

**Opioid-Related Deaths Investigated by the Dublin  
City and County Coroners in 1999:  
Background, Analysis and Prevention Initiatives.**

**Ray Byrne.**

**The interim report from an M.Litt project - "The relative mortality risks of  
heroin, methadone and other drugs implicated in opioid-related deaths  
investigated by the Dublin City and County Coroners in 1998,1999 and 2000".**

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## Summary

- Data in this report relates only to Opioid-Related Deaths due to unnatural causes investigated by the Dublin City and County Coroners.
- The source of the data was the files of the offices of the Coroners, which contain all the evidence presented at inquests into such deaths.
- The Dublin City and County Coroners conducted 645 inquests in 1999. 86 (13.33%) were deemed to have been Opioid-Related Deaths. A detailed examination was conducted on the files of these cases.
- The characteristic profile of opioid-related deaths as predominantly affecting those young, male, single and unemployed established in the 1998 survey is continued in 1999. The male: female ratio was 8.55:1.
- Only 7 decedents (8.13%) had a singular drug implicated in their deaths. 91.87% of decedents had 2 or more drugs (up to a maximum of 7 in one case) implicated in their deaths with an average of 3.38 drugs implicated per death.
- For the second year running benzodiazepines were implicated in the highest number of deaths. 73.3% (n=63) of cases proved benzodiazepine positive at toxicology.
- A rise of 9.17% was found in the percentage of cases proving positive for heroin. 57 (66.27%) cases were found to have heroin implicated. This contrasts with a percentage decrease of 11.55% in the number of cases where methadone was implicated - 54.65% (n=47).
- In 68.6% (n=59) of cases the deceased were known to have used or to have been addicted to opiates before their death.
- It appears that death occurred almost instantly or soon after injection of heroin in 25.58% of cases (n=22).
- 55.8% (n=48) were apparently alone when taking the drugs, which contributed to their death.
- 7 of the people who died were either on temporary release or had been recently released from prison. However 1 person died in Mountjoy Prison and a second collapsed there and later died in the Mater Hospital.
- 11 cases (12.79%) were apparently opioid-related suicides.
- It is clear that some opiate-related deaths are potentially preventable. A range of relatively simple and for the most part inexpensive interventions could reduce the incidence of such tragedies. These interventions include both improved quality and range of services for and greater dissemination of risk factors to opiate users.

## Introduction

The use of opiates is associated with substantial morbidity and mortality from overdose, blood borne infectious diseases and environmental factors such as accidents and increased exposure to violence (Strang *et al*, 1999; Hulse *et al*, 1999). It is essential to monitor the frequency and circumstances of opioid-related deaths and trends in opioid mortality rate, as these have implications for the provision of prevention and treatment services (Walsh, 1991). Coronial investigations allow a deep insight into this subject and they can also serve as an indication for epidemiological developments, preventive strategies and clinical care (Piischel, 1993).

This report outlines the findings of the second in a series of surveys on the inquest files of the Dublin City and County Coroners. The role of the coroners in investigating deaths due to unnatural causes in their jurisdictions brings them into sometimes-daily contact with the most tragic consequences of the use of opiates. The report aims to collate and disseminate the evidence on causes, circumstances and contributing factors, presented to them at inquests into such deaths.

The nature and extent of opioid-related deaths investigated by the coroners in 1999 will be documented. A national and international context will be profiled and a range of preventive measures discussed. It is hoped that the report will inform and guide policy makers and practitioners attempting to reduce the harms associated with drug taking and encourage the development of prevention strategies against the ultimate drug related harm - premature mortality.

## Background

Throughout the '90s the trend in the number of drug-related deaths has risen in Ireland at a higher rate than in any other country in the European Union (EMCDDA, 1999). While this marked increase may be partly due to under-reporting in the early part of the decade, it must reflect also, the increase in the number of people abusing opiates in Ireland during this period. It was estimated that there were 13,460 opiate users in Dublin in 1996 and for planning purposes it was deemed prudent to presume that there were approximately 10,500 to 12,500 (Comiskey, 1997). More recently it was estimated that in Ireland there was between 2.2 and 6.7 problem drug users per 1000 population between the ages of 15 and 54 (EMCDDA, 1999).

Addicted heroin injectors face a risk of death which may be 20 or 30 times higher than in the general population of the same age (EMCDDA, 1997a). Overdose remains the leading cause of death among drug injectors (EMCDDA, 1997b). However, because ambiguities remain concerning the role of drug purity, individual tolerance and polydrug co-abuse in such deaths, the World Health Organisation has cautioned against the use of the term "overdose" (WHO, 1993). They recommend instead the use of the ICD-10 classification (WHO, 1992) of "acute intoxication".

In recent years the Eastern Health Board has taken the core of the evidence on the effectiveness of methadone maintenance and attempted to develop a range of services to ensure higher levels of treatment access (Farrell *et al*, 2000). By the end of



February 2000 there were 4,353 people receiving methadone treatment in its catchment area. While international evidence indicates that methadone maintenance has a substantial protective effect on mortality from opiate overdose, there is also evidence that people in opioid substitution programmes may be at risk of overdose (WHO, 1998). This can occur when, for example, tolerance is incorrectly assessed, when doses are combined or when combinations of other drugs are taken. Methadone overdose deaths can also occur when therapeutically prescribed methadone is diverted and used by non-opioid tolerant individuals (Hall *et al.*, 2000).

**On the 1st of October 1998 the *Misuse of Drugs (Supervision of Prescription and Supply of Methadone) Regulations*** were introduced. By registering those presenting for treatment and by regulating the prescription and dispensing of methadone it was intended that 'The Methadone Protocol' would substantially reduce the problem of diversion from legitimate sources here. Future surveys may confirm its success in achieving this goal. :

The criteria for the definition of a "drug-related death" can be based on: (a) clinical and toxicological criteria, such as the type of substance used and the route of administration; (b) the circumstances surrounding the death; and (c) whether the person is known as a drug addict. However, different countries place different emphasis on aspects of these criteria and consequently the definition of a drug-related death adopted in various countries may differ (EMCDDA, 1997b). The lack of a common terminology or classification system has been seen as one of the major problems for international comparisons of drug-related mortality data (WHO, 1993).

In Ireland such data is classified using the ninth revision of the International Classification of Diseases and related health problems (WHO, 1977). The introduction of ICD-10 may improve the classification and coding of drug-related deaths. The inadequacies of earlier ICD classification to capture opioid-related deaths may in part explain the lack of reliable and comparable international data (WHO, 1998).

The causes of and risk factors associated with drug related deaths appear now to be more varied than was previously perceived. Deaths attributed to heroin overdose, for example, are likely to have morphine levels no higher than those in non-fatal overdoses (Darke and Zador, 1996). Also, the span of blood concentrations of victims of methadone overdose overlaps that of methadone maintenance subjects (Baselt and Cravey, 1995). Therefore, quantity or purity alone cannot explain the cause of death in these cases.

Variations in individual tolerance are likely to be an important factor in opioid overdose deaths (NDARC, 1998). After periods of abstinence individual tolerance to opiates is lowered and opiate users are particularly vulnerable to overdose after release from prison (Seaman *et al.*, 1998) and when they leave or 'drop out' of treatment programmes (Zanis and Woody, 1998; Davoli *et al.*, 1993). It has also been suggested that variation in rate of metabolism due to genetic factors could explain differential sensitivity to overdose (White and Irvine, 1999).

However, polydrug misuse, particularly the concurrent misuse of benzodiazepines and/or alcohol with opiates, is a major overdose risk factor (EMCDDA, 1999;

NDARC, 1998; WHO, 1998). In fact, fatalities solely involving opiates appear to form a minority of such overdose deaths. The respiratory depressant effects of opiates are heightened by the concurrent use of other central nervous system depressants such as benzodiazepines and alcohol (Darke and Zador, 1996).

Finally, opiate users are generally in poorer health than their peers and this may increase their vulnerability to overdose death (WHO, 1998). Apart from HP/ and hepatitis B and C infection prevalence, medical complications common among opiate users include septicaemia, endocarditis, malnutrition and pulmonary, cerebral, and subcutaneous abscesses (Ward *et al.*, 1998).

## Methodology

### *Number of Inquests Held and Cases Extracted*

The Dublin City Coroner conducted 462 inquests and the Dublin County Coroner conducted 183 inquests in 1999. The total of 645 represents a slight percentage decrease (2.72%) on the total number of inquests held in the city and county for 1998 (n=663). Between the 10<sup>th</sup> and the 18<sup>th</sup> January and between the 24<sup>th</sup> January and the 1<sup>st</sup> of February 2000 the files of these 645 inquests were examined in the offices of the coroners. Of these 86(13.33%) were identified as having opiates implicated in the death and were extracted for further examination. In 1998 77 cases were extracted from 663 (11.61%) indicating an increase in 1999 of 1.27%.

The length of time between the date of death and date of inquest for the extracted cases in the Dublin City Coroner's Court in 1999 ranged between 1 month and 4 years with an average of 10 months, an increase of 2 months on 1998. The length of time between the date of death and date of inquest in the Dublin County Coroner's Court in 1999 ranged between approximately 2 and 20 months with an average of 6 1/2 months, an increase of 2 1/4 month on 1998. - - .

