

# The Extent and Implications of Poly-drug Use in Ireland

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## Abstract

The phenomenon of poly-drug use is prevalent in Ireland. Statistics from the National Drug Treatment Reporting System show that this behaviour is increasing, from 5590 cases treated in 1998 to 7845 cases treated in 2002. The most frequent combinations include: heroin and cannabis when two drugs are implicated; heroin, methadone and benzodiazepines when three drugs are involved; and heroin, methadone, benzodiazepines and cannabis when four drugs are consumed. Opiate-related deaths account for the largest proportion of fatalities amongst drug users, with most of the deaths attributable to consumption of heroin in combination with benzodiazepines, alcohol, methadone and cocaine. There is a significant problem of driving under the influence of drugs in Ireland. Results of a nationwide survey carried out by the Medical Bureau of Road Safety demonstrates that there is a strong trend of increasing positive drug tests with decreasing levels of alcohol, 68% of drivers with blood alcohol concentrations below the legal limit were positive for one or more drugs. There is a need for treatment services dealing with poly-drug use as services in Ireland remain focussed on individual drugs of abuse.

## Introduction

The World Health Organisation (WHO) defines poly-drug or multiple drug use as, *“The use of more than one drug or type of drug by an individual, often at the same time or sequentially, and usually with the intention of enhancing, potentiating, or counteracting the effects of another drug. The term is also used more loosely, to include the unconnected use of two or more drugs by the same person. It carries the connotation of illicit use, although alcohol, nicotine, and caffeine are the substances most frequently taken simultaneously in developed societies.”*<sup>1</sup>

The phenomenon of poly-drug use in Ireland has been severely under-investigated, despite increased attention on drug misuse issues, and no report has been published which deals specifically with poly-drug consumption at a national level. Compared to their exclusive drug or alcohol using counterparts, poly-drug users are more likely to consume greater quantities of drugs, exhibit more symptoms of psychopathology, and are more prone to act aggressively, to engage in acts of domestic violence or other criminal conduct.<sup>2</sup> Poly-drug use in Ireland is not an emerging practice. It was demonstrated in the earliest prevalence studies of opiate use in Ireland in the early 1980's, and as illustrated in Table 1, continues to be a significant problem amongst individuals in drug treatment programmes.

**Table 1:** Studies of Poly-drug use in Ireland

Author	Sample Source	Data Collection	Definition of Poly-drug Use	Evidence of Poly-drug Use
Carr et al (1980) <sup>3</sup>	Treatment centre (n=100)	Interviews	Use of $\geq 2$ drugs in last month excluding opiates	25% reported poly-drug use in the last month
Bradshaw (1983) <sup>4</sup>	Opiate users in the community (n=82)	Interviews	Lifetime usage	Almost 75% use heroin & other drugs
Dean et al (1984) <sup>5</sup>	Opiate users in the community (n=36)	Interviews	Drug usage in 12 months prior to interview	92% using heroin, cannabis & others
Lavelle (1985) <sup>6</sup>	Opiate users in the community (n=74)	Interviews	Lifetime usage	33% report daily use of heroin & methadone
Keogh (1997) <sup>2</sup>	Garda records (n=352)	Garda interviews	Lifetime usage	96% report heroin use: 35% use methadone, 33% use cannabis, 20% use ecstasy & 13% use cocaine in addition to heroin
Cassin et al (1998) <sup>7</sup>	Health Promotion Unit (n=770)	Self report questionnaire	Drug use in previous month	67.4% < 25 years & 63.5% > 25 years reported poly-drug use (individual drugs not specified)
Centre for Health	Irish prisons	Self report	Drug use in previous 3	63% of males & 83% of females used cannabis plus other

Promotion Studies (2000) <sup>8</sup>	(n=777)	questionnaire	months Drug use in previous 12 months	drugs 47% of males & 52% of females used amphetamines plus heroin
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### Prevalence & Combinational Poly-drug Use

Drug treatment data is observed as an indicator of drug misuse and of demand for treatment services. The prevalence of poly-drug use in Ireland can be identified using The National Drug Treatment Reporting System (NDTRS), an epidemiological database monitoring treated problem drug use. This data is used at national and European levels to provide information about the features of clients entering treatment and patterns of drug misuse; formulations of drugs used and consumption behaviours. Information about the types of drugs consumed is central to developing individualised treatment plans for drug detoxification.

