below the regional average and has seen slight decreases in recent years (Manthey, 2019). Nevertheless, an estimated 6% of all deaths were attributable to alcohol use in Mexico (WHO, 2019) and nearly one-fifth of all fully alcohol-attributable deaths registered in the Americas occurred in Mexico. Moreover, high rates of homicides,

cirrhosis and other diseases causally linked to alcohol consumption have resulted in a deterioration of health prospects among Mexican males in the past decade (Aburto et al., 2018; Canudas-Romo et al., 2015).

Alcohol measurement, delivered in primary health care settings, has been suggested as an easy-to-implement and cost-effective program (Angus et al., 2014) and has been listed as a priority measure to combat alcohol-attributable harm by the World Health Organization (WHO, 2021). Alcohol measurement entails the assessment of a patient's alcohol consumption by a health care provider and can be achieved with e.g. the three-item version of the Alcohol Use Disorder Identification Test (AUDIT-C) (Bush et al., 1998; WHO, 2001). Patients reporting alcohol use above a risk threshold are recommended to receive subsequent interventions in the form of brief advice aimed at cutting down alcohol use or to be referred to specialized treatment in case of very high drinking levels. In Mexico, some efforts to implement alcohol measurement and subsequent interventions in primary health care settings have been undertaken (Ayala et al., 1998; Barragán Torres et al., 2005; Monteiro, 2007), however, without achieving full implementation in routine practice.

While alcohol measurement and subsequent interventions has been shown to be a cost-effective programme, most of the supporting evidence was collected in high-income countries with considerably higher alcohol consumption levels compared to the rest of the world (Angus et al., 2018). Cost-effectiveness and cost-utility analyses contrast the required costs to the achieved health gains (e.g., QALYs gained), whereas cost-benefit and return-on-investment (ROI) analyses compare the required costs to economic returns resulting from health gains attributable to the health programme (Eisenberg, 1989). For policymakers, estimations of economic gains obtained from a health programme are of particular relevance, allowing, among others, to increase comparability among policy options in domains other than health. However, in the alcohol measurement field, cost-benefit and ROI analyses are scarce and have been exclusively done in high-income countries (for examples, see Fleming et al., 2002; Horn et al., 2017; Mundt et al., 2005).

In this contribution, we aim to estimate the economic returns from scaling up improved alcohol management in Mexican primary health care settings. The ROI analyses were conducted from a public sector healthcare perspective, i.e., health care services coordinated and offered by the public sector (e.g., Ministry of Health), not by private institutions, and are based on a mixture of empirical and estimated data collected during a large-scale quasi-experimental trial (SCALA, www.scalaproject.eu) (Jané-Llopis et al., 2020). In addition to financial gains, we also estimated the number of alcohol-attributable deaths that could be avoided by improving alcohol management in Mexico.

Methods

Study design

The ROI analyses were conducted to evaluate the impact of different alcohol management strategies on rates of alcohol measurement. For this purpose, we compared the four empirical SCALA strategies to a hypothetical control scenario, in which no alcohol management takes place in PHC settings. In the SCALA study, the following four study arms were set up (for more details, see Table 5.1 and the study protocol (Jané-Llopis et al., 2020)): 1) Baseline (as is) delivery of alcohol measurement; 2) Delivery of alcohol measurement along with standard provider training package; 3) Delivery of alcohol measurement along with standard provider training package, plus implementation of community support; 4) Delivery of alcohol measurement along with more intensive provider training, plus implementation of community support.

The disruptions caused by the COVID-19 pandemic in April 2020 hindered the complete implementation of all planned interventions and the required data collection. For example, the provision of regular performance feedback as part of the support offered to participating providers was only partly implemented. To account for these impediments, we included an additional hypothetical intervention scenario, in which higher alcohol measurement rates were assumed, than those observed in SCALA (see Supporting information for details). For the present analyses, we use data collected during the first five months of the implementation phase (20 August 2019 to 23 March 2020).

Target population

The target population was defined as the population of primary health care patients that could be potentially reached by the intervention. As the ROI analyses were conducted from a public sector healthcare perspective, the target population was restricted to the population covered by health care services offered by the public sector. In other words, people using private services and uninsured people were excluded from the target population. In Mexico, the target population was assumed to make up 80% of the entire population (UN, 2019). As the remaining 20% were either uninsured or covered by private insurance plans (Guanais et al., 2018), we assumed that the target population constitutes a representative sample of the entire population, making further adjustments with regards to sex, age, or socioeconomic status irrelevant. Further information on the Mexican health care system and the calculations used to estimate the target population can be found in the Supporting information.

Table 5.1.

Description of the scenarios for the ROI analysis.

Scenario #	0	1	2	3	4	5
Label	Do-nothing	Baseline (Care as usual)	Training	Training and support 1	Training and support 2	30% alcohol measurement rate
Provision of alcohol measurement materials (paper tally sheets)	None	Paper tally sheets with the AUDIT-C questionnaire	Paper tally sheets with the AUDIT-C questionnaire	Paper tally sheets with the AUDIT-C questionnaire	Paper tally sheets with the AUDIT questionnaire	Paper tally sheets with the AUDIT-C questionnaire
Provision of training	None	None	Providers receive one training session in the first year and one booster session in the second year. Providers are given leaflets to be offered to patients upon receiving brief advice.	Providers receive one training session in the first year and one booster session in the second year. Providers are given leaflets to be offered to patients upon receiving brief advice.	Providers receive one intensive training session in the first year and one booster session in the second year. Providers are given leaflets to be offered to patients upon receiving brief advice.	Providers receive one training session in the first year and one booster session in the second year. Providers are given leaflets to be offered to patients upon receiving brief advice.
Provision of additional support	None	None	None	Community support offered to participating PHCCs, in the form of supportive actions and annual Community Advisory Boards (CAB) meetings.	Community support offered to participating PHCCs in the form of supportive actions and annual CAB meetings.	More intense support offered to participating PHCCs, as compared to scenario 3 and 4, in the form of supportive actions, annual CAB meetings and endorsement from public health institutions (e.g., Ministry of Health).
Data source	Hypothetical	Empirical	Empirical	Empirical	Empirical	Hypothetical

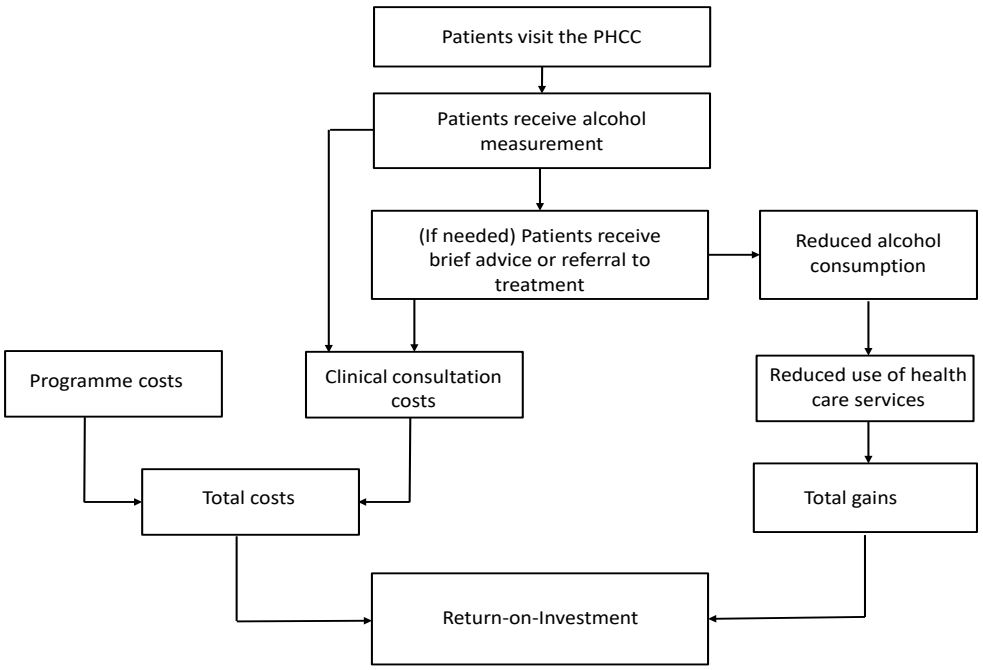
Analytic plan

The ROI analyses were performed for a retrospective timeframe of 10 years, between 2008 and 2017. A 10-year timeframe was selected, to be able to estimate the long-term health and financial effects of the intervention. A retrospective perspective was chosen because this allowed using available epidemiological and health service use data (available for Mexico, at the moment of writing, only until 2017). All input data were based on empirical data collected in the SCALA study, where applicable. In brief, the ROI analyses contrasted the cost of the economic investments for each of the four study arms and the hypothetical scenario against the financial gains from these investments (see Formula 1). The latter were calculated from health gains resulting from improved alcohol management in primary health care settings and mediated by lowered alcohol consumption among intervened patients (see Figure 5.1)

Formula 1.
ROI calculation

$$\text{ROI} = \frac{\text{Gain from investment} - \text{Cost of investment}}{\text{Cost of investment}}$$

Figure 5.1.
Parameters used to calculate the return-on-investment.



Estimating economic investments

The economic investments required for scaling up alcohol management at the national level were based on the costs incurred throughout the first five months of SCALA implementation. Research-related costs (e.g., for data collection) were not included in the estimations, as they would not be incurred in real life. Relevant cost units were identified from previous literature and based on discussions with the local research teams and/or local PHC managers. The identified cost units are described in more detail elsewhere (Solovei et al., 2022) and are included as Supporting information *(Details on estimating economic investments).* The main economic investments consist of the clinical consultation costs, i.e., direct costs that arise from delivering the intervention to a new patient, and programme costs, i.e., costs incurred outside the point of delivery of the intervention to beneficiaries (e.g., set-up and adaptation, implementation strategies). The parameters used for the estimation of the programme costs can be found Table S1 in the Supporting information. Costs were valuated by converting local currencies to 2019 International Dollars (Int$), using the purchasing power parity exchange rates (Int$1= MXN9.31) (World Bank, 2021b).

Estimating economic returns

Across the 10-year period, we estimated health gains, defined as the number of hospital nights and emergency department admissions avoided by improved alcohol management in Mexican PHC settings, through the following four steps:

(1) Obtaining rates of alcohol management for each scenario;

(2) Obtaining a time series of alcohol exposure data for the baseline scenario;

(3) For the four alternative scenarios, estimating a time series of lowered alcohol exposure dependent on improved alcohol management;

(4) Estimating the alcohol-attributable number of hospital nights and emergency department admissions for each scenario.

The data sources and a brief summary of the four steps are given below. For further information, see *Details on estimating economic returns* in Supporting information.

For (1) – we calculated three key parameters from a total of N=3,683 alcohol measurements performed by 145 health care providers in 17 PHCCs: a) alcohol measurement rate (number of adult patients having their alcohol consumption measured divided by the number of adults registered with the PHCC), b) intervention rate for patients identified as low risk (AUDIT-C score 1 to 4), medium risk (AUDIT-C score 5 to 7), or high risk (AUDIT-C score 8 to 12) drinker, with interventions assumed to have an effect on alcohol consumption for medium- and high-risk drinkers. For the fifth (hypothetical) scenario, the main parameter – the alcohol measurement rate – was set at 30% (see *Assumptions for the fifth scenario* in the Supporting information for further details) and the intervention rates were set to equal those of the best-performing study arm.

For (2) – we obtained annual per capita consumption estimates from the World Health Organization [25], in addition to prevalence estimates of lifetime abstinence, past-year abstinence, past-year drinking, and heavy episodic drinking from a modelling study (Manthey et al., 2019).

For (3) – we simulated changes in alcohol consumption dependent on the extent of improved alcohol management over the 10-year period (for a comprehensive demonstration of the methods, see Manthey, Solovei and colleagues (2021)). This simulation took into account the probability of PHC service use and the attenuation of intervention effects over time, as well as secular changes in alcohol consumption across the 10-year period. The effect sizes of interventions on daily drinking levels and engagement in heavy episodic drinking were obtained from a Cochrane meta-analysis (Kaner et al., 2018) and are detailed in the Supporting information.

For (4) – a comparative risk assessment was performed in each scenario. A comparative risk assessment is a method to determine the share of cases that could be potentially avoided if the underlying risk factor was completely eliminated – in this case expressed as alcohol-attributable fractions (AAFs). For the present analyses, the five different alcohol exposure time series (data from step (2) and (3)) resulted in five different estimates of AAFs, which were combined with the number of hospital nights and emergency department admissions (DGIS, 2021a; DGIS, 2021b) (see Supporting information for details). The difference in hospital nights and emergency department admissions between the do-nothing scenario and the four alternative scenarios, cumulated over the 10-year period, constituted the health gains, which were translated into economic returns using inflation-adjusted unit costs (World Bank, 2021a). Specifically, we multiplied the number of avoided hospital nights and emergency department admissions with the inflation-adjusted unit cost of one hospital night and one emergency department admission in Mexico, which in 2014 was MXN 6,637 and MXN 1,317 (on average), respectively (Instituto Mexicano del Seguro Social, 2021).

Lastly, the avoided number of hospital nights and emergency department admissions in each alternative scenario were calculated as the difference in the alcohol-attributable hospital nights and emergency department admissions (data from step (4)) between a do-nothing scenario and the five alternative scenarios. All these analyses were stratified by gender (male, female) and four age groups (15-34, 35-49, 50-64, 65+).

Correction for underestimating the health/economic gains

As we only had access to data on hospital nights and admissions to emergency departments, the potential gains from other health care sectors also affected by alcohol use, such as outpatient care, medication, or administration, were not included. To avoid underestimating the economic gains, we corrected for including only a portion of the affected health care sectors. For this purpose, the proportion of alcohol-attributable health care costs that are represented by hospital nights and emergency department admissions costs (i.e., ~55%) was calculated based on data from 25 studies identified in a recent review on alcohol-attributable cost-of-illness (Manthey et al., 2021). The final economic gains were then calculated by dividing the estimated economic gains from averted hospital nights and emergency visits by 0.55.

Additional/sensitivity analyses

In additional analyses, we estimated the investments required for avoiding one alcohol-attributable death. For this purpose, we repeated the analyses as described above and estimated the number of deaths, rather than the monetary gains, from averted health care service utilization as outcome (WHO, 2021c).

All analyses were performed using Microsoft Excel and R version 4.0.5 (R Core Team, 2021). The presented 95% confidence intervals (CIs) take into account the uncertainties in the data and were produced by repeating the analyses 1 million times and sampling from the space of possible data points in every iteration. For the economic investments, CIs could be assessed only for the clinical consultation costs (based on the variance in staff costs assessed empirically in SCALA), and not for the programme costs (due to lack of sufficient data variability).

Results

Economic investments

As shown in Table 5.2, the scenario with the lowest costs is scenario 1 (care as usual), whereas the scenario with the largest costs is hypothetical scenario 5, with a 30% alcohol measurement rate. Clinical consultation costs of alcohol measurement represented the largest proportion of the total costs, ranging from 84% in scenario 4 to 100% in scenario 1 (for more details on the different cost categories, see Table S2).

Table 5.2.

Economic investments estimated for five alcohol management scenarios for a 10-year period (2008 to 2017).

Scenario #	**1**	**2**	**3**	**4**	**5**
Label	Baseline (Care as usual)	Training	Training and support 1	Training and support 2	30% alcohol measurement rate
Clinical consultation costs (millions of 2019 Int$)	4.15 (2.81 to 5.48)	12.77 (7.46 to 18.09)	32.29 (23.23 to 41.33)	36.26 (22.17 to 50.39)	199.56 (117.08 to 282.06)
Programme costs (millions of 2019 Int$)	0	1.86	6.71	7.15	15.86
Total costs (millions of 2019 Int$)	4.15 (2.81 to 5.48)	14.63 (9.32 to 19.95)	39.00 (29.94 to 48.04)	43.41 (29.32 to 57.54)	215.42 (132.94 to 297.98)

Note. Annual costs are summed up for a period of 10 years and are rounded to the nearest ten thousand.

Economic returns

As illustrated in Table 5.3, one in 20 adults was estimated to have their alcohol consumption measured at least once during the 10-year period under the baseline scenario. In the best-performing empirical scenario, 4 out of 10 persons would have their alcohol consumption measured, however, without any noticeable effects on population-level alcohol consumption. Only in the hypothetical scenario, in which 30% of the target population would have their alcohol consumption measured at least once per year, would alcohol per capita consumption reduce noticeably but not significantly (see also overlapping confidence intervals in Figure S7).

Table 5.3.

Reach of alcohol management and effects on alcohol per capita consumption by end of 10-year period in the year 2017.

Scenario #	**0**	**1**	**2**	**3**	**4**	**5**
Label	Do-nothing	Baseline (Care as usual)	Training	Training and support 1	Training and support 2	30% alcohol measurement rate
Cumulative alcohol measurement rate[1]	0%	5.4% (4.9 to 6.0%)	18.1% (17.2 to 19.1%)	27.2% (26.0 to 28.2%)	41.7% (40.4 to 42.7%)	97.1% (96.7 to 97.6%)
Cumulative alcohol intervention rate[2]	0%	0.5% (0.3 to 0.6%)	4.2% (3.7 to 4.7%)	9.8% (9.1 to 10.7%)	9.7% (9.0 to 10.4%)	38.6% (37.0 to 40.2%)
Alcohol per capita consumption[3]	5.1 (4.5 to 5.7)	5.1 (4.5 to 5.7)	5.0 (4.5 to 5.7)	5.0 (4.4 to 5.7)	5.0 (4.4 to 5.7)	4.3 (3.8 to 4.8)

Notes.
[1] Proportion of target population that has their alcohol use measured at least once during the 10-year period
[2] Proportion of target population that has received a brief intervention or was referred to treatment at least once during the 10-year period
[3] Expressed in liters pure alcohol consumed per adult (15 years or older) within one year

Across the 10-year study period, a total of 174,829,522 hospital nights were registered, out of which 4,831,349 or 2.8% (CI: 1.2% to 4.4%) were estimated to be attributable to alcohol consumption in the baseline scenario. Moreover, across the 10-year study period, a total of 65,817,141 admissions to emergency departments were registered, out of which 2,135,074 or 3.2% (CI: 1.9% to 4.7%) were estimated to be attributable to alcohol consumption in the baseline scenario. The percentage of cases averted in each scenario is presented in Table S8.

The total estimated economic returns ranged from about Int$6,000,000 in the baseline scenario to about Int$452,000,000 in the hypothetical scenario 5 (see Table 5.4).