Additionally, the Kildare County Coroner was also interviewed on the 5<sup>th</sup> of April. After prior correspondence he had identified 8 cases (from the 82 inquests he conducted in 1998 and 1999), which may have interested the project. The files of 3 of these cases were scrutinised but it was decided that none of them was suitable. The Coroners for East and West Wicklow were also contacted. In telephone conversation with each of these it was deduced that there had been no qualifying case in the West of the County and that there may have been one methadone-implicated death in the East of the County in 1999.

### *Case Selection Criteria*

As stated earlier, there seems as yet to be no standardised international definition of a drug related death. The primary concern of this research project, however, is premature mortality related to the use of opiates. Files were extracted for further examination when any or all of the following criteria were met:

- On determining the cause of death the coroner specifies opiates.
- Opiates are implicated in pathology or toxicology examinations.

- A history of, use of or treatment for addiction to opiates is indicated in depositional evidence (i.e. evidence presented at inquest).
- Alcohol or other drugs are implicated additional to any or all of the first 3 criteria being met

### ***Data Extracted and Coding***

A standard form was completed for each case (appendix). Information was collected on demographics, cause and circumstances of the death. Full toxicological details were extracted and additional observations on a range of potential contributory factors were noted.

Depositional evidence presented to the Coroners at inquest provide valuable insights into the circumstances of the death and background information on the deceased which may or may not have contributed to their premature demise. For example, police officers will present evidence concerning the circumstances of finding the body, any evidence found at the scene and whether the deceased was known to them or not. Family members and friends may give evidence of events prior to the death and of the state of mind and personal history of the deceased. Background medical evidence may be presented which might state for example that the deceased was a known drug addict and whether they were being treated for this or for any drug-related illness. A more in depth analysis was carried out on such evidence in the current survey than in 1998.

In the first survey of the 1998 files of the Dublin City Coroner no information that would personally identify the deceased was extracted. In order to facilitate comparability with statutory public health databases, personal identifying details were collected in the 1999 survey. However, each case has been anonymised in all project documents for public consumption. A detailed copy of all the information extracted and compiled on each case has been returned to the Coroners. The research project will maintain paper and electronic versions of this database secure and in the strictest of confidence. Requests for access to the database will be referred to the offices of the coroner.

All cases were coded for District Electoral Division (DED). Total and standardised population statistics for each DED were obtained from the census of population 1996. Opioid-related death (ORD) rates/1,000 total and standardised population were calculated for each DED and a rate of unemployment was established.

Additionally cases were coded for Local Drug Task Force Area (LDTFA). The *First Report of the Ministerial Task Force on Measures to Reduce the Demand for Drugs* (1996) recommended the establishment of a Drugs Task Force in each of these areas identified as having the most acute heroin problem and therefore requiring priority action.

To facilitate future comparison with national and international databases cases were coded by both ninth and tenth revisions of the International Statistical Classification of Diseases, injuries and causes of death (ICD9 and ICD10).



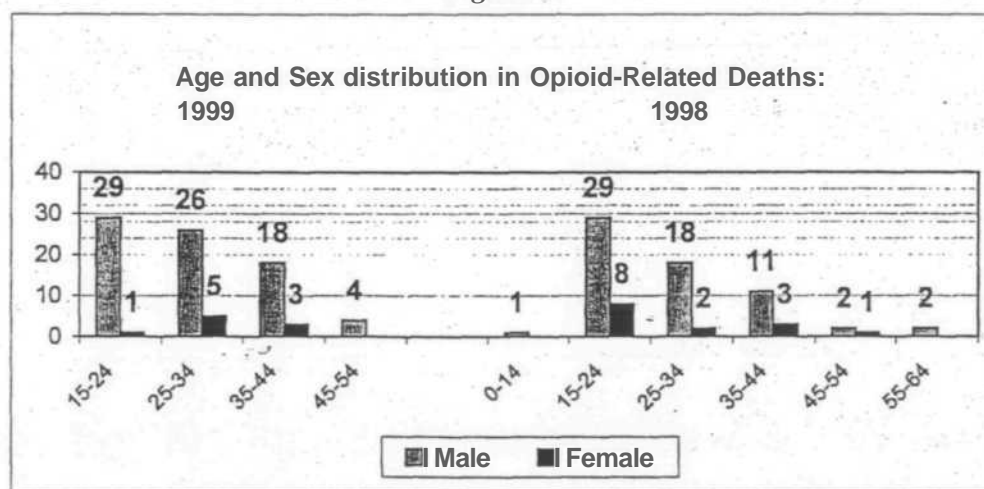
## Results

### Demographics

The characteristic profile of opioid-related deaths as predominantly affecting those young, male, single and unemployed established in the 1998 survey is continued in 1999. 95.3% of cases were between the ages of 15 and 44. They ranged between 17 and 48 and the mean age was 29.73 (up 2.68 years on 1998). The male: female ratio was 8.55:1, an increase of 90% on the ratio for the previous year - 4.66:1 (*figure 1*). The reason for this massive increase is unclear. Males are typically over-represented in fatalities attributed to overdose, ranging up to over 80% of recorded fatalities in some international studies (Darke and Zador, 1996). Further surveys may confirm if the 89.5% male dominance in the current survey is an oddity or part of a trend. In 1998 92.2% of cases were between the ages of 15 and 44. They ranged from a child of 3 who may have consumed some methadone, which had been prescribed to his parents, to a 60 year old man who died of respiratory failure following consumption of methadone.

The current survey reveals that 75.6% of decedents were single and that 70.9% were.. unemployed. An average unemployment rate of 11.17% was found in the 54 DEDs with one or more ORDs, ranging from 25.98% in the DED of Mountjoy B to 2.53% in the DED of Ballyboden (*table 1*). Over 93% of decedents resided within broader areas identified by the state as having the most acute heroin problem (LDTFAs).

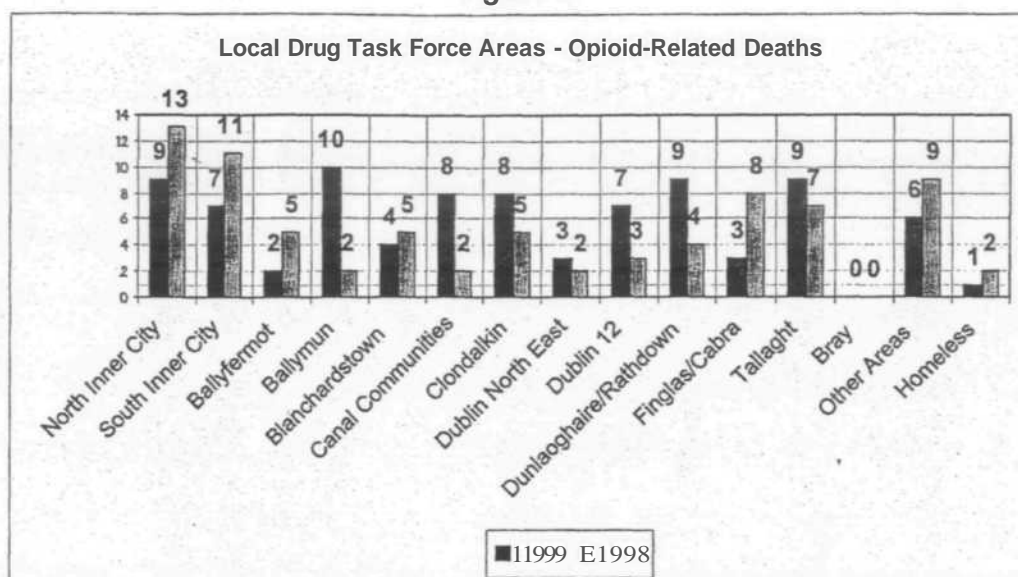
Figure 1.



### Opioid-Related Death (ORD) Rates

The North and South inner city Local Drug Task Force Areas (LDTFA) are again prominently affected with 9 and 7 deaths respectively (*figure 2*). Dunlaoghaire/Rathdown and Tallaght both had 9. While the Canal Communities and Clondalkin areas had 8 each. However in 1999 Ballymun predominates with 10 deaths (an increase of 8 on 1998).

Figure 2.



