BMJ Open

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-021046
Article Type:	Research
Date Submitted by the Author:	07-Dec-2017
Complete List of Authors:	Beynon, Caryl; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Bayliss, David; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Mason, Jenny; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Sweeney, Kate; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Perkins, Clare; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Henn, Clive; Public Health England, Drugs and Tobacco Division, Health Improvement Directorate
Keywords:	alcohol-related harm to others, alcohol, violence

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Beynon C, Bayliss D, Mason J, Sweeney K, Perkins, C, Henn C

Corresponding author: Caryl Beynon

Address: Risk Factor Intelligence Team, Health Improvement Directorate, Public Health England, Suite 3b, Cunard Building, Water Street, Liverpool, L3 1DS, United Kingdon
Email: caryl.beynon@phe.gov.uk
Telephone: 0151 706 6205

Co-Authors:

David Bayliss, Risk Factors Intelligence Team, Public Health England, Manchester, United Kingdom.

Jenny Mason, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Kate Sweeney, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clare Perkins, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clive Henn, Alcohol, Drugs and Tobacco Division, Public Health England, London, United Kingdom.

ABSTRACT

Objectives: to estimate the prevalence, the frequency and the perpetrators of alcohol-related harm to others and identify factors which predict experiencing harm and aggressive harm.

Design: Cross-sectional survey.

Setting: England.

Participants: Adults (general population) aged 16 and over.

Outcome measures: Percentage of respondents who experienced harm. The socio-economic and demographic factors (exposures) associated with the outcome (harm/no harm and aggressive harm/no aggressive harm) were identified.

Results: The weighted sample was 4,874; 20.1% (95% confidence interval [CI] 18.9-21.4) reported experiencing harm in the previous 12 months and 4.6% (95% CI 4.0-5.4) reported experiencing an aggressive harm. Friends and strangers were the dominant perpetrators of harm. Most harms occurred less than monthly but 5.2% of respondents experienced harm daily/almost daily. Factors associated with experiencing harm were: younger age, drinking harmfully/hazardously, White British, having a disability, being educated and living in private rented accommodation (compared to being an owner occupier). Being in the family stage of life was protective (compared to being single), as was being retired (compared to being employed). Factors associated with experiencing an aggressive harm were similar.

Conclusions: This exploratory study shows that alcohol-related harm to others affects a sizable proportion of the population of England. Even apparently insignificant harms, like being kept awake, can have a negative impact on health, while more serious harms are clearly of concern. That 5% of respondents experience harm daily/almost daily suggests a population of people with a particularly high burden likely to affect health. While the study identified factors associated with experiencing harm, methodological differences in the way harm is measured makes comparison with the literature difficult; using a standard methodology to measure harm across studies would be highly advantageous. Policies that focus on alcohol must take into consideration the impact of drinking on those other than the drinker.

Key words: alcohol-related harm to others, alcohol, violence

Word count: 4699

STRENGHTS AND LIMITATIONS OF THE STUDY

- This is the largest survey on alcohol-related harm to others in the United Kingdom and the first national survey in England.
- The sampling approach and weighting ensured the data were representative of the population of England.
- There is potential selection bias which is inherent in all national surveys.
- The use of a bespoke survey made comparison of the findings with the literature difficult but when the study was initiated no universally accepted survey was identified.

INTRODUCTION

The detrimental effect of alcohol is well documented; in 2012 alcohol consumption was responsible for approximately 6% of deaths and 5% of disease burden globally. [1] The focus has been on the harmful effects of alcohol on the drinker with less attention on the harms caused to others, including families, work colleagues and wider society. The World Health Organization's (WHO) global alcohol strategy highlights the need to consider the harm alcohol causes to people other than the drinker, [2] and it is these alcohol harms to others (AHTO) that are the focus of this study.

Health and social data provide insight into the potential harms caused by another's drinking. Data from the Crime Survey for England and Wales, for example, show that in just over half of all violent crimes the victim perceived the offender to be under the influence of alcohol and that alcohol use is particularly implicated in violent incidents between strangers. [3] Data from the Department of Transport show that during 2013 to 2015, there were almost 10,000 alcohol-related road traffic accidents in England which at least one driver failed the alcohol breathalyser test (data are available at: https://fingertips.phe.org.uk/profile/local-alcohol-profiles), demonstrating a considerable potential harm to both the drinking driver and to others on the roads.

In the last decade or so a number of studies have aimed to quantify and explore in more detail AHTO. These studies have provided widely varying estimates of the prevalence of harm, largely due to differences in the way harms are defined and the reference population. Studies which focus on identifying the socio-demographic and behavioural factors associated with being the victim of harm do not always provide consistent findings, suggesting the need for further research. While there is a relatively consistent finding across studies that younger age increases the likelihood of experiencing harm [4-6], the association of harm with other characteristics is less clear. For example, generally women have been identified as more at risk of harm from another's drinking than men but this is not consistent across all countries and some authors report this association for certain types of harm only. [4-7]

When the impact of alcohol includes the effects to both the individual drinker and wider society, the cost is considerable. A review of studies in high-income countries show the gross economic costs of alcohol to range from 1·4% to 2·7% of gross domestic product; in the UK this would be equivalent to between £27 billion and £52 billion in 2016.[8] There is a need to better understand AHTO and the characteristics of those affected in order to implement an effective response. To date there has been no national survey of AHTO in England. The objectives of this exploratory study were to estimate the prevalence of AHTO in England, identify factors associated with being the victim of harm, the frequency with which this harm occurs and the perpetrators of harm.

METHOD

The survey

The questions to identify experience of AHTO were devised after an evidence review and were appended to the Alcohol Toolkit Survey (ATS) between 1st November 2015 and 31st March 2016. The ATS is a cross-sectional household survey, run by University College London and administered by Ipsos Mori using computer-assisted interviews. Each month a new sample of adults aged 16 and over who live in England complete the survey. Households are selected using a type of random location sampling which is a hybrid of random probability sampling and simple quota sampling. Interviews are conducted with one member of the selected household. [9] The AHTO questions were self-completed on guidance from the Research Support and Governance Office, Public Health England. Due to the novel and exploratory nature of the work, no formal

sample size calculation was undertaken as the parameters on which to base this were unavailable. Instead, a three month window of data collection was chosen, knowing that the ATS aimed to survey approximately 1,800 adults per month. [9]

The AHTO questions asked whether or not the respondent had experienced the following harms from another's drinking in the past 12 months:

1. Had a serious argument that did not include physical violence.
2. Felt physically threatened.
3. Been emotionally hurt or neglected.
4. Been physically hurt due to them assaulting me or acting violently.
5. Been physically hurt due to them accidentally injuring me (e.g. by falling on me).
6. Been put at risk in a car when someone was driving after drinking.
7. Felt forced or pressured into sex or something sexual.
8. Felt uncomfortable or anxious at a social occasion (e.g. a party).
9. Had someone break or damage something that mattered to me.
10. Had money that would have improved the quality of my life spent on their alcohol-related purchases.
11. Felt genuinely concerned that they may cause harm to my children or someone else's children.
12. Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking.
13. Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking.
14. Been kept awake due to noise or disruption.
15. Drank alcohol myself in order to cope with the problems caused by their drinking.
16. Had to stop seeing or being in contact with someone because of their drinking.
17. Had to move out of my usual place of residence and stay somewhere else.
18. Had contact with the police.

If a respondent indicated that they had experienced any of the harms they were asked to indicate who perpetrated the harm and the frequency with which the harm occurred. Response options for who perpetrated the harm were: someone you were in a relationship with (e.g. wife/husband, partner) who you lived with; someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with; another family member you lived with; a family member you did not live with; someone else you lived with; a friend; a work colleague; someone else you know; a stranger; refused/prefer not to say and don't know. Response options for the frequency of harm were: daily or almost daily (i.e. 4-7 days per week); weekly (i.e. 1-3 times per week); monthly (i.e. 2-3 times per month); less than once a month; refused/prefer not to say and don't know.

A range of demographic and socio-economic variables, collected as part of the ATS, were used as independent variables: sex (female, male); age band in years (16-24, 25-44, 45-64, 65 and over); broad ethnic group (White British, Other White, Black, Asian, Other); life stage (single, pre-family, family, post-family); marital status (single, married, widowed/divorced/separated); educational attainment (no qualifications, GSCE/O-level/CSE, A-level/vocational, degree/higher degree, other/still studying); social grade (AB [higher managerial, administrative and professional], C1 [supervisory, clerical and junior managerial, administrative and professional], C2 [skilled manual workers], D [semi-skilled and unskilled manual workers], E [state pensioners, casual and lowest grade workers, unemployed with state benefits only]); tenure of home (owned outright, bought on a mortgage, rented from local authority, rented from private landlord, other); self-defined disability (yes, no) and employment status (employed, unemployed, economically inactive, retired). The respondents' alcohol consumption was measured using the Alcohol Use Disorders Identification Test (AUDIT) which can be used to identify hazardous and harmful drinkers. Here

hazardous/harmful drinkers were identified as those with scores of eight or more if aged 65 or under, and scores of seven or more if aged over 65, in line with WHO guidance. [10]

Analysis

Respondents who refused to complete the AHTO questions (N=96) and those who chose the 'don't know' or 'refused/prefer not to say' responses for all 18 harm questions (N=91) were excluded from all analyses. Individuals who failed to provide a valid response to other questions were excluded from the analysis of that particular variable.

Two binary dependent variables were created. 'Any harm' was coded as yes if a person had experienced any of the 18 harm types in the previous 12 months. 'Aggressive harm' was coded as yes if the person had experienced one or more of the following three harms: felt physically threatened, been physically hurt due to them assaulting me or acting violently and felt forced or pressured into sex or something sexual.

All analyses were undertaken using Stata 13 and the 'svy' command prefix for analysing survey data. Prevalence was estimated by dividing the positive responses by the total responses for each harm type, any harm and aggressive harm; 95% confidence intervals (CI) were calculated for each prevalence estimate using the standard settings of Stata's 'svy: tabulate' command. [11] Bivariate independence was tested using a 'corrected' Pearson chi-squared statistic for survey data [design-based *F* tests based on Rao and Scott correction [12]]. Multivariate analyses (binary logistic regression) were conducted to model the joint effects of the independent variables associated with any harm and aggressive harm in the bivariate analyses with 'no harm' and 'no aggressive harm' as the reference categories. Adjusted odds ratios (AOR) are given in comparison to the reference category for the given variable and *t* tests provide an indication of statistical significance. Where comparisons are presented between categories of a variable where neither is the reference category, an indication of statistical significance is given using adjusted Wald tests. Analyses were weighted (using weights generated by the ATS) in order to improve the representativeness of the sample relative to an English population profile using multiple socio-demographic variables. [9]

Ethics and funding

Approval for the ATS was granted by University College London's ethics committee (reference: 0498/001) and for the AHTO questions by the Research Support and Governance Office, Public Health England (reference: R&D 055). This work was funded by Public Health England.

RESULTS

The sample consisted of 4,881 people who had provided a valid response to AHTO questions (4,874 weighted sample size). Table 1 reports the estimated prevalence of each type of harm; 20.1% (95% CI 18.9%-21.4%) of people reported experiencing at least one harm due to someone else's drinking in the past 12 months. Aggressive harms were experienced by 4.6% (95% CI 4.0%-5.4%) of respondents.

Table 1: Prevalence of harm in the previous 12 months, weighted data

Harm type	Number of respondents who experienced harm	Percentage of respondents who experienced harm	95% CI
Been kept awake due to noise or disruption	390	8.0	7.2 - 8.9
Felt uncomfortable or anxious at a social occasion (e.g. a party)	331	6.8	6.0 - 7.6
Had a serious argument that did NOT include physical violence	275	5.7	5.0 - 6.4
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	174	3.6	3.0 - 4.2
Been emotionally hurt or neglected	170	3.5	3.0 - 4.1
Felt physically threatened	164	3.4	2.8 - 4.0
Had to stop seeing or being in contact with someone because of their drinking	120	2.5	2.0 - 3.0
Had to contact the police	117	2.4	2.0 - 2.9
Had someone break or damage something that mattered to me	95	1.9	1.5 - 2.5
Been physically hurt due to them assaulting me or acting violently	92	1.9	1.5 - 2.4
Been put at risk in a car when someone was driving after drinking	75	1.5	1.2 - 2.0
Felt genuinely concerned that they may cause harm to my children or someone else's children	61	1.2	0.9 - 1.6
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	57	1.2	0.9 - 1.5
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	53	1.1	0.8 - 1.5
Had money that would have improved the quality of my life spent on their alcohol-related purchases	50	1.0	0.8 - 1.4
Drank alcohol myself in order to cope with the problems caused by their drinking	33	0.7	0.5 - 1.0
Felt forced or pressured into sex or something sexual	33	0.7	0.5 - 1.0
Had to move out of my usual place of residence and stay somewhere else	25	0.5	0.3 - 0.8
At least one reported harm	980	20.1	18.9 - 21.4
At least one aggressive harm	225	4.6	4.0 – 5.4

Bivariate predictors of experiencing any harm are reported in Table 2. Experience of harm decreased with age. This trend by age was reflected in experience of harm by life stage, with 36.5% (95% CI 32.8%-40.5%) of single people experiencing harm compared to 15.0% (95% CI 13.4%-16.7%) of those in a 'post-family' life stage. White British people were more likely to report experiencing harm (21.8%, 95% CI 20.3%-23.4%) than people of other broad ethnic groups; people of Asian ethnicity had the lowest prevalence (10.9%, 95% CI 8.2%-14.2%). People with no qualifications were least likely to report experiencing harm (9.9%, 95% CI 7.9%-12.5%).Those whose highest attainment was A-level or vocational had the highest prevalence (26.7%, 95% CI 24.1%-29.3%). People in the private-rented sector had the highest harm prevalence by tenure (29.9%, 95% CI 26.9%-33.1%). This compares to just 14.0% (95% CI 12.3%-16.0%) of people who owned their home outright experiencing harm. People who considered themselves disabled were more likely to report having experienced harm than those who did not (24.0%, 95% CI 20.3%-28.1%, compared to 19.7%, 95% CI 18.4%-21.1%). Those who were unemployed (26.8%, 95% CI 21.0%-33.6%) or economically inactive (26.8%, 95% CI 24.0%-29.9%) were more likely to report harm than those employed (22.0%, 95% CI 20.2%-24.0%); the difference between the unemployed and employed was not significant. Retired people were much less likely to report experiencing at least one harm (9.1%, 95% CI 7.5%-10.9%) than all other employment statuses. The prevalence of AHTO was significantly higher among

hazardous/harmful drinkers (37.9%, 95% CI 33.9%-42.1%) compared to those who were not (17.3%, 95% CI 16.0%-18.6%).

In the multivariate model, young age remained a strong risk factor for experiencing harm due to someone else's drinking, with those aged 16-24 significantly more likely to report experiencing harm than all older age groups (Table 2). Being a hazardous/harmful drinker was a strong risk factor, with odds of experiencing harm around double the odds of those who were not hazardous/harmful drinkers. Being White British compared to being in an Other White, Black or Asian ethnic group was also associated with increased risk of experiencing harm, as was considering oneself disabled, being educated, and living in private rented accommodation relative to being an owner occupier. Being in the family stage of life reduced the odds of experiencing harm compared to those that were single. Being retired, remained a significantly protective factor compared to those who were employed.

Table 2: Bivariate and multivariate comparisons of harm versus no harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Explanatory variable	No harm			Harm					
	N	%	95% CI	N	%	95% CI	Adjusted odds ratio		95% CI
Sex									
Female	2,008	80.1	78.3 - 81.8	498	19.9	18.2 - 21.7	Not entered into the model		
Male	1,887	79.7	77.7 - 81.4	482	20.3	18.6 - 22.3			
Age band †									
16-24	446	63.4	59.6 - 67.0	258	36.6	33.0 - 40.4	Reference		
25-44	1,278	78.4	76.0 - 80.7	352	21.6	19.3 - 24.0	0.63	**	0.49 - 0.83
45-64	1237	81.5	79.1 - 83.7	281	18.5	16.3 - 20.9	0.50	**	0.34 - 0.75
65+	933	91.2	89.3 - 92.9	90	8.8	7.1 - 10.7	0.36	**	0.21 - 0.61
Broad ethnic group†									
White British	2,975	78.2	76.7 - 79.7	830	21.8	20.3 - 23.4	Reference		
Other White groups	334	84.9	80.4 - 88.5	59	15.1	11.5 - 19.6	0.52	**	0.36 - 0.76
Black groups	151	83.9	78.6 - 88.1	29	16.1	11.9 - 21.4	0.61	*	0.41 - 0.92
Asian groups	376	89.1	85.8 - 91.8	46	10.9	8.2 - 14.2	0.39	**	0.28 - 0.56
Other groups	44	82.2	68.7 - 90.7	9	17.8	9.3 - 31.3	0.60		0.30 - 1.21
Life stage†									
Single	436	63.5	59.5 - 67.2	251	36.5	32.8 - 40.5	Reference		
Pre-family	222	72.2	65.6 - 77.9	86	27.8	22.1 - 34.4	0.91		0.61 - 1.34
Family	1,285	81.1	78.8 - 83.2	299	18.9	16.8 - 21.2	0.68	**	0.52 - 0.89
Post family	1,950	85.0	83.3 - 86.6	344	15.0	13.4 - 16.7	0.85		0.56 - 1.28
Education†									
No qualifications	683	90.1	87.5 - 92.2	75	9.9	7.8 - 12.5	Reference		
GCSE/O-level/CSE	764	79.3	76.2 - 82.1	199	20.7	17.9 - 23.8	1.74	**	1.25 - 2.44
A-level/vocational	974	73.3	70.7 - 75.9	354	26.7	24.1 - 29.3	2.04	**	1.48 - 2.82
Degree/higher degree	1,156	79.3	76.8 - 81.7	301	20.7	18.3 - 23.2	2.16	**	1.56 - 3.00
Other/still studying	294	85.6	81.2 - 89.1	50	14.4	10.9 - 18.9	1.42		0.92 - 2.18
Social grade‡									
AB	1,066	80.8	78.0 - 83.3	254	19.2	16.7 - 22.0	Not entered into the model		
C1	1,023	77.4	75.0 - 79.6	299	22.6	20.4 - 25.0			
C2	878	81.7	78.8 - 84.4	196	18.3	15.6 - 21.2			
D	614	82.5	79.1 - 85.4	131	17.5	14.6 - 20.9			
E	313	75.8	71.8 - 79.4	100	24.2	20.6 - 28.2			
Tenure†									
Owned outright	1,451	86.0	84.0 - 87.8	237	14.0	12.3 - 16.0	Reference		
Bought on a mortgage	1,142	79.2	76.4 - 81.6	301	20.9	18.4 - 23.6	0.97		0.74 - 1.28
Rented from local authority	341	78.8	74.6 - 82.5	92	21.2	17.6 - 25.4	1.38		0.99 - 1.94
Rented from private landlord	678	70.1	66.9 - 73.1	289	29.9	26.9 - 33.1	1.52	**	1.15 - 2.01
Other	248	81.1	76.7 - 84.8	58	19.0	15.2 - 23.4	1.11		0.77 - 1.61
Disability†									
Considers self disabled	396	76.0	71.9 - 79.7	125	24.0	20.3 - 28.1	Reference		
Not disabled	3,422	80.3	78.9 - 81.6	842	19.7	18.4 - 21.1	0.56	**	0.42 - 0.74
Employment status†									
Employed	2,081	78.0	76.0 - 79.8	588	22.0	20.2 - 24.0	Reference		
Unemployed	157	73.2	66.4 - 79.0	58	26.8	21.0 - 33.6	1.09		0.75 - 1.58
Economically inactive	634	73.2	70.1 - 76.1	232	26.8	24.0 - 29.9	1.01		0.81 - 1.27
Retired	1,021	90.9	89.1 - 92.5	102	9.1	7.5 - 10.9	0.54	**	0.38 - 0.78
AUDIT†									
Not hazardous/harmful drinking	3,463	82.7	81.4 - 84.0	723	17.3	16.0 - 18.6	Reference		
Hazardous/harmful drinking	419	62.1	57.9 - 66.1	256	37.9	33.9 - 42.1	2.06	**	1.66 - 2.56

*p<0.05, **p<0.01.

†test of bivariate independence indicates significant difference (p<0.05).

‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

In bivariate analyses, men were marginally more likely to experience an aggressive harm than women (5.3% and 4.0% respectively, *p*=0.04, Table 3). The other characteristics associated with experiencing aggressive harms were similar to experiencing any harm, with a higher prevalence of aggressive harm associated with being younger, disabled, single, non-retired, White British, renting accommodation and being a hazardous/harmful drinker.

Controlling for other variables in the model, sex and stage of life were not associated with experiencing an aggressive harm (Table 3). Age remained a predictor with those aged 45 and over significantly less likely to experience an aggressive harm than those aged 16-24. Disability was also a strong risk factor for experience of aggressive harm; the odds of experiencing aggressive harm for non-disabled people was just over a third of the odds for disabled people (adjusted OR=0.37, 95% CI 0.24-0.59). Housing tenure was a relatively strong risk factor, with the odds of experiencing an aggressive harm for renters around double the odds of those who are home owners. This was also the case for hazardous/harmful drinkers, with an adjusted odds ratio of 2.35 (95% CI 1.63-3.40) relative to those who were not hazardous/harmful drinkers. Being White British compared to being in the other White, Black or Asian ethnic groups was also associated with increased risk of experiencing an aggressive harm. Differences in the risk of experiencing aggressive harm, between people with different educational attainment were minimal; the only significant difference being the greater risk for those with a degree/higher degree relative to those with no qualifications. Being retired remained protective of experiencing an aggressive harm compared to being employed (AOR 0.33, 95% CI 0.13-0.83).

Table 3: Bivariate and multivariate comparisons of aggressive harm versus no aggressive harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Explanatory variable	No aggressive harm			Aggressive harm					
	N	%	95% CI	N	%	95% CI	Adjusted odds ratio		95% CI
Sex†									
Male	2,242	94.7	93.5 - 95.6	127	5.3	4.4 - 6.5	Reference		
Female	2,407	96.1	95.1 - 96.8	99	4.0	3.2 - 4.9	0.74		0.53 - 1.04
Age band†									
16-24	646	91.7	89.1 - 93.6	59	8.4	6.4 - 10.9	Reference		
25-44	1,539	94.4	92.9 - 95.6	91	5.6	4.4 - 7.1	0.84		0.49 - 1.43
45-64	1,454	95.8	94.4 - 96.9	64	4.2	3.1 - 5.6	0.43	*	0.20 - 0.89
65+	1,010	98.8	98.0 - 99.3	12	1.2	0.7 - 2.0	0.29	*	0.09 - 0.97
Broad ethnic group†									
White British	3,605	94.8	93.8 - 95.5	200	5.3	4.5 - 6.2	Reference		
Other White groups	384	97.7	95.6 - 98.8	9	2.3	1.2 - 4.4	0.30	**	0.14 - 0.64
Black groups	176	97.6	95.1 - 98.8	4	2.4	1.2 - 4.9	0.37	*	0.16 - 0.86
Asian groups	411	97.5	95.4 - 98.7	11	2.5	1.4 - 4.7	0.43	*	0.21 - 0.89
Other groups	52	97.5	88.7 - 99.5	1	2.5	0.5 - 11.3	0.36		0.07 - 1.83
Life stage†									
Single	629	91.5	88.9 - 93.6	58	8.5	6.4 - 11.1	Reference		
Pre-family	286	92.9	88.2 - 95.9	22	7.1	4.2 - 11.8	1.23		0.60 - 2.50
Family	1,519	95.9	94.7 - 96.9	65	4.1	3.1 - 5.3	0.89		0.52 - 1.55
Post family	2,213	96.5	95.5 - 97.3	81	3.5	2.7 - 4.6	1.80		0.90 - 3.60
Education†									
No qualifications	739	97.5	96.0 - 98.4	19	2.6	1.6 - 4.0	Reference		
GCSE/O-level/CSE	911	94.6	92.6 - 96.1	52	5.4	3.9 - 7.4	1.75		0.96 - 3.21
A-level/vocational	1242	93.6	91.9 - 94.9	86	6.5	5.1 - 8.1	1.69		0.95 - 3.01
Degree/higher degree	1396	95.8	94.3 - 96.9	62	4.2	3.1 - 5.7	1.94	*	1.02 - 3.69
Other/still studying	337	97.9	95.8 - 99.0	7	2.1	1.0 - 4.2	0.88		0.36 - 2.16
Social grade‡									
AB	1,265	95.9	94.2 - 97.1	54	4.1	2.9 - 5.8	Not entered into the model		
C1	1,267	95.8	94.6 - 96.8	55	4.2	3.2 - 5.4			
C2	1,016	94.6	92.5 - 96.0	59	5.5	4.0 - 7.5			
D	718	96.4	94.5 - 97.6	27	3.6	2.4 - 5.5			
E	382	92.6	89.8 - 94.7	30	7.4	5.3 - 10.2			
Tenure†									
Owned outright	1,648	97.7	96.7 - 98.3	40	2.4	1.7 - 3.3	Reference		
Bought on a mortgage	1,386	96.0	94.5 - 97.2	57	4.0	2.8 - 5.5	1.03		0.57 - 1.88
Rented from local authority	405	93.5	90.4 - 95.6	28	6.5	4.4 - 9.6	2.58	**	1.31 - 5.09
Rented from private landlord	885	91.5	89.3 - 93.3	82	8.5	6.7 - 10.7	2.33	**	1.34 - 4.05
Other	287	94.0	91.0 - 96.0	18	6.0	4.0 - 9.0	2.04	*	1.04 - 4.02
Disability†									
Considers self disabled	477	91.4	88.4 - 93.7	45	8.6	6.3 - 11.7	Reference		
Not disabled	4,086	95.8	95.1 - 96.5	178	4.2	3.5 - 4.9	0.37	**	0.24 - 0.59
Employment status†									
Employed	2,535	95.0	93.8 - 95.9	135	5.0	4.1 - 6.2	Reference		
Unemployed	204	95.0	91.3 - 97.2	11	5.0	2.8 - 8.7	0.62		0.32 - 1.22
Economically inactive	799	92.2	90.2 - 93.9	67	7.8	6.1 - 9.8	1.10		0.73 - 1.66
Retired	1,110	98.9	98.1 - 99.3	13	1.1	0.7 - 1.9	0.33	*	0.13 - 0.83
AUDIT†									
Not hazardous/harmful drinking	4,038	96.5	95.7 - 97.1	149	3.6	2.9 - 4.3	Reference		
Hazardous/harmful drinking	599	88.7	85.6 - 91.2	76	11.3	8.8 - 14.4	2.35	**	1.63 - 3.40

*p<0.05, **p<0.01.

†test of bivariate independence indicates significant difference (p<0.05).

‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

The most frequently reported perpetrators of harms were friends (23.4% of total perpetrator reports) and strangers (22.9%), while work colleagues were the least reported perpetrators (3.7%, Table 1). The perpetrator varied according to the type of harm (Supplementary Table 1). Focussing on the most common harms experienced, being kept awake due to noise or disruption was predominantly perpetrated by strangers (49.5%, 95% CI 43.8%-55.3%), while both strangers and friends were the most common cause of feeling uncomfortable or anxious at a social occasion (strangers 34.4%, 95% CI 28.5%-40.7%; friends 32.8%, 95 CI 27.2%-39.0%). Serious arguments that did not include physical violence were predominantly perpetrated by friends (35.7%, 95% CI 29.5%-42.6%) or someone the respondent was in a relationship with and lived with (23.1%, 95% CI 17.6%-29.6%). Likewise, being let down by someone or being emotionally hurt or neglected were harm types perpetrated by people close to respondents.

Strangers were most likely to be the perpetrators of two of the aggressive harms: 60.5% (95% CI 51.2%-69.1%) of respondents reporting feeling physically threatened by a stranger and 31.5% (95% CI 21.5%-43.6%) of respondents reporting being physically hurt by a stranger. While 19.0% (95% CI 6.5%-44.2%) of respondents reported being forced or pressured into sex or something sexual by a stranger, the most commonly reported perpetrator for this sexual aggressive harm was someone the respondent was in a relationship with and lived with (23.3%, 95% CI 9.8%-46.0%; rising to 39.9% when also including people in a relationship who lived elsewhere).

Insert Figure 1 here.

Figure 2 reports information on the frequency with which harms were experienced. The majority of reported harms were experienced less than once a month (74.8%); 12.8% experienced harm at least monthly but less than weekly, 7.2% experienced weekly but less than daily, and 5.2% experienced daily or almost daily.

Insert Figure 2 here.

The frequency of harm varied by harm type (Supplementary Table 2). The harm types that were reported to reoccur most often were those whose description implies that the harm occurs over a prolonged period of time with someone who the respondent was in regular contact with. For example, ‘had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking’ (19.4% daily or almost daily, 95% CI 10.2%-33.8%) and ‘had to stop seeing or being in contact with someone because of their drinking’ (19.3% daily or almost daily, 95% CI 11.9%-29.6%). It was less common for other harms to be experienced at a daily or almost daily frequency. Nevertheless, all harm types had at least one respondent reporting daily or almost daily frequency of harm.

DISCUSSION

In this exploratory study one in five respondents experienced AHTO in the previous 12 months. The most commonly reported AHTO were being kept awake due to noise or disruption and feeling uncomfortable or anxious at a social occasion, which have been identified as the most prevalent harms in other studies. [4 5] More concerning, 4.6% reported experiencing an aggressive harm. Experiencing AHTO was predicted by a number of demographic and socio-economic variables. Friends and strangers were the dominant perpetrators of AHTO. Most harms occurred less than monthly but some respondents experienced harm daily or almost daily.

The main strength of this study is its large sample size; this is the largest survey on AHTO to have been conducted in the United Kingdom and the first to provide data for England. The sampling and weighting strategy were employed to ensure the sample was representative of the English population and thus the generalisability of the findings. There are a number of limitations to note. Recall is always a problem with surveys and harms that occurred a year ago or had little impact on the respondent may be more difficult to recall. Attributing causality is not possible using a cross sectional design. There are also some social groups that are systematically missing from surveys such as homeless people, those in hospital or care homes and those who are incarcerated; populations whose alcohol use is likely different. [13] A response rate could not be calculated as Ipsos Mori did not collect the data needed to calculate this. Previous studies on alcohol harm to others have also largely relied on cross-sectional surveys and are affected by the same limitations.

Here the prevalence of harm was 20.1%. The closest comparison is from a cross-sectional survey conducted in Wales in 2015 which used identical AHTO questions and reported the prevalence of any harm to be 59.7%. [14] There is some evidence from routine data to support a lower prevalence of harm in England than Wales. For example, the percentage of violent incidents where the victim believed the offender(s) to be under the influence of alcohol tends to be higher in Wales than England [15] although not conclusively so. However, the magnitude of the difference in the reported prevalence of harm between England and Wales seems questionable, given the similarities between the two nations. This difference could be due, in part, to differences in methodology and caution needs to be applied in drawing direct comparisons. In England the harm questions were asked after the ATS questions; this may have affected how people perceived harm, and therefore how they responded to the harm questions. It is also possible that respondents were experiencing fatigue by the end of the survey and this may have affected how fully they reported their experiences of harm. The English survey was administered face-to-face while the survey in Wales was administered via the telephone using landline numbers. Using data from the USA, researchers comparing face-to-face and telephone interviews reported that telephone surveys may miss certain sections of the population if they solely rely on landlines, including those with lower incomes. [16] Other surveys of AHTO conducted in the United Kingdom have reported the prevalence of harm in adults to be 46.3% [5] and 51% [17] in Scotland and 79% in the North West of England, [17] however these studies used very different AHTO questions so the results are not comparable. Despite the difference in prevalence between the Welsh survey and that reported here, the relative prevalence of the types of harm were similar; being kept awake at night, feeling uncomfortable or anxious at a social occasion and having a serious argument were the most prevalent harms in both surveys.

Being a hazardous/harmful drinker increased the odds of experiencing AHTO. This is perhaps unsurprising given that drinking with other drinkers and in places where alcohol is consumed increases one's exposure to drinkers. However the association with drinking and experiencing alcohol-harm is not conclusive. A cross-sectional comparison of harm from 'heavy drinking' friends and family across five Nordic countries and Scotland reported that drinking frequency was not

significantly related to experiencing harm from others but binge drinking frequency was. A higher frequency of binge drinking increased the risk of experiencing AHTO in Sweden and Norway and there was some evidence for this relationship in Finland also, but not in the other countries. [7] A paper using the same Norwegian data showed that the association between experiencing harm and one's own drinking was not evident for all types of harm. [6] Another cross-sectional survey showed a dose response relationship between how much a person drinks and experiencing AHTO, with dependent drinkers having the greatest risk. [4]

Here, age was also predictive of experiencing any harm and aggressive harm. A number of studies from a range of countries have reported that being of younger age increases the risk of being harmed from another's drinking. [4-7 18] However, 'younger age' in this context does not always mean 'young'; one study, for example, concluded that those aged 59 or less had a higher risk of being negatively affected by a known drinker than those aged 60 and over. [7] A global survey of 63,725 respondents aged 18-34 years reported that those aged 18-24 years were significantly more likely to experience an aggressive AHTO than those aged 30-34 or 25-29; [4] similar to results reported here.

The respondent's sex was not a significant risk factor for experiencing harm. The literature is mixed regarding sex as a risk factor. Women were reported to be significantly more likely to experience harm than men in Finland and Sweden but not in Denmark, Iceland, Norway or Scotland. [5 6] Being a woman was found to be a significant risk factor for all harms and aggressive harms using data from the Global Drug Survey. [4] Women have also been identified as being at higher risk of harm in the USA. [19] The association of sex and experiencing harm is different for different types of harm. For example women are significantly more likely than men to experience unwanted sexual attention/sexual harassment or assault [4 6] whereas men are more likely to have clothing, property or other belongings damaged. [4 6]

Few studies have considered whether ethnic background is a risk factor for experiencing harm. Data from the USA demonstrate that the link between ethnicity and experience of harm is not conclusive. [18 19] Here, being White British was significantly associated with experiencing harm and also aggressive harm. Most minority ethnic groups in United Kingdom have higher rates of abstinence from alcohol and lower levels of drinking than people of white ethnicity. [20] However the results of the multivariate modelling presented in this study show that White British ethnicity is predictive of experiencing harm and aggressive harm independently of AUDIT score.

Measures such as educational attainment, type of accommodation and employment status are proxy measures for socio-economic status. Here findings show that experiencing harm was significantly associated with having qualifications (compared to having none) with the highest risk being for those with a degree or higher degree. It is difficult to compare these results to the literature because of differences in the ways education is measured. Data from a Danish national survey showed no clear association between experiencing harm and education level with education categorised as low (completion up to year 11), middle (high school/technical college) and high (college or university). [21] Data from the Global Drug Survey showed no association between education and experience of harm or aggressive harm but there was an association between education and experiencing particular types of harm. [4]

The current study shows that being retired is protective of harm and aggressive harm compared to all other employment statuses. This association was independent of age. The risk of being harmed did not differ significantly between those who were employed and not employed. Data from two surveys conducted in the USA show that those who were unemployed were significantly more likely to experience AHTO than those who were employed. [18 19] Data from Denmark show that

employment might be significantly associated with experiencing harm but no conclusive results were provided and the wide confidence intervals show that estimates lacked precision. [21]

Here, compared to those that owned their home outright, those who rented from a private landlord were significantly more likely to experience harm and those who rented from the local authority or rented from a private landlord were significantly more likely to experience an aggressive harm. Having a disability was a significant predictor of experiencing any harm and an aggressive harm. No previous studies on the association between type of accommodation tenure or having a disability and experiencing harm were identified. Being in the family stage of life was also protective of experiencing harm compared to being single. This is perhaps surprising given that the survey included questions which specifically asked about harms most likely caused by a family member. Evidence on the effect of relationships and household types is mixed and largely dependent on the way these are categorised and so cannot be directly compared.

This study identified friends and strangers as the dominant perpetrators making up around 46% of all reports, though the perpetrator varied depending on type of harm. For example, family members made up a larger proportion of perpetrators of harms such as stopping seeing someone or having to care for someone because of their drinking. In terms of frequency of harm, while three quarters of harms were experienced less than monthly, 5.2% were experienced daily or almost daily indicating a considerable burden for of alcohol-related harm for a section of the population. The frequency of experiencing harm was largely dependent on the type of harm. Harms with the highest frequency of daily/almost daily reports were those which occurred over a prolonged period of time and/or implied frequent contact with the perpetrator such as caring for someone with a long-term health condition or disability that results from them drinking. Data from two surveys suggest that exposure to heavy drinkers is associated with poorer health, wellbeing and quality of life. [22 23]

To conclude, this is the largest ever survey of AHTO conducted within the United Kingdom and the first national study in England. It is clear that AHTO is relatively prevalent and that some individuals experience harm frequently. The most prevalence harms could be considered insignificant but even apparently minor harms such as sleep disruption can have an impact on health and quality of life, [24] particularly if experienced persistently. It is difficult to compare results with the literature because of the diversity of methods being employed. In order to support temporal and geographic comparisons it would be advantageous for studies to use a consistent methodology including the sampling and data collection methods, in addition to the harm questions. The WHO-ThaiHealth project has designed a survey to measure AHTO in order to facilitate international comparison. [25 26] While lengthy, the use of this would be a good way to develop a comprehensive and consistent evidence base. However it is clear that there are differences across harm types and more detailed analysis of specific harms would be valuable in terms of supporting remedial action from policymakers. Research on the types of alcohol consumption patterns that increase the likelihood of experiencing AHTO would be valuable. Understanding what puts younger adults at increased risk could be a useful focus for future research as it might identify the contextual factors which make experiencing harm more likely.

ACKNOWLEDGEMENTS

The authors would like to thank the alcohol expert forum of the five nations Public Health Peer Network for initiating this work and to PHE for funding it. Thanks also to the following people in PHE: Craig Timpson for quality assuring the analyses, Helen Outhwaite for help with searching for literature, Robyn Burton and Helen Willey for their input into early conversations about methods. Thanks to Dr Jamie Brown, University College London, for permitting the harm to others questions to be appended to the alcohol toolkit survey and for his subsequent support with interpretation of the alcohol toolkit survey questions. Finally, thanks to Ipsos MORI for delivering the survey, in particular Stuart Smedley.

COMPETING INTERESTS

None declared.

FUNDING

The work was funded by Public Health England.

