

# **Using linked health survey and hospital data to examine the risk factors associated with alcohol-related morbidity and mortality**

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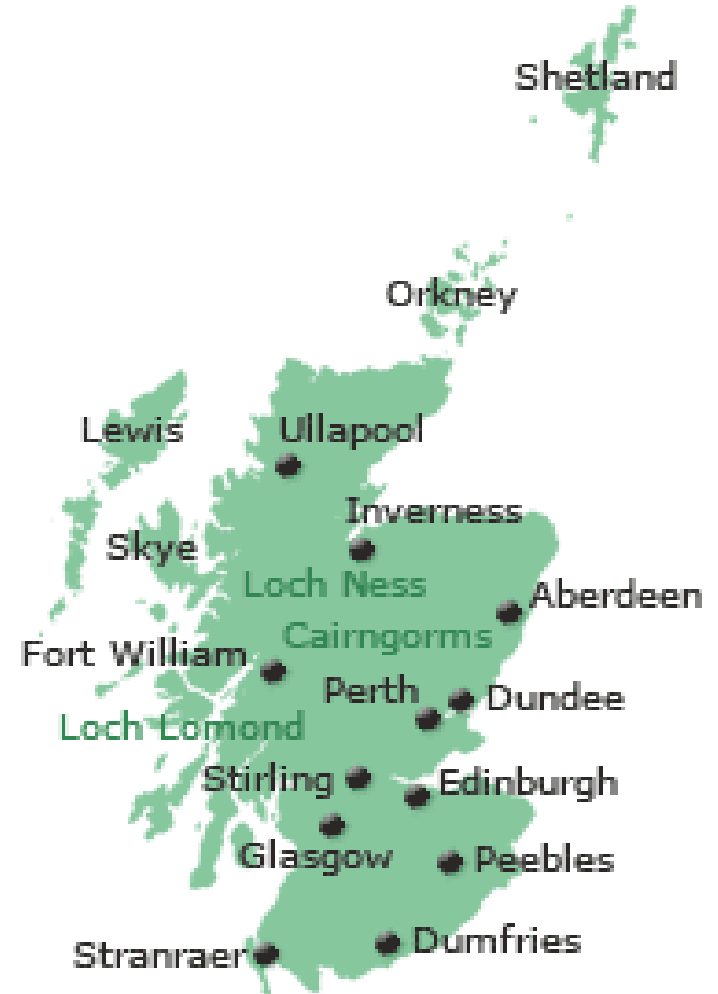
# Outline

- ISD Scotland
- Alcohol in Scotland
- Scottish linked health data
- Alcohol related harm in Scotland study:
  - Prospective study – Linked Scottish Health Survey
  - Retrospective study – linked patient records
- Conclusions

# ISD Scotland

- National collection and management of health & care information on behalf of Scotland's National Health Service
- Analysis, interpretation and statistical advice; publish official national statistics
- Customers include other NHS Scotland departments, Scottish Government, research community, media and the public
- Split into 3 groups: Data Intelligence, Healthcare Information and Epidemiology and Statistics
- Programme areas such as Cancer, Mental Health, Women and Children's Health

# Alcohol in Scotland



# Alcohol in Scotland

- Scotland's alcohol related death rates are consistently higher than those found in the rest of the UK and Northern Ireland<sup>1</sup>
- Scotland now has the highest mortality rate from liver cirrhosis in Western Europe<sup>2</sup>
- In 2008/09 the rate of alcohol-related discharges from general hospitals was 6.8 times greater in the most deprived than least deprived group<sup>3</sup>
- Recently been a high profile topic in news; minimum alcohol pricing being considered



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## Scots 'drink 46 bottles of vodka'

**Adults in Scotland are drinking the equivalent of 46 bottles of vodka each in a year, a study has suggested.**

The research was based on industry sales data analysed by NHS Health Scotland.

It said sales for the year to September 2009 averaged 12.2 litres of pure alcohol per person over the age of 18.

The Scottish government said the figure, which had remained static since 2005, was the equivalent of 537 pints or 130 bottles of wine per person.

The new figures come as the Scottish government pushes for a minimum price for alcohol to tackle the country's drink-related problems.



