Guidance for the future governance of delivering screening and brief intervention programmes for heavy drinking in primary health care, based on the findings of the ODHIN Project

THE ODHIN CONSORTIUM

Edited by Peter Anderson, Fleur Braddick and Jillian Reynolds

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This e-reader is authored by the ODHIN Consortium*

The ODHIN Consortium is formed by over 50 scientists from 19 partner institutions located in nine European countries. This multidisciplinary team of psychiatrists, psychologists, primary health care practitioners, health economists, public health specialists, public managers and political scientists has worked together between 2011 and 2014 with the aim of improving the delivery of health care interventions by understanding how to better translate the results of clinical research into everyday practice.

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1. INTRODUCTION

The ODHIN project[1] (Optimizing delivery of health care interventions) is a four-year project (2011-2014) co-financed under the under the 7th Framework Programme of the European Commission to study how best to increase the delivery of screening and brief advice programmes for heavy drinking in primary health care.

The project addressed five questions:

1. What are general practitioners' attitudes and views to delivering screening and brief advice programmes for heavy drinking?
2. What does the published scientific literature tell to us about the best ways to improve the volume of screening and brief advice programmes for heavy drinking delivered in primary health care?
3. Can we increase the volume of screening and brief advice programmes for heavy drinking delivered in primary health care by providing training and support, financial reimbursement and the use of internet-based brief advice programmes for identified heavy drinkers?
4. How cost effective are strategies to encourage primary health care providers to deliver screening and brief advice programmes for heavy drinking?
5. How can we assess screening and brief advice programmes for heavy drinking at the country level?

In this book, we present the overall findings of the ODHIN project, and we offer guidance for the future governance of delivering screening and brief intervention (SBI) programmes for heavy drinking in primary health care.

First, we remind ourselves of the evidence of the impact of alcohol consumption on health, also documenting the health benefits that can accrue from reduced drinking; second, we discuss how best to identify heavy drinkers in primary health care settings; and, third, we summarize the evidence for the effectiveness and cost-effectiveness of screening and brief advice programmes delivered in primary health care. We continue with four sub-chapters summarizing the ODHIN findings, and then conclude, reminding us of the core challenges facing the implementation of screening and brief advice programmes for heavy drinking in primary health care, and how these might be overcome, with high-level guidance for practitioners and commissioners and funders of health services.

[1] http://www.odhinproject.eu

2. IMPACT OF ALCOHOL CONSUMPTION ON HEALTH

Alcohol consumption is a wholly or contributory cause for more than 200 diseases, injuries and other health conditions with ICD-10 codes, Box 1 (World Health Organization 2014). For most diseases and injuries, there is a dose–response relationship with alcohol. Not only the volume of alcohol consumed, but also the pattern of drinking over time affects the risks of harm. Patterns of drinking are linked to injuries (both unintentional and intentional) and risk of cardiovascular diseases (mainly ischaemic heart disease and ischaemic stroke). The cardio-protective effect of low-risk patterns of alcohol consumption disappears completely in the presence of heavy episodic drinking (Roerecke & Rehm 2010).

Age, gender and socio-economic status impact the relationship between alcohol consumption and harm. Children, adolescents and older people are more vulnerable to alcohol-related harm from a given volume of alcohol than other age groups. An increased burden of alcohol-related disease among men is largely explained by the fact that compared to women, men are less often abstainers, drink more frequently and in larger quantities. When the number of health and social consequences is considered for a given level of alcohol use or drinking pattern, sex differences for social outcomes reduce significantly or even reverse. One explanation is the higher prevalence of injuries among men; however, for health outcomes such as cancers, gastrointestinal diseases or cardiovascular diseases, the same level of consumption leads to more pronounced outcomes for women. In addition, women who drink during pregnancy may increase the risk of foetal alcohol spectrum disorder, and other preventable health conditions in their new-borns.

Surveys indicate that there are more drinkers, more drinking occasions and more drinkers with low-risk drinking patterns in higher socioeconomic groups, while abstainers are more common in the poorer social groups. However, people with lower socioeconomic status are more vulnerable to tangible problems and consequences of alcohol consumption (Grittner et al. 2012). One explanation for the potentially greater vulnerability among lower socioeconomic groups is that they are less able to avoid adverse consequences of their behaviour due to a lack of resources. For example, individuals with higher socioeconomic status may be more able to choose safer environments in which to drink, purchase social or spatial buffering of their behaviour, and have better access to high-quality health care services.

A European study estimated the risk of dying from alcohol before the age of 70 years related to daily alcohol consumption for European men and women, Figure 1 (Rehm et al 2014). Combining the risk of death from disease and the risk of death from injuries, the risk of death increased with the level of alcohol consumption for both men and women, with beyond about 30 grams of alcohol a day, the risk for men greater than the risk for women at any given level of alcohol consumption. At a consumption level of 60 grams a day, there was nearly a 4% chance for women dying from alcohol before the age of 70 years, and more than a 5% chance for men.

Box 1

Major disease and injury categories causally impacted by alcohol consumption
Source, which includes supporting references: (World Health Organization 2014)

Neuropsychiatric conditions: alcohol use disorders are the most important neuropsychiatric conditions caused by alcohol consumption. Epilepsy is another disease causally impacted by alcohol, over and above withdrawal-induced seizures. Alcohol consumption is associated with many other neuropsychiatric conditions, such as depression or anxiety disorders, but the complexity of the pathways of these associations currently prevents their inclusion in the estimates of alcohol-attributable disease burden.

Gastrointestinal diseases: liver cirrhosis and pancreatitis (both acute and chronic) are causally related to alcohol consumption. Higher levels of alcohol consumption create an exponential increase in risk. The impact of alcohol is so important that for both disease categories there are subcategories which are labelled as “alcoholic” or “alcohol-induced” in the ICD.

Cancers: alcohol consumption has been identified as carcinogenic for the following cancer categories cancer of the mouth, nasopharynx, other pharynx and oropharynx, laryngeal cancer, oesophageal cancer, colon and rectum cancer, liver cancer and female breast cancer. In addition, alcohol consumption is likely to cause pancreatic cancer. The higher the consumption, the greater the risk for these cancers, with consumption as low as one drink per day causing significantly increased risk for some cancers, such as female breast cancer.

Intentional injuries: alcohol consumption, especially heavy drinking, has been causally linked to suicide and violence.

Unintentional injuries: almost all categories of unintentional injuries are impacted by alcohol consumption. The effect is strongly linked to the alcohol concentration in the blood and the resulting effects on psychomotor abilities. Higher levels of alcohol consumption create an exponential increase in risk.

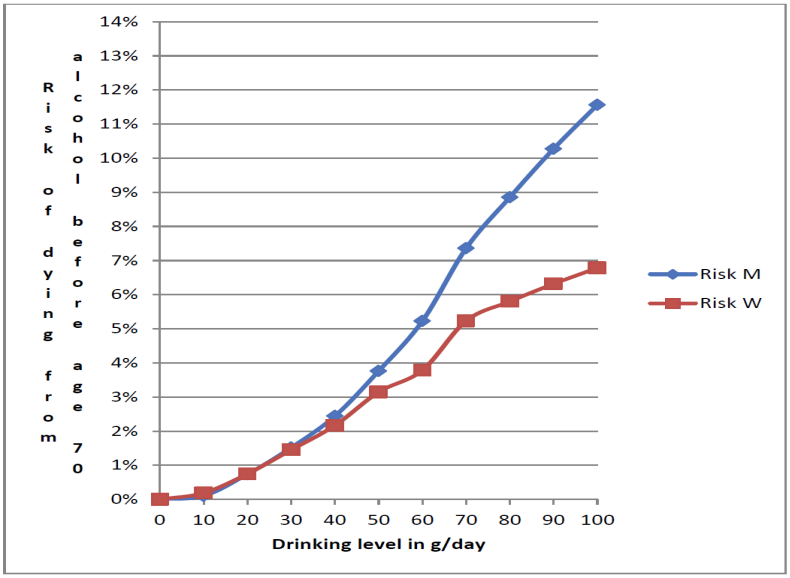
Cardiovascular diseases (CVD): the relationship between alcohol consumption and cardiovascular diseases is complex. The beneficial cardioprotective effect of relatively low levels of drinking for ischaemic heart disease and ischaemic stroke disappears with heavy drinking occasions. Moreover, alcohol consumption has detrimental effects on hypertension, atrial fibrillation and haemorrhagic stroke, regardless of the drinking pattern.

Fetal alcohol syndrome (FAS) and preterm birth complications: alcohol consumption by an expectant mother may cause these conditions that are detrimental to the health of a newborn infant.

Diabetes mellitus: a dual relationship exists, whereby a low-risk pattern of drinking may be beneficial while heavy drinking is detrimental.

Infectious diseases: harmful use of alcohol weakens the immune system thus enabling development of pneumonia and tuberculosis. This effect is markedly more pronounced when associated with heavy drinking, and there may be a threshold effect, meaning that disease symptoms manifest mainly if a person drinks above a certain level of heavy drinking.

Figure 1 *Risk of dying prematurely (up to age 70) due to alcohol consumption by drinking level in grams of pure alcohol per day (average for 6 EU countries based on mortality profile for 2012). Source: (Rehm et al. 2014).*



M = men
W = women

The implication of the relationship between alcohol consumption and harm is that any reduction in the dose of alcohol consumed, as well as in the frequency of drinking occasions and the amount drunk on a single occasion, will have an immediate impact in reducing alcohol-related injuries and those cardiovascular events related to heavy episodic drinking (Rehm et al. 2011). Even some chronic conditions, such as mortality from liver cirrhosis, also demonstrate an immediacy of impact from reductions in consumption. Other conditions, such as alcohol-related cancers will have longer time spans before interventions could show effects, with some reductions in risk occurring soon after changes in consumption, but with the full extent of reductions in risk not occurring until some 15 -20 years after reductions of alcohol use (Rehm et al. 2007).

Heavy drinkers who reduce their drinking reduce their risk of mortality compared with those who continue heavy drinking (Fillmore et al. 2003; Emberson et al. 2005). The comparison group is important here. In the general population in high-income countries, a sizable proportion of people who quit drinking do so because of illness due to their drinking - for instance, if their doctor told them so. Of course, these people have higher mortality risks than lifetime abstainers or former light drinkers. The effect of a reduction of drinking can be ascertained only in comparison with those who continue their heavy drinking.

Brief advice studies to reduce heavy drinking also find reductions in all-cause mortality with a difference in reduction of 18.3 g of pure alcohol per day between experimental and control group associated with a 43% reduction in mortality (McQueen et al 2011).

The higher the level of drinking, the stronger the effects of a given reduction. For example, based on an hypothetical 40-year-old French man drinking 96 g of pure alcohol per day, a reduction of 36 g of pure alcohol per day results in a reduced one year mortality risk of 119 per 10,000; however, a similar reduction of 36 g from a level of 60 g per day results in a reduced one year mortality risk of 38 per 10,000 (Rehm & Roerecke 2013).

3. EFFECTIVENESS OF BRIEF ADVICE TO REDUCE HEAVY DRINKING IN PRIMARY HEALTH CARE

O'Donnell et al (2014) recently under took a systematic review of 24 systematic reviews, and this section reports their findings[2]. The review found that that brief advice for heavy drinking was both clinically- and cost-effective (based on a definition of regular average consumption of more than 40g alcohol a day for women and more than 60g a day for men (Rehm *et al.*, 2004)) when delivered in primary health care settings.

Weekly alcohol consumption was the most commonly reported outcome, and a meta-analysis by Kaner et al. (2007) showed that compared with control conditions, brief advice reduced the quantity of alcohol drunk by 38 g per week (95%CI (confidence interval): 23-54g). Kaner et al. (2007) scored studies on a scale measuring degree of efficacy (a study performed under ideal conditions) or degree of effectiveness (a study performed in routine circumstances) and found no relationship between degree of efficacy or effectiveness and outcome. Systematic reviews and meta-analyses find significant reductions in control groups (Bernstein et al. 2010), suggesting that assessment procedures themselves may lead to reductions in alcohol consumption that also diminish differences between intervention and control groups.

Delivery by a range of practitioners in primary healthcare settings has beneficial effects (Huibers *et al.*, 2003), although findings of one review suggests that the effect-sizes are greater if delivered by doctors (Sullivan *et al.*, 2011). Finally, whilst available evidence remains limited, results from one meta-analysis found indications of the effectiveness of brief advice for heavy drinking on mortality outcomes, estimating a reduction amongst problem drinkers of about 23%-36% (Cuijpers *et al.*, 2004). A trial result not included in the systematic review of O'Donnell et al (2014) is the SIPS study, which found equal improvement in AUDIT negative status between patients who received simple feedback and a patient information leaflet, those who received five minutes structured advice, and those who received 20 minutes brief lifestyle counselling (Kaner et al. 2013).

Although overall the evidence implies that brief advice for heavy drinking is equally effective in men and women (Ballesteros *et al.*, 2003; Bertholet *et al.*, 2005; Whitlock *et al.*, 2004), it is also the case that most studies to date have either focussed on male drinkers or not reported the data disaggregated by sex (Berglund *et al.*, 2003; Kaner *et al.*, 2007; Moyer *et al.*, 2002). One review suggested that brief advice for heavy drinking may not be consistently helpful to women, or at least the results are more equivocal (Chang, 2002).

Further, whilst brief advice for heavy drinking appears to improve alcohol-related outcomes for adults aged eighteen years and over, evidence on effectiveness at either end of the age spectrum is less conclusive. Previous research (predominantly conducted in US-based college settings) suggests that effects appear less long-lived for young adults and college-age students, and there is insufficient evidence of effectiveness in both adolescents (Jackson *et al.*, 2010; Kaner *et al.*, 2007; Latimer *et al.*, 2010) and older adults (Jonas *et al.*, 2012; Kaner *et al.*, 2007), with only one review showing effect in adults aged 65 years and over (Whitlock *et al.*, 2004)).

There is limited consideration of the impact of socio-economic status on the effectiveness of brief advice for heavy drinking in most reviews, with a general acknowledgment of the lack of evidence for disadvantaged populations in those that did (Gordon *et al.*, 2007; Jackson *et al.*, 2010; Littlejohn, 2006).

[2] See O'Donnell et al (2014) for additional supporting references.

Finally, in terms of the existing health status of participants, a number of reviews suggest that brief advice for heavy drinking is most impactful in non-treatment seeking, non-dependent patient populations (Babor *et al.*, 2012; Ballesteros *et al.*, 2004; Moyer *et al.*, 2002). However other reviews highlight the equivocal nature of the existing evidence base (Jackson *et al.*, 2010), and emphasise the exclusion or lack of disaggregated data in primary studies for dependent versus non-dependent patients (Berglund *et al.*, 2003; Solberg *et al.*, 2008). There is also a lack of conclusive evidence on the use of brief advice for heavy drinking in patients with co-morbid medical or psychiatric conditions (Berglund *et al.*, 2003; Jackson *et al.*, 2010; Jonas *et al.*, 2012).

Research shows that effect sizes are largest at the earliest follow-up points, with decay in intervention effects over time. In addition, although recent evidence suggests that greater effect sizes may be achieved with brief multi-contact interventions (each contact up to 15 minutes), compared with very brief (up to 5 minutes) and brief (more than 5 minutes, up to 15 minutes) single-contact interventions (Jonas *et al.*, 2012), the 2007 Cochrane Review found that longer (more intensive) brief interventions offered no significant additional benefit over shorter input (Kaner *et al.*, 2007).

