



Fatal Poisonings in New Jersey, 2003

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MAJOR FINDINGS:

- During the last decade, deaths from poisoning have increased considerably, both in New Jersey and in the nation as a whole. This increase is largely attributed to a rise in fatal drug overdoses, most of which are classified as unintentional poisonings.
- Unintentional poisoning caused more than 600 deaths in 2003, and was the second leading cause of injury fatality after deaths from motor vehicle crashes.
- There were approximately 150 suicides by poisoning in 2003.
- In New Jersey, nearly 70% of fatal unintentional poisonings involve illicit drugs, usually heroin and/or cocaine.
- Compared to other states, New Jersey has relatively high mortality rates for unintentional poisoning. This is largely attributable to the supply of high purity heroin, although prescription drugs are an increasingly important component of poisoning deaths.

Introduction

Over the past several decades, there have been marked declines in injuries and deaths resulting from motor vehicle crashes. Yet the overall rate of unintentional injuries has remained relatively constant and has even risen slightly in recent years, as declines in motor vehicle injury have been offset by increases in unintentional poisonings. In New Jersey the number of unintentional poisoning deaths in 2003 (623) was the second leading cause of unintentional injury mortality after deaths from motor vehicle crashes (761) [Figure 1]. There are about three times as many unintentional poisoning fatalities each year in New Jersey as compared with suicides by poisoning (Figure 2).

Most fatal unintentional poisonings are drug overdoses. In part, these high rates of unintentional poisoning fatalities are attributable to the fact that New Jersey has a supply of street drugs which is above average in terms of purity.[2] Yet while New Jersey's rate is above average, unintentional poisoning is a growing national problem, with "epidemics" of fatal unintentional poisoning noted in Maine, Massachusetts, North Carolina, and other states.[3] [4] Currently, overdose deaths in a



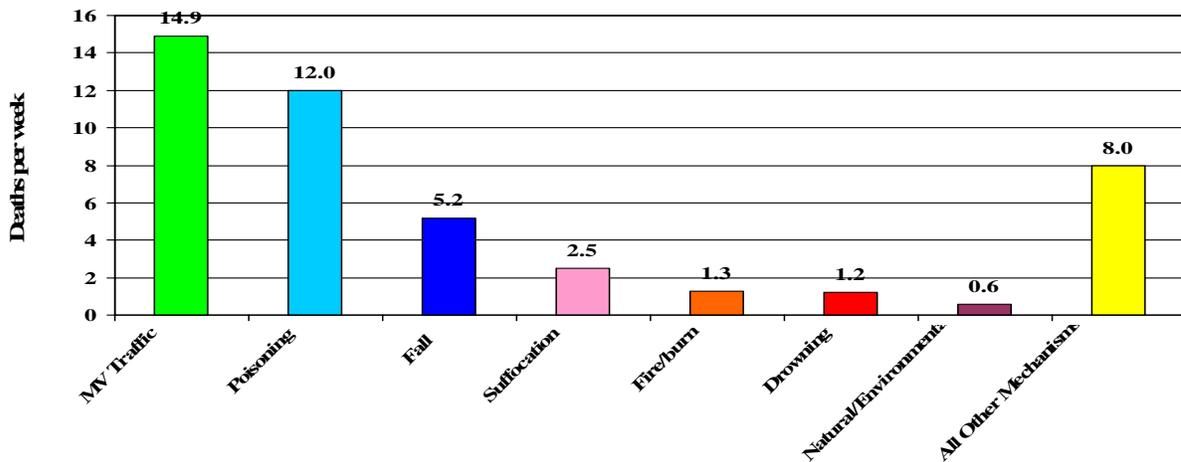
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number of states, New Jersey among them, have increased as a result of the sale of heroin laced with fentanyl, a powerful opiate.

