

BMJ Open

Implementing referral to an electronic alcohol brief advice website in primary health care: results from the ODHIN implementation trial

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2015-010271
Article Type:	Research
Date Submitted by the Author:	16-Oct-2015
Complete List of Authors:	Bendtsen, Preben; Linköping University, Department of Medicine and Health Mussener, Ulrika; Linköping University, Medical and Health Sciences Karlsson, Nadine; Linköping University, Department of Medical and Health Sciences Lopez-Pelayo, Hugo; University of Barcelona, IDIBAPS, RTA, University of Barcelona Palacio-Vieria, Jorge; Agència Salut Pública Catalunya, Colom, Joan; Agència Salut Pública Catalunya, Gual, Antoni; University of Barcelona, IDIBAPS, RTA, University of Barcelona Reynolds, Jillian; University of Barcelona, IDIBAPS, RTA, University of Barcelona Wallace, Paul; University of Leeds, National Institute of Health Research Clinical Research Networks Segura, Lidia; Agència Salut Pública Catalunya, Anderson, Peter; Maastricht Univ
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Addiction, Public health
Keywords:	Alcohol screening, brief intervention, referral to electronic brief advice, fidelity to intervention

SCHOLARONE™
Manuscripts

1
2
3
4 1 Implementing referral to an electronic alcohol brief advice
5
6
7
8 2 website in primary health care: results from the ODHIN
9
10
11 3 implementation trial
12
13

14 Preben Bendtsen¹, Ulrika Müssener², Nadine Karlsson², Hugo López-
15 Pelayo³, Jorge Palacio-Vieira⁴, Joan Colom⁴, Antoni Gual³, Jillian
16 Reynolds³, Paul Wallace⁵, Lidia Segura⁴, Peter Anderson^{6,7}
17
18
19

20
21
22
23 7 ¹Department of Medical Specialist and Department of Medical and Health Sciences,
24 Linköping University, Motala, Sweden
25
26

27
28 9 ²Department of Medical and Health Sciences, Linköping University, Linköping,
29 Sweden
30
31

32
33 11 ³Grup Addiccions Clínic (GRA-GRE), Hospital Clínic de Barcelona, IDIBAPS, RTA,
34 University of Barcelona, Barcelona, Spain
35
36

37
38 13 ⁴Program on Substance Abuse, Public Health Agency, Government of Catalonia,
39 Barcelona, Spain
40
41

42
43 15 ⁵Department of Primary Care and Population Health, University College London,
44 London, UK
45
46

47
48 17 ⁶Institute of Health and Society, Newcastle University, Newcastle-upon-Tyne, UK
49

50
51 18 ⁷Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, the
52 Netherlands
53
54

55 20
56
57
58
59
60

- 1
2
3 21 Corresponding author: Preben Bendtsen; Linköping University, IMH/SAM, 581 83
4
5 22 Linköping Sweden. Mail: preben.bendtsen@liu.se, phone: +467072324615
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

1
2
3 **Abstract**
4

5 **Objectives:** The objective of the present study was to explore whether the possibility of
6 offering facilitated access to an electronic brief alcohol intervention instead of
7 delivering brief face-to-face advice, increased the proportion of consulting adults who
8 were screened and given brief advice.
9
10
11

12
13
14 **Design:** The study was a 12-week implementation study in 60 primary health care units
15 (PHCU) in 5 jurisdictions (Catalonia, England, the Netherlands, Poland and Sweden)
16 were asked to screen adult who attended the PHCU for risky drinking.
17
18
19

20
21 **Setting:** A total of 120 primary health care centres from 5 jurisdictions in Europe were
22 included in the study.
23
24

25
26 **Participants:** 746 individual providers (general practitioners, nurses or other
27 professionals) participated in the study.
28
29

30
31 **Primary outcome:** Change in proportion of patients screened and referred to electronic
32 alcohol intervention comparing baseline with a 12 week implementation period.
33
34

35
36 **Results:** The possibility of referring patients to the eBI was not found to be associated
37 with any increase in the proportion of patients screened. However, it was associated
38 with an increase in the proportion of screen-positive patients receiving brief advice from
39 70% to 80% for the screen-positive sample as a whole ($p<0.05$), mainly driven by a
40 significant increase in brief intervention rates in England from 87 to 96% ($p<0.01$). The
41 study indicated that staff displayed a low level of engagement and perhaps mistrust in
42 this new technology. Staff continued to offer face-to-face advice to a larger proportion
43 of patients (54%) than referral to eBI (38%). In addition, low engagement was seen
44 among the referred patients; on average 18% of the patients logged on to the website.
45
46
47
48
49
50

51 **Conclusions:** Referral to eBI takes nearly as much time as brief oral advice and might
52 require more introduction and training before staff are comfortable with referring to
53 eBI.
54

55 **Trial registration:** ClinicalTrials.gov. Trial identifier: NCT01501552.
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80

Keywords: Alcohol screening, brief intervention, referral to electronic brief advice, fidelity to intervention.

Article summary

Strength and limitations:

1. There is a lack of studies aiming at implementing referral to an alcohol eBI by health care staff in primary health care as reported in the present study..
2. The strength of this study is the participation from 5 jurisdictions, enabling us to study the variability of referrals to eBI.
3. In addition, the high number of participating providers and PHCUs is seen as a strength.
4. Limitations include the failure of some jurisdictions to implement referral to the eBI as intended, as well as the lack of access and trust in Internet-based health promotion among patients (that might be due to the age of the population screened in some jurisdictions).

Background

Alcohol continues to be a leading cause of disease globally.[1] Despite evidence on the efficacy and cost efficacy of screening and brief advice to risky drinkers in primary health care, these interventions are rarely implemented in routine practice, resulting in identification of less than 10% of the population at risk and less than 5% of those who are screened receiving brief advice.[2-4] Although delivery of a brief alcohol intervention might only take around 10–15 minutes this is too time consuming for most consultations and has been put forward by health care professionals as one of the key factors hindering more widespread implementation of brief alcohol interventions.[2,5-7]

1
2
3 81 As access to the Internet has increased, electronic brief advice websites (eBI) for
4
5 82 risky drinkers have been developed and made available online. Research indicates that
6
7 83 they can have beneficial effects equivalent to face-to-face interventions depending on
8
9 84 the content of the eBI and the target group.[8-11] Such interventions might reduce the
10
11 85 workload of health care professionals after identification of patients with risky drinking
12
13 86 and could be effective if the patients respond positively when advised by their health
14
15 87 care professionals to use the online intervention.
16
17
18

19 88 Optimizing the use of electronic health behavioural interventions in the
20
21 89 population at large is a major challenge.[12] In a review on what enhances exposure to
22
23 90 online interventions using various methods of promotion, it was suggested that referral
24
25 91 or promotion by a health professional might be an effective means of increasing the use
26
27 92 of online interventions.[13] There is an increasing amount of literature on the feasibility
28
29 93 of guided or facilitated access to online interventions for anxiety and depression; there
30
31 94 are fewer studies on facilitated access to online alcohol interventions.[14]
32
33
34

35 95 One of the few published studies involving the offer of an eBI in a primary care
36
37 96 setting was undertaken in the United Kingdom where staff at 18 primary health care
38
39 97 centres agreed to refer patients with risky drinking to an electronic alcohol
40
41 98 intervention.[15] Referral to the intervention after identification of risky drinking
42
43 99 behaviour was done in 2 stages. Over a period of 12 months, these 18 practices
44
45 100 managed to refer a total of just 31 patients, of whom only 19 actually attended a first
46
47 101 face-to-face appointment (first step) and 6 eventually logged on to the intervention
48
49 102 website (step 2). The two-stage referral process in this study may have played a
50
51 103 significant role in the low rates of access to the eBI. However, the study highlights the
52
53 104 various challenges in initiating discussions about alcohol in practice. This was partly
54
55
56
57
58
59
60

1
2
3 105 explained by reluctance of the staff to screen for risky drinking and difficulty in
4
5 106 remembering the possibility of referring to an online intervention.
6
7

8
9 107 Research on referral of patients by health care staff to Internet applications
10
11 108 promoting healthy lifestyle such as low-risk drinking is still in its infancy; only a few
12
13 109 studies having been conducted in the United Kingdom and Sweden, with a few more
14
15 110 studies underway.[16]
16

17
18 111 The ODHIN (Optimizing Delivery of Health Care Intervention) trial was
19
20 112 designed to evaluate the effect of 3 implementation strategies (alone or in combination)
21
22 113 on implementation of alcohol screening and brief intervention in primary health care:
23
24 114 (1) financial reimbursement, (2) training and support, and (3) facilitated access to an
25
26 115 eBI as an alternative to face-to-face intervention [5]. The trial was an eight-arm factor
27
28 116 cluster randomized controlled trial (RCT) in which facilitated access to an eBI was
29
30 117 included in 4 of the 8 arms, with or without one or more of the other interventions. The
31
32 118 trial was undertaken in 120 primary health care units (PHCUs), distributed equally
33
34 119 across the 5 participating jurisdictions. This article reports the findings from the study
35
36 120 with specific reference to referral to eBI.
37
38
39

40
41 121 The objective of the present study was to explore whether the possibility of
42
43 122 offering facilitated access to an eBI instead of delivering oral brief advice in the
44
45 123 ODHIN study increased the proportion of consulting adults who were screened and the
46
47 124 proportion given brief advice using data from the ODHIN study. The study also
48
49 125 examines differences in the levels of implementation among the various participating
50
51 126 jurisdictions in the trial and adherence to referral to eBI among the patients.
52
53
54
55
56
57
58
59
60

1	
2	
3	127
4	
5	
6	
7	128
8	
9	
10	
11	129
12	
13	
14	130
15	
16	
17	
18	131
19	
20	
21	
22	132
23	
24	
25	
26	133
27	
28	
29	
30	134
31	
32	
33	
34	135
35	
36	
37	136
38	
39	
40	
41	137
42	
43	
44	
45	138
46	
47	
48	
49	139
50	
51	
52	
53	140
54	
55	
56	
57	141
58	
59	
60	

For peer review only

142 **Participants and methods**

143 This study is a subanalysis of the data obtained during the ODHIN RCT.[5,17]
144 We used data obtained during the trial relating to the offer of facilitated access to an eBI
145 as an alternative to providing a face-to-face brief intervention to risky drinkers.

146 The results of the 12-week implementation of the ODHIN RCT will be
147 described in a forthcoming article.[17] A total of 120 PHCUs in Catalonia, England, the
148 Netherlands, Poland and Sweden were randomly allocated to 1 of 8 groups using
149 computerized randomization, stratified by jurisdiction. In total, 746 individual providers
150 (general practitioners, nurses or other professionals) agreed to participate in the trial and
151 gave informed consent.

152 Of the 120 centres, 15 were allocated to the eBI strategy alone and 45 to
153 combined intervention strategies (training and support (TS); financial reimbursement
154 (FR) and training and support plus financial reimbursement (TS+FR)). After formal
155 agreement with the PHCU to take part in the trial, baseline measurements took place
156 over a 4-week period. After a gap of 2–6 weeks, the 12-week implementation period
157 began; the start date for each jurisdiction was between November 2012 and May 2013.
158 All 7 intervention groups received the same basic input as the controls together with
159 additional components.

160 Staff in each PHCU were asked to screen adult patients (≥ 18 years of age who
161 attended the PHCU) for risky drinking, using a paper version of the AUDIT-C alcohol
162 screening questionnaire,[18] except in Catalonia, where a computerized version was
163 used. On the tally sheet (or in Catalonia the electronic record), any brief intervention
164 activity was to be recorded.

1
2
3 165 Screen positives were defined in Catalonia and England as men and women who
4
5 166 scored ≥ 5 on AUDIT-C, and in Poland, Netherlands and Sweden as men who scored ≥ 5
6
7 167 and women who scored ≥ 4 on AUDIT-C. The providers in all 8 arms were asked to
8
9 168 deliver brief alcohol advice to screen positives, with the length and format of the advice
10
11 169 based on country-specific guidelines or existing routines. In addition, the eBI arms were
12
13 170 given the option of referring to an eBI website.

14
15
16
17 171 Providers in PHCUs allocated to referral to eBI (alone or in combination) were
18
19 172 offered the opportunity to refer patients to an online brief alcohol intervention as an
20
21 173 alternative to a face-to-face brief intervention, but were advised that they could continue
22
23 174 to offer face-to-face intervention if they so wished to do so. Providers were advised that
24
25 175 referral should consist of taking a few minutes to encourage screen-positive patients to
26
27 176 log on to the designated eBI package. All providers in this arm of the trial were asked to
28
29 177 spend time familiarizing themselves with the website and to use this intervention;
30
31 178 unique log on codes were used to trace whether they actually did so. Patients referred to
32
33 179 the eBI were handed a leaflet containing a unique log on code for an approved eBI
34
35 180 online intervention. The eBI website used in each jurisdiction was required to meet the
36
37 181 following criteria: (1) customized as an ODHIN website, (2) log on facility to allow
38
39 182 monitoring of patient log on, (3) suitable brief screening tool with the ability to
40
41 183 calculate a score and give feedback (i.e. intervention), (4) appropriate information on
42
43 184 sensible drinking guidelines, (5) information on the impact of alcohol on health and
44
45 185 well-being, and (6) a drink diary facility. In each country, the eBI package was selected
46
47 186 from existing programmes with the exception of Poland where the World Health
48
49 187 Organization eBI programme was used.
50
51
52
53
54
55
56
57
58
59
60

188 Measures

189 The tally sheet with the AUDIT-C score and registration of brief advice activity
190 (or for Catalonia the electronic record) was used to calculate the proportion of patients
191 screened, the proportion of screen positive patients who were offered brief advice in any
192 of the following formats: oral advice, handing out an informative leaflet about sensible
193 drinking, referral for oral advice by other staff, or referral to eBI, and the proportion of
194 screen positive patients referred to eBI.