However, when an opioid-related death (ORD) rate per 1000 total population is calculated for each DED a different picture begins to emerge. The highest rate (1.3) was in the DED of Merchants Quay F with 3 ORDs from a total population of 2296. Merchants Quay F is in the Canal Communities LDTFA. The Lowest rate (0.1) was in the DED of Clondalkin-Dunawley with 1 ORD from a total population of 9289 (table

When a total of standardised ORD rates per 1000 population between the ages of 15-44 for all DEDs in each LDTFA is established, further clarity emerges. With a total of 8.16, Canal Communities predominates showing almost a 400% increase on 1998. While the North Inner City total is down from 9.6 to 6.29 it still has the second highest total. Dunlaoghaire/Rathdown comes next with a rate of 6.03. Ballymun, Dublin 12 and South Inner City follow these with 5.74, 5.74 and 4.93 respectively (Table 2)

### Classification of Cause of Death

#### (A):ICD9.

Using the ninth revision of the International Statistical Classification of Diseases, the cause of death was categorised, in the majority of cases (57%) in 1999, as being "drug dependence" (304). The fourth character subdivisions .0, .7 and .8 refer to 'morphine type', 'combination of morphine type with any other' and 'excluding morphine type drug' respectively. In 1998 the ICD9 code 304 was attributed to 49.4% of cases (table3)

The cause of death was categorised as "Nondependent abuse of drugs" (305) in 25.6% of deaths in 1999 compared to 45.5% in 1998. This percentage reflects the totals of those who were not known to have used or been addicted to opiates and those where no depositional evidence was presented on this matter (reported below). However, the high percentage recorded for 1998 may reflect the fact that this specific question was

not asked in the first survey of the Dublin City Coroners inquest files. The ICD 9 code 305 refers to the maladaptive effects of a drug on which a person is not dependent and that was taken on their own initiative (WHO, 1972). The fourth character subdivisions .5, .6, .7 and .9 refer to 'morphine type', 'cocaine type', 'amphetamine type' and 'other, mixed or unspecified' respectively.

Suicide and self-inflicted poisoning (E950) or injury by hanging (E953.0) and by jumping from a high place (E957.0) accounted for 2, 8 and 1 death respectively (12.9%) in 1999 compared to 3.9% in 1998. Other causes including: assault by shotgun or cutting and piercing instrument (E965.0 or E966); accidental drowning (E910.9) or accidental poisonings by opiates and related narcotics (E850.0) accounted for 4.7% in 1999 and 1.3% in 1998.

### ***(B):ICD10.***

Using the tenth revision of the International Statistical Classification of Diseases the cause of death was categorised, in the majority of cases (52.3%) in 1999, as "Mental and behavioural disorders due multiple drug use..." (F19.0). The fourth character subdivisions .0 and .2 refer to acute intoxication and dependence syndrome respectively. In 1998 the ICD10 code F19.0 was attributed to 50.6% of cases (*table 4*).

"Accidental poisoning by and exposure to narcotics and psychodysleptics (hallucinogens) not elsewhere classified" (X42) was the cause of death in 26.7% of deaths in 1999 and 32.5% in 1998. "Mental and behavioural disorders due to use of opioids" (F11.0 and F11.2) accounted for 3.5% in 1999 and 13% in 1998. Intentional self-poisoning (X62) and intentional self-harm by hanging (X70) or jumping from a high place (X80) accounted for 2, 8, and 1 death respectively (12.8%) in 1999 compared to 3.9% in 1998. Other causes including assault by shotgun or sharp object (X94 or X99) and drowning (W69) accounted for 4.7% in 1999.

### ***Circumstances and Potential Contributory Factors***

In 68.6% (n=59) of cases the deceased were known to have used or to have been addicted to opiates before their death. 16.3% (n=14) were not known to have used or to have been addicted to opiates, and 14.8% (n=13) of cases no depositional evidence was presented on this matter.

It appears that death occurred almost instantly or soon after injection of heroin in 25.58% of cases (n=22). Evidence was presented of syringes being found in or next to the body; of tourniquets still tied around the arm, the wrist or the thigh and of injection paraphernalia found next to the body.

55.8% (n=48) were apparently alone when taking the drugs, which contributed to their death. 25.6% (n=22) were in company and in the remaining 18.6% of cases (n=16) it was not possible to ascertain from depositional evidence whether they were alone or not

Whether or not the deceased had been prescribed drugs proven positive at toxicology is not always apparent from depositional evidence. However it was stated that 32.6%



(n=28) were being prescribed methadone, benzodiazepines or antidepressants. It appears that 30.2% (n=26) were not being prescribed these drugs and in 37.2% of cases (n=32) it was not possible to deduce either option from the evidence presented.

Seven of the people who died were either on temporary release or had been recently released from prison. However 1 person died in Mountjoy Prison and a second collapsed there and later died in the Mater Hospital. In 1998 1 person died in Mountjoy and 9 decedents had been recently released or were on temporary release from prison.

In what were apparent suicide cases or indeed the coroners stated so as cause of death, 7 people were found hanging. 3 of these cases proved positive at toxicology for heroin and 1 for methadone. Depositional evidence was presented of heroin use in 1 case and of methadone maintenance treatment in 2 cases. Suicide notes were found in 3 separate cases of polydrug overdose. Depositional evidence was presented in an additional case of a statement of suicide intent and a history of suicide ideation and attempts. This person, who was on methadone maintenance treatment at the time, seems to have jumped from a high building. In total 11 cases (12.79%) were apparently opioid-related suicides.

### ***Drugs Implicated in Opioid-Related Deaths***

A drug is deemed implicated when it has been proven positive at toxicology or when evidence was presented that the drug had been consumed. However, this is not to infer that the presence of this drug is deemed to have been the cause of death, although it may have been. It merely implies that it may have been a contributing factor in the death.

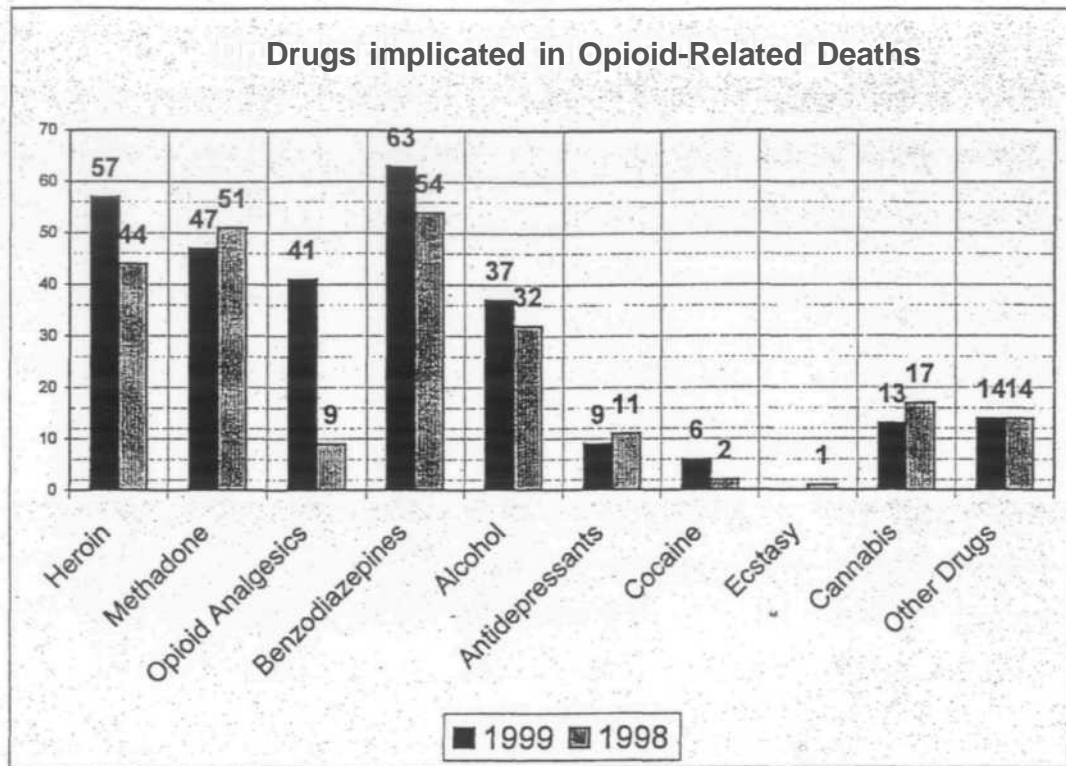
Only 7 decedents (8.13%) had a singular drug implicated in their deaths: 3 heroin, 2 benzodiazepines and 1 each for methadone and alcohol. Concentrations of 5.74µg/ml, >25µg/ml and 0.54µg/ml total morphine were found at toxicology in the urine samples of the three cases where heroin was the only drug implicated. Concentrations of 0.21µg/ml and 6.7µg/ml free morphine were also found in the urine of the first two of these cases. In the case where methadone was the only drug implicated, the urine contained 1.3µg/ml methadone and was also positive for its unique urinary metabolite EDDP. A blood sample in this case contained 0.4p.g/ml methadone.

One decedent had 7 separate drugs implicated in his death. In a further 3 cases 6 drugs were implicated. 5,4,3 and 2 drugs were implicated in 16(18.6%), 22(25.58%), 20(23.3%) and 17(19.8%) cases respectively.

For the second year running benzodiazepines were implicated in the highest number of deaths (*figure 3*). 73.3% (n=63) of cases proved benzodiazepine positive at toxicology in 1999. This represents an increase of 22% on the 1998 figure of 64.7% (n=55). Diazepam was by far the most implicated benzodiazepine followed by flurazepam and a few mentions each for flunitrazepam and bromazepam.



Figure 3.



A rise of 9.17% was found in the percentage of cases proving positive for heroin. In 1999 57 (66.27%) cases were found to have heroin implicated compared to 44 (57.1%) in 1998. This contrasts with a percentage decrease of 11.55% in the number of cases where methadone was implicated from 66.2% (n=51) in 1998 to 54.65% (n=47) in 1999.

