Mortality among a cohort of heavy drinkers in Edinburgh & Glasgow

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Acknowledgements

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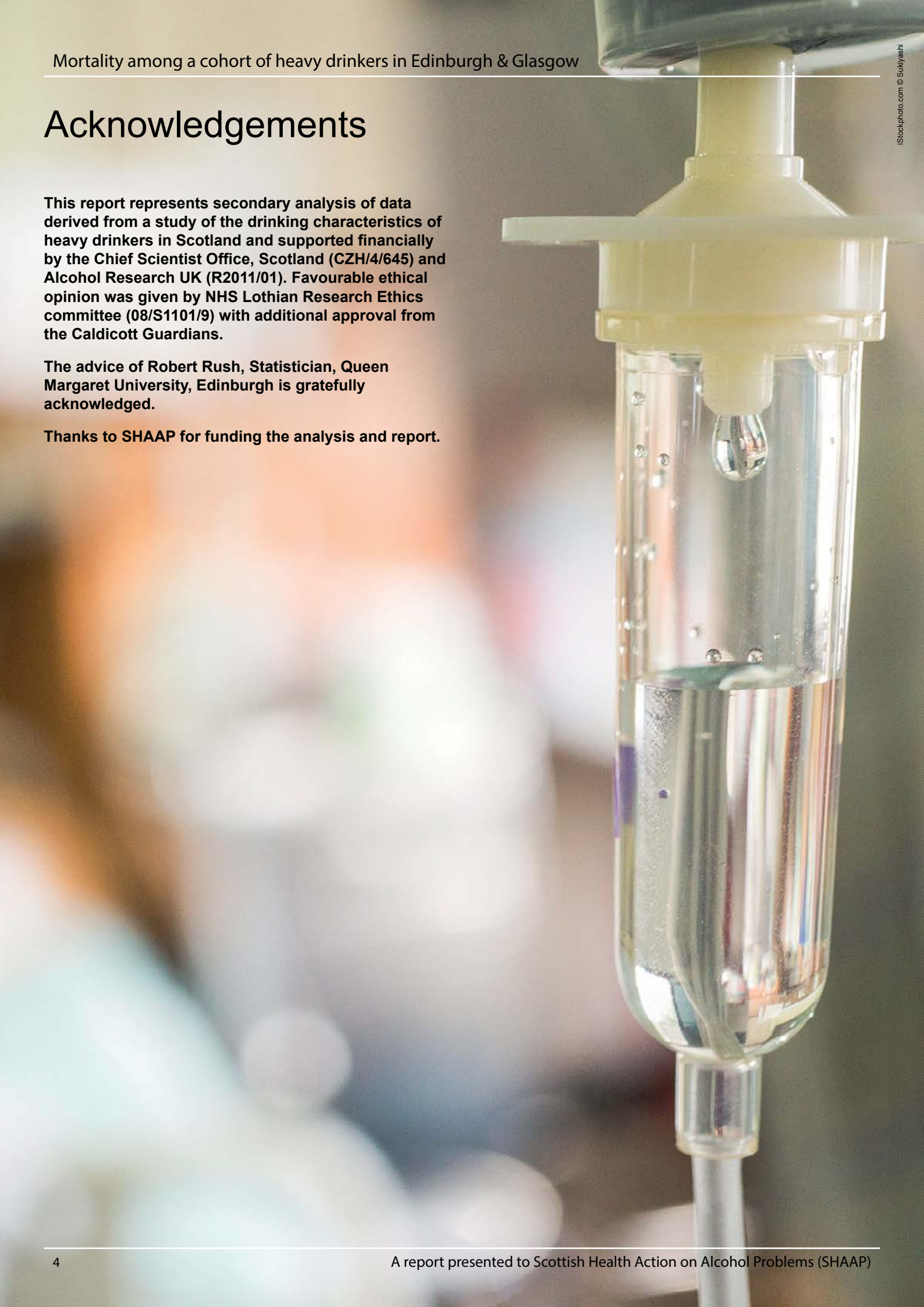


Key findings

- **The percentage of the original sample (n=639) of heavy drinkers who died during the time period of the study (Dec 2012-Feb2015) was 16.4% (N=105) with a gender ratio of 3.0:1.0, male: female. (In the original sample the ratio was 2.5:1.0).**
- **The mean age at death was 51.1 years. At initial recruitment interview just under one quarter of these drinkers self-reported illicit drug use, 62% smoking and 55% as having a mental health condition.**
- **While the mean age at death of the women was lower than that of men, this difference was not significant.**
- **Preliminary evidence highlights aspects of concern in relation to the drinking of the Glasgow women in this sample; their consumption of alcohol in the recorded week was significantly higher than that of their counterparts in Edinburgh but no different from Glasgow males.**
- **By contrast as anticipated, male drinking exceeded that of females amongst participants living in Edinburgh.**
- **Overall Glasgow participants differed from their Edinburgh counterparts in being younger at time of death and having more self-reported drug use.**
- **While Glasgow was also distinguished by greater self-reported harm score (ARPQ) than Edinburgh this was only statistically significant when comparing females.**
- **The most common physical health condition self-reported by participants was liver damage (73%).**
- **A striking city divide is evident when comparing the prevalence of self-reported mental health conditions; 72.9% (Glasgow) versus 32.6% Edinburgh. Within Glasgow (but not Edinburgh) women reported significantly more mental health conditions than men.**
- **Examination of completed death certificates concluded that alcohol was not mentioned in 27% of completed certificates.**
- **The most common underlying cause of death (46% of cases) linked to liver conditions, including hepatitis and hepatocarcinoma.**
- **In terms of underlying cause of death, only in relation to cancer did female numbers exceed males (despite the smaller female sample size).**
- **Where the underlying cause of death was external (not due to disease) the male to female ratio was 8:1.**
- **When compared to participants who were designated as 'long term' survivors, significant associations were found between being deceased and being a hospital inpatient (not clinic outpatient), any drug use, any white cider drinking, paying a lower unit price for alcohol and reporting a higher ARPQ score.**
- **Within Edinburgh the deceased patients were associated with again being recruited at an inpatient setting ($p=0.031$) categorised as a white cider drinker ($p=0.041$) or a vodka drinker ($p=0.014$). Deceased patients paid significantly less for their unit of alcohol than surviving patients; median unit price of 41 pence versus 48 pence ($p=0.029$).**
- **In Glasgow participants, significant associations were found for being deceased and 'any drug use' ($p<0.001$) and being a white cider drinker ($p=0.04$). Like their Edinburgh counterparts the deceased Glasgow participants paid significantly less for their unit of alcohol than surviving patients; median unit price of 38 pence versus 46 pence ($p=0.002$).**
- **Deceased drinkers, both those who purchased 'any' vodka or 'exclusively' drank vodka, paid significantly less per unit of vodka than their surviving counterparts.**
- **Significant associations were found for being a male deceased participant and consuming mainly white cider ($p=0.018$) and amber cider (<6% ABV) ($p=0.025$).**
- **A significantly lower ARPQ score (harm score) was self-reported by the surviving patients when compared with the deceased patients.**

Introduction

Background to study

During the period between September 2011 and February 2015 we were funded by the Chief Scientist's Office (Scottish Government) and Alcohol Research UK to conduct a large follow-up study of heavy drinkers recruited within NHS settings in Edinburgh and Glasgow. The study was entitled; *Effects of Scottish Government Changes in Alcohol Policy on Consumption and Purchasing of Alcohol Beverages by Patients with Alcohol-related Health Harms*. Originally, this longitudinal, pre-post study was designed to document any self-reported changes in drinking behaviour among harmed alcohol consumers (price paid, drink types and volumes purchased) in response to the implementation of the Alcohol Minimum Pricing (Scotland) Act, 2012. This legislation proposes a minimum unit price for alcohol (currently favoured at 50 pence per unit (one UK unit equals 8g ethanol)). Despite the Bill receiving Royal assent in 2012, it has not been implemented due to legal challenges brought by the Scottish Whisky Association and two European groups of alcohol manufacturers.

It was after the study commenced, and during the baseline data collection period, that the likely delay to the implementation of the Bill became apparent. However, as study recruitment had exceeded the target number, the project steering group took the decision to continue with the original design in order to capture detailed information characterising the drinking behaviour of a traditionally difficult to access population of drinkers.

During 2011-12 we had recruited NHS patients (n = 639) in Edinburgh and Glasgow who had been harmed by their alcohol consumption. Eligible patients were those admitted with a diagnosis of a physical or psychiatric alcohol-related illness. Recruitment took place at NHS alcohol services in Edinburgh and Glasgow at outpatient and day patient clinics plus acute hospitals settings. Clinic staff, or alcohol liaison nurses in the acute settings, referred eligible patients to the research interviewers.

Four interviews with participants, approximately 6 months apart, were planned.

The exclusion criteria were;

- being under 18 years old
- being unable to understand English or give comprehensible responses in English
- having clinically significant memory impairment (e.g. Korsakov's Dementia)
- being unwilling to provide three follow-up interviews
- unsuitable due to separate clinical issues (on advice from clinicians)

Following completion of the consent form, research interviewers administered a questionnaire (Black et al. 2011) which documented participants' most recent seven days of drinking using the time line follow-back method (Sobell and Sobell, 1996) or their most typical week. The type, volume, brand (when known) of beverage, cost and location of purchase were recorded and participants were asked to give estimations of the hours spent drinking. Additionally interviewers recorded participants' reasons for the choice of any beverages purchased. Age, gender and postcode were documented, the latter acting as a proxy for socioeconomic status using the Scottish Index of Multiple Deprivation (SIMD) (Scottish Government, 2012). The 2012 SIMD divides Scotland into 6505 geographical areas called datazones each containing approximately 350 households identified by postcode. Each datazone is assigned a rank of relative deprivation based on seven domains (employment, income, health, education, geographic access to services, crime and housing). We used our participants' postcode to record the SIMD rank by quintile.