Few reviews considered the impact of the actual content of interventions on their effectiveness (Berglund *et al.*, 2003; Cuijpers *et al.*, 2004; Jonas *et al.*, 2012; Whitlock *et al.*, 2004). In general, these reviews highlighted a lack of available evidence on this issue, in particular due to the heterogeneity of the included studies. Whitlock et al (2004) reported that all interventions demonstrating statistically significant improvements in alcohol outcomes included at least two of the following three elements - feedback, advice and goal-setting - but added that given the most effective interventions were multi-contact, inevitably these also comprised additional assistance and follow-up. Further, as Beich (2003) highlights, conversations about alcohol can take place in different ways in primary health care settings; thus the effectiveness of brief advice may be as much down to the well-established 'helping relationship' between patient and practitioner as the frequency or content of contact per se.

4. IDENTIFYING HEAVY DRINKERS IN PRIMARY HEALTH CARE

Out of a wide range of screening instruments (including single-question screening; AUDIT; CAGE; Michigan Alcoholism Screening Test; Rapid Alcohol Problems Screen; and the Alcohol-Related Problems Survey), systematic reviews have found that the full AUDIT instrument, the abbreviated AUDIT-C, and single-question screening (asking, "How many times in the past year have you had 5 [for men] or 4 [for women and all adults older than 65 years] or more drinks in a day?") have the best performance characteristics as screening instruments (Jonas et al 2012).

The performance of a screening instrument is assessed through its sensitivity and specificity. **Sensitivity** (also called the *true positive rate*) measures the proportion of actual positives which are correctly identified as such (e.g. the percentage of all drinkers who are correctly identified as being heavy drinkers). **Specificity** (sometimes called the *true negative rate*) measures the proportion of negatives which are correctly identified as such (e.g. the percentage of all drinkers who are correctly identified as not being a heavy drinker). The primary reference standard for estimating sensitivity and specificity is commonly recommended limits on drinking. Since many studies are based on US samples, this is commonly US-based recommended limits of 196 grams of alcohol per week for men and 98 grams of alcohol per week for women, an average of 28 grams of alcohol per day for men and 14 grams a day for women.

Based on these (or similar reference standards), the full ten question AUDIT shows an optimal balance of sensitivity and specificity as a screening instrument when cut-off points of 4 or more (sensitivity, 84% to 85%; specificity, 77% to 84%) or 5 or more (sensitivity, 70% to 92%; specificity, 73% to 94%) are used; use of higher cut-off points increases specificity to an extent but reduces sensitivity (Jonas et al 2012). The sensitivity and specificity of the three AUDIT-C questionnaire are best balanced at cut-off points of 4 or more (74% to 76% and 80% to 83%, respectively) and 3 or more (74% to 88% and 64% to 83%, respectively). Single-question screening has a reported sensitivity of 82% to 87% and specificity of 61% to 79%.

There are advantages and disadvantages between using the full AUDIT, AUDIT-C and the single question. AUDIT-C has the advantage that it only includes three questions about alcohol and thus is quicker and easier to use than the full ten item AUDIT. Single-question screening is another option, but there are far fewer studies of its validity than of AUDIT-C. AUDIT-C scores have been associated with several alcohol- related health risks, including alcohol dependence, severity of problem drinking, postoperative complications, hospitalizations for gastrointestinal conditions, trauma, and mortality, generally in a dose–response manner (Rubinsky et al 2013).

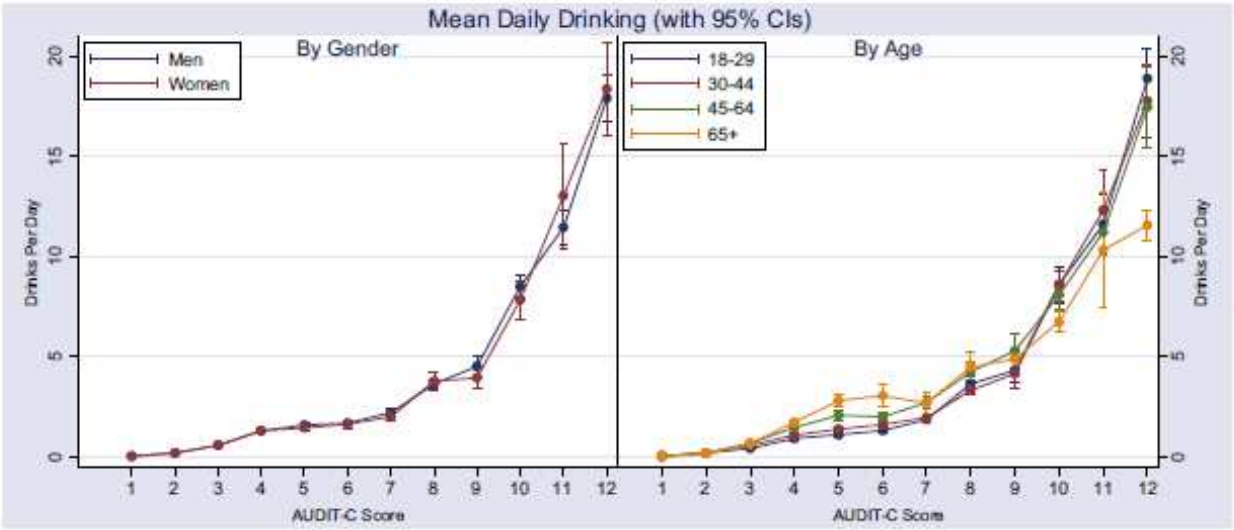
The 3 questions of AUDIT-C (Box 2) assess different dimensions of alcohol consumption, with each question scored on a different scale (i.e., drinking days per week, drinks per drinking day, and frequency of heavy drinking). Therefore, the summed total score can reflect varying patterns of typical drinking and atypical heavy drinking, and increasing scores do not necessarily reflect linear increases in a given dimension of consumption. Further, reported consumption on simple global questions about typical drinking, such as first 2 items of the AUDIT-C, is often lower than estimated consumption based on in-depth assessments that include beverage-specific information on the respondent's usual drink size and brand (Rubinsky et al 2013). In AUDIT-C, each question is scored 0 to 4 points and summed for a total score ranging from 1 to 12 points among drinkers.

***Box 2** AUDIT-C*

AUDIT-C Questions:	Scoring system					Your score:
	0	**1**	**2**	**3**	**4**	
How often do you have a drink containing alcohol?	Never	Monthly or less	2 - 4 times per month	2 - 3 times per week	4+ times per week	
How many units of alcohol do you drink on a typical day when you are drinking?	1 -2	3 - 4	5 – 6	7 - 9	10+	
How often do you have 6 or more units on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
					Total:	

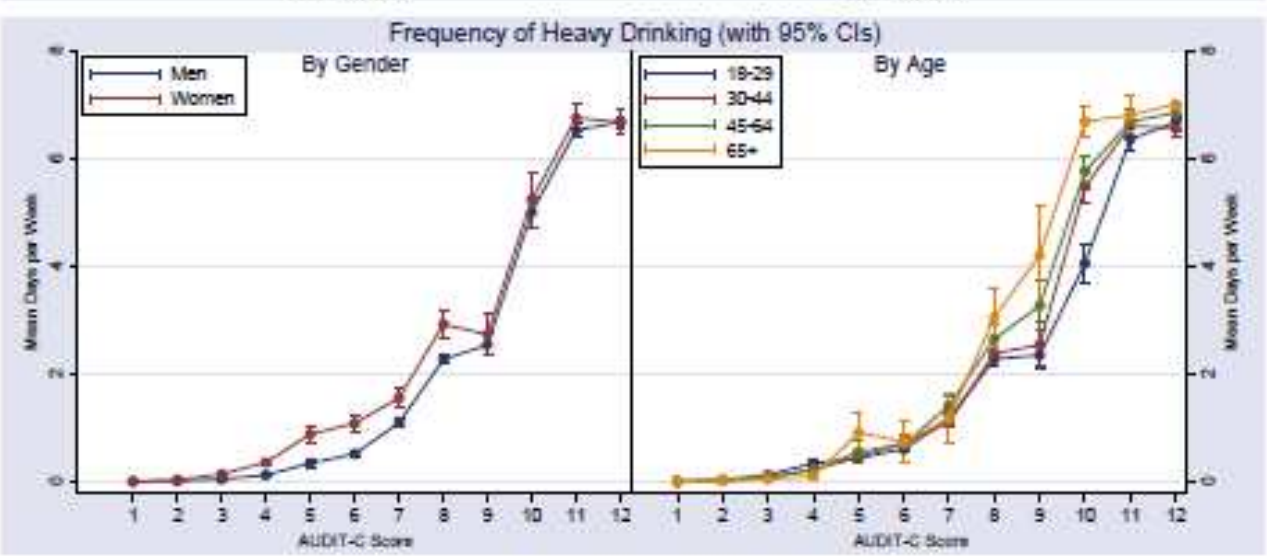
Analyses of data from more than 26,000 respondents of the US 2001 to 2002 National Epidemiologic Survey on Alcohol and Related Conditions find that mean daily drinking increases exponentially across increasing AUDIT-C scores, from < 0.1 drink/day at a score of 1 to 18 drinks/day at a score of 12, Figure 2 (Rubinsky et al 2013). The relationship between AUDIT-C score and mean daily drinking was not modified by gender, and estimates for men and women were similar at every score. Age, however, did modify the relationship, with the oldest age group (65+ years) having the highest mean daily drinking at AUDIT-C scores 4 to 6 but the lowest consumption at scores 10 to 12.

***Figure 2**. Drinks per day across AUDIT-C scores. Each drink contains 14 grams of alcohol. Source: Rubinsky et al. (2013).*



The frequency of heavy drinking (i.e., drinking at levels that exceeded US-recommended maximum daily limits, 56 grams alcohol for men and 42 grams for women), increased with increasing AUDIT-C scores, more steeply at higher scores, Figure 3.

***Figure 3**. Frequency of heavy drinking across AUDIT-C scores.*
Source: Rubinsky et al. (2013).



Cut offs for case positives Cut-off points for screening instruments are often based on receiver operating characteristic (ROC) curves, which are graphical plots plotting the fraction of true positives out of the total actual positives (true positive rate) versus the fraction of false positives out of the total actual negatives (false positive rate), at various threshold settings. As noted above, for alcohol screening questionnaires, sensitivity and specificity at different scores are simply dependent on the reference cut-off points of drinking limits used for public education, and these vary from country to country. A more logical approach would be to use cut offs determined by risks of negative outcomes due to alcohol consumption, with risk of death being the determining outcome.

Twenty grams of alcohol per day is equivalent to an AUDIT-C score of 5 (Rubinsky et al 2013). In this case, a cut off of more than 5 (i.e., an AUDIT-C score of 6 or more, equivalent to 24 grams of alcohol per day), would be a logical cut-off point for defining a case positive, if a case positive is accepted as a level of alcohol consumption with a greater than 1 in 100 risk of dying from an alcohol-related condition before the age of 70 years (NHMRC 2009). Given that there is no difference in risk of death between men and women at this level of consumption (Rehm et al. 2014), and, given that the relationship between an AUDIT-C score of 6 and drinks per day is identical between men and women (Rubinsky et al 2013), there should be no difference between men and women in the cut off score. A cut-off AUDIT-C score of 6 reduces the risk of false positives (i.e., drinkers with a positive AUDIT-C score, but who actually consume less than 24g alcohol a day), although it might increase the risk of false negatives (i.e., drinkers with a negative AUDIT-C score, but who actually consume more than 24g alcohol a day), although false positives seem a more common problem than false negatives (Delaney et al 2014).

Given that the outcome of a positive screen is the offer of brief advice, an alternative argument for the cut-off point would be the baseline levels of alcohol consumption in the randomized controlled trials that have investigated the effectiveness of primary health care delivered brief advice. When reported, these range from 89 to 456 grams per week, with an overall mean across trials of 313

grams per week (Kaner et al. 2007). For men, when reported, the mean baseline consumption was 377 grams of alcohol per week; and, for women, when reported, 219 grams of alcohol per week. At a mean of 313 grams per week (45 grams per day), the equivalent AUDIT-C cut off would be 8 ((Rubinsky et al 2013).

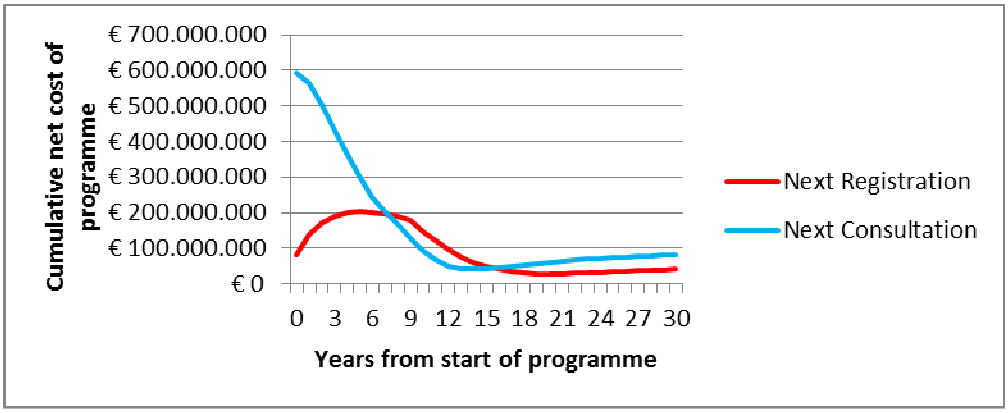
There are three main ways to implement screening: as a preventive measure, screening all patients as they consult their primary health care provider; as a preventive measure, screening all patients as they newly register with a primary health care centre; or as a measure, screening patients with relevant co-morbid conditions, such as hypertension. Each approach has its advantages and disadvantages.

In England, for example, screening patients with AUDIT-C on registration with a family doctor would steadily capture about 40% of the population over a 10-year programme (Purshouse et al. 2013). The registration approach, delivered by a practice nurse with subsequent five minutes of brief advice, would cost the health service £95 million over 10 years, offset by savings to the health care system of £215 million over 30 years (i.e., a net save of £120 million over 30 years). Health gains over the same period amount to 32,000 quality-adjusted life years (QALYs, which, taking into account both the quantity and quality of life generated by healthcare interventions, is the arithmetic product of life expectancy and a measure of the quality of the remaining life-years), with a cost-effectiveness of £6900 per QALY gained compared with no programme. In contrast, screening patients with the full AUDIT at next primary health care consultation would capture 96% of the population over a ten year period, but with high resourcing needs in the first year. The consultation approach, delivered by a doctor with subsequent five minutes of brief advice, would cost the health service £702 million over 10 years, offset by savings to the health care system of £594 million over 30 years (i.e., a net cost of £108 million over 30 years). Health gains over the same period amount to 92,000 QALYs, with an incremental cost-effectiveness ratio of £1175 per QALY gained compared with current practice.

In Italy, as another example studied in the ODHIN project, the population coverage for a programme of screening at next GP registration is estimated to be 63% of the total adult population, leading to 32% of people receiving a brief intervention during the 10 years of the programme (Angus et al. 2014). Coverage is spread relatively evenly across the 10 years, peaking in year 1 with 11% of the population being screened. A programme of screening at next consultation is estimated to capture 97% of the population over 10 years, with 49% of adults receiving an intervention as a result; however this is heavily loaded towards the start of the programme, with 84%% of people being screened in the first year. Over the course of 30 years, a programme of screening at next GP registration is estimated to result in 7200 fewer alcohol-attributable deaths, predominantly amongst men (66%) and from chronic (68%), rather than acute causes. The total number of hospitalisations saved by the programme is estimated to be 91,700, also largely amongst men (72%) and for chronic conditions (67%). The cost of delivering the programme over ten years is estimated to be €411 million. This is offset by a total reduction in hospital costs over 30 years of €370 million. The total gain in QALYs is estimated to be 75,200 giving an incremental cost-effectiveness ratio (ICER) of €550/QALY, suggesting that such a programme is close to being cost-neutral. As a large proportion of the health benefits are experienced by men (69% of total QALYs), delivering programmes to men only is estimated to be cost-saving, although the estimated ICER for a female-only programme of €3100/QALY is still well within the recommended Italian threshold of €25000-€40000/QALY. As a programme at next GP consultation has a wider coverage, it is estimated to produce even greater improvements in public health, with 12,400 fewer alcohol-attributable deaths and 153,700 fewer hospital admissions over 30 years. The cost of delivery is also higher, at €687 million, although this is offset by cumulative healthcare savings of €605 million, making the programme around twice as expensive as screening at next registration. Health savings are estimated to be 139,200 additional

QALYs, giving an ICER of €590/QALY and suggesting there is little to choose between the two programmes in terms of cost-effectiveness. It should be noted that as the majority of screening and brief advice takes place in the first year of the programme, the bulk of the delivery costs are incurred up front, whilst the health care savings are accrued over a longer time frame. This is in contrast to screening at next registration, where the costs are spread more evenly across the duration of the programme, Figure 4.