Codeine was in all cases but one the opioid analgesic implicated in 47.7% (n=41) of cases in the current survey, the remaining case implicating dextropropoxyphene. All but one of these cases had heroin implicated concurrently, the remaining case proved positive alongside methadone.

The presence of alcohol was detected in 43% (n=37) of cases in the current survey and 41.6% (n=32) in 1998. The amount of alcohol detected again varied greatly. These range from the highest case with 401mgs% urine content and 279mgs% blood content, to the lowest case with only 11mgs% and 31mgs% urine and blood content respectively (the current blood alcohol drink-driving limit in this country is 80mgs%). In both these cases alcohol is implicated concurrently with heroin.

There was a small decrease of 3.84% in the amount of cases where antidepressants were implicated. All 9 cases (10.46%) in the current survey had tricyclic antidepressants implicated. One of these cases had the Selective Serotonin Reuptake Inhibitor (SSRI) fluoxetine implicated concurrently. Only one of the 11 cases implicating antidepressants in 1998 did not prove positive for tricyclics. In this case the Monoamine Oxidase Inhibitor (MAOI) moclobemide was implicated.

There was a rise in the number of cocaine-implicated deaths from 2 (2.6%) in 1998 to 6 (7%) in 1999. In all of these deaths cocaine was concurrently implicated with heroin. Cannabis has fallen from 22.07% to 15.11 %. Finally, other drugs were implicated in 16.27% (n=14) of cases in 1999. These included antipsychotics, decongestants, amphetamines, barbiturates and paracetamol.

## **Analysis and interpretation of findings**

### ***Poly drug Misuse and Benzodiazepines***

Polydrug misuse has been consistently verified in international research as a major risk factor in drug related deaths (EMCDDA, 1999; WHO, 1998; NDARC, 1998). It has been established that the concurrent use of opiates and other central nervous system depressants (primarily alcohol and benzodiazepines) is more likely to lead to fatalities than the use of opiates alone (Hall *et al.*, 2000; Darke and Zador, 1996). 91.87% of decedents in the current survey had 2 or more drugs (up to a maximum of 7 in one case) implicated in their deaths with an average of 3.38 drugs implicated per death.

A recent external review of drug services for the Eastern Health Board highlighted a major problem with polydrug misuse among those in treatment in its catchment area. It recommends urgent and concerted attention be paid to the fact that in a sample of 5 clinics, over a 4 month period in 1999, a 65% benzodiazepine positive urinalysis rate was recorded (Farrell *et al.*, 2000). The toxicology results presented above dramatically underline the need for such urgency. Benzodiazepines are once again predominantly implicated in opioid-related deaths investigated by the Dublin City and County Coroners; 7.03% (n=6) more than heroin and 18.65% (n=16) more than methadone. Dr. Michael Farrell's team recommends a prescribing audit within and external to the drug treatment services. They warn that '...action may need to be taken to restrict benzodiazepine prescribing if the current high levels of misuse are to be contained' (Farrell *et al.*, 2000, p.33).

### ***Heroin***

A State Laboratory Test Report interpretation of results in a case reported in the first survey cited a review of 40 cases of death due to injection of diamorphine by addicts. Urine total morphine levels ranged from 0.1-120µg/ml (mean 13.2, 23 cases)(Clarke, 1986). However, in the 3 cases reported in the current survey where heroin was the only drug implicated, while their urine total morphine levels were within this fatal range, only one of them was known to have been an addict. She was found to have had not less than 25µg/ml total morphine in her blood. The next was not known to have been an addict and 0.54µg/ml total morphine was found in his blood. In the last case it could not be determined from the evidence presented whether or not he was an addict and 5.74µg/ml total morphine was detected. It is clear that quantity and purity of heroin injected alone cannot predicate mortality risk and that individual tolerance and susceptibility must also be a determinant.

The same State Laboratory interpretation also cites a study of multiple variables . " common to 200 morphine induced fatalities which found that the most reliable predictor for overdose death was the presence of blood unconjugated (free) morphine levels that were greater than 0.24µg/ml (Spiehler, 1989). Blood free morphine was detected at toxicology in 24 of the 57 cases where heroin was implicated in the current survey. 75% (n=18) of these were found to have free morphine levels exceeding 0.24jig/ml (range 0.28-0.81, mean 0.53). While these levels may have predicted . . . - overdose alone the average of 2.12 (range 1-4) additional drugs implicated in each case undoubtedly enhanced their mortality risks.

*Methadone* .Twenty two cases had both heroin and methadone implicated in their death in 1999. The relationship between the rise in the number of heroin implicated deaths and the fall in the number of methadone-implicated deaths between 1998 and 1999 may or may not be of significance. However, the introduction of *The Misuse of Drugs (Supervision of Prescription and Supply of Methadone) Regulations* (The Methadone Protocol) may have affected the availability of street/diverted methadone and consequently have influenced this trend.

In an effort to determine the impact of methadone diversion on the numbers of methadone-implicated deaths in Dublin in 1999 a database cross-reference audit was conducted with the central patient methadone treatment list. Since the introduction of The Methadone Protocol a registered medical practitioner intending to prescribe methadone must notify the Eastern Health Board. The Board maintains the Central Treatment List and it will inform the practitioner as to whether the person has previously been registered. It will then issue a treatment card to the person. The practitioner can only issue a prescription for methadone to a person with a valid Methadone

Names, sex, address, age and dates of death of the 47 decedents who had methadone implicated in their death were supplied to the Eastern Health Board AIDS/DRUGS Services. It was confirmed that 21 (44.68%) of these were on the central patient methadone treatment list at the time of their death. However only 23 of the 47 methadone-implicated deaths recorded in 1999 occurred after the introduction of the methadone protocol on the 1st of October 1998. As everyone receiving methadone must now be registered, a repeat of this exercise on the findings of the 2000 survey should provide a clearer indication of the success of the protocol in curtailing diversion. A breakdown of the numbers of people receiving methadone treatment within each LDTFA at the end of February 2000 can be found in table 2.

In the one case where methadone was the only drug implicated a level of 0.4µg/ml was detected in the blood. The span of blood concentrations of victims of methadone overdosage overlaps that of methadone maintenance subjects and it is difficult, if not impossible to distinguish between the two on this basis alone. In one survey blood methadone concentrations averaged 0.28jig/ml (range 0.06-3.1) in 59 victims of fatal methadone overdosage; in comparison, blood levels averaged 0.11ug/ml (range 0.03-0.56) in 62 methadone maintenance subjects included as controls (Baselt and Cravey, 1995). The average blood concentration in methadone related deaths investigated by

the Dublin City and County Coroners in 1999 was 0.51 jig/ml (range 0.08-2.2). However, an average of 3.57 (range 0-6) other drugs were implicated in each of these deaths

The level of methadone implication in opioid-related deaths in Dublin gives cause for concerns (54.65% in 1999 and 66.2% in 1998). However, because of the difficulties in quantifying the prevalence of opiate use, comparative aggregate mortality risk estimates between methadone and heroin are hindered by inherent methodological impediments. Furthermore, how many people would have died in Dublin in 1999 if they had not been receiving methadone treatment? It is impossible to answer this and in the absence of longitudinal cohort studies here, comparative mortality rate estimates between untreated heroin users and those in methadone maintenance treatment cannot be calculated either. Meanwhile, programmes must aim to maximize the protective effects of methadone and minimize its contribution to opioid overdose (WHO, 1998).

Some internationally work has been done in this area. One study followed up a cohort of 307 heroin addicts admitted into a methadone programme in the early 1970s. They found that subjects were nearly three times as likely to die outside of methadone maintenance as in it (Caplehorn *et al*, 1994). In New South Wales between July 1990 and December 1995 the overall mortality rate among methadone participants was only 26% of the rate reported in studies of untreated heroin users (Sunjic *et al*, 1998). In Stockholm it was found that addicts who had never been on methadone maintenance had a mortality risk 3 times greater than those in treatment (Fugalstad *et al*, 1995). This confirmed the earlier Swedish findings highlighting the protective effects of methadone treatment against drug related mortality (Grönbladh *et al*, 1990).

While comparing trends in opiate-related deaths in the U.K. and Australia between 1985 and 1995 Hall *et al* (2000) found that methadone appeared to contribute to 50% of these deaths in the Britain. This is comparable with the 54.65% of methadone-implicated deaths found in Dublin in 1999. They concluded that greater availability and ease of access to methadone maintenance contributes to both a lower rate of opioid overdose mortality and to a higher rate of methadone implication in such deaths. The proportional increase in the number of methadone-related deaths to the increase in the number of persons enrolled in methadone treatment has been previously highlighted (NDARC, 1998; Neeleman and Farrell, 1997).

Opiate overdose prevention strategies might therefore include the apparent contradictory elements of greater availability and ease of access to methadone maintenance, alongside stringent compliance with proven safe clinical practice. The challenge to service providers is to develop safer and more accessible methadone maintenance regimen.

