

## Alcohol-related deaths and deaths among people who were alcohol dependent in Ireland, 2004 to 2008

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### Summary

This paper describes, for the first time, trends in alcohol-related deaths and deaths among people who were alcohol dependent in Ireland, as recorded by the National Drug-Related Deaths Index (NDRDI) for the years 2004–2008.

The main findings of the analysis are:

The NDRDI recorded 672 poisoning deaths in which alcohol was implicated in the five-year period. This total comprised almost equal numbers of **alcohol-only** poisonings and **alcohol polysubstance** (alcohol plus other substance/s) poisonings. The annual number fluctuated over the period, being highest in 2007 (170 deaths) and lowest in 2006 (111 deaths). Alcohol was the substance most frequently implicated in *all* fatal poisonings in Ireland in the five-year period.

The majority of all poisoning deaths were male. The median age of those who died of alcohol-only poisoning was 48 years, while the median age of those who died of alcohol polysubstance poisoning was 41 years.

The drugs most frequently implicated along with alcohol in polysubstance poisonings were benzodiazepines (61.3%) and opiates (including heroin and methadone) (55.7%).

The NDRDI recorded 3,336 non-poisoning deaths of people who were alcohol dependent, with the annual number increasing from 508 in 2004 to 799 in 2008. The vast majority (89.2%) of the deaths were due to medical causes; 10.8% were due to traumatic causes.

In the five-year period, alcoholic liver disease (23.6%), cardiac conditions (17.2%) and respiratory infections (11.4%) were the most common medical causes of death among those who were alcohol dependent. The median age was 59 years and almost two thirds (65.2%) were aged 64 years or under.

Over one third (36.8%) of the deaths in the 25–34-year age group were the result of alcoholic liver disease.

The most common causes of death from trauma were falls (39.9%) and hanging (19.4%). Those who died as a result of a traumatic event were generally younger than those who died from medical causes: the median age was 49 years and just over one third (34.3%) were aged 44 years or under.

The types of medical and traumatic death recorded in the NDRDI correlate very closely with findings on alcohol-attributable mortality reported by other national sources, and by international studies. Further analysis of the NDRDI data will be needed to investigate the relationships between alcohol use and specific disease categories, such as cancer.

Alcohol was implicated in 215 non-poisoning deaths of people who did *not* have a recorded history of alcohol dependence. The number of these deaths increased over the reporting period, rising from 14 in 2004 to 84 in 2008. Two thirds (66.0%) died as a result of traumatic events, of which drowning (21.1%) and choking (18.3%) were the most frequent.

In the context of *all* fatal poisonings recorded in the NDRDI in the five-year period, alcohol was the substance most frequently implicated (40.2%), followed by benzodiazepines (31.4%). Any strategy to reduce deaths due to alcohol must also consider the impact of benzodiazepines on these poisoning deaths.

The figures show clearly that many of those who died were still in their prime, aged between 40 and 59 years. It is beyond the scope of this paper to estimate the considerable social cost of the premature mortality of these individuals, its detrimental effect on the family, and the burden to society.

The increase in the number of deaths recorded may be explained by a true increase in deaths or by improved recording practices; given that the per capita consumption of alcohol in Ireland is among the highest in Europe, that the majority (56%) of Irish people drink in a harmful manner, and that the NDRDI is a relatively new system, a combination of these factors is the most likely explanation.

The World Health Organization has endorsed certain strategies that have been shown to reduce alcohol related-harm. These include: increased taxes on alcohol; restrictions on alcohol outlet density, days and hours of sale; a minimum legal purchase age (18 years or over); a low legal blood alcohol concentration for drivers; random breath testing for drivers; and accessible brief advice programmes and alcohol treatment programmes. Alcohol is to be included in the forthcoming new National Substance Misuse Strategy. The effect of any changes in public health policy on alcohol, and the impact of those changes on alcohol-related mortality rates in the Irish population, will be monitored and measured by the NDRDI into the future.

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- (a) deaths from medical or traumatic causes of people who were alcohol dependent;
- (b) deaths from medical or traumatic causes that also involved alcohol, of people who were not alcohol dependent.

**Part 3 All NDRDI-recorded deaths, from whatever cause, of people who were alcohol dependent are presented in order to provide an overview of poisoning and non-poisoning deaths among people with alcohol dependence.**

**Part 4 All NDRDI-recorded poisoning deaths, from whatever substance, are presented in order to identify the contribution of alcohol to all fatal poisonings nationally.**

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### Acknowledgements

Glossary and acronyms can be accessed online at [www.drugsandalcohol.ie/glossary](http://www.drugsandalcohol.ie/glossary)

## Introduction

The World Health Organization (WHO) ranks alcohol as the eighth leading cause of death globally.<sup>1</sup> WHO considers alcohol a causal factor or component cause in 260 different diseases or injuries. Globally, most alcohol-attributable deaths are caused by injury (intentional or unintentional), cancer, cardiovascular disease and liver cirrhosis.<sup>1-3</sup>

In Ireland, per capita consumption of alcohol is high. While consumption of alcohol in Ireland has reduced since its peak in 2000, according to the Department of Health and the Revenue Commissioners, the average Irish adult drank 11.3 litres of pure alcohol in 2009. This is more than twice the average in 1960.<sup>4</sup> Irish adults had the third highest per capita consumption in Europe in 2008.<sup>4</sup> A national survey in 2007 found that half of the drinkers surveyed had a harmful drinking pattern,<sup>5</sup> which equates to nearly one

and a half million Irish adults drinking in a harmful manner. Per capita consumption is a strong indicator of alcohol-related harm at both an individual and a population level. Alcohol intoxication can cause an increase in risk-taking behaviour, impulsiveness, reduced inhibition and lack of co-ordination, which can lead to accidents, violence or self-harm.<sup>1, 6, 7</sup>

The Irish National Drug-Related Deaths Index (NDRDI) is an epidemiological database which records poisoning deaths by alcohol and/or other drug(s), and deaths among drug users and those who are alcohol dependent. The NDRDI is maintained by the National Health Information Systems (NHIS) staff of the Health Research Board (HRB) on behalf of the Department of Health and the Department of Justice and Equality. This is the first national paper from the NDRDI reporting all alcohol-related deaths.

## Background and methods

The NDRDI was established in September 2005 to comply with Action 67 of the 2001–2008 National Drugs Strategy. That action called for the development of a system for recording drug-related deaths and deaths among drug users to enable the State and its agencies to respond in a timely manner, with accurate data. The remit of the NDRDI was further expanded in January 2006 to include alcohol-related deaths and deaths of people who were alcohol dependent. The objectives of the NDRDI include identifying and prioritizing areas for intervention and prevention, and measuring the effects of such interventions.

The NDRDI records data from four sources: the Coroner Service, the Hospital In-Patient Enquiry scheme (HIPE), the Central Treatment List (CTL), and the General Mortality Register (GMR) in order to ensure that the database is complete and accurate. Cases from the different data sources are cross-matched on a selection of variables, including name, gender, county of residence, date of birth and date of death. This allows the NDRDI to eliminate duplicates and to maximise the amount of information available on each case recorded on the database. Named data were not available from the GMR for the years 2004 and 2005; to avoid duplication and over-estimation of the number of cases, GMR cases with no match in the other three data sources were not included in the NDRDI for those two years. The methodology has been described in more detail in previous HRB Trends Series papers.<sup>8, 9</sup>

The NDRDI has retrospectively recorded data from 2004 onwards on alcohol-related deaths and deaths of people who were alcohol dependent. The following cases are included in the NDRDI definition:

- deaths in which alcohol was implicated (regardless of history of alcohol dependence); and
- deaths of individuals reported in *any* of the data sources as having been ‘an alcoholic’ or ‘alcohol dependent’ or suffering from ‘chronic alcohol use’ or having had a diagnosis of ‘alcohol dependence syndrome’ (exact terms only) and/or one or more of the relevant International Classification of Diseases (ICD) codes (F10.2 to F10.9).

These deaths are categorised as follows:

**Poisonings:** deaths directly attributable to the consumption of alcohol (alone or in combination with other substances) or to the consumption of substance(s) other than alcohol by people who were alcohol dependent.