The Scottish government wants a minimum pricing scheme for alcohol

### SEE ALSO

- ▶ [Health chiefs in booze price plea](#)  
24 Dec 09 | Scotland
- ▶ [Ex-ministers back SNP drink plan](#)  
29 Nov 09 | Scotland
- ▶ [Alcohol price rise to be blocked](#)  
26 Nov 09 | Scotland
- ▶ ['Minimum price' call on alcohol](#)  
23 Nov 09 | Wales
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15 Nov 09 | Scotland
- ▶ [Alcohol misuse 'costing £2.25bn'](#)  
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## Alcohol abuse 'costs every Scot £900 a year'

**Alcohol misuse could be costing every adult in Scotland £900 every year, according to a new report.**

York University economists said the problem may be costing taxpayers between £2.4bn and £4.6bn.

The Scottish government said the research strengthened its argument for minimum alcohol pricing.

Ministers do not have enough support to get the plan through parliament, with opposition parties saying it could be illegal under European competition law.

The research, which looked at the impact of alcohol misuse across society, put a much higher cost on the problem than the £2.25bn figure previously used by the Scottish government.



The study calculated the cost to social services, the economy, NHS and police

### SEE ALSO

- ▶ [MPs back minimum alcohol pricing](#)  
08 Jan 10 | Scotland
- ▶ [MSPs told to back minimum pricing](#)  
30 Dec 09 | Scotland
- ▶ [Health chiefs in booze price plea](#)  
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## Tennent's backs minimum alcohol price policy



Tennent's is Scotland's biggest-selling lager

**The head of one of Scotland's biggest alcohol brands has backed controversial moves for minimum pricing for alcohol.**

### SEE ALSO

- ▶ Scots 'drink 46 bottles of vodka'  
17 Jan 10 | Scotland
- ▶ Health chiefs in booze price plea  
24 Dec 09 | Scotland
- ▶ Alcohol price rise to be blocked  
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## Buckfast 'in 5,000 crime reports'

**New evidence linking Buckfast Tonic Wine to crime has been uncovered by a BBC Scotland investigation.**



A Freedom of Information request showed the drink was mentioned in 5,638 crime reports in Strathclyde from 2006-2009, equating to three a day on average.

One in 10 of those offences were violent and the bottle was used as a weapon 114 times in that period.

Buckfast's distributors denied that it caused crime and said the drink made up just 0.5% of Scotland's alcohol market.

However, Strathclyde Police said the figures suggested there was an association between the tonic wine and violence.

Supt Bob Hamilton said: "I think it's clear from the figures that there

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Organised crime gangs dominate shoplifting

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# Scottish linked health data

- ISD holds two permanently linked patient databases:
  - Acute hospital episodes, psychiatric hospital episodes, cancer registrations and death records
  - Births records, maternity, neonatal, still births/infant deaths, Scottish Birth Record
- Rich sources of patient data for stand-alone analyses, or linkage to other data sources for in-depth studies (patient follow-up, epidemiology, social influences on health etc)
- ISD also holds Scottish Health Survey permanently linked to acute hospital episodes etc

# Scottish linked health data

- Scottish Health Survey linked datasets available to research community
- Survey comprises information on patients' demographics, lifestyle factors, biological data
- Cited in numerous research publications
- Formed basis for the current study on alcohol harm in Scotland and associated risk factors

# Alcohol related harm in Scotland study

## Project group:

Professor Phil Hanlon (University of Glasgow)

David Walsh (Glasgow Centre for Population Health)

Bruce Whyte (Glasgow Centre for Population Health)

Ian Grant (ScotPHO/ISD Scotland)

Richard Lawder (ScotPHO/ISD Scotland)

Catherine Storey (ISD Scotland)

# Alcohol related harm in Scotland study



## RETROSPECTIVE COHORT

What is the hospital admission pattern of those who died of alcohol related harm?

## PROSPECTIVE COHORT

What are the risk factors associated with an alcohol related admission?

