Clinical Toxicology (2007) **45**, 605–648

ISSN: 1556-3650 print / 1556-9519 online
DOI: 10.1080/15563650701610056

informa
healthcare

NACCT ABSTRACTS

Abstracts of the 2007 North American Congress of Clinical Toxicology Annual Meeting, October 19–24, 2007, New Orleans, Louisiana

1. Acetaminophen-Protein Adducts in Therapeutic Acetaminophen Dosing

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Background: Acetaminophen-protein adducts (APAP-ADD) are formed when the toxic metabolite of APAP (NAPQI) binds to intracellular proteins. APAP-ADD have been detected in the serum of patients with acetaminophen poisoning. This study was designed to determine whether APAP-ADD are detectable in patients taking therapeutic doses of APAP who do not develop hepatotoxicity. *Methods:* This was a sub-study in a randomized, placebo controlled trial where subjects were administered 4 gm/day of APAP for 10 days. Serum APAP-ADD were measured in samples obtained on day 0 and day 11. APAP-ADD were quantified using a modification of a published HPLC-EC method. Each subject was monitored for clinical signs of hepatic injury as well as a standardized laboratory evaluation. *Results:* Samples were available for 47/50 placebo subjects and 95/100 APAP subjects. At day 0, APAP-ADD were detected in one (1%) APAP and two (4%) placebo subjects. Levels were 0.086, 0.155 and 0.241 nmol/mL serum, respectively. At day 11, APAP-ADD were detected in 79 (83%) APAP subjects and one (2%) placebo subject. The mean APAP-ADD level was 0.129 ± 0.056 nmol/mL serum in APAP subjects. APAP-ADD level was 0.0998 nmol/mL serum in the placebo subject. One placebo subject had a measurable APAP-ADD at both day 0 and 11; the day 11 level was lower than at day 0. This subject had a measurable acetaminophen level at baseline. No subject fulfilled the Drug Induced Liver Injury Network definition of drug induced liver injury. *Discussion:* APAP-ADD were previously thought to be a specific indicator of hepatotoxicity. However, subjects taking the maximal therapeutic dose of APAP for 10 days without drug induced liver injury had detectable APAP-ADD. In comparison, APAP-ADD levels in APAP overdose cases are generally 70–100 fold the levels reported here. *Conclusion:* Low levels of APAP-ADD are a marker of APAP exposure and not necessarily toxicity. [Platform]

2. Propylene Glycol Ameliorates Hepatocellular Damage Induced by Acetaminophen in Mice

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Background: Children are thought to be less susceptible than adults to hepatotoxicity following acetaminophen (APAP) overdose. The reason is unclear. Cytochrome P-450 (CYP) 2E1 inhibitors may protect against APAP toxicity. Liquid preparations of APAP, used frequently by children, contain propylene glycol (PG) as an excipient. PG is a potent inhibitor of CYP 2E1, which could be a factor in the reduced incidence of hepatic toxicity secondary to APAP overdose in children. We administered hepatotoxic doses of APAP to mice, with and without PG, and found that PG ameliorated hepatocellular injury. *Methods:* Our animal use committee approved all protocols. Male C57 Bl/6 mice were divided into 3 groups as follows: Group 1 (control, N = 11), received 0.5 mL warmed normal saline (NS) via intraperitoneal (IP) injection; Group 2 (N = 10) received APAP, 600 mg/kg IP in 0.5 mL warmed NS/PG solution (50% volume/volume); group 3 (N = 12) received APAP, 300 mg/kg IP in warmed NS. All mice received 0.5 mL despite differences in APAP solution concentration. At 6 hours animals were sacrificed and blood obtained for alanine aminotransferase (ALT) levels as a marker of hepatocellular damage. ALT levels between groups were compared using 1 way ANOVA analysis. Statistical significance was defined as a P value < 0.05. *Results:* Transaminase levels were statistically significantly different between treated groups. The Mice in the APAP/PG group had a mean ALT of 354 IU/L. Mice in the APAP/saline group had a mean ALT of 6743 IU/L (P < 0.05). Control mice had a mean ALT of 46 IU/L. *Discussion:* Liquid APAP preparations contain PG as an excipient in order to dissolve APAP, which is sparingly soluble in aqueous solution. This allowed us to double the dose of APAP administered in our target volume of 0.5 mL. The protective effect of the PG was conspicuous despite the doubling of the APAP dose. *Conclusion:* PG reduces hepatocellular injury in our standard murine model of APAP poisoning. The effect of excipients, particularly PG, on APAP toxicity needs to be considered and further investigated. [Platform]

3. Antidotal Therapy of Fluoroacetate Intoxication

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Background: Fluoroacetates (FA) are a class of highly toxic compounds that have been utilized for the control of animal pests such as rodents or mammalian livestock predators. Published accounts suggest a lethal dose in humans in the range of 2 to 10 mg/kg. The mechanism of action of FA is believed to include in vivo conversion to fluorocitrate, which in turn causes inhibition of aconitase, a major component of the tricarboxylic acid cycle (TCA). Experiments in our laboratory using rat, mice, and rabbit models have found that acute intoxication with FA at 1/2 the LD50 has been associated with increases in tissue concentrations of citrate, as well as sharp decreases in blood and tissue levels of glutamate and glutamine. We investigated a potential antidotal approach (designated METIS therapy) that combined two principal approaches: competitive inhibition of the interactions of FA with CoA and of fluorocitrate with aconitase, and administration of substrates that enhance the activity of the downstream enzymatic processes in the TCA cycle. *Methods:* Eight groups of male Wistar rats received a single peroral administration of sodium monofluoroacetate at doses ranging from 1.5 mg/kg to 10.0 mg/kg. The 4 highest FA doses were followed by i.p. METIS therapy at 10 minutes, then at 1, 2 and 24 hours after the poisoning. The coefficient of efficiency (K) was the ratio of the LD values in the groups receiving or not receiving METIS (LD*/LD). *Results:* As shown in the table, METIS therapy was associated with a K(LD50) efficiency ratio of 4.2. *Discussion:* An antidotal approach (designated METIS therapy) that features competitive inhibition of the actions of FA and its metabolite fluorocitrate, and supplementation with downstream TCA cycle substrates, shows very good experimental efficacy in the treatment of intoxication with this highly lethal compound. *Conclusion:* [see discussion] [Platform]

Influence of METIS therapy on FA intoxication in rats

FA dose (mg/kg) and (therapy)	Lethal frequency	Probit Analysis
1.5 (none)	1/4	LD16 = 1.26
2.0 (none)	2/4	LD50 = 1.87
2.5 (none)	4/4	LD84 = 2.78
3.0 (none)	3/4	
7.5 (METIS)	3/7	LD16* = 6.42
8.0 (METIS)	5/8	LD50* = 7.87
9.0 (METIS)	4/8	LD84* = 9.66
10.0 (METIS)	4/4	
K(LD16) = 5.1		
K(LD50) = 4.2		
K(LD84) = 3.5		

4. Effect of Glucagon on Amitriptyline Induced Cardiovascular Toxicity in Rats

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Background: The aim of this study was to investigate the effect of glucagon on cardiovascular parameters in anaesthetized rat model of tricyclic antidepressant overdose. *Methods:* Toxicity was induced by an infusion of amitriptyline 0.94 mg/kg/min until a 40–45% of reduction in mean arterial pressure (MAP). After amitriptyline infusion rats were randomized into three groups (n = 7, each group). While control group of rats (Group 1) received a bolus of 5 % dextrose followed by the continuous infusion of dextrose, treatment groups received 1 mg/kg (Group 2) or 2 mg/kg (Group 3) bolus doses of glucagon followed by continuous infusions (0.1 mg/kg/min) of glucagon for 60 minutes. MAP, heart rate (HR), electrocardiogram and survival rate were recorded. *Results:* Amitriptyline caused a significant decrease in MAP and a prolongation in QRS yet it did not change HR. When compared to control, high dose glucagon (2 mg/kg bolus followed by 0.1 mg/kg/min) significantly increased MAP at 40, 50 and 60 minutes (76.5 ± 3.6 %, 54.5 ± 10.6 % at 40 min; 75.9 ± 4.7 %, 52.4 ± 7.3 % at 50 min; 77.5 ± 5.5 %, 45.7 ± 12.2 % at 60 min, p < 0.05, respectively) and shortened the prolonged QRS at 50 and 60 minutes (151.8 ± 15.6 %, 199.7 ± 7.8 % at 50 min; 150.7 ± 14.4 %, 201.6 ± 8.1 % at 60 min, p < 0.05, respectively). Glucagon (1mg/kg bolus followed by 0.1 mg/kg/min) significantly changed HRs at 60 minutes when compared to control group (95.8 ± 3.5 %, 70.7 ± 11.5 %, p < 0.05). High dose glucagon changed HRs at 40, 50 and 60 minutes significantly when compared to control group (105.2 ± 3.5 %, 81.6 ± 11.3 %, p < 0.05 at 40 min; 104.8 ± 2.5 %, 75.2 ± 14.6 %, p < 0.05 at 50 min; 105.7 ± 3.8 %, 70.7 ± 11.5, p < 0.01, at 60 min). Survival rate remained unchanged. *Discussion:* Glucagon caused an increase in MAP and HR which may be explained by its well-known positive inotropic and positive chronotropic effect. Further studies are needed to reveal the exact mechanism of the improvement in prolongation of QRS. *Conclusion:* Use of glucagon may be considered for reversing amitriptyline-induced hypotension and QRS prolongation. [Platform]

5. Liquid Nitrogen Ingestion May Produce Massive Pneumoperitoneum without Identifiable Gastrointestinal Perforation

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Background: Liquid nitrogen (LN) ingestion is unusual, but may be encountered by poison centers, emergency physicians, and general surgeons. Unique properties of LN produce a characteristic pattern of injury. *Case Report:* A 19-year-old male college student drank LN after a dare by friends. He presented shortly after the ingestion complaining of abdominal pain and "bloating." His presentation vital signs were only remarkable for mild tachypnea and tachycardia. On physical examination, he had mild respiratory difficulty due to abdominal distention. His abdomen was tense and distended, but only mildly tender. Abdominal x-rays revealed a massive pneumoperitoneum. The patient was taken for exploratory laparotomy. He was found to have a large amount of peritoneal gas under tension. No perforation was identified. Upper gastrointestinal endoscopy also did not reveal a site of perforation. Following surgery, the patient made an uneventful recovery and was discharged 5 days later. At 2-week clinic follow-up, he was doing well without complications. *Case Discussion:* Nitrogen is a colorless, odorless gas at room temperature. Because of its low boiling point (–195 C), LN rapidly evaporates when in contact with ambient air or body surface temperatures. Therefore, ingested LN causes damage by two mechanisms: rapid freezing injury upon mucosal contact and rapid volume expansion as nitrogen gas is formed. Patients who ingest LN may develop gastrointestinal perforation and massive pneumoperitoneum. Because rapid gas formation may allow large volumes to escape from tiny perforations, the exact site of perforation may never be identified. Patients found to have signs of gastrointestinal perforation should undergo laparotomy and search for perforation sites. *Conclusion:* In cases of LN ingestion, mucosal injury and rapid gas formation are likely to cause massive pneumoperitoneum. While laparotomy is recommended for all patients with signs of perforation, the site of injury may never be identified.

6. On the Correlation between Serum ß-Glucuronidase and Severity of Poisoning in Acute Human Organophosphorus Exposure

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Background: Beta-Glucuronidase (BG) is a liver microsomal enzyme which stabilized within luminal site of the microsomal vesicle by complexation with an accessory protein named Egasyn. Organophosphorus (OP) compounds are known to cause the selective release of liver microsomal BG into plasma. OPs may induce nitrosative stress leading to generation of nitrogen free radicals and alterations in scavengers of free radicals in many biological systems. *Methods:* In this study, we investigate how acute human OP intoxication is associated with changes of blood nitric oxide (NO), total thiol molecules (TTM), acetylcholinesterase (AChE) and BG activities. Patients (n = 21) with acute OP poisoning according to case history and clinical diagnosis were selected. Twenty-six age-matched healthy volunteers were recruited as control group. *Results:* Results indicated that patients had higher blood BG activity (420.93 ± 38.64 vs. 338.91 ± 15.81 U/dL, P < 0.001) and lower AChE activity (4.36 ± 0.70 vs. 10.02 ± 0.28 KU/L, P < 0.001). No significant change in blood NO was observed between patients and controls (3.72 ± 0.41 vs. 4.06 ± 0.47 µg/L). The patients had lower blood TTM (0.48 ± 0.04 vs. 0.85 ± 0.09 mmol/L, P < 0.001). Among blood parameters tested, only blood BG activity showed significant correlation with the poisoning severity (r = 0.203, P < 0.05) and needing to atropine administration. *Discussion:* Nitrosative stress has a minor role in toxicity of OPs. *Conclusion:* Determination of blood BG activity can be used as a sensitive biomarker for estimation of OP poisoning severity.

7. Phosphine Induced Respiratory Distress among the Health Care Team Caring for an Aluminum Phosphide Poisoned Patient

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Background: Aluminum Phosphide (AlP) is a compound used as a fumigant and rodenticide. Interaction of AlP with water produces Phosphine gas (PH_3). This, in turn, is thought to cause human toxicity by several mechanisms including inhibition of cytochrome c of the electron transport chain and free radical production. There are multiple reports of Phosphine toxicity in humans from both direct ingestion of phosphides as well as inhalation of PH_3. To our knowledge, this is the first report of clinical illness in health care workers exposed to PH_3 via the secretions of a Phosphide poisoned patient. *Case Report:* We present a case of a 50 year old woman who presented to a community ED in Canada 1.5 to 5 hours after the deliberate ingestion of 10g of AlP. The patient was placed in a negative pressure room. The patient was initially asymptomatic, but began vomiting profusely early in her clinical course. Although all health care providers were gowned, gloved and wore N95 masks, several developed tachypnea, dyspnea and throat irritation such that they had to be excused from their clinical duties. Our national HAZMAT service was consulted and recommended full face masks with supplied air for all health care providers in the patient's room. Once these precautions were instituted, no further respiratory symptoms were experienced by health care providers and to our knowledge, none of those initially affected has had any long term effects from their PH_3 exposure. Within hours, the patient became hypotensive and acidemic. She died approximately five hours after her arrival. *Case Discussion:* The patient presented to an extremely busy ED. At the time, many other patients were also present. Had our patient not been initially placed in a negative pressure room, or if the health care team had not used complete face masks with independent air supplies early, significant morbidity to other ED patients and the health care team itself may have occurred. *Conclusion:* Phosphine gas is a rapidly acting cellular poison that is well absorbed by inhalation. In a phosphide poisoned patient, every precaution should be taken for the protection of health care workers and surrounding patients.

8. A Swine Model for Poison-Induced Cardiac Arrest Using Intravenous Potassium Cyanide

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Background: Animal models have been used for cardiovascular toxicity in poisoning; however, there are no reported models of poison-induced cardiac arrest (CA). A reproducible model is required to evaluate the efficacy of antidotes in low-flow states. *Objective:* To create an animal model that 1) reproducibly generates poison-induced cardiac arrest and 2) allows for recovery with appropriate treatment. *Methods:* In our grant-funded study, adult female *Sus scrofa* swine were endotracheally intubated and anesthetized. One venous and two arterial Millar catheters were placed to administer medications, withdraw samples, and obtain continuous hemodynamics. The pigs were then allowed to stabilize for 15 minutes prior to obtaining baseline hemodynamic and metabolic measurements. Intravenous potassium cyanide (KCN), safer and more reproducible than inhalation, was infused at 0.5 mg/kg/min. This rate, titrated with a goal of achieving cardiac arrest (MAP 30 mmHg and pulse wave amplitude < 10 mmHg), was met between 10 to 15 min after starting the infusion. Once CA occurred, cardiopulmonary resuscitation (CPR) was initiated with a mechanical chest compressor at 100 compressions/min. Mechanical ventilation was ceased upon initiation of the KCN infusion, and restarted at ROSC (systolic blood pressure [MAP] > 50 mm Hg and a pulse pressure > 20 for 1 minute). Animals were then treated with epinephrine (n = 2), hydroxocobalamin (n = 2) or sodium nitrite/sodium thiosulfate (n = 1). *Results:* The median dose of cyanide required to produce CA was 3 mg/kg (range 2–5 mg/kg). Median time from initiation of infusion to CA was 9 min (range 4 to 19 min). All animals had ROSC within 4 minutes of treatment and survived for 2 hours after arrest. *Discussion:* With this grant-funded preliminary study, we developed a swine model for poison-induced CA. We used intravenous KCN as the poisoning agent, a chemical that can induce severe toxicity quickly, but allows animals to recover with treatment. *Conclusion:* This model for poison-induced cardiac arrest may be used for future comparative studies.

