



1 Article

2 **Attitudes and delivering brief interventions for heavy**
3 **drinking in primary health care: analyses from the**
4 **ODHIN five country cluster randomized factorial**
5 **trial**

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39 **Abstract:** In this paper, we test path models that study the interrelations between primary health
40 care provider attitudes towards working with drinkers, their screening and brief advice activity,
41 and their receipt of training & support and financial reimbursement. Study participants were 756
42 primary health care providers from 120 primary health care units (PHCU) in different locations
43 throughout Catalonia, England, Netherlands, Poland and Sweden. Our interventions were training
44 & support and financial reimbursement to providers. Our design was a randomized factorial trial
45 with baseline measurement period, 12-week implementation period, and nine-month follow-up
46 measurement period. Our outcome measures were: attitudes of individual providers in working
47 with drinkers as measured by the Short Alcohol and Alcohol Problems Perception Questionnaire;
48 and, the proportion of consulting adult patients (age 18+ years) who screened positive and were
49 given advice to reduce their alcohol consumption (intervention activity). We found that more

50 positive attitudes were associated with higher intervention activity, and higher intervention
51 activity was associated with more positive attitudes. Training & support was associated with both
52 positive changes in attitudes and higher intervention activity. Financial reimbursement was
53 associated with more positive attitudes through its impact on higher intervention activity. We
54 conclude that to improve primary health care providers screening and brief advice activity for
55 heavy drinking requires a combination of training & support and on the job experience of actually
56 delivering screening and brief advice activity.

57 **Keywords:** Primary health care; heavy drinking; screening and brief advice; training and support;
58 financial reimbursement; role security; therapeutic commitment; Short Alcohol and Alcohol
59 Problems Perception Questionnaire.
60

61 1. Introduction

62 Primary health care providers find screening and giving brief advice for heavy drinking a
63 difficult business [1-3]. This can be changed with professional and organizational-based
64 interventions [4, 5]. During the 1970s, the Maudsley Alcohol Pilot Project was set up in the United
65 Kingdom to make practical recommendations for an improved local response to dealing with
66 drinking problems [6]. The project, which subsequently informed the United Kingdom's Royal
67 College of General Practitioners' report on alcohol [7], was premised on the view that to respond to
68 drinking problems adequately, primary health care providers need to be involved.

69 The Maudsley Alcohol Pilot Project used the Alcohol and Alcohol Problems Perception
70 Questionnaire (AAPPQ) as a theoretical basis to understand why community agents have difficulty
71 with alcohol problems, and as a basis to monitor improvement [8, 9]. In the AAPPQ, for which a
72 shortened version is available [10,11], role security measures role adequacy, for example "*I feel I can*
73 *appropriately advise my patients about drinking and its effects*"; and role legitimacy, for example, "*I feel I*
74 *have the right to ask patients questions about their drinking when necessary*". Role insecurity is expressed
75 at the emotional level as therapeutic commitment which measures motivation, for example
76 "*pessimism is the most realistic attitude to take toward drinkers*"; task specific self-esteem, for example "*all*
77 *in all I am inclined to feel I am a failure with drinkers*"; and work satisfaction, for example "*in general, it is*
78 *rewarding to work with drinkers*".

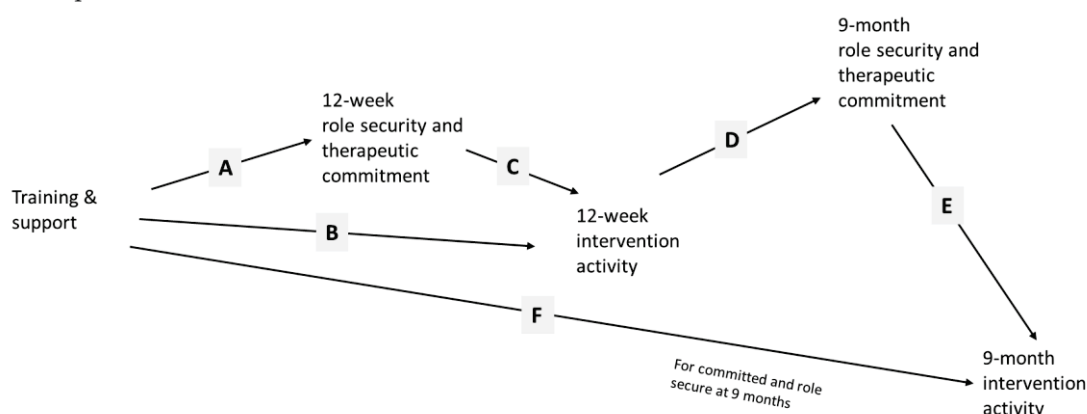
79 The Maudsley Alcohol Pilot Project found that primary health care provides failed to recognize
80 and respond to drinking problems because they felt anxieties about their role adequacy through not
81 having the information and skills necessary to recognize and respond to drinkers; and because they
82 felt anxieties about their role legitimacy through being uncertain as to whether or indeed how far
83 drinking problems came within their responsibilities. The project proposed that the key to increasing
84 on-the-job experience and effectiveness was to provide education and training to primary health
85 care providers along with supporting brief advice activity, such as referral opportunities, to improve
86 their role security and therapeutic commitment, which, in turn, would lead to more brief advice
87 activity.