Return on investments

As shown in Table 5.4, the ROI values resulting from the implementation of alcohol measurement are positive in all scenarios, with 95% CI including zero in scenario 4 (indicating that investments could surpass the gains in this scenario) (see Figure 5.2). The ROI values range from 21% in scenario 4 (CI: -9% to 79%) to 110% in scenario 5 (CI: 52% to 240%). This means that for every invested Int$100, healthcare savings of Int$121 to Int$210 would be expected.

Table 5.4.

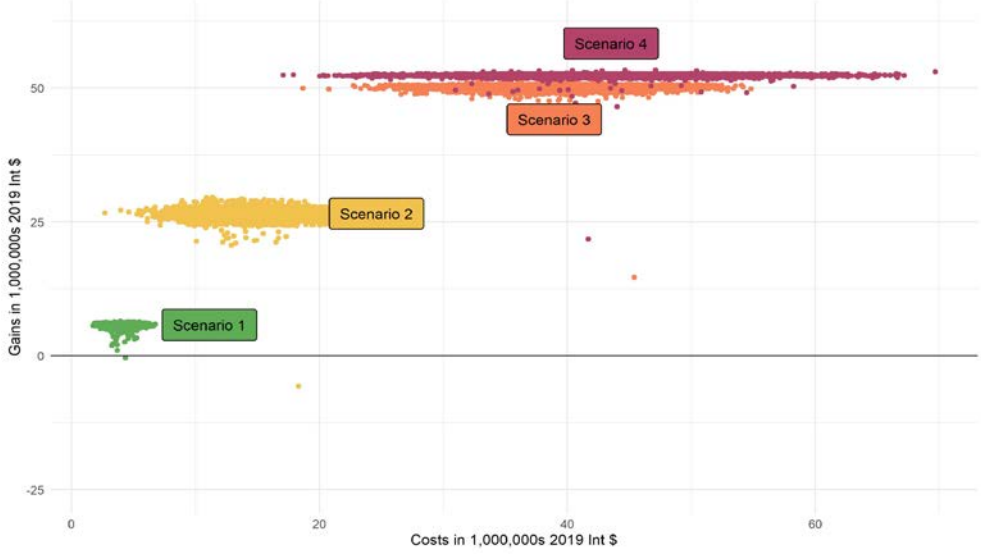
Economic investments and returns as well as return-on-investment estimated for five alcohol management scenarios for a 10-year period (2008 to 2017).

Scenario #	1	2	3	4	5
Label	Baseline (Care as usual)	Training	Training and support 1	Training and support 2	30% alcohol measurement rate
Economic investments (millions of 2019 Int $)	4.15 (2.81 to 5.48)	14.63 (9.32 to 19.95)	39.00 (29.94 to 48.04)	43.41 (29.32 to 57.54)	215.42 (132.94 to 297.98)
Economic returns (millions of 2019 Int $)	5.77 (5.39 to 6.12)	26.78 (25.11 to 27.78)	50.26 (49.32 to 50.61)	52.33 (51.96 to 52.68)	451.76 (446.28 to 456.13)
Return-on-investment (%)	39.4% (8.2% to 117.2%)	81.5% (32.4% to 185.7%)	28.6% (4.3% to 67.6%)	20.6% (-9.1% to 78.6%)	109.6% (51.5% to 239.6%)

Notes. Investments and returns are estimated from a public sector healthcare perspective, rounded to the nearest ten thousand.

Figure 5.2.

Costs and gains estimation for the four empirical scenarios, based on the applied iterations taking into account the uncertainties in the data.



Note. Hypothetical scenario 5, which incorporates substantially larger costs and gains, is not included in the figure, in order to allow a better visual comparison of the four empirical scenarios.

Additional analyses

As shown in Table 5.5, relative to scenario 0 (do nothing), in the intervention scenarios a certain amount of premature alcohol-attributable deaths could be avoided, as a result of implementing the alcohol measurement programme over a 10-year timeframe, ranging from 900 (in scenario 2) to 15,579 (in scenario 5). Based on the costs required for the intervention in each scenario, this would translate into investments ranging from approximately Int$14,000 (scenario 5) to Int$26,000 (scenario 4) per delayed death.

Table 5.5.

Number of avoided alcohol-attributable deaths by end of 10-year implementation period in the year 2017 in the four intervention scenarios

Scenario #	2	3	4	5
Label	Training	Training and support 1	Training and support 2	30% alcohol measurement rate
Number of avoided alcohol-attributable deaths	900 (869 to 943)	1,752 (1,723 to 1771)	1,653 (1,610 to 1,674)	15,579 (15,423 to 15,736)
Economic investment per avoided alcohol-attributable death	16,000 (16,000 to 17,000)	22,000 (22,000 to 23,000)	26,000 (26,000 to 27,000)	14,000 (14,000 to 14,000)

Notes. Number of avoided alcohol-attributable deaths are summed-up for a period of 10 years. Economic investments are reported in 2019 Int$, rounded to the nearest thousand.

Discussion

The current study aimed to calculate the ROI resulting from implementing an alcohol measurement programme in Mexico, assuming a scale-up at national level, in a retrospective timeframe of 10 years (from 2008 to 2017). Next to a hypothetical control 'do nothing' scenario, in which it was assumed that no alcohol measurements would be delivered, the study compared a baseline 'care as usual' and several alternative scenarios in which implementation strategies would be used. The results indicate that the health care gains resulting from the implementation of alcohol measurement in Mexico would surpass the investments, leading to positive ROI values, ranging from 21% to 110%. Of the five analysed scenarios, the most favourable ROI would be achieved in the scenario in which yearly 30% of the target population (i.e., aged 15+ years and using the public health care system) would receive alcohol measurements, which is a higher rate than the one observed in SCALA (i.e., up to 5% of the target population). Moreover, compared to care as usual, a scenario in which standard training would be delivered to providers, would result in a more positive ROI value, as compared to care as usual.

Also, the results showed that scaling up the alcohol measurement programme in Mexico would have resulted in up to 16,000 avoided alcohol-attributable deaths over the course of 10 years (scenario 5), translated into an investment ranging between Int$14,000

and Int$26,000 per delayed death. These values are substantially below the value of statistical life in Mexico (i.e., willingness to pay for reducing the statistical incidence of one premature death in a society) estimated in a recent study by De Lima at Int$210,880 (De Lima, 2020).

Strenghts and limitations

A strength of this paper is that it used empirical data as a basis for both economic investments and economic gains estimations. Costing data was acquired within a quasi-experimental trial implemented in Mexico over the course of 5 months, while the numbers of hospital nights and emergency department admissions in the analysed timeframe, used as a basis for the economic gains estimations, were acquired from publicly available data which was registered and shared by the Mexican government. By combining this empirical data with a comprehensive modelling approach, we compared the potential economic investment and economic gains of scaling up an alcohol measurement programme at national level in Mexico, over a retrospective timeframe of 10 years. This allows for a more complete illustration of potential economic effects in the health care system, resulting from the widespread adoption of a health care intervention, compared to trial-based analysis, which may be less generalizable. The modelling steps described in the current paper can be used for similar calculations in other countries, with different APC and/or hospitalization and health care use profiles.

A limitation of this study is that certain assumptions may not hold true in practice, such as the rates of delivery of the intervention by the health care providers, which remained constant over the estimated timeframe, based on the empirical data collected in the SCALA study over a five-month implementation period. Future studies can benefit from empirical data collected over a longer period of time, in order to better estimate whether the rates of delivering the intervention would tend to change or fluctuate over time. Also, the investments needed to scale up the programme nationally may differ in reality, as a result of different staff and/or programme costs than those attested in the SCALA study. In future studies, as well as in policy applications using current analyses, the investments can nevertheless be adjusted to reflect varying circumstances, for example by altering the unit costs, the cost categories, and the parameters of scaling up the costs outlined in this paper. Another limitation is that part of the economic gains could not be estimated based on empirical data, but rather on relative proportions derived from literature, which may differ in Mexico. Future studies can benefit from a more complete empirical assessment of the economic gains in the health care sector, as well as by broadening the analyses to a societal perspective.

Implications

The results of the current analyses indicate that the implementation of an alcohol measurement programme at national level in Mexico, over the course of 10 years, could have led to a positive ROI from a public sector healthcare perspective. Using implementation strategies such as training and/or community support would result in a substantial increase of the patients who receive alcohol measurement, compared to care a usual. Based on the empirical data collected in the SCALA study, our analyses showed that, compared to care

as usual, the larger investments needed for training providers to deliver the programme (using standard training) would also result in a more positive ROI. Moreover, assuming that a 30% alcohol measurement rate would be achieved and including the additional programme costs estimated to be needed for such a scale-up, the ROI is likely to become noticeably larger. Considering the health gains and avoided mortality resulting from a larger number of patients receiving alcohol measurement, scaling up this programme may therefore prove an attractive policy option in Mexico. In order to optimize the ROI, less costly implementation strategies should be considered, such as media campaigns or public endorsements by opinion leaders.

Conclusion

Scaling up the implementation of alcohol measurement in Mexico could lead to a positive ROI in Mexico from a public sector healthcare perspective, meaning that the economic gains would surpass the economic investments needed for set-up and deliver the programme. Moreover, a wider implementation of the programme, reaching an annual alcohol measurement rate of 30% of the population, could lead to about 16,000 avoided alcohol-attributable deaths over a 10-year timeframe.

Supplementary information

Supplemental methods

Details on the target population

The target population in Mexico (i.e., age 15+) was 77,075,695 in 2008 and gradually grew to 91,163,413 in 2017, with a life expectancy of approximately 75 years. The Mexican health care system has been described to be segmented into four, partially overlapping groups (Guanais et al., 2018): 1) social security, which covers workers and their families (about 63%), 2) "Seguro Popular" – a public health insurance conceived to provide health care for everyone (poor persons are exempted from paying insurance fees, about 46%), 3) private insurance (about 10%), and 4) uninsured persons (about 15%).

For the present analyses, we assumed that 80% of the Mexican population were covered by health services provided by the public sector (by subtracting from the total population those who are uninsured or own private insurance, assuming that about 5% would still use the public sector services). As the remaining 20% were either more wealthy (covered by private insurance) or less wealthy (uninsured), no adjustments with regards to socioeconomic status were assumed to be necessary.

Assumptions for the fifth scenario

For the fifth – hypothetical scenario – alcohol management parameters were set to describe an optimistic but realistic scenario. For a) the alcohol measurement rate, we assumed that up to 30% of the registered population could have their alcohol use measured within a given year. This assumption was based on higher alcohol measurement rates observed in Colombia (unpublished SCALA data), as well as other studies indicating that nearly 50% of the eligible population in primary health care settings can have their alcohol consumption measured (Muench et al., 2015). To achieve a 30% alcohol measurement rate, the several additional activities were assumed to be implemented throughout the 10-year timeframe, next to the delivery of standard training and of community support: i) the Ministry of Health, regional and municipal health departments and opinion leaders would publicly endorse the alcohol measurement programme, thereby stimulating PHCCs and providers to implement alcohol measurement routinely (Fleming, M. F., 1997); ii) in each PHCCs additional community support and coordinating activities would be implemented, for example by delivering regular performance feedback to providers regarding their alcohol measurement rates (Vendetti et al., 2017).

Details on estimating economic investments

For the economic investments module, we estimated the costs that would be needed for a 10-year implementation of the programme, scaled up at national level, based on the costs incurred throughout five-month SCALA implementation. A health care system perspective was used, i.e., the costs included in the analyses are related to the implementation of the intervention, rather than the full societal cost of the intervention. Below, the taken steps in the costs estimation are explained.

First, we identified the relevant cost units from previous literature and based on discussions with the local research teams and/or local PHC managers. The identified cost units are included in Table S1. Second, we measured the costs incurred in the SCALA programme, with data obtained from three main sources. Specifically, salary data of providers was given by PHC managers (n = 19), whereas data regarding the amount of time spent on average on an alcohol measurement session was given by participating PHC providers (n = 256). Data regarding costs of implementing the training sessions and community support activities was given by the local research team, via filled-in questionnaires.

Third, we valuated the costs by converting local currencies to International Dollars (Intl$), using the purchasing power parity (PPP) exchange rates (Intl$1= MXN9.31), to allow for easier inter-country comparison of costs (World Bank, 2021b).

Fourth, we estimated the costs for the 10-year period covering the ROI analyses. For this, the following parameters were estimated: a) amount of activities and corresponding cost units, related to the four alternative scenarios; b) number of providers to deliver the alcohol measurement sessions; c) number of PHCCs to receive community support; d) number of jurisdictional areas where CAB meetings would be organized, as follows.

The amount of activities and corresponding cost units related to the four alternative scenarios were estimated based on input from the local and international researchers involved in the SCALA project and are specified in Table S1. The number of providers that would deliver the alcohol measurement sessions and subsequent intervention was estimated from the total number of GPs and primary health care nurses working in the public health care sector in Mexico (i.e., about 1 GP and 1 nurse per 1,000 inhabitants) (Instituto Nacional de Salud Publica, 2018) multiplied by the proportion of providers assumed to participate in the programme, which was obtained from the actual participation rates of providers in the SCALA programme (i.e., 42% of the GPs and 12% of the nurses). Next, we applied the proportion of participating providers who received training, based on the proportions observed in SCALA, i.e., 67% of eligible participating providers. The number of PHCCs estimated to receive the community support activities was the total number of non-ambulant PHCCs in Mexico (DGED, 2021). The number of jurisdictional areas where CAB meetings would be organized was the total number of existing jurisdictional units Mexico, i.e., 32 states.

The total costs estimated for each of the five analysed scenario and specified per cost category can be seen in Table S2.

Table S1.

Cost categories, operationalization and estimation parameters used for scale up costs calculation.

Cost category	Operationalization	Estimation parameters for scaling up the activity at national level, for a period of 10 years
Consultation costs (time + materials)	Direct costs that arise from delivering the intervention to a new patient by the health care provider Include staff costs (salary of the health care provider delivering the intervention, i.e., GP or nurse) and material costs for an alcohol measurement session, brief advice session, referral to treatment session.	Number of delivered alcohol measurement sessions brief advice sessions, referral to treatment sessions.
Set-up and adaptation costs	Costs incurred in the time between the decision to implement the intervention and the start of its delivery. Set up include staff costs for programme coordination in each PHCC. Adaptation includes costs for two user panels (one with health care providers and one with patients) in the format of focus groups working on giving feedback and adapting the clinical package materials at national level. Costs included: user panel coordination, transportation, food and refreshments, printing materials, moderator salary, technical equipment, and materials adaptation coordination.	Set-up costs: for each participating PHCC, the costs estimation includes two hours spent coordinating the participation in the programme in the first implementation year. Adaptation costs are modelled at national level and include two User Panels (one with patient and one with providers), plus 30 hours for adapting the clinical package materials.
Standard training costs	Costs incurred for delivering the standard training to providers in scenarios 2, 3 and 5. Include staff, material, transportation, renting and food&refreshment costs.	The estimated costs include, for each health care provider: one training session in the first implementation year (15 participants per training) + one booster session each following year (15 participants per booster).
Intensive training costs (materials)	Costs incurred for delivering the intensive training to providers in scenario 4. Include staff, material, transportation, renting and food&refreshment costs.	The estimated costs include, for each participating health care provider: two training sessions in the first year (15 participants per training) + one booster session each following year (15 participants per booster session).
Community Advisory Board (CAB) costs	Costs incurred for organizing CAB meetings as part of community support. The CABs include stakeholders from the national/regional public health field and have the aim to provide feedback and support for the adoption and maintenance of the health programme. The CAB costs include: staff, material, transportation, renting and food&refreshment costs.	The estimated costs include 1 CAB meeting per year in each of Mexico's 32 jurisdictional units.
Supportive actions costs	Costs incurred for implementing supportive actions for providers, namely: providing regular performance feedback each trimester. Include staff costs by the coordinating staff in charge of preparing and delivering the supportive action.	The estimated costs include one/three hour(s) of preparation and delivery of supportive actions per trimester in each PHCC in scenario 3 and 4/ 5 (respectively). Cost of one hour of coordinating the supportive actions: Int$ 11.40

Table S2.

Economic investments per cost category estimated for five alcohol management scenarios for a 10-year period (2008 to 2017) and presented in millions of 2019 Int$.

Scenario #	**1**	**2**	**3**	**4**	**5**
Label	Baseline (Care as usual)	Training	Training and support 1	Training and support 2	30% alcohol measurement rate
Alcohol measurement sessions	2.34	8.76	13.92	23.56	135.70
Subsequent interventions (brief advice and/or referral to treatment followed by psychological consults)	1.81	4.02	18.38	12.40	63.85
Start-up and adaptation	0	0.23	0.23	0.23	0.23
Training and booster sessions	0	1.63	1.63	2.39	1.63
CAB costs	0	0	0.27	0.27	0.27
Supportive actions	0	0	4.58	4.58	13.73

Note. Costs are summed up for a period of 10 years, rounded to the nearest ten thousand.

Details on estimating economic returns

(1) Obtaining rates of alcohol management for each scenario

For each of the four empirical scenarios (baseline and three alternative), we used empirical data collected in each country to estimate rates of alcohol management in PHC settings. The data for alcohol measurement and management of positively screened cases were documented by the providers on tally sheets and were defined as follows:

- Patients having their alcohol use measured: number of completed AUDIT-C questionnaires
- Patients receiving an alcohol intervention: number of documented brief advice ("Brief advice to reduce alcohol consumption given" OR "Patient referred to other provider in practice for brief advice to reduce alcohol consumption" OR "Patient referred to other provider outside practice for brief advice to reduce alcohol consumption") or referrals ("Patient referred to specialist service for alcohol")

The alcohol measurement rate was calculated by dividing the number of patients that have their alcohol use measured by the adult population registered with the PHCCs.