**Non-poisonings:** deaths from medical or traumatic causes of people who were alcohol dependent, or in which alcohol was implicated.

## Analysis

Data for the years 2004–2008 are presented by category of death, as either poisonings or non-poisonings, with a number of distinct sub-groups within each category (Table 1). Parts 1 and 2 of this section present the analysis of these categories and sub-groups. Part 3 presents data on *all* deaths of people who were alcohol dependent, and Part 4 presents data on *all* poisoning deaths, whether by alcohol or other substances. The figures reported here may be revised in the future as new data become available.

### Part 1 Poisoning deaths:

- (a) alcohol-only poisonings;
- (b) alcohol polysubstance poisonings (alcohol plus other substance(s));
- (c) poisonings by substance(s) other than alcohol of people who were alcohol dependent.

### Part 2 Non-poisoning deaths:

- (a) deaths from medical or traumatic causes of people who were alcohol dependent;
- (b) deaths from medical or traumatic causes that also involved alcohol, of people who were *not* alcohol dependent.

**Part 3 All NDRDI-recorded deaths, from whatever cause, of people who were alcohol dependent are presented in order to provide an overview of poisoning and non-poisoning deaths among people with alcohol dependence.**

**Part 4 All NDRDI-recorded poisoning deaths, from whatever substance, are presented in order to identify the contribution of alcohol to all fatal poisonings nationally.**

**Table 1** Number of alcohol-related deaths and deaths of people who were alcohol dependent, by category (NDRDI 2004–2008)

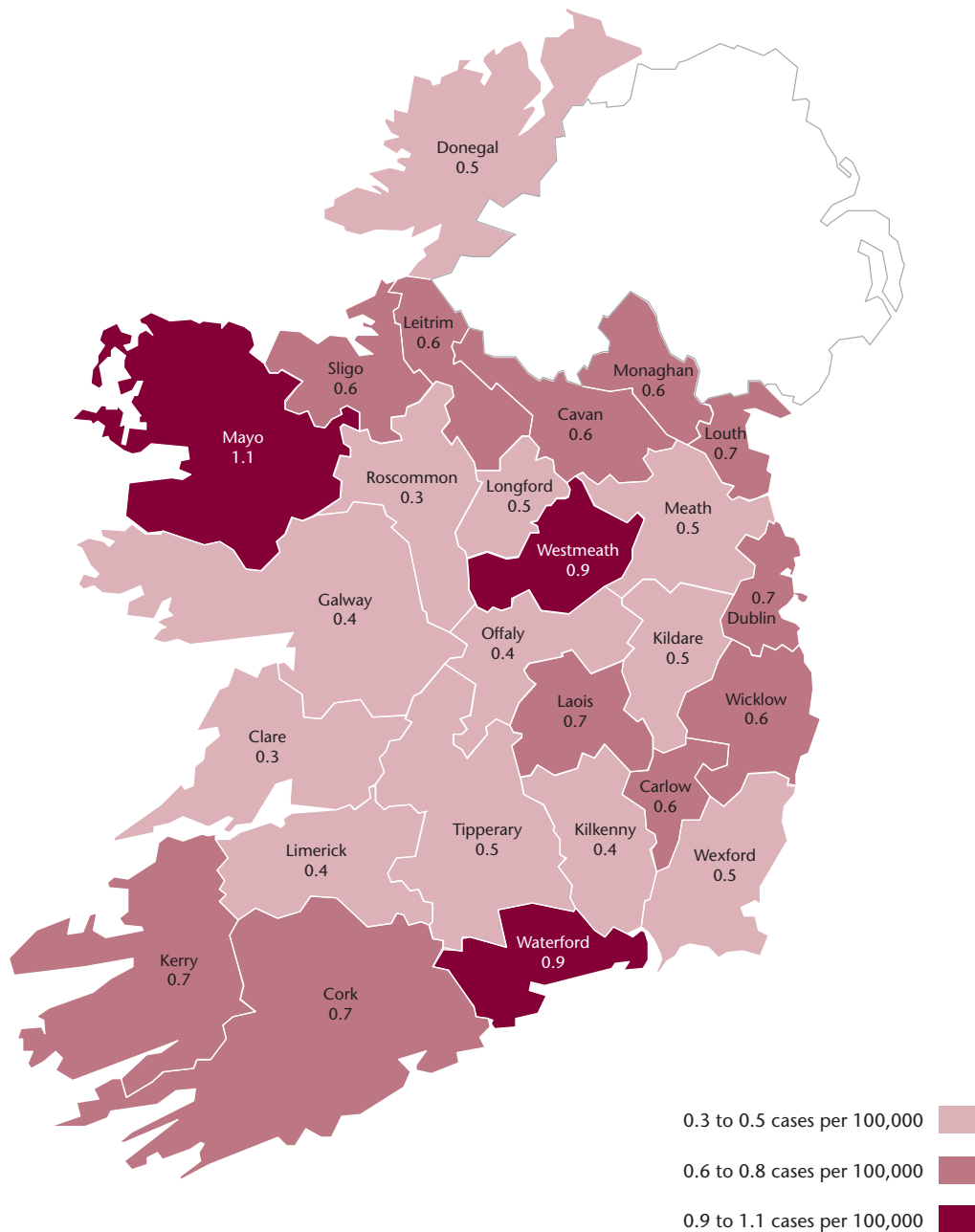
	2004	2005	2006	2007	2008
	<b>Number</b>				
<b>Total</b>	656	726	880	999	1060
<b>Poisonings</b>					
Alcohol only	61	51	54	85	80
Alcohol polysubstance	64	65	57	85	70
<i>Total poisonings in which alcohol was implicated</i>	125	116	111	170	150
By substance(s) other than alcohol of people who were alcohol dependent	9	21	19	22	27
<b>Non-poisonings (medical or traumatic)</b>					
Deaths of people who were alcohol dependent	508	564	720	745	799
Deaths of people who were <i>not</i> alcohol dependent but in which alcohol was implicated	14	25	30	62	84

The NDRDI recorded 4,321 deaths in the five-year period that were alcohol-related or of alcohol-dependant people. The annual number increased steadily each year, rising from 656 in 2004 to 1,060 in 2008. This increase may be explained by a true increase in deaths or by improved recording practices. Given that the per capita consumption of alcohol in Ireland is among the highest in Europe,<sup>4</sup> that the majority (56%) of Irish people drink in a harmful manner,<sup>5</sup> and that the NDRDI is a relatively new data system, a combination of all these factors is the most likely explanation.

## Part 1: Poisoning deaths

The number of fatal poisonings in which alcohol was a factor (with or without other substances) fluctuated throughout the 2004–2008 period, with the lowest number in 2006 (at 111) and the highest in 2007 (at 170) (Table 1). In addition, there were 98 poisoning deaths of alcohol-dependent people that involved a substance other than alcohol.

The average annual rate of poisoning deaths for the five-year period was calculated by county, per 100,000 of the population, based on Central Statistics Office figures (Figure 1).<sup>10, 11</sup> The rate was highest in Mayo at 1.1 deaths per 100,000. The rate for Dublin county as a whole was 0.7 per 100,000. However the rate for Dublin city was 1.4 per 100,000, and for the rest of Dublin county 0.2 per 100,000.