Participants also self-completed the Alcohol Related Problems Questionnaire (ARPQ) (Patience et al. 1997) which is an eleven point questionnaire used to assess severity of alcohol related problems. Scores ranged from zero to eleven with the highest score indicating the greatest number of problems. In addition, participants were asked to self-report any physical or psychological illnesses associated with their drinking. Note that due to ethical constraints, it was not possible to verify this information with clinical records. Participants were also asked specifically about drug use (excluding prescribed medications) which may have included legal highs, controlled medications or illegal drugs and consumption of alcohol purchased from an unlicensed vendor or non-commercially produced alcohol (e.g. 'homebrew' or being offered alcohol for sale 'on the doorstep'). We also asked participants to report their consumption of alcohol substitutes (e.g. mouthwash, perfume).

Of those eligible for the study, 244 patients were not interviewed and were recorded as 'refusals' e.g. the patient declined to take part even before speaking to an interviewer, or staff refused on behalf of a patient whom they considered too distressed to participate. During the initial recruitment phase 639 patients were successfully interviewed, 294 in Edinburgh and 345 in Glasgow. In Edinburgh this included 98 women (33.3%) and in Glasgow, 83 women (24.1%). Attrition was high and during each of the next three interview phases we

obtained follow-up interviews respectively for 227, 165 and 145 participants. (See Appendix 1 for overview of study recruitment and attrition at each phase.)

In a longitudinal study which included severely ill participants we expected some deaths to occur; a need for three follow-up interviews over approximately two years, inevitably increased the chance of contacting the relatives of a deceased participant. Therefore we approached the NHS Central Register for Scotland (NHSCR) and discussed the requirements for receiving notifications of any deaths in our sample during the term of the study. This involved obtaining further permissions from the NHS Lothian Research Ethics Committee and the Caldicott Guardians for NHS Lothian and NHS Greater Glasgow & Clyde. In addition our documentation was scrutinised by the Privacy Advisory Committee before preparing a database for record matching and subsequent transfer of data. This database was saved onto an encrypted disc which was personally delivered to NHSCR. We then received notification of deaths by email which was followed up with death certificate detail, on a password protected disc sent by Royal Mail Special Delivery.

By the end of the study, a total of 105 (16.4%) participants had died (mean age at death was 51.1 years). This report provides a descriptive overview of the drinking characteristics recorded at baseline interview for these deceased participants (Part A of the report). The information linked to the cause of their deaths is presented in Section B. Finally the baseline characteristics of the drinking behaviour of those who died is contrasted with that of the baseline characteristics of other, surviving, participants in Section C of the report. Membership of the surviving comparison group was restricted to 'longer term surviving patients' i.e. patients who survived to an age which exceeded the upper boundary of the 95% Confidence Interval of the mean age at death of the deceased patients. (In practice this meant that those within the long term surviving group had an age at entry to the study which was >53 years.)

Data analysis

Descriptive statistics report mean values, standard deviations and 95% Confidence intervals (95% CI) or median values (and Interquartile range (IQR)) where the distribution is uneven for continuous variables and correspondingly p values for t-test or Mann-Whitney U, significant at the alpha value 0.05. Chi-square tests for independence are used for categorical variables (p value significant at 0.05).

Data was analysed using IBM SPSS v20.

Findings

Part A: Descriptors of deceased study participants recorded at baseline interview.

(i) Number of recorded deaths

In total, there were 105 deaths recorded during the study period i.e. 16.4% of the 639 participants interviewed; 26 women and 79 men. Table 1 provides a timeline of deaths occurring during the course of the study.

Appendices 1a, 1b and 1c provide (i) an overview of sample recruitment and attrition during the course of the study and (ii) summary recruitment data per NHS setting.

(ii) Deceased sample descriptors

The characteristics of the deceased participants' group, in total and separately for each gender, are presented in Table 2. Around one quarter of the sample self-reported illicit drug use and just over 60% were smokers. Slightly over 70% of deaths were among participants belonging to the two most deprived SIMD quintiles.

Overall, no significant gender differences were detected. While the median alcohol consumption in the index week reported by women was lower than that of men, the difference was not significant (p=0.19).

However further analysis comparing cities and gender did reveal preliminary evidence of group differences. When comparing cities (see Table 3) Glasgow drinkers were characterised by a significantly: lower mean age at entry to the study, lower age at death, more self-reported drug use and higher self-reported harm (ARPQ score) than Edinburgh drinkers. (The significant difference in the SIMD profile between the two cities must be viewed within the constraints of the sample sizes. General population data highlight the striking differences between the cities in regards to SIMD profile.)

While numbers were low, the same analyses were repeated comparing genders within each city (see Appendices 2 and 3). With this caveat in place, it is of note that within Glasgow, no significant differences distinguished the genders, median consumption in the index week did not differ between men and women, however in Edinburgh a gender divide was evident; men consumed significantly more alcohol units in the index week than Edinburgh women (p=0.003).

Glasgow women drank significantly more than Edinburgh women (p=0.01). There was no significant difference between the consumption of men in Glasgow and Edinburgh (p=0.113).

For male (but not female) participants there was a significant positive correlation between the number of days between baseline interview and date of death, and the number of units consumed in the index week, r=0.267, p=0.017. See Figure 1.

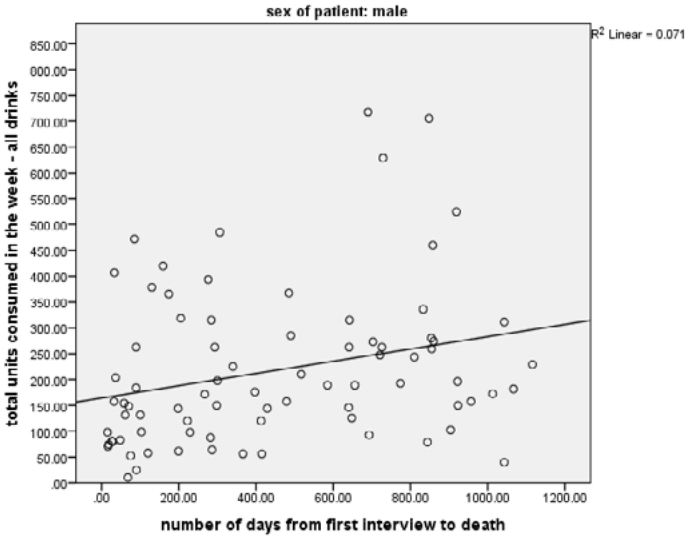


Figure 1 Scatterplot of total units consumed in the index week plotted as a function of number of days from first (baseline) interview to date of death.

(iii) Self-reported harm

We recorded participants' self-reported harm score as operationalised by the Alcohol Related Problems Questionnaire (ARPQ) score. Participants' scores could range from zero to eleven, with the highest score indicating greatest problems. Scores relate to four domains (physical health, mental health, social problems, and judicial problems). The ARPQ does not diagnose drinker type, harmful or dependent (e.g. as in AUDIT) or quantify consumption, rather it permits a score related to perceived current harm. Scores are presented in Table 4 for the total sample and also stratified by city and gender. Overall, Glasgow participants reported significantly higher problem scores than those living in Edinburgh but this city difference appeared to be significant only for women. (However this finding requires exploration with greater sample numbers.)

Table 1: Timeline of number of recorded deaths in 90 day periods during the study.

Days into study	0-90	91-180	181-270	271-360	361-450	451-540	541-630	631-720	721-810	811-900	901-990	991+	Total
Number of deaths	19	10	12	10	9	5	4	9	6	8	6	7	105

Table 2: Deceased sample characteristics (n = 105)

	All (n =105)	Male (n =79)	Female (n =26)	Gender comparison
% of total drinkers recruited to study (n=639)	16.4%	17.2%	14.4%	
Mean age (years) at baseline. (SD)	49.9 (10.6)	50.6 (10.6)	47.8 (10.4)	ns
Mean age (years) at death. (SD)	51.1 (10.5)	51.8 (10.5)	48.9 (10.6)	ns
Percentage Smokers (any)	61.9% (n=65)	62.0% (n=49)	61.5% (n=16)	ns
Median baseline UK units of alcohol (recorded week) (IQR)	172.5 (98.0-262.5)	181.7 (98.6-280.0)	137.0 (82.5-262.5)	ns
Percentage (n) self-reporting Illicit drug use (any)	24.8% (n=26)	22.8% (n=18)	30.8% (n=8)	ns
Median ARPQ score (IQR)*	6.0 (4.0-9.0) (n =99)	6.0 (4.0-8.25) (n =74)	7.0 (5.0-9.0) (n =25)	ns
Percentage (n) within each SIMD quintile				
1 (most deprived)	43.8 (46)	-	-	ns
2	26.7 (28)	-	-	
3	17.1 (18)	-	-	
4	7.6 (8)	-	-	
5	4.8 (5)	-	-	

* ARPQ not completed by all participants

(iv) Self-reporting of health conditions

(Note that participants could report more than one condition.)