Statistics from the NDTRS shows that poly-drug use in Ireland is increasing, 5590 cases were treated in 1998 compared with 7845 cases in 2002.<sup>9</sup> Between 1998 and 2002, 33,391 cases of drug misuse were treated in Ireland. Of these, 28% reported problem use of one drug, 32% reported problem use of two drugs, 26% reported problems with three drugs and 15% reported problems with four or more drugs. Where an opiate was the main problem drug, the most common additional problem drug was cannabis, followed by benzodiazepines, other opiates and then cocaine; whereas when cannabis was the main drug of abuse, the most common additional drug were ecstasy, followed by alcohol and then amphetamines.<sup>9</sup>

Where two drugs only were reported as being used on a daily basis (Table 2), heroin and cannabis, and heroin and benzodiazepines were the most common combinations, accounting for 45% of all two drug combinations. A further 15% used a daily methadone and benzodiazepine combination.

**Table 2:** The combinations of drugs used by all treatment contacts reporting daily use of two drugs only in the month prior to treatment, reported to the NDTRS (1999)<sup>9</sup>

Drug Combination (2 drugs only)	N (%)
Heroin + Cannabis	174 (23.5)
Heroin + BZN's	159 (21.5)
Methadone + BZN's	108 (14.6)
Heroin + Methadone	85 (11.5)
Heroin + Cocaine	34 (4.6)
Other Combinations	180 (24.3)
Total	740 (100)

BZN = Benzodiazepine

Where three drugs only were reported as being used on a daily basis (Table 3), heroin, methadone and benzodiazepines was the most common combination, accounting for over 31% of reports. A daily heroin, benzodiazepine and cannabis combination was used by a further 16.5 %.

**Table 3:** The combinations of drugs used by all treatment contacts reporting daily use of three drugs only in the month prior to treatment, reported to the NDTRS<sup>9</sup>

Drug Combination (3 drugs only)	N(%)
Heroin + Methadone + BZN's	59 (31.4)
Heroin + BZN's + Cannabis	31 (16.5)
Heroin+Methadone + Cannabis	13 (6.9)
Methadone + BZN's + Cocaine	9 (4.8)
Methadone+ BZN's + Cannabis	6 (3.2)
Other Combinations	70 (37.2)
Total	188 (100)

BZN = Benzodiazepine

Where four drugs only were being taken on a daily basis the most common combination of drugs used was heroin, methadone, benzodiazepine and cannabis. A total of 7 (25%) of the 28 treatment contacts using four drugs daily used this combination.<sup>9</sup>

Of the treated cases reporting problem use of more than one drug in addition to heroin, the order of additional drugs ranked from most to least common remained similar between 1998 and 2000, namely: benzodiazepines, cannabis, opiates, ecstasy, cocaine and alcohol.<sup>9</sup> In 2001 and 2002, the status changed, with cannabis replacing benzodiazepines as the most common drug, while cocaine moved from fifth most common to third most common in 2002.<sup>9</sup>

Concurrent opiate and benzodiazepine use is a common practice amongst drug-users (Table 5). The combination of these two drugs may have implications for the efficacy of opiate treatment programmes. If opiate dependence is treated in isolation, while co-existing benzodiazepine dependence is neglected, the potential exists for drug specific treatment programmes, such as methadone maintenance, to be undermined. It is important that all aspects of poly-drug abuse are targeted to maximise benefit to the individual.