# Retrospective cohort

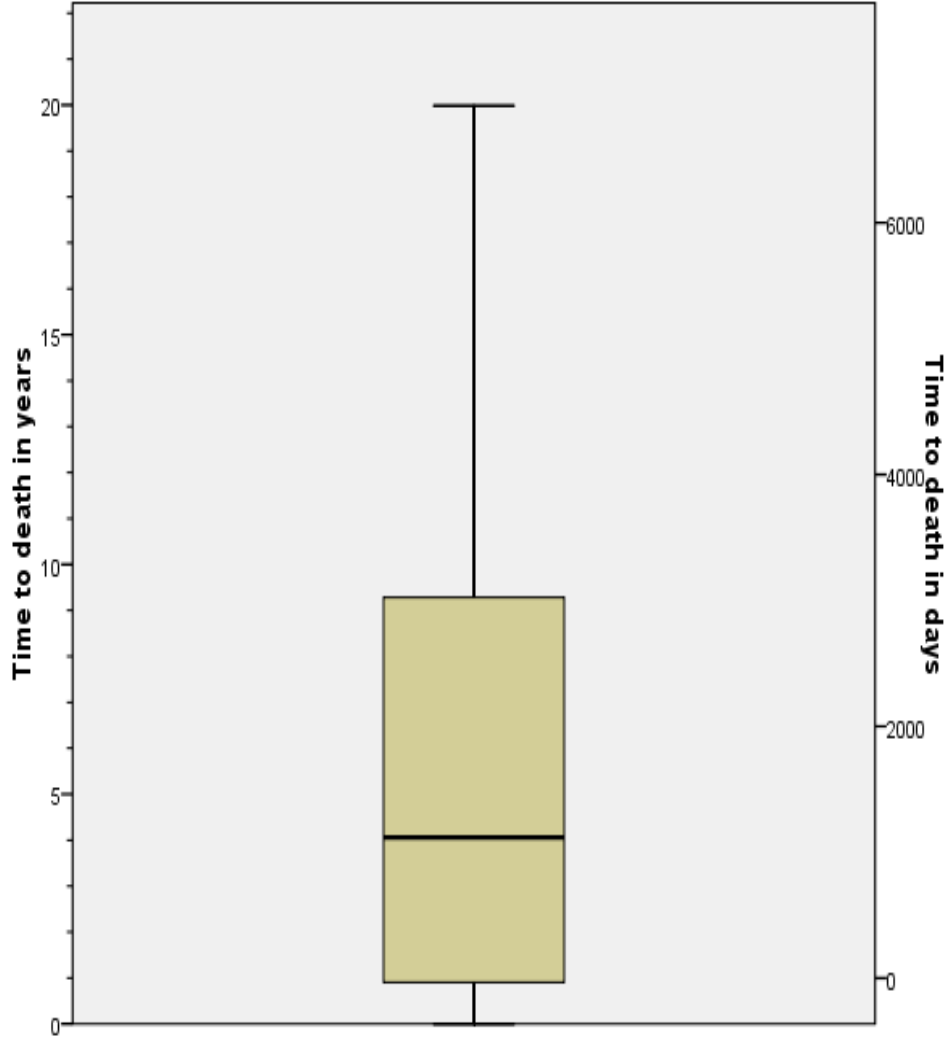
## Linked Dataset

**Hospital Discharges SMR01  
Psychiatric Inpatients SMR04  
Scottish Cancer Register SMR06  
RG Death Records**

- **All alcohol-related deaths from January 2000 to December 2006**
- **Hospital admission history to 1981**