AUTHORS' CONTRIBUTIONS

CB provided day to day management of the study, helped design the questionnaire and wrote the first draft. DB did the analysis and helped to write the first draft. JM undertook a systematic review of the literature. KS was involved with the initiation, helped design the questionnaire and provided statistical support. CP was involved with the initiation of the study. CH was involved with the initiation of the study and helped design the questionnaire. All authors reviewed and helped to revise successive drafts and approved the final version of the manuscript.

REFERENCES

1. World Health Organization. Global stauts report on alcohol and health. Geneva: World Health Organization, 2014.
2. World Health Organization. Global strategy to reduce the harmful use of alcohol. Geneva: World Health Organization, 2010.
3. Office for National Statistics. Chapter 5: Violent crime and sexual offences - alcohol-related violence. London: Office for National Statistics, 2015.
4. Bellis M, Quigg Z, Hughes K, et al. Harm from other people's drinking: an international survey of their occurance, impacts on feeling safe and legislation relating to their control. *BMJ Open* 2015;5
5. Moan I, Storvoll E, Sundin E, et al. Experienced harm from other people's drinking: a comparison of Northern European countries. *Substance Abuse Research and Treatment* 2015;9(S(2)):45-57.
6. Storvoll E, Moan I, Lund I. Negative consequences of other people'd drinking: prevalence, perpetrators and locations. *Drug and Alcohol Review* 2016;2016
7. Ramstedt M, Sundin E, Moan I, et al. Harm experienced from the heavy drinking of family and friends in the general population: A comparative study of six norther European countries. *Substance Abuse Research and Treatment* 2015;9(S2)
8. Burton R, Henn C, Lavoie D, et al. A rapid evidence review of the effectiveness and cost-effectiveness of alcohol polices: an English perspective. *The Lancet* 2016 doi: http://dx.doi.org/10.1016/S0140-6736(16)32420-5
9. Beard E, Brown J, West R, et al. Protocol for a national monthly survey of alcohol use in England with 6-month follow up: 'The Alcohol Toolkit Survey'. *BMC Public Health* 2015;15:230.
10. Barbor T, Higgins-Biddle J, Saunders J, et al. AUDIT: The alcohol use disorders identification test, guidelines for use in primary care. 2nd edition. Geneva: World Health Organization, 2001.
11. StataCorp. Stata survey data reference manual: release 13. Texas: StataCorp LP, 2013.
12. Rao J, Scott A. On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *Annals of Statistics* 1981;12:46-60.
13. Johnson T. Sources of error in substance use prevalence surveys. *International Scholarly Research Notices* 2014;2014 doi: http://dx.doi.org/10.1155/2014/923290
14. Quigg Z, Bellis AM, Grey H, et al. Alcohol's harms to others: the harms from other people's alcohol consumption in Wales. Cardiff: Public Health Wales, 2016.
15. Office for National Statistics. Estimates of violent incidents where the victim believed the offender(s) to be under the influence of alcohlol or drugs in England and Wales, year ending March 2006 to year ending March 2016 Crime Survey for England and Wales, 2017.
16. Greenfield T, Midanik L, Rogers J. Effects of telephone versus face-to-face interview models on reports of alcohol consumption. *Addiction* 2000;95(2):277-84.
17. Gell L, Ally A, Buykx P, et al. Alcohol's harm to others. Sheffield: The University of Sheffield, 2015.
18. Karriker-Jaffe K, Greenfield T. Gender differences in associations of neighbourhood disadvantage with alcohol's harms to others: a cross-sectional study from the United States. *Drug and Alcohol Review* 2014;33(3):296-303.
19. Greenfield T, Karriker-Jaffe K, Kaplan L, et al. Trands in alcohol's harms to others (AHTO) and co-occurrece of family-related AHTO: the four US National Alcohol Surveys, 2000-2015. *Substance Abuse Research and Treatment* 2015;2015(9(S2)):23-31.
20. Hurcombe R, Bayley M, Goodman A. Ethnicity and alcohol: a review of the UK literature. York: Joseph Rowntree Foundation, 2010.

21. Seid A, Grittner U, Greenfield T, et al. To cause harm and to be harmed by others: new perspectives on alcohol's harm to others. *Substance Abuse Research and Treatment* 2015;2015(S2):13-22.
22. Casswell S, You R, Huckle T. Alcohol's harm to others: reduced wellbeing and health status for those with heavy drinkers in their lives. *Addiction* 2011;106(6):1087-94.
23. Jiang H, Callinan S, Laslett A, et al. Correlates of caring for the drinkers and others among those harmed by another's drinking. *Drug and Alcohol Review* 2015;34:162-69.
24. Muzet A. Environmental noise, sleep and health. *Sleep medicine reviews* 2007;12(2):135-42.
25. World Health Organization/ThaiHealth International Collaboration Research Project. The Harm to Others from Drinking. Geneva: World Health Organization, 2012.
26. Callinan S, Laslett A, Rekve D, et al. Alcohol's harm to others: An international collaborative project. *International Journal of Alcohol and Drug Research* 2016;5(2):25-32.

Figure Legends

Figure 1: Perpetrators as a percentage of all reported harms to others

Figure 2: Frequency of all reported harms to others

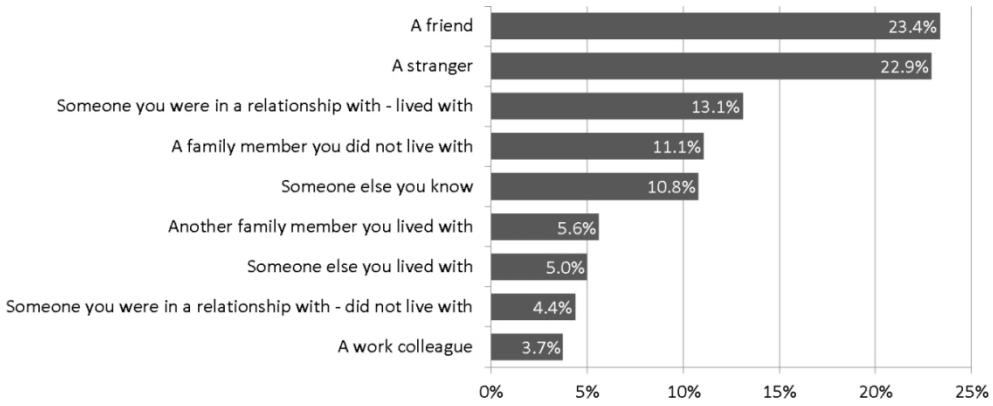

Figure 1: Perpetrators as a percentage of all reported harms to others

159x63mm (220 x 220 DPI)

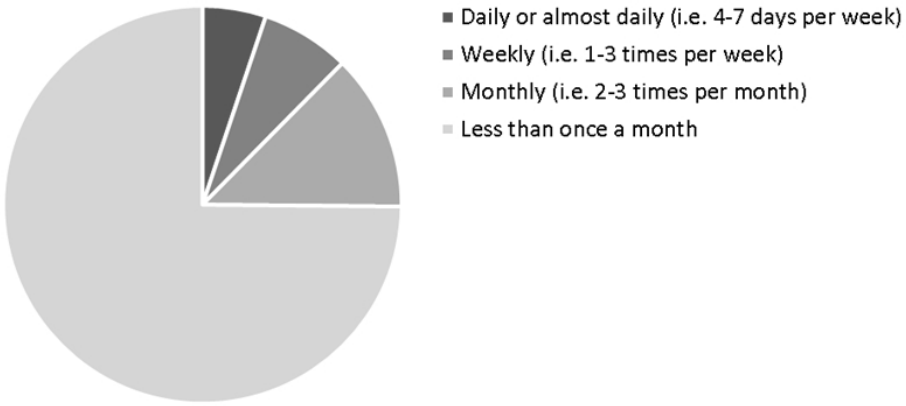

Figure 2: Frequency of all reported harms to others

144x64mm (150 x 150 DPI)

Supplementary Table 1: Perpetrator of harm by harm type (continued on the next page)

Harm type		Someone you were in a relationship with (e.g. wife/husband, partner) who you lived with			Someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with			Another family member you lived with			A family member you did not live with		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Had a serious argument that did NOT include physical violence	No	199	76.9	70.4-82.4	240	92.7	89.0-95.2	240	92.7	88.6-95.3	216	83.5	77.7-88.0
	Yes	60	23.1	17.6-29.6	19	7.3	4.8-11.0	19	7.3	4.7-11.4	43	16.5	12.0-22.3
Felt physically threatened	No	136	88.5	82.2-92.8	149	97.0	92.4-98.8	148	96.7	92.0-98.6	145	94.5	89.6-97.2
	Yes	18	11.5	7.2-17.8	5	3.0	1.2-7.6	5	3.3	1.4-8.0	8	5.5	2.8-10.5
Been emotionally hurt or neglected	No	121	76.1	67.7-82.9	137	85.9	78.7-91.0	146	92.0	86.4-95.4	116	72.7	64.2-79.8
	Yes	38	23.9	17.1-32.3	22	14.1	9.1-21.3	13	8.0	4.6-13.6	43	27.3	20.2-35.8
Been physically hurt due to them assaulting me or acting violently	No	66	79.8	69.2-87.4	79	95.0	86.3-98.3	76	90.8	80.5-95.9	73	88.1	76.8-94.3
	Yes	17	20.2	12.6-30.8	4	5.0	1.7-13.7	8	9.2	4.1-19.6	10	11.9	5.7-23.2
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	44	87.2	74.1-94.2	47	91.5	79.3-96.8	51	99.2	94.4-99.9	44	86.6	72.0-94.2
	Yes	7	12.8	5.8-25.9	4	8.5	3.2-20.7	0	0.8	0.1-5.6	7	13.4	5.8-28.0
Been put at risk in a car when someone was driving after drinking	No	62	89.5	78.5-95.2	65	93.6	83.4-97.7	63	90.4	79.6-95.8	66	96.1	87.9-98.8
	Yes	7	10.5	4.8-21.5	4	6.4	2.3-16.6	7	9.6	4.2-20.4	3	4.0	1.2-12.1
Felt forced or pressured into sex or something sexual	No	21	76.7	54.0-90.2	23	83.4	61.0-94.2	26	95.4	70.5-99.4	26	95.8	72.8-99.5
	Yes	6	23.3	9.8-46.0	5	16.6	5.8-39.0	1	4.7	0.6-29.5	1	4.2	0.5-27.2
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	280	91.7	87.4-94.6	297	97.3	94.5-98.7	299	97.8	95.2-99.0	271	88.9	84.3-92.3
	Yes	25	8.3	5.4-12.6	8	2.7	1.3-5.5	7	2.2	1.0-4.9	34	11.1	7.7-15.7
Had someone break or damage something that mattered to me	No	75	82.8	72.5-89.8	87	96.0	88.6-98.6	80	88.2	78.4-93.9	82	90.8	82.1-95.5
	Yes	16	17.2	10.2-27.5	4	4.0	1.4-11.4	11	11.8	6.1-21.6	8	9.2	4.5-17.9
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	30	66.5	49.1-80.4	44	95.9	83.2-99.1	40	87.5	73.4-94.6	40	89.1	72.6-96.2
	Yes	15	33.5	19.6-50.9	2	4.1	0.9-16.8	6	12.5	5.4-26.6	5	10.9	3.8-27.4
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	45	87.4	75.3-94.0	49	96.9	87.6-99.3	48	94.1	82.4-98.2	41	80.9	65.9-90.2
	Yes	6	12.6	6.0-24.7	2	3.1	0.7-12.4	3	5.9	1.8-17.6	10	19.2	9.8-34.1
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	47	87.5	73.5-94.6	52	96.4	86.2-99.2	49	91.0	79.4-96.4	34	62.4	47.2-75.5
	Yes	7	12.5	5.4-26.5	2	3.6	0.8-13.8	5	9.0	3.6-20.6	20	37.6	24.5-52.8
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	136	81.1	73.5-86.9	160	95.2	90.7-97.6	156	92.8	87.8-95.8	137	81.4	74.1-87.0
	Yes	32	18.9	13.1-26.5	8	4.8	2.4-9.4	12	7.2	4.2-12.2	31	18.6	13.0-25.9
Been kept awake due to noise or disruption	No	346	93.3	89.8-95.7	362	97.7	95.2-98.9	348	94.1	90.8-96.3	359	97.0	94.5-98.4
	Yes	25	6.7	4.3-10.2	8	2.3	1.1-4.8	22	5.9	3.7-9.2	11	3.0	1.6-5.5
Drank alcohol myself in order to cope with the problems caused by their drinking	No	22	76.9	53.4-90.6	25	87.3	66.8-95.9	27	93.8	76.5-98.6	25	86.0	62.0-95.9
	Yes	7	23.1	9.4-46.6	4	12.7	4.1-33.2	2	6.2	1.4-23.5	4	14.0	4.1-38.0
Had to stop seeing or being in contact with someone because of their drinking	No	92	80.6	71.2-87.4	107	93.9	87.2-97.2	106	92.7	85.9-96.3	86	75.9	66.1-83.6
	Yes	22	19.4	12.6-28.8	7	6.1	2.8-12.8	8	7.3	3.7-14.1	27	24.1	16.4-33.9
Had to move out of my usual place of residence and stay somewhere else	No	12	55.3	31.0-77.3	21	97.4	81.0-99.7	13	59.9	34.8-80.7	20	95.4	80.5-99.0
	Yes	10	44.7	22.7-69.0	1	2.6	0.3-19.0	9	40.1	19.3-65.2	1	4.6	1.0-19.5
Had to contact the police	No	93	87.0	79.0-92.2	105	97.8	93.1-99.3	101	94.8	88.4-97.8	95	88.8	79.1-94.3
	Yes	14	13.0	7.8-21.0	2	2.2	0.7-6.9	6	5.2	2.2-11.6	12	11.2	5.7-20.9

Supplementary Table 1: Perpetrator of harm by harm type (continued from the previous page)

Harm type		Someone else you lived with			A friend			A work colleague			Someone else you know			A stranger		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Had a serious argument that did NOT include physical violence	No	244	94.1	90.2-96.5	167	64.3	57.5-70.5	249	96.2	92.5-98.1	233	90.0	85.0-93.4	225	86.8	81.4-90.8
	Yes	15	5.9	3.5-9.9	93	35.7	29.5-42.6	10	3.8	1.9-7.5	26	10.0	6.6-15.0	34	13.2	9.2-18.6
Felt physically threatened	No	153	99.6	97.4-100.0	130	84.6	77.0-90.0	151	98.2	93.0-99.6	132	85.7	78.0-91.1	61	39.5	30.9-48.8
	Yes	1	0.4	0.1-2.6	24	15.4	1.0-23.0	3	1.8	0.4-7.0	22	14.3	8.9-22.0	93	60.5	51.2-69.1
Been emotionally hurt or neglected	No	147	92.5	85.9-96.1	115	72.5	64.0-79.6	154	97.0	91.9-98.9	152	95.7	91.1-97.9	150	94.3	88.7-97.2
	Yes	12	7.6	3.9-14.1	44	27.6	20.5-36.0	5	3.0	1.1-8.1	7	4.3	2.1-8.9	9	5.7	2.8-11.3
Been physically hurt due to them assaulting me or acting violently	No	82	97.9	93.2-99.4	71	85.4	74.7-92.0	79	94.4	79.9-98.6	74	89.3	79.5-94.7	57	68.5	56.4-78.5
	Yes	2	2.1	0.6-6.8	12	14.7	8.0-25.3	5	5.6	1.4-20.1	9	10.7	5.3-20.5	26	31.5	21.5-43.6
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	46	89.5	73.4-96.3	30	59.5	43.6-73.5	49	97.0	86.4-99.4	49	96.8	90.0-99.0	32	62.5	46.3-76.2
	Yes	5	10.6	3.7-26.6	21	40.5	26.5-56.4	2	3.0	0.6-13.6	2	3.2	1.0-10.0	19	37.6	23.8-53.7
Been put at risk in a car when someone was driving after drinking	No	69	99.1	93.7-99.9	46	66.7	54.0-77.4	66	95.0	84.4-98.5	59	85.3	74.7-91.9	52	75.5	61.6-85.6
	Yes	1	0.9	0.1-6.3	23	33.3	22.6-46.0	3	5.0	1.5-15.6	10	14.7	8.1-25.3	17	24.5	14.4-38.4
Felt forced or pressured into sex or something sexual	No	24	86.3	62.9-95.9	22	80.3	58.5-92.2	27	100.0	-	23	85.5	65.7-94.8	22	81.0	55.8-93.5
	Yes	4	13.7	4.1-37.1	5	19.7	7.8-41.5	0	0.0	-	4	14.5	5.2-34.3	5	19.0	6.5-44.2
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	294	96.5	93.0-98.3	205	67.2	61.0-72.8	276	90.6	86.0-93.8	264	86.7	81.8-90.4	200	65.6	59.3-71.5
	Yes	11	3.5	1.8-7.0	100	32.8	27.2-39.0	29	9.4	6.2-14.1	41	13.4	9.6-18.3	105	34.4	28.5-40.7
Had someone break or damage something that mattered to me	No	87	95.7	88.5-98.5	50	55.8	43.0-67.9	89	97.8	90.6-99.5	81	89.9	80.6-95.0	82	90.9	82.1-95.6
	Yes	4	4.3	1.5-11.5	40	44.2	32.1-57.0	2	2.2	0.5-9.4	9	10.1	5.0-19.4	8	9.1	4.4-17.9
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	40	88.9	72.6-96.0	29	63.0	46.6-76.8	45	98.1	87.0-99.8	43	95.6	86.2-98.7	44	97.1	80.6-99.6
	Yes	5	11.1	4.0-27.4	17	37.0	23.2-53.4	1	1.9	0.2-13.0	2	4.4	1.3-13.8	1	3.0	0.4-19.4
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	50	98.6	90.0-99.8	47	91.1	77.3-96.9	49	95.8	74.8-99.4	36	70.7	54.6-82.9	39	77.1	62.5-87.2
	Yes	1	1.4	0.2-10.0	5	8.9	3.1-22.7	2	4.2	0.6-25.2	15	29.3	17.1-45.4	12	22.9%	12.8-37.5
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	53	97.9	91.0-99.5	41	75.7	60.0-86.6	53	97.8	84.9-99.7	49	91.2	78.1-96.8	51	94.6	85.4-98.1
	Yes	1	2.2	0.5-9.0	13	24.3	13.4-40.0	1	2.2	0.3-15.1	5	8.8	3.2-21.9	3	5.4	1.9-14.6
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	157	93.7	87.6-96.9	95	56.6	48.1-64.7	150	89.4	82.1-94.0	156	93.0	86.7-96.5	162	96.4	91.9-98.5
	Yes	11	6.4	3.1-12.4	73	43.5	35.4-51.9	18	10.6	6.1-17.9	12	7.0	3.5-13.3	6	3.6	1.5-8.1
Been kept awake due to noise or disruption	No	325	87.7	83.7-90.9	314	84.8	80.3-88.4	365	98.5	96.3-99.4	296	80.1	75.0-84.3	187	50.5	44.7-56.2
	Yes	45	12.3	9.1-16.3	56	15.2	11.6-19.7	6	1.5	0.6-3.8	74	20.0	15.7-25.1	183	49.5	43.8-55.3
Drank alcohol myself in order to cope with the problems caused by their drinking	No	27	92.2	73.8-98.0	22	75.7	54.3-89.1	28	95.7	81.5-99.1	26	90.3	75.9-96.5	27	93.4	70.9-98.8
	Yes	2	7.9	2.0-26.2	7	24.3	10.9-45.7	1	4.3	0.9-18.5	3	9.7	3.5-24.1	2	6.6	1.2-29.1
Had to stop seeing or being in contact with someone because of their drinking	No	109	95.8	86.4-98.8	71	62.4	52.3-71.6	108	95.0	87.1-98.1	102	89.5	82.3-94.0	109	95.6	88.8-98.4
	Yes	5	4.2	1.2-13.6	43	37.6	28.4-47.7	6	5.0	1.9-12.9	12	10.5	6.0-17.7	5	4.4	1.6-11.2
Had to move out of my usual place of residence and stay somewhere else	No	21	100.0	-	18	82.9	62.3-93.4	21	100.0	-	20	94.0	63.8-99.3	20	94.1	74.7-98.8
	Yes	0	0.0	-	4	17.1	6.6-37.7	0	0.0	-	1	6.0	0.7-36.2	1	5.9	1.2-25.3
Had to contact the police	No	105	98.4	93.2-99.6	96	89.5	81.3-94.3	106	98.7	91.3-99.8	87	81.5	71.2-88.7	59	55.3	44.3-65.8
	Yes	2	1.6	0.4-6.8	11	10.5	5.7-18.7	1	1.3	0.2-8.7	20	18.5	11.3-28.8	48	44.7	34.2-55.7

Supplementary Table 2: Frequency of harm by harm type (as a percentage of those who experienced each harm)

	Frequency	Percentage		95% CI
had a serious argument that did NOT include physical violence	Daily or almost daily (i.e. 4-7 days per week)	1.4	0.4	4.4
	Weekly (i.e. 1-3 times per week)	4.8	2.7	8.6
	Monthly (i.e. 2-3 times per month)	7.0	4.3	11.3
	Less than once a month	86.7	81.5	90.6
felt physically threatened	Daily or almost daily (i.e. 4-7 days per week)	4.6	2.1	9.9
	Weekly (i.e. 1-3 times per week)	4.4	2.0	9.7
	Monthly (i.e. 2-3 times per month)	7.6	3.8	14.8
	Less than once a month	83.3	75.2	89.2
been emotionally hurt or neglected	Daily or almost daily (i.e. 4-7 days per week)	9.0	5.0	15.5
	Weekly (i.e. 1-3 times per week)	7.6	4.1	13.4
	Monthly (i.e. 2-3 times per month)	15.1	10.0	22.3
	Less than once a month	68.3	59.6	75.9
been physically hurt due to them assaulting me or acting violently	Daily or almost daily (i.e. 4-7 days per week)	7.1	2.6	18.2
	Weekly (i.e. 1-3 times per week)	6.3	2.0	17.7
	Monthly (i.e. 2-3 times per month)	11.0	5.5	20.8
	Less than once a month	75.6	62.8	85.0
been physically hurt due to them accidentally injuring me (eg by falling on me)	Daily or almost daily (i.e. 4-7 days per week)	3.9	0.9	15.7
	Weekly (i.e. 1-3 times per week)	8.1	2.8	21.3
	Monthly (i.e. 2-3 times per month)	11.7	5.0	24.7
	Less than once a month	76.3	61.2	86.8
been put at risk in a car when someone was driving after drinking	Daily or almost daily (i.e. 4-7 days per week)	8.6	3.4	19.9
	Weekly (i.e. 1-3 times per week)	3.2	0.7	13.0
	Monthly (i.e. 2-3 times per month)	8.5	3.3	20.1
	Less than once a month	79.7	66.6	88.6
felt forced or pressured into sex or something sexual	Daily or almost daily (i.e. 4-7 days per week)	2.4	0.3	17.6
	Weekly (i.e. 1-3 times per week)	4.5	0.5	28.7
	Monthly (i.e. 2-3 times per month)	2.1	0.3	15.5
	Less than once a month	91.0	72.0	97.5
felt uncomfortable or anxious at a social occasion (eg a party)	Daily or almost daily (i.e. 4-7 days per week)	1.5	0.6	3.9
	Weekly (i.e. 1-3 times per week)	1.0	0.4	2.6
	Monthly (i.e. 2-3 times per month)	8.0	5.3	12.0
	Less than once a month	89.5	85.2	92.6
had someone break or damage something that mattered to me	Daily or almost daily (i.e. 4-7 days per week)	3.2	0.9	10.7
	Weekly (i.e. 1-3 times per week)	5.0	1.9	12.5
	Monthly (i.e. 2-3 times per month)	7.4	3.6	14.5
	Less than once a month	84.4	74.9	90.8
had money that would have improved the quality of my life spent on their alcohol-related purchases	Daily or almost daily (i.e. 4-7 days per week)	6.3	1.9	19.1
	Weekly (i.e. 1-3 times per week)	7.6	2.1	24.0
	Monthly (i.e. 2-3 times per month)	35.8	21.3	53.4
	Less than once a month	50.3	33.7	66.7
felt genuinely concerned that they may cause harm to my children or someone else's children	Daily or almost daily (i.e. 4-7 days per week)	6.1	1.8	18.1
	Weekly (i.e. 1-3 times per week)	7.1	2.4	19.2
	Monthly (i.e. 2-3 times per month)	24.5	12.9	41.4
	Less than once a month	62.3	45.7	76.5
had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	Daily or almost daily (i.e. 4-7 days per week)	19.4	10.2	33.8
	Weekly (i.e. 1-3 times per week)	15.6	7.5	29.7
	Monthly (i.e. 2-3 times per month)	28.0	16.5	43.6
	Less than once a month	37.0	23.8	52.4
been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	3.9	1.7	8.6
	Weekly (i.e. 1-3 times per week)	9.6	5.5	16.4
	Monthly (i.e. 2-3 times per month)	13.6	8.9	20.3
	Less than once a month	72.9	64.6	79.8
been kept awake due to noise or disruption	Daily or almost daily (i.e. 4-7 days per week)	2.4	1.3	4.3
	Weekly (i.e. 1-3 times per week)	12.1	9.0	16.1
	Monthly (i.e. 2-3 times per month)	18.4	14.5	23.2
	Less than once a month	67.1	61.7	72.2
drank alcohol myself in order to cope with the problems caused by their drinking	Daily or almost daily (i.e. 4-7 days per week)	5.2	1.0	22.4
	Weekly (i.e. 1-3 times per week)	20.7	8.1	43.5
	Monthly (i.e. 2-3 times per month)	42.5	23.0	64.8
	Less than once a month	31.6	14.9	54.9
had to stop seeing or being in contact with someone because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	19.3	11.9	29.6
	Weekly (i.e. 1-3 times per week)	10.4	5.5	18.7

	Frequency	Percentage		95% CI
	Monthly (i.e. 2-3 times per month)	9.4	5.2	16.5
	Less than once a month	61.0	50.1	70.8
had to move out of my usual place of residence and stay somewhere else	Daily or almost daily (i.e. 4-7 days per week)	8.1	1.6	31.8
	Weekly (i.e. 1-3 times per week)	12.0	2.5	42.1
	Monthly (i.e. 2-3 times per month)	6.1	1.3	24.8
	Less than once a month	73.8	47.4	89.8
had to contact the police	Daily or almost daily (i.e. 4-7 days per week)	7.8	3.6	16.2
	Weekly (i.e. 1-3 times per week)	6.5	2.6	15.5
	Monthly (i.e. 2-3 times per month)	7.5	3.8	14.1
	Less than once a month	78.2	67.9	85.9

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	3-4
Bias	9	Describe any efforts to address potential sources of bias	3 (sampling) and 5 (weighting)
Study size	10	Explain how the study size was arrived at	3-4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	5
		(*c*) Explain how missing data were addressed	5
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	5
		(*e*) Describe any sensitivity analyses	NA

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8 and 10
		(b) Indicate number of participants with missing data for each variable of interest	Not included due to space. We can add this as another supplementary table.
Outcome data	15*	Report numbers of outcome events or summary measures	8 and 10
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-11
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	5

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-021046.R1
Article Type:	Research
Date Submitted by the Author:	17-May-2018
Complete List of Authors:	Beynon, Caryl; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Bayliss, David; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Mason, Jenny; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Sweeney, Kate; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Perkins, Clare; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Henn, Clive; Public Health England, Alcohol, Drugs and Tobacco Division, Health Improvement Directorate
Primary Subject Heading:	Public health
Secondary Subject Heading:	Epidemiology, Health policy
Keywords:	alcohol-related harm to others, alcohol, violence

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Beynon C, Bayliss D, Mason J, Sweeney K, Perkins, C, Henn C

Corresponding author: Caryl Beynon

Address: Risk Factor Intelligence Team, Health Improvement Directorate, Public Health England, Suite 3b, Cunard Building, Water Street, Liverpool, L3 1DS, United Kingdon
Email: caryl.beynon@phe.gov.uk
Telephone: 0151 706 6205

Co-Authors:

David Bayliss, Risk Factors Intelligence Team, Public Health England, Manchester, United Kingdom.

Jenny Mason, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Kate Sweeney, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clare Perkins, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clive Henn, Alcohol, Drugs and Tobacco Division, Public Health England, London, United Kingdom.

ABSTRACT

Objectives: to estimate the prevalence, the frequency and the perpetrators of alcohol-related harm to others and identify factors associated with experiencing harm and aggressive harm.

Design: Cross-sectional survey.

Setting: England.

Participants: Adults (general population) aged 16 and over.

Outcome measures: Percentage of respondents who experienced harm. Socio-economic and demographic factors (exposures) associated with the outcome (harm/no harm and aggressive harm/no aggressive harm [physically threatened, physically hurt and forced/pressured into something sexual]) were identified.

Results: The weighted sample was 4,874; 20.1% (95% confidence interval [CI] 18.9-21.4) reported experiencing harm in the previous 12 months and 4.6% (95% CI 4.0-5.4) reported experiencing an aggressive harm. Friends and strangers were the dominant perpetrators of harm. Most harms occurred less than monthly but 5.2% of respondents experienced harm daily/almost daily. Factors associated with experiencing harm were: younger age, drinking harmfully/hazardously, White British, having a disability, being educated and living in private rented accommodation (compared to being an owner occupier). Being in the family stage of life (defined as having children in the household) and being retired (compared to being employed) had significantly lower odds of harm Factors associated with experiencing an aggressive harm were similar.

Conclusions: This exploratory study shows that alcohol-related harm to others affects a sizable proportion of the population of England. Even apparently insignificant harms, like being kept awake, can have a negative impact on health, while aggressive harms are clearly of concern. That 5% of respondents experience harm daily/almost daily suggests a population of people with a particularly high burden likely to affect health. Using a standard methodology to measure harm across studies would be advantageous. Policies that focus on alcohol must take into consideration the impact of drinking on those other than the drinker.

STRENGHTS AND LIMITATIONS OF THE STUDY

- This is the largest survey on alcohol-related harm to others in the United Kingdom and the first national survey in England.
- The sampling approach and weighting ensured the data were representative of the population of England.
- There is potential selection bias which is inherent in all national surveys.
- The use of a bespoke survey made comparison of the findings with the literature difficult but when the study was initiated no universally accepted survey was identified.

Key words: alcohol-related harm to others, alcohol, violence

Word count: 5849

INTRODUCTION

The detrimental effect of alcohol is well documented; in 2012 alcohol consumption was responsible for approximately 6% of deaths and 5% of disease burden globally.[1] The focus has been on the harmful effects of alcohol on the drinker with less attention on the harms caused to others, including families, work colleagues and wider society. The World Health Organization's (WHO) global alcohol strategy highlights the need to consider the harm alcohol causes to people other than the drinker,[2] and it is these alcohol-related harms to others (AHTO) that are the focus of this study.

Health and social data provide insight into the potential harms caused by another's drinking. Data from the Crime Survey for England and Wales, for example, show that in just over half of all violent crimes the victim perceived the offender to be under the influence of alcohol and that alcohol use is particularly implicated in violent incidents between strangers.[3] Data from the Department of Transport show that during 2013 to 2015, there were almost 10,000 alcohol-related road traffic accidents in England which at least one driver failed the alcohol breathalyser test (data are available at: https://fingertips.phe.org.uk/profile/local-alcohol-profiles), demonstrating a considerable potential harm to both the drinking driver and to others on the roads.

In the last decade or so a number of studies have aimed to quantify and explore in more detail AHTO. These studies have provided widely varying estimates of the prevalence of harm, largely due to differences in the way harms are defined and the reference population. Studies which focus on identifying the socio-demographic and behavioural factors associated with being the victim of harm do not always provide consistent findings, suggesting the need for further research. While there is a relatively consistent finding across studies that younger age increases the likelihood of experiencing harm[4-6], the association of harm with other characteristics is less clear. For example, generally women have been identified as more at risk of harm from another's drinking than men but this is not consistent across all countries and some authors report this association for certain types of harm only.[4-7] Two studies have, for example, identified that women are more likely to experience unwanted sexual attention/harassment/assault, whereas men were more likely to experience having their belongings or property damaged.[4 6]

When the impact of alcohol includes the effects to the individual drinker and wider society, the cost is considerable. A review of studies in high-income countries show the gross economic costs of alcohol to range from 1.4% to 2.7% of gross domestic product; in the United Kingdom this would be equivalent to between £27 billion and £52 billion in 2016.[8] There is a need to better understand AHTO and the characteristics of those affected in order to implement an effective response. To date there has been no national survey of AHTO in England. The objectives of this exploratory study were to estimate the prevalence of AHTO in England, identify factors associated with being the victim of harm, the frequency with which this harm occurs and the perpetrators of harm.

METHOD

The survey

The questions to identify experience of AHTO were devised after an evidence review and were appended to the Alcohol Toolkit Survey (ATS) between 1st November 2015 and 31st January 2016. The ATS is a cross-sectional household survey, run by University College London and administered by Ipsos Mori using computer-assisted interviews. Each month a new sample of adults aged 16 and over who live in England complete the survey. Households are selected using a type of random location sampling which is a hybrid of random probability sampling and simple quota sampling (so that each monthly sample is representative of the population). Interviews are conducted with one member of the selected household.[9] The AHTO questions were self-

completed on guidance from the Research Support and Governance Office, Public Health England. Due to the novel and exploratory nature of the work, no formal sample size calculation was undertaken as the parameters on which to base this were unknown. Instead, a three month window of data collection was chosen, knowing that the ATS aimed to survey approximately 1,800 adults per month.[9]

The AHTO questions asked whether or not the respondent had experienced the following harms from another's drinking in the past 12 months:

Because of someone else's drinking I have….

1. Had a serious argument that did not include physical violence.
2. Felt physically threatened.
3. Been emotionally hurt or neglected.
4. Been physically hurt due to them assaulting me or acting violently.
5. Been physically hurt due to them accidentally injuring me (e.g. by falling on me).
6. Been put at risk in a car when someone was driving after drinking.
7. Felt forced or pressured into sex or something sexual.
8. Felt uncomfortable or anxious at a social occasion (e.g. a party).
9. Had someone break or damage something that mattered to me.
10. Had money that would have improved the quality of my life spent on their alcohol-related purchases.
11. Felt genuinely concerned that they may cause harm to my children or someone else's children.
12. Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking.
13. Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking.
14. Been kept awake due to noise or disruption.
15. Drank alcohol myself in order to cope with the problems caused by their drinking.
16. Had to stop seeing or being in contact with someone because of their drinking.
17. Had to move out of my usual place of residence and stay somewhere else.
18. Had contact with the police.

If a respondent indicated that they had experienced any of the harms they were asked to indicate who perpetrated the harm and the frequency with which the harm occurred. Response options for who perpetrated the harm were: someone you were in a relationship with (e.g. wife/husband, partner) who you lived with; someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with; another family member you lived with; a family member you did not live with; someone else you lived with; a friend; a work colleague; someone else you know; a stranger; refused/prefer not to say and don't know. Response options for the frequency of harm were: daily or almost daily (i.e. 4-7 days per week); weekly (i.e. 1-3 times per week); monthly (i.e. 2-3 times per month); less than once a month; refused/prefer not to say and don't know.

A range of demographic and socio-economic variables, collected as part of the ATS, were used as independent variables: sex (female, male); age band in years (16-24, 25-44, 45-64, 65 and over); broad ethnic group (White British, Other White, Black, Asian, Other); life stage (single, pre-family, family, post-family); educational attainment (no qualifications, GSCE/O-level/CSE, A-level/vocational, degree/higher degree, other/still studying); social grade (AB [higher managerial, administrative and professional], C1 [supervisory, clerical and junior managerial, administrative and professional], C2 [skilled manual workers], D [semi-skilled and unskilled manual workers], E [state pensioners, casual and lowest grade workers, unemployed with state benefits only]); tenure of home (owned outright, bought on a mortgage, rented from local authority, rented from private landlord, other); self-defined disability (yes, no) and employment status (employed, unemployed,

economically inactive, retired). 'Life stage' was derived from age, marital status and number of children living in the household and is defined as follow: single (up to the age of 39, not married/in a civil partnership and no children in the household), pre-family (up to the age of 39, married/in a civil partnership and no children in the household), family (children living in the household) and post family (aged 40 and over, no children in the household). The respondents' alcohol consumption was measured using the Alcohol Use Disorders Identification Test (AUDIT) which can be used to identify hazardous and harmful drinkers. Here hazardous/harmful drinkers were identified as those with scores of eight or more if aged 65 or under, and scores of seven or more if aged over 65, in line with WHO guidance.[10]

Analysis

Respondents who refused to complete the AHTO questions and those who chose the 'don't know' or 'refused/prefer not to say' responses for all 18 harm questions were excluded from all analyses. Chi square tests were used to compare the characteristics of those who were included in the analysis to those that were excluded due to missing data on the AHTO questions. Individuals who failed to provide a valid response to other questions were excluded from the analysis of that particular independent variable. People with one or more missing covariate were excluded from the multivariate analyses.

Two binary dependent variables were created. 'Any harm' was coded as yes if a person had experienced any of the 18 harm types in the previous 12 months. 'Aggressive harm' was coded as yes if the person had experienced one or more of the following three harms: felt physically threatened, been physically hurt due to them assaulting me or acting violently and felt forced or pressured into sex or something sexual. The categorisation of 'aggressive harm' is in line with previous research on AHTO.[4]

All analyses were undertaken using Stata 13 and the 'svy' command prefix for analysing survey data. Prevalence was estimated by dividing the positive responses by the total responses for each harm type, any harm and aggressive harm; 95% confidence intervals (CI) were calculated for each prevalence estimate using the standard settings of Stata's 'svy: tabulate' command.[11] Bivariate independence was tested using a 'corrected' Pearson chi-squared statistic for survey data [design-based *F* tests based on Rao and Scott correction].[12] Multivariate analyses (binary logistic regression) were conducted to model the joint effects of the independent variables significantly associated with any harm and aggressive harm in the bivariate analyses with 'no harm' and 'no aggressive harm' as the reference categories. Adjusted odds ratios (AOR) are given in comparison to the reference category for the given variable and *t* tests provide an indication of statistical significance. Where comparisons are presented between categories of a variable where neither is the reference category, an indication of statistical significance is given using adjusted Wald tests. Analyses were weighted (using weights generated by the ATS) in order to improve the representativeness of the sample relative to an English population profile using multiple socio-demographic variables.[9] Due to the exploratory nature of the analysis, α is set at 0.05 for all tests. The risk of type I error is considered less important than the risk of type II error: deflating α may limit further investigation at a point where the evidence base is developing.

Patient and public involvement

Patients and the public were not involved in this study.