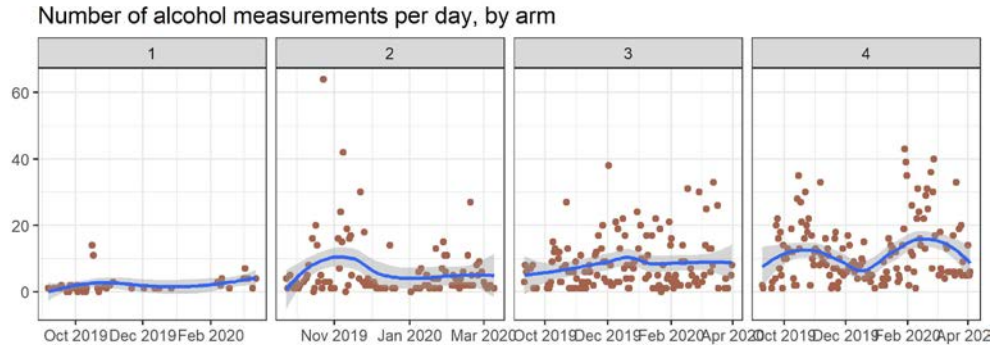
The intervention rates were defined for patients who had their alcohol consumption measured. The rates were stratified for three different groups of drinkers: a) low-risk drinkers, i.e. patients scoring 4 or less on the AUDIT-C, b) medium-risk drinkers, i.e. patients scoring 5 to 7 on the AUDIT-C, and c) high-risk drinkers, i.e. patients scoring 8+ on the AUDIT-C. For a) low-risk drinkers, interventions were not considered to be effective but were still considered in the cost calculation.

To avoid confounding with the COVID-19 pandemic, during which alcohol management was impeded, we only used the data of the implementation period leading up to the beginning of the COVID-19 pandemic. This was defined as the so-called 'National Journey of Healthy Distance', which was implemented on March 23, 2020 in Mexico. Estimates for each scenario and country were obtained by aggregating the tally data for the available time period by study arm/scenario. We further examined whether the available data from the first months of the implementation period could be extrapolated to a whole year.

As illustrated in Figure S1, there were no clear signs of an increasing trend in the daily number of alcohol measurement sessions in the observed time period. Accordingly, we extrapolated the data collected in the months leading up to the start of the COVID-19 pandemic and to a period of 365 days.

Figure S1.

Daily data on the number of patients who had their alcohol consumption measured, by arm and country.



As further illustrated in Figure S2, there were no clear signs of the intervention rates to change over time, for any of the three groups (low, middle, high risk drinkers). Based on the observed patterns, alcohol measurement rates as observed in the first months of the implementation period were extrapolated for a complete year of 365 days, taking into account the limited time period for data collection and assuming that similar alcohol management activities would have occurred in the remaining months.

To calculate alcohol measurement rates, the registered population size was employed, which was provided by the statistical division of each PHC Centre and is based on the total number of consultations provided by the centre. As the registered population corresponded to the target population, no further adjustments were required (see also *Details on the target population*).

The parameters of alcohol management are summarized for each empirical scenario in Table S3. Also included are the parameters for the hypothetical scenario 5.

Figure S2.

Daily data on the percentage of low (AUDIT-C 0 to 4), middle (5 to 7) and high (8+) risk patients who were documented to have received an intervention from their consulting PHC provider.

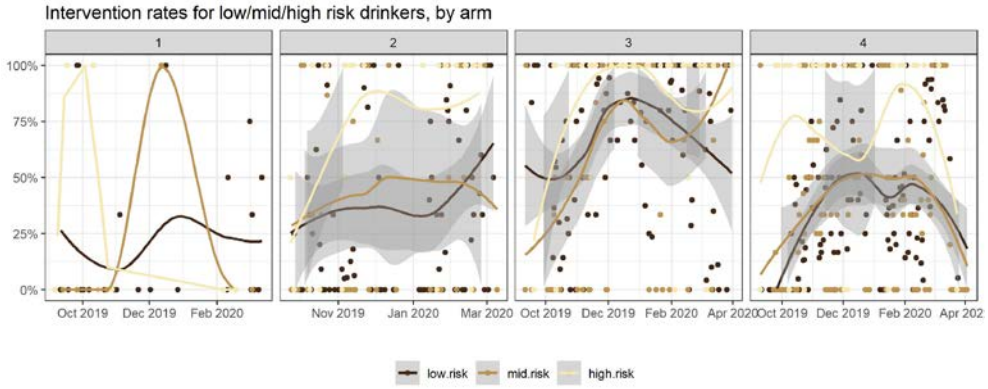


Table S3.

Parameters of alcohol management by scenario.

Scenario #	**0**	**1**	**2**	**3**	**4**	**5**
Label	Do-nothing	Baseline (Care as usual)	Training	Training and support 1	Training and support 2	30% alcohol measurement rate
Mean duration of implementation period in days	/	183	180.6	164.2	186.5	/
Registered adult population size	/	32,388	67,062	81,456	67,632	/
Number of alcohol measurement sessions [1]	/	181	1324	2545	3548	/
Alcohol measurement rate [2]	0%	0.6%	2.0%	3.1%	5.2%	30%
Intervention rate for *low risk* patients [3]	/	16.5%	38.8%	67.0%	37.2%	0%
Intervention rate for *medium risk* patients [3]	/	12.8%	52.1%	69.4%	38.2%	69.4%
Intervention rate for *high risk* patients [3]	/	30.3%	75.3%	77.3%	74.5%	77.3%

Notes.

[1] Extrapolated for 365 days of data collection

[2] Proportion of registered population, for which alcohol use was measured, extrapolated to 365 days of data collection

[3] Proportion of patients that have their alcohol consumption measured (denominator) who received alcohol brief advice or were refered to alcohol treatment (nominator), by risk status defined by AUDIT-C score: low risk = score 0 to 4; medium risk = AUDIT-C score 5 to 7; high risk = AUDIT-C score 8 or higher

We assumed that these parameters would be an accurate approximation of alcohol management in the three scenarios for the entire 10-year simulation period. In order to maintain higher rates of alcohol measurement in the alternative scenarios, booster training sessions were implemented in the second year of the intervention and community support actions were repeatedly implemented in each year, as mentioned in Table S1.

(2) Obtaining a time series of alcohol exposure data for the baseline scenario
The alcohol exposure data included estimates on annual per capita consumption of pure alcohol (APC), as well as year-, gender- and age-stratified prevalence estimates for drinking status (lifetime abstinence, former drinking, past-year drinking) and heavy episodic drinking (HED). APC data including corresponding uncertainty measures were obtained from the World Health Organization, which provide estimates derived from sales statistics corrected for unrecorded and tourist consumption (WHO, 2021a). The prevalence of drinking status and HED was obtained from a 2019 modelling study which estimated consistent data by sex and age based on survey and APC data, as well as economic indicators (Manthey et al., 2019).

(3) For the four alternative scenarios, estimating time series of lowered alcohol exposure
For the four alternative scenarios, alcohol exposure simulation model framework was consistent with one used for another study (Manthey et al., 2021) and is summarized here. For the simulation, a hypothetical set of drinkers and non-drinkers, stratified by sex and age, were sampled using the alcohol exposure data as summarized above. For each person, drinking status (lifetime abstinence, former drinking, current drinking, as well as engagement in heavy episodic drinking) was determined by sampling from binomial distributions of the respective prevalence estimates. Further, mean drinking levels were sampled from a gamma distribution, which was determined by APC data, split by sex and age (for details on the representation of drinking levels in the population, see Kehoe (Kehoe et al., 2012)). For each of the eight sex-age groups, N=1,000 persons (drinkers and non-drinkers) were sampled. In the simulation, the likelihood of a person to have their alcohol consumption measured and to receive a brief advice or referred to treatment depended not only on the respective rates presented in Table S3, but also on their probability to visit a primary health care center in the first place.

According to a 2018 survey, among the Mexican population covered by the public health care sector, between 78.7% and 84.1% report at least one visit a PHCC within one year (Guanais et al., 2018). These estimates were very similar to figures from Germany, which were used in a previous application of the simulation method (Manthey et al., 2021). Given the similarities and because a breakup of the PHC admission rates by socio-demographics and drinking levels were not available from Mexico, we calculated the population share with at least one annual PHC admission by sex, age group and risk level from a large-scale general population survey conducted in Germany in 2014/2015 (Lange et al., 2017). The data are presented in Table S4.

Table S4.

Share of the target population with at least one PHC admission in the past year.

Sex	Age group	Lifetime abstainers	Past-year abstainers	Low-risk drinkers [1]	Mid-risk drinkers [1]	High-risk drinkers [1]
Men	15-34	67.3% (4.5%)	76.1% (6.9%)	69.2% (1.6%)	69.6% (3.6%)	61.9% (10.0%)
	35-49	80.4% (4.3%)	68.1% (6.8%)	71.0% (1.4%)	73.4% (3.1%)	66.7% (8.4%)
	50-64	85.7% (3.2%)	88.9% (2.5%)	79.9% (1.2%)	78.1% (2.4%)	81.4% (6.1%)
	65+	88.0% (4.1%)	94.1% (1.9%)	89.4% (0.8%)	84.8% (2.3%)	95.4% (3.9%)
Women	15-34	76.8% (3.1%)	77.4% (4.0%)	77.2% (1.9%)	81.6% (7.5%)	61.7% (26.9%)
	35-49	78.0% (3.2%)	84.6% (3.3%)	76.3% (1.4%)	73.3% (6.4%)	85.9% (13.0%)
	50-64	85.6% (2.2%)	80.2% (3.8%)	81.7% (1.1%)	74.3% (5.5%)	100.0% (0.0%)
	65+	91.8% (1.7%)	93.1% (2.7%)	88.3% (1.2%)	80.9% (6.4%)	100.0% (0.0%)

Notes.[1] Thresholds defined via daily intake of pure alcohol consumption in grams per day (based on [13]): low-risk drinking (AUDIT-C 1 to 4): >0 bis 25.5; mid-risk drinking (AUDIT-C 1 to 4): 25.5 to 62.9; high-risk drinking (AUDIT-C 8 to 12) >62.9.

For the simulation, we converted the AUDIT-C cutoff scores separating low- from mid- from high-risk drinkers to the corresponding daily drinking levels based on a previous study (Rubinsky et al., 2013). Mid- and high-risk patients were simulated to receive a brief advice or referred to treatment based on the rates summarized in Table S3. The effect size of both the brief advice and of being referred to a specialist was assumed to be similar. Sex-specific effect sizes were taken from a Cochrane meta-analysis (Kaner et al., 2018) and transformed to proportional reductions, assuming these to be less prone to be biased by self-reported alcohol consumption levels. The effect sizes for delivery of the interventions were:

(a) daily drinking levels: women: -15.8% (-31.1 to -1.1%); men: -12.0%, -18.6 to -5.7%

(b) risk reduction (risk difference) of HED: -7%, -12% to -2%

Over a sequence of 10 years, changes in alcohol exposure (APC, prevalence of drinking status) were accounted for in the simulation. Repeating the simulation for 100 times and sampling the input data from the indicated uncertainty intervals around the input parameters (APC, drinking status, effect sizes, PHC admission probabilities) allowed to consider the uncertainty around all input estimates in the final estimates.

(4) Estimating the alcohol-attributable number of hospital nights, admissions to emergency departments and deaths for each scenario

For this step, we obtained the number of hospital nights, admissions to emergency departments and deaths, stratified by year, sex, age and disease group from the public health care sector (DGIS, 2021). As disease grouping, we used the same definitions employed in previous comparative risk assessments (Shield et al., 2020; WHO, 2019). In total, 21 disease groups were considered for the present analyses as summarized in Table S5.

For the hospital and emergency department databases, corrections for the two injury codes were required. In these databases, injuries are primarily coded with codes from chapter XIX, i.e., specifying the body part affected but not the external cause, which are coded with codes from chapter XX (for details on the different chapters, see Table S6). In the hospital data, codes from both chapter XIX and chapter XX were available for a small subset of cases. We assumed that for most other injury cases coded with chapter XIX codes, there were external causes but the data, i.e. chapter XX codes, were not available. This assumption was justified by comparing the share of injury cases in the morbidity and mortality data sets (see Table S6), which amounted to 11% to 13% in all three sources but were restricted to chapter XIX in the morbidity data and to chapter XX in the mortality data. In order to include the injury cases of the morbidity databases in our calculations, we estimated the external causes, i.e., the share of motor vehicle accidents and other unintentional/intentional based on the subset of hospital cases with available data.

Table S5.

Health conditions included in comparative risk assessment.

#	Group	Disease	ICD codes
1a	Fully alcohol-attributable diseases	Alcohol use disorders, poisonings and alcoholic Cardiomyopathy	F10, G72.1, Q86.0, I42.6, X45, T51
2a	Cancer	Lip and oral cavity	C00-C08
2b	Cancer	other pharyngeal cancers	C09-C10, C12-C14
2c	Cancer	Esophagus	C15
2d	Cancer	Colorectal	C18 – C21
2e	Cancer	Liver	C22
2f	Cancer	Larynx	C32
2g	Cancer	Breast	C50
3a	Cardiovascular diseases	Hypertension	I10-I15
3b	Cardiovascular diseases	Ischemic Heart Diseases	I20-I25
3c	Cardiovascular diseases	Haemorrhagic stroke	I60-I62.9, I67.0-I67.1, I69.0-I69.298
3d	Cardiovascular diseases	Ischaemic stroke	G45-G46.8, I63-I63.9, I65-I66.9, I67.2-I67.848, I69.3-I69.4
4a	Digestive diseases	Liver disease	K70, K74
4b	Digestive diseases	Pancreatitis	K85, K86
5a	Infectious diseases	Tuberculosis	A15-A19, B90
5b	Infectious diseases	HIV	B20-B24
6a	Injuries	Motor vehicle collisions	V01-V04, V06, V09-V80, V87, V89, V99[1]
6b	Injuries	Other injuries (unintentional and intentional)	Rest of V, W00-W19, W20–38, W39, W40–43, W44, W45, W46, W49–52, W53–64, W65-W74, W75, W76, W77–99, X00-X19, X20–29, X40, X43, X46–48, X49, X50–59, X60–X84, X85–Y09, Y40–86, Y870, Y871, Y88, Y89
7a	Other	Diabetes	E10-E14 (minus E10.2-E10.29, E11.2-E11.29, E12.2, E13.2-E13.29, E14.2)
7b	Other	Epilepsy	G40-G41
7c	Other	Lower respiratory diseases	J09-J22, P23, U04

Notes.

[1] Three digit ICD-10 codes include: V01.1-9, V02.1-9, V03.1-9, V04.1-9, V06.1-9, V09.2, V09.3, V10.3-9, V11.3-9, V12.3-9, V13.3-9, V14.3-9, V15.4-9, V16.4-9, V17.4-9, V18.4-9, V19.4-9, V20.3-9, V21.3-9, V22.3-9, V23.3-9, V24.3-9, V25.3-9, V26.3-9, V27.3-9, V28.3-9, V29.4-9, V30.4-9, V31.4-9, V32.4-9, V33.4-9, V34.4-9, V35.4-9, V36.4-9, V37.4-9, V38.4-9, V39.4-9, V40.4-9, V41.4-9, V42.4- 9, V43.4-9, V44.4-9, V45.4-9, V46.4-9, V47.4-9, V48.4-9, V49.4-9, V50.4-9, V51.4-9, V52.4-9, V53.4-9, V54.4-9, V55.4-9, V56.4-9, V57.4-9, V58.4-9, V59.4-9, V60.4-9, V61.4-9, V62.4-9, V63.4-9, V64.4-9, V65.4-9, V66.4-9, V67.4-9, V68.4-9, V69.4-9, V70.4-9, V71.4-9, V72.4-9, V73.4-9, V74.4-9, V75.4-9, V76.4-9, V77.4-9, V78.4-9, V79.4-9, V80.3-5, V81.1, V82.1, V82.8-9, V83.0-3, V84.0-3, V85.0-3, V86.0-3, V87.0-9, V89.2-3, V89.9, V99

[2] All other ICD10 codes beginning with V.

Table S6.

Proportion of health outcomes in each ICD-10 chapter.

Chapter	Description	Hospital nights	Emergency department visits	Deaths
I	Certain infectious and parasitic diseases	2.2%	4.5%	2.6%
II	Neoplasms	8.2%	0.8%	13.6%
III	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.8%	0.4%	0.7%
IV	Endocrine, nutritional and metabolic diseases	6.2%	3.6%	18.1%
V	Mental and behavioural disorders	5.9%	1.8%	0.8%
VI	Diseases of the nervous system	1.7%	1.2%	1.6%
VII	Diseases of the eye and adnexa	0.3%	0.4%	0.0%
VIII	Diseases of the ear and mastoid process	0.1%	0.7%	0.0%
IX	Diseases of the circulatory system	9.4%	3.9%	26.0%
X	Diseases of the respiratory system	5.1%	7.0%	8.5%
XI	Diseases of the digestive system	14.1%	28.7%	10.1%
XII	Diseases of the skin and subcutaneous tissue	1.6%	1.4%	0.4%
XIII	Diseases of the musculoskeletal system and connective tissue	2.7%	3.1%	0.8%
XIV	Diseases of the genitourinary system	8.6%	7.0%	3.4%
XV	Pregnancy, childbirth and the puerperium	19.5%	14.7%	0.2%
XVI	Certain conditions originating in the perinatal period	0.0%	0.1%	0.0%
XVII	Congenital malformations, deformations and chromosomal abnormalities	0.3%	0.1%	0.3%
XVIII	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1.7%	7.2%	1.7%
XIX	Injury, poisoning and certain other consequences of external causes	11.0%	13.6%	0%
XX	External causes of morbidity and mortality	0.3%	0%	11.2%

Notes. No cases falling into chapters XXI and XXII were registered in the data.

Specifically, we used this subset of hospital cases with available data of both chapter XIX and XX injury codes to calculate the probability that any chapter XIX injury code (stratified by a) one or multiple body parts (S00 to T14), b) and other injuries (T15 to T98, except for T51) were due to either motor vehicle accidents (condition #6a, see chapter XX codes definition in Table S5) or due to any other injury (condition #6b, see chapter XX codes definition in Table S5). Based on these sex- and age-stratified probabilities obtained from the subsample, we estimated the share of injury cases that were caused by motor vehicle accidents or other unintentional/intentional injuries for the entire hospital as well as for the emergency dataset. The probabilities are given in Table S7 and demonstrate decreasing probabilities of motor vehicle accident involvement with increasing age and higher probabilities of motor vehicle accident involvement for injuries involving one or multiply body parts as compared to injuries involving burns or poisonings.

Table S7.

Proportion of injury cases (ICD 10 chapter XIX) with external cause.

