HRB **Trends** Series

9

Problem benzodiazepine use in Ireland: treatment (2003 to 2008) and deaths (1998 to 2007)

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National Drug Treatment Reporting System and National Drug-Related Deaths Index

Contents

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Summary

The data presented in this paper describe trends in problem benzodiazepine use in Ireland. The paper describes treated problem benzodiazepine use as recorded by the National Drug Treatment Reporting System (NDTRS) for the years 2003–2008, and poisoning deaths where a benzodiazepine was implicated as recorded by the National Drug-Related Deaths Index (NDRDI) for the years 1998–2007. This is the first time that data from the NDTRS and the NDRDI have been presented together in a Trends Series paper. The presentation of these data together provides a more complete picture of problem benzodiazepine use and its consequences.

It is important to note that the NDTRS collects data on episodes of treatment in a calendar year, rather than on the individual person treated. This means that individuals may appear in the figures more than once if they receive treatment at more than one centre or at the same centre more than once a year. The NDRDI records and then matches data from four different sources on drug-related deaths and deaths among drug users and among those who are alcohol dependent.

The main findings from the analysis are:

In the period 2003–2008 the annual number of treated cases reporting a benzodiazepine as a problem substance increased by just over 63%, from 1,054 in 2003 to 1,719 in 2008.

For each case entering treatment the NDTRS records the main problem substance and up to three additional substances. The number of treated cases each year who reported a benzodiazepine as their **main** problem substance was relatively small, but increased by 120%, from 76 in 2003 to 167 in 2008. The number of cases who reported a benzodiazepine as an **additional** problem substance was much larger, and increased by 59%, from 982 in 2003 to 1,562 in 2008.

The incidence of treated problem benzodiazepine use among the 15–64-year-old population living in Ireland increased from eight per 100,000 in 2003 to 19 in 2008. The number of new cases entering treatment is an indirect indicator of recent trends and points to an increase in benzodiazepine use over the six-year period.

The prevalence of cases treated for problem benzodiazepine use among the 15–64-year-old population living in Ireland increased from 39 per 100,000 in 2003 to 56 in 2008. This indicates that problem benzodiazepine use is a chronic, recurring health condition that requires repeated episodes of treatment over time.

The increase in the number of treated benzodiazepine cases may be explained by a combination of factors: an increase in the number of treatment places, an increase in problem benzodiazepine use among the population and an increase in reporting to the NDTRS.

Between 1998 and 2007, benzodiazepines were implicated in nearly one third (31%) of all deaths by poisoning, with the annual number increasing from 65 in 1998 to 88 in 2007.

The annual rate of death by poisoning where a benzodiazepine was implicated increased from two per 100,000 of the 15–64-year-old population in 2003 to three per 100,000 in 2006; the rate decreased slightly in 2007.

When the incidence of treated benzodiazepine cases was examined by place of residence, it was found that the rate differed depending on whether the benzodiazepine was reported as a main or an additional problem substance. Up until 2007, the incidence of cases reporting a benzodiazepine as their **main** problem substance was higher outside Dublin than in Dublin (city and county). However, for cases reporting a benzodiazepine as an **additional** problem substance, the incidence was consistently higher in Dublin than outside Dublin.

When deaths were examined by place of residence, it was found that the annual death rate was consistently higher in Dublin than outside Dublin.

The majority of cases (78%) treated for a benzodiazepine as their **main** problem substance reported the use of more than one problem substance. Alcohol was the most common additional problem substance, reported by 52% of cases, followed by cannabis (43%) and opiates (40%). The main problem substances reported where a benzodiazepine was the **additional** problem substance were opiates (80%) and, to a much lesser extent, alcohol (9%), cannabis (5%), and cocaine (5%). It is generally accepted that the use of several substances increases the complexity of these cases and is associated with poorer treatment outcomes.

The additional substances most frequently involved in poisoning deaths where a benzodiazepine was implicated were alcohol (41%) and methadone (36%).

Almost all treated cases (98%) reported taking benzodiazepines orally, and less than 1% reported injecting benzodiazepines. The number of cases reported as injecting benzodiazepines may be under-estimated because of the way the data are recorded by the NDTRS, whereby only one route of administration is recorded. The majority of cases (64%) reported using benzodiazepines daily.

The median age of new cases entering treatment for a benzodiazepine as their **main** problem substance decreased from 34 to 25 years over the reporting period, while the median age of previously treated cases remained stable, ranging between 27 and 29 years. The median age of cases entering treatment and reporting a benzodiazepine as an **additional** problem substance increased over the reporting period from 24 to 26 years for new cases, and from 27 to 30 years for previously treated cases.

While numbers were small, the proportion of both new and previously treated cases who were aged under 18 years increased over the six-year period. The proportion of under-18s was higher among cases reporting a benzodiazepine as their **main** problem substance (10%) than among cases reporting a benzodiazepine as an **additional** problem substance (4%).

The median age of those who died as a result of poisoning where a benzodiazepine was implicated ranged between 33 and 39 years over the reporting period. Just over half (51%) were not alone at the time of their death. The majority of poisonings occurred in a private dwelling.

NDRDI and NDTRS data were further analysed by gender and age and, in the case of NDTRS data, by history of problem opiate use.

Approximately 70% of all benzodiazepine cases treated in the period 2003–2008 were men and the proportion was the same for new cases and for previously treated cases. However, the male to female ratio differed depending on whether benzodiazepines were reported as a main or an additional problem substance. Over the six-year period, women accounted for 40% of cases with a benzodiazepine as their **main** problem and 30% of cases with a benzodiazepine as an **additional** problem substance.

Among those who reported a benzodiazepine as their **main** problem substance and who had no history of opiate use, there were higher proportions of female cases in the older age groups and higher proportions of male cases in the younger age groups.

Similarly, among those who died, there were higher proportions of females in the older age groups and higher proportions of males in the younger age groups.

The analysis has identified different groups within the population of problem benzodiazepine users. Age, gender, history of opiate use and whether benzodiazepines are a main or an additional problem substance are all factors that need to be considered within current service provision when treating this population.

An online Appendix to this Trends Series paper, containing additional tables and figures with supplementary data from the NDTRS, is available on the National Documentation Centre on Drug Use website at www.drugsandalcohol.ie/14288

Glossary

- **Benzodiazepines** constitute a group of some 33 chemically similar drugs which by depressing the central nervous system can reduce anxiety and/or induce sleep.
- **Drug users:** individuals who have a history of drug dependency or of non-dependent abuse of drugs and/or other substances
- **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)
- 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, 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.
- **Incidence** is the number of new cases of disease or events that develop among a population during a specified time interval. As an example, in 2007, in a county with a population of 31,182, 10 opiate users sought treatment for the first time in 2007. The incidence is the number of new cases treated divided by the county population, expressed per given number of the population, i.e., per 100, per 1,000, per 10,000, per 100,000 etc.

  The rate in this example may be calculated as follows: (10/31,182) x 100,000, which gives an incidence rate of 32 per 100,000 of the county population in 2007.

- **Prevalence** is the proportion of people in a population who have a disease or condition at a specific point or period in time. As an example, in 2007, in a county with a population of 31,182, 10 opiate users sought treatment for the first time, 20 returned to treatment and five continued in treatment from the previous year, giving a total of 35 people treated for problem opiate use in the year. The prevalence is the total number of cases divided by the county population, expressed per given number of the population, i.e., per 100, per 1,000, per 10,000, per 100,000 etc.

  The rate in this example may be calculated as follows: (35/31,182) x 100,000, which gives a prevalence rate of 112 per 100,000 of the county population in 2007.

- **Health Service Executive (HSE):** Health care is provided through four HSE regions and 32 local health offices (LHOs). The local health offices are based on the geographical boundaries of the former community care areas. The table below presents the current HSE structure.

HSE regions	Local health offices		
HSE Dublin North East	Dublin North West	Dublin North	Louth
	Dublin North Central	Cavan/Monaghan	Meath
HSE Dublin Mid-Leinster	Dublin South	Dublin South West	Wicklow
	Dublin South East	Dublin West	Longford/Westmeath
	Dublin South City	Kildare/West Wicklow	Laois/Offaly
HSE South	Cork South Lee	North Cork	Tipperary South
	Cork North Lee	Kerry	Waterford
	West Cork	Carlow/Kilkenny	Wexford
HSE West	Donegal	Mayo	
	Sligo/Leitrim/West Cavan	Roscommon	
	Galway	Tipperary North/East	Limerick
		Limerick	Clare

- The data in this paper relating to the average annual incidence of treated problem substance use and place of residence of treated cases living in Ireland are presented by regional drugs task force areas. The 10 regional drugs task forces were created to service the areas covered by the former health boards.

  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:

Drugs 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

Acronyms

AIDS	Acquired immune deficiency syndrome
CSO	Central Statistics Office
CTL	Central Treatment List
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
EU	European Union
FSN	Family Support Network
GMR	General Mortality Register
GP	General practitioner
HIPE	Hospital In-Patient Enquiry scheme
HIV	Human immunodeficiency virus
HRB	Health Research Board
HSE	Health Service Executive
LDTF	Local drugs task force
MDMA	3,4-methylenedioxymethamphetamine, also known as ecstasy
NDRDI	National Drug-Related Deaths Index
NDS	National Drugs Strategy (interim) 2009–2016
NDTRS	National Drug Treatment Reporting System
NHIS	National Health Information Systems
RDTF	Regional drugs task force

Introduction

The benzodiazepine class of psychoactive drugs is one of the most commonly prescribed medications in the world.[1] These drugs are used to treat a range of conditions, such as anxiety, insomnia and seizures.[1-3] Benzodiazepines are generally considered safe for short-term use; however, the risk of overuse, abuse and dependence when used for longer periods has been well documented.[2] An overdose of benzodiazepine can cause respiratory depression, coma and death.[2, 4] Benzodiazepines can also amplify the depressant effects of other drugs, including alcohol and opiates, so increasing the risk of overdose in polysubstance use.[1-3]

A national drug prevalence survey in 2006/7 examined the use of sedatives and tranquillisers (which include benzodiazepines) in the adult population (aged 15–64) in Ireland (Table 1).[5] Almost 11% of those surveyed reported having used such drugs at some point in their lives, with the proportion varying by age and by gender. Use was reported by a higher proportion of older adults (15%) than young adults (6%), and by a higher proportion of females (13%) than males (8%). The average age at first use was 29 years for males and 31 years for females. This survey also found that over half (57%) of those who had used sedatives or tranquillisers in the previous month (current users) had taken them daily. The survey did not record the type(s) of sedative and tranquilliser used.

Table 1 Prevalence of sedative and tranquilliser use in Ireland, 2006/7

	Adults 15–64 years %	Males 15–64 years %	Females 15–64 years %	Young adults 15–34 years %	Older adults 35–64 years %
Lifetime (ever used)	10.5	8.0	13.2	5.9	14.6
Last year (recent use)	4.7	3.7	5.7	2.5	6.5
Last month (current use)	3.0	2.4	3.5	1.3	4.4

Source: NACD and DPHIRB (2009)

The National Drug Treatment Reporting System (NDTRS) and the National Drug-Related Deaths Index (NDRDI) are epidemiological databases co-ordinated by the National Health Information Systems (NHIS) staff of the Health Research Board (HRB). The NDTRS records information on treated drug and alcohol misuse in Ireland on behalf of the Department of Health and Children. The NDRDI records information on drug- and alcohol-related deaths in Ireland on behalf of the Department of Health and Children and the Department of Justice and Law Reform.

Background and Methods

National Drug Treatment Reporting System (NDTRS)

The monitoring role of the NDTRS was first recognised by the Government in the document *Building on experience: National Drugs Strategy 2001–2008*.[6] The collection and reporting of data to the NDTRS was one of the actions identified and agreed by Government for implementation by the former health boards (now HSE regions).

The *National Drugs Strategy (interim) 2009–2016*[7] (NDS) recognises the positive impact of the NDTRS on the development of key indicators, stating that '...the information provided through the NDTRS provide[s] significant insights into the patterns of problem drug use', and that 'drug treatment data has also improved substantially through the NDTRS...' (p. 69). The NDS also recommends the continuation and further development of data-collection systems, including the NDTRS (Action 49).

The NDTRS was established in 1990 in the Greater Dublin Area and was extended in 1995 to cover all areas of the country. It was developed in line with the Pompidou Group's Definitive Protocol[8] and subsequently refined in accordance with the Treatment Demand Indicator Protocol.[9]

Originally designed to record drug misuse, the NDTRS recorded problematic use of alcohol only in cases where it was an additional problem substance, that is, where the client's main reason for entering treatment was drug misuse but he/she also reported problematic use of alcohol. In 2004, the remit of the NDTRS was extended to include cases where alcohol is recorded as the main or only reason for seeking treatment. The overlap between problem use of alcohol and that of other drugs has been identified in the strategic plans of a number of drugs task forces, which have emphasised the need for treatment services that can address the many forms of drug and polysubstance use.