**Table 4:** *The combination of heroin and benzodiazepines amongst drug using individuals in Ireland*

Author	Sample Source	Data Collection	Definition of poly-drug use	Combination
Rooney et al (1998) <sup>10</sup>	Treatment Centre (n=63)	Interviews and urine analysis	Lifetime usage	34% of sample tested positive for opiate and benzodiazepine use
Browne et al (1998) <sup>11</sup>	Treatment Centre (n=107)	Urine/analysis	Drug use in 30 days prior to test	45% tested positive for using benzodiazepines while using methadone
Farrell (2000) <sup>12</sup>	Treatment Centres (n=18142)	Urine/analysis	Drug use in 30 days prior to test	65% tested positive for benzodiazepine use while taking methadone

## Drug-related Fatalities

Drug-related deaths and deaths among drug users are indicators of the consequences of problem drug use in Ireland. Mortality trends facilitate monitoring of the impact of drug treatment programmes and drug prevention and harm reduction strategies. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) identified drug-related deaths and deaths among drug users as one of the five key indicators of drug misuse in Europe.<sup>13</sup> At present, it is difficult to ascertain the exact number of deaths among drug users in Ireland, the best estimate for Dublin ranges between 60 and 90 fatalities per annum.<sup>14</sup> However, it has been suggested that these figures may underestimate the extent of the problem.<sup>14</sup>

Opiate-related deaths account for the largest proportion of deaths among drug users in Ireland. Results of toxicological analyses of fatal and non-fatal overdoses associated with illegal drug use are not widely available, but those that are, consistently reveal that the majority of deaths are associated with heroin use in combination with other drugs.<sup>14</sup> The probable mode of death is respiratory depression. Opiates depress the respiratory control centre, reducing its sensitivity to carbon dioxide and oxygen, resulting in hypoxia and subsequent cardiac arrest. Benzodiazepines, alcohol, methadone and cocaine are the substances most frequently found in combination with opiates.<sup>15</sup> These centrally-acting agents enhance the respiratory depressant effects of opiates, thereby increasing the likelihood of an adverse outcome.

A review by Byrne of the files on drug and alcohol related deaths investigated by the Dublin City coroner in 1998<sup>16</sup> revealed that of the 520 inquests held in that year, drugs or alcohol were implicated in 108 of these. After exclusion of cases which were deemed to be primarily alcohol related (28), and suicides or possible suicides (10), a cohort of 70 remained that were believed to be exclusively drug related deaths. The majority of these deaths occurred in males aged less than 44 years. A single drug was implicated in only 7 (10%) of these fatalities. Twenty four cases (34.2%) were positive for two drugs, 25 (35.7%) for three drugs, 13 (18.6%) for four drugs and 1 case (1.4%) was positive for 5 drugs. Benzodiazepines were implicated in 69% of cases, methadone in 53%, heroin in 51% and alcohol in 43%. Between 1<sup>st</sup> January 1998 and the 31<sup>st</sup> December 2000, the Dublin City and County Coroners conducted 2063 inquests into deaths due to unnatural causes within their jurisdictions, 254 (12%) of which were related to the use of opiates.<sup>16</sup> A single drug was

implicated in only 6.7% of drug related deaths. Table 6 characterises the number of drugs implicated in death due to unnatural causes:

**Table 6:** *Number of drugs implicated in deaths due to unnatural causes from 1998 to 2000, Byrne (2001)*<sup>16</sup>

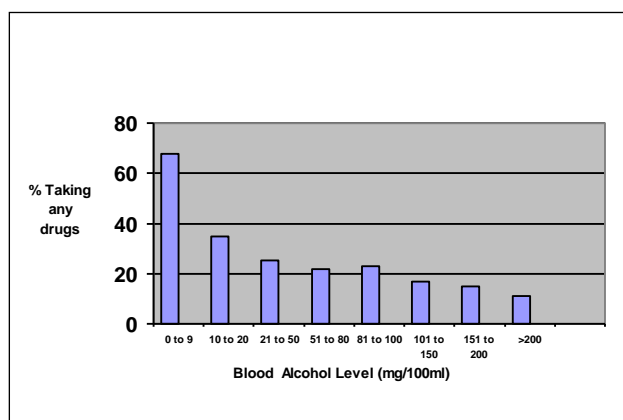
Number of Drugs	Frequency	Percentage %
0	5	2.0
1	17	6.7
2	53	20.9
3	70	27.6
4	60	23.6
5	36	14.2
6	9	3.5
7	3	1.2
10	1	0.4
Total	254	100