### ***Antidepressants***

The continuing moderate level of antidepressant-implicated deaths merits vigilant monitoring. Tricyclic antidepressants were implicated concurrently with benzodiazepines in 10.46% of cases (n=9) recorded in 1999. 6 of these also had methadone implicated and in the remaining 3 heroin was implicated concurrently. 6 of



these decedents were being prescribed antidepressants, 1 was not and in the other 2 cases it was not possible to determine from evidence presented whether or not these were being prescribed.

In a sample of 5 clinics in Dublin over a 4-month period in 1999 a 14% tricyclics positive urinalysis rate was recorded (Farrell *et al*, 2000). A survey in Sydney in 1998 found that 21% of subjects had used antidepressants in the previous 6 months (Darke and Ross, 2000). They found that among injecting drug users antidepressant use was associated with higher levels of polydrug use, higher levels of psychiatric distress and a greater risk of heroin overdose. This excess risk of overdose was specifically associated with tricyclics, rather than SSRIs. They concluded that if it is considered appropriate to prescribe antidepressants to injecting drug users, it would appear safer to prescribe SSRIs.

Darke and Ross (2000) also found that as with benzodiazepines, antidepressants are used by injecting drug users for a variety of reasons not associated with depression *per se*. Psychiatric comorbidity amongst drug misusers entering treatment has been linked to poorer outcomes (Scott *et al*, 1998). While a psychiatric evaluation is part of the assessment process for methadone maintenance, a more comprehensive psychiatric comorbidity audit within the drug treatment services might be of benefit in determining the actual prevalence of depressive disorders.

### ***Suicide***

Depression is by far the most common and consistently reported example of elevated psychiatric comorbidity among opiate users (Ward *et al*, 1998). Common with other factors associated with the misuse of drugs, depression is known to predispose individuals to suicide (Neale, 2000). Suicide risk among substance-abusing young people is correlated with the presence of depression and suicidal ideation (Farrell *et al*, 1996). However, none of the 9 antidepressant-implicated cases cited above are included in the 11 apparent opioid-related suicide cases identified in the current survey.

Nine male and 2 female decedents seem to have taken their own lives. The Coroners returned verdicts of suicide in 5 of these cases. Open verdicts were returned in 2 cases. In the first of these the cause of death was given as 'Shock and haemorrhage due to multiple injuries'. These were caused by a 'fall' from a third floor balcony. This known heroin addict who was receiving methadone treatment was also a heavy drinker. She had a history of depression and suicide ideation. A companion became concerned and momentarily returned to the flat to inform others present that she thought the deceased was going to jump. In the second case where an open verdict was returned the cause of death was 'Asphyxia due to hanging and drug overdose'. This 34-year-old man was found hanging by his 8-year-old son. He was facing a 5-year prison sentence and was struggling to 'get his head together' for his child's first holy communion.

Three separate cases of 'Asphyxia due to hanging' were recorded. Two of these were suffering from depression and the third was described as a chronic heroin addict who had a history of suicide attempts. In the final case a verdict of misadventure was

returned. The cause of death was <sup>4</sup> Acute CardioRespiratory Failure due to the combined toxic effects of benzodiazepine and opiate compounds'. This 21 year old man had a history of overdosing and suicide ideation. He had consumed methadone, - 'a load of tablets' and 'a bit of gear as well'. He was barred from the family home but had left suicide notes for his parents and brothers..

While their motivation is not always apparent, common to young people who commit suicide in the general population, the desire to achieve relief from pain and to escape unbearable situations (Hill, 1995) seem to predominate. Evidence was presented of them finding it hard to overcome their addiction. The notes left for loved ones by two separate decedents serve as poignant insights into their states of mind. One declares, "...I've lost control, I don't want to end up an everyday junkie; I can see no future in it; I'm sick of fighting it". The second wrote, "...at last my nightmare is over; with me being on drugs, I didn't realise how much I loved you's; I don't know what else to do; I cannot live like this anymore; I have no life".

In Britain suicide among addicts has been estimated at 20 times more likely than in the general population (Gunnell and Frankel, 1994). Polydrug misuse may lead to a more than 40-fold increase in suicide risk (Appleby, 2000). This higher risk concurs with the findings of Oyefeso *et al.* (1999) who examined suicide trends among registered addicts in Britain over a 25-year period and who also found that prescribed drugs, notably antidepressants and methadone, influence this heightened risk. They believe that greater vigilance should be demonstrated in prescribing and dispensing of methadone. Given that early diagnosis and treatment of psychiatric disorders are important factors in suicide prevention they recommend that routine assessment of addicts should include assessment of suicide risk.

### *Solitary and Instantaneous Deaths*

A "typical" death by opioid overdose is rarely solitary or instantaneous (WHO, 1998). Being present at an overdose is something that is extremely likely to occur in a heroin user's career (Darke *et al.*, 1996). Studies of fatal and nonfatal overdoses suggest that the majority of deaths attributed to overdose occur in the company of others (Darke and Zador, 1996). In one survey 80% of subjects who self-reported they had overdosed had done so in the presence of someone else (Powis *et al.*, 1999). However, from the evidence presented at inquest, it appears that only 25.58% (n=22) of decedents in the current survey were in the company of others when taking the drugs that contributed to their deaths. Of the 57 heroin-implicated deaths only 22.8% (n=13) were accompanied.

Also it appears that instant death following the administration of heroin is not the norm. Of 152 heroin-related deaths in New South Wales in 1992, 14% of cases were classified as instant (Zador *et al.*, 1996); and the time lapse between administration of heroin and death is commonly reported to be greater than 2-3 hours (Darke and Zador, 1996). However, in 21 (36.84%) of the 57 heroin-implicated cases in the current survey it appears that death occurred almost instantly or soon after injection of heroin.

It is not possible to ascertain from the evidence presented at inquest why a greater percentage of people seem to have died instantly after administration of heroin here

than in the surveys cited above; or why a greater percentage of them seemed to have died alone. These matters warrant further investigation. The time between administration of heroin and death presents an important opportunity for intervention. However, there may be a reluctance on the part of witnesses to overdoses (commonly other heroin users) to seek assistance (Darke and Zador, 1996; Strang *et al.*, 1996). Just 27% reported ambulances having been called in Powis *et al.* (1999). However, medical assistance was sought in only 10% of fatal cases reported by Zador *et al.* (1996). It seems that along with discouraging solitary administration of heroin, the engagement of the emergency services also needs to be promoted.

### *The Prison Service*

The continuing drugs crisis within our prison service is again starkly highlighted by the opiate-related deaths of two people in the current survey who were serving sentences in Mountjoy. These come on top of a similar death in the 1998 survey and a recently reported case, which will be included in the 2000 survey. However, these may not be surprising giving the extent of the captive drug using population. The drug treatment and rehabilitation regimes within our prison service need to be brought up to at least a comparable standard as that which exists in the wider community. There is an argument that given the much higher percentage of drug users in this captive population than in the community at large, a greater opportunity for intervention exists within the prison service.

While imprisonment does not seem to increase the overall risk of injecting drug users dying from overdose, the time immediately after release is one of intensified risk. This is probably caused by a decrease in tolerance to drugs as a result of less frequent injecting while in prison or the lower purity of drugs found in prison (Seaman *et al.*, 1998). The heightened mortality risk to this group re-entering the community was previously noted by Strang *et al.* (1996).

Between the current and the 1998 survey 16 deaths in total are recorded of people who were either recently released or were on temporary release from prison. In 9 of these cases the length of time between release and death was given in evidence at inquest. These range from one death on the day of release to another 8 weeks after release (with an average of 3 weeks). Evidence was presented in another 5 cases that the decedents were on temporary release and in the remaining 2 cases it was stated that they were recently released from Prison.

Seaman *et al.* (1998) concluded that prisons should evaluate interventions to reduce the risk of death from overdose after release. These interventions could include providing an information sheet to prisoners who are about to be released and improving communication between prison healthcare staff and external treatment services and general practitioners.

## **Prevention Initiatives**

It is clear that some opiate-related deaths are potentially preventable. A range of relatively simple and for the most part inexpensive interventions could reduce the incidence of such tragedies (WHO, 1998). These interventions include both improved quality and range of services for and greater dissemination of risk factors to opiate users

### ***Risk Factor Education***

Risk factor education of drug users and their peers can both prevent and improve the management of opioid overdose (Darke and Zador, 1996). The mechanisms for delivering such information should be varied, timely, factual and non-judgemental. It can be delivered during one-to-one contact or as a group activity.

Peer education projects focused on overdose prevention can also be successful in promoting behavioural changes, which decrease individual risk. These projects recognize the knowledge and expertise within the drug using community and utilize the interactional processes that play out in users' everyday lives (Trautmann, 1995). One such project initiated by the Australian Centre for Education and Information on Drugs and Alcohol targeted a reduction in the frequency of overdosing by the creation of support networks of drug users, knowledgeable in overdose prevention and management. Together with past and present drug users they produced a booklet called "Don't Mix With Your Fix" which provided information on overdosing illustrated by stories about overdose experiences (CEIDA, 1997).