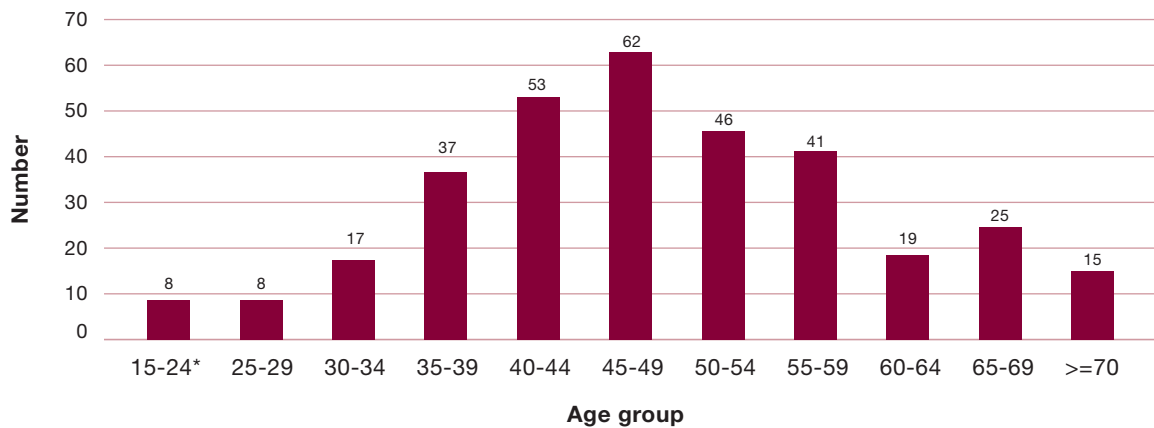
**Figure 1** Average annual rate of poisoning deaths in which alcohol was implicated, per 100,000 of the population, by county of residence (NDRDI 2004–2008)

### (a) Alcohol-only poisonings

The NDRDI recorded 331 alcohol-only poisoning deaths for the five-year period 2004–2008 (Table 1). The annual number of these deaths increased from 61 in 2004 to 85 in 2007, dropping marginally to 80 in 2008.

#### Age and gender

Almost half of cases were aged between 40 and 54 years (161, 48.6%) (Figure 2).



**Figure 2** Alcohol-only poisoning deaths, by age group (NDRDI 2004–2008) (N = 331)

\* Age groups 15–19 and 20–24 are combined because of small numbers.

Two thirds (221, 66.8%) of cases in the five-year period were male (Table 2). The proportion of females fluctuated over the reporting period, being highest in 2006 (40.7%) and lowest in 2004 (29.5%).

**Table 2** Alcohol-only poisoning deaths, by gender (NDRDI 2004–2008) (N = 331)

	2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Total	61		51		54		85		80	
Male (n = 221)	43	(70.5)	32	(62.7)	32	(59.3)	59	(69.4)	55	(68.8)
Female (n = 110)	18	(29.5)	19	(37.3)	22	(40.7)	26	(30.6)	25	(31.3)

The median age of the 331 cases was 48 years. Females were older (median age 52 years) compared to males (median age 47 years), which was a trend observed for all reporting years with the exception of 2006 (Table 3).

**Table 3** Median age of alcohol-only poisoning deaths, by gender (NDRDI 2004–2008) (N = 331)

	2004	2005	2006	2007	2008
Median age (in years)	47	50	47	47	50
Age range*	28–67	36–73	24–72	30–71	29–68
Median age males	47	50	48	45	48
Median age females	48	52	45	53	58

\* 5th to 95th percentile

### History of substance dependence

Of the 331 cases, 139 (42.0%) had a recorded history of alcohol dependence. Only a small number (11, 3.3%) had a recorded history of drug dependence or misuse, while seven (2.1%) had a recorded history of both alcohol dependence and drug dependence or misuse.

#### Key points – alcohol-only poisonings:

- The annual number of deaths increased from 61 in 2004 to 85 in 2007, but dropped marginally to 80 in 2008.
- Two thirds (221, 66.8%) of the deaths in the five-year period were male.
- The median age was 48; female cases were older than male cases.
- 42% of the deaths were of people with a history of alcohol dependence.

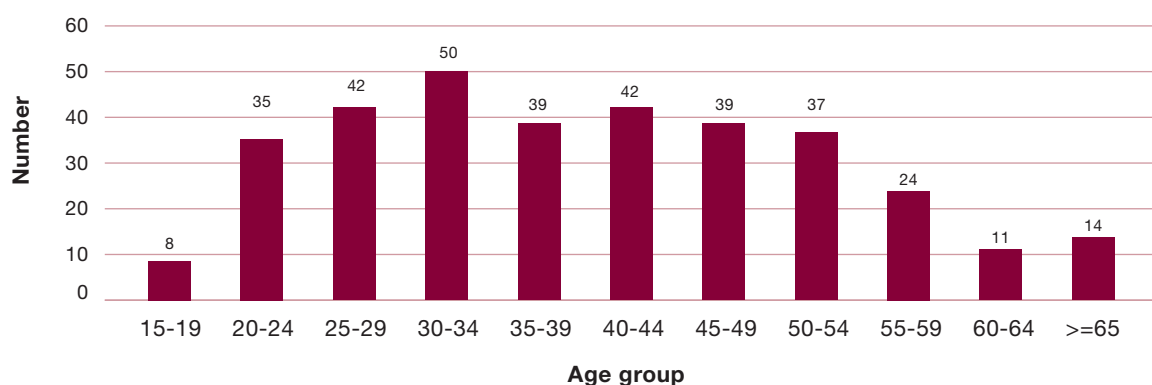
### (b) Alcohol polysubstance poisonings (alcohol plus other substance(s))

The NDRDI recorded 341 alcohol polysubstance poisonings for the period 2004–2008 (Table 1). These deaths have been reported in a previous HRB Trends Series paper on drug-related deaths.<sup>12</sup> The present paper provides a more detailed analysis of this specific subset of poisoning deaths.

The annual number of deaths due to alcohol polysubstance poisoning increased from 64 in 2004 to 85 in 2007, but dropped to 70 in 2008 (Table 1).

#### Age and gender

The highest number of deaths (50, 14.7%) was in the age group 30–34 years (Figure 3). The age profile of the alcohol polysubstance sub-group was younger than that of the alcohol-only sub-group.



**Figure 3** Alcohol polysubstance poisoning deaths, by age group (NDRDI 2004–2008) (N = 341)

The majority of deaths were male (223, 65.4%) (Table 4). The proportion of females dropped from 47% in 2004 to 27% in 2008.

**Table 4** Alcohol polysubstance poisoning deaths, by gender (NDRDI 2004–2008) (N = 341)

	2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Total deaths	64		65		57		85		70	
Male (n = 223)	34	(53.1)	41	(63.1)	37	(64.9)	60	(70.6)	51	(72.9)
Female (n = 118)	30	(46.9)	24	(36.9)	20	(35.1)	25	(29.4)	19	(27.1)



The median age of the 341 cases was 38 years. Overall, females were older (median age 46 years) than males (median age 35 years), which was a trend observed for all reporting years (Table 5).

**Table 5** Median age of alcohol polysubstance poisoning deaths, by gender (NDRDI 2004–2008) (N = 341)

	2004	2005	2006	2007	2008
Median age (in years)	44	34	37	41	40
Age range*	22–75	18–58	23–62	21–63	23–64
Median age males	35	34	35	37	38
Median age females	52	39	42	49	49

\* 5th to 95th percentile

### Additional drugs involved

The drugs most frequently implicated along with alcohol in polysubstance poisonings were benzodiazepines (61.3%) and opiates (including heroin and methadone) (55.7%) (Table 6). The number of deaths where heroin was implicated rose from less than five cases in 2004 to 26 cases in 2007.

**Table 6** Additional drugs involved in alcohol polysubstance poisoning deaths (NDRDI 2004–2008) (N = 341)

	2004	2005	2006	2007	2008	%
All alcohol polysubstance poisonings*	64	65	57	85	70	100.0
Benzodiazepines	32	37	41	52	47	61.3
Antidepressants	19	14	12	15	20	23.5
Heroin	~	12	12	26	24	22.9
Other opiates†	22	26	8	11	6	21.4
Other prescription medication	15	5	9	13	11	15.5
Methadone	5	9	8	7	10	11.4
Cocaine	~	~	~	15	6	9.1
Other‡	~	5	~	13	7	8.8

\* Numbers and percentages in columns do not add up to totals shown in this row because individual deaths are attributable to alcohol and one or more other drugs or substances.

~ Less than five cases.

† Excludes heroin and methadone.

‡ Includes other illicit and licit drugs such as amphetamines, hallucinogens, volatile inhalants, cannabis or non-opiate analgesia.

### History of substance dependence

Of the 341 alcohol polysubstance poisoning deaths, 61 (17.9%) had a recorded history of alcohol dependence. Over a third (121, 35.5%) had a recorded history of drug dependence or misuse. In addition, 26 individuals (7.6%) had a recorded history of both alcohol dependence and drug dependence or misuse.