88 Although there have been a number of international studies examining providers' attitudes in
89 this field [12-16], as far as we are aware, there have been no published studies with repeated
90 attitude measures that have further examined the original model of the Maudsley Alcohol Pilot
91 Project. The European ODHIN project reported in this paper allows the opportunity to do so.
92 ODHIN collected data on provider's role security and therapeutic commitment, and on their
93 screening and brief advice activity at three separate time points over a nine-month period, including
94 measurements at baseline, during a 12-week implementation period and at nine month's follow-up.
95 ODHIN also collected data enabling an assessment of the impact of training & support and of
96 financial reimbursement on providers' attitudes and on their screening and brief advice activity.
97 In this current paper, we test path models illustrated in Figures 1 and 2. We aim to demonstrate the
98 importance of on-the-job experience, through improving role security and therapeutic commitment,

99 in leading to more screening and brief advice activity. We also aim to test whether or not financial
 100 reimbursement has an enduring effect beyond the time of reimbursement, through its initial impact
 101 in improving on-the-job experience.

102

103 In Figure 1, we hypothesized that training & support would be associated with improved
 104 12-week role security and therapeutic commitment (line A); that training & support would directly
 105 (line B) and indirectly (lines A and C), be associated with increased 12-week screening and advice
 106 activity, hereafter termed intervention activity. In turn, we hypothesized that increased 12-week
 107 intervention activity would be associated with further improvement in role security and therapeutic
 108 commitment (line D), which should subsequently be associated with more 9-month intervention
 109 activity (line E). In addition, we hypothesized that training & support would be preferentially
 110 associated with increased 9-month intervention activity in those with higher 9-month role security
 111 and therapeutic commitment, line F.

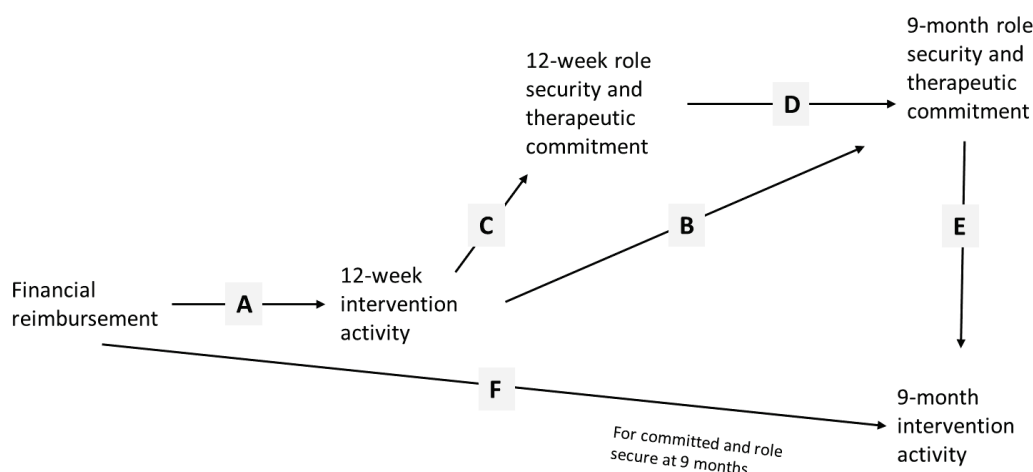


112

113

Figure 1. Hypothesized path model for training & support.

114 Our model should further imply, as in Figure 2, that, whilst financial reimbursement should
 115 have no direct relationship with role security and therapeutic commitment, it should be associated
 116 with increased role security and therapeutic commitment indirectly through its impact on
 117 intervention activity (lines A, B, C and D). Improved role security and therapeutic commitment
 118 should then be associated with future intervention activity (line E). Similar to training & support,
 119 financial reimbursement should be preferentially associated with increased 9-month intervention
 120 activity in those with higher 9-month role security and therapeutic commitment, line F.



121

122

Figure 2. Hypothesized path model for financial reimbursement

123 2. Methods

124 Details of the trial protocol [17] and the main results of the ODHIN study [5] have been
125 published. In a cluster randomized 2x2x2 factorial trial, data from primary health care units (PHCU)
126 in Catalonia, England, the Netherlands, Poland and Sweden were combined to examine the effect of
127 training & support, financial reimbursement and referral opportunities to an internet-based advice
128 programme (eBI) on the proportion of consulting adult patients given an intervention (screening and
129 advice to screen positives) for heavy drinking, operationalized by AUDIT-C [18].

130

131 2.1. Participants

132 PHCUs with approximately 5,000-20,000 registered patients were the unit of randomization
133 and implementation. PHCUs who agreed to participate in the study were volunteers drawn from
134 administrative or academic registries of PHCUs at national or regional levels. Eligible providers in
135 each PHCU included any fully trained full or part-time medical practitioner, nurse or PHCU
136 assistant with a permanent appointment working in the PHCU and involved in medical and/or
137 preventive care. Providers are the unit of analysis in this paper.

