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Gender differences in the impact of population-level alcohol policy interventions: evidence synthesis of systematic reviews.

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Abstract

Background: Consistent review-level evidence supports the effectiveness of population-level alcohol policies in reducing alcohol-related harms. Such policies interact with well-established social, cultural and biological differences in how men and women perceive, relate to and use alcohol, and with wider inequalities in ways which may give rise to gender differences in policy-effectiveness.

Aims: To examine the extent to which gender-specific data and analyses were considered in, and are available from, systematic reviews of the impact of population-level alcohol policy interventions, and where possible to conduct a narrative synthesis of relevant data.

Methods: A prior systematic 'review of reviews' of population level alcohol interventions 2002-2012 was updated to May 2014, all gender-relevant data extracted, and the level and quality of gender reporting assessed. A narrative synthesis of extracted findings was conducted.

Results: Sixty-three systematic reviews, covering ten policy areas, were included. Five reviews (8%) consistently provided information on baseline participation by gender for each individual study in the review and twenty-nine (46%) reported some gender-specific information on the impact of the policies under consideration. Specific findings include evidence of possible gender differences in the impact of and exposure to alcohol marketing, and a failure to consider potential unintended consequences and harm to others in most reviews.

Conclusions: Gender is poorly reported in systematic reviews of population-level interventions to reduce alcohol-related harm, making it difficult to assess the intended and unintended effects of such policies on women and men. Further consideration of potential gender differences is warranted in both research and policy.

1 Introduction

2 The identification and implementation of effective policies to reduce the adverse consequences of
3 alcohol is a major public health imperative (1). While the heterogeneity of the interventions and
4 outcomes may impede understanding of the mechanisms of effect, (2–4), consistent review-level
5 evidence supports the effectiveness of population-level alcohol policy interventions. These include
6 those involving regulatory enforcement such as increased taxation or price controls, drink-driving
7 limits, and the regulation of availability and marketing (4,5).

8
9 There is persistent and strong evidence, from multiple countries worldwide, that men and women
10 relate to, perceive and use alcohol differently (6,7). *“Nearly everywhere that epidemiological or
11 ethnographic research has been carried out, historically and cross-culturally, men have consumed
12 more alcohol than women”* (8)(p153). Women are more likely to abstain; men are more likely to drink
13 heavily and develop alcohol problems (7,9). Women are more likely to suffer intimate partner
14 violence; men to engage in drink-driving (5).

15
16 While sex-linked biological differences influence alcohol consumption and related harms (7,10), the
17 variation in magnitude of differences in drinking between men and women (6,7,10,11), and the
18 convergence in consumption levels between men and women in many countries over recent decades
19 (7,11–14), suggest that societal and cultural influences may be more important. Public excessive
20 drinking has historically been perceived as a demonstration of ‘masculinity’ in western societies (15).
21 Alcohol consumption has historically been associated with fewer social sanctions for men than women
22 (10,16), particularly among poorer populations (17).

23
24 The convergence in drinking between women and men has largely been attributed to a rise in
25 women’s drinking rather than a fall in men’s (18–21). Hypothesized influences include greater gender
26 equality, marriage and parenting at an older age, increasing female participation in the workplace and
27 financial independence, changes in drinking environments such as bar design, and more mixed-gender
28 drinking occasions (16). The alcohol industry is likely to have played, and continues to play, a role
29 through deliberate differentiation between men and women in product development, targeting and
30 marketing: *“in many countries [women] have been the obvious group in which the market has been
31 far from saturated”* (16).

32
33 Policies which attempt to reduce alcohol-related harms interact with social, cultural and biological
34 differences in how men and women relate to, perceive, and use alcohol. For this reason alone, there
35 may be gender differences in the effectiveness and unintended effects of alcohol policy interventions.
36 In addition, these differences intersect with wider gender inequality, which is acknowledged as an
37 influential social determinants of health (22–24): *“sex and society interact to determine who is well or
38 unwell, who is treated or not, who is exposed or vulnerable to ill health and how, whose behaviour is
39 risk-prone or risk-averse, and whose health needs are acknowledged or dismissed”* (23). Increasing
40 recognition of structural gender inequality, and its links with economic and other inequality, has led
41 to efforts to ‘mainstream gender’ within policy-making more broadly (25–28), as well as calls for
42 greater attention to gender in research(23,24,29–31).

43
44 ‘Umbrella’ reviews (reviews of reviews) are increasingly used to synthesize systematic review evidence
45 (32). Published umbrella alcohol policy reviews (4,5) have not focused on how well-represented
46 females are in studies, or the potential role of gender differences in influencing overall policy
47 effectiveness. Therefore, the aims of this umbrella review were to:

- 48
49 • examine the extent to which sex/gender data and analyses were considered in, and are
50 available from, systematic reviews of population-level alcohol policy interventions

- 51 • conduct a narrative synthesis of findings from systematic reviews relating to sex/gender
52 differences in effectiveness or potential effectiveness of such interventions.

53

54 Given the difficulty of separating differences in 'sex' (biological differences between men and
55 women) and 'gender' (cultural constructions of masculinity and femininity), we refer to 'gender' to
56 encompass both, in line with current thinking (33).

57

58

59 **Methods**

60 Search Strategy

61 Martineau and colleagues previously conducted a review of reviews in 10 alcohol policy areas ("the
62 Martineau review") without focusing on sex/gender (4). It was used as the starting point for this
63 umbrella review. Their search strategy (Table 1) from October 2012, identified 52 reviews from 2002
64 onwards from six databases (4); all 52 were included in this current review.

65 <Table 1 to be inserted here>

66

67 The Martineau review search strategy was re-run for the period 1st July 2012 to 19th May 2014, to
68 allow for delays in indexing. Six academic literature databases were searched: five the same as those
69 searched by Martineau and colleagues (*Medline, Database of Abstracts of Reviews of Effects (DARE),*
70 *Cochrane Database of Systematic Reviews, Campbell Collaboration Library of Systematic Reviews,* and
71 a site search of the National Institute for Health and Care Excellence's (NICE) website); and one
72 covering the same subject areas (*Applied Social Sciences Index and Abstracts*) as an older database
73 used by Martineau and colleagues (*Social Policy and Practice*). No reviews included in Martineau were
74 identified only in the latter database.

75 Results Screening

76 The search results were downloaded into bibliographic software (RefWorks) and duplicates removed.
77 Two researchers (KA, NF) assessed the new reviews by first applying the Martineau review inclusion
78 criteria (4)(p.259) to titles and abstracts, and then, if necessary, to the full text. The inclusion criteria
79 were:

- 80 1. Does the review have a stated aim to evaluate interventions to reduce alcohol use and/or
81 related harm, and report outcome data on alcohol use and/or related harm?
- 82 2. Does the review concern intervention effectiveness? (*And include studies with controlled,*
83 *before-and-after or time series designs.*)
- 84 3. Is at least one of the interventions reviewed population level? (*Exclude interventions*
85 *involving interaction between health professionals and individuals or groups, and*
86 *interventions selectively targeting high-risk individuals, such as those convicted of alcohol-*
87 *related offences.*)
- 88 4. Is the review a systematic review? (*If the study reports search strategy details, inclusion*
89 *and exclusion criteria, and clearly identifies all included studies. Exclude reviews of*
90 *reviews.*)

91

92 If the answer to all four questions above was yes, the review was included and assigned to the relevant
93 policy area. In the event of any disagreement or doubt about eligibility that could not be resolved by
94 discussion between KA and NF, a third researcher (LB) read the review to resolve disagreement by
95 majority opinion. We planned to use updated reviews in place of the original reviews; however no
96 updated reviews were identified by our search.