9. Efficacy of a Student-Centered Approach Using Human Patient Simulation in Teaching Venomous Snakebite Treatment

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Background: The Institute of Medicine has challenged the medical community to find uses for human patient simulation (HPS) in improving patient safety. Medical mistakes are the 8th leading cause of death for Americans, leading to untold human suffering and a cost approximating 29 billion dollars annually. Research regarding the educational benefits of technology rarely considers the accompanying teaching method as being the main reason for learning gains. We hypothesized a student-centered (SC) approach to teaching using HPS would improve performance outcomes in the management of venomous snakebites over an instructor-centered (IC) approach. *Methods:* In this study, two groups of medical students/medical residents (n = 30) were taught how to treat snakebite envenomation victims using either an IC lecture with slides or a SC education program using HPS. Written tests were administered before, and immediately after the above education. Data on participant performance treating a standardized patient actor (SP) suffering from a Timber Rattlesnake bite was also collected. Multivariate analysis was performed to identify any Type 1 sources of error, such as year of education, prior experience, and sex of participants. Tests of Between Subjects Effects were calculated on the scores from dependent measures to show significance of teaching methods. *Results:* Participants in SC instruction using HPS had significantly higher performance scores in all areas of testing: patient history (p = .001), physical exam (p = .001), observation of actions (p = .011), patient note (p = .001) and on the knowledge post test (p = .012). Type 1 error was not found regarding descriptive statistics. *Discussion:* HPS provides an effective SC education environment where the instructor acts as a guide and resource. Traditional methods of education, such as IC lectures improve knowledge but performance and post test knowledge were not as high as those receiving SC training with HPS. *Conclusion:* SC instruction using HPS improved performance of participants treating patients with venomous snakebites over participants in the IC education group.

10. Dextromethorphan-Induced Serotonin Syndrome

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Background: The ability of dextromethorphan (DXM) to potentiate serotonin levels and lead to serotonin syndrome (SS) is well known but few case reports are published. Due to the ubiquitous use of selective serotonin reuptake inhibitors (SSRI) and DXM, SS associated with these drugs (taken in combination) should be common. The lack of published cases suggests therapeutic doses of these drugs are not enough to cause SS. We present two cases of SS associated with supra-therapeutic doses of DXM and therapeutic levels of a SSRI. *Case Report:* Case One: A 20 YO man was found confused after a suspected ingestion of aripiprazole, benztropine, escitalopram and DXM. Physical examination was notable for tachycardia (HR 168), hyperthermia (102.0 F), tremor, and rigidity and clonus in his lower extremities only. Head CT, EEG and routine blood work were normal. He was treated with IV lorazepam, PO cyprohyptadine and IV fluids. GC-MS confirmed nicotine, chlorpheniramine, escitalopram and DXM. Serum drug levels from admission revealed a DXM level of 950 ng/mL (norma < l5), escitalopram 23 ng/mL (normal < 200), chlorpheniramine 430 ng/mL (normal < 20) and undetectable levels of aripiprazole and benztropine. He made a complete recovery within 24 hours. Case Two: A 6 YO boy, recently started on sertraline, was found lethargic and confused with an empty bottle of DXM elixir. Physical examination revealed: tachycardia (HR 118), mild hypertension (140/69), hyperthermia (100.6 F), and rigidity with clonus in his lower extremities only. He was intubated for airway protection and sedated with fentanyl and versed. Head CT, routine blood work and drug screen were normal (negative). GC-MS confirmed DXM and caffeine. Serum drug levels from admission revealed a DXM level of 2820 ng/mL and sertraline of 12.5 ng/mL (normal < 200). He was extubated and neurologically intact within 15 hours of admission. *Conclusion:* To our knowledge, this is the first case series to use serum levels of DXM and a SSRI to confirm DXM-induced SS. Our cases suggest supra-therapeutic DXM doses with a therapeutic amount of a SSRI are required for SS. More work is needed to answer this question more completely.

11. Automation of Drug Identification Using Interactive Voice Response Technology

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Background: In 2005, US poison center staff answered 849,082 drug identification calls (36.6% of all information calls) at an estimated cost of $25–30 per call ($18–21 million annually). To meet this demand, we developed and tested an interactive voice response drug identification system (IVR-DIDS). *Methods:* The IVR-DIDS captures and confirms non-exposure, drug data, age, sex and zip code. We produced picture-cards for the 78 library drugs and an additional 234 for drugs not in the database. Cards were randomly assigned to packets of 18–22 and given to a convenience sample of 40 subjects. Sensitivity and specificity were calculated from the response data and the association with tester demographics were examined using nominal logistic regression with SAS JMP v 6.0 (SAS Institute, Cary, NC). After using the IVR-DIDS, testers rated satisfaction, performance, script and trust each on a scale of 1–5. *Results:* Testers (35 of the 40 subjects) who completed packets had a median [min, max] age of 45 [13, 73] yr; 11% male, and median education of baccalaureate [< high school, doctorate]. Overall accuracy: was 91.3% (641 of 702), sensitivity: 70.2% (139 of 198), specificity: 99.6% (502 of 504); and false positive rate: 0.397% (2 of 504). Median ratings for satisfaction and performance were both 5, script rating was 3, and trust compared to an information specialist was 3. *Discussion:* The IVR-DIDS accurately identified drugs. An incorrect color-choice option caused one false positive and a user input error the other. Testers' most frequent complaints were system functionality and text-to-speech artificiality with most preferring a person to the machine. Improved IVR technology can address these issues. *Conclusion:* A prototype IVR-DIDS successfully handled > 90% of drug identification calls and miss-identified < 0.5% of drugs in this initial field-test. Recommendations include: replace text-to-speech with a recorded voice, simplify input directions and increase library size. An IVR-DIDS appears to be a viable option to maintain quality while reducing cost.

12. Multiple Transaminase Peaks Following Acute Acetaminophen Overdose

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Background: Standard protocols of N-acetylcysteine (NAC) therapy for acetaminophen (APAP) overdose do not apply to late (>8 h) presenting cases with elevated transaminases (AST, ALT). Some authors recommend NAC treatment until a peak and decline in transaminases is seen. The magnitude and duration of this decline is poorly defined. We present two cases that had declining transaminase levels followed by a second, higher peak. *Case Report:* Case 1: A 25 year-old female presented 24 hours after ingesting an unknown dose of APAP. IV NAC was started promptly. She developed Grade II encephalopathy and a peak INR of 3.44. Her condition improved and NAC was stopped 120 hours post-ingestion. Case 2: A 23 year-old female presented 43 hours after ingesting 27.5 g APAP. IV NAC was started promptly. She did not develop encephalopathy. Peak INR was 1.60. NAC was stopped 47 hours post-ingestion, but restarted 4 hours later and continued until 89 hours post-ingestion. AST, APAP levels are noted below:

	APAP at presentation (hrs post-ingestion)	AST Peak 1 (hrs post-ingestion)	AST Trough (hrs post-ingestion)	AST Peak 2 (hrs post-ingestion)
Case 1	30.7 mg/L (24 h)	3467 IU/L (37 h)	1958 IU/L (48 h)	7518 IU/L (65 h)
Case 2	0 mg/L (43 h)	507 IU/L (43 h)	390 IU/L (51 h)	1488 IU/L (69 h)

A review of a database of 1297 cases of APAP overdose found 76 cases of severe hepatotoxicity (AST > 1000 IU/L). Of these cases, 6 (7.9%) exhibited the same pattern of an initial AST peak, a decline of >20%, then a second, higher peak. *Case Discussion:* NAC treatment protocols are intended for APAP overdose patients presenting within 8 hours of ingestion, before transaminase elevations occur. In cases where patients present later with elevated transaminases, some authors recommend NAC treatment until a peak and decline is seen. Our cases indicate that multiple peaks in transaminases may occur within 72 hours of ingestion. *Conclusion:* In cases of late presenting APAP overdose, clinicians should be wary of discontinuing NAC therapy based on a single, decreasing transaminase level. Patients may require lab monitoring and treatment for 24 hours or more following a transaminase peak.

13. Trends in Extracorporeal Membrane Oxygenation (ECMO) Utilization for Treatment of Poisoning

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Background: Extracorporeal membrane oxygenation (ECMO) is a supportive modality for patients with potentially reversible cardiorespiratory failure. Use of ECMO for poisoning has been reported in anecdotal case reports. We previously reported data from the Extracorporeal Life Support Organization (ELSO) registry on patients treated with ECMO from 1985–2001. *Methods:* The patient data base of ELSO was queried using ICD9 codes related to poisoning and drug abuse. Demographic and clinical data were analyzed. Survivors and non-survivors were compared, and trends in ECMO utilization were investigated, comparing the previously reported data with the current query. *Results:* A total of 101 patients treated with ECMO for poisoning were identified. Table 1 summarizes the findings of the data analysis. Demographic data are listed with mean +/– S.D. *Discussion:* The patient population in the current analysis is older, suggesting greater utilization of ECMO in adolescent and adult patients. A larger proportion of the current cases involve pharmaceutical agents, suggesting a greater utilization of ECMO for acute cardiovascular collapse due to cardiotoxic drugs. Overall survival is not improved in the current query, emphasizing the need for careful selection of patients for this high risk supportive modality. *Conclusion:* Utilization of ECMO for support of poisoned patients with cardiorespiratory failure remains limited. Greater utilization in older patients, and for the treatment of cardiotoxicity in ingestion of pharmaceutical agents is identified. Further study is needed to identify patients best suited for ECMO support.

	All pts. (n = 101)	Prior (n = 61) 1985–2001	Current (n = 40) 2002–2007
Age (mos.)	107+/–146	54+/–87	164+/–171
ECMO duration (hrs.)	222+/–172	255+/–167	186+/–166
Survival (%)	58/101 (57%)	34/61 (56%)	24/40 (60%)
Hydrocarbons, % (% survival)	40/101,40% (67%)	32/61,52% (67%)	8/40,20% (87%)
Noxious gases, % (% survival)	33/101,33% (54%)	22/61,36% (50%)	17/40,42% (63%)
Pharmaceuticals, % (% survival)	21/101, 21% (52%)	4/61,7% (75%)	11/40,27% (47%)

14. Validity of the AAPCC Diphenhydramine Ingestion Guideline

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Background: The American Association of Poison Control Centers out-of-hospital guideline published in 2006 advises the amount of diphenhydramine ingestion for children under the age of 6 years (7.5 mg/kg) that requires evaluation at a health care facility (HCF). For this age group, this guideline was developed by an expert consensus panel using case reports. We wanted to validate the guideline using actual pediatric patients. *Methods:* Retrospective study of cases from all poison centers in one state for ingestion of diphenhydramine from 2000 to 2006. Only children under the age of 6 years with single substance ingestion of diphenhydramine where selected. In addition, each case had to have subject's weight, amount ingested, follow up call and known outcome recorded. *Results:* There were a total of 307 children that met all the inclusion criteria. Their ages ranged from 5 months to 5.5 years. They ingested from 0.16 mg/kg to 23.0 mg/kg of diphenhydramine. Most children had no symptoms (71.0%). There were no deaths and no severe symptoms noted (0%, 95% CI 0 – 1.2%). Only 8 (2.6%) had moderate symptoms, and the remainder had only minor or no symptoms. Most patients were observed at home. However, 28 (9.2%) were evaluated at a HCF, and twelve (3.9%) of these received activated charcoal. No patient received physostigmine. Only 6 children (2.0%) ingested more than the guideline dose. All of these were evaluated at a HCF. *Discussion:* Of the 301 who ingested less than the guideline, none developed severe symptoms and only 1.3% had moderate symptoms. The guideline would have kept an additional 22 (7.2%) of these children at home. Of the 6 who ingested more than the guideline, none developed severe symptoms and 50% had moderate symptoms. *Conclusion:* The 2006 diphenhydramine guideline appears to provide very safe triage dosages for young children. If it had been available, it would have kept a significant number of these children at home.

15. Severe Salicylate Poisoning from Hong Hoa Oil

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Background: Toxicity caused by ingestion of Chinese liniment oils has been reported previously. Imported Asian patent medicines are easily available for purchase and contain several toxic substances, most notably methyl salicylate (MS). *Case Report:* An 88 year old female, with a 2–3 month history of memory loss and personality change, was found by her son with acute worsening of her mental status. She was confused, vomiting a red liquid, and incontinent of stool and urine. The son noticed that the emesis had the odor of a topical liniment she had been using for arthritis pain. The 30 ml bottle of Hong Hoa Oil (Koong Yick Medical Factory) was empty. On ED presentation, she was lethargic and required intubation. Charcoal was given via NG tube. Initial vital signs: HR = 97, BP = 194/87, RR = 16, oxygen sat = 97%, T = 35.8 C. The lungs were clear to auscultation. Repeat temperature was 38.2 C. Laboratory values: Na = 146, K = 3.2, Cl = 120, HCO3 = 13, AG = 13, gluc = 132, BUN = 14, Cr = 0.5, salicylate level = 93 mg/dl, serum APAP < 10, ethanol < 10. ABG after intubation: pH = 7.35, pCO2 = 26, pO2 = 500. CXR: pulmonary vascular congestion. She was treated with bicarbonate infusion. Nephrology consultation was obtained. The patient's clinical condition was significantly improved after 4 hours of hemodialysis (HD). Post dialysis salicylate level was 32 mg/dl. Following HD, she made an uneventful recovery and was discharged 7 days later. *Case Discussion:* Hong Hoa Oil is readily available over the internet and in Asian stores. The active ingredient is listed as turpentine 22% and the inactive ingredients as wintergreen oil, cinnamon leaf oil, and citronella oil. Testing of this product at a DHS lab showed a MS concentration of 62%. The entire 30 ml bottle holds 26 gm of MS. The common use of Asian herbal medications in the USA poses a serious danger for accidental poisonings by children and confused adults, or for intentional poisonings by depressed patients. *Conclusion:* Hong Hoa Oil is a potential source of serious salicylate overdose. The product is illegally labeled according to the Food and Drug Branch of the California Department of Health Services.

16. Let It Snow! Emergency Set up of 6 Poison Center Remote Agents in under 8 Hours during a Severe Blizzard

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Background: The Rocky Mountain Poison Center (RMPC) operates 24/7/365 providing poison center service to 5 public regions as well as numerous corporate clients. Between 19–21 December 2006, over 20 inches of snow was forecasted for Metro Denver. By 20 December, Denver received a foot of snow with continued blizzard warnings overnight, resulting in a total snowfall of 21 inches, the 7th largest snowstorm in Denver history since 1946. Denver International Airport cancelled over 1000 flights and the city essentially shut down. All highways entering and exiting Denver were closed. Most employers closed, leaving only critical employees to find transportation to work. RMPC managed to maintain full staffing due to emergency

deployment of temporary remote agents (RA). *Case Report:* At the time of the blizzard, RMPC employed 2 full-time RA Specialists in Poison Information (SPI). To maintain full staffing the Information Systems (IS) department attempted to deploy 8 temporary RAs on 21 December. Of the 8, 6 were successfully set up as RAs. Reasons for failure included Microsoft operating system and Macintosh incompatibilities. Requirements for the temporary RAs: Windows 2000 or XP, processor of 1.5 mHz or faster, 512 MB RAM, 1 Gig hard drive, high-speed internet connection, and land phone line. Our IS team worked overtime, to ensure 1:1 instruction with each RA. Set-up took approximately 1 hour per person. Each RA was either emailed or given a CD of required software which included Virtual Private Network and telephony Internet Protocol Agent programs. *Case Discussion:* Set-up for the emergency RAs was accomplished in under 8 hours. The RAs functioned seamlessly as SPIs from home. Calls were recorded as usual. Call volumes for the RAs were similar to on-site staff. There were no major technical problems; the pilot was considered a success. *Conclusion:* The outcome of this emergency RA deployment operation proved an invaluable experience. We now know that RMPC can effectively maintain staffing during critical periods such as natural disasters and other unpredictable events. The harmonious efforts by IS and RMPC staff to stay operational during a major blizzard represents a poison center model.

17. A New Approach to Multi-Hazard Modeling and Simulation

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Background: Current chemical, biological, radiological, and explosive (CBRE) models share several limitations: overly contrived environments, failure to incorporate human behavior or population movement, ignoring evolving responses, or inability to accomplish prediction, management, and analysis of solutions of disaster plans. Agent-based models (ABMs) uniquely code "agents" (persons or components of interest) as autonomous decision-making entities, which interact and adjust via complex fashion during simulation progression. Such tools can assess the robustness of existing emergency plans and the impact of delayed response. *Methods:* We developed CBRE scenarios, persons, responders, ambulances, and hospital agents in an ABM. Urban topography integrated Geographic Information Systems (GIS) data. Published data, expert opinion, focus groups, and population sampling informed relevant parameters and defaults. Individual socio-behavioral parameters, communication device access, and messages from authorities addressed social and communication issues. Hospital agents incorporated fluctuating pre-disaster unit censuses; critical asset (e.g. ventilators) and resource consumption; and emergency incident response (e.g. triage, decontamination, and rapid discharge). *Results:* Our ABM simulated discrete and disseminated CBRE scenarios (e.g. sarin release, muliti-explosion, smallpox release, and foodborne illness). Surge recovery points, indicating system ability to absorb remaining casualties, were detected. Sweeping the parameters of interest across the range of input variables identified ED and hospital pre-disaster censuses, notably in the 70–100% range, as consequential mortality determinates in sarin scenarios. *Discussion:* This ABM supported multi-faceted evaluations: aggregate population statistics, micro-level individual agent traces, intra-run parameter alterations, factorial analysis, parameter sweeps, recovery point identification, and optimal response solutions. Our analysis of a chemical release approximated conventional expectations. Available GIS data can translocate the ABM to a new city. *Conclusion:* An ABM platform can feasibly simulate CBRE events and refine existing disaster plans and policies.

