

**HEROIN-RELATED DEATHS IN  
NEW SOUTH WALES  
1992-1996**

Shane Darke, Joanne Ross, Deborah Zador &  
Sandra Sunjic

Technical Report No. 68

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## EXECUTIVE SUMMARY

The coronial files of all heroin-related fatalities that occurred in New South Wales (NSW) over the period 1992-1996 were inspected for details and trends in demographic characteristics, circumstances of death and toxicological findings. There were 953 heroin-related fatalities in NSW over the study period. There was a substantial, statistically significant increase in heroin-related fatalities over the study period, from 152 deaths in 1992 to 226 during 1996. Twenty percent of deaths occurred outside the Sydney metropolitan region, with the Illawarra region contributing the largest number of deaths from outside Sydney. The proportional increase in the number of deaths that occurred outside Sydney was greater than that which occurred within Sydney (130% v 34%). The immediate surrounds of Kings Cross and Cabramatta contributed 35% of all NSW fatalities.

The mean age of cases was 31.0 years, 85% were male, and 85% were classified as dependent on heroin at the time of death. Five percent of cases had recently been released from prison, 2% died in custody, 3% were enrolled in methadone maintenance at the time of death, and 5% were classified as suicides. There were no significant trends in demographic characteristics of cases over the study period.

Fatalities predominantly occurred in home settings (61%). Of those cases in which an estimate could be made, 15% were classified as having died instantly upon heroin administration. No intervention occurred in 79% of cases.

Morphine concentrations rose markedly over the study period, from 0.24 mg/L in 1992 to 0.38 mg/L in 1996, with the major increase having occurred in the period 1993-1994. The majority of cases (76%) involved heroin in combination with other drugs: alcohol (46%), benzodiazepines (27%), antidepressants (7%) and cocaine (7%). In only 24% of cases was morphine the sole drug detected. The median blood alcohol concentration of cases in which alcohol was present was 0.13 g/100 ml. Males were significantly more likely to have alcohol detected at autopsy (49% v 24%), while females were more likely to have benzodiazepines detected (41% v 17%). The median blood morphine concentration among cases in which alcohol was detected was significantly lower than other cases (0.27 mg/L v 0.39 mg/L). In 66% of cases the cause of death was attributed to "acute narcotism" (or "narcotism"). Of the cases in which drugs other than morphine were detected, 57% of deaths were attributed solely to narcotism.

The problem of heroin-related fatalities grew throughout NSW throughout the study period. Innovative responses are necessary if the rise in the number of fatal cases is to be curbed. Possible interventions include educating heroin users on the dangers of the use of other drugs in combination with heroin, the provision of safe injecting rooms to reduce the number of street-based fatalities, expansion of methadone maintenance services, distributing naloxone directly to heroin users, and an improvement of responses to overdoses by witnesses.

### 1.0 INTRODUCTION

The estimated excess mortality rate among heroin users is 13 times that of peers of



the same age and gender<sup>1</sup>. Of the major causes of this excess mortality (overdose disease, trauma) overdose makes the largest single contribution<sup>2-6</sup>.

Of particular concern has been recent data indicating that the rate of opioid overdose in Australia is rising steeply<sup>7</sup>. The rate of fatal opioid overdoses in Australia rose from 10.7 per million in 1979 to 67.0 per million in 1995<sup>7</sup>. In overall terms, there were 70 fatal opioid overdoses in Australia in 1979, compared to 550 in 1995<sup>7</sup>. Similar increases have been reported in the United States<sup>8</sup>, The United Kingdom<sup>9</sup>, Italy<sup>10</sup>, Scandinavia<sup>11</sup> and Austria<sup>12</sup>.

The state of New South Wales (NSW) contributes approximately a half of the annual total of fatal opioid overdoses that occur in Australia<sup>13</sup>. The purity of heroin in NSW rose steeply in the early 1990's, following the emergence of the Sydney suburb of Cabramatta as a major distribution point for cheap, high purity heroin<sup>14,15</sup>. A study of street seizures of heroin in the Cabramatta region reported a mean diamorphine purity of 59%, ranging up to 80%<sup>16</sup>.

The major study of fatal heroin overdose in NSW conducted to date was that of Zador et al<sup>17</sup>. The authors analysed the data from coronial files of all 1992 New South Wales heroin-related deaths. This study found that cases of heroin-related deaths were overwhelmingly male, occurred in a dependent non-treatment population of users, and typically occurred in the home. A large proportion of cases had moderate to low blood morphine concentrations (heroin is rapidly metabolised to morphine once ingested). Of major importance, the study also found that 45% were positive for alcohol at autopsy, and 27% for benzodiazepines.

More recently, Darke and Ross<sup>18</sup> examined trends in all heroin-related fatalities that occurred in the south western Sydney region over the period 1992-1996. Heroin-related fatalities in this region rose from 20 in 1992 to 54 in 1996. There was a significant increase over the study period in the proportion of fatalities that occurred in public settings. Morphine concentrations doubled over the study period from 0.16 mg/L in 1992 to 0.37 mg/L in 1996. As was the case in the Zador et al<sup>17</sup>

study, the majority of cases involved heroin in combination with other drugs: alcohol (40%), benzodiazepines (30%) and antidepressants (9%). These data raise the question as to whether these trends in the south west of Sydney are statewide, or specific to a major heroin distribution point.

The aim of the present study was to provide an analysis of all heroin-related deaths in NSW over the five year period 1992 to 1996. By examining cases over a consecutive and substantial period of time, a period in which the price of heroin declined and purity increased, trends in the demographic characteristics, toxicological findings and circumstances of death could be analysed.

### **1.1 Study Aims**

The aims of the study were:

1. To describe the demographic characteristics of heroin-related deaths in NSW between 1992 and 1996;
2. To describe the circumstances of heroin-related deaths in NSW between 1992 and 1996;
3. To determine the toxicological findings at autopsy of all cases of heroin-related deaths in NSW between 1 January 1992 and 31 December 1996; and
4. To ascertain trends across the study period.