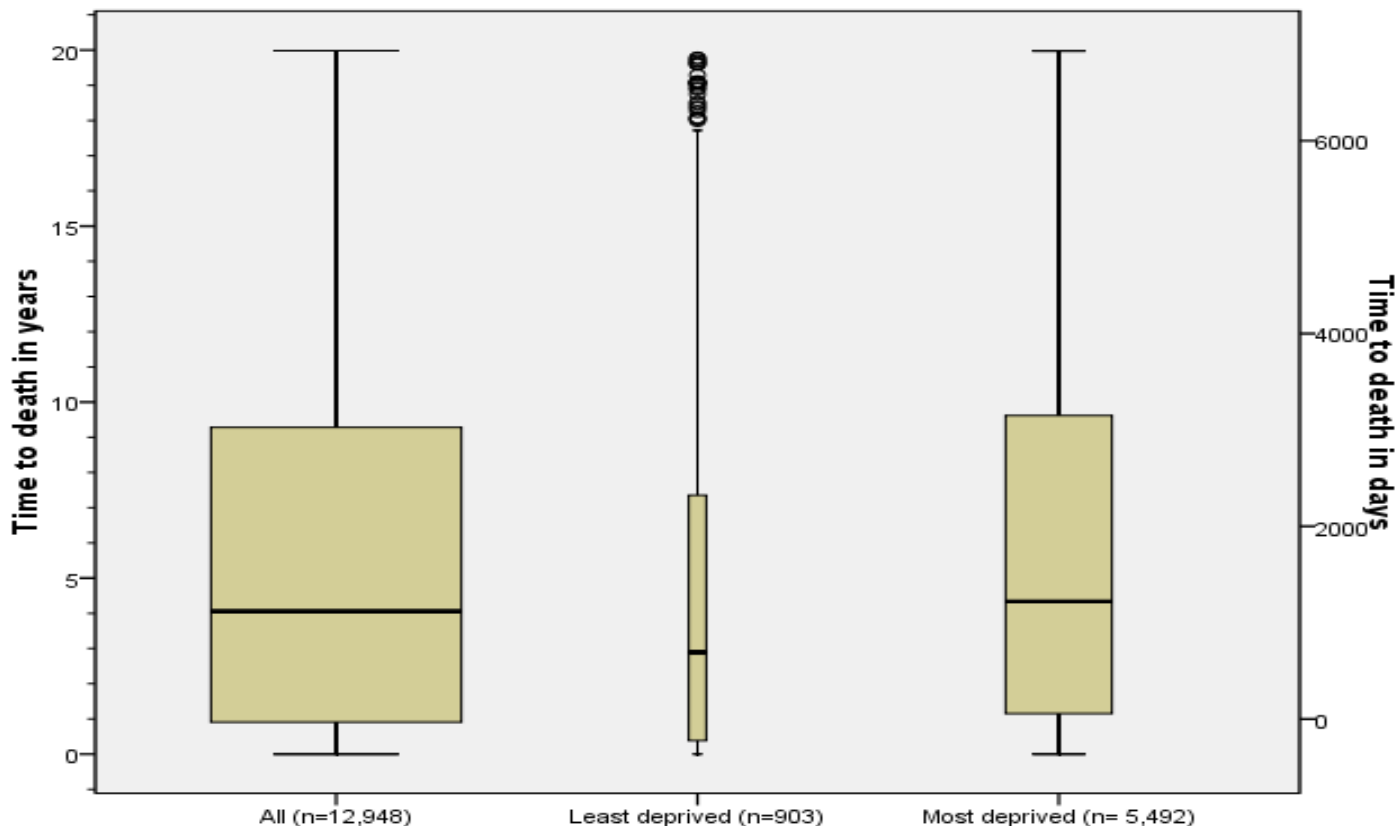
- **identified 15,811 alcohol related deaths**
- **18% no alcohol admission history**
- **4% no hospital admission history**
- **Final cohort =12,948**