Alcohol and other drug treatment data are viewed as an indirect indicator of drug and alcohol misuse, as well as a direct indicator of demand for treatment services. NDTRS data are used at national level (alcohol and drug data) and at European level (drug data) to provide information on the characteristics of clients entering treatment and on patterns of substance misuse, such as types of substance used and consumption behaviours. Drug data are 'valuable from a public health perspective to assess needs, … and to plan and evaluate services'.[10]

The HRB supplies service providers and policy makers with relevant data from the NDTRS to inform local and national substance misuse policy and planning. In recent years this information has been central to drug strategy and policy decisions:

- In 1996 NDTRS data were used to identify a number of local areas with problematic heroin use.[11] These areas were later designated as local drugs task force (LDTF) areas, and task force teams have continued to provide strategic responses to drug misuse in their communities.
- In 2004 NDTRS data were used to describe treatment-seeking characteristics and behaviours of those aged under 18 years and to inform the deliberations of the Working Group on treatment of under-18-year-olds.[12]
- In 2007 NDTRS data were used to inform some of the recommendations of the Working Group on drugs rehabilitation, and by the Working Group on residential services to help estimate the number of residential places required to address severe alcohol and drug problems in Ireland.[13]
- In 2009 the Comptroller and Auditor General used data from the NDTRS in a special report which examined treatment and rehabilitation services provided for persons with drug addictions.[14]
- In 2009 the NDS steering group used NDTRS data extensively to assess progress under the previous strategy.[7]

Treatment for problem benzodiazepine use in Ireland is provided by statutory and non-statutory services, including residential centres, community-based addiction services, general practices and prison services.

For the purpose of the NDTRS, treatment is broadly defined as any activity which aims to ameliorate the psychological, medical or social state of individuals who seek help for their substance misuse problems. Clients who attend needle-exchange services are not included in this reporting system. Treatment options for problem benzodiazepine use include one or more of the following: medication, psychiatric treatment, brief intervention, counselling (including cognitive behavioural therapy), medication-free therapy, family therapy, complementary therapy, and/or life-skills training.

Compliance with the NDTRS requires that one form be completed for each new client coming for first treatment and for each previously treated client returning to treatment for problem substance use. Service providers at treatment centres throughout Ireland collect data on episodes of treatment, rather than on the individual person treated each year. HRB staff compile anonymous, aggregated data, which are analysed and reported at national and EU levels.

The main elements of the reporting system in the context of this paper are defined as follows:

All cases treated – describes individuals who receive treatment for problem benzodiazepine use at each treatment centre in a calendar year, and includes:

– *Previously treated cases* – describes individuals who were treated previously for problem benzodiazepine or other drug use at any treatment centre and have returned to treatment for problem benzodiazepine use in the reporting year;

– *New cases treated* – describes individuals who have never been treated for problem benzodiazepine or other drug use; and

– *Status unknown* – describes individuals whose status with respect to previous treatment for problem benzodiazepine or other drug use is not known.

In the case of the data for 'previously treated cases', there is a possibility that individuals appear more than once in the database, for example, where a person receives treatment at more than one centre or at the same centre more than once per year.

National Drug-Related Deaths Index (NDRDI)

The NDRDI was established in September 2005 to comply with Action 67 of the 2001–2008 National Drugs Strategy.[6] 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 objectives of the NDRDI also include identifying and prioritising areas for intervention and prevention, and measuring the effects of such interventions.

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.

Data from the NDRDI were used to inform the current National Drugs Strategy[7] and the development of the proposed National Overdose Prevention Strategy.

In order to ensure a complete and accurate database, the NDRDI records data from several sources: the Coroner Service, the Hospital In-Patient Enquiry scheme (HIPE), the Central Treatment List (CTL), the General Mortality Register (GMR) and the community representative body, Family Support Network (FSN) (still in the pilot phase).

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 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.

Drug use can lead to premature death from a range of causes.[15] 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). For the purposes of this paper, this type of directly drug-related 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. For the purposes 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;[16-19]
- actions taken while under the influence of drugs, such as accidents caused by impaired judgement or exacerbation of risky behaviours;[15, 16]
- psychiatric illness as a co-morbid condition, which places the individual at a greater risk of suicide.[15, 20-22]

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

While the NDRDI has retrospectively recorded data from 2004 on alcohol-related deaths and deaths among those who are alcohol dependent, 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.

Analysis

The data presented in this paper provide a description of treated problem benzodiazepine use in Ireland between 2003 and 2008. Data for the years 1998–2007 on poisoning deaths where benzodiazepines were implicated are also presented. This analysis does not include non-benzodiazepine sedatives such as zopiclone or zolpidem (known colloquially as ‘Z-drugs’).

The analysis provides an outline of the following:

- treatment provision;
- number of deaths;
- incidence and prevalence;
- place of residence;
- other substances used in conjunction with/or implicated with a benzodiazepine;
- patterns of use and socio-demographic characteristics of cases; and
- gender, age and history of opiate use of treated cases.

Treatment provision

A total of 8,064 cases presented with a benzodiazepine as a problem substance in the six years 2003–2008, which represents 12.3% of all cases treated for problem substance use during that period. The HSE region of residence was known for 7,361 of those 8,064 cases. The following analysis excludes cases not normally resident in Ireland and cases whose HSE region of residence is not known.

The total number of cases reporting a benzodiazepine as a problem substance (either as a main or an additional problem) increased by 63% in the six-year period, from 1,054 in 2003 to 1,719 in 2008 (Table 2). The majority of benzodiazepine cases each year were treated in outpatient services, with the proportion ranging between 65% in 2004 and 82% in 2006. The number and proportion of benzodiazepine cases treated in inpatient services increased during the reporting period. The numbers of cases treated in low-threshold and general practice settings were small and, in fact, decreased over the six-year period. In 2008, 76% of all benzodiazepine cases were treated as outpatients and 20% as inpatients.

Table 2 All benzodiazepine cases entering treatment, by type of service provider (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases	1054		1026		1115		1222		1225		1719	
Outpatient	788	(74.8)	666	(64.9)	855	(76.7)	998	(81.7)	830	(67.8)	1303	(75.8)
Inpatient	123	(11.7)	186	(18.1)	155	(13.9)	157	(12.8)	330	(26.9)	341	(19.8)
Low threshold	65	(6.2)	90	(8.8)	54	(4.8)	39	(3.2)	29	(2.4)	41	(2.4)
General practitioner	76	(7.2)	84	(8.2)	51	(4.6)	28	(2.3)	36	(2.9)	34	(2.0)
Provider not known	2	(0.2)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)

Incidence and prevalence

Numbers treated for problem benzodiazepine use

The annual number of cases who reported a benzodiazepine as their **main** problem substance was small, but increased over the reporting period from 76 in 2003 to 167 in 2008 (Table 3). The number of cases who reported a benzodiazepine as an **additional** problem substance was much larger, and increased by 59%, from 982 in 2003 to 1,562 in 2008.

Overall, the number of **new cases** in treatment increased by 169% over the period, from 214 in 2003 to 576 in 2008, while the number of **previously treated cases** increased by 36%, from 816 to 1,113.

The number of new cases reporting a benzodiazepine as their **main** problem substance was small, but increased by 174%, from 27 cases in 2003 to 74 in 2008.

In the six-year period, the proportion of cases reporting a benzodiazepine as their **main** problem substance was higher among new cases (16%) than among previously treated cases (6%). Nearly half (48%) of cases reporting a benzodiazepine as their main problem substance were new cases.

Twenty-eight cases reported one type of benzodiazepine as their **main** problem substance and another type as an **additional** problem substance. Three-quarters of benzodiazepine cases treated in the years 2003–2008 did not specify the type of benzodiazepine used. Of those who did specify the type, 77% used diazepam.

Table 3 Benzodiazepine cases entering treatment, by treatment status (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases*	1054		1026		1115		1222		1225		1719	
Benzodiazepine as a main problem	76	(7.2)	103	(10.0)	75	(6.7)	96	(7.9)	163	(13.3)	167	(9.7)
Benzodiazepine as an additional problem	982	(93.2)	928	(90.4)	1044	(93.6)	1129	(92.4)	1064	(86.9)	1562	(90.9)
Previously treated cases*	816		758		810		839		787		1113	
Benzodiazepine as a main problem	49	(6.0)	50	(6.6)	30	(3.7)	40	(4.8)	72	(9.1)	87	(7.8)
Benzodiazepine as an additional problem	770	(94.4)	711	(93.8)	782	(96.5)	802	(95.6)	715	(90.9)	1032	(92.7)
New cases*	214		231		275		352		415		576	
Benzodiazepine as a main problem	27	(12.6)	47	(20.3)	42	(15.3)	50	(14.2)	85	(20.5)	74	(12.8)
Benzodiazepine as an additional problem	188	(87.9)	186	(80.5)	235	(85.5)	302	(85.8)	332	(80.0)	505	(87.7)
Treatment status unknown	24		37		30		31		23		30	

* The sum of 'main problem' and 'additional problem' cases may exceed the total number of cases in these treatment status categories as some cases reported one type of benzodiazepine as their main problem substance and another type of benzodiazepine as an additional problem substance.

Drug-related deaths where benzodiazepines were implicated

Between 1998 and 2007, benzodiazepines were implicated in 649 deaths, which accounted for 31% of all deaths by poisoning recorded by the NDRDI for the ten-year period (Table 4).

The number of deaths in which benzodiazepines were implicated increased from 65 in 1998 to 88 in 2007. Almost all of the deaths (633, 98%) were polysubstance poisonings, implicating at least one other drug alongside a benzodiazepine. Of the 633 polysubstance deaths, a proportion involved more than one type of benzodiazepine: 113 (18%) involved two different types; and 13 (2%) involved three to four different types.

Table 4 Percentage of poisonings where benzodiazepines were implicated (NDRDI 1998–2007)

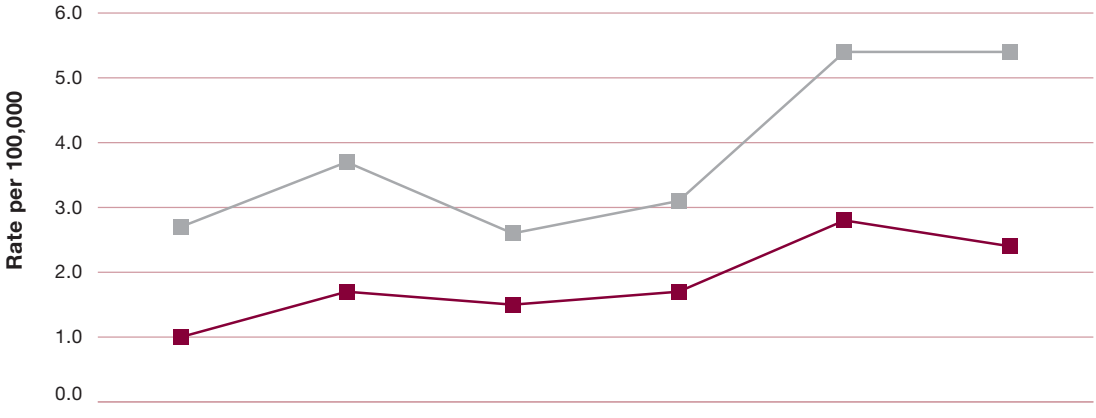
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Total poisonings (n = 2,120)	178	187	182	178	211	185	207	248	270	274
Benzodiazepines (n = 649)	65 (36.5)	56 (29.9)	61 (33.5)	47 (26.4)	61 (28.9)	54 (29.2)	63 (30.4)	66 (26.6)	88 (32.6)	88 (32.1)

History of drug treatment is not routinely recorded by all the data sources used by the NDRDI. Nevertheless, it was possible to ascertain that 174 (26.8%) of those who died in the ten-year period had received treatment for problem substance use at some point, and that 143 cases were in treatment for problem substance use at the time of their death.

Annual rates

Annual rates for the incidence (new cases) and prevalence (all cases) of treated benzodiazepine use are expressed per 100,000 of the population aged 15–64 years, based on census figures for 2003 to 2006 and CSO estimated figures for 2007 and 2008.[23, 24]

Figure 1 presents the annual incidence and prevalence rates of cases treated for a benzodiazepine as their **main** problem substance. The incidence increased from 1.0 in 2003 to 2.4 in 2008. The number of new cases entering treatment is an indirect indicator of recent trends and points to an increase in benzodiazepine use over the six-year period. The prevalence increased from 2.7 in 2003 to 5.4 in 2008. This indicates that problem benzodiazepine use is a chronic, recurring health condition that requires repeated episodes of treatment over time.