138 2.2. Implementation strategies

139 PHCUs were randomized to one of the following eight groups: 1. Control; 2. Training &
140 support (TS); 3. Financial reimbursement (FR); 4. Electronic Brief Intervention (e-BI); 5. Training &
141 support and financial reimbursement; 6. Training & support and eBI; 7. Financial reimbursement
142 and eBI; and, 8. Training & support, financial reimbursement and eBI. In this paper, we only
143 consider training & support and financial reimbursement, since these were the two implementation
144 strategies, rather than electronic brief intervention, that led to an increase in screening and brief
145 advice activity [5].

146 PHCUs were asked to screen all adult patients (aged 18 years) for heavy drinking who
147 consulted the PHCU for whatever reason, using a paper version of AUDIT-C, except in Catalonia,
148 where a computerized version was used. Screen positives were defined in Catalonia and England as
149 men and women who scored ≥ 5 on AUDIT-C, and in Poland, Netherlands and Sweden as men who
150 scored ≥ 5 and women who scored ≥ 4 on AUDIT-C. PHCU were asked to deliver brief alcohol advice
151 of 5-15 minutes' duration to screen positives patients.

152 2.3. Outcomes

153 Role security and therapeutic commitment of the participating providers were measured using
154 the short version of the Alcohol and Alcohol Problems Perception questionnaire (SAAPPQ) [10,11].
155 Measurements took place during the 4-week baseline period, towards the end of the 12-week
156 implementation period, and during the 4-week follow-up period at nine months. The questionnaire
157 comprised 10 statements, which addressed five sub-scales: (i) role adequacy; (ii) role legitimacy; (iii)
158 motivation; (iv) task specific self-esteem; and, (v) work satisfaction. Responses to the statements
159 were scored from 1 (strongly disagree) to 7 (strongly agree). Scores on the subscales 'role adequacy'
160 and 'role legitimacy' were added to form an index of 'role security' [10], with a total score ranging
161 from 4 to 28. The subscales relating to 'self-esteem', 'motivation' and 'work satisfaction' were added
162 to form an index of 'therapeutic commitment' [10], with a score ranging from 6 to 42. Individual
163 missing values for any of the items in a domain were assigned the mean value of the remaining
164 items of the domain before summation. For certain analyses, providers were split into those with
165 baseline scores below and above the mean for role security (mean value 20.98; 45.3% below the
166 mean), and therapeutic commitment (mean value 27.21; 53.6% below the mean); for other analyses,
167 providers were also split into those with 9-month scores below and above the mean for role security
168 (mean value 21.56; 45.8% below the mean), and therapeutic commitment (mean value 27.44; 52.7%
169 below the mean). Providers with scores below the mean are called 'role insecure' and
170 'uncommitted'; above the mean are called 'role secure' and 'committed'.

171 Screening and brief advice activity was measured at three time points: during the 4-week
172 baseline period, during the 12-week implementation period (when the intervention strategies were
173 actively applied), and during the 4-week follow-up period that occurred at nine months, six months
174 after the end of the 12-week implementation period. For each of the measurement periods, the
175 outcome is the proportion of consulting adult patients given an intervention (screening and advice
176 to screen positives; hereafter termed proportion intervened, defined as the number of AUDIT-C
177 positive patients that received one or more of oral advice, an advice leaflet, referral to the eBI
178 programme, or referral for advice to another provider in or outside the PHCU, divided by the total
179 number of adult consultations of the participating provider. For certain analyses, providers were
180 split into those who, at baseline, did not intervene with any patients (52.3% of sample) and those
181 who, at baseline, intervened with one or more patients. Providers who intervened with no patients
182 at baseline are called 'zero intervenors'; providers who intervened with at least one patient at
183 baseline are called greater than zero intervenors, 'GT zero intervenors'..

184 2.4. Randomization and blinding

185 Randomization took place after formal agreement of the PHCU to take part in the trial. The
186 PHCUs were randomly allocated to one of the eight groups by the ODHIN coordinating centre,
187 using computerized randomization, stratified by country, ensuring 15 PHCUs per group (three per
188 group per country).

189 2.5. Sample size

190 It was estimated that 56 PHCUs (seven per each of eight allocation groups) with a minimum of
191 1,000 adult patients consulting per month would be needed for an 80% chance of detecting an
192 increase in the proportion of consulting adult patients given an intervention from 4% to at least 6%
193 $\alpha = 0.05$). In calculating our sample size, we used an estimate of ICC of 0.029 across primary
194 care interventions [19], based on one PHCU study of implementation of alcohol screening and
195 advice [20]. Sample size estimation was conducted using STATA 12. As country was used as
196 stratification criteria, each country included a minimum of 24 PHCU.

197

198 2.6. Statistical methods

199 Two sets of dependent variables were analysed. The first set were scores for role security and
200 therapeutic commitment per provider; in these analyses, the independent variables were exposure
201 to two of the implementation strategies (training & support and financial reimbursement), and the
202 proportion of patients intervened. The second set of dependent variables were proportion of
203 patients intervened at different time periods; in these analyses, the independent variables were
204 exposure to two of the implementation strategies (training & support and financial reimbursement),
205 and scores for role security and therapeutic commitment per provider. For all follow-up data,
206 values at previous time points were incorporated as co-variables in the models.

207

208 Distributional assumptions of the outcome variables were assessed and natural log transformations
209 were undertaken for the proportion of patients intervened. As this approach creates some issues
210 with outcomes with a zero value, 0.001 was added to each proportion prior to logging.