Figure 4 *Cumulative net costs of modelled screening programmes (implementation costs less cost savings to healthcare provider) in Italy.*



A programme of screening and brief advice at next GP registration or next consultation is also likely to be cost-effective in the Netherlands (Angus et al. 2014). The outcome measures observed were the costs of screening, the reduction in costs to the Dutch healthcare system as a result of reduced morbidity and mortality and the improvement in health outcomes measured in QALYs. The resulting incremental cost-effectiveness ratios for all scenarios suggest that either of the modelled programmes would be highly cost-effective when compared with a policy of no programme, under current Dutch guidelines, with a policy of screening and brief advice at next consultation, using the current AUDIT-C 5/4 screening tool bringing the greatest net benefit of all modelled options (at a willingness-to-pay threshold of €20,000/QALY). The cumulative net costs are plotted in Figure 5.

A programme of SBIs at next GP registration or next consultation is also highly likely to be cost-effective in Poland (Angus et al. 2014). The outcome measures observed were the costs of screening, the reduction in costs to the Polish healthcare system as a result of reduced morbidity and mortality and the improvement in health outcomes measured in QALYs, in line with standard practice for economic evaluation. The resulting incremental cost-effectiveness ratios for all scenarios suggest that either of the modelled SBI programmes would be highly likely to be considered cost-effective when compared with a policy of no SBI, under current Polish guidelines, with a policy of SBI at next consultation, using the recommended AUDIT-C 5/4 screening tool bringing the greatest net benefit of all modelled options (at a willingness-to-pay threshold of 25000 zł/QALY). The cumulative net costs are plotted in Figure 6.

It should be noted that screening and brief advice programmes are estimated to be more expensive in countries with higher alcohol-related mortality, where more people will be captured by the programme and with lower alcohol-related morbidity rates (Angus et al. 2014). The health impact of screening and brief advice programmes is estimated to be greater in countries where alcohol consumption is greater and where more people are screened.

Figure 5 *Cumulative net costs of modelled screening programmes (implementation costs less cost savings to healthcare provider) in Netherlands.*

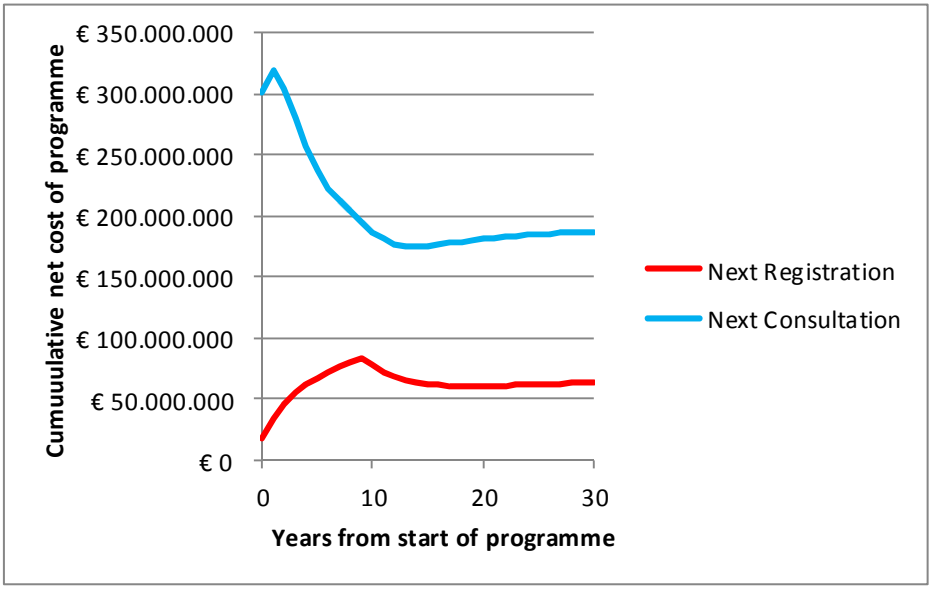
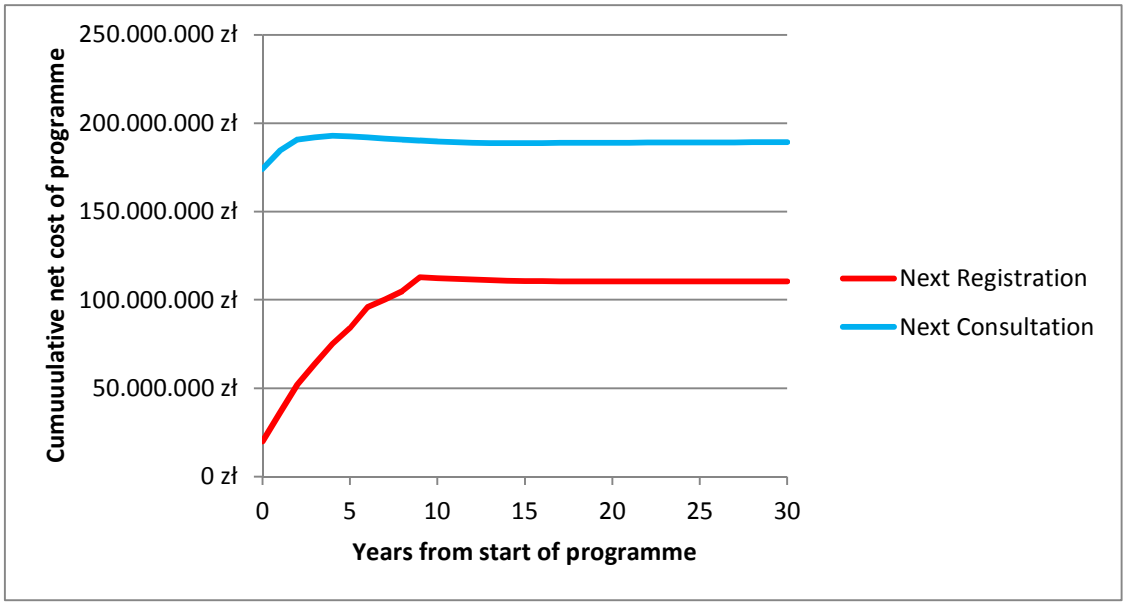


Figure 6 *Cumulative net costs of modelled screening programmes (implementation costs less cost savings to healthcare provider) in Poland.*



Alcohol and comorbid conditions

An alternative screening approach is to only screen patients with relevant co-morbid conditions. One such condition is raised blood pressure. For example, in Europe, over two-fifths of 35-74 year old Europeans are hypertensive (threshold 140/90 mm Hg) (Wolf-Maier et al. 2003), whereas one in eight 15-64 year old Europeans drink heavily (threshold of alcohol per day 60g men; 40g women) (Rehm et al. 2012). Amongst 13,000 PHC patients across six European countries, 42% of male and 49% of female patients aged 18-64 years with heavy drinking also had hypertension (Rehm et al. 2015), and alcohol is itself a risk factor for hypertension (Taylor et al. 2009). Both hypertension and heavy drinking are also both seriously undertreated. In Europe, about 88% of all hypertensive

patients based on a threshold of 140/90 were inadequately treated (Pereira et al. 2009) and only one in ten patients with alcohol use disorders are offered any kind of treatment (Alonso et al. 2005). Lifestyle reductions in alcohol consumption are found to lead to clinically significant reductions in blood pressure amongst normotensive and hypertensive drinkers in studies that evaluated the impact of brief advice to heavy drinkers and that, incidentally, measured blood pressure (Xin et al. 2011). Thus, all patients with a documented diagnosis of hypertension, or a clinic blood pressure of more than 160/100, could be screened with AUDIT-C. The attributable fraction of alcohol as a cause of hypertension in those diagnosed with hypertension increases from about 13% at 10g per day upwards to 76% at 100g/day (NHMRC 2009).

5. KEY ODHIN FINDINGS

In this section, we summarize the key findings of the ODHIN study: a survey of 2345 GPs views on screening and brief advice for alcohol (WP4); a systematic review and meta-regression analysis of 29 studies of determinants of successful implementation of screening and brief advice programmes for alcohol (WP2); the effectiveness and cost effectiveness results of a randomized controlled trial to increase primary health care screening and brief advice activity (WP3 and WP5); and, an assessment of the implementation of screening and brief advice programmes throughout Europe (WP6).

5.1 General Practitioners views on screening and brief advice for alcohol

Through a survey conducted in 2012 (in England, conducted in 2009), 2345 GPs from Catalonia, Czech Republic, England, Italy, the Netherlands, Poland, Portugal, and Slovenia[3] were asked for their views and attitudes in giving advice to heavy drinkers, with a view to better understanding of how brief advice activity could be increased (Anderson et al. 2014; Wojnar et al. 2014).

On average, the GPs reported that they had received about ten hours of postgraduate education or training on managing alcohol problems. In general, they felt capable[4] of giving advice to heavy drinkers, but were rather neutral in how inclined[5] they were to actually give such advice. The more education on alcohol that the GPs had reporting receiving, the more likely they were to feel able and inclined to deliver brief advice. On average, the GPs reported that they had advised about 10-11 heavy drinking patients over the previous year.

GPs who reported advising a high number of patients for their heavy drinking had three associated characteristics that were statistically significant:

1. GPs who had received more education on managing alcohol problems – for every extra ten hours of education received as part of professional training, two to three more heavy drinking patients were reported as being advised during the previous year, Figure 7.
2. GPs who felt more able to give advice[4] – for every extra point on the ability score, one additional heavy drinking patient was reported as being advised during the previous year, Figure 8.
3. GPs who felt more inclined to give advice[5] – for every extra five points on the inclination score, two additional heavy drinking patients were reported as being advised during the previous year, Figure 9.

[3] GPs were also surveyed in Sweden, but sample size problems and technical difficulties in the completion of the survey instrument raised concerns about the validity of the findings, which are thus excluded.

[4] Role security scale from the short form of the Alcohol and Alcohol Problems Perception Questionnaire (Anderson & Clement 1987).

[5] Therapeutic commitment scale from the short form of the Alcohol and Alcohol Problems Perception Questionnaire (Anderson & Clement 1987).

Figure 7 *Relationship between reported hours of postgraduate education received and reported number of patients advised for heavy drinking in previous year.*

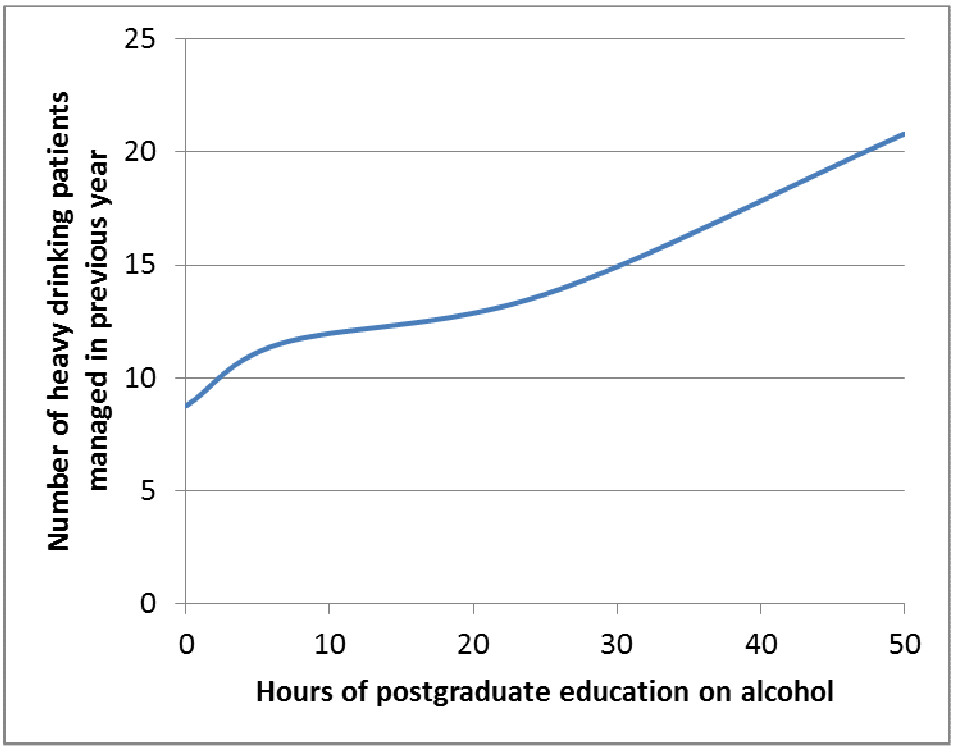


Figure 8 *Relationship between score on ability to deliver brief advice and reported number of patients advised for heavy drinking in previous year.*

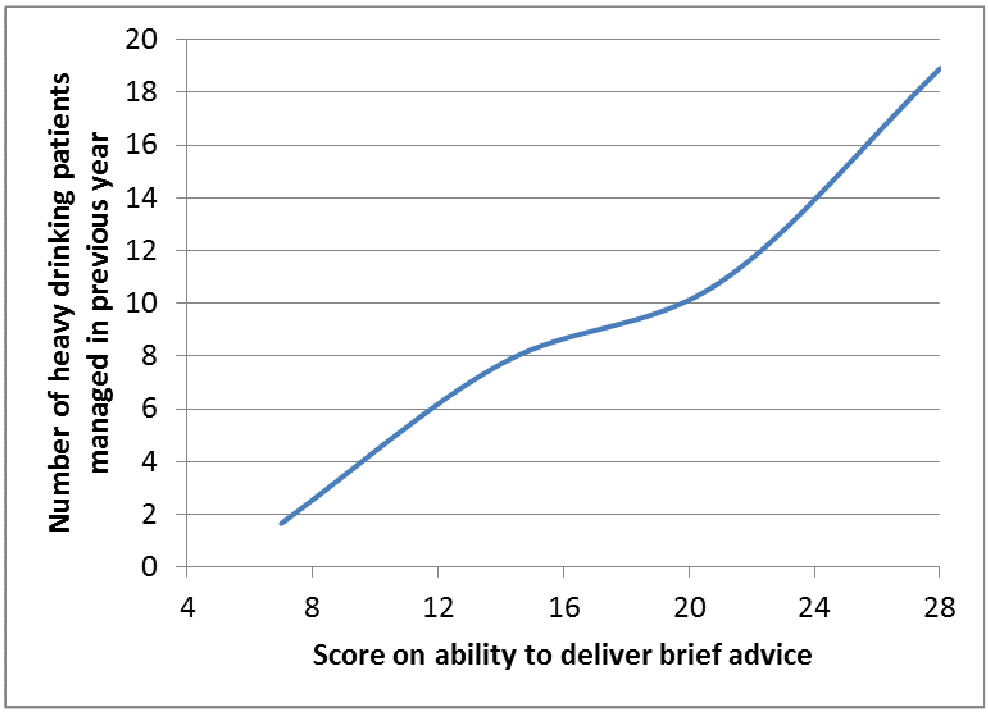
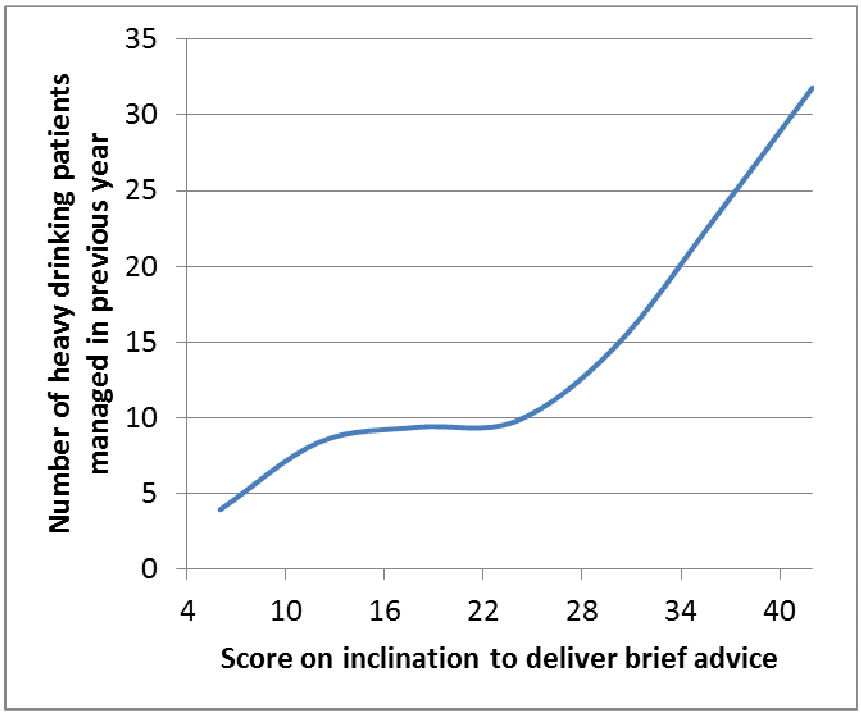


Figure 9 *Relationship between score on inclination to deliver brief advice and reported number of patients advised for heavy drinking in previous year.*



GPs who reported advising few or no patients for their heavy drinking had 2 associated characteristics that were statistically significant:

1. GPs who were more attuned to a *disease model of medicine* rather than a *preventive model of medicine* when dealing with alcohol, Figure 10.
2. GPs who were more likely to think that individuals should be responsible for managing their own drinking, Figure 11.