97

98 The Martineau review did not limit the searches by language, although all the included reviews were
99 in English. In our updated search, we excluded non-English language reviews due to lack of resources
100 for full-text translation. We planned to list any identified by our search, however none emerged. In
101 both the original and updated searches, reviews were not excluded on the basis of methodological
102 quality other than as outlined in the above criteria. This is in line with guidance on synthesizing
103 evidence on health equity which emphasises an inclusive approach (34).

104

105 Data Extraction

106

107 Each review was assessed for relevant sex/gender content as follows:

108

- 109 • Searchable PDF documents: electronic searches were conducted for key terms (including:
110 male female women woman man men girl boy gender sex mother father maternal paternal
111 daughter son pregnant pregnancy schoolgirl schoolboy husband wife wives spouse spousal);
- 112 • Data extraction tables within reviews: scanned for findings reported by gender using the
113 abbreviations 'f' and 'm', or 'w' and 'm'.
- 114 • PDF documents that were not fully text-searchable or photocopies: full text read carefully for
115 key terms.

116

117 Data were extracted from systematic reviews using a standardised framework (Table 2), which was
118 developed and revised by two researchers (NF, KA). Initially, data were extracted using the
119 preliminary framework from three reviews, one from each of three policy areas, by the two
120 researchers independently. The results were reconciled, and a consensus reached on adaptations to
121 the framework. The adapted framework was applied independently to two new reviews in two more
122 policy areas. The final version of the data extraction framework (Table 2) was agreed and applied to
123 all the remaining identified reviews by one researcher. A sample of reviews in each policy area was
124 checked for accuracy by a second researcher.

125

126 Many reviews included studies not relating to population-level alcohol policy interventions (e.g.
127 studies measuring the effectiveness of policy interventions for other addictive substances or those
128 targeting an individual rather than a population). As in the Martineau review, data relating to these
129 studies were not extracted. Within the eligible reviews, data were extracted from relevant studies of
130 any design.

131

132 <Table 2 to be inserted here>

133 Data analysis

134

135 The level and quality of reporting of sex/gender data in the reviews was analysed summatively for
136 each policy area using the items included in the data extraction framework (Table 2). An overall
137 narrative synthesis of sex/gender-relevant findings was conducted, as well as for individual policy
138 areas.

139

140 **Results**

141 In total, 63 unique systematic reviews were identified and included (52 from the Martineau review,
142 and 11 from our updated search: see Figure 1). Table 3 shows the reviews categorised into 10 broad
143 alcohol policy areas as defined by Martineau: three reviews covered two policy areas and one review
144 covered three policy areas.

145

146 <Figure 1 to be inserted here>

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<Table 3 to be inserted here>

Level of consideration and availability of gender-relevant data (Table 4)

<Table 4 to be inserted here>

Most of the systematic reviews (87%, n=55) did not plan to conduct pooled analysis of intervention effects by gender (Table 4). Seven of the 8 reviews which did plan to do so reported insufficient data in the primary studies to enable such analysis (35–41). The eighth of these reported pooled effects by gender in the area of higher education interventions (42), and a review of mass media interventions did post-hoc pooled gender analysis (43) (see policy findings below).

Five reviews (8%) (37–39,41,44) ‘consistently’ provided information on baseline participation by gender for the individual studies included in the review; four of these were conducted for the Cochrane Library. Another review sometimes (45) and another rarely (46) provided such information; the rest (89%, n=56) never did so.

More than half of the reviews (54%, n=34) provided no information on individual study findings relating to the impact of the reviewed policy by gender, and there was wide variation in the location, quality and level of detail of information provided for those which did (Table 4).

Gender-relevant findings from systematic reviews

Notwithstanding the gaps in reporting at review level, available information relevant to gender is outlined below by policy area.

Alcohol server setting/drinking environment (Table S1 – 6 reviews)

Five reviews focused on policies to prevent alcohol-related harm or intoxication in or around licensed premises (47–51), with between 13 and 26 studies in each; a further review included a single study of warning labels (52). Across all six reviews, gender-relevant findings were reported only for a single included study - of ‘Operation Drinksafe’ (a personalised risk-assessment in bars involving the AUDIT screening tool and breath alcohol concentration measurement) – which reported a greater reduction in AUDIT scores in women (p1588, Van Beurden et al., (2000) cited in (47)).

Sales Availability (Table S2 – 8 reviews)

Eight reviews, including between 13 and 132 studies, considered policies limiting the availability of alcohol through hours/days of sale, outlet density and/or purchase age (53–60). Gender-relevant findings were reported for very few (15% or less) of the included studies in each review. Such data were reported for 5 of 88 studies in one review (54), all of which suggested that increasing outlet density was associated with increased consumption or harms (suicides, night-time crashes, assaults) in males, less so in females. Another review (60) reported relevant findings for 10 of 69 studies, that were more mixed suggesting either no effect or an enhanced effect in males.

In another review, relevant data were reported from one paper which found that following an extension of hours of sale in Scotland, women’s drinking increased while men’s decreased (Knight & Wilson (61) as cited in (59)). The same paper was cited in another review (56) as finding that the introduction of Sunday alcohol sales in Scotland was associated with an increase in consumption amongst males aged 18-45, with no significant change in women’s drinking..

197 Two reviews cited studies considering the effect of increased availability on assaults against women;
198 one suggested no effect (Norstrom & Skog, 2003 cited in (56)) and the other found a decrease in
199 assaults against women but could not conclude causation (Duailibi et al., 2007, cited in (62)).
200

201 No gender-relevant data were reported for the 132 studies included in the one review of minimum
202 drinking age laws (58).
203

204 **Illicit alcohol – 1 review**

205 No gender relevant data were reported for the 14 studies included in the review of policy options to
206 address illicit alcohol (63).
207

208 **Taxation/pricing (Table S3 – 4 reviews)**

209 Gender relevant findings were reported for fewer than 25% of the studies included in the reviews,
210 which included between 9 and 50 studies overall. No consistent differences in the direct effect of
211 increased price/taxation on consumption or harms in men compared to women were found.
212

213 Two reviews (46,64) reported findings from 5 studies suggesting that higher prices were associated
214 with decreased male but not female harms, including suicide (Markowitz, 2003, cited in (46,64)) and
215 sexually transmitted diseases (Grossman 2004; Carpenter 2005 both cited in (46); Markowitz et al.,
216 2005; Chesson et al., 2000 both cited in (64)). A sixth study found an association between higher
217 prices and improved use of birth control and condoms that was only significant in males (Grossman &
218 Markowitz, 2005 cited in (64)). One other study (Heeb et al., 2003 cited in (65)) found a greater
219 increase in male spirits drinking with a decrease in price.

220 Three studies found greater decreases in female than male drinking or harms with increased price
221 (Chaloupka & Wechsler, 1996; Makela et al., 2008; Academy of Medical Sciences, 2004, all in (46); the
222 latter also cited in (60)). A further study (Herttua et al.2008a, as cited in (60)) found that a tax
223 reduction increased alcohol deaths more in females than in males.
224

225 Finally, one study did not find any evidence that an overall increase in spirits consumption following a
226 decrease in price differed by gender (Kuo et al., 2003 cited in (65)).
227

228 There was some consistency in studies considering indirect impact with five studies, all cited in one
229 review (46), suggesting an increase in price would reduce rapes (Cook and Moore, 1993), child abuse
230 perpetrated by females (but not males) (Markowitz & Grossman, 2000), sexual assault against women
231 (Markowitz, 2000, second listing), unwanted pregnancies/teen abortions (Sen et al., 2003 also cited
232 in (64)) and violence aimed at wives (Markowitz, 2000).
233

234 **Alcohol Marketing, Mass Media, Promotion, Counter-Advertising (Table S4 – 7 reviews)**