18. Refusing Sound Advice: Poison Control Center Referrals

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Background: The characteristics and outcomes of callers to poison control centers who decline referral for medical care are unknown. *Methods:* The Utah Poison Control Center (UPCC) database was queried for callers referred for medical evaluation between 1998 and 2001. Callers were matched to statewide emergency department, inpatient, and death records using probabilistic linkage to ascertain outcomes. Callers were subdivided as compliant or non-compliant. Non-complaint callers included those who refused referral and those who agreed to seek medical care but did not arrive at a health care facility. Relative risks of non-compliance with 95% confidence intervals were calculated using Chi-square statistics. *Results:* Of 140,578 total callers to UPCC, 20,110 (14%) were referred for treatment. Of these, 14,636 (73%) were compliant and 5474 (27%) were non-compliant. Of the non-compliant, 1866 (34%) never arrived and 3608 (65%) refused referral. 6% of non-compliant callers subsequently matched to a health care facility record. Non-compliant callers were older (22 vs 15 years $p < 0.01$), more likely to have had an intentional exposure (RR 1.4, CI:1.4–1.5), and more likely from an urban county (RR 1.1, CI:1.1–1.2). Gender was not associated with compliance ($p = 0.48$). Seven of the total referred callers died from poisoning (0.03%) of whom 3 (0.05%) were in the non-compliant group. Exposure to the following substances increased the risk for non-compliance: opiates (RR 1.5, CI:1.3–1.6), benzodiazepines (RR 1.5, CI:1.3–1.6), hallucinogens (RR 1.8, CI:1.5–2.3), and ethanol (RR 1.8, CI:1.7–2.0). Compared to ingestions (27% non-compliant), parenteral (RR 1.6, CI:1.4–1.9), inhalational (RR 1.4, CI:1.3–1.5), and unknown routes of exposure (RR 1.6, CI:1.2–2.2) were associated with non-compliance. *Discussion:* Most callers to UPCC were compliant with referral. Non-compliant callers were older, more often intentional exposures and more likely to have been exposed to a controlled substance. Few non-compliant callers later sought medical care or died. *Conclusion:* Callers refusing referral do not appear to be at high risk for adverse outcomes.

19. Educational Outreach Increases Poison Center Call Volume

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Background: Poison Centers provide educational outreach on toxicology related issues to health care professionals. One type of educational outreach initiative provided by the Upstate New York Poison Center is on-site in-services at health care facilities (HCF) within our catchment area. We sought to determine if call volume from a HCF significantly increased after a first time in-service. *Methods:* A retrospective review of all hospitals where a first time in-service was performed were identified from September 2005 through August 2006. Using the Toxicall® database, call volume of the identified hospitals was assessed 30 days prior to and 30 days after the in-service. Statistical analysis was performed using a paired students t-test. *Results:* 7 hospitals were identified with a first time in-service. One hundred percent of the hospitals showed an increase in call volume in the 30 days following an in-service. The mean call volume increased two-fold from 6.14 calls to 12.86 calls pre and post inservice, $p = 0.03$. *Discussion:* Toxicology related education improves awareness as well as establishing a relationship between health care providers and regional poison control centers. We describe a 50 % increase in call volume within the first 30 days after conduction of an in-service. We hypothesize that the increase in call volume is due to increased awareness of the poison center. *Conclusion:* This study demonstrates that call volume increases after a first time in-service is performed. Further evaluation needs to be performed to determine if the increase in call volume is sustained over a longer period of time as well and what impact, if any, in-services have on implementation of poison center recommendations. Poison centers should strive to initiate a minimum of one educational in-service to HCFs within their catchment area.

20. Mercuric Chloride (Hgcl 2) Poisioning Following Ingestion of a Stool Fixative

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Background: Stool preservatives can contain a potentially lethal amount of HgCl 2. We present a patient who ingested 15 ml of stool fixative containing HgCl 2 that was chelated. *Case Report:* A 74 yr old non-English speaking woman unintentionally ingested 15 ml of a stool fixative containing 4.5% HgCl 2 (675 mg) that was left by her bedside in a hospital. She vomited immediately and complained of abdominal burning. 2 hrs PI she was started on po Succimer tx. Stat blood Hg level was 584 mcg/L (0–90 mcg/L); CBC, lytes, BUN, Cr, and LFT s, were normal. 10 hrs later, she developed vomiting so was switched to IM BAL q 4 h. The following day, she complained of burning lips, mouth redness and generalized flushing. Endoscopy showed gastritis. The BAL was D/C because of these possible adverse reactions. On day 4, when she became asymptomatic po Succimer was resumed. Her 24-hr urine Hg was reported as 90 mcg/L (ref < 15 mcg/L) at that time. Succimer therapy was continued for an additional 14 days. Patient remained asymptomatic during the rest of her course. Her serum Hg level before discharge had decreased to 76 mcg/L. *Case Discussion:* Ingestion of a stool fixative containing HgCl2, can produces abdominal pain, vomiting, GI bleeding, or oropharyngeal burns, acute renal failure and septicemia. Three fatal cases of HgCl 2 ingestions have been reported in the AAPCC database since the 1980s. A lethal dose is 1–4 g, however fatalities have occurred following ingestion of 200 mg. Hg levels correlate poorly with clinical manifestations; symptoms may appear when urine Hg concentrations > 100 mcg/L and blood conc.> 200 mcg/L. This patient had unfortunately mistaken this product left on her bedside table because of her unfamiliarity with English. Health care professionals should be reminded to remove potential toxicants from a patient's bedside to avoid potential exposures. This is the second reported case of mercuric chloride poisoning where oral Succimer therapy was used to reduce mercury levels. *Conclusion:* Patients receiving stool fixatives should receive instructions on its proper use and potential toxicity of HgCl 2. Less toxic stool preservative should be used as an alternative.

21. Persistent Hypoglycemia Complicating Metformin Overdose (OD) in a Non-Diabetic Adult

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Background: Biguanides are used as anti-hyperglycemic agents for type 2 diabetics, and to induce ovulation and improve glucose control in Polycystic Ovarian Syndrome (PCOS). Metformin reduces glucose production and insulin resistance, but does not increase insulin release. Hypoglycemia is an expected side effect with agents that increase insulin release, but not with agents that modify insulin resistance. We describe a case of a patient who developed persistent hypoglycemia after a large OD of Metformin. *Case Report:* A 29 yo female with a history of PCOS presented to the emergency department 1 hour after ingesting 45 grams of metformin in a suicidal gesture. She denied co-ingestants. On arrival she was drowsy but oriented. Charcoal was held for depressed mental status. Her initial labs on arrival were: glucose 73 mg/dL, lactate 0.9 mmol/L and creatinine 1.0 mg/dL. Over the next 8 hours she became less responsive and had a bedside glucose of 11 mg/dL. After 25 grams of D50 her glucose was 153 mg/dL, falling 1 hour later to 67 mg/dL. Despite a D10 drip, she had glucose values of 67, 83, and 54 mg/dL over the next 4 hours. Her lactate peaked at 13.9 mmol/L and her creatinine peaked at 2.2 mg/dL during that time period. Pertinent labs include normal levels of hemoglobin A1C (5.0 %) and c-peptide (3.3 ng/mL), and an elevated metformin 39 mcg/ml (therapeutic 1–2 mcg/mL) 8 hours after ingestion. Urine comprehensive drug assay was positive for loxapine and benzodiazepine metabolites. Sulfonylurea screen was negative. The patient improved significantly after 4 hours of dialysis with reversal of acute renal failure, lactic acidosis and hypoglycemia. She was transferred to psychiatry on hospital day 3. *Case Discussion:* Hypoglycemia is rarely reported after metformin overdose and in most cases co-ingestants may account for low blood sugar. Persistent hypoglycemia requiring a glucose infusion was necessary in our patient while no other causes for hypoglycemia was found by history or lab data. *Conclusion:* While uncommon, clinicians caring for similar patients should be mindful of this potential complication and closely follow blood glucose values to promptly diagnose hypoglycemia.

22. Clinical Characteristics of Methamphetamine Body Stuffers

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Background: Body stuffers are patients who hastily ingest poorly-wrapped illicit drugs, typically in an attempt to avoid arrest. Although there is robust literature on crack/cocaine body stuffers, little data exists on methamphetamine body stuffers. *Methods:* We performed a retrospective review of all cases of meth ingestion over a 5yr period in 1 poison center. All cases coded to methamphetamine were reviewed by 3 physician toxicologists and selected for pre-determined criteria by majority. *Results:* 46 cases were determined to be methamphetamine body stuffer ingestions.

6 cases were eliminated for insufficient data, leaving 40 cases over the 5y period. Mean age was 26y (range 1–49y). Patients were mostly male(80%), were symptomatic on arrival(78%) and arrived a median of 2h after ingestion (mean 11.5 h, range 0.5–120h). Time to symptom onset ranged from immediate(.5h) to 36 h after ingestion(mean 3.25h, median 1h). Several patients(8%) developed symptoms longer than 4h after ingestion. Meth was wrapped in plastic baggies(45%), balloon(2.5%), plastic wrap(2.5%), no wrapping(18%), or unknown(33%). Of 14 cases with well-documented bag count, 79% were 1-packet ingestions. Patients developed a range of toxicity (25% none, 27% mild, 35% moderate, 13% severe) and complications that included: hyperthermia(18%), CPK > 5000(10%), renal failure(8%), Troponin > 2(8%), acidosis(5%), HR > 160bpm(15%), hypotension(8%), intubation(18%), IV sedation (60%), and 1 death. 75% received charcoal and 50% WBI. Few patients had diagnostic radiographic studies (5% xray, 5% CT), none of which revealed any packets. There were no packets identified in the stool of any of the 40 patients. *Discussion:* Meth body stuffers differ from other illicit substance body stuffers in that they typically ingest the drug without wrappers or in a single large plastic baggy (as opposed to several small dose-sized baggies). Several patients developed significant toxicity and there was 1 death. No packets were identified in the stool of any patient. *Conclusion:* Methamphetamine body stuffing significantly differs from other illicit substances and requires further prospective study.

23. Fatal Protamine Induced Pulmonary Hypertension in a Three Year Old

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Background: Protamine is known to induce several potentially life threatening adverse reactions. These include: systemic hypotension, anaphylactoid reactions, and pulmonary vasoconstriction. We present a fatal case of pulmonary hypertension occurring immediately after protamine administration. *Case Report:* A three year old female was undergoing elective repair of an atrial septal defect. On completion of the procedure the patient was given a test dose of protamine. Three minutes after the dose was given the patient became profoundly hypotensive, oxygen saturation decreased and then developed bradycardia. Surgeons observed rapid development of dilation of the heart simultaneous with the onset of severe cardiovascular compromise. An echocardiogram showed reduced right ventricular systolic function, increased right ventricle cavity size and tricuspid and mitral regurgitation. The patient was placed back on cardiopulmonary bypass and within 20 minutes the patients right ventricular systolic function was read as normal on a repeat echocardiogram. However, the patient's condition continued to deteriorate and despite extensive interventions she died three weeks later. *Case Discussion:* Protamine is used regularly for heparin reversal. It is normally well tolerated and the potential for anaphylaxis is well established. However, we should be aware that pulmonary hypertension is a rare but potentially fatal reaction that can occur even with appropriate use. *Conclusion:* We report a pediatric fatality secondary to pulmonary hypertension caused by protamine infusion.

24. Deadly Fentanyl Epidemic in Chicago and Surrounding Cook County Illinois

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Background: Fentanyl is a potent synthetic opioid agonist. Symptoms of fentanyl toxicity are similar to other opioids but with a more rapid onset. The clinical presentation of fentanyl toxicity may be difficult to recognize because routine drug screens do not detect fentanyl. Management of fentanyl overdose may require large amounts of naloxone. Fentanyl has recently been substituted for and adulterated heroin, resulting in many deaths. Fentanyl and fentanyl-laced heroin are known as "Drop Dead," "Flat Line," and "Lethal Injection." Chicago and Cook County, Illinois have been experiencing a fatal epidemic of illicit fentanyl abuse since April 2005. *Case Report:* From April 2005 to December 2006, the Cook County Medical Examiner's office identified 338 fatalities due to fentanyl abuse. 84% were black men. 80.2% of fatalities occurred in the city of Chicago, 19.8% in surrounding Cook County cities. 52.1% of deaths occurred in places other than a residence. 70.7% of the victims were residents of Chicago. Ages ranged from 17–68 years. Whole blood fentanyl levels ranged from 0.8–164 ng/mL at autopsy. *Case Discussion:* The Cook County Medical Examiner's office identified the first fatality due to illicit fentanyl in April 2005. Routine testing for fentanyl during autopsies began in December 2005. A surge in fatalities occurred in April through July 2006 with an average of 39.5 fatalities per month. During this time our institution experienced a naloxone shortage. Since April 2005, emergency medical service calls due to overdose have increased 800%. *Conclusion:* Chicago and Cook County, Illinois have experienced a fatal epidemic of illicit fentanyl abuse since April 2005. During an epidemic, it may be necessary for hospitals to increase naloxone supplies. Healthcare professionals should be aware of fentanyl abuse and the possibility of a national outbreak associated with high mortality.

Fentanyl Deaths April 2005-December 2005

	N (%)
Deaths	338
Male	284 (84)
Black	201 (59.5)
Caucasian	137 (40.5)
Death in Chicago	271 (80.2)
Death in a Residence	162 (47.9)
Age, y (mean, range)	40.5 (17–68)
Fentanyl level, ng/mL (mean, range)	22.9 (0.8–164)

25. Gender-Related Differences in Phenanthrene Metabolism in Adults

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Background: Phenanthrene is the simplest form of a polycyclic aromatic hydrocarbon that contains a "bay-region," and its oxidative metabolism by cytochrome P450 isoenzymes is purported to be regiospecific. *Objective*. To evaluate the difference in phenanthrene metabolism between men and women. *Methods:* Participants in this study were those older than 19 years in the National Health and Nutrition Examination Survey (2000–2001). Demographic data included age, gender, race/ethnicity, and body weight. Mono-hydroxylated phenanthrene metabolites (1-, 2-, 3-, 4-) were measured in urine by GC/IDHRMS. The metabolic ratio (MRp) of the levels of the phenanthrols ([1+2] / [3+4]) served as an index of metabolic activation and detoxification. Serum cotinine level determined active smoking status. Data analyses (SAS and SUDAAN) were performed with statistical sampling weights and they were adjusted for confounding variables. Alpha was set at 0.05. *Results:* The overall study comprised of 746 men and 785 women, and smokers represented 31% and 17% of these groups, respectively. The proportion of the major race/ethnic groups in the overall study population was Mexican-Americans (21%), non-Hispanic blacks (18%), and non-Hispanic whites (54%). The metabolic ratio of the phenanthrols varied by age and race/ethnicity, and the effect of smoking on the MRp was greater in women than in men when compared to non-smokers. Participants who were 20–39 years old had about a 20% lower geometric mean of MRp than those who were older. Non-Hispanic blacks had about a 25% lower geometric mean of MRp than Mexican-Americans or non-Hispanic whites. Men and women smokers had lower geometric means of MRp than non-smokers, 8% and 25%, respectively, but this difference was only significant in women. *Conclusion:* This study suggests the oxidative metabolism of phenanthrene is determined by age and race/ethnicity in adults. The effect of smoking on the relative levels of the phenanthrols is consistent with prior reports and it is attributed to the induction of microsomal enzymes by tobacco smoke. However, the observed greater response in women to mainstream tobacco smoke compared to men remains to be further investigated.

26. Characteristics of Aripiprazole Exposures Reported to a Poison Control System from 2002 – 2006

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Background: Aripiprazole is a widely prescribed second generation atypical antipsychotic. To date, minimal data exist on the characteristics of exposures to aripiprazole. We report a retrospective study of aripiprazole exposures over a 5 year period. *Methods:* All isolated aripiprazole exposures reported to a poison control system from Jan. 2002 thru Sept. 2006 were retrospectively reviewed. Patients with incomplete information or those lost to follow up were excluded. *Results:* A total of 286 cases were identified and 162 were females (57%). Mean age was 18.9 yrs. (SD 15.7) with a range of 6 months - 70 yrs. Seventy-seven patients (27%) were ≤ 6 yrs., 80 patients (28%) were 7–17 yrs., and 129 patients (45%) were ≥ 18 yrs. One hundred sixteen cases involved suicidal intentions and 170 cases in accidental exposures. Doses were known in 255 patients (89%) [See table]. Symptoms occurred in 158 patients (55%): somnolence 89 (56%), tachycardia 32(20%, HR186–102), nausea/vomiting 29(18%), dystonic reactions 21(13%), tremor 9(6%), agitation 3(2%), dizziness 3(2%), paresthesia 2(1%), headache 2(1%), dysphagia 1(< 1%), syncope 1(< 1%), minor facial swelling 1(< 1%), and 1 patient had hypotension (85/45) that responded to intravenous fluid (IVF). There were no deaths or EKG abnormalities. No treatment was required in 176 patients (62%). One hundred eighty-seven (65%) patients were seen in a health care facility (HCF). Treatments included activated charcoal 80(43%), antihistamine 11(6%), gastric lavage 5(3%), IVF 3(2%), antiemetic 2(1%), benzodiazepine 2(1%), dilution 1(< 1%) and ipecac 1(< 1%). None of the patients required intubation and all were discharged without sequelae. *Discussion:* Somnolence, dystonia, tachycardia, and nausea were the most common symptoms. Majority of patients required no interventions and activated charcoal is the most frequent therapy in HCF. *Conclusion:* Exposures to aripiprazole can result in mild transient effects. Referrals to HCF are more frequent when unintentional doses are above 30 mg.

