

# Past year drinking patterns, alcohol problems and alcohol diagnoses in the New Zealand Mental Health Survey

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Supplementary Table 1. Fit indices for latent class models of the AUDIT-C questions on alcohol consumption, Q1-3 (N=4823)

Model	Log Likelihood	Number of Parameters	AIC <sup>a</sup>	BIC <sup>b</sup>	AdjBIC <sup>c</sup>	LMR <sup>d</sup>	LMR p-value <sup>d</sup>	Entropy
2 classes	-18,417	23	36,881	37,030	36,957	2081.0	<.0001	0.737
3 classes	-18,049	35	36,169	36,396	36,284	728.9	<.0001	0.833
4 classes	-17,785	47	35,663	35,967	35,818	524.9	<.0001	0.839
5 classes	-17,700	59	35,517	35,900	35,713	167.7	<.0001	0.874
6 classes	-17,631	71	35,404	35,864	35,638	136.5	.02	0.833
7 classes	-17,567	83	35,299	35,837	35,574	127.3	.90	0.820

<sup>a</sup> Akaike's Information Criterion

<sup>b</sup> Bayesian Information Criterion

<sup>c</sup> Bayesian Information Criterion adjusted for sample size

<sup>d</sup> Lo-Mendell-Rubin adjusted likelihood ratio test for k versus (k-1) classes

A five class solution was selected, after consideration of the fit indices (Supplementary Table 1), and examination of sources of fit problems. Although the Lo-Mendell-Rubin adjusted likelihood ratio test for k versus (k-1) classes (LMR) indicated no improvement with a seven class solution, it was less clear on those grounds whether five or six classes were indicated. Simulations by Nylund (Nylund et al., 2007) suggest that LMR can overestimate the number of classes, which lends support to a five class solution here. The fit indices of AIC, BIC and Adjusted BIC did not reach a minimum but the change with each additional class was less than 0.5% after four classes. Inspection of the fit problems showed that pairs of cells defined by adjacent categories on the drinking frequency variable (monthly or less/up to 4 times a month), but the same responses on the other two questions, were almost equally balanced in overestimation and underestimation. Finally, the five class solution was cleaner in that participants allocated to their most likely latent class belonged to that class with probability of 0.89 or more, whereas with six classes this was only 0.66 for one class. The five class solution also had the highest entropy which, while not particularly useful in selecting the number of classes (Tein et al., 2013), did indicate that it would be acceptable to use assignment to most likely latent class in further analyses.

Supplementary Table 2. Fit indices for latent class models of the AUDIT problem questions, Q4-10 (N=4823)

Model	Log Likelihood	Number of Parameters	AIC <sup>a</sup>	BIC <sup>b</sup>	AdjBIC <sup>c</sup>	LMR <sup>d</sup>	LMR p-value <sup>d</sup>	Entropy
2 classes	-12,170	49	24,438	24,755	24,599	3577.3	<.0001	0.876
3 classes	-11,804	74	23,756	24,236	24,001	727.8	.70	0.864
4 classes	-11,646	99	23,490	24,132	23,817	314.5	.79	0.887
5 classes	-11,581	124	23,409	24,213	23,819	130.4	.76	0.891

<sup>a</sup> Akaike's Information Criterion

<sup>b</sup> Bayesian Information Criterion

<sup>c</sup> Bayesian Information Criterion adjusted for sample size

<sup>d</sup> Lo-Mendell-Rubin adjusted likelihood ratio test for k versus (k-1) classes

A three class solution was selected. Although LMR suggested that two classes would be adequate, BIC and Adjusted BIC were at a minimum with four classes. Inspection of the three and four class solutions showed that the four class solution subdivided the smallest class in the three class solution such that the most extreme problem class had only 42 participants assigned to it (0.6%), which was too small a number for further analyses, although possibly of clinical significance.

