Drug-related deaths and deaths among drug users in Ireland, 1998 to 2007

Data from the National Drug-Related Deaths Index

Health Research Board, June 2010

Summary of results

This paper presents new NDRDI figures on drug-related deaths and deaths among drug users in 2006 and 2007, and updates previously published figures for the years 1998–2005.

Overview

- Between 1998 and 2007 a total of 3,465 drug-related deaths and deaths among drug users met the criteria for inclusion in the NDRDI database. Of these deaths, 2,120 were due to poisoning and 1,345 were due to traumatic or medical causes (non-poisoning) (Table 1).
- In 1998, almost three-quarters (73.6%) of drug-related deaths recorded in the NDRDI were poisonings. The percentage of such deaths decreased over the 10-year reporting period, with 57% of deaths in 2007 due to poisoning and 42% to other causes (non-poisoning).
- The annual number of deaths more than doubled in nine years, rising from 242 in 1998 to 491 in 2006. The number fell to 476 in 2007, but this figure may be revised upwards when data relating to late inquests becomes available (Table 1).

Poisoning deaths

- The annual number of deaths by poisoning increased from 178 in 1998 to 274 in 2007. (Table 1)
- Males accounted for 68% of deaths by poisoning (Figure 1).
- The majority of those who died by poisoning were aged between 20 and 40 years. The median age was 34 years (Figure 2 and Table 2).
- Just over half of all deaths by poisoning involved more than one substance (polysubstance cases) (Table 3).
- Heroin and other opiates, including methadone, were implicated in over half (55.3%, 1,172) of all deaths by poisoning.
- The number of deaths by poisoning where cocaine was implicated rose from five in 1998 to 63 in 2007. Cocaine was implicated in 10% of all deaths by poisoning in the 10-year period (Table 4).
- Prescription and over-the-counter medication was implicated in many of the deaths by poisoning. Benzodiazepines continued to play a major role in polysubstance poisonings, being involved in more deaths by poisoning than any other substance in the reporting period (Table 4).
- Since 2003, more deaths by poisoning occurred outside Dublin than inside Dublin (city and county) (Figure 3).
- The number of poisoning deaths increased in all but two of the regional drugs task force (RDTF) areas between 1998 and 2007 (Table 5). The South Western RDTF area recorded the highest number of deaths (n = 478) for the 10-year period.

Non-poisoning deaths

- A total of 1,345 non-poisoning deaths among drug users were recorded between 1998 and 2007.
- Of the 1,183 non-poisoning cases with a known cause of death, almost two thirds (60.3%, 714) were due to trauma and 40% (469) were due to medical causes (Figure 4).

Deaths due to trauma

- The annual number of deaths due to trauma increased from 39 in 1998 to 116 in 2006, but decreased to 87 in 2007 (Figure 4). These figures may be revised when data relating to late inquests becomes available.
- Half (50.4%, 360) of those who died from traumatic causes were aged between 20 and 29 years (Figure 6). The median age was 27 years. Almost all (643, 90.1%) of those who died were male.
- The most common causes of death due to trauma were hanging and road traffic collisions (Figure 7).

Deaths due to medical causes

- The annual number of deaths due to medical causes rose fairly steadily over the reporting period, increasing from 11 in 1998 to 98 in 2007, when it exceeded the number of deaths due to trauma (Figure 4).
- The majority of those who died from medical causes were aged between 30 and 44 years (Figure 9). The median age was 39 years. Three-quarters (352, 75.0%) of those who died were male.
- The most common medical causes of death were cardiac events (118, 25.2%), respiratory infections (83, 17.7%) and liver disease (48, 10.2%) (Figure 10).

Glossary

Drug users: Individuals who have a history of drug dependency or of non-dependent abuse of drugs and/or other substances

Illicit drugs: Heroin, cocaine, cannabis, MDMA, LSD, volatile inhalants etc.

Median: The median is the value at the mid-point in a sequence of numerical values ranged in ascending or descending order. It is defined as the value above or below which half of the values lie. Unlike the mean (average), the median is not influenced by extreme values (or outliers). For example, in the case of five drug users aged 22, 23, 24 and 46 years respectively, the median (middle value) is 24 years, whereas the mean is 27.8 years. While both the median and the mean describe the central value of the data, the median is more useful in this case because the mean is influenced by the one older person in this example.

