Adjusted odds of death for EMS patients receiving naloxone, 2012-2013

Predictive variables	Odds ratio [95% Confidence Interval]	
Patient age group	Time to patient	Time to HCF
30 years or younger	0.38 [0.21, 0.64]	0.34 [0.19, 0.57]
31-40 years	1.01 [0.60, 1.61]	0.87 [0.52, 1.38]
41-60 years	1 (reference)	1 (reference)
61-70 years	1.77 [1.21, 2.56]*	1.65 [1.15, 2.35]*
71 years and older	4.21 [3.14, 5.69]*	3.91 [2.96, 5.2]*
Male gender	1.13 [0.88, 1.46]	1.06 [0.84, 1.35]
1st terfile (<7 minutes)	1 (reference)	1 (reference)
2nd tertile (7-10 minutes)	1.14 [0.84, 1.56]	1.31 [0.97, 1.78]
3rd tertile (11 min. or more)	1. 6 [0.83, 1. 61]	1.57 [1.16, 2.12]*

*95% Confidence Interval excludes 1. 00 (p-<0. 05

Most (97%) were ≥18 years of age, mean age 53 years (SD+ 20), and 58% (1,414) males. Patient condition was described by EMS as "serious" for 82% (1,985), and critical for 17% (403). EMS recorded patient response to naloxone as "improved" for 15% (371) of patients, unchanged for 31% (748) and worsened 0.2% (4); there was no report of patient response to naloxone for 54% (1,304) of the patients. Hospital-assigned diagnoses included drug poisoning 31.0% and opiate poisoning/dependence 17.5%. Of these patients, 35% had Medicaid or similar insurance, and 7% were self-pay. These 2 forms of payment accounted for 30% ($11.1 million) of the annual $37.0 million in medical charges for all 2,427 patients. The table shows the odds of death for these patients was more closely associated with Time-to-HCF than Time-to-patient. The PC reported 2,529 exposures to 1 or more of the 33 opioid GCs during the 16 years (465 during the 24-month period of EMS data). The number of opioid exposures was increasing [95% CI] over time for 2002-2015 (9.33 [6.54, 12.1] exposures/year ($n = 14$, rsquare $=0.815$, $p < 0.0001$). Naloxone was reported as performed (P) or recommended and performed (RP) in 212 (14%) of 2,529 cases over the 16 years. The proportion of patients receiving naloxone has increased from 0% to 15% over 2000-2015, increasing 0.870 [0.644, 1.10] %/year ($n = 16$, rsquared $=0.830$, $p < 0.0001$).

Conclusions: PC calls related to opioids show the expected increase over time, and % of naloxone use of is increasing on top of that increase. Opioid exposures strain health care resources. Age over 60 years is clearly a risk factor in patients receiving prehospital naloxone. Time-to-HCF showed a statistically significant relation to mortality. While Time-to-patient showed an increase, it was not statistically significant. Most of the patients receiving naloxone, however, were not finally diagnosed as opioid poisoned. Thus this experience does not argue strongly against the use of bystander naloxone.

KEYWORDS Naloxon; Opioid overdose treatment; Emergency Medical Services

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94. Ibuprofen overdose: a common but minimally toxic poisoning

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Objectives: Ibuprofen is a common poisoning due to its ready availability as an analgesic. Like most non-steroidal anti-inflammatory drugs it does not appear to be associated with major toxicity but there are reports of severe toxicity with larger doses. This study aimed to investigate the epidemiology and clinical effects in a large series of ibuprofen overdoses.

Drug	N	Dose (g)	LOS (h)	ICU	Coma (GCS <9)	Ventilation	Death
Ibuprofen	84	4.6 (2.4-9.2)	9.4 (5.4-15)	0	0	0	0
Ibuprofen-Codeine	40	6 (4.8-9. 6)	16.2 (8.4-25)	2	0	0	0
Ibuprofen + Coingestants	621	2.4 (1.6-4.8}	15.4 (9-24)	32	22	23	0
All Cases	745	3 (1.6-5.3)	14.9 (8-23)	34	22	23	0

Methods: All presentations of ibuprofen or ibuprofen-codeine overdoses to a tertiary toxicology service (1987-2013) were extracted from a prospective database and reviewed. The following data was extracted: demographics, complications (coma [GCS <9], hypotension [systolic BP <90mmHg], seizure), treatments and outcomes (length of stay [LOS], intensive care [ICU] admission, death).

Results: There were 745 ibuprofen ingestions, 594 ibuprofen, 142 ibuprofen-codeine and one with both. The commonest co-ingestants were paracetamol, alcohol, benzodiazepines, selective serotonin reuptake inhibitors and atypical antipsychotics (quetiapine). There were 124 cases where only ibuprofen [84] or ibuprofen-codeine [40] were taken without co-ingestants. For these 124 admissions, the median age was 24y (interquartile range [IQR]: 18-37; range: 15-59), and 92 (74%) were female. The median ingested dose was 5g (IQR: 2.7-9.6; range: 0.4-60). The median LOS was 11.5h (IQR: 5.7-18.4). There were no deaths, no cases of coma and no requirement for intubation. Only two patients, both ingesting ibuprofen-codeine alone were admitted to ICU. The LOS, ICU admission rate, intubation rate and coma were longer and higher respectively in patients co-ingesting other drugs (Table). Patients ingesting other drugs took a lower dose of ibuprofen.

Conclusions: Ibuprofen and ibuprofen-codeine combination alone overdoses cause only minor effects in overdose, with no major complications or interventions required. Ibuprofen alone overdoses represents a younger or more female group compared to deliberate self-poisoning in general. In the majority of cases other drugs were also ingested and the other drugs appeared to result in a longer LOS and greater requirement for critical care services.