235 Of the 7 reviews, Booth et al. (46) included the most relevant findings: males were found more likely
236 to be exposed to or influenced by broadcast advertising in 7 studies (Aitken, 1988; Casswell & Zhang,
237 1998; Chen et al., 2005; Kelly, 1998; Sargent, 2006; Stacy, 2004; Zwarun, 2006; all cited in (46)), notably
238 for beer, and such exposure was associated with increased consumption of beer in two studies (Collins
239 et al., 2003; Connolly, 1994, both cited in (46)). Two studies found that point of sale
240 pricing/advertising may have increased female drinking to a greater extent than male drinking (Saffer
241 & Dave, 2003; Smith et al., 2005; both cited in (46)); 2 found no gender difference (Pederson, 2002;
242 Yang & Raghubir, 2005; both cited in (46)). Two studies found a greater exposure of females to
243 billboard and print media advertising (Dring & Hope, 2001; Jernigan, 2004; both cited in (46)) and 2
244 studies suggested that the effects of advertising bans were generally larger for females (Saffer & Dave,
245 2003; Saffer & Dave, 2006; both cited in (46)). One study found an association between possession of
246 alcohol promotional items and binge drinking in girls and a stronger association between such
247

248 possession and alcohol initiation in girls rather than in boys (Fisher, 2007, cited in (46)). Finally, a
249 different study found that males were more likely to have alcohol promotional clothing items and that
250 that was associated with a range of drinking variables (Workman, 2004, cited in (46)).

251 The Jackson et al. review (60) was conducted by members of the same team as the Booth review (46).
252 It covered three policy areas, and rather than conducting a new review, reported on the earlier
253 findings from the Booth review, however it summarised the findings slightly differently. It reported
254 that younger age-groups and 15 to 17 year old girls experienced the greatest impact of alcohol
255 advertising, but did not highlight the finding from Booth that males may be more influenced by and
256 exposed to broadcast advertising.

257

258 **Drink-driving (Table S5 – 12 reviews)**

259 No two reviews reported gender-relevant information from the same primary studies of drink-driving
260 policy. Reported studies suggested that such interventions have more of an impact on males than on
261 females in reducing consumption: (Carpenter et al., 2007 cited in (36)); breath alcohol concentration
262 (Zwicker, 2007 cited in (35); Kloeden & McLean, 1997; 1994 cited in (36)); crash-related hospital
263 admissions (Harden et al., 1985 cited in (66)); road traffic fatalities (Albalade et al., 2006, cited in (36));
264 and insurance claims for crashes (Mercer et al., 1996 also cited in (66)). Other studies suggested that
265 females tended to be more compliant with drink driving laws (Timmerman et al., 2003; Boots and
266 Midford, 1999 both cited in (67); Kaplan and Prato, 2007 cited in (36)). A small number of studies
267 across the reviews involved male drivers only.

268

269 **School (Table S6 – 17 reviews)**

270 There was no consistent evidence of gender differences in the effectiveness of school programmes
271 targeting alcohol. Across all the reviews, gender relevant findings were reported for 14 studies, of
272 which six suggested greater impact of the intervention in females, five suggested greater impact in
273 males, and three found no gender differences. There was limited evidence that males may have
274 responded better to classroom management interventions such as the 'Good Behaviour Game'
275 (Kellam et al., 2008 cited in (38)). However, the review-level evidence for the effectiveness of school-
276 based interventions was weak overall (4).

277

278 **Higher Education (Table S7 – 5 reviews)**

279 There was no evidence to suggest gender differences in the effects of a range of higher-education
280 interventions focusing on alcohol. One meta-analysis (42) found that gender was not a significant
281 moderator for first-year college students' alcohol consumption post-intervention.

282

283 **Family and community (Table S8 – 4 reviews)**

284 Reported review-level findings did not suggest a consistent gender difference in the efficacy of family
285 and community interventions: two cited studies found no significant moderation of effect by gender
286 (Brody, 2006, Haggerty, 2007, both in (39)); another study suggested a negative impact on females
287 only (Wiggins et al., 2009, cited in (68)); another a greater positive impact on males (Perry et al., 2003,
288 cited in (69)); and a final study found a greater positive impact on females (Spath et al., 1999a cited in
289 (39)).

290

291 Four trials of a female only intervention for daughters and their parents (mostly mothers) showed
292 signs of efficacy in the short to medium term (39) (p.12).

293

294 **Workplace (Table S9 – 4 reviews)**

295 Few relevant findings were reported and there was no clear evidence overall for any specific gender
296 differences from the studies cited in these reviews (41,45,70,71).

297

298
299

Discussion

300 Although there is widespread recognition that *“explicitly identifying to whom the evidence does or*
301 *does not apply, is necessary to formulate social policy initiatives... and to determine what interventions*
302 *are appropriate with particular populations”* (72), gender has not been well-reported in reviews of
303 population-level alcohol policy. Across 10 policy areas, and 63 reviews of population-level alcohol
304 policies, few or no reviews reported results by gender and some reported a lack of such data in the
305 primary studies. Notwithstanding the lack of data in the reviews, the information extracted suggests
306 that there are likely to be gender differences that are relevant to policy effectiveness in some areas.

307

Policy Implications

309

310 Possible gender differences exist in the area of alcohol marketing/mass media interventions, where
311 young men may be more affected by broadcast advertising especially for beer; and young women by
312 billboard/print advertising. If broadcast advertising was subjected to restrictions (as has been
313 suggested (73) p19), which were not applied to print advertising, that may reduce advertising
314 exposure to a greater extent in young men and requires further investigation.

315

316 In school and family interventions, a number of studies evaluated single-gender interventions aimed
317 at daughters (along with a parent, mainly their mothers) cited in (37,38). There is potential for
318 reinforcing gender stereotypes and inequality, for example, by invoking even by their existence, a
319 sense of drinking being somehow more problematic, shameful or inappropriate for girls, than for boys
320 (see de Visser (74,75)). It has been suggested that mass media campaigns focusing on ‘binge drinking’
321 can fall into this category or engage in ‘victim-blaming’ in relation to sexual assaults sustained after
322 drinking alcohol (76). No measures of this potential unintended outcome were reported in any of the
323 included reviews.

324

325 While there were no consistent trends in the many gender differences reported in the impact of
326 increased alcohol prices or taxation on consumption or harms, studies did consistently report that
327 such interventions may have reduced harms such as assaults. Importantly, these indirect outcomes
328 were not reported in reviews for eight of the ten policy areas, despite an increasing focus on ‘harm to
329 others’ from alcohol (77,78).

330

Research implications

332 This review suggests a significant gap in the literature, which is not unusual. Similar ‘gender blindness’
333 has been reported in research in other health areas (79–81) and is both a symptom of, and contributor
334 to, wider gender inequality (22–24). More basic research is required to better consider, measure and
335 report on the effectiveness of alcohol policy interventions by gender, as well as potential unintended
336 consequences such as gender stereotyping, and indirect effects including ‘harm to others’.

337

338 Current developments may improve the analysis and reporting of sex and gender in health research.
339 Many research and governmental organisations require sex/gender issues to be addressed in research
340 proposals and policy initiatives (72). In addition, a group of science editors are currently consulting
341 on common standards for reporting of sex/gender differences in scientific research (31). Specific
342 guidance is available on how to address sex and gender issues in systematic reviews of policy
343 interventions (82).

344

345 It remains to be seen how transformative initiatives to incorporate a gendered perspective will be:
346 long-standing efforts to mainstream gender into policy-making (83) have faced challenges (84) and
347 criticism for having a narrow ‘technocratic’ focus on processes (such as gender impact assessment
348 (85)) while failing to achieve societal change (25,28). This review focused only on gender, it is

349 important to acknowledge that gender inequality intersects with other forms of inequality (including
350 economic, racial, sexual orientation) in complex ways (23,30) that can have important implications for
351 alcohol-related harms (17,86,87), and which require a broader focus in both research and policy
352 (22,29).