# Time from 1st alcohol related admission to alcohol related death



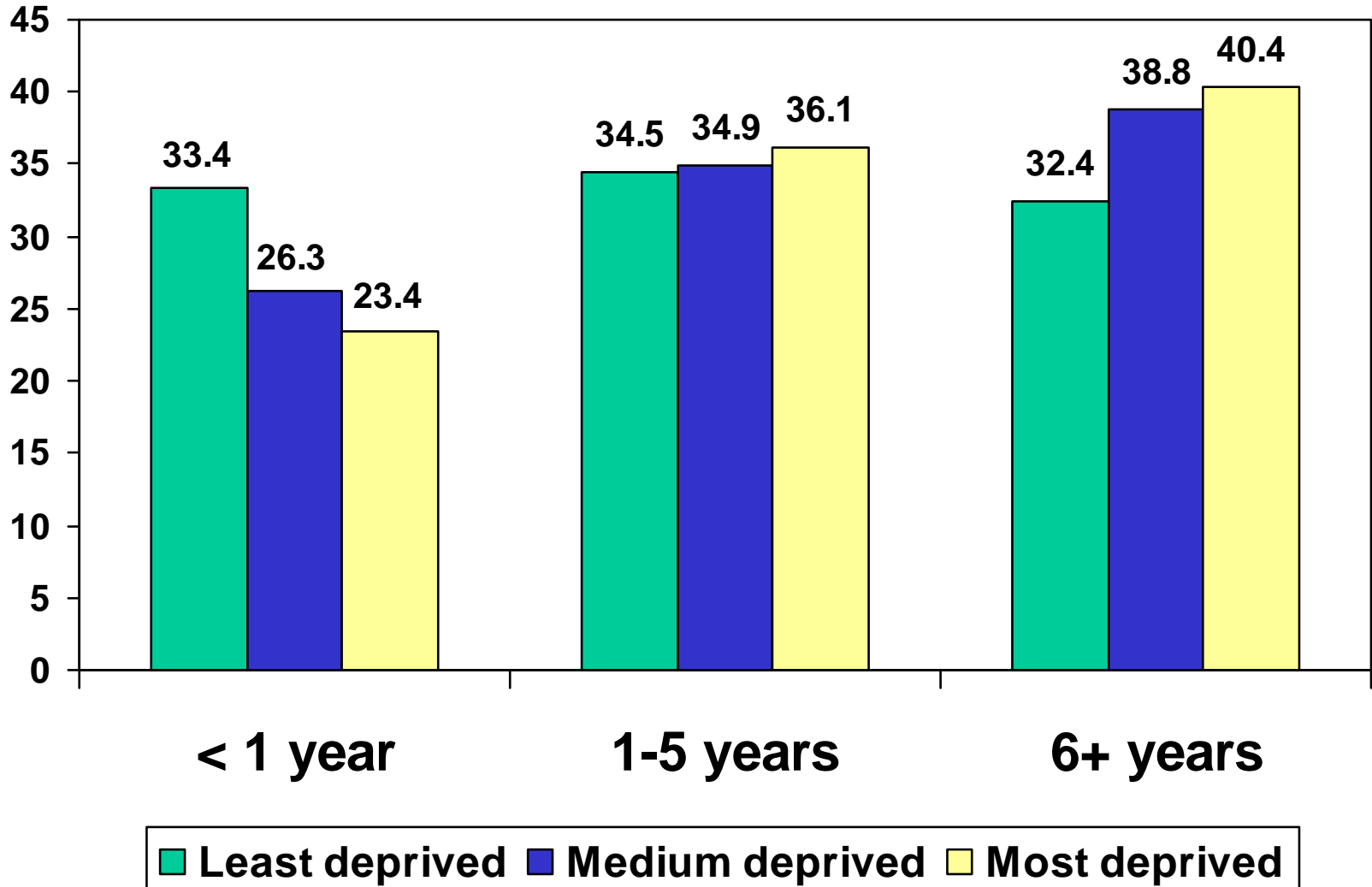
- 1<sup>st</sup> alcohol related admission to alcohol related death, median time, 4 years 21 days
- 25% died within 1 year of 1<sup>st</sup> alcohol related admission

# Time from 1st alcohol related admission to alcohol related death by deprivation quintile (SIMD)



- 1st alcohol admission to death: least deprived quintile 2 years 342 days  
most deprived quintile 4 years 144 days

# Percentage of patients who died from alcohol related causes by time from first alcohol admission to death by deprivation quintile (SIMD)



# Retrospective Cohort

- Those living in least deprived areas more likely to first present with a life threatening illness such as alcoholic liver disease than those from the most deprived areas (13.3% and 9.9% respectively)
- Those living in most deprived areas more likely to present with a generalised behavioural problem e.g. injuries and poisoning than those from the least deprived areas (18.7% and 11.7% respectively)

# Prospective Cohort

- What are the risk factors associated with an alcohol related admission?

