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**Bryant, J., Hobden, B. & Forshaw, K. et al. (2018). How accurately do general practitioners detect concurrent tobacco use and risky alcohol consumption? A cross-sectional study in Australian general practice. Australian Journal of Primary Health, 24(5), 378-384.**

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- 1 **How accurately do General Practitioners detect concurrent tobacco use and risky**
- 2 **alcohol consumption? A cross-sectional study in Australian General Practice**

**ABSTRACT**

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The negative health consequences of tobacco and risky alcohol consumption are compounded when used concurrently. Australian preventive health guidelines recommend that General Practitioners (GPs) assess and provide evidence-based intervention. No studies, however, have examined the accuracy of GP detection of concurrent tobacco use and risky alcohol consumption, nor the factors associated with accurate detection. This study aimed to examine the: (i) Accuracy of GP detection of concurrent tobacco and risky alcohol use compared to patient self-report; and (ii) GP and patient characteristics associated with accurate detection following a single clinical encounter. Patients attending 12 Australian general practices completed a survey assessing smoking and alcohol consumption. For each participating patient, GPs completed a checklist to indicate the presence of these health risk factors. GP judgements were compared to patient self-report. Fifty-one GPs completed a health risk checklist for 1,332 patients. Sensitivity of GP detection was low, with only 23% of patients who self-reported concurrent tobacco and risky alcohol use identified by their GP. Patients who visited their GP 4-6 times in the last year were most likely to have concurrent tobacco and risky alcohol use identified. It is imperative to establish and integrate systems for increasing detection of preventive health risks into the general practice setting to enable the provision of evidence-based treatments.

**Key words:** health behaviour, physicians' practice patterns, primary prevention

## SUMMARY STATEMENT

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24

### 25 **What is known about the topic?**

- 26 • Concurrent tobacco and risky alcohol use increases individual health risks and as such,  
27 preventive health guidelines recommend that General Practitioners assess and provide  
28 evidence-based intervention.

29

### 30 **What does this paper add?**

- 31 • General practitioners detection of concurrent tobacco and risky alcohol use is low,  
32 highlighting the need for improved systems to identify patients' lifestyle-related health  
33 risk factors.

## INTRODUCTION

34

35

36 Tobacco and alcohol are the two most commonly used drugs in Australia. In 2011-12, 19.5% of  
37 Australians aged 14 years and over used alcohol at a level that exceeded the recommendations  
38 for lifetime risk of harm <sup>1</sup>, and 16% of those aged 18 years and over smoked tobacco daily <sup>2</sup>.

39 Tobacco use and risky alcohol consumption are leading risk factors for the development of  
40 preventable disease, injury and premature death in Australia <sup>2</sup>, and these negative health  
41 consequences are compounded when the substances are used concurrently. Concurrent tobacco  
42 and alcohol use are associated with increased mortality <sup>3</sup> and higher risk of developing cancers of  
43 the aerodigestive tract (including the oropharynx, larynx, and oesophagus). This risk is  
44 multiplicative rather than additive <sup>4</sup>. Compared to those who use neither substance, the risk of  
45 developing mouth and throat cancer is seven times greater for those who use tobacco, six times  
46 greater for those who use alcohol, and 38 times greater for those who use both tobacco and  
47 alcohol <sup>5</sup>. Reducing tobacco and alcohol use are key priority areas identified by the Australian  
48 National Preventative Health Taskforce <sup>6</sup>.