### Key points – alcohol polysubstance poisonings:

- The NDRDI recorded 341 alcohol polysubstance poisonings for the period 2004–2008.
- The annual number of deaths increased from 64 in 2004 to 85 in 2007, but dropped to 70 in 2008.
- Almost two-thirds of cases were male (223, 65.4%).
- The median age of the 341 cases was 38 years; female cases were older than male cases.

- 18% had a recorded history of alcohol dependence.
- 36% had a recorded history of drug dependence or misuse.
- Benzodiazepines (61.3%) and opiates (55.7%) were the drugs most frequently implicated along with alcohol in the cause of death.

### (c) Poisonings by substances other than alcohol of people who were alcohol dependent

For the period 2004–2008 the NDRDI recorded 98 deaths due to poisoning by substances other than alcohol of people who were alcohol dependent (Table 1). The annual number of deaths increased from nine in 2004 to 27 in 2008.

The majority of this sub-group were male (61, 62.2%) and the median age of cases was 41 years. Fifty-nine (60.2%) had a history of drug dependence or misuse in addition to a history of alcohol dependence. Benzodiazepines were implicated in almost one fifth (31, 31.6%) of the deaths in this group (Table 7). Together, the three forms of opiate (heroin, methadone and other opiates) constitute the substance most frequently (64.3%) implicated in this group of deaths.

**Table 7** Substances other than alcohol implicated in poisoning deaths of people who were alcohol dependent (NDRDI 2004–2008) (N = 98)

	n	%
Total*	98	100.0
Benzodiazepines	31	31.6
Non-opiate analgesic	23	23.5
Anti-depressants	23	23.5
Other opiates	22	22.4
Heroin	21	21.4
Methadone	20	20.4
Other prescription medication	9	9.2
Cocaine	7	7.1
Other†	9	9.2

\* Numbers and percentages in columns do not add up to totals shown in this row because individual deaths may be attributable to more than one drug or substance.

† Includes other illicit drugs such as amphetamines, hallucinogens, volatile inhalants or other chemicals.

### Key points – poisonings by substances other than alcohol in people who were alcohol dependent:

- The annual number of deaths increased from nine in 2004 to 27 in 2008.
- The majority (62.2%) of deaths were male and the median age was 41 years.
- 60% of deaths had a recorded history of drug dependence or misuse.
- Opiates (64.3%) and benzodiazepines (31.6%) were the drugs most frequently implicated in these deaths.

## Part 2: Non-poisoning deaths

The NDRDI assigns medical and traumatic causes of death to a limited number of broad categories to allow for data to be presented in a meaningful way.

Examples of medical-cause categories:

- **Haemorrhage** includes deaths due to ruptured oesophageal varices, gastrointestinal bleed (but not cerebral haemorrhage);
- **Cerebral** includes deaths as a result of a stroke, cerebral haemorrhage (non-traumatic);
- **Other respiratory disease** includes emphysema, chronic obstructive airways disease;
- **Other infection** includes sepsis or peritonitis.

Examples of traumatic-cause categories:

- **Fall** includes deaths as a result of a fall from a height (from a building or down a stairs) or fall on same level (trip over step or from footpath);
- **Choking** includes deaths as a result of asphyxia due to a foreign body (for example food or vomit);
- **Violence** includes fatal injuries as a result of an assault, shooting or stabbing;
- **Road traffic collision** (RTC) includes drivers (of any vehicle), passengers or pedestrians.

### (a) Deaths from medical or traumatic causes of people who were alcohol dependent

The NDRDI recorded 3,336 non-poisoning deaths of people who were alcohol dependent in the period 2004–2008. The annual number of deaths increased from 508 in 2004 to 799 in 2008 (Table 8). The vast majority (2,975, 89.2%) of non-poisoning deaths were due to medical causes. Generally, the medical and traumatic causes of death for this category were in line with causes of alcohol-related deaths reported by WHO.<sup>1</sup>

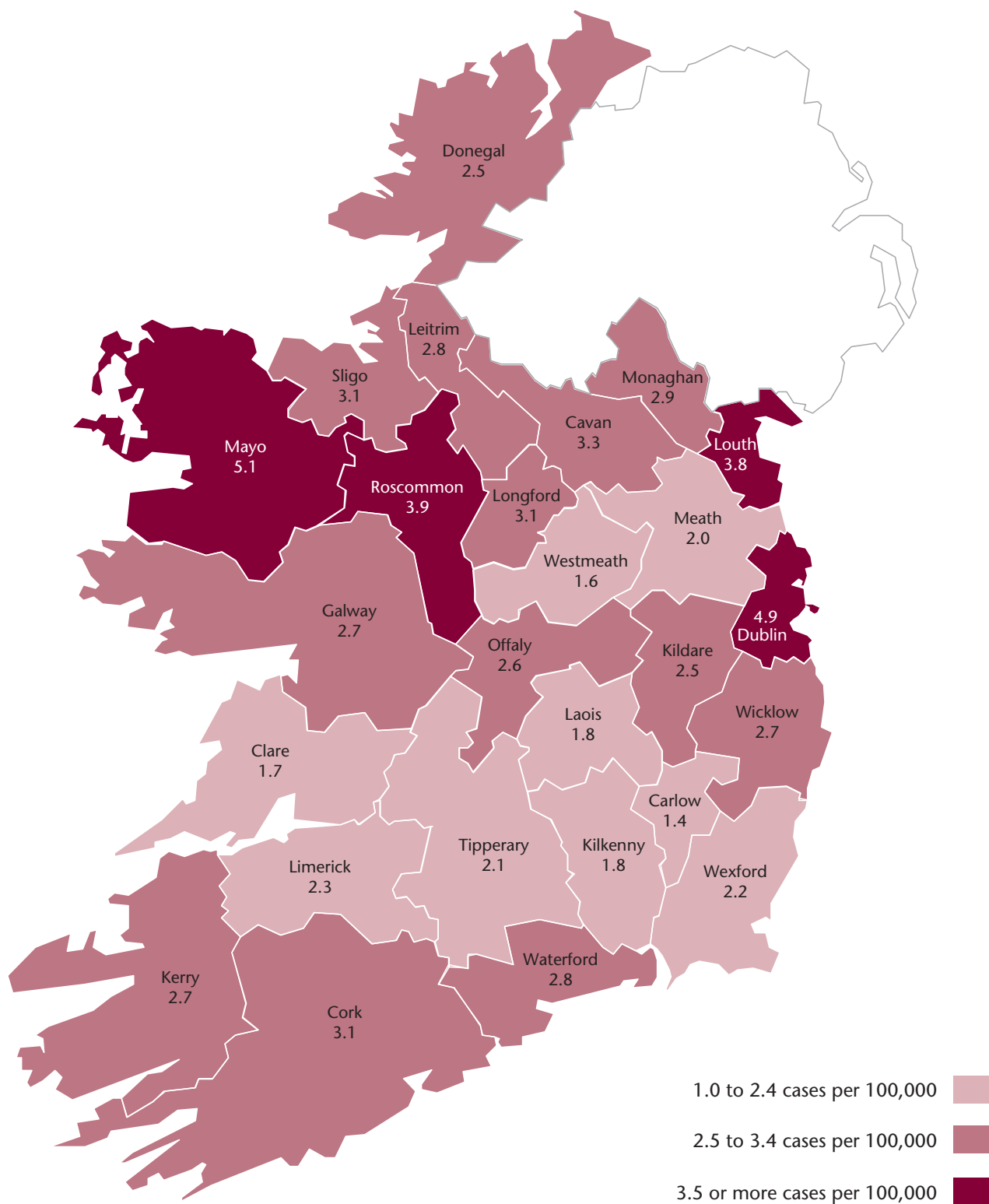
**Table 8** Type of death of people who were alcohol dependent (NDRDI 2004–2008) (N = 3,336)

	2004	2005	2006	2007	2008
Total	508	564	720	745	799
Medical (n = 2,975)	459	499	617	680	720
Trauma (n = 361)	49	65	103	65	79

When calculated by county using CSO data,<sup>10, 11</sup> the average annual rate of non-poisoning death of people who were alcohol dependent was highest in Mayo (5.1 deaths per 100,000 of the population) followed by Dublin at 4.9 (Figure 4). However, the rate for Dublin city was 9.8 per 100,000, compared to the rest of Dublin county (at 1.2 per 100,000).