Benzodiazepines were implicated in the highest number of fatalities (71%), with diazepam the drug most cited (68%) in this regard. Heroin was implicated in 62% of fatalities and methadone was involved in 57% of fatalities. There were 6 ecstasy-related deaths during the three-year period.<sup>16</sup>

### Driving Under the Influence of Drugs

The number of injuries and deaths due to road traffic accidents in Ireland is a cause for serious concern. The Government Strategy for Road Safety has identified four major factors as contributory causes in road traffic accidents: speeding, non-use of safety belts, careless and dangerous driving and intoxication.<sup>17</sup> Alcohol intoxication has long been recognised as a major contributor to road traffic collisions, and it remains the major intoxicant in drivers. The Road Traffic Act 1994 set the legal limits of alcohol at 80 mg/100ml in blood and 107mg/100ml in urine. Increasingly, intoxication with drugs other than alcohol has been recognised, even though driving under the influence of drugs has been illegal under statute since the 1961 Road Traffic Act. The significant effect of drugs on motor performance is evident from the number of drivers apprehended for dangerous or careless driving, while under the alcohol limit or with no alcohol present at all. Results of a nationwide survey carried out between 2000 and 2001 on drivers who were detained for dangerous driving by the Medical Bureau of Road Safety demonstrates that there is a strong trend of increasing positive drug tests with decreasing levels of alcohol. Sixty eight per cent of tested drivers with undetectable levels of alcohol were positive for one or more drugs. However, 23% of tested drivers had a combination of positive drug tests and alcohol levels above the legal limit. The classes of drugs found were similar in those who were over the legal alcohol limit and those who were under, with cannabis being the most common drug found.<sup>17</sup>

**Figure 1:** *Prevalence of Drug Taking by Blood Alcohol Level in Tested Drivers, reported by MBRS, 2003*<sup>17</sup>



Clearly, there is a significant problem of driving under the influence of drugs in Ireland. This is a troubling finding, as the combination of alcohol and other drugs could markedly impair driving performance, contributing significantly to the morbidity and mortality associated with road traffic accidents.

### **The combined effects of alcohol and drugs on individuals**

Concurrent poly-drug use is a style of ingestion where multiple drugs are consumed on separate occasions. The use of multiple drugs simultaneously may have a greater influence on individuals than concurrent poly-drug consumption, by producing greater intoxication and increasing the risk of damage to health. Simultaneous poly-drug use increases psychological distress, as measured by depression, anxiety and phobic anxiety scales, compared with concurrent use.<sup>18</sup> In addition, unique pharmacokinetic interactions may occur, resulting in the formation of metabolites of greater toxicity than those present when drugs are used individually.<sup>19</sup>

The most common drug taken in combination with illegal drugs is alcohol. The risks of a fatal overdose or toxic effects on major organs, such as the heart and liver, are greatly increased when drugs and alcohol are mixed. The use of alcohol in combination with benzodiazepines has been shown to produce greater psychomotor impairment than that produced by each substance separately.<sup>20</sup> Doses of benzodiazepines that are excessively sedating may cause severe drowsiness in the presence of alcohol, increasing the risk of household and automotive accidents.<sup>21</sup> This may be especially significant in older people, who demonstrate an increased pharmacodynamic susceptibility to these drugs. Similar super-additive effects have been found for alcohol and marijuana with regard to driving performance.<sup>22</sup> Use of alcohol and marijuana in combination has also been shown to produce foetal damage at levels of alcohol consumption not normally associated with foetotoxicity.<sup>23</sup>