Drug users and their peers can be taught prevention strategies such as overdose assessment, first aid and resuscitation techniques, and be encouraged to engage the emergency services. The value of such skills can be placed in the context of discouraging solitary administration. Safer drug using habits can also be promoted. An indication of their personal tolerance to and the purity of the substance being used may possibly be obtained, by using a smaller amount, by splitting the dose and by injecting slowly. Finally such educational initiatives provide opportunities to promote the avoidance of polydrug misuse, particularly the combinations of alcohol and benzodiazepines with heroin or methadone (CEIDA, 1997).

### ***Evaluation of Therapeutic Interventions***

Notwithstanding the risks from lowered tolerance of those who leave treatment, it is indisputable that there is minimal risk of overdosing within drug free treatments. However, the majority of those in treatment are on opiate substitution programmes. The role methadone maintenance plays in lowering the rate of opioid overdose mortality and increasing the rate of methadone implication in such deaths was discussed earlier. The onus is clearly on prescribers to continually review their therapeutic interventions.

One valuable way of identifying shortcomings in treatment and contributory external factors is by confidential enquiry. The medical care of all those who suffered a methadone-related death in Glasgow in 1996 (n=34) was peer reviewed and the results



of these assessments returned to the responsible clinicians (Scott *et al.*, 1999). Shortcomings in clinical care were identified in 56% of cases and problems in the organisation of services in 69%. However, 85% of doctors found the audit helpful and the majority of them whose patient management attracted criticism intended to amend their practice.

While such an enquiry would inevitably examine the roll of other drugs concurrently implicated with methadone, the extent of the benzodiazepine implication in opiate-related deaths in Dublin warrants independent investigation. If the benzodiazepine prescribing audit recommended by Farrell *et al.* (2000) was conducted within and external to the drug treatment services here it might help to ascertain the precise extent of the problem and identify possible containment measures.

### *An Alternative Opioid Treatment*

There are a number of alternatives to methadone, which may be more suitable in the management of the opioid dependence of some of those at risk of overdose.

Buprenorphine seems to have been the most tested of these. Because of its longer duration of action (which may allow for less than daily dosing) and the reduced risk of overdose with buprenorphine, it may have some advantages over methadone (WHO, 1998). Studies have shown buprenorphine to be as effective as methadone in reducing illicit opioid use, retaining clients in treatment, in reducing withdrawal symptoms and as a detoxification agent (Mattick *et al.*, 1998).

However, in the context of the research presented here, the reduced abuse liability and increased safety of buprenorphine is of most interest. Relative to methadone it produces limited respiratory depression and is extremely well tolerated by non-dependent humans (Walsh *et al.*, 1994). Apparently it also greatly reduces the self-reported drug effects of other opiates concurrently administered (Mattick *et al.*, 1998). Increasing the dose of buprenorphine only has effects up to a certain level and this translates into a greatly reduced chance of accidental or intentional overdose (NEDA, 1999).

In France there is a move towards buprenorphine and general practitioners prescribe it to about one third of heroin users who consult them (EMCDDA, 1999). Worldwide the risks of fatal overdose from buprenorphine are reported to be almost nil, except where it is combined with other drugs (WHO, 1998). Deaths seem to have occurred mainly from mixing buprenorphine and benzodiazepines (EMCDDA, 1999). This point warrants caution in the light of the prevalence of benzodiazepine abuse here in Dublin. However, because of the relative safety of buprenorphine as compared to methadone, it should be considered as an alternative in some cases here and its efficacy in protecting those most at risk of overdose tested.

Apart from the complete overhaul of the drug treatment services within our prisons, the above overdose prevention strategies could be very easily implemented with minimal additional expenditure, by and alongside services currently provided.

### *Additional Interventions*

Three controversial interventions were excluded from the above debate, partly because of inherent implementation costs, but primarily to avoid distraction from the more realizable options proposed. Firstly the international debate concerning the prescribing of diamorphine as a maintenance substitute deserves consideration. This is so particularly in the light of encouraging reduced mortality results from the Swiss experiment (Uchtenhagen *et al*, 1997). Secondly, the debate into the distribution of the antagonist naloxone to heroin users as a resuscitation agent warrants monitoring (Strang *et al*, 1996; Strang *et al*, 1999). And finally, the provision of "safer" drug using environments may reduce overdoses and the transmission of blood borne infections. In Germany, Switzerland, the Netherlands and Australia "Fixing Rooms" provide a hygienic and supervised environment for drug users to inject. This provides opportunities for education and counselling and minimizes public nuisance (WHO, 1998). The above topics are presented as a flavour of the broad range of research issues into opioid-related mortality prevention currently being debated.

### *Evidence Presented to Coroners at Inquests*

In some jurisdictions in England and Wales, the Coroner requires that, where methadone has been implicated in a death, any prescription for methadone shall be presented in evidence at inquest. If this was to be stipulated at inquests here it might help to determine the extent of methadone diversion from legitimate sources and whatever role this might play in opiate-related deaths. Also, in the light of the continued high rate of benzodiazepine abuse and its implication in the highest number of opiate-related deaths in both 1998 and 1999, the presentation at inquests of prescriptions for any medications prescribed to decedents before their deaths, may help to clarify the role, if any, these drugs played in their deaths.

## **Conclusion**

Coronial records are a valuable source of recent data on opioid-related deaths. Detailed investigations of this data can provide insights into the nature and extent of the problem and the efficacy of prevention and treatment strategies. Regular monitoring of these records, alongside highlighting trends, could provide an early warning of high-risk behaviour among specific population groups.

The profile of opioid-related deaths established in the first survey is repeated in 1999 and is consistent with comparable international research. The majority of decedents were young (mean age, 29.73), male (male: female ratio - 8.55:1), single (75.6%) and unemployed (70.9%). Benzodiazepines were again implicated in the highest number of deaths (73.3%). There was a 9.17% increase and an 11.55% decrease in the number of cases proving positive for heroin and methadone respectively. However, 90.71% of cases had 2 or more drugs (mean, 3.38) implicated per death. The increased risk of overdose among those recently released from prison was highlighted and the heightened risk of suicide among opiate users was also discussed.

The risk of opioid-related mortality is raised as the prevalence of opiate use increases. However, fatalities solely involving opiates appear to form a minority of overdose deaths. The major risk factors associated with opioid-related deaths are polydrug misuse and fluctuations in individual tolerance. Greater availability and ease of access to methadone maintenance may contribute to both a lower rate of opioid overdose mortality and to a higher rate of methadone implication in such deaths. The challenge to service providers is to develop safer and more accessible methadone maintenance regimen.

It is clear that some opiate-related deaths are potentially preventable. Improved dissemination of the risk factors, vigilant evaluation of therapeutic interventions and consideration of internationally proven alternatives may help reduce the incidence of such tragedies here. The competence of programmes in lowering the rate of opioid-related deaths should be a major treatment efficacy benchmark. ....

#### References

- Appleby, L. (2000). Drug misuse and suicide: a tale of two services. *Addiction*. Vol.95.no.2:175-177.
- Baselt, R. C. & Cravey, R. H. (1995). Disposition of Toxic Drugs and Chemicals in Man. Canton (conn.): Biomedical Publications
- Byrne, R. (1999). The relative mortality risks of methadone and other drugs implicated in drug related deaths investigated by the Dublin City Coroner in 1998. Unpublished.
- Caplehorn, J. R. M., Stella, M., Dalton, Y. N., Cluff, M. C. & Petrenas, A-M. (1994). Retention in methadone maintenance and heroin addicts' risk of death. *Addiction*. Vol.89.no.2:203-209.
- Centre for Education and Information on Drugs and Alcohol (CEIDA). (1997). Report of the Pilot Heroin Overdose Peer Education Project - March 1997. Sydney: CEIDA.
- Clarke, E. G. C, Lang, M., & Marriott, K. G. (1986) Isolation and identification of drugs. 2nd Ed. London: Pharmaceuticals Press.
- Comiskey, C. M. (1997). Estimating the Prevalence Of Opiate Drug Use In Dublin, Ireland During 1996. *The Department of Health and Children*, (unpublished)
- Darke, S., Ross, J., & Hall, W. (1996). Overdose among heroin users in Sydney, Australia: II. Responses to overdose. *Addiction*. Vol.91.no.3:413-417.
- Darke, S., & Zador, D. (1996). Fatal heroin 'overdose': a review. *Addiction*. Vol.91 JIO. 12:1765-1772.
- Darke, S., Ross, J. (2000). The use of antidepressants among injecting drug users in Sydney, Australia. *Addiction*. Vol.95 .no.3:407-417.
- E.M.C.D.D.A. (1997a). 1997 Annual Report on the State of the Drugs Problem in the European Union. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.
- E.M.C.D.D.A. (1997b). Review of scientific studies of mortality among drug users and feasibility study for a common methodology for monitoring overall and cause-specific mortality among drug users in member states of European Union. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.

