

# Drug Related Admissions to Intensive Care: The Role of Illicit Drugs and Self Poisoning

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## ABSTRACT

**Objective:** *Drug related problems are a major consumer of healthcare, although little is known about the impact of self-poisoning and illicit drug use on the provision of intensive care. We wished to quantify the number of admissions to our intensive care unit that were attributable to self-poisoning and illicit drug use, and to identify issues related to recognition, follow-up, prevention and cost.*

**Methods:** *A retrospective review of all admissions to Liverpool hospital intensive care unit for the year 2000. All admissions with non-alcohol drug-related causes or associations were reviewed and data relating to demographics, reason for admission, drugs taken, length of intensive care unit stay, interventions by Drug and Alcohol and Psychiatry services, follow-up and outcome were obtained.*

**Results:** *Of the 1790 patients admitted to the intensive care unit during the study period, 108 (6%) were non-alcohol drug-related. These admissions accounted for 407 intensive care unit bed days (5% of total intensive care unit bed days) and approximated to 10% of the intensive care unit budget for the year 2000. The majority of patients were male (66%), with a mean age of 33 years. Drug overdose was the most common reason for admission (80%), followed by drug related traumatic injury (16%). The most common drug classes involved were the benzodiazepines, followed by the opiates and tricyclic antidepressants. The majority of patients (65%) had used more than one drug.*

*Thirty-two patients (30%) did not return to their previous functioning level by the time of their discharge from hospital, and 13 of these (12% overall) required full-time nursing care. There were two deaths (2%) as a direct result of illicit drug use or self-poisoning.*

*The hospital Drug and Alcohol or Psychiatry services reviewed 78 patients (72%) as inpatients, and 3 patients (3%) after discharge. Self-discharge or patient refusal to be reviewed by these services occurred in 13 (12%) cases. Twelve patients (11%) were not assessed by these services and were either reviewed by the admitting team or returned to the care of their family practitioner.*

**Conclusions:** *Drug related problems account for a significant number of preventable admissions to intensive care unit every year. The mortality is low, but the cost to the community is high, as represented by the high level of morbidity and dependence on medical care. (Critical Care and Resuscitation 2003; 5: 253-257)*

**Key words:** Illicit drugs, self-poisoning, intensive care admission, cost, primary prevention, secondary prevention

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Self-poisoning accounts directly for 1% to 5% of medical admissions to hospital,<sup>1,2</sup> although the overall

impact of illicit drug use on hospital admissions is not well defined. Even less is known about the impact of

self-poisoning and illicit drug use on the need for intensive care services. A retrospective review was performed at the Liverpool hospital intensive care unit to quantify the number of intensive care unit admissions that were drug related, with the intention of identifying the role of illicit drugs in these admissions and to analyse cost and factors that could improve follow-up and prevention.

## METHODS

The Liverpool hospital is a 500 bed tertiary referral center for the South Western Sydney Area Health Service. It has a 24 bed intensive care unit that admits both ventilated intensive care and non-ventilated high dependency patients. The hospital is located in a region of low socioeconomic status<sup>4</sup> with a high incidence of drug related (particularly narcotic) offences,<sup>3</sup> serving a large migrant population with 36.5% of Liverpool residents born outside Australia.<sup>5</sup>

Following approval from the hospital ethics committee, a retrospective review of all admissions to the intensive care unit from January 1<sup>st</sup> to December 31<sup>st</sup>, 2000 was conducted. The records of all intentional and unintentional drug overdoses, traumatic injuries associated with drug use and other conditions with a drug association, were reviewed. The criteria for inclusion were: a history of drug use within the preceding 12 hours, a positive blood or urine test for a drug that was not administered within the hospital, written or other evidence of drug ingestion (e.g. suicide note or empty medication bottles) and trauma admissions with a clear history of prior drug use. Cases were excluded if the admission was solely related to alcohol abuse, the drug use was not positively identified (even though there may have been a high index of suspicion) or where the patient denied drug use within the previous 12 hours.

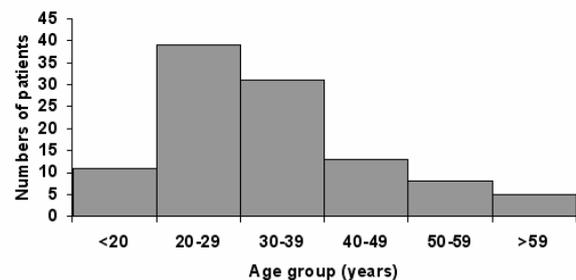
Data collected included patient demographics, category of drug involved, number and identity of drugs implicated, reason for intensive care unit admission, duration of intensive care unit stay, need for respiratory or cardiovascular support, need for dialysis and the discharge status of the patient. Additional morbidity as a result of the admission was only attributed to patients who did not regain their previous functioning level by the time of hospital discharge. Those patients with prior morbidity, for example chronic schizophrenia and previous physical injury, were not included in the calculation of additional morbidity outcomes attributable to the admission.