49

50 General practitioners (GPs) comprise the nation's largest single group of healthcare providers and  
51 are at the forefront of the delivery of preventive healthcare in Australia. GPs are accessed by over  
52 80% of the Australian population annually <sup>7</sup>, and the provision of preventive healthcare as part of  
53 these consultations is considered to be important <sup>8</sup>. Meta-analytic evidence supports the efficacy  
54 of brief intervention for tobacco use and risky alcohol consumption in primary care <sup>9,10</sup>. Clinical  
55 practice guidelines recommend smoking cessation is best supported through a combination of  
56 behavioural counselling, pharmacotherapy and follow-up <sup>11</sup>. Risky alcohol consumption is best  
57 addressed through the provision of brief advice, information on self-help and referral to available  
58 support services <sup>11</sup>. Given the existence of evidence-based interventions, current preventive  
59 health guidelines recommend that GPs screen their patients for health risks including smoking  
60 and risky alcohol use, and offer advice and lifestyle interventions as appropriate <sup>12</sup>.

61

62 For GPs to provide effective interventions to their patients who use tobacco and alcohol, they  
63 must first ascertain this information. Studies have demonstrated that detection of single risk  
64 factors, including tobacco and alcohol consumption, is low <sup>13</sup>. For example, a meta-analysis found  
65 that only 42% of patients with an alcohol use disorder were correctly identified by their GP <sup>13</sup>.  
66 Furthermore, a study by Bryant and colleagues reported GP sensitivity for detection of smoking  
67 among a sample of general practice patients was 66% <sup>14</sup>. These missed opportunities for

68 preventive health care suggests the need to develop more effective detection strategies within  
69 primary care settings. However, many people have more than one risk factor requiring  
70 preventative health care <sup>11</sup>. Previous research suggests that accurate detection of concurrent risk  
71 factors is even lower than single risk factors. Hobden et al. found that of general practice patients  
72 who self-reported alcohol misuse and depression, only 21% were detected as having both risk  
73 factors by their GPs <sup>15</sup>.

74

75 To date, no studies have examined the accuracy of GP detection of concurrent tobacco use and  
76 risky alcohol consumption, nor the factors associated with accurate detection. Given the social  
77 acceptability of alcohol use, consumption at risky levels is common and therefore the willingness  
78 of GPs to assess alcohol consumption may be influenced by sociocultural attitudes. Additionally,  
79 patient self-report of both alcohol and smoking is subject to social desirability bias <sup>16,17</sup>. Thus it is  
80 likely that detection of concurrent risky alcohol and tobacco use is likely to be low. Understanding  
81 the detection rates for concurrent use, as well as the factors associated with accurate GP  
82 detection, will assist in developing strategies for improving the care provided by GPs.

83

84

## AIMS

85

86 To examine the:

- 87 1. Accuracy (sensitivity, specificity, positive predictive value and negative predictive value) of  
88 GP detection of concurrent tobacco and risky alcohol use compared to patient self-report;
- 89 2. GP and patient characteristics associated with accurate detection of concurrent tobacco  
90 and risky alcohol use.

91

92

## METHODS

93

94 Detailed information about study methodology has been published elsewhere <sup>18</sup>.

95

96 **Design.** A cross-sectional study was conducted in twelve general practices located in urban New  
97 South Wales and Victoria, Australia.

98

99 **Patient Eligibility.** Patients who were: proficient in English; aged over 18 years; able to provide  
100 informed consent; and presenting for an appointment with a GP, were eligible to participate.

101

102 **Patient Recruitment.** Patients attending an appointment at a participating clinic were  
103 approached by a research assistant and invited to complete a survey about their health on a  
104 touch-screen computer tablet while waiting for their appointment. The gender of non-consenters  
105 was recorded to allow determination of consent bias. This study was granted full ethical approval  
106 by Human Research Ethics Committees at the University of Newcastle (H-2009-0341), the  
107 University of New South Wales (HREC09393/UN H-2009-0341) and Monash University  
108 (2009001860).

109

110 **Patient data collection.** Patients completed the following measures:

111 Patient demographics. Patients provided, via self-report, their: gender, age, education level,  
112 postcode, Aboriginal or Torres Strait Islander origin, private health insurance coverage, number of  
113 GP visits in the past 12 months and whether they had attended this clinic previously.