## **2.0 METHOD**

### **2.1 Procedure**

All heroin-related fatalities that occurred during 1992 in the NSW region were identified from the data reported by Zador et al<sup>17</sup>. These had been identified from Australian Bureau of Statistics records. For later cases, all cases positive for blood morphine that occurred in NSW between 1993 and 1996 inclusive were identified by the Division of Analytical Laboratories (DAL) (NSW Department of Health). The DAL performs toxicological analyses on all overdose cases that occur in NSW, and was the laboratory used for analyses for all cases reported in this study, including those from Zador et al<sup>17</sup>.

Permission was obtained from the Department of Courts Administration to inspect the coronial file relating to each morphine positive case. As with the 1992 data, each file was inspected by a member of the research team to ascertain whether the fatality was the result of a heroin overdose, or was due to other causes. Overdose fatalities were determined by pathology conclusions, circumstances of death (e.g. presence of injecting equipment) and police investigations. Cases due to causes other than heroin were excluded from the study.

### **2.2 Data Collection Form**

Information on the demographic characteristics, drug use history, circumstances of death, and toxicological findings of heroin-related deaths was retrieved from the coronial files. Documents of particular relevance contained in the files were police reports, ambulance officers' statements, witnesses' statements, autopsy reports, transcripts of coronial inquests (where conducted) and results of toxicological analyses. The standardised data collection form used by Zador et al<sup>17</sup> was employed to record the relevant data. The data collection form is outlined in more detail below.

### **2.2.1 Demographic characteristics**

Demographic data obtained included age, sex, marital status, employment status, country of birth, and suburb/town of residence at the time of death.

### **2.2.2 History of drug use**

Information was sought on the history of known drug use, and extent of heroin involvement of cases. History of known use of heroin, benzodiazepines and heavy alcohol use was obtained from family members' and friends' statements to police. Information was also sought on cases' history of treatment for heroin dependence.

As was the case with Zador et al<sup>17</sup> an attempt was made to categorise the extent of dependence on heroin of cases into three groups: dependent, recreational, and novice. For the purposes of the study, a classification of "dependent" was not restricted to criteria of physiological dependence (tolerance and withdrawal symptoms). A subject was defined as "dependent" if the coronial file provided evidence of participation in the heroin lifestyle or sub-culture (which may include physiological dependence). The following criteria were considered suggestive of the centrality of heroin use in the deceased's life: known history of heroin use, partner or friends known to be heroin users, history of heroin overdose or treatment for dependence (e.g. rehabilitation or methadone treatment) and a criminal record for drug-related offences. Cases which did not meet the criteria for inclusion in the "dependent" category were defined as "recreational" users if there was evidence of infrequent, casual heroin use. A "novice" was considered to be a person whose death was due to first time use of heroin.

### **2.2.3 Circumstances of death**

Information was obtained on the day and month of death, suburb/town in which death occurred, physical location of death (e.g. home, street, public toilet), time of death, the presence of other persons at the overdose, whether the death was due to suicide and interventions sought or administered prior to death.

As noted, suburb or town of death was recorded. In order to examine regional trends within Sydney, four broad regions were defined (inner city/east, west, south, north)

based upon local government areas (Appendix 1). Non-Sydney fatalities were allocated to the appropriate country region (Appendix 1).

An attempt was made to estimate the time interval between final administration of heroin and the onset of death on the basis of witnesses' and ambulance officers' statements, police reports, and police photographs of the body and surrounds. A death was defined as "instant" if photographs showed evidence of a needle and syringe still in situ (e.g. still in the arm), if the posture or position of the body was consistent with a sudden collapse or drop (e.g. seated on toilet slumped against cubicle wall), or if witnesses provided evidence of same. In cases where the death was not instant, but no further estimation could be made, the classification was made "Not instant-time uncertain".

#### **2.2.4 Toxicological analyses**

Information on results of toxicological analysis was obtained from reports of laboratory analyses performed by the Division of Analytical Laboratories on blood and other tissue specimens taken at autopsy. These reports were contained in the coronial files. As it was not possible in some cases to ascertain whether the presence of two or more benzodiazepine drugs detected at autopsy represented the administration of two drugs or the original drug and its metabolite (e.g. positive for diazepam and oxazepam), all individually detected benzodiazepines were grouped into the single drug class "benzodiazepines".

### **2.3 *Statistical Analyses***

T-tests were used for continuous data. Where distributions were highly skewed, medians were reported, and were analysed using the Mann-Whitney U statistic. For dichotomous categorical variables, Odds Ratios (OR) and 95% Confidence Intervals (95% CI) were reported. The chi-square statistic was reported for other categorical data. In order to determine whether trends occurred in continuous variables across the years of the study, multiple regressions were conducted.

A Spearman rank order correlation to ascertain whether elapsed time between death

and autopsy was related to blood morphine concentrations was conducted. In cases where there was a range of time in which death could have occurred, the mid-point was chosen for these analyses. Spearman correlations were also calculated to determine the relationship between blood morphine and alcohol concentrations.

In order to determine which factors were independently associated with blood morphine concentration, multiple logistic regressions were conducted. Backwards elimination of variables was used to select the most appropriate models.