At interview, participants were asked to respond to the following open question; *please tell me if you have any physical illness or mental condition that might be at least partly, caused by, or has been worsened by, your drinking*.

Overall 73% (n= 77) of participants self-reported liver disease. For hepatic/pancreatic illnesses no city differences were detected (see Table 5).

Neurological illnesses were self-reported by participants; Epilepsy, convulsions or seizures were reported by n=30; peripheral neuropathy and balance or gait problems, n=26; memory loss/poor memory n=21; and acute withdrawal symptoms (without seizures), n=20.

Gastrointestinal-associated symptoms/illnesses (vomiting/ retching/gastritis, haematemesis, oesophageal varices, diarrhoea) were reported by 44 (42%) of participants.

Respiratory conditions were reported by five participants (4.8%) and

Cardiovascular system conditions, by 26 participants (24.8%).

Table 3: Deceased sample characteristics split by city.

	All (n =105)	Edinburgh (n =46)	Glasgow (n =59)	City comparison
Percentage of total sample	16.4	15.6	17.1	n.s
Mean age (years) at baseline. (SD)	**49.9 (10.6)**	**52.2 (10.4)**	**48.1 (10.4)**	**p=0.043**
Mean age (years) at death. (SD)	**51.1 (10.5)**	**53.4 (10.2)**	**49.3 (10.5)**	**p=0.047**
Percentage smokers (n)	61.9 (65)	58.7 (27)	64.4 (38)	n.s
Median baseline consumption of alcohol. UK units (in index week). (IQR)	172.5 (98.0-262.5)	173.8 (88.2-281.3)	172.5 (98.0-262.5)	n.s.
Percentage (n) self-reporting drug use (any)	**24.8 (26)**	**13.0 (6)**	**33.9 (20)**	**p=0.014**
Median ARPQ score (IQR) *	**6.0 (4.0-9.0) (n=99)**	**5.0 (4.0-7.0) (n =40)**	**7.0 (5.0-9.0) (n = 59)**	**p= 0.009**
Percentage (n) within each SIMD quintile				
1 (most deprived)	43.8 (46)	26.1 (12)	57.6 (34)	**p=0.011****
2	26.7 (28)	-	-	
3	17.1 (18)	-	-	
4	7.6 (8)	-	-	
5	4.8 (5)	-	-	

* ARPQ not completed by all participants, ** note low numbers in least deprived quintiles

Table 4: Participant's self-reported harm as operationalised by Alcohol Related Problems Score split by city and by gender.

	Median ARPQ score (IQR)	Mann Whitney U		
		U	Z	p
<u>All deceased</u> Male (n=74) Female (n=25)	6.0 (4.0-8.3) 7.0 (5.0-9.0)	804.00	-0.982	0.326
<u>All deceased</u> Edinburgh (n=40) Glasgow (n=59)	5.0 (4.0-7.0) 7.0 (5.0-9.0)	816.50	-2.611	**0.009**
<u>Male only</u> Edinburgh (n=28) Glasgow (n=46)	5.0 (4.0-7.8) 7.0 (4.0-9.0)	496.50	-1.655	0.098
<u>Female only</u> Edinburgh (n=12) Glasgow (n=13)	5.0 (4.0-7.0) 9.0 (6.0-9.0)	34.50	-2.418	**0.016**

Table 5: Percentage (n) of sample self-reporting conditions linked to hepatic and pancreatic inflammation.

Condition	Edinburgh % (n)	Glasgow % (n)	City comparison
Any liver disease (any alcoholic liver disease, abnormal function/enlarged liver, viral hepatitis, awaiting results for liver function tests or scans)	78.3 (36)	69.5 (41)	ns
Any pancreatic disease (chronic pancreatitis, acute pancreatitis or diabetes caused by alcohol damage to pancreas)	8.7 (4)*	13.6 (8)	-

* where expected count is less than 5, chi-square tests not performed

Table 6: Percentage (n) self- reporting various mental health conditions.

Condition	Glasgow	Edinburgh	City comparison
Self-harm*	18.6 (11)	-	-
Suicide attempt or ideation*	16.9 (10)	-	-
Depression	69.5 (41)	32.6 (15)	P<0.001
Anxiety/Panic attacks	39 (23)	6.5 (3)*	-
Stress*	18.6 (11)	-	-
Paranoia*	3.4 (2)	-	-
Any mental health condition listed above	72.9 (43)	32.6 (15)	P<0.001

*In Edinburgh these numbers were too low to permit comparison also note that a participant could self-report more than one condition.

(When asked, six participants reported having 'no illnesses' associated with their drinking, at the time of interview. (None of these death certificates made reference to alcohol consumption or recorded any liver disease.) Three of these patients died within one year following recruitment to the study.)

The proportions of patients self-reporting mental health-related conditions are summarised in Table 6. Over one half (55%) reported at least one of the conditions listed. Glasgow participants were more likely than their Edinburgh counterparts to self-report any mental health condition (72.9% vs 32.6%; p<0.001). (Unsurprisingly therefore the median number of any mental health conditions reported by Glasgow participants was significantly higher than that reported by Edinburgh participants (p<0.001).)

Within Glasgow, women reported significantly more mental health conditions than men, a median of 3.0 (IQR 2.5) compared to 1.0 (IQR 2.0) for men (p =0.013). (There was no significant difference between the genders in Edinburgh where the median for both was actually zero.

In relation to gender, for men there was a significant difference in the numbers in each city self-reporting any mental health condition, Edinburgh n=12 compared to Glasgow n=32 (p=0.003). This was also true for women, Edinburgh n=3 compared to Glasgow n=11 (p=0.002). Interestingly, there was a noteworthy city difference in the numbers self-reporting stress or self-harm.

Overall eleven of the deceased participants reported at baseline interview, suicide attempts or suicide ideation (in the preceding 6 month period). Of these eleven, none of the subsequent deaths were confirmed as suicides.

Part B: Analysis of data retrieved from death certificates

(i) Cause of death

Detail relating to death records was advised by NHS Central register.

The following notes (Scottish Government, 2009) were employed to aid interpretation of the information;

Underlying cause of death: *The initiating condition, on the* ***lowest line of part I****, of the death certificate will usually be selected as the* ***underlying cause of death****. WHO defines the underlying cause of death as "a) the disease or injury which initiated the train of morbid events leading directly to death, or b) the circumstances of the accident or violence which produced the fatal injury"*

The immediate and direct cause of death *is noted in part* ***I(a)*** *of the certificate.*

(n.b. for the purposes of this report will be referred to as **direct cause**)

Factors believed to be contributing to death*. Any other diseases, injuries, conditions, or events that are believed to have contributed to the death, but were not part of the direct sequence are noted in* ***Part II*** *of the form.*
(n.b. for the purposes of this report will be referred to as **contributory cause**)

However as seen in the three exemplars of death record abstracts shown below, the guidance was not always followed. In some entries very little information appeared in the direct causes (part 1 a-d).

The underlying cause of death was established for 100 participants. (Of the remaining five, the cause was not confirmed.)

Death Record Extracts

ICD-10 International classification of disease	*underlying cause of death*	*I (a) duration*	*I (a) (direct cause)*	*I (b)*	*I (c)*	*I (d) ("lowest line")*	*II*
K11.1	*AAA*	-	*AAA*	-	-	-	-
F22.2	*BBBB*	-	*CCCCC*	*DDDD*	*EEEEE*	*FFFFFF*	-
K33.3	*GGGG*	*1 month*	*HHHH*	*IIIII*	-	-	*JJJJ*

n.b. All text relating to actual diagnoses has been removed but identical conditions are coded similarly.

For an overview of underlying cause see Figure 2. The most common underlying cause was hepatic which included hepatitis and hepatocarcinoma.

Of the deaths where underlying cause was established (n=100), death records were checked for any mention of alcohol in all three sections of the form relating to cause of death i.e. as underlying cause, any direct cause (I a-d) or contributory cause (II)). This was true in only 73% (n=73) of cases. Alcohol was not mentioned in 27 cases.

When the ARPQ scores and self-reported consumption of alcohol in the index week of those where alcohol was mentioned, were compared with those for whom alcohol was not mentioned (n=27), the latter group actually had higher levels of consumption and higher ARPQ scores but these differences were not significant. Respectively the median units reported were 157.5 (alcohol mentioned) (IQR=171.19) and 200.6 (not mentioned) (IQR=162.57); the ARPQ scores were 6.0 (IQR=5.0) and 8.0 (IQR=4.5). These two groups were also checked for differences (using chi-square tests for independence) and no significant differences were noted in relation to: gender, city, drug use, SIMD quintile and being an inpatient or outpatient.
Of these deaths where alcohol was not mentioned and the underlying cause was confirmed, in four cases death was linked to liver pathology but the majority (10) were due to 'external' causes of death.

For those where any alcohol was mentioned on their death certificate, a significant association was found with reporting any liver disease or liver dysfunction at interview (n=63, p<0.001). Also and perhaps unsurprisingly, a significant association was found with those having liver disease present at death and any alcohol being mentioned on their death certificates (n=55, p<0.001). In all, liver disease was recorded on the death certificates of 59 participants (as underlying cause, any direct cause (I a-d) or contributory cause (II)).