353

354 Strengths and limitations

355 This umbrella review synthesizes a large amount of evidence about the impact of population-level
356 alcohol policy interventions on males and females, and adds to the current literature on alcohol and
357 gender, which focuses predominantly on consumption and consequences (7). Its value is constrained
358 by a lack of focus on, and low levels of reporting of, gender-relevant data at review level, either due
359 to gaps in primary studies, selective reporting in the reviews, or more likely both. This makes it difficult
360 to speculate on the reasons for the differences found or to assume their wider transferability.
361 Different reviews reported different aspects of the same primary studies and working from reviews
362 impeded judgement of the quality of the primary evidence. Even reviews which sought to analyse by
363 gender were largely unable to do so, suggesting that further study of the primary literature may not
364 yield results that are any more conclusive.

365

366 **Conclusions**

367 Gender differences in experiences of direct and indirect harm from alcohol are well established (87–
368 89) but appear to be rarely considered in policy reviews. Available evidence from systematic reviews
369 suggests that there may be plausible and important gender differences in the impact of population-
370 level alcohol policy interventions which require further consideration in research and policy,
371 particularly in the area of advertising controls and mass media campaigns.

372

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380

381 **References**

- 382 1. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, et al. Priority actions for the
383 non-communicable disease crisis. *Lancet*. Elsevier; 2011 Apr 23;377(9775):1438–47.
- 384 2. Holmes J, Meier PS, Booth A, Brennan A. Reporting the characteristics of the policy context
385 for population-level alcohol interventions: A proposed “Transparent Reporting of Alcohol
386 Intervention ContExts” (TRAICE) checklist. *Drug Alcohol Rev*. 2014 Nov;33(6):596–603.
- 387 3. Holmes J, Guo Y, Maheswaran R, Nicholls J, Meier PS, Brennan A. The impact of spatial and
388 temporal availability of alcohol on its consumption and related harms: a critical review in the
389 context of UK licensing policies. *Drug Alcohol Rev*. 2014 Sep;33(5):515–25.
- 390 4. Martineau F, Tyner E, Lorenc T, Petticrew M, Lock K. Population-level interventions to reduce
391 alcohol-related harm: an overview of systematic reviews. *Prev Med (Baltim)*. Elsevier Inc.;
392 2013 Oct;57(4):278–96.
- 393 5. Babor TF, Caetano R, Casswell S, Edwards G, Giesbrecht N, Graham K, et al. *Alcohol: No
394 Ordinary Commodity: Research and Public Policy*. 2nd ed. OUP Oxford; 2010. 384 p.
- 395 6. McCartney G, Mahmood L, Leyland AH, Batty GD, Hunt K. Contribution of smoking-related
396 and alcohol-related deaths to the gender gap in mortality: evidence from 30 European

- 397 countries. *Tob Control*. 2011 Mar 12;20(2):166–8.
- 398 7. Erol A, Karpyak VM. Sex and gender-related differences in alcohol use and its consequences:
399 Contemporary knowledge and future research considerations. *Drug Alcohol Depend*. Elsevier
400 Ireland Ltd; 2015;156:1–13.
- 401 8. Wilsnack RW, Wilsnack SC. Gender and alcohol: consumption and consequences. *Alcohol*
402 *Science, Policy, and Public Health*. 2013. p. 153–60.
- 403 9. Emslie C, Lewars H, Batty GD, Hunt K. Are there gender differences in levels of heavy, binge
404 and problem drinking? Evidence from three generations in the west of Scotland. *Public*
405 *Health*. 2009 Jan;123(1):12–4.
- 406 10. Wilsnack SC. The GENACIS project : a review of findings and some implications for global
407 needs in women-focused substance abuse prevention and intervention. *Subst Abuse Rehabil*.
408 2012;3(Suppl 1):5–15.
- 409 11. Wilsnack RW, Wilsnack SC, Kristjanson AF, Vogeltanz-Holm ND, Gmel G. Gender and alcohol
410 consumption: patterns from the multinational GENACIS project. *Addiction*. 2009
411 Sep;104(9):1487–500.
- 412 12. Kuntsche E, Kuntsche S, Knibbe R, Simons-Morton B, Farhat T, Hublet A, et al. Cultural and
413 gender convergence in adolescent drunkenness: evidence from 23 European and North
414 American countries. *Arch Pediatr Adolesc Med*. American Medical Association; 2011 Feb
415 7;165(2):152–8.
- 416 13. Lyons AC, Willott SA. Alcohol Consumption, Gender Identities and Women’s Changing Social
417 Positions. *Sex Roles*. 2008 Jun 28;59(9-10):694–712.
- 418 14. Keyes KM, Grant BF, Hasin DS. Evidence for a closing gender gap in alcohol use, abuse, and
419 dependence in the United States population. *Drug Alcohol Depend*. 2008 Jan 11;93(1-2):21–
420 9.
- 421 15. Emslie C, Hunt K, Lyons A. The role of alcohol in forging and maintaining friendships amongst
422 Scottish men in midlife. *Heal Psychol*. 2013;32(1):33–41.
- 423 16. Holmila M, Raitasalo K. Gender differences in drinking: why do they still exist? *Addiction*.
424 2005 Dec;100(12):1763–9.
- 425 17. Schmidt LA. The equal right to drink. *Drug Alcohol Rev*. 2014 Nov;33(6):581–7.
- 426 18. Plant M. *Women and Alcohol: Contemporary and Historical Perspectives*. Free Association
427 Books; 1997.
- 428 19. Leon DA, McCambridge J. Liver cirrhosis mortality rates in Britain from 1950 to 2002: an
429 analysis of routine data. *Lancet*. 2006 Jan 7;367(9504):52–6.
- 430 20. Smith L, Foxcroft D. *Drinking in the UK An exploration of trends*. 2009.
- 431 21. Shipton D, Whyte B, Walsh D. Alcohol-related mortality in deprived UK cities: worrying trends
432 in young women challenge recent national downward trends. *J Epidemiol Community Health*.
433 2013 Oct 1;67(10):805–12.
- 434 22. Greaves L, Jategaonkar N. Tobacco policies and vulnerable girls and women: toward a
435 framework for gender sensitive policy development. *J Epidemiol Community Heal*.
436 2006;60(Supplement 2):ii57–65.
- 437 23. Sen G, Ostlin P. Gender inequity in health: why it exists and how we can change it. *Glob Public*
438 *Health*. 2008;3 Suppl 1(April 2015):1–12.
- 439 24. Doyal L. Sex, gender, and health: the need for a new approach. *Bmj*. 2001;323(7320):1061–3.
- 440 25. True J. *Mainstreaming Gender in Global Public Policy*. *Int Fem J Polit*. Taylor & Francis; 2003