195 The staff were asked to indicate on the tally sheet which form of brief advice
196 activity were offered to the patients. In jurisdictions using paper tally sheets, it was
197 possible to tick (and therefore deliver) several forms of brief advice to one patient in a
198 single consultation, whereas in Catalonia just one option was recorded on the electronic
199 record. Staff were also asked to note on the tally sheet if the patient did not want to be
200 referred to eBI or had no computer, and to take note of any other reason for not offering
201 advice during the consultation including lack of time. On the paper version, it was
202 possible to tick more than one activity but for Catalonia, only one option could be
203 selected.

204 The proportion of patients screened was calculated as the number of patients
205 screened divided by the number of patients eligible for screening per participating
206 provider times 100.

207 The proportion of screen-positive patients given brief advice was calculated as
208 the number of screen-positive patients who received oral brief advice and/or were given
209 a leaflet, were referred to another provider in or outside the practice or were referred to
210 eBI divided by the total number of screen-positive patients per participating provider
211 times 100.

1
2
3 212 The proportion of patients logging on to the eBI was calculated as the number of
4
5 213 patients who logged on to the intervention per PHCU divided by the number of eBI
6
7 214 referral cards handed out (calculated from the tally sheets of each PHCU) times 100.

8
9
10 215 The number of patients logging on to the eBI was retrieved from the eBI system in each
11
12 216 jurisdiction. Each patient could be traced using the log on number unique to an
13
14 217 individual provider.

15
16
17 218 After the implementation period, staff were asked to complete a questionnaire as
18
19 219 part of a monitoring process of attitudes towards dealing with heavy drinkers that was
20
21 220 established throughout the ODHIN trial. This questionnaire also enquired about the
22
23 221 average time spend delivering screening and oral advice as well as screening and
24
25 222 referral to eBI.

223 **Statistical analysis**

224 For descriptive purposes, the proportion for categorical variables and the mean
225 values for quantitative variables were calculated. Differences in the proportion of
226 providers familiarizing themselves with the content of the eBI website were compared
227 between active and non-active providers using the chi-squared test.

228 The main ODHIN trial had a factorial design,[17] in which (-1,1) coding was
229 used, resulting in the outcome regression coefficients having half the effects. The eBI
230 factor was coded as follows: eBI=-1 for the control, FR, TS, TS+FR arms and +1 for
231 the eBI, eBI+TS, eBI+FR, eBI+TS+FR arms.

232 Analyses were performed in IBM SPSS V22, using the MIXED procedure with
233 a random intercept and fixed variables that included the factor and baseline
234 measurements. Because of the hierarchical structure of the data (provider within PHCU

1
2
3 235 within jurisdiction), models were analysed with random variable subject
4
5 236 (jurisdiction×PHCU). Evidence for interactions between TS, FR and e-BI was
6
7 237 investigated. There was an interaction between FR and eBI for screening rates and the
8
9 238 interaction term FR×eBI was entered in the models. There was an interaction between
10
11 239 TS, FR and eBI for brief advice rates and the interaction term TS×FR×eBI was entered
12
13 240 in the models. The outcome rates presented in Table 2 are estimated marginal means per
14
15 241 provider with 95% confidence intervals (CIs), accounting for provider within PHCU
16
17 242 within jurisdiction. When examining the impact of the factors on the 12-week screening
18
19 243 and brief advice rates, examination of residuals found them to be not symmetrically
20
21 244 distributed around 0, so log-transformed data, which provided a better fit, were used.
22
23 245 Before logging, rates with a value of zero were assigned a value of 0.001. Differences in
24
25 246 the coefficients with and without the factor were tested by t-tests in the MIXED
26
27 247 procedure.

248 **Ethical approval**

249 Ethical approval for the study was obtained within each jurisdiction from the
250 relevant approval bodies.^{17]}

251

252

253

254

255

256

257

258

259 Results

260 In total, 350 providers from 60 PHCUs were allocated to 1 of the 4 arms that
261 included eBI referral. Of these, 178 (51%) providers from 56 different PHCUs
262 participated actively in referral of patients to the eBI by handing out at least 1 eBI
263 referral card to the patients. The remaining 172 (49%) providers from 41 different
264 PHCUs did not hand out any eBI referral cards.

265 Of the 350 providers, 252 (72 %) never familiarized themselves with the content
266 on the eBI website. Of the 178 active providers referring patients to the eBI, 71 (40%)
267 familiarized themselves with the eBI website in contrast to the 172 non-active
268 providers, of whom only 27 (16%) logged on to the website (χ^2 25.39, df 1, $p=0.0001$).

269 During the 12-week implementation period, a total of 3405 (35.4%) of 9619
270 patients screened were found to have a positive AUDIT-C score and of these 1286
271 (38%) from 56 of the 60 PHCUs were referred to eBI.

272 Calculations for the proportion of referred patients logging on to the eBI were
273 obtained from 54 of the 60 PHCUs, excluding 4 PHCUs that did not refer any patient to
274 eBI and 2 PHCUs for whom no log on rate was reported (missing value). A total of 17
275 of the 60 PHCUs had a log on rate of zero despite having referred patients to the eBI; 9
276 PHCUs in Catalonia, 5 in the Netherlands and 3 in Poland 3.

277 The number of providers, referrals to eBI and mean log on rates are presented in
278 Table 1. The mean log on rate was 18.40% based on values from 54 of the 60 PHCUs.
279 The mean proportion of log ons for each jurisdiction (number of PHCUs included in the

1
2
3 280 calculation) were 0.58% ($n=10$) in Catalonia, 28.81% ($n=10$) in England, 17.32%
4
5 281 ($n=10$) in the Netherlands, 10.58% ($n=12$) in Poland and 36.95% ($n=12$) in Sweden.
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

282 **Table 1 Number of referrals to eBI and log on rates per jurisdiction in 60 PHCUs**
 283 **randomized to the eBI arms of the ODHIN trial**

Jurisdiction	Providers, <i>n</i>	Active providers, <i>n</i> (%) ¹	Referrals to eBI, <i>n</i> ²	Mean log on rate (%)
Catalonia	107	34 (32)	100	0.58
England	52	39 (75)	258	28.81
Netherlands	72	28 (39)	58	17.32
Poland	34	33 (97)	793	10.58
Sweden	85	44 (52)	198	36.95
Total	350	178 (51)	1407	18.40

284 ¹Active providers defined as having handed out at least 1 eBI referral card during the 12-week implementation
 285 period.

286 ²Number of patients referred to eBI.
 287

288 **Change in screening and brief advice rate between baseline and after** 289 **implementation**

290 One of the aims of the study was to explore whether the possibility of referring
 291 to the eBI would increase the proportion of patients screened and receiving brief advice
 292 (among screen positives). In general, little evidence of this was found (Table 2). The
 293 eBI was not associated with any increase in the proportion of patients screened, but was
 294 associated with an increase in the proportion of patients receiving brief advice in the
 295 sample as a whole ($p < 0.05$) and in England in particular ($p < 0.01$).

296 Providers who had familiarized themselves with the content on the eBI website
 297 had a slightly higher proportion of screening during the 12-week implementation
 298 period, controlling for baseline proportions (11.5%; 95% CI 8.0 to 15.4) than providers
 299 who had not (8.8%; 95% CI 6.1 to 11.4), but this difference was not significant ($t = 1.4$,
 300 ns).

301 **Table 2 Mean proportion of patients screened and proportion given brief advice**
 302 **(95% CI) per provider at baseline and after the implementation period without**
 303 **and with each eBI factor, including all 60 PHCUs randomized to the eBI arms**

		Proportion screened, % (95% CI) ¹		Proportion given BI, % (95% CI) ²	
		Baseline	Implementation	Baseline	Implementation
Catalonia	Without eBI option	7.3 (4.4–10.2)	8.4 (6.4–10.4)	52.5 (34.9–70.0)	69.0 (58.9–79.1)
	With eBI option	8.6 (5.6–11.6)	8.5 (6.4–10.7)	47.4 (27.4–67.4)	67.7 (56.5–78.8)
England	Without eBI option	5.4 (3.3–7.5)	8.0 (4.8–11.1)	83.2 (71.4–94.9)	82.3 (72.4–92.2)
	With eBI option	4.6 (2.4–6.8)	3.7 (0.5–6.9)	86.8 (75.3–98.2)	96.0 (86.0–100.0)**
Netherlands	Without eBI option	11.5 (6.9–16.1)	8.7 (4.6–12.8)	80.6 (72.3–89.0)	74.3 (65.3–83.2)
	With eBI option	8.8 (4.0–13.6)	5.8 (1.5–10.1)	66.3 (57.0–75.5)	77.6 (68.3–87.0)
Poland	Without eBI option	3.4 (0.5–6.2)	24.4 (14.3–34.4)	94.7 (87.1–100.0)	91.1 (85.2–97.0)
	With eBI option	1.3 (0–4.1)	13.0 (3.0–22.9)	96.6 (87.9–100.0)	91.6 (86.2–97.1)
Sweden	Without eBI option	13.6 (0–59.8)	11.9 (3.2–20.6)	75.1 (60.1–90.2)	73.4 (61.4–85.4)
	With eBI option	48.2 (2.7–93.6)	16.7 (8.1–25.2)	67.9 (53.8–82.0)	78.5 (66.6–90.3)
Total	Without eBI option	8.6 (0–18.9)	10.8 (8.3–13.4)	73.9 (67.0–80.8)	76.4 (71.5–81.2)
	With eBI option	16.2 (5.6–26.8)	9.6 (7.0–12.3)	70.4 (63.2–77.5)	80.7(75.7–85.7)*

304 See methods for an explanation of the statistical tests. The tests are testing for differences in implementation rates in
 305 the presence of a factor compared with the absence of a factor, controlling for baseline rates, accounting for the
 306 multi-level nature of the data (providers nested within PHCUs nested within countries). * $p < 0.05$; ** $p < 0.01$;
 307 *** $p < 0.001$.

308 ¹Proportion screened was calculated as the number of patients screened divided by the number of patients eligible
 309 for screening per participating provider times 100.

310 ²Proportion given brief advice (BI) was calculated as the number of screen-positive patients who received oral
 311 brief advice, and/or were given a leaflet, were referred to another provider within or outside the practice or
 312 referred to eBI, divided by the total number of screen-positive patients per participating provider times 100.
 313

314

315 Use of referral to the eBI in relation other BI activities

316 Although the providers in the eBI arm were encouraged to refer patients to the
317 eBI, they were still able to offer face-to-face advice, hand out a leaflet about sensible
318 drinking and/or refer patients to other staff at the PHCU or outside the PHCU, who
319 would then deliver oral advice. The distribution of the type of advice offered in the eBI
320 arms among AUDIT-positive patients is presented in Table 3, including the number of
321 patients who refused referral to the eBI or did not have a computer or were referred to
322 other staff/did not want advice. While in countries using paper tally sheets several brief
323 advice formats could be used and delivered in combination within one same
324 consultation, in Catalonia providers could only record one brief advice option.

325 A little more than half of the 3405 cases with a positive AUDIT score received
326 face-to-face advice ($n=1837$), whereas about one-third (1286) were referred to the eBI.

327 Separate analysis showed that about half of the patients (608) referred to the eBI
328 received this as the only intervention activity. For each jurisdiction, the proportion of
329 referrals to the eBI as the only intervention was as follows: Catalonia 15.0%, England
330 7.1%, Netherlands 3.3%, Poland 41.1% and Sweden 10.6%. However, for Catalonia,
331 only one option could be selected on electronic version of the tally sheet.

332 Furthermore, among the 1837 patients receiving face-to-face advice, 616
333 (34.6%) were also referred to eBI. A total of 8.6% of the patients refused referral to the
334 eBI or rejected this option because of lack of access to a computer. Only a small
335 majority of the patients were referred to other staff within or outside the practice,
336 meaning that in most cases the staff who screened the patients also delivered the advice.
337 Only 114 (3.3 %) of the patients who screened positive did not get any advice because
338 of lack of time.