There were 18 deaths we coded as 'external' causes. 'External' is the term the report authors employed to represent non-pathological causes. Nine of these 'external' causes were drugs related (predominately male and from Glasgow), while others included drowning, hanging, fall, assault and accidental poisoning by and exposure to, alcohol. Four of the 18 were confirmed as suicide; none of these four had self-reported previous self-harm or suicide attempts/ideation at baseline interview (two self-reported depression). The other deaths (N=14) were either undetermined intent, accidental, assault or pending investigations and within these, four had self-reported previous suicide attempts/ideation at interview.

A significant city difference is evident in the incidence of deaths from 'external causes' (table 7).

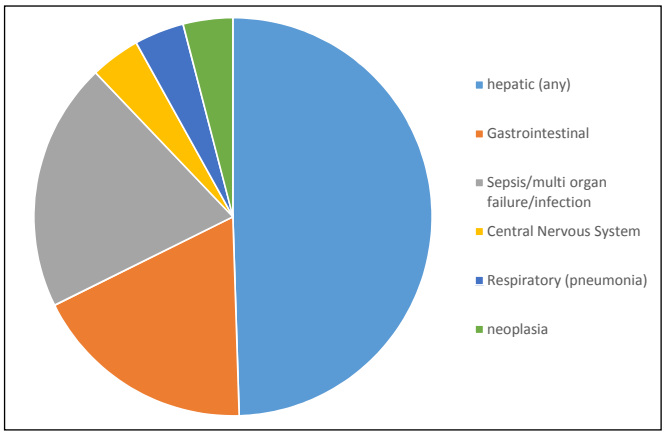


Figure 2: Direct cause of death for those participants whose underlying death was linked to hepatic cause (n=49).

Figure 2 refers to those deaths with an underlying cause as hepatic origin (n=49). The direct causes (column 1a in example of record on page 12) shown on these records are illustrated with only 49% of these associated with the liver.

A gender comparison of numbers assigned to the different underlying causes of death (see Figure 3) highlights the numbers associated with liver pathology for both genders and is in direct proportion to the overall gender ratio of the sample (3.5:1). In most categories the numbers were too low (n<5) to permit further testing. However two preliminary observations are worthy of comment; (i) only in relation

Table 7: Categories of underlying cause of participant deaths (n) split by city.

	All	Edinburgh	Glasgow	City comparison (X^2)
Liver	49	24	25	ns
Respiratory/ Cardiovascular Disease	13	6	7	-
Neoplasia (exc liver)	6	3	3	-
External	**18**	**4**	**14**	**p=0.043**
Alcohol abuse plus other causes	6	2	4	-
Other/ unknown/pending	13	7	6	-
All	105	46	59	

to cancer did female numbers exceed males (despite the smaller female sample size) and (ii) the male to female ratio for 'external' causes was 8:1.

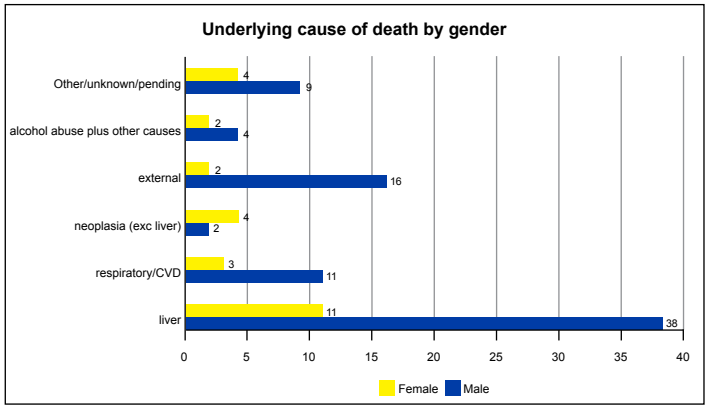


Figure 3: Underlying cause of participant deaths (n) (split by gender).

Part C: Comparison of baseline interview data of deceased participants with baseline data of long term surviving participants.

As already documented, of the original cohort of participants (n=639) recruited during 2011-12, 105 died before the completion of the study in February 2015. Among the surviving patients (n=538), we identified a group whose age at time of recruitment to the study exceeded the upper 95% CI of the mean age at death of the deceased group. Their age at entry to the study was therefore >53 years. We have labelled this group 'long term survivors' (LTS). In this section we contrast data relating to this group 15.8% (n=101) with those of the deceased participants 16.4% (n=105). See Figure 4 and Table 8.

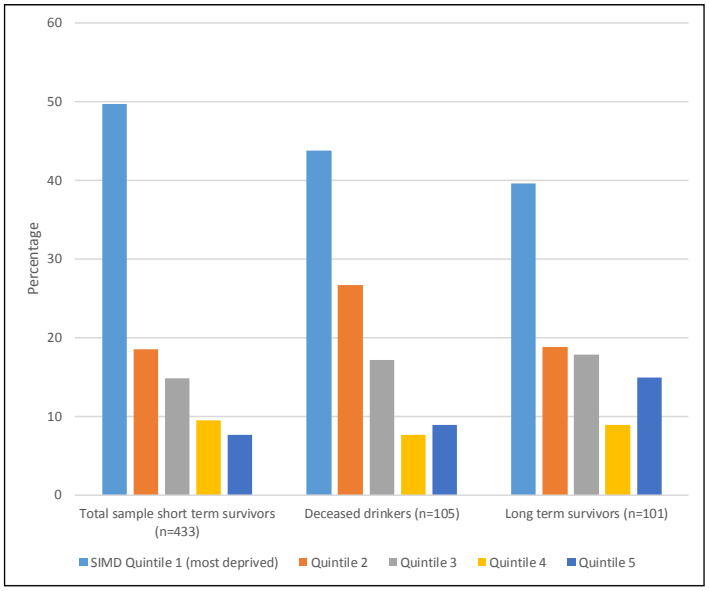


Figure 4: Percentage of participants belonging to each SIMD quintile profile for different sample groups.

(n.b. In Figure 4 we also include data relating to the remaining participants (those who were alive at the end of the study but who were not significantly different in age from the deceased participants; these participants we have labelled 'Short-term' survivors; 67.8% (n=433).)

Preliminary inspection of the data presented in Figure 4 could suggest over-representation of the least deprived quintile within the LTS group.

As would be expected a statistically significant difference ($p<0.001$) was found in mean age at entry to the study between the deceased participants and the LTS sample. However, no significant difference between the two groups was detected in relation to gender, city designation or SIMD distribution.

Table 8: Comparison of long-term surviving (LTS) and deceased participant characteristics at baseline.

	LTS (n=101)	**Deceased (n=105)**			
Mean age (years) (SD)	59.7 (5.5)	49.9 (10.6)			
			X^2		p
	LTS n	Deceased n	expected LTS	expected Deceased	
Male	72	79	74	77	0.522
Female	29	26	27	28	
Edinburgh	47	46	45.6	47.4	0.694
Glasgow	54	59	55.4	57.6	
SIMD Quintile 1	40	46	42.2	43.8	0.129
Inpatient	**66**	**85**	**74**	**77**	**0.011**
Any drug use	**6**	**26**	**15.7**	**16.3**	**<0.001**
Smoker	54	65	58	61	0.193
White cider drinker- any*	**7**	**14.2**	**3.7**	**14.8**	**0.004**
White cider drinker- exclusive**	4***	11	3.6	11.4	0.742
Vodka drinker-any	38	45	40.7	42.3	0.444
Vodka drinker- exclusive	20	24	20.1	23.9	0.949
			Mann-Whitney U		
			U	z	p
Median UK units of alcohol consumed in index week. (IQR)	132.13 (93.0-211.1)	172.5 (98.0-262.5)	4322.50	-2.292	0.22
Median ARPQ score (IQR) (n=195)*	**5.0 (4.0-7.75) (n=96)**	**6.0 (4.0-9.0) (n=99)**	**3828.50**	**-2.360**	**0.018**
Median expenditure (£) on alcohol in index week. (IQR)	66.25 (41.2-104.1)	60.00 (37.3-105.6)	5256.50	-0.108	0.914
Median unit price (pence) paid for all drinks consumed in index week. (IQR)	**46.0 (40.0-61.0)**	**39.0 (31.5-50.5)**	**3642.50**	**-3.883**	**<0.001**

* any use –where white cider /vodka is consumed along with other alcoholic drinks.

** exclusive use- where white cider or vodka is drunk exclusively during the index week.

*** low expected cell count – Fischer's exact Test =not significant.

Further, chi-square tests for independence were performed on other key variables and significant associations were found between being deceased and; being a hospital inpatient (not clinic outpatient), any drug use, white cider drinker-any, paying a lower unit price for alcohol and a higher ARPQ score.

By City

(See Appendices 4 and 5 for comparisons split by city).

When the same tests were performed split by city, in Edinburgh, again being recruited at an inpatient setting was significantly associated with the deceased group (p=0.031). Smoking status did not distinguish the two patient groups. The deceased group was associated with being categorised as a white cider drinker (p=0.041) or a vodka drinker (p=0.014). Deceased patients paid significantly less for their unit of alcohol than surviving patients; median unit price of 41 pence versus 48 pence (p=0.029).

In Glasgow, unlike Edinburgh, no significant association was found with being a deceased patient and being recruited within an in-patient setting. Within the Glasgow participants, significant associations were found for being deceased and 'any drug use' (p<0.001) and being a white cider drinker (p=0.04). Like their Edinburgh counterparts the deceased Glasgow participants paid significantly less for their unit of alcohol than surviving patients; median unit price of 38 pence versus 46 pence (p=0.002).