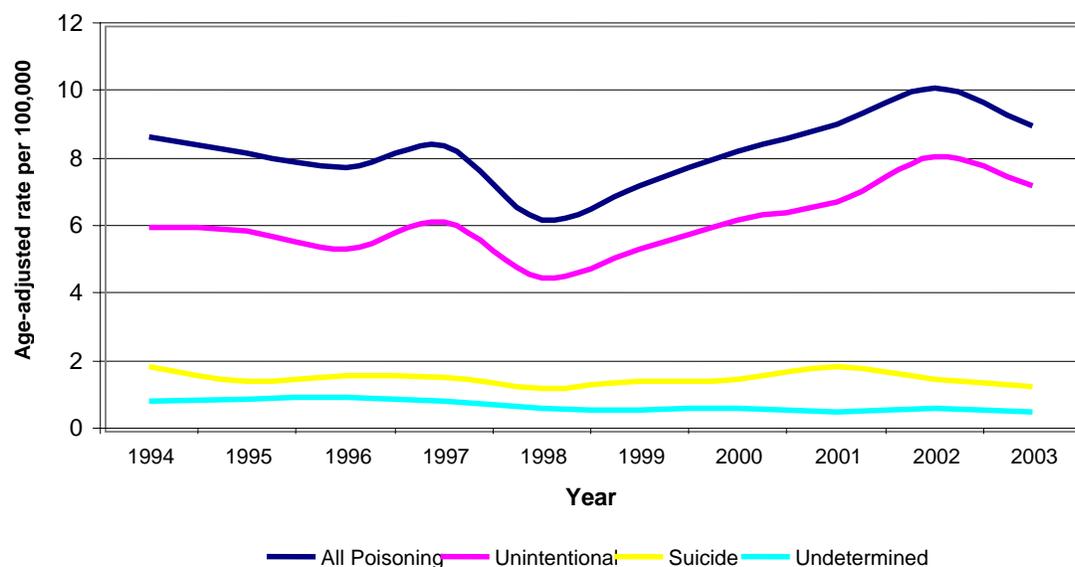
Poisoning is defined as damaging physiologic effects from substances which are classified as a) illicit drugs, b) pharmaceutical drugs (both prescribed and over the counter), c) chemicals, such as pesticides, d) heavy metals (i.e. mercury), e) gases/vapors, such as carbon monoxide, or f) household substances, such as antifreeze or bleach. This classification is somewhat unsatisfactory in that many pharmaceutical drugs, such as oxycodone which is often prescribed for pain management, are often sold illicitly, or otherwise obtained by persons without a valid prescription. Among adults, chemicals, household substances, and gases and vapors are almost exclusively used in suicides, and are rarely the cause of an unintentional death.

Figure 1: Average unintentional injury deaths per week, New Jersey, 2003



It is believed that some fraction of fatal poisonings coded as unintentional or undetermined are actually suicides. Under-reporting of suicide has been attributed to factors such as pressure from families and subjectivity among coroners and medical examiners.[5-11] As compared with firearms and suffocation, suicide by poisoning is considered to be particularly susceptible to underreporting. The rapid rise in unintentional poisonings in recent years has led some to wonder whether part of this increase represents misdiagnosed suicides.

Figure 2: Fatal poisonings by manner of death, New Jersey, 1994-2003



The purpose of this report is to describe the nature of fatal poisoning in New Jersey, and to compare decedent characteristics, circumstances, and risk factors by coded manner of death. A better understanding of these patterns may inform preventive practices in both the areas of suicide and substance abuse.

Data and Methods

The data used are death certificates and medical examiner reports for fatal poisonings occurring to New Jersey adult residents in New Jersey during 2003. This report uses data on 679 such fatal poisonings. There were 107 cases coded as suicides, 537 coded as unintentional, and 35 coded as undetermined. The report is limited to cases where the immediate cause of death is toxicity, rather than cases where the immediate cause is trauma or is related to a medical condition exacerbated by drug ingestion. The causes of death included are those with underlying cause of death from unintentional poisoning (ICD10 X40-X49), intentional poisoning (X60-X69) and poisoning of undetermined intent (Y10-Y19). Poisonings coded as homicides and legal intervention are excluded from this study. The underlying cause of death and the manner of death are determined by the medical examiner at the scene investigation, and confirmed by autopsy and toxicology reports. Approximately ninety fatal unintentional poisonings occurred in the hospital, and did not generate a report from the medical examiner; therefore they are not included in this study. Additionally, fatal poisonings to New Jersey residents which occurred out of state are not included. Poisonings of out of state residents were excluded.

For all poisoning fatalities, the medical examiner narrative and death certificate were coded according to the protocols of the New Jersey Violent Death Reporting System (NJVDRS). The NJVDRS is a participant in the National Violent Death Reporting System (NVDRS), a detailed surveillance system which uses medical examiner narratives, law enforcement records, and death certificate data. These sources are linked for each violent death, and data items are coded according to a standardized protocol by trained coders from each participating state. New Jersey has participated in the NVDRS since 2003.