- 441 Nov 4;5(3):368–96.
- 442 26. Pollack MA, Hafner-Burton E. Mainstreaming gender in the European Union. *J Eur Public*
443 *Policy*. Taylor & Francis; 2011 Feb 4;7(3):432–56.
- 444 27. Himmelweit S. Making Visible the Hidden Economy: The Case for Gender-Impact Analysis of
445 *Economic Policy*. *Fem Econ*. Taylor & Francis; 2002 Jan 20;8(1):49–70.
- 446 28. Daly M. Gender mainstreaming in theory and practice. *Soc Polit*. 2005;12(3):433–50.
- 447 29. Ostlin P, Eckermann E, Mishra US, Nkowane M, Wallstam E. Gender and health promotion: a
448 *multisectoral policy approach*. *Health Promot Int*. 2006;21 Suppl 1:25–35.
- 449 30. Ostlin P, Sen G, George A. Paying attention to gender and poverty in health research: content
450 *and process issues*. *Bull World Health Organ*. 2004 Oct;82(10):740–5.
- 451 31. European Association of Science Editors. Consultation Draft: Engendering Change in Scientific
452 *Publishing : A Common Standard for Sex and Gender Policies in Scientific Reporting and*
453 *Editorial Management*. 2014.
- 454 32. Bambra C, Gibson M, Sowden a, Wright K, Whitehead M, Petticrew M. Tackling the wider
455 *social determinants of health and health inequalities: evidence from systematic reviews*. *J*
456 *Epidemiol Community Health*. 2010 Apr;64(4):284–91.
- 457 33. Annandale E. *The sociology of health and medicine. A critical introduction*. Cambridge: Polity
458 *Press*; 1998.
- 459 34. Welch V a, Petticrew M, O’Neill J, Waters E, Armstrong R, Bhutta Z a, et al. Health equity:
460 *evidence synthesis and knowledge translation methods*. *Syst Rev*. *Systematic Reviews*; 2013
461 *Jan*;2(1):43.
- 462 35. Bergen G, Pitan A, Qu S, Shults R a, Chattopadhyay SK, Elder RW, et al. Publicized sobriety
463 *checkpoint programs: a community guide systematic review*. *Am J Prev Med*. Elsevier; 2014
464 *May*;46(5):529–39.
- 465 36. Killoran AA, Canning U, Doyle N, Sheppard L. Review of effectiveness of laws limiting blood
466 *alcohol concentration levels to reduce alcohol-related road injuries and deaths*. 2010.
- 467 37. Foxcroft DR, Tsertsvadze A. Universal multi-component prevention programs for alcohol
468 *misuse in young people (Review)*. *Cochrane Database Syst Rev*. 2011;(9):Art.No.: CD009307.
469 DOI: 10.1002/14651858.CD009307.
- 470 38. Foxcroft DR, Tsertsvadze A. Universal school-based prevention programs for alcohol misuse in
471 *young people (Review)*. *Cochrane Database Syst Rev*. 2011;(5):Art.No.: CD009113. DOI:
472 10.1002/14651858.CD009113.
- 473 39. Foxcroft D, Tsertsvadze A. Universal family-based prevention programs for alcohol misuse in
474 *young people (Review)*. *Cochrane Database Syst Rev*. 2011;(9):Art.No.: CD009308. DOI:
475 10.1002/14651858.CD009308.
- 476 40. Hale DR, Fitzgerald-Yau N, Viner RM. A systematic review of effective interventions for
477 *reducing multiple health risk behaviors in adolescence*. *Am J Public Health*. 2014
478 *May*;104(5):e19–41.
- 479 41. Webb G, Shakeshaft A, Sanson-Fisher R, Havard A. A systematic review of work-place
480 *interventions for alcohol-related problems*. *Addiction*. 2009 Mar;104(3):365–77.
- 481 42. Scott-Sheldon L a J, Carey KB, Elliott JC, Garey L, Carey MP. Efficacy of alcohol interventions
482 *for first-year college students: a meta-analytic review of randomized controlled trials*. *J*
483 *Consult Clin Psychol*. 2014 Apr;82(2):177–88.
- 484 43. Derzon JH, Lipsey MW. A meta-analysis of the effectiveness of mass-communication for
485 *changing substance-use knowledge, attitudes and behavior*. *Mass media and drug*

- 486 prevention. 2002.
- 487 44. Moreira M, Smith L, Foxcroft D. Social norms interventions to reduce alcohol misuse in
488 University or College students (Review). *Cochrane Database Syst Rev.* 2009;(3):Art. No.:
489 CD006748. DOI: 10.1002/14651858.CD006748.
- 490 45. Kazemi DM, Berry-Cabán CS, Becker C, Hiebert J. Review of interventions designed to address
491 drinking among soldiers. *Mil Psychol.* 2013;25(4):365–80.
- 492 46. Booth A, Meier P, Stockwell T, Sutton A, Wilkinson A, Wong R. Independent review of the
493 effects of alcohol pricing and promotion: Part A : Systematic Reviews. Sheffield; 2008.
- 494 47. Bolier L, Voorham L, Monshouwer K, van Hasselt N, Bellis M. Alcohol and drug prevention in
495 nightlife settings: a review of experimental studies. *Subst Use Misuse.* 2011 Jan;46(13):1569–
496 91.
- 497 48. Brennan I, Moore SC, Byrne E, Murphy S. Interventions for disorder and severe intoxication in
498 and around licensed premises, 1989-2009. *Addiction.* 2011 Apr;106(4):706–13.
- 499 49. Jones L, Hughes K, Atkinson AM, Bellis M a. Reducing harm in drinking environments: a
500 systematic review of effective approaches. *Health Place.* Elsevier; 2011 Mar;17(2):508–18.
- 501 50. Ker K, Chinnock P. Interventions in the alcohol server setting for preventing injuries (Review
502). *Cochrane Database Syst Rev.* 2008;(3):Art. No.: CD005244. DOI:
503 10.1002/14651858.CD005244.
- 504 51. Rammohan V, Hahn R a, Elder R, Brewer R, Fielding J, Naimi TS, et al. Effects of dram shop
505 liability and enhanced overservice law enforcement initiatives on excessive alcohol
506 consumption and related harms: Two community guide systematic reviews. *Am J Prev Med.*
507 Elsevier Inc.; 2011 Sep;41(3):334–43.
- 508 52. Scholes-Balog KE, Heerde J a, Hemphill S a. Alcohol warning labels: unlikely to affect alcohol-
509 related beliefs and behaviours in adolescents. *Aust N Z J Public Health.* 2012 Dec;36(6):524–9.
- 510 53. Bryden A, Roberts B, McKee M, Petticrew M. A systematic review of the influence on alcohol
511 use of community level availability and marketing of alcohol. *Health Place.* Elsevier; 2012
512 Mar;18(2):349–57.
- 513 54. Campbell CA, Hahn RA, Elder R, Brewer R, Chattopadhyay S, Fielding J, et al. The effectiveness
514 of limiting alcohol outlet density as a means of reducing excessive alcohol consumption and
515 alcohol-related harms. *Am J Prev Med.* 2009 Dec;37(6):556–69.
- 516 55. Hahn R a, Middleton JC, Elder R, Brewer R, Fielding J, Naimi TS, et al. Effects of alcohol retail
517 privatization on excessive alcohol consumption and related harms: a community guide
518 systematic review. *Am J Prev Med.* Elsevier Inc.; 2012 Apr;42(4):418–27.
- 519 56. Middleton JC, Hahn R a, Kuzara JL, Elder R, Brewer R, Chattopadhyay S, et al. Effectiveness of
520 policies maintaining or restricting days of alcohol sales on excessive alcohol consumption and
521 related harms. *Am J Prev Med.* Elsevier Inc.; 2010 Dec;39(6):575–89.
- 522 57. Popova S, Giesbrecht N, Bekmuradov D, Patra J. Hours and days of sale and density of alcohol
523 outlets: impacts on alcohol consumption and damage: a systematic review. *Alcohol Alcohol.*
524 2009;44(5):500–16.
- 525 58. Wagenaar AC, Toomey TL. Effects of Minimum Drinking Age Laws : Review and Analyses of
526 the Literature from 1960 to 2000. *J Stud Alcohol.* 2002;Supplement:206–25.
- 527 59. Hahn R a, Kuzara JL, Elder R, Brewer R, Chattopadhyay S, Fielding J, et al. Effectiveness of
528 policies restricting hours of alcohol sales in preventing excessive alcohol consumption and
529 related harms. *Am J Prev Med.* Elsevier Inc.; 2010 Dec;39(6):590–604.
- 530 60. Jackson R, Johnson M, Campbell F, Messina J, Guillaume L, Meier P, et al. Interventions on