Ethics and funding

Approval for the ATS was granted by University College London's ethics committee (reference: 0498/001) and for the AHTO questions by the Research Support and Governance Office, Public Health England (reference: R&D 055). This work was funded by Public Health England.

RESULTS

Missing data

The original (unweighted) sample size was 5,068. The proportion of missing data was relatively small; 96 people (1.9%) did not complete the AHTO questions and a further 91 (1.8%) answered 'don't know/refused' to all of the AHTO questions; both groups were excluded from the analyses leaving an unweighted sample size of 4,881 (or 96.3% of the original sample). Supplementary Table 1 compares the number/proportion of people included in the analyses with those who were excluded because they did not provide a response to the AHTO questions, by independent variable. There were significant differences in the proportion of people that were included and excluded for sex, tenure of home, disability and AUDIT score. Of the 4,881 people included in the bivariate analyses, 189 (3.9%) were excluded from the multivariate analyses because one or more independent variable was missing.

Prevalence of harm

Table 1 reports the estimated prevalence of each type of harm; 20.1% (95% CI 18.9%-21.4%) of people reported experiencing at least one harm due to someone else's drinking in the past 12 months. These data by sex are reported in Supplementary Table 2. While the numbers are too small to make a comprehensive assessment of the differences by sex (and such differences are not the focus of this paper), some disparities in harm are evident. Aggressive harms were experienced by 4.6% (95% CI 4.0%-5.4%) of respondents.

Table 1: Prevalence of harm in the previous 12 months, weighted data

Harm type	Number of respondents who experienced harm	Percentage of respondents who experienced harm	95% CI
Been kept awake due to noise or disruption	390	8.0	7.2 - 8.9
Felt uncomfortable or anxious at a social occasion (e.g. a party)	331	6.8	6.0 - 7.6
Had a serious argument that did NOT include physical violence	275	5.7	5.0 - 6.4
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	174	3.6	3.0 - 4.2
Been emotionally hurt or neglected	170	3.5	3.0 - 4.1
Felt physically threatened	164	3.4	2.8 - 4.0
Had to stop seeing or being in contact with someone because of their drinking	120	2.5	2.0 - 3.0
Had to contact the police	117	2.4	2.0 - 2.9
Had someone break or damage something that mattered to me	95	1.9	1.5 - 2.5
Been physically hurt due to them assaulting me or acting violently	92	1.9	1.5 - 2.4
Been put at risk in a car when someone was driving after drinking	75	1.5	1.2 - 2.0
Felt genuinely concerned that they may cause harm to my children or someone else's children	61	1.2	0.9 - 1.6
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	57	1.2	0.9 - 1.5
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	53	1.1	0.8 - 1.5
Had money that would have improved the quality of my life spent on their alcohol-related purchases	50	1.0	0.8 - 1.4
Drank alcohol myself in order to cope with the problems caused by their drinking	33	0.7	0.5 - 1.0
Felt forced or pressured into sex or something sexual	33	0.7	0.5 - 1.0
Had to move out of my usual place of residence and stay somewhere else	25	0.5	0.3 - 0.8
At least one reported harm	980	20.1	18.9 - 21.4
At least one aggressive harm	225	4.6	4.0 – 5.4

Weighted N = 4,874.

Bivariate and multivariate results (factors associated with harm)

Factors associated with experiencing any harm in the bivariate analyses are reported in Table 2. Experience of harm decreased with age. This trend by age was reflected in experience of harm by life stage, with 36.5% (95% CI 32.8%-40.5%) of single people experiencing harm compared to 15.0% (95% CI 13.4%-16.7%) of those in a 'post-family' life stage. White British people were more likely to report experiencing harm (21.8%, 95% CI 20.3%-23.4%) than people of other broad ethnic groups; people of Asian ethnicity had the lowest prevalence (10.9%, 95% CI 8.2%-14.2%). People with no qualifications were least likely to report experiencing harm (9.9%, 95% CI 7.9%-12.5%).Those whose highest attainment was A-level or vocational had the highest prevalence (26.7%, 95% CI 24.1%-29.3%). People in the private-rented sector had the highest harm prevalence by tenure (29.9%, 95% CI 26.9%-33.1%). This compares to just 14.0% (95% CI 12.3%-16.0%) of people who owned their home outright experiencing harm. People who considered themselves disabled were more likely to report having experienced harm than those who did not (24.0%, 95% CI 20.3%-28.1%, compared to 19.7%, 95% CI 18.4%-21.1%). Those who were unemployed (26.8%, 95% CI 21.0%-33.6%) or economically inactive (26.8%, 95% CI 24.0%-29.9%) were more likely to report harm than those employed (22.0%, 95% CI 20.2%-24.0%); the difference between the unemployed and employed was not significant. Retired people were much less likely to report experiencing at least one harm (9.1%, 95% CI 7.5%-10.9%) than all other employment statuses. The prevalence of AHTO

was significantly higher among hazardous/harmful drinkers (37.9%, 95% CI 33.9%-42.1%) compared to those who were not (17.3%, 95% CI 16.0%-18.6%).

In the multivariate model, young age remained a strong risk factor for experiencing harm due to someone else's drinking, with those aged 16-24 significantly more likely to report experiencing harm than all older age groups (Table 2). Being a hazardous/harmful drinker was a strong risk factor, with odds of experiencing harm around double the odds of those who were not hazardous/harmful drinkers. Being White British compared to being in an Other White, Black or Asian ethnic group was also associated with increased risk of experiencing harm, as was considering oneself disabled, being educated, and living in private rented accommodation relative to being an owner occupier. Being in the family stage of life reduced the odds of experiencing harm compared to those that were single, as did being retired compared to those who were employed.

Table 2: Bivariate and multivariate comparisons of harm versus no harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Independent variable	No harm			Harm					
	N	%	95% CI	N	%	95% CI	AOR	p	95% CI
Sex									
Female	2,008	80.1	78.3 - 81.8	498	19.9	18.2 - 21.7	Not entered into the model		
Male	1,887	79.7	77.7 - 81.4	482	20.3	18.6 - 22.3			
Age band †									
16-24	446	63.4	59.6 - 67.0	258	36.6	33.0 - 40.4	Reference		
25-44	1,278	78.4	76.0 - 80.7	352	21.6	19.3 - 24.0	0.63	<0.001	0.49 - 0.83
45-64	1237	81.5	79.1 - 83.7	281	18.5	16.3 - 20.9	0.50	<0.001	0.34 - 0.75
65+	933	91.2	89.3 - 92.9	90	8.8	7.1 - 10.7	0.36	<0.001	0.21 - 0.61
Broad ethnic group†									
White British	2,975	78.2	76.7 - 79.7	830	21.8	20.3 - 23.4	Reference		
Other White groups	334	84.9	80.4 - 88.5	59	15.1	11.5 - 19.6	0.52	<0.001	0.36 - 0.76
Black groups	151	83.9	78.6 - 88.1	29	16.1	11.9 - 21.4	0.61	0.017	0.41 - 0.92
Asian groups	376	89.1	85.8 - 91.8	46	10.9	8.2 - 14.2	0.39	<0.001	0.28 - 0.56
Other groups	44	82.2	68.7 - 90.7	9	17.8	9.3 - 31.3	0.60	0.154	0.30 - 1.21
Life stage†									
Single	436	63.5	59.5 - 67.2	251	36.5	32.8 - 40.5	Reference		
Pre-family	222	72.2	65.6 - 77.9	86	27.8	22.1 - 34.4	0.91	0.620	0.61 - 1.34
Family	1,285	81.1	78.8 - 83.2	299	18.9	16.8 - 21.2	0.68	0.006	0.52 - 0.89
Post family	1,950	85.0	83.3 - 86.6	344	15.0	13.4 - 16.7	0.85	0.433	0.56 - 1.28
Education†									
No qualifications	683	90.1	87.5 - 92.2	75	9.9	7.8 - 12.5	Reference		
GCSE/O-level/CSE	764	79.3	76.2 - 82.1	199	20.7	17.9 - 23.8	1.74	<0.001	1.25 - 2.44
A-level/vocational	974	73.3	70.7 - 75.9	354	26.7	24.1 - 29.3	2.04	<0.001	1.48 - 2.82
Degree/higher degree	1,156	79.3	76.8 - 81.7	301	20.7	18.3 - 23.2	2.16	<0.001	1.56 - 3.00
Other/still studying	294	85.6	81.2 - 89.1	50	14.4	10.9 - 18.9	1.42	0.109	0.92 - 2.18
Social grade‡									
AB	1,066	80.8	78.0 - 83.3	254	19.2	16.7 - 22.0	Not entered into the model		
C1	1,023	77.4	75.0 - 79.6	299	22.6	20.4 - 25.0			
C2	878	81.7	78.8 - 84.4	196	18.3	15.6 - 21.2			
D	614	82.5	79.1 - 85.4	131	17.5	14.6 - 20.9			
E	313	75.8	71.8 - 79.4	100	24.2	20.6 - 28.2			
Tenure†									
Owned outright	1,451	86.0	84.0 - 87.8	237	14.0	12.3 - 16.0	Reference		
Bought on a mortgage	1,142	79.2	76.4 - 81.6	301	20.9	18.4 - 23.6	0.97	0.825	0.74 - 1.28
Rented from local authority	341	78.8	74.6 - 82.5	92	21.2	17.6 - 25.4	1.38	0.060	0.99 - 1.94
Rented from private landlord	678	70.1	66.9 - 73.1	289	29.9	26.9 - 33.1	1.52	0.004	1.15 - 2.01
Other	248	81.1	76.7 - 84.8	58	19.0	15.2 - 23.4	1.11	0.562	0.77 - 1.61
Disability†									
Considers self disabled	396	76.0	71.9 - 79.7	125	24.0	20.3 - 28.1	Reference		
Not disabled	3,422	80.3	78.9 - 81.6	842	19.7	18.4 - 21.1	0.56	<0.001	0.42 - 0.74
Employment status†									
Employed	2,081	78.0	76.0 - 79.8	588	22.0	20.2 - 24.0	Reference		
Unemployed	157	73.2	66.4 - 79.0	58	26.8	21.0 - 33.6	1.09	0.648	0.75 - 1.58
Economically inactive	634	73.2	70.1 - 76.1	232	26.8	24.0 - 29.9	1.01	0.896	0.81 - 1.27
Retired	1,021	90.9	89.1 - 92.5	102	9.1	7.5 - 10.9	0.54	<0.001	0.38 - 0.78
AUDIT†									
Not hazardous/harmful drinking	3,463	82.7	81.4 - 84.0	723	17.3	16.0 - 18.6	Reference		
Hazardous/harmful drinking	419	62.1	57.9 - 66.1	256	37.9	33.9 - 42.1	2.06	<0.001	1.66 - 2.56

Weighted N = 4,874 (bivariate analyses) and 4,698 (multivariate analysis). Bivariate totals that are 4,875 not 4,874 are due to rounding as the analyses use weighted data.
AOR: adjusted odds ratio.
†test of bivariate independence indicates significant difference ($p<0.05$).
‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Aggressive harm

In bivariate analyses, men were marginally more likely to experience an aggressive harm than women (5.3% and 4.0% respectively, p=0.04, Table 3). The other characteristics associated with experiencing aggressive harms were similar to experiencing any harm, with a higher prevalence of aggressive harm associated with being younger, disabled, single, non-retired, White British, renting accommodation and being a hazardous/harmful drinker.

Controlling for other variables in the model, sex and stage of life were not associated with experiencing an aggressive harm (Table 3). Age remained associated with harm after adjustment for other variables; those aged 45 and over were significantly less likely to experience an aggressive harm than those aged 16-24. Disability was also a strong risk factor for experience of aggressive harm; the odds of experiencing aggressive harm for non-disabled people was just over a third of the odds for disabled people (adjusted OR=0.37, 95% CI 0.24-0.59). Housing tenure was a relatively strong risk factor, with the odds of experiencing an aggressive harm for renters around double the odds of those who are home owners. This was also the case for hazardous/harmful drinkers, with an adjusted odds ratio of 2.35 (95% CI 1.63-3.40) relative to those who were not hazardous/harmful drinkers. Being White British compared to being in the other White, Black or Asian ethnic groups was also associated with increased risk of experiencing an aggressive harm. Differences in the risk of experiencing aggressive harm, between people with different educational attainment were minimal; the only significant difference being the greater risk for those with a degree/higher degree relative to those with no qualifications. The odds of experiencing an aggressive harm for those that were retired remained significantly lower than the odds of an aggressive harm for those that were employed (AOR 0.33, 95% CI 0.13-0.83).

Table 3: Bivariate and multivariate comparisons of aggressive harm versus no aggressive harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Independent variable	No aggressive harm			Aggressive harm					
	N	%	95% CI	N	%	95% CI	AOR	p	95% CI
Sex†									
Male	2,242	94.7	93.5 - 95.6	127	5.3	4.4 - 6.5		Reference	
Female	2,407	96.1	95.1 - 96.8	99	4.0	3.2 - 4.9	0.74	0.086	0.53 - 1.04
Age band†									
16-24	646	91.7	89.1 - 93.6	59	8.4	6.4 - 10.9		Reference	
25-44	1,539	94.4	92.9 - 95.6	91	5.6	4.4 - 7.1	0.84	0.510	0.49 - 1.43
45-64	1,454	95.8	94.4 - 96.9	64	4.2	3.1 - 5.6	0.43	0.024	0.20 - 0.89
65+	1,010	98.8	98.0 - 99.3	12	1.2	0.7 - 2.0	0.29	0.044	0.09 - 0.97
Broad ethnic group†									
White British	3,605	94.8	93.8 - 95.5	200	5.3	4.5 - 6.2		Reference	
Other White groups	384	97.7	95.6 - 98.8	9	2.3	1.2 - 4.4	0.30	0.002	0.14 - 0.64
Black groups	176	97.6	95.1 - 98.8	4	2.4	1.2 - 4.9	0.37	0.020	0.16 - 0.86
Asian groups	411	97.5	95.4 - 98.7	11	2.5	1.4 - 4.7	0.43	0.023	0.21 - 0.89
Other groups	52	97.5	88.7 - 99.5	1	2.5	0.5 - 11.3	0.36	0.217	0.07 - 1.83
Life stage†									
Single	629	91.5	88.9 - 93.6	58	8.5	6.4 - 11.1		Reference	
Pre-family	286	92.9	88.2 - 95.9	22	7.1	4.2 - 11.8	1.23	0.573	0.60 - 2.50
Family	1,519	95.9	94.7 - 96.9	65	4.1	3.1 - 5.3	0.89	0.684	0.52 - 1.55
Post family	2,213	96.5	95.5 - 97.3	81	3.5	2.7 - 4.6	1.80	0.097	0.90 - 3.60
Education†									
No qualifications	739	97.5	96.0 - 98.4	19	2.6	1.6 - 4.0		Reference	
GCSE/O-level/CSE	911	94.6	92.6 - 96.1	52	5.4	3.9 - 7.4	1.75	0.069	0.96 - 3.21
A-level/vocational	1242	93.6	91.9 - 94.9	86	6.5	5.1 - 8.1	1.69	0.077	0.95 - 3.01
Degree/higher degree	1396	95.8	94.3 - 96.9	62	4.2	3.1 - 5.7	1.94	0.042	1.02 - 3.69
Other/still studying	337	97.9	95.8 - 99.0	7	2.1	1.0 - 4.2	0.88	0.788	0.36 - 2.16
Social grade‡									
AB	1,265	95.9	94.2 - 97.1	54	4.1	2.9 - 5.8	Not entered into the model		
C1	1,267	95.8	94.6 - 96.8	55	4.2	3.2 - 5.4			
C2	1,016	94.6	92.5 - 96.0	59	5.5	4.0 - 7.5			
D	718	96.4	94.5 - 97.6	27	3.6	2.4 - 5.5			
E	382	92.6	89.8 - 94.7	30	7.4	5.3 - 10.2			
Tenure†									
Owned outright	1,648	97.7	96.7 - 98.3	40	2.4	1.7 - 3.3		Reference	
Bought on a mortgage	1,386	96.0	94.5 - 97.2	57	4.0	2.8 - 5.5	1.03	0.918	0.57 - 1.88
Rented from local authority	405	93.5	90.4 - 95.6	28	6.5	4.4 - 9.6	2.58	0.006	1.31 - 5.09
Rented from private landlord	885	91.5	89.3 - 93.3	82	8.5	6.7 - 10.7	2.33	0.003	1.34 - 4.05
Other	287	94.0	91.0 - 96.0	18	6.0	4.0 - 9.0	2.04	0.039	1.04 - 4.02
Disability†									
Considers self disabled	477	91.4	88.4 - 93.7	45	8.6	6.3 - 11.7		Reference	
Not disabled	4,086	95.8	95.1 - 96.5	178	4.2	3.5 - 4.9	0.37	<0.001	0.24 - 0.59
Employment status†									
Employed	2,535	95.0	93.8 - 95.9	135	5.0	4.1 - 6.2		Reference	
Unemployed	204	95.0	91.3 - 97.2	11	5.0	2.8 - 8.7	0.62	0.166	0.32 - 1.22
Economically inactive	799	92.2	90.2 - 93.9	67	7.8	6.1 - 9.8	1.10	0.654	0.73 - 1.66
Retired	1,110	98.9	98.1 - 99.3	13	1.1	0.7 - 1.9	0.33	0.018	0.13 - 0.83
AUDIT†									
Not hazardous/harmful drinking	4,038	96.5	95.7 - 97.1	149	3.6	2.9 - 4.3		Reference	
Hazardous/harmful drinking	599	88.7	85.6 - 91.2	76	11.3	8.8 - 14.4	2.35	<0.001	1.63 - 3.40

Weighted N = 4,874 (bivariate analyses) and 4,698 (multivariate analysis). Bivariate totals that are 4,875 not 4,874 are due to rounding as the analyses use weighted data.
AOR: adjusted odds ratio.
†test of bivariate independence indicates significant difference ($p<0.05$).
‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Perpetrators of harm

The most frequently reported perpetrators of harms were friends (23.4% of total perpetrator reports) and strangers (22.9%), while work colleagues were the least reported perpetrators (3.7%, Figure 1). The perpetrator varied according to the type of harm (Supplementary Table 3). Focussing on the most common harms experienced, being kept awake due to noise or disruption was predominantly perpetrated by strangers (49.5%, 95% CI 43.8%-55.3%), while both strangers and friends were the most common cause of feeling uncomfortable or anxious at a social occasion (strangers 34.4%, 95% CI 28.5%-40.7%;

friends 32.8%, 95 CI 27.2%-39.0%). Serious arguments that did not include physical violence were predominantly perpetrated by friends (35.7%, 95% CI 29.5%-42.6%) or someone the respondent was in a relationship with and lived with (23.1%, 95% CI 17.6%-29.6%). Likewise, being let down by someone or being emotionally hurt or neglected were harm types perpetrated by people close to respondents.

Strangers were most likely to be the perpetrators of two of the aggressive harms: 60.5% (95% CI 51.2%-69.1%) of respondents reporting feeling physically threatened by a stranger and 31.5% (95% CI 21.5%-43.6%) of respondents reporting being physically hurt by a stranger. While 19.0% (95% CI 6.5%-44.2%) of respondents reported being forced or pressured into sex or something sexual by a stranger, the most commonly reported perpetrator for this sexual aggressive harm was someone the respondent was in a relationship with and lived with (23.3%, 95% CI 9.8%-46.0%; rising to 39.9% when also including people in a relationship who lived elsewhere).

Insert Figure 1 here.

Breaking perpetrator type down further by sex reveals significant differences (data not reported). Focusing on aggressive harms only, of those who had experienced an aggressive harm, women were more likely than men to report the perpetrator being someone they were in a relationship with and lived with. This is true for feeling physically threatened (21.2% vs 4.1%, $p<0.001$), being physically hurt (37.8% vs 6.3%, $p<0.001$) and being forced or pressured into sex or something sexual (though not with statistical significance due to small numbers of people reporting this type of harm, 34.3% vs 0.0%, $p=0.077$). In contrast, of those who had experienced an aggressive harm men were more likely than women to report feeling physically threatened by a stranger (71.4% vs 46.1%, $p=0.008$) and being physically hurt by stranger (42.2% vs 18.0%, $p=0.036$).

Frequency of harm

Figure 2 reports information on the frequency with which harms were experienced. The majority of reported harms were experienced less than once a month (74.8%); 12.8% experienced harm at least monthly but less than weekly, 7.2% experienced weekly but less than daily, and 5.2% experienced daily or almost daily.

Insert Figure 2 here.

The frequency of harm varied by harm type (Supplementary Table 4). The harm types reported to reoccur most often were those whose description implies that the harm occurs over a prolonged period of time with someone whom the respondent was in regular contact. These included ‘had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking’ (19.4% daily or almost daily, 95% CI 10.2%-33.8%) and ‘had to stop seeing or being in contact with someone because of their drinking’ (19.3% daily or almost daily, 95% CI 11.9%-29.6%). It was less common for other harms to be experienced at a daily or almost daily frequency. Nevertheless, all harm types had at least one respondent reporting daily or almost daily frequency of harm.

DISCUSSION

In this exploratory study one in five respondents experienced AHTO in the previous 12 months. The most commonly reported AHTO were being kept awake due to noise or disruption and feeling uncomfortable or anxious at a social occasion, which have been identified as the most prevalent harms in other studies.[4 5] More concerning, 4.6% reported experiencing an aggressive harm. Experiencing AHTO was associated with a number of demographic and socio-economic variables. Friends and strangers were the dominant perpetrators of AHTO. Most harms occurred less than monthly but some respondents experienced harm daily or almost daily.

The main strength of this study is its large sample size; this is the largest survey on AHTO to have been conducted in the United Kingdom and the first to provide data for England. The sampling and weighting strategy were employed to ensure the sample was representative of the English population and thus the generalisability of the findings. There are a number of limitations to note. Recall is always a problem with surveys; harms that occurred a year ago or had little impact on the respondent may be more difficult to recall. Attributing causality is not possible using a cross sectional design. There are also some social groups that are systematically missing from surveys such as homeless people, those in hospital or care homes and those who are incarcerated; populations whose alcohol use is likely different.[13] Previous studies on AHTO have also largely relied on cross-sectional surveys and are affected by the same limitations. A response rate could not be calculated because Ipsos Mori did not collect the necessary data. While the total amount of missing data is small, any missing data can potentially introduce bias. There were some significant differences in the characteristics of those that answered the AHTO questions and those that did not. The internal validity of the AHTO questions used here has not been measured; in the initial search of the literature the authors failed to identify a validated survey. Consequently it is possible that discrepancies exist between the responses provided by participants and their actual experience of alcohol-related harm. Finally, ecological fallacy, where the inferences about individuals are made based upon data for a group, is also a consideration in this type of study. It is likely that systematic differences exist in harm by population sub-groups (for example by sex and ethnicity) and future work on AHTO in the UK should explore this.

In this study the prevalence of harm was 20.1%. The closest comparison is from a cross-sectional survey conducted in Wales in 2015 which used identical AHTO questions and reported the prevalence of any harm in the previous 12 months to be 59.7%.[14] There is some evidence from routine data to support a lower prevalence of harm in England than Wales. For example, the percentage of violent incidents where the victim believed the offender(s) to be under the influence of alcohol tends to be higher in Wales than England[15] although not conclusively so. However, the magnitude of the difference in the reported prevalence of harm between England and Wales seems questionable, given the similarities between the two nations. This difference could be due, in part, to differences in methodology and caution needs to be applied in drawing direct comparisons. In England the harm questions were asked after the ATS questions; this may have affected how people perceived harm, and therefore how they responded to the harm questions. It is also possible that respondents were experiencing fatigue by the end of the survey and this may have affected how fully they reported their experiences of harm. The English survey was administered face-to-face while the survey in Wales was administered via the telephone using landline numbers. Using data from the USA, researchers comparing face-to-face and telephone interviews reported that telephone surveys may miss certain sections of the population if they solely rely on landlines, including those with lower incomes.[16] However the Welsh survey was weighted so the data were representative of the deprivation of the general population.[14] Other surveys of AHTO conducted in the United Kingdom have reported the prevalence of harm in adults to be 46.3%[5] and 51%[17] in Scotland and 79% in the North West of England,[17] however these studies used very different AHTO questions so the results are not comparable. Despite the difference in prevalence between the Welsh survey and the current study, the relative prevalence

of the types of harm were similar; being kept awake at night, feeling uncomfortable or anxious at a social occasion and having a serious argument were the most prevalent harms in both surveys.

Being a hazardous/harmful drinker increased the odds of experiencing AHTO. This is perhaps unsurprising given that drinking with other drinkers and in places where alcohol is consumed increases one's exposure to drinkers. However the association with drinking and experiencing alcohol-harm is not conclusive. A cross-sectional comparison of harm from 'heavy drinking' friends and family across five Nordic countries and Scotland reported that drinking frequency was not significantly related to experiencing harm from others but binge drinking frequency was. A higher frequency of binge drinking increased the risk of experiencing AHTO in Sweden and Norway and there was some evidence for this relationship in Finland also, but not in the other countries.[7] A paper using the same Norwegian data showed that the association between experiencing harm and one's own drinking was not evident for all types of harm.[6] Another cross-sectional survey showed a dose response relationship between how much a person drinks and experiencing AHTO, with dependent drinkers having the greatest risk.[4]

Here, age was also associated with experiencing any harm and aggressive harm. A number of studies from a range of countries have reported that being of younger age increases the risk of being harmed from another's drinking.[4-7 18] However, 'younger age' in this context does not always mean 'young'; one study, for example, concluded that those aged 59 or less had a higher risk of being negatively affected by a known drinker than those aged 60 and over.[7] A global survey of 63,725 respondents aged 18-34 years reported that those aged 18-24 years were significantly more likely to experience an aggressive AHTO than those aged 30-34 or 25-29;[4] similar to results reported here.

The respondent's sex was not a significant risk factor for experiencing harm. The literature is mixed regarding sex as a risk factor. Women were reported to be significantly more likely to experience harm than men in Finland and Sweden but not in Denmark, Iceland, Norway or Scotland.[5 6] Being a woman was found to be a significant risk factor for all harms and aggressive harms using data from the Global Drug Survey.[4] Women have also been identified as being at higher risk of harm in the USA.[19] The association of sex and experiencing harm is different for different types of harm. For example women are significantly more likely than men to experience unwanted sexual attention/sexual harassment or assault[4 6] whereas men are more likely to have clothing, property or other belongings damaged.[4 6] While examining differences in harm by sex was not the focus of this study, Supplementary Table 2 shows that such differences may exist and should be considered in future work on this topic in the United Kingdom.

Few studies have considered whether ethnic background is a risk factor for experiencing harm. Data from the USA demonstrate that the link between ethnicity and experience of harm is not conclusive.[18 19] Here, being White British was significantly associated with experiencing harm and also aggressive harm. Most minority ethnic groups in United Kingdom have higher rates of abstinence from alcohol and lower levels of drinking than people of white ethnicity.[20] However the results of the multivariate modelling presented in this study show that White British ethnicity is associated with experiencing harm and aggressive harm independently of AUDIT score.

Measures such as educational attainment, type of accommodation, social grade and employment status are proxy measures for socio-economic status. Literature on the effect of socio-economic status is mixed and comparisons are hindered by the multitude of different measures used. Here findings show that experiencing harm was significantly associated with having qualifications (compared to having none) with the highest risk being for those with a degree or higher degree. It is difficult to compare these results to the literature because of differences in the ways education is measured. Data from a Danish national survey showed no clear association between experiencing harm and education level with education categorised as low (completion up to year 11), middle

(high school/technical college) and high (college or university).[21] Data from the Global Drug Survey showed no association between education and experience of harm or aggressive harm but there was an association between education and experiencing particular types of harm.[4] In this study social grade was not significantly associated with harm or aggressive harm in the bivariate analyses.

The current study shows that being retired lowers the odds of experiencing harm and aggressive harm compared to all other employment statuses. This association was independent of age. The risk of being harmed did not differ significantly between those who were employed and not employed. Data from two surveys conducted in the USA show that those who were unemployed were significantly more likely to experience AHTO than those who were employed.[18 19] Data from Denmark show that employment might be significantly associated with experiencing harm but no conclusive results were provided and the wide confidence intervals show that estimates lacked precision.[21]

Here, compared to those that owned their home outright, those who rented from a private landlord were significantly more likely to experience harm and those who rented from the local authority or rented from a private landlord were significantly more likely to experience an aggressive harm. No previous studies on the association between type of accommodation tenure and experiencing harm were identified. It is possible that those who rent represent a more transitory and vulnerable population which increases their risk of harm. While it is premature to advocate a policy response to this exploratory data, an investigation of the applicability of smoke-free housing policies might be of relevance here. Having a disability was also significantly associated with experiencing any harm and an aggressive harm. No previous studies on the association between having a disability and experiencing harm were identified, although there is good evidence to suggest that adults with a disability are at a higher risk of experiencing violence in general.[22] In combination these findings suggest that vulnerable people may be more likely to experience AHTO. Being in the family stage of life also lowered the odds of experiencing harm compared to being single. This is perhaps surprising given that the survey included questions which specifically asked about harms most likely caused by a family member. Evidence on the effect of relationships and household types is mixed and largely dependent on the way these are categorised and so cannot be directly compared.

This study identified friends and strangers as the dominant perpetrators making up around 46% of all reports, though the perpetrator varied depending on type of harm. For example, family members made up a larger proportion of perpetrators of harms such as stopping seeing someone or having to care for someone because of their drinking. While differences by sex were not the focus of this paper, and were not investigated in detail, investigating perpetrator type by sex for aggressive harms revealed significant differences (data not reported). Women were more likely to be physically hurt and forced or pressured into something sexual by someone they were in a relationship with. In contrast, for men, strangers were the most likely perpetrators of being hurt physically and feeling threatened. These findings are in line with data from England and Wales on the relationship between offender and perpetrator,[23] and from previous research. A study in the US using the 2010 National Alcohol Survey reported that men were more likely to be assaulted in bar fights by strangers while women were more likely to be (sexually) assaulted by other drinkers (partners or acquaintances) within a more private setting.[24] The context within which drinking occurs is therefore relevant in relation to exploring differences in AHTO by sex.

While three quarters of harms were experienced less than monthly, 5.2% were experienced daily or almost daily indicating a considerable burden for of alcohol-related harm for a section of the population. The frequency of experiencing harm was largely dependent on the type of harm. Harms with the highest frequency of daily/almost daily reports were those which occurred over a prolonged period of time and/or implied frequent contact with the perpetrator such as caring for

someone with a long-term health condition or disability that results from them drinking. Data from two surveys suggest that exposure to heavy drinkers is associated with poorer health, wellbeing and quality of life.[25 26]

To conclude, this is the largest ever survey of AHTO conducted within the United Kingdom and the first national study in England. It is clear that AHTO is relatively prevalent and that some individuals experience harm frequently. The most prevalent harms could be considered insignificant but even apparently minor harms such as sleep disruption can have an impact on health and quality of life,[27] particularly if experienced persistently. It is difficult to compare results with the literature because of the diversity of methods being employed. In order to support temporal and geographic comparisons it would be advantageous for studies to use a consistent methodology including the sampling and data collection methods, in addition to the harm questions. The WHO ThaiHealth project has designed a survey to measure AHTO in order to facilitate international comparison[28 29] but unfortunately authors were not aware of this when they began this current study. While lengthy, using this would be a good way to develop a comprehensive and consistent evidence base. However it is clear that there are differences across harm types and more detailed analysis of specific harms would be valuable for supporting remedial action from policymakers. Here we consider 'aggressive harms' as a distinctive group of harms; future research could consider other harm groupings in order to provide a more detailed assessment of specific harm types. Research on the types of alcohol consumption patterns that increase the likelihood of experiencing AHTO in the United Kingdom would be valuable. Understanding what puts younger adults at increased risk could be a useful focus for future research as it might identify the contextual factors which make experiencing harm more likely. Further focus on the differences in harm by sex would also be advantageous as there is little data on this in relation to the United Kingdom. Policy to address AHTO is less well developed than policy that seeks to address harms to the drinker; exceptions include crime and violence and harm to the unborn foetus which have been included in previous Government's Alcohol Strategy.[30] Given that AHTO research is in its early stages it is premature to advocate a detailed policy response but results presented here will be of interest to policy makers to help understand the wider impact of other people's drinking.

ACKNOWLEDGEMENTS

The authors would like to thank the alcohol expert forum of the five nations Public Health Peer Network for initiating this work and to PHE for funding it. Thanks also to the following people in PHE: Craig Timpson for quality assuring the analyses, Helen Outhwaite for help with searching for literature, Robyn Burton and Helen Willey for their input into early conversations about methods. Thanks to Dr Jamie Brown, University College London, for permitting the harm to others questions to be appended to the alcohol toolkit survey and for his subsequent support with interpretation of the alcohol toolkit survey questions. Thanks to Ipsos MORI for delivering the survey, in particular Stuart Smedley. Finally, thanks for the four reviewers for their comments on the first draft of this paper.

COMPETING INTERESTS

None declared.

FUNDING

The work was funded by Public Health England.

AUTHORS' CONTRIBUTIONS

CB provided day to day management of the study, helped design the questionnaire and wrote the first draft. DB did the analysis and helped to write the first draft. JM undertook a review of the literature. KS was involved with the initiation, helped design the questionnaire and provided statistical support. CP was involved with the initiation of the study. CH was involved with the initiation of the study and helped design the questionnaire. All authors reviewed and helped to revise successive drafts and approved the final version of the manuscript.

DATA SHARING AGREEMENT

Sharing of data will be considered by PHE and UCL on a case-by-case basis. Please contact the lead author for further details.

REFERENCES

1. World Health Organization. Global stauts report on alcohol and health. Geneva: World Health Organization, 2014.
2. World Health Organization. Global strategy to reduce the harmful use of alcohol. Geneva: World Health Organization, 2010.
3. Office for National Statistics. Chapter 5: Violent crime and sexual offences - alcohol-related violence. London: Office for National Statistics, 2015.
4. Bellis M, Quigg Z, Hughes K, et al. Harm from other people's drinking: an international survey of their occurance, impacts on feeling safe and legislation relating to their control. *BMJ Open* 2015;5
5. Moan I, Storvoll E, Sundin E, et al. Experienced harm from other people's drinking: a comparison of Northern European countries. *Substance Abuse Research and Treatment* 2015;9(S(2)):45-57.
6. Storvoll E, Moan I, Lund I. Negative consequences of other people'd drinking: prevalence, perpetrators and locations. *Drug and Alcohol Review* 2016;2016
7. Ramstedt M, Sundin E, Moan I, et al. Harm experienced from the heavy drinking of family and friends in the general population: A comparative study of six norther European countries. *Substance Abuse Research and Treatment* 2015;9(S2)
8. Burton R, Henn C, Lavoie D, et al. A rapid evidence review of the effectiveness and cost-effectiveness of alcohol polices: an English perspective. *The Lancet* 2016 doi: http://dx.doi.org/10.1016/S0140-6736(16)32420-5
9. Beard E, Brown J, West R, et al. Protocol for a national monthly survey of alcohol use in England with 6-month follow up: 'The Alcohol Toolkit Survey'. *BMC Public Health* 2015;15:230.
10. Barbor T, Higgins-Biddle J, Saunders J, et al. AUDIT: The alcohol use disorders identification test, guidelines for use in primary care. 2nd edition. Geneva: World Health Organization, 2001.
11. StataCorp. Stata survey data reference manual: release 13. Texas: StataCorp LP, 2013.
12. Rao J, Scott A. On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *Annals of Statistics* 1981;12:46-60.
13. Johnson T. Sources of error in substance use prevalence surveys. *International Scholarly Research Notices* 2014;2014 doi: http://dx.doi.org/10.1155/2014/923290
14. Quigg Z, Bellis AM, Grey H, et al. Alcohol's harms to others: the harms from other people's alcohol consumption in Wales. Cardiff: Public Health Wales, 2016.
15. Office for National Statistics. Estimates of violent incidents where the victim believed the offender(s) to be under the influence of alcohlol or drugs in England and Wales, year ending March 2006 to year ending March 2016 Crime Survey for England and Wales, 2017.
16. Greenfield T, Midanik L, Rogers J. Effects of telephone versus face-to-face interview models on reports of alcohol consumption. *Addiction* 2000;95(2):277-84.
17. Gell L, Ally A, Buykx P, et al. Alcohol's harm to others. Sheffield: The University of Sheffield, 2015.
18. Karriker-Jaffe K, Greenfield T. Gender differences in associations of neighbourhood disadvantage with alcohol's harms to others: a cross-sectional study from the United States. *Drug and Alcohol Review* 2014;33(3):296-303.
19. Greenfield T, Karriker-Jaffe K, Kaplan L, et al. Trands in alcohol's harms to others (AHTO) and co-occurrece of family-related AHTO: the four US National Alcohol Surveys, 2000-2015. *Substance Abuse Research and Treatment* 2015;2015(9(S2)):23-31.
20. Hurcombe R, Bayley M, Goodman A. Ethnicity and alcohol: a review of the UK literature. York: Joseph Rowntree Foundation, 2010.
21. Seid A, Grittner U, Greenfield T, et al. To cause harm and to be harmed by others: new perspectives on alcohol's harm to others. *Substance Abuse Research and Treatment* 2015;2015(S2):13-22.

22. Hughes K, Bellis AM, Jones L, et al. Prevalence and risk of violence against adults with disabilities: a systematic review and meta-analysis of observational studies. *The Lancet* 2012;379(9826):1621-29.
23. Office for National Statistics. Overview of violent crime and sexual offences. Newport: Office for National Statistics, 2016.
24. Kaplan L, Karriker-Jaffe J, Greenfield K. Drinking context and alcohol's harm from others among men and women in the US National Alcohol Survey. *Journal of Substance Use* 2017;22(4):412-18.
25. Casswell S, You R, Huckle T. Alcohol's harm to others: reduced wellbeing and health status for those with heavy drinkers in their lives. *Addiction* 2011;106(6):1087-94.
26. Jiang H, Callinan S, Laslett A, et al. Correlates of caring for the drinkers and others among those harmed by another's drinking. *Drug and Alcohol Review* 2015;34:162-69.
27. Muzet A. Environmental noise, sleep and health. *Sleep medicine reviews* 2007;12(2):135-42.
28. World Health Organization/ThaiHealth International Collaboration Research Project. The Harm to Others from Drinking. Geneva: World Health Organization, 2012.
29. Callinan S, Laslett A, Rekve D, et al. Alcohol's harm to others: An international collaborative project. *International Journal of Alcohol and Drug Research* 2016;5(2):25-32.
30. HM Government. The Government's Alcohol Strategy. London: HM Government, 2012.