	2003	2004	2005	2006	2007	2008
Incidence (new cases)	1.0	1.7	1.5	1.7	2.8	2.4
Prevalence (total cases)	2.7	3.7	2.6	3.1	5.4	5.4

Figure 1 Incidence and prevalence of cases treated for a benzodiazepine as their main problem substance, per 100,000 of the 15–64-year-old population (NDTRS 2003–2008)

Figure 2 presents the annual incidence and prevalence of cases treated for benzodiazepines as a **main** or an **additional** problem substance, alongside the rate of poisoning deaths where benzodiazepines were implicated (data not available for 2008). The prevalence of treated cases increased from 39 in 2003 to 56 in 2008 and the incidence increased from eight in 2003 to 19 in 2008. The rate of death per 100,000 increased between 2003 and 2006, but decreased slightly in 2007.

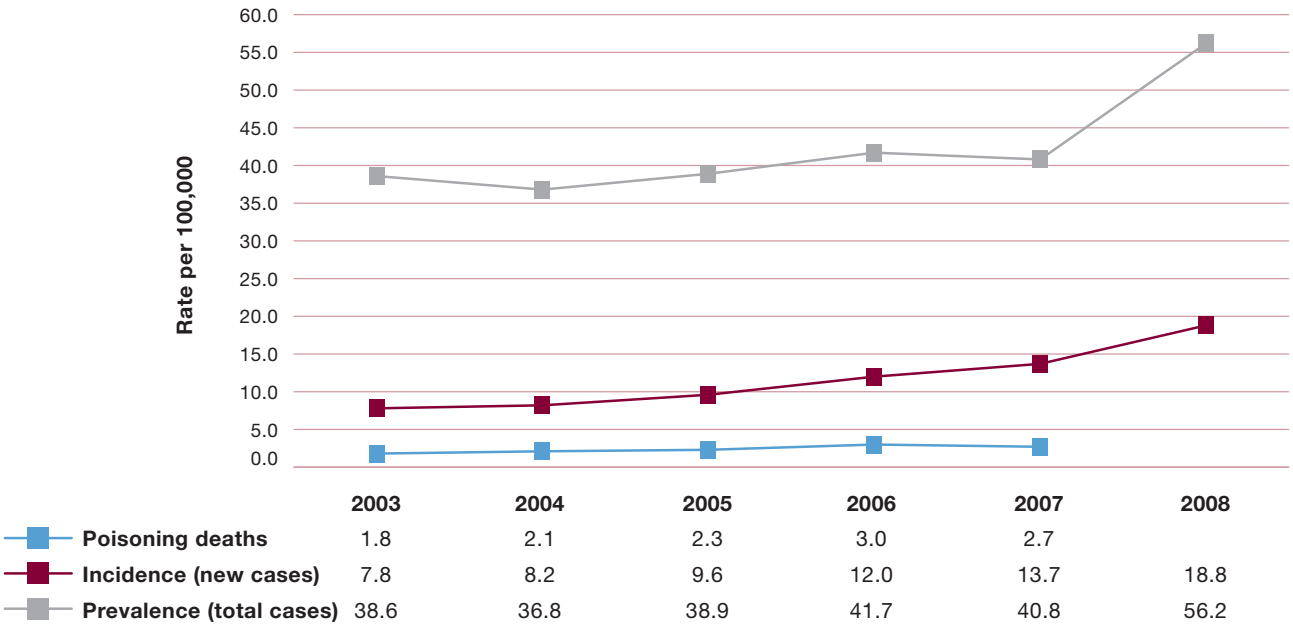


Figure 2 Incidence and prevalence of all treated benzodiazepine cases and rate of death, per 100,000 of the 15–64-year-old population (NDTRS 2003–2008 and NDRDI 2003–2007)

Place of residence

The annual numbers of treated benzodiazepine cases were analysed by place of residence, as in Dublin (city and county) or outside Dublin. Overall, 68% of benzodiazepine cases in the six-year period were living in Dublin at the time of entry into treatment. Just over half (51%) of **new cases** lived outside Dublin; the majority (75%) of **previously treated cases** lived in Dublin.

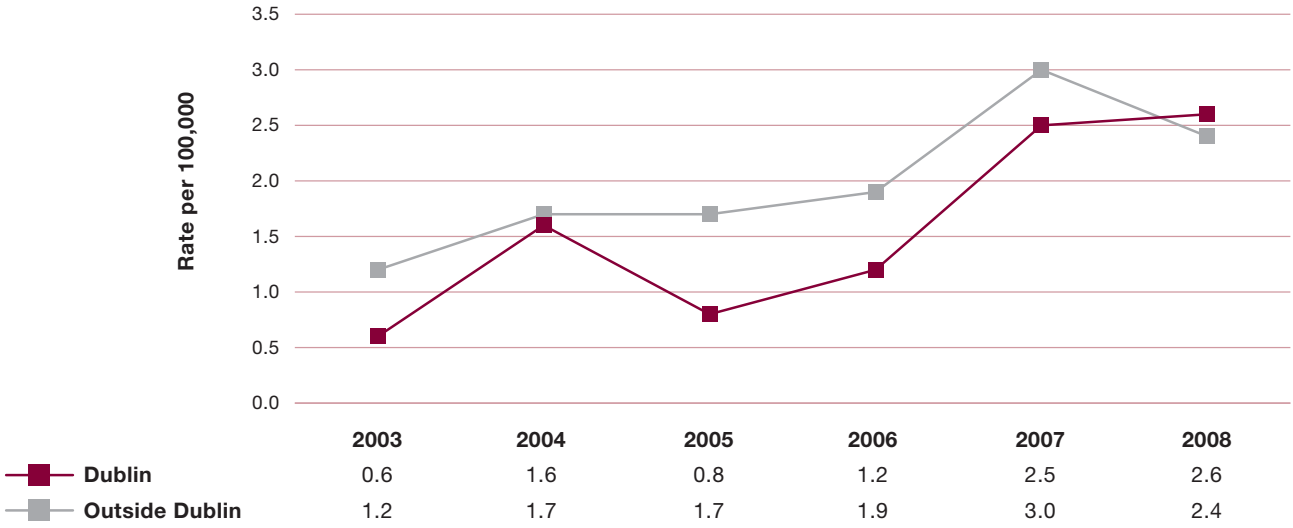
Table 5 presents new cases who reported benzodiazepines as a **main** or an **additional** problem substance, by place of residence. Three quarters (75%) of new cases reporting a benzodiazepine as their **main** problem substance lived outside Dublin, whereas the proportion of new cases reporting a benzodiazepine as an **additional** problem substance was higher in Dublin (54%).

Table 5 New benzodiazepine cases entering treatment, by place of residence (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
New cases	214		231		275		352		415		576	
Dublin	134	(62.6)	127	(55.0)	142	(51.6)	166	(47.2)	167	(40.2)	278	(48.3)
Outside Dublin	80	(37.4)	104	(45.0)	133	(48.4)	186	(52.8)	248	(59.8)	298	(51.7)
Benzodiazepine as a main problem	27		47		42		50		85		74	
Dublin	5	(18.5)	13	(27.7)	7	(16.7)	10	(20.0)	22	(25.9)	23	(31.1)
Outside Dublin	22	(81.5)	34	(72.3)	35	(83.3)	40	(80.0)	63	(74.1)	51	(68.9)
Benzodiazepine as an additional problem	188		186		235		302		332		505	
Dublin	129	(68.6)	114	(61.3)	135	(57.4)	156	(51.7)	146	(44.0)	255	(50.5)
Outside Dublin	59	(31.4)	72	(38.7)	100	(42.6)	146	(48.3)	186	(56.0)	250	(49.5)

In order to adjust for variation in population size, the annual incidence of treated benzodiazepine use was calculated by dividing the number of new cases living either in or outside Dublin by the population aged 15–64 years living in the respective geographical areas, using the census figures for 2003 to 2006 and CSO estimated figures for 2007 and 2008.

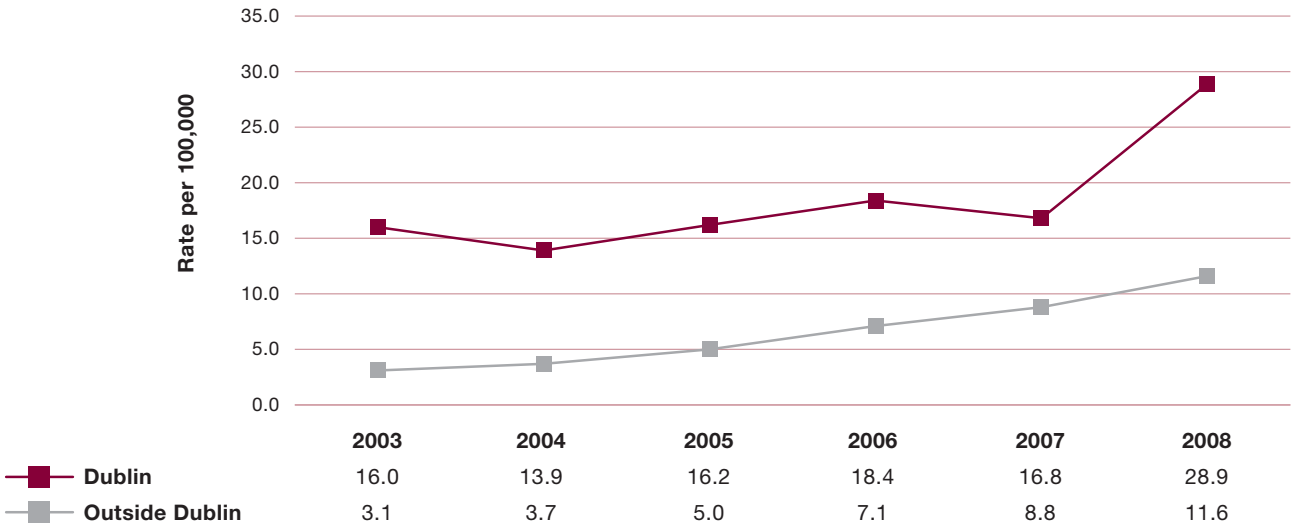
Up until 2007 the incidence of cases reporting a benzodiazepine as their **main** problem substance and living outside Dublin was consistently higher than that of cases living in Dublin (Figure 3). In 2008 the incidence of cases living in Dublin exceeded that of cases living outside Dublin.



	2003	2004	2005	2006	2007	2008
Dublin	0.6	1.6	0.8	1.2	2.5	2.6
Outside Dublin	1.2	1.7	1.7	1.9	3.0	2.4

Figure 3 Incidence of treated cases reporting a benzodiazepine as their main problem substance, by place of residence per 100,000 of the 15–64-year-old population (NDTRS 2003–2008)

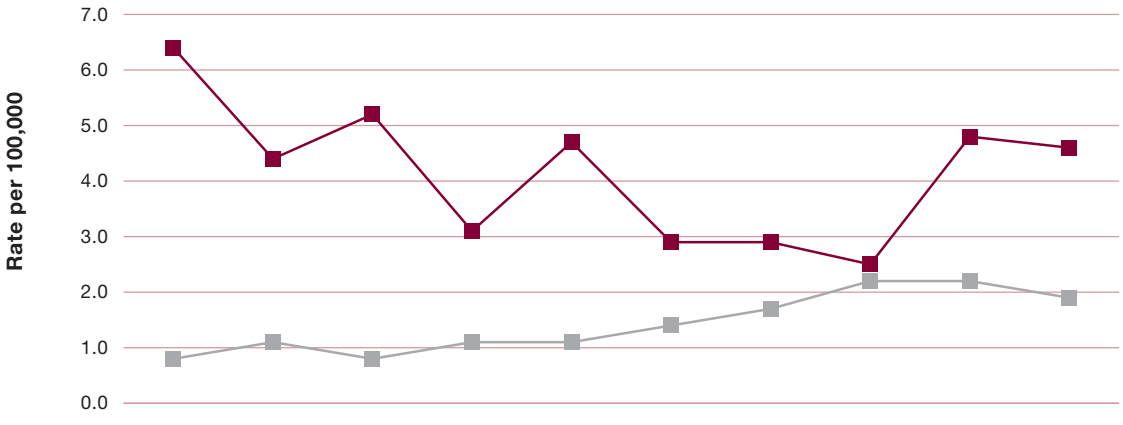
The incidence of cases reporting a benzodiazepine as an **additional** problem substance and living in Dublin was higher than the incidence of those living outside Dublin in each of the years examined (Figure 4). The incidence of cases outside Dublin increased steadily over the six-year period, while the incidence in Dublin fluctuated in the years between 2003 and 2007 and peaked in 2008. The actual number of cases in Dublin almost doubled, rising from 129 in 2003 to 255 in 2008, and there was a fourfold increase in the number of cases outside Dublin, which rose from 59 in 2003 to 250 in 2008.