211

212 The study was conceived and analysed as a factorial design, in which (-1,1) coding was used for the
213 factors, (in this case training & support and financial reimbursement) resulting in regression
214 coefficients having half the effects. In presenting the results, the estimates for training & support

215 and for financial reimbursement have been doubled. The factorial design is based on the premise
 216 that the effect of, for example, training & support instead of no training & support can not only be
 217 estimated from TS vs control, but also from TS+FR vs FR, TS+eBI vs eBI, and TS+FR+eBI v FR+eBI,
 218 giving a pooled estimate with more precision (for definition of abbreviations, see section,
 219 implementation strategies). The two factors for the interventions were coded as follows:

220 TS=-1 for control, FR, e-BI, FR+e-BI; and, +1 for TS, TS+FR, TS+e-BI , TS+FR+e-BI; and
 221 FR=-1 for control, TS, e-BI, TS+e-BI; and, +1 for FR, FR +TS, FR+e-BI, FR+TS+e-BI.

222 . Unstandardized estimates are presented throughout, as there are problems in standardizing
 223 the factors, which, in a factorial design are analysed as continuous variables with a value of either
 224 -1.0 or 1.0. A generalised linear model was used employing a multi-level approach using country
 225 and PHCU with random intercepts and slopes. Analysis was conducted using IBM SPSS V22,
 226 procedure MIXED.

227 **3. Results**

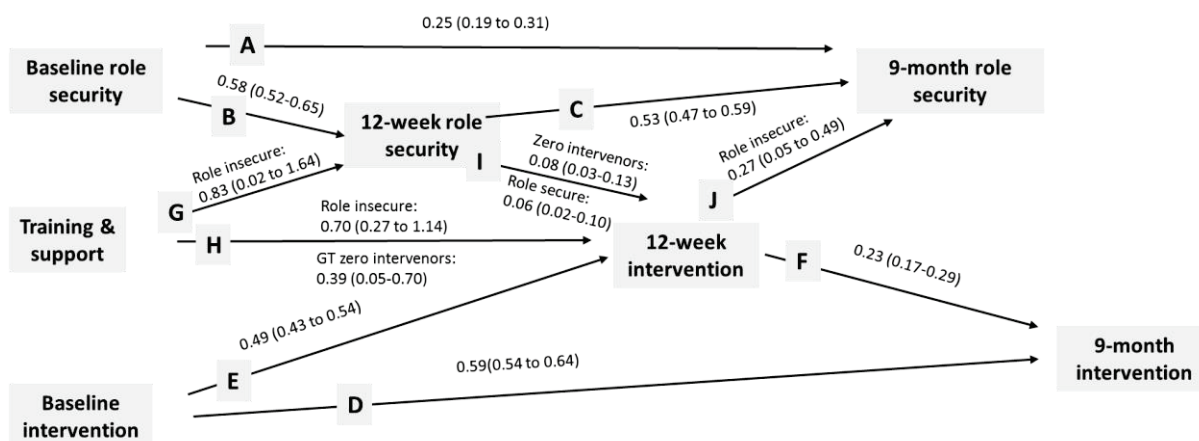
228 Of the 746 providers at baseline, 408 providers (55%) were doctors, 562 (75%) were women, and
 229 the mean age was 46.8 years (SD=9.3).

230 *3.1. Role security*

231 Figure 3 shows that previous role security was associated with future role security (lines A, B, and
 232 C), and that the previous proportion of patients intervened was associated with the future
 233 proportion intervened (lines D, E, and F).

234
 235 Training & support was associated with increased 12-week role security (line G) for those who
 236 were role insecure at baseline, for whom role security was one point higher (20.0) with training &
 237 support, than without (19.0).

238 Training & support was directly associated with a higher proportion of patients intervened at 12
 239 weeks (line H) for those who were role insecure at baseline, for whom the proportion was 26/1000
 240 with training & support, compared to 15/1000 without; and for those who had intervened with at
 241 least one patient at baseline, for whom the proportion at 12 weeks was 28/1000 with training &
 242 support, compared to 19/1000 without. Training & support was indirectly associated with a higher
 243 proportion of patients intervened at 12 weeks (lines G and I), for line I for those who were role
 244 secure at baseline and for those who had intervened with at least one patient at baseline, for whom,
 245 in both cases, there was an increase in the proportion of patients intervened at 12 weeks of 1/1000
 246 for every one-point increase in role security.
 247



249 **Figure 3** Unstandardized estimates (95% Confidence Intervals) for interrelationships between role
 250 security and the proportion of patients intervened. [Estimates for impact of Training &
 251 support have been doubled – see statistical methods].