Figure Legends

Figure 1: Perpetrators as a percentage of all reported harms to others

Figure 2: Frequency of all reported harms to others

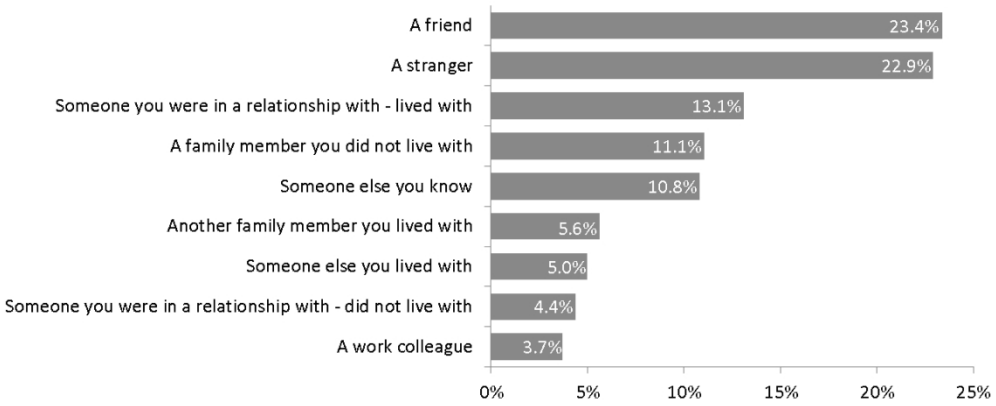

Figure 1: Perpetrators as a percentage of all reported harms to others

364x149mm (300 x 300 DPI)

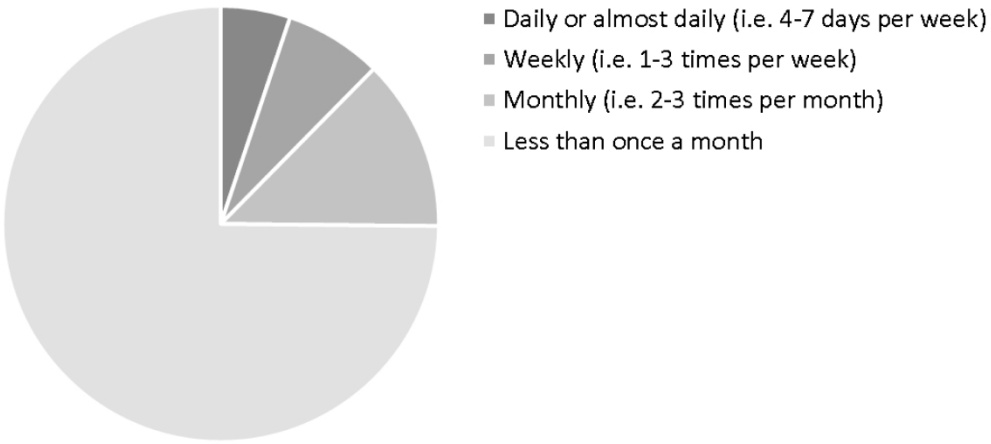

Figure 2: Frequency of all reported harms to others

292x132mm (300 x 300 DPI)

Supplementary Table 1: Examination of missing data, non-weighted data

Independent variable	Included (AHTO questions answered)		Excluded (AHTO questions not answered)		p value
	N	%	N	%	
Sex (N = 5,068)					
Female	2,397	96.9	76	3.1	0.023
Male	2,484	95.7	111	4.3	
Age band (N = 5,608)					
16-24	789	97.4	21	2.6	0.111
25-44	1,460	96.3	56	3.7	
45-64	1,435	95.5	68	4.5	
65+	1,197	96.6	42	3.4	
Broad ethnic group (N = 5,040)					
White British	3,603	96.2	142	3.8	0.125
Other White groups	393	98.3	7	1.8	
Black groups	262	95.6	12	4.4	
Asian groups	539	97.3	15	2.7	
Other groups	63	94.0	4	6.0	
Life stage (N = 5,067)					
Single	716	97.4	19	2.6	0.150
Pre-family	260	95.9	11	4.1	
Family	1,473	96.7	50	3.3	
Post family	2,431	95.8	107	4.2	
Education (5,039)					
No qualifications	866	97.2	25	2.8	0.075
GCSE/O-level/CSE	952	95.9	41	4.1	
A-level/vocational	1,334	97.2	39	2.8	
Degree/higher degree	1,335	95.4	64	4.6	
Other/still studying	368	96.1	15	3.9	
Social grade[†] (N = 5,068)					
AB	1,081	96.2	43	3.8	0.134
C1	1,554	95.8	68	4.2	
C2	947	96.7	32	3.3	
D	757	97.7	18	2.3	
E	542	95.4	26	4.6	
Tenure (N = 5,027)					
Owned outright	1,729	97.5	45	2.5	<0.001
Bought on a mortgage	1,124	95.4	54	4.6	
Rented from local authority	568	95.5	27	4.5	
Rented from private landlord	1,029	97.0	32	3.0	
Other	392	93.6	27	6.4	
Disability (N = 4,956)					
Considers self disabled	571	94.4	34	5.6	0.002
Not disabled	4,213	96.8	138	3.2	
Employment status (N = 5,066)					
Employed	2,306	95.9	98	4.1	0.121
Unemployed	237	98.8	3	1.3	
Economically inactive	1,009	96.1	41	3.9	
Retired	1,327	96.7	45	3.3	
AUDIT(N = 5,044)					
Not hazardous/harmful drinking	4,215	96.7	142	3.3	0.003
Hazardous/harmful drinking	649	94.5	38	5.5	

N = 5,068 (totals for independent variables will not equal 5,068 where the person did not provide responses to the AHTO questions and the independent variable.

[†]AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Supplementary Table 2: Prevalence of harm in the previous 12 months by sex, weighted data

Harm type	Number of respondents who experienced harm		Percentage of respondents who experienced harm	
	Men	Women	Men (95% CI)	Women (95% CI)
Been kept awake due to noise or disruption	177	213	7.5 (6.3-8.8)	8.5 (7.4-9.8)
Felt uncomfortable or anxious at a social occasion (e.g. a party)	160	171	6.8 (5.7-8.0)	6.8 (5.8-8.0)
Had a serious argument that did NOT include physical violence	129	147	5.4 (4.6-6.6)	5.8 (4.9-6.9)
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	82	92	3.5 (2.7-4.4)	3.7 (3.0-4.6)
Been emotionally hurt or neglected	50	120	2.1 (1.6-2.9)	4.8 (3.9-5.8)
Felt physically threatened	95	69	4.0 (3.2-5.1)	2.7 (2.1-3.6)
Had to stop seeing or being in contact with someone because of their drinking	47	73	2.0 (1.4-2.7)	2.9 (2.3-3.7)
Had to contact the police	56	62	2.4 (1.8-3.2)	2.5 (1.9-3.2)
Had someone break or damage something that mattered to me	52	43	2.2 (1.6-3.0)	1.7 (1.2-2.4)
Been physically hurt due to them assaulting me or acting violently	50	42	2.1 (1.5-2.9)	1.7 (1.2-2.3)
Been put at risk in a car when someone was driving after drinking	37	38	1.6 (1.1-2.3)	1.5 (1.1-2.1)
Felt genuinely concerned that they may cause harm to my children or someone else's children	18	43	0.7 (0.4-1.3)	1.7 (1.3-2.4)
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	24	33	1.0 (0.7-1.6)	1.3 (0.9-1.9)
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	16	37	0.7 (0.4-1.2)	1.5 (1.0-2.1)
Had money that would have improved the quality of my life spent on their alcohol-related purchases	18	32	0.8 (0.5-1.2)	1.3 (0.9-1.9)
Drank alcohol myself in order to cope with the problems caused by their drinking	19	14	0.8 (0.5-1.3)	0.5 (0.3-1.0)
Felt forced or pressured into sex or something sexual	12	20	0.5 (0.3-0.9)	0.8 (0.5-1.3)
Had to move out of my usual place of residence and stay somewhere else	9	16	0.4 (0.2-0.8)	0.6 (0.4-1.1)

Weighted N = 4,874.

Supplementary Table 3: Perpetrator of harm by harm type (continued on the next page)

Harm type		Someone you were in a relationship with (e.g. wife/husband, partner) who you lived with			Someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with			Another family member you lived with			A family member you did not live with		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Had a serious argument that did NOT include physical violence	No	199	76.9	70.4-82.4	240	92.7	89.0-95.2	240	92.7	88.6-95.3	216	83.5	77.7-88.0
	Yes	60	23.1	17.6-29.6	19	7.3	4.8-11.0	19	7.3	4.7-11.4	43	16.5	12.0-22.3
Felt physically threatened	No	136	88.5	82.2-92.8	149	97.0	92.4-98.8	148	96.7	92.0-98.6	145	94.5	89.6-97.2
	Yes	18	11.5	7.2-17.8	5	3.0	1.2-7.6	5	3.3	1.4-8.0	8	5.5	2.8-10.5
Been emotionally hurt or neglected	No	121	76.1	67.7-82.9	137	85.9	78.7-91.0	146	92.0	86.4-95.4	116	72.7	64.2-79.8
	Yes	38	23.9	17.1-32.3	22	14.1	9.1-21.3	13	8.0	4.6-13.6	43	27.3	20.2-35.8
Been physically hurt due to them assaulting me or acting violently	No	66	79.8	69.2-87.4	79	95.0	86.3-98.3	76	90.8	80.5-95.9	73	88.1	76.8-94.3
	Yes	17	20.2	12.6-30.8	4	5.0	1.7-13.7	8	9.2	4.1-19.6	10	11.9	5.7-23.2
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	44	87.2	74.1-94.2	47	91.5	79.3-96.8	51	99.2	94.4-99.9	44	86.6	72.0-94.2
	Yes	7	12.8	5.8-25.9	4	8.5	3.2-20.7	0	0.8	0.1-5.6	7	13.4	5.8-28.0
Been put at risk in a car when someone was driving after drinking	No	62	89.5	78.5-95.2	65	93.6	83.4-97.7	63	90.4	79.6-95.8	66	96.1	87.9-98.8
	Yes	7	10.5	4.8-21.5	4	6.4	2.3-16.6	7	9.6	4.2-20.4	3	4.0	1.2-12.1
Felt forced or pressured into sex or something sexual	No	21	76.7	54.0-90.2	23	83.4	61.0-94.2	26	95.4	70.5-99.4	26	95.8	72.8-99.5
	Yes	6	23.3	9.8-46.0	5	16.6	5.8-39.0	1	4.7	0.6-29.5	1	4.2	0.5-27.2
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	280	91.7	87.4-94.6	297	97.3	94.5-98.7	299	97.8	95.2-99.0	271	88.9	84.3-92.3
	Yes	25	8.3	5.4-12.6	8	2.7	1.3-5.5	7	2.2	1.0-4.9	34	11.1	7.7-15.7
Had someone break or damage something that mattered to me	No	75	82.8	72.5-89.8	87	96.0	88.6-98.6	80	88.2	78.4-93.9	82	90.8	82.1-95.5
	Yes	16	17.2	10.2-27.5	4	4.0	1.4-11.4	11	11.8	6.1-21.6	8	9.2	4.5-17.9
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	30	66.5	49.1-80.4	44	95.9	83.2-99.1	40	87.5	73.4-94.6	40	89.1	72.6-96.2
	Yes	15	33.5	19.6-50.9	2	4.1	0.9-16.8	6	12.5	5.4-26.6	5	10.9	3.8-27.4
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	45	87.4	75.3-94.0	49	96.9	87.6-99.3	48	94.1	82.4-98.2	41	80.9	65.9-90.2
	Yes	6	12.6	6.0-24.7	2	3.1	0.7-12.4	3	5.9	1.8-17.6	10	19.2	9.8-34.1
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	47	87.5	73.5-94.6	52	96.4	86.2-99.2	49	91.0	79.4-96.4	34	62.4	47.2-75.5
	Yes	7	12.5	5.4-26.5	2	3.6	0.8-13.8	5	9.0	3.6-20.6	20	37.6	24.5-52.8
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	136	81.1	73.5-86.9	160	95.2	90.7-97.6	156	92.8	87.8-95.8	137	81.4	74.1-87.0
	Yes	32	18.9	13.1-26.5	8	4.8	2.4-9.4	12	7.2	4.2-12.2	31	18.6	13.0-25.9
Been kept awake due to noise or disruption	No	346	93.3	89.8-95.7	362	97.7	95.2-98.9	348	94.1	90.8-96.3	359	97.0	94.5-98.4
	Yes	25	6.7	4.3-10.2	8	2.3	1.1-4.8	22	5.9	3.7-9.2	11	3.0	1.6-5.5
Drank alcohol myself in order to cope with the problems caused by their drinking	No	22	76.9	53.4-90.6	25	87.3	66.8-95.9	27	93.8	76.5-98.6	25	86.0	62.0-95.9
	Yes	7	23.1	9.4-46.6	4	12.7	4.1-33.2	2	6.2	1.4-23.5	4	14.0	4.1-38.0
Had to stop seeing or being in contact with someone because of their drinking	No	92	80.6	71.2-87.4	107	93.9	87.2-97.2	106	92.7	85.9-96.3	86	75.9	66.1-83.6
	Yes	22	19.4	12.6-28.8	7	6.1	2.8-12.8	8	7.3	3.7-14.1	27	24.1	16.4-33.9
Had to move out of my usual place of residence and stay somewhere else	No	12	55.3	31.0-77.3	21	97.4	81.0-99.7	13	59.9	34.8-80.7	20	95.4	80.5-99.0
	Yes	10	44.7	22.7-69.0	1	2.6	0.3-19.0	9	40.1	19.3-65.2	1	4.6	1.0-19.5
Had to contact the police	No	93	87.0	79.0-92.2	105	97.8	93.1-99.3	101	94.8	88.4-97.8	95	88.8	79.1-94.3
	Yes	14	13.0	7.8-21.0	2	2.2	0.7-6.9	6	5.2	2.2-11.6	12	11.2	5.7-20.9

Supplementary Table 3: Perpetrator of harm by harm type (continued from the previous page)

Harm type		Someone else you lived with			A friend			A work colleague			Someone else you know			A stranger		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Had a serious argument that did NOT include physical violence	No	244	94.1	90.2-96.5	167	64.3	57.5-70.5	249	96.2	92.5-98.1	233	90.0	85.0-93.4	225	86.8	81.4-90.8
	Yes	15	5.9	3.5-9.9	93	35.7	29.5-42.6	10	3.8	1.9-7.5	26	10.0	6.6-15.0	34	13.2	9.2-18.6
Felt physically threatened	No	153	99.6	97.4-100.0	130	84.6	77.0-90.0	151	98.2	93.0-99.6	132	85.7	78.0-91.1	61	39.5	30.9-48.8
	Yes	1	0.4	0.1-2.6	24	15.4	1.0-23.0	3	1.8	0.4-7.0	22	14.3	8.9-22.0	93	60.5	51.2-69.1
Been emotionally hurt or neglected	No	147	92.5	85.9-96.1	115	72.5	64.0-79.6	154	97.0	91.9-98.9	152	95.7	91.1-97.9	150	94.3	88.7-97.2
	Yes	12	7.6	3.9-14.1	44	27.6	20.5-36.0	5	3.0	1.1-8.1	7	4.3	2.1-8.9	9	5.7	2.8-11.3
Been physically hurt due to them assaulting me or acting violently	No	82	97.9	93.2-99.4	71	85.4	74.7-92.0	79	94.4	79.9-98.6	74	89.3	79.5-94.7	57	68.5	56.4-78.5
	Yes	2	2.1	0.6-6.8	12	14.7	8.0-25.3	5	5.6	1.4-20.1	9	10.7	5.3-20.5	26	31.5	21.5-43.6
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	46	89.5	73.4-96.3	30	59.5	43.6-73.5	49	97.0	86.4-99.4	49	96.8	90.0-99.0	32	62.5	46.3-76.2
	Yes	5	10.6	3.7-26.6	21	40.5	26.5-56.4	2	3.0	0.6-13.6	2	3.2	1.0-10.0	19	37.6	23.8-53.7
Been put at risk in a car when someone was driving after drinking	No	69	99.1	93.7-99.9	46	66.7	54.0-77.4	66	95.0	84.4-98.5	59	85.3	74.7-91.9	52	75.5	61.6-85.6
	Yes	1	0.9	0.1-6.3	23	33.3	22.6-46.0	3	5.0	1.5-15.6	10	14.7	8.1-25.3	17	24.5	14.4-38.4
Felt forced or pressured into sex or something sexual	No	24	86.3	62.9-95.9	22	80.3	58.5-92.2	27	100.0	-	23	85.5	65.7-94.8	22	81.0	55.8-93.5
	Yes	4	13.7	4.1-37.1	5	19.7	7.8-41.5	0	0.0	-	4	14.5	5.2-34.3	5	19.0	6.5-44.2
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	294	96.5	93.0-98.3	205	67.2	61.0-72.8	276	90.6	86.0-93.8	264	86.7	81.8-90.4	200	65.6	59.3-71.5
	Yes	11	3.5	1.8-7.0	100	32.8	27.2-39.0	29	9.4	6.2-14.1	41	13.4	9.6-18.3	105	34.4	28.5-40.7
Had someone break or damage something that mattered to me	No	87	95.7	88.5-98.5	50	55.8	43.0-67.9	89	97.8	90.6-99.5	81	89.9	80.6-95.0	82	90.9	82.1-95.6
	Yes	4	4.3	1.5-11.5	40	44.2	32.1-57.0	2	2.2	0.5-9.4	9	10.1	5.0-19.4	8	9.1	4.4-17.9
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	40	88.9	72.6-96.0	29	63.0	46.6-76.8	45	98.1	87.0-99.8	43	95.6	86.2-98.7	44	97.1	80.6-99.6
	Yes	5	11.1	4.0-27.4	17	37.0	23.2-53.4	1	1.9	0.2-13.0	2	4.4	1.3-13.8	1	3.0	0.4-19.4
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	50	98.6	90.0-99.8	47	91.1	77.3-96.9	49	95.8	74.8-99.4	36	70.7	54.6-82.9	39	77.1	62.5-87.2
	Yes	1	1.4	0.2-10.0	5	8.9	3.1-22.7	2	4.2	0.6-25.2	15	29.3	17.1-45.4	12	22.9%	12.8-37.5
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	53	97.9	91.0-99.5	41	75.7	60.0-86.6	53	97.8	84.9-99.7	49	91.2	78.1-96.8	51	94.6	85.4-98.1
	Yes	1	2.2	0.5-9.0	13	24.3	13.4-40.0	1	2.2	0.3-15.1	5	8.8	3.2-21.9	3	5.4	1.9-14.6
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	157	93.7	87.6-96.9	95	56.6	48.1-64.7	150	89.4	82.1-94.0	156	93.0	86.7-96.5	162	96.4	91.9-98.5
	Yes	11	6.4	3.1-12.4	73	43.5	35.4-51.9	18	10.6	6.1-17.9	12	7.0	3.5-13.3	6	3.6	1.5-8.1
Been kept awake due to noise or disruption	No	325	87.7	83.7-90.9	314	84.8	80.3-88.4	365	98.5	96.3-99.4	296	80.1	75.0-84.3	187	50.5	44.7-56.2
	Yes	45	12.3	9.1-16.3	56	15.2	11.6-19.7	6	1.5	0.6-3.8	74	20.0	15.7-25.1	183	49.5	43.8-55.3
Drank alcohol myself in order to cope with the problems caused by their drinking	No	27	92.2	73.8-98.0	22	75.7	54.3-89.1	28	95.7	81.5-99.1	26	90.3	75.9-96.5	27	93.4	70.9-98.8
	Yes	2	7.9	2.0-26.2	7	24.3	10.9-45.7	1	4.3	0.9-18.5	3	9.7	3.5-24.1	2	6.6	1.2-29.1
Had to stop seeing or being in contact with someone because of their drinking	No	109	95.8	86.4-98.8	71	62.4	52.3-71.6	108	95.0	87.1-98.1	102	89.5	82.3-94.0	109	95.6	88.8-98.4
	Yes	5	4.2	1.2-13.6	43	37.6	28.4-47.7	6	5.0	1.9-12.9	12	10.5	6.0-17.7	5	4.4	1.6-11.2
Had to move out of my usual place of residence and stay somewhere else	No	21	100.0	-	18	82.9	62.3-93.4	21	100.0	-	20	94.0	63.8-99.3	20	94.1	74.7-98.8
	Yes	0	0.0	-	4	17.1	6.6-37.7	0	0.0	-	1	6.0	0.7-36.2	1	5.9	1.2-25.3
Had to contact the police	No	105	98.4	93.2-99.6	96	89.5	81.3-94.3	106	98.7	91.3-99.8	87	81.5	71.2-88.7	59	55.3	44.3-65.8
	Yes	2	1.6	0.4-6.8	11	10.5	5.7-18.7	1	1.3	0.2-8.7	20	18.5	11.3-28.8	48	44.7	34.2-55.7

Supplementary Table 4: Frequency of harm by harm type (as a percentage of those who experienced each harm)

	Frequency	Percentage		95% CI
had a serious argument that did NOT include physical violence	Daily or almost daily (i.e. 4-7 days per week)	1.4	0.4	4.4
	Weekly (i.e. 1-3 times per week)	4.8	2.7	8.6
	Monthly (i.e. 2-3 times per month)	7.0	4.3	11.3
	Less than once a month	86.7	81.5	90.6
felt physically threatened	Daily or almost daily (i.e. 4-7 days per week)	4.6	2.1	9.9
	Weekly (i.e. 1-3 times per week)	4.4	2.0	9.7
	Monthly (i.e. 2-3 times per month)	7.6	3.8	14.8
	Less than once a month	83.3	75.2	89.2
been emotionally hurt or neglected	Daily or almost daily (i.e. 4-7 days per week)	9.0	5.0	15.5
	Weekly (i.e. 1-3 times per week)	7.6	4.1	13.4
	Monthly (i.e. 2-3 times per month)	15.1	10.0	22.3
	Less than once a month	68.3	59.6	75.9
been physically hurt due to them assaulting me or acting violently	Daily or almost daily (i.e. 4-7 days per week)	7.1	2.6	18.2
	Weekly (i.e. 1-3 times per week)	6.3	2.0	17.7
	Monthly (i.e. 2-3 times per month)	11.0	5.5	20.8
	Less than once a month	75.6	62.8	85.0
been physically hurt due to them accidentally injuring me (eg by falling on me)	Daily or almost daily (i.e. 4-7 days per week)	3.9	0.9	15.7
	Weekly (i.e. 1-3 times per week)	8.1	2.8	21.3
	Monthly (i.e. 2-3 times per month)	11.7	5.0	24.7
	Less than once a month	76.3	61.2	86.8
been put at risk in a car when someone was driving after drinking	Daily or almost daily (i.e. 4-7 days per week)	8.6	3.4	19.9
	Weekly (i.e. 1-3 times per week)	3.2	0.7	13.0
	Monthly (i.e. 2-3 times per month)	8.5	3.3	20.1
	Less than once a month	79.7	66.6	88.6
felt forced or pressured into sex or something sexual	Daily or almost daily (i.e. 4-7 days per week)	2.4	0.3	17.6
	Weekly (i.e. 1-3 times per week)	4.5	0.5	28.7
	Monthly (i.e. 2-3 times per month)	2.1	0.3	15.5
	Less than once a month	91.0	72.0	97.5
felt uncomfortable or anxious at a social occasion (eg a party)	Daily or almost daily (i.e. 4-7 days per week)	1.5	0.6	3.9
	Weekly (i.e. 1-3 times per week)	1.0	0.4	2.6
	Monthly (i.e. 2-3 times per month)	8.0	5.3	12.0
	Less than once a month	89.5	85.2	92.6
had someone break or damage something that mattered to me	Daily or almost daily (i.e. 4-7 days per week)	3.2	0.9	10.7
	Weekly (i.e. 1-3 times per week)	5.0	1.9	12.5
	Monthly (i.e. 2-3 times per month)	7.4	3.6	14.5
	Less than once a month	84.4	74.9	90.8
had money that would have improved the quality of my life spent on their alcohol-related purchases	Daily or almost daily (i.e. 4-7 days per week)	6.3	1.9	19.1
	Weekly (i.e. 1-3 times per week)	7.6	2.1	24.0
	Monthly (i.e. 2-3 times per month)	35.8	21.3	53.4
	Less than once a month	50.3	33.7	66.7
felt genuinely concerned that they may cause harm to my children or someone else's children	Daily or almost daily (i.e. 4-7 days per week)	6.1	1.8	18.1
	Weekly (i.e. 1-3 times per week)	7.1	2.4	19.2
	Monthly (i.e. 2-3 times per month)	24.5	12.9	41.4
	Less than once a month	62.3	45.7	76.5
had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	Daily or almost daily (i.e. 4-7 days per week)	19.4	10.2	33.8
	Weekly (i.e. 1-3 times per week)	15.6	7.5	29.7
	Monthly (i.e. 2-3 times per month)	28.0	16.5	43.6
	Less than once a month	37.0	23.8	52.4
been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	3.9	1.7	8.6
	Weekly (i.e. 1-3 times per week)	9.6	5.5	16.4
	Monthly (i.e. 2-3 times per month)	13.6	8.9	20.3
	Less than once a month	72.9	64.6	79.8
been kept awake due to noise or disruption	Daily or almost daily (i.e. 4-7 days per week)	2.4	1.3	4.3
	Weekly (i.e. 1-3 times per week)	12.1	9.0	16.1
	Monthly (i.e. 2-3 times per month)	18.4	14.5	23.2
	Less than once a month	67.1	61.7	72.2
drank alcohol myself in order to cope with the problems caused by their drinking	Daily or almost daily (i.e. 4-7 days per week)	5.2	1.0	22.4
	Weekly (i.e. 1-3 times per week)	20.7	8.1	43.5
	Monthly (i.e. 2-3 times per month)	42.5	23.0	64.8
	Less than once a month	31.6	14.9	54.9
had to stop seeing or being in contact with someone because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	19.3	11.9	29.6
	Weekly (i.e. 1-3 times per week)	10.4	5.5	18.7

	Frequency	Percentage		95% CI
	Monthly (i.e. 2-3 times per month)	9.4	5.2	16.5
	Less than once a month	61.0	50.1	70.8
had to move out of my usual place of residence and stay somewhere else	Daily or almost daily (i.e. 4-7 days per week)	8.1	1.6	31.8
	Weekly (i.e. 1-3 times per week)	12.0	2.5	42.1
	Monthly (i.e. 2-3 times per month)	6.1	1.3	24.8
	Less than once a month	73.8	47.4	89.8
had to contact the police	Daily or almost daily (i.e. 4-7 days per week)	7.8	3.6	16.2
	Weekly (i.e. 1-3 times per week)	6.5	2.6	15.5
	Monthly (i.e. 2-3 times per month)	7.5	3.8	14.1
	Less than once a month	78.2	67.9	85.9

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	3-4
Bias	9	Describe any efforts to address potential sources of bias	3 (sampling) and 5 (weighting)
Study size	10	Explain how the study size was arrived at	3-4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	5
		(*c*) Explain how missing data were addressed	5
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	5
		(*e*) Describe any sensitivity analyses	NA

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8 and 10
		(b) Indicate number of participants with missing data for each variable of interest	Not included due to space. We can add this as another supplementary table.
Outcome data	15*	Report numbers of outcome events or summary measures	8 and 10
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-11
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	5

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-021046.R2
Article Type:	Research
Date Submitted by the Author:	12-Jul-2018
Complete List of Authors:	Beynon, Caryl; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Bayliss, David; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Mason, Jenny; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Sweeney, Kate; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Perkins, Clare; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Henn, Clive; Public Health England, Alcohol, Drugs and Tobacco Division, Health Improvement Directorate
Primary Subject Heading:	Public health
Secondary Subject Heading:	Epidemiology, Health policy
Keywords:	alcohol-related harm to others, alcohol, violence

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Beynon C, Bayliss D, Mason J, Sweeney K, Perkins, C, Henn C

Corresponding author: Caryl Beynon

Address: Risk Factor Intelligence Team, Health Improvement Directorate, Public Health England, Suite 3b, Cunard Building, Water Street, Liverpool, L3 1DS, United Kingdon
Email: caryl.beynon@phe.gov.uk
Telephone: 0151 706 6205

Co-Authors:

David Bayliss, Risk Factors Intelligence Team, Public Health England, Manchester, United Kingdom.

Jenny Mason, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Kate Sweeney, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clare Perkins, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clive Henn, Alcohol, Drugs and Tobacco Division, Public Health England, London, United Kingdom.

ABSTRACT

Objectives: to estimate the prevalence, the frequency and the perpetrators of alcohol-related harm to others and identify factors associated with experiencing harm and aggressive harm.

Design: Cross-sectional survey.

Setting: England.

Participants: Adults (general population) aged 16 and over.

Outcome measures: Percentage of respondents who experienced harm. Socio-economic and demographic factors associated with the outcomes. Outcomes were 1. Experienced harm/did not experience harm and 2. Experienced aggressive harm (physically threatened, physically hurt and forced/pressured into something sexual)/did not experience an aggressive harm (no aggressive harm plus no harm at all).

Results: The weighted sample was 4,874; 20.1% (95% confidence interval [CI] 18.9-21.4) reported experiencing harm in the previous 12 months and 4.6% (95% CI 4.0-5.4) reported experiencing an aggressive harm. Friends and strangers were the dominant perpetrators. Most harms occurred less than monthly but 5.2% of respondents experienced harm daily/almost daily. Factors associated with experiencing harm were: younger age, drinking harmfully/hazardously, White British, having a disability, being educated and living in private rented accommodation (compared to being an owner occupier). Being in the family stage of life (defined as having children in the household) and being retired (compared to being employed) had significantly lower odds of harm Factors associated with experiencing an aggressive harm were similar.

Conclusions: This exploratory study shows that alcohol-related harm to others affects a sizable proportion of the population of England. Even apparently insignificant harms, like being kept awake, can have a negative impact on health, while aggressive harms are clearly of concern. That 5% of respondents experience harm daily/almost daily suggests a population of people with a particularly high burden likely to affect health. Using a standard methodology to measure harm across studies would be advantageous. Policies that focus on alcohol must take into consideration the impact of drinking on those other than the drinker.

STRENGHTS AND LIMITATIONS OF THE STUDY

- This is the largest survey on alcohol-related harm to others in the United Kingdom and the first national survey in England.
- The sampling approach and weighting ensured the data were representative of the population of England.
- There is potential selection bias which is inherent in all national surveys.
- The use of a bespoke survey made comparison of the findings with the literature difficult but when the study was initiated no universally accepted survey was identified.

Key words: alcohol-related harm to others, alcohol, violence

Word count: 6,212

INTRODUCTION

The detrimental effect of alcohol is well documented; in 2012 alcohol consumption was responsible for approximately 6% of deaths and 5% of disease burden globally.[1] The focus has been on the harmful effects of alcohol on the drinker with less attention on the harms caused to others, including families, work colleagues and wider society. The World Health Organization's (WHO) global alcohol strategy highlights the need to consider the harm alcohol causes to people other than the drinker,[2] and it is these alcohol-related harms to others (AHTO) that are the focus of this study.

Health and social data provide insight into the potential harms caused by another's drinking. Data from the Crime Survey for England and Wales, for example, show that in just over half of all violent crimes the victim perceived the offender to be under the influence of alcohol and that alcohol use is particularly implicated in violent incidents between strangers.[3] Data from the Department of Transport show that during 2013 to 2015, there were almost 10,000 alcohol-related road traffic accidents in England which at least one driver failed the alcohol breathalyser test (data are available at: https://fingertips.phe.org.uk/profile/local-alcohol-profiles), demonstrating a considerable potential harm to both the drinking driver and to others on the roads.

In the last decade or so a number of studies have aimed to quantify and explore in more detail AHTO. These studies have provided widely varying estimates of the prevalence of harm, largely due to differences in the way harms are defined and the reference population. Studies which focus on identifying the socio-demographic and behavioural factors associated with being the victim of harm do not always provide consistent findings, suggesting the need for further research. While there is a relatively consistent finding across studies that younger age increases the likelihood of experiencing harm[4-6], the association of harm with other characteristics is less clear. For example, generally women have been identified as more at risk of harm from another's drinking than men but this is not consistent across all countries and some authors report this association for certain types of harm only.[4-7] Two studies have, for example, identified that women are more likely to experience unwanted sexual attention/harassment/assault, whereas men were more likely to experience having their belongings or property damaged.[4 6]

When the impact of alcohol includes the effects to the individual drinker and wider society, the cost is considerable. A review of studies in high-income countries show the gross economic costs of alcohol to range from 1.4% to 2.7% of gross domestic product; in the United Kingdom this would be equivalent to between £27 billion and £52 billion in 2016.[8] There is a need to better understand AHTO and the characteristics of those affected in order to implement an effective response. To date there has been no national survey of AHTO in England. The objectives of this exploratory study were to estimate the prevalence of AHTO in England, identify factors associated with being the victim of harm, the frequency with which this harm occurs and the perpetrators of harm.

METHOD

The survey

The questions to identify experience of AHTO were devised after an evidence review and were appended to the Alcohol Toolkit Survey (ATS) between 1st November 2015 and 31st January 2016. The ATS is a cross-sectional household survey, run by University College London and administered by Ipsos Mori using computer-assisted interviews. Each month a new sample of adults aged 16 and over who live in England complete the survey. Households are selected using a type of random location sampling which is a hybrid of random probability sampling and simple quota sampling (so that each monthly sample is representative of the population). Interviews are conducted with one member of the selected household.[9] The AHTO questions were self-

completed on guidance from the Research Support and Governance Office, Public Health England. Due to the novel and exploratory nature of the work, no formal sample size calculation was undertaken as the parameters on which to base this were unknown. Instead, a three month window of data collection was chosen, knowing that the ATS aimed to survey approximately 1,800 adults per month.[9] The sample size was considerably larger than other studies of AHTO conducted in the United Kingdom.[10-12]

The AHTO questions asked whether or not the respondent had experienced the following harms from another's drinking in the past 12 months:

Because of someone else's drinking I have….

1. Had a serious argument that did not include physical violence.
2. Felt physically threatened.
3. Been emotionally hurt or neglected.
4. Been physically hurt due to them assaulting me or acting violently.
5. Been physically hurt due to them accidentally injuring me (e.g. by falling on me).
6. Been put at risk in a car when someone was driving after drinking.
7. Felt forced or pressured into sex or something sexual.
8. Felt uncomfortable or anxious at a social occasion (e.g. a party).
9. Had someone break or damage something that mattered to me.
10. Had money that would have improved the quality of my life spent on their alcohol-related purchases.
11. Felt genuinely concerned that they may cause harm to my children or someone else's children.
12. Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking.
13. Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking.
14. Been kept awake due to noise or disruption.
15. Drank alcohol myself in order to cope with the problems caused by their drinking.
16. Had to stop seeing or being in contact with someone because of their drinking.
17. Had to move out of my usual place of residence and stay somewhere else.
18. Had contact with the police.

If a respondent indicated that they had experienced any of the harms they were asked to indicate who perpetrated the harm and the frequency with which the harm occurred. Response options for who perpetrated the harm were: someone you were in a relationship with (e.g. wife/husband, partner) who you lived with; someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with; another family member you lived with; a family member you did not live with; someone else you lived with; a friend; a work colleague; someone else you know; a stranger; refused/prefer not to say and don't know. Response options for the frequency of harm were: daily or almost daily (i.e. 4-7 days per week); weekly (i.e. 1-3 times per week); monthly (i.e. 2-3 times per month); less than once a month; refused/prefer not to say and don't know.

A range of demographic and socio-economic variables, collected as part of the ATS, were used as independent variables: sex (female, male); age band in years (16-24, 25-44, 45-64, 65 and over); broad ethnic group (White British, Other White, Black, Asian, Other); life stage (single, pre-family, family, post-family); educational attainment (no qualifications, GSCE/O-level/CSE, A-level/vocational, degree/higher degree, other/still studying); social grade (AB [higher managerial, administrative and professional], C1 [supervisory, clerical and junior managerial, administrative and professional], C2 [skilled manual workers], D [semi-skilled and unskilled manual workers], E [state pensioners, casual and lowest grade workers, unemployed with state benefits only]); tenure of home (owned outright, bought on a mortgage, rented from local authority, rented from private

landlord, other); self-defined disability (yes, no) and employment status (employed, unemployed, economically inactive, retired). 'Life stage' was derived from age, marital status and number of children living in the household and is defined as follow: single (up to the age of 39, not married/in a civil partnership and no children in the household), pre-family (up to the age of 39, married/in a civil partnership and no children in the household), family (children living in the household) and post family (aged 40 and over, no children in the household). The respondents' alcohol consumption was measured using the Alcohol Use Disorders Identification Test (AUDIT) which can be used to identify hazardous and harmful drinkers. Here hazardous/harmful drinkers were identified as those with scores of eight or more if aged 65 or under, and scores of seven or more if aged over 65, in line with WHO guidance.[13]

Analysis

Respondents who refused to complete the AHTO questions and those who chose the 'don't know' or 'refused/prefer not to say' responses for all 18 harm questions were excluded from all analyses. Chi square tests were used to compare the characteristics of those who were included in the analysis to those that were excluded due to missing data on the AHTO questions. Individuals who failed to provide a valid response to other questions were excluded from the analysis of that particular independent variable. People with one or more missing covariate were excluded from the multivariate analyses.

Two binary dependent variables were created. 'Any harm' was coded as yes if a person had experienced any of the 18 harm types in the previous 12 months. 'Aggressive harm' was coded as yes if the person had experienced one or more of the following three harms: felt physically threatened, been physically hurt due to them assaulting me or acting violently and felt forced or pressured into sex or something sexual. The categorisation of 'aggressive harm' is in line with previous research on AHTO.[4]

All analyses were undertaken using Stata 13 and the 'svy' command prefix for analysing survey data. Prevalence was estimated by dividing the positive responses by the total responses for each harm type, any harm and aggressive harm; 95% confidence intervals (CI) were calculated for each prevalence estimate using the standard settings of Stata's 'svy: tabulate' command.[14] Bivariate independence was tested using a 'corrected' Pearson chi-squared statistic for survey data [design-based *F* tests based on Rao and Scott correction].[15] Multivariate analyses (binary logistic regression) were conducted to model the joint effects of the independent variables significantly associated with any harm and aggressive harm in the bivariate analyses with 'no harm' and 'no aggressive harm' as the reference categories. Adjusted odds ratios (AOR) are given in comparison to the reference category for the given variable and *t* tests provide an indication of statistical significance. Where comparisons are presented between categories of a variable where neither is the reference category, an indication of statistical significance is given using adjusted Wald tests. Analyses were weighted (using weights generated by the ATS) in order to improve the representativeness of the sample relative to an English population profile using multiple socio-demographic variables.[9] Due to the exploratory nature of the analysis, α is set at 0.05 for all tests. The risk of type I error is considered less important than the risk of type II error: deflating α may limit further investigation at a point where the evidence base is developing.