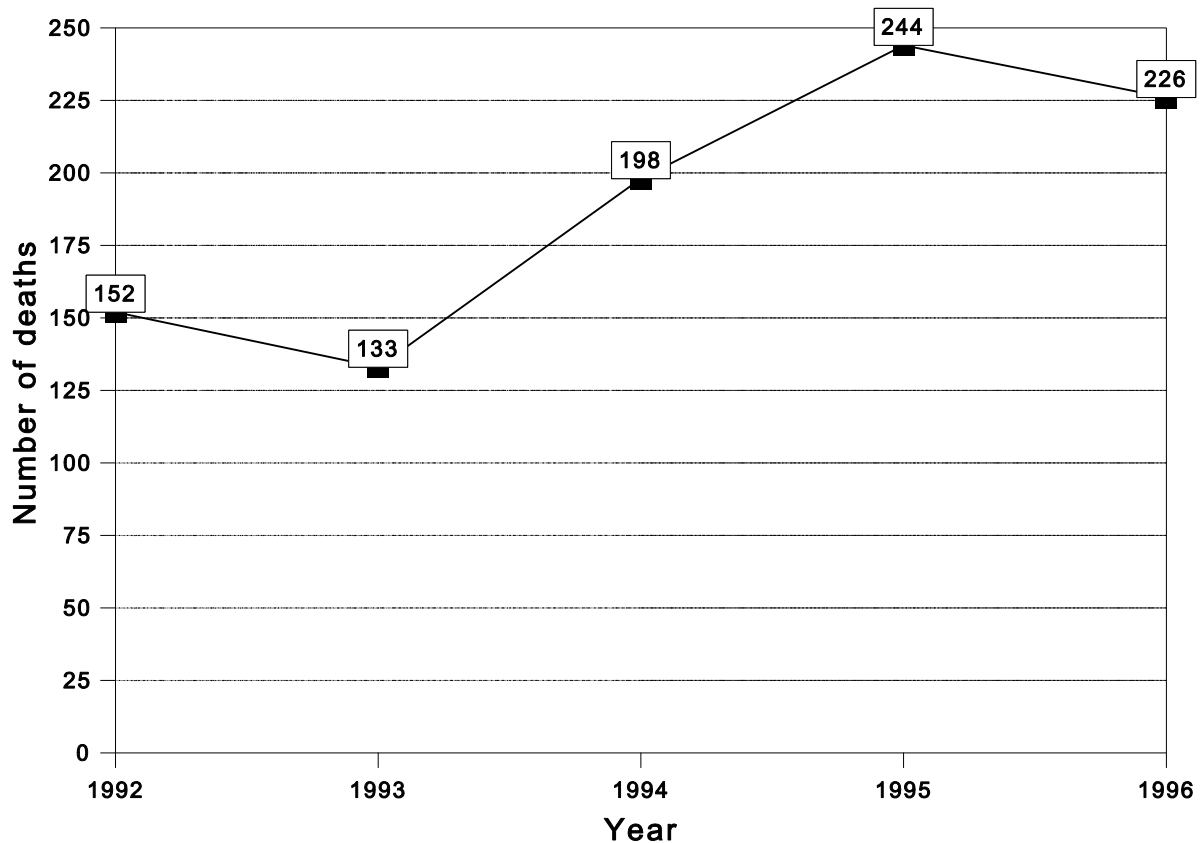
All analyses were conducted using SYSTAT<sup>19</sup>.

### **3.0 RESULTS**

#### **3.1 *Number of Heroin-Related Fatalities***

A total of 953 heroin-related fatalities occurred in NSW during the five year period 1992-1996: 1992 (152 deaths), 1993 (133), 1994 (198), 1995 (244), 1996 (226). The number of fatalities by year are presented graphically in Figure 1.

**Figure 1: Number of heroin-related fatalities in NSW, 1992-1996**



As can be seen, the number of deaths rose substantially over the period 1992-1996. The increase in the number of deaths over the period was statistically significant ( $F_{1,3}=8.9, p<.05$ ).

### 3.2 *Geographic Distribution of Deaths*

The geographic distribution of deaths over the study period is presented in Table 1. As expected, given that it is the major population centre and heroin distribution point of the state, the majority of deaths ( $n=765, 80\%$ ) occurred in the Sydney metropolitan area. However, a large proportion of deaths ( $n=188, 20\%$ ) occurred outside Sydney. The three major non-Sydney regions in which deaths occurred were Wollongong/Illawarra (43 deaths), Newcastle/Hunter (35 deaths) and the far north coast (25 deaths).