#### Key points – non-poisoning deaths of people who were alcohol dependent:

- A total of 3,336 deaths was recorded by the NDRDI between 2004 and 2008.
- The annual number of deaths increased from 508 in 2004 to 799 in 2008.
- Almost three quarters of deaths were male.
- Approximately nine out of ten deaths were due to medical causes.



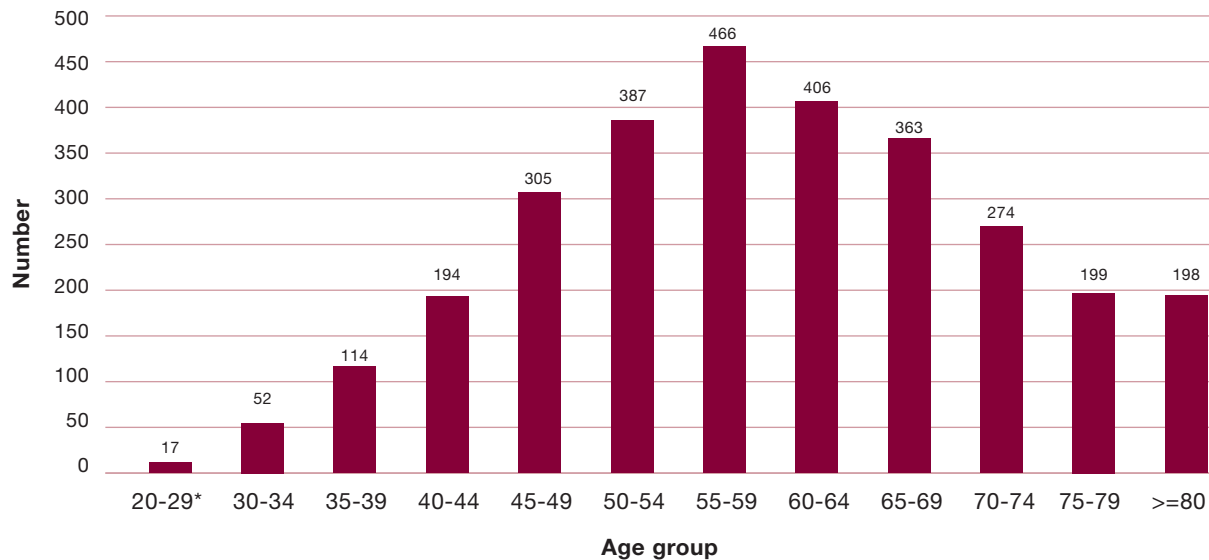
**Figure 4** Average annual rate of non-poisoning death among people who were alcohol dependent, per 100,000 of the population, by county of residence (NDRDI 2004–2008)

## Deaths from medical causes

The annual number of deaths from medical causes of people who were alcohol dependent rose every year during the reporting period, from 459 in 2004 to 720 in 2008 (Table 8).

### Age and gender

The highest number of cases (466, 15.7%) was in the 55–59-year age group (Figure 5). Just under two thirds (1,941, 65.2%) of cases were aged 64 years or under.



**Figure 5** Deaths from medical causes in people who were alcohol dependent, by age group (NDRDI 2004–2008) (N = 2,975)

\* Age groups 20–24 and 25–29 are combined because of small numbers.

Overall, nearly three quarters of cases were male (2,189, 73.6%). The ratio of males to females did not vary over the reporting period (Table 9).

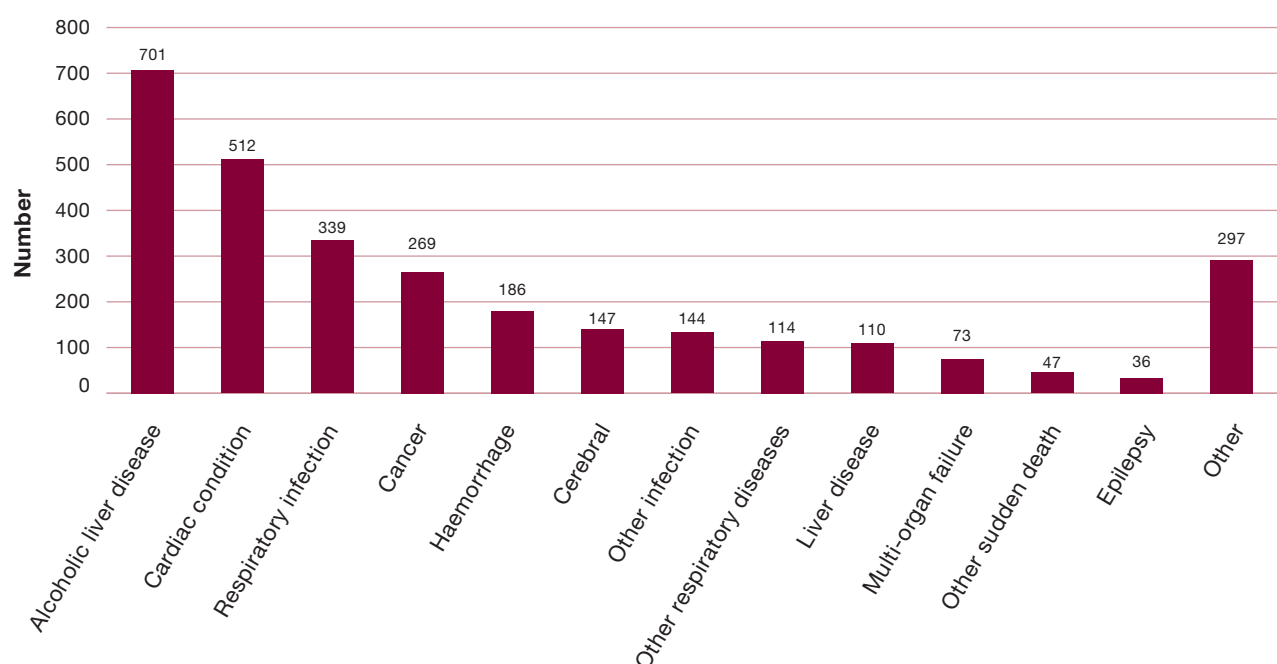
**Table 9** Deaths from medical causes in people who were alcohol dependent, by gender (NDRDI 2004–2008) (N = 2,975)

	2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Total	459		499		617		680		720	
Male	336	(73.2)	368	(73.7)	441	(71.5)	503	(74.0)	541	(75.1)
Female	123	(26.8)	131	(26.3)	176	(28.5)	177	(26.0)	179	(24.9)

The median age of cases for the five-year period was 59 years, with little difference between males (median age 59 years) and females (median age 58 years).

### Medical causes of death as categorised by the NDRDI

Alcoholic liver disease (701, 23.6%), cardiac conditions (512, 17.2%) and respiratory infections (339, 11.4%) were the most common medical causes of death in the five-year period (Figure 6).