Patient and public involvement

Patients and the public were not involved in this study.

Ethics and funding

Approval for the ATS was granted by University College London's ethics committee (reference: 0498/001) and for the AHTO questions by the Research Support and Governance Office, Public Health England (reference: R&D 055). This work was funded by Public Health England.

RESULTS

Missing data

The original (unweighted) sample size was 5,068. The proportion of missing data was relatively small; 96 people (1.9%) did not complete the AHTO questions and a further 91 (1.8%) answered 'don't know/refused' to all of the AHTO questions; both groups were excluded from the analyses leaving an unweighted sample size of 4,881 (or 96.3% of the original sample). Supplementary Table 1 compares the number/proportion of people included in the analyses with those who were excluded because they did not provide a response to the AHTO questions, by independent variable. There were significant differences in the proportion of people that were included and excluded for sex, tenure of home, disability and AUDIT score. Of the 4,881 people included in the bivariate analyses, 189 (3.9%) were excluded from the multivariate analyses because one or more independent variable was missing.

Prevalence of harm

Table 1 reports the estimated prevalence of each type of harm; 20.1% (95% CI 18.9%-21.4%) of people reported experiencing at least one harm due to someone else's drinking in the past 12 months. These data by sex are reported in Supplementary Table 2. While the numbers are too small to make a comprehensive assessment of the differences by sex (and such differences are not the focus of this paper), some disparities in harm are evident. For example there is a clear difference between the proportion of men (2.1% 95% CI 1.6%-2.9%) and women (4.8% 95% CI 3.9%-5.8%) who reported experiencing alcohol-related emotional hurt or neglect. Aggressive harms were experienced by 4.6% (95% CI 4.0%-5.4%) of respondents.

Table 1: Prevalence of harm in the previous 12 months, weighted data

Harm type	Number of respondents who experienced harm	Percentage of respondents who experienced harm	95% CI
Been kept awake due to noise or disruption	390	8.0	7.2 - 8.9
Felt uncomfortable or anxious at a social occasion (e.g. a party)	331	6.8	6.0 - 7.6
Had a serious argument that did NOT include physical violence	275	5.7	5.0 - 6.4
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	174	3.6	3.0 - 4.2
Been emotionally hurt or neglected	170	3.5	3.0 - 4.1
Felt physically threatened	164	3.4	2.8 - 4.0
Had to stop seeing or being in contact with someone because of their drinking	120	2.5	2.0 - 3.0
Had to contact the police	117	2.4	2.0 - 2.9
Had someone break or damage something that mattered to me	95	1.9	1.5 - 2.5
Been physically hurt due to them assaulting me or acting violently	92	1.9	1.5 - 2.4
Been put at risk in a car when someone was driving after drinking	75	1.5	1.2 - 2.0
Felt genuinely concerned that they may cause harm to my children or someone else's children	61	1.2	0.9 - 1.6
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	57	1.2	0.9 - 1.5
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	53	1.1	0.8 - 1.5
Had money that would have improved the quality of my life spent on their alcohol-related purchases	50	1.0	0.8 - 1.4
Drank alcohol myself in order to cope with the problems caused by their drinking	33	0.7	0.5 - 1.0
Felt forced or pressured into sex or something sexual	33	0.7	0.5 - 1.0
Had to move out of my usual place of residence and stay somewhere else	25	0.5	0.3 - 0.8
At least one reported harm	980	20.1	18.9 - 21.4
At least one aggressive harm	225	4.6	4.0 – 5.4

Weighted N = 4,874.

Bivariate and multivariate results (factors associated with harm)

Factors associated with experiencing any harm in the bivariate analyses are reported in Table 2. Experience of harm decreased with age. This trend by age was reflected in experience of harm by life stage, with 36.5% (95% CI 32.8%-40.5%) of single people experiencing harm compared to 15.0% (95% CI 13.4%-16.7%) of those in a 'post-family' life stage. White British people were more likely to report experiencing harm (21.8%, 95% CI 20.3%-23.4%) than people of other broad ethnic groups; people of Asian ethnicity had the lowest prevalence (10.9%, 95% CI 8.2%-14.2%). People with no qualifications were least likely to report experiencing harm (9.9%, 95% CI 7.9%-12.5%).Those whose highest attainment was A-level or vocational had the highest prevalence (26.7%, 95% CI 24.1%-29.3%). People in the private-rented sector had the highest harm prevalence by tenure (29.9%, 95% CI 26.9%-33.1%). This compares to just 14.0% (95% CI 12.3%-16.0%) of people who owned their home outright experiencing harm. People who considered themselves disabled were more likely to report having experienced harm than those who did not (24.0%, 95% CI 20.3%-28.1%, compared to 19.7%, 95% CI 18.4%-21.1%). Those who were unemployed (26.8%, 95% CI 21.0%-33.6%) or economically inactive (26.8%, 95% CI 24.0%-29.9%) were more likely to report harm than those employed (22.0%, 95% CI 20.2%-24.0%); the difference between the unemployed and employed was not significant. Retired people were much less likely to report experiencing at least one harm (9.1%, 95% CI 7.5%-10.9%) than all other employment statuses. The prevalence of AHTO

was significantly higher among hazardous/harmful drinkers (37.9%, 95% CI 33.9%-42.1%) compared to those who were not (17.3%, 95% CI 16.0%-18.6%).

In the multivariate model, young age remained strongly associated with experiencing harm due to someone else's drinking, with those aged 16-24 having greater odds of experiencing harm than all older age groups (Table 2). Being a hazardous/harmful drinker was strongly associated with experiencing harm; the odds of experiencing harm were around double the odds of those who were not hazardous/harmful drinkers. Being White British compared to being in an Other White, Black or Asian ethnic group was also associated with greater odds of experiencing harm, as was considering oneself disabled, being educated, and living in private rented accommodation relative to being an owner occupier. The odds of experiencing harm were lower for respondents in the family stage of life than the odds for those that were single. The odds of experiencing harm were lower for retired respondents than the odds for employed respondents.

Table 2: Bivariate and multivariate comparisons of harm versus no harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Independent variable	No harm			Harm					
	N	%	95% CI	N	%	95% CI	AOR	p	95% CI
Sex									
Female	2,008	80.1	78.3 - 81.8	498	19.9	18.2 - 21.7	Not entered into the model		
Male	1,887	79.7	77.7 - 81.4	482	20.3	18.6 - 22.3			
Age band †									
16-24	446	63.4	59.6 - 67.0	258	36.6	33.0 - 40.4	Reference		
25-44	1,278	78.4	76.0 - 80.7	352	21.6	19.3 - 24.0	0.63	<0.001	0.49 - 0.83
45-64	1237	81.5	79.1 - 83.7	281	18.5	16.3 - 20.9	0.50	<0.001	0.34 - 0.75
65+	933	91.2	89.3 - 92.9	90	8.8	7.1 - 10.7	0.36	<0.001	0.21 - 0.61
Broad ethnic group†									
White British	2,975	78.2	76.7 - 79.7	830	21.8	20.3 - 23.4	Reference		
Other White groups	334	84.9	80.4 - 88.5	59	15.1	11.5 - 19.6	0.52	<0.001	0.36 - 0.76
Black groups	151	83.9	78.6 - 88.1	29	16.1	11.9 - 21.4	0.61	0.017	0.41 - 0.92
Asian groups	376	89.1	85.8 - 91.8	46	10.9	8.2 - 14.2	0.39	<0.001	0.28 - 0.56
Other groups	44	82.2	68.7 - 90.7	9	17.8	9.3 - 31.3	0.60	0.154	0.30 - 1.21
Life stage†									
Single	436	63.5	59.5 - 67.2	251	36.5	32.8 - 40.5	Reference		
Pre-family	222	72.2	65.6 - 77.9	86	27.8	22.1 - 34.4	0.91	0.620	0.61 - 1.34
Family	1,285	81.1	78.8 - 83.2	299	18.9	16.8 - 21.2	0.68	0.006	0.52 - 0.89
Post family	1,950	85.0	83.3 - 86.6	344	15.0	13.4 - 16.7	0.85	0.433	0.56 - 1.28
Education†									
No qualifications	683	90.1	87.5 - 92.2	75	9.9	7.8 - 12.5	Reference		
GCSE/O-level/CSE	764	79.3	76.2 - 82.1	199	20.7	17.9 - 23.8	1.74	<0.001	1.25 - 2.44
A-level/vocational	974	73.3	70.7 - 75.9	354	26.7	24.1 - 29.3	2.04	<0.001	1.48 - 2.82
Degree/higher degree	1,156	79.3	76.8 - 81.7	301	20.7	18.3 - 23.2	2.16	<0.001	1.56 - 3.00
Other/still studying	294	85.6	81.2 - 89.1	50	14.4	10.9 - 18.9	1.42	0.109	0.92 - 2.18
Social grade‡									
AB	1,066	80.8	78.0 - 83.3	254	19.2	16.7 - 22.0	Not entered into the model		
C1	1,023	77.4	75.0 - 79.6	299	22.6	20.4 - 25.0			
C2	878	81.7	78.8 - 84.4	196	18.3	15.6 - 21.2			
D	614	82.5	79.1 - 85.4	131	17.5	14.6 - 20.9			
E	313	75.8	71.8 - 79.4	100	24.2	20.6 - 28.2			
Tenure†									
Owned outright	1,451	86.0	84.0 - 87.8	237	14.0	12.3 - 16.0	Reference		
Bought on a mortgage	1,142	79.2	76.4 - 81.6	301	20.9	18.4 - 23.6	0.97	0.825	0.74 - 1.28
Rented from local authority	341	78.8	74.6 - 82.5	92	21.2	17.6 - 25.4	1.38	0.060	0.99 - 1.94
Rented from private landlord	678	70.1	66.9 - 73.1	289	29.9	26.9 - 33.1	1.52	0.004	1.15 - 2.01
Other	248	81.1	76.7 - 84.8	58	19.0	15.2 - 23.4	1.11	0.562	0.77 - 1.61
Disability†									
Considers self disabled	396	76.0	71.9 - 79.7	125	24.0	20.3 - 28.1	Reference		
Not disabled	3,422	80.3	78.9 - 81.6	842	19.7	18.4 - 21.1	0.56	<0.001	0.42 - 0.74
Employment status†									
Employed	2,081	78.0	76.0 - 79.8	588	22.0	20.2 - 24.0	Reference		
Unemployed	157	73.2	66.4 - 79.0	58	26.8	21.0 - 33.6	1.09	0.648	0.75 - 1.58
Economically inactive	634	73.2	70.1 - 76.1	232	26.8	24.0 - 29.9	1.01	0.896	0.81 - 1.27
Retired	1,021	90.9	89.1 - 92.5	102	9.1	7.5 - 10.9	0.54	<0.001	0.38 - 0.78
AUDIT†									
Not hazardous/harmful drinking	3,463	82.7	81.4 - 84.0	723	17.3	16.0 - 18.6	Reference		
Hazardous/harmful drinking	419	62.1	57.9 - 66.1	256	37.9	33.9 - 42.1	2.06	<0.001	1.66 - 2.56

Weighted N = 4,874 (bivariate analyses) and 4,698 (multivariate analysis). Bivariate totals that are 4,875 not 4,874 are due to rounding as the analyses use weighted data.
AOR: adjusted odds ratio.
†test of bivariate independence indicates significant difference ($p<0.05$).
‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Aggressive harm

In bivariate analyses, men were marginally more likely to experience an aggressive harm than women (5.3% and 4.0% respectively, p=0.04, Table 3). The other characteristics associated with experiencing aggressive harms were similar to experiencing any harm, with a higher prevalence of aggressive harm associated with being younger, disabled, single, non-retired, White British, renting accommodation and being a hazardous/harmful drinker.

Controlling for other variables in the model, sex and stage of life were not associated with experiencing an aggressive harm (Table 3). Age remained associated with harm after adjustment for other variables; those aged 45 and over had lower odds of experiencing an aggressive harm than those aged 16-24. Disability was also strongly associated with experience of aggressive harm; the odds of experiencing aggressive harm for non-disabled people was just over a third of the odds for disabled people (adjusted OR=0.37, 95% CI 0.24-0.59). Housing tenure was relatively strongly associated, with the odds of experiencing an aggressive harm for renters around double the odds of those who are home owners. This was also the case for hazardous/harmful drinkers, with an adjusted odds ratio of 2.35 (95% CI 1.63-3.40) relative to those who were not hazardous/harmful drinkers. Being White British compared to being in the other White, Black or Asian ethnic groups was also associated with greater odds of experiencing an aggressive harm. Differences in the odds of experiencing aggressive harm between people with different educational attainment were minimal; the only significant difference being the greater odds for those with a degree/higher degree relative to those with no qualifications. The odds of experiencing an aggressive harm for those that were retired remained significantly lower than the odds of an aggressive harm for those that were employed (AOR 0.33, 95% CI 0.13-0.83).

Table 3: Bivariate and multivariate comparisons of aggressive harm versus no aggressive harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Independent variable	No aggressive harm			Aggressive harm					
	N	%	95% CI	N	%	95% CI	AOR	p	95% CI
Sex†									
Male	2,242	94.7	93.5 - 95.6	127	5.3	4.4 - 6.5	Reference		
Female	2,407	96.1	95.1 - 96.8	99	4.0	3.2 - 4.9	0.74	0.086	0.53 - 1.04
Age band†									
16-24	646	91.7	89.1 - 93.6	59	8.4	6.4 - 10.9	Reference		
25-44	1,539	94.4	92.9 - 95.6	91	5.6	4.4 - 7.1	0.84	0.510	0.49 - 1.43
45-64	1,454	95.8	94.4 - 96.9	64	4.2	3.1 - 5.6	0.43	0.024	0.20 - 0.89
65+	1,010	98.8	98.0 - 99.3	12	1.2	0.7 - 2.0	0.29	0.044	0.09 - 0.97
Broad ethnic group†									
White British	3,605	94.8	93.8 - 95.5	200	5.3	4.5 - 6.2	Reference		
Other White groups	384	97.7	95.6 - 98.8	9	2.3	1.2 - 4.4	0.30	0.002	0.14 - 0.64
Black groups	176	97.6	95.1 - 98.8	4	2.4	1.2 - 4.9	0.37	0.020	0.16 - 0.86
Asian groups	411	97.5	95.4 - 98.7	11	2.5	1.4 - 4.7	0.43	0.023	0.21 - 0.89
Other groups	52	97.5	88.7 - 99.5	1	2.5	0.5 - 11.3	0.36	0.217	0.07 - 1.83
Life stage†									
Single	629	91.5	88.9 - 93.6	58	8.5	6.4 - 11.1	Reference		
Pre-family	286	92.9	88.2 - 95.9	22	7.1	4.2 - 11.8	1.23	0.573	0.60 - 2.50
Family	1,519	95.9	94.7 - 96.9	65	4.1	3.1 - 5.3	0.89	0.684	0.52 - 1.55
Post family	2,213	96.5	95.5 - 97.3	81	3.5	2.7 - 4.6	1.80	0.097	0.90 - 3.60
Education†									
No qualifications	739	97.5	96.0 - 98.4	19	2.6	1.6 - 4.0	Reference		
GCSE/O-level/CSE	911	94.6	92.6 - 96.1	52	5.4	3.9 - 7.4	1.75	0.069	0.96 - 3.21
A-level/vocational	1242	93.6	91.9 - 94.9	86	6.5	5.1 - 8.1	1.69	0.077	0.95 - 3.01
Degree/higher degree	1396	95.8	94.3 - 96.9	62	4.2	3.1 - 5.7	1.94	0.042	1.02 - 3.69
Other/still studying	337	97.9	95.8 - 99.0	7	2.1	1.0 - 4.2	0.88	0.788	0.36 - 2.16
Social grade‡									
AB	1,265	95.9	94.2 - 97.1	54	4.1	2.9 - 5.8	Not entered into the model		
C1	1,267	95.8	94.6 - 96.8	55	4.2	3.2 - 5.4			
C2	1,016	94.6	92.5 - 96.0	59	5.5	4.0 - 7.5			
D	718	96.4	94.5 - 97.6	27	3.6	2.4 - 5.5			
E	382	92.6	89.8 - 94.7	30	7.4	5.3 - 10.2			
Tenure†									
Owned outright	1,648	97.7	96.7 - 98.3	40	2.4	1.7 - 3.3	Reference		
Bought on a mortgage	1,386	96.0	94.5 - 97.2	57	4.0	2.8 - 5.5	1.03	0.918	0.57 - 1.88
Rented from local authority	405	93.5	90.4 - 95.6	28	6.5	4.4 - 9.6	2.58	0.006	1.31 - 5.09
Rented from private landlord	885	91.5	89.3 - 93.3	82	8.5	6.7 - 10.7	2.33	0.003	1.34 - 4.05
Other	287	94.0	91.0 - 96.0	18	6.0	4.0 - 9.0	2.04	0.039	1.04 - 4.02
Disability†									
Considers self disabled	477	91.4	88.4 - 93.7	45	8.6	6.3 - 11.7	Reference		
Not disabled	4,086	95.8	95.1 - 96.5	178	4.2	3.5 - 4.9	0.37	<0.001	0.24 - 0.59
Employment status†									
Employed	2,535	95.0	93.8 - 95.9	135	5.0	4.1 - 6.2	Reference		
Unemployed	204	95.0	91.3 - 97.2	11	5.0	2.8 - 8.7	0.62	0.166	0.32 - 1.22
Economically inactive	799	92.2	90.2 - 93.9	67	7.8	6.1 - 9.8	1.10	0.654	0.73 - 1.66
Retired	1,110	98.9	98.1 - 99.3	13	1.1	0.7 - 1.9	0.33	0.018	0.13 - 0.83
AUDIT†									
Not hazardous/harmful drinking	4,038	96.5	95.7 - 97.1	149	3.6	2.9 - 4.3	Reference		
Hazardous/harmful drinking	599	88.7	85.6 - 91.2	76	11.3	8.8 - 14.4	2.35	<0.001	1.63 - 3.40

Weighted N = 4,874 (bivariate analyses) and 4,698 (multivariate analysis). Bivariate totals that are 4,875 not 4,874 are due to rounding as the analyses use weighted data.
AOR: adjusted odds ratio.
†test of bivariate independence indicates significant difference ($p<0.05$).
‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Perpetrators of harm

The most frequently reported perpetrators of harms were friends (23.4% of total perpetrator reports) and strangers (22.9%), while work colleagues were the least reported perpetrators (3.7%, Figure 1). The perpetrator varied according to the type of harm (Supplementary Table 3). Focussing on the most common harms experienced, being kept awake due to noise or disruption was predominantly perpetrated by strangers (49.5%, 95% CI 43.8%-55.3%), while both strangers and friends were the most common cause of feeling uncomfortable or anxious at a social occasion (strangers 34.4%, 95% CI 28.5%-40.7%;

friends 32.8%, 95 CI 27.2%-39.0%). Serious arguments that did not include physical violence were predominantly perpetrated by friends (35.7%, 95% CI 29.5%-42.6%) or someone the respondent was in a relationship with and lived with (23.1%, 95% CI 17.6%-29.6%). Likewise, being let down by someone or being emotionally hurt or neglected were harm types perpetrated by people close to respondents.

Strangers were most likely to be the perpetrators of two of the aggressive harms: 60.5% (95% CI 51.2%-69.1%) of respondents reporting feeling physically threatened by a stranger and 31.5% (95% CI 21.5%-43.6%) of respondents reporting being physically hurt by a stranger. While 19.0% (95% CI 6.5%-44.2%) of respondents reported being forced or pressured into sex or something sexual by a stranger, the most commonly reported perpetrator for this sexual aggressive harm was someone the respondent was in a relationship with and lived with (23.3%, 95% CI 9.8%-46.0%; rising to 39.9% when also including people in a relationship who lived elsewhere).

Insert Figure 1 here.

Breaking perpetrator type down further by sex reveals significant differences (data not reported). Focusing on aggressive harms only, of those who had experienced an aggressive harm, women were more likely than men to report the perpetrator being someone they were in a relationship with and lived with. This is true for feeling physically threatened (21.2% vs 4.1%, $p<0.001$), being physically hurt (37.8% vs 6.3%, $p<0.001$) and being forced or pressured into sex or something sexual (though not with statistical significance due to small numbers of people reporting this type of harm, 34.3% vs 0.0%, $p=0.077$). In contrast, of those who had experienced an aggressive harm men were more likely than women to report feeling physically threatened by a stranger (71.4% vs 46.1%, $p=0.008$) and being physically hurt by stranger (42.2% vs 18.0%, $p=0.036$).

Frequency of harm

Figure 2 reports information on the frequency with which harms were experienced. The majority of reported harms were experienced less than once a month (74.8%); 12.8% experienced harm at least monthly but less than weekly, 7.2% experienced weekly but less than daily, and 5.2% experienced daily or almost daily.

Insert Figure 2 here.

The frequency of harm varied by harm type (Supplementary Table 4). The harm types reported to reoccur most often were those whose description implies that the harm occurs over a prolonged period of time with someone whom the respondent was in regular contact. These included ‘had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking’ (19.4% daily or almost daily, 95% CI 10.2%-33.8%) and ‘had to stop seeing or being in contact with someone because of their drinking’ (19.3% daily or almost daily, 95% CI 11.9%-29.6%). It was less common for other harms to be experienced at a daily or almost daily frequency. Nevertheless, all harm types had at least one respondent reporting daily or almost daily frequency of harm.

DISCUSSION

In this exploratory study one in five respondents experienced AHTO in the previous 12 months. The most commonly reported AHTO were being kept awake due to noise or disruption and feeling uncomfortable or anxious at a social occasion, which have been identified as the most prevalent harms in other studies.[4 5] More concerning, 4.6% reported experiencing an aggressive harm. Experiencing AHTO was associated with a number of demographic and socio-economic variables. Friends and strangers were the dominant perpetrators of AHTO. Most harms occurred less than monthly but some respondents experienced harm daily or almost daily.

The main strength of this study is its large sample size; this is the largest survey on AHTO to have been conducted in the United Kingdom and the first to provide data for England. The sampling and weighting strategy were employed to ensure the sample was representative of the English population and thus the generalisability of the findings. There are a number of limitations to note. Recall is always a problem with surveys; harms that occurred a year ago or had little impact on the respondent may be more difficult to recall. Attributing causality is not possible using a cross sectional design. There are also some social groups that are systematically missing from surveys such as homeless people, those in hospital or care homes and those who are incarcerated; populations whose alcohol use is likely different.[16] Previous studies on AHTO have also largely relied on cross-sectional surveys and are affected by the same limitations. A response rate could not be calculated because Ipsos Mori did not collect the necessary data. While the total amount of missing data is small, any missing data can potentially introduce bias. There were some significant differences in the characteristics of those that answered the AHTO questions and those that did not. The internal validity of the AHTO questions used here has not been measured; in the initial search of the literature the authors failed to identify a validated survey. Consequently it is possible that discrepancies exist between the responses provided by participants and their actual experience of alcohol-related harm. Finally, ecological fallacy, where the inferences about individuals are made based upon data for a group, is also a consideration in this type of study. It is likely that systematic differences exist in harm by population sub-groups (for example by sex and ethnicity) and future work on AHTO in the UK should explore this. It is possible that the findings on factors associated with harm represent those that are associated with the most common but 'low impact' harms and cannot be generalised to more severe harms. However, that we specifically examine factors associated with aggressive harms (which are the most serious harms considered) mitigates this. That said, further research to identify the factors associated with individual harms would be advantageous.

In this study the prevalence of harm was 20.1%. The closest comparison is from a cross-sectional survey conducted in Wales in 2015 which used identical AHTO questions and reported the prevalence of any harm in the previous 12 months to be 59.7%.[11] There is some evidence from routine data to support a lower prevalence of harm in England than Wales. For example, the percentage of violent incidents where the victim believed the offender(s) to be under the influence of alcohol tends to be higher in Wales than England[17] although not conclusively so. However, the magnitude of the difference in the reported prevalence of harm between England and Wales seems questionable, given the similarities between the two nations. This difference could be due, in part, to differences in methodology and caution needs to be applied in drawing direct comparisons. In England the harm questions were asked after the ATS questions; this may have affected how people perceived harm, and therefore how they responded to the harm questions. It is also possible that respondents were experiencing fatigue by the end of the survey and this may have affected how fully they reported their experiences of harm. The English survey was administered face-to-face while the survey in Wales was administered via the telephone using landline numbers. Using data from the USA, researchers comparing face-to-face and telephone interviews reported that telephone surveys may miss certain sections of the population if they solely rely on landlines, including those with lower incomes.[18] However the Welsh survey was

weighted so the data were representative of the deprivation of the general population.[11] Other surveys of AHTO conducted in the United Kingdom have reported the prevalence of harm in adults to be 46.3%[10] and 51%[12] in Scotland and 79% in the North West of England,[12] however these studies used very different AHTO questions so the results are not comparable. Despite the difference in prevalence between the Welsh survey and the current study, the relative prevalence of the types of harm were similar; being kept awake at night, feeling uncomfortable or anxious at a social occasion and having a serious argument were the most prevalent harms in both surveys.

Being a hazardous/harmful drinker increased the odds of experiencing AHTO. This is perhaps unsurprising given that drinking with other drinkers and in places where alcohol is consumed increases one's exposure to drinkers. However the association with drinking and experiencing alcohol-harm is not conclusive. A cross-sectional comparison of harm from 'heavy drinking' friends and family across five Nordic countries and Scotland reported that drinking frequency was not significantly related to experiencing harm from others but binge drinking frequency was. A higher frequency of binge drinking increased the risk of experiencing AHTO in Sweden and Norway and there was some evidence for this relationship in Finland also, but not in the other countries.[7] A paper using the same Norwegian data showed that the association between experiencing harm and one's own drinking was not evident for all types of harm.[6] Another cross-sectional survey showed a dose response relationship between how much a person drinks and experiencing AHTO, with dependent drinkers having the greatest risk.[4]

Here, age was also associated with experiencing any harm and aggressive harm. A number of studies from a range of countries have reported that being of younger age increases the risk of being harmed from another's drinking.[4-7 19] However, 'younger age' in this context does not always mean 'young'; one study, for example, concluded that those aged 59 or less had a higher risk of being negatively affected by a known drinker than those aged 60 and over.[7] A global survey of 63,725 respondents aged 18-34 years reported that those aged 18-24 years were significantly more likely to experience an aggressive AHTO than those aged 30-34 or 25-29;[4] similar to results reported here.

The respondent's sex was not significantly associated with experiencing harm. The literature is mixed regarding sex as a risk factor. Women were reported to be significantly more likely to experience harm than men in Finland and Sweden but not in Denmark, Iceland, Norway or Scotland.[5 6] Being a woman was found to be a significant risk factor for all harms and aggressive harms using data from the Global Drug Survey.[4] The association of sex and experiencing harm is different for different types of harm. For example women are significantly more likely than men to experience unwanted sexual attention/sexual harassment or assault[4 6] whereas men are more likely to have clothing, property or other belongings damaged.[4 6] Survey data from the USA examined family/marriage, financial and assault harms due to drinking of a partner/spouse/family member and reported that women were more likely to report financial and family/martial harms while a higher proportion of men experienced assaults.[20] While examining differences in harm by sex was not the focus of this study, Supplementary Table 2 shows that such differences may exist. For example there is a clear difference between the proportion of men (2.1% 95% CI 1.6%-2.9%) and women (4.8% 95% CI 3.9%-5.8%) who reported experiencing alcohol-related emotional hurt or neglect. Such differences should be considered in future work on this topic in the United Kingdom.

Few studies have considered whether ethnic background is a risk factor for experiencing harm. Data from the USA demonstrate that the link between ethnicity and experience of harm is not conclusive.[19 20] Here, being White British was significantly associated with experiencing harm and also aggressive harm. Most minority ethnic groups in United Kingdom have higher rates of abstinence from alcohol and lower levels of drinking than people of white ethnicity.[21] However the

results of the multivariate modelling presented in this study show that White British ethnicity is associated with experiencing harm and aggressive harm independently of AUDIT score.

Measures such as educational attainment, type of accommodation, social grade and employment status are proxy measures for socio-economic status. Literature on the effect of socio-economic status is mixed and comparisons are hindered by the multitude of different measures used in different studies. In this study social grade was not significantly associated with harm or aggressive harm in the bivariate analyses but other socio-economic variables were.

Here findings show that experiencing harm was significantly associated with having qualifications (compared to having none) with the greatest odds being for those with a degree or higher degree. The association between education and experience of harm in the literature is mixed. Data from a Danish national survey showed no clear association between experiencing harm and education level with education categorised as low (completion up to year 11), middle (high school/technical college) and high (college or university).[22] Data from the Global Drug Survey showed no association between education and experience of harm or aggressive harm but there was an association between education and experiencing particular types of harm.[4] A comparison of northern European countries reported that a significantly higher proportion of respondents with high school/university education experienced harm than those with elementary education in four of the six countries considered.[5]

The current study shows that being retired lowers the odds of experiencing harm and aggressive harm compared to all other employment statuses. This association was independent of age. The odds of being harmed did not differ significantly between those who were employed and not employed. Data from two surveys conducted in the USA show that those who were unemployed were significantly more likely to experience AHTO than those who were employed.[19 20] Data from Denmark show that employment might be significantly associated with experiencing harm but no conclusive results were provided and the wide confidence intervals show that estimates lacked precision.[22]

Here, compared to those that owned their home outright, those who rented from a private landlord had significantly greater odds of experiencing harm and those who rented from the local authority or rented from a private landlord had significantly greater odds of experiencing an aggressive harm. No previous studies on the association between type of accommodation tenure and experiencing alcohol-related harm were identified. It is possible that those who rent represent a more transitory, poor and vulnerable population which increases their risk of harm. Research not specifically related to alcohol shows that those living in unstable housing (for example living on the streets, in temporary sheltered accommodation or with relatives or friends) experience relatively high rates of victimisation,[23 24] while data from national surveys in Great Britain show that being the victim of domestic property crimes is higher among those that rent (including those in the private rented sector) than those who own their own homes.[25]

Having a disability was also significantly associated with experiencing any harm and an aggressive harm. No previous studies on the association between having a disability and experiencing alcohol-related harm were identified. However there is good evidence to show that those with a disability are the victims of harm more generally including physical, sexual and intimate partner violence,[26 27] and financial hardship.[28]

Being in the family stage of life also lowered the odds of experiencing harm compared to being single. This is perhaps surprising given that the survey included questions which specifically asked about harms most likely caused by a family member. Evidence on the effect of relationships and household types is mixed and largely dependent on the way these are categorised and so cannot be directly compared.

Here we show that AHTO is associated with demographic and socio-economic factors. In the United Kingdom, there are cultural differences in drinking behaviour and some of these are reflected in our AHTO findings (such as differences between ethnic groups[29]). Other socio-cultural variations are not easily identified in our findings. For example, while national survey data show that people have different drinking habits across income levels (people on higher incomes tend to drink more[29]), neither social grade nor employment status (excepting retirement) were associated with AHTO in our study. Education, as a proxy of earning potential, was associated with AHTO, but there was no significant variation between the groups GCSE/O-level/CSE, A-level/vocational and degree/higher degree.

This study identified friends and strangers as the dominant perpetrators making up around 46% of all reports, though the perpetrator varied depending on type of harm. For example, family members made up a larger proportion of perpetrators of harms such as stopping seeing someone or having to care for someone because of their drinking. While differences by sex were not the focus of this paper, and were not investigated in detail, investigating perpetrator type by sex for aggressive harms revealed significant differences (data not reported). Women were more likely to be physically hurt and forced or pressured into something sexual by someone they were in a relationship with. In contrast, for men, strangers were the most likely perpetrators of being hurt physically and feeling threatened. These findings are in line with data from England and Wales on the relationship between offender and perpetrator,[30] and from previous research. A study in the US using the 2010 National Alcohol Survey reported that men were more likely to be assaulted in bar fights by strangers while women were more likely to be (sexually) assaulted by other drinkers (partners or acquaintances) within a more private setting.[31] The context within which drinking occurs is therefore relevant in relation to exploring differences in AHTO by sex.

While three quarters of harms were experienced less than monthly, 5.2% were experienced daily or almost daily indicating a considerable burden for of alcohol-related harm for a section of the population. The frequency of experiencing harm was largely dependent on the type of harm. Harms with the highest frequency of daily/almost daily reports were those which occurred over a prolonged period of time and/or implied frequent contact with the perpetrator such as caring for someone with a long-term health condition or disability that results from them drinking. Data from two surveys suggest that exposure to heavy drinkers is associated with poorer health, wellbeing and quality of life.[32 33]

To conclude, this is the largest ever survey of AHTO conducted within the United Kingdom and the first national study in England. It is clear that AHTO is relatively prevalent and that some individuals experience harm frequently. The most prevalent harms could be considered insignificant but even apparently minor harms such as sleep disruption can have an impact on health and quality of life,[34] particularly if experienced persistently. It is difficult to compare results with the literature because of the diversity of methods being employed. In order to support temporal and geographic comparisons it would be advantageous for studies to use a consistent methodology including the sampling and data collection methods, in addition to the harm questions. The WHO ThaiHealth project has designed a survey to measure AHTO in order to facilitate international comparison[35 36] but unfortunately authors were not aware of this when they began this current study. While lengthy, using this would be a good way to develop a comprehensive and consistent evidence base. However it is clear that there are differences across harm types and more detailed analysis of specific harms would be valuable for supporting remedial action from policymakers. Here we consider ‘aggressive harms’ as a distinctive group of harms; future research could consider other harm groupings in order to provide a more detailed assessment of specific harm types. Research on the types of alcohol consumption patterns that increase the likelihood of experiencing AHTO in the United Kingdom would be valuable. Understanding what puts younger adults at increased risk could be a useful focus for future

research as it might identify the contextual factors which make experiencing harm more likely. Further focus on the differences in harm by sex would also be advantageous as there is little data on this in relation to the United Kingdom. Policy to address AHTO is less well developed than policy that seeks to address harms to the drinker; exceptions include crime and violence and harm to the unborn foetus which have been included in previous Government's Alcohol Strategy.[37] Given that AHTO research is in its early stages it is premature to advocate a detailed policy response but results presented here will be of interest to policy makers to help understand the wider impact of other people's drinking.

ACKNOWLEDGEMENTS

The authors would like to thank the alcohol expert forum of the five nations Public Health Peer Network for initiating this work and to PHE for funding it. Thanks also to the following people in PHE: Craig Timpson for quality assuring the analyses, Helen Outhwaite for help with searching for literature, Robyn Burton and Helen Willey for their input into early conversations about methods. Thanks to Dr Jamie Brown, University College London, for permitting the harm to others questions to be appended to the alcohol toolkit survey and for his subsequent support with interpretation of the alcohol toolkit survey questions. Thanks to Ipsos MORI for delivering the survey, in particular Stuart Smedley. Finally, thanks for the four reviewers for their comments on this paper.

COMPETING INTERESTS

None declared.

FUNDING

The work was funded by Public Health England.

AUTHORS' CONTRIBUTIONS

CB provided day to day management of the study, helped design the questionnaire and wrote the first draft. DB did the analysis and helped to write the first draft. JM undertook a review of the literature. KS was involved with the initiation, helped design the questionnaire and provided statistical support. CP was involved with the initiation of the study. CH was involved with the initiation of the study and helped design the questionnaire. All authors reviewed and helped to revise successive drafts and approved the final version of the manuscript.

DATA SHARING AGREEMENT

Sharing of data will be considered by PHE and UCL on a case-by-case basis. Please contact the lead author for further details.

REFERENCES

1. World Health Organization. Global status report on alcohol and health. Geneva: World Health Organization, 2014.
2. World Health Organization. Global strategy to reduce the harmful use of alcohol. Geneva: World Health Organization, 2010.
3. Office for National Statistics. Chapter 5: Violent crime and sexual offences - alcohol-related violence. London: Office for National Statistics, 2015.
4. Bellis M, Quigg Z, Hughes K, et al. Harm from other people's drinking: an international survey of their occurrence, impacts on feeling safe and legislation relating to their control. *BMJ Open* 2015;5
5. Moan I, Storvoll E, Sundin E, et al. Experienced harm from other people's drinking: a comparison of Northern European countries. *Substance Abuse Research and Treatment* 2015;9(S(2)):45-57.
6. Storvoll E, Moan I, Lund I. Negative consequences of other people's drinking: prevalence, perpetrators and locations. *Drug and Alcohol Review* 2016;2016
7. Ramstedt M, Sundin E, Moan I, et al. Harm experienced from the heavy drinking of family and friends in the general population: A comparative study of six norther European countries. *Substance Abuse Research and Treatment* 2015;9(S2)
8. Burton R, Henn C, Lavoie D, et al. A rapid evidence review of the effectiveness and cost-effectiveness of alcohol polices: an English perspective. *The Lancet* 2016 doi: http://dx.doi.org/10.1016/S0140-6736(16)32420-5
9. Beard E, Brown J, West R, et al. Protocol for a national monthly survey of alcohol use in England with 6-month follow up: 'The Alcohol Toolkit Survey'. *BMC Public Health* 2015;15:230.
10. Hope A, Curran J, Bell G, et al. Unrecognised and under-reported: the impact of alcohol on people other than the drinker in Scotland. Glasgow: Alcohol Focus Scotland, 2013.
11. Quigg Z, Bellis AM, Grey H, et al. Alcohol's harms to others: the harms from other people's alcohol consumption in Wales. Cardiff: Public Health Wales, 2016.
12. Gell L, Ally A, Buykx P, et al. Alcohol's harm to others. Sheffield: The University of Sheffield, 2015.
13. Barbor T, Higgins-Biddle J, Saunders J, et al. AUDIT: The alcohol use disorders identification test, guidelines for use in primary care. 2nd edition. Geneva: World Health Organization, 2001.
14. StataCorp. Stata survey data reference manual: release 13. Texas: StataCorp LP, 2013.
15. Rao J, Scott A. On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *Annals of Statistics* 1981;12:46-60.
16. Johnson T. Sources of error in substance use prevalence surveys. *International Scholarly Research Notices* 2014;2014 doi: http://dx.doi.org/10.1155/2014/923290
17. Office for National Statistics. Estimates of violent incidents where the victim believed the offender(s) to be under the influence of alcohlol or drugs in England and Wales, year ending March 2006 to year ending March 2016 Crime Survey for England and Wales, 2017.
18. Greenfield T, Midanik L, Rogers J. Effects of telephone versus face-to-face interview models on reports of alcohol consumption. *Addiction* 2000;95(2):277-84.
19. Karriker-Jaffe K, Greenfield T. Gender differences in associations of neighbourhood disadvantage with alcohol's harms to others: a cross-sectional study from the United States. *Drug and Alcohol Review* 2014;33(3):296-303.
20. Greenfield T, Karriker-Jaffe K, Kaplan L, et al. Trends in alcohol's harms to others (AHTO) and co-occurrence of family-related AHTO: the four US National Alcohol Surveys, 2000-2015. *Substance Abuse Research and Treatment* 2015;2015(9(S2)):23-31.
21. Hurcombe R, Bayley M, Goodman A. Ethnicity and alcohol: a review of the UK literature. York: Joseph Rowntree Foundation, 2010.