Medical categories of death: Cases in which more than one medical condition was listed as the cause of death were categorised by the main cause of death. The main categories of death from medical causes include:

- Cerebral event: e.g. cerebral haemorrhage, cerebral vascular disease and disorders of the brain
- Other infection(s): e.g. bacterial or other viral diseases
- Respiratory disease: e.g. asthma, chronic obstructive pulmonary disease or emphysema
- Respiratory infection: e.g. pneumonia or pneumonitis due to the inhalation of solids or liquids

Non-poisoning deaths: Deaths in individuals with a history of drug dependency or non-dependent abuse of drugs (ascertained from toxicology results and from Central Treatment List, medical or coronial records) whether or not the use of the drug was directly implicated in the death

Poisoning deaths: Deaths which are directly due to the toxic effect of the presence in the body of one or more drugs and/or other substance(s)

Trauma: A serious injury to the body, often the result of violence or accident

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
BBV	Blood-borne virus
CSO	Central Statistics Office
CTL	Central Treatment List
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ESRI	Economic and Social Research Institute
FSN	Family Support Network
HIPE	Hospital In-Patient Enquiry scheme
HIV	Human immunodeficiency virus
HRB	Health Research Board
ICD	International Classification of Diseases
LDTF	Local drugs task force
LSD	Lysergic acid diethylamide
MDMA	3,4-Methylenedioxymethamphetamine, also known as ecstasy
NDRDI	National Drug-Related Deaths Index
RDTF	Regional drugs task force
RTC	Road traffic collision

In the case of data presented by region, this paper refers to the areas covered by the regional drugs task forces (RDTFs), together with the local drugs task forces (LDTFs) within their boundaries, as follows:

Task force		**Area included**
ECRDTF	East Coast Regional Drugs Task Force (DTF)	South-east Dublin city and county and East Wicklow, including the two LDTF areas within these boundaries
MRDTF	Midland Regional DTF	Counties Laois, Longford, Offaly and Westmeath
MWRDTF	Mid West Regional DTF	Counties Clare and Limerick, and North Tipperary
NDRDTF	North Dublin City and County Regional DTF	North Dublin city and county, including the five LDTF areas within these boundaries
NERDTF	North Eastern Regional DTF	Counties Cavan, Louth, Meath and Monaghan
NWRDTF	North West Regional DTF	Counties Donegal, Leitrim and Sligo, and north-west Cavan
SERDTF	South East Regional DTF	Counties Carlow, Kilkenny, Waterford and Wexford, and South Tipperary,
SRDTF	Southern Regional DTF	Counties Cork and Kerry, including the Cork LDTF area
SWRDTF	South Western Regional DTF	South-west Dublin, west Wicklow and County Kildare, including the six LDTF areas within these boundaries
WRDTF	Western Region DTF	Counties Galway, Mayo and Roscommon

Introduction

The Irish National Drug-Related Deaths Index (NDRDI) is an epidemiological database which records cases of death by drug and alcohol poisoning, and deaths among drug users and those who are alcohol dependent.[1, 2] The NDRDI is maintained by the Health Research Board (HRB). It is jointly funded by the Department of Health and Children and the Department of Justice, Equality and Law Reform.

The NDRDI was established in September 2005 to comply with Action 67 of the 2001–2008 National Drugs Strategy.[3] The aim of Action 67 was to put in place a system for recording drug-related deaths to enable the State and its agencies to respond in a timely manner, with accurate data.

The number of drug-related deaths and deaths among drug users is one of the key indicators used to measure the consequences of problem drug use in Europe. The NDRDI enables accurate reporting of these key data to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). The EMCDDA has recommended that all EU member states establish a special register to record these deaths.

Aim and objectives of the NDRDI

The aim of the NDRDI is to ensure complete (90%) and accurate (95%) reporting of drug- and alcohol-related deaths, and deaths among drug users and among those who are alcohol dependent, in order to allow the State and its agencies to respond in a timely manner.

Objectives of the NDRDI:

- To provide accurate information on drug- and alcohol-related deaths and deaths among drug users and among those who are alcohol dependent.
- To assist in identifying and prioritising areas for intervention and prevention, and to measure the effects of such interventions.

Background

Drug use can lead to premature death from a range of different causes.[4] Many deaths are caused by poisoning (both intentional and unintentional), where the death is directly attributable to the consumption of drugs (alone or in combination with other substances). This type of death is often defined as a directly drug-related death**.** For the purposes of this paper, this type of death is referred to as a **poisoning**.

Deaths among drug users (whether the user is dependent or non-dependent) may be indirectly attributed to their drug use. This type of death is often defined as an indirectly drug-related death. For the purpose of this paper, this type of death is referred to as a **non-poisoning**. Causes of death in such cases include:

- infection with HIV as a result of sharing drug paraphernalia, and subsequent development of an AIDS-related illness;
- the harmful effects of drug use (both short and long term) on the health of the drug user, such as the cardio-toxic effect of cocaine or drug-related liver disease;[5, 6, 7, 8]
- actions taken while under the influence of drugs, such as accidents caused by impaired judgement or exacerbation of risky behaviours;[4, 5]
- psychiatric illness as a co-morbid condition, which places the individual at a greater risk of suicide.[4, 9, 10, 11]

In line with international practice, deaths as the result of the drug use of another individual, such as a road traffic accident or an assault, are not recorded by the NDRDI.

Alcohol consumption has been reported as the third most detrimental risk factor for ill health and premature death in Europe.[12] While the NDRDI has recorded data on alcohol-related deaths and deaths among those who are alcohol dependent since 2004, these data are not presented in this paper. Alcohol is included in the analysis presented in this paper only when it features as an additional addiction, and/or as part of a polysubstance finding in toxicology.