KEYWORDS Ibuprofen; overdose; epidemiology

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95. International Perspective on Prescription Benzodiazepine Exposures Reported by Poison Centres in the Global Toxicosurveillance Network

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Objectives: To describe characteristics of exposures to prescription benzodiazepines reported by Global Toxicosurveillance Network poison centres (PCs) in Europe.

Methods: Human benzodiazepine exposures reported in 2014 by PCs in France (Paris), Germany (Göttingen), Italy (Milan), Lithuania,

	France N = 209	Germany N = 737	Italy N = 1452	Lithuania N = 40	Netherlands N = 1448	UK N = 948
Age, median	33.5	41.0	42.0	22.5	41.0	39.0
Gender, %female	63.6	57.7	67.5	60.0	70.2	59.4
Route, % oral	99.5	97.7	98.7	100	99.9	98.9
Reason, % intentional	53.6	77.1	86.9	62.5		70.4
Rate per 100,000 population						
Alprazolam	1.0600	0.3083	1.0084	0.3026	1.3132	0.0828
Diazep a m	0.5173	2.3770	0.3997	0.5043	3.2206	1.1566
Larazepam	0.1950	2.3633	1.0201	0.5380	4.0703	0.2423
Rate per 1000 standard units						
Alprazolam	0.0011	0.0136	0.0016		0.0115	0.0322
Diazepam	0.0027	0.0288	0.0022		0.0154	0.0019
Larozepom	0.0005	0.0138	0.0014		0.0250	0.0029

the Netherlands, and the UK (Birmingham, Cardiff, Edinburgh, Newcastle) were examined. UK and Dutch PCs provide medical management advice to healthcare providers only, while other PCs also offer services to the public. Defined regions of coverage exist for each PC except Milan, which handles 65-70% of calls in Italy. Descriptive statistics are provided for the gender, age, exposure reason, exposure route, and rates of enquiries for particular benzodiazepine drugs (alprazolam, diazepam, lorazepam). Exposure reasons are classified as intentional and unintentional; the Netherlands are excluded as reason is not collected. Routes are classified as oral and non-oral. Rates per 100,000 population and per 1,000 standard units are presented to account for country differences. For PCs without full country coverage, the distribution of standard units sold is assumed proportional to the population. Drug utilization data are acquired from IMS Government Solutions, Inc.

Results: In each country, the greatest proportion of exposures involved a female. The median age was lowest in Lithuania (22.5 years) and highest in Italy (42.0 years). In general, the proportion of intentional exposures was substantially greater than unintentional exposures. The majority of exposures were oral. Population-based exposure rates were relatively high in the Netherlands for each drug. Adjusting for standard units sold appears to mitigate the highest population-based rates within drug classes in each country.

Conclusions: The greatest proportions of exposures in each country were oral, of an intentional nature, and occurred in females. Despite methodological differences in PC data collection, these characteristics may be explored further to identify preventive measures.

KEYWORDS Benzodiazepines; exposures; international poison centers

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96. A Characterization of Fentanyl Exposures Reported to the National Poison Data System from 2000-2015

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Background: In the US, fentanyl abuse is recently reemerging. Medical diversion and clandestine synthesis has made fentanyl increasingly available to the public for abuse. Due to its potency, fentanyl is becoming a significant cause of morbidity and mortality. Fentanyl is also used in combination or as an adulterant with illicit drugs such as heroin and cocaine with deaths reported. It is unclear whether fentanyl abused as a sole agent or in combination with other illicit drugs increases the likelihood of a major adverse outcome. We sought to characterize fentanyl exposures reported to the National Poison Data System (NPDS) to determine which factors lead to major outcomes.

Methods: We queried NPDS for all closed, human exposures to fentanyl using AAPCC Generic Code 0200628 within our 5-state regional poison center (RPC). Cases without a known outcome were excluded. Descriptive statistics for age, gender, level of health care facility (HCF) care, presence of other drugs (categorized by drug class), route of administration, medical outcome, and reason for exposure were performed. Findings are summarized in Table 1.

Results: A total of 236 exposures were identified and 69% (n = 164) met inclusion criteria.The mean age was 41 years. There were 86 (52.4%) female exposures. 54 (32.9%) patients exposed required critical care unit admission. 109 (66.5%) were single-substance fentanyl exposures. Route of administration is illustrated in Table 1. The majority of exposures involved fentanyl transdermal systems; 105 of these cases were patch ingestions. The majority of exposures involved minor outcomes (n = 78, 47.6%), followed by moderate (n = 65,39.6%), and major (n = 20,12.2%). There was one reported death. There were 103 intentional exposures, including 33 suspected suicide attempts. There were 49 cases of unintentional exposures, including adverse drug events. Of these, 33 (67.3%) resulted in only minor outcomes. Co-ingestants are shown in Table 2.

Conclusions: Cases involving parenteral exposures were surprisingly uncommon and may reflect regional trends. Historically, fentanyl has been used as an adulterant to heroin; however, this combination was not reported. As shown in Table 2, the percentage of concomitant exposures to opioids or amphetamines was high amongst exposures resulting in major outcomes and these combinations may represent increased risk of toxicity. Intentional exposures resulted in a high percentage of moderate or major

Table 1

Route of administration	Occurrences
Ingestion	105
Dermal	54
Inhalation/Intranasal	3
Parenteral	10

Table 2

Co-ingestants	Major outcomes Occurrences	Moderate outcomes	Minor outcomes	Total
Benzodiazepines	4	14	7	25
Opioids	6	13	11	30
Cocaine	0	1	0	1
Amphetamines	2	2	0	4