Supplementary Table 3. Distribution of alcohol problem responses for three latent classes formed from the AUDIT questions 4-10 for last year drinkers. Bold values indicate most common responses. SE=standard error. (N=4823)

Alcohol problem questions	LC1	LC2	LC3
	% (SE) <sup>a</sup>	% (SE) <sup>a</sup>	% (SE) <sup>a</sup>
<b>4. Loss of control in last year</b>			
Never	<b>97.4 (0.3)</b>	<b>62.3 (3.2)</b>	22.4 (6.2)
Less than monthly	1.4 (0.3)	25.4 (2.5)	3.5 (1.7)
Monthly	0.2 (- <sup>b</sup> )	9.5 (1.9)	19.6 (6.0)
Weekly	0.2 (- <sup>b</sup> )	2.8 (1.4)	<b>34.9 (5.4)</b>
Daily or almost daily	0.3 (- <sup>b</sup> )	0.0 (- <sup>b</sup> )	19.6 (6.0)
<b>5. Role failure in last year</b>			
Never	<b>98.6 (0.3)</b>	<b>63.6 (3.6)</b>	<b>24.4 (5.8)</b>
Less than monthly	1.4 (0.3)	32.9 (3.0)	22.1 (5.2)
Monthly	0.0 (- <sup>b</sup> )	3.3 (1.6)	21.8 (5.6)
Weekly	0.0 (- <sup>b</sup> )	0.1 (- <sup>b</sup> )	17.6 (5.0)
Daily or almost daily	0.0 (- <sup>b</sup> )	0.2 (- <sup>b</sup> )	14.1 (4.2)
<b>6. Morning drinking in last year</b>			
Never	<b>99.9 (-<sup>b</sup>)</b>	<b>95.9 (1.1)</b>	<b>67.8 (6.7)</b>
Less than monthly	0.1 (- <sup>b</sup> )	3.9 (1.0)	4.6 (2.2)
Monthly	0.0 (- <sup>b</sup> )	0.0 (- <sup>b</sup> )	7.9 (3.0)
Weekly	0.1 (- <sup>b</sup> )	0.0 (- <sup>b</sup> )	5.0 (2.2)
Daily or almost daily	0.0 (- <sup>b</sup> )	0.2 (- <sup>b</sup> )	14.7 (4.2)
<b>7. Guilt or remorse in last year</b>			
Never	<b>97.2 (0.5)</b>	38.8 (3.7)	26.0 (8.0)
Less than monthly	2.5 (0.5)	<b>55.7 (4.1)</b>	7.3 (3.1)
Monthly	0.2 (- <sup>b</sup> )	3.6 (1.5)	<b>30.2 (5.9)</b>
Weekly	0.0 (- <sup>b</sup> )	1.7 (0.9)	15.8 (3.9)
Daily or almost daily	0.0 (- <sup>b</sup> )	0.3 (- <sup>b</sup> )	20.7 (5.6)
<b>8. Blackouts in last year</b>			
Never	<b>94.5 (0.6)</b>	46.6 (3.8)	21.7 (4.5)
Less than monthly	5.2 (0.6)	<b>46.7 (3.2)</b>	12.3 (4.8)
Monthly	0.2 (- <sup>b</sup> )	6.4 (1.9)	<b>33.4 (5.6)</b>
Weekly	0.1 (- <sup>b</sup> )	0.2 (- <sup>b</sup> )	21.0 (5.0)
Daily or almost daily	0.0 (- <sup>b</sup> )	0.1 (- <sup>b</sup> )	11.6 (3.4)
<b>9. Injury</b>			
Never	<b>95.3 (0.5)</b>	<b>70.2 (3.1)</b>	<b>64.4 (6.1)</b>
Yes, but not last year	4.1 (0.5)	19.2 (2.7)	11.7 (5.8)
Yes, in last year	0.6 (- <sup>b</sup> )	10.6 (1.7)	23.9 (5.5)
<b>10. Concern by Others</b>			
Never	<b>95.8 (0.5)</b>	<b>71.7 (3.4)</b>	<b>43.8 (5.7)</b>
Yes, but not last year	3.3 (0.4)	15.0 (2.8)	13.5 (6.8)
Yes, in last year	0.9 (0.3)	13.3 (1.9)	42.8 (7.1)
Model % in each class	80.1	16.1	3.8
Raw number allocated to most likely class <sup>b</sup>	3920	688	215
AUDIT-P score <sup>b,c</sup>	Mean (SE)	Mean (SE)	Mean (SE)
	(SD) <sup>b</sup>	(SD)	(SD)
	0.4 (0.02)	4.5 (0.1)	12.2 (0.4)
	(1.3)	(3.2)	(6.3)