Figure 10 *Relationship between strength of views that doctors have a disease rather than a preventive model and reported number of patients advised for heavy drinking in previous year.*

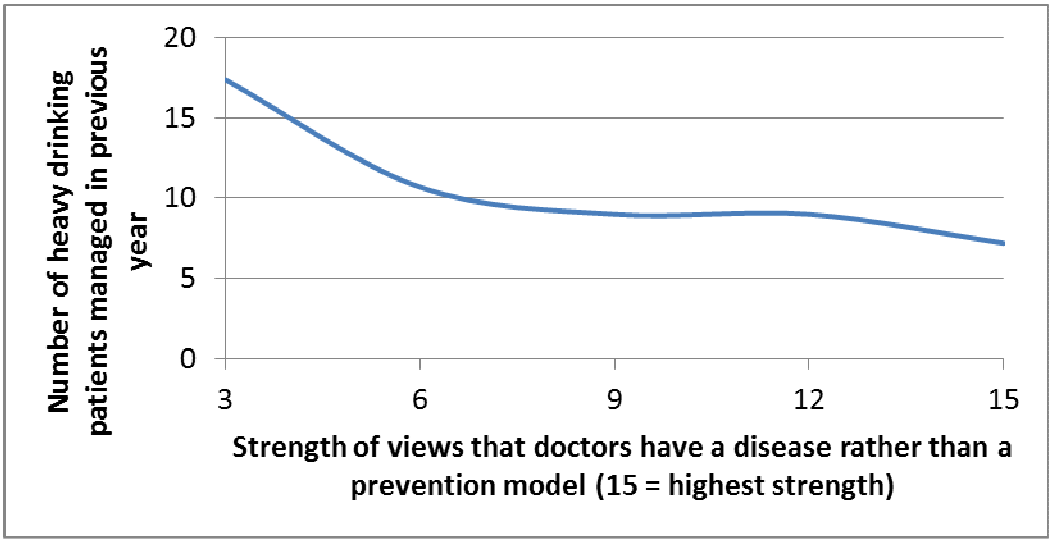
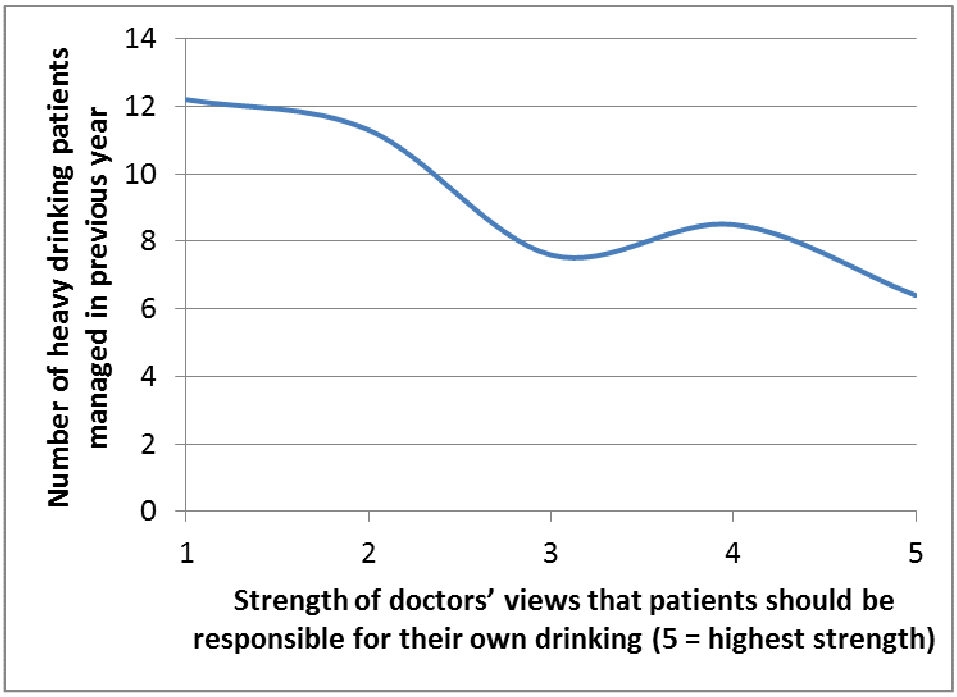


Figure 11 *Relationship between strength of views that patients should be responsible for their own drinking and reported number of patients advised for heavy drinking in previous year.*



GPs who had received more education on alcohol were less likely to adhere to a disease model for alcohol, although not less likely to believe that individuals were responsible themselves for their drinking.

Conclusions:

First, education seems to be related to increased role security, and each of education and role security were associated with a reported increase in the number of patients managed for heavy drinking. This would suggest the importance of scaled-up education and training for managing heavy drinking patients in primary health care settings. Unfortunately, there is very little information available on the extent, uptake and quality of education on alcohol throughout Europe. A survey of European Union countries undertaken at the end of the year 2010, found that in 14 out of 29 countries, training programmes were available for health professionals in screening and brief interventions for alcohol problems. No information was given on the type or length of training, or its uptake (Anderson et al 2012). Across 23 European countries, on a scale from 0 (not included) to 10 (fully included), education on managing hazardous and harmful alcohol consumption in the curriculum of professional training at undergraduate, postgraduate, and continuing professional education levels scored 5 in 2012. Again, no information was given on the type or length of training, or its uptake (Gandin & Scafato 2013).

Training sessions could address knowledge, skills, attitudes and perceived barriers and facilitators for implementing screening and brief advice (Keurhorst et al 2013). Knowledge should include information on the harm done by alcohol and on the evidence base for screening and brief advice programmes; skills should include the use of screening instruments and brief Intervention methods; discussion of attitudes could be based on the role security and therapeutic commitment scales of

the short alcohol and alcohol problems perceptions questionnaire and be embedded in practice based situations; training should include an open discussion of experienced barriers and facilitators, and how barriers can be overcome. Such brief training could be delivered in two one hour face to face events.

Second, doctors believing that having a disease model would impede brief advice activity seemed to impair the respondents own management activity. This might suggest alternative approaches to engaging general practitioners in advising patients with hazardous and harmful alcohol consumption to reduce their alcohol consumption. One option would be to study the extent to which screening and brief advice targeted at comorbid conditions improves delivery. A candidate example here would by high blood pressure. All patients with a documented diagnosis of hypertension, or a clinic blood pressure of more than 160/100, could be screened for their alcohol consummation and offered brief advice in the case of a screen positive. Alternatively, pharmacotherapies could be considered for greater use in primary health care settings. For example, two efficacy studies have evaluated as-needed nalmefene versus placebo in reducing alcohol consumption in out-patients settings with a high risk drinking level (men: >60 g/day; women: >40 g/day) at both screening and randomisation (Gual A et al. 2013; Mann et al. 2013; Van den Brink, W. et al. 2013). The efficacy analyses found significantly superior effects of nalmefene compared to placebo in reducing the number of heavy drinking days [treatment difference: −3.2 days (95% CI: −4.8; −1.6); P < 0.0001] and total alcohol consumption [treatment difference: −14.3 g/day (−20.8; −7.8); P < 0.0001] 6 months after starting treatment. Nalmefene constitutes a new pharmacological treatment paradigm in terms of treatment goal (reduced drinking, rather than abstinence) and dosing regimen (as-needed, rather than at defined intervals).

Third, a belief in individual patient responsibility seemed to impair management activity. This would suggest that patient owned identification and brief advice technologies, that could be explored and developed, might broaden the number of heavy drinkers exposed to actions to reduce their drinking. For example, the widespread use of computers, the Internet, and smartphones has led to the development of electronic systems to deliver screening and brief advice that can potentially address some of the barriers to implementation of traditional face-to-face screening and brief advice. Electronic screening and brief advice has the potential to offer greater flexibility and anonymity for the individual and reach a larger proportion of the in-need population. A systematic review and meta-analysis of 23 studies of the effectiveness of electronic screening and brief intervention (eSBI) over time in non-treatment-seeking hazardous and harmful drinkers found a statistically significant mean difference in grams of ethanol consumed per week between those receiving an eSBI versus controls at up to 3 months (mean difference –32.74, 95% CI –56.80 to –8.68), 3 to less than 6 months (mean difference –17.33, 95% CI –31.82 to –2.84), and from 6 months to less than 12 months follow-up (mean difference –14.91, 95% CI –25.56 to –4.26). No statistically significant difference was found at a follow-up period of 12 months or greater (Donoghue et al 2014).

5.2 Increasing provider activity for screening and brief advice for alcohol

A systematic review and meta-regression analysis of 29 studies of determinants of successful implementation of screening and advice for hazardous and harmful alcohol consumption in primary health care found that professional and patient-oriented implementation strategies could improve screening (standardized effect 0.53;95%-CI 0.28-0.78) and advice (standardized effect 0.64;95%-CI 0.27-1.02) rates (Keurhorst et al. 2015). Overall, implementation strategies that included patient outcomes found no impact on patients' alcohol consumption (standardized effect 0.07; 95%-CI -0.02–0.16).

Eleven studies used professional-oriented implementation strategies (for example education programmes and outreach training), three studies reported organisational-oriented strategies (e.g., delivering counselling by telephone), and one study reported a patient-oriented strategy (e.g., educational materials for patients), See Table 1. Six studies reported a combination of professional-oriented and organisational-oriented interventions. The other eight studies reported various combinations of professional-oriented, organisational-oriented, patient-oriented and financial-oriented strategies.

Table 1 *Implementation strategies and their components*

Combinations of implementation strategy components (EPOC sub category)	Nr of studies
Professional oriented implementation strategies	
Audit and feedback	1
Audit and feedback; educational meeting; educational outreach visits	1
Audit and feedback; educational meeting	1
Educational meetings; educational materials	1
Educational meetings; reminders	1
Educational outreach visits	2
Educational meetings; educational outreach visits	1
Educational outreach visits; distribution of educational materials; audit and feedback; educational meetings	1
Patient mediated interventions	1
Reminders	1
Organisational oriented implementation strategies	
Changes to the setting/ site of service delivery	1
Changes in scope and nature of benefits and services	2
Patient oriented implementation strategies	
Printed educational materials for patients	1
Professional and organisational oriented implementation strategies	
Educational meetings; changes in medical record system	1
Educational meetings; skill mix changes	2
Educational meetings; formal integration of services	1
Educational meetings; educational materials; changes in medical record system	1
Educational meetings; educational materials; reminders; changes in medical record systems	1
Professional and patient oriented implementation strategies	
Educational outreach visits; Distribution of educational materials; Patient self-management education materials	1
Patient mediated interventions; patient feedback; patient education	1
Organisational and patient oriented implementation strategies	
Changes to the setting/ site of service delivery; patient feedback	3
Professional, organisational and patient oriented implementation strategies	
Distribution of educational materials; educational meetings; reminders; audit and feedback; formal integration of services; educational outreach visits; patient feedback	1
Educational outreach visits; changes to the setting/ site of service delivery; patient feedback	1
Organisational, patient and financial oriented implementation strategies	
Changes to the setting/ service delivery; provider incentives; patient feedback	1
Total	29

Meta-regression showed that applying multiple components of any implementation category and combining professional with patient-oriented implementation strategies were more effective than single strategies implemented alone on alcohol consumption and screening and brief intervention outcomes. Furthermore, targeting implementation strategies at multidisciplinary primary health care teams rather than on solely physicians, increased overall screening rates.

Conclusions:

The most common implementation strategy included was education, supplemented with organizational and patient oriented strategies. Thus, the results of the meta-regression analyses further support the importance of delivering education on screening and brief advice programmes to primary health care providers. It seems that the impact of education on screening and brief intervention delivery is enhanced when supplemented with patient oriented strategies and when delivered comprehensively to multidisciplinary primary health care teams rather than singly to physicians.

5.3 Effectiveness and cost-effectiveness of strategies to increase interventions for heavy drinking in primary health care

5.3.1 ODHIN RCT design

The ODHIN study was designed to investigate the effects of three different implementation strategies, singly and in combination, to promote brief intervention for heavy drinking in 120 primary health care units (PHCU) across five European jurisdictions (Catalonia, England, the Netherlands, Poland and Sweden) (Anderson & Reynolds, 2014). The three strategies were delivering training and support, financial reimbursement, and referral to an internet based method of delivering advice (e-BI):

1. *Training and support (TS):* the TS group were offered two initial 1-2 hours face-to-face educational trainings, and one (10-30 minutes) telephone support call to the lead PHCU contact person during the 12-week implementation period. If necessary one additional face-to-face training of 1-2 hours duration was offered. The training addressed knowledge, skills, attitudes, and perceived barriers and facilitators in implementing screening and advice, combining theory and practical exercises.

2. *Financial reimbursement (FR):* Financial reimbursement groups were paid for screening and advice activities during the 12-week implementation period, with rates based on existing country-specific financial reimbursement for clinical preventive activities. In Catalonia, a maximum ceiling rate of €250 per provider was established, and fees were calculated based on the average individual performance of the 12-week implementation period. A minimum rate had to be met in order to receive any payment, and above this rate, the amount increased proportionally up until the maximum of €250. In England, fees were €6 per screening and €25 per advice, with a maximum ceiling rate of €2200 per PHCU. In the Netherlands, fees were €9 per screening and €13.50 per advice, with a maximum ceiling rate of €1250 per PHCU. In Poland, fees were €1.25 per screening and €10 per advice, with no ceiling rate. In Sweden, fees were €2 per screening and €15 per advice with a maximum ceiling rate of €3300 per PHCU. The type of advice that was reimbursable differed by country. In Catalonia and the Netherlands, reimbursement was given for any of delivering oral advice; giving an advice leaflet; referring to the e-BI programme; or referral to another provider in or outside the PHCU. In Sweden, reimbursement was given for any of delivering oral advice; referring to the e-BI programme; or

referral to another provider in or outside the PHCU. In England and Poland, reimbursement was given for either delivering oral advice; or, referring to the e-BI programme.