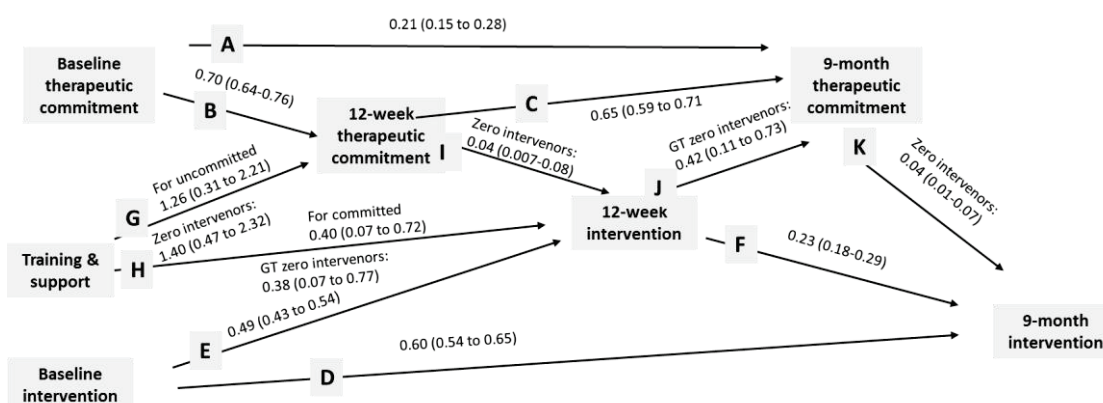
252 The proportion of patients intervened at 12 weeks was associated with a future increase in role
 253 security (line J) for those who were role insecure at baseline, for whom role security increased by
 254 one point for every 1/100 increase in the proportion intervened at 12 weeks. Role security at
 255 9-month follow-up was not associated with an increase in the proportion of patients intervened at 9
 256 months.

257
 258 There was no association between training & support and the proportion of patients intervened at 9
 259 months for those with high 9-month role security (hypothesized line F in Figure 1).

260 **3.2. Therapeutic Commitment**

261 Figure 4 shows that previous therapeutic commitment was associated with future therapeutic
 262 commitment (lines A, B, and C), and that the previous proportion of patients intervened was
 263 associated with the future proportion intervened (lines D, E, and F).

264
 265 Training & support was associated with increased 12-week therapeutic commitment (line G) for
 266 those who were uncommitted at baseline, for whom therapeutic commitment was 1.5 points higher
 267 (26.0) with training & support than without (24.5); it was also the case for those who had intervened
 268 with at least one patient at baseline, for whom, also, therapeutic commitment was 1.5 points higher
 269 (28.0) with training & support than without (26.5).
 270

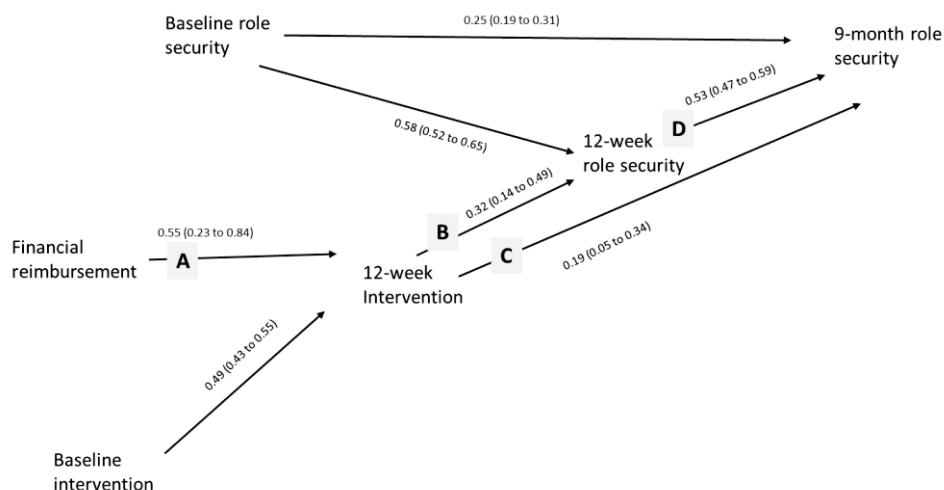


271 **Figure 4** Unstandardized estimates (95% Confidence Intervals) for interrelationships between
 272 therapeutic commitment and proportion of patients intervened. [Estimates for impact of
 273 Training & support have been doubled – see statistical methods].
 274

275 Training & support was directly associated with a higher proportion of patients intervened at 12
 276 weeks (line H) for those who were committed at baseline, for whom the proportion was 18/1000
 277 with training & support, compared to 13/1000 without; and for those who had intervened with at
 278 least one patient at baseline, for whom the proportion at 12 weeks was 28/1000 with training &
 279 support, compared to 19/1000 without. Training & support was indirectly associated with a higher
 280 proportion of patients intervened at 12 weeks (lines G and I), for line I for those who had
 281 intervened with at least one patient at baseline, for whom there was an increase in the proportion of
 282 patients intervened at 12 weeks of 2/1000 for every one-point increase in therapeutic commitment.