- E.M.C.D.D.A. (1999). Annual report on the state of the drugs problem in the European Union -1999. Lisbon: E.M.C.D.D.A.
- Farrell, M., Neeleman, J., Griffiths, P., & Strang, J. (1996). suicide and overdose among opiate addicts. *Addiction*. Vol.91.no.3:321-323.
- Farrell, M., Gerada, C, & Marsden, J. (2000). External review of drug services for the Eastern Health Board. Dublin: Eastern Health Board.
- Gunnell, D., & Frankel, S. (1994). Prevention of suicide: aspirations and evidence. *British Medical Journal*. Vol.308:1227-1233.
- Hall, W., Lynskey, M., & Degenhardt, L. (2000). Trends in opiate-related deaths in the United Kingdom and Australia, 1985-1995. *Drug and Alcohol Dependence*. Vol.57:247-254.
- Hill, K. (1995). *The Long Sleep*. Young people and suicide. London: Virago Press.
- Hulse, G. K., English, D. R., Milne, E., & Holman, C. D. J. (1999). The quantification of mortality resulting from the regular use of illicit opiates. *Addiction*. Vol.94.no.2:221-229.
- Mattick, R. P., Oliphant, D., Ward, J., & Hall, W. (1998). The effectiveness of other opioid replacement therapies: LAAM, heroin, buprenorphine, naltrexone and injectable maintenance. In Ward, J., Mattick, R. P., & Hall, W. (Eds.), *Methadone Maintenance Treatment and other Opioid Replacement Therapies*, (pp. 123-157). Amsterdam: Harwood Academic Publishers.
- Minister for Health and Children (Mr. Brian Cowen T.D.). (1998). Misuse of drugs (supervision of : prescription and supply of methadone) regulations, 1998. (S.I. No.225 of 1998). Dublin: *Government Publications Stationery Office*.
- National Drug and Alcohol Research Centre (NDARC). (1998). Proceedings of an international opioid overdose symposium, Sydney, Australia, 14-15 August 1997. Hall, W. (ed.). Monograph No.3 5. Sydney: NDARC, University of New South Wales.
- National Institute on Drug Abuse. (1999). Buprenorphine Update: Questions and Answers. <http://www.nida.nih.gov/Bupupdate.html> 27/10/99.
- Neale, J. (2000). Suicidal intent in non-fatal illicit drug overdose. *Addiction*. Vol.95.no. 1:85-93.
- Neeleman, J., & Farrell, M. (1997). Fatal methadone and heroin overdoses: time trends in England and Wales. *Journal of Epidemiology and Community Health*. Vol.51:435-437.
- Oyefeso, A., Ghodse, H., Clancy, C. & Corkery, J. M. (1999). Suicide among drug addicts in the UK. *British Journal of Psychiatry*. Vol. 175:277-282.
- Powis, B., Strang, J., Griffiths, P., Taylor, C, Williamson, S., Fountain, J., & Gossop, M. Self-reported overdose among injecting drug users in London: extent and nature of problem. *Addiction*. vol.94.no.4:471-478.
- Piischel, K. (1993). Drug-related death - an update. *Forensic Science International* Vol.62:121-128.
- Seaman, S. R., Brettell, R. P., & Gore, S. M. (1998). Mortality from overdose among injecting drug users recently released from prison: database linkage study. *BMJ*. Vol.316:426-428.
- Spiehler, (1989) in Karch, S. B. (1996). *The pathology of Drug abuse*. 2nd Ed. London: CRC.
- Scott, J., Gilvarry, E., & Farrell, M. (1998). Managing anxiety and depression in alcohol and drug dependence. *Addictive Behaviours*. Vol.23:919-931.



- Scott, R. T. A., Jay, M. J. H., Keith, R., Oliver, J. S., & Cassidy, M. T. (1999). A confidential enquiry into methadone-related deaths. *Addiction*. Vol.94.no.12:1789-1794.
- Strang, J., Darke, S., Hall, W., Farrell, M., & Ali, R. (1996). Heroin overdose: the case for take-home naloxone. *BMJ*. Vol.312:1435.
- Strang, J., Powis, B., Best, D., Vingoe, L., Griffiths, P., Taylor, C., Welch, S., & Gossop, M. (1999). Preventing opiate overdose fatalities with take-home naloxone: Pre-launch study of possible impact and acceptability. *Addiction*. Vol.94.no.2:199-204.
- Sunjic, S., Zador, D., & Basili, H. (1998). Methadone Syrup-Related Deaths in New South Wales, July 1990-december 1995. in Hall, W. (Ed.). 1998. *Proceedings of an international opioid overdose symposium, Sydney, Australia, 14-15 August 1997*. Sydney: NDARC, University of New South Wales.
- Trautmann, F. (1995). Peer Support as a method of risk reduction in injecting drug user communities: Experience in Dutch Projects and the "European Peer Support Project". *Journal of Drug Issues*. Vol.25.no.3:617-628.
- Uchtenhagen, A., Gutzwiller, F., & Dobler-Mikola, A. (1997). Programme for a Medical Prescription of Narcotics: Final Report of the Research Representatives. Berne: Swiss Federal Office of Public Health.
- Walsh, R. A. (1991). Opioid drug accidental deaths in the Newcastle area of New South Wales, 1970-1987. *Drug and Alcohol Review*. Vol.10:79-83.
- Walsh, S. L., Preston, K. L., Stitzer, M. L., Cone, E. J., & Bigelow, G. E. (1994). Clinical Pharmacology of Buprenorphine: Ceiling effects at high doses. *Clinical Pharmacology and Therapeutics*. Vol.55:569-580.
- Ward, J., Mattick, R. P., & Hall, W. (Eds.) (1998). Methadone maintenance treatment and other opioid replacement therapies. Amsterdam: Harwood Academic Publishers.
- White, J. M., & Irvine, R. J. (1999). Mechanisms of fatal opioid overdose. *Addiction*. Vol.94.no.7:961-972.
- World Health Organisation (WHO). (1977). Manual of the international statistical classification of diseases, injuries and causes of death. (Ninth Revision). Vol.1. Geneva: WHO.
- World Health Organisation (WHO). (1992). International classification of diseases and related health problems. (Tenth Revision). Vol.1. Geneva: WHO.
- World Health Organisation (WHO). (1993). Deaths Related to Drug Abuse: Report on a WHO Consultation, Geneva, 22-25 November 1993. Geneva: World Health Organisation.
- World Health Organisation (WHO). (1998). Opioid Overdose Trends, Risk Factors, Interventions and Priorities for Action. (unpublished document WHO/HSC/SAB/98.4). Geneva: World Health Organisation.
- Zador, D., Sunjic, S., & Darke, S. (1996). Heroin-related deaths in New South Wales, 1992: toxicological findings and circumstances. *Medical Journal of Australia*. Vol.164:204-207.

Table 1.