By Gender

The gender ratio (M/F) in the LTS patients was 2.5:1, in the deceased patients 3.0:1 (not significant).

Within gender comparisons, (see Appendices 6 and 7) found one significant association for women; being deceased was associated with any drug use (p=0.001) (n.b. low numbers relating to this finding).

For men, being an inpatient was again significantly associated with the deceased group (p=0.018) as was any drug use (p=0.015) and being a white cider drinker (p=0.004). Another significant difference found only amongst men was in the median unit price paid for alcohol; Glasgow males paid significantly less for their unit of alcohol than surviving LTS males; median unit price of 39 pence versus 48.5 pence (p<0.001).

Drinking Pattern

During the interview participants were guided back through their most recent week of drinking and as such we were able to record on how many days in the index week a participant consumed alcohol (drinking days). In addition they were asked to estimate the time spent drinking on each occasion (seven participants found this question too difficult to answer accurately and therefore data is missing for these interviews).

Most participants (81.1%) reported consuming alcohol on each of the seven days in the index week (there was no significant difference between the LTS (81.2%) and deceased (78.1 %) participants). Whilst mean number of hours for which participants reported drinking was slightly higher in the deceased group at 69.3 hours (SD=43.0) this was not significantly different to the LTS group at 60.9 hours (SD=40.6).

Beverage Preference

Our analysis of the total sample had identified a preference for particular drinks namely white cider, vodka, white wine and beer. The first three drinks being favoured by women (Black et al. 2014; Gill et al. 2015). In the total sample (n=639) vodka consumption accounted for 26.5% of all units purchased. For females, vodka sales actually accounted for 40.6% of all units consumed. For males the most popular drink was white cider (25.9% of all sales). Their consumption amongst the surviving and deceased participants is contrasted in the following sections.

Vodka

Two types of vodka drinkers were identified; those who drank ('any') vodka plus other types of alcoholic drinks and, secondly, those who drank vodka 'exclusively'. These two groups are compared in Table 9. Deceased drinkers, both those who purchased 'any' or 'exclusively' vodka, paid significantly less per unit of vodka than their LTS counterparts (p= 0.006 and p=0.007). The deceased participants in both of the 'any' or 'exclusively' vodka groups consumed more units as vodka than the LTS drinkers, but these differences were not significant.

A chi-square test for independence was performed between the deceased and LTS participants for an association with vodka as the main drink consumed (the majority of an individual's units consumed as vodka) and whilst there was no significant association for men, there was for women (p=0.011).

Cider

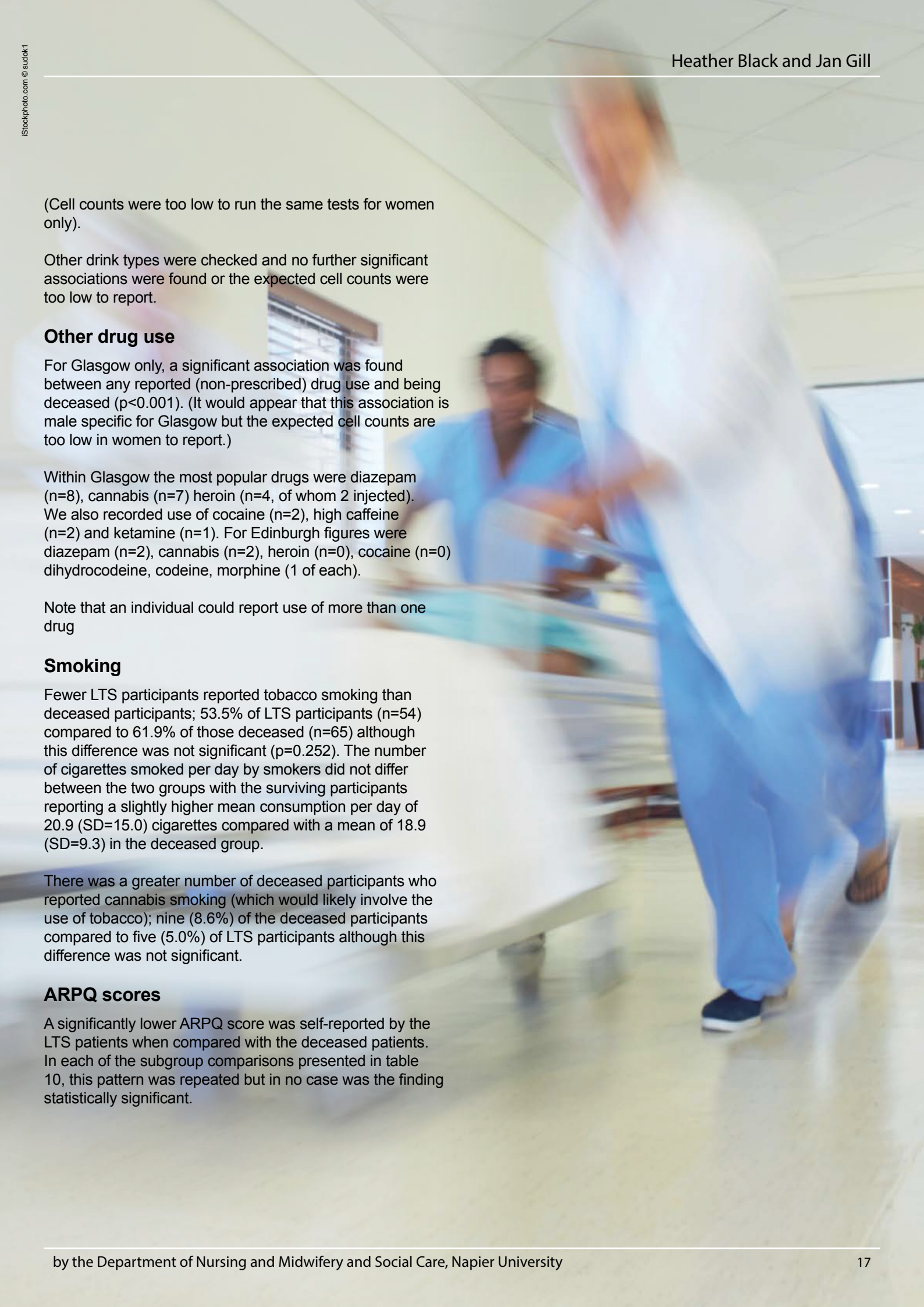
Significant associations were found between male deceased participants and mainly consuming white cider (p=0.018) and amber cider (<6% ABV%) (p=0.025).

Table 9: Comparison of vodka consumption by long term surviving (LTS) and deceased drinkers at baseline.

	Vodka drinkers ('Any')		Mann-Whitney U		
	LTS (n=38)	Deceased (n=45)	U	z	p
Median UK units of vodka consumed (IQR)	121.4 (70.1-189.4)	150.0 (58.7-262.5)	755.0	-0.916	0.360
Median unit price paid for vodka (pence) (IQR)	**44.0 (38.5-49.5)**	**38.00 (34.5-44.0)**	**538.5**	**-2.743**	**0.006**
% of units consumed in index week	*35.2*	*35.8*			
	Vodka drinkers ('Exclusive')		**Mann-Whitney U**		
	LTS (n=20)	**Deceased (n=24)**	**U**	**z**	**p**
Median UK units of vodka (IQR)	183.8 (115.6-262.5)	226.9 (115.8-262.5)	219.0	-0.499	0.62
Median unit price paid for vodka (pence) (IQR)	**41.50 (37.3-46.0)**	**38.00 (33.0-39.8)**	**126.0**	**-2.694**	**0.007**
% of units consumed in index week	100.00	100.00			

Table 10: Comparison of Alcohol Related Problems Score (ARPQ) for long term surviving (LTS) and deceased participants split by city and gender as reported at baseline.

	Median ARPQ score (IQR)	Mann Whitney U		
		U	Z	p
All participants				
Deceased (n=99)	6.0 (4.0-9.0)	3828.5	-2.36	**0.018**
Surviving (n=96)	5.0 (4.0-7.8)			
Edinburgh				
Deceased (n=40)	5.0 (4.0-7.0)	663.0	-1.81	0.07
Surviving (n=43	4.0 (3.0-6.0)			
Glasgow				
Deceased (n=59)	7.0 (5.0-9.0)	1273.0	-1.707	0.088
Surviving (n=53)	6.0 (5.0-8.0)			
Male				
Deceased (n=74)	6.0 (4.0-8.3)	2052.0	-1.776	0.076
Surviving (n=67)	5.0 (4.0-7.0)			
Female				
Deceased (n=25)	7.0 (5.0-9.0)	268.5	-1.644	0.10
Surviving (n=29)	6.0 (3.0-8.0)			



(Cell counts were too low to run the same tests for women only).

Other drink types were checked and no further significant associations were found or the expected cell counts were too low to report.

Other drug use

For Glasgow only, a significant association was found between any reported (non-prescribed) drug use and being deceased ($p<0.001$). (It would appear that this association is male specific for Glasgow but the expected cell counts are too low in women to report.)

Within Glasgow the most popular drugs were diazepam (n=8), cannabis (n=7) heroin (n=4, of whom 2 injected). We also recorded use of cocaine (n=2), high caffeine (n=2) and ketamine (n=1). For Edinburgh figures were diazepam (n=2), cannabis (n=2), heroin (n=0), cocaine (n=0) dihydrocodeine, codeine, morphine (1 of each).