22. Seid A, Grittner U, Greenfield T, et al. To cause harm and to be harmed by others: new perspectives on alcohol's harm to others. *Substance Abuse Research and Treatment* 2015;2015(S2):13-22.
23. Kushel M, Evans J, Perry S. Victimization among homeless and marginally housed persons. *Archives of Internal Medicine* 2003;163(20):2492-99.
24. Nyamathi A, Leake B, Gelberg L. Sheltered versus nonsheltered homeless women: Differences in health, behavior, victimisation and utilization of care. *Journal of General Internal Medicine* 2000;15(8):565-72.
25. Farrall S, Hay C, Gray E. Thatcherite ideology, housing tenure and crime: The socio-spatial consequences of the right to buy for domestic property crime. . *The British Journal of Criminology* 2016;56(1):1235-52.
26. Hughes K, Bellis AM, Jones L, et al. Prevalence and risk of violence against adults with disabilities: a systematic review and meta-analysis of observational studies. *The Lancet* 2012;379(9826):1621-29.
27. Krnjacki L, Emerson E, Llewellyn G, et al. Prevalence and risk of violence against people with and without disabilities: Findings from an Australian population-based study. *Violence and Trauma* 2015;40(1):16-21.
28. Frier A, Barnett F, Devine S, et al. Understanding disability and the 'social determinants of health': how does disability affect people's social determinants of health? *Disability and Rehabilitation* 2016;40(5):538-47.
29. Office for National Statistics. Adult drinking habits in Great Britain: 2017. Newport: Office for National Statistics, 2018.
30. Office for National Statistics. Overview of violent crime and sexual offences. Newport: Office for National Statistics, 2016.
31. Kaplan L, Karriker-Jaffe J, Greenfield K. Drinking context and alcohol's harm from others among men and women in the US National Alcohol Survey. *Journal of Substance Use* 2017;22(4):412-18.
32. Casswell S, You R, Huckle T. Alcohol's harm to others: reduced wellbeing and health status for those with heavy drinkers in their lives. *Addiction* 2011;106(6):1087-94.
33. Jiang H, Callinan S, Laslett A, et al. Correlates of caring for the drinkers and others among those harmed by another's drinking. *Drug and Alcohol Review* 2015;34:162-69.
34. Muzet A. Environmental noise, sleep and health. *Sleep medicine reviews* 2007;12(2):135-42.
35. World Health Organization/ThaiHealth International Collaboration Research Project. The Harm to Others from Drinking. Geneva: World Health Organization, 2012.
36. Callinan S, Laslett A, Rekve D, et al. Alcohol's harm to others: An international collaborative project. *International Journal of Alcohol and Drug Research* 2016;5(2):25-32.
37. HM Government. The Government's Alcohol Strategy. London: HM Government, 2012.

Figure Legends

Figure 1: Perpetrators as a percentage of all reported harms to others, weighted data

Weighted N = 2,522 (represents the total number of perpetrators across all harms).

Figure 2: Frequency of all reported harms to others, weighted data

Weighted N = 2,052 (represents the total number of harms across all individuals).

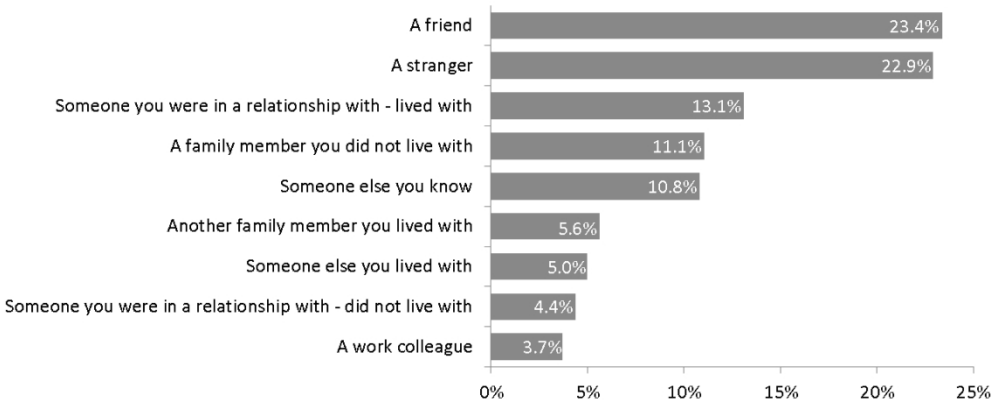

Figure 1: Perpetrators as a percentage of all reported harms to others

364x149mm (300 x 300 DPI)

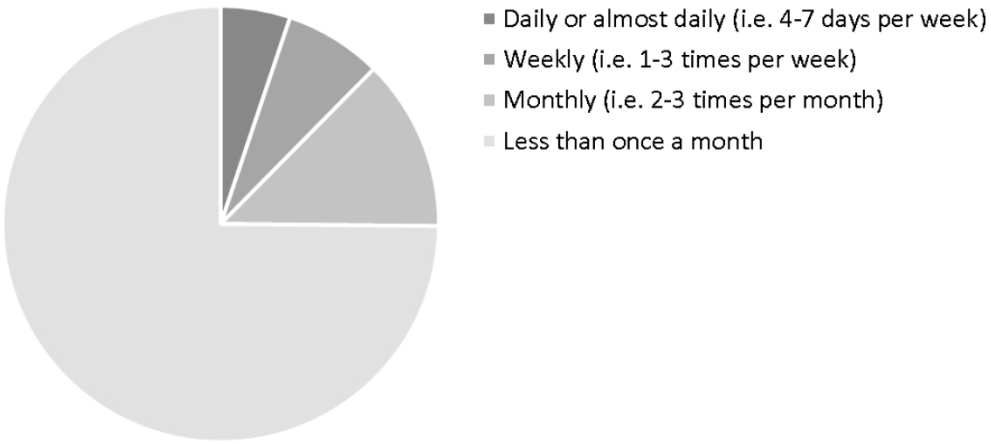

Figure 2: Frequency of all reported harms to others

292x132mm (300 x 300 DPI)

Supplementary Table 1: Examination of missing data, non-weighted data

Independent variable	Included (AHTO questions answered)		Excluded (AHTO questions not answered)		p value
	N	%	N	%	
Sex (N = 5,068)					
Female	2,397	96.9	76	3.1	0.023
Male	2,484	95.7	111	4.3	
Age band (N = 5,608)					
16-24	789	97.4	21	2.6	0.111
25-44	1,460	96.3	56	3.7	
45-64	1,435	95.5	68	4.5	
65+	1,197	96.6	42	3.4	
Broad ethnic group (N = 5,040)					
White British	3,603	96.2	142	3.8	0.125
Other White groups	393	98.3	7	1.8	
Black groups	262	95.6	12	4.4	
Asian groups	539	97.3	15	2.7	
Other groups	63	94.0	4	6.0	
Life stage (N = 5,067)					
Single	716	97.4	19	2.6	0.150
Pre-family	260	95.9	11	4.1	
Family	1,473	96.7	50	3.3	
Post family	2,431	95.8	107	4.2	
Education (5,039)					
No qualifications	866	97.2	25	2.8	0.075
GCSE/O-level/CSE	952	95.9	41	4.1	
A-level/vocational	1,334	97.2	39	2.8	
Degree/higher degree	1,335	95.4	64	4.6	
Other/still studying	368	96.1	15	3.9	
Social grade[†] (N = 5,068)					
AB	1,081	96.2	43	3.8	0.134
C1	1,554	95.8	68	4.2	
C2	947	96.7	32	3.3	
D	757	97.7	18	2.3	
E	542	95.4	26	4.6	
Tenure (N = 5,027)					
Owned outright	1,729	97.5	45	2.5	<0.001
Bought on a mortgage	1,124	95.4	54	4.6	
Rented from local authority	568	95.5	27	4.5	
Rented from private landlord	1,029	97.0	32	3.0	
Other	392	93.6	27	6.4	
Disability (N = 4,956)					
Considers self disabled	571	94.4	34	5.6	0.002
Not disabled	4,213	96.8	138	3.2	
Employment status (N = 5,066)					
Employed	2,306	95.9	98	4.1	0.121
Unemployed	237	98.8	3	1.3	
Economically inactive	1,009	96.1	41	3.9	
Retired	1,327	96.7	45	3.3	
AUDIT(N = 5,044)					
Not hazardous/harmful drinking	4,215	96.7	142	3.3	0.003
Hazardous/harmful drinking	649	94.5	38	5.5	

N = 5,068 (totals for independent variables will not equal 5,068 where the person did not provide responses to the AHTO questions and the independent variable.

[†]AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Supplementary Table 2: Prevalence of harm in the previous 12 months by sex, weighted data

Harm type	Number of respondents who experienced harm		Percentage of respondents who experienced harm	
	Men	Women	Men (95% CI)	Women (95% CI)
Been kept awake due to noise or disruption	177	213	7.5 (6.3-8.8)	8.5 (7.4-9.8)
Felt uncomfortable or anxious at a social occasion (e.g. a party)	160	171	6.8 (5.7-8.0)	6.8 (5.8-8.0)
Had a serious argument that did NOT include physical violence	129	147	5.4 (4.6-6.6)	5.8 (4.9-6.9)
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	82	92	3.5 (2.7-4.4)	3.7 (3.0-4.6)
Been emotionally hurt or neglected	50	120	2.1 (1.6-2.9)	4.8 (3.9-5.8)
Felt physically threatened	95	69	4.0 (3.2-5.1)	2.7 (2.1-3.6)
Had to stop seeing or being in contact with someone because of their drinking	47	73	2.0 (1.4-2.7)	2.9 (2.3-3.7)
Had to contact the police	56	62	2.4 (1.8-3.2)	2.5 (1.9-3.2)
Had someone break or damage something that mattered to me	52	43	2.2 (1.6-3.0)	1.7 (1.2-2.4)
Been physically hurt due to them assaulting me or acting violently	50	42	2.1 (1.5-2.9)	1.7 (1.2-2.3)
Been put at risk in a car when someone was driving after drinking	37	38	1.6 (1.1-2.3)	1.5 (1.1-2.1)
Felt genuinely concerned that they may cause harm to my children or someone else's children	18	43	0.7 (0.4-1.3)	1.7 (1.3-2.4)
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	24	33	1.0 (0.7-1.6)	1.3 (0.9-1.9)
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	16	37	0.7 (0.4-1.2)	1.5 (1.0-2.1)
Had money that would have improved the quality of my life spent on their alcohol-related purchases	18	32	0.8 (0.5-1.2)	1.3 (0.9-1.9)
Drank alcohol myself in order to cope with the problems caused by their drinking	19	14	0.8 (0.5-1.3)	0.5 (0.3-1.0)
Felt forced or pressured into sex or something sexual	12	20	0.5 (0.3-0.9)	0.8 (0.5-1.3)
Had to move out of my usual place of residence and stay somewhere else	9	16	0.4 (0.2-0.8)	0.6 (0.4-1.1)

Weighted N = 4,874.

Supplementary Table 3: Perpetrator of harm by harm type (continued on the next page), weighted data

Harm type		A friend			A stranger			Someone you were in a relationship with (e.g. wife/husband, partner) who you lived with			A family member you did not live with		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Been kept awake due to noise or disruption	No	314	84.8	80.3-88.4	187	50.5	44.7-56.2	346	93.3	89.8-95.7	359	97.0	94.5-98.4
	Yes	56	15.2	11.6-19.7	183	49.5	43.8-55.3	25	6.7	4.3-10.2	11	3.0	1.6-5.5
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	205	67.2	61.0-72.8	200	65.6	59.3-71.5	280	91.7	87.4-94.6	271	88.9	84.3-92.3
	Yes	100	32.8	27.2-39.0	105	34.4	28.5-40.7	25	8.3	5.4-12.6	34	11.1	7.7-15.7
Had a serious argument that did NOT include physical violence	No	167	64.3	57.5-70.5	225	86.8	81.4-90.8	199	76.9	70.4-82.4	216	83.5	77.7-88.0
	Yes	93	35.7	29.5-42.6	34	13.2	9.2-18.6	60	23.1	17.6-29.6	43	16.5	12.0-22.3
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	95	56.6	48.1-64.7	162	96.4	91.9-98.5	136	81.1	73.5-86.9	137	81.4	74.1-87.0
	Yes	73	43.5	35.4-51.9	6	3.6	1.5-8.1	32	18.9	13.1-26.5	31	18.6	13.0-25.9
Been emotionally hurt or neglected	No	115	72.5	64.0-79.6	150	94.3	88.7-97.2	121	76.1	67.7-82.9	116	72.7	64.2-79.8
	Yes	44	27.6	20.5-36.0	9	5.7	2.8-11.3	38	23.9	17.1-32.3	43	27.3	20.2-35.8
Felt physically threatened	No	130	84.6	77.0-90.0	61	39.5	30.9-48.8	136	88.5	82.2-92.8	145	94.5	89.6-97.2
	Yes	24	15.4	1.0-23.0	93	60.5	51.2-69.1	18	11.5	7.2-17.8	8	5.5	2.8-10.5
Had to stop seeing or being in contact with someone because of their drinking	No	71	62.4	52.3-71.6	109	95.6	88.8-98.4	92	80.6	71.2-87.4	86	75.9	66.1-83.6
	Yes	43	37.6	28.4-47.7	5	4.4	1.6-11.2	22	19.4	12.6-28.8	27	24.1	16.4-33.9
Had to contact the police	No	96	89.5	81.3-94.3	59	55.3	44.3-65.8	93	87.0	79.0-92.2	95	88.8	79.1-94.3
	Yes	11	10.5	5.7-18.7	48	44.7	34.2-55.7	14	13.0	7.8-21.0	12	11.2	5.7-20.9
Had someone break or damage something that mattered to me	No	50	55.8	43.0-67.9	82	90.9	82.1-95.6	75	82.8	72.5-89.8	82	90.8	82.1-95.5
	Yes	40	44.2	32.1-57.0	8	9.1	4.4-17.9	16	17.2	10.2-27.5	8	9.2	4.5-17.9
Been physically hurt due to them assaulting me or acting violently	No	71	85.4	74.7-92.0	57	68.5	56.4-78.5	66	79.8	69.2-87.4	73	88.1	76.8-94.3
	Yes	12	14.7	8.0-25.3	26	31.5	21.5-43.6	17	20.2	12.6-30.8	10	11.9	5.7-23.2
Been put at risk in a car when someone was driving after drinking	No	46	66.7	54.0-77.4	52	75.5	61.6-85.6	62	89.5	78.5-95.2	66	96.1	87.9-98.8
	Yes	23	33.3	22.6-46.0	17	24.5	14.4-38.4	7	10.5	4.8-21.5	3	4.0	1.2-12.1
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	47	91.1	77.3-96.9	39	77.1	62.5-87.2	45	87.4	75.3-94.0	41	80.9	65.9-90.2
	Yes	5	8.9	3.1-22.7	12	22.9	12.8-37.5	6	12.6	6.0-24.7	10	19.2	9.8-34.1
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	41	75.7	60.0-86.6	51	94.6	85.4-98.1	47	87.5	73.5-94.6	34	62.4	47.2-75.5
	Yes	13	24.3	13.4-40.0	3	5.4	1.9-14.6	7	12.5	5.4-26.5	20	37.6	24.5-52.8
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	30	59.5	43.6-73.5	32	62.5	46.3-76.2	44	87.2	74.1-94.2	44	86.6	72.0-94.2
	Yes	21	40.5	26.5-56.4	19	37.6	23.8-53.7	7	12.8	5.8-25.9	7	13.4	5.8-28.0
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	29	63.0	46.6-76.8	44	97.1	80.6-99.6	30	66.5	49.1-80.4	40	89.1	72.6-96.2
	Yes	17	37.0	23.2-53.4	1	3.0	0.4-19.4	15	33.5	19.6-50.9	5	10.9	3.8-27.4
Drank alcohol myself in order to cope with the problems caused by their drinking	No	22	75.7	54.3-89.1	27	93.4	70.9-98.8	22	76.9	53.4-90.6	25	86.0	62.0-95.9
	Yes	7	24.3	10.9-45.7	2	6.6	1.2-29.1	7	23.1	9.4-46.6	4	14.0	4.1-38.0
Felt forced or pressured into sex or something sexual	No	22	80.3	58.5-92.2	22	81.0	55.8-93.5	21	76.7	54.0-90.2	26	95.8	72.8-99.5
	Yes	5	19.7	7.8-41.5	5	19.0	6.5-44.2	6	23.3	9.8-46.0	1	4.2	0.5-27.2
Had to move out of my usual place of residence and stay somewhere else	No	18	82.9	62.3-93.4	20	94.1	74.7-98.8	12	55.3	31.0-77.3	20	95.4	80.5-99.0
	Yes	4	17.1	6.6-37.7	1	5.9	1.2-25.3	10	44.7	22.7-69.0	1	4.6	1.0-19.5

Supplementary Table 3: Perpetrator of harm by harm type (continued from the previous page), weighted data

Harm type		Someone else you know			Another family member you lived with			Someone else you lived with			Someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with			A work colleague		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Been kept awake due to noise or disruption	No	296	80.1	75.0-84.3	348	94.1	90.8-96.3	325	87.7	83.7-90.9	362	97.7	95.2-98.9	365	98.5	96.3-99.4
	Yes	74	20.0	15.7-25.1	22	5.9	3.7-9.2	45	12.3	9.1-16.3	8	2.3	1.1-4.8	6	1.5	0.6-3.8
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	264	86.7	81.8-90.4	299	97.8	95.2-99.0	294	96.5	93.0-98.3	297	97.3	94.5-98.7	276	90.6	86.0-93.8
	Yes	41	13.4	9.6-18.3	7	2.2	1.0-4.9	11	3.5	1.8-7.0	8	2.7	1.3-5.5	29	9.4	6.2-14.1
Had a serious argument that did NOT include physical violence	No	233	90.0	85.0-93.4	240	92.7	88.6-95.3	244	94.1	90.2-96.5	240	92.7	89.0-95.2	249	96.2	92.5-98.1
	Yes	26	10.0	6.6-15.0	19	7.3	4.7-11.4	15	5.9	3.5-9.9	19	7.3	4.8-11.0	10	3.8	1.9-7.5
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	156	93.0	86.7-96.5	156	92.8	87.8-95.8	157	93.7	87.6-96.9	160	95.2	90.7-97.6	150	89.4	82.1-94.0
	Yes	12	7.0	3.5-13.3	12	7.2	4.2-12.2	11	6.4	3.1-12.4	8	4.8	2.4-9.4	18	10.6	6.1-17.9
Been emotionally hurt or neglected	No	152	95.7	91.1-97.9	146	92.0	86.4-95.4	147	92.5	85.9-96.1	137	85.9	78.7-91.0	154	97.0	91.9-98.9
	Yes	7	4.3	2.1-8.9	13	8.0	4.6-13.6	12	7.6	3.9-14.1	22	14.1	9.1-21.3	5	3.0	1.1-8.1
Felt physically threatened	No	132	85.7	78.0-91.1	148	96.7	92.0-98.6	153	99.6	97.4-100.0	149	97.0	92.4-98.8	151	98.2	93.0-99.6
	Yes	22	14.3	8.9-22.0	5	3.3	1.4-8.0	1	0.4	0.1-2.6	5	3.0	1.2-7.6	3	1.8	0.4-7.0
Had to stop seeing or being in contact with someone because of their drinking	No	102	89.5	82.3-94.0	106	92.7	85.9-96.3	109	95.8	86.4-98.8	107	93.9	87.2-97.2	108	95.0	87.1-98.1
	Yes	12	10.5	6.0-17.7	8	7.3	3.7-14.1	5	4.2	1.2-13.6	7	6.1	2.8-12.8	6	5.0	1.9-12.9
Had to contact the police	No	87	81.5	71.2-88.7	101	94.8	88.4-97.8	105	98.4	93.2-99.6	105	97.8	93.1-99.3	106	98.7	91.3-99.8
	Yes	20	18.5	11.3-28.8	6	5.2	2.2-11.6	2	1.6	0.4-6.8	2	2.2	0.7-6.9	1	1.3	0.2-8.7
Had someone break or damage something that mattered to me	No	81	89.9	80.6-95.0	80	88.2	78.4-93.9	87	95.7	88.5-98.5	87	96.0	88.6-98.6	89	97.8	90.6-99.5
	Yes	9	10.1	5.0-19.4	11	11.8	6.1-21.6	4	4.3	1.5-11.5	4	4.0	1.4-11.4	2	2.2	0.5-9.4
Been physically hurt due to them assaulting me or acting violently	No	74	89.3	79.5-94.7	76	90.8	80.5-95.9	82	97.9	93.2-99.4	79	95.0	86.3-98.3	79	94.4	79.9-98.6
	Yes	9	10.7	5.3-20.5	8	9.2	4.1-19.6	2	2.1	0.6-6.8	4	5.0	1.7-13.7	5	5.6	1.4-20.1
Been put at risk in a car when someone was driving after drinking	No	59	85.3	74.7-91.9	63	90.4	79.6-95.8	69	99.1	93.7-99.9	65	93.6	83.4-97.7	66	95.0	84.4-98.5
	Yes	10	14.7	8.1-25.3	7	9.6	4.2-20.4	1	0.9	0.1-6.3	4	6.4	2.3-16.6	3	5.0	1.5-15.6
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	36	70.7	54.6-82.9	48	94.1	82.4-98.2	50	98.6	90.0-99.8	49	96.9	87.6-99.3	49	95.8	74.8-99.4
	Yes	15	29.3	17.1-45.4	3	5.9	1.8-17.6	1	1.4	0.2-10.0	2	3.1	0.7-12.4	2	4.2	0.6-25.2
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	49	91.2	78.1-96.8	49	91.0	79.4-96.4	53	97.9	91.0-99.5	52	96.4	86.2-99.2	53	97.8	84.9-99.7
	Yes	5	8.8	3.2-21.9	5	9.0	3.6-20.6	1	2.2	0.5-9.0	2	3.6	0.8-13.8	1	2.2	0.3-15.1
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	49	96.8	90.0-99.0	51	99.2	94.4-99.9	46	89.5	73.4-96.3	47	91.5	79.3-96.8	49	97.0	86.4-99.4
	Yes	2	3.2	1.0-10.0	0	0.8	0.1-5.6	5	10.6	3.7-26.6	4	8.5	3.2-20.7	2	3.0	0.6-13.6
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	43	95.6	86.2-98.7	40	87.5	73.4-94.6	40	88.9	72.6-96.0	44	95.9	83.2-99.1	45	98.1	87.0-99.8
	Yes	2	4.4	1.3-13.8	6	12.5	5.4-26.6	5	11.1	4.0-27.4	2	4.1	0.9-16.8	1	1.9	0.2-13.0
Drank alcohol myself in order to cope with the problems caused by their drinking	No	26	90.3	75.9-96.5	27	93.8	76.5-98.6	27	92.2	73.8-98.0	25	87.3	66.8-95.9	28	95.7	81.5-99.1
	Yes	3	9.7	3.5-24.1	2	6.2	1.4-23.5	2	7.9	2.0-26.2	4	12.7	4.1-33.2	1	4.3	0.9-18.5
Felt forced or pressured into sex or something sexual	No	23	85.5	65.7-94.8	26	95.4	70.5-99.4	24	86.3	62.9-95.9	23	83.4	61.0-94.2	27	100.0	-
	Yes	4	14.5	5.2-34.3	1	4.7	0.6-29.5	4	13.7	4.1-37.1	5	16.6	5.8-39.0	0	0.0	-
Had to move out of my usual place of residence and stay somewhere else	No	20	94.0	63.8-99.3	13	59.9	34.8-80.7	21	100.0	-	21	97.4	81.0-99.7	21	100.0	-
	Yes	1	6.0	0.7-36.2	9	40.1	19.3-65.2	0	0.0	-	1	2.6	0.3-19.0	0	0.0	-

Supplementary Table 4: Frequency of harm by harm type (as a percentage of those who experienced each harm), weighted data

	Frequency	Percentage	95% CI
Been kept awake due to noise or disruption	Daily or almost daily (i.e. 4-7 days per week)	2.4	1.3- 4.3
	Weekly (i.e. 1-3 times per week)	12.1	9.0-16.1
	Monthly (i.e. 2-3 times per month)	18.4	14.5-23.2
	Less than once a month	67.1	61.7- 72.2
Felt uncomfortable or anxious at a social occasion (e.g. a party)	Daily or almost daily (i.e. 4-7 days per week)	1.5	0.6-3.9
	Weekly (i.e. 1-3 times per week)	1.0	0.4-2.6
	Monthly (i.e. 2-3 times per month)	8.0	5.3-12.0
	Less than once a month	89.5	85.2-92.6
Had a serious argument that did NOT include physical violence	Daily or almost daily (i.e. 4-7 days per week)	1.4	0.4-4.4
	Weekly (i.e. 1-3 times per week)	4.8	2.7-8.6
	Monthly (i.e. 2-3 times per month)	7.0	4.3-11.3
	Less than once a month	86.7	81.5-90.6
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	3.9	1.7-8.6
	Weekly (i.e. 1-3 times per week)	9.6	5.5-16.4
	Monthly (i.e. 2-3 times per month)	13.6	8.9-20.3
	Less than once a month	72.9	64.6-79.8
Been emotionally hurt or neglected	Daily or almost daily (i.e. 4-7 days per week)	9.0	5.0-15.5
	Weekly (i.e. 1-3 times per week)	7.6	4.1-13.4
	Monthly (i.e. 2-3 times per month)	15.1	10.0-22.3
	Less than once a month	68.3	59.6-75.9
Felt physically threatened	Daily or almost daily (i.e. 4-7 days per week)	4.6	2.1-9.9
	Weekly (i.e. 1-3 times per week)	4.4	2.0-9.7
	Monthly (i.e. 2-3 times per month)	7.6	3.8-14.8
	Less than once a month	83.3	75.2-89.2
Had to stop seeing or being in contact with someone because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	19.3	11.9-29.6
	Weekly (i.e. 1-3 times per week)	10.4	5.5-18.7
	Monthly (i.e. 2-3 times per month)	9.4	5.2-16.5
	Less than once a month	61.0	50.1-70.8
Had to contact the police	Daily or almost daily (i.e. 4-7 days per week)	7.8	3.6-16.2
	Weekly (i.e. 1-3 times per week)	6.5	2.6-15.5
	Monthly (i.e. 2-3 times per month)	7.5	3.8-14.1
	Less than once a month	78.2	67.9-85.9
Had someone break or damage something that mattered to me	Daily or almost daily (i.e. 4-7 days per week)	3.2	0.9-10.7
	Weekly (i.e. 1-3 times per week)	5.0	1.9-12.5
	Monthly (i.e. 2-3 times per month)	7.4	3.6-14.5
	Less than once a month	84.4	74.9-90.8
Been physically hurt due to them assaulting me or acting violently	Daily or almost daily (i.e. 4-7 days per week)	7.1	2.6-18.2
	Weekly (i.e. 1-3 times per week)	6.3	2.0-17.7
	Monthly (i.e. 2-3 times per month)	11.0	5.5-20.8
	Less than once a month	75.6	62.8-85.0
Been put at risk in a car when someone was driving after drinking	Daily or almost daily (i.e. 4-7 days per week)	8.6	3.4-19.9
	Weekly (i.e. 1-3 times per week)	3.2	0.7-13.0
	Monthly (i.e. 2-3 times per month)	8.5	3.3-20.1
	Less than once a month	79.7	66.6-88.6
Felt genuinely concerned that they may cause harm to my children or someone else's children	Daily or almost daily (i.e. 4-7 days per week)	6.1	1.8-18.1
	Weekly (i.e. 1-3 times per week)	7.1	2.4-19.2
	Monthly (i.e. 2-3 times per month)	24.5	12.9-41.4
	Less than once a month	62.3	45.7-76.5
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	Daily or almost daily (i.e. 4-7 days per week)	19.4	10.2-33.8
	Weekly (i.e. 1-3 times per week)	15.6	7.5-29.7
	Monthly (i.e. 2-3 times per month)	28.0	16.5-43.6
	Less than once a month	37.0	23.8-52.4
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	Daily or almost daily (i.e. 4-7 days per week)	3.9	0.9-15.7
	Weekly (i.e. 1-3 times per week)	8.1	2.8-21.3
	Monthly (i.e. 2-3 times per month)	11.7	5.0-24.7
	Less than once a month	76.3	61.2-86.8
Had money that would have improved the quality of my life spent on their alcohol-related purchases	Daily or almost daily (i.e. 4-7 days per week)	6.3	1.9-19.1
	Weekly (i.e. 1-3 times per week)	7.6	2.1-24.0
	Monthly (i.e. 2-3 times per month)	35.8	21.3-53.4
	Less than once a month	50.3	33.7-66.7
Drank alcohol myself in order to cope with the problems caused by	Daily or almost daily (i.e. 4-7 days per week)	5.2	1.0-22.4

	Frequency	Percentage	95% CI
their drinking	Weekly (i.e. 1-3 times per week)	20.7	8.1-43.5
	Monthly (i.e. 2-3 times per month)	42.5	23.0-64.8
	Less than once a month	31.6	14.9-54.9
Felt forced or pressured into sex or something sexual	Daily or almost daily (i.e. 4-7 days per week)	2.4	0.3-17.6
	Weekly (i.e. 1-3 times per week)	4.5	0.5-28.7
	Monthly (i.e. 2-3 times per month)	2.1	0.3-15.5
	Less than once a month	91.0	72.0-97.5
Had to move out of my usual place of residence and stay somewhere else	Daily or almost daily (i.e. 4-7 days per week)	8.1	1.6-31.8
	Weekly (i.e. 1-3 times per week)	12.0	2.5-42.1
	Monthly (i.e. 2-3 times per month)	6.1	1.3-24.8
	Less than once a month	73.8	47.4-89.8

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	3-4
Bias	9	Describe any efforts to address potential sources of bias	3 (sampling) and 5 (weighting)
Study size	10	Explain how the study size was arrived at	3-4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	5
		(*c*) Explain how missing data were addressed	5
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	5
		(*e*) Describe any sensitivity analyses	NA

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8 and 10
		(b) Indicate number of participants with missing data for each variable of interest	Not included due to space. We can add this as another supplementary table.
Outcome data	15*	Report numbers of outcome events or summary measures	8 and 10
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-11
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	5

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-021046.R3
Article Type:	Research
Date Submitted by the Author:	03-Oct-2018
Complete List of Authors:	Beynon, Caryl; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Bayliss, David; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Mason, Jenny; Public Health England, Risk Factors Intelligence Team, Health Improvement Directorate Sweeney, Kate; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Perkins, Clare; Public Health England, Risk Factors Intelligence, Health Improvement Directorate Henn, Clive; Public Health England, Alcohol, Drugs and Tobacco Division, Health Improvement Directorate
Primary Subject Heading:	Public health
Secondary Subject Heading:	Epidemiology, Health policy
Keywords:	alcohol-related harm to others, alcohol, violence

Alcohol-related harm to others in England: a cross-sectional analysis of National survey data

Beynon C, Bayliss D, Mason J, Sweeney K, Perkins C, Henn C

Corresponding author: Caryl Beynon

Address: Risk Factor Intelligence Team, Health Improvement Directorate, Public Health England, Suite 3b, Cunard Building, Water Street, Liverpool, L3 1DS, United Kingdom
Email: caryl.beynon@phe.gov.uk
Telephone: 0151 706 6205

Co-Authors:

David Bayliss, Risk Factors Intelligence Team, Public Health England, Manchester, United Kingdom.

Jenny Mason, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Kate Sweeney, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clare Perkins, Risk Factors Intelligence Team, Public Health England, Liverpool, United Kingdom.

Clive Henn, Alcohol, Drugs and Tobacco Division, Public Health England, London, United Kingdom.

ABSTRACT

Objectives: to estimate the prevalence, the frequency and the perpetrators of alcohol-related harm to others and identify factors associated with experiencing harm and aggressive harm.

Design: Cross-sectional survey.

Setting: England.

Participants: Adults (general population) aged 16 and over.

Outcome measures: Percentage of respondents who experienced harm. Socio-economic and demographic factors associated with the outcomes. Outcomes were 1. Experienced harm/did not experience harm and 2. Experienced aggressive harm (physically threatened, physically hurt and forced/pressured into something sexual)/did not experience an aggressive harm (no aggressive harm plus no harm at all).

Results: The weighted sample was 4,874; 20.1% (95% confidence interval [CI] 18.9-21.4) reported experiencing harm in the previous 12 months and 4.6% (95% CI 4.0-5.4) reported experiencing an aggressive harm. Friends and strangers were the dominant perpetrators. Most harms occurred less than monthly but 5.2% of respondents experienced harm daily/almost daily. Factors associated with experiencing harm were: younger age, drinking harmfully/hazardously, White British, having a disability, being educated and living in private rented accommodation (compared with being an owner occupier). Being in the family stage of life (defined as having children in the household) and being retired (compared with being employed) had significantly lower odds of harm. Factors associated with experiencing an aggressive harm were similar.

Conclusions: This exploratory study shows that alcohol-related harm to others affects a sizeable proportion of the population of England. Even apparently insignificant harms, like being kept awake, can have a negative impact on health, while aggressive harms are clearly of concern. That 5% of respondents experience harm daily/almost daily suggests a population of people with a particularly high burden likely to affect health. Using a standard methodology to measure harm across studies would be advantageous. Policies that focus on alcohol must take into consideration the impact of drinking on those other than the drinker.

STRENGTHS AND LIMITATIONS OF THE STUDY

- This is the largest survey on alcohol-related harm to others in the United Kingdom and the first national survey in England.
- The sampling approach and weighting ensured the data were representative of the population of England.
- There is potential selection bias which is inherent in all national surveys.
- The use of a bespoke survey made comparison of the findings with the literature difficult but when the study was initiated no other universally accepted survey was identified.

Key words: alcohol-related harm to others, alcohol, violence

Word count: 6,415

INTRODUCTION

The detrimental effects of alcohol are well documented; in 2012 alcohol consumption was responsible for approximately 6% of deaths and 5% of disease burden globally.[1] The focus has been on the harmful effects of alcohol on the drinker with less attention on the harms caused to others, including families, work colleagues and wider society. The World Health Organization's (WHO) global alcohol strategy highlights the need to consider the harm alcohol causes to people other than the drinker,[2] and it is these alcohol-related harms to others (AHTO) that are the focus of this study.

Health and social data provide insight into the potential harms caused by another's drinking. Data from the Crime Survey for England and Wales, for example, show that in just over half of all violent crimes the victim perceived the offender to be under the influence of alcohol and that drinking was particularly implicated in violent incidents between strangers.[3] Data from the Department of Transport show that in England during 2013 to 2015, there were almost 10,000 alcohol-related road traffic accidents in which at least one driver failed the alcohol breathalyser test (data are available at: https://fingertips.phe.org.uk/profile/local-alcohol-profiles), demonstrating a considerable potential harm to both the drinking driver and to others on the roads.

In the last decade or so several studies have aimed to quantify and explore AHTO in more detail. These studies have provided widely varying estimates of the prevalence of harm, largely due to differences in the way harms are defined and the reference population. Studies which focus on identifying the socio-demographic and behavioural factors associated with being the victim of harm do not always provide consistent findings, suggesting the need for further research. While there is a relatively consistent finding across studies that younger age increases the likelihood of experiencing harm,[4-6] the association of harm with other characteristics is less clear. For example, women have generally been identified as more at risk of harm from another's drinking than men but this is not consistent across all countries and some authors report this association for certain types of harm only.[4-7] Two studies identified that women were more likely to experience unwanted sexual attention/harassment/assault, whereas men were more likely to experience having their belongings or property damaged.[4 6]

When the impact of alcohol includes the effects to the individual drinker and wider society, the cost is considerable. A review of studies in high-income countries found the gross economic costs of alcohol to range from 1.4% to 2.7% of gross domestic product; in the United Kingdom (UK) in 2016 this would be equivalent to between £27 billion and £52 billion.[8] There is a need to better understand AHTO and the characteristics of those affected in order to implement an effective response. To date there has been no national survey of AHTO in England, although surveys have been conducted in Scotland,[9] Wales[10] and Ireland.[11] The objectives of this exploratory study were to estimate the prevalence of AHTO in England, identify factors associated with being the victim of harm, the frequency with which this harm occurs and the perpetrators of harm.

METHOD

The survey

The questions to identify experience of AHTO were devised after an evidence review and were added to the Alcohol Toolkit Survey (ATS) between 1st November 2015 and 31st January 2016. The ATS is a cross-sectional household survey, run by University College London and administered by Ipsos MORI using computer-assisted interviews. Each month a new sample of adults aged 16 and over who live in England complete the survey. Households are selected using a type of random location sampling which is a hybrid of random probability sampling and simple quota sampling (so that each monthly sample is representative of the population). Interviews are

conducted with one member of the selected household.[12] The AHTO questions were self-completed following guidance on this from the Research Support and Governance Office, Public Health England. Due to the novel and exploratory nature of the work, no formal sample size calculation was undertaken as the parameters on which to base this were unknown. Instead, a three month window of data collection was chosen, knowing that the ATS aimed to survey approximately 1,800 adults per month.[12] The sample size was considerably larger than other studies of AHTO conducted in the UK.[9 10 13]

The AHTO questions asked whether or not the respondent had experienced the following harms from another's drinking in the past 12 months:

Because of someone else's drinking I have….