Characteristics of fatal poisonings by manner of death

Table 1 presents some information about the characteristics of fatal poisonings. As can be seen, approximately 75% of these cases are male, and the majority of decedents are between ages 25 and 44 years old. While nearly three quarters of decedents are non-Hispanic White, approximately 18% of deaths are to non-Hispanic blacks, which is somewhat above that groups share of the state's population. It can also be seen that these decedent characteristics varied by coded manner of death ($p < .0001$). For example, the percent of decedents who are male is highest for unintentional poisonings, which are primarily drug overdoses. Additionally, non-Hispanic blacks were disproportionately represented among unintentional poisonings relative to other manners of death ($p < .0001$). The age distribution also varies significantly by manner, with unintentional poisonings relatively more likely to be younger adults ($p < .001$). In part due to the different age composition, decedents from unintentional poisonings are significantly more likely to be never married ($p < .0001$). The category of undetermined intent, which is relatively small in New Jersey, falls in between the suicide and undetermined categories with regard to age and marital status, but is most likely to be female, and most likely to be non-Hispanic white.

	Manner of death			
	Unintentional (%)	Suicide (%)	Undetermined (%)	All Poisonings (%)
Gender				
Male (n=502)	79.0	57.0	51.4	74.0
Female (n=177)	21.0	43.0	48.6	26.0
Race/Ethnicity				
Non-Hispanic white (n=497)	70.0	83.18	91.4	73.2
Non-Hispanic black (n=125)	21.0	8.41	8.6	18.4
Hispanic (n=44)	7.8	1.87	-	6.5
Asian (n=4)	0.2	2.8	-	0.6
Age				
15-24 years (n=70)	11.7	3.7	8.57	10.3
25-44 years (n=358)	56.2	35.5	51.43	52.7
45-64 years (n=233)	30.9	50.5	37.14	34.3
65 + years (n=18)	1.1	10.3	2.86	2.6
Marital Status				
Married (n=127)	16.6	28.0	22.9	18.7
Divorced or Separated (n=108)	14.2	25.2	14.3	15.9
Never married (n=319)	50.6	31.8	37.4	46.9
Total (n)	537	107	35	679
Note: Column percents are shown. Statistical tests are reported in the text. Excludes out of state residents and out of state deaths.				

The most common drug type used in a fatal poisoning was illicit drugs, which in New Jersey, largely consists of heroin and cocaine. Illicit drugs were used in nearly 70% of all fatal poisonings, but were far more common in unintentional poisonings as opposed to suicides (82.3% v 12.2%; $p < .0001$) The category “illicit” drugs, excludes drugs such as oxycodone, which while they are prescription drugs, are often purchased and used in an illicit manner. Therefore the significance of “illicit” drugs is understated by the current typology. Use of pharmaceutical products was far more common in suicides (57.0% v 13.8%; $p < .001$).

Table 2 lists leading individual drugs mentioned in fatal poisoning. Cocaine and heroin each are mentioned in nearly 40% of cases, although they are used jointly in approximately 15% of all deaths. Other leading drugs are morphine and oxycodone. The use of opiates is far more common in the case of unintentional as compared to intentional poisoning (79% v 28%; $p < .0001$), with undetermined deaths falling somewhere in between.

Table 2. Leading drugs mentioned in fatal poisonings, New Jersey, 2003

Drug	Unintentional	Suicide	Undetermined	Total	N
Cocaine	45.1	8.4	14.3	37.7	256
Alcohol	38.2	32.7	20.0	36.4	247
Heroin	42.5	1.9	20.0	34.9	237
Morphine	33.5	11.2	20.0	29.3	199
Oxycodone	14.0	13.1	25.7	14.4	98
Methadone	11.4	4.7	5.7	10.0	68
Codeine	9.7	0.0	8.6	8.1	55
Alprazolam	7.5	4.7	5.7	6.9	47
Acetaminophen	4.8	11.2	14.3	6.3	43
Amitriptyline	4.5	9.4	2.9	5.2	35
Fentanyl	1.3	0.9	11.4	1.8	12

Note: Cell percents are shown. List of drugs is not mutually exclusive.

Table 3 shows the prevalence of mental health and substance abuse risk factors in fatal poisonings. The true prevalence of these conditions is probably underreported, as information from friends and relatives or evidence at the scene may not be present in all cases. The prevalence of mental health related risk factors is highest among those deaths coded as undetermined as compared with suicides and unintentional (71% v 59.4% (suicide) v 24.3% (unintentional); $p < .001$), while substance abuse is most likely among those coded as unintentional poisonings.

Only 10% of all cases had neither of these risk factors, 20% had both types. The prevalence differed by manner. In only approximately 6% of unintentional poisonings was there no reported mental health or substance abuse risk factors, while this was true for more than 30% of suicides.