114 Smoking. A single question was used to assess smoking status <sup>19</sup>: '*Which of the following best*  
115 *describes your smoking status? This includes cigarettes, cigars and pipes*' [response options: I  
116 smoke daily; I smoke occasionally; I don't smoke now but I used to; I've tried it a few times but  
117 never smoked regularly; or I've never smoked].

118 Alcohol use. A modified version of the Alcohol Use Disorder Identification Test–Consumption  
119 (AUDIT-C) was used to measure alcohol consumption. This measure has demonstrated reliability  
120 and accuracy for indicating risky alcohol consumption in general practice <sup>20</sup>. Definitions  
121 pertaining to a standard drink were updated to align with Australian recommendations <sup>21</sup>. Alcohol  
122 misuse was also established in line with current Australian guidelines <sup>22</sup>. To coincide with this,  
123 question three of the original AUDIT was altered to read: '*How often did you have four or more*  
124 *drinks on one occasion?*' In addition, levels of risk were not distinguished according to gender, as  
125 this specification is not included in Australian drinking guidelines.

126

127 **GP assessment.** GPs were provided with a single-page checklist to complete for a consecutive  
128 subsample of 35 of their patients. GPs were asked to record the name and date of birth of each  
129 patient to enable data linking. GPs were then asked to indicate '*yes*', '*no*' or '*unsure*' for the  
130 presence of the following health risks: smoking status, overweight or obesity, clinical depression,  
131 risky alcohol consumption and inadequate exercise. A cover page was included which provided  
132 definitions of each health risk. The inclusion of multiple risk factors aimed to reduce the likelihood  
133 of a reactivity bias. GPs could complete the checklist during the patients' appointment, after the  
134 appointment or at the end of the day and could use screening tools or clinical notes to assist with  
135 completion.

136

137 **Statistical analysis.** For both patient surveys and GP checklists, those with missing data or  
138 *'unsure'* responses regarding tobacco use or risky alcohol use were excluded from the analysis.  
139 Those who indicated smoking daily or occasionally were classified as current smokers. Individual  
140 AUDIT-C items were scored from 0-4, with a maximum possible overall score of 12. Patients with  
141 a score of 4 were classified as risky alcohol users. Counts and percentages for all GP and patient  
142 demographic variables were calculated. The frequency of concurrent tobacco and alcohol use was  
143 calculated and estimates of sensitivity, specificity, positive predictive value and negative  
144 predictive value of GP identification of smoking and alcohol use performed. A logistic regression  
145 was used to examine characteristics associated with accurate identification, with GP identification  
146 of tobacco and risky alcohol use used as the outcome. For the logistic regression, age category  
147 was dichotomised, and the number of previous GP visits reduced to three categories (0-3, 4-6, 7+)  
148 to minimise the number of parameters estimated. Crude and adjusted odds ratios with 95%  
149 confidence intervals (CIs) and p-values for the association of the outcome with GP and patient  
150 demographics are presented. A robust variance estimator (using the Taylor series method for  
151 variance estimation) was used to adjust for GP clustering by practice. All statistical analyses were  
152 programmed using SAS v9.4.

153

154

## RESULTS

155

156 A total of 48 general practices were approached to participate, of which 12 agreed (25%). The  
157 demographic characteristics of participating GPs and patients are presented in Tables 1 and 2  
158 respectively. The majority of participating GPs were male (63%), aged 45 years or older (76%) and  
159 had spent five years or less as a GP (57%). Patient data were collected as part of a larger study  
160 (Yoong ref). In the main sample, 5667 patients were assessed for eligibility of which  
161 4705 were eligible and 4058 (86%) consented to participate. GPs were invited to complete  
162 checklists for a subset of these patients. In total, 1332 participants had complete self-report and  
163 GP data available. Sixty-one percent of these patients were female and 43% had a high school  
164 level or lower level of education. Ninety-seven percent of participants had visited the GP clinic  
165 prior to their current appointment.