Outocme	Mean Dose (mg)	Median Dose (mg)
Symptoms	135	50
No Symptoms	88	30
Mild Symptoms	132	50
Moderate Symptoms	106	40
Major Symptoms	N/A	N/A

27. Medical Students Knowledge of Drugs of Abuse

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Background: Poisoning with recreational drugs of abuse is increasing, and patients commonly present to the ED were they are often seen initially by newly qualified junior medical staff. There is no data available on medical students' knowledge of which drugs are used as recreational drugs of abuse. *Methods:* 135 final year medical students at an inner-city medical school were surveyed by questionnaire. The students were given a list of 15 different drugs and asked to say whether the drug was used as a recreational drug of abuse. The drugs were either known recreational drugs of abuse, licensed pharmaceutical products or made-up drug names that sounded similar to known recreational drugs of abuse. Data was also collected on the student's age and sex. *Results:* 53% of the students were male and 47% female, mean age was 24.9 years (range 22–34). Over 90% of students knew that MDMA (93%), cocaine (93%), methampehtamine (90%) and LSD (96%) were drugs of abuse but there was much poorer knowledge of benzylpiperazine (BZP, 27%), gamma-butyrolactone (GBL, 25%), gamma-hydroxybutyrate (GHB, 64%), and ketamine (67%). A significant proportion of the students thought that methanemine (44%), benzocaine (42%), benzylbenzoate (33%), GABA (34%), MDMQ (43%), ketotifen (21%) and LST (27%) were drugs of abuse. *Discussion:* There was good awareness amongst this group of final year medical students that cocaine, LSD and methamphetamine are used as recreational drugs of abuse. However there was poor awareness that ketamine, GHB and particularly GBL and BZP are used as recreational drugs of abuse. Additionally a third of the medical students thought that the neurotransmitter GABA was a recreational drug of abuse. *Conclusion:* There is a need for more focused education of medical students on recreational drugs of abuse, particularly focusing on GHB/GBL and BZP, as they encounter recreational drug poisoning whilst working in the ED as newly qualified doctors.

28. Hospital Education Outreach Project

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Background: NNEPC hotline staff provides hospitals consultation and faxed overviews of agents involved in poisonings, plus follow-up until patients are medically stable. Frequently hospitals request only faxed information, foregoing staff consultation. Often hospitals do not re-contact the Poison Center (PC) for continued consultation, or solicit further information at time of follow-up. Early and ongoing consultation provides opportunity for Specialists in Poison Information to educate providers in poisoning management, improving patient outcomes. We studied the impact on PC utilization following an on-site presentation and distribution of retention tools. *Methods:* A convenience sample of 8 hospitals received an on-site presentation consisting of an overview of PC services and an overdose case study. The target audience was emergency/critical care nurses, physicians, and pharmacists. A post-presentation survey was administered. This study is in progress and retention tools (newsletters and others) continue to be applied. To assess utilization, hospital calls were stratified by year, week, facility. Sample hospitals' total call volume was compared to control non-participating hospitals for a similar time period. Chi-square analysis was done for 4, 8, 12, and 16 weeks before and after outreach. The impact of utilization following retention tools has not yet been analyzed. *Results:* There were 80 participants at 8 hospitals; 80% were nurses. Based on the post-presentation survey, 84% of participants saw the PC as part of the patient management team. Preliminary analysis did not detect a trend of increased utilization. There was no apparent significant increase in: call volume; initial or re-consultation for 4, 8, 12 or 16 weeks after outreach compared to control group hospitals. *Discussion:* Interim findings show no increase in PC utilization after an on-site presentation. *Conclusion:* Utilization may improve as distribution of retention tools continues. This study continues to assess the impact of coupling outreach with subsequent retention tools on PC utilization until fall 2007. Limitations so far include low attendance and difficulty with follow-up communication for continued distribution of retention tools.

29. Perchlorate Concentrations and Reconstituted Infant Formula: Comparisons with the Perchlorate Reference Dose (RfD)

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Background: Perchlorate, potentially found in water supplies used for human consumption as well as crop irrigation, competitively inhibits uptake of iodide by the thyroid gland. Certain sensitive subpopulations such as infants may be more vulnerable to this effect. The United States Environmental Protection Agency recently adopted a daily perchlorate RfD of 0.7 µg/kg. The objectives of this study were to quantify the presence of perchlorate in various commercial infant formulas (IFAs), and estimate the perchlorate dose to infants consuming these products. *Methods:* We quantified perchlorate levels in three samples (different lot numbers) of reconstituted IFA (using perchlorate-free water) from commercial brands of IFA in each of the following categories: milk-based, soy-based, lactose-free, and elemental. *Results:* We obtained three different samples in each of five brands of milk- and soy-based IFA and three different samples each of three brands of lactose-free and elemental IFA. One brand of IFA labeled as elemental was milk-based and was analyzed separately. The geometric mean perchlorate concentration of each category was as follows: milk-based (1.72 µg/L); soy-based (0.21 µg/L); lactose-free (0.27 µg/L); elemental (0.18 µg/L); and milk-based elemental (2.68 µg/L). Milk-based IFAs had a significantly higher concentration of perchlorate ($p < 0.05$) compared to all but the milk-based elemental IFA. Two widely-distributed brands of milk-based IFAs had significantly higher perchlorate levels (3.17–5.05 µg/L) than the others ($p. < 0001$). *Discussion:* An 8 kg infant consuming 120 calories (cal) per kg per day of the milk-based IFA (20 cal/ounce or 0.67 cal/milliliter) with a perchlorate concentration of 5.05 µg/L would exceed the RfD. Reconstitution of IFA with perchlorate containing water would further increase exposure. *Conclusion:* Perchlorate can be found in different types of commercially available IFA. Infants consuming some milk-based IFAs may be at risk for exceeding the perchlorate RfD.

30. Diagnosis of Opium Swallowed Body Packers with CT Scan: Determination Hounsfield Unit of the Packets

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Background: There is limited data on opium body packers and most articles discussing body packers refer to cocaine and heroin. The aim of this study is to report our experience in diagnosis of the opium body packers with CT scan, inasmuch as plain radiography is sometimes unable to identify the packets. *Case Report:* For 12 cases that confessed to opium packet ingestion, we did an abdominal and pelvic CT scan without contrast (Spiral CT scanner/ Shimatsu 7800/Japan) and evaluated the presence, number and location of opium packets and also measured the density of packets in Hounsfield unit (HU). After the CT scan, all cases undergone the routine treatment and were followed to prove the presence of opium packets in their gastrointestinal (GI) lumen. All packets were weighted by digital scale and their content was analyzed chemically for documenting the opium. Mean age of our cases was 28.2 ± 5.9 years (ranging 17 – 35 years). Eleven (91.6%) of patients were male and only one case was female. In all patients, the packets were visualized in gastrointestinal (GI) lumen by CT scan. For each case, we measured minimum and maximum of HU in one of the packets. The mean of minimum HU was 163.8 ± 19.6 and the mean of maximum HU was 205.3 ± 32.8. We had mortality in an eighteen years old female due to opium overdose. *Case Discussion:* An important point in our study was the HU of the packets that was greater than the soft tissue (mean of 164–205 for packets in comparison to 40–60 for soft tissues); as we can easily identify the packets in GI lumen and differentiate them from the adjacent tissues in CT images. This could mean the ability of CT scan in the precise determination and differentiation of the packets from soft tissues in opium. The results of the study suggest that although the Hounsfield units for opium are similar to those of cocaine but no body has a negative CT. *Conclusion:* As we can easily identify the packets in GI lumen and differentiate them from the adjacent tissues in CT images, this could mean the ability of CT scan in the precise determination and differentiation of the packets from soft tissues in opium.

31. Poisonous Apple – How Fairy Tales Made Evaluation Difficult

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Background: It is important to evaluate the effectiveness of educational materials. Using pen and paper assessment tools can be difficult with kindergarten and first graders because of their limited reading ability. Assessment tools need to be designed to measure the student's knowledge not their ability to perform tasks. *Methods:* A 2-part evaluation was administered to 509 kindergarteners and first graders in Maine. Worksheet 1 was administered prior to viewing Spike's Poison Prevention Adventure video and Worksheet 2 was administered afterwards. Worksheet 1 asked the students to link food-related graphics to the table graphic. This Worksheet was designed to assess the student's ability to perform the required "linking" task. Worksheet 2 asked them to link poisonous items to the Spike porcupine graphic. This Worksheet was designed to assess the student's ability to identify poisons. *Results:* Based on the results of Worksheet 1, kindergarteners and first graders were able to perform the "linking" task. Worksheet 2 was more difficult to interpret the results. Some of the graphics used were confusing to the students because of family values and prior teaching. For instance, even though the apple was healthy; some children stated their parents said there could be poison in an apple (the presentation took place around Halloween). In addition, many students think of poisonings as "bad for you." Some students were puzzled about the unhealthy food choices such as ice cream or candy. *Discussion:* What appears to be an obvious correct answer to one may not be to others. More work needs to be done to improve the assessment tools used with kindergarten and first graders to ensure an accurate measurement of the students knowledge. *Conclusion:* Further development of pen and paper assessment tools will assist educators in evaluating the effectiveness of the Spike Poison Prevention Adventure program, as well as other education programs.

32. Suicide Exposures in Patients 60 Years of Age or Older: A 6-Year Review of a Single Poison Center's Records

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Background: The incidence, demographics, and outcomes of intentional suicide exposures in patients ≥ 60 years is not well characterized. *Methods:* Suicidal exposures for the years 2000–2005 from a signle poison center's database were retrospectively reviewed. *Results:* Over a 6-year period, 6.8% of all exposures occurred in patients ≥ 60 years. 168 cases (0.11% of all exposures; 1.6% of all suicide exposures) were coded as intentional suicidal exposures in patients ≥ 60 years. Of the suicidal exposures in persons ≥ 60 years, 102 (61%) were female, versus 67.2% female in all suicidal exposures, and 48.4% female in all exposures. Age range was 60 to 97 years (mean 73 years; median 69 years). Poly drug overdose occurred in 48%, versus 42% of all suicide cases (ns). The top 4 product categories for suicidal exposures were identical regardless of age: (1) Analgesics, (2) Sedative Hypnotics, (3) Antidepressants, and (4) Alcohols. In those ≥ 60 years, the fifth category was Cardiovascular Drugs. The number of clinical effects coded ranged from 0–15, averaging 5 per case. Previous health history was obtained in 94/170 cases (55%), of which depression was documented in 79/168 cases (47%), diabetes in 54/168 cases (32%), and cardiovascular disease in 42/168 cases (25%). The number of treatments coded ranged from 0–19, averaging 8 per case. Outcome codes were no effect in 15 (9%), minor effect in 63 (38%), moderate effect in 51 (30%), major effect in 12 (7%) and death in 5 (3%) cases. All 5 deaths were poly-drug overdoses with pre-existing cardiovascular conditions. 2 of the 5 patients who died had ingested cardiovascular drugs. Patients aged ≥ 60 years had a 10-fold higher case fatality rate than in the overall database for suicidal exposures. *Discussion:* The elderly have significant rates of depression. Poly-substance exposure occurred in nearly half the cases of patients ≥ 60 years. Pre-existing morbidity and availability of medications with increased cardiovascular toxicity may increase the risk of sucessful suicidal exposures. *Conclusion:* Suicidal exposures in all groups are disproportionately female. The case fatality rate in suicidal exposures in those ≥ 60 years is 10-fold higher than in younger individuals.

33. Eastern Green Mamba Envenomation Occurring in a Midwest City

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Background: Internet commerce and air delivery has resulted in worldwide availability of exotic venomous pets. We present a case of envenomation by a non-indigenous snake and the use of a computer database to locate antivenin. *Case Report:* A 47-year-old male presented to the ED 42 minutes after being bitten on his left index finger by his pet eastern green mamba (Dendroaspis angusticeps). After the bite he experienced left finger pain and perioral and tongue numbness, followed by paresthesias of his extremities and pain with eye movement and breathing. The patient attempted to suck out the venom, placed a constriction bandage or his left arm, and called 911. On exam the patient's vital signs were: P-110., BP-154/108, R-17, Biox-99% on 4 L NC. Pulmonary exam was normal. He had a small puncture wound to the distal end of his left index finger with swelling to the 2nd, 3rd, and 4th digits on that hand. He had pain with extraocular movements and mild dysarthria, otherwise cranial nerves were intact. Left extremity motor function was unable to be assessed secondary to swelling and pain. He had decreased lower extremity strength bilaterally. He had a normal basic metabolic profile, complete blood count, and coagulopathy profile. The Anitvenom Index (http://www.aza.org/ai/) was used to locate antivenin for the eastern green mamba. South African Institution for Medical Research Polyvalent antivenin was obtained from the local zoo. The patient was pretreated with hydroxyzine 75 mg, famotidine 20 mg, and decadron 10 mg IV. One hour and 38 minutes after hospital arrival, he was given a total of 5 vials of antivenin over a course of 3.5 hours. He had no acute hypersensitivity reaction, had resolution of neurologic symptoms, and was discharged 39 hours after the envenomation. On follow up at 2 days he had a pruritic rash at his right arm IV site. He was prescribed oral prednisone and diphenhydramine for serum sickness. *Conclusion:* This case demonstrates the use of the Antivenom Index to expedite location and use of appropriate antivenin for an exotic non-indigenous snake envenomation.

34. Intrapartum Warfarin Overdose with Fetal Effects

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Background: Although warfarin is a known teratogen, little is known about acute warfarin toxicity in the newborn due to placental transfer during labor and delivery. We report a case of attempted suicidal ingestion during labor and the course of toxicity in both mother and infant. *Case Report:* **#1**: A 33yo multiparous female in active labor ingested at least 500 mg of coumadin 2 hours before arrival. She was prescribed coumadin before pregnancy for antiphospholipid syndrome and deep vein thrombosis. No bleeding was noted on exam, and baseline coagulation studies were normal. She received 2 mg of SC Vitamin K_1 and 2 units of fresh frozen plasma before delivery; epidural anesthesia was not administered. She uneventfully delivered a healthy term male vaginally 2 hours after arrival, 4 hours after ingestion. Her INR remained normal until 42 h after ingestion, at which time it peaked at 2.9. She was again given 2mg of Vitamin K SC, was transitioned to PO vitamin K 10mg q6h, and was discharged home 3 days after admission to follow-up and obtain repeat INR; follow-up was not obtained. During admission, she experienced no bleeding complications. Other results included a positive urine immunoassay for benzoylecgonine and a serum warfarin level of 9.3mcg/ml/ (nl 0.6–3.1). **#2**: The newborn had no notable bruising or bleeding, and received 1mg of IM Vitamin K per standard neonatal treatment. At delivery his PT was 16.3s (range for age < 16s). At 24 hours his PT had risen to 36.2s with an INR of 3.9, and he received 4mg of Vitamin K. His coagulation parameters normalized over the following day, and were normal at 56 hours of life. A head ultrasound revealed a small Grade I intraventricular hemorrhage; the patient's neurological examination remained normal. He developed no other bleeding complications. He was discharged to an adoption agency after which follow-up could not be obtained. *Case Discussion:* We present a case of intrapartum coumadin overdose resulting in coagulopathy of both mother and newborn. Transplacental passage of coumadin appears to have been rapid; the newborn developed an intracerebral hemorrhage. *Conclusion:* Coumadin overdose during labor poses a number of management challenges for both mother and infant.

35. *Latrodectus* Envenomation in Pregnancy and Antidote Availability

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Background: "Black widow" is the common name applied to several venomous *Latrodectus* spider species found in Canada, México, and the United States. Only four previous case reports of North American *Latrodectus* envenomation during pregnancy are found. *Case Report:* A 35-year-old, G7 P6, 38-week gestational woman applying for Medicaid picked up a magazine and felt a prick to her left hand. Minutes later she felt a similar sensation to her back where a spider was found. Feeling ill, she promptly went to the ED for evaluation. She had hand tingling, numbness and pain. Initial signs were: HR 90, BP 123/78, RR 18, T 36.6°C, O_2 sat 98%, FHT 130. Within 45 minutes our patient developed wound erythema, increasing pain, leg and abdominal muscle cramping, dyspnea and anxiety and was treated with lorazepam, morphine, acetaminophen and O_2, but her symptoms worsened. The attending emergency physician positively identified the offending *Latrodectus* spider. The poison center medical toxicologist recommended specific antivenom (AV) but it was not found in the 289-bed hospital pharmacy. Emergency caesarean section was performed due to premature labor. The baby, delivered in respiratory distress, was given naloxone, intubated and ventilated. Post-delivery the mom received 1 vial AV obtained from a zoo. Both patients recovered unremarkably. At 14 days both were well with no evidence of serum sickness in the mom. *Case Discussion: Latrodectus* venom contains α-latrotoxin, a potent neurotoxin that is probably too large to cross the placenta. It causes muscle cramping and pain, nausea, emesis, hypertension, dysrythmias, and seizures. These are often managed with analgesics, sedation, calcium, and AV. Patients of extreme age and those who are pregnant are more likely to exhibit severe symptoms and receive AV therapy. Our first patient received AV late and early delivery was required that may have resulted in increased morbidity for both patients. *Conclusion:* Although rare, in four of five pregnant women with *Latrodectus* envenomation, AV use was associated with rapid relief of symptoms. Lack of timely availability of antivenom may adversely affect maternal morbidity and, secondarily, fetal morbidity in such cases.