Table 3. Mental health and substance abuse risk factors, fatal poisonings, New Jersey, 2003

	Manner of death			
	n=537	N=107	n=35	n=679
(%)	Unintentional	Suicide	Undetermined	Total
No mental health or substance abuse risk factors	6.2	32.1	8.6	10.3
Mental health only	3.9	43.4	37.1	11.8
Substance abuse only	69.5	8.5	20.0	57.4
Mental health and substance abuse	20.5	16.0	34.3	20.5
Mental health and alcohol abuse	1.9	4.7	5.7	2.5
Mental health and other substance abuse	14.7	9.4	17.1	14.0
Mental health, alcohol, and other substance abuse	3.1	1.9	11.4	4.0

Note: Column percents are shown. Statistical tests are reported in the text.

Selected circumstances are shown in Table 4. A physical health problem was the most commonly noted factor. Most of the other circumstances were noted fairly infrequently, and many of these circumstances were more likely to be reported in suicides as compared with unintentional poisonings. For example, in deaths ruled suicides it was more likely that there was a crisis in the past two weeks ($p=.0031$), prior evidence of an intent to commit suicide ($p<.0001$), prior suicide attempts ($p<.001$), a financial problem ($p=.0273$), an intimate partner problem ($p=.0002$), a job problem ($p=.0186$), or a legal problem ($p<.0001$), as compared with unintentional poisonings.

Table 4. Presence of selected circumstances, fatal poisonings, New Jersey, 2003

	Manner of death			
	Unintentional	Suicide	Undetermined	Total
(%)				
Physical health problem	18.25	24.3	45.71	20.62
Crisis in the past two weeks	9.68	19.63	17.14	11.63
Intimate partner problem	4.66	14.02	17.14	6.77
History of suicide attempt	2.23	20.56	2.86	5.15
Disclosed intent to commit suicide	0.56	13.08	11.43	3.09
Other legal problem	1.12	9.35	0	2.36
Other relationship problem	1.68	1.87	5.71	1.9
Recent death of friend or family member	1.68	3.74	2.86	2.06
Job problem	1.3	4.67	2.86	1.91
Financial problems	0.56	2.8	0	0.88
Total (n)	537	107	35	671

Note: Column percentages are shown. Statistical tests are reported in the text. Circumstances are not mutually exclusive.

Decedents with physical health problems

Aside from substance abuse and mental health problems, which are major and well known risk factors for overdose and suicide, respectively, the existence of a physical health problem was the most prevalent risk factor to emerge from this analysis of circumstance data. In 20 % of fatal poisonings, the decedent had a physical health problem. This is the only circumstance that appeared important in all manner of death categories. While the proportion citing a physical health problem is higher for suicides than in the case of unintentional poisonings, the difference is not statistically significant. Further, the presence of a physical health problem stands out as a particularly important circumstance of death in the case of unintentional fatalities, since the prevalence of most of the others is quite low.

Compared to other fatal poisonings, those with physical health problems were more likely to be female (42% v 22%, $p < .0001$), were an average of approximately 5 years older, (44.1 v 39.2 years, $p < .0001$), were more likely to use prescription drugs (42.5% v 17.8%, $p < .0001$), and were less likely to have a manner of death coded as unintentional (70.0% v 81.5%, $p < .0003$). Given the frequent stories of addiction to painkillers following illness or injury, one might expect that physical health problems and substance abuse problems would be positively correlated, but in fact the opposite is the case. For fatal poisonings as a whole, there is a significant and negative correlation between having a physical health and substance abuse problem ($r = -.1491$, $p < .0007$), while the correlation between physical and mental health problems is positive and significant ($r = .1989$, $p < .0001$). (Figure 2)

Among decedents with a physical health problem, some differences by manner of death categories are lessened. For example, gender, race and ethnicity and marital status do not differ significantly by manner of death among those with a physical health problem, although significant age differences remain. Additionally, while use of illicit drugs still differs by manner (65.3% v 11.5%, $p < .0001$), the difference is smaller than when all deaths were included. While differences in the prevalence of substance abuse and mental health risk factors differ less by manner among those with a physical health problem, they remain significant ($p < .0001$).

There is also more similarity across manner of death categories in the prevalence of event-related circumstance variables when the population is restricted to those with a physical health problem. For example, the proportion experiencing a crisis in the past two weeks, having an intimate partner problem, a job problem, legal problem, relationship problem and/or death of a friend are not significantly different by manner when the population is restricted to those with a physical health problem. The presence of a physical health problem is positively related to the presence of these other types of circumstances for unintentional poisonings, while negatively for suicides, causing a lessening of differences by manner of death for this group. In other words, unintentional poisonings with a physical health problem are more like suicides in terms of decedent characteristics and circumstances of death as compared with other unintentional poisonings.