Most cases of drug misuse or dependence involve illicit drugs; however, licit drugs also may be misused and may lead to dependency. These deaths are also included in the NDRDI.

A documented history of drug dependence or drug use is not available in all cases, leading to an under-recording of the total number of non-poisoning deaths in the drug-using population.

Calculation of mortality figures for both poisonings and non-poisonings provides an estimate of the total burden of mortality related to drug use in Ireland.

Methods

The data-collection tool was developed from those used in previous research and from tools devised by the EMCDDA. Data were collected retrospectively for each of the 10 years between 1998 and 2007.

Data collected include:

- demographic details
- socio-economic information
- history of drug or alcohol dependence or non-dependent abuse of drugs
- risk factors, e.g. history of injecting, imprisonment
- drug or alcohol treatment history
- details about the death itself:
    - toxicology
    - cause of death.

Data sources

In order to ensure a complete and accurate database, the NDRDI records data from several sources: the Coroner Service, the acute hospital sector through the Hospital In-Patient Enquiry (HIPE) scheme, the Central Treatment List (CTL) of clients prescribed methadone, the General Mortality Register (GMR) and the Family Support Network (FSN), a community representative body.

The Coroner Service

The primary objective of the Coroner Service is to establish, following public investigation, the cause of death (including how the person died) in cases of sudden or unexpected death.[13] In Ireland, a coroner has the same absolute privileges as a judge. To establish the cause of death, the coroner can instigate further inquiries, such as ordering a post-mortem and, if necessary, an inquest. If the results of the post-mortem and any other tests establish the cause of death as being natural, the coroner can then issue a certificate to the Registrar of Births, Deaths and Marriages, enabling that office to issue a death certificate.

An inquest is an inquiry in public by a coroner, sitting with or without a jury, into the circumstances surrounding a death. An inquest must be held by law if a death could be due to unnatural causes. An inquest is concerned with establishing the facts of the death, rather than determining the innocence or guilt of any third party. Once the inquest has been completed, the final outcome is a matter of public record. The cause of death as determined by the coroner is recorded in the NDRDI.

NDRDI researchers collect data on closed inquests on site from the 47 coroner districts countrywide. The data are entered directly into the database on laptops secured by encryption. The time between date of death and completion of inquest varies from case to case.[14] Because of this, information on some deaths that occurred during the reporting period was not available from the coroners. The NDRDI database is updated as and when the verdicts from these inquests become available and amended figures will be presented in future publications.

The Hospital In-Patient Enquiry (HIPE) scheme

The Economic and Social Research Institute (ESRI) manages the HIPE scheme. HIPE is a computer-based health information system designed to collect medical and administrative data on discharges and deaths in acute hospitals.

Sixty acute hospitals participate in the HIPE scheme. The estimated coverage of cases discharged from these hospitals was approximately 95.5% between 1999 and 2004.[15] The International Classification of Diseases

(ICD) codes used by HIPE changed over the reporting period (from ICD9 CM to ICD10 AM), which may have led to some small differences in classification of cases.

An automated programme was developed by the HIPE information technology department of the ESRI to extract the required information from the HIPE database on cases who died in hospital and had the appropriate ICD codes. Ninety-eight per cent of HIPE hospitals provided data, which the NDRDI researchers download on site in each hospital.

The Central Treatment List (CTL)
The CTL was established under Statutory Instrument No. 225 following publication of the *Report of the Methadone Treatment Services Review Group 1998*.[16] This list is administered by the Drug Treatment Centre Board on behalf of the Health Service Executive and is a complete register of all clients in Ireland receiving methadone for treatment of opiate misuse. The data on all deaths reported to CTL staff are sent electronically in a secure format to the NDRDI.

The General Mortality Register (GMR)
The Registrar of Births, Deaths and Marriages formally records all notified deaths in Ireland. Using these data, the Central Statistics Office (CSO) categorises each death and the underlying cause of death using ICD codes, and returns this information to the GMR. If the gardaí investigate a death on behalf of the Coroner Service, they also provide supplementary information related to the death to the CSO (Form 104). In the case of each death, only one underlying cause of death and only one external cause, which describes the circumstances under which the death occurred, are recorded. The main disadvantage of this method of recording is that contributory factors, such as drug use, may not be recorded. GMR data is collected on site.

The Family Support Network (FSN)
The FSN was established in 2000 by the CityWide Drugs Crisis Campaign. It consists of national representatives of family support groups, individual family members and those working directly with the families of drug users. Information on drug-related deaths may be given voluntarily by family members to personnel from the Network, who then forward it to the NDRDI. Informed consent is required prior to data collection. The FSN data collection is still in its pilot phase and the analysis presented in this paper does not include data from the FSN.

Ethical approval

Ethical approval for the NDRDI was obtained from the HRB ethics committee and from ethics committees covering each hospital providing HIPE data. Approval for the use of CTL data was obtained from the Methadone Prescribing Protocol Implementation Committee. All work was carried out in accordance with the IEA/European Epidemiology Group guideline document.[17]

Case matching

Cases from the data sources described above were 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 period 1998 to 2005; to avoid duplication and over-estimation of the number of cases, GMR cases with no match are not included in the NDRDI for those years.