**Table 1: Regional distribution of NSW cases of heroin-related deaths, 1992-1996**

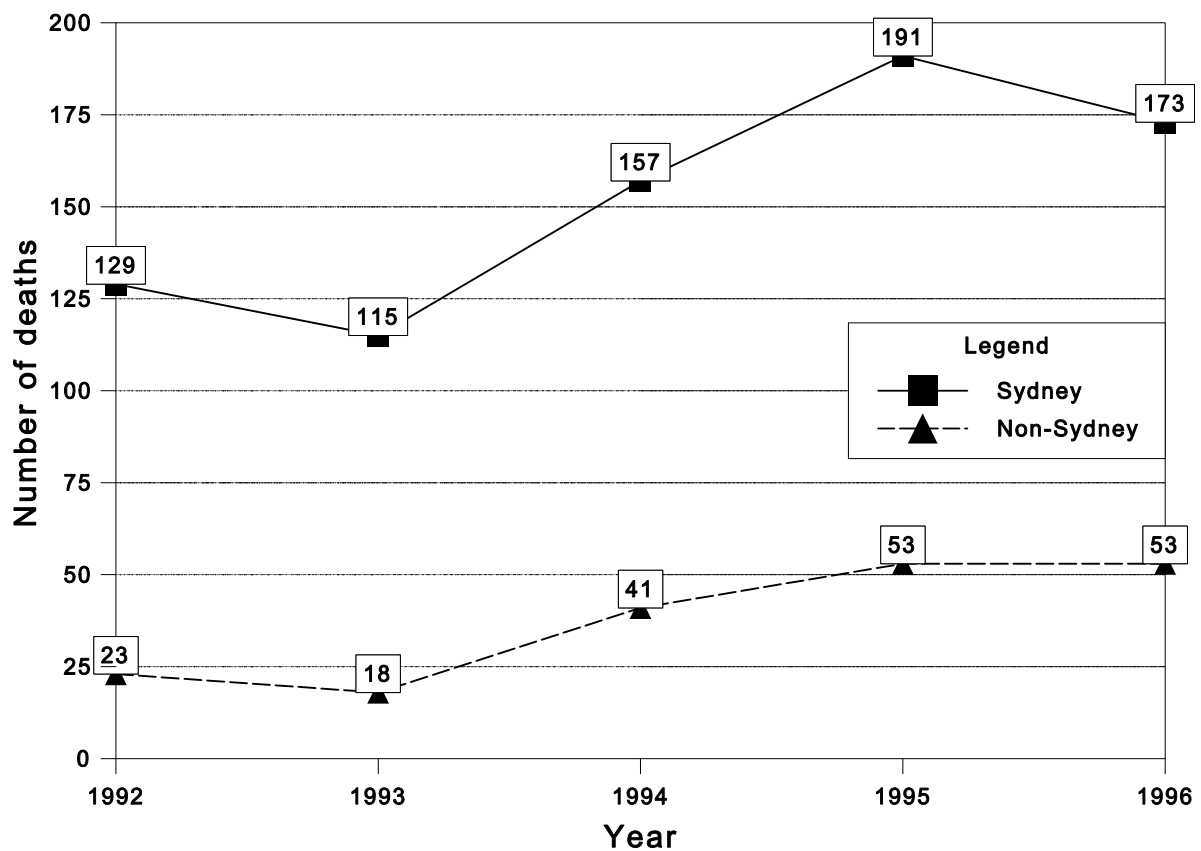
| <b>Region</b>             | <b>1992<br/>N</b> | <b>1993<br/>N</b> | <b>1994<br/>N</b> | <b>1995<br/>N</b> | <b>1996<br/>N</b> | <b>Total<br/>N</b> | <b>% of<br/>cases</b> |
|---------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-----------------------|
| Sydney<br>(Inner/East)    | 68                | 61                | 71                | 74                | 70                | 344                | 36                    |
| Sydney<br>(Western)       | 48                | 38                | 64                | 97                | 76                | 323                | 34                    |
| Sydney<br>(Northern)      | 7                 | 13                | 15                | 11                | 17                | 63                 | 7                     |
| Sydney<br>(Southern)      | 6                 | 3                 | 7                 | 9                 | 10                | 35                 | 4                     |
| <i>All Sydney</i>         | 129               | 115               | 157               | 191               | 173               | 765                | 80                    |
| Illawarra                 | 5                 | 7                 | 10                | 8                 | 13                | 43                 | 5                     |
| Hunter                    | 4                 | 3                 | 3                 | 12                | 13                | 35                 | 4                     |
| Far North<br>Coast        | 2                 | 3                 | 4                 | 12                | 4                 | 25                 | 3                     |
| Mid-West NSW              | 2                 | 0                 | 8                 | 5                 | 5                 | 20                 | 2                     |
| Central Coast             | 2                 | 2                 | 6                 | 3                 | 5                 | 18                 | 2                     |
| Southern<br>Highlands     | 2                 | 1                 | 5                 | 3                 | 6                 | 17                 | 2                     |
| South Coast               | 0                 | 0                 | 1                 | 3                 | 5                 | 9                  | 1                     |
| Southern NSW              | 3                 | 1                 | 2                 | 1                 | 0                 | 7                  | <1                    |
| Mid-North<br>Coast        | 1                 | 1                 | 1                 | 2                 | 1                 | 6                  | <1                    |
| New England               | 0                 | 0                 | 0                 | 4                 | 1                 | 5                  | <1                    |
| Far West NSW              | 2                 | 0                 | 1                 | 0                 | 0                 | 3                  | <1                    |
| <i>All<br/>non-Sydney</i> | 23                | 18                | 41                | 53                | 53                | 188                | 20                    |
| <i>Total</i>              | 152               | 133               | 198               | 244               | 226               | 953                | 100                   |



There were increases in the number of heroin-related deaths over the study period in both Sydney and the remainder of the state (Figure 2). In the Sydney metropolitan area, the number of deaths increased significantly from 129 in 1992 to 173 in 1996, with a peak of 191 in 1995 ( $F_{1,3}=6.8$ ,  $p<.05$ ). Similarly, the non-Sydney deaths increased significantly from 23 deaths in 1992 to 53 in 1996 ( $F_{1,3}=15.0$ ,  $p<.05$ ). Thus, while Sydney deaths increased by 34% between 1992 and 1996, deaths outside Sydney increased by 130%.

In order to examine the impact of the major NSW drug markets (Kings Cross and Cabramatta) on overdose fatalities, the number of overdoses that occurred in these localities and their immediate surrounds were investigated. There were 191 heroin-related deaths in the 2km radius surrounding inner city Kings Cross, 20% of all NSW overdose deaths. Similarly, there were 144 deaths in the 4 km radius around Cabramatta in south western suburban Sydney, 15% of all cases. A larger radius was chosen for the Cabramatta region, due to its outer suburban geography. Overall, these two distribution points accounted for 35% of all heroin-related fatalities in NSW during the study period.