The presence of a physical health problem is also related to the drug that is used. As noted, the use of illicit drugs is less common in the cases where a physical health problem is present as compared with all fatal poisonings. There are also particular drugs which are more likely to be used in poisonings with reported physical health problems. The most notable of these is oxycodone, which is positively correlated with physical health risk factors for all fatal poisonings and for unintentional poisonings ($p < .0001$).

Discussion

This analysis of circumstances of fatal poisonings in New Jersey suggests that overall, poisonings coded as unintentional and intentional have quite different risk factors and characteristics. The most apparent differences relate to substance used and documentation of substance abuse and mental health risk factors. Results of this analysis do not suggest that a sizable portion of unintentional poisoning fatalities are miscoded suicides, as the characteristics of decedents and the circumstances of death are quite different. However, physical health problems appear to be a risk factor which cuts across manner of death categories, and differences between manner of death categories are smaller for this group of decedents.

Implications for prevention

The main factor involved in fatal poisonings in New Jersey is clearly illicit drugs, namely cocaine and heroin, so prevention of these fatalities must involve in great part substance abuse treatment and drug interdiction. Recent reports about heroin and cocaine tainted with fentanyl highlight the

dangers associated with illicit drugs. One potential tool in the effort to reduce fatal overdoses is Nalaxone (Narcan), which can be administered to treat an overdose. But the distribution of Nalaxone to drug users is controversial, and has not been approved in most jurisdictions.

The importance of physical health problems in both unintentional and intentional fatal poisonings, and the relationship between physical health problems and use of certain substances, most particularly oxycodone, provides an opportunity for prevention. More needs to be learned about the nature of these physical ailments, and whether inadequate or inappropriate medical care and potentially over-reliance on pain medications may be a factor. The U.S. Drug Enforcement Agency has noted the existence of suspicious prescribing practices in some areas of South Jersey [2]. It may be the case that controlled substances need to be more carefully monitored, as has been initiated in several other states. [14]. Further work needs to be done to analyze potential spatial patterns in fatal poisonings, particularly those that involve physical health problems and prescription pain medications.

References

- 1 New Jersey Department of Health and Senior Services. New Jersey Health Statistics, 2003. <http://www.state.nj.us/health/chs/stats03/mort03.pdf#ds32>
- 2 Drug Enforcement Agency. State Fact Sheets. New Jersey: 2005. <http://www.dea.gov/pubs/states/newjersey.html>
- 3 Centers for Disease Control, WISQARS, <http://webappa.cdc.gov/cgi-bin/broker.exe>
- 4 Unintentional and undetermined poisoning deaths – 11 states, 1990-2001. MMWR. 2004; 53(11), 233-238.
- 5 Current Trends Operational Criteria for Determining Suicide. The Center for Disease Control and Prevention, Morbidity and Mortality Weekly Report. 1988; 37(50); 773-774.
- 6 Lindqvist P; Gustafsson L. Suicide classification-clues and their use - A study of 122 cases of suicide and undetermined manner of death. Forensic Science International 2002; 128(3):136-140.
- 7 Jobes DA, Berman AL, Josselson AR. Improving the validity and reliability of medical-legal certifications of suicide. Suicide Life Threat Behav 1987;17:310-25.
- 8 Rosenberg ML, Davidson LE, Smith JC, et al. Operational criteria for the determination of suicide. J Forensic Sci 1988;33:1445-56.
- 9 Huusko, R. and Hirvonen, J. 1988. The problem of determining the manner of death as suicide or accident in borderline cases. International Journal of Legal Medicine. Volume 100, 2-3, pp.207-213.
- 10 Sorenson SB, Shen H, Kraus JF. 1997. Undetermined manner of death. A comparison with unintentional injury, suicide, and homicide death. Eval Rev. 1997 Feb;21(1):43-57.
- 11 Guide For Manner of Death Classification. National Association of Medical Examiners; 2002.
- 12 Neale, J. Suicidal intent in non-fatal illicit drug overdose. Addiction. 2000; 95(1):85-93.
- 13 Rossow, I Lauritzen G. Balancing on the edge of death: suicide attempts and life threatening overdoses among drug addicts. Addiction 1999; 94(2):209-219.
- 14 Ballesteros MF, Budnitz DS, Sanford CP, Gilchrist J, Agyekum GA, Butts J. Increase in deaths due to methadone in North Carolina. JAMA 2003;290:40.