Types of cases included in the NDRDI

Poisonings: Deaths directly due to the toxic effect of the presence in the body of a drug or drugs and/or other substance(s). Other terms used to describe such deaths include overdose, directly drug-related death and acute drug death. Deaths arising from adverse reactions to prescribed medication are not included in the NDRDI.

Non-poisonings: Deaths in individuals with a history of drug dependency or non-dependent abuse of drugs (ascertained from toxicology results and from CTL, medical or coronial records), irrespective of whether the use of the drug was directly implicated in the death.

Results

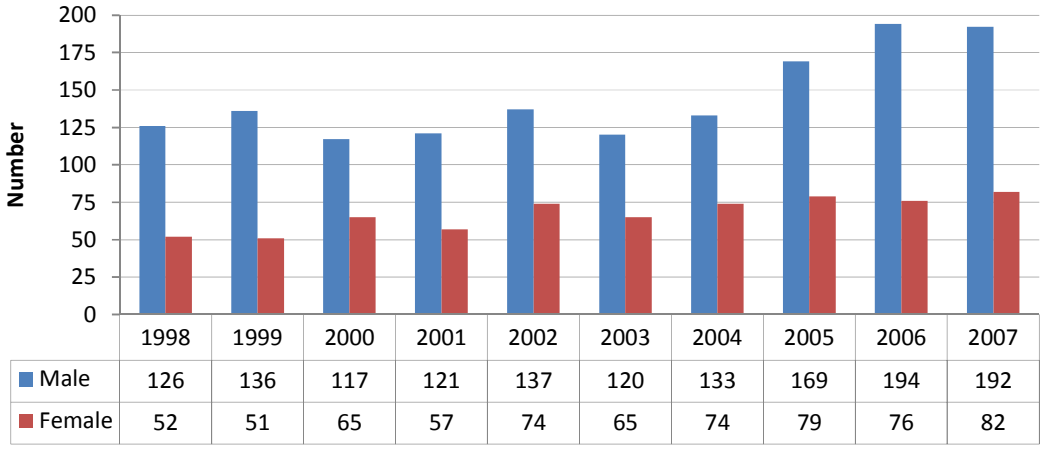
Between 1998 and 2007, 3,465 drug-related deaths and deaths among drug users met the criteria for inclusion in the NDRDI. Data on these cases were obtained from four sources, and almost two-thirds (63.5%, 2,202) appeared in more than one source.

Previously reported figures for the years 1998–2005 have been updated to include data from the Coroner Service from late inquests. Similarly, figures for the years 2006 and 2007 may be revised when data relating to late inquests becomes available.

Table 1 Drug-related deaths, by year of death, NDRDI 1998 to 2007 (N=3,465)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
All deaths	242	271	261	277	338	297	365	447	491	476
Poisoning (n=2120)	178	187	182	178	211	185	207	248	270	274
Non-poisoning (n=1345)	64	84	79	99	127	112	158	199	221	202

Poisoning deaths



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Male	126	136	117	121	137	120	133	169	194	192
Female	52	51	65	57	74	65	74	79	76	82

Figure 1 Poisoning deaths, by gender and by year, NDRDI 1998 to 2007 (N=2,120)

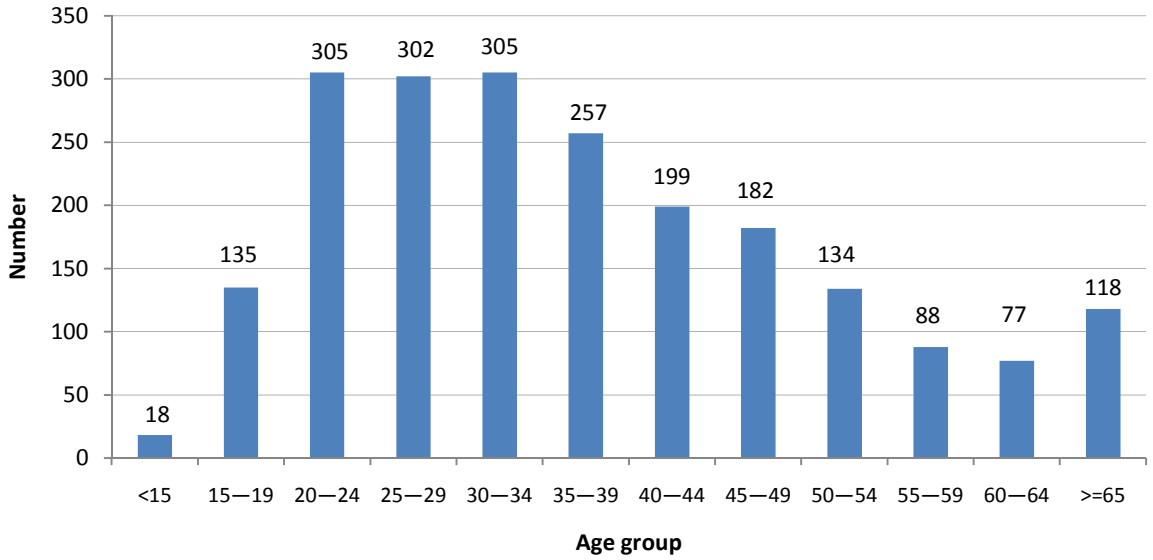


Figure 2 Poisoning deaths, by age group, NDRDI 1998 to 2007 (N=2,120)