339 **Table 3 Number of patients with a positive AUDIT screening receiving each type**
 340 **of advice* per participating jurisdiction in the 60 PHCUs in the eBI arms**

Jurisdiction	Number of patients with a positive screening	Patients receiving oral advice, <i>n</i> (%)	Patients referred to eBI, <i>n</i> (%)	Patients handed a leaflet, <i>n</i> (%)	Patients not accepting eBI/no computer, <i>n</i> (%)	Patients referred to other staff (within or outside the practice), <i>n</i> (%)	Patients referred to another kind of treatment or consultation, <i>n</i> (%)	Patients who did not get a BI due to lack of time, <i>n</i> (%)
Catalonia	492	138 (28.1)	74 (15.0)	110 (22.4)	25 (5.1)	9 (1.8)	1 (0.2)	2 (0.4)
England	817	601 (73.4)	245 (30.0)	153 (18.7)	97 (11.9)	43 (5.3)	39 (4.8)	20 (2.5)
Netherlands	546	323 (59.2)	55 (10.1)	19 (3.5)	42 (7.7)	28 (5.1)	9 (1.7)	57 (10.4)
Poland	964	462 (47.9)	754 (78.2)	98 (10.2)	69 (7.2)	13 (1.4)	3 (0.3)	6 (0.6)
Sweden	586	313 (53.4)	158 (27.0)	86 (14.7)	58 (9.9)	17 (2.9)	39 (6.7)	29 (5.0)
Total	3405	1837 (54.0)	1286 (37.8)	466 (13.7)	291 (8.6)	110 (3.2)	91 (2.7)	114 (3.3)

341 * More than one option could be selected except in Catalonia where it was possible to tick only one box.

342
 343 The distribution of the various forms of interventions offered is presented by
 344 jurisdiction in Table 3. Providers in Poland had the highest uptake of eBI referrals with
 345 nearly 80% of their patients with a positive AUDIT screen being referred to eBI. The
 346 lowest proportion of referrals to eBI was seen in the Netherlands where only 10% were
 347 referred to eBI. In all jurisdictions except Poland, the most frequently used intervention
 348 was face-to-face advice, which was given on average to 54% of screen-positive patients,
 349 ranging from 28% in Catalonia to 73% in England.

350 **Time spent delivering face-to-face advice and eBI**

351 One of the reasons for including eBI as an arm in the trial was an expectation
 352 that referral to an eBI advice system would take less consultation time than delivering
 353 brief advice face to face. However, this was not found to be the case. Although the
 354 mean self-reported time per provider for referring a screen-positive patient to an eBI

1
2
3 355 programme (5.5 minutes, 95% CI 4.4 to 6.5) for those providers in the eBI arms was
4
5 356 less than the mean time (7.0 minutes, 95% CI 5.8 to 8.1) for delivering face-to-face
6
7 357 brief advice for those providers not in an eBI arm, this difference, accounting for the
8
9 358 multi-level nature of the data, was not significant ($t=1.90$, $p=0.06$). When examining the
10
11 359 time differences by country, time spent on referral to an eBI advice system was
12
13 360 significantly less than time spent delivering face-to-face brief advice in Poland (5.0
14
15 361 minutes versus 7.8 minutes, $p<0.05$) and Sweden (4.5 minutes versus 8.6 minutes,
16
17 362 $p<0.05$). However, these time benefits were not associated with improvements in
18
19 363 screening or brief advice rates in either Poland or Sweden (Table 2).
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

364

365

366

367

368

369

370

371

372

373

374

375

376

377

378

For peer review only

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

379 Discussion

380 Main findings

381 The study found little evidence to support the main hypothesis that the
382 possibility of referring to an eBI would increase the proportion of patients screened and
383 receiving brief advice. The eBI was not associated with any increase in the proportion
384 of patients screened. However, it was associated with an increase in the proportion of
385 screen-positive patients receiving brief advice from 70% to 80% of the screen-positive
386 sample as a whole ($p<0.05$), mainly driven by a significant increase in BI rates in
387 England from 87% to 96% ($p<0.01$).

388 Furthermore, the findings in the study indicate that staff displayed a low level of
389 engagement and perhaps mistrust in this new technology. Only 28% of all the
390 participants in the eBI arms of the trial familiarized themselves with the eBI; this
391 proportion increased to 40% among those who referred at least one patient (51% of the
392 providers), indicating that those who were familiar with the eBI package were more
393 likely to recommend its use. Staff continued to offer face-to-face advice to a larger
394 proportion of the patients (54%) than referring to the eBI (38%).

395 A wide variability in engagement (on average 18% of referred patients logged
396 on to the website) was seen among patients both between and within jurisdictions.

397 Our findings are in line with previous research that has repeatedly shown the
398 challenges of competing tasks (i.e. other important things that have to be done as part of
399 the daily routine) facing staff in primary health care, often is a hindrance when
400 implementing new methods, not least implementing new methods for working with
401 risky drinkers.[19,20] This was also suggested as the main reason for the low

1
2
3 402 implementation rate in a previous qualitative study on referral to an online intervention
4
5 403 in primary care in the United Kingdom.[15] Also, the new technology might not fit with
6
7 404 the professional's views on how to interact with patients.[21] Referral to the eBI thus
8
9 405 challenges roles and responsibility with regard to the patients health and uncertainty
10
11 406 about the potential benefits to the patients. Also, as shown in this study, referral to eBI
12
13 407 takes just as much time as delivering a face-to- face intervention.[22] We did not
14
15 408 explore potential reasons for non-compliance with the study protocol but certainly this
16
17 409 needs to be explored in future research.[22]
18
19
20

21 **Adherence to the intervention among referred patients**

22
23
24 411 Engagement of the referred patients varied to a high degree both within and
25
26 412 across jurisdictions. In 2 jurisdictions, Catalonia and the Netherlands, a high number of
27
28 413 PHCUs had a log on rate of zero, i.e. patients did not log on, despite having being
29
30 414 referred to the eBI. However, in Poland and in particular in England and Sweden, eBI
31
32 415 referrals seem to have been implemented without any major problems (Table 1). Lack
33
34 416 of adherence to or attrition from online health interventions is a well-known
35
36 417 problem.[15]
37
38
39

40
41 418 Facilitated access or referral has been shown to reduce attrition in psychological
42
43 419 online interventions targeting anxiety and depression.[23-25] In our study, the mean
44
45 420 proportion of patients adhering to the referral was low, on average 18.4%, but in one-
46
47 421 third of the PHCUs, no patients logged on to the website. However, 2 jurisdictions
48
49 422 showed more positive results with adherence of 37% in Sweden and 29% in England. In
50
51 423 one of the few earlier studies on primary health care referral to eBI in the United
52
53 424 Kingdom, adherence was 32% based on only 19 referrals.[15] Despite the lack of results
54
55 425 from some PHCUs in our study, the results indicate that it is feasible to refer patients to
56
57
58
59
60

1
2
3 426 an eBI and get a reasonable proportion of them to log on, although the results also point
4
5 427 to implementation issues that need to be considered and explored in more depth in
6
7 428 future studies. We did not specify an obligatory revisit to the provider, which might
8
9 429 have increased the adherence rate somewhat.

10
11
12 430 Our findings concerning the engagement of the patients are in line with a recent
13
14 431 review in which it was concluded that the few projects published so far on referral to
15
16 432 eBI have not been able to show a satisfying level of engagement and sustainability.
17
18 433 Referral to eBI seems only to succeed if the health care provider offers personal
19
20 434 engagement in promoting the referral, ensuring that the patients log on and adhere to the
21
22 435 online intervention.[16]

23 24 25 26 27 436 **Use of referral to eBI in relation to other BI activities**

28
29 437 Staff in this study were given the option of referring patients to the eBI but they
30
31 438 could also offer face-to-face advice, hand out a leaflet or refer patients to another
32
33 439 professional within or outside the PHCU, except for Catalonia where only one option
34
35 440 could be recorded in the electronic record. Only half of the patients referred to eBI were
36
37 441 given this as the only option and thus did not receive oral advice. This means that half
38
39 442 of the patients referred to eBI were also given oral advice using referral to eBI as an
40
41 443 adjunct to oral advice. Whether this was due to lack of familiarity with or mistrust of the
42
43 444 eBI or simply implies that when referring to eBI oral advice becomes a part of the
44
45 445 referral talk is not known.

46
47
48
49
50 446 Referral to eBI was meant to save time and in average the staff spend 12% less
51
52 447 time (7.25 minutes compared with 8.28 minutes on average) when referring to eBI than
53
54 448 when giving oral advice. The reason why more time was not saved could be that staff
55
56 449 first had to screen the patients with the pen-and-paper AUDIT-C questionnaire (or in
57
58
59
60

1
2
3 450 Catalonia using the electronic record) and then, based on the results, had to explain to
4
5 451 the patients why they were recommended to log on to the eBI intervention.
6
7

8 452 **Differences in the level of implementation in the participating** 9 10 11 453 **jurisdictions**

12
13 454 Differences in the level of implementation among the participating jurisdictions
14
15 455 were seen with regard to the proportion of AUDIT-C positive patients referred to eBI;
16
17 456 Poland referred most of their patients (80%) in contrast to the Netherlands where only
18
19 457 10% were referred.
20
21

22
23 458 Assuming that a zero log on rate reflects the ability to motivate the patients to
24
25 459 use the eBI, it seems that patients in Catalonia were less compelled to use the eBI
26
27 460 because only 1 of the 12 PHCUs reported a log on rate greater than zero. We did not
28
29 461 study the reason for this but it could be due to a different culture among patients in
30
31 462 Catalonia towards Internet use and trust in websites. In the Netherlands, only 5 of the 12
32
33 463 PHCUs reported a log on rate greater than zero and 2 PHCUs did not refer a single
34
35 464 patient. However, in Poland 9 of 12 PHCUs reported a log on rate, 10 of 12 in England
36
37 465 and all 12 PHCUs in Sweden (Table 1). This might reflect a different maturity in
38
39 466 different jurisdictions with regard to eHealth solutions for promoting healthy lifestyle.
40
41 467 In Catalonia, this was the first attempt to introduce an eBI. This difference can be
42
43 468 expected to fade out in years to come but is a real challenge for implementation of eBI
44
45 469 in primary care at the present time.
46
47
48
49

50 51 470 **Strength and limitations**

52
53 471 To our knowledge, this is one of the first studies aiming at implementing referral
54
55 472 to an alcohol eBI by health care staff in primary health care. The strength of this study
56
57 473 is the participation from 5 jurisdictions, enabling us to study the variability of referrals
58
59
60

1
2
3 474 to eBI. In addition, the high number of participating providers and PHCUs is seen as a
4
5 475 strength. Limitations include the failure of some jurisdictions to implement referral to
6
7 476 the eBI as intended, as well as the lack of access and trust in Internet-based health
8
9 477 promotion among patients (that might be due to the age of the population screened in
10
11 478 some jurisdictions). However, the main ODHIN study was not designed to study the
12
13 479 reasons for failure in implementing referral to eBI but a forthcoming qualitative study
14
15 480 with participants from the ODHIN project will partly enable us to answer some of the
16
17 481 questions raised by the present study.
18
19
20

21 **Conclusions**

22
23
24 483 The study shows that it was difficult to get staff engaged in referring to the eBI;
25
26 484 fact that is reflected in the low proportion of staff familiarizing themselves with the eBI
27
28 485 intervention. The referred patients showed a low level of engagement in logging on to
29
30 486 the eBI intervention although there was a high degree of variation in engagement by
31
32 487 patients across jurisdictions and within jurisdictions, perhaps as a consequences of the
33
34 488 low level of engagement from the staff, the age of the patients and access to the
35
36 489 Internet.
37
38
39

40
41 490 Consequently, although the staff had the opportunity to refer patients to the
42
43 491 somewhat time-saving eBI intervention, the study did not show much evidence of
44
45 492 increased engagement from staff with regard to the proportion of patients screened but a
46
47 493 small increase in the proportion who screened positive getting advice was seen in some
48
49 494 jurisdictions. Perhaps the time saved did not counterbalance the risk involved; when
50
51 495 giving face-to-face advice, the staff know that the patients receive the advice; whereas
52
53 496 when the patients are referred to the eBI, the staff do not know whether the patient will
54
55 497 actually log on and receive the advice.
56
57
58
59
60

1
2
3 498 Among the patients referred to the eBI, 18% logged on to the intervention. No
4
5 499 follow-up was done of the patients, so it is not known whether they benefitted from the
6
7 500 information on the website. Implementation of eBI failed to become embedded in some
8
9 501 of the participating countries, whereas England and Sweden reported a more reasonable
10
11 502 proportion of referrals and log on proportion of 30% from all or nearly all participating
12
13 503 units. Most certainly, the various jurisdictions have different experiences with electronic
14
15 504 health promotion interventions, reflecting different maturity in how to interact with
16
17 505 Internet-based interventions.
18
19

20
21 506 What can be learned from this implementation study? Referral to eBI takes
22
23 507 nearly as much time as brief oral advice; less than one-fifth of referred patients actual
24
25 508 log on the website; all staff are not ready to refer to eBI and might require more
26
27 509 introduction and training before they are comfortable with referring to eBI. Finally, a
28
29 510 follow-up routine would also reduce the risk of no advice being delivered.
30
31