36. Prolonged Hallucinations Following Therapeutic Doses of Antihistamines/ Decongestants in Young Children

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Background: Antihistamine and decongestant preparations are commonly prescribed for children under 6 years of age. We report 4 cases of prolonged hallucinations in children following therapeutic doses of cough/cold medications. *Case Report:* Case 1: A 6 y.o boy was given 1.5 mg of cetirizine and 1.25 teaspoons of Tannate 12 (37.5 mg carbapentane, 5 mg chlorpheniramine, 6.25 mg phenylephrine). Three hours later, he became agitated with hallucinations and began "yelling out in his sleep". He was observed at home and symptoms resolved overnight without treatment. Case 2: A 5 y.o boy received 2.5 mL of carbinoxamine compound syrup (brompheniramine maleate 4 mg/5 ml, dextromethorphan hydrobromide 15 mg/5 mL, pseudoephedrine hydrochloride 45 mg/5 mL). Twenty hours after his second dose, he began "picking bugs off". He was observed at home overnight and his symptoms resolved by the next morning. Case 3: A 3 year old girl began hallucinating following a dose of Pediacare Decongestant plus Cough (dextromethorphan hydrobromide 2.5 mg/5 mL, pseudoephedrine hydrochloride 7.5 mg/5 mL). She was given diphenhydramine in the emergency department for her agitation and was discharged with instructions to continue to take diphenhydramine every 4 hours. Her symptoms persisted into the following day and she presented to a second emergency department. Time for resolution of symptoms was not documented. Case 4: A 2 y.o girl experienced episodes of inconsolable crying and skin picking after therapeutic administration of an OTC cough/cold medication. Her symptoms prompted admission to an overnight observation unit and evaluation for seizures. She improved over 24 hours. *Case Discussion:* Commonly known side effects of cough/cold medications include agitation, excessive drowsiness, irritability and tachycardia. However, visual hallucinations may occur rarely, causing parental anxiety and necessitating medical evaluation. *Conclusion:* Therapeutic dosing of antihistamines and decongestants should be considered as part of the differential diagnosis in a young child with acute onset of visual hallucinations.

37. A Case Series of Amanita Poisoning

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Background: In 2004, there were 8601 mushroom exposures in the US, 50 of which were cyclopeptide exposures; of these, 4 died. We report on a series of 3 cases during 2005–06 in Upstate New York. *Case Report:* Case 1. A 56 yo man presented to a local ED 17 hours after consuming wild mushrooms. He was initially treated with activated charcoal. Approximately 40 hours post-ingestion (PI) the mushrooms were identified as *Amanita bisporigera*, and he was started on N-acetylcysteine (NAC), cimetidine, and high dose (HD)penicillin. He improved initially, then deteriorated with hepatic failure, encephalopathy, coagulopathy, renal failure, and profound metabolic acidosis. He expired on day 4 PI of multi-organ failure. Case 2. A 56 yo man ate over 20 wild mushrooms. He presented 12 hours PI; the mushrooms were identified as *A. bisporigera*. He was transferred to tertiary care by 24 hours PI and started on HD penicillin, NAC, and cimetidine. On day 4 PI he deteriorated with hepatic failure, encephalopathy, coagulopathy, GI bleed; he improved by day 12 and was discharged home on day 22 PI. He was readmitted 4 weeks later for sepsis and expired 8 weeks PI. Case 3. A 55 yo man ate 3 large wild mushrooms; he presented approximately 10 hours PI. Mushrooms were identified as *A. bisporigera*. He was treated with HD penicillin, cimetidine, NAC, and supportive care; he had evidence of hepatic and renal damage which resolved over the course of hospitalization. He was discharged home on day 8 PI. *Case Discussion:* These cases illustrate the theme of confusing Amanita species with "known" mushrooms. In the first two cases diagnosis was delayed and in the first case a donor liver was not found. In the second case, he refused transplantation due to cultural/ethnic beliefs; although he survived initially he died with sepsis and ongoing liver failure. It is unknown whether the treatment regimen of penicillin, cimetidine and NAC had any significant effect on these cases. The most significant factor seems to be the time to diagnosis. *Conclusion:* Early recognition permits initiating therapy earlier, which may contribute to improved survival. Educational outreach is critical to reduce exposures in the public and increase index of suspicion in health care providers.

38. Renal Injury and Outcomes in Acetaminophen-Induced Hepatotoxicity

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Background: Liver failure is well recognised following acute acetaminophen overdose. Some patients develop renal failure following overdose, with or without liver failure. Acetaminophen-induced renal failure manifests as acute tubular necrosis (1). The aim of this study was to identify 1) how renal involvement affects the outcome of severe acetaminophen hepatotoxicity; 2) factors contributing to development of renal failure after in these patients. *Methods:* A retrospective study on 523 cases of severe acetaminophen overdose admitted to a national hepatology referral center between 1992 and 2004 with suspected severe hepatic damage. Severe liver failure was defined as prothrombin time > = 25 sec. Patients with severe liver failure were categorised into three groups: without renal involvement (creatinine < 1.8 mg/dl [160 mmol/l]); with moderate renal dysfunction (creatinine 1.8 –3.4 mg/dl [160–300 umol/l]); and severe renal dysfunction (creatinine >3.4 mg/dl [300 umol/l]). *Results:* 97.5% of patients developed severe liver failure, of these 28.6% had moderate renal dysfunction and 15.7% severe renal dysfunction. Subjects with renal dysfunction were significantly older, presented later to the referral hospital, had higher PT, ALT and GGT, and were more acidotic at first presentation. They were also more likely to have taken acetaminophen over a prolonged period (staggered OD). They stayed longer in intensive care, had worse prognosis (KCH criteria), were twice as likely to have liver transplantation and had a four-fold higher mortality. *Discussion:* Factors including delay to admission, staggered ingestion and liver injury increase risk of renal failure in severe acetaminophen OD. *Conclusion:* Renal involvement in acetaminophen-induced hepatotoxicity worsens the outcome. Understanding the relationship between renal and hepatic injury may provide further insight into toxic mechanisms in patients with severe acetaminophen overdose. *References*: Blakely P, McDonald BR: Acute renal failure due to acetaminophen ingestion: a case report and review of the literature. J Am Soc Nephrol 1995; 6(1):48–53.

39. Etiologies of Extreme Hyperpyrexia in an Adult Emergency Department Population

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Background: Research in children indicates that infections are typically responsible for temperatures greater than 106°F (41°C). To our knowledge, similar research has not been done on adults, in whom non-infectious etiologies, including toxicological, may be more likely. Additionally, a temperature ceiling may exist in adults for infectious etiologies. The purpose of this study was to determine the etiologies of extreme hyperpyrexia, defined as a temperature equal to or greater than 106°F, in adult patients presenting to the ED. Additionally, we aimed to identify the maximal temperature found in patients with a purely infectious etiology. *Methods:* This study was a retrospective chart review on all identified adult patients with a recorded temperature equal to or greater than 106°F who presented over a thirteen-year period to a single tertiary care ED. ED records, cultures within 24 hours of arrival, drug testing, toxicology consultations, and discharge summaries were used to determine the etiology of hyperpyrexia. *Results:* Fifteen adult patients were identified who had a recorded temperature of 106°F or greater. Eight (53%) patients (Tmax range 106.2–108.8°F) had non-infectious etiologies, six with toxicological causes, one with environmental-induced hyperthermia, and one with status epilepticus. In five of the six patients with toxic causes, methamphetamine and/or cocaine poisoning were responsible, one of whom was known to have been a body stuffer. One patient was diagnosed with neuroleptic malignant syndrome. The maximum recorded temperature in the purely infectious group was106.7°F. *Discussion:* A significant percentage of adult patients were found to have non-infectious etiologies of extreme hyperpyrexia. This is distinctly different from what has been reported in the pediatric population in whom infectious etiologies account for the vast

majority. Limitations include retrospective design and a relatively small number of identified patients. *Conclusion:* A significant number of adult patients who presented to the ED with extreme hyperpyrexia had a toxicological etiology. In this review no patient with a purely infectious etiology had a temperature beyond 106.7°F.

40. Introduction of Poison Center Services to the Federated States of Micronesia, a Previously Unserved Pacific Island Nation

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Background: In September 2004, HRSA began funding poison center (PC) services to the Federated States of Micronesia (FSM), a previously unserved Pacific island nation. FSM has four island states with a hospital in each state. English is the official language. *Methods:* Initial efforts were focused on healthcare providers. Letters and calls were made to public health and hospital personnel describing the PC's services and access via the national toll-free number. A questionnaire was sent regarding healthcare capabilities and the spectrum of poisonings. Customized telephone stickers were developed and mailed. NRPC's medical director traveled to FSM to discuss PC services, access via the 800 number, assess healthcare capabilities, and provide toxicology education. Subsequent contacts were made with practitioners to assess the service provided and to provide additional professional education. *Results:* Initially, access to the 800 number required costly assistance from local telephone companies and resulted in calls randomly routing to various US poison centers. Correction required six months and now requires dialing a prefix access code. Between May '05 and Feb '07 NRPC received calls on 21 human exposures. Prior to the in-person visit only one human exposure call was received over 13 months of available access. In the 8 months following the visit there were calls on 20 human exposures. Four (19%) involved medications, including morphine, hydrocodone with acetaminophen, hydrochlorothiazide, captopril, trazodone, and amoxicillin. There were 3 cases (14%) of ciguatera and 4 (19%) fish stings. Moderate or major outcome effects occurred in 7 (33%) cases. 86.7% of patients were male. There was one information call. Island hospital laboratories were unable to perform many of the tests commonly used in exposure evaluation and management, and antidote stocking in hospitals was generally deficient. *Discussion:* Unfamiliarity with PC services, telecommunication difficulties, healthcare capabilities, and other factors pose substantial barriers to establishing PC services to this region. *Conclusion:* An in-person visit by PC staff was essential to establishing poison center services to FSM.

41. Adsorption of Acetaminophen to a New Binding Agent

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Background: Activated charcoal (AC) is often used to decrease drug absorption in overdoses. A new binding agent with modified physical properties has recently been developed. The goal of this study is to determine the ability of AST-120 to bind acetaminophen (APAP) in comparison to AC. *Methods:* Acetaminophen solutions were prepared with simulated gastric fluid (pH 1.2) and buffer (pH 7.4) to concentrations of 2.5, 3.5 and 5 mg/ml. Adsorption and desorption phases were conducted for both AST-120 and AC. For the adsorption phase, 40 ml of 3.5 mg/ml stock solutions were added to 2g, 4g and 6g of AST-120 or 0.2g, 0.4g, 0.6g, 0.8g and 1.0g of AC, respectively. The solution was agitated for 15, 30, 60 and 120 minutes. Samples were centrifuged, filtered, and assayed for free APAP. 40 mL of the 5 mg/ml APAP solutions were added to 4g, 6g and 8g AST-120 and AC. After 1 hour, solutions were centrifuged, filtered and assayed. For desorption, 1 g of AC and 2g and 6g of AST-120 were added to 2.5 mg/ml APAP solutions for 1 hour. The suspensions were centrifuged, the supernates aspirated and assayed. 40 mL of fresh buffer were added, and the suspensions shaken again. Samples were removed at 15, 30 and 60 minutes for assay. *Results:* At APAP concentrations of 3.6 mg/ml, 99–100% of the APAP was bound at the 1 hour time point for 4g, 6g and 8g of AST-120 as well as 0.8g and 1g of AC. The results were similar for both acidic and neutral solutions. At APAP concentrations of 5 mg/ml, 100% was adsorbed at 1 hour for 4g, 6g and 8g of AST-120 as well as 4g, 6g and 8g of AC. There was no measurable APAP detectable at any time point during the desorption phase. *Discussion:* AST-120 binds acetaminophen in vitro in both neutral and acidic environments with no appreciable desorption occurring from the complex for the conditions tested. AST-120 binds APAP in a similar mode as activated charcoal and may offer an alternative for drug overdose situations. *Conclusion:* Studies are ongoing to further evaluate the kinetics of drug binding to AST-120, and to demonstrate the advantages of its use compared to standard AC regimens.

42. First Reported Human Oral Exposure to a Reed Diffuser Air Freshener Containing 3-Methoxy-3-Methyl-1-Butanol (MMB)

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Background: Reed diffusers have been popularized over the past several years as a more aesthetically pleasing variety of air freshener. Typically, such reed diffuser liquid contains essential oils and/or hydrocarbons as odorants. In order to disperse the odorant, the compound 3-methoxy-3-methyl-1-butanol (MMB) is used. Little toxicity data is available regarding MMB. We report the first human oral exposure to MMB. *Case Report:* An otherwise healthy 19-month-old male presented to an emergency department after ingesting an unknown amount of reed diffuser liquid from an 8-ounce bottle. The poison center was contacted 90 minutes after ingestion as the child had symptoms of emesis, excessive salivation, changes in phonation (a raspy, hoarse voice), erythema of the face and chest, and a mildly ataxic gait. The patient was admitted overnight for observation. Eight hours post ingestion, an ENT consult revealed no significant oral/esophageal damage. At twelve hours post ingestion the child was able to eat breakfast and all symptoms had resolved. The patient was subsequently discharged to home in good condition. *Case Discussion:* MMB is a colorless liquid with a slight ether odor. Due to its controlled evaporation rate at room temperature, MMB is used as a fragrance dispersal agent for air fresheners at concentrations of 40 – 90% by weight. Limited data exists for MMB, and no human toxicological data exists. The product (CAS number 56539–66–3) has been deemed a low priority for further study. Our patient appeared to develop similar findings to previously reported rodent toxicology studies after oral exposure of an unknown amount of MMB. Although concern existed for potential caustic effects given the changes in phonation and salivation, no findings were noted upon ENT consultation. *Conclusion:* We report the first human case of oral MMB exposure. Symptoms of oropharyngeal irritation and mild CNS disturbances were similar to those noted in rodent studies. No significant toxicity occurred. Given the increasing popularity of reed diffusers in the home, further evaluation is required to better understand the potential toxicity of such agents.

43. Toxicity after Misidentification of Foxglove for Borage in the Garden

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Background: Health enthusiasts continue to explore nutritional properties of botanicals. Borage (Borago officinalis) is a thick hairy annual herb that develops large blue star shaped flowers that can grow up to 2 feet tall. It has been used in salads and is added to certain drinks. We describe a case of botanical misidentification resulting in cardiac glycoside toxicity from the ingestion of Foxglove. *Case Report:* A 66 year old man presented to an ED complaining of dizziness, nausea, vomiting, delirium and hallucinations for approximately 36 hours. His wife had mistaken foxglove for borage in the garden and had used it to make a soup 2 days prior to admission. BP 125/70,HR 35 b/min, RR 15/min. His EKG revealed a sinus bradycardia in 1st degree block. Initial CBC, electrolytes, BUN creatinine, liver enzymes and coagulation tests were within normal limits. The digoxin level was 1.8 ng/ml (nl 0.8–2 ng/ml). Two vials of digoxin immune FAB (Digibind®) was administered without improvement. An additional 4 vials resulted in complete resolution of effects with NSR on EKG and HR 80 b/min in 1 hr. The patient remained asymptomatic and was discharged after 24 hours of ICU monitoring. *Case Discussion:* Digitalis purpurea is a biennial herb known as foxglove. All parts of the plant contain numerous cardiac glycosides including digitoxin, gitoxin, and gitaloxin. It produces numerous showy terminal clusters of bell-shaped, tubular flowers. The plant can grow up to 4 feet tall. Symptoms of foxglove intoxication include dizziness, nausea, vomiting, arrhythmias, heart block, delirium and hallucinations. Interpretation of digoxin assays is often difficult because the RIA does not detect the presence of other cardiac glycosides except digoxin. These other cardiac glycosides may have contributed to the toxicity that the patient had despite a "therapeutic" digoxin concentration. Treatment guidelines for the use of FAb following foxglove ingestion are not available. *Conclusion:* Foxglove ingestion may lead to serious cardiac intoxication. Foxglove contains numerous cardiac glycosides making interpretation of digoxin assay difficult. Digoxin immune Fab may be useful in treating manifestations of severe toxicity.

44. Thermometer Induced Acrodynia in the 21st Century

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Background: Mercury has been associated with pediatric acrodynia for over 100 years. Affected patients present with insomnia, erethism, hypertension, hyperhidrosis, and pink desquamating rash. Since the elimination of calomel teething powders, the incidence of acrodynia has declined in the last 50 years, making the diagnosis rare. Recently there have been a limited number of cases, mostly from elemental mercury (Hg), resulting in incorrect diagnosis as pheochromocytoma, Kawasaki's disease, or idiopathic hypertension. *Case Report:* A 4 y/o Pakistani male presented with 3 months of irritability, generalized pruritic rash and pink, peeling palms and soles, hyperhidrosis and hypertension resulting in an extensive evaluation. His urinary VMA was found to be slightly elevated although workup was negative for pheochromocytoma, Kawasaki's disease, scarlet fever and staph scalded skin. He was discharged with a diagnosis of hypertension, however, his persistent symptoms prompted a heavy metal screen. His initial 24 hr urine Hg level was 9 µg/L and serum Hg level, 8 µg/L. Two months later the 24 hr urine Hg level increased to 49 µ/L with a serum Hg level, 25 µg/L. Inspection of the house revealed breathing space Hg levels of 14,000–19,000 ng/m^3 with a metal trash can measuring 40,000 ng/m^3. His mother later recalled discarding a malfunctioning thermometer. After chelation with DMSA and removal from the home, he began showing improvement. *Case Discussion:* Mercury is ubiquitous in our environment and children can be readily exposed through daily living. Acrodynia is a forgotten syndrome leading to extensive evaluation and testing in affected patients. In children presenting with an adrenergic state, eretheism, hyperhidrosis, and a pruritic erythematous rash on acral extremities, the physician should consider Hg intoxication among the differential diagnosis. The health hazards of heavy metal exposure needs to be reinforced to the general public and medical professionals. *Conclusion:* We describe a patient who developed acrodynia after exposure to a simple broken mercury thermometer. This led to extremely high levels of Hg in his home for an unknown period of time and severe reversible health consequences to the child.