Note that an individual could report use of more than one drug

Smoking

Fewer LTS participants reported tobacco smoking than deceased participants; 53.5% of LTS participants (n=54) compared to 61.9% of those deceased (n=65) although this difference was not significant ($p=0.252$). The number of cigarettes smoked per day by smokers did not differ between the two groups with the surviving participants reporting a slightly higher mean consumption per day of 20.9 (SD=15.0) cigarettes compared with a mean of 18.9 (SD=9.3) in the deceased group.

There was a greater number of deceased participants who reported cannabis smoking (which would likely involve the use of tobacco); nine (8.6%) of the deceased participants compared to five (5.0%) of LTS participants although this difference was not significant.

ARPQ scores

A significantly lower ARPQ score was self-reported by the LTS patients when compared with the deceased patients. In each of the subgroup comparisons presented in table 10, this pattern was repeated but in no case was the finding statistically significant.

Discussion

This report has presented a descriptive analysis of data relating to a sample comprising 105, now deceased, patients originally admitted to a study investigating the alcohol consumption characteristics of heavy drinkers (n=639). These participants had initially been seen as either in- or out-patients at NHS settings in two Scottish cities during the period December 2011 to October 2012 and met the study inclusion criterion of being 'harmed by their drinking'.

Within this sample the mean age at death for men was 51.8 years and for women, 48.9 years. These figures contrast sharply with recent statistics relating to the prospects for babies born in 2013 in Scotland, the *'annual estimates for Scotland are for boys born in 2013 to live 77.1 years on average, 60.8 of these in a 'healthy' state. Girls born in 2013 would be expected to live 81.1 years on average, 61.9 of these years being 'healthy'* (Scottish Government, 2015). Of more direct relevance to our study group born around 1966, life expectancy would be around 68 years for men and 74.5 years for women (Office for National Statistics, 2012).

In relation to smoking prevalence, in 2012 it was estimated that 22.9% of the Scottish adult population smoked (Scottish Government, 2014), 62% of this sample did so, a factor likely contributing to the morbidity associated with harmful alcohol consumption. It is interesting that amongst the long term survivors, smoking prevalence was lower at 54%.

Overall the gender ratio evident in the deceased participant sample (3.0:1.0) is similar to that of the surviving participants with women accounting for around one quarter of participants. However when analysing by city the value for Glasgow was 3.5:1.0, in Edinburgh 2.5:1.0. This latter value is very similar to that (2.7:1.0) reported by Sheron et al. (2014) for patients defined as harmful consumers and presenting with liver disease at an NHS setting in England but slightly higher than that we recorded in our earlier work in 2008-09 (2.1:1.0) for harmful consumers also recruited within Edinburgh NHS settings (Black et al, 2011). Males may comprise a greater proportion of heavy drinkers seen at NHS settings in Glasgow than in Edinburgh.

Several findings emerging from our analysis argue for the need for further research, particularly in relation to female heavy drinkers. While women were responsible for proportionately fewer of the heavy drinkers in Glasgow their alcohol intake did not differ significantly from men. No anticipated gender divide was detected. We would argue that our preliminary evidence of significantly higher consumption levels, ARPQ scores and prevalence of self-reported mental health issues recorded for Glaswegian women merit further investigation in a similar but more appropriately powered study. Recently, Shipton et al (2014) from their analysis of different areas within Glasgow city concluded that trends in alcohol-related deaths for women were rising in a small number of city areas despite the falling trends for male alcohol-related deaths.

The well-documented hepatotoxic effects of alcohol are reflected in the percentage of participants who self-reported liver disease (73%). Of similar concern and worthy of further investigation is the fact that an identical percentage was documented for those self-reporting mental health conditions in Glasgow. The challenge of distinguishing between cause and effect in relation to the interaction of alcohol with mental health conditions is self-evident (Scottish Government, 2007). Nevertheless the high percentage of participants within both cities but particularly Glasgow, self-reporting this issue contrasts sharply with the figures reported for the general population within the Scottish Health Survey; in 2012/2013, where around 16% of men and 18% of women reported one, two or more symptoms of depression, indicating moderate to high severity while the prevalence of one, two or more symptoms of anxiety was reported by 15% of men and 26% of women (Scottish Government, 2014). Indeed, Catto et al. (2012) in their report Scotland's Mental Health, recommended *"To improve Scotland's mental health, priority should be given to the three indicators where there is solid evidence of worsening over the last decade or so:* ***psychoactive substance-related deaths, alcohol dependency*** *(our emphasis added) and manager support at work."* [page 70]. Our data would endorse the challenge for Scotland articulated by Catto and colleagues.

Alcohol was referred to as a contributory factor to death in only 73% (n=73) of cases. However within the remaining group of 27 participants (who had presented to NHS settings due to harm caused by alcohol) 21 were recruited into the study as hospital inpatients. Despite the fact that no mention of alcohol appeared on the death certificate, these individuals had reported higher ARPQ score (harm indicator) and consumption of alcohol in the index week when compared to the 73 cases where alcohol was noted on the death certificate. These differences however were not statistically significant.

In our experience the completion of medical certificates did not accurately follow the guidance and inconsistencies were evident. In the guidance offered by the Scottish Chief Medical Officer for the completion of medical certificates in Scotland, it is stressed that;

"Statistical information on deaths by underlying cause is important for monitoring the health of the population,

Limitations

designing and evaluating public health interventions, recognising priorities for medical research and health services, planning health services, and assessing the effectiveness of those services". (Scottish Government, 2009, p3.)

In addition it is noted that *"The initiating condition on the lowest line of part I will usually be selected as the underlying cause of death….. From a public health point of view, preventing the first disease or injury will result in the greatest health gain."* (Scottish Government, 2009, p6.)

If our concerns were to be supported by larger studies, the full gains for public health envisaged in the documentation may not be fully realised.

We recognise the constraint imposed on our discussion by our sample size. But, with this qualification, we would argue that the greater numbers of females compared to males with cancer recorded at time of death may merit further investigation. The male to female ratio of 8:1 for 'external' causes of death is potentially more predictable (Walsh et al. 2010).

Beverage type-specific analysis of our data highlighted issues related to the two categories which include lowest cost alcohol (Beeston et al. 2013). White cider drinking was significantly associated with the deceased group of participants in both cities. With Edinburgh this was also true for vodka. The key contribution made by vodka to the general population's alcohol intake has been well documented in various reports analysing Scottish sales data e.g. Beeston et al (2013). These authors have stated that around 69% of alcohol sold in Scotland is through the off trade with 13% of this sale linked to vodka. Scottish off-trade sales of vodka are 2.2 times higher than in England & Wales (Beeston et al. 2013) and analysis of purchase patterns shows that higher sales of low cost vodka account for much of Scotland's higher consumption compared to England. In their report Beeston et al (2013) called for further work to explore the historical perspective of spirits consumption in Scotland, our preliminary findings would endorse this view. In our study deceased participants bought significantly lower cost vodka compared to surviving participants.

Our own work has highlighted the toxicological ramifications of vodka consumption at the levels of consumption reported by our study participants (Lachenmeier et al, 2015) while our description of the alcohol consumption of female drinkers (Gill et al. 2015) has emphasised the important contribution made by vodka (41% of all units consumed) to the alcohol drink choices of these heavy consumers.

We suspect that the incidence of death reported here for a sample of Scottish heavy drinkers is likely an underestimate. Had we recruited all drinkers who initially met the study inclusion criteria, the numbers of participants dying during the first phase of the study would likely have been higher; clinicians judged some of their severely ill patients too unwell to participate. Within some clinical settings the medical status of a patient could decline rapidly.

While the recorded alcohol intake for the index week equates to over three times the definition of 'harmful' consumption (for both genders) these figures too, are likely underestimates. We report evidence of an association between number of days to death and consumption level with those closest to death appearing to drink less; 19% of the sample died within 100 days of their interview. The actual consumption levels responsible for the medical and psychological harm may have been much higher.

Greater sample numbers would have permitted further exploration of the potentially important influence of SIMD on survival. Our data are consistent with a negative influence of deprivation on health. The expected SIMD profile for Edinburgh city (unlike Glasgow) is not reproduced in our participant sample (either deceased or surviving). Greater numbers would allow exploration of the relationship between socioeconomic status and alcohol-related health harm in Edinburgh. We would argue for further investigation of these observations.

Finally we acknowledge that we do not know the drinking history of our participants. We do know that alcohol's harmful effects was responsible for their attendance at an NHS setting. However, their chronological age cannot be assumed to be a surrogate measure of drinking age.

Recommendations

1 Our findings provide important questions to be addressed in larger scale studies.

2 Further work should be conducted to explore the particular needs of female heavy drinkers, and must recognise the additional needs of those living within Glasgow. This should include issues around mental health especially against a background of social service cuts and the introduction of measures impacting on the sale or availability of alcohol.

3 An exploration of the factors supporting the key role of vodka and white cider in Scottish drinking culture is warranted. Do specific aspects of these drinks including, low price (i) support the continuation of the drinking behaviour of the heaviest drinkers and; (ii) crucially (but not discussed in this report) the recruitment of young drinkers to a heavy, and eventually harmful, drinking pattern?