32
33 511 Not much progress has been reported on engagement by health care staff in
34
35 512 alcohol interventions during the last decade.[19,20] Thus, there is a need for more
36
37 513 translational research that identifies innovative means of embedding alcohol preventive
38
39 514 measures into daily practice.[20] More alcohol eBI implementation studies should
40
41 515 therefore be performed to get a more profound understanding of attitudes and practices
42
43 516 among providers concerning trust in eBI and how best to support the implementation,
44
45 517 including the importance of facilitated access.[21,22] If successful implementation of an
46
47 518 eBI on alcohol could be achieved, there is no doubt that this would save time and
48
49 519 money. Simulation studies on the effects of introducing an eBI on alcohol on a larger
50
51 520 scale to a whole nation such as the Netherlands shows substantial cost effectiveness for
52
53 521 the health care system.[26] But there are still questions to be answered such as whether
54
55 522 eBI should be offered after face-to-face screening or whether it is possible to set up a
56
57
58
59
60

1
2
3 523 system whereby the patients are referred directly to eBI without face-to-face screening
4
5 524 without losing compliance, i.e. ensuring that patients do log on to the web site.[27,28]
6
7

8 525 **Competing interests**

9
10
11 526 **Preben Bendtsen** is part owner of a private company that develops and distributes eBI
12
13 527 solutions as used in the Swedish part of the study. **Hugo López-Pelayo** has received
14
15 528 travel grants from Lundbeck, Lilly, Pfizer, Rovi, Esteve and honoraria and travel grants
16
17 529 from Janssen and Lundbeck. **Antoni Gual** has received honoraria, research grants, and
18
19 530 travel grants from Lundbeck, Janssen, Pfizer, Lilly, Abbvie D&A Pharma, and
20
21 531 Servier. Previous stated honoraria had no influence on this article. **Paul Wallace** PI in
22
23 532 the EFAR studies and provides private consultancy to Lundbeck and the Safe Sensible
24
25 533 London Partnership on the topic of screening and brief interventions. He is Chief
26
27 534 Medical Advisor to the UK charity, Drinkaware.

28
29
30 535 **All other authors** declare no financial relationships with any organizations that might
31
32 536 have an interest in the submitted work in the previous 3 years, and no other
33
34 537 relationships or activities that could appear to have influenced the submitted work.
35
36
37
38
39

40 538

41 539 **Authors' contributions**

42
43
44
45
46 540 All authors, except PA, were involved in implementing the trial in their
47
48 541 jurisdictions. NK and PA undertook the analyses, PB and UM wrote the first draft of the
49
50 542 manuscript. All other authors revised the manuscript critically. All authors read and
51
52 543 approved the final manuscript.
53
54

55
56 544
57
58
59
60

545 **Data Sharing Statement**

546 Data set available on request from corresponding author

547 (preben.bendtsen@liu.se)

548

549 **Acknowledgements**

550 We thank all participating PHCUs and practitioners for their support with the
551 trial. We thank Steven Teerenstra (statistician at the Department of Health Evidence,
552 Radboud University Medical Centre) who assisted PA, MK and ML in designing the
553 analysis plan for the factorial RCT design. We thank the Catalan society of Family and
554 Community Medicine, the Catalan Association of Family and Community Nursing and
555 the Alcohol Network of Referents on Alcohol (XaROH) of the Programa Beveu Menys,
556 who collaborated in the implementation of the trial in Catalonia. We thank Sebastián
557 Calero from the Catalan Health Institute's Healthcare Issues' Area of Clinical
558 Development, Carmen Olmos and Manuel Iglesias from the eCAP Functional
559 Competences Centre and Manuel Medina, Francesc Fina, Leonardo Méndez and Eduard
560 Hermosilla from the Information System for Research Development in Primary Health
561 Care (SIDIAP database) for supporting the Catalan ODHIN team in the adaptation of
562 the electronic medical records (eCAP) and in the data extraction for the trial.

563 **Funding**

564 The research leading to these results or outcomes has received funding from the
565 European Union's Seventh Framework Programme for Research, Technological
566 Development and Demonstration under grant agreement no. 259268 – Optimizing

1
2
3 567 Delivery of Health Care Intervention (ODHIN). Participant organizations in ODHIN
4
5 568 can be seen at www.odhinproject.eu. Radboud University Medical Center received co-
6
7 569 funding from The Netherlands Organisation for Health Research and Development
8
9 570 (ZonMW, Prevention Program) under grant agreement no. 200310017 – ODHIN –
10
11 571 Optimizing Delivery of Healthcare Interventions in the Netherlands, according Art.II.17
12
13 572 of the FP7 EC Grant Agreement. Colin Drummond is partly funded by the NIHR
14
15 573 Biomedical Research Centre for Mental Health at South London and Maudsley NHS
16
17 574 Foundation Trust and King’s College London and partly funded by the NIHR
18
19 575 Collaborations for Leadership in Applied Health Research and Care South London at
20
21 576 King’s College Hospital NHS Foundation Trust. The views expressed are those of the
22
23 577 author(s) and not necessarily those of the NHS, the NIHR, the Department of Health, or
24
25 578 the European Commission. Pomeranian Medical University in Szczecin received co-
26
27 579 funding for the ODHIN project from Polish science financial resources in 2012–2014.
28
29
30
31
32 580
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 5814
5
6 5827
8
9 58310
11
12 58413
14
15 58516
17
18 58619
20
21
22
23 **References**24
25
26 588 1. Rehm J, Taylor B, Room, R. Global burden of disease from alcohol, illicit drugs and
27 589 tobacco. *Drug Alcohol Rev* 2006;25:503-13.30
31 590 2. Anderson P. Overview of interventions to enhance primary-care provider
32 591 management of patients with substance-use disorders. *Drug Alcohol Rev*
33 592 2009;28:567-74.34
35 593 3. Kaner EF, Beyer F, Dickinson HO, Pienaar E, Campbell F, Schlesinger C, et al.
36 594 Effectiveness of brief alcohol interventions in primary care populations.
37 595 *Cochrane Database Syst Rev* 2007;(2):CD004148.38
39 596 4. Jonas DE, Garbutt JC, Amick HR, Brown JM, Brownley KA, Council CL, et al.
40 597 Behavioral counseling after screening for alcohol misuse in primary care: a
41 598 systematic review and meta-analysis for the U.S. Preventive Services Task
42 599 Force. *Ann Internal Med* 2012;157:645-54.43
44
45 600 5. Keurhorst MN, Anderson P, Spak F, Bendtsen P, Segura L, Colom J, et al.
46 601 Implementing training and support, financial reimbursement, and referral to an

- 1
2
3 602 internet-based brief advice program to improve the early identification of
4
5 603 hazardous and harmful alcohol consumption in primary care (ODHIN): study
6
7 604 protocol for a cluster randomized factorial trial. *Implement Sci* 2013;8:11.
8
9
10 605 6. Nilsen P, Aalto M, Bendtsen P, Seppa K. Effectiveness of strategies to implement
11
12 606 brief alcohol intervention in primary healthcare. A systematic review. *Scand J*
13
14 607 *Prim Health Care* 2006.;24:5-15.
15
16
17 608 7. Nilsen P. Brief alcohol intervention—where to from here? Challenges remain for
18
19 609 research and practice. *Addiction* 2010;105:954-9.
20
21
22 610 8. Riper H, Spek V, Boon B, Conijn B, Kramer J, Martin-Abello K, et al. Effectiveness
23
24 611 of E-Self-help interventions for curbing adult problem drinking: a meta-analysis.
25
26 612 *J Med Internet Res* 2011;13:e42.
27
28
29 613 9. Wallace P, Murray E, McCambridge J, Khadjesari Z, White IR, Thompson S, et al.
30
31 614 On-line randomized controlled trial of an Internet based psychologically
32
33 615 enhanced intervention for people with hazardous alcohol consumption. *PLoS*
34
35 616 *One* 2011;6:e14740.
36
37
38 617 10. Khadjesari Z, Murray E, Hewitt C, Hartley S, Godfrey C. Can stand-alone
39
40 618 computer-based interventions reduce alcohol consumption? A systematic
41
42 619 review. *Addiction* 2011;106:267-82.
43
44
45 620 11. Rooke S, Thorsteinsson E, Karpin A, Copeland J, Allsop D. Computer-delivered
46
47 621 interventions for alcohol and tobacco use: a meta-analysis. *Addiction*
48
49 622 2010;105:1381-90.
50
51
52 623 12. Kohl LF, Crutzen R, de Vries NK. Online prevention aimed at lifestyle behaviors: a
53
54 624 systematic review of reviews. *J Med Internet Res* 2013;15:e146.
55
56
57
58
59
60

- 1
2
3 625 13. Brouwer W, Kroeze W, Crutzen R, de Nooijer J, de Vries NK, Brug J, et al. Which
4
5 626 intervention characteristics are related to more exposure to internet-delivered
6
7 627 healthy lifestyle promotion interventions? A systematic review. *J Med Internet*
8
9 628 *Res* 2011;;13:e2.
- 11
12 629 14. Riper H, Blankers M, Hadiwijaya H, Cunningham J, Clarke S, Wiers R, et al.
13
14 630 Effectiveness of guided and unguided low-intensity internet interventions for
15
16 631 adult alcohol misuse: a meta-analysis. *PLoS One* 2014;9:e99912.
- 18
19 632 15. Murray E, Linke S, Harwood E, Conroy S, Stevenson F, Godfrey C. Widening
20
21 633 access to treatment for alcohol misuse: description and formative evaluation of
22
23 634 an innovative web-based service in one primary care trust. *Alcohol Alcohol*
24
25 635 2012;47:697-701.
- 27
28 636 16. Wallace P, Bendtsen P. Internet applications for screening and brief interventions
29
30 637 for alcohol in primary care settings – implementation and sustainability. *Front*
31
32 638 *Psychiatry* 2014;5:151.
- 34
35 639 17. Anderson P, Bendtsen P, Spak F, Reynolds J, Drummond C et. Improving the
36
37 640 delivery of brief advices for heavy drinking in primary health care: outcome
38
39 641 results of the ODHIN five country cluster randomized factorial trial. Submitted
40
41 642 to *Addiction*.
- 43
44 643 18. Bush, K et al. The AUDIT Alcohol Consumption Questions (AUDIT-C): an
45
46 644 effective brief screening test for problem drinking. Ambulatory Care Quality
47
48 645 Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test.
49
50 646 *Arch Internal Med* 1998;158:1789-95.
- 51
52
53
54
55
56
57
58
59
60

- 1
2
3 647 19. Rapley T, May C, Frances Kaner E. Still a difficult business? Negotiating alcohol-
4
5 648 related problems in general practice consultations. *Soc Sci Med* 2006;63:2418-
6
7 649 28.
- 8
9
10 650 20. Wilson GB, Lock CA, Heather N, Cassidy P, Christie MM, Kaner EF. Intervention
11
12 651 against excessive alcohol consumption in primary health care: a survey of GPs'
13
14 652 attitudes and practices in England 10 years on. *Alcohol Alcohol* 2011;46:570-7.
- 15
16
17 653 21. Murray E, Burns J, May C, Finch T, O'Donnell C, Wallace P, et al. Why is it
18
19 654 difficult to implement e-health initiatives? A qualitative study. *Implement Sci*
20
21 655 2011;6:6.
- 22
23
24 656 22. Mair FS, May C, O'Donnell C, Finch T, Sullivan F, Murray E. Factors that promote
25
26 657 or inhibit the implementation of e-health systems: an explanatory systematic
27
28 658 review. *Bull World Health Organ* 2012;90:357-64.
- 29
30
31 659 23. Robinson E, Titov N, Andrews G, McIntyre K, Schwencke G, Solley K. Internet
32
33 660 treatment for generalized anxiety disorder: a randomized controlled trial
34
35 661 comparing clinician vs. technician assistance. *PLoS One* 2010;5:e10942.
- 36
37
38 662 24. Johnston L, Titov N, Andrews G, Spence J, Dear BF. A RCT of a transdiagnostic
39
40 663 internet-delivered treatment for three anxiety disorders: examination of support
41
42 664 roles and disorder-specific outcomes. *PLoS One* 2011;6:e28079.
- 43
44
45 665 25. Spek V, Cuijpers P, Nyklicek I, Riper H, Keyzer J, Pop V. Internet-based cognitive
46
47 666 behaviour therapy for symptoms of depression and anxiety: a meta-analysis.
48
49 667 *Psychol Med* 2007;37:319-28.
- 50
51
52 668 26. Smit F, Lokkerbol J, Riper H, Majo MC, Boon B, Blankers M. Modeling the cost-
53
54 669 effectiveness of health care systems for alcohol use disorders: how