1. Had a serious argument that did not include physical violence.
2. Felt physically threatened.
3. Been emotionally hurt or neglected.
4. Been physically hurt due to them assaulting me or acting violently.
5. Been physically hurt due to them accidentally injuring me (e.g. by falling on me).
6. Been put at risk in a car when someone was driving after drinking.
7. Felt forced or pressured into sex or something sexual.
8. Felt uncomfortable or anxious at a social occasion (e.g. a party).
9. Had someone break or damage something that mattered to me.
10. Had money that would have improved the quality of my life spent on their alcohol-related purchases.
11. Felt genuinely concerned that they may cause harm to my children or someone else's children.
12. Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking.
13. Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking.
14. Been kept awake due to noise or disruption.
15. Drank alcohol myself in order to cope with the problems caused by their drinking.
16. Had to stop seeing or being in contact with someone because of their drinking.
17. Had to move out of my usual place of residence and stay somewhere else.
18. Had contact with the police.

If a respondent indicated that they had experienced any of the harms they were asked to indicate who perpetrated the harm and the frequency with which the harm occurred. Response options for who perpetrated the harm were: someone you were in a relationship with (e.g. wife/husband, partner) who you lived with; someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with; another family member you lived with; a family member you did not live with; someone else you lived with; a friend; a work colleague; someone else you know; a stranger; refused/prefer not to say and don't know. Response options for the frequency of harm were: daily or almost daily (i.e. 4-7 days per week); weekly (i.e. 1-3 times per week); monthly (i.e. 2-3 times per month); less than once a month; refused/prefer not to say and don't know.

A range of demographic and socio-economic variables, collected as part of the ATS, were used as independent variables: sex (female, male); age band in years (16-24, 25-44, 45-64, 65 and over); broad ethnic group (White British, Other White, Black, Asian, Other); life stage (single, pre-family, family, post-family); educational attainment (no qualifications, GCSE/O-level/CSE, A-level/vocational, degree/higher degree, other/still studying); social grade (AB [higher managerial, administrative and professional], C1 [supervisory, clerical and junior managerial, administrative and professional], C2 [skilled manual workers], D [semi-skilled and unskilled manual workers], E [state pensioners, casual and lowest grade workers, unemployed with state benefits only]); tenure

of home (owned outright, bought on a mortgage, rented from local authority, rented from private landlord, other); self-defined disability (yes, no) and employment status (employed, unemployed, economically inactive, retired). 'Life stage' was derived from age, marital status and number of children living in the household and is defined as follows: single (up to the age of 39, not married/in a civil partnership and no children in the household), pre-family (up to the age of 39, married/in a civil partnership and no children in the household), family (children living in the household) and post-family (aged 40 and over, no children in the household). The respondents' alcohol consumption was measured using the Alcohol Use Disorders Identification Test (AUDIT) which is used to identify hazardous and harmful drinkers. Here hazardous/harmful drinkers were identified as those with scores of eight or more if aged 65 or under, and scores of seven or more if aged over 65, in line with WHO guidance.[14]

Analysis

Respondents who refused to complete the AHTO questions and those who chose the 'don't know' or 'refused/prefer not to say' options for all 18 harm questions were excluded from all analyses. Chi square tests were used to compare the characteristics of those who were included in the analysis to those that were excluded due to missing data on the AHTO questions. Individuals who failed to provide a valid response to other questions were excluded from the analysis of that particular independent variable. People with one or more missing covariate were excluded from the multivariate analyses.

Two binary dependent variables were created. 'Any harm' was coded as yes if a person had experienced any of the 18 harm types in the previous 12 months. 'Aggressive harm' was coded as yes if the person had experienced one or more of the following three harms: felt physically threatened, been physically hurt due to them assaulting me or acting violently and felt forced or pressured into sex or something sexual. The categorisation of 'aggressive harm' is in line with previous research on AHTO.[4]

All analyses were undertaken using Stata 13 and the 'svy' command prefix for analysing survey data. Prevalence was estimated by dividing the positive responses by the total responses for each harm type, any harm and aggressive harm; 95% confidence intervals (CI) were calculated for each prevalence estimate using the standard settings of Stata's 'svy: tabulate' command.[15] Bivariate independence was tested using a 'corrected' Pearson chi-squared statistic for survey data [design-based *F* tests based on Rao and Scott correction].[16] Multivariate analyses (binary logistic regression) were conducted to model the joint effects of the independent variables significantly associated with any harm and aggressive harm in the bivariate analyses with 'no harm' and 'no aggressive harm' as the reference categories. Adjusted odds ratios (AOR) are presented in comparison to the reference category for the given variable and *t* tests provide an indication of statistical significance. Where comparisons are presented between categories of a variable where neither is the reference category, an indication of statistical significance is given using adjusted Wald tests. Analyses were weighted (using weights generated by the ATS) in order to improve the representativeness of the sample relative to an English population profile using multiple socio-demographic variables.[12] Due to the exploratory nature of the analysis, α is set at 0.05 for all tests. The risk of type I error is considered less important than the risk of type II error: deflating α may limit further investigation at a point where the evidence base is developing.

Patient and public involvement

Patients and the public were not involved in this study.

Ethics and funding

Approval for the ATS was granted by University College London's ethics committee (reference: 0498/001) and for the AHTO questions by the Research Support and Governance Office, Public Health England (reference: R&D 055). This work was funded by Public Health England.

RESULTS

Missing data

The original (unweighted) sample size was 5,068. The proportion of missing data was relatively small; 96 people (1.9%) did not complete the AHTO questions and a further 91 (1.8%) answered 'don't know/refused' to all AHTO questions; both groups were excluded from the analyses leaving an unweighted sample size of 4,881 (96.3% of the original sample). Supplementary Table 1 compares the number/proportion of people included in the analyses with those who were excluded because they did not provide a response to the AHTO questions, by independent variable. There were significant differences in the proportion of people that were included and excluded for sex, tenure of home, disability and AUDIT score. Of the 4,881 people included in the bivariate analyses, 189 (3.9%) were excluded from the multivariate analyses because one or more independent variable was missing.

Prevalence of harm

Table 1 reports the estimated prevalence of each type of harm; 20.1% (95% CI 18.9%-21.4%) of people reported experiencing at least one harm due to someone else's drinking in the past 12 months. These data by sex are reported in Supplementary Table 2. While the numbers are too small to make a comprehensive assessment of the differences by sex (and such differences are not the focus of this paper), some disparities in harm were evident. For example there was a clear difference between the proportion of men (2.1% 95% CI 1.6%-2.9%) and women (4.8% 95% CI 3.9%-5.8%) who reported experiencing alcohol-related emotional hurt or neglect. Aggressive harms were experienced by 4.6% (95% CI 4.0%-5.4%) of respondents.

Table 1: Prevalence of harm in the previous 12 months, weighted data

Harm type	Number of respondents who experienced harm	Percentage of respondents who experienced harm	95% CI
Been kept awake due to noise or disruption	390	8.0	7.2 - 8.9
Felt uncomfortable or anxious at a social occasion (e.g. a party)	331	6.8	6.0 - 7.6
Had a serious argument that did NOT include physical violence	275	5.7	5.0 - 6.4
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	174	3.6	3.0 - 4.2
Been emotionally hurt or neglected	170	3.5	3.0 - 4.1
Felt physically threatened	164	3.4	2.8 - 4.0
Had to stop seeing or being in contact with someone because of their drinking	120	2.5	2.0 - 3.0
Had to contact the police	117	2.4	2.0 - 2.9
Had someone break or damage something that mattered to me	95	1.9	1.5 - 2.5
Been physically hurt due to them assaulting me or acting violently	92	1.9	1.5 - 2.4
Been put at risk in a car when someone was driving after drinking	75	1.5	1.2 - 2.0
Felt genuinely concerned that they may cause harm to my children or someone else's children	61	1.2	0.9 - 1.6
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	57	1.2	0.9 - 1.5
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	53	1.1	0.8 - 1.5
Had money that would have improved the quality of my life spent on their alcohol-related purchases	50	1.0	0.8 - 1.4
Drank alcohol myself in order to cope with the problems caused by their drinking	33	0.7	0.5 - 1.0
Felt forced or pressured into sex or something sexual	33	0.7	0.5 - 1.0
Had to move out of my usual place of residence and stay somewhere else	25	0.5	0.3 - 0.8
At least one reported harm	980	20.1	18.9 - 21.4
At least one aggressive harm	225	4.6	4.0 – 5.4

Weighted N = 4,874.

Bivariate and multivariate results (factors associated with harm)

Factors associated with experiencing any harm in the bivariate analyses are reported in Table 2. Experience of harm decreased with age. This trend by age was reflected in experience of harm by life stage, with 36.5% (95% CI 32.8%-40.5%) of single people experiencing harm compared to 15.0% (95% CI 13.4%-16.7%) of those in a 'post-family' life stage. White British people were more likely to report experiencing harm (21.8%, 95% CI 20.3%-23.4%) than people of other broad ethnic groups; people of Asian ethnicity had the lowest prevalence (10.9%, 95% CI 8.2%-14.2%). People with no qualifications were least likely to report experiencing harm (9.9%, 95% CI 7.9%-12.5%).Those whose highest attainment was A-level or vocational had the highest prevalence (26.7%, 95% CI 24.1%-29.3%). People in the private-rented sector had the highest harm prevalence by tenure (29.9%, 95% CI 26.9%-33.1%). This compares to just 14.0% (95% CI 12.3%-16.0%) of people who owned their home outright experiencing harm. People who considered themselves disabled were more likely to report having experienced harm than those who did not (24.0%, 95% CI 20.3%-28.1%, compared to 19.7%, 95% CI 18.4%-21.1%). Those who were unemployed (26.8%, 95% CI 21.0%-33.6%) or economically inactive (26.8%, 95% CI 24.0%-29.9%) were more likely to report harm than those who were employed (22.0%, 95% CI 20.2%-24.0%); the difference between the unemployed and employed was not significant. Retired people were much less likely to report experiencing at least one harm (9.1%, 95% CI 7.5%-10.9%) than people across all other employment statuses. The prevalence of AHTO was significantly higher among hazardous/harmful drinkers

(37.9%, 95% CI 33.9%-42.1%) compared to those who were not (17.3%, 95% CI 16.0%-18.6%).

In the multivariate model, young age remained strongly associated with experiencing harm due to someone else's drinking, with those aged 16-24 having greater odds of experiencing harm than all older age groups (Table 2). Being a hazardous/harmful drinker was strongly associated with experiencing harm; the odds of experiencing harm were around double the odds of those who were not hazardous/harmful drinkers. Being White British compared to being Other White, Black or Asian ethnicities was also associated with greater odds of experiencing harm, as was considering oneself disabled, being educated, and living in private-rented accommodation compared to being an owner occupier. The odds of experiencing harm were lower for respondents in the family stage of life than the odds for those that were single. The odds of experiencing harm were lower for retired respondents than the odds for employed respondents.

Table 2: Bivariate and multivariate comparisons of harm versus no harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Independent variable	No harm			Harm					
	N	%	95% CI	N	%	95% CI	AOR	p	95% CI
Sex									
Female	2,008	80.1	78.3 - 81.8	498	19.9	18.2 - 21.7	Not entered into the model		
Male	1,887	79.7	77.7 - 81.4	482	20.3	18.6 - 22.3			
Age band †									
16-24	446	63.4	59.6 - 67.0	258	36.6	33.0 - 40.4	Reference		
25-44	1,278	78.4	76.0 - 80.7	352	21.6	19.3 - 24.0	0.63	<0.001	0.49 - 0.83
45-64	1,237	81.5	79.1 - 83.7	281	18.5	16.3 - 20.9	0.50	<0.001	0.34 - 0.75
65+	933	91.2	89.3 - 92.9	90	8.8	7.1 - 10.7	0.36	<0.001	0.21 - 0.61
Broad ethnic group†									
White British	2,975	78.2	76.7 - 79.7	830	21.8	20.3 - 23.4	Reference		
Other White groups	334	84.9	80.4 - 88.5	59	15.1	11.5 - 19.6	0.52	<0.001	0.36 - 0.76
Black groups	151	83.9	78.6 - 88.1	29	16.1	11.9 - 21.4	0.61	0.017	0.41 - 0.92
Asian groups	376	89.1	85.8 - 91.8	46	10.9	8.2 - 14.2	0.39	<0.001	0.28 - 0.56
Other groups	44	82.2	68.7 - 90.7	9	17.8	9.3 - 31.3	0.60	0.154	0.30 - 1.21
Life stage†									
Single	436	63.5	59.5 - 67.2	251	36.5	32.8 - 40.5	Reference		
Pre-family	222	72.2	65.6 - 77.9	86	27.8	22.1 - 34.4	0.91	0.620	0.61 - 1.34
Family	1,285	81.1	78.8 - 83.2	299	18.9	16.8 - 21.2	0.68	0.006	0.52 - 0.89
Post-family	1,950	85.0	83.3 - 86.6	344	15.0	13.4 - 16.7	0.85	0.433	0.56 - 1.28
Education†									
No qualifications	683	90.1	87.5 - 92.2	75	9.9	7.8 - 12.5	Reference		
GCSE/O-level/CSE	764	79.3	76.2 - 82.1	199	20.7	17.9 - 23.8	1.74	<0.001	1.25 - 2.44
A-level/vocational	974	73.3	70.7 - 75.9	354	26.7	24.1 - 29.3	2.04	<0.001	1.48 - 2.82
Degree/higher degree	1,156	79.3	76.8 - 81.7	301	20.7	18.3 - 23.2	2.16	<0.001	1.56 - 3.00
Other/still studying	294	85.6	81.2 - 89.1	50	14.4	10.9 - 18.9	1.42	0.109	0.92 - 2.18
Social grade‡									
AB	1,066	80.8	78.0 - 83.3	254	19.2	16.7 - 22.0	Not entered into the model		
C1	1,023	77.4	75.0 - 79.6	299	22.6	20.4 - 25.0			
C2	878	81.7	78.8 - 84.4	196	18.3	15.6 - 21.2			
D	614	82.5	79.1 - 85.4	131	17.5	14.6 - 20.9			
E	313	75.8	71.8 - 79.4	100	24.2	20.6 - 28.2			
Tenure†									
Owned outright	1,451	86.0	84.0 - 87.8	237	14.0	12.3 - 16.0	Reference		
Bought on a mortgage	1,142	79.2	76.4 - 81.6	301	20.9	18.4 - 23.6	0.97	0.825	0.74 - 1.28
Rented from local authority	341	78.8	74.6 - 82.5	92	21.2	17.6 - 25.4	1.38	0.060	0.99 - 1.94
Rented from private landlord	678	70.1	66.9 - 73.1	289	29.9	26.9 - 33.1	1.52	0.004	1.15 - 2.01
Other	248	81.1	76.7 - 84.8	58	19.0	15.2 - 23.4	1.11	0.562	0.77 - 1.61
Disability†									
Considers self disabled	396	76.0	71.9 - 79.7	125	24.0	20.3 - 28.1	Reference		
Not disabled	3,422	80.3	78.9 - 81.6	842	19.7	18.4 - 21.1	0.56	<0.001	0.42 - 0.74
Employment status†									
Employed	2,081	78.0	76.0 - 79.8	588	22.0	20.2 - 24.0	Reference		
Unemployed	157	73.2	66.4 - 79.0	58	26.8	21.0 - 33.6	1.09	0.648	0.75 - 1.58
Economically inactive	634	73.2	70.1 - 76.1	232	26.8	24.0 - 29.9	1.01	0.896	0.81 - 1.27
Retired	1,021	90.9	89.1 - 92.5	102	9.1	7.5 - 10.9	0.54	<0.001	0.38 - 0.78
AUDIT†									
Not hazardous/harmful drinking	3,463	82.7	81.4 - 84.0	723	17.3	16.0 - 18.6	Reference		
Hazardous/harmful drinking	419	62.1	57.9 - 66.1	256	37.9	33.9 - 42.1	2.06	<0.001	1.66 - 2.56

Weighted N = 4,874 (bivariate analyses) and 4,698 (multivariate analysis). Bivariate totals that are 4,875 not 4,874 are due to rounding as the analyses use weighted data.
AOR: adjusted odds ratio.
†test of bivariate independence indicates significant difference ($p<0.05$).
‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Aggressive harm

In bivariate analyses, men were marginally more likely to experience an aggressive harm than women (5.3% and 4.0% respectively, p=0.04, Table 3). The other characteristics associated with experiencing aggressive harms were similar to experiencing any harm, with a higher prevalence of aggressive harm associated with being younger, disabled, single, non-retired, White British, renting accommodation and being a hazardous/harmful drinker.

Controlling for other variables in the model, sex and stage of life were not associated with experiencing an aggressive harm (Table 3). Age remained associated with harm after adjustment for other variables; those aged 45 and over had lower odds of experiencing an aggressive harm than those aged 16-24. Disability was also strongly associated with experience of aggressive harm; the odds of experiencing aggressive harm for non-disabled people was just over a third of the odds for disabled people (AOR=0.37, 95% CI 0.24-0.59). Housing tenure was relatively strongly associated, with the odds of experiencing an aggressive harm for renters around double the odds of those who are home owners. This was also the case for hazardous/harmful drinkers, with an AOR of 2.35 (95% CI 1.63-3.40) relative to those who were not hazardous/harmful drinkers. Being White British compared to being in the Other White, Black or Asian ethnic groups was also associated with greater odds of experiencing an aggressive harm. Differences in the odds of experiencing an aggressive harm between people with different educational attainment were minimal; the only significant difference being the greater odds for those with a degree/higher degree relative to those with no qualifications. The odds of experiencing an aggressive harm for those that were retired remained significantly lower than the odds of an aggressive harm for those that were employed (AOR 0.33, 95% CI 0.13-0.83).

Table 3: Bivariate and multivariate comparisons of aggressive harm versus no aggressive harm from another's drinking in past 12 months, weighted data

	Bivariate comparisons						Multivariate comparisons		
Independent variable	No aggressive harm			Aggressive harm					
	N	%	95% CI	N	%	95% CI	AOR	p	95% CI
Sex†									
Male	2,242	94.7	93.5 - 95.6	127	5.3	4.4 - 6.5	Reference		
Female	2,407	96.1	95.1 - 96.8	99	4.0	3.2 - 4.9	0.74	0.086	0.53 - 1.04
Age band†									
16-24	646	91.7	89.1 - 93.6	59	8.4	6.4 - 10.9	Reference		
25-44	1,539	94.4	92.9 - 95.6	91	5.6	4.4 - 7.1	0.84	0.510	0.49 - 1.43
45-64	1,454	95.8	94.4 - 96.9	64	4.2	3.1 - 5.6	0.43	0.024	0.20 - 0.89
65+	1,010	98.8	98.0 - 99.3	12	1.2	0.7 - 2.0	0.29	0.044	0.09 - 0.97
Broad ethnic group†									
White British	3,605	94.8	93.8 - 95.5	200	5.3	4.5 - 6.2	Reference		
Other White groups	384	97.7	95.6 - 98.8	9	2.3	1.2 - 4.4	0.30	0.002	0.14 - 0.64
Black groups	176	97.6	95.1 - 98.8	4	2.4	1.2 - 4.9	0.37	0.020	0.16 - 0.86
Asian groups	411	97.5	95.4 - 98.7	11	2.5	1.4 - 4.7	0.43	0.023	0.21 - 0.89
Other groups	52	97.5	88.7 - 99.5	1	2.5	0.5 - 11.3	0.36	0.217	0.07 - 1.83
Life stage†									
Single	629	91.5	88.9 - 93.6	58	8.5	6.4 - 11.1	Reference		
Pre-family	286	92.9	88.2 - 95.9	22	7.1	4.2 - 11.8	1.23	0.573	0.60 - 2.50
Family	1,519	95.9	94.7 - 96.9	65	4.1	3.1 - 5.3	0.89	0.684	0.52 - 1.55
Post-family	2,213	96.5	95.5 - 97.3	81	3.5	2.7 - 4.6	1.80	0.097	0.90 - 3.60
Education†									
No qualifications	739	97.5	96.0 - 98.4	19	2.6	1.6 - 4.0	Reference		
GCSE/O-level/CSE	911	94.6	92.6 - 96.1	52	5.4	3.9 - 7.4	1.75	0.069	0.96 - 3.21
A-level/vocational	1,242	93.6	91.9 - 94.9	86	6.5	5.1 - 8.1	1.69	0.077	0.95 - 3.01
Degree/higher degree	1,396	95.8	94.3 - 96.9	62	4.2	3.1 - 5.7	1.94	0.042	1.02 - 3.69
Other/still studying	337	97.9	95.8 - 99.0	7	2.1	1.0 - 4.2	0.88	0.788	0.36 - 2.16
Social grade‡									
AB	1,265	95.9	94.2 - 97.1	54	4.1	2.9 - 5.8	Not entered into the model		
C1	1,267	95.8	94.6 - 96.8	55	4.2	3.2 - 5.4			
C2	1,016	94.6	92.5 - 96.0	59	5.5	4.0 - 7.5			
D	718	96.4	94.5 - 97.6	27	3.6	2.4 - 5.5			
E	382	92.6	89.8 - 94.7	30	7.4	5.3 - 10.2			
Tenure†									
Owned outright	1,648	97.7	96.7 - 98.3	40	2.4	1.7 - 3.3	Reference		
Bought on a mortgage	1,386	96.0	94.5 - 97.2	57	4.0	2.8 - 5.5	1.03	0.918	0.57 - 1.88
Rented from local authority	405	93.5	90.4 - 95.6	28	6.5	4.4 - 9.6	2.58	0.006	1.31 - 5.09
Rented from private landlord	885	91.5	89.3 - 93.3	82	8.5	6.7 - 10.7	2.33	0.003	1.34 - 4.05
Other	287	94.0	91.0 - 96.0	18	6.0	4.0 - 9.0	2.04	0.039	1.04 - 4.02
Disability†									
Considers self disabled	477	91.4	88.4 - 93.7	45	8.6	6.3 - 11.7	Reference		
Not disabled	4,086	95.8	95.1 - 96.5	178	4.2	3.5 - 4.9	0.37	<0.001	0.24 - 0.59
Employment status†									
Employed	2,535	95.0	93.8 - 95.9	135	5.0	4.1 - 6.2	Reference		
Unemployed	204	95.0	91.3 - 97.2	11	5.0	2.8 - 8.7	0.62	0.166	0.32 - 1.22
Economically inactive	799	92.2	90.2 - 93.9	67	7.8	6.1 - 9.8	1.10	0.654	0.73 - 1.66
Retired	1,110	98.9	98.1 - 99.3	13	1.1	0.7 - 1.9	0.33	0.018	0.13 - 0.83
AUDIT†									
Not hazardous/harmful drinking	4,038	96.5	95.7 - 97.1	149	3.6	2.9 - 4.3	Reference		
Hazardous/harmful drinking	599	88.7	85.6 - 91.2	76	11.3	8.8 - 14.4	2.35	<0.001	1.63 - 3.40

Weighted N = 4,874 (bivariate analyses) and 4,698 (multivariate analysis). Bivariate totals that are 4,875 not 4,874 are due to rounding as the analyses use weighted data.
AOR: adjusted odds ratio.
†test of bivariate independence indicates significant difference ($p<0.05$).
‡AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Perpetrators of harm

The most frequently reported perpetrators of harms were friends (23.4% of total perpetrator reports) and strangers (22.9%), while work colleagues were the least reported perpetrators (3.7%, Figure 1). The perpetrator varied according to the type of harm (Supplementary Table 3). Focussing on the most common harms experienced, being kept awake due to noise or disruption was predominantly perpetrated by strangers (49.5%, 95% CI 43.8%-55.3%), while both strangers and friends were the most common cause of feeling uncomfortable or anxious at a social occasion (strangers 34.4%, 95% CI 28.5%-40.7%;

friends 32.8%, 95% CI 27.2%-39.0%). Serious arguments that did not include physical violence were predominantly perpetrated by friends (35.7%, 95% CI 29.5%-42.6%) or someone the respondent was in a relationship with and lived with (23.1%, 95% CI 17.6%-29.6%). Likewise, being let down by someone or being emotionally hurt or neglected were harm types perpetrated by people close to respondents.

Strangers were most likely to be the perpetrators of two of the aggressive harms: 60.5% (95% CI 51.2%-69.1%) of respondents reporting feeling physically threatened by a stranger and 31.5% (95% CI 21.5%-43.6%) of respondents reporting being physically hurt by a stranger. While 19.0% (95% CI 6.5%-44.2%) of respondents reported being forced or pressured into sex or something sexual by a stranger, the most commonly reported perpetrator for this sexually aggressive harm was someone the respondent was in a relationship with and lived with (23.3%, 95% CI 9.8%-46.0%; rising to 39.9% when also including people in a relationship who lived elsewhere).

Insert Figure 1 here.

Breaking perpetrator type down further by sex reveals significant differences (data not reported). Focusing on aggressive harms only, of those who had experienced an aggressive harm, women were more likely than men to report the perpetrator being someone they were in a relationship with and lived with. This is true for feeling physically threatened (21.2% vs 4.1%, $p<0.001$), being physically hurt (37.8% vs 6.3%, $p<0.001$) and being forced or pressured into sex or something sexual (though not with statistical significance due to small numbers of people reporting this type of harm, 34.3% vs 0.0%, $p=0.077$). In contrast, of those who had experienced an aggressive harm, men were more likely than women to report feeling physically threatened by a stranger (71.4% vs 46.1%, $p=0.008$) or being physically hurt by stranger (42.2% vs 18.0%, $p=0.036$).

Frequency of harm

Figure 2 reports information on the frequency with which harms were experienced. The majority of reported harms were experienced less than once a month (74.8%); 12.8% experienced harm at least monthly but less than weekly, 7.2% experienced weekly but less than daily, and 5.2% experienced daily or almost daily.

Insert Figure 2 here.

The frequency of harm varied by harm type (Supplementary Table 4). The harm types reported to reoccur most often were those for which the description implies that the harm occurred over a prolonged period of time with someone whom the respondent was in regular contact. These included ‘had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking’ (19.4% daily or almost daily, 95% CI 10.2%-33.8%) and ‘had to stop seeing or being in contact with someone because of their drinking’ (19.3% daily or almost daily, 95% CI 11.9%-29.6%). It was less common for other harms to be experienced at a daily or almost daily frequency. Nevertheless, all harm types had at least one respondent reporting daily or almost daily frequency of harm.

DISCUSSION

In this exploratory study, one in five respondents experienced AHTO in the previous 12 months. The most commonly reported AHTO were being kept awake due to noise or disruption and feeling uncomfortable or anxious at a social occasion, which have been identified as the most prevalent harms in other studies.[4 5] More concerning, 4.6% reported experiencing an aggressive harm. Experiencing AHTO was associated with a number of demographic and socio-economic variables. Friends and strangers were the dominant perpetrators of AHTO. Most harms occurred less than monthly but some respondents experienced harm daily or almost daily.

The main strength of this study is its large sample size; this is the largest survey on AHTO conducted in the UK and the first to provide data for England. The sampling and weighting strategy employed ensured the sample was representative of the English population and thus the generalisability of the findings. There are a number of limitations to note. Recall is always a problem with surveys; harms that occurred a year ago or had little impact on the respondent may be more difficult to recall. Attributing causality is not possible using a cross-sectional design. There are also some social groups that are systematically missing from surveys such as homeless people, those in hospital or care homes and those in prison; populations whose alcohol use is likely to be different.[17] Previous studies on AHTO have also largely relied on cross-sectional surveys and are affected by the same limitations. A response rate could not be calculated because Ipsos MORI did not collect the necessary data. While the total amount of missing data is small, any missing data can potentially introduce bias. There were some significant differences in the characteristics of those that answered the AHTO questions and those that did not. The internal validity of the AHTO questions used here has not been measured; in the initial search of the literature the authors failed to identify a validated survey. Consequently it is possible that discrepancies exist between the responses provided by participants and their actual experience of alcohol-related harm. Finally, ecological fallacy, where the inferences about individuals are made based upon data for a group, is also a consideration in this type of study. It is likely that systematic differences exist in harm by population sub-groups (for example by sex and ethnicity) and future work on AHTO in the UK should explore this. It is possible that the findings on factors associated with harm represent those that are associated with the most common but 'low impact' harms and cannot be generalised to more severe harms. However, the fact that we specifically examine factors associated with aggressive harms (which are the most serious harms considered) mitigates this. That said, further research to identify the factors associated with individual harms would be advantageous.

In this study the prevalence of harm was 20.1%. The closest comparison is from a cross-sectional survey conducted in Wales in 2015 which used identical AHTO questions and reported the prevalence of any harm in the previous 12 months to be 59.7%.[10] There is some evidence from routine data to support a lower prevalence of harm in England than Wales. For example, the percentage of violent incidents where the victim believed the offender(s) to be under the influence of alcohol tends to be higher in Wales than England[18] although not conclusively so. However, the magnitude of the difference in the reported prevalence of harm between England and Wales seems questionable, given the similarities between the two nations. This difference could be due, in part, to differences in methodology and caution needs to be applied in drawing direct comparisons. In Wales, a free text box was included that gave participants the option to report 'other alcohol-related harm' and these were included in the 'any harm' figures for Wales which would likely increase the prevalence compared to England. This approach was not undertaken in England because not all harms reported in the free text box appeared to be alcohol-related. In England the harm questions were asked after the ATS questions; this may have affected how people perceived harm, and therefore how they responded to the harm questions. It is also possible that respondents were experiencing fatigue by the end of the survey and this may have affected how fully they reported their experiences of harm. The English survey was administered

face-to-face while the survey in Wales was administered via the telephone using landline numbers. Using data from the USA, researchers comparing face-to-face and telephone interviews reported that telephone surveys may miss certain sections of the population if they solely rely on landlines, including those with lower incomes.[19] However the Welsh survey was weighted so the data were representative of the deprivation of the general population.[10] Other surveys of AHTO conducted in the UK have reported the prevalence of harm in adults to be 28% in Ireland[11], 51% in Scotland,[9] 79% in the North West of England,[13] however these studies used very different AHTO questions so the results are not comparable. Despite the difference in prevalence between the Welsh survey and the current study, the relative prevalence of the types of harm were similar; being kept awake at night, feeling uncomfortable or anxious at a social occasion and having a serious argument were the most prevalent harms in both surveys.

Being a hazardous/harmful drinker increased the odds of experiencing AHTO. This is perhaps unsurprising given that drinking with other drinkers and in places where alcohol is consumed increases one's exposure to drinkers. However the association with drinking and experiencing alcohol-harm is not conclusive. A cross-sectional comparison of harm from 'heavy drinking' friends and family across five Nordic countries and Scotland reported that drinking frequency was not significantly related to experiencing harm from others but binge drinking frequency was. A higher frequency of binge drinking increased the risk of experiencing AHTO in Sweden and Norway and there was some evidence for this relationship in Finland also, but not in the other countries.[7] A paper using the same Norwegian data showed that the association between experiencing harm and one's own drinking was not evident for all types of harm.[6] Other cross-sectional surveys show an association between one's own drinking and experience of any harm,[20 21] including two which report a dose response relationship, with dependent/frequent risky drinkers having the greatest risk.[4 22]

Here, age was also associated with experiencing any harm and aggressive harm. A number of studies from a range of countries have reported that being of younger age increases the risk of being harmed from another's drinking.[4-7 23] However, 'younger age' in this context does not always mean 'young'; one study, for example, concluded that those aged 59 or less had a higher risk of being negatively affected by a known drinker than those aged 60 and over.[7] A global survey of 63,725 respondents aged 18-34 years reported that those aged 18-24 years were significantly more likely to experience an aggressive AHTO than those aged 30-34 or 25-29;[4] similar to results reported here.

The respondent's sex was not significantly associated with experiencing harm. The literature is mixed regarding sex as a risk factor. Women were reported to be significantly more likely to experience harm than men in Finland and Sweden but not in Denmark, Iceland, Norway or Scotland.[5 6] Being a woman was found to be a significant risk factor for all harms and aggressive harms using data from the Global Drug Survey.[4] The association of sex and experiencing harm is different for different types of harm. For example women are significantly more likely than men to experience unwanted sexual attention/sexual harassment or assault,[4 6] whereas men are more likely to have clothing, property or other belongings damaged.[4 6] Survey data from the USA examined family/marriage, financial and assault harms due to drinking of a partner/spouse/family member and reported that women were more likely to report financial and family/martial harms while a higher proportion of men experienced assaults.[24] While examining differences in harm by sex was not the focus of this study, Supplementary Table 2 shows that such differences may exist. For example there is a clear difference between the proportion of men (2.1% 95% CI 1.6%-2.9%) and women (4.8% 95% CI 3.9%-5.8%) who reported experiencing alcohol-related emotional hurt or neglect. Such differences should be considered in future work on this topic in the UK.

Few studies have considered whether ethnic background is a risk factor for experiencing harm. Data from the USA demonstrate that the link between ethnicity and experience of harm is not

conclusive (two studies show no association and one a weak association).[20 23 24] Here, being White British was significantly associated with experiencing harm and also aggressive harm. Most minority ethnic groups in the UK have higher rates of abstinence from alcohol and lower levels of drinking than people of white ethnicity.[25] However the results of the multivariate modelling presented in this study show that White British ethnicity is associated with experiencing harm and aggressive harm independently of AUDIT score.

Having a disability was also significantly associated with experiencing any harm and an aggressive harm. No previous studies on the association between having a disability and experiencing alcohol-related harm were identified. However there is good evidence to show that those with a disability are the victims of harm more generally including physical, sexual and intimate partner violence,[26 27] and financial hardship.[28]

Being in the family stage of life also lowered the odds of experiencing harm compared to being single. This is perhaps surprising given that the survey included questions which specifically asked about harms most likely caused by a family member. Evidence on the effect of relationships and household types is mixed and largely dependent on the way these are categorised and so cannot be directly compared.

Educational attainment, type of accommodation, social grade and employment status are proxy measures for socio-economic status. Literature on the effect of socio-economic status is mixed and comparisons are hindered by the multitude of different measures used in different studies. In this study social grade was not significantly associated with harm or aggressive harm in the bivariate analyses. A study in Scotland also reported no significant difference in experience of any harm according to social class.[9]

Here findings show that experiencing harm was significantly associated with having qualifications (compared to having none) with the greatest odds being for those with a degree or higher degree. The association between education and experience of harm in the literature is mixed. Data from two national surveys (Denmark[29] and the USA[20]) showed no clear association between experiencing harm and education level. Data from the Global Drug Survey showed no association between education and experience of harm or aggressive harm but there was an association between education and experiencing particular types of harm.[4] However, a comparison of northern European countries reported that a significantly higher proportion of respondents with high school/university education experienced harm than those with elementary education in four of the six countries considered.[5] Those with higher educational attainment were more likely to experience any harm in a Canadian study.[30]

The current study shows that being retired lowers the odds of experiencing harm and aggressive harm compared to all other employment statuses. This association was independent of age. The odds of being harmed did not differ significantly between those who were employed and not employed. A cross-sectional survey in Canada also reported that those who were retired were least likely to experience harm.[30] Data from two surveys conducted in the USA show that those who were unemployed were significantly more likely to experience AHTO than those who were employed.[23 24] Data from Denmark show that employment might be significantly associated with experiencing harm but no conclusive results were provided and the wide confidence intervals show that estimates lacked precision.[29] Conversely, data from the USA reported no association between experiencing any harm and employment status.[20]

Here, compared to those that owned their home outright, those who rented from a private landlord had significantly greater odds of experiencing harm and those who rented from the local authority or rented from a private landlord had significantly greater odds of experiencing an aggressive harm. No previous studies on the association between type of accommodation tenure and

experiencing alcohol-related harm were identified. It is possible that those who rent represent a more transitory, poor and vulnerable population which increases their risk of harm. Research not specifically related to alcohol shows that those living in unstable housing (for example living on the streets, in temporary sheltered accommodation or with relatives or friends) experience relatively high rates of victimisation,[31 32] while data from national surveys in Great Britain show that being the victim of domestic property crimes is higher among those that rent (including those in the private-rented sector) than those who own their own homes.[33]

How exactly socio-economic status influences the experience of harm is not clear from our findings. Neither social grade nor employment status (excepting retirement) were associated with AHTO in our study. Education, as a proxy of earning potential, was associated with AHTO, but there was no significant variation between the groups GCSE/O-level/CSE, A-level/vocational and degree/higher degree. No clear picture of the association between experience of harm and socio-economic status emerges from the literature either. A comparable study of AHTO in Wales reported no association between experience of any harm and area-level deprivation.[10] It is possible that more sensitive methods are needed to fully explore the relationship between socio-economic status and AHTO, and any patterns in relation to particular types of harm.

In the UK, there are cultural differences in drinking behaviour and some of these are reflected in our AHTO findings (such as differences between ethnic groups).[34] However, other socio-cultural variations are not easily identified in our findings. For example, while national survey data show that people have different drinking habits across income levels (people on higher incomes tend to drink more[34]), this pattern is not reflected in our findings on socio-economic status.

This study identified friends and strangers as the dominant perpetrators making up around 46% of all reports, though the perpetrator varied depending on type of harm. For example, family members made up a larger proportion of perpetrators of harms such as stopping seeing someone or having to care for someone because of their drinking. While differences by sex were not the focus of this paper, and were not investigated in detail, investigating perpetrator type by sex for aggressive harms revealed significant differences (data not reported). Women were more likely to be physically hurt and forced or pressured into something sexual by someone they were in a relationship with. In contrast, for men, strangers were the most likely perpetrators of being hurt physically and feeling threatened. These findings are in line with data from England and Wales on the relationship between offender and perpetrator,[35] and from previous research. A study in the US using the 2010 National Alcohol Survey reported that men were more likely to be assaulted in bar fights by strangers while women were more likely to be (sexually) assaulted by other drinkers (partners or acquaintances) within a more private setting.[36] The context within which drinking occurs is therefore relevant in relation to exploring differences in AHTO by sex.