## Dataset 1

## Dataset 2

1st January 1981  
to  
31<sup>st</sup> December  
2007

Hospital Discharges SMR01  
Psychiatric Inpatients SMR04  
Scottish Cancer Register SMR06  
RG Death Records

Linked  
Dataset

1998 Scottish Health Survey  
9,047 respondents aged 16-74  
8,305 (92%) consented to  
follow-up studies

# Linkage results

- Follow up period April 1998 and 31 December 2007, n=8305
- 300 (3.6%) respondents experienced 1+ alcohol related admission
  - 68% males, mean age = 50 years
  - 32% females, mean age = 44 years
- accounted for 961 alcohol related admissions
  - Mean number of admissions
    - Males = 4
    - Females = 2

# Descriptive Statistics

Risk Factor Category	Risk Factor	Alcohol related admission	
		No (N=8,005)	Yes (N=300)
Lifestyle	Smoker	38%	71%
	Exceeding weekly alcohol limits (M>21 units; F>14 units)	20%	47%
	Binge drinker	22%	43%
Biological	Hypertensive Untreated	17%	27%
	Obese	20%	13%
Social	In receipt of income related benefits	23%	53%
	Most deprived quintile	21%	39%
	Social Class I or II	32%	20%
Health	In receipt of incapacity benefit	6%	20%

# Methods/Modelling

- Logistic regression modelling
  - Multiple risk factor model (gender, age, factors x,y,..)
    - Outcome – *alcohol related admission*
- Results presented as odds ratios with level of significance

# Risk factors considered:

## Health

Self-assessed health  
Limiting longstanding illness  
Psychosocial Health (GHQ-12)  
Incapacity benefits

## Social

Area deprivation  
Income benefits  
Employment status  
Education  
Housing tenure  
Marital Status  
Social class

## Demographic

Gender  
Age

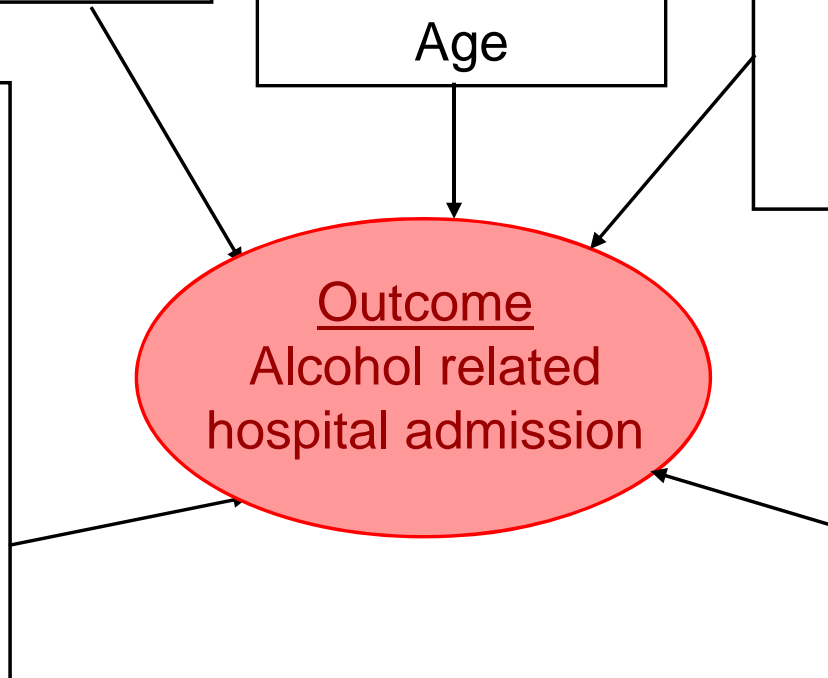
## Biological

Body Mass Index  
Waist-Hip Ratio  
Blood pressure  
Total cholesterol  
HDL cholesterol  
Gamma-GT  
Fibrinogen  
C-Reactive Protein  
Forced Expiratory  
Volume (FEV)