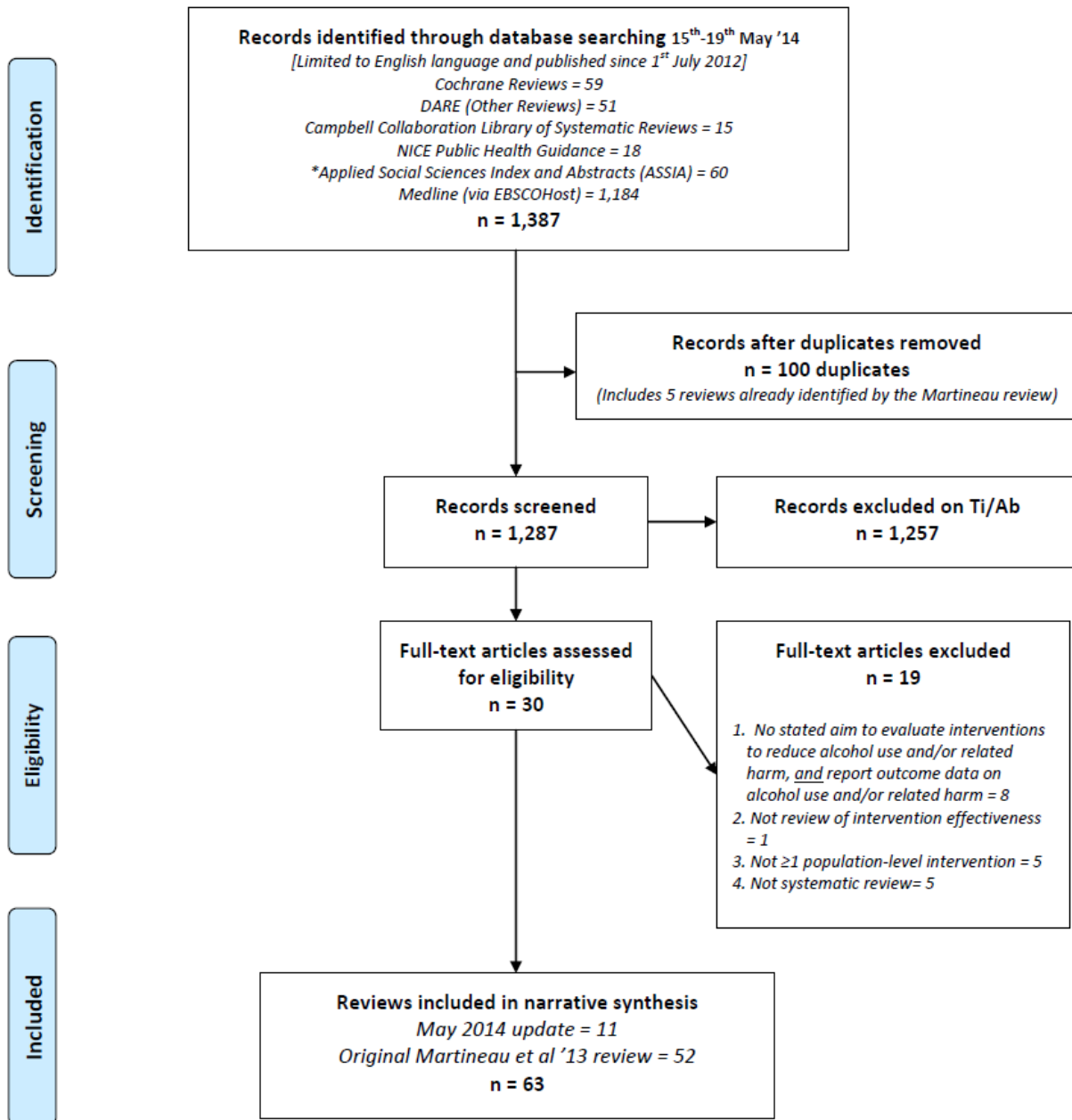
- 531 Control of Alcohol Price , Promotion and Availability for Prevention of Alcohol Use Disorders
532 in Adults and Young People. Sheffield; 2010.
- 533 61. Knight I, Wilson P. Scottish Licensing Laws. London; 1980.
- 534 62. Popova S, Giesbrecht N, Bekmuradov D, Patra J. Hours and days of sale and density of alcohol
535 outlets: impacts on alcohol consumption and damage: a systematic review. *Alcohol Alcohol.*
536 2009;44(5):500–16.
- 537 63. Lachenmeier DW, Taylor BJ, Rehm J. Alcohol under the radar: do we have policy options
538 regarding unrecorded alcohol? *Int J drug policy.* Elsevier B.V.; 2011 Mar;22(2):153–60.
- 539 64. Wagenaar AC, Tobler AL, Komro K a. Effects of alcohol tax and price policies on morbidity and
540 mortality: a systematic review. *Am J Public Health.* 2010 Nov;100(11):2270–8.
- 541 65. Elder RW, Lawrence B, Ferguson A, Naimi TS, Brewer RD, Chattopadhyay SK, et al. The
542 effectiveness of tax policy interventions for reducing excessive alcohol consumption and
543 related harms. *Am J Prev Med.* Elsevier Inc.; 2010 Mar;38(2):217–29.
- 544 66. Elder RW, Shults RA, Sleet DA, Nichols JL, Zaza S, Thompson RS. Effectiveness of Sobriety
545 Checkpoints for Reducing Alcohol-Involved Crashes. *Traffic Inj Prev.* 2002;3:266–74.
- 546 67. Ditter SM, Elder RW, Shults R a, Sleet D a, Compton R, Nichols JL. Effectiveness of designated
547 driver programs for reducing alcohol-impaired driving: a systematic review. *Am J Prev Med.*
548 2005 Jun;28(5 Suppl):280–7.
- 549 68. Jones L, Bates G, Downing J, Sumnall H, Bellis MA. A review of the effectiveness and cost
550 effectiveness of alcohol and sex and relationship education for all children and young people
551 aged 5-19 years in community settings. 2010.
- 552 69. Petrie J, Bunn F, Byrne G. Parenting programmes for preventing tobacco, alcohol or drugs
553 misuse in children <18: a systematic review. *Health Educ Res.* 2007 Apr;22(2):177–91.
- 554 70. Cashman C, Ruotsalainen J, Greiner B, Beirne P, Verbeek J. Alcohol and drug screening of
555 occupational drivers for preventing injury (Review). *Cochrane Database Syst Rev.*
556 2009;(2):Art. No.: CD006566. DOI: 10.1002/14651858.CD006566.
- 557 71. Janer G, Sala M, Kogevinas M. Health promotion trials at worksites and risk factors for cancer.
558 *Scand J Work Environ Health.* 2002 Jun;28(3):141–57.
- 559 72. Runnels V, Tudiver S, Doull M, Boscoe M. The challenges of including sex/gender analysis in
560 systematic reviews: a qualitative survey. *Syst Rev.* BioMed Central Ltd; 2014 Jan 10;3(1):33.
- 561 73. Scottish Governement. Changing Scotland’s Relationship with Alcohol : A Framework for
562 Action Progress Report February 2012. Edinburgh; 2012.
- 563 74. de Visser RO, McDonnell EJ. “That”s OK. He’s a guy’: a mixed-methods study of gender
564 double-standards for alcohol use. *Psychol Health.* Routledge; 2012 Jan;27(5):618–39.
- 565 75. de Visser R, Smith J, Abraham C, Wheeler Z. Gender, alcohol, and interventions. London;
566 2012.
- 567 76. Brown R, Gregg M. The pedagogy of regret: Facebook, binge drinking and young women.
568 *Contin J Media Cult Stud.* Special Is(Forthcoming):1–31.
- 569 77. Wood K, Patterson C, Katikireddi SV, Hilton S. Harms to “others” from alcohol consumption in
570 the minimum unit pricing policy debate: a qualitative content analysis of UK newspapers
571 (2005-12). *Addiction.* 2014 Apr;109(4):578–84.
- 572 78. Gell L, Ally A, Buykx P, Hope A, Meier P. Alcohol’s Harm to Others. 2015. London; 2015.
- 573 79. Emslie C. Women, men and coronary heart disease: a review of the qualitative literature. *J*
574 *Adv Nurs.* 2005 Aug;51(4):382–95.