	2003	2004	2005	2006	2007	2008
Dublin	16.0	13.9	16.2	18.4	16.8	28.9
Outside Dublin	3.1	3.7	5.0	7.1	8.8	11.6

Figure 4 Incidence of treated cases reporting a benzodiazepine as an additional problem substance, by place of residence per 100,000 of the 15–64-year-old population (NDTRS 2003–2008)

The rate of deaths where benzodiazepines were implicated fluctuated over the reporting period. The rate of deaths per 100,000 of the adult population (aged 15–64) remained higher in Dublin than outside Dublin (Figure 5). However, the actual number of deaths in Dublin fell from 49 in 1998 to 41 in 2007, while outside Dublin the actual number of deaths rose from 15 in 1998 to 45 in 2007.



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Dublin	6.4	4.4	5.2	3.1	4.7	2.9	2.9	2.5	4.8	4.6
Outside Dublin	0.8	1.1	0.8	1.1	1.1	1.4	1.7	2.2	2.2	1.9

Figure 5 Poisonings where benzodiazepines were implicated, by place of residence per 100,000 of the 15–64-year-old population (NDRDI 1998–2007)

Treatment and death data were further analysed by regional drugs task force (RDTF) area of residence. The numbers reported for each area may be influenced by treatment availability in the area, and by the extent to which services participated in the NDTRS.

Table 6 presents the number of **new cases** entering treatment in the period 2003–2007 who reported benzodiazepines as a problem substance, alongside the number of poisoning deaths where benzodiazepines were implicated, by RDTF area of residence.

The highest numbers of **new cases** entering treatment were reported in the North Dublin, South West and Southern RDTF areas. The North West and Western RDTF areas reported the lowest numbers.

The annual numbers of poisoning deaths where benzodiazepines were implicated fluctuated over the reporting period, with no clearly discernable trends, in part due to the small numbers of cases in many of the RDTF areas. In the period 2003–2007 the highest numbers of deaths were recorded in the North Dublin, South West and Southern RDTF areas and the lowest numbers were in the North West and Western RDTF areas. This distribution pattern corresponds with the data on treated cases by RDTF area of residence.

Table 6 New benzodiazepine cases entering treatment, and poisoning deaths where benzodiazepines were implicated, by regional drugs task force area of residence (NDTRS and NDRDI 2003–2007)

	NDTRS 2003–2007		NDRDI 2003–2007	
RDTF area of residence*	**n**	**%**	**n**	**%**
North Dublin City and County	423	28.4	78	21.7
South Western	302	20.3	65	18.1
Southern	282	19.0	67	18.7
South East	111	7.5	27	7.5
Mid West	90	6.1	23	6.4
North Eastern	69	4.6	13	3.6
Midland	66	4.4	18	5.0
East Coast	59	4.0	34	9.5
Western	45	3.0	14	3.9
North West	34	2.3	13	3.6
Address in Ireland unknown	6	0.4	7	2.0
Total	**1487**	**100.0**	**359**	**100.0**

* See glossary for details of counties/areas covered by each RDTF.

In order to adjust for variation in population size by geographical area, the incidence of treated benzodiazepine cases in each of the 10 RDTF areas was calculated by dividing the average number of new cases over the five-year period living in each of the areas by the population aged 15–64 years of the respective RDTF areas, using the census figures for 2003 to 2006 and CSO estimated figures for 2007.[23, 24]

Figure 6 presents the average annual incidence of cases reporting a benzodiazepine as their **main** problem substance, by RDTF area of residence. Figure 7 presents the average annual incidence of cases reporting a benzodiazepine as a **main** or an **additional** problem substance, also by RDTF area of residence.

For the period 2003–2007, the average annual incidence of new cases treated for a benzodiazepine as their **main** problem substance was highest in the Southern RDTF area at 3.6 cases per 100,000, followed by the South East, North Dublin and Mid West RDTF areas (Figure 6). The Western and East Coast RDTF areas had the lowest average annual incidence at less than one case per 100,000.

In the same period, the average annual incidence of benzodiazepine cases (main or additional problem substance) was highest in the North Dublin RDTF area at 23 cases per 100,000, followed by the South Western and Southern RDTF areas (Figure 7). The East Coast, North West and Western RDTF areas had the lowest average annual incidence at less than five cases per 100,000.

The incidence of treated benzodiazepine use was compared with the rate of poisoning deaths per 100,000 population for the combined years 2003 to 2007 using the census figures for 2003 to 2006 and CSO estimated figures for 2007.[23, 24]

For the period 2003–2007, the highest rate of death per 100,000 population was in the North Dublin RDTF area at 4.0 cases per 100,000, followed by the Southern RDTF area at 3.1 cases per 100,000 (Figure 8).

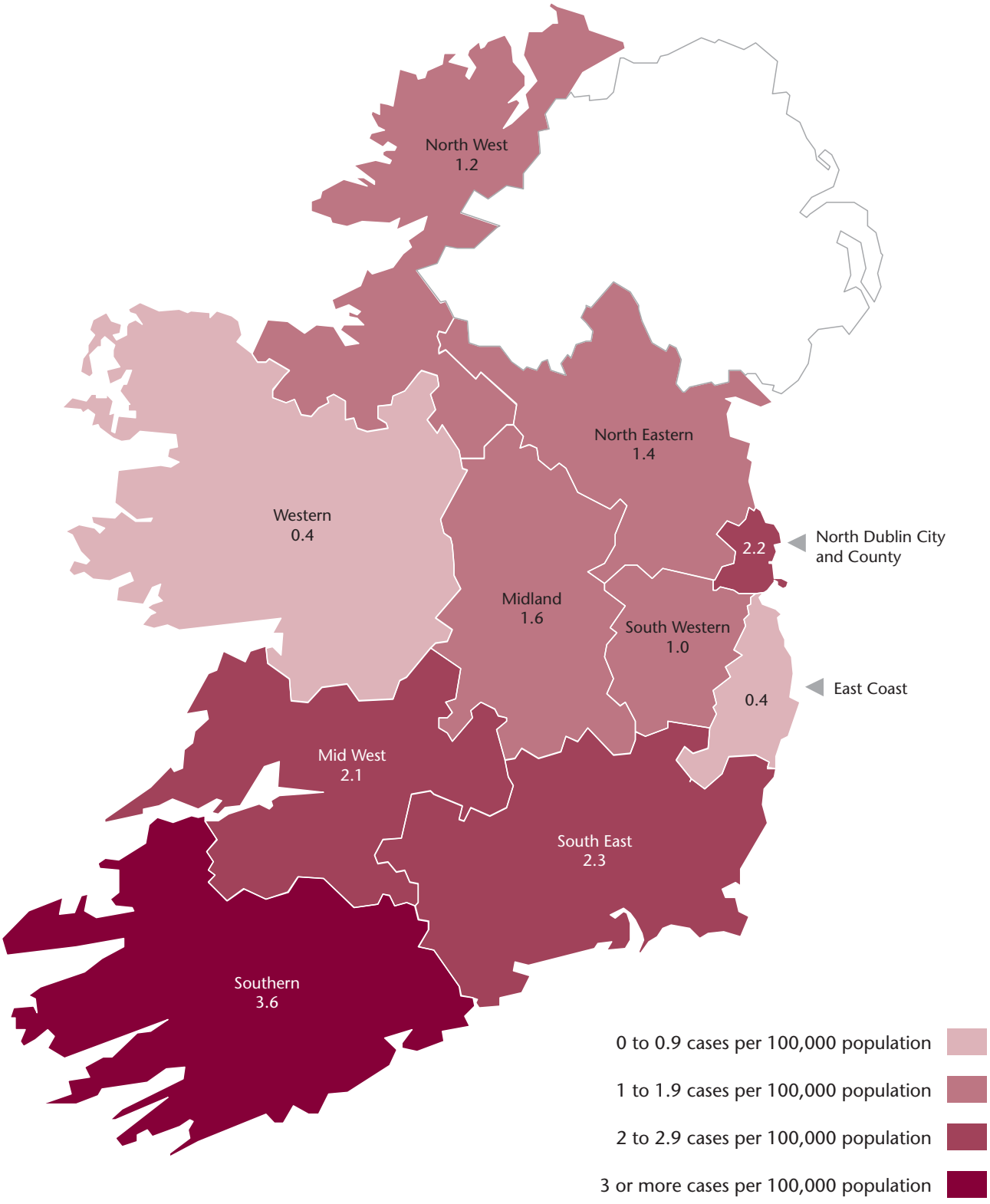


Figure 6 Average annual incidence of cases treated for a benzodiazepine as their main problem substance per 100,000 of the 15–64-year-old population, by regional drugs task force area of residence (NDTRS 2003–2007)

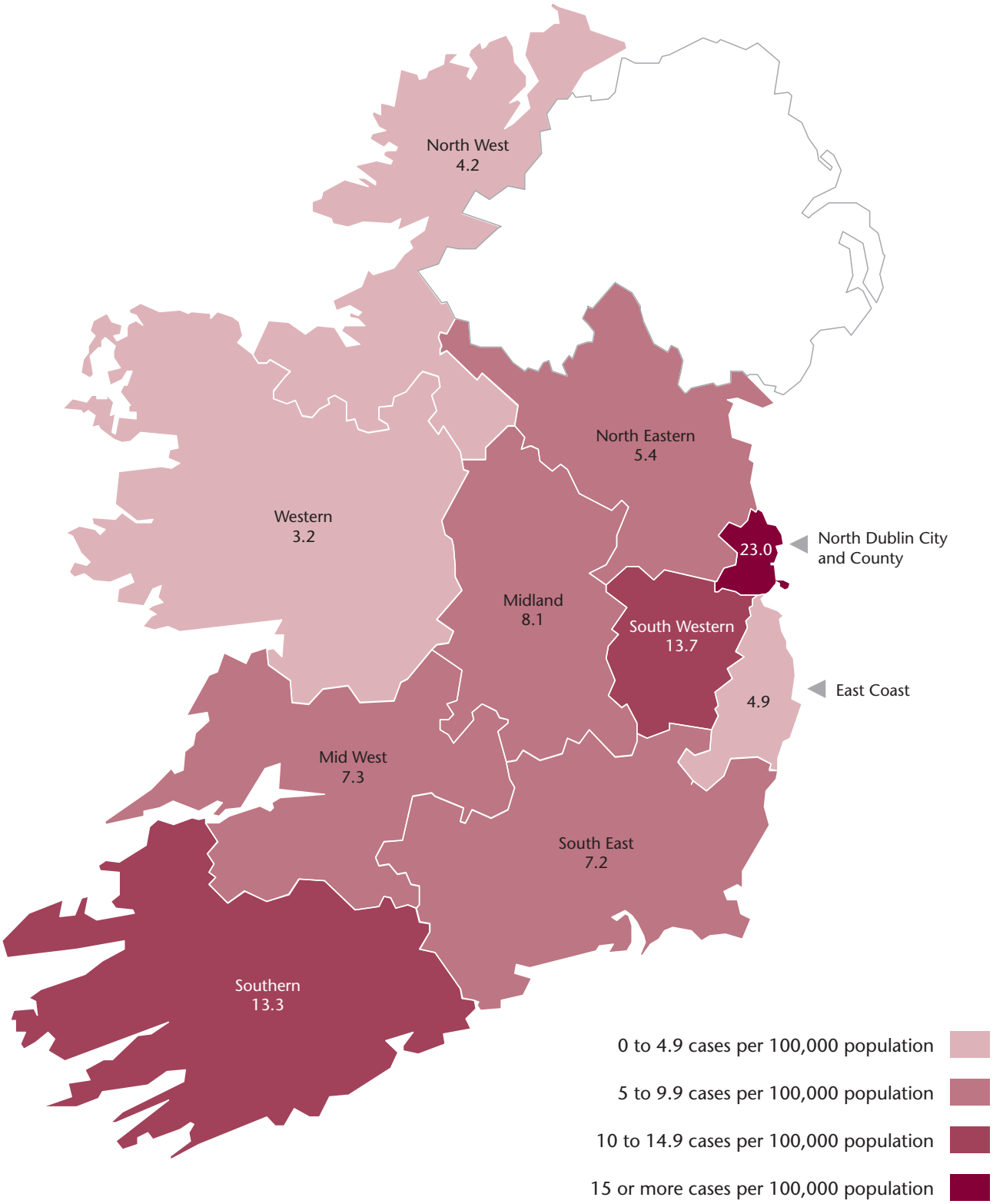


Figure 7 Average annual incidence of all treated benzodiazepine cases per 100,000 of the 15–64-year-old population, by regional drugs task force area of residence (NDTRS 2003–2007)