**Population, unemployment & Opioid-Related Death rate per DED & DED in  
LDTFA 1999.**

DED	Total Population	unemployed 15+	% tot.pop. unemployed	No. of ORDs	ORDs'99/ 1000 pop.	Population Between 15-44	Standardised ORDs'99/1000 pop.15-44	L.D.T.F.A
Merchants Quay F	2296	416	18.11	3	1.3	1170	2.56	Canal Communities
Royal Exchange B	1613	259	16.05	2	1.23	1005	1.99	South Inner City
Ushers D	1802	317	17.59	2	1.1	900	2.02	Canal Communities
Crumlin B	3330	407	12.22	3	0.9	1386	2.16	Dublin 12
Ballinteer-Marley	2763	71	2.57	2	0.72	1358	1.47	Dunlaoghaire/Rathdown
Merchants Quay A	1513	234	15.47	1	0.66	854	1.17	South Inner City
Mountjoy A	3108	757	24.36	2	0.64	1511	1.32	North Inner City
Finglas South B	3210	357	11.12	2	0.62	1552	1.28	Finglas/Cabra
Ballymun C	6575	1154	17.55	4	0.6	3139	1.27	Ballymun
Kilmainham C	3446	410	11.90	2	0.58	1496	1.33	Canal Communities
Inns Quay C	1748	301	17.22	1	0.57	802	1.24	North Inner City
Clondalkin-Rowliagh	5238	805	15.37	3	0.57	2705	1.1	Clondalkin
Wood Quay B	3539	391	11.05	2	0.56	2154	0.92	South Inner City
Tallaght-Jobstown	7294	955	13.09	4	0.54	3770	1.06	Tallaght
Ballymun E	1863	58	3.11	1	0.53	810	1.23	Ballymun
Chapelizod	1855	94	5.07	1	0.53	823	1.21	Ballyfermot
Ballybrack	3731	179	4.80	2	0.53	1734	1.15	Dunlaoghaire/Rathdown
Ballymun D	3794	509	13.42	2	0.52	1684	1.18	Ballymun
Arran Quay C	1914	337	17.61	1	0.52	1278	0.78	North Inner City
Ushers E	1894	351	18.53	1	0.52	885	1.12	Canal Communities
Mountjoy B	1994	518	25.98	1	0.5	1181	0.89	North Inner City
Dunlaoghaire-East Central	2000	194	9.70	1	0.5	1030	0.97	Dunlaoghaire/Rathdown
Rathfarnham-Hermitage	4284	99	2.31	2	0.46	2132	0.93	Clondalkin
Inchecore A	2145	180	8.39	1	0.46	884	1.13	Canal Communities
Blackrock-Boosterstown	2283	65	2.85	1	0.43	1134	0.88	Dunlaoghaire/Rathdown
Ballymun B	4431	827	18.66	2	0.43	2005	0.99	Ballymun
Crumlin C	2345	286	12.20	1	0.42	1011	0.98	Dublin 12
Walkinstown C	2341	150	6.41	1	0.42	904	1.1	Dublin 12
Kimmage D	2375	230	9.68	1	0.42	1099	0.9	Dublin 12
Rotunda A	2522	458	18.16	1	0.39	1434	0.69	North Inner City
Wood Quay A	2651	378	14.26	1	0.37	1165	0.85	South Inner City
Cabra West D	2731	320	11.72	1	0.36	1280	0.78	Finglas/Cabra
Tallaght-Fettercairn	5513	883	16.02	2	0.36	2689	0.74	Tallaght
Arran Quay E	317	317	10.72	1	0.33	1381	0.72	North Inner City
Ballymun A	3064	301	9.82	1	0.32	931	1.07	Ballymun
Tallaght-Tymon	6289	537	8.54	2	0.31	3182	0.62	Tallaght
Finglas North B	3242	357	11.01	1	0.3	1372	0.72	Finglas/Cabra
Harmonstown A	3388	180	5.31	1	0.29	1510	0.66	Dublin North East
Priorswood B	3353	603	17.98	1	0.29	1628	0.61	Dublin North East
Kimmage E	3443	345	10.02	1	0.29	1656	0.6	Dublin 12
Druncondra South C	3498	149	4.26	1	0.28	1665	0.6	Other Areas
Ballybough A	3570	579	16.22	1	0.28	1518	0.65	North Inner City
Churchtown Nutgrove	3692	355	9.62	1	0.27	1719	0.58	Dunlaoghaire/Rathdown
Blanchardstown-Blakestown	15131	700	4.63	4	0.26	8161	0.49	Blanchardstown
Cherry Orchard C	3941	726	18.42	1	0.25	1783	0.56	Ballyfermot
Palmerston Village	3951	181	4.57	1	0.25	1739	0.57	Other Areas
Rathmines East A	4609	151	3.28	1	0.21	2868	0.34	Other Areas
Ballyboden	5260	133	2.53	1	0.19	2688	0.37	Dunlaoghaire/Rathdown
Shankill-Rathsallagh	5399	323	5.98	1	0.18	1634	0.61	Dunlaoghaire/Rathdown
Swords-Glasmere	7088	419	5.91	1	0.14	3919	0.25	Other Areas
Tallaght-Springfield	7803	637	8.16	1	0.12	4072	0.24	Tallaght
Palmerston West	8449	710	8.40	1	0.11	4341	0.23	Clondalkin
Clondalkin-Monastery	8633	477	5.53	1	0.11	4494	0.22	Clondalkin
Clondalkin-Dunawley	9289	935	10.07	1	0.1	4708	0.21	Clondalkin
			average =11.17					

Table 2.

**Numbers in treatment & total standardized Opioid-Related Death rates / DEDs  
in LDTFA 1999**

L.D.T.F.A	G.P.s	Clinics	Total being treated within each LDTFA	no. of ORDs	no. of DEDs	Total Standardised ORDs'99/1000 pop.15- 44/DEDs in LDTFA
Canal Communities	73	63	136	8	5	8.16
North Inner City	194	557	751	9	7	6.29
Dunlaoghaire/Rathdown	183	128	311	9	7	6.03
Ballymun	77	216	293	10	5	5.74
Dublin 12	26	72	98	7	5	5.74
South Inner City	139	419	558	7	4	4.93
Finglas/Cabra	42	81	123	3	3	2.78
Clondalkin	177	43	220	8	5	2.69
Tallaght	91	239	330	9	4	2.66
Ballyfermot	19	350	369	2	2	1.77
Bray	16	74	90	0	0	0.00
Dublin North East	62	161	223	2	2	1.27
Other Areas	219	27	246	7	4	1.16
Blanchardstown	49	75	124	4	1	0.49
Homeless	***	***	***	1	***	***
<b>Totals</b>	<b>1367</b>	<b>2505</b>	<b>3872</b>	<b>86</b>	<b>54</b>	<b>49.71 / 14 =</b>
		Trinity Court	481			<b>3.55</b>
Total number on the Central Methadone Treatment list as of the 29th February 2000 (source E.H.B.)			4353			

Table 3.

	ICD9 CODES	DESCRIPTION	ORDs '98	%	ORDs '99	%
1	304	Drug Dependence	2	2.6	1	1.2
2	304..0	...morphine type			3	3.5
3	304.7	...combination of morphine type drug with any other	36	46.8	44	51.2
4	304.8	...excluding morphine type drug			1	1.2
5	305	Nondependent abuse of drugs				
6	305.5	...morphine type	9	11.7	6	7.0
7	305.6	...cocaine type				
8	305.7	...Amphetamine type			1	1.2
9	305.9	...other, mixed or unspecified	26	33.8	15	17.4
10	E850	Accidental poisoning				
11	E850..0	...by opiates and related narcotics	1	1.3		
12	E950	Suicide and selfinflicted poisoning				
13	E950.2	...by other sedatives and hypnotics	1	1.3		
14	E950.4 and N965.0 and N968.5	...mixed including opiates and cocaine			1	1.2
15	E950.4 and N965.0 and not N968.5	...mixed including opiates and no cocaine			1	1.2
16	E953.0	Suicide and selfinflicted injury by hanging	2	2.6	8	9.3
17	E957.0	Suicide and selfinflicted injury by jumping from high place...Residential premises			1	1.2
18	E965.0	Assault by Shotgun			1	1.2
19	E966	Assault by cutting and piercing instrument			2	2.3
20	E910.9	Accidental drowning and submersion...Unspecified			1	1.2
		Totals	77	100	86	100



Table 4.

	ICD10 CODES	DESCRIPTION	ORDs '98	%	ORDs '99	%
1	F19.0	Mental an behavioural disorders due to multiple drug use and use of other psychoactive substances - acute intoxication	39	50.6	45	52.3
2	X42	Accidental poisoning by and exposure to narcotics and psychodysleptics (hallucinogens) not elsewhere classified	25	32.5	23	26.7
3	F11.0	Mental an behavioural disorders due to use of opioids - acute intoxication	9	11.7	3	3.5
4	X62	Intentional self-poisoning by and exposure to narcotics and psychodysleptics (Hallucinogens) not elsewhere classified	1	1.3	2	2.3
5	F11.2	Mental an behavioural disorders due to use of opioids - dependence syndrome	1	1.3		
6	X70	Intentional self-harm by hanging, strangulation and suffocation	2	2.6	8	9.3
7	X94	Assault by rifle, shotgun and larger firearm discharge			1	1.2
8	X99	Assault by sharp object			2	2.3
9	W69	Drowning and submersion following fall into natural water			1	1.2
10	X80	Intentional self-harm by jumping from a high place			1	1.2
		Totals	77	100	86	100

Appendix: Standard Recording Form.

**DATA SHEETS - OPIOID-RELATED DEATHS -  
DUBLIN CITY AND COUNTY CORONERS 1998/99.**

Admin: Case: \_\_\_\_\_ File: \_\_\_\_\_ Date of inquest: \_\_\_\_\_

**Demographics:**

Name: \_\_\_\_\_ Sex: 1. Male 2. Female

Age: \_\_\_\_\_ Date of Birth: \_\_\_\_\_ Date of Death: \_\_\_\_\_

Address: \_\_\_\_\_

*Local Drug Task Force Area:*

- |                       |                            |                       |
|-----------------------|----------------------------|-----------------------|
| 1. North Inner City.  | 2. South Inner City.       | 3. Ballyfermot.       |
| 4. Ballymun.          | 5. Blanchardstown.         | 6. Bray.              |
| 7. Canal Communities. | 8. Clondalkin.             | 9. Dublin north East. |
| 10. Dublin 12.        | 11. Dunlaoghaire/Rathdown. |                       |
| 12. Finglas/Cabra.    | 13. Tallaght.              | 14. Other Areas.      |
| 15. Homeless.         |                            |                       |

*Occupation:*

- |                       |                           |                         |
|-----------------------|---------------------------|-------------------------|
| 1. Employed (manual). | 2. Employed (non-man).    | 3. Self employed        |
| 4. Unemployed.        | 5. Childcare/houseparent. | 6. Invalidity/sickness. |
| 7. Retired.           | 8. Student/Pupil.         | 9. Not Known.           |
| 10. Other _____       |                           |                         |

**Cause and Circumstances:**

*Coroner's Verdict:*

1. Misadventure. 2. Open Verdict. 3. Suicide.  
4. Other \_\_\_\_\_

ICD-10 Code: \_\_\_\_\_

*Was Deceased alone?:*

1. Yes. 2. No. 3. Unknown.

ICD-9 Code: \_\_\_\_\_

*Opiate addict/Known opiate user?:*

1. Yes. 2. No. 3. Unknown.

*Official Prescription?:*

1. Yes. 2. No. 3. Unknown.

**Comments:**