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Glossary

Alcohol substitutes – Other forms of ethanol consumed such as hand gel, perfume, mouthwash

Illicit substances – Illegal drugs, controlled medications not prescribed to participant (legal highs also recorded)

Illicit alcohol – Alcohol bought from an unlicensed vendor, or illegally produced alcohol

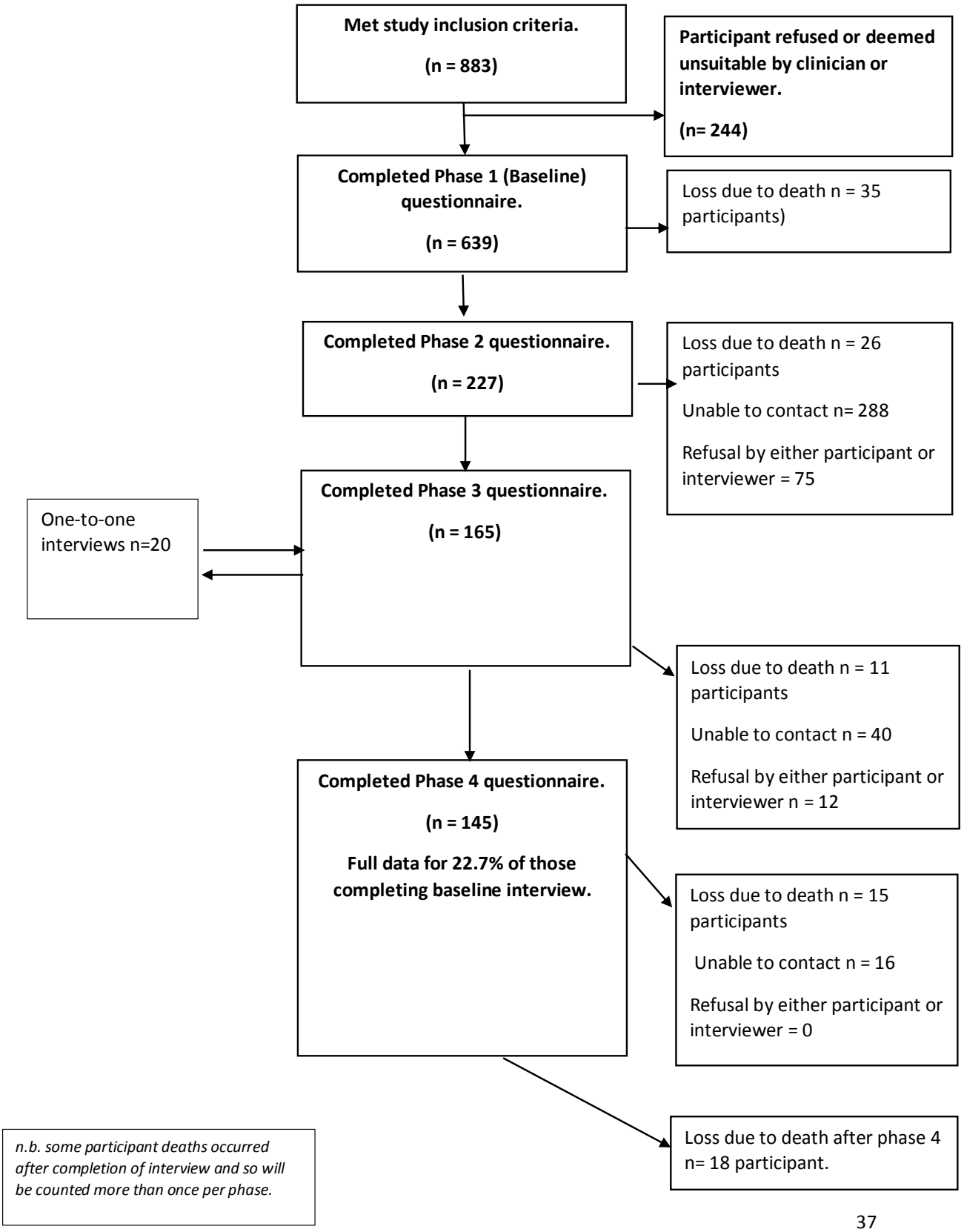
Underlying cause of death – The initiating condition, on the lowest line of part I, of the death certificate will usually be selected as the underlying cause of death. WHO defines the underlying cause of death as "a) the disease or injury which initiated the train of morbid events leading directly to death, or b) the circumstances of the accident or violence which produced the fatal injury".

Direct cause of death – The immediate and direct cause of death noted in line 1(a) of the certificate.

Factors believed to be contributing to death – Any other diseases, injuries, conditions, or events that are believed to have contributed to the death, but were not part of the direct sequence are included in part II of the form.

Appendices

Appendix 1a Overview of study recruitment



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Appendix 1b: Deaths occurring as a percentage at each recruitment site (cities combined).

Recruitment Site	Total deaths (n)	% of total deaths in sample	Recruitment (n)	Deaths as % of site recruitment	Refusals by site (n)	Patients too ill to consent (n)
Inpatient – acute	53	50.5	190	27.9	151	26
Inpatient – alcohol treatment	32	30.5	253	12.6	39	1
Outpatient – alcohol treatment	20	19.0	196	10.2	54	0
Total	**105**	**100**	**639**		**244**	**27**

Acute inpatients represented the greatest number of deaths and were characterised as having the greatest number of patients judged to be to be too ill to consent.

Appendix 1c: Deaths occurring as a percentage at each recruitment site (city split).

Recruitment site	Total deaths (n)	% of total deaths in sample	Recruitment (n)	Deaths as % of site recruitment	Refusals by site (n)	Patients too ill to consent (n)
Edinburgh Inpatient (acute)	27	25.7	80	33.8	86	20
Edinburgh Inpatient (alcohol treatment)	15	14.3	151	9.9	27	0
Edinburgh Out-patient (alcohol treatment)	4	3.8	63	6.3	46	0
Glasgow Inpatient (acute)	26	24.8	110	23.6	65	6
Glasgow Inpatient (alcohol treatment)	17	16.2	102	16.7	12	1
Glasgow Outpatient (alcohol treatment)	16	15.2	133	12.0	8	0
Total	**105**	**100**	**639**		**244**	**27**

Note: Glasgow Outpatient (alcohol treatment) includes day patients and outpatients.

Appendix 2: Descriptors of deceased participants, Edinburgh (n=46) only.

	All (n=46)	Male (n=33)	Female (n=13)	Gender comparison
% of total sample	15.6%	16.8%	13.3%	ns
Mean age (years) at baseline. (SD)	52.2 (10.4)	53.1 (9.6)	50.0 (12.4)	ns
Mean age (years) at death. (SD)	53.4 (10.2)	54.2 (9.3)	51.2 (12.4)	ns
Smoker (any) %	58.7%	63.6%	46.2%	ns
Median baseline consumption (UK units in index week) (IQR)	173.8 (88.2-281.3)	210.0 (131.2-340.3)	105.0 (47.2-137.0)	p=0.003
Drug use (any) %	13.0%	9.1%	23.1%	ns
Median ARPQ score (IQR) *	5.0 (4.0-7.0) (n=40)	5.0 (4.0-7.8) (n=28)	5.0 (4.0-7.0) (n=12)	ns

* ARPQ not completed by all participants

Appendix 3: Descriptors of deceased participants, Glasgow (n=59) only.

	All (n=59)	Male (n=46)	Female (n=13)	Gender comparison
% of total sample	17.1%	17.6%	15.7%	ns
Mean age (years) at baseline (SD)	48.1 (10.4)	48.7 (11.0)	45.6 (7.8)	ns
Mean age (years) at death (SD)	49.3 (10.5)	50.0 (11.0)	46.7 (8.4)	ns
Smoker (any) %	64.4%	60.9%	76.9%	ns
Median (IQR) baseline consumption (UK units in index week)	172.5 (98-262.5)	157.5 (96.7-262.5)	240.0 (132.2-272.6)	ns
Drug use (any) %	33.9%	32.6%	38.5%	ns
Median ARPQ score (IQR)	7.00 (5.0-9.0)	7.00 (4.0-9.0)	9.00 (6.0-9.0)	ns

Appendix 4: Comparison of long term surviving (LTS) and deceased participants: Edinburgh.

	LTS (n=47)	**Deceased (n=46)**			
Mean age (years) at entry to study. (SD)	**59.5 (4.5)**	**52.2 (10.4)**			
			X^2		p
	n LTS	n deceased	expected LTS	expected deceased	
Male	30	33	31.8	31.2	0.415
Female	17	13	15.2	14.8	
SIMD Q1	6	12	9.1	8.9	0.168
Inpatient	**35**	**42**	**38.1**	**38.6**	**0.031**
Any drug use	3*	6	4.5	4.5	0.277
Smoker	19	27	23.0	23.0	0.095
White cider drinker- any	**-**	**-**	**-**	**-**	**0.041**
White cider drinker- exclusive	-	-	--	-	0.301
Vodka drinker- any	**11**	**22**	**16.7**	**16.3**	**0.014**
Vodka drinker- exclusive	5	11	8.1	7.9	0.805
			Mann-Whitney U		
	LTS	deceased	U	z	p
Median UK units of alcohol consumed (IQR)	131.3 (93.7-175.0)	173.8 (88.2-281.3)	834.5	-1.894	0.058
Median ARPQ score (IQR) (n=83**)	4.0 (3.0-6.0)	5.0 (4.0-7.0)	663.0	-1.810	0.070
Median week expenditure (£) (IQR)	68.0 (35.99-94.64)	58.75 (38.13-122.06)	1037.5	-0.334	0.738
Median unit price (pence) (all drinks) (IQR)	**48.0 (40.0-63.0)**	**40.0 (36.5-55.3)**	**796.5**	**-2.187**	**0.029**

** expected cell count <5, **not all participants completed an ARPQ*

Due to low numbers, figures are not reported in all cells.