<sup>a</sup> Calculated SE for percentages close to 0% or 100% are not applicable

<sup>b</sup> Based on most likely latent class membership. Entropy=0.864. Probability of assignment to most likely latent class  $\geq 0.89$

<sup>c</sup> AUDIT Problem score. Possible range 0-28 (7 questions, scores of 0-4 on each)

Supplementary Table 4. Percentage in each problem latent class for each value of AUDIT-P

AUDIT-P score	Raw N	Latent Class 1	Latent Class 2	Latent Class 3
0	3113	100.0	0.0	0.0
1	409	100.0	0.0	0.0
2	402	59.3	40.7	0.0
3	155	25.3	74.7	0.0
4	197	51.6	48.4	0.0
5	126	1.9	95.0	3.1
6	84	0.4	77.8	21.8
7	60	0.0	92.0	8.0
8	61	0.0	60.0	40.0
9	51	2.2	69.2	28.7
10	23	0.0	47.0	53.0
11	18	0.0	16.0	84.1
12	20	0.0	11.8	88.3
13	18	0.0	1.4	98.6
14-28	82	0.0	0.0	100.0

Supplementary Table 5. ROC comparisons for scores from AUDIT-C questions as indicators of AUDIT problem scores or alcohol diagnoses

Indicator	AUDIT Problem Score (N=4814)			12-month alcohol diagnosis (N=4821)	
	1+	3+	10+	Disorder	Dependence
	c <sup>a</sup> (95% CI)	c <sup>a</sup> (95% CI)	c <sup>a</sup> (95% CI)	c <sup>a</sup> (95% CI)	c <sup>a</sup> (95% CI)
AUDIT-C <sup>b</sup>	0.78 (0.77, 0.79)	0.81 (0.79, 0.82)	<b>0.84</b> (0.80,0.88)	<b>0.87</b> (0.85, 0.90)	<b>0.85</b> (0.80, 0.90)
Q1+Q2 <sup>c</sup>	0.73 (0.72, 0.75) ****	0.77 (0.75, 0.78) ****	0.81 (0.77, 0.85) ***	0.85 (0.82, 0.88) ****	0.83 (0.83, 0.89) ****
Q1+Q3 <sup>c</sup>	0.71 (0.70, 0.73) ****	0.74 (0.72, 0.76) ****	0.79 (0.77, 0.85) ****	0.81 (0.77, 0.84) ****	0.79 (0.74, 0.85) ****
Q2+Q3 <sup>c</sup>	<b>0.80</b> (0.79, 0.81) ****	<b>0.82</b> (0.80, 0.83) *	0.83 (0.79, 0.87)	<b>0.87</b> (0.85, 0.89)	<b>0.85</b> (0.81, 0.90)
Q1 <sup>c</sup>	0.57 (0.55, 0.58)****	0.59 (0.57, 0.61)****	0.65 (0.60, 0.69)****	0.64 (0.61, 0.68) ****	0.63 (0.57, 0.69) ****
Q2 <sup>c</sup>	0.73 (0.72, 0.74)****	0.75 (0.73, 0.77) ****	0.78 (0.74, 0.82)****	0.82 (0.79, 0.85) ****	0.81 (0.76, 0.89) *
Q3 <sup>c</sup>	0.79 (0.77, 0.80)	0.80 (0.79, 0.82)	0.82 (0.78, 0.86)*	0.85 (0.83, 0.88) ****	<b>0.85</b> (0.80, 0.89)
Prevalence of outcome % (95% CI)	34.5 (32.8, 36.3)	16.8 (15.5, 18.2)	2.8 (2.2, 3.4)	4.0 (3.4, 4.8)	1.7 (1.4, 2.2)

<sup>a</sup> c= Mann-Whitney estimate of Area under the ROC curve (AUROC). 95% CI and comparisons of c are from weighted data but computed in SAS ignoring the complex sample, although taking account of ROC curves coming from the same sample. Highest c per outcome shown in bold. Note that predictors were not entered as categorical variables because if they were, SAS would reorder them by the probability of the outcome, which produces erroneous values for c if there is any non-monotonicity between outcome and predictor