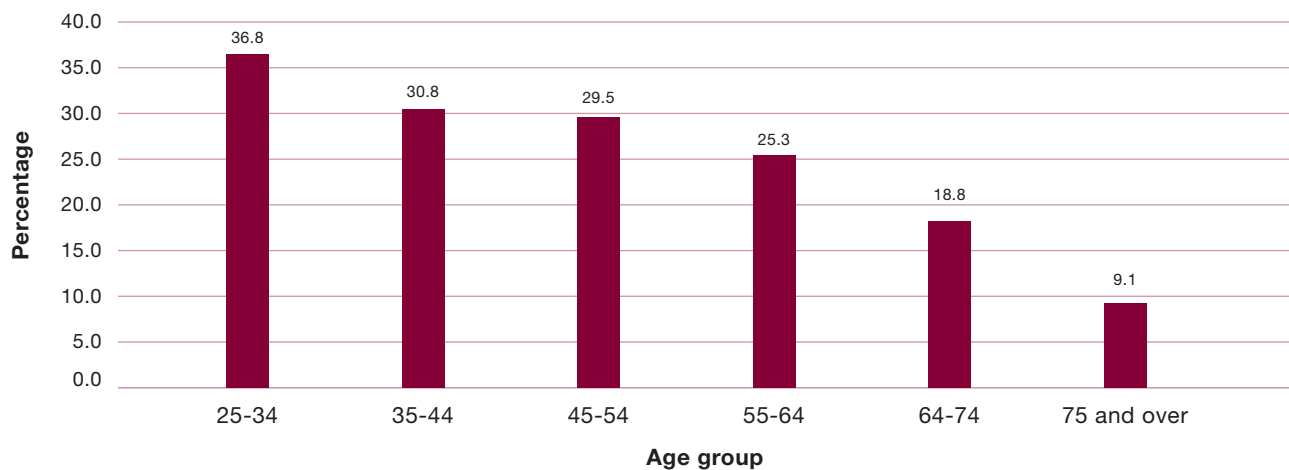
**Figure 6** Medical causes of death, as categorised by the NDRDI, in people who were alcohol dependent (NDRDI 2004–2008) (N = 2,975)

Table 10 presents the medical causes of death by NDRDI disease category and by gender. The most common medical causes of death among men were alcoholic liver disease (21.7%) and cardiac conditions (19.0%) and the most common cause among women was alcoholic liver disease (28.9%).

**Table 10** Medical causes of death, as categorised by the NDRDI, in people who were alcohol dependent, by gender (NDRDI 2004 –2008 (N = 2,975)

	Male		Female	
	n	(%)	n	(%)
Total	2189		786	
Alcoholic liver disease	474	(21.7)	227	(28.9)
Cardiac condition	417	(19.0)	95	(12.1)
Respiratory infection	251	(11.5)	88	(11.2)
Cancer	221	(10.1)	48	(6.1)
Haemorrhage	133	(6.1)	53	(6.7)
Cerebral	107	(4.9)	40	(5.1)
Other infection	96	(4.4)	48	(6.1)
Other respiratory condition	91	(4.2)	23	(2.9)
Liver disease	68	(3.1)	42	(5.3)
Multi-organ failure	51	(2.3)	22	(2.8)
Other sudden death, cause unknown	34	(1.6)	13	(1.7)
Epilepsy	24	(1.1)	12	(1.5)
Other	222	(10.1)	75	(9.5)

As alcoholic liver disease (701, 23.6%) was the most frequent cause of non-poisoning death among alcohol-dependent people, a more in-depth analysis of this group was done. This showed that over one third (36.8%) of deaths in the 25–34-year age group, and 30.8% in the 35–44-year age group, were the result of alcoholic liver disease (Figure 7).



**Figure 7** Deaths caused by alcoholic liver disease in people who were alcohol dependent, by age group (NDRDI 2004–2008) (N = 701)

### History of substance dependence

Of the 2,975 alcohol-dependent people who died of medical causes, 143 (4.8%) had a reported history of drug dependence or misuse. A number of individuals with a history of drug dependence or misuse would have been included in the previous publication on trends in deaths among drug users.<sup>8</sup>

### Key points – deaths from medical causes in people who were alcohol dependent:

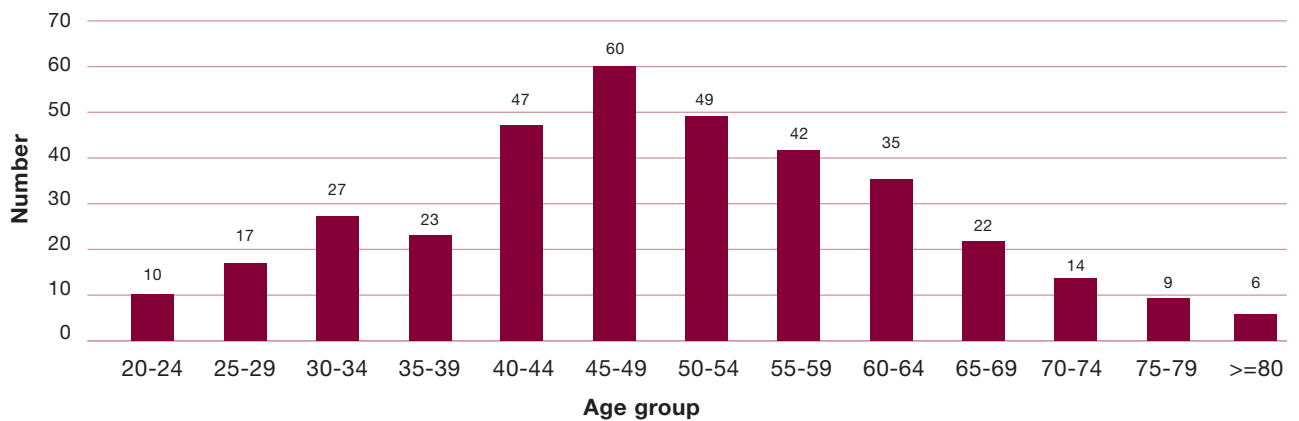
- The number of deaths from medical causes increased from 459 in 2004 to 720 in 2008.
- 74% of those who died were male.
- Almost two thirds (65.2%) were aged 64 years or under.
- Alcoholic liver disease (23.6%), cardiac conditions (17.2%) and respiratory infections (11.4%) were the most common medical causes of death.
- Over one third (36.8%) of deaths among those aged 25 to 34 years were caused by alcoholic liver disease.

### Deaths from traumatic causes

The annual number of deaths from traumatic causes in people who were alcohol dependent fluctuated throughout the period, ranging from 49 in 2004 to 103 in 2006 (Table 8).

### Age and gender

The highest number (60, 16.6%) of deaths was in the 45–49-year age group; 34.3% (124) were aged 44 years or under, and 14.1% (51) were aged 65 years or over (Figure 8).



**Figure 8** Deaths from traumatic causes in people who were alcohol dependent, by age group (NDRDI 2004–2008) (N = 361)

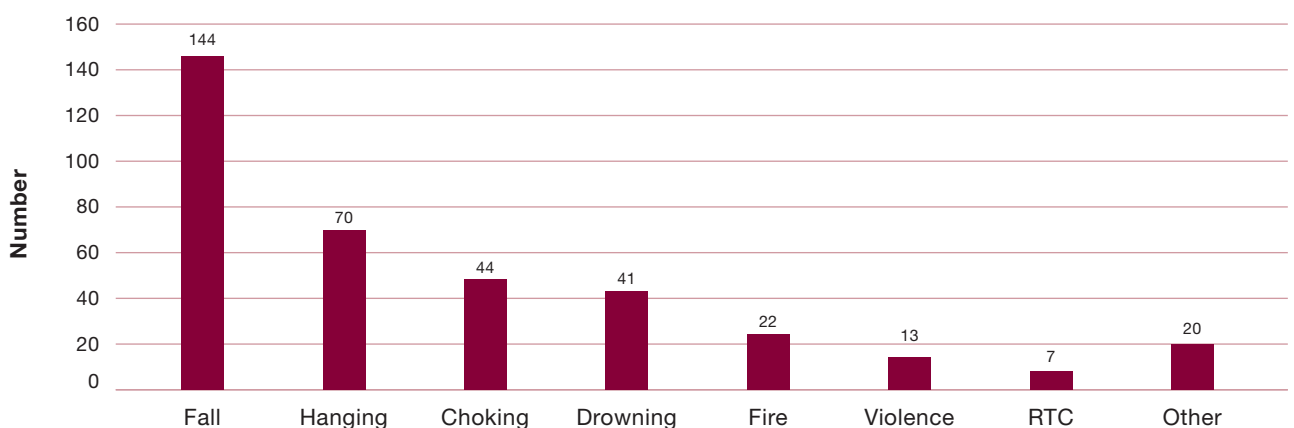
The majority (288, 79.8%) of cases were male (Table 11). The median age of cases for the five-year period was 49 years, and was similar for males (49 years) and for females (50 years).