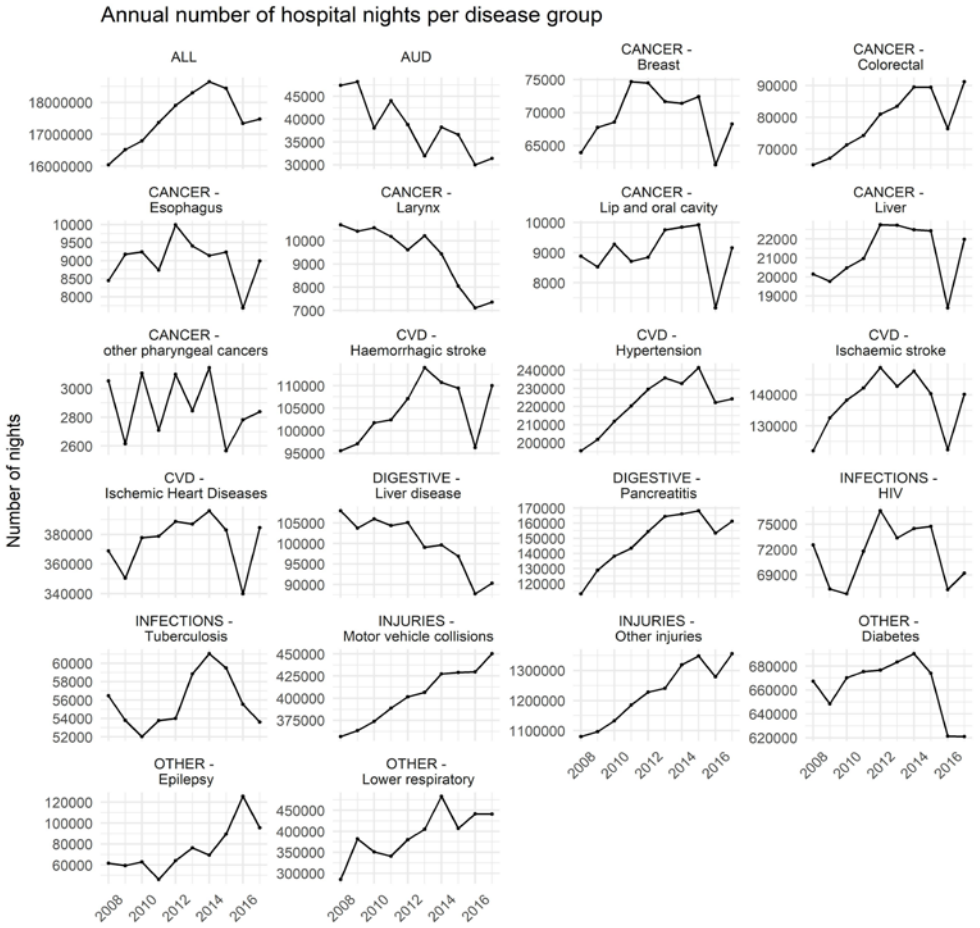
Sex	Age	ICD 10 chapter XIX code range	Motor vehicle accident	Other unintentional injuries and intentional injuries
Women	15-34	S00 to T14	44.3%	42.5%
	35-49	S00 to T14	31.1%	52.3%
	50-64	S00 to T14	18.2%	60.5%
	65-99	S00 to T14	5.2%	69.6%
Men	15-34	S00 to T14	35.1%	53.7%
	35-49	S00 to T14	24.0%	61.6%
	50-64	S00 to T14	18.8%	65.7%
	65-99	S00 to T14	11.5%	68.0%
Women	15-34	T15 to T98	2.1%	68.8%
	35-49	T15 to T98	1.3%	56.8%
	50-64	T15 to T98	0.7%	47.3%
	65-99	T15 to T98	0.4%	47.0%
Men	15-34	T15 to T98	3.5%	70.3%
	35-49	T15 to T98	3.3%	66.0%
	50-64	T15 to T98	1.3%	56.8%
	65-99	T15 to T98	1.0%	50.8%

Note. No cases falling into chapters XXI and XXII were registered in the data.

In Figures S3 to S5, the trajectory of the cases for all three health outcomes of interest are displayed.

Figure S3.

Trajectory of registered hospital nights in Mexico for the study period, for all-cause admissions ("ALL") and for disease groups impacted by alcohol consumption.

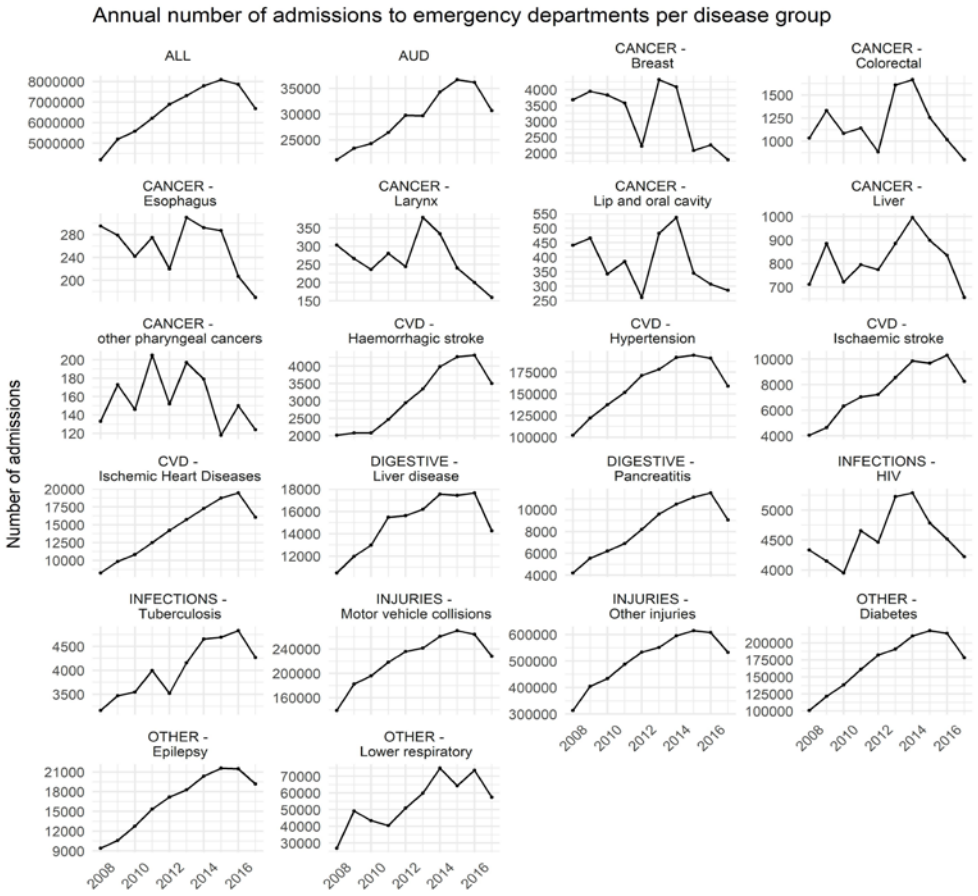


Over the 10-year period and for the Mexican adult population covered by the public health care sector, a total of 174,829,522 hospital nights were recorded. In disease groups for which alcohol is a contributing factor, 42,125,443 hospital nights were recorded. For most disease groups, an increase of hospitalisations could be observed, except for infectious diseases and liver diseases. For the latter, considerable declines could be observed between 2008 and 2017.

Notably, 60% of all hospital nights were recorded among women (105,032,499 hospital nights). In disease groups that were affected by alcohol consumption, the contribution of women was lower (42% or 17,803,695 hospital nights). Among the four age groups of interest, the largest share of hospital nights were recorded among 15 to 34 year olds (34%), followed by 65 year olds or older (26%) and similar proportions recorded among 35 to 49 year olds (20%) and 50 to 64 year olds (21%).

Figure S4.

Trajectory of registered Emergency Department admissions in Mexico for the study period, for all-cause admissions ("ALL") and for disease groups impacted by alcohol consumption.

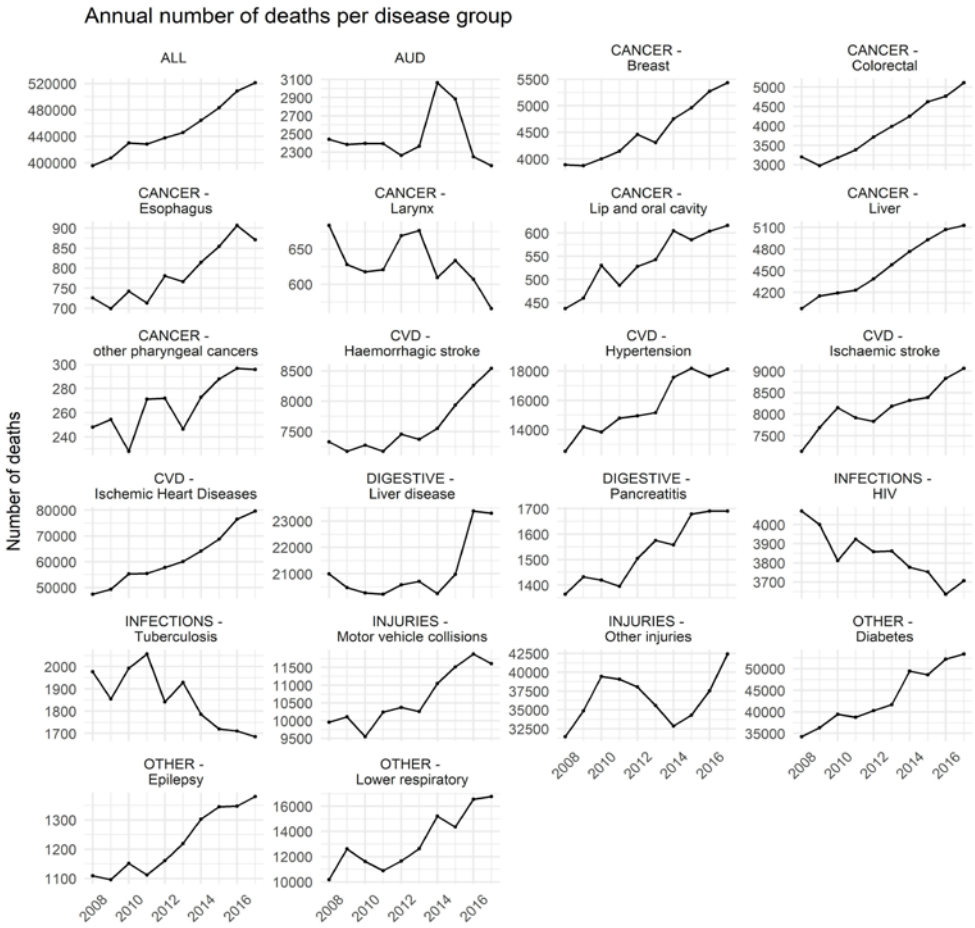


Over the 10-year period and for the Mexican adult population covered by the public health care sector, a total of 65,817,141 emergency department admissions were recorded. In disease groups for which alcohol is a contributing factor, 12,251,815 emergency department admissions were recorded. For many disease groups, an increase of emergency department admissions could be observed, with less clear trends for cancer related admissions. In contrast to declining hospital nights for liver diseases, emergency department admissions for liver diseases increased between 2008 and 2017.

Notably, 72% of all emergency department admissions were recorded among women (47,621,162 admissions). In disease groups that were affected by alcohol consumption, the share of women dropped to 47% (5,760,151 admissions). Among the four age groups of interest, the by far largest share of emergency department admissions were recorded among 15 to 34 year olds (60%), followed by 35 to 49 year olds (19%), 50 to 64 year olds (11%), and 65 year olds or older (10%).

Figure S5.

Trajectory of registered deaths in Mexico for the study period, for all-cause admissions ("ALL") and for disease groups impacted by alcohol consumption.



Over the 10-year period and for the Mexican adult population covered by the public health care sector, a total of 4,522,195 deaths were recorded. In disease groups for which alcohol is a contributing factor, 2,438,914 deaths were recorded. For most disease groups, an increase of deaths could be observed. Parallel to trends in hospital nights, deaths for infectious diseases decreased between 2008 and 2017. Larynx cancer was the only other cause of death examined to have decreased. Deaths from liver diseases rose sharply in 2016.

Out of all deaths, 44% were recorded among women (1,997,896 deaths). In disease groups that were affected by alcohol consumption, the share of women was slightly lower (39% or 972,534 deaths). Among the four age groups of interest, the by far largest share of deaths were recorded among the oldest group (65 year olds or older: 59%). With younger age, less deaths were recorded (15 to 34 year olds: 9%; 35 to 49 year olds: 11%; 50 to 64 year olds: 20%).

Using the alcohol exposure data for each of the five scenarios (see Step (3)), a comparative risk assessment was performed in order to estimate the share of hospital cases caused by alcohol consumption. For fully alcohol-attributable conditions (1a in Table S5), we relied on a method working with absolute case numbers (Churchill, Samuel et al., 2020). For all other conditions that are partially caused by alcohol consumption, we relied on risk functions derived from meta-analyses that are summarized elsewhere (see appendix of Shield et al. (2020)).

Supplemental Results

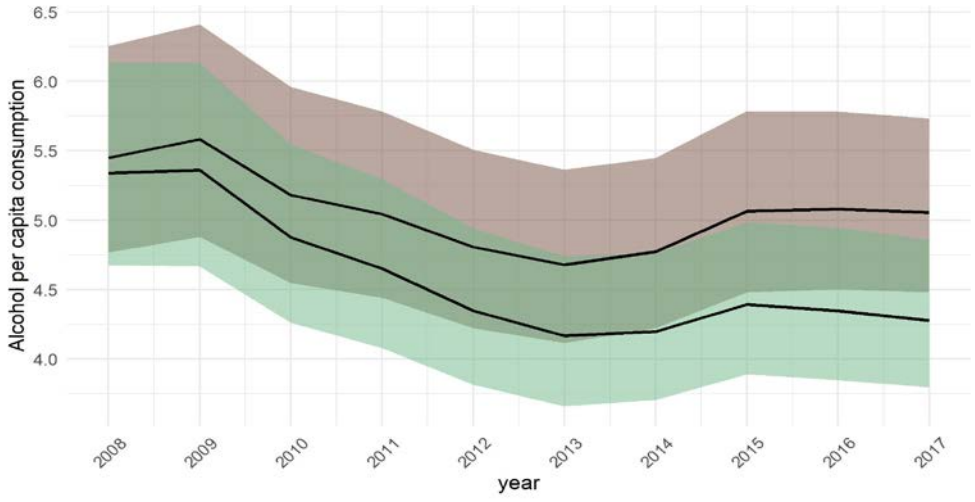
Impact of improved alcohol management on alcohol consumption

As illustrated in Figure S6, alcohol per capita consumption in the baseline scenario was relatively stable during the study period and averaged at just over 5 litres per adult per year. This is lower than the global average of 6.5 litres in 2017 (Manthey et al., 2019). Figure S6 also illustrates that the impact from improved alcohol management on per capita consumption accumulate over time as patients with risky drinking patterns are repeatedly supported to reduce their drinking or maintain lower drinking levels by their consulting health care providers.

The impact of improved alcohol management in primary health care settings can be observed in Figure S7, which displays the alcohol per capita consumption levels at the end of the 10-year period for the four intervention scenarios as compared to the baseline scenario. The simulation models suggest that non-significant reductions of 0.4%, 1.2%, 1.6% would have been achieved if the SCALA arms 2, 3, and 4 were scaled up, respectively. Only in the hypothetical scenario 5, at an annual measurement rate of 30%, alcohol per capita consumption would be 15.4% below the levels observed in 2017.

Figure S6.

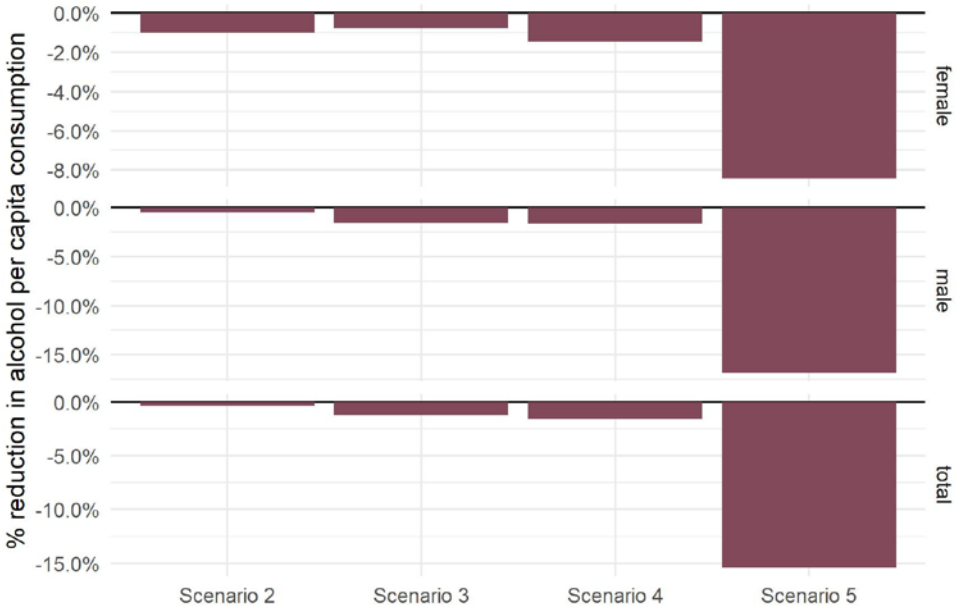
Trajectory of alcohol consumption (expressed in litres pure alcohol per adult per year) in the baseline/care-as-usual scenario and in the hypothetical scenario.



Notes. Baseline/care-as-usual scenario (#1) is shown with the upper line (brown shade = 95% confidence interval); the hypothetical scenario (#5) is shown with the lower line (green shade = 95% confidence interval).

Figure S7.

Proportional reduction of alcohol per capita consumption in the three empirical (#2-4) and one hypothetical (#5) intervention scenario, relative to the baseline/care-as-usual scenario (#1), for the year 2017.



Impact on morbidity and mortality

In Table S8, the avoided percentage of alcohol-attributable hospital nights, emergency department visits and avoided alcohol-attributable deaths are reported for each of the five interventions scenario (in comparison to the do-nothing scenario #0).

Impact on morbidity and mortality by disease group

Over the course of the 10-year period, a total of 4,830,932 hospital nights, 2,134,447 admissions to emergency departments and 237,682 deaths were attributable to alcohol consumption in the baseline/care as usual scenario. The distribution of alcohol-attributable health outcomes by disease group is illustrated in Figure S8. Net protective effects of alcohol for cardiovascular diseases and diabetes were present for mortality but not morbidity outcomes, due to differences in the distribution of cases.

Table S8.