Table 2 Poisoning deaths, by median age and by gender, NDRDI 1998 to 2007 (N=2,120)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
						Years				
Median	35	33	35	35	34	36	36	35	34	33
Age range*	19–69	17–67	17–69	20–64	17–64	18–68	20–70	17–64	20–62	18–63
Male	32	31	33	33	33	33	32	32	33	31
Female	42	41	39	37	38	39	47	42	40	40

* Age range presented is the 5th to the 95th percentile (90% of cases are included within this range).

Table 3 Single-drug and polysubstance poisoning deaths, NDRDI 1998 to 2007 (N=2,120)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Poisonings						n (%)				
Single-drug	79	91	82	89	94	84	92	115	141	118
(n=985)	(44.4)	(48.7)	(45.1)	(50.0)	(44.5)	(45.4)	(44.4)	(46.4)	(52.2)	(43.1)
Polysubstance	99	96	100	89	117	101	115	133	129	156
(n=1135)	(55.6)	(51.3)	(54.9)	(50.0)	(55.5)	(54.6)	(55.6)	(53.6)	(47.8)	(56.9)
Total	178	187	182	178	211	185	207	248	270	274

Table 4 Drugs involved in poisoning deaths, NDRDI 1998 to 2007 (N=2,120)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
All deaths*	178	187	182	178	211	185	207	248	270	274	2120	*100*
Heroin	29	48	37	48	46	28	29	48	66	63	442	*20.8*
Methadone	43	37	40	28	39	34	40	43	60	50	414	*19.5*
Other opiates†	39	35	45	54	47	48	65	67	55	55	510	*24.1*
Cocaine	5	5	5	8	14	10	19	36	52	63	217	*10.2*
MDMA	4	8	8	6	10	11	13	10	6	11	87	*4.1*
Benzodiazepines	78	72	73	55	71	62	76	80	113	113	793	*37.4*
Alcohol‡	35	43	38	38	57	49	63	65	53	77	518	*24.4*
Antidepressants	32	34	41	40	47	44	51	54	43	40	426	*20.1*
Other prescription drug§	38	37	35	18	33	37	41	37	39	60	375	*17.7*
Non-opiate analgesics	12	17	11	16	16	11	12	22	13	16	146	*6.9*
Other¶	14	17	13	13	21	14	9	21	21	24	167	*7.9*

* 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 unspecified opiates and analgesics containing an opiate compound.
‡ Alcohol is recorded only when it contributes to a polysubstance death.
§ Includes non-benzodiazepine sedatives, anti-psychotics, cardiac and all other types of medication, including over-the-counter medication.
¶ Includes solvents, insecticides, herbicides, barbiturates, other amphetamines, hallucinogens, cannabis and other chemicals.

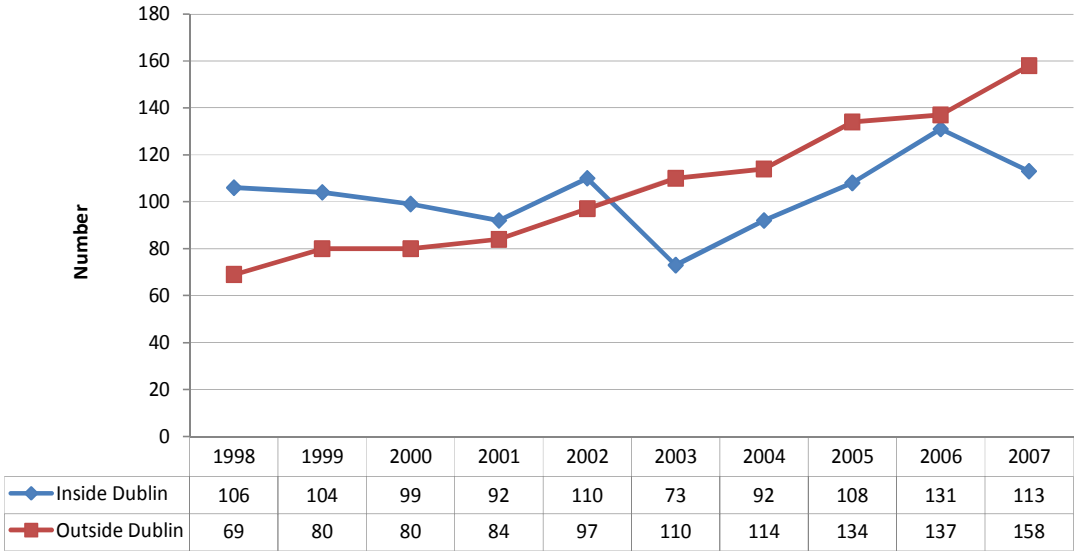


Figure 3 Poisoning deaths, by place of residence, NDRDI 1998 to 2007 (N=2,120)