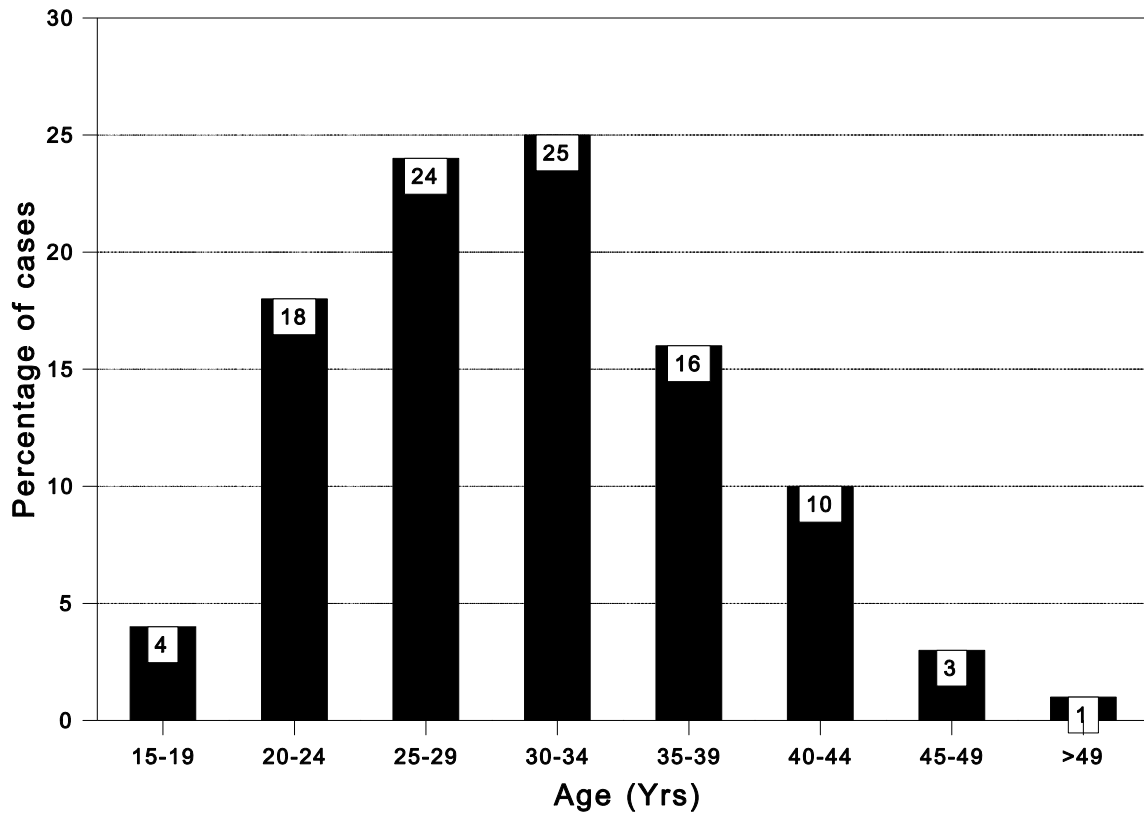
**Figure 2: Sydney metropolitan and Non-Sydney NSW heroin-related**



**fatalities, 1992-1996**

**3.3 Demographic Characteristics**

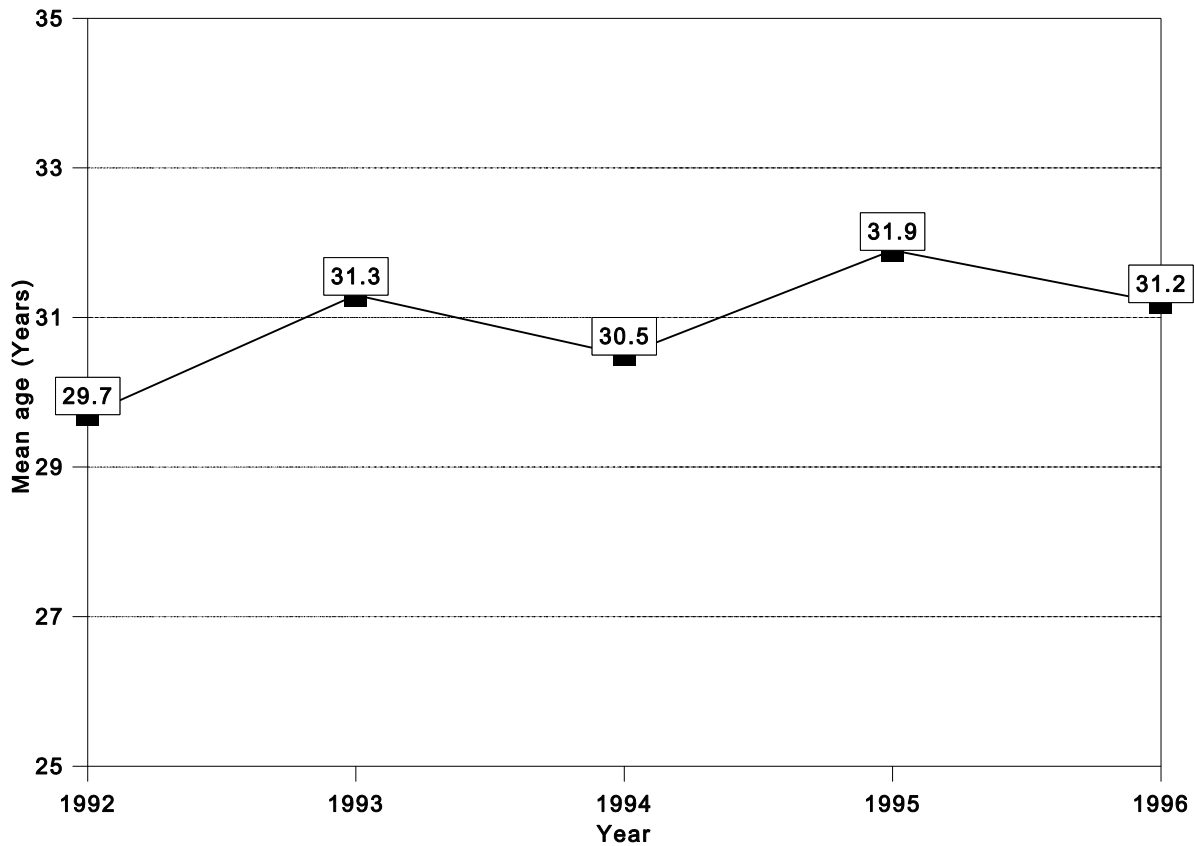
The mean age of cases was 31.0 years (SD 7.4 yrs, range 16-59 yrs). Males were significantly older than females, being on average three years older at death (31.5 yrs v 28.2 yrs,  $t_{950}=5.0$ ,  $p<.001$ ). The distribution of age at death of cases is displayed in Figure 3. Only 4% of cases were below the age of twenty at the time of death. The modal age range was the 30-34 year range (25% of cases), with 24% of cases in the 25-29 year range.