The simultaneous use of alcohol and cocaine is popular amongst drug users. A number of theories have been proposed to account for this: a more intense feeling of a 'high' beyond that perceived with either drug alone, to minimise alcohol-induced inebriation, and to assuage sensations associated with coming down from cocaine intoxication. Cocaine and alcohol metabolites combine to form cocaethylene, an active metabolite which is more toxic than either drug alone. Cocaethylene is the ethyl ester of benzoylecgonine, and is only formed following simultaneous ingestion of alcohol and cocaine. It has been associated with enhanced subjective euphoria, increased heart rate and increased plasma cocaine concentration.<sup>24</sup> Cocaethylene affects normal cardiac function and has been a contributory factor in many cocaine related deaths.<sup>25</sup> It can also potentiate the tendency towards violent thoughts and threats, which may lead to an increase in violent behaviour.<sup>26</sup>

Combined heroin and cocaine use has also been reported.<sup>9</sup> It has been suggested that heroin enhances the rewarding effects of cocaine by reducing the anxiolytic side effects that occur after the positive euphoric reaction of cocaine diminishes.<sup>27</sup> Both cocaine and  $\mu$  opioid agonists activate reward pathways, the former by blocking dopamine uptake, the latter by enhancing mesolimbic dopamine release. Furthermore, there is evidence to suggest that morphine and opiates may enhance the toxic potential of cocaine, and that cocaine can induce respiratory depression, possibly contributing to the ultimate mechanism of death in narcotic overdose cases.<sup>28</sup>

### **Conclusions and Recommendations**

Poly-drug use is a common practice amongst drug users, and is associated with considerable morbidity and mortality. More evidence-based research is needed to ascertain the best possible care for poly-drug users and especially for problem drug users. In recent years, much emphasis has been placed on expanding treatment services, and this has to a large extent been achieved. The challenge now is to widen the spectrum of treatment services, and refine the interventions themselves, thereby increasing their success rates. Treatment for users of several drugs in the recreational scene is virtually non-existent, as most drug services are only equipped to deal with opiate and severe dependence problems and not stimulant poly-drug use. Targeted initiatives to tackle the social origins of poly-drug problems should be addressed with inter-agency co-operation and community participation. Furthermore, there is a need to include legal drugs as part of the poly-drug treatment policy, since experience has shown that an exclusive focus on illegal drugs has limited effectiveness. Policy makers must have a clear vision of what they wish to achieve within the context of poly-drug use in Ireland if they hope to combat this escalating crisis.

### **Acknowledgements**

With thanks to Dr Desmond Corrigan, School of Pharmacy, Trinity College, Dublin.