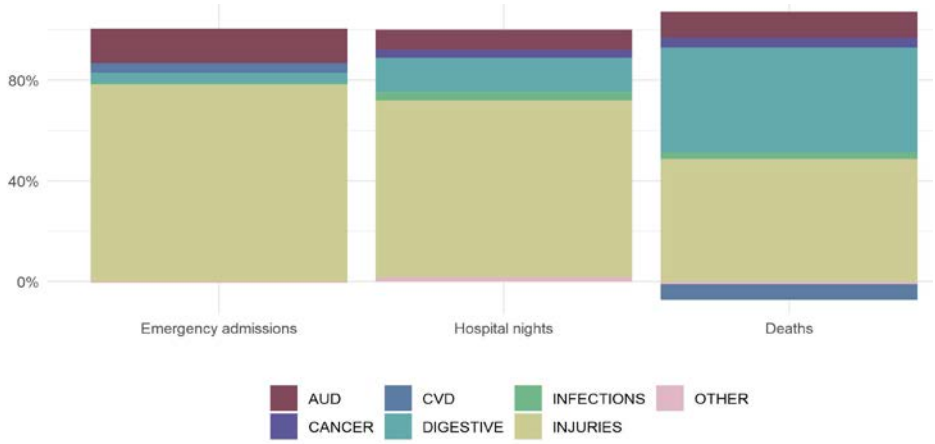
Relative difference in the number of alcohol-attributable health outcomes that could have been avoided in the five intervention scenarios, relative to the do-nothing scenario

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Hospital nights	-0.1% (-0.1% to -0.1%)	-0.4% (-0.4% to -0.3%)	-0.6% (-0.6% to -0.6%)	-0.7% (-0.7% to -0.6%)	-5.6% (-5.8% to -5.5%)
Emergency department admissions	-0.1% (-0.1% to -0.1%)	-0.3% (-0.3% to -0.3%)	-0.6% (-0.7% to -0.6%)	-0.7% (-0.7% to -0.7%)	-6% (-6.2% to -5.8%)
Deaths	0.1% (0.1% to 0.1%)	-0.4% (-0.4% to -0.4%)	-0.7% (-0.8% to -0.7%)	-0.7% (-0.7% to -0.7%)	-6.5% (-6.7% to -6.3%s)

Note. Reported is the relative difference between the scenario as indicated in the column head and the do-nothing scenario (#0). Figures in brackets indicate 95% confidence intervals (CI). Negative numbers indicate a lower number of alcohol-attributable health outcomes in the intervention scenario as compared to the do-nothing scenario.

Figure S8.

Distribution of all hospital nights and deaths caused by alcohol consumption during the 10-year study period by disease group (CVD = cardiovascular diseases).



In Figure S9, the cause-specific distribution of averted alcohol-attributable hospital nights, admissions to emergency departments, as well as deaths is presented. For this graph, the difference in alcohol-attributable cases between the respective scenario and the do-nothing scenario (#0) was calculated, stratified by disease group. Presented is the % contribution of each disease group to the total number of cases that were different between the do-nothing scenario and the alternative scenarios. Averted hospital/emergency department stays or delayed deaths are included as positive outcome (between 0 and 100%) while additional CVD/ Diabetes cases, resulting from a reduction of the protective effects of alcohol, are included as

negative outcomes (less than 0%). Scenario 1 – the baseline/care-as-usual scenario - was not included in this graph because it hardly differed from the do-nothing scenario.

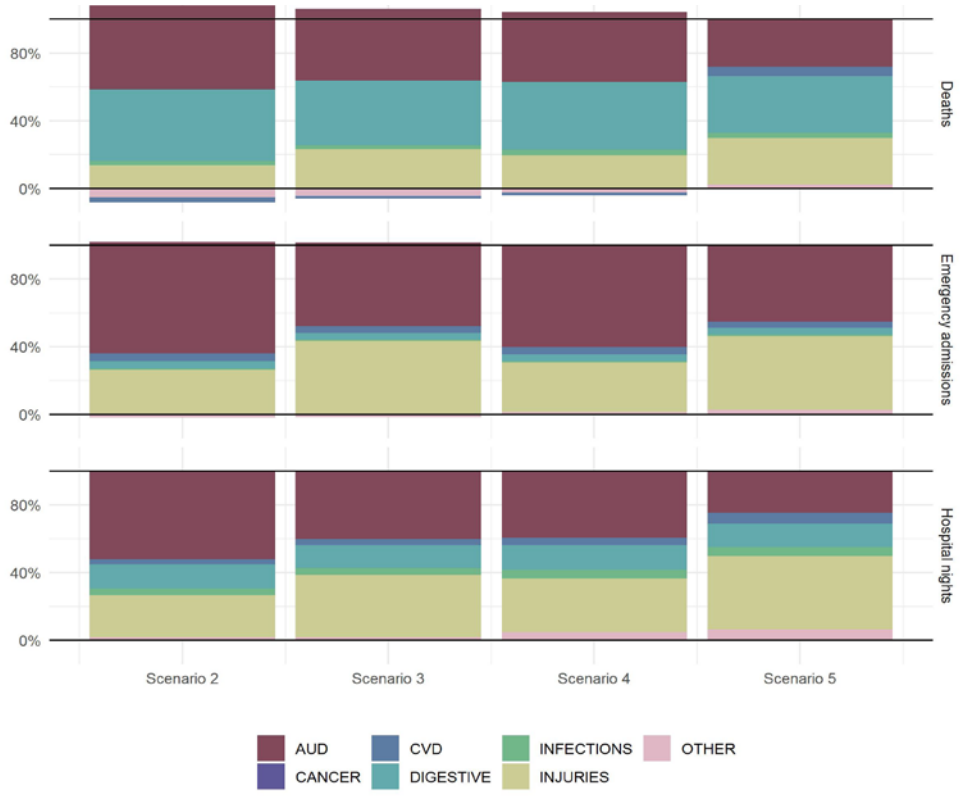
The figure illustrates that injuries, diseases of the digestive tract (mainly liver cirrhosis), and fully alcohol-attributable diseases have the largest potential in being averted/delayed by improved alcohol management in primary health care settings. As the share of cases due to liver cirrhosis is generally smaller in populations admitted to hospitals and emergency departments as compared to the deceased population (see Figure S9), injuries and fully alcohol-attributable diseases contribute more to the avoidable morbidity cases.

Moreover, the figure shows that, with increased alcohol management, the contribution of fully alcohol-attributable cases to the total number of averted cases declines. In other words, our results indicate that with higher alcohol measurement rates, diseases other than those affecting very high drinkers, could be prevented.

Lastly, the additional CVD and diabetes cases that would be expected based on the reduction of alcohol use would be more than offset by reductions in other disease groups. This effect is even more pronounced with higher levels of alcohol measurement activities.

Figure S9.

Distribution of all alcohol-attributable hospital nights and deaths that could have been avoided during the 10-year study period if alcohol management was improved.



Note. Presented is the difference between the respective scenario and the do-nothing scenario.

CHAPTER 6

General discussion, conclusion, and implications

This dissertation had five main aims, concentrating on the topic of scaling up the implementation of alcohol measurement and brief advice in Latin America. The first three aims were to present the 1) development, 2) effect and 3) mechanisms of effect of community support used as a strategy to increase the adoption and implementation of alcohol measurement and brief advice. The last two aims were to assess the 4) costs and 5) economic returns of implementing and upscaling alcohol measurement and brief advice at a country level. The studies described in this dissertation were part of the SCALA project - an international study investigating various strategies to improve alcohol management in Colombia, Mexico and Peru. In this chapter, the main results are presented and discussed in the context of previous literature, along with implications for future research – this is done separately for the first three research aims (focusing on the SCALA community support) and for the last two research aims (focusing on the SCALA economic evaluation). Finally, methodological considerations, implications for practice, and concluding remarks are presented.

Community support activities: what were the similarities and differences between the three countries?

In **chapter 2**, we described an evidence-based package of community support activities aiming to stimulate the implementation of alcohol measurement and brief advice in primary health care settings. The community support activities were based on the *Institute for Healthcare Improvement (IHI) framework for going to scale* (Barker et al., 2015) and planned in close collaboration with local stakeholders from Colombia, Mexico, and Peru. As a result, five types of community support activities were planned, namely: 1) community advisory boards; 2) project champions; 3) adoption mechanisms; 4) support systems; 5) communication campaigns. Below we summarize the key characteristics of these activities, followed by the main similarities and differences found between the three countries. It should be noted that, as explained in chapter 3, these activities could not be fully implemented in our study, because of the COVID-19 pandemic which brought the implementation of the SCALA programme to a halt.

Community Advisory Boards

One community advisory board (CAB) was formed per country, each including 10-12 members. The CAB componence was comparable in the three countries and was formed of experts in public health, members of the academia, communication professionals and journalists, and representatives of municipal or governmental institutions. Several similarities were noted between the three countries. Firstly, the process of recruiting CAB members was aided by making use of the professional networks of the local researchers and by clearly explaining the potential benefits of the project for the local communities. Secondly, the CABs were actively involved in tailoring clinical package materials and community support activities, based on the local needs and contexts. Thirdly, in all three countries, the functioning of the CABs was bolstered by maintaining regular communication with its members and providing updates regarding the project in between formal meetings.

Some differences were found as well. Firstly, CAB meetings in full componence

were preferred in Colombia, whereas in Mexico and Peru full meetings were alternated with thematic subgroups. Secondly, the CAB in Colombia gave the most attention to developing support strategies for maintaining the programme; in Mexico – to the provision of feedback for optimal dissemination; and in Peru - to embedding the programme within existing community networks. Thirdly, in Mexico, several health care providers took part in a CAB meeting to discuss perceived barriers and facilitators; in Colombia and Peru, on the other hand, health care providers did not participate directly in the CABs.

Project champions

In each of the three countries, one or two persons were involved as project champions who would advocate and/or facilitate the implementation of the programme. A first similarity was that all project champions were selected by the local researchers and held functions in the public health field. Moreover, the roles of the project champions were defined similarly, namely to i) motivate the health care providers and/or managers to get 'on-board' with the programme and maintain its implementation, and ii) offer advice regarding the optimal development and adaptation of the programme based on the local contexts.

A first difference lay in the directness of communication between the project champions and the health care providers: the project champion in Colombia was relatively more 'hands-on' involved in the project, participating directly and more frequently in the communication with the health care providers; in Mexico and Peru, on the other hand, the project champions served primarily as links between public authorities and the primary health care centres' managers. Secondly, in Colombia, the main focus of the project champion was to motivate all potentially participating primary health care centres to adopt the alcohol measurement programme, in Mexico – to motivate those primary health centres that were less willing to adopt the programme after the set-up phase, and in Peru – to advise on the general development, tailoring and dissemination the programme.

Adoption mechanisms

The five main adoption mechanisms planned in the three countries were i) to communicate the simplicity of the programme and its benefits to patients; ii) to communicate the large gap between the number of patients who need advice regarding their alcohol use and the number of patients who receive it; iii) to involve local stakeholders in promoting the programme; iv) to use examples of other providers who are successful at delivering the programme; and v) to identify organizational barriers and ways to overcome them. Similarities were noticed, firstly, in the planned timing: in all three countries, the adoption mechanisms were planned to be carried out in the first two-three implementation months. Secondly, the involvement and endorsement of local stakeholders, particularly public health authorities, were deemed essential for the successful adoption of the programme. And thirdly, the turnover of personnel was found to be an important barrier to the adoption of the programme.

A first difference was that, in Peru, primary health care managers were generally less predisposed to adopt the project, compared to Colombia and Mexico, given that alcohol prevention had not been included in the Peruvian primary health care guidelines by the

start of the SCALA project. Secondly, in Peru, more health care providers declined to adopt the intervention, even after their employing institution agreed to participate (as compared to Colombia and Mexico). Thirdly, in Mexico, health care providers preferred that the communication about the project was organized through the liaisons at each primary health care centre; in Colombia and Peru, on the other hand, direct communication was preferred.

Support systems

The five main support systems planned in the three countries were i) tailoring and adapting the training offered to providers, if needed; ii) tailoring and adapting the clinical package materials used in the alcohol measurement sessions if needed; iii) offering regular performance feedback to providers regarding their delivery of alcohol measurement and brief advice; iv) offering to providers the opportunity to exchange ideas and experiences regarding the alcohol measurement programme, and v) discussing sustainability plans regarding the alcohol measurement programme.

A first similarity was that in all three countries the support systems were planned to be implemented in a more dispersed, rather than concentrated, manner throughout the 18-month implementation period. Secondly, in all three countries, the clinical package materials were shortened and simplified, in order to reduce the time needed to deliver the intervention to each patient. Thirdly, regular performance feedback was deemed essential for the successful implementation of the programme.

Concerning the differences, we found that, firstly, the tailoring of the training consisted in Colombia of additional short videos explaining the clinical package materials, in Mexico - of supportive paper-based materials, along with additional face-to-face training on an as-needed basis; and in Peru – of an online version of the training. Secondly, in Peru, community workers outside of the participating primary health care centres were trained, next to the participating health care providers, whereas in Colombia and Mexico no outside community workers were involved. Thirdly, the frequency of performance feedback differed, being given monthly in Peru, every two months in Colombia, and every three months in Mexico.

Communication campaign

The planned communication campaign in all three countries included six main components, namely: i) posters, ii) leaflets, iii) radio and/or tv information spots, iv) public meetings, v) media appearances, vi) online communication via e.g., emails. A first similarity was that the main areas selected for displaying the communication campaign materials were the primary health care centres, given their high reachability for the main target groups (i.e., health care providers and patients). Moreover, in all three countries, other public areas were selected to display the materials, namely markets, bus stops and pharmacies. Also, the slogans of the campaigns were similar, emphasizing the conversational aspect of the alcohol measurement programme: in Peru and Mexico, the slogan was ‘Hablemos de alcohol’ (in English: ‘Let’s talk about alcohol’) and in Colombia ‘Preguntame sobre tu consume de alcohol’ (in English ‘Ask me about your alcohol consumption’).

A first difference was that, in Peru, three target groups for the campaign were identified, namely tuberculosis patients, victims of domestic violence, and persons at risk

of sexually transmitted diseases. Secondly, the dominant message framing in each country varied. In Colombia, gain frames were used more frequently, i.e., accentuating the benefits of drinking less. In Peru, on the other hand, loss frames were prevalent, i.e., accentuating the risks associated with alcohol. In Mexico, a combination of these two frames was used. Thirdly, in Peru, the municipal public health authorities participated and provided resources for the dissemination of the campaign, which resulted in a longer and more iterative process of developing the campaign materials, compared to Mexico and Colombia.

In conclusion, chapter 2 showed that various community support activities can be planned to stimulate the adoption and maintenance of alcohol measurement and brief advice in health care settings. In the planning of such community support, it is important to involve and take into account the perspectives and needs of local stakeholders.

Additionally, the results showed differences between the three countries. Factors explaining these differences included, among others, how much the country was already familiar with addressing the topic of alcohol consumption in primary health care, the existing alcohol prevention strategies at the community level, the organizational and dissemination systems in place, the local policies regarding alcohol prevention, the cultural norms regarding alcohol use, and the preferences in terms of styles of (technology assisted) communication.

What were the effects of the planned community support activities?

In **chapter 3**, we analysed the effect of a part of the planned community support activities described in chapter 2 on the delivery of alcohol measurement by health care providers. We found a direct, albeit small, effect of community support on the delivery of alcohol measurement which was consistent in terms of direction and significance in the three countries. To the best of our knowledge, our study was the first to explore the effect of a wide, multi-component package of community support on health care providers in the context of an alcohol measurement programme.

In terms of the mechanisms of effect of community support, we found that those health care providers working in the municipalities where community support was offered had a higher self-efficacy to deliver alcohol measurement to their patients. In other words, by receiving community support, health care providers increased their positive beliefs regarding their capability to deliver the intervention. Furthermore, the impact of community support on self-efficacy was mediated through awareness of support, meaning that in order for community support to impact health care providers' self-efficacy, it is necessary that providers first become aware of the community support. Contrary to our expectations, we did not find effects of community support on providers' attitudes, nor on their subjective norms, regarding the delivery of alcohol measurement to their patients. We could not test for potential differences per country because of the statistical underpower of the study for such analyses, given that the data collection could not be finalized during the COVID-19 pandemic, as explained in chapter 3.

In conclusion, chapter 3 showed that community support can be beneficial for increasing the number of patients who receive alcohol measurement in primary health care. Community support can also make health care providers more confident to deliver alcohol measurement to their patients, but only if they first become aware of the community support.

Community support: reflections and implications for future research

Planned community support

The community support activities that were planned in our study and are described in chapter 2 built upon key theories of change in health promotion, such as Havelock's 'linkage' approach (Havelock, 1979) or Rogers' Diffusion of Innovations (Rogers, 1995). These theories highlight the importance of involving stakeholders in the development of (health) programmes, particularly when these programmes are deployed to new contexts. Thereby it is expected that the commitment of stakeholders towards the new programmes is enhanced, which subsequently contributes to their successful adoption and implementation, as also shown in previous empirical research (Morin & Audebrand, 2003; Vendetti et al., 2017). For future research, we recommend the involvement of CABs and project champion(s) at early stages of developing alcohol measurement and brief advice (research) programmes, particularly when the aim is to scale it up at municipal, regional, or national level. Such involvement can play a pivotal role in ensuring a more sustainable approach to integrating the proposed intervention in the local context, by taking into consideration the needs and realities at play.

Our results also showed that the involvement of such stakeholders is fostered by clear explanations of the benefits of the programme and how it fits within the local public health priorities. A diverse and multidisciplinary membership of CABs, adapted to the topic of the project and the characteristics of the community seems to aid the programme adoption, in line with findings of Strauss and colleagues (Strauss et al., 2001). Stakeholders can contribute to a wide array of activities connecting research and communities, including providing advice on the study protocol, evaluating clinical materials, disseminating information, or advocating for policy change (Newman et al., 2011)

Although the study described in chapter 2 was based on a collaborative approach with local stakeholders, we could not use formative research to identify the specific needs of the community, due to timing reasons. Future research may benefit from using a systematic planning framework, such as Intervention Mapping (Bartholomew-Eldredge et al., 2016) or the Precede-Proceed model (Crosby & Noar, 2011). This would allow to systematically identify the needs of the involved stakeholders that are to be addressed with community support and to pre-test and adjust the developed activities, if needed, potentially leading to their higher effectiveness. In line with this reasoning, future research can also benefit from a more in-depth analysis of message frames to be used for increasing the persuasiveness of the communication campaigns as part of community support. A previous study showed, for example, that, in the broader alcohol control topic, gain frames (i.e., emphasizing the benefits of less drinking) tend to be more effective at persuading college students to drink less, compared to loss frames (i.e., emphasizing the risks of drinking) (Quick & Bates, 2010). On the other hand, it has also been shown that for some people, loss frames may be more effective in this regard (Churchill, Susan et al., 2016), for example when the causal link between alcohol and cancer is specified (Bowden et al., 2014). It would be informative to explicitly research what type of messages are most effective at convincing health care

providers and patients to discuss the patient's alcohol use. Both inductive and deductive research approaches could prove relevant in this regard (Bryman, 2015). For an inductive approach, one could start with interviewing persons from the larger patient population of a primary health care centre, in order to find out what general topics, frames and messages they would expect to see in a communication campaign. A deductive approach would entail testing some message features in an experiment, in order to determine which message is the most persuasive.