**Figure 3: Age distribution of NSW heroin-related fatalities, 1992-1996**

The mean ages of fatalities by year are presented in Figure 4.

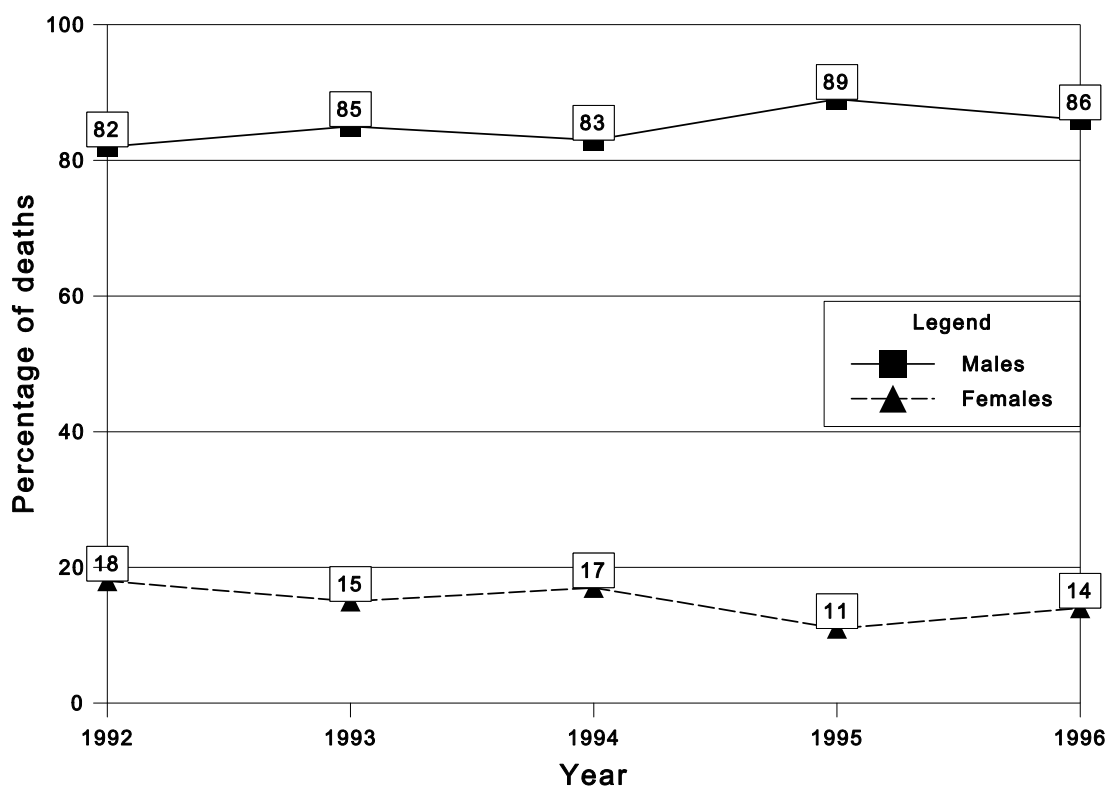
**Figure 4: Mean age of heroin-related fatalities in NSW, 1992-1996**



There was no significant variation in the mean age of fatalities over the study period, which ranged from a minimum of 29.7 years in 1992 to a maximum of 31.9 years in 1995.

The overwhelming majority of cases during the study period were male (85%). There was no significant variation in the gender of subjects over the study period, which ranged from 82% male in 1992 to 89% in 1995 (Figure 5).

**Figure 5: Gender of NSW heroin-related deaths, 1992-1996**



Marital status, employment status and country of birth of cases are presented in Table 2. The majority of cases were single, unemployed and born in Australia. There were noticeable gender differences in the characteristics of cases. The majority of females (67%) were married or in a defacto relationship, compared to a minority of males (24%) (OR 1.50, 95% CI 1.02-2.22). Males were, however, more likely to be in some form of employment at the time of death (33% v 21%, OR 1.87, 95% CI 1.21-2.89).

There were clear differences in employment status, depending upon whether the person was classified as being heroin dependent or not. Three quarters (75%) of dependent cases were unemployed at the time of death, compared to 33% of casual users and 57% of the novices (although there were only seven such cases). Overall, cases classified as dependent were significantly more likely than other cases to be unemployed (OR 5.84 95% CI 3.96-8.60).