**Table 11** Deaths from traumatic causes in people who were alcohol dependent, by gender (NDRDI 2004–2008) (N = 361)

	2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Total	49		65		103		65		79	
Male	40	(81.6)	50	(76.9)	76	(73.8)	53	(81.5)	69	(87.3)
Female	9	(18.4)	15	(23.1)	27	(26.2)	12	(18.5)	10	(12.7)

### Causes of death by trauma

The most frequent causes of death by trauma were falls (144, 39.9%) and hangings (70, 19.4%) (Figure 9).



**Figure 9** Types of trauma causing death in people who were alcohol dependent (NDRDI 2004–2008) (N = 361)

### History of substance dependence

The 361 individuals who died as a result of a traumatic event had a history of alcohol dependence; among them were 44 (12.2%) who also had a reported history of drug dependence or misuse. Some of these 44 individuals will have been included in a previous Trends Series publication on deaths among drug users.<sup>8</sup>



### Key points – deaths due to trauma in people who were alcohol dependent:

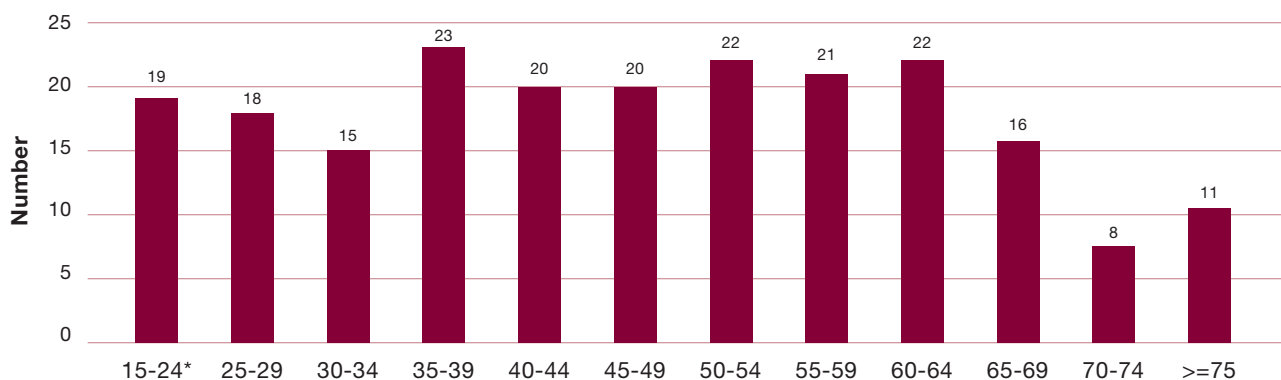
- Four out of five (79.8%) of those who died were male.
- The median age was 49 years and just over one third were under 45 years old.
- Falls (39.9%) and hangings (19.4%) were the most common traumatic causes of death.

### (b) Deaths from medical or traumatic causes that also involved alcohol, of people who were *not* alcohol dependent

As recorded by the NDRDI, a total of 215 people who did *not* have a recorded history of alcohol dependence died from medical or traumatic causes where alcohol was mentioned on the death certificate. The annual numbers of these cases increased over the reporting period, albeit from a low base, from 14 in 2004 to 84 in 2008 (see Table 1 on p. 5); the small numbers in the earlier years make analysis and interpretation of trends difficult.

#### Age and gender

The numbers of cases were evenly distributed among the age bands between 35 and 64 years (Figure 10). The majority (176, 81.9%) of cases were male. The median age for all cases in the period was 48 years; that for females (51 years) was higher than that for males (47 years).



**Figure 10** Deaths from medical or traumatic causes that also involved alcohol, by age group (NDRDI 2004–2008) (N = 215)

\* Age groups 15–19 and 20–24 are combined because of small numbers.

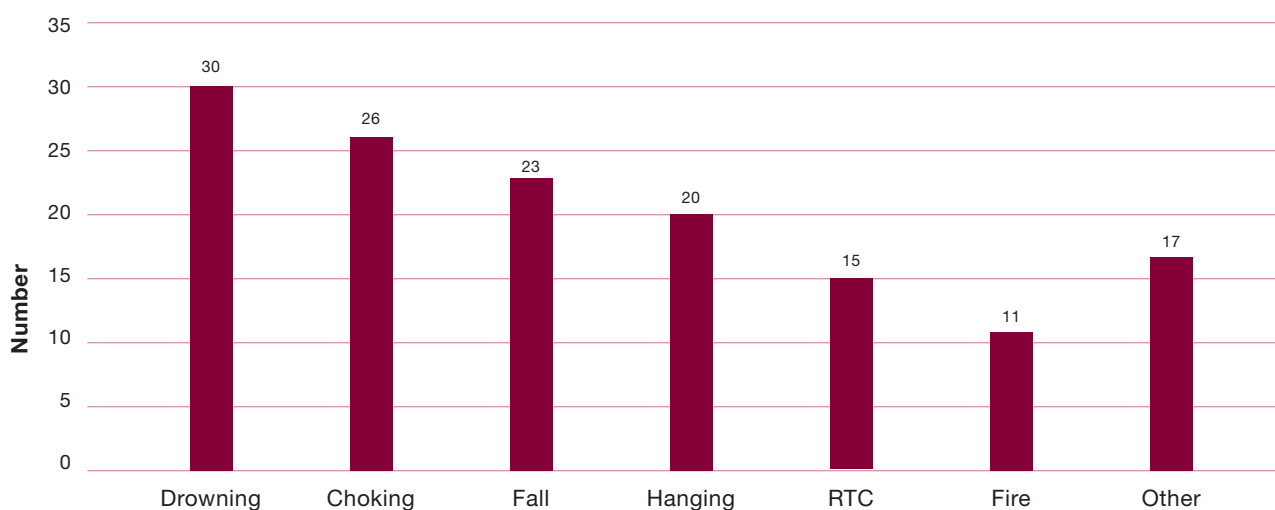
Two thirds (142, 66.0%) of deaths in this group were due to traumatic events. The number of deaths due to medical causes increased considerably over the reporting period (Table 12).

**Table 12** Deaths from medical or traumatic causes that also involved alcohol, by category of death (NDRDI 2004–2007) (N =215)

	2004/2005*	2006	2007	2008
<b>All deaths</b>				
Trauma (n = 142)	31	19	44	48
Medical (n = 73)	8	11	18	36

\* Years 2004 and 2005 are combined because of small numbers.

One fifth (30, 21.1%) of traumatic deaths were due to drowning; similar numbers were due to choking (26, 18.3%). Falls (23, 16.2%) were the next most frequent cause (Figure 11).



**Figure 11** Deaths from medical or traumatic causes that also involved alcohol, by type of death (NDRDI 2004–2008) (N =142).

The majority (46, 63.0%) of deaths due to medical causes were the result of cardiac conditions.

#### History of substance dependence

None of the 215 deaths from medical or traumatic causes that also involved alcohol had a recorded history of alcohol dependence in the NDRDI data sources; however, 28 (13.0%) did have a reported history of drug dependence or misuse. Some of these 28 individuals have been included in the previous publication on trends in deaths among drug users.<sup>8</sup>

#### Key points – deaths from medical or traumatic causes that also involved alcohol, among people who were *not* alcohol dependent:

- The annual number of deaths rose from 14 in 2004 to 84 in 2008.
- 82% of those who died were male.
- The median age was 48 years but was slightly higher among females than males.
- Two thirds of the deaths were due to traumatic events: drowning (21.1%), choking (18.3%) and falls (16.2%).
- One third of the deaths were due to medical causes, most commonly cardiac events/conditions.

### Part 3: All NDRDI-recorded deaths, from whatever cause, of people who were alcohol dependent

The deaths of all individuals with alcohol dependence recorded in the NDRDI in the five-year period are presented in this section of the analysis in order to provide an overview of poisoning and non-poisoning deaths in this group (Table 13). The annual number of cases increased from 566 in 2004 to 879 in 2008. The majority (2,975, 81.1%) died of medical causes.