283 3.3. Financial reimbursement

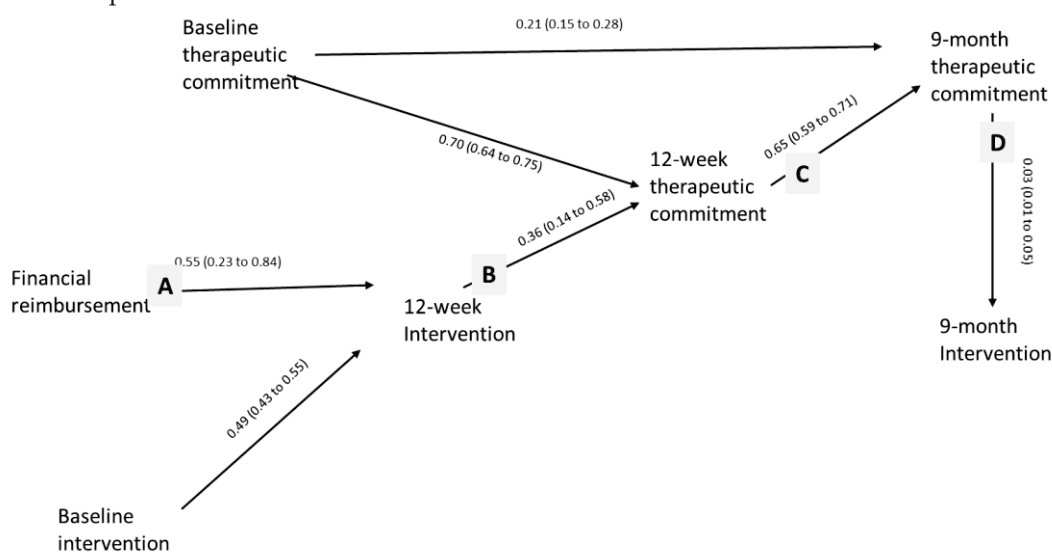
284 Financial reimbursement was associated indirectly with increased 12-week and 9-month role
 285 security, Figure 5 (lines A, B, C, and D). Nine-month role security was not associated with the
 286 proportion of patients intervened at 9 months. There was no association between financial
 287 reimbursement and the proportion of patients intervened at 9 months for those with high 9-month
 288 role security (hypothesized line F in Figure 2).



289

290 **Figure 5** Unstandardized estimates (95% Confidence Intervals) for interrelationships between role
 291 security and financial reimbursement. [Estimates for impact of Financial Reimbursement have been
 292 doubled – see statistical methods].

293 Financial reimbursement was associated indirectly with increased 12-week therapeutic
 294 commitment, Figure 6 (lines A and B). Twelve-week therapeutic commitment was associated with
 295 increased 9-month therapeutic commitment (line C), which, in turn, was associated with a higher
 296 proportion of patients intervened at 9 months (line D). As predicted by the hypothesized path model
 297 of Figure 2 (line F), financial reimbursement was directly associated with a higher proportion of
 298 patients intervened at 9 months for committed (estimate = 0.26, 95% CI= 0.008 to 0.52) but not for
 299 uncommitted providers at 9 months.



300

301 **Figure 6** Unstandardized estimates (95% Confidence Intervals) for interrelationships between
 302 therapeutic commitment and financial reimbursement. [Estimates for impact of Financial
 303 Reimbursement have been doubled – see statistical methods].

304 4. Discussion

305 Systematic reviews and meta-analyses have concluded a positive impact of primary health care
306 based screening and brief advice programmes in reducing heavy drinking [21-23]. Modelling
307 studies have suggested that were these programmes widely implemented, considerable population
308 health gain could be achieved [24]. The public health problem is one of failure to achieve
309 widespread take-up of screening and brief advice programmes [25]. In ODHIN, we found that only
310 5.9% of eligible patients consulting their primary health-care provider during a 4-week baseline
311 measurement period were screened for their alcohol consumption [5]. ODHIN demonstrated that
312 up to four hours training and support to primary health care providers and financial
313 reimbursement delivered during a 12-week implementation period resulted in a higher proportion
314 of heavy drinkers given a brief intervention (screened and advice given to screen positives) to
315 reduce their drinking [5]. The ratio of the logged proportion given an intervention during the
316 12-week implementation period was 1.61 (95% CI 1.24 to 2.10) in PHCU that received training &
317 support versus PHCU that did not receive training & support; for financial reimbursement, the
318 ratio was 2.00 (95% CI 1.49 to 2.47). This present paper has examined the extent to which on-the-job
319 experience, through improving role security and therapeutic commitment leads to more screening
320 and brief advice activity. The paper also examined whether or not financial reimbursement had an
321 enduring effect beyond the time of reimbursement, through its short-term impact in improving
322 on-the-job experience.

323 We report associations over time between: primary health care providers' attitudes to
324 managing heavy drinking patients; their exposure to factors aimed at increasing their screening and
325 brief advice activity for heavy drinking; and changes in the proportion of providers' adult patients
326 who were screened and offered advice to reduce their heavy drinking. Inevitably, if associations are
327 found, they may operate in two directions. For example, if increases in the proportion of patients
328 screened and advised are found (independent variable) to be associated with increases in positive
329 attitudes (dependent variable), we are likely to find an association between increases in positive
330 attitudes (independent variable) and increases in the proportion of patients screened and advised
331 (dependent variable), which we do. However, because we repeated measures over time, we are able
332 to tease out some of the likely directions of the relationships.