<sup>b</sup> AUDIT-C score=Q1+Q2+Q3

<sup>c</sup> Q1=frequency of drinking; Q2=usual amount per drinking day; Q3=frequency of drinking six or more drinks per occasion

\* p<.05, \*\* p<.01, \*\*\* p<.001, \*\*\*\* p<.0001 for comparisons of values of c, relative to the reference which is AUDIT-C. Calculation of design effects for sensitivity around 50% suggests design effects of 1.6-2.2 and ratios of observed to expected standard errors of 1.6-2.2 (expected standard errors as in a simple random sample). If these ratios apply to the significance of differences between ROC curves then they suggest that p<.002 should be used to indicate significance and hence only \*\*\* or \*\*\*\* indicate significant differences.

Table 6a. Sensitivity and (1-specificity) for detection of alcohol problems or diagnoses in relation to AUDIT-C question scores by sex

Positive Scores	AUDIT Problem score 1+						12-month Alcohol Disorder					
	Total		Male		Female		Total		Male		Female	
	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec
AUDIT-C (Q1+Q2+Q3: usual frequency + usual amount + frequency of 6+ drinks per occasion)												
2+	97	82	98	87	96	78	98	87	97	91	100	82
3+	93	66	95	73	89	60	97	74	96	81	99	67
4+	<b>84</b>	<b>49</b>	86	57	<b>79</b>	<b>43</b>	95	60	94	68	99	51
5+	73	29	<b>78</b>	<b>39</b>	66	21	95	42	94	53	98	31
6+	59	16	64	24	51	10	89	29	91	38	<b>86</b>	<b>20</b>
7+	41	9	48	13	31	5	<b>81</b>	<b>18</b>	<b>85</b>	<b>24</b>	71	11
8+	30	5	35	8	20	2	67	11	71	16	56	6
9+	19	2	24	4	11	1	54	6	59	10	39	3
Q2+Q3 (usual amount + frequency of 6+ drinks/occasion)												
1+	94	56	95	68	91	46	98	68	97	78	99	57
2+	<b>80</b>	<b>34</b>	<b>82</b>	<b>43</b>	<b>74</b>	<b>26</b>	96	48	96	58	96	38
3+	63	19	67	25	57	14	93	32	94	40	89	24
4+	49	12	53	16	41	8	<b>82</b>	<b>22</b>	<b>82</b>	<b>28</b>	<b>82</b>	<b>15</b>
5+	35	6	39	8	29	5	71	14	73	18	68	10
6+	23	3	27		16	2	50	8	52	11	45	5
Q3 (frequency of 6+ drinks per occasion)												
1+	91	50	93	62	87	39	98	62	97	73	99	51
2+	59	17	63	24	51	11	87	29	88	37	84	20
3+	31	5	37	8	22	3	68	12	73	17	54	7
N	1703	3111	983	1279	720	1832	229	4592	144	2123	85	2469

Table 6b. Sensitivity and (1-specificity) for detection of alcohol problems or diagnoses in relation to AUDIT-C question scores by age group