- 575 80. Amos A, Greaves L, Nichter M, Bloch M. Women and tobacco: a call for including gender in
576 tobacco control research, policy and practice. *Tob Control*. 2012 Mar 1;21(2):236–43.
- 577 81. Emslie C, Ridge D, Ziebland S, Hunt K. Exploring men’s and women's experiences of
578 depression and engagement with health professionals: more similarities than differences? A
579 qualitative interview study. *BMC Fam Pract*. 2007 Jan;8:43.
- 580 82. Doull M, Runnels V, Tudiver S. Sex and Gender in Systematic Reviews Planning Tool. 2011.
- 581 83. Sen G, Östlin P, George A. Unequal , Unfair , Ineffective and Inefficient Gender Inequity in
582 Health : Why it exists and how we can change it Final Report to the WHO Commission on
583 Social Determinants of Health. World Health. Stockholm; 2007.
- 584 84. Payne S. Beijing Fifteen Years On : The Persistence of Barriers to Gender Mainstreaming in
585 Health Policy Beijing Fifteen Years On : The Persistence of Barriers to Gender Mainstreaming
586 in Health Policy. 2013;18(4):515–42.
- 587 85. European Commission. A guide to gender impact assessment. EU Comm Bruxelles. 2003;
- 588 86. Hughes TL, Wilsnack SC, Kantor LW. The Influence of Gender and Sexual Orientation on
589 Alcohol Use and Alcohol-Related Problems: Toward a Global Perspective. *Alcohol Res Curr
590 Rev*. 2014;38(1):e – 1–012.
- 591 87. Probst C, Roerecke M, Behrendt S, Rehm J. Gender differences in socioeconomic inequality of
592 alcohol-attributable mortality: A systematic review and meta-analysis. *Drug Alcohol Rev*.
593 2014 Aug 8;
- 594 88. Nolen-Hoeksema S. Gender differences in risk factors and consequences for alcohol use and
595 problems. *Clin Psychol Rev*. 2004 Dec;24(8):981–1010.
- 596 89. Wilsnack SC, Wilsnack RW, Kantor LW. Focus On: Women and the Costs of Alcohol Use.
597 *Alcohol Res Curr Rev*. 2013;35(2).
- 598 90. Elder RW, Shults R a, Sleet D a, Nichols JL, Thompson RS, Rajab W. Effectiveness of mass
599 media campaigns for reducing drinking and driving and alcohol-involved crashes: a systematic
600 review. *Am J Prev Med*. 2004 Jul;27(1):57–65.
- 601 91. Janssen MM, Mathijssen JJP, van Bon-Martens MJH, van Oers H a M, Garretsen HFL.
602 Effectiveness of alcohol prevention interventions based on the principles of social marketing:
603 a systematic review. *Subst Abuse Treat Prev Policy*. *Substance Abuse Treatment, Prevention,
604 and Policy*; 2013 Jan;8(1):18.
- 605 92. Snyder LB, Hamilton M a, Mitchell EW, Kiwanuka-Tondo J, Fleming-Milici F, Proctor D. A
606 meta-analysis of the effect of mediated health communication campaigns on behavior
607 change in the United States. *J Health Commun*. 2004 Jan;9 Suppl 1(October 2012):71–96.
- 608 93. Stead M, Gordon R, Angus K, McDermott L. A systematic review of social marketing
609 effectiveness. *Health Education*. 2007. 126-191 p.
- 610 94. Phillips RO, Ulleberg P, Vaa T. Meta-analysis of the effect of road safety campaigns on
611 accidents. *Accid Anal Prev*. Elsevier Ltd; 2011 May;43(3):1204–18.
- 612 95. Pollack KM, Frattaroli S, Young JL, Dana-Sacco G, Gielen AC. Motor vehicle deaths among
613 American Indian and Alaska Native populations. *Epidemiol Rev*. 2012 Jan;34(1):73–88.
- 614 96. Russell K, Vandermeer B, Hartling L. Graduated driver licensing for reducing motor vehicle
615 crashes among young drivers (Review). *Cochrane Database Syst Rev*. 2011;(10):Art. No.:
616 CD003300. DOI: 10.1002/14651858.CD003300.
- 617 97. Shults RA, Elder RW, Nichols JL, Sleet DA, Compton R, Chattopadhyay SK. Effectiveness of
618 multicomponent programs with community mobilization for reducing alcohol-impaired
619 driving. *Am J Prev Med*. Elsevier Inc.; 2009 Oct;37(4):360–71.

- 620 98. Elder RW, Nichols JL, Shults R a, Sleet D a, Barrrios LC, Compton R. Effectiveness of school-
621 based programs for reducing drinking and driving and riding with drinking drivers: a
622 systematic review. *Am J Prev Med.* 2005 Jun;28(5 Suppl):288–304.
- 623 99. Erke A, Goldenbeld C, Vaa T. The effects of drink-driving checkpoints on crashes--a meta-
624 analysis. *Accid Anal Prev.* 2009 Sep;41(5):914–23.
- 625 100. Goss C, Van Bramer L, Gliner J, Porter T, Roberts I, DiGuseppi C. Increased police patrols for
626 preventing alcohol-impaired driving (Review). *Cochrane Database Syst Rev.* 2008;(4):Art.
627 No.: CD005242. DOI: 10.1002/14651858.CD005242.
- 628 101. Bonell C, Parry W, Wells H, Jamal F, Fletcher A, Harden A, et al. The effects of the school
629 environment on student health: a systematic review of multi-level studies. *Health Place.*
630 Elsevier; 2013 May;21:180–91.
- 631 102. Rodriguez DM, Teesson M, Newton NC. A systematic review of computerised serious
632 educational games about alcohol and other drugs for adolescents. *Drug Alcohol Rev.* 2014
633 Mar;33(2):129–35.
- 634 103. Champion KE, Newton NC, Barrett EL, Teesson M. A systematic review of school-based
635 alcohol and other drug prevention programs facilitated by computers or the internet. *Drug*
636 *Alcohol Rev.* 2013 Mar;32(2):115–23.
- 637 104. Langford R, Bonell C, Jones H, Pouliou T, Murphy S, Waters E, et al. The WHO Health
638 Promoting School framework for improving the health and well-being of students and their
639 academic achievement (Review). *Cochrane Database Syst Rev.* 2014;(4):Art. No.: CD008958.
640 DOI: 10.1002/14651858.CD008958.
- 641 105. Jones L, Bates G, Downing J, Sumnall H, Bellis MA. A review of the effectiveness and cost-
642 effectiveness of personal , social and health education on sex in and secondary schools
643 focusing relationships and alcohol education for young people aged 11 to 19 years. 2009.
- 644 106. Jones L, Bates G, Downing J, Sumnall H, Bellis MA. A review of the effectiveness and cost-
645 effectiveness of personal , social and health education in primary schools focusing on sex and
646 relationships and alcohol education for young people aged 5 to 11 years. Liverpool; 2009.
- 647 107. Lemstra M, Bennett N, Nannapaneni U, Neudorf C, Warren L, Kershaw T, et al. A systematic
648 review of school-based marijuana and alcohol prevention programs targeting adolescents
649 aged 10–15. *Addict Res Theory.* 2010 Jan;18(1):84–96.
- 650 108. Daykin N, Orme J, Evans D, Salmon D, McEachran M, Brain S. The impact of participation in
651 performing arts on adolescent health and behaviour: a systematic review of the literature. *J*
652 *Health Psychol.* 2008 Mar;13(2):251–64.
- 653 109. D’Onise K, Lynch JW, Sawyer MG, McDermott R a. Can preschool improve child health
654 outcomes? A systematic review. *Soc Sci Med.* Elsevier Ltd; 2010 May;70(9):1423–40.
- 655 110. Fletcher A, Bonell C, Hargreaves J. School effects on young people’s drug use: a systematic
656 review of intervention and observational studies. *J Adolesc Health.* 2008 Mar;42(3):209–20.
- 657 111. Jackson C, Geddes R, Haw S, Frank J. Interventions to prevent substance use and risky sexual
658 behaviour in young people: a systematic review. *Addiction.* 2012 Apr;107(4):733–47.
- 659 112. Loveland-cherry CJ. Alcohol, Children and Adolescents. *Annual review of nursing research.*
660 2005. p. 135–77.
- 661 113. Teesson M, Newton NC, Barrett EL. Australian school-based prevention programs for alcohol
662 and other drugs: a systematic review. *Drug Alcohol Rev.* 2012 Sep;31(6):731–6.
- 663 114. Borsari B, Hustad JTP, Capone C. Alcohol Use in the Greek System , 1999-2009 : A Decade of
664 Progress. *Curr Drug Abuse Rev.* 2009;2:216–25.