333 Our findings are in line with the model put forward by the Maudsley Alcohol Pilot Project [6].
334 Through direct and indirect (via changes in attitudes) paths, training & support was associated with
335 improved screening and brief advice activity during the 12-week implementation period.
336 Twelve-week screening and advice activity was associated with future role security and therapeutic
337 commitment. Nine-month therapeutic commitment, but not role security, was associated with
338 increased nine-month screening and advice activity. The model is further corroborated by the
339 demonstration that, whilst financial reimbursement was not directly associated with improvements
340 in role security and therapeutic commitment, through its association with increased 12-week
341 screening and advice activity, it was indirectly associated with improved future role security and
342 therapeutic commitment.

343 A criticism of pay for performance is that changed behaviour is unlikely to persist once the
344 incentive is removed. However, our findings suggest that it could be possible for financial
345 reimbursement to have an impact beyond removal of the incentive. Financial reimbursement was
346 associated with increased screening and brief advice activity, which in turn was associated with
347 improved role security and therapeutic commitment, with increased therapeutic commitment, in
348 turn, associated with increased screening and brief advice activity beyond the duration of the
349 reimbursement. Thus, financial incentives can open the door to positive changes in practitioners'
350 screening and advice activity, which then are likely to be reinforced by day-to-day repetition
351 (familiarity) and embedding of the action in routine practice behaviour. Future withdrawal of pay

352 for performance schemes, thus, may not extinguish the desired practitioner behaviour. Financial
353 reimbursement may be more useful, though, if it encourages embedding approaches (such as
354 templates or registers), as occurs in the quality and outcomes framework, part of the General
355 Medical Services contract for general practices in England [26].

356 5. Conclusions

357 Our findings suggest that to improve primary health care providers' screening and brief advice
358 activity for heavy drinking, two actions are needed: first, the provision of training and support to
359 all providers, irrespective of initial levels of role security and therapeutic commitment, and
360 irrespective of initial screening and brief advice activity; and, second, on-the-job experience, by
361 actually delivering screening and brief advice activity. Screening and brief advice activity may be
362 further enhanced when embedded within wider policy and community actions [24, 27].
363

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381 **Author Contributions:** All authors jointly conceived and designed the experiments; all authors except PA
382 undertook the study and collected the data. PA analyzed the data. PA drafted the paper. All authors read and
383 approved the paper.

384 **Conflicts of Interest:** The authors declare no conflict of interest.

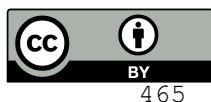
385 References

- 386 1. Thom, B. & Tellez, C. (1986) A difficult business: detecting and managing alcohol problems in general
387 practice. *British Journal of Addiction* 81 405-418.
- 388 2. Anderson P (2006) Classic texts revisited: Responding to Alcohol problems. *Addiction* 101, 750-752.
- 389 3. Rapley T, May C, Kaner E. (2006) Still a difficult business: Negotiating alcohol-related problems in
390 general practice consultations. *Social Science & Medicine* 63: 2418-2428.
- 391 4. Keurhorst M, van de Glind I, Bitarello do Amaral-Sabadini M, Anderson P, Kaner E, Newbury-Birch D et
392 al. (2015) Determinants of successful implementation of screening and Advice for hazardous and harmful
393 alcohol consumption in primary healthcare. A systematic review and meta-regression analysis. *Addiction*
394 110:877–900.
- 395 5. Anderson, P., Bendsten, P., Spak, F., et al. (2016) 'Improving the delivery of brief interventions for heavy
396 drinking in primary health care: outcome results of the ODHIN five country cluster randomized factorial
397 trial' *Addiction* DOI: 10.1111/add.13476.
- 398 6. Shaw, S., Cartwright, A., Spratley, T. & Harwin, J. (1978). *Responding to drinking problems*. London, Croom
399 Helm.