Scores	AUDIT Problem score 1+								12-month Alcohol Disorder							
	16-24 years		24-44 years		45-64 years		65+ years		16-24 years		24-44 years		45-65 years		65+ years	
	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec	Sens	1-Spec
	AUDIT-C (Q1+Q2+Q3: usual frequency + usual amount + frequency of 6+ drinks per occasion)															
2+	98	89	97	83	95	81	96	79	100	94	97	88	93	84	100	81
3+	94	72	92	66	91	66	93	63	99	84	95	76	93	71	100	66
4+	88	55	<b>82</b>	<b>48</b>	<b>80</b>	<b>49</b>	93	48	96	72	95	61	93	56	100	51
5+	<b>80</b>	<b>42</b>	71	30	69	29	<b>80</b>	<b>19</b>	96	62	95	45	90	37	100	24
6+	68	28	58	18	51	15	55	10	88	48	91	32	84	22	100	13
7+	52	17	38	10	36	8	40	6	<b>83</b>	<b>33</b>	<b>80</b>	<b>18</b>	<b>80</b>	<b>14</b>	100	8
8+	40	10	25	5	27	5	28	2	68	24	66	11	70	9	100	4
9+									59	16	50	5	53	4	100	2
	Q2+Q3 (usual amount + frequency of 6+ drinks/occasion)															
1+	98	84	95	65	<b>85</b>	<b>53</b>	<b>85</b>	<b>29</b>	99	91	97	76	93	60	100	34
2+	92	62	<b>79</b>	<b>40</b>	64	30	67	14	99	78	94	54	93	37	100	19
3+	<b>79</b>	<b>45</b>	61	22	48	15	47	9	94	63	92	35	90	22	100	12
4+	65	35	45	13	37	8	33	3	85	49	<b>81</b>	23	<b>75</b>	14	100	5
5+	53	19	31	7	22	4	22	1	<b>78</b>	35	68	14	60	8	100	3
6+	39	11	19	3	13	2	14	1	65	23	41	8	28	4	0	2
	Q3 (frequency of 6+ drinks per occasion)															
1+	95	76	94	58	<b>79</b>	46	<b>78</b>	3	99	86	97	71	93	53	100	27
2+	69	29	57	19	49	15	44	8	<b>89</b>	49	<b>87</b>	32	<b>82</b>	22	100	11
3+	40	10	27	5	30	5	30	4	63	24	72	11	65	10	100	6
N	358	227	930	1165	350	1088	65	631	511	75	1976	122	1410	31	1	695



Supplementary Table 7a. Predicted marginal risk ratios in models of five outcomes by AUDIT-C, age group and sex

Predictor	Outcome				
	AUDIT-P 1+	AUDIT-P 3+	AUDIT-P 10+	12-month alcohol disorder	12-month alcohol dependence
<b>AUDIT-C</b>					
1	1.0	1.0	1.0	1.0	1.0
2	1.5 (1.0, 2.2)	0.7 (0.3, 1.6)	0.3 (0.1, 1.9)	0.5 (0.1, 3.5)	0.2 (0.0, 1.2)
3	2.3 (1.6, 3.3)	2.1 (1.1, 3.9)	0.3 (0.1, 1.6)	0.4 (0.0, 4.6)	0.4 (0.0, 4.6)
4	2.5 (1.7, 3.5)	2.2 (1.2, 4.1)	0.8 (0.2, 3.8)	0.1 (0.0, 1.0)	0.0 (0.0, 0.3)
5	3.7 (2.6, 5.2)	3.1 (1.7, 5.7)	0.8 (0.2, 3.4)	2.0 (0.4, 9.4)	0.5 (0.1, 3.4)
6	5.1 (3.6, 7.2)	5.0 (2.7, 9.1)	1.7 (0.4, 7.2)	2.6 (0.6, 12.5)	1.2 (0.2, 6.1)
7	5.4 (3.8, 7.6)	7.1 (4.0, 12.6)	2.6 (0.7, 9.7)	7.2 (1.6, 31.6)	1.4 (0.3, 7.5)
8+	6.9 (4.9, 9.6)	11.7 (6.7, 20.4)	8.4 (2.5, 28.1)	15.9 (3.7, 67.8)	7.6 (1.7, 34.4)
<i>F</i> (7), <i>p</i>	<i>F</i> =62.5, <i>p</i> <.0001	<i>F</i> =48.7, <i>p</i> <.0001	<i>F</i> =13.0, <i>p</i> <.0001	<i>F</i> =17.3, <i>p</i> <.0001	<i>F</i> =12.6, <i>p</i> <.0001
<b>Age group</b>					
16-24	1.2 (1.1, 1.4)	1.4 (1.2, 1.6)	1.5 (0.9, 2.2)	1.3 (0.9, 1.9)	1.2 (0.7, 2.0)
25-44	1.0	1.0	1.0	1.0	1.0
45-64	0.6 (0.6, 0.7)	0.6 (0.5, 0.7)	0.6 (0.3, 1.1)	0.3 (0.2, 0.5)	0.3 (0.1, 0.6)
65+	0.3 (0.2, 0.4)	0.3 (0.2, 0.5)	-	-	-
<i>F</i> (3 or 2), <i>p</i>	<i>F</i> =71.1, <i>p</i> <.0001	<i>F</i> =32.7, <i>p</i> <.0001	<i>F</i> =4.0, <i>p</i> =.02	<i>F</i> =16.6, <i>p</i> <.0001	<i>F</i> =7.5, <i>p</i> =.0006
<b>Sex</b>					
Male	1.2 (1.1, 1.3)	1.2 (1.0, 1.4)	1.4 (0.9, 2.2)	1.5 (1.0, 2.1)	1.6 (0.9, 2.8)
Female	1.0	1.0	1.0	1.0	1.0
<i>F</i> (1), <i>p</i>	<i>F</i> =17.4, <i>p</i> <.0001	<i>F</i> =5.9, <i>p</i> =.02	<i>F</i> =2.4, <i>p</i> =.12	<i>F</i> =4.7, <i>p</i> =.03	<i>F</i> =2.8, <i>p</i> =.09
<b>Goodness of fit</b>					
<i>H-L</i> (i) <i>p</i>	.13	.90	.40	.77	.99
<i>H-L</i> (ii) <i>p</i>	.11	.84	.52	.47	.84
<i>H-L</i> (iii) <i>p</i>	.22	.89	.46	.48	.87