Outcome  
Alcohol related  
hospital admission

## Behavioural

Smoking  
Drinking  
Diet  
Physical Activity



# Summary of Results

## Significant variables in multiple risk factor model:

### ***Demographic***

- Gender

### ***Behaviours***

- Drinking
- Smoking

### ***Social factors***

- Employment status
- In receipt of income benefits
- Marital status

### ***Health***

- Self-assessed health
- Psychosocial health

### ***Biological***

- Gamma GT

# Weekly drinking and alcohol related admissions

Category	N(%)	Multiple Odds-Ratio
Never drank & trivial	6 (2.0)	0.55 n/s
Ex-drinker	25 (8.3)	2.06**
<i>Light Drinker - M(&gt;1-10); F(&gt;1-7)</i>	63 (21.0)	1.00
Moderate Drinker – M(>10-21); F(>7-14)	57 (19.0)	2.09**
Heavy Drinker – M(>21-50); F(>14-35)	82 (27.3)	2.95**
Excessive Drinker – M(>50); F(>35)	58 (19.3)	5.51**

\*\*\* p<0.001 \*\* p<0.01 \* p<0.05 n/s non-significant

Note: Missing data on 9 respondents

# Smoking and alcohol related admissions

Category	N(%)	Multiple Odds-Ratio
<i>Never smoked</i>	49 (16.3)	1.00
Ex-smoker	39 (13.0)	1.20 n/s
Current – light (<10)	33 (11.0)	1.52 n/s
Current – moderate (10-20)	77 (25.7)	2.59***
Current – heavy (20+)	102 (34.0)	2.54***

\*\*\* p<0.001 \*\* p<0.01 \* p<0.05 n/s non-significant

# Employment and alcohol related admissions

Category	N (%)	Multiple Odds-Ratio
<i>In Employment</i>	87 (29.0)	1.00
Unemployment	29 (9.7)	1.49 n/s
Retired or other economically inactive	183 (61.0)	1.94***

\*\*\* p<0.001 \*\* p<0.01 \* p<0.05 n/s non-significant

Note: Missing data on 1 respondents

# Psychosocial health (GHQ12) and alcohol related admissions

Category	N (%)	Multiple Odds-Ratio
<i>zero score</i>	<i>112 (37.3)</i>	<i>1.00</i>
1 to 3 score	70 (23.3)	1.03 n/s
4 plus score	115 (38.3)	2.00**

\*\*\* p<0.001 \*\* p<0.01 \* p<0.05 n/s non-significant

# Marital status and alcohol related admissions

Category	N (%)	Multiple Odds-Ratio
Single	89 (26.7)	1.36 n/s
<i>Married</i>	79 (26.3)	1.00
Separated, divorced, or widowed	132 (44.0)	2.34***

\*\*\* p<0.001 \*\* p<0.01 \* p<0.05 n/s non-significant

# Limitations

- Under-reporting of drinking behaviour in surveys.
- Information only collected at baseline
- One health survey only, fewer cases

# Summary

## RETROSPECTIVE

- 25% die within 1 year of 1<sup>st</sup> admission
- Median 4 yrs
- Time to death quicker in least deprived areas
- More likely to present with serious illness if from least deprived areas

## PROSPECTIVE

- Male
- Current or former drinker
- Moderate or heavy smoker
- Retired or economically inactive
- In receipt of income related benefits
- Separated, divorced or widowed
- Potential psychiatric disorder
- High Gamma – gt level

# Conclusions

- Linkage of health and death records contributes to our understanding of the circumstances leading to alcohol-related mortality
- Further linkage to survey data reveals a wide variety of risk factors contributing to alcohol-related hospitalisation
- Both undoubtedly contribute far more to our understanding of the issues than simple counts of deaths or hospital admissions
- Two papers have been produced from this study, one for each cohort

# References

1. Breakwell C, Baker A, Griffiths C, Jackson G, Fegan G, Marshall D. Trends and geographical variations in alcohol-related deaths in the United Kingdom, 1991–2004. Health Stat Q. 2007; 33: 6-24
2. Leon DA, McCambridge L. Liver cirrhosis mortality rates in Britain from 1950 to 2002: an analysis of routine data. Lancet. 2006; 367(9504):52–56
3. Information Services Division. Alcohol-related Hospital Statistics 2010 , Edinburgh: Information Services Division, NHS Scotland; 2010

ISD website: [www.isdscotland.org](http://www.isdscotland.org)

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