3. *e-BI:* the e-BI group were asked to refer identified at risk patients with an e-leaflet containing unique log in codes to an approved e-BI specific package, which was country specific, or, for Poland based on the WHO e-SBI programme. The website included: log in facility to allow monitoring of the patient (i.e. patient actually log-in); suitable brief screening tool with ability to calculate score and give feedback (i.e. intervention); appropriate information on lower risk drinking guidelines; information on impact of alcohol on health and wellbeing; and a drink diary facility.

Delivering training and support plus financial reimbursement were chosen as professional oriented interventions for which there is some evidence of impact in changing provider behaviour (Keurhorst et al. 2015). E-BI was chosen, since there is evidence for its impact in reducing alcohol consumption (Donoghue et al 2014); referral to e-BI might be helpful as an organizational-oriented strategy in reducing the workload of healthcare professionals after identification of patients at risk and thus might increase screening activity of primary health care providers. The study analysed the impact of the different implementation strategies on four different outcomes, defined as:

- **Intervention rate**: number of AUDIT-C positive patients that received one or more of oral advice, an advice leaflet, referral to the e-BI programme, or referral for advice to another provider in or outside the PHCU, divided by the total number of adult consultations of the participating providers per PHCU.
- **Screening rate**: number of patients screened divided by the number of adult consultations of the participating providers per PHCU.
- **AUDIT-C positive rate**: number of patients with an AUDIT-C positive score divided by the number of patients screened per PHCU.
- **Advice rate**: number of AUDIT-C positive patients that received one or more of oral advice, an advice leaflet, referral to the e-BI programme, or referral for advice to another provider in or outside the PHCU, divided by the total number of screen positive patients per PHCU.

5.3.2 PHCU and baseline characteristics

The number of registered patients averaged 10,000 across the 120 PHCUs. There were 1500 adult (age 18+ years) consultations per PHCU during the 4-week baseline period, mean age 55 years (SD=7), of whom 53% were men. Thus, the PHCUs catered for a population of 1.2 million people, and saw about 180,000 adult patients during a 4-week period. The mean number of full or part-time providers (doctors, nurses and practice assistants) working per PHCU was 15.1 (SD=10.4), of which half were doctors, and two-fifths nurses; of these, 6.2 (SD=3.7) per PHCU (41%) participated in the study, with just over half of the participating providers being doctors (55%), 38% nurses, and 7% practice assistants**.** The mean age of the participating providers was 47 years (SD=5), and 26% were men.

During the 4-week baseline period, intervention rates were 11.1 per thousand (‰) (95%CI=5.2-17.1) per PHCU; screening rates were 5.9% (95%CI=3.4-8.4) per PHCU; AUDIT-C positive rates were 33.3% (95%CI=18.8-47.8) per PHCU; and, advice rates were 73.7% (95%CI=60.6-86.8) per PHCU. The use of electronic records in Catalonia did not appear to affect the rates – excluding Catalonia, the screening rate in the other four countries was 5.6% (95%CI=2.6-8.7).

The baseline screening rate did not vary by the sex of screened patients but was marginally higher amongst older patients (coefficient = 0.0025, p=0.003). The AUDIT-C positive rate was lower the greater the screening rate (coefficient = -1.128, p=<0.001), and marginally lower, the greater the age

of the patient (coefficient = -0.0064, p=0.018). The brief advice rates did not differ by screening rate, AUDIT-C positive rate or sex and age of the patient. The intervention rate did not differ by the sex or age of the patient.

The baseline screening and intervention rates were higher the greater the proportion of PHCU providers that were nurses or practice assistants rather than doctors (screening rates, coefficient = 0.087, p<0.001; intervention rates, coefficient = 0.011, p=0.014), but was not related to provider sex or age. Audit-C positive rates and brief advice rates were not related to provider characteristics.

5.3.3 Impact of implementation factors during the 12-week implementation period

Of the 120 PHCUs, one dropped out after the baseline measurement period (PHCU from Netherlands in financial reimbursement group) and two PHCUs failed to provide adequate data to calculate outcome rates during the 12-week implementation period (PHCU from England in control group; and, PHCU from Netherlands in training and support and e-BI group). For these PHCUs, the outcome rates during the 12-week implementation period were set as the rates for the baseline measurement period.

Table 2 displays the intervention rates for the baseline, and each of the three four week blocks during the 12 week implementation period when the implementation strategies (factors) were delivered without or with the factors, singly and in combination. Table 3 displays the relative per cent differences (95% CI) in 12-week implementation rates with, as opposed to without the factors, singly and in combination.

- **Training and support**: The trend in drop-off of intervention rates with the factor during the 12-week implementation period was statistically significant, with most of the drop-off occurring between the first and second four-week blocks (Table 2). PHCU that received training and support demonstrated a 69% (95% CI 30 to 119) higher 12-week intervention rate than PHCUs that did not receive training and support (Table 3). Adding screening rates to the model reduced the size of the higher rate to 33.5% (95% CI 8.3 to 64.6), and then adding brief advice rates to the model reduced the size further to 28.1% (95% CI 4.2 to 57.4), indicating that about one half of the higher intervention rate was due to a higher screening rate.

- **Financial reimbursement**: The trend in drop-off of intervention rates with the factor during the 12-week implementation period was statistically significant, with most of the drop-off occurring between the first and second four-week blocks (Table 2). PHCU that received financial reimbursement demonstrated a 125% (95% CI 73 to 193) higher 12-week intervention rate than PHCUs that did not receive financial reimbursement (Table 3). Adding screening rates to the model reduced the size of the higher rate to 49.1% (95% CI 19 to 87), and then adding brief advice rates to the model reduced the size further to 42% (95% CI 14 to 77), indicating that about two-thirds of the higher intervention rate was due to a higher screening rate.

- **E-BI**: The trend in drop-off of intervention rates with the factor during the 12-week implementation period was statistically significant, with most of the drop-off occurring between the first and second four-week blocks (Table 2). Providing PHCU with the referral opportunity to e-BI was not associated with a higher intervention rate (the definition of intervention and advice included a referral to e-BI), Table 3.

Table 2 *Mean intervention rates[1] per thousand (‰) (95% CI) per PHCU without and with each of the factors, singly and in combination over the measurement periods.*

Factor		Baseline[2]	12 week Implementation period				12 week Implementation period as a whole[4]
			Weeks 1-4	Weeks 5-8	Weeks 9-12	Test for trend; F value[3]	
Training and support	Without factor	12.1 (5.6-18.5)	12.5 (6.1-18.9)	9.5 (5.1-13.9)	9.3 (4.4-14.2)	3.07	10.3 (5.1-15.4)
	With factor	10.2 (4.5-15.9)	22.1 (9.3-34.8)	16.3 (7.7-24.9)	14.2 (6.6-21.7)	4.92*	17.5 (8.2-26.7)
Financial reimbursement	Without factor	12.7 (5.3-20.0)	10.9 (5.5-16.2)	8.7 (4.8-12.5)	8.0 (4.0-12.0)	3.59	9.0 (4.9-13.2)
	With factor	9.6 (5.0-14.3)	23.8 (8.0-39.6)	17.2 (8.4-26.0)	15.4 (6.2-24.7)	5.65*	18.7 (7.8-29.7)
e-BI	Without factor	11.6 (5.8-17.4)	19.4 (8.1-30.8)	16.6 (6.9-26.3)	14.9 (5.0-24.7)	1.39	16.6 (6.6-26.7)
	With factor	10.7 (4.2-17.3)	15.2 (7.3-23.3)	9.3 (6.2-12.3)	8.6 (4.4-12.7)	14.64***	11.1 (6.4-15.8)
Training and support plus financial reimbursement	Without factor	12.0 (5.4 to 18.5)	12.5 (6.4 to 18.7)	9.7 (5.1 to 14.4)	9.3 (4.5 to 14.0)	4.87*	10.3 (5.3 to 15.4)
	With factor	8.7 (4.3 to 13.2)	31.5 (9.5 to 5.4)	22.3 (10.5 to 34.0)	19.2 (8.1 to 30.2)	4.74*	24.5 (10.2 to 38.8)
Training and support plus e-BI	Without factor	12.2 (5.8 to 18.6)	17.1 (7.5 to 26.7)	13.6 (6.6 to 20.6)	12.5 (5.5 to 19.6)	2.92	14.2 (6.5 to 21.9)
	With factor	8.0 (3.2 to 12.8)	18.2 (8.6 to 27.8)	11.1 (7.0 to 15.2)	9.4 (5.2 to 13.5)	8.51**	13.1 (7.7 to 18.5)
Financial reimbursement plus e-BI	Without factor	11.9 (5.6 to 18.2)	16.8 (7.6 to 26.0)	13.9 (6.4 to 21.4)	12.9 (5.8 to 20.0)	2.18	14.3 (6.6 to 22.1)
	With factor	8.9 (3.8 to 14.0)	19.0 (8.6 to 29.4)	10.2 (6.5 to 14.0)	8.2 (5.5 to 10.8)	12.57**	12.7 (8.0 to 17.4)
Financial reimbursement plus training and support plus e-BI	Without factor	11.8 (5.4 to 18.2)	16.3 (7.3 to 25.3)	12.8 (6.2 to 19.4)	12.0 (5.5 to 18.4)	3.60	13.5 (6.3 to 20.7)
	With factor	6.6 (4.1 to 9.1)	24.6 (12.2 to 37.1)	14.2 (8.6 to 19.7)	10.3 (6.7 to 13.9)	7.58**	16.9 (11.5 to 22.3)

[1] Estimated marginal means accounting for PHCU nested within country
[2] Contrast estimates found no differences in mean rates with and without the factor at baseline
[3] Type III tests with time as a fixed independent variable accounting for PHCU nested within country
[4] Calculated as the mean of the three 4-week blocks, with, in the case of missing data from any of the three blocks, the mean calculated from the blocks that contained data
* P<0.05; ** p<0.01; *** p<0.001 (accounting for PHCU nested within country)

- **Training and support plus financial reimbursement**: The trend in drop-off of intervention rates both without and with the combined factors during the 12-week implementation period was statistically significant, with most of the drop-off occurring between the first and second four-week blocks (Table 2). PHCU that received training and support plus financial reimbursement demonstrated a 280% (95% CI 162 to 451) higher 12-week intervention rate than PHCUs that did not receive training and support plus financial reimbursement (Table 3). Adding screening rates to the model reduced the size of the higher rate to 99% (95% CI 45 to 174), and then adding brief advice rates to the model reduced the size further to 81% (95%

CI 32 to 148), indicating that about two-thirds of the higher intervention rate was due to a higher screening rate.

The combination of training and support plus financial reimbursement led to a 165.4% (95% CI 80.8 to 289.6) higher intervention rate than training and support alone (p<0.001) and to a 101.6% (95% CI 41 to 188) higher intervention rate than financial reimbursement alone (p<0.001).

Table 3 *Relative per cent difference[1] (95% CI) in 12-week implementation rates with factor as opposed to without factor (controlling for baseline rates and accounting for PHCU nested within country).*

Factor	Intervention rate	Screening rate	AUDIT-C positive rate	Advice rate
Training and support	68.6*** (29.9 to 118.6)	46.0** (12.0 to 90.3)	11.2 (-9.0 to 35.9)	31.1 (-16.0 to 104.5)
Financial reimbursement	125.3*** (73.2 to 193.0)	96.0*** (50.8 to 154.9)	-0.2 (-18.4 to 21.9)	21.4 (-22.2 to 89.6)
e-BI	-12.4 (-32.4 to 13.6)	-18.9 (-37.7 to 5.6)	13.6 (-6.9 to 38.5)	-9.5 (-42.0 to 41.2)
Training and support plus financial reimbursement	279.7*** (161.6 to 451.2)	186.2*** (97.6 to 314.7)	10.9 (-16.5 to 47.3)	59.2 (-14.8 to 197.5)
Training and support plus e-BI	47.7* (2.2 to 113.5)	18.4 (-18.9 to 72.9)	26.3 (-5.3 to 68.3)	18.6 (-37.3 to 124.5)
Financial reimbursement plus e-BI	44.4 (-8.3 to 127.5)	28.5 (-18.7 to 103.0)	5.0 (-25.1 to 47.1)	-7.3 (-56.6 to 98.1)
Financial reimbursement plus training and support plus e-BI	143.5** (43.8 to 312.2)	87.6* (10.0 to 219.9)	16.7 (-21.0 to 72.5)	21.5 (-49.2 to 190.6)

[1] As an example, for the intervention rate for the factor training and support, the 12-week rate was 68.6% higher (95% CI=29.9 to 118.6) with the factor (training and support) as opposed to without the factor (this is not the same as the factor increasing the baseline rate by 68.6%).

* P<0.05; ** p<0.01; *** p<0.001

- **Training and support plus e-BI**: The trend in drop-off of intervention rates with the combined factors during the 12-week implementation period was statistically significant, with most of the drop-off occurring between the first and second four-week blocks (Table 2). PHCU that received training and support plus e-BI demonstrated a 48% (95% CI 2 to 113) higher 12-week intervention rate than PHCUs that did not receive training and support plus e-BI (Table 3). The combination of training and support plus e-BI led to a non-significant 28.6% (95% CI -54.8 to 12.6) lower intervention rate than training and support alone.

- **Financial reimbursement plus e-BI** The trend in drop-off of intervention rates with the combined factors during the 12-week implementation period was statistically significant, with most of the drop-off occurring between the first and second four-week blocks (Table 1). The combination of financial reimbursement and referral to e-BI was not associated with a higher intervention rate (the definition of intervention and advice included a referral to e-BI), Table 2.

- **Training and support plus financial reimbursement plus eBI**: The trend in drop-off of intervention rates with the combined factors during the 12-week implementation period was statistically significant, with most of the drop-off occurring between the first and second four-week blocks (Table 2). PHCU that received training and support plus financial reimbursement plus eBI demonstrated a 144% (95% CI 44 to 312) higher 12-week intervention rate than PHCUs that did not receive training and support plus financial reimbursement plus eBI (Table 3). The combination of training and support plus financial reimbursement plus eBI led to a non-significant 34.7% (95% CI -62.4 to 13.5) lower intervention rate than training and support plus financial reimbursement alone.

- **Providers and patients** Neither characteristics of the providers (profession, gender and age) nor characteristics of the patients (number of registered patients, adult consultation rate, age and gender of screened patients) influenced the findings.

5.3.4 Sustainability of findings at 6 month follow up

At the end of the 12-week implementation period, a six month gap ensued, during which no implementation strategies were delivered. After the six month no implementation period, a four week follow-up period took place. Eighteen of the 120 PHCUs failed to provide adequate data to calculate intervention rates during this 4-week follow-up period. For these 18 PHCUs, implementation rates during the 4-week follow-up period were set as the rates for the baseline measurement period (intention to treat). Excluding these 18 PHCUs with no data during the 6-month follow-up period did not change the results (per protocol).

Table 4 displays the mean intervention rates per PHCU without and with each of the factors, singly and in combination over the three measurement periods. The right hand columns contrast the intervention rate at 6-months follow-up with the intervention rate during the implementation period and during the baseline period. Table 5 displays the relative per cent difference (95% CI) in follow-up implementation rates with, as opposed to without factor, controlling for baseline rates. One column displays the rates for all 120 PHCU (intention to treat, with, for those 18 PHCUs without follow-up data, implementation rates during the 4-week follow-up period set as the rates for the baseline measurement period), and the other, the rates for the 102 PHCU that had follow-up data (per protocol).

- **Training and support**: the 6-month intervention rate in PHCU without training and support was not statistically different than the 12-week implementation rate, but significantly less than the baseline rate; in contrast, the 6-month rate in PHCU with training and support was statistically less than the 12-week implementation rate, but not significantly different from the baseline rate (Table 4). PHCU that received training and support demonstrated a 41% (95% CI 3 to 93) higher 6-month intervention rate than PHCUs that did not receive training and support (Table 5).