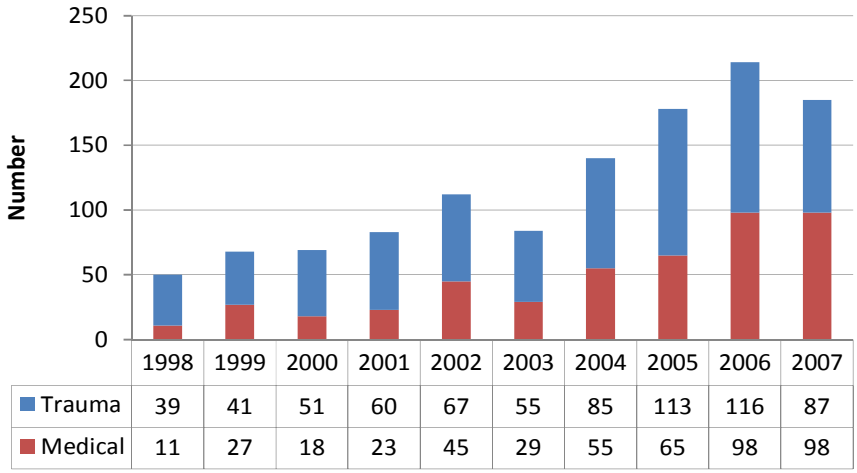
Table 5 Poisoning deaths, by task force area, NDRDI 1998 to 2007 (N=2,120)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
SWRDTF	51	50	44	51	54	30	42	45	60	51
NDRDTF	42	48	48	37	49	38	36	50	69	54
SRDTF	14	23	21	21	29	31	24	28	33	43
ECRDTF	13	15	14	12	19	10	23	32	19	17
SERDTF	10	8	13	12	10	21	20	17	15	27
NERDTF	9	11	8	9	17	10	14	13	17	13
MWRDTF	6	9	9	7	10	16	14	17	12	15
WRDTF	14	10	9	12	~	11	9	13	10	15
MRDTF	~	6	7	9	5	8	10	12	14	9
NWRDTF	6	~	~	~	9	5	9	10	7	~
Other/Unknown	11	~	5	~	5	5	6	11	14	28

~ Less than five cases

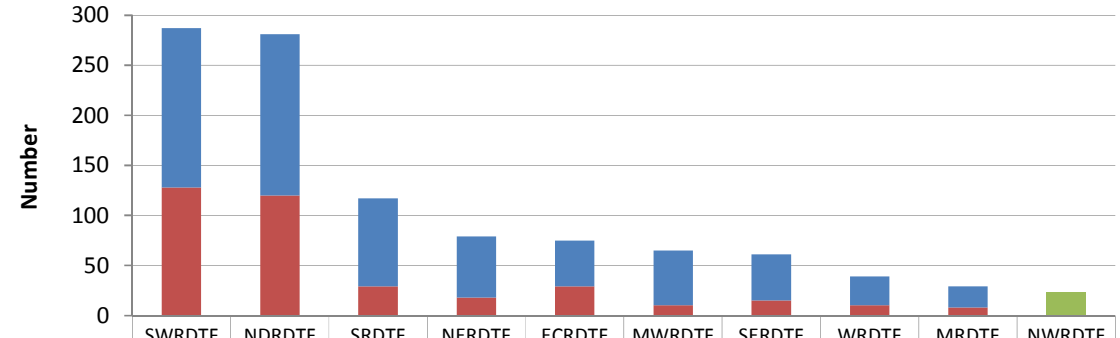
Non-poisoning deaths from traumatic and medical causes

Between 1998 and 2007, 1,345 non-poisoning deaths were recorded among drug users. The cause of death was known in 1,183 (88.0%) of these cases.



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Trauma	39	41	51	60	67	55	85	113	116	87
Medical	11	27	18	23	45	29	55	65	98	98

Figure 4 Non-poisoning deaths among drug users, NDRDI 1998 to 2007 (N=1,183)



	SWRDTF	NDRDTF	SRDTF	NERDTF	ECRDTF	MWRDTF	SERDTF	WRDTF	MRDTF	NWRDTF
Trauma	159	161	88	61	46	55	46	29	21	
Medical	128	120	29	18	29	10	15	10	8	
Combined*										23

Figure 5 Non-poisoning deaths among drug users, by regional drugs task force area, NDRDI 1998 to 2007 (N=1,056)

* Numbers for the two categories are combined as the number of deaths from medical causes was less than five for the reporting period.