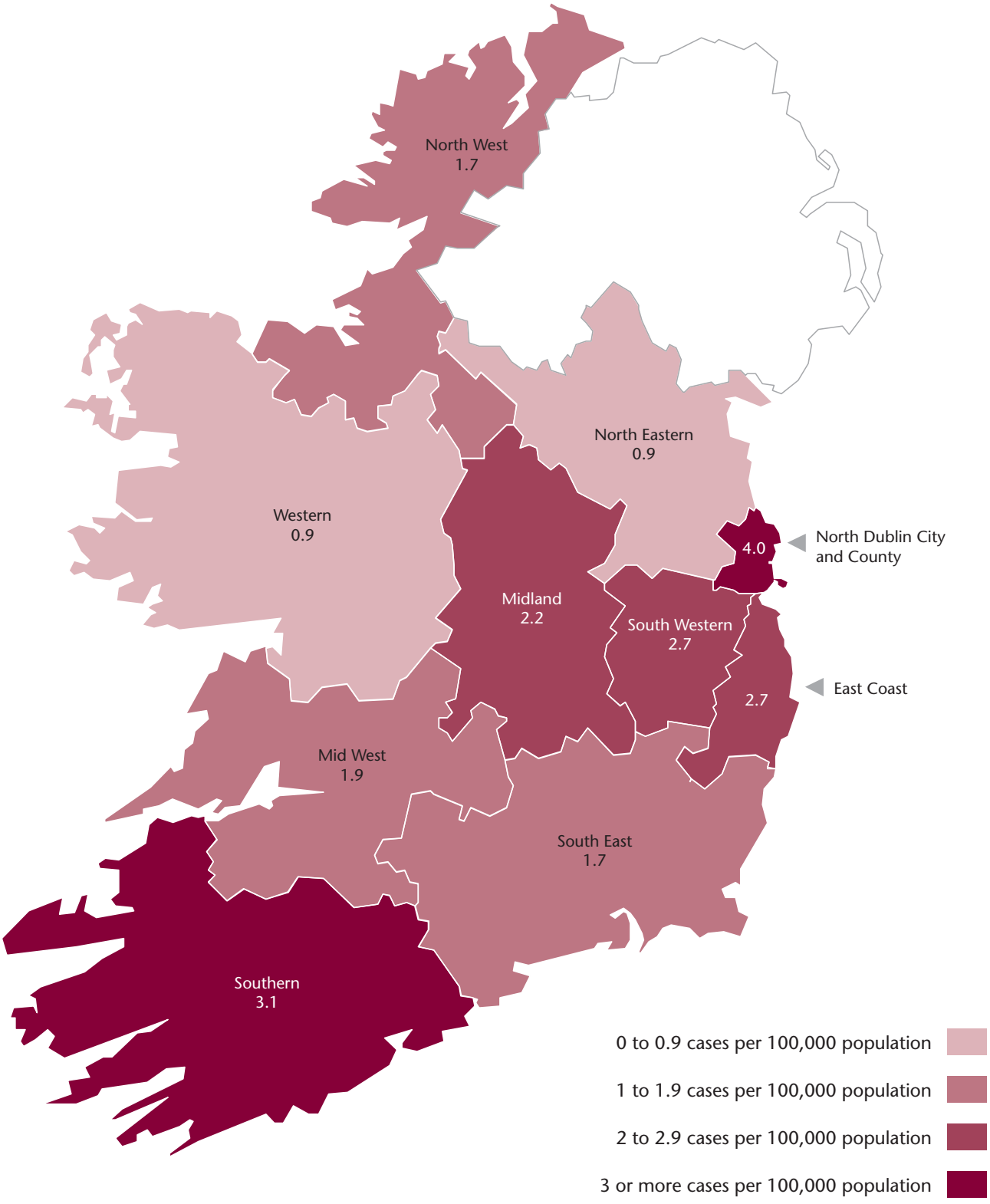


Figure 8 Average annual rate of death by poisoning where benzodiazepines were implicated per 100,000 of the 15–64-year-old population, by regional drugs task force area of residence (NDRDI 2003–2007)

Additional substances used with benzodiazepine

The proportion of cases entering treatment who reported a benzodiazepine as their **main** problem substance and who also reported use of more than one problem substance fluctuated during the reporting period (Table 7). Overall, 78% of cases reported using more than one drug.

The proportion of new benzodiazepine cases reporting use of any additional problem substance decreased from 89% to 70% over the reporting period. The reverse was noted among previously treated cases. Within this group, the proportions reporting use of more than one substance rose from 67% in 2003 to 86% in 2008. It is generally accepted that the use of several substances increases the complexity of these cases and is associated with poorer treatment outcomes.

Table 7 Use of more than one drug by cases entering treatment who reported a benzodiazepine as their main problem substance, by treatment status (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases	76		103		75		96		163		167	
All cases who used more than one drug	57	(75.0)	73	(70.9)	59	(78.7)	75	(78.1)	135	(82.8)	129	(77.2)
Previously treated cases	49		50		30		40		72		87	
Previously treated cases who used more than one drug	33	(67.3)	45	(90.0)	23	(76.7)	33	(82.5)	64	(88.9)	75	(86.2)
New cases	27		47		42		50		85		74	
New cases who used more than one drug	24	(88.9)	24	(51.1)	34	(81.0)	39	(78.0)	66	(77.6)	52	(70.3)
Treatment status unknown	0		6		3		6		6		6	

Of the cases who reported a benzodiazepine as their **main** problem substance between 2003 and 2008, 32% reported problem use of two substances, 22% of three and 23% of four or more. Cases with a benzodiazepine as their main problem substance most commonly reported two substances as part of their current problem substance use. The trends were similar for previously treated and new cases.

Additional problem substances where benzodiazepines were the main problem substance

Table 8 presents the additional problem substances used by those who reported a benzodiazepine as their **main** problem substance and who used more than one drug. Between 2003 and 2008, alcohol was the most common additional problem substance, reported by 52% of cases, followed by cannabis (43%) and opiates (40%).

The proportion of benzodiazepine cases reporting cannabis as an **additional** problem substance increased from 23% in 2003 to 49% in 2008, when it became the most commonly reported additional substance, on a par with alcohol at 48%. Over two-fifths of cases reported opiates as an additional problem substance in that year.

Overall, cannabis and alcohol were the most common additional problem drugs reported by **new** benzodiazepine cases entering treatment. The most frequently used additional problem substances reported by **previously treated** benzodiazepine cases in the period under review were opiates (55%), alcohol (47%) and cannabis (39%).

Table 8 Additional problem substances used by cases entering treatment who reported a benzodiazepine as their main problem substance (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases	57		73		59		75		135		129	
Opiates	20	(35.1)	46	(63.0)	19	(32.2)	24	(32.0)	50	(37.0)	54	(41.9)
Cocaine	7	(12.3)	20	(27.4)	18	(30.5)	18	(24.0)	38	(28.1)	33	(25.6)
Cannabis	13	(22.8)	24	(32.9)	28	(47.5)	32	(42.7)	65	(48.1)	63	(48.8)
Alcohol	34	(59.6)	24	(32.9)	35	(59.3)	46	(61.3)	72	(53.3)	62	(48.1)
Other*	18	(31.6)	28	(38.4)	14	(23.7)	17	(22.7)	34	(25.2)	38	(29.5)
Previously treated cases	33		45		23		33		64		75	
Opiates	18	(54.5)	37	(82.2)	11	(47.8)	12	(36.4)	34	(53.1)	38	(50.7)
Cocaine	2	(6.1)	13	(28.9)	6	(26.1)	5	(15.2)	18	(28.1)	18	(24.0)
Cannabis	8	(24.2)	14	(31.1)	9	(39.1)	16	(48.5)	26	(40.6)	32	(42.7)
Alcohol	16	(48.5)	13	(28.9)	13	(56.5)	16	(48.5)	31	(48.4)	38	(50.7)
Other*	9	(27.3)	12	(26.7)	8	(34.8)	6	(18.2)	10	(15.6)	20	(26.7)
New cases	24		24		34		39		66		52	
Opiates	2	(8.3)	8	(33.3)	7	(20.6)	10	(25.6)	15	(22.7)	15	(28.8)
Cocaine	5	(20.8)	6	(25.0)	12	(35.3)	12	(30.8)	19	(28.8)	14	(26.9)
Cannabis	5	(20.8)	8	(33.3)	19	(55.9)	13	(33.3)	35	(53.0)	31	(59.6)
Alcohol	18	(75.0)	10	(41.7)	21	(61.8)	29	(74.4)	37	(56.1)	24	(46.2)
Other*	9	(37.5)	16	(66.7)	6	(17.6)	11	(28.2)	21	(31.8)	16	(30.8)
Treatment status unknown	0		4		2		3		5		2	

* Includes other licit and illicit substances such as ecstasy, amphetamines, other benzodiazepines and hypnotics, volatile inhalants and antidepressants.

Treated main problem substance where benzodiazepines were an additional problem substance

In the six-year period examined, the **main** problem substances reported where a benzodiazepine was an **additional** problem substance were opiates (80% of cases) and, to a much lesser extent, alcohol (9%), cannabis (5%) and cocaine (5%). This pattern of use was the same for new cases and previously treated cases; however the proportion of opiate users was much lower (63%) and the proportions of alcohol (16%) and cannabis (11%) users were higher among new cases.

The proportion of cases reporting opiates as their main problem substance and a benzodiazepine as an additional problem substance decreased from 92% in 2003 to 74% in 2008 (Table 9). During this period, although numbers were small, there was a sharp increase in cases reporting cocaine as their **main** problem substance and benzodiazepines as an **additional** problem substance.

Table 9 Main problem substance used by cases entering treatment who reported a benzodiazepine as an additional problem substance (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases	982		928		1044		1129		1064		1562	
Opiates	899	(91.5)	776	(83.6)	859	(82.3)	924	(81.8)	779	(73.2)	1155	(73.9)
Cocaine	19	(1.9)	37	(4.0)	35	(3.4)	54	(4.8)	69	(6.5)	93	(6.0)
Cannabis	50	(5.1)	21	(2.3)	40	(3.8)	47	(4.2)	59	(5.5)	123	(7.9)
Alcohol	n/a		79	(8.5)	98	(9.4)	99	(8.8)	144	(13.5)	169	(10.8)
Other*	14	(1.4)	15	(1.6)	12	(1.1)	5	(0.4)	13	(1.2)	22	(1.4)
Previously treated cases	770		711		782		802		715		1032	
Opiates	718	(93.2)	624	(87.8)	685	(87.6)	709	(88.4)	589	(82.4)	849	(82.3)
Cocaine	15	(1.9)	19	(2.7)	14	(1.8)	29	(3.6)	35	(4.9)	47	(4.6)
Cannabis	29	(3.8)	9	(1.3)	22	(2.8)	15	(1.9)	23	(3.2)	49	(4.7)
Alcohol	n/a		49	(6.9)	57	(7.3)	45	(5.6)	61	(8.5)	78	(7.6)
Other*	8	(1.0)	10	(1.4)	4	(0.5)	4	(0.5)	7	(1.0)	9	(0.9)
New cases	188		186		235		302		332		505	
Opiates	158	(84.0)	126	(67.7)	149	(63.4)	196	(64.9)	176	(53.0)	290	(57.4)
Cocaine	3	(1.6)	16	(8.6)	20	(8.5)	23	(7.6)	34	(10.2)	44	(8.7)
Cannabis	21	(11.2)	12	(6.5)	18	(7.7)	32	(10.6)	36	(10.8)	72	(14.3)
Alcohol	n/a		27	(14.5)	40	(17.0)	50	(16.6)	80	(24.1)	87	(17.2)
Other*	6	(3.2)	5	(2.7)	8	(3.4)	1	(0.3)	6	(1.8)	12	(2.4)
Treatment status unknown	24		31		27		25		17		25	

* Includes other licit and illicit substances such as ecstasy, amphetamines, other benzodiazepines and hypnotics, volatile inhalants and antidepressants.
n/a Not applicable, as alcohol was not recorded as a main problem substance prior to 2004.

Table 10 presents all drugs and other substances involved in cases of deaths by poisoning where benzodiazepines were implicated. Alcohol was the substance most frequently implicated in these deaths (41%), followed by methadone (an opiate) which was involved in over one third of cases (36%). As seen in the treatment data, although the numbers are small, the number of cases where cocaine was implicated in the cause of death in addition to benzodiazepines increased over the reporting period, from less than five cases in the years 1998–2003 to six cases in 2004 and to 13 cases in 2007.

Table 10 Additional drugs involved in poisonings where benzodiazepines were implicated (NDRDI 1998–2007) (N = 649)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	
	n	n	n	n	n	n	n	n	n	n	n	%
All deaths where a benzodiazepine was implicated*	62	54	61	46	61	54	61	66	88	89	642	100.0
Alcohol	21	19	19	20	25	28	27	30	33	39	261	40.7
Methadone	26	25	24	15	25	17	21	18	31	26	228	35.5
Other opiate (excluding heroin and methadone)	18	12	11	13	10	15	22	23	21	13	158	24.6
Antidepressants	9	7	16	13	10	12	25	18	22	13	145	22.6
Heroin	10	18	14	10	15	6	6	16	20	22	137	21.3
Benzodiazepine (additional types)	8	14	12	5	10	8	11	14	25	24	131	20.1
Other prescription medication	6	10	14	4	10	13	12	10	15	20	114	17.8
Cocaine	~	~	~	~	~	~	6	7	12	13	53	8.3
Other†	3	6	2	3	5	3	4	7	5	13	52	8.0

* 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.
~ Less than five cases.
† Includes other illicit and licit drugs, including MDMA, amphetamines, hallucinogens, volatile inhalants and non-opiate analgesics.