- 1
2
3 670 implementation of eHealth interventions improves cost-effectiveness. *J Med*
4
5 671 *Internet Res* 2011;13:e56.
6
7
8 672 27. Struzzo P, Scafato E, McGregor R, Della Vedova R, Verbano L, Lygidakis C,
9
10 673 et al. A randomised controlled non-inferiority trial of primary care-based
11
12 674 facilitated access to an alcohol reduction website (EFAR-FVG): the study
13
14 675 protocol. *BMJ Open* 2013;3:e002304.
15
16
17 676
18 677 28. López-Pelayo H, Wallace P, Segura L, Miquel L, Díaz E, Teixidó L et al. A
19
20 678 A randomised controlled non-inferiority trial of primary care-based facilitated
21
22 679 access to an alcohol reduction website (EFAR Spain): the study protocol. *BMJ*
23
24 680 *Open* 2014;4:e007130.
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

BMJ Open

Implementing referral to an electronic alcohol brief advice website in primary health care: results from the ODHIN implementation trial

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2015-010271.R1
Article Type:	Research
Date Submitted by the Author:	03-May-2016
Complete List of Authors:	Bendtsen, Preben; Linköping University, Department of Medicine and Health Mussener, Ulrika; Linköping University, Medical and Health Sciences Karlsson, Nadine; Linköping University, Department of Medical and Health Sciences Lopez-Pelayo, Hugo; University of Barcelona, IDIBAPS, RTA, University of Barcelona Palacio-Vieria, Jorge; Agència Salut Pública Catalunya, Colom, Joan; Agència Salut Pública Catalunya, Gual, Antoni; University of Barcelona, IDIBAPS, RTA, University of Barcelona Reynolds, Jillian; University of Barcelona, IDIBAPS, RTA, University of Barcelona Wallace, Paul; University of Leeds, National Institute of Health Research Clinical Research Networks Segura, Lidia; Agència Salut Pública Catalunya, Anderson, Peter; Maastricht Univ
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Addiction, Public health
Keywords:	Alcohol screening, brief intervention, referral to electronic brief advice, fidelity to intervention

SCHOLARONE™
Manuscripts

1
2
3
4 1 Implementing referral to an electronic alcohol brief advice
5
6
7
8 2 website in primary health care: results from the ODHIN
9
10
11 3 implementation trial
12

13
14 4 Preben Bendtsen¹, Ulrika Müssener², Nadine Karlsson², Hugo López-
15
16
17 5 Pelayo³, Jorge Palacio-Vieira⁴, Joan Colom⁴, Antoni Gual³, Jillian
18
19
20 6 Reynolds³, Paul Wallace⁵, Lidia Segura⁴, Peter Anderson^{6,7}
21

22
23 7 ¹Department of Medical Specialist and Department of Medical and Health Sciences,
24
25 8 Linköping University, Motala, Sweden
26

27
28 9 ²Department of Medical and Health Sciences, Linköping University, Linköping,
29
30 10 Sweden
31

32
33 11 ³Grup Addiccions Clínic (GRA-GRE), Hospital Clínic de Barcelona, IDIBAPS, RTA,
34
35 12 University of Barcelona, Barcelona, Spain
36

37
38 13 ⁴Program on Substance Abuse, Public Health Agency, Government of Catalonia,
39
40 14 Barcelona, Spain
41

42
43 15 ⁵Department of Primary Care and Population Health, University College London,
44
45 16 London, UK
46

47
48 17 ⁶Institute of Health and Society, Newcastle University, Newcastle-upon-Tyne, UK
49

50
51 18 ⁷Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, the
52
53 19 Netherlands
54

55
56 20 Correspondence to: Preben Bendtsen, Linköping University, IMH/SAM, 581 83

57
58 21 Linköping Sweden. Email: preben.bendtsen@liu.se; Tel: +467072324615.
59
60

1
2
3 22 **Keywords:** Alcohol screening, brief intervention, referral to electronic brief advice,
4
5 23 fidelity to intervention.
6

7
8 24 Word count: 4954
9
10 25
11 26
12 27
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

1
2
3 **Abstract**
4

5 **Objectives:** The objective of the present study was to explore whether the possibility of
6
7 offering facilitated access to an electronic brief alcohol intervention (eBI) instead of
8
9 delivering brief face-to-face advice increased the proportion of consulting adults who
10
11 were screened and given brief advice.
12
13

14 **Design:** The study was a 12-week implementation study. Sixty primary health care
15
16 units (PHCU) in 5 jurisdictions (Catalonia, England, the Netherlands, Poland and
17
18 Sweden) were asked to screen adults who attended the PHCU for risky drinking.
19
20

21 **Setting:** A total of 120 primary health care centres from 5 jurisdictions in Europe
22

23 **Participants:** 746 individual providers (general practitioners, nurses or other
24
25 professionals) participated in the study.
26
27

28 **Primary outcome:** Change in the proportion of patients screened and referred to eBI
29
30 comparing a baseline 4-week pre-implementation period with a 12-week
31
32 implementation period.
33

34 **Results:** The possibility of referring patients to the eBI was not found to be associated
35
36 with any increase in the proportion of patients screened. However, it was associated
37
38 with an increase in the proportion of screen-positive patients receiving brief advice from
39
40 70% to 80% for the screen-positive sample as a whole ($p<0.05$), mainly driven by a
41
42 significant increase in brief intervention rates in England from 87 to 96% ($p<0.01$). The
43
44 study indicated that staff displayed a low level of engagement in this new technology.
45
46 Staff continued to offer face-to-face advice to a larger proportion of patients (54%) than
47
48 referral to eBI (38%). In addition, low engagement was seen among the referred
49
50 patients; on average, 18% of the patients logged on to the website with a mean log on
51
52 rate across the different countries of between 0.58% and 36.95%.
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

52 **Conclusions:** Referral to eBI takes nearly as much time as brief oral advice and might
53 require more introduction and training before staff are comfortable with referring to
54 eBI.

55 **Trial registration:** ClinicalTrials.gov. Trial identifier: NCT01501552.

56 **Strength and limitations of this study**

- 57 1. There is a lack of studies on implementing referral to an alcohol eBI by health care
58 staff in primary health care as reported in the present study.
- 59 2. The strength of this study is the participation from 5 jurisdictions, enabling us to
60 study the variability of referrals to eBI.
- 61 3. In addition, the high number of participating providers and PHCUs is seen as a
62 strength.
- 63 4. Limitations include the failure of some jurisdictions to implement referral to the eBI
64 as intended, as well as the lack of access and trust in Internet-based health
65 promotion among patients (that might be due to the age of the population screened
66 in some jurisdictions).

67 **BACKGROUND**

68 Alcohol continues to be a leading cause of disease globally.[1] Despite evidence
69 on the efficacy and cost efficacy of screening and brief advice to risky drinkers in
70 primary health care, these interventions are rarely implemented in routine practice,
71 resulting in identification of less than 10% of the population at risk and less than 5% of
72 those who are screened receiving brief advice.[2-4] Although delivery of a brief alcohol
73 intervention might only take 10–15 min, this is too time consuming for most

1
2
3 74 consultations and has been put forward by health care professionals as one of the key
4
5 75 factors hindering more widespread implementation of brief alcohol interventions.[2,5-7]
6
7

8
9 76 As access to the Internet has increased, electronic brief advice websites (eBI) for
10
11 77 risky drinkers have been developed and made available online. Research indicates that
12
13 78 they can have beneficial effects equivalent to face-to-face interventions depending on
14
15 79 the content of the eBI and the target group.[8-11] Such interventions might reduce the
16
17 80 workload of health care professionals after identification of patients with risky drinking
18
19 81 and could be effective if the patients respond positively when advised by their health
20
21 82 care professionals to use the online intervention.
22
23

24
25 83 Optimizing the use of electronic health behavioural interventions in the
26
27 84 population at large is a major challenge.[12] In a review on what enhances exposure to
28
29 85 online interventions using various methods of promotion, it was suggested that referral
30
31 86 or promotion by a health professional might be an effective means of increasing the use
32
33 87 of online interventions.[13] There is an increasing amount of literature on the feasibility
34
35 88 of guided or facilitated access to online interventions for anxiety and depression; there
36
37 89 are fewer studies on facilitated access to online alcohol interventions.[14]
38
39

40
41 90 One of the few published studies involving the offer of an eBI in a primary care
42
43 91 setting was undertaken in the United Kingdom where staff at 18 primary health care
44
45 92 centres agreed to refer patients with risky drinking to an electronic alcohol
46
47 93 intervention.[15] Referral to the intervention after identification of risky drinking
48
49 94 behaviour was done in 2 stages. Over a period of 12 months, these 18 practices
50
51 95 managed to refer a total of just 31 patients, of whom only 19 actually attended a first
52
53 96 face-to-face appointment (first step) and 6 eventually logged on to the intervention
54
55 97 website (step 2). The two-stage referral process in this study may have played a
56
57
58
59
60

1
2
3 98 significant role in the low rates of access to the eBI. However, the study highlights the
4
5 99 various challenges in initiating discussions about alcohol in practice. This was partly
6
7 100 explained by reluctance of the staff to screen for risky drinking and difficulty in
8
9 101 remembering the possibility of referring to an online intervention.
10

11
12
13 102 Research on referral of patients by health care staff to Internet applications
14
15 103 promoting healthy lifestyle such as low-risk drinking is still in its infancy; only a few
16
17 104 studies have been conducted in the United Kingdom and Sweden, and a few more
18
19 105 studies are underway.[16]
20

21
22
23 106 The ODHIN (Optimizing Delivery of Health Care Intervention) trial was
24
25 107 designed to evaluate the effect of 3 implementation strategies (alone or in combination)
26
27 108 on implementation of alcohol screening and brief intervention in primary health care:
28
29 109 (1) financial reimbursement, (2) training and support, and (3) facilitated access to an
30
31 110 eBI as an alternative to face-to-face intervention.[5] The trial was an 8-arm factor
32
33 111 cluster randomized controlled trial (RCT) in which facilitated access to an eBI was
34
35 112 included in 4 of the 8 arms, with or without one or more of the other interventions. The
36
37 113 trial was undertaken in 120 primary health care units (PHCUs), distributed equally
38
39 114 across the 5 participating jurisdictions. This article reports the findings from the study
40
41 115 with specific reference to referral to eBI.
42
43
44

45
46 116 The objective of the present study was to explore whether the possibility of
47
48 117 offering facilitated access to an eBI instead of delivering oral brief advice in the
49
50 118 ODHIN study increased the proportion of consulting adults who were screened and the
51
52 119 proportion given brief advice using data from the ODHIN study. The study also
53
54 120 examines differences in the levels of implementation among the various participating
55
56 121 jurisdictions in the trial and adherence to referral to eBI among the patients.
57
58
59
60

122 PARTICIPANTS AND METHODS

123 This study is a subanalysis of the data obtained during the ODHIN RCT.[5,17]

124 We used data obtained during the trial relating to the offer of facilitated access to an eBI
125 as an alternative to providing a face-to-face brief intervention to risky drinkers.

126 The results of the 12-week implementation of the ODHIN RCT will be
127 described in a forthcoming article.[17] A total of 120 PHCUs in Catalonia, England, the
128 Netherlands, Poland and Sweden were randomly allocated to 1 of 8 groups using
129 computerized randomization, stratified by jurisdiction. In total, 746 individual providers
130 (general practitioners, nurses or other professionals) agreed to participate in the trial and
131 gave written informed consent after a 30–45 min introductory meeting explaining the
132 evidence base on alcohol screening and brief interventions.

133 Of the 120 centres, 15 were allocated to the eBI strategy alone and 45 to
134 combined intervention strategies (training and support (TS), financial reimbursement
135 (FR) and training and support plus financial reimbursement (TS+FR)). After formal
136 agreement with the PHCU to take part in the trial, baseline measurements took place
137 over a 4-week period. After a gap of 2–6 weeks, the 12-week implementation period
138 began; the start date for each jurisdiction was between November 2012 and May 2013.
139 All 7 intervention groups received the same basic input as the controls together with
140 additional components. Providers in PHCUs allocated to referral to eBI (alone or in
141 combination) had a mean age of 47.1 years (SD=9.4; range 24-67 years) and 76% were
142 women. The mean age of the providers was lowest for the Netherlands (44,1 years) and
143 highest for Poland (48.9 years). The proportion of women varied from 68% in The
144 Netherlands to 90 % in Sweden.

1
2
3 145 Staff in each PHCU were asked to screen adult patients (≥ 18 years of age who
4
5 146 attended the PHCU for any reason) for risky drinking, using a paper version of the
6
7 147 AUDIT-C alcohol screening questionnaire,[18] except in Catalonia, where a
8
9 148 computerized version was used. On the tally sheet (or in Catalonia the electronic
10
11 149 record), any brief intervention activity was to be recorded.

150 Screen positives were defined in Catalonia and England as men and women who
151 scored ≥ 5 on AUDIT-C, and in Poland, Netherlands and Sweden as men who scored ≥ 5
152 and women who scored ≥ 4 on AUDIT-C. The providers in all 8 arms were asked to
153 deliver brief alcohol advice to screen positives, with the length and format of the advice
154 based on country-specific guidelines or existing routines. In addition, the eBI arms were
155 given the option of referring to an eBI website. No demographic data concerning the
156 patients were collected.