45. Miami-Dade Fire Rescue Antivenom Bank Should Be Added to Antivenin Index!

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Background: The Miami-Dade Anti-Venom Bank (MDAVB) antivenins proportedly covers 95% of the world´s venomous snake species. Miami-Dade County is a primary port of entry for exotic venomous snakes shipped to the US, averaging 2,500 to 3,000/yr. Over 400 people in Florida are licensed to keep venomous snakes. Florida Wildlife Conservation Commission estimates 3 to 5 times that number keep venomous snakes, without a license. The Tri-County area has about 250 bites/yr. MDAVB staff state that they stock only unexpired antivenin and in quantities sufficient to provide three doses of each antivenin. *Methods:* Review of antivenin data from www.miami-dadefirerescue.com accessed 3/27/07 and compared with 48 antivenin listed by the AZA Antivenin Index (AI) 3/27/07. *Results:* The MDAVB listed 38 antivenin (32 snake, 3 scorpion, 2 spider, 1 fish). The MDAVB contained 5 antivenin listed by the AI but only expired vials, 9 listed but not stocked and 5 not even listed in the AI, see table. *Discussion:* MDAVB staff have expressed a desire to be included in the AI. Inclusion of MDAVB would add 19 additional types of unexpired antivenin to the AI. Miami's airport has frequent connections to most major US and many non US cities. *Conclusion:* The MDAVB is also an invaluable resource for poison centers and clinicians treatinging exotic snakebites. Inclusion of collection of the MDAVB would substantially enhance the availability of unexpired exotic antivenin in the US. The AAPCC and AZA should allow the MDAVB to be

included in the Antivenin Index to facilitate identification of the closest source of exotic antivenin and delivery of unexpired antivenin to treating physicians.

MDAVB Antivenin in Antivenin Index

Not Available	Not Listed	Only Expired
Brown Snake	SAIMR Boomslang	FAVIREPT
Polyvalent Snake	SAIMR Scorpion	Polyvalent African
Soro Anti-Arachnidico	SCORPIFAV	Soro Anti-Botropico-Laquetico
Soro Anti-Botropico-Crotalico	Thai Cobra	Suero Antilachesico Monovalente
Soro Anti-Elapidico	Tiger Snake	Taipan
Suero Antibotropico Polivalente		
Suero Anticrotalico Monovalente		
Suero Antiofidico Anti-Coral		
Suero Antiofidico Polyvalent		

46. Near Fatal Pediatric Flecainide Overdose Treated with Extracorporeal Membrane Oxygenation

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Background: Flecainide is a Class 1C antidysrhythmic agent used for supraventricular and selected ventricular dysrhythmias. Flecainide overdose is rare and frequently fatal. We report the first case of pediatric flecainide ovedose managed with extracorporeal membrane oxygenation (ECMO). *Case Report:* A 21 month old Hispanic male with known supraventricular tachycardia presented to paramedics with a seizure and unresponsiveness following a witnessed ingestion of his own flecainide. Paramedics intubated the airway, performed chest compressions, and placed an intraosseous line. PALS was continued in the ED for a wide complex, nonperfusing rhythm with a rate of 30 beats/minute. Bolus administration of atropine, epinephrine, and sodium bicarbonate, and infusion of epinephrine restored a perfusing rhythm 90 minutes after arrest. Continued seizures were treated with lorazepam and fosphenytoin. Initial ECG during resuscitation revealed a heart rate of 63, QRS duration of 180 msec, and QTc of 586 msec. Cannulation for ECMO was performed due to recurrent hemodynamic compromise. Hemodynamics stabilized and inotropic support was discontinued following ECMO initiation. Plasma flecainide concentration 15 hours after ingestion was 2240 ng/mL (therapeutic = 200–1000 ng/mL). Cardiac rhythm gradually normalized allowing ECMO discontinuation after 49 hours of support. Laboratory evaluation revealed no organ system dysfunction. Full neurological recovery with normal function was documented prior to hospital discharge and on one-year followup examination. *Case Discussion:* This is the first published case of pediatric flecainide intoxication treated with ECMO. Few cases of pediatric poisoning managed with ECMO have been reported. Aggressive initial resuscitation followed by hemodynamic support with ECMO resulted in intact recovery of this child with life threatening flecainide intoxication. *Conclusion:* The first case of extracorporeal membrane oxygenation for management of flecainide overdose in a pediatric patient is reported.

47. Epidemiology of Stonefish Envenomation Presented to a Singapore Hospital

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Background: Stonefish are commonly found in the shallow waters of Indo-Pacific region and are considered the most dangerous and venomous of the scorpionfish family. However, little is known regarding the epidemiology of stonefish envenomations in general. The aim of this study was to describe the treatment outcome and incidence of stonefish envenomation in patients presenting to Singapore General Hospital. *Methods:* Data involving stonefish stings was retrospectively retrieved from the Accident & Emergency (A & E) Emerge Version 3.7.6 database from October 2004 – September 2006. *Results:* 30 cases were identified. The average age was 27.7 years and the majority were male (80%) .47% of cases were foreign nationalities. Most incidences occurred on weekends with November having the highest number of cases. The majority of cases (80%) arrived at the hospital within 2 hours of envenomation. The most common complaints were extreme pain, swelling and redness of the affected limbs. The average pain score upon arrival was 7.4.19 cases presented with swollen limbs and 15 cases had erythema. 80% cases received hot water soak treatment and 90% of patients received analgesia.33% of patients required additional analgesics.16% received anti-histamines and 3.3% case received steroid. 58% were treated and discharged, 26% were referred to a specialist for follow-up and 16% were warded. The average pain score upon discharge was 1.4. The average number of days warded is 3 (Range 1–7).1 case had persistent pain and hyperalgesia 5 months post-envenomation. No deaths and systemic symptoms were reported. *Discussion:* Stonefish envenomation presented to our hospital showed that majority of patients were young male adults. Stonefish envenomation, though rarely fatal, can still cause significant morbidity such as extreme pain, swelling and erythema. The treatment outcomes and incidence of stonefish envenomation in patients presenting to Singapore General Hospital are discussed. *Conclusion:* As more people visit beaches on weekends and public holidays, it is consistent with the increase in occurrence of envenomations. Standardized guidelines for treatment of stonefish envenomation would optimize management and treatment outcome for such patient.

48. "Man This Stuff Burns!" Two Cases of Contact Dermatitis Resulting from Use of Body Wash as a Skin Moisturizer

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Background: The use of liquid skin cleanser or body wash (BW) has become common during the past five years. While most BW have a consistency which is distinct from that of skin moisturizing creams, some possess characteristics that are more akin to moisturizers and can lead to confusion regarding product use. We report two cases of contact dermatitis due to the application of Dove Body Wash. *Case Report:* Case 1: A 40 year old male applied Dove Deep Moisture Body Wash for Dry Skin as a skin moisturizer. 30 minutes later he noted burning across his face. He then reapplied the BW. He noted severe redness and continued burning. After leaving work, he discovered that the product was actually a body wash rather than a skin moisturizer. Case 2. A 26 year old Caucasian female noted skin dryness while on a medical mission. She applied Dove Night Calming Body Wash also under the impression that the product was intended for use as a skin moisturizer. She noted burning on her face and then reapplied the BW on at least 5 occasions. She developed induration and erythema where she had applied the cream. She noted later in the day that she misused this product, leaving it on her skin rather than washing it off. *Case Discussion:* The products in figures one and two contain chemicals which may act as skin irritants if left in place for prolonged periods. While consumers must be attentive to the products which they use, more effective product labeling may also help prevent cases such as these two. In the case of Dove Body Wash, the words "for dry skin", "hydratation profonde", and "deep moisture" appear prominently on the front of the bottle. An additional issue contributing to the confusion in these two cases likely involves a tactile formulation that is similar to many skin moisturizers used in the United States. Finally, there are no instructions for use listed anywhere on this particular product, which is not unusual for body wash product of all types. *Conclusion:* We describe 2 cases of misuse of a common skin care product leading to contact dermatitis.

49. Safety of Naloxone Administered in the Emergency Department

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Background: Naloxone is an antidote commonly used in the Emergency Department (ED) to treat acute opioid poisoning. Previous case reports have suggested that naloxone may be associated with adverse effects including vomiting, pulmonary oedema, seizures, hypertension and arrhythmias. These reports have been questioned as many of these adverse effects occurred in the post-operative setting or in circumstances of excessive single dosing of IV naloxone and therefore may have been due to other factors. *Methods:* Information was collected prospectively using an electronic clinical toxicology database on all patients presenting to an inner-city ED who were administered intramuscular (IM) and / or intravenous (IV) naloxone as part of their clinical management. *Results:* Between May 2005 and February 2007 naloxone was administered to a total of 153 patients. IM naloxone was administered to 47 patients (mean total dose 617 mcg, range 200–1600 mcg), who were given a total of 53 separate doses of naloxone (mean single dose 547 mcg, range 200–800 mcg). IV naloxone was administered to 130 patients (mean total dose 952 mcg, range 40–10000 mcg), who were given a total of 244 separate doses (mean single dose 507 mcg, range 40–2000 mcg). Both IV and IM naloxone was administered to 24 patients (mean total IM dose 633 mcg, range 400–800 mcg, mean total IV dose 950 mcg, range 400–2000 mcg). There were no documented hypertensive episodes, seizures, arrhythmias, or episodes of pulmonary oedema post naloxone administration in any of these patients. Two patients with opioid toxicity who were treated with naloxone died, but both of these patients arrived in the ED following an out of hospital cardiac arrest. *Discussion:* Administration of naloxone has been previously reported to be associated with adverse reactions, however in this large series of patients no significant adverse events were associated with the administration of either IV or IM naloxone in bolus doses of up to 2000 mcg. *Conclusion:* Naloxone is a safe antidote when used appropriately in the ED setting.

50. Chlorine: It's the Bomb!

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Background: Chlorine gas is a well known oxidizer used in chemical warfare as well as industrial and household applications. We report a case of a 15-year-old male who developed respiratory distress after exposure to chlorine gas from a bomb made of household items that he learned to construct from videos on the Internet. *Case Report:* Our patient was a previously healthy 15-year-old male. Prior to admission the patient had constructed a bomb which consisted of adding equal parts of isopropyl alcohol and sodium hypochlorite 5.4% into a two-liter bottle. While shaking the bottle, as seen on the Internet, to speed the reaction, the bomb exploded in the patient's hand. It emitted a yellow-green gas to which the patient was heavily exposed. The patient was taken to a community ED where he was intubated for respiratory distress. The Poison Center was contacted and per their recommendations, the patient was checked for chemical burns, revealing none. The patient was then transported to a local Level 1 trauma center with a burn unit, for further care. The patient was maintained on mechanical ventilation for 1 hospital day, after which time he was weaned and extubated. He was observed in the hospital for another day, during which, he continued to improve. He was discharged on hospital day 2 in good condition. *Case Discussion:* Mixing isopropyl alcohol and sodium hypochlorite yields chlorine gas among other chemicals. Chlorine gas is intermediately water soluble, and can cause both upper and lower respiratory irritation and damage. Chlorine dissolved in water from the respiratory tract produces hydrochloric and hypochlorus acids. Hypochlorus acid decomposes into hydrochloric acid and nascent oxygen, which can cause further oxidative damage. Treatment for exposures to chlorine gas is primarily supportive, including airway protection, ventilatory support, Beta-2 agonists, steroids, and frequent suctioning for secretions. Neutralization of the acid with nebulized sodium bicarbonate may also have some benefit. *Conclusion:* Chlorine exposures in the home are not uncommon. This patient learned how to make this bomb from the internet. A search of youtube.com with keyword "bottle bomb" reveals over 800 videos. An example of what happened to our patient can be found at http://youtube.com/watchv = 8XxoKaOk7D4.

51. Signs of Anticholinergic Toxicity as Surrogate Markers of Acetaminophen Toxicity in Acetaminophen Diphenhydramine (Tylenol PM®) Exposures

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Background: Surrogate markers are used in toxicology as means of estimating toxicity for a variety of toxic exposures, e.g. anion gap acidosis for ethylene glycol exposures. Because diphenhydramine (DPH) may causes anticholinergic toxicity this study was undertaken to assess whether the clinical signs of tachycardia, agitation, and hallucinations correlate with toxic acetaminophen (APAP) levels. *Methods:* A chart review of 278 cases from the Texas

Poison Network Database involving acute APAP with DPH exposure alone was performed. Group 1 consisted of patients who developed signs of anticholinergic toxicity including agitation, hallucinations, and tachycardia. Group 2 served as a control and included patients without the above symptoms. Toxicity was defined as per the Matthew-Rumack nomogram. Nontoxic exposures were defined as APAP levels below the treatment line on the nomogram or in cases where APAP levels were not done an exposure involving less than 7.5 gm in an adult or less than 200 mg/kg in a child. Power analysis suggested a study population size of 240 patients needed to achieve an alpha of 0.05 and B of 0.10. *Results:* Sensitivity, Specificity, PPV, and NPV of the clinical indicators as a group (any of the 3 signs) for detecting toxic acetaminophen exposure are 94%, 57%, 42%, and 97% respectively. Of the patients with one or more of the symptoms of agitation, hallucinations, or tachycardia 42% had toxic APAP levels. In this group tachycardia was the most consistent finding occurring in 86% of toxic patients. Agitation and hallucinations were described in only 30% and 9% of toxic patients respectively. Hallucinations were absent in all nontoxic individuals. Of the patients without any of the clinical signs only 3% had toxic APAP levels. *Discussion:* Toxic patients without any clinical signs had borderline APAP levels on the nomogram or presented later after their exposure. *Conclusion:* The absence of agitation, hallucinations, and tachycardia in patients with acute Tylenol PM® exposure presenting soon after ingestion strongly suggests a nontoxic exposure (NPV 97%). Tachycardia, and agitation are nonspecific markers of toxicity while hallucinations are more specific.

52. Pediatric Coin Ingestions Reported to a Regional Poison Control Center

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Background: Foreign objects are commonly ingested by small children. Prior to this study, this regional PCC recommended that asymptomatic coin ingestions be observed at home for passage of coin. The purpose of this study was to evaluate coin exposures to a statewide poison center. *Methods:* This is an observational case series of pediatric coin ingestions reported to a regional poison center between January 1, 2005 and March 31, 2006. Cases were retrospectively identified through the poison center's database if the route was ingestion and the age was < 13 years. Frequencies and cross-tabulations were performed to describe the data. *Results:* A total of 90 coin exposures were identified. The age range was 8 months to 12 years. Penny was the most common denomination (n = 69,76.7%) followed by dime (7), quarter (7), and nickel (3). The denomination was unknown in 4 cases. No symptoms were noted in 69 (76.7%) patients at the time of the call. Coughing and abdominal pain were each noted in 8 (9.7%); throat pain in 7 (7.6%), vomiting in 5 (5.4%), excess salivation in 2(2.2%). Thirty eight patients were referred to a HCF, of which 22 (57.9%) were compliant. Seven (7.8%) patients were identified with coins lodged in the esophagus, 3 were initially asymptomatic. Of the 3 initially asymptomatic patients, a 3 yo who swallowed a quarter developed difficulty swallowing within hours and was evaluated in the ED. In the remaining 2 asymptomatic patients (8 months and 3 years), both ingested a penny which was not identified until 3 or more days after the ingestion and required surgical removal. *Discussion:* Three (3.3%) initially asymptomatic pediatric coin ingestions reported to a PCC were subsequently determined to have a coin lodged in the esophagus. As a result of this study, the PCC now refers all asymptomatic coin ingestions in children for X-ray localization within 24 hours of ingestion. *Conclusion:* The majority of children who swallowed coins passed them without difficulty. However, lodged esophageal coins can be present in a small number of asymptomatic children.

53. Acute Barium Carbonate Toxicity

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Background: Toxicity associated with barium carbonate is a rare occurance. We report a case of significant toxicity after barium carbonate ingestion in a suicide attempt. Prior to ingesting the substance, the patient obtained information regarding toxicity from the Internet. *Case Report:* A 24-year-old man presented to the emergency department (ED) approximately 15 hours after ingesting an unknown quantity of barium carbonate which is used in pottery making. He developed profound nausea, violent vomiting, abdominal cramping and diarrhea. Fourteen hours postingestion he was found lying on the floor, unable to move, with distal extremity cyanosis and circumorally. He was found by medics in respiratory distress, an oxygen saturation of 78% and cyanosis of his digits. This resolved rapidly with supplemental oxygen. On arrival to the ED he described facial tingling, mild intermittant sharp abdominal pain, and upper and lower extremity weakness. He admitted to depression and that this was a suicide attempt. He learned of the toxicity from the Internet. His initial vital signs were, BP 139/83, Pulse 96, respiratory rate 28/min, temperature 97.0 F, and oxygen saturation 99% on 10 liter of oxygen. The physical examination was unremarkable except for mid abdominal tenderness; cool extremities and cyanosis of the distal fingers and a dusky appearance from the knees to the feet. The neurologic exam revealed generalized motor weakness. The initial laboratory results revealed a potassium of 2.0, HCO3 20, BUN 30, creatinine 2.2, anion gap 27, and WBC 4.0, hemaglobin 11.8, otherwise laboratories values were within normal limits. The patient received potassium replacement in the ED and ICU and his weakness gradually improved over the next 36 hours. He was subsequently transferred to a psychiatry unit. *Case Discussion:* This case illustrates the toxicity of barium carbonate. Hypokalemia and muscle weakness can be profiound. Our patient developed many of the classic symptoms associated with this ingestion. Barium carbonate blocks the efflux of potassium and subsequently results in extracellular hypokalemia. *Conclusion:* Barium carbonate can be a fatal ingestion and clinicians should be aware of the toxicity associated with this substance and the treatment.