- 665 115. Martens MP, Dams-O'Connor K, Beck NC. A systematic review of college student-athlete
666 drinking: Prevalence rates, sport-related factors, and interventions. *J Subst Abuse Treat.* 2006
667 Oct;31(3):305–16.
- 668 116. Reavley N, Jorm AF. Prevention and early intervention to improve mental health in higher
669 education students: a review. *Early Interv Psychiatry.* 2010 May;4(2):132–42.
- 670

Figure 1: Flow diagram of the review screening process updating the searches from Martineau *et al.* 2013



*Substitution database for Social Policy and Practice

Table 1: Search Strategy from Martineau et al., 2013 (4).

Alcohol terms	<u>AND</u>	Policy settings and interventions terms: <ul style="list-style-type: none"> • sexual or risky behaviour • roads and transport • public space • domestic • workplace • school • leisure • social • availability • affordability • acceptability 	<u>AND</u>	Population-level terms	<u>AND</u>	Systematic review terms
		<u>OR</u> Outcomes terms: <ul style="list-style-type: none"> • mental harm • communicable diseases • unintentional injury and accidents • violence and crime • employment • economic • environment • social 				
		<u>OR</u> Specific interventions terms				
<p>See Appendix A. 'Supplementary Data' of the Martineau review for the complete search strategy. Online at http://dx.doi.org/10.1016/j.ypped.2013.06.019</p>						

Table 2: Final Framework for Data Extraction from Reviews

Item	Item description and/or instructions/response options
Study Details	
A. Review Title	Brief reference e.g. Jackson et al., 2010
B. Citation	Full citation.
C. Relevant studies	Number of relevant studies/total number of studies in review. Studies deemed relevant if they relate to a population-level alcohol policy intervention as defined by the Martineau review, and of any design.
Gender focus of review	
D. Did this review have a major and a priori focus on gender equity?	If so, enter 1, 2 or 3 to indicate which type, using criteria from Welch et al., 2013 (34) (p2): Type 1 Reviews assess effects of interventions in disadvantaged populations; Type 2 Reviews assess effects of interventions aimed at reducing social gradients across populations; Type 3 Reviews have a major focus on equity and are “designed to assess the effects of interventions not aimed at reducing inequity but where it is important to understand the effects of the intervention on equity, positive or negative”.
E. Was post-hoc analysis conducted of the effects of the intervention by gender?	Yes/No or N/A (not applicable) if a priori analysis by gender was planned.
F. Extract all gender-relevant data except from single-gender studies.	Cut and paste any data on gender if relevant to population level alcohol interventions or policy.
G. Extract all data from single-gender studies.	Cut and paste any data from single gender studies if relevant to population level alcohol interventions or policy.
Pooled data for all studies in review	
H. Is pooled baseline participation by gender reported?	Yes/No
I. If yes to 8, extract data	Provide data or N/A
J. Were pooled intervention effects by gender reported?	Yes/No
K. If yes to 10, extract data	Provide data or N/A
Data provided for individual studies in review Excluding single gender studies & only including data from population-level alcohol studies.	
L. Baseline participation reported by gender in table for individual studies	Consistently/Mostly/Sometimes/Rarely/Never
M. Intervention effects reported by gender for individual studies in the study table or narrative?	No/Table/Narrative/Both
N. Quality of data reported for intervention effects by gender for individual studies	None (if qualitative only) Poor (if very basic quantitative e.g. before and after measures given only) Good (if quantitative with effect size or p value or confidence interval) Variable (if different quality of reporting across different studies within the review)

Table 3: Policy areas and reviews included

Policy Area	Types or examples of interventions included:	Reviews
1. Alcohol server setting	Drinking environment interventions including server training, warning labels etc.	(47–52)
2. Sales Availability	Restricting opening hours/days, outlet density, legal drinking age, monopolies.	(53–56,58–60,62)
3. Illicit Alcohol	Any interventions to tackle illicit alcohol.	(63)
4. Taxation/Pricing	Changing tax or price of alcohol.	(46,60,64,65)
5. Mass media/promotion	Advertising, mass media, promotion, counter-advertising, social marketing.	(43,46,60,90–93)
6. Drink-driving	Increased police patrols, sobriety checkpoints, blood alcohol limits etc.	(35,36,66,67,90,94–100)
7. School	Pre-school/school setting interventions e.g. education, life skills etc.	(37,38,40,98,101–113)
8. Higher education	e.g. regulation, media campaigns, social norms, multicomponent interventions.	(42,44,114–116)
9. Family and community	e.g. mailed literature, community wide campaigns.	(39,40,68,69)
10. Workplace	e.g. mandatory testing, staff training, mail-outs, peer-referral programmes.	(41,45,70,71)

Table 4: Review-level reporting of gender by policy area

	Data Extraction Item [Reference Letter from Table 2 where applicable]					
	Number of reviews	Number of reviews with gender focus/Number of reviews with post-hoc analysis by gender [D, E]	Number of reviews which pooled data by gender [H, I, J, K]	Frequency of baseline participation reported by gender for individual studies (number of reviews) [L]	Number of reviews with intervention effects reported by gender in table only/in narrative only/in both table and narrative [M]	Quality of data reported for gender intervention effects where reported (number of reviews) [N]
1. Alcohol server setting	6	0/0	0	Never (6)	1/0/0	Poor (1)
2. Sales Availability	8	0/0	0	Never (8)	0/1/4	Poor (2) Good (1) Variable (2)
3. Illicit Alcohol	1	0/0	0	Never (1)	0/0/0	
4. Taxation/Pricing	4	0/0	0	Rarely (1) Never (3)	1/1/2	Good (1) Variable (3)
5. Mass media/promotion	7	0/1	1	Sometimes (1) Never (6)	0/0/4	Poor (1) Good (1) Variable (2)
6. Drink-driving	12	2/0	0*	Never (12)	3/0/2	Poor (3) Good (2)
7. School	17	2/0	0*	Consistently (2) Never (15)	4/0/5	Poor (1) Good (8)
8. Higher education	5	1/0	1	Consistently (1) Never (4)	0/0/0	
9. Family and community	4	2/0	0*	Consistently (1) Never (3)	0/1/2	Poor (1) Good (2)
10. Workplace	4	1/0	0*	Consistently (1) Sometimes (1) Never (2)	0/1/1	Poor (1) Variable (1)
Totals for unique reviews**	63	8/1	2	Consistently (5) Sometimes (2) Rarely (1) Never (56) ^λ	8/4/17	Poor (10) Good (14) Variable (5)

**In the Type 3 reviews which planned to focus on gender, subgroup analysis by gender was not possible due to lack of suitable data.*

*** The totals are sometimes different to the sum of the data in columns as some reviews covered more than one policy area.*

^λ n=64 because the frequency of reporting was rated differently for two policy areas within the same review.