We also recorded the rates of patient review by the Drug and Alcohol and Psychiatry services of the Liverpool hospital. An estimate was made of the cost of drug related admissions to the intensive care unit, based

on the Department of Health intensive care unit bed day costs.

## RESULTS

From January 1<sup>st</sup> to December 31<sup>st</sup>, 2000, 1790 patients were admitted to the intensive care unit. Of these admissions, 108 (i.e. 6% of total intensive care unit admissions) were found to be drug-related. The majority of patients were male (66%) with an age that ranged from 15 to 77 years (mean of 33 years (figure 1)). Approximately 30% of patients were born outside Australia.



**Figure 1.** Number of patients by age with a drug-related intensive care unit admission

The reasons for the drug-related admissions to the intensive care unit are detailed in table 1. The majority were self-poisoning (80%) with 62% taking more than one agent (table 2). Of the 204 trauma admissions to the intensive care unit during the 12 month review period, 17 (i.e. 8%) were associated with drug use, 12 were male.

**Table 1. Reason for the drug-related admission to the intensive care unit**

	<i>Number of patients</i>
Drug overdose	86 (80%)
Trauma related (total)	17 (16%)
Motor vehicle accident	7
Gunshot	3
Stabbing	2
Other (assault/fall)	5
Drug associated disease (total)	5 (4%)
Endocarditis	2
Atypical pneumonia	2
Intracranial haemorrhage	1

The class of drug ingested are shown in table 3. The most common being benzodiazepines, opiates (principally heroin) and tricyclic antidepressant agents.

**Table 2. Number of drugs ingested per patient requiring admission to the intensive care unit**

	<i>Number of patients</i>
One drug	36
Two drugs	29
Three drugs	24
Four drugs	8
Five drugs	3
Six drugs	5
Seven drugs	1
Unknown	2

**Table 3. Class of drug associated with admission to the intensive care unit**

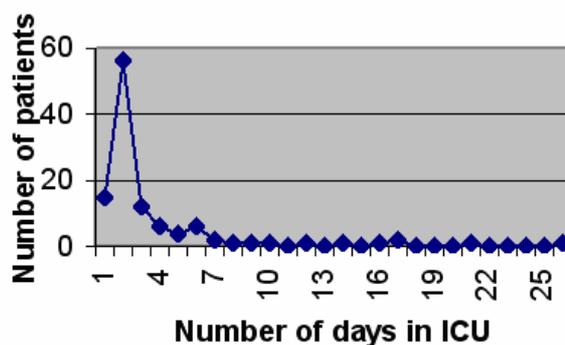
	<i>Number of patients</i>
Benzodiazepines	43
Opioids	
Heroin	39
Methadone	11
Other	11
Antidepressants	
Tricyclic	25
Other	9
Antipsychotics	19
Cannabinoids	13
Paracetamol	12
Amphetamines	9
Antiepileptics	9
Cocaine	8
Alcohol in addition to another drug	7
Organophosphates	3
Other	34

A combination of benzodiazepines with a variety of other drugs was also a common feature. Of the 108 patients requiring admission, 19 (18%) required intubation and mechanical ventilation, 19 patients (18%) required inotropic support and 6 patients (6%) required dialysis. Of the 19 patients requiring intubation and mechanical ventilation, 5 required a tracheostomy. The interventions and resulting intensive care unit bed days are summarised in Table 4 and distribution of length of stay in the intensive care unit is shown in figure 2.

The hospital discharge status of the 108 patients was classified as abnormal in 32 patients (30%) due to both chronic physical problems such as head injury and renal impairment, as well as ongoing psychological problems (e.g. depression). Thirteen patients required a transfer to another full-time care unit including brain injury unit (4

patients), rehabilitation unit (4 patients), other hospital (3 patients) and a mental health unit (2 patients).

Two patients (2%) died. One patient was a 19-year-old female intravenous drug user who died from pulmonary candidiasis, the other patient, a 59-year-old female who had an opiate overdose, died from aspiration pneumonia and sepsis.



**Figure 2.** Distribution of length of stay in the intensive care unit

**Table 4. Intensive care unit intervention and number of days in intensive care**

<i>Intervention</i>	<i>Number of days</i>
Mechanical ventilation with ETT	157
Mechanical ventilation with tracheostomy	45
Dialysis without ventilation	13
Inotropes without ventilation	8
No ventilation/dialysis/inotropes required	184
<b>Total number of bed days</b>	<b>407</b>

ETT = endotracheal tube

The hospital Drug and Alcohol or Psychiatry services reviewed 78 patients (72%) as inpatients, and 3 patients (3%) after discharge. Self-discharge or patient refusal to be reviewed by these services occurred in 13 (12%) cases. Twelve patients (11%) were not assessed by these services and were either reviewed by the admitting team or returned to the care of their family practitioner (table 5). Only 4 of the 108 patients (i.e. 4%) were not provided with any opportunity for drug-related intervention, review or follow-up. Thirty patients (i.e. 28%) had a documented psychiatric illness prior to their presentation.