Appendix 5: Comparison of long term surviving (LTS) and deceased participants: Glasgow.

	LTS (n=54)	**Deceased (n=59)**			
Mean age (years) (SD)	**59.8 (6.2)**	**48.1 (10.4)**			
			X^2		p
	n LTS	n deceased	expected LTS	expected deceased	
Male	42	46	42.1	45.9	0.981
Female	12	13	11.9	13.1	
SIMD Q1	34	34	32.5	35.5	0.619
Inpatient	31	43	35.4	38.6	0.084
Any drug use	**3***	**20**	**11.0**	**12.0**	**<0.001**
Smoker**	35	38	34.9	38.1	0.964
White Cider drinker- any	**-**	**-**	**-**	**-**	**0.040**
White Cider drinker- exclusive	-	-	-	-	0.363
Vodka drinker- any	27	23	23.9	26.1	0.239
Vodka drinker- exclusive	15	13	15.1	12.9	0.945
			Mann-Whitney U		
	LTS	deceased	U	z	p
Median UK units of alcohol consumed (IQR)	136.7 (91.7-241.4)	172.5 (98.0-262.5)	1382.5	-1.21	0.226
Median ARPQ score (IQR) (n=112***)	6.0 (5.0-8.0)	7.0 (5.0-9.0)	1273.0	-1.707	0.088
Median week expenditure (£) (IQR)	65.96 (41.88-108.33)	62.50 (35.42-100.50)	1507.0	-0.494	0.621
Median unit price (pence) (all drinks) (IQR)	**46.0 (39.8-59.0)**	**38.0 (30.0-48.0)**	**1047.0**	**-3.140**	**0.002**

** expected cell count <5, ** Smoking status missing for one participant, ***not all participants completed an ARPQ*

Due to low numbers, figures are not reported in all cells.

Appendix 6: Comparison of long term surviving (LTS) and deceased participants: Men.

	LTS (n=72)	**Deceased (n=79)**			
Mean age (years) (SD)	**60.0 (5.7)**	**50.6 (10.6)**			
			X^2		p
	n LTS	n deceased	expected LTS	expected deceased	
Glasgow	42	46	42	46	0.990
Edinburgh	30	33	30	33	
SIMD Quintile 1	28	35	30	33	0.059
Inpatient	**46**	**64**	**52.5**	**57.5**	**0.018**
Any drug use	**6**	**18**	**11.4**	**12.6**	**0.015**
Smoker**	38	49	41.2	45.8	0.292
White Cider drinker- any	**-**	**-**	**-**	**-**	**0.004**
White Cider drinker- exclusive	-	-	-	-	0.769
Vodka drinker- any	25	28	25.3	27.7	0.926
Vodka drinker- exclusive	12	14	12.3	13.7	0.884
	LTS	deceased	Mann-Whitney U		
			U	z	p
Median UK units of alcohol consumed (IQR)	138.9 (97.51-225.2)	181.7 (98.6-280.0)	2341.5	-1.872	0.061
Median ARPQ score (IQR) n=141***	5.0 (4.0-7.0)	6.0 (4.0-8.25)	2052	-1.776	0.076
Median week expenditure (£) (IQR)	74.02 (48.00-110.78)	60.00 (39.14-120.00)	2609	-0.876	0.381
Median unit price (pence) (all drinks) (IQR)	**48.5 (41.0-69.8)**	**39.0 (34.5-51.3)**	**1748**	**-4-085**	**<0.001**

**expected cell count <5, ** smoking status missing for one participant, **not all participants completed an ARPQ*

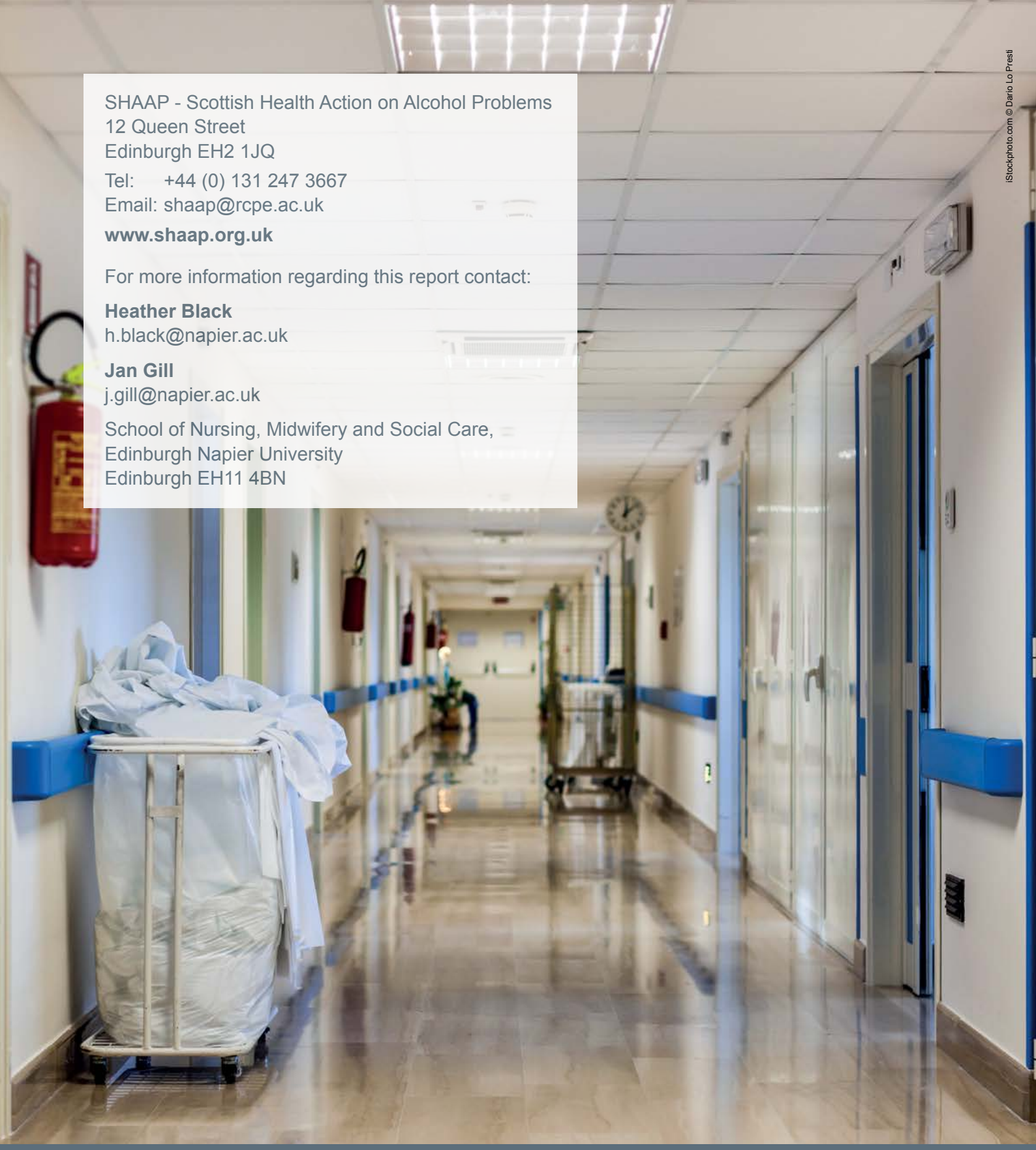
Due to low numbers, figures are not reported in all cells.

Appendix 7: Comparison of long term surviving (LTS) and deceased participants: Women.

	LTS n=29	**deceased n=26**			
Mean age (years) (SD)	**58.8 (4.8)**	**47.8 (10.4)**			
			X^2		p
	n LTS	n deceased	expected LTS	expected deceased	
Glasgow	12	13	13.2	11.8	0.522
Edinburgh	17	13	15.8	14.2	
SIMD Q1	12	11	12.1	10.9	0.956
Inpatient	20	21	21.6	19.4	0.316
Any drug use	**0***	**8**	**4.2**	**3.8**	**0.001**
Smoker	16	16	16.9	15.1	0.633
White Cider drinker- any	-	-	-	-	0.550
White Cider drinker- exclusive	-	-	-	-	0.709
Vodka drinker- any	13	17	15.8	14.2	0.126
Vodka drinker- exclusive	8	10	7.8	10.2	0.880
	LTS	deceased	Mann-Whitney U		
			U	z	p
Median UK units of alcohol consumed (IQR)	112.5 (79.8-160.8)	137.0 (82.5-262.5)	3105.5	-1.123	0.262
Median ARPQ score (IQR) n=54**	6.0 (3.0-8.0)	7.0 (5.0-9.0)	268.5	-1.644	0.100
Median week expenditure (£) (IQR)	42.00 (28.33-73.40)	59.22 (34.73-87.45)	306.0	-1.197	0.231
Median unit price (pence) (all drinks) (IQR)	44.0 (35.5-50.0)	39.0 (34.5-51.3)	335.5	-0.70	0.484

** expected cell count <5, **not all participants completed an ARPQ (15)*

Due to low numbers, figures are not reported in all cells.



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