166

### 167 **Detection of concurrent tobacco and risky alcohol use**

168 In total, 7.5% (n=100) patients self-reported tobacco and risky alcohol use. Sensitivity of detection  
169 of concurrent tobacco and risky alcohol use by GPs was low, with only 23% (95% CI: 0.14, 0.34) of

170 participants who self-reported tobacco and risky alcohol use correctly identified by their GP.  
171 Specificity was high, with 99% (95% CI: 0.99, 1.00) correctly identified as not using either  
172 substance. The positive predictive value was 72% (95% CI: 0.53, 0.86) and the negative predictive  
173 value was 94% (95% CI: 0.91, 0.96).

174

#### 175 **Factors associated with accurate detection of concurrent tobacco and risky alcohol use**

176 The results of the logistic regression examining factors associated with accurate detection of  
177 concurrent tobacco and risky alcohol use are provided in Table 3. The number of years the GP had  
178 been in practicing, number of sessions per week, patients' Aboriginal and Torres Strait Islander  
179 status, and whether the patient had previously visited the clinic were unable to be modelled due  
180 to zero counts. No GP characteristics were associated with accurate detection. Accurate detection  
181 differed between the number of visits to the GP in the last 12 months and this was statistically  
182 significant at the group level ( $P=0.0251$ ). Patients who had visited their GP 4-6 times in the  
183 previous 12 months were the most likely to have their concurrent tobacco and risky alcohol use  
184 detected; compared to this group of patients, those with 0-3 visits were less likely to be detected  
185 (OR=0.33; 95% CI: 0.08, 1.38) as were patients with 7 or more visits (OR= 0.17; 95% CI: 0.04, 0.77).

186

187

## 188 **DISCUSSION**

189

190 There is strong evidence supporting the provision of brief intervention in general practice for  
191 modifiable risk factors including tobacco use and risky alcohol consumption<sup>9,10</sup>. Intervention is  
192 crucial when these behaviours co-occur, given the synergistic effects of concurrent alcohol and  
193 tobacco use<sup>3</sup>. However, identification of these risk factors amongst patients is the first step in  
194 being able to deliver evidence-based interventions. This cross-sectional study examined the  
195 accuracy of GP detection of concurrent tobacco and risky alcohol use during a single clinical  
196 encounter amongst a sample of patients attending Australian primary care clinics, and examined  
197 the GP and patient factors associated with accurate detection.

198

199 Overall, 7.5% of patients self-reported concurrent tobacco and risky alcohol use. This low  
200 prevalence is encouraging, suggesting that the multiplicative harmful effects of concurrent  
201 substance abuse is impacting only a minority of the sample. However, sensitivity of GP detection  
202 was low, with GPs identifying only 23% of patients who self-reported concurrent tobacco and  
203 risky alcohol use following the clinical encounter. To the authors' knowledge, no other studies

204 have examined the accuracy of detection of concurrent tobacco and risky alcohol consumption.  
205 However, the low rate of sensitivity aligns with previous research examining GP detection of  
206 single risk factors, particularly for alcohol misuse. For example, several studies have found  
207 moderate rates of sensitivity for detection of smoking (56%-66%)<sup>23,24</sup>, but overall low rates of  
208 sensitivity for detection of alcohol misuse (26%-40%)<sup>24-26</sup>. It is therefore not surprising that  
209 sensitivity of concurrent detection of both risk factors was low. In contrast, specificity of  
210 detection of concurrent smoking and risky alcohol use was high, with GPs correctly identifying  
211 99% of patients who self-reported no concurrent use of tobacco and risky alcohol consumption.  
212 This high rate of specificity aligns with previous work examining detection of smoking and alcohol  
213 as single risk factors<sup>14,25</sup>.