Supplementary Table 7b. Predicted marginal risk ratios in models of five outcomes by (Q2 + Q3), age group and sex

Predictor	Outcome				
	AUDIT-P 1+	AUDIT-P 3+	AUDIT-P 10+	12-month alcohol disorder	12-month alcohol dependence
<b>Q2 + Q3</b>					
0	1.0	1.0	1.0	1.0	1.0
1	2.7 (2.1, 3.5)	2.0 (1.2, 3.3)	0.4 (0.1, 1.5)	0.6 (0.1, 3.9)	0.0 (0.0, 0.4)
2	3.7 (2.9, 4.7)	3.6 (2.3, 5.5)	0.3 (0.0, 2.1)	1.6 (0.3, 8.1)	1.1 (0.2, 7.2)
3	4.9 (3.8, 6.2)	6.6 (4.3, 10.1)	3.0 (1.0, 8.7)	7.0 (1.7, 29.3)	1.1 (0.2, 6.9)
4	5.3 (4.1, 6.8)	6.3 (4.1, 9.9)	2.8 (1.0, 8.1)	8.0 (2.0, 82.1)	3.4 (0.7, 17.0)
5	6.5 (5.0, 8.3)	8.6 (5.6, 13.2)	3.9 (1.4, 10.9)	20.9 (5.3, 103.1)	7.5 (1.7, 32.1)
6+	7.6 (6.0, 9.8)	15.3 (10.2, 22.8)	11.7 (4.8, 28.7)	27.0 (7.1, 103.1)	13.9 (3.4, 57.5)
<i>F(6), p</i>	<i>F=77.8, p&lt;.0001</i>	<i>F=57.3, p&lt;.0001</i>	<i>F=14.3, p&lt;.0001</i>	<i>F=16.1, p&lt;.0001</i>	<i>F=10.7, p&lt;.0001</i>
<b>Age group</b>					
16-24	1.1 (1.0, 1.3)	1.2 (1.0, 1.4)	1.2 (0.7, 2.0)	1.2 (0.8, 1.7)	1.0 (0.6, 1.7)
25-44	1.0	1.0	1.0	1.0	1.0
45-64	0.7 (0.6, 0.8)	0.7 (0.6, 0.9)	0.7 (0.4, 1.3)	0.4 (0.2, 0.7)	0.4 (0.2, 0.7)
65+	0.4 (0.3, 0.6)	0.4 (0.3, 0.6)	-	-	-
<i>F(3 or 2), p</i>	<i>F=33.7, p&lt;.0001</i>	<i>F=13.7, p&lt;.0001</i>	<i>F=1.4, p=.26</i>	<i>F=9.1, p&lt;.0001</i>	<i>F=4.4, p=.01</i>
<b>Sex</b>					
Male	1.2 (1.1, 1.3)	1.2 (1.1, 4.3)	1.6 (1.0, 2.4)	1.7 (1.2, 2.5)	1.8 (1.1, 3.2)
Female	1.0	1.0	1.0	1.0	1.0
<i>F(1), p</i>	<i>F=18.7, p&lt;.0001</i>	<i>F=8.7, p=.003</i>	<i>F=4.1, p=.04</i>	<i>F=8.7, p=.0001</i>	<i>F=4.7, p=.03</i>
<b>Goodness of fit</b>					
<i>H-L (i) p</i>	.14	.27	.64	.75	.97
<i>H-L (ii) p</i>	.10	.07	.19	.13	.49
<i>H-L (iii) p</i>	.13	.04	.15	.21	.67