**Table 2: Marital status, employment status and country of birth of NSW heroin-related fatalities, 1992-1996**

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| <b>Variable</b>                | <b>Males<br/>(N=812)</b> | <b>Females<br/>(N=141)</b> | <b>Total<br/>(N=953)</b> |
|--------------------------------|--------------------------|----------------------------|--------------------------|
| <i>Marital status (%)</i> :    |                          |                            |                          |
| Single                         | 76                       | 32                         | 74                       |
| Married/defacto                | 24                       | 67                         | 25                       |
| Unknown                        | <1                       | <1                         | <1                       |
| <i>Employment status (%)</i> : |                          |                            |                          |
| Unemployed                     | 67                       | 79                         | 69                       |
| Employed                       | 33                       | 21                         | 31                       |
| Unknown                        | <1                       | <1                         | <1                       |
| <i>Country of birth (%)</i> :  |                          |                            |                          |
| Australia                      | 80                       | 87                         | 81                       |
| New Zealand                    | 3                        | 4                          | 4                        |
| United Kingdom                 | 4                        | 2                          | 4                        |
| South East Asia                | 3                        | 0                          | 3                        |
| Europe                         | 3                        | 2                          | 3                        |
| Middle East                    | 3                        | 0                          | 2                        |
| North America                  | 1                        | 0                          | 1                        |
| South America                  | 1                        | 1                          | 1                        |
| Pacific Islands                | <0.5                     | 0                          | <0.5                     |
| Africa                         | 0                        | 1                          | <0.5                     |
| Unknown                        | 3                        | 4                          | 3                        |

### **3.4 History of Drug Use**

Drug use histories of cases are presented in Table 3. Almost all cases (88%) were known heroin users (based upon statements by friends and relatives in coronial files). In addition, a third were mentioned as known heavy alcohol users, and a fifth as known benzodiazepine users. The overwhelming majority of cases (85%) were classified as heroin dependent, with recreational users comprising 14% of cases. Less than 1% (7 cases) were classified as "novices". Females were significantly more likely to be classified as dependent than males (91% v 81%, OR 2.81, 95% CI 1.39-5.66).

Injection was the route of final heroin administration in 98% of cases. However, it is important to note that 10 deaths occurred after non-injecting routes of heroin administration, specifically after smoking (4 cases), snorting (4 cases) and swallowing (2 cases). These results document that fatal heroin overdoses have occurred in NSW after non-injecting routes of administration. All such cases were male.

Three percent of cases were enrolled in methadone maintenance at the time of death.

**Table 3: Known drug use, dependence status, and treatment status of NSW heroin-related fatalities, 1992-1996**

| <b>Variable</b>                             | <b>Males<br/>(N=812)<br/>%</b> | <b>Females<br/>(N=141)<br/>%</b> | <b>Total<br/>(N=953)<br/>%</b> |
|---|--------------------------------|----------------------------------|--------------------------------|
| <i>History of known drug use</i>            |                                |                                  |                                |
| Heroin use                                  | 87                             | 92                               | 88                             |
| Heavy alcohol use                           | 38                             | 28                               | 37                             |
| Benzodiazepine use                          | 18                             | 38                               | 21                             |
| <i>Dependence status</i>                    |                                |                                  |                                |
| Dependent                                   | 81                             | 91                               | 85                             |
| Recreational                                | 15                             | 6                                | 14                             |
| Novice                                      | <1                             | <1                               | <1                             |
| Unknown                                     | 3                              | 3                                | 3                              |
| <i>Route of final heroin administration</i> |                                |                                  |                                |
| Injection                                   | 98                             | 97                               | 98                             |
| Smoking                                     | 0.4                            | 0                                | 0.4                            |
| Swallowing                                  | 0.5                            | 0                                | 0.4                            |
| Snorting                                    | 0.3                            | 0                                | 0.2                            |
| Unknown                                     | <1                             | 3                                | 1                              |
| <i>Methadone Treatment</i>                  |                                |                                  |                                |
| In methadone at time of death               | 3                              | 6                                | 3                              |

### **3.5 Circumstances of Death**

#### **3.5.1 Imprisonment**

There were 16 cases of heroin overdose deaths that occurred while the deceased was in custody, representing 2% of cases (Table 4). A further 5% (n=50) of cases died within a month of release from custody. In 16 cases, death occurred within 24 hours of release from custody. These figures were relatively stable over the study period.

There were no differences in the proportions of males and females who had died in custody (2% v 1%) or within a month of release from custody (5% v 7%).



**Table 4: Percentage of recently released prison inmates, and deaths in custody among NSW heroin-related fatalities, 1992-1996**

| Year                  | 1992<br>(N=152) | 1993<br>(N=133) | 1994<br>(N=198) | 1995<br>(N=244) | 1996<br>(N=226) | Total<br>(N=953) |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Recently released (%) | 6               | 8               | 5               | 5               | 4               | 5                |
| Death in custody (%)  | 1               | 2               | 2               | 2               | 1               | 2                |
| Combined (%)          | 7               | 9               | 7               | 7               | 5               | 7                |

### 3.5.2 Suicide

Suicide by heroin administration accounted for 5% of cases (n=50), including 36 males and 14 females. Proportions of suicides by year are presented in Table 5.

The proportion of suicides among females varied greatly over the study period, from 0% of female cases in 1993 and 1995 to 19% of female cases in 1996. The proportion of male overdose cases attributed to suicide was relatively stable over the study period. Overall, a significantly larger proportion of females cases were attributed to deliberate opioid overdose than was the case for males (10% v 4%, OR 2.42, 95% CI 1.27-4.62).

**Table 5: Percentage of suicides among NSW heroin-related fatalities, 1992-1996**

| <b>Year</b> | <b>1992<br/>%</b> | <b>1993<br/>%</b> | <b>1994<br/>%</b> | <b>1995<br/>%</b> | <b>1996<br/>%</b> | <b>Total<br/>%</b> |
|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| All cases   | 7                 | 2                 | 7                 | 5                 | 5                 | 5                  |
| Males       | 6                 | 2                 | 6                 | 6                 | 3                 | 4                  |
| Females     | 14                | 0                 | 12                | 0                 | 19                | 10                 |

### 3.5.3 Location of death

The physical locations of deaths are presented in Table 6. Nearly a half of cases (46%) died in their own home, with a further 15% dying in the home of friends or family. There were some distinct regional differences, however. Among the 191 cases in Kings Cross and immediate surrounds, 47% died in home environments, 25% in hotel rooms and 19% in public places. Among the 144 cases in Cabramatta and surrounds, 65% occurred in a public place, 27% in home environs, and 4% in hotel rooms.