214

215 Number of visits with the GP was the only characteristic associated with increased rates of  
216 detection. Those who had visited their GP 4-6 times in the previous 12 months were more likely  
217 to have their concurrent tobacco and risky alcohol use identified than those who had fewer or  
218 more visits. This may be due to those with fewer visits attending for acute conditions which does  
219 not allow sufficient time for GPs to investigate health risk behaviours. Those with seven or more  
220 visits may have more serious chronic conditions which GPs prioritise over preventive health care.  
221 This finding is of concern as tobacco and risky alcohol use play a causal and exacerbating role for  
222 many chronic conditions<sup>11</sup>. The identification of these individuals may therefore be of value to  
223 increase the index of suspicion.

224

225 Taken together, these findings suggest that it is challenging for GPs to identify those who might  
226 benefit from intervention about their tobacco use and risky alcohol consumption, with more than  
227 two-thirds of general practice patients concurrently using tobacco and consuming alcohol at risky  
228 levels not detected as having these risk factors by their GP. Therefore, there is a high likelihood  
229 that these individuals will not be provided with evidence-based intervention to manage these  
230 health risks. The burden of smoking and risky alcohol consumption at an individual and at a health  
231 service level is significant<sup>11,27</sup>. While improved detection and initiation of treatment for  
232 vulnerable individuals who use both substances concurrently would have significant benefits, this  
233 does not discount the considerable complexity associated with preventative health detection by  
234 GPs. Barriers to detection of tobacco and risky alcohol use which have been reported by GPs  
235 includes: time constraints; unreliability of patient self-report; social and cultural considerations;  
236 lack of confidence in their ability to counsel patients effectively about lifestyle issues, a

237 perception that patients are not interested in receiving intervention for lifestyle risk factors, and  
238 that asking such questions may impact their relationship with the patient <sup>28,29</sup>.

239

240 Given that patients rarely present to a GP to address these health risks and that known  
241 interventions need to be opportunistic, this data suggests that it is important to identify  
242 systematic ways to ensure GPs are aware of these risk factors so interventions can be  
243 administered. One potential avenue for ensuring systematic detection of these conditions  
244 involves utilising E-Health strategies for data collection prior to a patient's consultation. E-Health  
245 data collection methods have demonstrated acceptability in general practice settings <sup>30</sup> and allow  
246 for data to be relayed to the healthcare provider instantaneously. The use of computer  
247 algorithms could enable GPs to be alerted when tobacco or alcohol use exceeds a predefined  
248 threshold. Collecting the data in this way would reduce the time burden placed on GPs, allowing  
249 more time to administer best practice intervention. Future research should focus on examining  
250 the effectiveness of using E-Health strategies to improve detection and intervention for  
251 preventative health measures.

252

### 253 **Limitations**

254 Study findings should be considered in light of several limitations. Firstly, a small number of  
255 practices participated, which limits the generalisability of findings. Secondly, despite assurances  
256 to participants that their responses would not be provided to their GP, it is possible that social  
257 desirability bias, or a desire not to have their smoking and/or alcohol consumption raised with  
258 their doctor, resulted in underreporting. Further, there have been issues identified regarding the  
259 validity of a risky drinking score on the AUDIT <sup>31</sup>. These issues may have impacted the rates of  
260 sensitivity and specificity reported. Additionally, no restrictions were placed on GPs about when  
261 they could complete each patient checklist. This may have impacted their recall of patient's risk  
262 factors. Lastly, the use of checklists may have prompted GPs to assess these health risk factors  
263 where they usually would not. Therefore, rates of detection in usual clinical practice may be  
264 lower than that reported in the current study. This potential limitation, however, would reaffirm  
265 rather than alter study conclusions.

266

### 267 **Conclusions**

268 GPs accurately detect less than a quarter of their patients who concurrently smoke and use  
269 alcohol at risky levels. Given the increased likelihood of harm from concurrent use of these two  
270 substances, it is imperative to establish and integrate systems for increasing detection of

271 preventive health risks into the general practice setting to enable the provision of evidence-based  
272 treatments.