Patterns of treated problem benzodiazepine use

Taking benzodiazepine orally was the recorded method of administration for nearly all (98%) of the benzodiazepine cases who entered treatment between 2003 and 2008. In 2008, 100% of new benzodiazepine cases reported taking benzodiazepines orally, while less than one per cent of previously treated cases reported injecting benzodiazepines. The number of benzodiazepine injectors may be under-estimated because of the way the data are recorded by the NDTRS, whereby only one route of administration is recorded for each problem substance. Service providers therefore might record either the most common route of administration or the assumed route of administration. While the practice of smoking benzodiazepine-containing tablets that have been crushed into a powder has been reported and verified with service providers by HRB staff, this route of administration is seldom used and less than half of one per cent of cases in the six-year period reported smoking benzodiazepines.

The proportion of cases injecting benzodiazepines was higher among cases reporting a benzodiazepine as an additional problem substance (2%). Nearly 3% of previously treated cases reporting a benzodiazepine as an additional problem substance were injecting benzodiazepine at the time of entry into treatment. Among cases reporting a benzodiazepine as an **additional** problem substance, the proportion of injectors decreased over the period under review, from 5% in 2003 to 1% in 2008.

The majority of cases (64%) reported using benzodiazepines daily (Figure 9). In 2008, of the 167 cases who reported a benzodiazepine as their **main** problem substance, 61% used it daily, 15% used it between two and six days per week, 5% used it once per week or less, and 16% had not used it in the month prior to entering treatment. In the same year, the figure for 'daily use' was higher for new cases (65%) than for previously treated cases (55%).

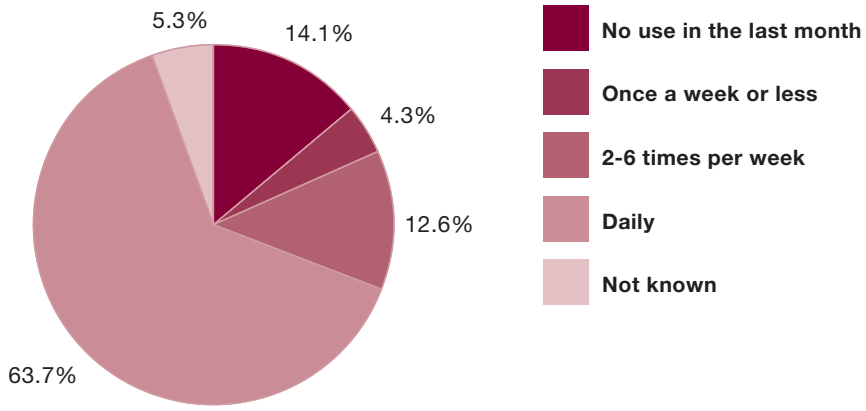


Figure 9 Frequency of benzodiazepine use in the month prior to treatment for cases treated for a benzodiazepine as their main problem substance (NDTRS 2003–2008)

Between 2003 and 2008, the median age at which new cases reporting a benzodiazepine as their **main** problem substance commenced use of any drug was 15 years (Table 11). The median age at which new cases commenced benzodiazepine use was 20 years. Half of the new benzodiazepine cases had used benzodiazepines for six years or more before seeking treatment.

Table 11 Median age at significant points, and time in years between first use of benzodiazepines and entry into treatment, for new cases who reported a benzodiazepine as their main problem substance (NDTRS 2003–2008)

New cases (n=325)	Age first used any drug (n=280)	Age first used benzodiazepines (n=284)	Age first sought treatment (n=325)	Years between first use of benzodiazepines and first seeking treatment (n=284)
Median age/time (range*) in years	15 (12–43)	20 (13–47)	28 (16–58)	6 (1–24)

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

Socio-economic characteristics

Table 12 presents socio–economic characteristics of cases entering treatment who reported a benzodiazepine as their **main** problem substance, by treatment status. Table 13 presents the socio–economic characteristics of cases who reported a benzodiazepine as an **additional** problem substance.

Of those entering treatment for a benzodiazepine as their **main** problem substance, the median age of new cases decreased from 34 to 25 years over the reporting period, while the median age of previously treated cases remained stable, ranging between 27 and 29 years (Table 12).

The median age of cases entering treatment who reported a benzodiazepine as an **additional** problem substance increased both for new cases, from 24 to 26 years, and for previously treated cases, from 27 to 30 years (Table 13).

While numbers were small, the proportion of cases aged under 18 years increased significantly over the six-year period, for both new and previously treated cases. The proportion of under-18s was higher among cases reporting a benzodiazepine as their **main** problem substance (10%) than among those for whom it was an **additional** problem substance (4%). Of those treated in 2008 for a benzodiazepine as their **main** problem substance, 16% of new cases and 12% of previously treated cases were under 18 years of age.

In the period 2003–2008, 6% of treated benzodiazepine cases reported being homeless. The proportion was the same for both those treated for a benzodiazepine as their **main** problem substance and those for whom it was an **additional** problem substance.

In 2008, 20% of all cases reporting a benzodiazepine as their **main** problem substance had left school before the age of 15; the proportions were similar for new cases and previously treated cases, at 19% and 20% respectively.

In the same year, 7% of new cases were still at school and 14% were employed.

Table 12 Socio-economic characteristics of cases entering treatment who reported a benzodiazepine as their main problem substance, by treatment status (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases	76		103		75		96		163		167	
Median age (range)	31	(18-56)	30	(18-57)	27	(16-56)	28	(16-60)	27	(16-51)	28	(16-59)
Under 18 years	~		~		10	(13.3)	11	(11.5)	20	(12.3)	22	(13.2)
Male	35	(46.1)	54	(52.4)	51	(68.0)	62	(64.6)	111	(68.1)	93	(55.7)
Living with parents and/or family	26	(34.2)	39	(37.9)	31	(41.3)	39	(40.6)	72	(44.2)	71	(42.5)
Homeless	~		5	(4.9)	~		7	(7.3)	16	(9.8)	6	(3.6)
Non-Irish national	~		~		~		~		~		8	(4.8)
Early school leaver	15	(19.7)	21	(20.4)	19	(25.3)	18	(18.8)	27	(16.6)	33	(19.8)
Still at school	0	(0.0)	~		6	(8.0)	6	(6.3)	~		9	(5.4)
Employed (aged 16–64)	16	(21.3)	18	(17.6)	15	(20.3)	11	(12.5)	14	(8.8)	20	(12.4)
Previously treated cases	49		50		30		40		72		87	
Median age (range)	29	(19-57)	27	(19-47)	27	(17-62)	27	(15-66)	28	(17-52)	29	(16-56)
Under 18 years	~		0	(0.0)	~		~		5	(6.9)	10	(11.5)
Male	21	(42.9)	31	(62.0)	23	(76.7)	27	(67.5)	48	(66.7)	50	(57.5)
Living with parents and/or family	17	(34.7)	23	(46.0)	13	(43.3)	16	(40.0)	27	(37.5)	40	(46.0)
Homeless	~		~		~		~		6	(8.3)	~	
Non-Irish national	~		~		~		~		~		~	
Early school leaver	7	(14.3)	10	(20.0)	10	(33.3)	9	(22.5)	9	(12.5)	17	(19.5)
Still at school	0	(0.0)	0	(0.0)	0	(0.0)	~		~		~	
Employed (aged 16–64)	9	(18.8)	9	(18.0)	6	(20.7)	5	(13.9)	5	(6.9)	9	(11.0)
New cases	27		47		42		50		85		74	
Median age (range)	34	(18-59)	34	(17-59)	27	(16-59)	29	(16-64)	27	(16-50)	25	(16-61)
Under 18 years	0	(0.0)		~	8	(19.0)	7	(14.0)	12	(14.1)	12	(16.2)
Male	14	(51.9)	21	(44.7)	27	(64.3)	31	(62.0)	59	(69.4)	41	(55.4)
Living with parents and/or family	9	(33.3)	15	(31.9)	17	(40.5)	18	(36.0)	41	(48.2)	30	(40.5)
Homeless	~		~		~		~		8	(9.4)	~	
Non-Irish national	0	(0.0)	0	(0.0)	~		~		~		6	(8.1)
Early school leaver	8	(29.6)	8	(17.0)	8	(19.0)	8	(16.0)	16	(18.8)	14	(18.9)
Still at school	0	(0.0)	~		6	(14.3)	~		~		5	(6.8)
Employed (aged 16–64)	7	(25.9)	9	(19.6)	9	(21.4)	6	(13.0)	9	(10.8)	10	(13.7)
Treatment status unknown	0		6		3		6		6		6	

~ Less than five cases.

Table 13 Socio-economic characteristics of cases entering treatment who reported a benzodiazepine as an additional problem substance, by treatment status (NDTRS 2003–2008)

	2003		2004		2005		2006		2007		2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases	982		928		1044		1129		1064		1562	
Median age (range)	26	(19-40)	27	(20-42)	28	(18-44)	29	(18-44)	28	(17-45)	28	(17-45)
Under 18 years	13	(1.3)	9	(1.0)	36	(3.4)	46	(4.1)	54	(5.1)	89	(5.7)
Male	674	(68.6)	642	(69.2)	716	(68.6)	797	(70.6)	768	(72.2)	1060	(67.9)
Living with parents and/or family	520	(53.0)	435	(46.9)	525	(50.3)	568	(50.3)	505	(47.5)	757	(48.5)
Homeless	56	(5.7)	62	(6.7)	59	(5.7)	68	(6.0)	66	(6.2)	94	(6.0)
Non-Irish national	25	(2.5)	18	(1.9)	19	(1.8)	23	(2.0)	25	(2.3)	45	(2.9)
Early school leaver	250	(25.5)	256	(27.6)	295	(28.3)	363	(32.2)	305	(28.7)	423	(27.1)
Still at school	8	(0.8)	1	(0.1)	16	(1.5)	7	(0.6)	12	(1.1)	36	(2.3)
Employed (aged 16–64)	121	(12.4)	111	(12.0)	119	(11.6)	97	(8.7)	113	(10.8)	148	(9.7)
Previously treated cases	770		711		782		802		715		1032	
Median age (range)	27	(20-41)	28	(21-41)	28	(20-44)	29	(19-44)	29	(19-42)	30	(19-44)
Under 18 years	5	(0.6)	~		17	(2.2)	18	(2.2)	14	(2.0)	25	(2.4)
Male	530	(68.8)	482	(67.8)	540	(69.1)	563	(70.2)	519	(72.6)	699	(67.7)
Living with parents and/or family	416	(54.0)	320	(45.0)	386	(49.4)	396	(49.4)	343	(48.0)	472	(45.7)
Homeless	43	(5.6)	47	(6.6)	46	(5.9)	48	(6.0)	56	(7.8)	67	(6.5)
Non-Irish national	17	(2.2)	13	(1.8)	10	(1.3)	12	(1.5)	19	(2.7)	31	(3.0)
Early school leaver	197	(25.6)	202	(28.4)	230	(29.4)	264	(32.9)	213	(29.8)	308	(29.8)
Still at school	~		0	(0.0)	5	(0.6)	~		~		10	(1.0)
Employed (aged 16–64)	92	(12.0)	75	(10.5)	79	(10.2)	60	(7.6)	61	(8.6)	77	(7.6)
New cases	188		186		235		302		332		505	
Median age (range)	24	(18-40)	25	(18-46)	25	(16-44)	27	(16-47)	26	(16-49)	26	(16-46)
Under 18 years	8	(4.3)	8	(4.3)	19	(8.1)	27	(8.9)	40	(12.0)	62	(12.3)
Male	126	(67.0)	138	(74.2)	154	(65.5)	216	(71.5)	239	(72.0)	347	(68.7)
Living with parents and/or family	93	(49.5)	100	(53.8)	124	(52.8)	159	(52.6)	157	(47.3)	278	(55.0)
Homeless	11	(5.9)	12	(6.5)	12	(5.1)	19	(6.3)	9	(2.7)	24	(4.8)
Non-Irish national	8	(4.3)	~		9	(3.8)	10	(3.3)	6	(1.8)	14	(2.8)
Early school leaver	47	(25.0)	48	(25.8)	57	(24.3)	92	(30.5)	87	(26.2)	109	(21.6)
Still at school	6	(3.2)	~		11	(4.7)	~		11	(3.3)	25	(5.0)
Employed (aged 16–64)	23	(12.4)	34	(18.5)	37	(16.3)	34	(11.5)	51	(16.0)	68	(13.9)
Treatment status unknown	24		31		27		25		17		25	

~ Less than five cases.

Table 14 presents socio–economic characteristics of poisoning deaths in the years 1998 to 2007 where benzodiazepines were implicated.

The median age of those who died fluctuated over the ten-year period, ranging between 33 years and 39 years. Overall, just over half (51%) of those who died were not alone at the time of their death. The majority of poisonings occurred in a private dwelling.