**Table 13** Deaths of people who were alcohol dependent (NDRDI 2004–2008) (N = 3,667)

	2004	2005	2006	2007	2008
All deaths recorded in the NDRDI of people who were alcohol dependent	566	617	776	829	879
Poisoning deaths	58	53	56	84	80
Non-poisoning deaths (medical causes)	459	499	617	680	720
Non-poisoning deaths (traumatic causes)	49	65	103	65	79

**Key points – all NDRDI-recorded deaths of people who were alcohol dependent:**

- The NDRDI recorded 3,667 deaths of people who were alcohol dependent for the five-year period 2004–2008.
- The annual number of deaths increased from 566 in 2004 to 879 in 2008.
- The majority died of medical causes.

**Part 4: All NDRDI-recorded poisoning deaths (2004–2008)**

The final part of this section presents data on alcohol poisonings alongside data on poisonings from all other substances in order to compare the contribution of alcohol to fatal poisonings nationally.

The number of poisonings where alcohol was implicated fluctuated over the reporting period, but was highest in 2007, with 170 deaths. Table 14 shows that alcohol was implicated in 40.7% of poisonings, making it the drug most frequently implicated in fatal poisonings in Ireland. Benzodiazepines were the next most frequently implicated substance (31.4%).

**Table 14** Drugs involved in poisoning deaths in Ireland (NDRDI 2004–2008) (N=1,650)

	2004 n	2005 n	2006 n	2007 n	2008 n	(%)
All poisoning deaths*	267	302	325	383	373	100
Alcohol	125	116	111	170	150	40.7
Benzodiazepines	77	80	116	123	117	31.1
Heroin	29	48	67	78	86	18.7
Methadone	40	43	61	54	78	16.7
Antidepressants	54	54	43	47	77	16.7
Other prescription drugs	42	37	39	62	59	14.5
Cocaine	19	36	52	66	58	14.0
Other opiates†	62	70	55	53	45	17.3
Non-opiate analgesic	13	23	12	18	17	5.0
MDMA	13	10	6	18	7	3.3
Other‡	5	5	10	16	15	3.1

\* Numbers and percentages in columns do not add up to totals shown in this row because individual deaths may be attributable to more than one drug or substance.

† Excludes heroin and methadone.

‡ Includes other illicit and licit drugs such as amphetamines, hallucinogens, volatile inhalants or cannabis.

**Key points – all NDRDI-recorded poisoning deaths (2004–2008):**

- Alcohol was implicated in 40.7% of poisoning deaths nationally.
- Benzodiazepines were the second most common drug (31.1%) implicated in poisoning deaths.

## Discussion

This is the first report from the NDRDI on alcohol-related deaths and deaths among people who were alcohol dependent. One of the strengths of the NDRDI is that it records the cause of death of people who were alcohol dependent (regardless of whether the death was directly attributable to alcohol) and also deaths where alcohol was implicated (regardless of the person's history of alcohol dependence). This allows for deaths within the Irish population that are directly or indirectly attributable to alcohol to be accounted for.

The NDRDI inclusion criteria for alcohol dependence are very strict. Additionally, the NDRDI does not record deaths of people with a history of harmful use of alcohol (for example, a history of binge drinking) where alcohol is not directly implicated in the death. Therefore, the numbers reported in this paper represent the minimum number of alcohol-related deaths and deaths among people who were alcohol dependent in Ireland between 2004 and 2008.

There was a noticeable rise in the number of deaths recorded by the NDRDI over the reporting period. The increase each year may be explained by a true increase in deaths or by improved recording practices; given that the per capita consumption of alcohol in Ireland is among the highest in Europe, that the majority (56%) of Irish people drink in a harmful manner, and that the NDRDI is a relatively new system, a combination of all these factors is the most likely explanation.

The NDRDI recorded 672 poisoning deaths in which alcohol was implicated in the five-year period. This total comprised almost equal numbers of alcohol-only poisonings and alcohol polysubstance poisonings. In the context of *all* fatal poisonings recorded in the NDRDI, the combined figures published here show that alcohol was the drug most frequently implicated in poisoning deaths in the five-year period.

Benzodiazepines were the drugs most frequently implicated along with alcohol in polysubstance poisonings. Benzodiazepines are known to amplify the depressant effects of other drugs, including alcohol and opiates, so increasing the risk of overdose in polysubstance use.<sup>13, 14</sup> As highlighted in the recent HRB Trends Series paper on problem benzodiazepine use,<sup>15</sup> prescribers and users need to be more aware of the potentially fatal effects of benzodiazepines when used with alcohol. Any strategy to reduce deaths due to alcohol must also consider the role played by benzodiazepines in these poisoning deaths.

Among people who were alcohol dependent, the main medical causes of death were alcoholic liver disease and cardiac events and the main traumatic causes were falls and hanging. These findings correlate with those of other national and international studies on alcohol-attributable mortality.<sup>1, 3, 6, 16</sup> The findings are also similar to those of a recent study of alcohol-related mortality in Ireland.<sup>2</sup> That study estimated that chronic conditions such as cancer and alcoholic liver disease accounted for 69% of all alcohol-attributable deaths and for 31% of acute conditions such as suicide, falls and alcohol poisoning.<sup>2</sup>

Over one third (36.8%) of the deaths in the 25–34-year age group were the result of alcoholic liver disease. A recent study found that the rate of hospital discharges for alcoholic liver disease in the 15–34-year age group increased by 247% between 1995 and 2007 in Ireland.<sup>17</sup> It is not surprising therefore to see deaths due to alcoholic liver disease in this young age group.

For the purposes of this paper, the NDRDI has assigned medical and traumatic causes of death to a limited number of broad categories to allow for data to be presented in a meaningful way. This means that some of the more complex relations and interconnections between a specific disease (e.g. liver cancer or oesophageal cancer), alcohol use and death are not represented in this analysis and will need to be investigated further in the future.<sup>1, 3</sup>

The figures show very clearly that many of those who died were still in their prime, aged between 40 and 59. The detrimental effect of alcohol is further illustrated by the high proportion of those aged 44 or under who died as a result of alcoholic liver disease. This paper cannot estimate the considerable social cost of premature mortality of these individuals, its detrimental effect on the family, and burden to society.<sup>18</sup>

A third of deaths among those who were alcohol dependent were of people aged over 65 years. There is limited research on the effect of problem alcohol use among older people. There is some evidence that older people are more sensitive to the detrimental effects of alcohol, and that they may be at greater risk of accidental injuries, such as falls.<sup>19</sup> Some studies have suggested that isolation and depression among this group can lead to increased alcohol consumption with all its attendant problems, although the evidence is limited.<sup>20</sup> With the growth in Ireland's aging population, this is an issue that will need to be further investigated.

Over the reporting period there was a big increase in the number of medical and traumatic deaths among people who were not alcohol dependent but where alcohol was involved. This increase may reflect a change in recording practices in the various data sources included in the NDRDI but is likely also to reflect a true increase in these deaths. Many of these individuals died traumatically due to drowning or choking; this finding is consistent with the international literature in this area.<sup>1, 6, 21</sup>

A review by WHO found convincing evidence that alcohol policies that contain and implement certain actions can reduce alcohol-related harm.<sup>1, 22</sup> The review identified these actions as: increased taxes on alcohol; restrictions on alcohol outlet density, days and hours of sale; a minimum legal purchase age (18 years or over); a low legal blood alcohol concentration for drivers; random breath testing for drivers; and accessible brief advice programmes and alcohol treatment programmes in health services.

There is probable evidence that alcohol policies that set a minimum price per gram of alcohol, impose restrictions on the sale of alcohol to intoxicated drinkers and children (under 18 years) and/or impose restrictions on alcohol or alcohol-brand advertising may reduce alcohol-related harm.<sup>22</sup> There is no published evidence that school-based education and information programmes reduce alcohol-related harm. There is probable evidence that public education campaigns and consumer warning labels do not reduce alcohol-related harm; however, an element of education and consumer warning may be necessary to inform the public of the dangers of alcohol to their health and well-being.<sup>22</sup>

Alcohol is to be included in the forthcoming National Substance Misuse Strategy.<sup>23</sup> The effect of any changes in public health policy on alcohol-related harm, and the impact of those changes on the number of alcohol-related deaths in Ireland, will be monitored and measured by the NDRDI into the future.

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