Another suggested line of research concerns the effects of online communication, for example on social media platforms, in the context of alcohol measurement and brief advice. Notably, such online communication was not planned in our package of community support activities, for internal validity purposes - we wanted to avoid research contamination of the control group by unintended exposure to the online messages. However, generally, online communication can have an important potential in health campaigns, as it is relatively inexpensive and can be well-targeted to specific demographic groups (Wright, 2016). Future research can benefit from investigating the usage of social media in communication campaigns regarding alcohol measurement and brief advice.

Impact of community support

Our found effect of community support on behaviour corroborates with findings reported by Kaner et al. (1999) and Anderson et al. (2017), who showed that supportive actions, in their studies operationalized as regular telephone calls, had a positive effect on the delivery of alcohol measurement. Interestingly, in a recent study using data from the SCALA project as well, we did not find a significant effect of community support (Anderson et al., 2021). The main difference between that study and the study in chapter 3 of this thesis is the unit of analysis. More specifically, in the former study, the analyses were done at the primary health care centre level, whereas in the latter study - at the health care provider level, which allowed to detect differences at an individual level. This smaller unit of analysis was deemed important, based on the assumption that the perception of community support can differ among individuals, for example, due to their demographic characteristics or pre-existing views regarding alcohol measurement in primary health care. This points towards the relevance of taking individual characteristics into account when planning and executing community support – as it can be that such actions have (stronger) effects on some members of the target group. There may be, therefore, a potential for targeting or tailoring community support interventions in the context of alcohol measurement programmes, to increase their effectiveness, for example by using different content approaches or channels of communication (Nguyen et al., 2018; Smit et al., 2016).

The found effect of community support on health care providers' self-efficacy is in line with previous findings showing that a supportive work environment in health care institutions may lead to increased self-efficacy of health care providers to perform tasks, e.g., communicate with their patients (Manojlovich, 2005; Nørgaard et al., 2012). Moreover, the mediating role of awareness which we found in chapter 3, is also postulated in theoretical models such as the I-CHANGE model for behaviour change (De Vries, 2017), the Precaution Adoption Model (Weinstein,1988), or the Communication – Persuasion matrix (McGuire,

1985) and has been empirically shown in previous studies (Bauman et al., 2008; Kite et al., 2018; Spence et al., 2009). Even though we did not find effects of community support on the other measured socio-cognitive beliefs, (i.e., attitude, subjective norms, and intention), we think that it may be premature to conclude that community support does not have an impact on these constructs. Given that the planned community support could not be fully implemented, it is plausible that certain effects would have needed a longer time to become visible, and hence the results that we found are on the conservative side. Also, considering that not all health care providers could fill in the questionnaires, it could be that the study did not have enough power to detect the effects.

Based on the findings in chapter 3, several directions for future research can be suggested. Firstly, it would be important to investigate the effects of a fully implemented package of community support in the context of alcohol measurement and brief advice, as this may allow for detecting effects that were not found in our analyses. For instance, we would expect that the full implementation of the support systems and communication campaign (which could not be completed in our research) could lead to significant effects on other socio-cognitive beliefs of the implementers, besides self-efficacy (e.g., attitudes, subjective norms).

Moreover, it would be important to research ways in which health care providers become aware of the available community support, given the mediating role of awareness found in our results. For example, one could look at the role of face-to-face or interpersonal communication in increasing the visibility of community support, in comparison to mediated communication (Southwell & Yzer, 2007). Additionally, a network analysis approach could be employed to assess how the effects of community support spread throughout the teams of health care providers and whether key stakeholders driving change can be identified in social and organisational networks (Mercken et al., 2010; Prevo et al., 2018). In such a network analysis approach it would be particularly interesting to assess how the information flows toward health care providers who are, at first, less motivated to adopt the alcohol measurement programme and whether their motivation to adopt the programme changes throughout time, based on the influence from managers, opinion leaders or colleagues. Also, in-depth process evaluations of community support (for examples, see (Linnan & Steckler, 2002)) are recommended for a better understanding of what are the working elements of community support in the context of alcohol measurement and brief advice, along with elements that need to be adjusted.

Considering the broader goal of reducing alcohol consumption at population level, it is worth exploring how to best integrate the promotion of alcohol measurement and brief advice into wider community action initiatives. Digital health programmes, such as e-health and m-health (i.e., interventions that make use of internet and mobile technologies, respectively), tele-medicine and/or wearables may prove fruitful in this regard, with recent evidence showing that they can be effective at reducing alcohol consumption in the general population (Kaner et al., 2017; Knox et al., 2019; Riper et al., 2018). Possible advantages of digital health technologies in the context of alcohol measurement and brief advice include the reduced time that needs to be offered by health care providers to deliver the programme, the decreased (perceived) stigma associated with discussing one's alcohol use with another

person (versus an electronic device), the possibility to efficiently tailor messages based on the alcohol consumption profile of the patient, more objective measurement of alcohol consumption, compared to self-report. More longitudinal research is needed to assess the best ways in which digital interventions can be used as a supportive implementation strategy (and even as an alternative) to face-to-face alcohol measurement.

Economic costs and returns

What are the economic costs of the SCALA intervention?

In **chapter 4**, we assessed the costs of setting up and implementing alcohol measurement and brief advice. Different cost categories were included, pertaining to consultation costs (e.g., salaries of health care providers delivering the intervention, material costs) and programme costs (i.e., setting up the intervention, implementation strategies such as community support and training of providers). We found that the consultation costs in the three countries were comparable, with the average rounded costs, expressed in International Dollars (Int$), being Int$1.20 in Colombia, Int$0.70 in Mexico, Int$1.10 in Peru. The differences in consultation costs among countries were not statistically significant.

The costs were mainly driven by the salary of the health care providers delivering alcohol measurement and brief advice. The salary costs were, in their turn, dependent on the time spent by the health care provider on delivering the consultation (i.e., number of minutes) and the hourly salary of the health care provider. For programme costs, in all three countries, the cheapest implementation strategy was standard training. The average rounded costs for training one health care provider were Int$30 in Colombia, Int$35 in Mexico, and Int$40 in Peru (statistical difference could not be tested, as explained in chapter 4). For community support, the average cost of one CAB meeting was Int$720 in Colombia, Int$835 in Mexico, and Int$605 in Peru. The average cost of one month of supportive actions (including set-up, planning, and implementation) delivered to the participating primary health care centres in the intervention municipality was Int$360 in Colombia, Int$205 in Mexico, and Int$145 in Peru. The most substantial parts of the programme costs were the salaries for coordinating and supporting personnel, venue rent, and transportation.

What were the economic benefits of SCALA: the case of Mexico

In **chapter 5** we explored the economic benefits of scaling up alcohol measurement and brief advice at national level, focusing on the example of Mexico. We used a return-on-investment approach, whereby both the investments (i.e., costs) and the gains of the intervention were expressed in financial terms, from a health care sector perspective. The results indicated that, if alcohol measurement would be scaled up at national level in Mexico, for a period of ten years, financial health care gains would surpass the investments. This would lead to positive return-on-investment values of up to 110% (assuming that 30% of Mexico's adult population would receive alcohol measurement each year). In other words, for each 100$ invested, up to 210$ would be saved in terms of health care utilization costs, over a period of 10 years. This return-on-investment includes the estimated costs of community support, along with the training of health care providers, indicating that these

can be cost-effective implementation strategies in the context of alcohol measurement. Finally, our study showed that scaling up alcohol measurement and brief advice in Mexico can result in up to 16,000 avoided alcohol-attributable deaths over a period of 10 years. This translates into an investment of up to Int$26,000 per avoided alcohol-attributable death.

In conclusion, chapters 4 and 5 illustrate cost categories that are relevant for budgeting alcohol measurement and brief advice, including salaries of health care providers and coordinating staff, material costs, such as the printed clinical package, as well as programme costs, such as transportation, renting of space and coordination of community support and training of providers. Despite the needed investments, scaling up alcohol measurement and brief advice at national level in a country like Mexico seems to lead to potentially significant cost savings in health care utilization, as well as to a substantial number of avoided alcohol-attributable deaths.

Economic costs and returns: reflections and implications for future research

The results of chapter 4 highlight the importance of taking into account contextual characteristics when considering the costs of alcohol measurement and brief advice. For instance, transportation was a programme cost component in all three SCALA countries, but given that the traffic system is generally more congested in large cities and particularly in Latin America (Statista, 2022), it could be the case that scaling up the intervention in rural settings or a different region would also require different programme costs. Therefore, in future research, it is important to be transparent regarding the categories that are taken into account when calculating the costs in economic evaluations of alcohol measurement and brief advice programmes. Often, economic evaluations and costing studies are not very explicit regarding how certain costs are calculated (Johns et al., 2003), while this can have important implications for the generalizability of the results beyond the context of the country or region where the study was conducted. Future research can also benefit from the creation of country-wide manuals and/or guidelines on standard costs of health interventions (e.g., salaries of health care providers) in countries where this is not yet available. Such information could greatly benefit costing research and the overall generalisability of its results.

Our results in chapter 5 are in line with a previous economic evaluation (Fleming et al., 2002). which showed that alcohol measurement and brief advice in primary health care settings lead to positive financial outcomes, as compared to investments. In a more recent study, by Horn and colleagues (2017), no positive financial outcomes of alcohol measurement and brief advice were found, however, that study was done in an emergency department setting, rather than in a primary health care centre. In the abovementioned study of Fleming and colleagues (2002), the found effect was twice larger as the effect we found in chapter 5 (i.e., 4.3$ vs. 2.1$ saved for every 1$ invested). This can be explained by the fact that in their study societal benefits were also taken into account (e.g., avoided criminal justice costs) when operationalizing the results. In our study in chapter 5, on the other hand, we focused on a health care perspective, whereby only the costs and benefits relevant to the health care domain were included, which led to more conservative results. For future research, we recommend using a broader societal perspective, in order to achieve a more complete picture of the costs and gains. As shown in a recent review (Manthey et al., 2021),

a substantial proportion of the costs of alcohol for society are related to lost productivity, rather than health care usage. Hence, the overall financial gains from alcohol measurement and brief advice would be even higher if a wide range of societal gains would be considered (Solberg et al., 2008). Such information would be particularly informative for policymakers beyond the health domain in the decisions for resource allocation.

Future research regarding economic returns can also benefit from a longer implementation period of the alcohol measurement trial, in which the implementation rates, costs, and effects can be assessed more accurately across time. For example, it can be the case that after several implementation months, the number of alcohol measurements delivered by health care providers may gradually increase (e.g., due to routine implementation seen in other providers) or decrease (e.g., due to wear-off of training effects). Such fluctuations in the programme implementation may have implications for the actual effects of the intervention, and ultimately for its financial costs and gains. Hence, it is important to consider how actual implementation occurs throughout a longer period, for improved economic estimations of the programme's costs and gains. It is also worthwhile exploring ways to decrease the costs of implementing alcohol measurement and brief advice. For example, employing digital health technologies could reduce the needed staff time, thereby increasing the cost-effectiveness of the intervention. This is worth investigating in future research – particularly in more resource-constrained regions.

Moreover, to optimally promote a decrease in alcohol consumption at the population level, a wider array of cost-effective health interventions should be considered, next to alcohol measurement and brief advice. A recent review evaluating alcohol prevention policies in Latin America, including the three countries on which this thesis focuses (Medina-Mora et al., 2021), concluded based on modeling estimations that a cost-effective reduction of alcohol consumption can be stimulated by the combination of several alcohol prevention strategies, at meso and macro level, particularly alcohol measurement and brief advice, combined with pricing strategies (e.g., increasing the excise taxes), marketing restrictions (e.g., reduced advertising), and reduction of alcohol availability (e.g., a limitation of points of sale of alcohol) (Chisholm et al., 2018; Sornpaisarn et al., 2017). Given that empirical research in this regard is scarce, we recommend a focus on empirical research, both qualitative and quantitative, in order to determine the optimal ways for combining such health policies, for achieving synergistic effects on the reduction of alcohol consumption.

Methodological considerations of the thesis

One of the main strengths of this thesis is that is it based on a large-scale trial, implemented in municipal settings in three Latin American countries. This contributes to the ecological validity of the results and aids confidence in their generalizability beyond the tested settings. The longitudinal data, collected monthly, along with baseline data, contributes to the internal validity of the results, by allowing to control for potentially confounding factors of the tested relationships in chapter 3.

Furthermore, the involvement of multiple local stakeholders in the process of creating community support contributed to the development of activities that are evidence-based and locally relevant. This also allowed us to adapt the alcohol measurement and brief advice

to the local settings, and, when needed, tailor the approach and the materials so that it would be more feasible and appropriate in the three countries.

Another strength of the thesis is that it used a detailed and transparent assessment of the costing data described in chapter 4, which can potentially be used in future budgeting efforts for similar interventions. Moreover, the return-on-investment analysis in chapter 5 provides a detailed explanation of a comprehensive modelling approach that has been employed, thereby allowing for the usage of this approach in other settings, upon sufficient available data.

However, several methodological limitations of the dissertation should be considered. Firstly, for reasons beyond our control, the SCALA alcohol measurement and brief advice programme could not be implemented over the total initially planned period of 18 months. As mentioned earlier, this is because the implementation of the project was paused after its first 5 months due to the start of the COVID-19 pandemic that disrupted the primary health care service in the three countries. Therefore, some effects may have not been found, for instance in the case of community support. We would generally expect that community support has cumulative effects that would be more visible after 18 months of implementation, compared to the 5 months completed in our study. This may have resulted in more conservative results found in chapter 3, with certain hypothesized effects not confirmed (e.g., on attitude or subjective norms), although in reality, they might have been there.

Another methodological limitation is that we could not test whether there are any interaction effects between community support and training. More specifically, all health care providers included in our analyses received training regarding alcohol measurement and brief advice (with an intervention group receiving community support and a control group receiving no community support). Ideally, we would use a research design in which a group receives only community support, without training, to be able to test the interaction effects between community support and training. It could be the case that training and community support have synergistic effects, i.e., that their effects strengthen each other, for instance, if providers who receive training perceive the community support as more helpful compared to those who receive no training. Therefore, the impact of community support found in this dissertation should be interpreted in the context of training provision. Another limitation is that societal costs and gains were not considered in our studies in chapters 4 and 5. Hence, the results should be interpreted from a health care perspective, rather than a full societal perspective. This limitation is, nevertheless, not expected to change the direction of our results, since, as explained earlier, a health care perspective probably led to smaller effects in terms of the economic return-on-investment ratio.

Also, ideally, we would have wanted to perform return-on-investment analyses in all three countries where the SCALA alcohol measurement programme was implemented. However, only Mexico had publicly available data regarding the number of alcohol-attributable hospitalizations, provided by its Ministry of Health, which could be used in our economic model in chapter 5. The lack of such public data in Colombia and Peru prevented us from doing comparable analyses in these countries. Even though the health care systems and epidemiological realities are comparable in the three countries, and the conclusions of the economic evaluation for Mexico most probably apply to Colombia, Peru, as well as to other

Latin American countries, it is nevertheless important to keep country differences in mind. To deal with this in the future, two main solutions are suggested. Firstly, trial-based economic evaluations can be performed, with longitudinal data collections both at the health care provider and patient level (as done in Fleming et al., 2002). Secondly, ministries of health and other responsible entities are encouraged to provide accessible open data for research regarding alcohol-attributable hospitalisations, in line with privacy regulations.

Recommendations for practice

Based on the results found in this thesis, the main recommendations for practice are:

- Community support should be used to stimulate the adoption and implementation of alcohol measurement and brief advice in primary health care settings. Especially when implementing the programme in a new region/country, it can be helpful to set up a CAB incorporating stakeholders from various fields. Project champions who can advocate for the adoption and implementation of the intervention should also be involved.
- To ensure the CAB's sustainability, it is important to make agreements regarding CAB membership not only with the recruited members but also with the institutions they represent. This is because due to political changes, certain initial members of the CAB may change their function or no longer work in the institution, and in that case, it is important to have other representatives.
- Regular communication with health care providers delivering the intervention should be maintained throughout the programme, to sustain the adoption and continuous delivery of alcohol measurement and brief advice. The channel of communication should be tailored to local preferences and contexts, for example via face-to-face meetings, online platforms, or liaisons.
- When giving community support, health care providers should be made aware of this support, as awareness of support is expected to increase providers' self-efficacy (i.e., perceived capability) to deliver the intervention.
- For optimal budgeting of alcohol measurement programmes, increased attention should be paid to the local contexts, for example in terms of expected salary and transportation costs.
- Overall, the implementation of alcohol measurement and brief advice is expected to give a positive return on investment, considering all the saved health care costs due to decreased alcohol consumption. This economic return is likely to increase when the programme is scaled up at a national level. Intervention developers and health promoters should communicate the potential cost-effectiveness of alcohol measurement and brief advice to policymakers in the alcohol management field, to stimulate the general adoption of the programme in routine practice, particularly in primary health care settings.

Final conclusion

To conclude, the findings described in this thesis support the idea that community support can bolster the implementation of alcohol measurement and brief advice in Latin America. The development of community support actions and their implementation requires actively involving local stakeholders and champions, and developing clear implementation and support actions, for instance, those described in this thesis. Our results show that community support also leads to increasing the health care providers' self-efficacy to deliver the intervention, given that they are aware of that community support. Economically, the costs of alcohol measurement and brief advice in the three countries were comparable, including the costs of the implementation strategies – community support and training. Overall, based on the example of Mexico, it is expected that scaling up alcohol measurement and brief advice at a national level may result in a positive return-on -investment. The next challenge, however, will be to communicate these results to policymakers in order to translate them into national actions.