- **Financial reimbursement**: the 6-month intervention rate in PHCU without financial reimbursement was not statistically different than the 12-week implementation rate, but significantly less than the baseline rate; in contrast, the 6-month rate in PHCU with financial reimbursement was statistically less than the 12-week implementation rate, but not significantly different from the baseline rate (Table 4). Providing financial reimbursement during (and only during) the 12-week implementation period was not associated with a higher intervention rate at 6-month follow-up, Table 5.

- **E-BI**: the 6-month intervention rate in PHCU without e-BI was not statistically different than the 12-week implementation rate, but statistically less than the baseline rate; in contrast, the 6-month rate in PHCU with eBI was statistically less than both the 12-week implementation and the baseline rates (Table 4). Providing referral to e-BI was not associated with a higher intervention rate at 6-month follow-up, Table 5.

Table 4 *Mean intervention rates[1] (‰ (95% CI)) per PHCU without and with each of the factors, singly and in combination over the measurement periods.*

Factor		Baseline	12-week implementation period	6 month follow-up	Comparing 6-month follow-up with 12-week implementation period; t-test; df; p value	Comparing 6-month follow-up with baseline; t-test; df; p value
Training and support	Without factor	12.1 (5.6-18.5)	10.3 (5.2-15.3)	7.5 (4.2-10.8)	-1.37; 0.17	-2.57*; 0.012
	With factor	10.2 (4.5-15.9)	17.5 (8.2-26.7)	9.0 (5.3-12.8)	-2.58*; 0.011	-0.45; 0.65
Financial reimbursement	Without factor	12.7 (5.3-20.0)	9.0 (4.9-13.2)	7.4 (3.9-10.8)	-1.05; 0.30	-3.25**; 0.002
	With factor	9.6 (5.0-14.3)	18.7 (7.8-29.7)	9.2 (5.5-12.9)	-2.87**; 0.005	-0.22; 0.82
e-BI	Without factor	11.6 (5.8-17.4)	16.6 (6.6-26.7)	9.0 (5.1-12.9)	-2.0*; 0.048	-1.15; 0.26
	With factor	10.7 (4.2-17.3)	11.1 (6.4-15.8)	7.6 (3.9-11.1)	-2.43*; 0.017	-2.39*; 0.03
Training and support plus financial reimbursement	Without factor	13.6 (5.9-21.3)	5.4 (1.1-9.8)	6.6 (3.5-9.7)	-1.76; .08	-3.02**; 0.003
	With factor	8.7 (4.5-12.9)	22.3 (8.8-35.8)	10.0 (6.1-13.9)	-2.64*; 0.011	0.77; 0.44
Training and support plus e-BI	Without factor	12.5 (6.4-18.6)	13.1 (5.4-20.7)	8.3 (4.0-12.5)	-2.36*; 0.020	-2.51*; 0.013
	With factor	9.8 (3.7-15.8)	14.7 (8.4-21.0)	8.3 (3.9-12.8)	-1.82; 0.075	-0.36; 0.72
Financial reimbursement plus e-BI	Without factor	12.8 (5.3-20.3)	8.5 (4.9-12.2)	6.7 (3.9-9.5)	-2.18*; 0.031	-2.08*; 0.039
	With factor	8.9 (3.8-14.0)	12.7 (8.0-17.4)	7.1 (3.8-10.3	-2.10*; 0.041	-0.75; 0.455
Financial reimbursement plus training and support plus e-BI	Without factor	13.7 (6.3-21.2)	4.9 (2.1-7.8)	5.9 (3.6-8.3)	-2.43*; 0.016	-2.62**; 0.009
	With factor	8.0 (3.3-12.6)	16.3 (9.2-23.3)	7.8 (3.6-12.1)	-1.79; 0.086	-1.06; 0.3

[1] Estimated marginal means accounting for PHCU nested within country

* P<0.05; ** p<0.01; *** p<0.001 (accounting for PHCU nested within country)

- **Training and support plus financial reimbursement**: the 6-month intervention rate in PHCU without training and support plus financial reimbursement was not statistically different than the 12-week implementation rate, but significantly less than the baseline rate; in contrast, the 6-month rate in PHCU with training and support plus financial reimbursement was statistically less than the 12-week implementation rate, but not significantly different from the baseline rate (Table 4). PHCU that received training and support plus financial reimbursement demonstrated an 80% (95% CI 15 to 182) higher 6-month intervention rate than PHCUs that did not receive training and support (Table 5). The combination of training and support plus financial reimbursement did not lead to higher intervention rates than either training and support (coefficient=0.20; 95%CI=-0.02 to 0.43) or financial reimbursement (coefficient=0.25; 95%CI=-0.006 to 0.51) alone.

Table 5 *Relative per cent difference[1] (95% CI) in 6-month intervention rates with factor as opposed to without factor (controlling for baseline rates and accounting for PHCU nested within country).*

	Intervention rates	
Factor	**Intention to treat[2]**	**Per protocol[3]**
Training and support	41.1* (3.0 to 93.3)	46.8* (3.5 to 108.1)
Financial reimbursement	27.4 (-7.3 to 75.0)	20.4 (-15.9 to 72.4)
e-BI	-7.0 (-32.1 to 27.3)	-10.2 (-36.7 to 27.3)
Training and support plus financial reimbursement	79.8* (14.6 to 182.1)	76.8* (7.7 to 190.1)
Training and support plus e-BI	31.2 (-16.0 to 104.9	31.8 (-20.1 to 117.3)
Financial reimbursement plus e-BI	-12.4 (-49.4 to 51.8)	-11.7 (-51.4 to 60.3)
Financial reimbursement plus training and support plus e-BI	23.7 (-34.6 to 133.8)	29.6 (-35.1 to 158.8)

[1] As an example, for the intervention rate for the factor training and support, the 12-week rate was 41.1% higher (95% CI=3.0 to 93.3) with the factor (training and support) as opposed to without the factor (this is not the same as the factor increasing the baseline rate by 41.16%).
[2]Rates for all 120 PHCU, with, for those 18 PHCUs without follow-up data, implementation rates during the 4-week follow-up period set as the rates for the baseline measurement period.
[3]Rates for the 102 PHCU that had follow-up data.
* P<0.05; ** p<0.01; *** p<0.001

- **Training and support plus e-BI**: the 6-month intervention rate in PHCU without training and support plus e-BI was statistically less than both the 12-week implementation and baseline rates; in contrast, the 6-month rate in PHCU with training and support plus eBI was not statistically different from either the 12-week implementation or the baseline rates (Table 4). Providing training and support plus referral to e-BI was not associated with a higher intervention rate at 6-month follow-up, Table 5.

- **Financial reimbursement plus e-BI**: the 6-month intervention rate in PHCU without financial reimbursement plus e-BI was statistically less than both the 12-week implementation and baseline rates; in contrast, the 6-month rate in PHCU with financial reimbursement plus eBI was statistically less than the 12-week implementation rate but not statistically different

from the baseline rate (Table 4). Providing training and support plus referral to e-BI was not associated with a higher intervention rate at 6-month follow-up, Table 5.

- **Financial reimbursement plus training and support plus e-BI**: the 6-month intervention rate in PHCU without financial reimbursement plus training and support plus e-BI was statistically less than both the 12-week implementation and baseline rates; in contrast, the 6-month rate in PHCU with financial reimbursement plus training and support plus e-BI was not statistically different from either the 12-week implementation or the baseline rates (Table 4). Providing financial reimbursement plus training and support plus e-BI was not associated with a higher intervention rate at 6-month follow-up, Table 5.

5.3.5 Cost-effectiveness of implementation strategies

An incremental analysis comparing all strategies to the control arm (i.e., business as usual) in the trial shows that training and support combined with financial reimbursement (TS+FR) is the most cost-effective strategy in Catalonia, England, Poland and Sweden, whilst in the Netherlands the incremental cost-effectiveness ratio (ICER) compared to the next-best option (TS alone) is above the maximum threshold for cost-effectiveness, and therefore TS is the most cost-effective strategy in the Netherlands, Figure 12 (Angus et al. 2015).

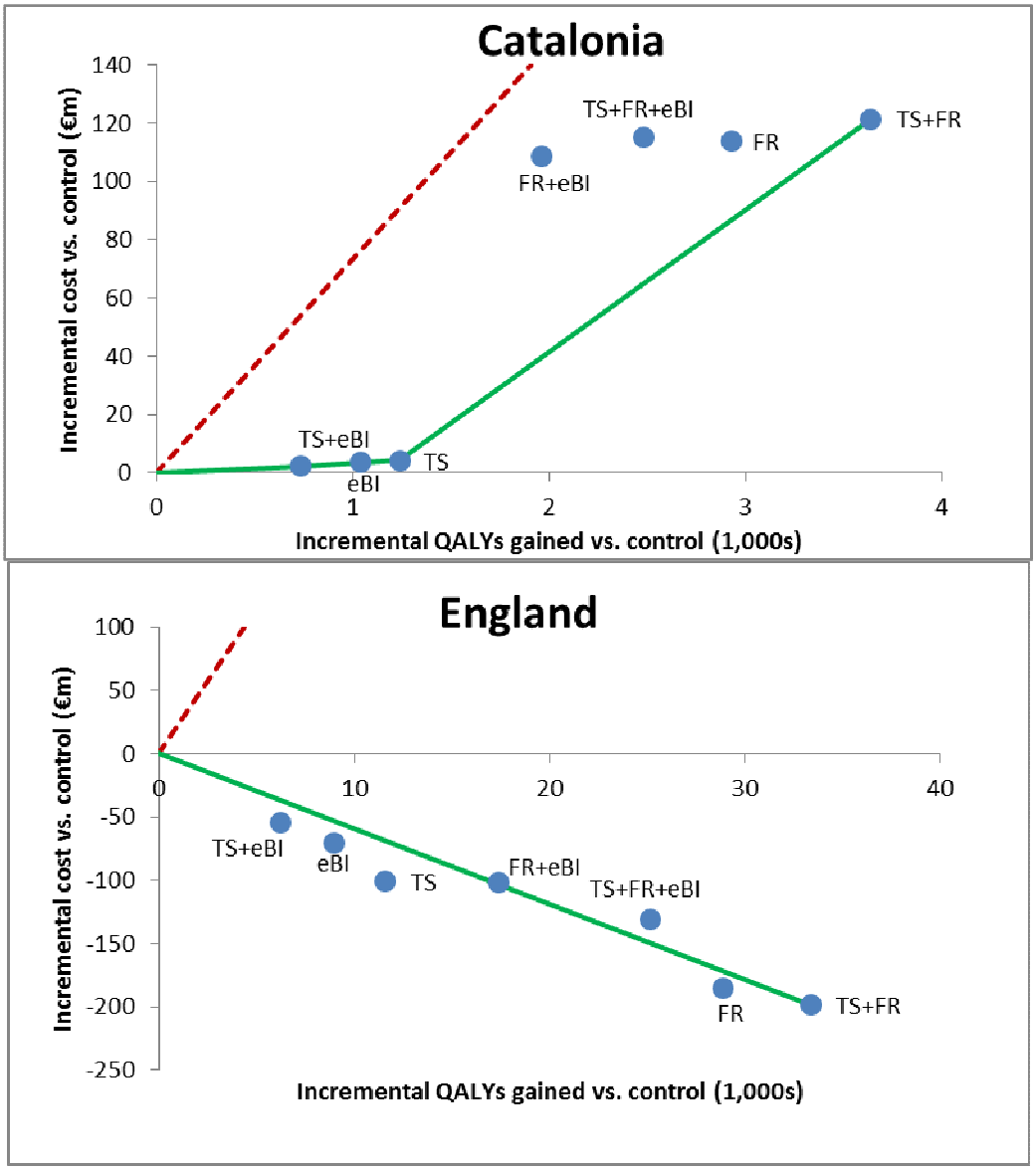
TS+FR is estimated to be cost-saving and health improving in England. TS+FR also has a low ICER of €4,632/QALY in Poland (vs. the next best option of TS alone). TS+FR also has a low ICER of €6,522/QALY (vs. control) in Sweden. In Catalonia the ICER versus the next most cost-effective option (TS alone) is considerably higher at €48,954/QALY, although this is still likely to be considered cost-effective. In the Netherlands where TS is the most cost-effective option, the TS strategy has an ICER of €3,386 compared to the next best option of eBI referral.

Across the five countries, whilst the details of the results differ, the broad patterns remain the same. TS+FR is amongst the most expensive strategies to implement (costing in excess of €100m over 10 years in Catalonia and England) but produces the greatest cost savings to healthcare services (e.g. €398m over 30 years in England) and the greatest corresponding health benefits (e.g. 5,480 QALYs over 30 years in Poland). This pattern is illustrated in Figure 13 which shows the per capita net benefit of each strategy over the 30 year time horizon of the model. For example, implementation of TS+FR is estimated to benefit Sweden by the equivalent of €24.90 for every adult over 30 years.

There is substantial variation between countries in terms of the estimated scale and impact of the various strategies. This variation is driven by a huge range of underlying differences between the five countries, in terms of alcohol consumption (both mean levels of consumption and patterns of drinking), frequency of primary care consultations (which is over twice as high on average in the Netherlands as in Sweden, for example), rates of alcohol-related harm and the healthcare costs of treatment and practitioners' time as well as substantial differences in SBI delivery measures at baseline. For example, Catalonia has a markedly lower screen positive rate than the other four countries, while Poland has the lowest screening rate, but the highest conversion rate from positive screens to brief interventions delivered. These differences interact with the different impact of the 8 strategies on each of the three outcomes measures, leading to different changes in population alcohol consumption and consequent changes in alcohol-related hospitalisation and mortality rates and associated healthcare costs. In spite of this heterogeneity, the analysis shows a clear picture across all five countries, suggesting that the conclusions are likely to be applicable to other countries with their own unique drinking and primary care contexts.

Figure 12 - *Cost-effectiveness diagrams for all strategies in all countries.*

Green lines represent the 'expansion path' – the set of cost-effective strategies ranked in increasing order of effectiveness. Dashed red lines represent the cost-effectiveness threshold for each country – the maximum amount that the country is willing to pay for additional gains in health-related quality of life.