While three quarters of harms were experienced less than monthly, 5.2% were experienced daily or almost daily indicating a considerable burden of alcohol-related harm for a section of the population. The frequency of experiencing harm was largely dependent on the type of harm. Harms with the highest frequency of daily/almost daily reports were those which occurred over a prolonged period of time and/or implied frequent contact with the perpetrator such as caring for someone with a long-term health condition or disability that results from them drinking. Data from two surveys suggest that exposure to heavy drinkers is associated with poorer health, wellbeing and quality of life.[37 38]

To conclude, this is the largest ever survey of AHTO conducted within the UK and the first national study in England. It is clear that AHTO is relatively prevalent and that some individuals experience harm frequently. The most prevalent harms could be considered insignificant but even apparently minor harms such as sleep disruption can have an impact on health and quality of life,[39] particularly if experienced persistently. It is difficult to compare results with the literature because

of the diversity of methods being employed. In order to support temporal and geographic comparisons it would be advantageous for studies to use a consistent methodology including the sampling and data collection methods, in addition to the harm questions. The WHO ThaiHealth project has designed a survey to measure AHTO in order to facilitate international comparisons[40] [41] but unfortunately authors were not aware of this when they began the current study. While lengthy, using this would be a good way to develop a comprehensive and consistent evidence base. However it is clear that there are differences across harm types and more detailed analysis of specific harms would be valuable for supporting remedial action from policymakers. Here we consider 'aggressive harms' as a distinctive group of harms; future research could consider other harm groupings in order to provide a more detailed assessment of specific harm types. Research on the types of alcohol consumption patterns that increase the likelihood of experiencing AHTO in the UK would be valuable. Understanding what puts younger adults at increased risk could be a useful focus for future research as it might identify the contextual factors which make experiencing harm more likely. Further focus on the differences in harm by sex would also be advantageous as there is little data on this in relation to the UK. Policy to address AHTO is less well developed than policy that seeks to address harms to the drinker; exceptions include crime and violence and harm to the unborn foetus which have been included in previous Government's Alcohol Strategy.[42] Given that AHTO research is in its early stages it is too early to advocate a detailed policy response but results presented here will be of interest to policy makers to help understand the wider impact of other people's drinking.

ACKNOWLEDGEMENTS

The authors would like to thank the alcohol expert forum of the Five Nations Public Health Peer Network for initiating this work and to PHE for funding it. Thanks also to the following people in PHE: Craig Timpson for quality assuring the analyses, Helen Outhwaite for help with searching for literature, Robyn Burton and Helen Willey for their input into early conversations about methods and Fionnuala O'Toole and Alyson Jones for proof reading/editing the paper. Thanks to Dr Jamie Brown, University College London, for permitting the harm to others questions to be appended to the ATS and for his subsequent support with interpretation of the alcohol toolkit survey questions. Thanks to Ipsos MORI for delivering the survey, in particular Stuart Smedley. Finally, thanks for the four reviewers for their comments on this paper.

COMPETING INTERESTS

None declared.

FUNDING

The work was funded by Public Health England.

AUTHORS' CONTRIBUTIONS

CB provided day to day management of the study, helped design the questionnaire and wrote the first draft. DB did the analysis and helped to write the first draft. JM undertook a review of the literature. KS was involved with the initiation, helped design the questionnaire and provided statistical support. CP was involved with the initiation of the study. CH was involved with the

initiation of the study and helped design the questionnaire. All authors reviewed and helped to revise successive drafts and approved the final version of the manuscript.

DATA SHARING AGREEMENT

Sharing of data will be considered by PHE and UCL on a case-by-case basis. Please contact the lead author for further details.

REFERENCES

1. World Health Organization. Global status report on alcohol and health. Geneva: World Health Organization, 2014.
2. World Health Organization. Global strategy to reduce the harmful use of alcohol. Geneva: World Health Organization, 2010.
3. Office for National Statistics. Chapter 5: Violent crime and sexual offences - alcohol-related violence. London: Office for National Statistics, 2015.
4. Bellis M, Quigg Z, Hughes K, et al. Harm from other people's drinking: an international survey of their occurrence, impacts on feeling safe and legislation relating to their control. *BMJ Open* 2015;5
5. Moan I, Storvoll E, Sundin E, et al. Experienced harm from other people's drinking: a comparison of Northern European countries. *Substance Abuse Research and Treatment* 2015;9(S(2)):45-57.
6. Storvoll E, Moan I, Lund I. Negative consequences of other people's drinking: prevalence, perpetrators and locations. *Drug and Alcohol Review* 2016;2016
7. Ramstedt M, Sundin E, Moan I, et al. Harm experienced from the heavy drinking of family and friends in the general population: A comparative study of six norther European countries. *Substance Abuse Research and Treatment* 2015;9(S2)
8. Burton R, Henn C, Lavoie D, et al. A rapid evidence review of the effectiveness and cost-effectiveness of alcohol polices: an English perspective. *The Lancet* 2016 doi: http://dx.doi.org/10.1016/S0140-6736(16)32420-5
9. Hope A, Curran J, Bell G, et al. Unrecognised and under-reported: the impact of alcohol on people other than the drinker in Scotland. Glasgow: Alcohol Focus Scotland, 2013.
10. Quigg Z, Bellis AM, Grey H, et al. Alcohol's harms to others: the harms from other people's alcohol consumption in Wales. Cardiff: Public Health Wales, 2016.
11. Hope A. Alcohol's harm to others in Ireland. Dublin: Health Service Executive, 2014.
12. Beard E, Brown J, West R, et al. Protocol for a national monthly survey of alcohol use in England with 6-month follow up: 'The Alcohol Toolkit Survey'. *BMC Public Health* 2015;15:230.
13. Gell L, Ally A, Buykx P, et al. Alcohol's harm to others. Sheffield: The University of Sheffield, 2015.
14. Barbor T, Higgins-Biddle J, Saunders J, et al. AUDIT: The alcohol use disorders identification test, guidelines for use in primary care. 2nd edition. Geneva: World Health Organization, 2001.
15. StataCorp. Stata survey data reference manual: release 13. Texas: StataCorp LP, 2013.
16. Rao J, Scott A. On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *Annals of Statistics* 1981;12:46-60.
17. Johnson T. Sources of error in substance use prevalence surveys. *International Scholarly Research Notices* 2014;2014 doi: http://dx.doi.org/10.1155/2014/923290
18. Office for National Statistics. Estimates of violent incidents where the victim believed the offender(s) to be under the influence of alcohlol or drugs in England and Wales, year ending March 2006 to year ending March 2016 Crime Survey for England and Wales, 2017.
19. Greenfield T, Midanik L, Rogers J. Effects of telephone versus face-to-face interview models on reports of alcohol consumption. *Addiction* 2000;95(2):277-84.
20. Greenfield K, Ye Y, Kerr W, et al. Externalities from alcohol consumption in the 2005 US National Alcohol Survey: implications for policy. *International Journal of Environmental Research and Public Health* 2009;6:3205-24.
21. Stanesby O, Rankin G, Callinan S. Experience of harm from others' drinking and support for stricter alcohol policies: Analysis of the Australian National Drug Strategy Household Survey. *International Journal of Drug Policy* 2017;45:25-32.

22. Ferris J, Devaney M, Davis G, et al. Reporting of problematic drinkers and the harm they cause: assessing the role of alcohol use, sex, and age of those affected by a problematic drinker. *Experimental and Clinical Psychopharmacology* 2016;24(1):48-54.
23. Karriker-Jaffe K, Greenfield T. Gender differences in associations of neighbourhood disadvantage with alcohol's harms to others: a cross-sectional study from the United States. *Drug and Alcohol Review* 2014;33(3):296-303.
24. Greenfield T, Karriker-Jaffe K, Kaplan L, et al. Trends in alcohol's harms to others (AHTO) and co-occurrence of family-related AHTO: the four US National Alcohol Surveys, 2000-2015. *Substance Abuse Research and Treatment* 2015;2015(9(S2)):23-31.
25. Hurcombe R, Bayley M, Goodman A. Ethnicity and alcohol: a review of the UK literature. York: Joseph Rowntree Foundation, 2010.
26. Hughes K, Bellis AM, Jones L, et al. Prevalence and risk of violence against adults with disabilities: a systematic review and meta-analysis of observational studies. *The Lancet* 2012;379(9826):1621-29.
27. Krnjacki L, Emerson E, Llewellyn G, et al. Prevalence and risk of violence against people with and without disabilities: Findings from an Australian population-based study. *Violence and Trauma* 2015;40(1):16-21.
28. Frier A, Barnett F, Devine S, et al. Understanding disability and the 'social determinants of health': how does disability affect people's social determinants of health? *Disability and Rehabilitation* 2016;40(5):538-47.
29. Seid A, Grittner U, Greenfield T, et al. To cause harm and to be harmed by others: new perspectives on alcohol's harm to others. *Substance Abuse Research and Treatment* 2015;2015(S2):13-22.
30. Lewis-Laietmark C, Wettlaufer A, Shield K, et al. The effects of alcohol-related harms to others on self-perceived mental well-being in a Canadian sample. *International Journal of Public Health* 2017;62:669-78.
31. Kushel M, Evans J, Perry S. Victimization among homeless and marginally housed persons. *Archives of Internal Medicine* 2003;163(20):2492-99.
32. Nyamathi A, Leake B, Gelberg L. Sheltered versus nonsheltered homeless women: Differences in health, behavior, victimisation and utilization of care. *Journal of General Internal Medicine* 2000;15(8):565-72.
33. Farrall S, Hay C, Gray E. Thatcherite ideology, housing tenure and crime: The socio-spatial consequences of the right to buy for domestic property crime. . *The British Journal of Criminology* 2016;56(1):1235-52.
34. Office for National Statistics. Adult drinking habits in Great Britain: 2017. Newport: Office for National Statistics, 2018.
35. Office for National Statistics. Overview of violent crime and sexual offences. Newport: Office for National Statistics, 2016.
36. Kaplan L, Karriker-Jaffe J, Greenfield K. Drinking context and alcohol's harm from others among men and women in the US National Alcohol Survey. *Journal of Substance Use* 2017;22(4):412-18.
37. Casswell S, You R, Huckle T. Alcohol's harm to others: reduced wellbeing and health status for those with heavy drinkers in their lives. *Addiction* 2011;106(6):1087-94.
38. Jiang H, Callinan S, Laslett A, et al. Correlates of caring for the drinkers and others among those harmed by another's drinking. *Drug and Alcohol Review* 2015;34:162-69.
39. Muzet A. Environmental noise, sleep and health. *Sleep medicine reviews* 2007;12(2):135-42.
40. World Health Organization/ThaiHealth International Collaboration Research Project. The Harm to Others from Drinking. Geneva: World Health Organization, 2012.
41. Callinan S, Laslett A, Rekve D, et al. Alcohol's harm to others: An international collaborative project. *International Journal of Alcohol and Drug Research* 2016;5(2):25-32.
42. HM Government. The Government's Alcohol Strategy. London: HM Government, 2012.

Figure Legends

Figure 1: Perpetrators as a percentage of all reported harms to others, weighted data

Weighted N = 2,522 (represents the total number of perpetrators across all harms).

Figure 2: Frequency of all reported harms to others, weighted data

Weighted N = 2,052 (represents the total number of harms across all individuals).

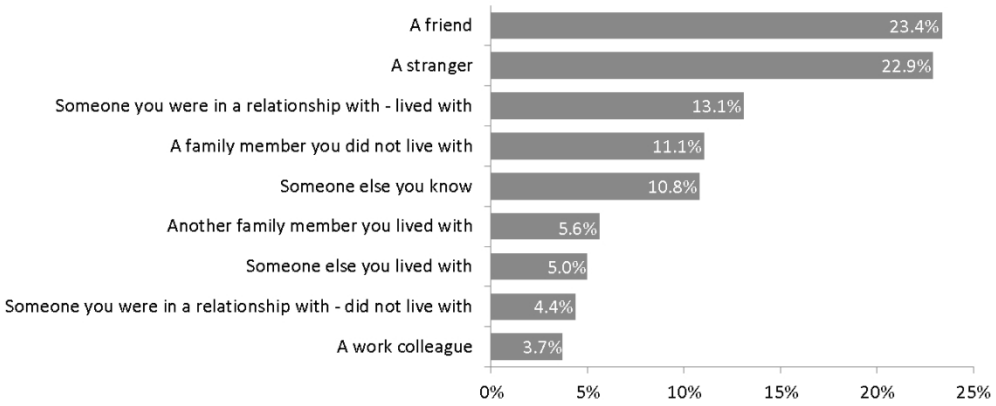

Figure 1: Perpetrators as a percentage of all reported harms to others

364x149mm (300 x 300 DPI)

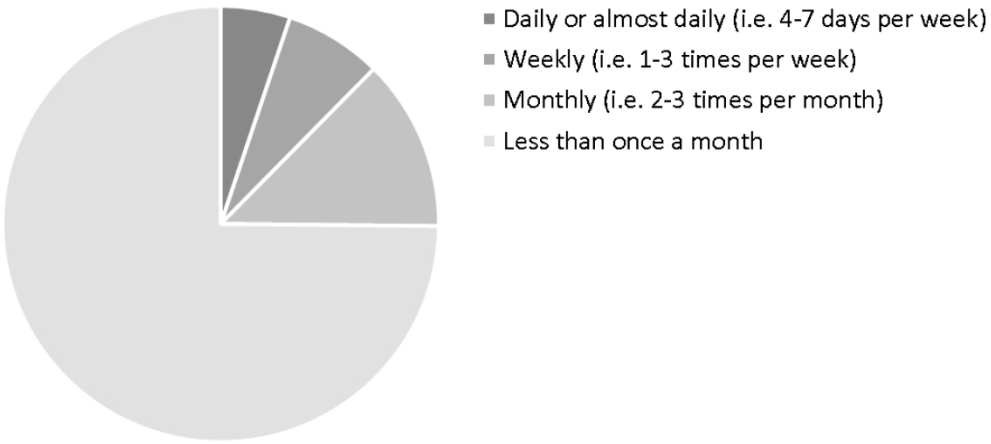

Figure 2: Frequency of all reported harms to others

292x132mm (300 x 300 DPI)

Supplementary Table 1: Examination of missing data, non-weighted data

Independent variable	Included (AHTO questions answered)		Excluded (AHTO questions not answered)		p value
	N	%	N	%	
Sex (N = 5,068)					
Female	2,397	96.9	76	3.1	0.023
Male	2,484	95.7	111	4.3	
Age band (N = 5,608)					
16-24	789	97.4	21	2.6	0.111
25-44	1,460	96.3	56	3.7	
45-64	1,435	95.5	68	4.5	
65+	1,197	96.6	42	3.4	
Broad ethnic group (N = 5,040)					
White British	3,603	96.2	142	3.8	0.125
Other White groups	393	98.3	7	1.8	
Black groups	262	95.6	12	4.4	
Asian groups	539	97.3	15	2.7	
Other groups	63	94.0	4	6.0	
Life stage (N = 5,067)					
Single	716	97.4	19	2.6	0.150
Pre-family	260	95.9	11	4.1	
Family	1,473	96.7	50	3.3	
Post family	2,431	95.8	107	4.2	
Education (5,039)					
No qualifications	866	97.2	25	2.8	0.075
GCSE/O-level/CSE	952	95.9	41	4.1	
A-level/vocational	1,334	97.2	39	2.8	
Degree/higher degree	1,335	95.4	64	4.6	
Other/still studying	368	96.1	15	3.9	
Social grade[†] (N = 5,068)					
AB	1,081	96.2	43	3.8	0.134
C1	1,554	95.8	68	4.2	
C2	947	96.7	32	3.3	
D	757	97.7	18	2.3	
E	542	95.4	26	4.6	
Tenure (N = 5,027)					
Owned outright	1,729	97.5	45	2.5	<0.001
Bought on a mortgage	1,124	95.4	54	4.6	
Rented from local authority	568	95.5	27	4.5	
Rented from private landlord	1,029	97.0	32	3.0	
Other	392	93.6	27	6.4	
Disability (N = 4,956)					
Considers self disabled	571	94.4	34	5.6	0.002
Not disabled	4,213	96.8	138	3.2	
Employment status (N = 5,066)					
Employed	2,306	95.9	98	4.1	0.121
Unemployed	237	98.8	3	1.3	
Economically inactive	1,009	96.1	41	3.9	
Retired	1,327	96.7	45	3.3	
AUDIT(N = 5,044)					
Not hazardous/harmful drinking	4,215	96.7	142	3.3	0.003
Hazardous/harmful drinking	649	94.5	38	5.5	

N = 5,068 (totals for independent variables will not equal 5,068 where the person did not provide responses to the AHTO questions and the independent variable.

[†]AB is higher managerial, administrative and professional and Intermediate managerial, administrative and professional; C1 is supervisory, clerical and junior managerial, administrative and professional; C2 is skilled manual workers; D is semi-skilled and unskilled manual workers; and E is state pensioners, casual and lowest grade workers, unemployed with state benefits only.

Supplementary Table 2: Prevalence of harm in the previous 12 months by sex, weighted data

Harm type	Number of respondents who experienced harm		Percentage of respondents who experienced harm	
	Men	Women	Men (95% CI)	Women (95% CI)
Been kept awake due to noise or disruption	177	213	7.5 (6.3-8.8)	8.5 (7.4-9.8)
Felt uncomfortable or anxious at a social occasion (e.g. a party)	160	171	6.8 (5.7-8.0)	6.8 (5.8-8.0)
Had a serious argument that did NOT include physical violence	129	147	5.4 (4.6-6.6)	5.8 (4.9-6.9)
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	82	92	3.5 (2.7-4.4)	3.7 (3.0-4.6)
Been emotionally hurt or neglected	50	120	2.1 (1.6-2.9)	4.8 (3.9-5.8)
Felt physically threatened	95	69	4.0 (3.2-5.1)	2.7 (2.1-3.6)
Had to stop seeing or being in contact with someone because of their drinking	47	73	2.0 (1.4-2.7)	2.9 (2.3-3.7)
Had to contact the police	56	62	2.4 (1.8-3.2)	2.5 (1.9-3.2)
Had someone break or damage something that mattered to me	52	43	2.2 (1.6-3.0)	1.7 (1.2-2.4)
Been physically hurt due to them assaulting me or acting violently	50	42	2.1 (1.5-2.9)	1.7 (1.2-2.3)
Been put at risk in a car when someone was driving after drinking	37	38	1.6 (1.1-2.3)	1.5 (1.1-2.1)
Felt genuinely concerned that they may cause harm to my children or someone else's children	18	43	0.7 (0.4-1.3)	1.7 (1.3-2.4)
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	24	33	1.0 (0.7-1.6)	1.3 (0.9-1.9)
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	16	37	0.7 (0.4-1.2)	1.5 (1.0-2.1)
Had money that would have improved the quality of my life spent on their alcohol-related purchases	18	32	0.8 (0.5-1.2)	1.3 (0.9-1.9)
Drank alcohol myself in order to cope with the problems caused by their drinking	19	14	0.8 (0.5-1.3)	0.5 (0.3-1.0)
Felt forced or pressured into sex or something sexual	12	20	0.5 (0.3-0.9)	0.8 (0.5-1.3)
Had to move out of my usual place of residence and stay somewhere else	9	16	0.4 (0.2-0.8)	0.6 (0.4-1.1)

Weighted N = 4,874.

Supplementary Table 3: Perpetrator of harm by harm type (continued on the next page), weighted data

Harm type		A friend			A stranger			Someone you were in a relationship with (e.g. wife/husband, partner) who you lived with			A family member you did not live with		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Been kept awake due to noise or disruption	No	314	84.8	80.3-88.4	187	50.5	44.7-56.2	346	93.3	89.8-95.7	359	97.0	94.5-98.4
	Yes	56	15.2	11.6-19.7	183	49.5	43.8-55.3	25	6.7	4.3-10.2	11	3.0	1.6-5.5
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	205	67.2	61.0-72.8	200	65.6	59.3-71.5	280	91.7	87.4-94.6	271	88.9	84.3-92.3
	Yes	100	32.8	27.2-39.0	105	34.4	28.5-40.7	25	8.3	5.4-12.6	34	11.1	7.7-15.7
Had a serious argument that did NOT include physical violence	No	167	64.3	57.5-70.5	225	86.8	81.4-90.8	199	76.9	70.4-82.4	216	83.5	77.7-88.0
	Yes	93	35.7	29.5-42.6	34	13.2	9.2-18.6	60	23.1	17.6-29.6	43	16.5	12.0-22.3
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	95	56.6	48.1-64.7	162	96.4	91.9-98.5	136	81.1	73.5-86.9	137	81.4	74.1-87.0
	Yes	73	43.5	35.4-51.9	6	3.6	1.5-8.1	32	18.9	13.1-26.5	31	18.6	13.0-25.9
Been emotionally hurt or neglected	No	115	72.5	64.0-79.6	150	94.3	88.7-97.2	121	76.1	67.7-82.9	116	72.7	64.2-79.8
	Yes	44	27.6	20.5-36.0	9	5.7	2.8-11.3	38	23.9	17.1-32.3	43	27.3	20.2-35.8
Felt physically threatened	No	130	84.6	77.0-90.0	61	39.5	30.9-48.8	136	88.5	82.2-92.8	145	94.5	89.6-97.2
	Yes	24	15.4	1.0-23.0	93	60.5	51.2-69.1	18	11.5	7.2-17.8	8	5.5	2.8-10.5
Had to stop seeing or being in contact with someone because of their drinking	No	71	62.4	52.3-71.6	109	95.6	88.8-98.4	92	80.6	71.2-87.4	86	75.9	66.1-83.6
	Yes	43	37.6	28.4-47.7	5	4.4	1.6-11.2	22	19.4	12.6-28.8	27	24.1	16.4-33.9
Had to contact the police	No	96	89.5	81.3-94.3	59	55.3	44.3-65.8	93	87.0	79.0-92.2	95	88.8	79.1-94.3
	Yes	11	10.5	5.7-18.7	48	44.7	34.2-55.7	14	13.0	7.8-21.0	12	11.2	5.7-20.9
Had someone break or damage something that mattered to me	No	50	55.8	43.0-67.9	82	90.9	82.1-95.6	75	82.8	72.5-89.8	82	90.8	82.1-95.5
	Yes	40	44.2	32.1-57.0	8	9.1	4.4-17.9	16	17.2	10.2-27.5	8	9.2	4.5-17.9
Been physically hurt due to them assaulting me or acting violently	No	71	85.4	74.7-92.0	57	68.5	56.4-78.5	66	79.8	69.2-87.4	73	88.1	76.8-94.3
	Yes	12	14.7	8.0-25.3	26	31.5	21.5-43.6	17	20.2	12.6-30.8	10	11.9	5.7-23.2
Been put at risk in a car when someone was driving after drinking	No	46	66.7	54.0-77.4	52	75.5	61.6-85.6	62	89.5	78.5-95.2	66	96.1	87.9-98.8
	Yes	23	33.3	22.6-46.0	17	24.5	14.4-38.4	7	10.5	4.8-21.5	3	4.0	1.2-12.1
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	47	91.1	77.3-96.9	39	77.1	62.5-87.2	45	87.4	75.3-94.0	41	80.9	65.9-90.2
	Yes	5	8.9	3.1-22.7	12	22.9	12.8-37.5	6	12.6	6.0-24.7	10	19.2	9.8-34.1
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	41	75.7	60.0-86.6	51	94.6	85.4-98.1	47	87.5	73.5-94.6	34	62.4	47.2-75.5
	Yes	13	24.3	13.4-40.0	3	5.4	1.9-14.6	7	12.5	5.4-26.5	20	37.6	24.5-52.8
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	30	59.5	43.6-73.5	32	62.5	46.3-76.2	44	87.2	74.1-94.2	44	86.6	72.0-94.2
	Yes	21	40.5	26.5-56.4	19	37.6	23.8-53.7	7	12.8	5.8-25.9	7	13.4	5.8-28.0
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	29	63.0	46.6-76.8	44	97.1	80.6-99.6	30	66.5	49.1-80.4	40	89.1	72.6-96.2
	Yes	17	37.0	23.2-53.4	1	3.0	0.4-19.4	15	33.5	19.6-50.9	5	10.9	3.8-27.4
Drank alcohol myself in order to cope with the problems caused by their drinking	No	22	75.7	54.3-89.1	27	93.4	70.9-98.8	22	76.9	53.4-90.6	25	86.0	62.0-95.9
	Yes	7	24.3	10.9-45.7	2	6.6	1.2-29.1	7	23.1	9.4-46.6	4	14.0	4.1-38.0
Felt forced or pressured into sex or something sexual	No	22	80.3	58.5-92.2	22	81.0	55.8-93.5	21	76.7	54.0-90.2	26	95.8	72.8-99.5
	Yes	5	19.7	7.8-41.5	5	19.0	6.5-44.2	6	23.3	9.8-46.0	1	4.2	0.5-27.2
Had to move out of my usual place of residence and stay somewhere else	No	18	82.9	62.3-93.4	20	94.1	74.7-98.8	12	55.3	31.0-77.3	20	95.4	80.5-99.0
	Yes	4	17.1	6.6-37.7	1	5.9	1.2-25.3	10	44.7	22.7-69.0	1	4.6	1.0-19.5

Supplementary Table 3: Perpetrator of harm by harm type (continued from the previous page), weighted data

Harm type		Someone else you know			Another family member you lived with			Someone else you lived with			Someone you were in a relationship with (e.g. wife/husband, partner) who you did not live with			A work colleague		
		n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
Been kept awake due to noise or disruption	No	296	80.1	75.0-84.3	348	94.1	90.8-96.3	325	87.7	83.7-90.9	362	97.7	95.2-98.9	365	98.5	96.3-99.4
	Yes	74	20.0	15.7-25.1	22	5.9	3.7-9.2	45	12.3	9.1-16.3	8	2.3	1.1-4.8	6	1.5	0.6-3.8
Felt uncomfortable or anxious at a social occasion (e.g. a party)	No	264	86.7	81.8-90.4	299	97.8	95.2-99.0	294	96.5	93.0-98.3	297	97.3	94.5-98.7	276	90.6	86.0-93.8
	Yes	41	13.4	9.6-18.3	7	2.2	1.0-4.9	11	3.5	1.8-7.0	8	2.7	1.3-5.5	29	9.4	6.2-14.1
Had a serious argument that did NOT include physical violence	No	233	90.0	85.0-93.4	240	92.7	88.6-95.3	244	94.1	90.2-96.5	240	92.7	89.0-95.2	249	96.2	92.5-98.1
	Yes	26	10.0	6.6-15.0	19	7.3	4.7-11.4	15	5.9	3.5-9.9	19	7.3	4.8-11.0	10	3.8	1.9-7.5
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	No	156	93.0	86.7-96.5	156	92.8	87.8-95.8	157	93.7	87.6-96.9	160	95.2	90.7-97.6	150	89.4	82.1-94.0
	Yes	12	7.0	3.5-13.3	12	7.2	4.2-12.2	11	6.4	3.1-12.4	8	4.8	2.4-9.4	18	10.6	6.1-17.9
Been emotionally hurt or neglected	No	152	95.7	91.1-97.9	146	92.0	86.4-95.4	147	92.5	85.9-96.1	137	85.9	78.7-91.0	154	97.0	91.9-98.9
	Yes	7	4.3	2.1-8.9	13	8.0	4.6-13.6	12	7.6	3.9-14.1	22	14.1	9.1-21.3	5	3.0	1.1-8.1
Felt physically threatened	No	132	85.7	78.0-91.1	148	96.7	92.0-98.6	153	99.6	97.4-100.0	149	97.0	92.4-98.8	151	98.2	93.0-99.6
	Yes	22	14.3	8.9-22.0	5	3.3	1.4-8.0	1	0.4	0.1-2.6	5	3.0	1.2-7.6	3	1.8	0.4-7.0
Had to stop seeing or being in contact with someone because of their drinking	No	102	89.5	82.3-94.0	106	92.7	85.9-96.3	109	95.8	86.4-98.8	107	93.9	87.2-97.2	108	95.0	87.1-98.1
	Yes	12	10.5	6.0-17.7	8	7.3	3.7-14.1	5	4.2	1.2-13.6	7	6.1	2.8-12.8	6	5.0	1.9-12.9
Had to contact the police	No	87	81.5	71.2-88.7	101	94.8	88.4-97.8	105	98.4	93.2-99.6	105	97.8	93.1-99.3	106	98.7	91.3-99.8
	Yes	20	18.5	11.3-28.8	6	5.2	2.2-11.6	2	1.6	0.4-6.8	2	2.2	0.7-6.9	1	1.3	0.2-8.7
Had someone break or damage something that mattered to me	No	81	89.9	80.6-95.0	80	88.2	78.4-93.9	87	95.7	88.5-98.5	87	96.0	88.6-98.6	89	97.8	90.6-99.5
	Yes	9	10.1	5.0-19.4	11	11.8	6.1-21.6	4	4.3	1.5-11.5	4	4.0	1.4-11.4	2	2.2	0.5-9.4
Been physically hurt due to them assaulting me or acting violently	No	74	89.3	79.5-94.7	76	90.8	80.5-95.9	82	97.9	93.2-99.4	79	95.0	86.3-98.3	79	94.4	79.9-98.6
	Yes	9	10.7	5.3-20.5	8	9.2	4.1-19.6	2	2.1	0.6-6.8	4	5.0	1.7-13.7	5	5.6	1.4-20.1
Been put at risk in a car when someone was driving after drinking	No	59	85.3	74.7-91.9	63	90.4	79.6-95.8	69	99.1	93.7-99.9	65	93.6	83.4-97.7	66	95.0	84.4-98.5
	Yes	10	14.7	8.1-25.3	7	9.6	4.2-20.4	1	0.9	0.1-6.3	4	6.4	2.3-16.6	3	5.0	1.5-15.6
Felt genuinely concerned that they may cause harm to my children or someone else's children	No	36	70.7	54.6-82.9	48	94.1	82.4-98.2	50	98.6	90.0-99.8	49	96.9	87.6-99.3	49	95.8	74.8-99.4
	Yes	15	29.3	17.1-45.4	3	5.9	1.8-17.6	1	1.4	0.2-10.0	2	3.1	0.7-12.4	2	4.2	0.6-25.2
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	No	49	91.2	78.1-96.8	49	91.0	79.4-96.4	53	97.9	91.0-99.5	52	96.4	86.2-99.2	53	97.8	84.9-99.7
	Yes	5	8.8	3.2-21.9	5	9.0	3.6-20.6	1	2.2	0.5-9.0	2	3.6	0.8-13.8	1	2.2	0.3-15.1
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	No	49	96.8	90.0-99.0	51	99.2	94.4-99.9	46	89.5	73.4-96.3	47	91.5	79.3-96.8	49	97.0	86.4-99.4
	Yes	2	3.2	1.0-10.0	0	0.8	0.1-5.6	5	10.6	3.7-26.6	4	8.5	3.2-20.7	2	3.0	0.6-13.6
Had money that would have improved the quality of my life spent on their alcohol-related purchases	No	43	95.6	86.2-98.7	40	87.5	73.4-94.6	40	88.9	72.6-96.0	44	95.9	83.2-99.1	45	98.1	87.0-99.8
	Yes	2	4.4	1.3-13.8	6	12.5	5.4-26.6	5	11.1	4.0-27.4	2	4.1	0.9-16.8	1	1.9	0.2-13.0
Drank alcohol myself in order to cope with the problems caused by their drinking	No	26	90.3	75.9-96.5	27	93.8	76.5-98.6	27	92.2	73.8-98.0	25	87.3	66.8-95.9	28	95.7	81.5-99.1
	Yes	3	9.7	3.5-24.1	2	6.2	1.4-23.5	2	7.9	2.0-26.2	4	12.7	4.1-33.2	1	4.3	0.9-18.5
Felt forced or pressured into sex or something sexual	No	23	85.5	65.7-94.8	26	95.4	70.5-99.4	24	86.3	62.9-95.9	23	83.4	61.0-94.2	27	100.0	-
	Yes	4	14.5	5.2-34.3	1	4.7	0.6-29.5	4	13.7	4.1-37.1	5	16.6	5.8-39.0	0	0.0	-
Had to move out of my usual place of residence and stay somewhere else	No	20	94.0	63.8-99.3	13	59.9	34.8-80.7	21	100.0	-	21	97.4	81.0-99.7	21	100.0	-
	Yes	1	6.0	0.7-36.2	9	40.1	19.3-65.2	0	0.0	-	1	2.6	0.3-19.0	0	0.0	-

Supplementary Table 4: Frequency of harm by harm type (as a percentage of those who experienced each harm), weighted data

	Frequency	Percentage	95% CI
Been kept awake due to noise or disruption	Daily or almost daily (i.e. 4-7 days per week)	2.4	1.3- 4.3
	Weekly (i.e. 1-3 times per week)	12.1	9.0-16.1
	Monthly (i.e. 2-3 times per month)	18.4	14.5-23.2
	Less than once a month	67.1	61.7- 72.2
Felt uncomfortable or anxious at a social occasion (e.g. a party)	Daily or almost daily (i.e. 4-7 days per week)	1.5	0.6-3.9
	Weekly (i.e. 1-3 times per week)	1.0	0.4-2.6
	Monthly (i.e. 2-3 times per month)	8.0	5.3-12.0
	Less than once a month	89.5	85.2-92.6
Had a serious argument that did NOT include physical violence	Daily or almost daily (i.e. 4-7 days per week)	1.4	0.4-4.4
	Weekly (i.e. 1-3 times per week)	4.8	2.7-8.6
	Monthly (i.e. 2-3 times per month)	7.0	4.3-11.3
	Less than once a month	86.7	81.5-90.6
Been let down by someone due to them failing to do something that I was counting on them to do because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	3.9	1.7-8.6
	Weekly (i.e. 1-3 times per week)	9.6	5.5-16.4
	Monthly (i.e. 2-3 times per month)	13.6	8.9-20.3
	Less than once a month	72.9	64.6-79.8
Been emotionally hurt or neglected	Daily or almost daily (i.e. 4-7 days per week)	9.0	5.0-15.5
	Weekly (i.e. 1-3 times per week)	7.6	4.1-13.4
	Monthly (i.e. 2-3 times per month)	15.1	10.0-22.3
	Less than once a month	68.3	59.6-75.9
Felt physically threatened	Daily or almost daily (i.e. 4-7 days per week)	4.6	2.1-9.9
	Weekly (i.e. 1-3 times per week)	4.4	2.0-9.7
	Monthly (i.e. 2-3 times per month)	7.6	3.8-14.8
	Less than once a month	83.3	75.2-89.2
Had to stop seeing or being in contact with someone because of their drinking	Daily or almost daily (i.e. 4-7 days per week)	19.3	11.9-29.6
	Weekly (i.e. 1-3 times per week)	10.4	5.5-18.7
	Monthly (i.e. 2-3 times per month)	9.4	5.2-16.5
	Less than once a month	61.0	50.1-70.8
Had to contact the police	Daily or almost daily (i.e. 4-7 days per week)	7.8	3.6-16.2
	Weekly (i.e. 1-3 times per week)	6.5	2.6-15.5
	Monthly (i.e. 2-3 times per month)	7.5	3.8-14.1
	Less than once a month	78.2	67.9-85.9
Had someone break or damage something that mattered to me	Daily or almost daily (i.e. 4-7 days per week)	3.2	0.9-10.7
	Weekly (i.e. 1-3 times per week)	5.0	1.9-12.5
	Monthly (i.e. 2-3 times per month)	7.4	3.6-14.5
	Less than once a month	84.4	74.9-90.8
Been physically hurt due to them assaulting me or acting violently	Daily or almost daily (i.e. 4-7 days per week)	7.1	2.6-18.2
	Weekly (i.e. 1-3 times per week)	6.3	2.0-17.7
	Monthly (i.e. 2-3 times per month)	11.0	5.5-20.8
	Less than once a month	75.6	62.8-85.0
Been put at risk in a car when someone was driving after drinking	Daily or almost daily (i.e. 4-7 days per week)	8.6	3.4-19.9
	Weekly (i.e. 1-3 times per week)	3.2	0.7-13.0
	Monthly (i.e. 2-3 times per month)	8.5	3.3-20.1
	Less than once a month	79.7	66.6-88.6
Felt genuinely concerned that they may cause harm to my children or someone else's children	Daily or almost daily (i.e. 4-7 days per week)	6.1	1.8-18.1
	Weekly (i.e. 1-3 times per week)	7.1	2.4-19.2
	Monthly (i.e. 2-3 times per month)	24.5	12.9-41.4
	Less than once a month	62.3	45.7-76.5
Had to spend my personal time caring for a person with a long term health condition or disability that resulted from their current or previous drinking	Daily or almost daily (i.e. 4-7 days per week)	19.4	10.2-33.8
	Weekly (i.e. 1-3 times per week)	15.6	7.5-29.7
	Monthly (i.e. 2-3 times per month)	28.0	16.5-43.6
	Less than once a month	37.0	23.8-52.4
Been physically hurt due to them accidentally injuring me (e.g. by falling on me)	Daily or almost daily (i.e. 4-7 days per week)	3.9	0.9-15.7
	Weekly (i.e. 1-3 times per week)	8.1	2.8-21.3
	Monthly (i.e. 2-3 times per month)	11.7	5.0-24.7
	Less than once a month	76.3	61.2-86.8
Had money that would have improved the quality of my life spent on their alcohol-related purchases	Daily or almost daily (i.e. 4-7 days per week)	6.3	1.9-19.1
	Weekly (i.e. 1-3 times per week)	7.6	2.1-24.0
	Monthly (i.e. 2-3 times per month)	35.8	21.3-53.4
	Less than once a month	50.3	33.7-66.7
Drank alcohol myself in order to cope with the problems caused by	Daily or almost daily (i.e. 4-7 days per week)	5.2	1.0-22.4

	Frequency	Percentage	95% CI
their drinking	Weekly (i.e. 1-3 times per week)	20.7	8.1-43.5
	Monthly (i.e. 2-3 times per month)	42.5	23.0-64.8
	Less than once a month	31.6	14.9-54.9
Felt forced or pressured into sex or something sexual	Daily or almost daily (i.e. 4-7 days per week)	2.4	0.3-17.6
	Weekly (i.e. 1-3 times per week)	4.5	0.5-28.7
	Monthly (i.e. 2-3 times per month)	2.1	0.3-15.5
	Less than once a month	91.0	72.0-97.5
Had to move out of my usual place of residence and stay somewhere else	Daily or almost daily (i.e. 4-7 days per week)	8.1	1.6-31.8
	Weekly (i.e. 1-3 times per week)	12.0	2.5-42.1
	Monthly (i.e. 2-3 times per month)	6.1	1.3-24.8
	Less than once a month	73.8	47.4-89.8

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	3-4
Bias	9	Describe any efforts to address potential sources of bias	3 (sampling) and 5 (weighting)
Study size	10	Explain how the study size was arrived at	3-4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	5
		(*c*) Explain how missing data were addressed	5
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	5
		(*e*) Describe any sensitivity analyses	NA

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8 and 10
		(b) Indicate number of participants with missing data for each variable of interest	Not included due to space. We can add this as another supplementary table.
Outcome data	15*	Report numbers of outcome events or summary measures	8 and 10
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-11
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	5

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.