Impact paragraph

Alcohol consumption is expected to increase in the Latin American region in the following decade, making research regarding ways to promote a reduction of alcohol consumption at the population level highly relevant and timely. This thesis contributes to a better understanding of how alcohol measurement and brief advice – an alcohol control strategy that has been shown to be clinically- and cost-effective - can be implemented and scaled up, by focusing on the example of three Latin American countries: Colombia, Mexico, and Peru. For this, we explored 1) whether community support can play a role in supporting the implementation of alcohol measurement and brief advice, and 2) the needed financial investments and expected financial returns of scaling up an alcohol measurement and brief advice programme at the country level. In this final paragraph, we mention some of the thesis' most important results and reflect on their dissemination and relevance for practice, research, and society.

Findings

Community support. To stimulate the adoption and implementation of alcohol measurement and brief advice, community support can be used as an implementation strategy. Community support refers to activities carried out in a wider setting (e.g., a neighbourhood, workplace, school, or municipality) to help people perform a certain behaviour. In this thesis, we explored and identified five types of community support activities that can be used in the context of alcohol measurement and brief advice. These were: 1) the development of Community Advisory Boards which include local stakeholders; 2) the involvement of project champions to support the adoption and maintenance of the programme; 3) the implementation of adoption mechanisms to stimulate buy-in among potential participants; 4) implementation of support systems to help with dealing with potential barriers; 5) implementation of communication campaigns in order to promote the programme.

The next step, after the development of community support activities, was to assess whether community support has an impact on the adoption and maintenance of alcohol measurement and brief advice in primary health care centres. In other words, whether health care providers who received community support were more likely to address the topic of alcohol consumption with their patients. For this, we used longitudinal data, or in other words, we compared the number of patients being given alcohol measurements, by the same health care providers, before and after community support was implemented. We also compared these numbers with primary health care centres in which no community support was given (also called 'control groups'), in order to be more confident about the correctness of our results. We found that health care providers who received community support did indeed deliver alcohol measurement to more patients, compared to health care providers who did not receive community support. This indicates that community support may be an effective strategy to stimulate health care providers to implement alcohol measurement and brief advice in their routine practice.

We also wanted to see how community support impacts health care providers to implement alcohol measurement and brief advice. Our statistical analyses showed that health care providers receiving community support increased their confidence in their ability (also called 'self-efficacy') to address the topic of alcohol with their patients. Moreover, we found that self-efficacy increased particularly in health care providers who were aware of the community support they received. In other words, our results indicate that community support may lead to more self-efficacy in health care providers to deliver alcohol measurement and brief advice to their patients, but for this to happen, health care providers need to become/be made aware of the community support that is offered.

Economic costs and returns. We also analysed the economic costs of implementing alcohol measurement and brief advice in the three SCALA countries. First, the relevant cost categories were identified, for example, salaries of the health care providers and materials offered to patients. We also calculated the costs of implementation strategies, namely community support and training of providers, and noticed that the costs were relatively comparable in the three countries. Finally, the financial costs were compared to the financial returns, in order to assess whether scaling up alcohol measurement and brief advice is worth the investments. For this, we used the example of Mexico. The results showed that, over a period of 10 years, alcohol measurement and brief advice would lead to a return-on-investment of up to 110%.

This return-on-investment includes the estimated costs of community support, along with the training of health care providers, indicating that these can be cost-effective implementation strategies in the context of alcohol measurement. Additionally, our study showed that scaling up alcohol measurement and brief advice in Mexico can result in up to 16,000 avoided alcohol-attributable deaths over a period of 10 years. This translates into an investment of up to Int$26,000 per avoided alcohol-attributable death.

Practical relevance

The results of this thesis are an essential contribution to the *SCALA Implementation framework*, which is freely available on the SCALA project website: https/www.scalaproject.eu. This framework can be used to guide the implementation of health programmes in various regions of the world, being relevant to e.g., program directors and managers working in primary health care centres and municipal health departments; professional groups supporting primary health care providers; and, primary health care providers themselves who are active in their communities to help decrease heavy drinking and the harm done by alcohol.

The three main areas of practical relevance of this thesis are:

1) How to develop effective community support activities in order to bolster the adoption and implementation of alcohol measurement and brief advice at primary health care level (chapters 2 and 3). The materials used to develop the community support packages, including the communication campaigns, are openly available online. The results of our thesis indicate that for an improved implementation of alcohol measurement programmes, these should be embedded within wider community support activities, that would make health care providers more confident to address the topic of alcohol with their patients. Community support activities are best developed and implemented in collaboration with local stakeholders, such as public health experts, in order to reflect and respond to local needs and contexts.

2) How to budget an alcohol measurement and brief advice programme in accordance with available local resources (chapter 4) – the most important cost categories related to the implementation of the programme were identified and described in our paper. The information can be used as a planning tool by policymakers and intervention developers in budgeting efforts for similar interventions.

3) How to calculate the potential economic return-on-investment of the alcohol measurement and brief advice programme, adjusting this local contexts (chapter 5) – the model we used in this paper is described transparently and can be used in order to estimate the possible financial returns of the health programmes from a health care perspective, which is particularly important in the decision making process regarding the adoption of new (health) policies.

Research relevance

The results of this thesis bring several contributions to the existing body of literature regarding the implementation of alcohol measurement and brief advice programmes. The thesis is, to our knowledge, the first to explore the development of a broad package of evidence-based community support activities in the context of alcohol measurement and brief advice. Future research can benefit from these findings, particularly given the current focus on implementation research and the need for effective implementation strategies to accelerate the usage of clinically- and cost-effective health interventions (such as alcohol measurement and brief advice) in health systems across the world.

Also, our research provided evidence that community support can be effective at increasing the adoption and maintenance of alcohol measurement and brief advice - although this was theorized before, empirical evidence was lacking. Moreover, our research

showed how community support can bring about such effects, namely by increasing the self-efficacy of health care providers in delivering the health programme. This is relevant for future research focusing on mechanisms of effect of implementation strategies.

Furthermore, by presenting a transparent cost assessment of alcohol measurement and brief advice, the thesis fills a research gap regarding the costs of this health programme in low and middle-income countries. Also, the model-based return-on-investment analysis presented in chapter 5 can be used in the future by researchers who are interested in evaluating the potential economic benefits of scaling up health programmes in other countries as well, beyond the domain of alcohol.

The four original manuscripts have been published in peer-reviewed open-source journals. Also, our results were presented at various international conferences. The results of this thesis, as part of the wider SCALA project, have been disseminated on several public online platforms, such as CORDIS (a website of the European Commission focusing on dissemination of EU funded research), CAPHRI's website, as well SCALA's website and Twitter account.

Societal relevance

The societal contribution of this thesis can be noted at several levels. Firstly, the topic focused on improving alcohol prevention, which is highly relevant and timely, considering the substantial public health and economic harm caused by alcohol. In terms of numbers, there were 58 primary health centres from six municipalities that participated in the SCALA project, with more than 600 health care providers receiving community support to address the topic of alcohol with their patients – resulting, ultimately, in tens of thousands of patients receiving advice about the risks of alcohol (despite the disruptions in the implementation of the project caused by the COVID-19 pandemic). This is, perhaps, the most straightforward illustration of the societal relevance to which this thesis brought a contribution.

Furthermore, the design of our studies allowed for the active involvement of local stakeholders from the three countries on which our research focused, thereby contributing to an efficient inclusion of our research within local realities and needs. Also, by showing what are the costs and potential return-on-investment of this health programme, our thesis contributes to a more effective translation of research results into wider policy plans.

Finally, our research also focused on building-in sustainability plans beyond the finalization of the SCALA project, by exploring together with the local stakeholders possibilities to incorporate the alcohol measurement and brief advice programme in routine practice. In Colombia and Mexico, several primary health care centres that were not involved in the SCALA project already expressed their interest in utilizing the SCALA package, including the communication campaign materials developed in our community support package. In Peru, sustainability plans were coordinated with the National Mental Health Office of the Ministry of Health, as a result agreeing to incorporate the SCALA programme in the 2022 National Mental Health Budget.

In conclusion, scaling up alcohol measurement and brief advice has the potential to be a cost-effective alcohol prevention intervention in the Latin American region, and beyond. Its adoption and maintenance can be aided by the provision of community support.

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SUMMARY

Summary (English)
Resumen (Spanish)
Samenvatting (Dutch)
Rezumat (Romanian)

Discussing alcohol: strategies and return-on-investment of implementing alcohol measurement and brief advice in Latin America

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Summary | English

Worldwide, about three million deaths are caused by alcohol every year, making alcohol consumption one of the leading preventable risk factors for physical and social harms. Alcohol is causally linked with over 200 diseases, such as cancers, liver disease, and heart disease. This leads to over 5% of the total global burden of disease. Next to the direct harm to the consumer, alcohol causes substantial harm to others through e.g., increased interpersonal violence, negative impact on fetal health, and traffic accidents. Latin America faces one of the largest alcohol-related disease burdens globally, with the consumption of alcohol expected to increase in the region in the coming decade. This stresses the need to develop and implement effective alcohol management programmes in Latin America.

One of the strategies recommended by the WHO to manage and reduce alcohol consumption is through the delivery of alcohol measurement and brief advice by health care providers. This entails that a patient's alcohol consumption is measured during a health care consultation. Upon detection of risky alcohol consumption, the health care provider offers brief advice to the patient regarding the reduction of drinking and/or refers the patient to specialized treatment. A large body of evidence has shown that alcohol measurement and brief advice is clinically effective. However, despite this evidence, alcohol measurement and brief advice is not yet widely implemented in practice.

One of the most important barriers encountered by health care providers to adopt and deliver this health programme is the (perceived) lack of support from their managers, colleagues, and patients. Community support aimed at enhancing the environment in which providers must deliver alcohol measurement and brief advice has been repeatedly recommended as a strategy to overcome this barrier, but has not yet been researched empirically. Another barrier to the adoption and implementation of alcohol measurement and brief advice is the scarcity of knowledge regarding the expected financial costs and outcomes of the programme. Some data on this topic have been collected in high-income western countries, while evidence is lacking in middle-income regions such as Latin America.

Based on these arguments, the current dissertation focused on analysing the implementation of an alcohol measurement and brief advice programme in three Latin American countries: Colombia, Mexico, and Peru. The dissertation had the goal to analyse the role of community support as an implementation strategy for alcohol measurement and brief advice, and the costs and financial outcomes of this heath programme. More specifically, the dissertation aimed to present the 1) development, 2) effect and 3) mechanisms of effect of community support used as a strategy to increase the adoption and implementation of alcohol measurement and brief advice in Latin America. Also, the dissertation aimed to assess the 4) costs and 5) economic returns of implementing and upscaling alcohol measurement and brief advice at a country level. The studies described

in this dissertation were part of the SCALA project - an international study investigating various strategies to improve alcohol management. The importance of the research conducted in this dissertation is further explained in **chapter 1**.

Chapter 2 of this dissertation presents the development of a package of community support actions implemented in three Latin American municipalities, in Colombia, Mexico, and Peru. The community support actions were based on the Institute for Health Care Improvement's framework for going to full scale, and included: (i) involvement of a Community Advisory Board, (ii) involvement of a project champion, (iii) adoption mechanisms, (iv) support systems and (v) a communication campaign. The research in chapter 2 showed that in the planning of community support, it is important to involve and take into account the perspectives and needs of local stakeholders.

Chapter 3 used a pre-post quasi-experimental design in order to investigate the effect of the abovementioned community support on health care providers' rates of measuring alcohol consumption in their patients. Moreover, the study explored possible mechanisms underlying the effects of community support, through health care providers' awareness of support, as well as their attitudes, subjective norms, self-efficacy, and subsequent intention towards delivering alcohol measurement. Results showed that community support had a significant effect on health care providers' rates of measuring alcohol consumption in their patients. Also, a path analysis revealed that community support had a significant indirect positive effect on providers' self-efficacy to deliver the programme, which was mediated through awareness of support. Specifically, the provision of community support resulted in a higher awareness of support among health care providers, which then led to higher self-efficacy to deliver alcohol measurement and brief advice. Hence, chapter 3 showed that community support can be beneficial for increasing the number of patients who receive alcohol measurement in primary health care and can make health care providers more confident to deliver alcohol measurement to their patients, but only if they first become aware of the community support.

Chapter 4 aimed to provide an assessment and comparison of the costs of implementing an alcohol measurement programme in the three abovementioned Latin American countries. Additional to the intervention costs, the costs of three implementation strategies: standard training and clinical package, intensive training and clinical package, and community support, were assessed and subsequently translated into costs per additional alcohol measurement session. Results showed that the costs for one alcohol measurement session ranged between Int$ 0.67 and Int$ 2.57, and were comparable in the three countries, being mainly driven by the salaries of the health professionals. Implementation strategies costs ranged between Int$ 1.24 and Int$ 6.17 per additional alcohol measurement session. In all three countries, standard training and clinical package seemed to be a promising implementation strategy with a relatively low cost per additional alcohol measurement session.

Chapter 5 explored the economic benefits of scaling up alcohol measurement and brief advice at national level, focusing on the example of Mexico. For this, a return-on-investment approach was used, whereby both the investments (i.e., costs) and the gains of the intervention were expressed in financial terms, from a health care sector perspective. The results indicated that, if alcohol measurement would be scaled up at national level in Mexico, for a period of ten years, financial health care gains would surpass the investments. This would lead to positive return-on-investment values of up to 110% (assuming that 30% of Mexico's adult population would receive alcohol measurement each year). Finally, the study in chapter 5 showed that scaling up alcohol measurement and brief advice in Mexico can result in up to 16,000 avoided alcohol-attributable deaths over a period of 10 years. This translates into an investment of up to Int$ 26,000 per avoided alcohol-attributable death.

In **chapter 6** the main results of the dissertation are presented and discussed in the context of previous literature, along with implications for future research and practice, methodological considerations, and concluding remarks.

Resumen | Spanish

En todo el mundo, cerca de tres millones de muertes son causadas por el alcohol cada año, lo que convierte el consumo de alcohol en uno de los principales factores de riesgo prevenibles de daños físicos y sociales. El alcohol está relacionado causalmente con más de 200 enfermedades, como cánceres, enfermedades del hígado y cardiacas; esto lleva a más del 5% de la carga global total de enfermedad. Además del daño directo al consumidor, el alcohol causa un daño sustancial a los demás a través, por ejemplo, del aumento de la violencia interpersonal, el impacto negativo en la salud fetal y los accidentes de tráfico. América Latina enfrenta una de las mayores cargas de enfermedades relacionadas con el alcohol a nivel mundial, y se espera que el consumo de alcohol crezca en la región en la próxima década. Esto enfatiza la necesidad de desarrollar e implementar programas efectivos de manejo del alcohol en América Latina.

Una de las estrategias recomendadas por la OMS para manejar y reducir el consumo de alcohol, es a través de la realización del tamizaje y del consejo breve por parte de los profesionales de atención primaria en salud; esto implica que el consumo de alcohol de un paciente se mida durante una consulta con estos profesionales. Ante la detección de un consumo de riesgo de alcohol, el profesional de la salud ofrece un consejo breve sobre la reducción del consumo de alcohol y/o deriva al paciente a un tratamiento especializado. Una gran cantidad de evidencia ha demostrado que el tamizaje del alcohol y los consejos breves son clínicamente efectivos. Sin embargo, a pesar de esta evidencia, éstos aún no están ampliamente implementados en la práctica.

Una de las barreras más importantes que enfrentan los profesionales de atención primaria en salud para adoptar y brindar este programa, es la falta (percibida) de apoyo de sus gerentes, colegas y pacientes. El apoyo comunitario destinado a mejorar el entorno en el que los proveedores deben realizar el tamizaje y el consejo breve, se ha recomendado repetidamente como una estrategia para superar esta barrera, pero aún no se ha investigado empíricamente. Otra barrera para la adopción e implementación del tamizaje y el consejo

breve es la falta de evidencia sobre los costos financieros esperados y los resultados del programa, particularmente en regiones de ingresos medios como América Latina.

Con base en estos argumentos, la presente disertación se centró en analizar la implementación de un programa de tamizaje y consejo breve en tres países de América Latina: Colombia, México y Perú. La disertación tuvo como objetivo analizar el papel del apoyo comunitario como estrategia de implementación para el tamizaje y el consejo breve, y los costos y resultados financieros de este programa de salud. Más específicamente, la disertación tuvo como objetivo presentar 1) el desarrollo, 2) el efecto y 3) los mecanismos del efecto del apoyo comunitario utilizado como estrategia para aumentar la adopción e implementación del tamizaje y el consejo breve en América Latina. Además, la disertación tuvo como objetivo evaluar 4) los costos y 5) los beneficios económicos de implementar y ampliar el tamizaje y el consejo breve a nivel de país. Los estudios descritos en esta disertación formaron parte del proyecto SCALA, un estudio internacional que investiga varias estrategias para mejorar el manejo del uso de alcohol. La importancia de la investigación realizada en esta tesis se explica con más detalle en el **Capítulo 1**.

El **Capítulo 2** de esta disertación presenta el desarrollo de un paquete de acciones de apoyo comunitario implementado en tres municipios latinoamericanos, ubicados en Colombia, México y Perú. Las acciones de apoyo a la comunidad se basaron en el marco del 'Institute for Health Care Improvement's framework for going to full scale', e incluyeron: (i) participación de un Consejo Asesor Comunitario, (ii) participación de un project champion, (iii) mecanismos de adopción, (iv) sistemas de apoyo y (v) una campaña de comunicación. La investigación del capítulo 2 mostró que en la planificación del apoyo comunitario es importante involucrar y tomar en cuenta las perspectivas y necesidades de los actores locales.

El **Capítulo 3** utilizó un diseño cuasi-experimental para investigar el efecto del apoyo comunitario mencionado anteriormente en las tasas de medición de consumo de alcohol que hicieron los profesionales de atención primaria en salud con sus pacientes. Además, el estudio exploró los posibles mecanismos que subyacen a los efectos del apoyo de la comunidad, a través de la conciencia (*awareness)* del apoyo de los profesionales de atención en salud, así como sus actitudes, normas subjetivas, autoeficacia, e intención de realizar el tamizaje del consumo de alcohol en los pacientes. Los resultados mostraron que el apoyo comunitario tuvo un efecto significativo en las tasas de tamizaje del consumo de alcohol; además, los resultados han mostrado que el apoyo comunitario tuvo un efecto positivo indirecto en la autoeficacia de los profesionales para entregar el programa. Este efecto estuvo mediado por la conciencia (*awareness)* del apoyo. Específicamente, la provisión de apoyo comunitario resultó en una mayor conciencia de apoyo entre los profesionales de atención primaria en salud, lo que luego condujo a una mayor autoeficacia. El capítulo 3 mostró que el apoyo de la comunidad puede ser beneficioso para aumentar el número de pacientes que reciben el tamizaje de alcohol en la atención primaria en salud y puede hacer que los profesionales tengan más confianza para aplicar cuestionarios de medición de alcohol a sus pacientes, pero solo si primero se dan cuenta del apoyo comunitario.