Table 14 Socio-economic characteristics of poisonings where benzodiazepines were implicated (NDRDI 1998–2007)

	1998		1999		2000		2001		2002		2003		2004		2005		2006		2007	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
All cases*	65		56		61		47		61		54		63		66		88		88	
Median age (range)	33 (19-62)		33 (18-66)		36 (17-69)		39 (21-65)		33 (18-69)		35 (21-69)		36 (22-70)		30 (18-61)		34 (19-63)		36 (20-72)	
Male	52	(80.0)	50	(89.3)	38	(62.3)	31	(66.0)	41	(67.2)	32	(59.3)	32	(50.8)	47	(71.2)	57	(64.8)	56	(63.6)
Accommodation	51		46		53		36		53		46		59		61		82		79	
Homeless	6	(11.8)	~		6	(11.3)	~		~		~		6	(10.2)	~		~		10	(12.7)
Employment status	57		48		51		37		50		44		46		51		65		61	
Employed (aged 16–64)	7	(12.3)	3	(6.3)	9	(17.6)	8	(21.6)	10	(20.0)	8	(18.2)	8	(17.4)	12	(23.5)	10	(15.4)	11	(18.0)
Location at time of death	61		54		61		46		61		53		61		64		83		82	
Private dwelling	45	(73.8)	40	(74.1)	49	(80.3)	35	(76.1)	41	(67.2)	39	(73.6)	50	(82.0)	52	(81.3)	64	(77.1)	59	(72.0)
Public building or place	11	(16.9)	10	(18.5)	7	(11.5)	6	(13.0)	10	(16.4)	9	(17.0)	7	(11.5)	10	(15.6)	11	(13.3)	13	(15.9)
Other	5	(8.2)	4	(7.4)	5	(8.2)	5	(10.9)	10	(16.4)	5	(9.4)	4	(6.6)	2	(3.1)	8	(9.6)	10	(12.2)
With whom at time of death	59		50		60		46		59		52		61		63		83		82	
With partner/family/friends	31	(52.5)	32	(64.0)	26	(43.3)	22	(47.8)	31	(52.5)	28	(53.8)	31	(50.8)	30	(47.6)	44	(53.0)	38	(46.3)
Alone	25	(42.4)	15	(30.0)	29	(48.3)	22	(47.8)	24	(40.7)	22	(42.3)	28	(45.9)	31	(49.2)	30	(36.1)	39	(47.6)
Other	3	(5.1)	3	(6.0)	5	(8.3)	2	(4.3)	4	(6.8)	2	(3.8)	2	(3.3)	2	(3.2)	9	(10.8)	5	(6.1)

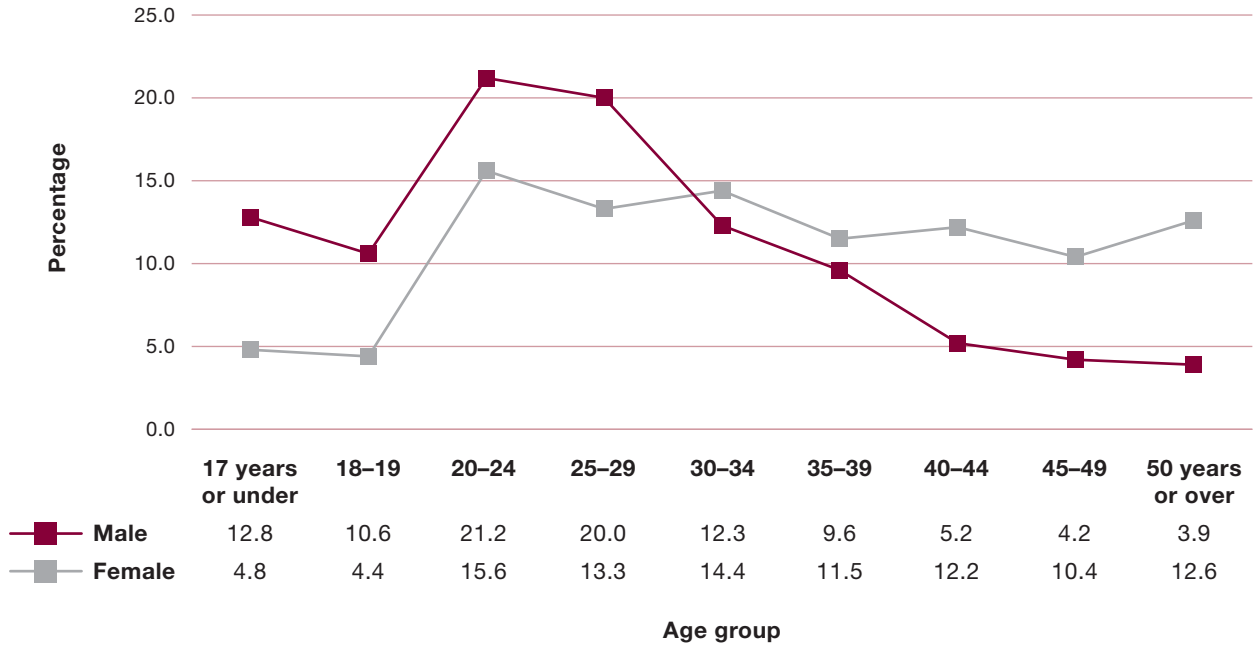
* Denominators for each variable are different as not all information required is available from the data sources.
~ Less than five cases.

Gender, age and history of problem opiate use

Studies have shown that there are some differences in age and gender in those who misuse benzodiazepines.[1, 3, 25] In addition, problem benzodiazepine use among those who are also problem opiate users is well documented.[26-28] Both NDRDI and NDTRS data were analysed by gender and by age and, in the case of NDTRS data, by history of problem opiate use.

Approximately 70% of all benzodiazepine cases treated in the period 2003–2008 were men, and the proportion was the same for new cases and for previously treated cases. However, the male to female ratio differed depending on whether benzodiazepines were reported as a main or an additional problem substance. The male to female ratio was 6:4 for cases with a benzodiazepine as their **main** problem substance, and it was 7:3 for cases with a benzodiazepine as an **additional** problem substance. Over the six-year period, women accounted for 40% of cases with a benzodiazepine as their **main** problem substance and 30% of cases with a benzodiazepine as an **additional** problem substance.

Figure 10 presents a breakdown by age group and by gender of cases reporting a benzodiazepine as their **main** problem substance. Percentage figures show the age distribution within each gender. Female cases were more evenly distributed between age groups, particularly from the 25–29-year age group onwards. There were higher proportions of male cases in the younger age groups: 13% of men and 5% of women were under 18 years of age. There were higher proportions of females in the older age groups. Over one third (35%) of all women reporting a benzodiazepine as their **main** problem substance between 2003 and 2008 were over 40 years of age, compared to 13% of men.



	17 years or under	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50 years or over
Male	12.8	10.6	21.2	20.0	12.3	9.6	5.2	4.2	3.9
Female	4.8	4.4	15.6	13.3	14.4	11.5	12.2	10.4	12.6

Figure 10 Cases entering treatment who reported a benzodiazepine as their main problem substance, by age group and by gender (NDTRS 2003–2008)

In terms of age and gender, the NDRDI data showed similar trends to those of the treatment data (Figure 11). Of the total number of poisoning deaths where a benzodiazepine was implicated, the male to female ratio was 2:1. The proportion of male deaths was highest among the younger age groups. The proportion of female deaths increased in the age groups over 40. More than half (54%) of all female deaths between 1998 and 2007 were aged 40 years or over, compared to 27% of male deaths.

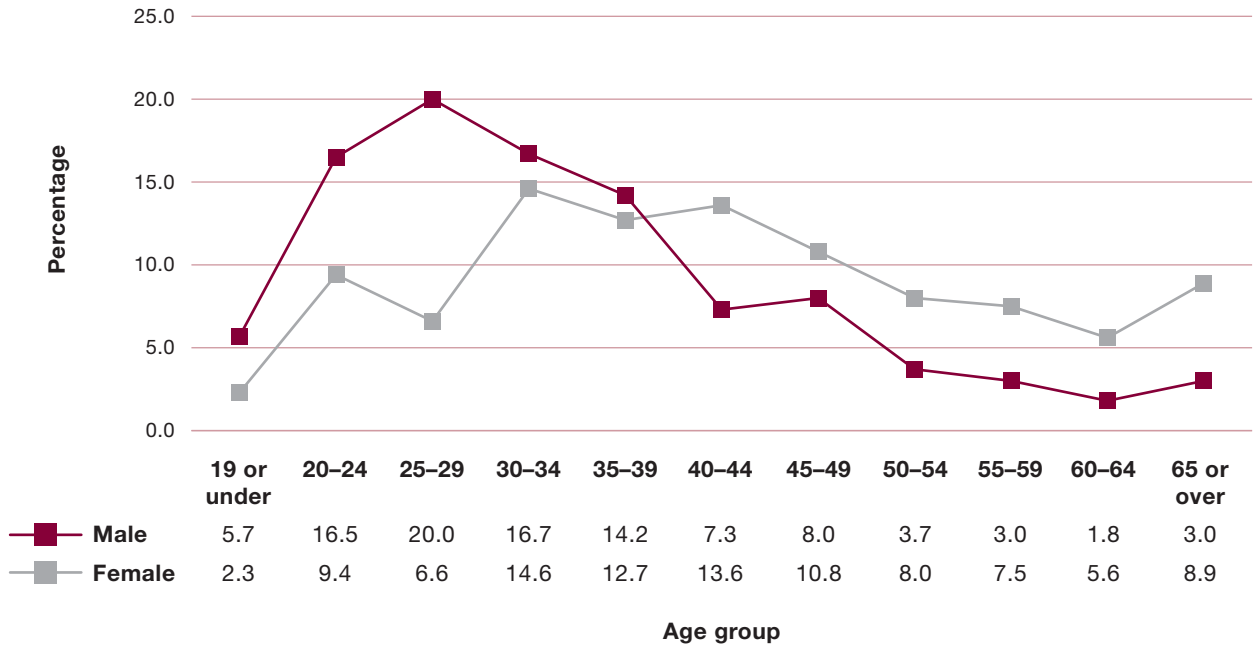


Figure 11 Poisoning deaths where benzodiazepines were implicated, by age group and by gender (NDRDI 1998–2007) (N = 649)

NDTRS data were further analysed by gender and by type of additional substances used. Table 15 presents the additional problem substances used by cases treated for a benzodiazepine as their **main** problem substance, by gender.

Alcohol was the most common additional problem substance reported by both men and women using a benzodiazepine as their **main** problem substance; the proportion was slightly higher among women (53%) than men (51%). However, the next most common additional problem substances reported by women were opiates (41%), other substances (31%, a third of which were another type of benzodiazepine) and cannabis (30%), whereas those reported by men were cannabis (49%), opiates (41%) and cocaine (33%).

Table 15 Additional problem substances used by cases entering treatment who reported a benzodiazepine as their main problem substance, by gender (NDTRS 2003–2008)

	Male		Female		Gender not recorded	
	n	(%)	n	(%)	n	(%)
All cases	341		183		4	
Alcohol	175	(51.3)	97	(53.0)	1	(25.0)
Cannabis	169	(49.4)	55	(30.1)	1	(25.0)
Opiates	138	(40.5)	75	(41.0)	0	(0.0)
Cocaine	111	(32.6)	23	(12.6)	0	(0.0)
Other*	89	(26.1)	57	(31.1)	3	(75.0)

* Includes other licit and illicit substances such as ecstasy, amphetamines, other benzodiazepines and hypnotics, volatile inhalants and antidepressants.

Opiates were the **main** problem substance used by the majority of cases reporting a benzodiazepine as an **additional** problem substance, with the proportions of male and female cases almost equal, at approximately 80% (Table 16). Among those whose main problem substance was *not* an opiate, there was a difference between the proportions of male and female cases. A higher proportion of women (12%) than men (8%) reported alcohol as their **main** problem substance. Higher proportions of men than women reported cocaine and cannabis as their **main** problem substance.

Table 16 Main problem substance used by cases entering treatment who reported a benzodiazepine as an additional problem substance, by gender (NDTRS 2003–2008)

	Male		Female		Gender not recorded	
	n	(%)	n	(%)	n	(%)
All cases	4657		2000		52	
Opiates	3731	(80.1)	1617	(80.9)	44	(84.6)
Alcohol	349	(7.5)	237	(11.9)	3	(5.8)
Cannabis	280	(6.0)	59	(3.0)	1	(1.9)
Cocaine	245	(5.3)	60	(3.0)	2	(3.8)
Other*	52	(1.1)	27	(1.4)	2	(3.8)

* Includes other licit and illicit substances such as ecstasy, amphetamines, other benzodiazepines and hypnotics, volatile inhalants and antidepressants

Problem benzodiazepine use among opiate users has been documented in many studies.[26-28] The NDTRS data were analysed by age and by gender to look at the history of opiate use among those who reported a benzodiazepine as their **main** problem substance.