273

274

#### **CONFLICTS OF INTEREST**

275

276 The authors declare no conflicts of interest.

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355 **Table 1.** GP demographic and professional characteristics (n=51), compared to national data  
 356 where available

Characteristic	Category	Current study		National data <sup>32</sup>	
		n	%	n	%
Gender	<i>Male</i>	32	63	570	57
	<i>Female</i>	19	37	425	43
Age	<i>25-44</i>	12	24	261	26
	<i>45-54</i>	20	39	279	28
	<i>≥55</i>	19	37	448	45
Years in general practice	<i>≤5</i>	29	57	125	13
	<i>6-19</i>	8	16	275	28
	<i>≥20</i>	14	27	582	59
No. of sessions per week	<i>≤5</i>	31	61	NA	NA
	<i>5.5-10</i>	19	37	NA	NA
	<i>&gt;10</i>	1	2	NA	NA

357 NA: Data not available

358

359 **Table 2.** Patient demographic and GP attendance characteristics (n=1,332), compared to national  
 360 data where available

Characteristic	Category	Current study		National data <sup>32</sup>	
		n	%	n	%
Gender	Male	523	39	41,960	43
	Female	809	61	55,888	57
Age	18-29	137	10	¥	¥
	30-44	278	21	¥	¥
	45-64	468	35	26,672	27
	≥65	449	34	30,085	31
Highest level of education	High school or below	533	43	NA	NA
	Technical certificate or Diploma	187	15	NA	NA
	University or Postgraduate	481	39	NA	NA
	Other	45	3.6	NA	NA
Aboriginal or Torres Strait Islander Origin	Yes	6	0.5	1,536	1.7
	No	1326	99	89,604	98
Private health insurance	Yes	780	59	NA	NA
	No	552	41	NA	NA
Visited this clinic previously	Yes	1256	97	6,184	6.3
	No	42	3.2	97,353	94
Number of visits to this GP in last 12 months	0-3	365	29	NA	NA
	4-6	473	37	NA	NA
	7-10	207	16	NA	NA
	More than 10	234	18	NA	NA
Smoking and alcohol status	Smoker	129	3.6	NA	NA
	Alcohol misuse	1223	34	NA	NA
	Both	277	7.8	NA	NA
	Neither	1930	54	NA	NA

361 NA: Data not available

362 ¥ National data reported using different categories. Comparisons were therefore not possible.

363

364 **Table 3.** GP and patient characteristics associated with detection of concurrent smoking and risky  
 365 alcohol consumption (n=88).

		Unadjusted model		Adjusted model	
		OR (95% CI)	p-value	OR (95% CI)	p-value
<b>GP characteristics</b>					
<b>Gender</b>	Male	Reference	0.7627	-	
	Female	1.15 (0.47, 2.82)			
<b>Age</b>	<45	Reference	0.5947	Reference	0.7950
	≥45	1.48 (0.35, 6.29)		1.29 (0.15, 10.82)	
<b>Patient characteristics</b>					
<b>Gender</b>	Male	Reference	0.7547	-	
	Female	0.79 (0.18, 3.48)			
<b>Age</b>	<45	Reference	0.7236	-	
	≥45	0.81 (0.25, 2.60)			
<b>Highest level of education</b>	High school or below	Reference	0.7630	-	
	Technical certificate, Diploma, University or Other	0.84 (0.26, 2.69)			
<b>Private Health Insurance</b>	Yes	Reference	0.1454	Reference	0.0960
	No	2.37 (0.74, 7.58)		3.27 (0.68, 15.64)	
<b>Number of visits to this GP in last 12 months</b>	0-3	0.41 (0.10, 1.76)	0.0640	0.33 (0.08, 1.38)	0.0251
	4-6	Reference		Reference	
	7+	2.37 (0.74, 7.58)		0.17 (0.04, 0.77)	

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