El **Capítulo 4** tuvo como objetivo proporcionar una evaluación y comparación de los costos de implementar un programa de tamizaje de alcohol en los tres países latinoamericanos mencionados anteriormente. Además de los costos de la intervención, se evaluaron los costos de tres estrategias de implementación: capacitación estándar y paquete clínico; capacitación intensiva y paquete clínico; y apoyo comunitario. Estos posteriormente fueron traducidos en costos por sesión adicional de tamizaje de alcohol. Los resultados mostraron que los costos de una sesión de tamizaje de alcohol oscilaron entre Int$ 0,67 e Int$ 2,57, y fueron comparables en los tres países, debido principalmente a los salarios de los profesionales de la salud. Los costos de las estrategias de implementación oscilaron entre Int$ 1,24 y Int$ 6,17 por sesión adicional de tamizaje de alcohol. En los tres países, la capacitación estándar y el paquete clínico parecían ser una estrategia de implementación prometedora con un costo relativamente bajo por sesión adicional de tamizaje de alcohol.

El **Capítulo 5** exploró los beneficios económicos de ampliar el tamizaje del alcohol y el asesoramiento breve a nivel nacional, centrándose en el ejemplo de México. Para ello, se utilizó un enfoque de Retorno de la Inversión (Return on Investment), en el que tanto las inversiones (es decir, los costos) como las ganancias de la intervención se expresaron en términos financieros, desde la perspectiva del sector de salud. Los resultados indicaron que, si el tamizaje del alcohol se escalara a nivel nacional en México, durante un período de diez años, las ganancias financieras en atención primaria en salud superarían las inversiones. Esto daría lugar a valores positivos de Retorno de la Inversión de hasta el 110 % (suponiendo que el 30 % de la población adulta de México recibiría un tamizaje de alcohol cada año). Finalmente, el estudio del capítulo 5 mostró que ampliar el tamizaje del alcohol y el consejo breve en México pueden resultar en hasta 16.000 muertes evitadas, atribuibles al alcohol, durante un período de 10 años. Esto se traduce en una inversión de hasta Int$ 26.000 por muerte atribuible al alcohol evitada.

En el **Capítulo 6** se presentan y discuten los principales resultados de la disertación en el contexto de la literatura previa, junto con las implicaciones para la investigación y la práctica futuras, las consideraciones metodológicas y las observaciones finales.

Samenvatting | Dutch

Wereldwijd worden jaarlijks ongeveer drie miljoen sterfgevallen veroorzaakt door alcohol, waardoor alcoholconsumptie een van de belangrijkste te voorkomen risicofactoren is voor fysieke en sociale schade. Alcohol is oorzakelijk verbonden met meer dan 200 ziekten, zoals kanker, leverziekte en hartziekte. Dit leidt tot ruim 5% van de totale wereldwijde ziektelast. Naast de directe schade voor de gebruiker veroorzaakt alcohol aanzienlijke schade aan anderen door bijvoorbeeld meer interpersoonlijk geweld, een negatieve invloed op de gezondheid van de foetus en verkeersongevallen. Latijns-Amerika kent een van de grootste aan alcohol gerelateerde ziektelasten ter wereld, en de verwachting is dat de consumptie van alcohol in de regio de komende tien jaar zal toenemen. Dit benadrukt de noodzaak om effectieve programma's voor alcohol management in Latijns-Amerika te ontwikkelen en te implementeren.

Een van de door de WHO aanbevolen strategieën om alcoholgebruik te verminderen is de toepassing van alcohol screeningsessies en korte interventies (hierna: alcohol

screening) door zorgverleners. Dit houdt in dat het alcoholgebruik van een patiënt wordt gemeten tijdens een zorgconsult. Bij constatering van risicovol alcoholgebruik geeft de zorgverlener de patiënt kort advies over minder drinken en/of verwijst hij diegene door naar een gespecialiseerde behandeling. Er is een grote hoeveelheid bewijs dat alcohol screening klinisch effectief is. Ondanks dit bewijs wordt alcohol screening in de praktijk nog niet breed toegepast.

Een van de belangrijkste belemmeringen die zorgverleners tegenkomen om dit gezondheidsprogramma te adopteren en uit te voeren, is het (waargenomen) gebrek aan steun van hun managers, collega's en patiënten. *Community support* (maatschappelijke ondersteuning), gericht op het verbeteren van de omgeving waarin zorgverleners alcohol screening moeten geven, is vaak aanbevolen als een strategie om deze barrière te overwinnen, maar is nog minimaal empirisch onderzocht. Een andere barrière voor de adoptie en implementatie van alcohol screening is de schaarste aan kennis over de verwachte financiële kosten en uitkomsten van het programma, vooral in regio's met een gemiddeld inkomen, zoals Latijns-Amerika.

Op basis van deze argumenten concentreerde het huidige proefschrift zich op het analyseren van de implementatie van een alcohol screeningprogramma in drie Latijns-Amerikaanse landen: Colombia, Mexico en Peru. Het proefschrift had als doel de rol van community support als implementatiestrategie, en de kosten en financiële resultaten van dit gezondheidsprogramma te analyseren. Meer specifiek was het doel van het proefschrift om 1) de ontwikkeling, 2) het effect en 3) de werkingsmechanisme van community support te analyseren als een strategie om de adoptie en implementatie van alcohol screening in Latijns-Amerika te vergroten. Het proefschrift was ook gericht op het in kaart brengen van de 4) kosten en 5) economische opbrengsten van het implementeren en opschalen van alcohol screening op landniveau. De studies beschreven in dit proefschrift maakten deel uit van het SCALA-project – een internationale studie die verschillende strategieën onderzocht om het alcoholmanagement in Latijns-America te verbeteren. Het belang van het onderzoek in dit proefschrift wordt verder toegelicht in **hoofdstuk 1**.

Hoofdstuk 2 van dit proefschrift presenteert de ontwikkeling van een pakket van community support acties geïmplementeerd in drie Latijns-Amerikaanse gemeenten in Colombia, Mexico en Peru. De acties waren gebaseerd op het kader van het 'Institute for Health Care Improvement framework for going to full scale' en omvatten: (i) betrokkenheid van een maatschappelijke adviesraad, (ii) betrokkenheid van een projectleider, (iii) adoptiemechanismen, (iv) ondersteunende systemen en (v) een communicatiecampagne. Het onderzoek in hoofdstuk 2 toonde aan dat het bij het plannen van community support belangrijk is om de perspectieven en behoeften van lokale stakeholders te betrekken en er rekening mee te houden.

Hoofdstuk 3 gebruikte een pre-post quasi-experimenteel design om het effect te onderzoeken van de bovengenoemde community support op het implementeren van alcohol screening. Bovendien onderzocht de studie mogelijke werkingsmechanismen van de effecten van community support, door het bewustzijn (awareness) van zorgverleners over community support te meten, evenals hun attitudes, subjectieve normen, zelfeffectiviteit en de daaropvolgende intentie om alcohol screening uit te voeren. De resultaten toonden aan dat community support een significant effect had op de mate waarin zorgverleners alcoholgebruik bij hun patiënten meten. Ook bleek uit een statistische pad analyse dat community support een significant indirect positief effect had op de zelfeffectiviteit van de zorgverleners om het programma aan te bieden, wat verklaard werd door bewustzijn (awareness) van community support. Met andere woorden, het verlenen van community support resulteerde in een groter bewustzijn van ondersteuning bij zorgverleners, wat vervolgens leidde tot een hogere zelfeffectiviteit om alcohol screening uit te voeren. Hoofdstuk 3 laat zien dat community support gunstig kan zijn voor het verhogen van het aantal patiënten dat alcohol screening krijgt en dat zorgverleners er meer vertrouwen in kunnen krijgen om alcohol screening uit te voeren, maar alleen als ze zich eerst bewust zijn van de community support.

Hoofdstuk 4 had tot doel een evaluatie en vergelijking te geven van de kosten van het implementeren van een alcohol screeningprogramma in de drie bovengenoemde Latijns-Amerikaanse landen. Naast de interventiekosten werden de kosten van drie implementatiestrategieën: 1) standaard training en klinische materialen, 2) intensieve training en klinische materialen, en 3) community support, in kaart gebracht en vervolgens vertaald naar kosten per extra alcohol screeningsessie. De resultaten toonden aan dat de kosten voor één alcohol screeningsessie varieerden tussen Int$ 0,67 en Int$ 2,57, en vergelijkbaar waren in de drie landen, voornamelijk gedreven door de salarissen van de zorgverleners. De kosten van implementatiestrategieën varieerden tussen Int$ 1,24 en Int$ 6,17 per extra alcohol screeningsessie. In alle drie de landen leek de standaard training en klinische materialen strategie een veelbelovende implementatiestrategie te zijn met relatief lage kosten.

Hoofdstuk 5 onderzocht de economische baten van het opschalen van alcohol screening op nationaal niveau, waarbij het voorbeeld van Mexico centraal stond. Hierbij is gebruik gemaakt van een return-on-investment benadering, waarbij zowel de investeringen (kosten) als de baten van de interventie in financiële termen zijn uitgedrukt, vanuit het perspectief van de zorgsector. De resultaten gaven aan dat, als alcohol screening in Mexico gedurende tien jaar op nationaal niveau zou worden opgeschaald, de resulterende financiële gezondheidswinst de investeringen zou overtreffen. Dit zou leiden tot een positief rendement van bijna 110% (ervan uitgaande dat 30% van de volwassen bevolking van Mexico elk jaar een alcohol screeningsessie zou ondergaan). Ten slotte laat de studie in hoofdstuk 5 zien dat het opschalen van alcohol screening in Mexico kan leiden tot 16.000 vermeden sterfgevallen als gevolg van alcoholgebruik over een periode van 10 jaar. Dit vertaalt zich in een investering van maximaal Int$ 26.000 per vermeden sterfgeval door alcoholgebruik.

In hoofdstuk 6 worden de belangrijkste resultaten van het proefschrift gepresenteerd en besproken in de context van eerdere literatuur, samen met implicaties voor toekomstig onderzoek en praktijk, methodologische overwegingen en concluderende opmerkingen.

Rezumat | Romanian

La nivel mondial, aproximativ trei milioane de decese sunt cauzate de alcool în fiecare an, consumul de alcool fiind astfel unul dintre principalii factori prevenibili de risc pentru daune sănătății fizice și sociale. Alcoolul cauzează peste 200 de boli, precum cancerul, bolile hepatice și cardiace, reprezentând peste 5% din povara totală a bolilor la nivel mondial. Pe lângă efectele directe asupra consumatorului, alcoolul provoacă daune substanțiale și altora prin, de exemplu, violență interpersonală crescută, impact negativ asupra sănătății prenatale și accidente de circulație. America Latină se confruntă cu una dintre cele mai mari probleme legate de alcool la nivel global, iar consumul de alcool este estimat să crească în această regiune în următorul deceniu. Acest lucru subliniază necesitatea dezvoltării și implementării unor programe eficiente de gestionare a consumului de alcool în America Latină.

Una dintre strategiile recomandate de OMS pentru a gestiona și a reduce consumul de alcool este prin furnizarea de screening și intervenții scurte pentru reducerea consumului de alcool (în continuare: screening și intervenții scurte) către pacienți, din partea lucrătorilor în medicina primară (de exemplu, medicii de familie sau asistenții/asistentele medicale). Aceasta presupune că nivelul consumului de alcool al unui pacient este măsurat în timpul unei consultații medicale. În cazul depistării unui consum riscant de alcool, lucrătorul medical oferă pacientului o intervenție scurtă cu privire la reducerea consumului de alcool și/sau îl redirecționează către un tratament de specialitate. Un număr substanțial de cercetări au arătat că furnizarea de screening și intervenții scurte reprezintă o metodă eficientă din punct de vedere clinic pentru reducerea consumului de alcool. Cu toate acestea, acest program de sănătate încă nu este implementat pe scară largă în practică.

Unul dintre cele mai importante obstacole întâlnite de lucrătorii medicali în adoptarea și implementarea de screening și intervenții scurte este lipsa (percepută) de suport din partea managerilor, colegilor și pacienților lor. O strategie recomandată în mod repetat pentru depășirea acestui obstacol, dar care încă nu a fost cercetată empiric, este suportul comunitar. Mai exact, suportul comunitar vizează îmbunătățirea mediului în care lucrătorii medicali oferă screening și intervenții scurte pacienților lor. Un alt obstacol în adoptarea și implementarea de screening și intervenții scurte este lipsa de cercetări și informații privind costurile și rezultatele financiare ale acestui program de sănătate, mai ales în regiunile cu venituri medii, cum ar fi America Latină.

Pornind de la aceste argumente, teza actuală s-a concentrat pe analiza implementării unui program de screening și intervenții scurte în trei țări din America Latină: Columbia, Mexic și Peru. Teza a avut ca scop analiza rolului suportului comunitar ca strategie de implementare a programului de screening și intervenții scurte, precum și a costurilor și rezultatelor financiare ale acestui program. Mai precis, teza și-a propus să prezinte 1) dezvoltarea, 2) efectul și 3) mecanismele de impact ale suportului comunitar utilizat ca strategie pentru a crește adoptarea și implementarea programului de screening și interevenții scurte în America Latină. De asemenea, teza și-a propus să evalueze 4) costurile și 5) randamentele economice ale implementării și extinderii acestui program de sănătate la nivel de țară. Studiile descrise în această teză au făcut parte din proiectul SCALA - un studiu internațional care a investigat diverse strategii de îmbunătățire a managementului

alcoolului în America Latină. Structura și importanța cercetării efectuate în această teză este explicată în mai multe detalii în **capitolul 1.**

Capitolul 2 al acestei teze prezintă dezvoltarea unui pachet de acțiuni de suport comunitar implementate în trei municipalități din America Latină, în Columbia, Mexic și Peru. Acțiunile de suport comunitar s-au bazat pe cadrul: *Institute for Health Care Improvement's framework for going to full scale* și au inclus: (i) implicarea unui consiliu consultativ comunitar, (ii) implicarea unui campion de proiect, (iii) mecanisme de adoptare, (iv) sisteme de suport și (v) o campanie de comunicare. Cercetarea din capitolul 2 a arătat că în planificarea suportului comunitar este important să se implice și să se țină cont de perspectivele stakeholderilor locali.

Capitolul 3 a folosit un design pre-post cvasi-experimental pentru a investiga efectul suportului comunitar menționat mai sus asupra implementării programului de screening de către lucrătorii medicali. Mai mult, studiul a explorat mecanisme de impact care explică acest efect. Rezultatele au arătat că suportul comunitar a avut un efect semnificativ asupra implementării programului de screening. De asemenea, analizele statistice au arătat că suportul comunitar a avut un efect pozitiv indirect asupra auto-eficacității lucrătorilor medicali de a implementa programul, efectul fiind mediat de percepția acestui suport.

Capitolul 4 a urmărit să ofere o evaluare și o comparație a costurilor implementării programului de screening și intervenții scurte în cele trei țări din America Latină menționate mai sus. În plus, au fost evaluate costurile a trei strategii de implementare: training standard & pachet clinic, training intensiv & pachet clinic, și suport comunitar. Rezultatele au arătat că costurile pentru o ședință de screening au variat între 0,67 Int$ și 2,57 Int$ și au fost comparabile în cele trei țări, fiind determinate în principal de salariile lucrătorilor medicali. Costurile strategiilor de implementare au variat între 1,24 Int$ și 6,17 Int$ per sesiune suplimentară de screening. În toate cele trei țări, trainingul standard pare a fi o strategie promițătoare de implementare a programului de screening și intervenții scurte, cu un cost relativ redus.

Capitolul 5 a explorat beneficiile economice ale extinderii programului de screening și intervenții scurte la nivel național, concentrându-se pe exemplul Mexicului. Pentru aceasta, a fost utilizat formatul *Return on Investment* prin care atât investițiile cât și rezultatele programului au fost exprimate în termeni financiari. Analizele statistice au indicat că în cazul implementării la nivel național a acestui program de sănătate în Mexic, pentru o perioadă de zece ani, câștigurile financiare ar fi estimate să depășească investițiile. Acest lucru ar duce la un randament finaciar de până la 110%. De asemenea, prin implementarea acestui program, până la 16.000 de decese cauzate de alcool ar putea fi evitate, într-o perioadă de 10 ani.

În **capitolul 6**, principalele rezultate ale tezei sunt prezentate, alături de implicații și sugestii pentru cercetări viitoare, considerații metodologice și concluzii finale.

A

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ADRIANA
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About the author

Adriana Solovei was born on July 14th 1992 in Șoldănești, Republic of Moldova. After graduating from highschool in 2010 (Chișinău, Republic of Moldova), she started her Bachelor's education at the *Babeș - Bolyai* University in Cluj-Napoca, Romania, in the field of Journalism and Media Studies. She graduated in 2013 as the valedictorian student of her cohort. Afterwards, she spent a gap year in the Netherlands, as an international volunteer through the European Voluntary Service of the European Commission. Before starting her Master's studies, she spent one year in her home-country Moldova, working as a programme coordinator at the Independent Journalism Center, in Chișinău. In 2015 she started a pre-master at the renowned Communication Science programme at the University of Amsterdam, and continued there with a two-year Research Master in Persuasive Communication, which she completed in February 2018, *cum laude*. In March 2018 she started to work as a PhD candidate at the Department of Health Promotion of Maastricht University and was supervised by dr. Liesbeth Mercken, dr. Eva Jane Llopis and prof. dr. Hein de Vries. Until June 2022 she worked on several studies for her dissertation and combined her research with various teaching responsibilities, obtaining her University Teaching Qualification in 2021. Adriana presented her research work at several national and international conferences. Currently, Adriana works as a postdoctoral researcher in health communication at the Department of Communication Science, University of Amsterdam.

DISCUSSING ALCOHOL

ADRIANA SOLOVEI