- 400 7. Anderson P, Bennison J, Orford J, Spratley T, Tether P, Tomson P. and Wilson D. (1986). Alcohol - A
401 balanced view. London: Royal College of General Practitioners.
- 402 8. Cartwright, A.K.J. (1979) *The Effect of Role Insecurity on the Therapeutic Commitment of Alcoholism*
403 *Counsellors*. Ph.D. Thesis, Institute of Psychiatry, London.
- 404 9. Cartwright, A.K.J. (1980) The attitudes of helping agents towards the alcoholic client: the influence of
405 experience, support, training and self-esteem. *British Journal of Addiction*, 413-431.
- 406 10. Anderson P. (1985) Management of Alcohol Problems in General Practice. *British Medical Journal*, 296
407 1873- 1875.
- 408 11. Anderson P. & Clement S. (1987) The AAPPQ Revisited. Measurement of general practitioners' attitudes to
409 alcohol problems. *British Journal of Addiction* 82, 753-759.
- 410 12. Anderson, P., Kaner, E. Wutzke, S, Wensing, M., Grol, R., Heather, N. & Saunders, J. (2003). Attitudes and
411 management of alcohol problems in general practice: descriptive analysis based on findings of a WHO
412 international Collaborative Survey. *Alcohol and Alcoholism* 38 597-601.
- 413 13. Anderson, P., Kaner, E., Wutzke, S., Funk, M., Heather, N., Wensing, M., Grol, R., Gual, A. & Pas, L.
414 (2004). Attitudes and managing alcohol problems in general practice: an interaction analysis based on
415 Findings from a WHO Collaborative Study. *Alcohol and Alcoholism* 39:351-356.
- 416 14. Anderson P, Wojnar M, Jakubczyk A et al. (2014). Managing Alcohol Problems in General Practice in
417 Europe: Results from the European ODHIN Survey of General Practitioners. *Alcohol and Alcoholism* 49
418 531–539
- 419 15. Bendsten, P, Anderson P, Wojnar M, et al. (2015) Professional's attitudes do not influence screening and
420 brief intervention rates for hazardous and harmful drinkers: results from ODHIN study. *Alcohol and*
421 *Alcoholism* doi: 10.1093/alcalc/agt020
- 422 16. Keurhorst M, Anderson P, Heinen M, Bendtsen P, Baena B Brzozka K et al. (2016). Impact of primary
423 health care providers' initial role security and therapeutic commitment in implementing brief
424 interventions in managing risky alcohol consumption: a cluster randomised factorial trial.
425 *Implementation Science* DOI 10.1186/s13012-016-0468-5.
- 426 17. Keurhorst M, Anderson P, Spak F, Bendtsen P, Segura L, Colom J et al. (2013) Implementing training and
427 support, financial reimbursement, and referral to an internet-based Advice program to improve the early
428 identification of hazardous and harmful alcohol consumption in primary care (ODHIN): study protocol
429 for a cluster randomized factorial trial. *Implementation Science* 8:11. doi:10.1186/1748-5908-8-11.
- 430 18. Jonas DE, Garbutt JC, Brown JM, Amick HR, Brownley KA, Council CL, et al. Screening, Behavioral
431 Counseling, and Referral in Primary Care to Reduce Alcohol Misuse. *Comparative Effectiveness Review*
432 No. 64. Rockville, MD: Agency for Healthcare Research and Quality; July 2012. Accessed at [www.ncbi](http://www.ncbi.nlm.nih.gov/books/NBK99199/)
433 [.nlm.nih.gov/books/NBK99199/](http://www.ncbi.nlm.nih.gov/books/NBK99199/) on 16 April 2016.
- 434 19. Adams G, Gulliford MC, Ukoumunne OC et al. Patterns of intra-cluster correlation from primary care
435 research to inform study design and analysis. *Journal of Clinical Epidemiology* 2004 57 785–794.
- 436 20. Kaner EFS, Lock CA, McAvoy BR, Heather N, Gilvarry E. A RCT of three training and support strategies
437 to encourage implementation of screening and brief alcohol intervention by general practitioners. *Br J Gen*
438 *Pract* 1999;49:699–703.
- 439 21. Kaner EF, Dickinson HO, Beyer FR, Campbell F, Schlesinger C, Heather N, Saunders JB, Burnand B,
440 Pienaar ED. Effectiveness of brief alcohol interventions in primary care populations. *Cochrane Database of*
441 *Systematic Reviews* 2007, Issue 2. Art. No.: CD004148. DOI: 10.1002/14651858.CD004148.pub3.
- 442 22. O'Donnell, A., Anderson, P., Newbury-Birch, D., Schulte, B., Schmidt, C., Reimer, J. & Kaner, E. The
443 Impact of Brief Alcohol Interventions in Primary Healthcare: A Systematic Review of Reviews. *Alcohol*
444 *and Alcoholism* doi: 10.1093/alcalc/agt170.
- 445 23. Platt L, Melendez- Torres GJ, O'Donnell A, et al. How effective are brief interventions in reducing alcohol
446 consumption: do the setting, practitioner group and content matter? Findings from a systematic review and
447 metaregression analysis. *BMJ Open* 2016;6:e011473. doi:10.1136/bmjopen-2016- 011473.

- 448 24. Organisation for Economic Co-operation and Development. *Tackling Harmful Alcohol Use: Economics and*
449 *Public Health Policy*. Paris: Organisation for Economic Co-operation and Development, 2015.
- 450 25. Kaner, E. (2012). Health sector responses. In Anderson, P., Møller, L. & Galea, G. 2012. *Alcohol in the*
451 *European Union: consumption, harm and policy approaches*. Copenhagen, Denmark, World Health
452 Organization.
- 453 26. NHS (2016). Quality and Outcomes Framework.
454 [http://www.nhsemployers.org/your-workforce/primary-care-contacts/general-medical-services/quality-an-](http://www.nhsemployers.org/your-workforce/primary-care-contacts/general-medical-services/quality-and-outcomes-framework)
455 [d-outcomes-framework](http://www.nhsemployers.org/your-workforce/primary-care-contacts/general-medical-services/quality-and-outcomes-framework). Accessed 24 August 2016.
- 456 27. Heather N. Ed. WHO Collaborative Project on Identification and Management of Alcohol-related
457 Problems in Primary Health Care – Report to the World Health Organisation on Phase IV: Development of
458 Country-wide Strategies for Implementing Early Identification and Brief Intervention in Primary Health
459 Care. Geneva: World Health Organisation, Department of Mental Health and Substance Abuse: 2006.
460 [http://www.who.int/substance_abuse/publications/identification_management_alcoholproblems_phaseiv.](http://www.who.int/substance_abuse/publications/identification_management_alcoholproblems_phaseiv.pdf)
461 [pdf](http://www.who.int/substance_abuse/publications/identification_management_alcoholproblems_phaseiv.pdf). Accessed 9 January 2017.

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