On the basis of the current funding for intensive care unit beds by the Department of Health of \$3114 per day,<sup>6</sup> the cost of the acute admission to the intensive care unit alone for the patients requiring mechanical ventilation, dialysis or inotropic support was \$694,000 and the cost of the high dependency admissions was estimated to be \$573,000, which represented approximately 10% of the intensive care unit budget for the 12

month study period.

**Table 5. Interventions of psychiatric and drug and alcohol services**

	<i>Number of patients</i>
Reviewed as an inpatient (total)	78
Psychiatry alone	50
Drug and alcohol alone	17
Both Psychiatry and drug and alcohol services	11
No inpatient review but outpatient follow up (total)	3
Psychiatry alone	1
Drug and alcohol alone	2
No review or follow up by psychiatry or drug and alcohol services (total)	27
Patient self-discharge or refusal	13
Patient death	2
Missed	12

## DISCUSSION

More than 108 admissions to the Liverpool hospital intensive care unit had a high likelihood of a non-alcohol drug-related cause. Where this was not documented or confirmed by toxicological testing, or where the patient denied drug use, the admissions were excluded from analysis and probably resulted in an underestimate of the true number of drug-related intensive care unit admissions.

The study population had an age similar to other studies reporting drug-related hospital admissions,<sup>7,8</sup> although unlike other studies we found a high proportion of our patients were male. For example, the male: female ratio for the self-poisoning sub-group (1.87:1) is the converse of that seen in other self-poisoning studies,<sup>8,9</sup> and is probably the result of a high number of illicit drug overdoses in our study (e.g. 48 heroin, amphetamines and cocaine cases). Approximately 30% of the patients with drug related admissions to our intensive care unit were born outside Australia, which is representative of the population served by the Liverpool hospital. Benzodiazepines, heroin and tricyclic antidepressants were the three most commonly used self-poisoning drugs. A combination of benzodiazepines with a variety of other drugs was also a common feature, and has been recorded previously.<sup>8,11</sup>

The identification of a drug-related illness is important if the patient requires admission to an intensive care unit.<sup>12,13</sup> This is necessary not only to improve the quality of acute care but also to allow early and appropriate psychiatric referral, as many of these patients may self-discharge prior to the referral.<sup>14</sup> Self-

discharge or patient refusal to be reviewed by these services occurred in 13 (12%) cases in our study.

Concerning drug-related trauma cases, one study found that up to 36% of intentional injury victims have a drug dependency problem,<sup>12</sup> with another study reporting that 17.7% of seriously injured trauma victims are dependent on drugs other than alcohol.<sup>15</sup> A review of all motor vehicle related trauma patients in South Western Sydney reported low rates of illicit drug use, with the exception of cannabinoids, which were found to be present in 15% of drivers.<sup>16</sup> The trauma drug-related admissions to our intensive care unit represented 8% of the total trauma admissions to the intensive care unit, indicating that trauma admissions were more commonly associated with drugs other than alcohol and cannabinoids compared with the general trauma admissions for South Western Sydney (i.e. 4%).<sup>16</sup> The recognition of this has led to suggestion that at least all patients admitted to the intensive care unit for treatment of traumatic injuries should be tested for alcohol and illicit drugs. The intent of such testing is to aid clinical management, to identify patients at risk for withdrawal, to assist appropriate anaesthetic/pain management, and to identify patients at risk of an underlying substance use disorder.<sup>17</sup>

Twelve per cent of patients required significant ongoing medical management once discharged from the acute hospital wards. Two patients (2%) died in our review as a direct result of drug self-administration which is a mortality rate that is comparable to that recorded in other studies.<sup>8,18</sup>

The relatively young age of our patients indicates the high potential for chronic morbidity and mortality, with many years of life likely to be affected or lost. From previous follow-up studies it has been reported that approximately 3% of patients admitted for self-poisoning will die from suicide in the following ten years,<sup>10</sup> and where self-poisoning resulted in an intensive care unit admission, 10% died from another suicide attempt in the following ten years.<sup>9</sup>

In our study, eighty-one patients (75%) had contact with a specific interventional service that offered long-term follow-up for drug-related or psychiatric problems. This high initial intervention rate, which is more than previously published rates,<sup>7,14</sup> may relate to patients admitted to the intensive care unit only, as overall rates of completed hospital or community follow-up by these services were not assessed. As thirty patients (28%) had a documented psychiatric illness prior to their intensive care unit admission they were at risk for future specific drug-related problems, requiring appropriate follow-up from skilled community-based teams.

The direct cost of the drug-related intensive care unit admissions represented approximately 10% of the

intensive care unit budget for the study period, a small amount compared with the indirect and ongoing morbidity and mortality costs in this group of patients.

In conclusion, we found that 6% of the admissions to our intensive care unit result directly from, or are strongly associated with, illicit drug ingestion or self-poisoning, which may be an under estimate of the proportion of drug-related admissions to our unit for the year 2000. The study highlights the urgent need for preventive strategies in this group of patients.

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