**Table 6: Physical location of deaths in NSW, 1992-1996**

| <b>Location of death</b> | <b>Males<br/>(N=812)<br/>%</b> | <b>Females<br/>(N=141)<br/>%</b> | <b>Total<br/>(N=953)<br/>%</b> |
|--------------------------|--------------------------------|----------------------------------|--------------------------------|
| Own home                 | 45                             | 51                               | 46                             |
| Home of friend or family | 15                             | 14                               | 15                             |
| Street/Park/Bushland     | 13                             | 6                                | 12                             |
| Hotel room               | 8                              | 9                                | 8                              |
| Public toilet            | 5                              | 3                                | 4                              |
| Hospital                 | 4                              | 8                                | 5                              |
| Car                      | 4                              | 4                                | 4                              |
| Prison                   | 2                              | 1                                | 2                              |
| Railway station/Train    | 2                              | 2                                | 2                              |
| Hotel/club               | 2                              | 2                                | 2                              |

### 3.5.4 Time of death

The times at which deaths occurred over the study period are presented in Table 7. In 81% of cases the time of death was able to be estimated within the six hour periods presented in Table 5. The most common time of death was between 6 pm and midnight (36%), where an excess of deaths occurred ( $\chi^2=71.6$ ,  $df=3$ ,  $p<.001$ ). The fewest deaths occurred in the period 6am to midday.

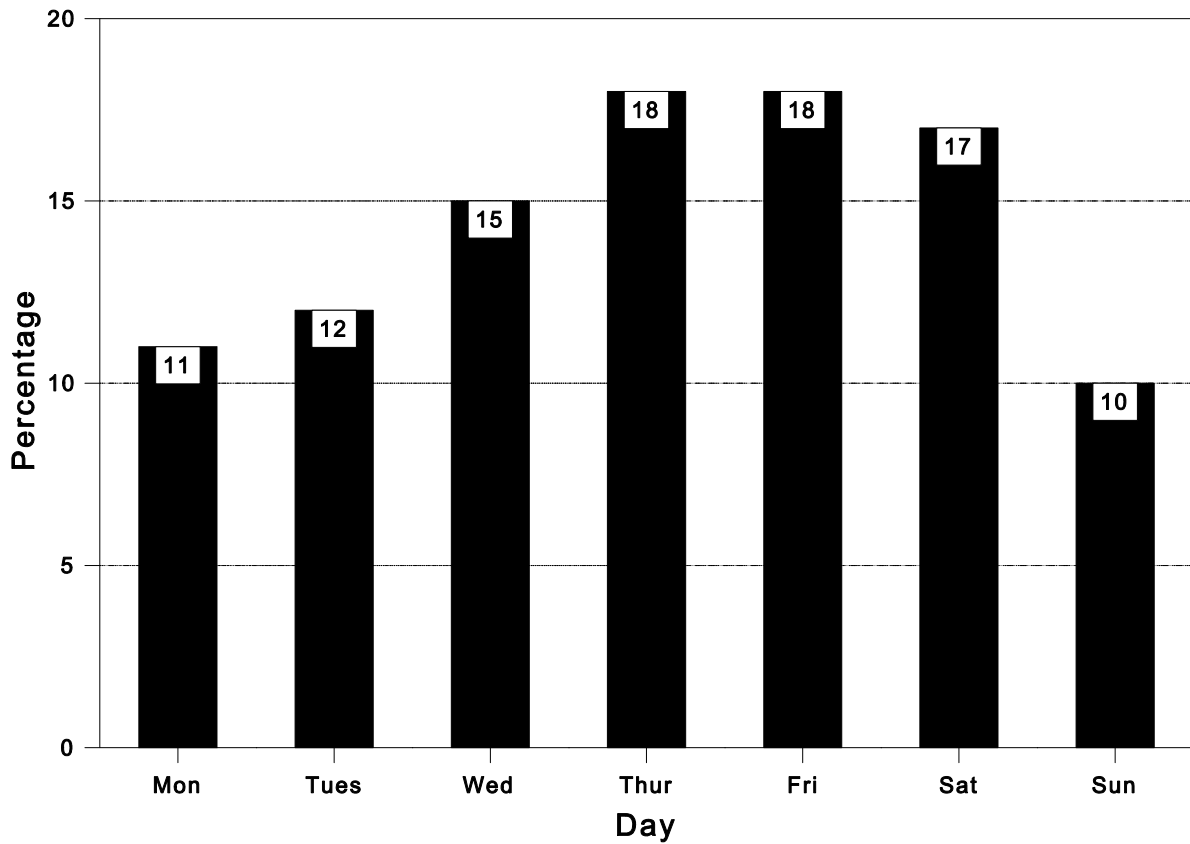
**Table 7: Time of death of NSW heroin-related fatalities, 1992-1996**

| <b>Time of death</b> | <b>%<br/>(N=732)*</b> |
|----------------------|-----------------------|
| Midnight to 6 AM     | 26                    |
| 6 AM to midday       | 12                    |
| Midday to 6 PM       | 27                    |
| 6 PM to midnight     | 36                    |

\* *In 221 cases time of death was not able to be ascertained within these intervals*

The days of the week upon which deaths occurred are presented in Figure 6. Day of death was unable to be determined in 93 cases. The days on which deaths most frequently occurred were Thursday (18%) and Friday (18%). There was no over-representation of week-end deaths, with 28% of death occurring on a week-end, almost identical to the 29% of cases expected by chance.

**Figure 6: Days of week on which NSW heroin-related fatalities occurred,**



**1992-1996**

The months in which deaths occurred are presented in Figure 7. Month of death was able to be determined in all but one case. There was no significant monthly variations in deaths, with deaths being distributed throughout the year. As can be seen, there was a slight peak in July (10%).

**Figure 7: Months in which NSW heroin-related fatalities occurred, 1992-1996**