## References

1. Lexicon of alcohol and drug terms, WHO, Geneva, 1994.  
[http://www.who.int/substance\\_abuse/terminology/who\\_lexicon/en/print.html](http://www.who.int/substance_abuse/terminology/who_lexicon/en/print.html)
2. Keogh E. Illicit Drug Use and Related Criminal Activity in the Dublin Metropolitan Area. Dublin: An Garda Siochana 1997.
3. Carr AJ, Hart I, Kelly MJ. Irish Drug Abusers: Their social background. *Ir Med J* 1980;73(12):453-457.
4. Bradshaw JS. Drug Misuse in Ireland, 1982-83: Investigation in a North Central Dublin Area and in Galway, Sligo and Cork. Dublin: Medico-Social Research Board, 1983.
5. Dean G, Bradshaw J, Lavelle P. Drug misuse in Ireland, 1982-83. Investigation in a north central Dublin area and in Galway, Sligo and Cork. Dublin: Medico-Social Research Board Dublin, 1983.
6. Lavelle P. Heroin misuse in a North Central Dublin Area. A follow up on the 1982-83 Drug Misuse in Ireland Study. Dublin: Medico-Social Research Board, 1986.
7. Cassin S, Geoghegan T, Cox G. Young Injectors: A Comparative Analysis of Risk Behaviour. *Ir J Med Sci* 1998;167(4):234-237.
8. Centre for Health Promotion Studies, National University of Ireland, Galway. General health case study of te Irish prison population. Dublin: Stationary House, 2000.
9. Long J, Lynn E, Kelly F. Occasional Paper No. 17. Trends in Treated Problem Drug Use in Ireland, 1998 to 2002. Dublin: Health Research Board, 2005.
10. Rooney S, Kelly G, Bamford L, Sloan D, O' Connor JJ. Co-abuse of opiates and benzodiazepines. *Ir J Med Sci* 1998;168(1):36-41.
11. Browne R, Sloan D, Fahy S, Moran C, O' Connor JJ. Detection of benzodiazepine use in opiate addicts. *Ir Med J* 1998;91;1;18-19.
12. Farrell M, Gerada C, Marsden J. External Review of Drug Services for the Eastern Health Board. London: National Addiction Centre, Institute of Psychiatry, 2000.
13. EMCDDA. Mortality of drug users in the EU: Co-ordination of implementation of new cohort studies, follow up and analysis of existing cohorts and development of new methods and outputs. Expert annual report, Lisbon, 2002.
14. Long J, Lynn, E, Keating J. Drug-related deaths in Ireland 1990-2002, Overview 1. Dublin: Health Research Board, 2005.
15. Corkery J, Schifano F, Ghodse H, Oyefeso A. The effects of methadone and its role in fatalities, *Hum Psychopharmacol* 2004;19(8):565-576.
16. Byrne R. Opiate Related Deaths Investigated by the Dublin City and County Coroners in 1998, 1999 and 2000. Unpublished. Addiction Research Centre, Trinity College Dublin, 2001.
17. Cusack DA, Leavy CP, Daly, L, Fitzpatrick, P. Driving Under the Influence of Drugs in Ireland 2000-2001. Medical Bureau of Road Safety, Department of Forensic Medicine & Department of Public Health Medicine and Epidemiology, UCD, 2003.
18. Hansell S, White HR. Adolescent drug use, psychological distress and physical symptoms, *J Health Soc Behav* 1991;32(3):288-301.
19. Katz J, Terry P, Witkin JM Comparative behavioural pharmacology and toxicology of cocaine and its ethanol-derived metabolite, cocaine ethyl-ester (cocaethylene). *Life Sci* 1992;50(18):1351-1361.
20. Girre C, Facy F, Lagier G, Dally S. Detection of blood benzodiazepines in injured people. Relationship with alcoholism. *Drug Alcohol Depend* 1998;21(1):61-65.
21. Hollister LE. Interactions between alcohol and benzodiazepines. In: Galanter M, ed. *Recent Developments in Alcoholism: Vol 8. Combined Alcoholism and Other Drugs Dependence*. 1990 New York: Plenum Press, 233-239.
22. Marijuana & Alcohol combined increase impairment. *Traffic Tech* 1999  
<http://www.nhtsa.dot.gov/people/outreach/traftech/pub/tt201.html>
23. Ezechi OC, Kalu BK, Ezechi CO, Nwokoro CA, Ndububa VI, Okeke GC. Prevalence and pattern of domestic violence against pregnant Nigerian women, *J Obstet Gynecol* 2004; 24(6):652-656.
24. McCance EF, Price LH, Kosten TR, Jatlow PI. Cocaethylene: pharmacology, physiology and behavioral effects in humans. *J Pharmacol Exp Ther* 1995;274(1):215-223.
25. Corrigan D. Growing Cocaine Use Targeted by National Drugs Awareness Campaign 2005.  
<http://www.drugsinfo.ie/pressrel040705.htm>.
26. Pennings EJ, Leccese AP, Wolff FA. Effects of concurrent use of alcohol and cocaine. *Addiction* 2002;97(7):773-783.
27. Ettenberg A. Opponent process properties of self administered cocaine, *Neurosci Biobehav Rev* 2004;27:721-728.
28. Jaffe JH. Drug addiction and drug abuse. In: Goodman A, Gilman TW, Nies AS, Taylor P eds. *The Pharmacological Basis of Therapeutics*. 1992 New York: Mc Graw-Hill International: 542.