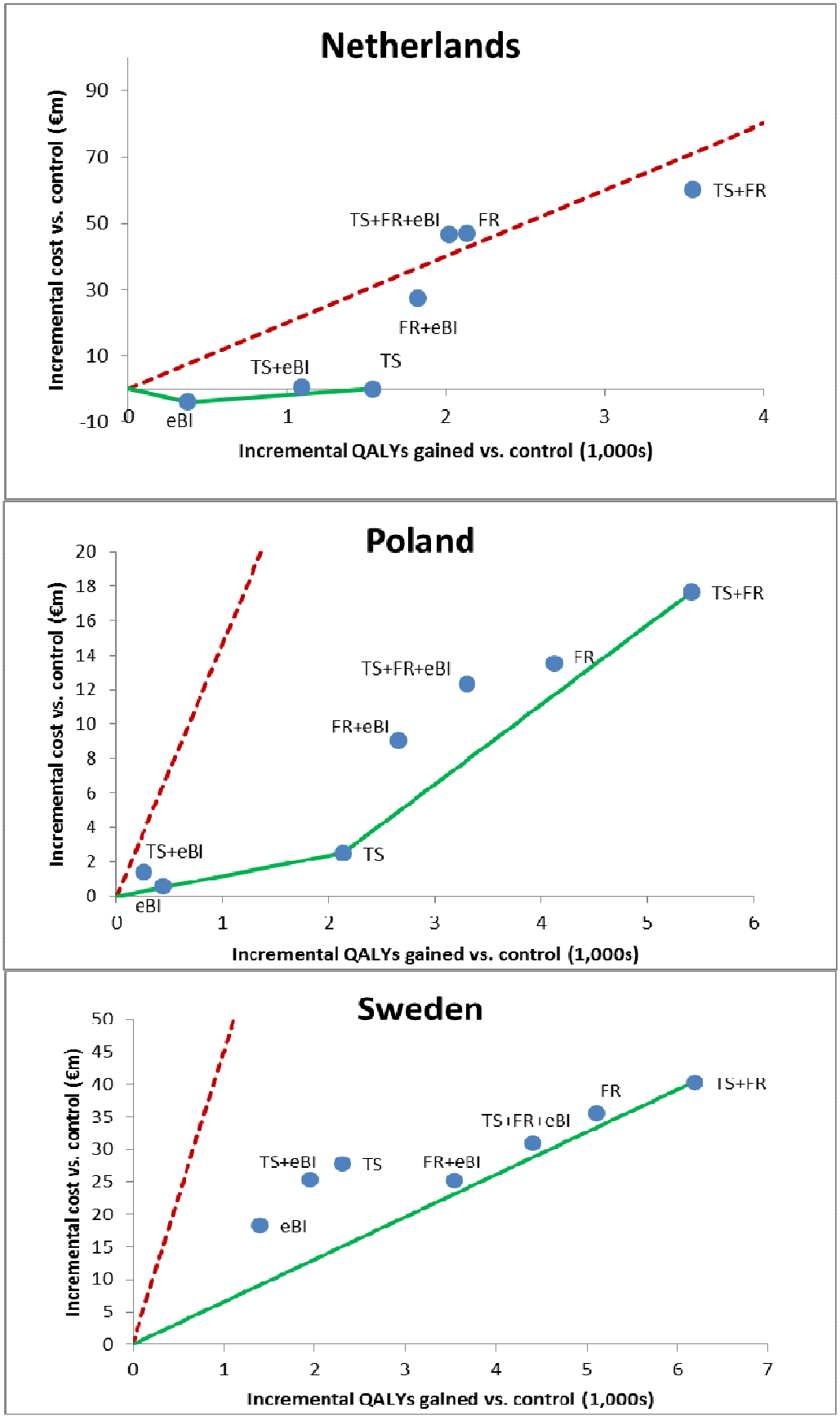
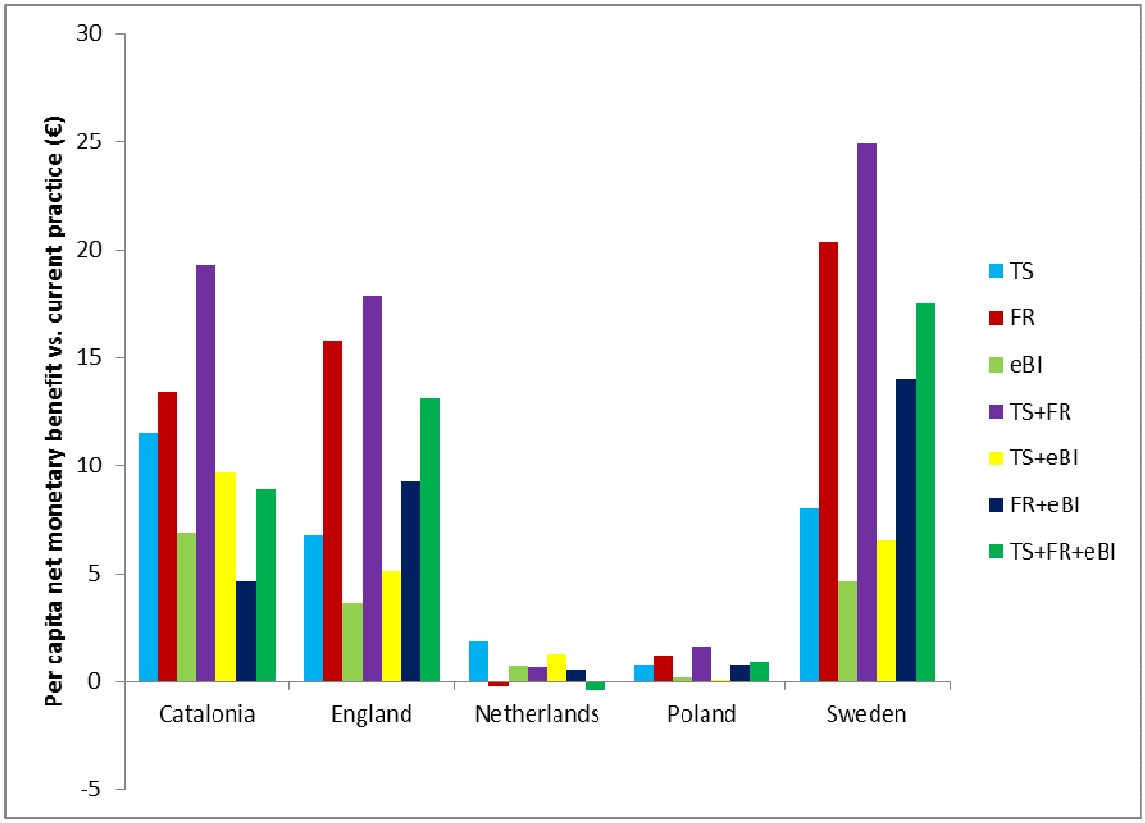

Netherlands
Incremental cost vs. control (€m)
90
70
50
30
10
-10
0
1
2
3
4
TS+FR
TS+FR+eBI
FR
FR+eBI
TS+eBI
TS
eBI
Incremental QALYs gained vs. control (1,000s)
Poland
Incremental cost vs. control (€m)
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
TS+FR
FR
TS+FR+eBI
FR+eBI
TS+eBI
TS
eBI
Incremental QALYs gained vs. control (1,000s)
Sweden
Incremental cost vs. control (€m)
50
45
40
35
30
25
20
15
10
5
0
0
1
2
3
4
5
6
7
FR
TS+FR+eBI
TS+eBI
TS
FR+eBI
eBI
Incremental QALYs gained vs. control (1,000s)

Figure 13 - *Net Monetary Benefit per capita of all strategies vs. current practice*



5.3.6 Conclusions

During a 4-week baseline measurement period, the mean intervention rate was 11.1 per 1,000 adult consultations per PHCU. An AUDIT-C cut-off score of 5 is equivalent to a consumption level of 20 grams of alcohol per day (Rubinsky et al.2013). Amongst EU citizens aged 15-64 years, 230/1,000 women regularly drink 20 grams of alcohol or more per day and 300/1, 000 men regularly drink 40 grams of alcohol or more per day (Rehm et al. 2012). Of those screened in the ODHIN study, 330/1000 were AUDIT-C positive (≥5 in Catalonia and England and ≥5 for men ≥4 for women in Poland, Netherlands and Sweden); given that there was no evidence for selective screening by providers, this suggests that only some 3% of those who might benefit from brief advice were receiving it. The ODHIN trial demonstrates that providing training and support to PHCU providers is associated with higher intervention rates, an effect still present at least six months after the training and support sessions, Figures 14 and 15. Given the modesty of training and support (less than 4 hours face-to face training), it would be expedient to offer training and support in screening and brief advice programmes for heavy drinking to all PHCU providers.

The ODHIN trial also demonstrates that providing financial reimbursement for screening and advice activity is associated with higher intervention rates for the duration of financial reimbursement. When financial reimbursement is withdrawn, intervention rates drop to their baseline rates. Further, the combination of training and support plus financial reimbursement resulted in higher intervention rates than either training and support or financial reimbursement alone, at least for the duration of financial reimbursement. Thus, it might be expedient to consider implementing and testing a financial reimbursement programme to increase the volume of screening and brief advice activity. If financial reimbursement is to be introduced, it would be expedient to always do this in combination with training and support.

The combined provision of training and support and financial reimbursement is highly cost effective in leading to improved health outcomes in four out of the five jurisdictions studied, and, in three out of five jurisdictions studied, would lead to large resource savings (approximately €20 per adult over a 30 year time frame).

Figure 14 *Mean intervention rates for heavy drinking per 1,000 adult consultations with and without training and support (TS), financial reimbursement (FR) and opportunity to refer identified patients to internet-based advice (eBI) over the 12-week implementation period (weeks 1-12) and at the follow-up period, which occurred six months after the implementation period was completed.*

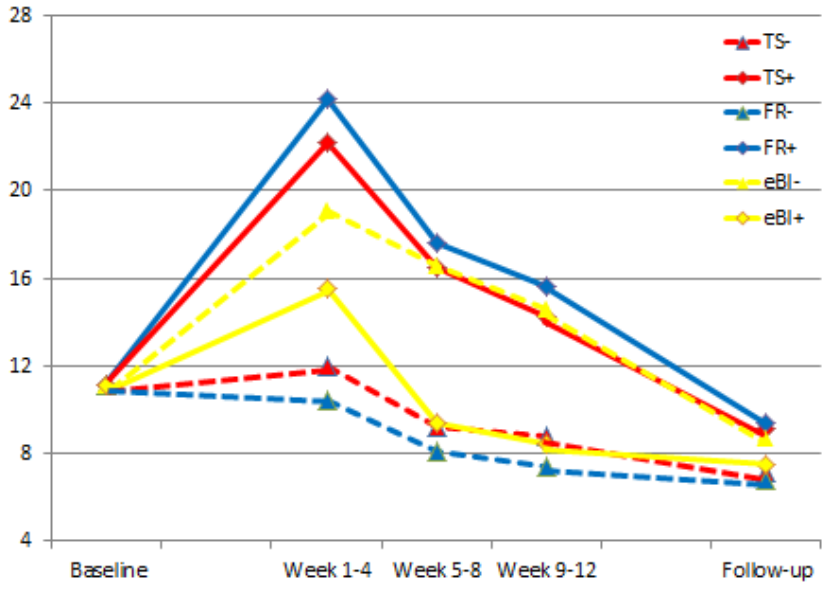
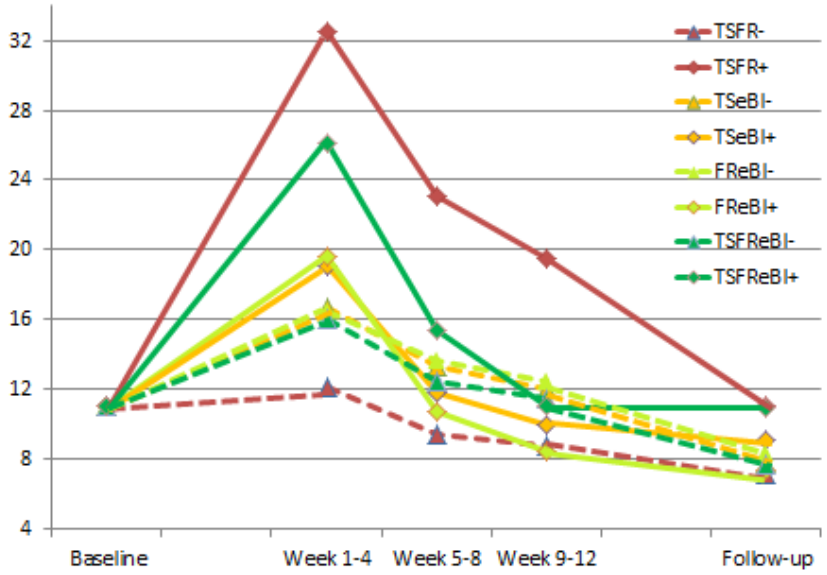


Figure 15 *Mean intervention rates for heavy drinking per 1,000 adult consultations with and without combinations of the interventions over the 12-week implementation period (weeks 1-12) and at the follow-up period, which occurred six months after the implementation period was completed.*



There is little doubt that internet based screening and brief advice programmes have an impact in reducing alcohol consumption amongst those drinkers who use them. The ODHIN trial included the option of referral to an e-BI programme as one of the implementation strategies in the belief that this might encourage high screening rates, as providers did not then have to deliver a brief advice themselves. The failure of this strategy to impact on any of the rates would suggest that providers in this study are not yet ready to refer patients to e-BI programmes. It is not known if this is due the fact that providers do not regard e-BI programmes as effective, if more training was needed, or if they found the referral process too complicated, and thus did not want to engage with it.

5.4 Assessing programme implementation

The ODHIN "assessment tool" has been completed by 23 European countries[6]. The tool includes 24 questions distributed on the management of hazardous and harmful alcohol consumption (HHAC) across 7 key domains. The main findings for each of these domains are summarised in the following sections.

5.4.1 Presence of a country coalition or partnership

In 2012, most countries (78.3%) had a country and/or regional coalition for the management of HHAC.

5.4.2 Community action and media education

Implemented media education campaigns on alcohol consumption were not widely available, or not reported. The most common available education campaigns were reported on the website followed by newspaper/magazines and radio, and they were generally fully publicly funded and implemented at country level.

5.4.3 Health care services and infrastructure for harmful / hazardous alcohol use management

5.4.3.1 Integrated health care system

According to personal opinions, in most countries, the integration of the management of HHAC in PHC is quite low with great differences between countries. Only 48% of the countries (11 out of 23) scored the integration of the management of HHAC in the PHC system over 5.4 points (mid-point in a scale from 0- no integrated, to 10- fully integrated).

5.4.3.2 Structures for quality of care

Most countries had formal governmental organizations in charge for monitoring health outcomes at the population level for HHAC (78%), for reviewing the safety of pharmacological treatments for managing alcohol dependence (68%) and for providing information on managing HHAC to health care providers (64%). About half of the countries had structures in charge of monitoring the quality of care provided for managing HHAC (57%) and for preparing clinical guidelines (57%). The structures for reviewing the cost effectiveness of interventions for managing HHAC were available in England, Finland, Portugal, Sweden and The Netherlands (23%).

[6] Catalonia-Spain, Czech Republic, Italy, Portugal, Slovenia, England-UK, Poland, Sweden and the Netherlands, Belgium, Cyprus, Croatia, Estonia, Germany, Latvia, Malta, Switzerland, Greece, Finland, Ireland, Iceland, Romania, and FYROM -Ex Macedonia.

5.4.3.3 Research and knowledge for health

Nearly half the countries had a formal research programme for managing HHAC with specifically allocated funding (44%) during the last 10 years, at least in part, from governmental organizations. There was a lack of formal education on managing HHAC for health care professionals in all the educational levels (particularly for pharmacists and dentists), with great differences among countries. There was a tendency for most professionals (but not for dentists, obstetricians and pharmacists) to have more formal education on the managing of HHAC in the curriculum of postgraduate and continuing professional training compared to the undergraduate curriculum.

5.4.3.4 Health care policies and strategies for dissemination and implementation of the management of HHAC

In 2012, an official written policy on managing HHAC was reported in 83% of countries, mostly as a part of a more general alcohol policy strategy. In the countries where such a policy existed, an intensive support for managing alcohol dependence in specialised treatment facilities was included in all countries, a strategy on training for health professionals in 74%, a strategy to support interventions in primary care in 68%, while a national funded research strategy was included only in nearly half of the policies. In most countries (83%) there was government funding for services for the management of HHAC, usually reviewed from time to time. In almost none of the countries (but not for Switzerland) a proportion of alcohol taxes was specifically earmarked or allocated to fund the costs of services for managing HHAC.

5.4.4 Support for treatment provision

5.4.4.1 Screening, quality assessment, referral and follow-up systems

In 57% of countries, screening instruments to identify risky drinkers were considered available and scored an average of 6.4 points (in a scale from 0 to 10), while only in 30%, a follow up system for monitoring and advice patients was considered available and scored an average of 4.1 points.

5.4.4.2 Protocols and guidelines

Nearly three out of every four countries had already developed, or were developing, multidisciplinary guidelines for managing HHAC (74%). The majority were standalone guidelines as opposed to a part of other clinical guidelines. However, there was a great lack of studies about their adherence and implementation.