157 Providers in PHCUs allocated to referral to eBI (alone or in combination) were
158 offered the opportunity to refer patients to an online brief alcohol intervention as an
159 alternative to a face-to-face brief intervention, but were advised that they could continue
160 to offer face-to-face intervention if they so wished to do so. Providers were advised that
161 referral should consist of taking a few minutes to encourage screen-positive patients to
162 log on to the designated eBI package. All providers in this arm of the trial were trained
163 in how to offer the eBI to the patients using a designated script and were asked to spend
164 time familiarizing themselves with the website before referring patients to the
165 intervention. Unique log on codes were used to trace whether they actually did so.
166 Patients referred to the eBI were handed a leaflet containing a unique log on code for an
167 approved eBI online intervention. The eBI website used in each jurisdiction was
168 required to meet the following criteria: (1) customized as an ODHIN website, (2) log on
169 facility to allow monitoring of patient log on, (3) suitable brief screening tool with the

1
2
3 170 ability to calculate a score and give feedback (i.e. intervention), (4) appropriate
4
5 171 information on sensible drinking guidelines, (5) information on the impact of alcohol on
6
7 172 health and well-being, and (6) a drink diary facility. In each country, the eBI package
8
9
10 173 was selected from existing programmes with the exception of Poland where the World
11
12 174 Health Organization eBI programme was used.

175 **Measures**

176 The tally sheet with the AUDIT-C score and registration of brief advice activity
177 (or for Catalonia the electronic record) was used to calculate the proportion of patients
178 screened, the proportion of screen-positive patients who were offered brief advice in
179 any of the following formats: oral advice, given an informative leaflet about sensible
180 drinking, referral for oral advice by other staff, or referral to eBI.

181 The staff were asked to indicate on the tally sheet which forms of brief advice
182 activity were offered to the patients. In jurisdictions using paper tally sheets, it was
183 possible to tick (and therefore deliver) several forms of brief advice to one patient in a
184 single consultation, whereas in Catalonia just one option was recorded on the electronic
185 record. Staff were also asked to note on the tally sheet if the patient did not want to be
186 referred to eBI or had no computer, and to take note of any other reason for not offering
187 advice during the consultation, including lack of time. On the paper version, it was
188 possible to tick more than one activity but for Catalonia, only one option could be
189 selected.

190 The proportion of patients screened was calculated as the number of patients
191 screened divided by the number of patients eligible for screening per participating
192 provider times 100.

1
2
3 193 The proportion of screen-positive patients given brief advice was calculated as
4
5 194 the number of screen-positive patients who received oral brief advice and/or were given
6
7 195 a leaflet, were referred to another provider in or outside the practice or were referred to
8
9 196 eBI divided by the total number of screen-positive patients per participating provider
10
11
12 197 times 100.

13
14
15 198 The proportion of patients logging on to the eBI was calculated as the number of
16
17 199 patients who logged on to the intervention per PHCU divided by the number of eBI
18
19 200 referral cards handed out (calculated from the tally sheets of each PHCU) times 100.
20
21 201 The number of patients logging on to the eBI was retrieved from the eBI system in each
22
23 202 jurisdiction. Each patient could be traced using the log on number unique to an
24
25 203 individual provider.

26
27
28
29 204 After the implementation period, staff were asked to complete a questionnaire as
30
31 205 part of a monitoring process of attitudes to dealing with heavy drinkers that was
32
33 206 established throughout the ODHIN trial. This questionnaire also enquired about the
34
35 207 average time spent delivering screening and oral advice as well as screening and referral
36
37 208 to eBI.

209 **Statistical analysis**

210 For descriptive purposes, the proportion for categorical variables and the mean
211 values for quantitative variables were calculated. Differences in the proportion of
212 providers familiarizing themselves with the content of the eBI website were compared
213 between active and non-active providers using the chi-squared test.

214 The main ODHIN trial had a factorial design,[17] in which (-1,1) coding was
215 used, resulting in the outcome regression coefficients having half the effects. The eBI

1
2
3 216 factor was coded as follows: eBI=-1 for the control, FR, TS, TS+FR arms and +1 for
4
5 217 the eBI, eBI+TS, eBI+FR, eBI+TS+FR arms.
6
7

8 218 Analyses were performed with IBM SPSS V22, using the MIXED procedure
9
10 219 with a random intercept and fixed variables that included the factor and baseline
11
12 220 measurements. Because of the hierarchical structure of the data (provider within PHCU
13
14 221 within jurisdiction), models were analysed with PHCU nested within country as random
15
16 222 effect variables. Evidence for interactions between TS, FR and eBI was investigated.
17
18 223 There was an interaction between FR and eBI for screening rates and the interaction
19
20 224 term FR×eBI was entered in the models. There was an interaction between TS, FR and
21
22 225 eBI for brief advice rates and the interaction term TS×FR×eBI was entered in the
23
24 226 models. The outcome rates were estimated marginal means per provider with 95%
25
26 227 confidence intervals (CIs), accounting for provider within PHCU within jurisdiction.
27
28 228 When examining the impact of the factors on the 12-week screening and brief advice
29
30 229 rates, examination of residuals found them to be not symmetrically distributed around 0,
31
32 230 so log-transformed data, which provided a better fit, were used. Before logging, rates
33
34 231 with a value of zero were assigned a value of 0.001. Differences in the coefficients with
35
36 232 and without the factor were tested by t-tests in the MIXED procedure.
37
38
39
40
41

42 233 **Ethical approval**

43
44 234 Ethical approval for the study was obtained within each jurisdiction from the
45
46 235 relevant approval bodies.[17]
47
48
49

50 236 **RESULTS**

51
52 237 In total, 350 providers from 60 PHCUs were allocated to 1 of the 4 arms that
53
54 238 included eBI referral. Of these, 178 (51%) providers from 56 different PHCUs
55
56
57
58
59
60

1
2
3 239 participated actively in referral of patients to the eBI by handing out at least 1 eBI
4
5 240 referral card to the patients. The remaining 172 (49%) providers from 41 different
6
7 241 PHCUs did not hand out any eBI referral cards.
8
9

10 242 Of the 350 providers, 252 (72 %) never familiarized themselves with the content
11
12 243 on the eBI website. Of the 178 active providers referring patients to the eBI, 71 (40%)
13
14 244 familiarized themselves with the eBI website in contrast to the 172 non-active
15
16
17 245 providers, of whom only 27 (16%) logged on to the website (χ^2 25.39, df 1, $p=0.0001$).
18
19

20
21 246 During the 12-week implementation period, a total of 3405 (35.4%) of 9619
22
23 247 patients screened were found to have a positive AUDIT-C score and of these, 1286
24
25 248 (38%) from 56 of the 60 PHCUs were referred to eBI.
26
27

28
29 249 Calculations for the proportion of referred patients logging on to the eBI were
30
31 250 obtained from 54 of the 60 PHCUs, excluding 4 PHCUs that did not refer any patient to
32
33 251 eBI and 2 PHCUs for whom no log on rate was reported (missing value). A total of 17
34
35 252 of the 60 PHCUs had a log on rate of zero despite having referred patients to the eBI; 9
36
37 253 PHCUs in Catalonia, 5 in the Netherlands and 3 in Poland.
38
39

40
41 254 The number of providers, referrals to eBI and mean log on rates are presented in
42
43 255 Table 1. The mean log on rate was 18.40% based on values from 54 of the 60 PHCUs.
44
45

46 256

47
48
49 257

50
51
52 258

53
54
55 259
56
57
58
59
60

260 Table 1 Number of referrals to eBI and log on rates per jurisdiction in 60 PHCUs
 261 randomized to the eBI arms of the ODHIN trial

Jurisdiction	Providers, <i>n</i>	Active providers, <i>n</i> (%)*	Referrals to eBI, <i>n</i> [†]	Mean log on rate (%)
Catalonia	107	34 (32)	100	0.58
England	52	39 (75)	258	28.81
Netherlands	72	28 (39)	58	17.32
Poland	34	33 (97)	793	10.58
Sweden	85	44 (52)	198	36.95
Total	350	178 (51)	1407	18.40

262 *Active providers defined as those who had handed out at least one eBI referral card during the 12-week
 263 implementation period.

264 †Number of patients referred to eBI.
 265

266 **Change in screening and brief advice rate between baseline and after** 267 **implementation**

268 One of the aims of the study was to explore whether the possibility of referring
 269 to the eBI would increase the proportion of patients screened and receiving brief advice
 270 (among screen positives). In general, little evidence of this was found (Table 2). The
 271 eBI was not associated with any increase in the proportion of patients screened, but was
 272 associated with an increase in the proportion of patients receiving brief advice in the
 273 sample as a whole ($p < 0.05$) and in England in particular ($p < 0.01$).

274 Providers who had familiarized themselves with the content on the eBI website
 275 had a slightly higher proportion of screening during the 12-week implementation
 276 period, controlling for baseline proportions (11.5%; 95% CI 8.0 to 15.4) than providers
 277 who had not (8.8%; 95% CI 6.1 to 11.4), but this difference was not significant ($t = 1.4$,
 278 ns).

279 Table 2 Mean proportion of patients screened and proportion given brief advice (95%
 280 CI) per provider at baseline and after the implementation period without and with each
 281 eBI factor, including all 60 PHCUs randomized to the eBI arms

		Proportion screened, % (95% CI) [†]		Proportion given brief advice, % (95% CI) [‡]	
		Baseline	Implementation	Baseline	Implementation
Catalonia	Without eBI option	7.3 (4.4–10.2)	8.4 (6.4–10.4)	52.5 (34.9–70.0)	69.0 (58.9–79.1)
	With eBI option	8.6 (5.6–11.6)	8.5 (6.4–10.7)	47.4 (27.4–67.4)	67.7 (56.5–78.8)
England	Without eBI option	5.4 (3.3–7.5)	8.0 (4.8–11.1)	83.2 (71.4–94.9)	82.3 (72.4–92.2)
	With eBI option	4.6 (2.4–6.8)	3.7 (0.5–6.9)	86.8 (75.3–98.2)	96.0 (86.0–100.0)**
Netherlands	Without eBI option	11.5 (6.9–16.1)	8.7 (4.6–12.8)	80.6 (72.3–89.0)	74.3 (65.3–83.2)
	With eBI option	8.8 (4.0–13.6)	5.8 (1.5–10.1)	66.3 (57.0–75.5)	77.6 (68.3–87.0)
Poland	Without eBI option	3.4 (0.5–6.2)	24.4 (14.3–34.4)	94.7 (87.1–100.0)	91.1 (85.2–97.0)
	With eBI option	1.3 (0–4.1)	13.0 (3.0–22.9)	96.6 (87.9–100.0)	91.6 (86.2–97.1)
Sweden	Without eBI option	13.6 (0–59.8)	11.9 (3.2–20.6)	75.1 (60.1–90.2)	73.4 (61.4–85.4)
	With eBI option	48.2 (2.7–93.6)	16.7 (8.1–25.2)	67.9 (53.8–82.0)	78.5 (66.6–90.3)
Total	Without eBI option	8.6 (0–18.9)	10.8 (8.3–13.4)	73.9 (67.0–80.8)	76.4 (71.5–81.2)
	With eBI option	16.2 (5.6–26.8)	9.6 (7.0–12.3)	70.4 (63.2–77.5)	80.7(75.7–85.7)*

282 See the Statistical analysis section for an explanation of the statistical tests. The tests examine differences in
 283 implementation rates in the presence of a factor compared with the absence of a factor, controlling for baseline rates,
 284 accounting for the multi-level nature of the data (providers nested within PHCUs nested within countries). * $p < 0.05$;
 285 ** $p < 0.01$.

286 †Proportion screened was calculated as the number of patients screened divided by the number of patients eligible
 287 for screening per participating provider times 100.