54. Hand Sanitizer Exposure in a Two Year Old with a Documented High Blood Ethanol Level

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Background: Unintentional ingestion of ethanol-based hand sanitizer products by children have not been of great concern in the past due to poor palatability, but this case report documents a high measured blood alcohol and ataxia in a pediatric exposure. *Case Report:* The poison control center was contacted by a parent 10 minutes after an exposure to an ethanol-based hand sanitizer by a two year old female. The child was reported to have had a previous history of licking her hands after using the product. The child accessed the product while in a bathroom and only a small amount of the substance was likely to have been ingested per the parent's report. The child was reported to be sedated, ataxic, and eyes were described as "glassy" by the parent and the child's breath smelled of the product. Based on the child's decreasing level of consciousness and history, the child was referred to an emergency department for assessment and care. The center contacted the receiving emergency department and recommended a blood alcohol level, blood sugar check and observation. The child appeared intoxicated on arrival to the emergency department and did not react to pain when blood sample was drawn. Within a few hours the child was discharged to home and the emergency department reported the child had a measured blood ethanol level of 0.1% (100mg/dL, 21.7mmol/L). *Case Discussion:* An estimated blood ethanol level may be calculated using a Vd of 0.53L/kg for ethanol. The estimated blood ethanol level is 100 mg/dL (21.7 mmol/L) if 13.5 mL of a standard 60% v/v ethanol-based hand sanitizer is ingested by a 12kg child, using *POISINDEX® System* [intranet database]. Version 5.1. Greenwood Village, CO: Thomson Micromedex for the example calculation. *Conclusion:* Poison control practitioners must be aware of the potential hazards involving ethanol-based hand sanitizers and attempt to quantify the amounts of the products that may have been ingested to reduce pediatric morbidity and mortality.

55. Poison Prevention? No Time and Tools for Schools!

Miller RL, Heinen MA, Clark TL, Bubar J. *Northern New England Poison Center, Portland, ME, USA*.

Background: National health education standards recommend elementary schools provide poison prevention information. In 2003, AAPCC developed the Spike's Poison Prevention Adventure (Spike) Education Program to educate young school-aged children about poisonings in a cost-effective manner. A study was conducted in Maine to evaluate the appropriateness of Spike in fulfilling the recommendation to include poison prevention information in kindergarten and first grade education. *Methods:* A convenient sample of 10 schools participated. 12 teachers were responsible for several classes. The schools were contacted by the NNEPC educator. In a 2-month timeframe, the educator presented the Spike education program in 30 kindergarten and first grade classrooms for a total of 509 students. A paper-based evaluation was administered to 12 teachers to evaluate their current classroom-based poison prevention education activities and the potential usefulness of the Spike Education Program. *Results:* 11/12 teachers responded. 9 teachers did not previously include a poison prevention lesson in their curriculum. 11 did spend "some" time on poisons – often "just the basics" and "as it comes up." Only 1 teacher had a parent component in a previously used poison prevention lesson. All found the information age appropriate. All but 1 teacher plan to use Spike in the future for poison prevention. *Discussion:* Due to the small number of teachers that participated, further research needs to be done to support these findings. In addition, more research is planned to assess the impact on parents and long-term recall from the students. *Conclusion:* The Spike program assists teachers in providing poison prevention to kindergarteners and first graders. Prior to this program, most teachers were not providing poison prevention due to lack of time and age-appropriate education programs or materials. It appears there is a need for poison centers to provide tools, like Spike, to educators. More work needs to be done to promote the Spike program.

56. Long-Acting Neuromuscular Blocking Agents Are Commonly Administered during the Treatment of Overdose Patients

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Background: Many patients require intubation following overdose. We advise clinicians to avoid long-acting neuromuscular blocking agents (LNBA) in these patients because it may mask seizure activity delaying recognition and treatment. We sought to determine how many patients have LNBA administered after overdosing on potential seizure inducing drugs. *Methods:* A search was performed from our poison center's Toxicall database. We searched exposure calls from January 2003 through March 2007. A total of 120,849 exposures were included in the search. The search criteria included patients presenting to outside hospitals that required intubation after an ingestion of drugs associated with seizures (for example, tricyclic antidepressants, diphenhydramine, doxylamine, cocaine, amphetamines, buproprion, tramadol, isoniazid, and venlafaxine). These cases were then hand searched to look for administration of a LNBA (pancuronium or vecuronium). *Results:* 284 cases met the inclusion criteria and 28 had received at least one dose of a LNBA during their treatment. This represents 9.9 % of cases. *Discussion:* This is a worrisome statistic especially considering the limitations of the database and the potential of missing a number of cases. In several cases seizures or seizure-like activity was noted prior to administration of LNBA. *Conclusion:* This study indicates that the use of long-acting neuromuscular blockade is a relatively common practice in overdose patients.

57. Argyria in a Neonate Secondary to Silver Impregnated Wound Dressings

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Background: Argyria is a syndrome characterized by systemic or local deposition of silver containing particles resulting in slate-blue dermal discoloration. Although considered clinically benign, argyria may be cosmetically worrisome as the resulting skin discoloration is permanent. *Case Report:* A 10 week-old male born with ectopia cordis and Hypoplastic Left Heart Syndrome underwent corrective surgery one day after birth. A large, full thickness, pectoral skin flap was mobilized to cover a sternal defect. The skin donor site and other surgical wounds were treated with daily applications of a silver impregnated wound dressing (Acticoat™). On postoperative day 65, skin surrounding the donor site, the incisions, and the child's right ear and right cheek developed a blue-grey tint. Serum and urine assays confirmed silver absorption, and we made the diagnosis of both local and generalized argyria. The Acticoat™ dressing applications were promptly discontinued. *Case Discussion:* Cases of argyria have been described after ingestion of colloidal silver, the use of silver containing nose drops, anti-smoking lozenges, silver nitrate, dental amalgam, silver-sulfadiazine cream, arthroplasty cement, cosmetics, and even edible cake decorations. Occupational sources of potential exposure can be found in the electroplating, photographic processing, and silversmithing industries. Silver containing particles from

these sources can locally infiltrate abraded or injured tissue, while silver particles that gain access to the systemic circulation may be deposited in a variety of tissues. The resulting skin discoloration is most pronounced in light-exposed areas as silver is known to increase the production of epidermal melanin. Generalized argyria mimics cyanosis, but in our patient, areas of focal hyperpigmentation were clearly distinguishable from the uniform purplish tint of cyanosis. Acticoat™ is a layered antimicrobial dressing containing silver impregnated polyethylene mesh. *Conclusion:* We believe that this case represents the first report of argyria in a neonate secondary to Acticoat™ exposure.

58. Changes in Blood Pressure after Administration of Hydroxocobalamin: Relationship to Changes in Plasma Cobalamins-(III) Concentrations in Healthy Volunteers

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Background: The cyanide antidote hydroxocobalamin can cause blood pressure increases that are typically transitory and self-limiting in patients with known or suspected cyanide poisoning, healthy human subjects, and animals not exposed to cyanide. As cyanide poisoning is often associated with hypotension, these increases in blood pressure can be beneficial. This investigation was undertaken to examine the relationship between blood pressure changes and hydroxocobalamin exposure as measured by free and total cobalamins-(III) plasma concentrations. *Methods:* Healthy volunteers received single intravenous doses of 2.5, 5, 7.5, or 10 g hydroxocobalamin over 7.5 to 30 minutes in a double-blind, randomized, placebo-controlled study. *Results:* Elevations in blood pressure were observed in all dose groups. Blood pressure peaked toward the end of infusion and returned to baseline by about 4 hours after the end of infusion. The time course of blood pressure changes was associated with that of free and total plasma cobalamins-(III) concentrations. Maximum plasma concentrations of cobalamins-(III) were typically observed at the end of the infusion (free cobalamins-(III) group mean t_{max} = 8.5–30.4 minutes; total cobalamins-(III) group mean t_{max} = 13.5–33.1 minutes). Change in mean arterial pressure (MAP) correlated strongly with plasma AUCs of cobalamins-(III) during infusion ($r > 0.7$) but not through 24 hours post-infusion ($r \leq 0.36$). Maximum change in MAP correlated weakly with plasma concentrations of cobalamins-(III). The presence of a clinically relevant increase in blood pressure (i.e., systolic ≥180 mmHg, diastolic ≥110 mmHg) did not affect the strength of the correlation between blood pressure and total and free cobalamins-(III) concentrations. *Discussion:* Hydroxocobalamin-associated increase in blood pressure is linked to initial hydroxocobalamin exposure. A clinically relevant increase in blood pressure was independent of hydroxocobalamin dose. *Conclusion:* The short-lived increase in mean blood pressure during administration of antidotal doses of hydroxocobalamin is closely linked to initial hydroxocobalamin exposure.

59. A Case of Hyperammonemia with Acute Valproic Acid Overdose in a VPA-Naïve Patient

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Background: Valproic acid (VPA) is a broad-spectrum anti-epileptic that is used for a wide range of seizure disorders, as a mood stabilizer, and for migraine headache prophylaxis. VPA can lead to hyperammonemia in patients chronically taking the drug after either acute poisoning or chronic dosing; however, extreme hyperammonemia following acute VPA poisoning in a VPA-naive patient has not been previously reported. *Case Report:* A 29 year old healthy male presented with altered mental status after ingesting an unknown amount of alcohol and his friend's VPA. The ingestion time was unknown. Upon arrival, his vital signs were: HR 107, BP 155/82, T 98.4, with glucose 90 mg/dL. The patient underwent gastric lavage, and received a dose of activated charcoal. His physical exam, other than somnolence, was unremarkable. His lab studies were remarkable for: ethanol 131 mg/dL, VPA 292 mg/L, ammonia 405 µmol/L. Renal and hepatic functions were normal, and hepatitis serologies negative. Acetaminophen, salicylate, and urine toxicology screens were all negative. He was intubated for increasing somnolence and airway protection. A head CT was unremarkable, and his EEG showed diffuse slowing. Lactulose was initiated, without improvement in mental status. IV L-carnitine was then given and within four hours, his repeat ammonia was 60 µmol/L. Two days later, the ammonia concentration again increased to 77 µmol/L, but again decreased to 65 µmol/L with another dose of carnitine. The patient's mental status gradually improved, he was extubated, and was eventually discharged home without any permanent neurologic sequelae. *Case Discussion:* Poisoning with VPA can lead to a spectrum of neurological symptoms, from mild confusion to coma with cerebral edema. One mechanism is through valproate-induced hypocarnitinemia, which can result in hyperammonemia. VPA has been found to deplete carnitine stores, especially in those on long-term and high-dose therapy. This case, however, demonstrates that even patients who do not take VPA chronically can develop hyperammonemia with acute overdose. *Conclusion:* Hyperammonemia can develop following acute VPA poisoning in VPA-naive patients.

60. A Pilot Study To Investigate Levosimendan, a Calcium Channel Sensitizer, as a Potential Antidote in a Rat Model of Verapamil Toxicity

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Background: Calcium channel blocker toxicity continues to present a clinical challenge with no true antidotal therapy. Levosimendan (LEVO), a calcium sensitizer, has been shown to improve cardiac contractility in heart failure. In this pilot study we test the hypothesis that calcium channel sensitization will prolong survival in a rat model of verapamil poisoning. *Methods:* This is a blinded, randomized controlled animal study. Wistar rats, mean weight 371g, were used. The verapamil (2.5mg/ml) was infused at a rate of 37.5mg/kg/hr. LEVO (5mcg/mL) was then bolused at 0 min (12mcg/kg) and 5 min (8 mcg/kg), saline control was of equal volume. The rats were intubated and maintained under general anesthesia on a small animal ventilator with isoflurane. ECG monitoring and temperature measurements were performed during the poisoning and the treatment phases of the study. Each rat underwent femoral vein cutdown and cannulation with a 24 gauge catheter. Each rat was then randomized, in a blinded fashion, to receive either LEVO or saline control which was administered at times 0 and 5 minutes during the verapamil infusion. Time to death, defined as 1 minute of asystole, was used as the endpoint. *Results:* Initial results revealed animals treated with LEVO died before the control group with a mean of 8.0 ± 0.8 m (n = 4) vs. 24.2 ± 14.2 m (n = 3). All animals experienced bradycardia prior to asystole. p = NS *Discussion:* LEVO could improve the negative inotropic effects of calcium channel blocker poisoning via enhanced binding of Ca^{2+} to cardiac troponin C, thus leading to further stimulation of the excitation-contraction coupling mechanism. Unfortunately, LEVO also inhibits phosphodiesterase which may lead to vasodilation and account for the more rapid cardiovascular collapse the experimental group experienced. *Conclusion:* In this pilot study, using LEVO as solitary antidotal therapy for the treatment of verapamil toxicity, it does not appear to be beneficial. Continuing the study until we reach statistical significance will require 10 animals in each group and may prove that levosimendan is harmful in this rat model.

61. Differences in the Treatment of Chronic Mild-Moderate Digoxin Toxicity by Specialty

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Background: Treatment of chronic mild-moderate digoxin toxicity often involves a multidisciplinary team of medical toxicologists (TOX), emergency physicians (EP), and cardiologists (CARD). We observed that use of Fab is often not unanimous; we sought to examine the association between specialty and management decisions. *Methods:* A sample of CARD (1715), EP (1000) and TOX (420) received an anonymous survey by mail. Addresses were obtained from respective societies: ACC, ACEP, and ACMT. The survey detailed 4 hypothetical cases of chronic digoxin toxicity created by consensus among authors. All cases had the same digoxin concentration but signs and symptoms varied in an attempt to stimulate 4 responses: symptomatic (SYM), asymptomatic (ASYM), treatment may be pharmaco-economically justified (PJ), treatment may unmask underlying cardiac disease (UD). For each scenario clinicians made decisions about admission/treatment. *Results:* Survey response varied:CARD = 17%; EP = 6.7%; TOX = 39%. Admission rates were similar; treatment decisions varied.

% treated, Odds Ratio relative to TOX, (95% CI)

Scenario	TOX	EP	CARD
SYM	91.5%	82.0%,0.50(0.27,0.95)	66.9%,0.22(0.12, 0.38)
ASYM	1.2%	1.8%,1.49(0.25,9.05)	2.1%,2.93(0.63,13.57)
PJ	24.2%	16.2%,0.83(0.50,1.37)	9.0%,0.43(0.26,0.70)
UD	17.0%	17.4%,1.26(0.74,2.16)	10.7%,0.71(0.43,1.19)
Any Senario	92.1%	83.2%,0.43(0.21,0.85)	67.8%,0.18(0.10,0.33)

Discussion: Treatment differences may reflect diverse perspectives or indicate knowledge gaps, which may translate into excess cost or less than ideal care. Exploring differences may improve patient care and interactions among health providers and/or provide more cost effective care. *Conclusion:* Differences exist between clinicians of various specialties regarding treatment of chronic mild-moderate digoxin toxicity. CARD are significantly less likely to treat mild-moderate toxicity than TOX. Further study is needed to identify factors that influence decisions.

62. Hypocalcemia and Dysrhythmia in a Pediatric Patient Following Toothpaste Ingestion

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Background: Ingestion of fluoride-containing toothpaste in the pediatric patient typically results in a benign course, with the most frequently observed toxic effects being nausea and vomiting. More significant exposures, which are unusual, may result in hypocalcemia, hypomagnesemia, and dysrhythmias. We present a case of pediatric toothpaste ingestion which resulted in hypocalcemia and cardiac rhythm disturbance. *Case Report:* The mother of a 2 yo 15.7 kg male called our poison center to report her son had ingested up to five ounces of toothpaste, active ingredient 0.15% fluoride ion, and had already vomited twice. With a potential fluoride exposure of up to 16 mg/kg, the child was referred to the emergency department (ED). Initial examination, performed 2 to 3 hours post-exposure, revealed a healthy-appearing child whose only complaint was abdominal pain. Pertinent initial labs included ionized calcium of 1.02 mmol/L (normal 1.12 – 1.32) and magnesium of 2.2 mg/dL (normal 1.6 – 2.6). An ECG in the ED revealed a sinus bradycardia (HR 81), QTc of 406 ms, with occasional PVCs and inverted T waves. Milk was given to drink, the child was started on an oral magnesium-containing antacid every six hours, and he was admitted for monitoring of cardiac rhythm and electrolytes. Ten hours post-ingestion, laboratory levels included ionized calcium of 0.95 mmol/L and magnesium 1.7 mg/dL. One dose of calcium gluconate 50 mg/kg was administered intravenously. Fourteen hours post-ingestion the child's ionized calcium was 1.18 mmol/L and magnesium was 1.9 mg/dL. No further electrolyte disturbances were noted, cardiac rhythm remained normal, and he was discharged after two days of observation. *Case Discussion:* This child's decreased calcium and magnesium were temporally related to the fluoride ingestion, and are a likely result of the exposure. Both the electrolyte disturbances and cardiac rhythm resolved after administration of oral and IV calcium. *Conclusion:* Though infrequently seen, with large exposures of fluoride-containing toothpaste there is a potential for significant toxicity. Electrolytes and cardiac rhythm should be monitored in all potentially toxic exposures.