5.4.4.3 Reimbursement for health care providers

The most common practice was reimbursement as a part of their normal salary as opposed to “within terms of service”.

5.4.4.5 Protocol, policies and training for professionals

In most countries, there were specialized guidelines or protocols for managing HHAC for addiction specialists (82%), general practitioners (65%), psychiatrists (59%), doctors in hospital (55%) and psychologists (50%). Training for managing HHAC within professional vocational training was available in most countries and for different professionals (still uncommon for obstetricians, pharmacists and dentists). The availability of training for managing HHAC within accredited continuing medical education was inferior to the training for managing HHAC within professional vocational training for the majority of the professionals.

5.4.5 Intervention and treatment: availability and accessibility

Patient help for HHAC was considered accessible mainly in addition services, followed by specialist clinics, in general/family practice, in hospital clinics and to a lesser extent, with the lowest percentage, in pharmacies.

5.4.6 Health care providers

5.4.6.1 Clinical accountability

Participants considered that advice for HHAC was part of the routine clinical practice for addiction specialists and psychiatrists, but not for pharmacists and dentists.

5.4.6.2 Treatment provision

Regarding treatment provision in PHC, there are many studies on patients screened about alcohol consumption (in 74% of countries) followed by studies on the use of AUDIT questionnaire, on the attitudes of health care providers in managing HHAC, and on patients with HHAC given advice and on (52%, 50% and 50% respectively), on increasing the involvement of health care providers in managing HHAC (45%), on the effectiveness of interventions for HHAC (37%) and on practice protocols and guidelines followed (28%). Few studies, survey or publications had been carried out on whether advice met quality criteria (16%) and on the cost-effectiveness of interventions for HHAC (11%).

5.4.7 Health care users: knowledge and Help seeking behaviour

Studies on people's knowledge that HHAC can be dangerous to their health were mentioned in 38% of countries, while studies on people's knowledge about effective methods to reduce HHAC were not available.

5.4.8 Conclusions

The ODHIN assessment tool has demonstrated to be useful for:

- providing a baseline description of available services and infrastructers for managing hazardous and harmful alcohol consumption, identifying areas where services may require development or strengthening;
- providing a general view on the existing gaps or areas that need further work and strengthening;
- providing a mechanism for future monitoring services provision over time;
- promoting sharing of information and examples of practice; and
- enhancing partnerships and/or national/regional coalition to reach a consensus on a shared view on services for managing hazardous and harmful alcohol consumption.

Nonetheless, some points need further development to increase the validity and the comparability of the results. Since, within countries the knowledge of the available services can vary according to the respondents completing the questionnaire, it could be recommended the setting of a core panel of representatives from the different professional areas that should contribute in a much more comprehensive way to the assessment tool fulfillment. The creation of a formal and stable panel of experts within countries would facilitate reaching best fitting and grounded consensus on those questions that cannot be supported by objective indicators.

The ODHIN assessment tool shows that, in 2012, EIBI is still not the norm in daily consultation in PHC and that more resources are needed to overcome the main obstacles. The tool suggests to integrate HHAC management in national and regional health systems:

- the integration of the management of HHAC in the health care system assuring that treatment is offered to those that need it, hopefully widening the availability of existing treatments;
- the implementation of a communication and information strategy about health and social alcohol impact, including a major effort to provide a formal, mandatory continuing training and medical education aimed at integrating EIBI in the daily practice of health professionals in the PHC settings with public allocated funding;
- formal educational programs on managing HHAC for health care professionals, being the training levels low in most of the countries and not available for some professionals;
- the availability of a well identified national health plan on alcohol aimed at prevention of alcohol use disorders and alcohol dependence and of a research funded strategy and/or formal research programs on HHAC with targeted allocated funded activities included in a written policies;
- the availability of guidelines and protocols for health professionals for different target groups and settings;
- studies on the adherence and implementation of the clinical guidelines for managing HHAC;
- tools and structures for reviewing the cost effectiveness of interventions for managing HHAC mainly focused in monitoring health care users needs and what health care providers are delivering;
- specific studies to check the quality of the advice and the cost-effectiveness of interventions for HHAC integrated by yearly evaluation surveys and reports on the activities by health care providers aimed at collecting information about the management of HHAC and on the evaluation of the health professionals who receive specific training on HHAC management;
- dissemination of available sources of knowledge, research results and information to health care providers together with the provision of materials and incentive measures aimed at ensuring that prevention, EIBI is implemented in PHC and supported by specialist services according to a real networking of the available services and competencies.

6. CORE CHALLENGES

1. Alcohol is a cause of more than 200 diseases and conditions, most of which present in primary health care – thus primary health care providers cannot avoid dealing with alcohol in routine clinical practice
2. Alcohol increases the risk of dying before the age of 70 years in a more or less dose response relationship. At an intake of 20 grams of alcohol a day (similar to two standard drinks), 1 in 100 people will die before the age of 70 years due their alcohol consumption. Beyond 30 grams of alcohol a day, men are more likely to die than women for any given level of alcohol consumption. Reducing alcohol consumption reduces the subsequent risk of an alcohol caused death.
3. Brief advice from a primary health care provider is effective in reducing heavy drinking (an average reduction 38 grams of alcohol per week over and above control conditions from a pre-advice level of 313 grams per week - a 12% reduction).
4. Screening and giving brief advice delivered in primary health care is cost-effective when delivered both at next consultation and at next patient registration. When delivered at next patient registration, screening and brief advice is, in some jurisdictions, cost-saving.
5. Despite the health burden and evidence for effectiveness and cost effectiveness, only 11 per thousand adult patients who consulted their primary health care doctor in Catalonia, England, Netherlands, Poland and Sweden were given brief advice for heavy drinking, an estimated 1 in 30 of those who could have benefited from brief advice.
6. Despite the health burden and evidence for effectiveness and cost effectiveness, in general, health systems across Europe lack the infrastructures to support the delivery of screening and brief advice programmes, with less than half of 23 European countries considering that screening and brief advice programmes were integrated to at least some extent, and hardly any countries able to provide routine data on the extent to which screening and brief advice programmes were actually delivered in primary health care.

7. CORE OPPORTUNITIES FOR MEETING THE CHALLENGES

1. Primary health care physicians who report having received more training on managing alcohol problems report advising a higher number of heavy drinking patients – as do those who report being either able or inclined to deliver brief advice.
2. Primary health care physicians who hold strong views that doctors have a disease rather than a prevention model, or who believe that patients should be responsible for their own drinking report advising a lower number of heavy drinking patients.
3. A systematic review of 29 studies found that professional oriented strategies, such as delivering education on screening and brief advice programmes to primary health care providers increases their screening and brief advice activities – a finding consistent with general practitioners' own views. The impact of professional oriented strategies on screening and brief intervention delivery is enhanced when supplemented with patient oriented strategies (e.g., patient education progammes) and when delivered comprehensively to multidisciplinary primary health care teams rather than singly to isolated professional groups.
4. The ODHIN five-country study found that, when compared with no education, education of primary health care providers in delivering screening and brief advice led to a two-thirds increase in the number of adult patients consulting their primary health care doctor who were given brief advice for heavy drinking during the three month period in which 2-3 hours of education was delivered, an effect that was still present six months later (two-fifths increase in the number of adult patients consulting their primary health care doctor who were given brief advice for heavy drinking with education as opposed to without).
5. Compared with no financial reimbursement of screening and brief advice activity, modest financial reimbursement given to primary health care providers led to a more than doubling in the number of adult patients consulting their primary health care doctor who were given brief advice for heavy drinking during the three month period in which financial reimbursement was given, an effect that disappeared when the financial reimbursement was stopped.
6. A combination of training and support and financial reimbursement led to a trebling in the number of adult patients consulting their primary health care doctor who were given brief advice for heavy drinking during the three month period in which financial reimbursement was given.
7. The combined provision of training and support and financial reimbursement were found to be highly cost effective in leading to improved health outcomes in four out of the five jurisdictions studied, and, in three out of five jurisdictions studied, would lead to large resource savings of approximately €20 per adult over a 30 year time frame.
8. It is possible to assess the delivery of primary health care based screening and brief advice programmes for heavy drinking at jurisdictional level, although existing measures need to be supplemented with objective monitoring of the number of adult patients actually given a brief advice over a defined time period.

8. ADVICE FOR CLINICAL PRACTICE

Target population for brief advice for heavy drinking: All adults who have been identified via a validated screening tool as positive cases for whom advice is indicated.

Identification: Practitioners may use any contact with clients to carry out identification, on both a universal basis (for example, during new patient registrations), and targeted basis (for instance, by focusing on groups that may be at an increased risk of harm from alcohol and/or those with an alcohol-related condition, such as the middle-aged, or those with hypertension). The recommended identification instrument is the 3 item AUDIT-C (Jonas et al. 2012; Rubinsky et al. 2013). The recommended cut-off level for the 3 item AUDIT-C can be 5 (a positive score is 5 or more) when based on country guidelines, 6 when based on a 1 in 100 risk of an alcohol-related death before the age of 70 years, or 8 when based on the results of primary health care based clinical trials testing the effectiveness of brief advice.

Brief advice: Where clients screen positive with the AUDIT-C (or clinical presentation), all practitioners should provide a session of structured brief advice on alcohol using a recognised, evidence-based resource built on the FRAMES principles and the Five As (Miller & Sanchez 1993). **FRAMES** is an acronym summarising the key components of brief advice: **F**eedback (on the client's risk of having alcohol problems); **R**esponsibility (change is the client's responsibility); **A**dvice (provision of clear advice when requested); **M**enu (what are the options for change?); **E**mpathy (an approach that is warm, reflective and understanding); and **S**elf-efficacy (optimism about the behaviour change). **The five As** are: (1) *assess* alcohol consumption with a brief screening tool, followed by clinical assessment as needed; (2) *advise* patients to reduce alcohol consumption to lower levels; (3) *agree* on individual goals for reducing alcohol use or abstinence (if indicated); (4) *assist* patients in acquiring the motivations, self-help skills or support needed for behaviour change; and, (5) *arrange* follow-up support and repeated counselling, including the referral of dependent drinkers to specialty treatment (Whitlock et al. 2002).

Structured brief advice should take 5–10 minutes and should: cover the potential harm caused by the level of drinking and reasons for changing the behaviour, including the health and wellbeing benefits; cover the barriers to change; outline practical strategies to help reduce alcohol consumption (to address the 'menu' component of FRAMES); and lead to a set of goals. Where there is an on-going relationship with the patient or client, practitioners should routinely monitor their progress in reducing their alcohol consumption to a low-risk level. Where required, an additional session of structured brief advice can be offered or, if there has been no response, an extended brief intervention can be offered. Patients can be referred and encouraged to use available web-based, computer-based and mobile applications to support them in their behaviour change.

Extended advice: Adults who have not responded to brief structured advice on alcohol may require extended advice from specifically trained practitioners. This could take the form of motivational interviewing or motivational enhancement therapy. Sessions should last from 20 to 30 minutes and should aim to help people to reduce the amount they drink to low risk levels, reduce risk-taking behaviour as a result of drinking alcohol or to consider abstinence. People who have received an extended brief advice should be followed up and assessed. It may be necessary to offer up to four additional sessions of extended advice, or to refer patients to a specialist alcohol treatment service.

Specialist referral: Patients can be considered for referral to specialist treatment if one or more of the following has occurred: have failed to benefit from structured brief advice and extended brief advice and wish to receive further help for an alcohol problem; show signs of severe alcohol-related

impairment or have a related comorbid condition (for example, liver disease or alcohol-related mental health problems).

9. ADVICE FOR GOVERNMENTS AND FUNDERS OF HEALTH CARE SYSTEMS

Governments can support identification and brief advice programmes in primary health care settings by ensuring that clinical guidelines for these interventions are widely available; that providers receive the training, the materials and the advice they need to set up such programmes; and that they are adequately reimbursed for the interventions, either as part of quality improvement initiatives or with fee-for-service payments.

Primary health care providers find it easier to undertake these interventions when they are supported by specialist services to which they can refer difficult-to-manage drinkers. In the management of alcohol use disorders, the transition from primary to specialist care should ideally be seamless.

Questions governments and funders of health care systems can consider

Are there guidelines for early identification and brief advice programmes? The guidelines should lay the foundation of the scientific evidence for early identification and brief advice programmes, outlining what can be done, when and by whom. They should be issued by appropriate bodies, such as guideline development bodies or institutes of clinical excellence that are responsible in some countries for preparing and disseminating such guidelines. Development should involve appropriate professional organizations to ensure that the guidelines reflect the needs of primary care providers and to ensure their support. The Primary Health Care European Project on Alcohol (PHEPA) has prepared clinical guidelines on identification and brief advice interventions for the European Union, and these guidelines can be adapted for local use (Anderson, Gual & Colom, 2005). National guidelines can also be supplemented with models of the effectiveness and cost–effectiveness of different scenarios for implementing identification and brief advice programmes.

Are there training programmes for primary health care providers on early identification and brief advice interventions? Few primary health care providers are trained to deliver these interventions during their clinical training or postgraduate education. Training programmes for them can be developed based on the clinical guidelines. They should be systematically offered to all primary health care providers. Accredited versions of these courses can be included as part of mandatory continuing education. PHEPA has also prepared a training programme that can be adapted for local use (Gual et al., 2005).

Are there systems for monitoring the quantity and quality of early identification and brief advice programmes, so that their effectiveness can be analysed and improved? It is important to measure the extent and quality of these programmes. Such monitoring can be carried out through a regular audit of case records and implementation of a quality assurance programme. ODHIN has prepared an assessment tool for monitoring the delivery of these interventions (Gandin & Scafato 2013).

Is there any financial support for delivering early identification and brief advice programmes? Such support can be provided by either quality improvement programmes or fee-for-service payments. Financial incentives can play an important motivating role for primary care providers, especially given their relatively poor uptake of these programmes, and

the reluctance that some of them exhibit about incorporating preventive interventions into their practices.

Options for action by governments and funders of health care systems

Preserve the status quo on the assumption that risky drinkers already receive advice from primary health care providers as a matter of course, and that people with alcohol use disorders are currently receiving appropriate treatment, primarily from specialist services. However, all the evidence suggests that this assumption is highly unlikely to be true. And in the absence of surveys or reliable estimates of the provision-to-need ratio, it is impossible to know what the present situation is with any accuracy. Preserving the status quo might be viewed as costing nothing, but that is a false assumption. Investments in early identification and brief advice programmes not only improve health and save lives, but can also save health systems money. Moreover, it can be argued that people who suffer from alcohol use disorders, including harmful use and dependence, have a moral if not a legal right to appropriate treatment.

Set a target of offering early identification and brief advice programmes to 30% of the population at risk for risky drinking. This target could be achieved by putting into place appropriate systems, including provider training, so that every patient who registers with a new primary health care provider, receives a health check, consults a provider about particular disease categories (such as hypertension or tuberculosis) or attends particular types of clinics is offered these interventions.

Set a target of offering early identification and brief advice programmes to 60% of the population at risk. This more ambitious target would require that every patient who receives primary health care services would be offered these interventions, irrespective of the reason for the consultation. It would also necessitate a greater investment in training and supporting primary health care providers.

Stakeholders for action

One key stakeholder is the clinical body or institute for clinical excellence that is responsible for developing clinical guidelines, and which can therefore be asked to prepare guidelines for early identification and brief advice. Another major stakeholding group consists of the professional bodies that represent primary health care providers. Their involvement will help ensure that the guidelines reflect their professional perspectives, as well as secure their endorsement and support for early identification and brief advice programmes. A third stakeholder category covers the public bodies and private organizations that fund and provide primary health care services. This category includes the national health service, local trusts and commissioning services, insurance companies and local communities and municipalities. These stakeholders need to be persuaded of the case for funding and managing early identification and brief advice programmes. To make this case effectively, it may be helpful to model the impact and cost–effectiveness of different scenarios for implementing these programmes.

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