Overall, the majority (73.5%) of cases reporting a benzodiazepine as their **main** problem substance did not report use of an opiate. Among non-opiate users there were higher proportions of male benzodiazepine cases in the younger age groups. The majority (51%) of male cases were aged under 25 years, compared to 24% of female cases. There were higher proportions of female cases in the older age groups: over half (53%) of female cases were over 35 years of age, compared to 24% of male cases. However, among opiate users, the age distribution was similar for both males and females.

Table 17 Cases entering treatment who reported a benzodiazepine as their main problem substance, by age group, gender and opiate use (NDTRS 2003–2008)

	Male		Female		Gender not recorded	
	n	(%)	n	(%)	n	(%)
Not an opiate user	292		204		4	
17 years or under	49	(16.8)	13	(6.4)	1	(25.0)
18–19	37	(12.7)	9	(4.4)	0	(0.0)
20–24	62	(21.2)	27	(13.2)	1	(25.0)
25–29	43	(14.7)	20	(9.8)	1	(25.0)
30–34	30	(10.3)	25	(12.3)	0	(0.0)
35–39	27	(9.2)	24	(11.8)	1	(25.0)
40–44	14	(4.8)	29	(14.2)	0	(0.0)
45–49	15	(5.1)	22	(10.8)	0	(0.0)
50 years or over	14	(4.8)	34	(16.7)	0	(0.0)
Age not recorded	1	(0.3)	1	(0.5)	0	(0.0)
Opiate user	114		66		0	
17 years or under	~		0	(0.0)	0	(0.0)
18–19	6	(5.3)	~		0	(0.0)
20–24	24	(21.1)	15	(22.7)	0	(0.0)
25–29	38	(33.3)	16	(24.2)	0	(0.0)
30–34	20	(17.5)	14	(21.2)	0	(0.0)
35–39	12	(10.5)	7	(10.6)	0	(0.0)
40–44	7	(6.1)	~		0	(0.0)
45–49	~		6	(9.1)	0	(0.0)
50 years or over	~		0	(0.0)	0	(0.0)
Age not recorded	0	(0.0)	1	(1.5)	0	(0.0)

~ Less than five cases.

Further tables and figures with supplementary NDTRS data for this Trends Series paper are available in an online appendix at www.drugsandalcohol.ie/14288

Conclusions

This is the first time that data from the NDTRS and the NDRDI have been presented together in a Trends Series paper. The presentation of these data together allows different aspects of problem benzodiazepine use to be examined to build a more complete picture of the burden of this problem.

The number of cases entering treatment for problem benzodiazepine use, as either a **main** or an **additional** problem substance, increased steadily between 2003 and 2008. The highest numbers of cases consisted of those previously treated who reported a benzodiazepine as an additional problem substance.

Differences were noted in the incidence of treated cases depending on whether the client lived in or outside Dublin (city and county). Up until 2007, the incidence of cases reporting a benzodiazepine as their **main** problem substance was higher outside Dublin. However the incidence of cases reporting benzodiazepines as an **additional** problem substance was higher in Dublin over the six-year reporting period. This may reflect differences in access to treatment or differences in patterns of drug use. Most benzodiazepine cases (74%) were treated in outpatient services.

The majority of cases treated for problem benzodiazepine use were also using another drug or substance, most frequently opiates, alcohol and cannabis. Alcohol was the most common additional problem substance reported by cases using a benzodiazepine as their **main** problem substance; 80% of cases reporting a benzodiazepine as an **additional** substance were opiate users. This is significant as it is generally accepted that the use of several substances increases the complexity of these cases and is associated with poorer treatment outcomes. Problem use of benzodiazepines needs to be approached in the context of multiple substance use. The types of intervention and treatment setting very much depend on the individual's current problem substances and history of substance use and the treatment services available in the HSE area.

Benzodiazepines were implicated in almost one third of all deaths by poisoning in Ireland between 1998 and 2007. Almost all of the deaths involved polysubstance use, which reflects international trends showing that benzodiazepine-only poisonings occur but are rare.[15, 29] The most frequently implicated additional substances were alcohol and opiates (methadone, heroin and other opiates). This pattern of benzodiazepine use was reflected in the treatment data, where most cases used a benzodiazepine in combination with other substances, particularly alcohol and opiates. Alone, these substances may not be sufficient to cause death, but it is likely that the respiratory depressant effect is amplified when these substances are taken together, increasing the risk of fatal overdose. The combination of substances with benzodiazepines, especially when it includes opiates such as methadone, in fatal poisonings has frequently been reported in international studies.[15, 30-32]

The increasing number of cases in treatment and the number of deaths among the population support the findings of the most recent national drug prevalence study, which showed that 11% of all adults had used sedatives or tranquillisers (which include benzodiazepines) at some point in their lives.[5] A study in the west of Ireland showed that the number of prescriptions for benzodiazepines had increased annually between 2000 and 2007.[33] Although beyond the scope of this paper, it would be useful to examine the number of benzodiazepine prescriptions provided nationally in order to have a clearer view of the nature and extent of the issue.

A very small proportion of treated cases reported injecting benzodiazepines; many of these were previously treated cases who reported a benzodiazepine as an **additional** problem substance. The national population survey found that only 0.5% of those who used sedatives or tranquillisers injected them, and that all who did inject were male.[5] However, the survey data do not reflect the finding of the recent longitudinal drug treatment study that 13% of those entering opiate treatment had injected benzodiazepines.[28] It is likely, then, that the number of cases injecting benzodiazepines is under-estimated in the NDTRS.

Although the numbers were small, the proportion of cases under 18 years of age increased steadily between 2003 and 2008. The proportion was highest in those who presented with a benzodiazepine as their **main** problem substance. This finding has implications for health promotion, drug awareness campaigns and service provision for this vulnerable age group.

Among those who reported a benzodiazepine as their **main** problem substance, there were higher proportions of female cases in the older age groups and higher proportions of male cases in the younger age groups. Similarly, among those who died, there were higher proportions of females in the older age groups and higher proportions of males in the younger age groups.

The analysis presented in this paper has identified different groups within the population of problem benzodiazepine users. Age, gender, history of opiate use and whether benzodiazepines are a main or an additional problem substance are all factors that need to be considered within current service provision when treating this population. As previously stated, there needs to be a greater awareness among prescribers and users of the potentially fatal effects of benzodiazepines in polysubstance use. Identifying and controlling possible illicit sources of benzodiazepines is also necessary, but it is equally important to revisit the good practice and prescribing guidelines for doctors.[34]

References

1. The American Psychiatric Association (1990) *Benzodiazepine dependence, toxicity and abuse: a task force report of the American Psychiatric Association*. Washington DC: The American Psychiatric Association.
2. Sweetman S (ed.) (2007) *Martindale: the complete drug reference*. Vol. 35. London: The Pharmaceutical Press.
3. Hindmarch I, Beaumont G, Brandon S and Leonard B (eds) (1991) *Benzodiazepines: current concepts biological, clinical and social perspectives*. Chichester: John Wiley & Sons Ltd.
4. Isbister G, O'Regan L, Sibbritt D and Whyte I (2004) Alprazolam is relatively more toxic than other benzodiazepines in overdose. *British Journal of Clinical Pharmacology*, 58(1): 88–95.
5. National Advisory Committee on Drugs and Drug and Public Health Information and Research Branch (2009) *Drug use in Ireland and Northern Ireland: 2006/2007 drug prevalence survey: sedatives or tranquillisers, and anti-depressants results*. Bulletin 6. Dublin: National Advisory Committee on Drugs.
6. Department of Tourism Sport and Recreation (2001) *Building on experience: National Drugs Strategy 2001–2008*. Dublin: Stationery Office.
7. Department of Community Rural and Gaeltacht Affairs (2009) *National Drugs Strategy (interim) 2009–2016*. Dublin: Department of Community, Rural and Gaeltacht Affairs.
8. Hartnoll R (1994) *Drug treatment reporting systems and the first treatment demand indicator: definitive protocol*. Strasbourg: Council of Europe.
9. EMCDDA and Pompidou Group (2000) *Treatment demand indicator: standard protocol 2.0*. EMCDDA scientific report. Lisbon: European Monitoring Centre for Drugs and Drugs Addiction.
10. EMCDDA (1998) *Annual report on the state of the drugs problem in the European Union 1998*. Luxembourg: Office for Official Publications of the European Communities.
11. Ministerial Task Force on measures to reduce the demand for drugs (1996) *First report of the ministerial task force on measures to reduce the demand for drugs*. Dublin: Stationery Office.
12. Working Group on treatment of under 18 year olds (2005) *Report of the working group on treatment of under 18 year olds presenting to treatment services with serious drug problems*. Dublin: Department of Health and Children.
13. O'Gorman A and Corrigan D (2008) *Report of the HSE working group on residential treatment and rehabilitation (substance users)*. Dublin: Health Service Executive.
14. Comptroller and Auditor General and Department of Community Rural and Gaeltacht Affairs (2009) *Drug addiction treatment and rehabilitation*. Dublin: Office of the Comptroller and Auditor General.
15. Darke S, Degenhardt L and Mattick R (2007) *Mortality amongst illicit drug users: epidemiology, causes and interventions*. Cambridge: Cambridge University Press.
16. Webb L, Adenekan O, Schifano F, Cheeta S, Pollard M and Ghodse AH (2003) Cause and manner of death in drug-related fatality: an analysis of drug-related deaths recorded by coroners in England and Wales in 2000. *Drug and Alcohol Dependence*, 72(1): 67–74.
17. Darke S, Kaye S and Duflou J (2004) Cocaine-related fatalities in New South Wales, Australia 1993–2002. *Drug and Alcohol Dependence*, 77(2): 107–114.
18. Quaglio G, Talamini G, Lechi A, Venturini L, Lugoboni F, Mezzelani P and Gruppo Intersert di Collaborazione Scientifica (GICS) (2001) Study of 2708 heroin-related deaths in north-eastern Italy 1985–98 to establish the main cause of death. *Addiction*, 96(6): 1127–1137.
19. Karch S (2002) *Karch's pathology of drug abuse*. 3rd edition. Boca Raton: CRC Press.

20. Baldacchino A and Corkery J (2006) *Comorbidity: perspectives across Europe*. London: European Collaborating Centres in Addition Studies.

21. Darke S, Duflou J and Torok M (2009) Toxicology and circumstances of completed suicide by means other than overdose. *Journal of Forensic Sciences*, 54(2): 490–494.

22. Farrell M, Neeleman J, Griffiths P and Strang J (1996) Suicide and overdose among opiate addicts. *Addiction*, 91(3): 321–323.

23. Central Statistics Office (2007) *2002 Census interactive tables*. Accessed August 2010 at www.cso.ie/census/interactive_tables.htm.

24. Central Statistics Office (2008) *2006 Census interactive tables*. Accessed August 2010 at www.cso.ie/census/interactive_tables.htm.

25. National Advisory Committee on Drugs (2008) *Drug use in Ireland and Northern Ireland 2006/2007: drug prevalence survey. Regional Drugs Task Force (Ireland) and Health and Social Services Board (Northern Ireland) results*. Bulletin 2. Dublin: National Advisory Committee on Drugs.

26. Carew AM, Bellerose D, Lyons S and Long J (2009) *Trends in treated problem opiate use in Ireland, 2002 to 2007*. HRB Trends Series 7. Dublin: Health Research Board.

27. Ronney S, Kelly G, Bamford L, Sloan D and O'Connor J (1999) Co-abuse of opiates and benzodiazepines. *Irish Journal of Medical Science*, 168(1): 36–41.

28. Comiskey C, Kelly P and Stapleton R (2008) *ROSIE Findings 6: a summary of 3-year outcomes*. Dublin: National Advisory Committee on Drugs.

29. World Health Organization (1996) Programme on substance abuse: *rational use of benzodiazepines*. Geneva: World Health Organization.

30. Koski A, Ojanpera I and Vuori E (2002) Alcohol and benzodiazepines in fatal poisonings. *Alcoholism: Clinical and Experimental Research*, 26(7): 956–959.

31. Paulozzi L, Logan J, Hall A, McKinstry E, Kaplan J and Crosby A (2009) A comparison of drug overdose deaths involving methadone and other opioid analgesics in West Virginia. *Addiction*, 104: 1541–1548.

32. Hickman M, Carrivick S, Paterson S, Hunt N, Zador D, Cusick L and Henry J (2007) London audit of drug-related overdose deaths: characteristics and typology, and implications for prevention and monitoring. *Addiction*, 102: 317–323.

33. Flynn K (2009) *Minor tranquillisers and sedatives: use and misuse in the west of Ireland*. Galway: Western Region Drugs Task Force.

34. Department of Health and Children (2002) *Benzodiazepines: good practice guidelines for clinicians*. Dublin: Department of Health and Children.

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