Deaths due to trauma

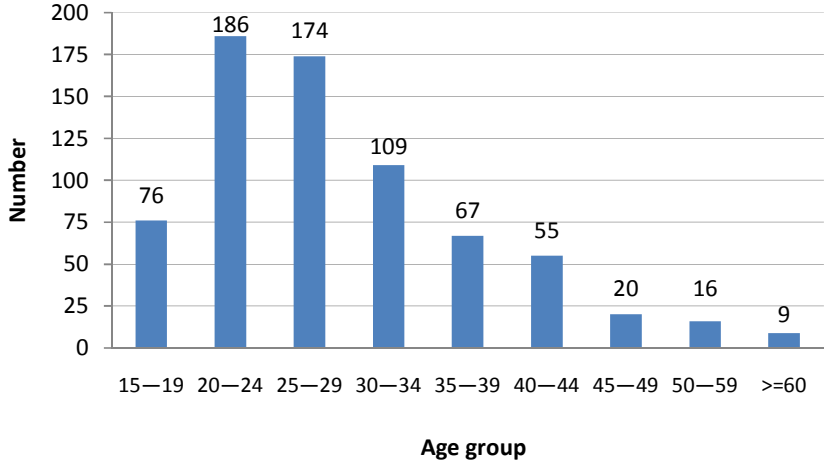


Figure 6 Deaths among drug users due to trauma, by age group, NDRDI 1998 to 2007 (N=714)

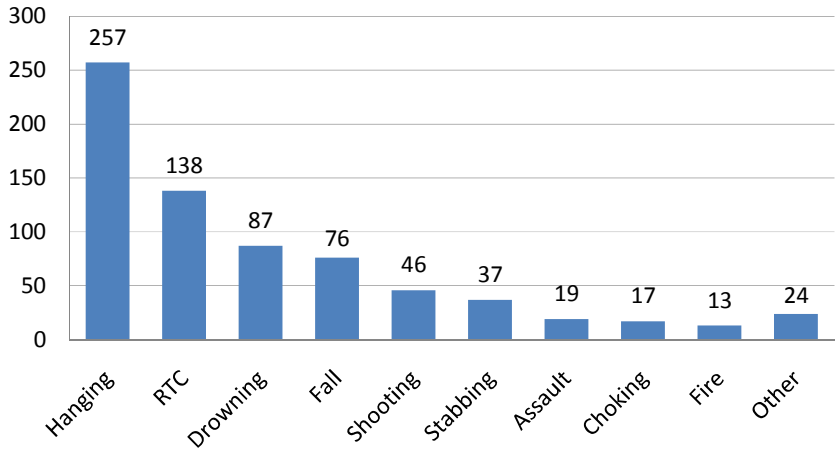
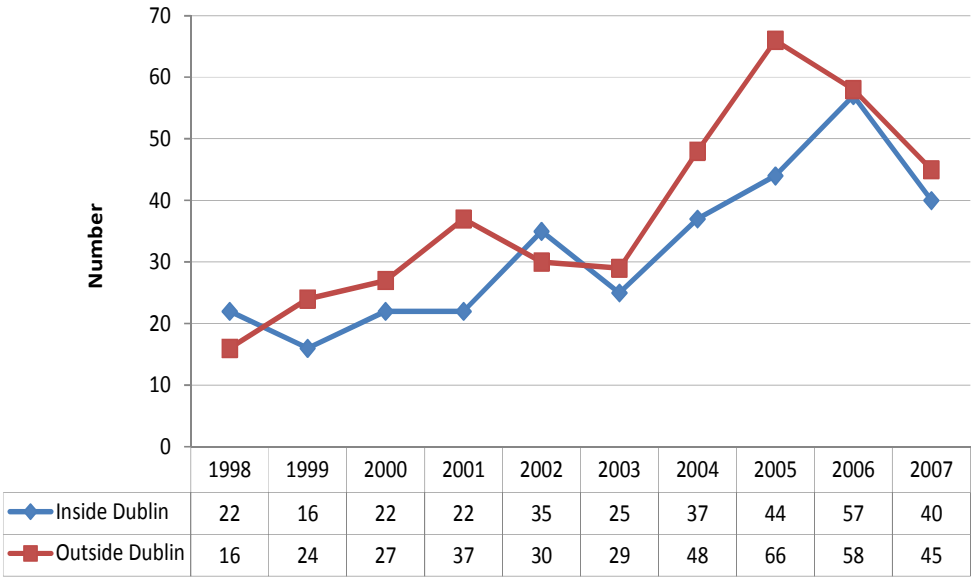


Figure 7 Deaths due to trauma, by type of death, NDRDI 1998 to 2007 (N=714)



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Inside Dublin	22	16	22	22	35	25	37	44	57	40
Outside Dublin	16	24	27	37	30	29	48	66	58	45

Figure 8 Deaths among drug users due to trauma, by place of residence, NDRDI 1998 to 2007 (N=700)