Supplementary Table 7c. Predicted marginal risk ratios in models of five outcomes by Q3, age group and sex

Predictor	Outcome				
	AUDIT-P 1+	AUDIT-P 3+	AUDIT-P 10+	12-month alcohol disorder	12-month alcohol dependence
<b>Q3</b>					
0	1.0	1.0	1.0	1.0	1.0
1	2.7 (2.2, 3.3)	2.5 (1.7, 3.5)	0.7 (0.3, 1.9)	2.7 (0.7, 11.0)	0.7 (0.1, 3.7)
2	4.2 (3.4, 5.2)	5.1 (3.5, 7.4)	2.0 (0.8, 5.4)	8.1 (2.1, 31.2)	2.9 (0.7, 12.6)
3 & 4	5.8 (4.8, 7.1)	11.3 (8.0, 15.8)	11.2 (4.9, 25.4)	32.8 (8.7, 123.4)	15.3 (3.8, 61.4)
<i>F(3), p</i>	<i>F=144.5, p&lt;.0001</i>	<i>F=119.6, p&lt;.0001</i>	<i>F=34.8, p&lt;.0001</i>	<i>F=40.0, p&lt;.0001</i>	<i>F=17.0, p&lt;.0001</i>
<b>Age group</b>					
16-24	1.2 (1.1, 1.4)	1.4 (1.2, 1.6)	1.5 (0.9, 2.4)	1.4 (1.0, 2.0)	1.2 (0.7, 2.1)
25-44	1.0	1.0	1.0	1.0	1.0
45-64	0.7 (0.6, 0.8)	0.6 (0.5, 0.8)	0.6 (0.3, 1.0)	0.3 (0.2, 0.5)	0.3 (0.1, 0.6)
65+	0.4 (0.3, 0.5)	0.4 (0.2, 0.5)	-	-	-
<i>F(3 or 2), p</i>	<i>F=47.4, p&lt;.0001</i>	<i>F=26.3, p&lt;.0001</i>	<i>F=4.7, p=.009</i>	<i>F=16.9, p&lt;.0001</i>	<i>F=7.9, p=.0004</i>
<b>Sex</b>					
Male	1.2 (1.1, 1.3)	1.2 (1.0, 1.4)	1.5 (0.9, 2.4)	1.6 (1.1, 2.2)	1.7 (1.0, 3.0)
Female	1.0	1.0	1.0	1.0	1.0
<i>F(1), p</i>	<i>F=14.4, p=.0002</i>	<i>F=5.8, p=.02</i>	<i>F=3.0, p=.08</i>	<i>F=6.1, p=.01</i>	<i>F=3.5, p=.06</i>
<b>Goodness of fit</b>					
<i>H-L (i) p</i>	.02	.04	.67	.94	.87
<i>H-L (ii) p</i>	.002	.01	.28	.75	.87
<i>H-L (iii) p</i>	.0008	.02	.21	.66	.74

H-L (i): Hosmer-Lemeshow goodness of fit p value from Chi-Square

H-L (ii): Hosmer-Lemeshow goodness of fit p value from Wald F

H-L (iii): Hosmer-Lemeshow goodness of fit p value from Satterthwaite F

The models in Supplementary Table 7c for AUDIT-P 1+ and AUDIT-P 3+ were rerun with all two-way interactions but no clear interactions emerged. There were a few sporadic interactions which were mostly of marginal significance so the non-interaction models are reported above.

**References**

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