1
2
3 288 ‡Proportion given brief advice was calculated as the number of screen-positive patients who received oral brief
4 289 advice, and/or were given a leaflet, were referred to another provider within or outside the practice or referred to
5
6 290 eBI, divided by the total number of screen-positive patients per participating provider times 100.
7
8 291

10 292 **Use of referral to the eBI in relation other BI activities**

11
12
13
14 293 Although the providers in the eBI arm were encouraged to refer patients to the
15
16 294 eBI, they were still able to offer face-to-face advice, hand out a leaflet about sensible
17
18 295 drinking and/or refer patients to other staff at the PHCU or outside the PHCU, who
19
20 296 would then deliver oral advice. The distribution of the type of advice offered in the eBI
21
22 297 arms among AUDIT-positive patients is presented in Table 3, including the number of
23
24 298 patients who refused referral to the eBI or did not have a computer or were referred to
25
26 299 other staff/did not want advice. Several brief advice formats could be used and
27
28
29 300 delivered in combination within the same consultation in countries using paper tally
30
31 301 sheets, in Catalonia providers could only record one brief advice option.
32
33

34
35 302 A little more than half of the 3405 cases with a positive AUDIT score received
36
37 303 face-to-face advice ($n=1837$), whereas about one-third (1286) were referred to the eBI.
38
39

40 304 Separate analysis showed that about half of the patients (608) referred to the eBI
41
42 305 received this as the only intervention activity. For each jurisdiction, the proportion of
43
44 306 referrals to the eBI as the only intervention was as follows: Catalonia 15.0%, England
45
46 307 7.1%, Netherlands 3.3%, Poland 41.1% and Sweden 10.6%. However, for Catalonia,
47
48 308 only one option could be selected on electronic tally sheet.
49
50

51
52 309 Furthermore, among the 1837 patients receiving face-to-face advice, 616
53
54 310 (34.6%) were also referred to eBI. The log on rate was somewhat higher among these
55
56 311 patients (22.0%; CI 18.5%, 25.5%) compared with those only being referred to the eBI
57
58
59
60

1
2
3 312 (16.9%; CI 13.2%, 20.6%). A total of 8.6% of the patients refused referral to the eBI or
4
5 313 rejected this option because of lack of access to a computer. Only a small minority of
6
7 314 the patients were referred to other staff within or outside the practice, meaning that, in
8
9 315 most cases, the staff who screened the patients also delivered the advice. Only 114 (3.3
10
11 316 %) of the patients who screened positive did not get any advice because of lack of time.

12
13
14
15 317 Table 3 Number of patients with a positive AUDIT screening receiving each type of
16
17 318 advice* per participating jurisdiction in the 60 PHCUs in the eBI arms

Jurisdiction	Number of patients with a positive screening	Patients receiving oral advice, <i>n</i> (%)	Patients referred to eBI, <i>n</i> (%)	Patients handed a leaflet, <i>n</i> (%)	Patients not accepting eBI/no computer, <i>n</i> (%)	Patients referred to other staff (within or outside the practice), <i>n</i> (%)	Patients referred to another kind of treatment or consultation, <i>n</i> (%)	Patients who did not get advice due to lack of time, <i>n</i> (%)
Catalonia	492	138 (28.1)	74 (15.0)	110 (22.4)	25 (5.1)	9 (1.8)	1 (0.2)	2 (0.4)
England	817	601 (73.4)	245 (30.0)	153 (18.7)	97 (11.9)	43 (5.3)	39 (4.8)	20 (2.5)
Netherlands	546	323 (59.2)	55 (10.1)	19 (3.5)	42 (7.7)	28 (5.1)	9 (1.7)	57 (10.4)
Poland	964	462 (47.9)	754 (78.2)	98 (10.2)	69 (7.2)	13 (1.4)	3 (0.3)	6 (0.6)
Sweden	586	313 (53.4)	158 (27.0)	86 (14.7)	58 (9.9)	17 (2.9)	39 (6.7)	29 (5.0)
Total	3405	1837 (54.0)	1286 (37.8)	466 (13.7)	291 (8.6)	110 (3.2)	91 (2.7)	114 (3.3)

19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43 319 *More than one option could be selected except in Catalonia where it was possible to tick only one box.

44
45 320
46 321 The distribution of the various forms of interventions offered is presented by
47
48 322 jurisdiction in Table 3. Providers in Poland had the highest uptake of eBI referrals with
49
50 323 nearly 80% of their patients with a positive AUDIT screen being referred to eBI. The
51
52 324 lowest proportion of referrals to eBI was seen in the Netherlands where only 10% were
53
54 325 referred to eBI. In all jurisdictions except Poland, the most frequently used intervention

326 was face-to-face advice, which was given on average to 54% of screen-positive patients,
327 ranging from 28% in Catalonia to 73% in England.

328 **Time spent delivering face-to-face advice and eBI**

329 One of the reasons for including eBI as an arm in the trial was an expectation
330 that referral to an eBI advice system would take less consultation time than delivering
331 brief advice face to face. However, this was not found to be the case. Although the
332 mean self-reported time per provider for referring a screen-positive patient to an eBI
333 programme (5.5 min, 95% CI 4.4 to 6.5) for those providers in the eBI arms was less
334 than the mean time (7.0 min, 95% CI 5.8 to 8.1) for delivering face-to-face brief advice
335 for those providers not in an eBI arm, this difference, accounting for the multi-level
336 nature of the data, was not significant ($t=1.90$, $p=0.06$). When examining the time
337 differences by country, time spent on referral to an eBI advice system was significantly
338 less than time spent delivering face-to-face brief advice in Poland (5.0 min versus 7.8
339 min, $p<0.05$) and Sweden (4.5 min versus 8.6 min, $p<0.05$). However, these time
340 benefits were not associated with improvements in screening or brief advice rates in
341 either Poland or Sweden (Table 2).

342 **DISCUSSION**

343 **Main findings**

344 The study found little evidence to support the main hypothesis that the
345 possibility of referring to an eBI would increase the proportion of patients screened and
346 receiving brief advice. The eBI was not associated with any increase in the proportion
347 of patients screened. However, it was associated with an increase in the proportion of
348 screen-positive patients receiving brief advice from 70% to 80% of the screen-positive

1
2
3 349 sample as a whole ($p<0.05$), mainly driven by a significant increase in England from
4
5 350 87% to 96% ($p<0.01$).
6
7

8
9 351 Furthermore, the findings in the study indicate that staff displayed a low level of
10
11 352 engagement and perhaps mistrust in this new technology. Only 28% of all the
12
13 353 participants in the eBI arms of the trial familiarized themselves with the eBI; this
14
15 354 proportion increased to 40% among those who referred at least one patient (51% of the
16
17 355 providers), suggesting that those who were familiar with the eBI package were more
18
19 356 likely to recommend its use. Staff continued to offer face-to-face advice to a larger
20
21 357 proportion of the patients (54%) than referring to the eBI (38%).
22
23

24
25 358 A wide variability in engagement (on average 18% of referred patients logged
26
27 359 on to the website) was seen among patients both between and within jurisdictions.
28
29

30
31 360 Our findings are in line with previous research that has repeatedly shown the
32
33 361 challenges of competing tasks (i.e. other important things that have to be done as part of
34
35 362 the daily routine) facing staff in primary health care are often a hindrance when
36
37 363 implementing new methods, not least implementing new methods for working with
38
39 364 risky drinkers.[19,20] This was also suggested as the main reason for the low
40
41 365 implementation rate in a previous qualitative study on referral to an online intervention
42
43 366 in primary care in the United Kingdom.[15] Also, the new technology might not fit with
44
45 367 the professional's views on how to interact with patients.[21] Referral to the eBI thus
46
47 368 challenges roles and responsibility with regard to the patients' health and uncertainty
48
49 369 about the potential benefits to the patients. Also, as shown in this study, referral to eBI
50
51 370 takes just as much time as delivering a face-to-face intervention.[22] We did not explore
52
53 371 potential reasons for non-compliance with the study protocol but certainly this needs to
54
55 372 be explored in future research.[22]
56
57
58
59
60

373 **Adherence to the intervention among referred patients**

374 Engagement of the referred patients varied to a high degree both within and
375 across jurisdictions. In 2 jurisdictions, Catalonia and the Netherlands, a high number of
376 PHCUs had a log on rate of zero, i.e. patients did not log on, despite having being
377 referred to the eBI. However, in Poland, and in particular in England and Sweden, eBI
378 referrals seem to have been implemented without any major problems (Table 1). Lack
379 of adherence to or attrition from online health interventions is a well-known
380 problem.[15]

381 Facilitated access or referral has been shown to reduce attrition in psychological
382 online interventions targeting anxiety and depression.[23-25] In our study, the mean
383 proportion of patients adhering to the referral was low, on average 18.4%, but in one-
384 third of the PHCUs, no patients logged on to the website. However, 2 jurisdictions
385 showed more positive results with adherence of 37% in Sweden and 29% in England. In
386 one of the few earlier studies on primary health care referral to eBI in the United
387 Kingdom, adherence was 32% based on only 19 referrals.[15] Despite the lack of results
388 from some PHCUs in our study, the results indicate that it is feasible to refer patients to
389 an eBI and get a reasonable proportion of them to log on, although the results also point
390 to implementation issues that need to be considered and explored in more depth in
391 future studies. We did not specify a mandatory revisit to the provider, which might have
392 increased the adherence rate somewhat.

393 Our findings concerning the engagement of the patients are in line with a recent
394 review in which it was concluded that the few projects published so far on referral to
395 eBI have not been able to show a satisfactory level of engagement and sustainability.
396 Referral to eBI seems only to succeed if the health care provider offers personal

1
2
3 397 engagement in promoting the referral, ensuring that the patients log on and adhere to the
4
5 398 online intervention.[16]
6
7

8 399 **Use of referral to eBI in relation to other BI activities**

9
10 400 Staff in this study were given the option of referring patients to the eBI but they
11
12 401 could also offer face-to-face advice, hand out a leaflet or refer patients to another
13
14 402 professional within or outside the PHCU, except for Catalonia where only one option
15
16 403 could be recorded in the electronic record. Only half of the patients referred to eBI were
17
18 404 given this as the only option and thus did not receive oral advice. This means that half
19
20 405 of the patients referred to eBI were also given oral advice using referral to eBI as an
21
22 406 adjunct to oral advice. Whether this was due to lack of familiarity with or mistrust of the
23
24 407 eBI or simply implies that when referring to eBI, oral advice becomes a part of the
25
26 408 referral talk is not known. However, we asked staff to take a few minutes to encourage
27
28 409 and motivate patients to log on to the eBI so the latter is highly probable. This is also
29
30 410 supported by a somewhat higher log on rate to the eBI among those who received both
31
32 411 oral advice and eBI (log on rate on 22% versus 17%).
33
34
35
36
37

38 412 Referral to eBI was meant to save time and on average the staff spent 12% less
39
40 413 time (7.25 min compared with 8.28 min on average) when referring to eBI than when
41
42 414 giving oral advice. The reason why more time was not saved could be that staff first had
43
44 415 to screen the patients with the pen-and-paper AUDIT-C questionnaire (or in Catalonia
45
46 416 using the electronic record) and then, based on the results, had to explain to the patients
47
48 417 why they were recommending that the patient log on to the eBI intervention.
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 418 **Differences in the level of implementation in the participating**
4
5 419 **jurisdictions**
6
7

8 420 Differences in the level of implementation among the participating jurisdictions
9
10 421 were seen with regard to the proportion of AUDIT-C-positive patients referred to eBI;
11
12 422 Poland referred most of their patients (80%) in contrast to the Netherlands where only
13
14 423 10% were referred.
15
16

17 424 Assuming that a zero log on rate reflects the ability to motivate the patients to
18
19 425 use the eBI, it seems that patients in Catalonia were less compelled to use the eBI
20
21 426 because only 1 of the 12 PHCUs reported a log on rate greater than zero. We did not
22
23 427 study the reason for this but it could be due to a different culture among patients in
24
25 428 Catalonia towards Internet use and trust in websites. In the Netherlands, only 5 of the 12
26
27 429 PHCUs reported a log on rate greater than zero and 2 PHCUs did not refer a single
28
29 430 patient. However, in Poland 9 of 12 PHCUs reported a log on rate, 10 of 12 in England
30
31 431 and all 12 PHCUs in Sweden (Table 1). This might reflect a different maturity in
32
33 432 different jurisdictions with regard to eHealth solutions for promoting healthy lifestyle.
34
35 433 In Catalonia, this was the first attempt to introduce an eBI. This difference can be
36
37 434 expected to fade out in the future but is a real challenge for implementation of eBI in
38
39 435 primary care at the present time.
40
41
42
43
44

45 436 Not much progress has been reported on engagement by health care staff in
46
47 437 alcohol interventions during the last decade.[19,20] Thus, there is a need for more
48
49 438 translational research that identifies innovative means of embedding alcohol preventive
50
51 439 measures into daily practice.[20] More alcohol eBI implementation studies should
52
53 440 therefore be performed to get a more profound understanding of attitudes and practices
54
55 441 among providers concerning trust in eBI and how best to support the implementation,
56
57
58
59
60

1
2
3 442 including the importance of facilitated access.[21,22] If successful implementation of an
4
5 443 eBI on alcohol could be achieved, there is no doubt that this would save time and
6
7 444 money. Simulation studies on the effects of introducing an eBI on alcohol on a larger
8
9 445 scale to a whole nation such as the Netherlands shows substantial cost effectiveness for
10
11 446 the health care system.[26] But there are still questions to be answered such as whether
12
13 447 eBI should be offered after face-to-face screening or whether it is possible to set up a
14
15 448 system whereby the patients are referred directly to eBI without face-to-face screening
16
17 449 without losing compliance, i.e. ensuring that patients do log on to the web site.[27,28]
18
19
20
21
22
23
24

25 451 **Strength and limitations**

26
27 452 To our knowledge, this is one of the first studies on implementing referral to an
28
29 453 alcohol eBI by health care staff in primary health care. The strength of this study is the
30
31 454 participation from 5 jurisdictions, enabling us to study the variability of referrals to eBI.
32
33 455 In addition, the high number of participating providers and PHCUs is seen as a strength.
34
35 456 Limitations include the failure of some jurisdictions to implement referral to the eBI as
36
37 457 intended, as well as the lack of access and trust in Internet-based health promotion
38
39 458 among patients (that might be due to the age of the population screened in some
40
41 459 jurisdictions). However, the main ODHIN study was not designed to study the reasons
42
43 460 for failure in implementing referral to eBI but a forthcoming qualitative study with
44
45 461 participants from the ODHIN project will enable us to answer some of the questions
46
47
48 462 raised by the present study.
49
50
51
52
53
54
55
56
57
58
59
60

463 CONCLUSIONS

464 The study shows that it was difficult to get staff engaged in referring to the eBI;
465 a fact that is reflected in the low proportion of staff familiarizing themselves with the
466 eBI intervention. The referred patients showed a low level of engagement in logging on
467 to the eBI intervention although there was a high degree of variation in engagement by
468 patients across jurisdictions and within jurisdictions, perhaps as a consequence of the
469 low level of engagement from the staff, the age of the patients and access to the
470 Internet.