Deaths due to medical causes

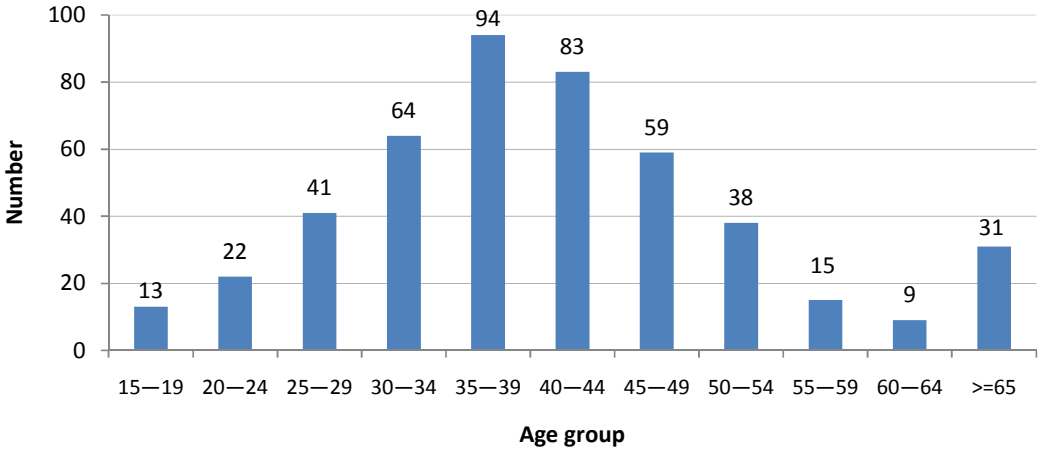


Figure 9 Deaths among drug users due to medical causes, by age group, NDRDI 1998 to 2007 (N=469)

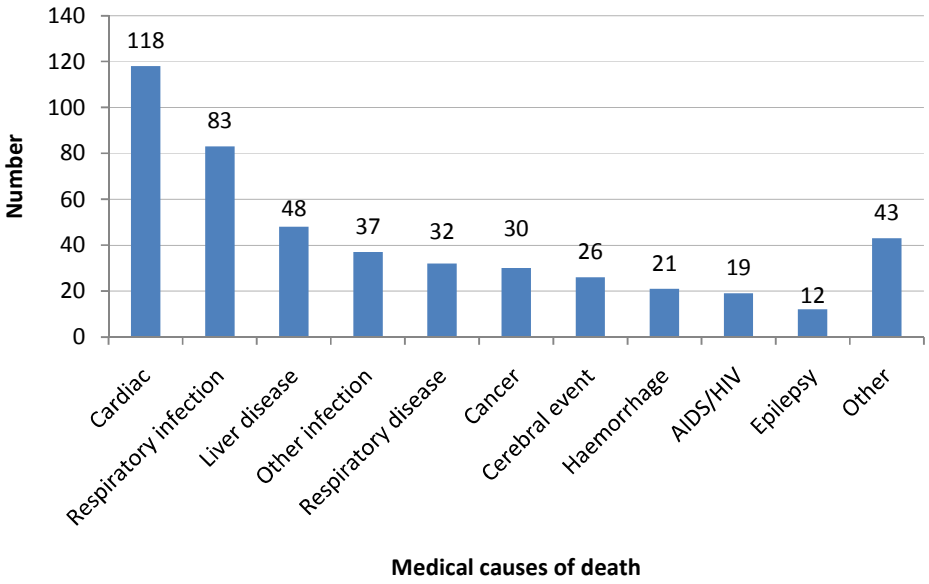
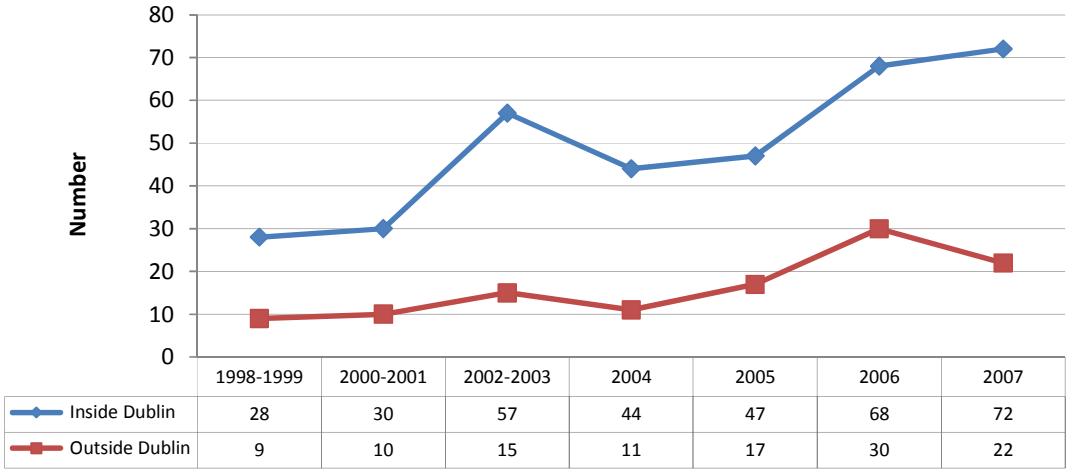


Figure 10 Deaths among drug users due to medical causes, by type, NDRDI 1998 to 2007 (N=469)



	1998-1999	2000-2001	2002-2003	2004	2005	2006	2007
Inside Dublin	28	30	57	44	47	68	72
Outside Dublin	9	10	15	11	17	30	22

Figure 11 Deaths among drug users due to medical causes, by place of residence, NDRDI 1998 to 2007 (N=460)

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