471 What can be learned from this implementation study? Referral to eBI takes
472 nearly as much time as brief oral advice; less than one-fifth of referred patients actually
473 log on the website; all staff are not ready to refer to eBI and might require more
474 introduction and training before they are comfortable with referring to eBI. Finally, a
475 follow-up routine would also reduce the risk of no advice being delivered.

476 Acknowledgements

477 We thank all participating PHCUs and practitioners for their support with the
478 trial. We thank Steven Teerenstra (statistician at the Department of Health Evidence,
479 Radboud University Medical Centre) who assisted PA, MK and ML in designing the
480 analysis plan for the factorial RCT design. We thank the Catalan Society of Family and
481 Community Medicine, the Catalan Association of Family and Community Nursing and
482 the Alcohol Network of Referents on Alcohol (XaROH) of the Programa Beveu Menys,
483 who collaborated in the implementation of the trial in Catalonia. We thank Sebastián
484 Calero from the Catalan Health Institute's Healthcare Issues' Area of Clinical
485 Development, Carmen Olmos and Manuel Iglesias from the eCAP Functional

1
2
3 486 Competences Centre and Manuel Medina, Francesc Fina, Leonardo Méndez and Eduard
4
5 487 Hermosilla from the Information System for Research Development in Primary Health
6
7 488 Care (SIDIAP database) for supporting the Catalan ODHIN team in the adaptation of
8
9 489 the electronic medical records (eCAP) and in the data extraction for the trial.
10
11

12 13 490 **Authors' contributions**

14
15
16 491 All authors, except PA, were involved in implementing the trial in their
17
18 492 jurisdictions. NK and PA undertook the analyses, PB and UM wrote the first draft of the
19
20 493 manuscript. All other authors revised the manuscript critically. All authors read and
21
22 494 approved the final manuscript.
23
24

25 26 495 **Funding**

27
28
29 496 The research leading to these results or outcomes has received funding from the
30
31 497 European Union's Seventh Framework Programme for Research, Technological
32
33 498 Development and Demonstration under grant agreement no. 259268 – Optimizing
34
35 499 Delivery of Health Care Intervention (ODHIN). Participant organizations in ODHIN
36
37 500 can be seen at www.odhinproject.eu. Radboud University Medical Center received co-
38
39 501 funding from The Netherlands Organisation for Health Research and Development
40
41 502 (ZonMW, Prevention Program) under grant agreement no. 200310017 – ODHIN –
42
43 503 Optimizing Delivery of Healthcare Interventions in the Netherlands, according to
44
45 504 Art.II.17 of the FP7 EC Grant Agreement. Colin Drummond is partly funded by the
46
47 505 NIHR Biomedical Research Centre for Mental Health at South London and Maudsley
48
49 506 NHS Foundation Trust and King's College London and partly funded by the NIHR
50
51 507 Collaborations for Leadership in Applied Health Research and Care South London at
52
53 508 King's College Hospital NHS Foundation Trust. The views expressed are those of the
54
55
56
57
58
59
60

1
2
3 509 author(s) and not necessarily those of the NHS, the NIHR, the Department of Health, or
4
5 510 the European Commission. Pomeranian Medical University in Szczecin received co-
6
7 511 funding for the ODHIN project from Polish science financial resources in 2012–2014.
8
9

10 **Competing interests**

11
12
13 513 **Preben Bendtsen** is part owner of a private company that develops and distributes eBI
14
15 514 solutions as used in the Swedish part of the study. **Hugo López-Pelayo** has received
16
17 515 travel grants from Lundbeck, Lilly, Pfizer, Rovi, Esteve and honoraria and travel grants
18
19 516 from Janssen and Lundbeck. **Antoni Gual** has received honoraria, research grants, and
20
21 517 travel grants from Lundbeck, Janssen, Pfizer, Lilly, Abbvie D&A Pharma, and Servier.
22
23 518 Previously stated honoraria had no influence on this article. **Paul Wallace** was PI in the
24
25 519 EFAR studies and provides private consultancy to Lundbeck and the Safe Sensible
26
27 520 London Partnership on the topic of screening and brief interventions. He is Chief
28
29 521 Medical Advisor to the UK charity, Drinkaware. **All other authors** declare no financial
30
31 522 relationships with any organizations that might have an interest in the submitted work in
32
33 523 the previous 3 years, and no other relationships or activities that could appear to have
34
35 524 influenced the submitted work.
36
37
38
39

40 **Data Sharing**

41
42 526 Data set available on request from corresponding author (preben.bendtsen@liu.se)
43
44

45 **References**

- 46
47
48 528 1. Rehm J, Taylor B, Room, R. Global burden of disease from alcohol, illicit drugs and
49
50 529 tobacco. *Drug Alcohol Rev* 2006;25:503-13.
51
52
53 530 2. Anderson P. Overview of interventions to enhance primary-care provider
54
55 531 management of patients with substance-use disorders. *Drug Alcohol Rev*
56
57 532 2009;28:567-74.
58
59
60

- 1
2
3 533 3. Kaner EF, Beyer F, Dickinson HO, et al. Effectiveness of brief alcohol interventions
4
5 534 in primary care populations. *Cochrane Database Syst Rev* 2007;(2):CD004148.
6
7
8 535 4. Jonas DE, Garbutt JC, Amick HR, et al. Behavioral counseling after screening for
9
10 536 alcohol misuse in primary care: a systematic review and meta-analysis for the
11
12 537 U.S. Preventive Services Task Force. *Ann Intern Med* 2012;157:645-54.
13
14
15 538 5. Keurhorst MN, Anderson P, Spak F, et al. Implementing training and support,
16
17 539 financial reimbursement, and referral to an internet-based brief advice program
18
19 540 to improve the early identification of hazardous and harmful alcohol
20
21 541 consumption in primary care (ODHIN): study protocol for a cluster randomized
22
23 542 factorial trial. *Implement Sci* 2013;8:11.
24
25
26 543 6. Nilsen P, Aalto M, Bendtsen P, et al. Effectiveness of strategies to implement brief
27
28 544 alcohol intervention in primary healthcare. A systematic review. *Scand J Prim*
29
30 545 *Health Care* 2006.;24:5-15.
31
32
33 546 7. Nilsen P. Brief alcohol intervention—where to from here? Challenges remain for
34
35 547 research and practice. *Addiction* 2010;105:954-9.
36
37
38 548 8. Riper H, Spek V, Boon B, et al. Effectiveness of E-Self-help interventions for
39
40 549 curbing adult problem drinking: a meta-analysis. *J Med Internet Res*
41
42 550 2011;13:e42.
43
44
45 551 9. Wallace P, Murray E, McCambridge J, et al. On-line randomized controlled trial of
46
47 552 an Internet based psychologically enhanced intervention for people with
48
49 553 hazardous alcohol consumption. *PLoS One* 2011;6:e14740.
50
51
52 554 10. Khadjesari Z, Murray E, Hewitt C, et al. Can stand-alone computer-based
53
54 555 interventions reduce alcohol consumption? A systematic review. *Addiction*
55
56 556 2011;106:267-82.
57
58
59
60

- 1
2
3 557 11. Rooke S, Thorsteinsson E, Karpin A, et al. Computer-delivered interventions for
4
5 558 alcohol and tobacco use: a meta-analysis. *Addiction* 2010;105:1381-90.
6
7
8 559 12. Kohl LF, Crutzen R, de Vries NK. Online prevention aimed at lifestyle behaviors: a
9
10 560 systematic review of reviews. *J Med Internet Res* 2013;15:e146.
11
12
13 561 13. Brouwer W, Kroeze W, Crutzen R, et al. Which intervention characteristics are
14
15 562 related to more exposure to internet-delivered healthy lifestyle promotion
16
17 563 interventions? A systematic review. *J Med Internet Res* 2011;;13:e2.
18
19
20 564 14. Riper H, Blankers M, Hadiwijaya H, et al. Effectiveness of guided and unguided
21
22 565 low-intensity internet interventions for adult alcohol misuse: a meta-analysis.
23
24 566 *PLoS One* 2014;9:e99912.
25
26
27 567 15. Murray E, Linke S, Harwood E, et al. Widening access to treatment for alcohol
28
29 568 misuse: description and formative evaluation of an innovative web-based service
30
31 569 in one primary care trust. *Alcohol Alcohol* 2012;47:697-701.
32
33
34 570 16. Wallace P, Bendtsen P. Internet applications for screening and brief interventions
35
36 571 for alcohol in primary care settings – implementation and sustainability. *Front*
37
38 572 *Psychiatry* 2014;5:151.
39
40
41 573 17. Anderson P, Bendtsen P, Spak F, et al. Improving the delivery of brief advice for
42
43 574 heavy drinking in primary health care: outcome results of the ODHIN five
44
45 575 country cluster randomized factorial trial. Submitted to *Addiction*.
46
47
48 576 18. Bush K, Kivlahan DR, McDonell MB, et al. The AUDIT Alcohol Consumption
49
50 577 Questions (AUDIT-C): an effective brief screening test for problem drinking.
51
52 578 Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use
53
54 579 Disorders Identification Test. *Arch Intern Med* 1998;158:1789-95.
55
56
57
58
59
60

- 1
2
3 580 19. Rapley T, May C, Frances Kaner E. Still a difficult business? Negotiating alcohol-
4
5 581 related problems in general practice consultations. *Soc Sci Med* 2006;63:2418-
6
7 582 28.
- 8
9
10 583 20. Wilson GB, Lock CA, Heather N, et al. Intervention against excessive alcohol
11
12 584 consumption in primary health care: a survey of GPs' attitudes and practices in
13
14 585 England 10 years on. *Alcohol Alcohol* 2011;46:570-7.
- 15
16
17 586 21. Murray E, Burns J, May C, et al. Why is it difficult to implement e-health
18
19 587 initiatives? A qualitative study. *Implement Sci* 2011;6:6.
- 20
21
22 588 22. Mair FS, May C, O'Donnell C, et al. Factors that promote or inhibit the
23
24 589 implementation of e-health systems: an explanatory systematic review. *Bull*
25
26 590 *World Health Organ* 2012;90:357-64.
- 27
28
29 591 23. Robinson E, Titov N, Andrews G, et al. Internet treatment for generalized anxiety
30
31 592 disorder: a randomized controlled trial comparing clinician vs. technician
32
33 593 assistance. *PLoS One* 2010;5:e10942.
- 34
35
36 594 24. Johnston L, Titov N, Andrews G, et al. A RCT of a transdiagnostic internet-
37
38 595 delivered treatment for three anxiety disorders: examination of support roles and
39
40 596 disorder-specific outcomes. *PLoS One* 2011;6:e28079.
- 41
42
43 597 25. Spek V, Cuijpers P, Nyklicek I, et al. Internet-based cognitive behaviour therapy for
44
45 598 symptoms of depression and anxiety: a meta-analysis. *Psychol Med*
46
47 599 2007;37:319-28.
- 48
49
50 600 26. Smit F, Lokkerbol J, Riper H, et al. Modeling the cost-effectiveness of health care
51
52 601 systems for alcohol use disorders: how implementation of eHealth interventions
53
54 602 improves cost-effectiveness. *J Med Internet Res* 2011;13:e56.
- 55
56
57
58
59
60

- 1
2
3 603 27. Struzzo P, Scafato E, McGregor R, et al. A randomised controlled non-inferiority
4
5 604 trial of primary care-based facilitated access to an alcohol reduction website
6
7 605 (EFAR-FVG): the study protocol. *BMJ Open* 2013;3:e002304.
8
9
10 606 28. López-Pelayo H, Wallace P, Segura L, et al. A randomised controlled non-
11
12 607 inferiority trial of primary care-based facilitated access to an alcohol reduction website
13
14 608 (EFAR Spain): the study protocol. *BMJ Open* 2014;4:e007130.
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60