63. Prolonged CNS Toxicity in a Child with Lamotrigine Poisoning

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Background: Lamotrigine (Lamictal) is an anticonvulsant that is also used off-label to treat a variety of neurological and psychiatric disorders. Only one other case report involving pediatric lamotrigine toxicity has been published. We report a documented unintentional pediatric

exposure to lamotrigine that resulted in a prolonged symptomatic post-exposure period. *Case Report:* A four year-old male ingested a minimum of 600 mg and a maximum of 1000 mg of his mother's lamotrigine tablets. The child's mother contacted the poison center at one hour post-exposure and reported that he was drowsy and "shaking all over". He was referred to an emergency department for evaluation and observed for a period of eight hours post-exposure and discharged. Due to the presence of persistent symptoms at 19.5 hours post-exposure, the mother took the child to the pediatrician's office for further evaluation. The pediatrician reported to the poison center that the child had slurred speech, was shaking and having difficulty walking. There was no history of re-exposure to lamotrigine. The child was transferred immediately to a specialty children's hospital. At 23 hours post-exposure the child was noted to have ataxia, tremors, dysphagia and irritability. Vital signs and laboratory values were within normal limits at this time. By 30 hours post-exposure he was asymptomatic and discharged the following day. A lamotrigine serum concentration of 18.9 mcg/ml (therapeutic*:* 4–5 mcg/ml) was present at 25 hours post-exposure. *Case Discussion:* This child ingested a maximum of 1000 mg, which exceeds significantly the normal starting pediatric dose of 25 mg. He exhibited toxic effects within one hour that were consistent with the rapid and complete absorption of lamotrigine and remained symptomatic for nearly 30 hours post-exposure which is expected since the half-life of lamotrigine is 25–35 hours. He recovered uneventfully with minimal supportive care. *Conclusion:* Lamotrigine poisoning in children may cause prolonged mental status changes.

64. Volatile Substance Abuse (VSA) Reported to US Poison Centers

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Background: VSA is reported to be prevalent in the US. Poison center data can provide another valuable source of data when monitoring or studying this problem. *Methods:* Retrospective review of all patients reported to US poison centers for the years 2000 through 2005. Selection criteria included: route of exposure = inhalation (only) AND reason for exposure = intentional abuse AND substance = a non-pharmaceutical. *Results:* There were 12,428 patients with VSA reported to US poison centers with a mean of 2071 patients annually. VSA occurred throughout the year with 2 peak months identified (March and May, 9.4% and 9.6 % of cases respectively) and two trough months (December and January, 7% and 7.1% of cases, respectively). Patient numbers remained steady over the 6 years with no annual trend of increase or decrease identified. 8992 (73%) were male. Median age was 16 yrs, with a mode of 15 yrs. 82 patient ≤ 6 years of age were reported. There were 53 deaths (0.4%), 325 major effects (2.6%) and 2579 moderate effects (20.8%). The substances abused varied widely but the most commonly abused substances involved one of the hydrocarbons classes (aliphatic, aromatic or halogenated). The top five categories were Freon/propellant 1915 Pts (15.4%), Gasoline 1421 Pts (11.4%), Paint 948 Pts (7.6%), Unknown hydrocarbon 772 Pts (6.2%), and Propane 565 Pts (4.5%). 9182 Pts (74%) were treated in a HCF of which 2940 Pts (23.7%) had been referred to a HCF. *Discussion:* Poison center data may be a helpful surveillance tool when monitoring or studying VSA. *Conclusion:* VSA abuse remains persistent with significant morbidity and utilization of healthcare resources. Products containing a hydrocarbon appear to be involved in the majority of cases.

65. Doctors Knowledge of the Appropriate Use of Specific Antidotes in Recreational Drug Poisoning

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Background: Specific antidotes are available for the management of certain drug-induced toxicity. These include naloxone for opioid toxicity, flumazenil for benzodiazepine toxicity, cyproheptadine for serotonin toxicity (ST) induced by ecstasy (MDMA) and benzodiazepines for the management of cocaine toxicity. There are some controversies about the use of some of these antidotes, especially flumazenil in benzodiazepine toxicity. There is no previously produced data on doctors' knowledge of the use of these specific antidotes. *Methods:* Internal medicine and emergency medicine physicians were recruited to complete a questionnaire survey. For 8 simulated clinical scenarios of acute poisoning from recreational drug poisoning (benzodiazepines, cocaine, ecstasy and opioids), they were asked to indicate whether the suggested antidote and route of administration were correct. A panel of Clinical Toxicologists reviewed the clinical scenarios and suggested antidotes and identified the correct answers, which were scored as 1, with a maximum score of 8. *Results:* 42 physicians of all grades completed the questionnaire. The mean (± SD) correct score was 5.4 ± 1.1. The percentage correct for the various clinical scenarios were 68.3%, 81%, 28.6% and 70.2% for opioid, benzodiazepine, ecstasy-related ST and cocaine toxicity respectively. Doctors were more likely to record an answer of unsure for the use of cyproheptadine in ST (28.6%) compared to the use of the other antidotes (1.4%) ($p < 0.0001$). *Discussion:* This study suggests that internal medicine and emergency medicine physicians have some knowledge of the appropriate use of antidotes in the management of recreational drug-induced toxicity. However this knowledge is not consistent across the range of specific antidotes available, with poorer knowledge on the use of cyproheptadine. *Conclusion:* This suggests that education by Clinical Toxicologists is required to increase the overall knowledge on the use of specific antidotes in the management of recreational drug-induced toxicity and in particular on the use of cyproheptadine for the management of serotonin toxicity.

66. Acute Overdose of Dextromethorphan and Benzylpiperazine

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Background: During the last two years there has been an increasing use of hallucinogenic substances in Sweden. The use of drugs such as dextromethorphan (DXM), benzylpiperazine (BZP), tryptamines and different phenetylamines have been reported. The Swedish Poison Centre reported 4 questions 2004 and 25 questions 2005 concerning DXM. The Swedish National Laboratory of Forensic Science reported 15 captures of DXM 2004 and 24 captures 2005. *Case Report:* A 21-year old man was admitted by ambulance to the psychiatric department after intake of 750 mg of dextromethorphan and 5000 mg of n-benzylpiperazine. The patient presented with anxiety, confusion and psychotic symptoms. He claimed he was going to be reborn and that the earth was flat and would shortly be destroyed. He also said that his aura was 40 cm from his own body and that he could feel the presence of the physician from there. In his status it was noted that he was warm and sweating. His skin colour was normal, he was agitated with tachycardia, hypertension, trismus, and increased sound and light sensitivity. He developed more anxiety, claimed he was going to die and became obviously psychotic. The patient was treated with olanzapine and diazepam and his critical condition subsided over 12–24 hours. He was discharged on the following day in normal condition but returned after a month with an identical episode, again after ingestion of dextromethorphan. *Case Discussion:* Our case shows that dextromethorphan and benzylpiperazine may induce a severe psychosis with agitation, confusion, depression and severe anxiety in previously healthy individuals. It may also induce a serotonin syndrome requiring intensive care. Dantrolene is probably of no use in this condition. *Conclusion:* Abuse of dextromethorphan and benzylpiperazine seems to be an increasing problem in Sweden. These agents may induce a severe psychotic reaction with harmful physiologic reactions and should be considered for classification as narcotic drugs.

67. A 24 Month Retrospective Study of Adult Eszopiclone Ingestions

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Background: Eszopiclone (S-zopiclone) is a non-benzodiazepine hypnotic agent indicated for the treatment of insomnia. Published reports of clinical experience with acute overdose in adults of eszopiclone are minimal. *Methods:* A 24-month retrospective study was completed on cases of adults (18 years and older) having ingestions of eszopiclone reported to CPCS and followed to a known outcome. The parameters used in the case analysis were eszopiclone as the single substance, age 18 years or older, sex, reason for exposure, amount ingested, clinical symptoms, and patient outcome. *Results:* A total of 49 cases of eszopiclone ingestion without coingestants were identified. Of the 49 exposures, 22% were male, and 78% were female with a mean age of 43 years old (range 18–96 yo, SD 18.0 years). 18 of the 49 exposures (37%) were due to accidental ingestions and 31 of the 49 exposures (63%) were due to intentional ingestions. The mean amount ingested was 24.5 mg (range 2–96 mg, SD 24.4 mg). Of the 49 patients, 47 patients (96%) developed CNS depression, 2 patients (0.04%) developed nausea and vomiting, 1 patient treated with IV fluids, 1 patient (0.02%) developed confusion, 1 patient (0.02%), developed tachycardia (121 bpm) and 1 patient (0.02%) developed respiratory depression (dose related at 96mg) treated with intubation and supportive care. Of the 49 patients, 30 patients (61%) were treated in the ED. Activated charcoal was administered to 16 (33%) of the 30 patients. Of the 30 patients (61%) treated in the ED, 29 patients (96.7%) were discharged without sequelae. Outcome: Minor effect in 47 patients (96%) with tachycardia, nausea and vomiting, and CNS depression. Major effects in 2 patients (4%) with CNS depression and respiratory depression. *Discussion:* Eszopiclone toxicity manifested primarily as CNS depression. Supportive care and gastric decontamination with activated charcoal appear to be the mainstays of therapy for acute ingestions of eszopiclone. *Conclusion:* Continued evaluation of ingestions of eszopiclone is essential to determine specific thresholds for toxicity.

68. Modified Application of Evidence-Based Ranking System for Scientific Data to Toxicological Websites

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Background: Vast medical information exists on the internet for patients and practitioners. Web content, accuracy, and reliability varies widely. Poison center staff need tools to evaluate web information. No such toxicological ranking tool exists. We sought to create a website ranking tool for staff to use while assessing the internet. *Methods:* Our staff submitted their 84 most frequently used websites for review. We performed a literature search using key words: medical internet sites, toxicology websites, and nursing websites. An expert panel composed of MD, PharmD and RN applied the FDA's evidence-based system to rank the strength of each website and evaluated each site by the following modified tool: A) peer reviewed toxicology/ medical sites, B) education or governmental sites, C) local/national information and search engines, D) no attribution or peer reviewed medical sites, E) unable to rank. *Results:* The literature reviewed listed 15 attributes for assessing websites: quality, relevance, validity, accuracy, timeliness, transparency, honesty, authority, consistency, responsibility, accountability, accessibility, findability, searchability, and readability. The expert opinion panel varied widely in their ranking of the 84 websites for a majority of the categories. See table for results:

Websites Ranked by Expert Opinion

Category/N(%)	A	B	C	D	E
MD	14 (17)	37 (44)	14 (17)	06 (07)	13 (15)
Pharm D	08 (10)	30 (35)	26 (31)	12 (14)	08 (10)
RN/SPI	28 (33)	26 (31)	11 (13)	08 (10)	11 (13)

A = highest rank of scientific evidence.

Analysis showed 11.9 % or lower agreement in all categories rated. *Discussion:* We believe it is impractical and too labor intensive to apply this many categories to a website in a timely manner. However, our tool had limited applicability due to wide inter-rater variability. *Conclusion:* By applying this tool, clinical significance can be narrowed, but not defined. While the internet can provide effective medical toxicological information, practitioners should exercise caution and use clinical judgment when assessing information. Further development of our model would benefit poison centers.

69. Appropriate Antidote Use and Poison Control Center Recommendations

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Background: Antidote use may pose a challenge because of infrequent use and uncertainty of indications and dosing. We compared the appropriateness of antidote use in poisoning cases receiving PCC consultation versus those that did not for two prototypical antidotes, Digoxin-specific

antibodies (Fab) and Fomepizole (4-MP). *Methods:* A cross-sectional study was conducted of PCC cases that were given Fab or 4-MP from 2005–2006. Cases were separated in 2 groups: 1) those that received the antidote with PCC's recommendation and 2) those that received the antidote without PCC's recommendation. Cases were excluded if it was unclear who recommended the antidote. 3 Certified Specialists in Poison Information (CSPI), blinded to the initial recommendations, determined if antidotes were indicated. *Results:* 223 cases were included: 83 (37%) received Fab and 140 (63%) 4-MP. The PCC recommended antidote use in 80% (179 cases; 60 Fab and 119 4-MP) and not in 20% (44 cases; 23 Fab and 21 4-MP) of cases. CSPI review of Group 1 cases showed that antidotes were indicated in 58% (103 cases;47 Fab and 56 4-MP) while not in 42% (76 cases; 13 Fab and 63 4-MP) of cases. PCC appropriately recommended Fab 78% (47 of 60) and 4-MP 47% (56 of 119) of the cases. CSPI review of Group 2 cases showed that the antidote was indicated in 55% (24 cases;13 Fab and 11 4-MP), and not in 45% (20 cases;10 Fab and 10 4-MP). Fab was appropriately recommended in 56% (13 of 23), and 4-MP in 52% (11 of 21) of cases. PCC's recommendations were more likely to be appropriately indicated for Fab (OR = 2.8, 95% CI = 1.0–7.8) than 4-MP (OR = 0.81, 95% CI = 0.31 to 2.0). *Discussion:* The findings indicate that the decision of antidote administration is variable, and subject to individual staff judgment. *Conclusion:* Significant proportions (43%) of cases were given antidotes without an appropriate indication, possibly resulting in unnecessary antidote use and costs. While PCC recommendations were more likely associated with appropriate Fab administration, they were not for 4-MP, indicating a need for uniformity and justification in the decision-making process for antidote use.

70. Diffused Brain Injury in Glufosinate Herbicide Poisoning

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Background: Glufosinate ammonium is an alternative of paraquat herbicid. It inhibits the activity of glutamine synthetase, an enzyme that is necessary for the production of glutamine and for ammonia detoxification in plants. Glufosinate also inhibits the same enzyme in animals. Despite its low mammalian toxicity, delayed convulsion and respiratory failure to death had been noted in few reports. The mechanism of neurotoxicity has not been uncovered. Here, we reported a case of glufosinate poisoning presented with diffused brain injury evidenced by magnetic resonance imaging (MRI) study. *Case Report:* A 39-year-old female suffered from sorethroat, vomiting, diarrhea and abdominal pain after drinking 300 ml of Gu-Sa-Chau (18.2% of Glufosinate). Somnolence and metabolic acidosis were noted 3 hours after poisoning. Difficulty in arousal, hyperammonemia (plasma ammonia:171 ug/dl) and hypoventilation with CO2 retention were noted 21 hours later. Hemodialysis was performed for two times on the second and third day without significant improvement of conscious level and elimination of plasma ammonia. She got clear on the sixth day and complained of retrograde and antegrade amnesia. Two days later, her plasma ammonia returned to be normal under lactulose treatment. The MRI study of brain on the ninth day showed multiple demylination lesions at bilateral centrum semiovale and splenium of corpus callosum. The amnesic condition improved slowly at OPD follow-up. *Case Discussion:* Glofosinate poisoning might induce hyperammonemia and diffuse cytotoxicity on central nerve system. The accumulation of ammonia and glutamate in brain could be the central role of neurotoxicity of glufosinate. Hemodialysis seem do no benefit on the clinical improvement of glufosinate poisoning. *Conclusion:* Glufosinate herbicide can induce diffuse injury over central nerve system. The toxic mechanism needs more clinical and laboratory investigation.

71. Why Does the FDA Tolerate so Many Acetaminophen Fatalities?

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Background: The purpose of this abstract is to draw attention to the unacceptably high, and ever-increasing, number of US fatalities caused by acetaminophen (APAP) overdose. APAP has been for many years responsible for more deaths recorded in the AAPCC Toxic Exposure Surveillance System (TESS) than any other pharmaceutical. *Methods:* Published TESS data over a 20 year period beginning in 1985 are examined as a method of examining the epidemiology of acetaminophen fatalities. APAP and aspirin (ASA) deaths are abstracted for cases where those substances were listed as the primary substance. Patients receiving N-acetylcysteine are trended as indicative of serious APAP poisonings. *Results:* From 1985 to 2004, total APAP deaths rose from 21 to 218, (938% increase) and increased every single year but one. Suicidal deaths from APAP rose from 13 to 154 (1,085%). By contrast, aspirin deaths only rose from 21 to 41 (95%). Relative to the total number of yearly fatalities, APAP deaths rose from 4.57% to 18.43%, and APAP suicides rose from 3.96% to 13.02% of deaths. By contrast, ASA deaths fell from 6.40 to 3.46 % of fatalities. In 2004, 15,333 patients received the oral antidote for APAP poisoning, N-acetylcysteine, compared to 2,743 in 1985, a 459% increase. 3,807 patients received IV NAC also in 2004. *Discussion:* Acetaminophen is widely available in large quantities. The author purchased 1,000 tablets of 500 mg APAP for $6.84 in 2007. APAP is also combined with codeine, diphenhydramine and hydrocodone, and each of these combinations is yearly implicated in many APAP deaths. Hydrocodone is not available as an analgesic without APAP or other drug. Regulatory actions including limitation of sales quantities were widely credited with staunching the flow of US aspirin deaths a quarter century ago, and have been adopted in Europe for APAP. *Conclusion:* Suicidal and total fatalities from acetaminophen ingestion (as single-agent or combination drug) increased yearly from 1985 to 2004, both as absolute numbers and as a % of total deaths in the AAPCC epidemiology database. Non-fatal serious APAP poisonings continue to skyrocket. It is time for FDA to intervene, and stem the carnage caused by this valuable drug.

72. Gatifloxacin Interaction in Diabetic Patients with Hypoglycemic Agents

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Background: Gatifloxacin (GAT) was a fluoroquinolone available in oral/parenteral form. Both hypoglycemia/hyperglycemia have been reported in diabetic patients receiving GAT when concurrently on a hypoglycemic agent or insulin. We report 2 patients who developed hypoglycemia within 16 hrs of initiation of oral GAT on the same day that the drug was discontinued by the manufacturer (6.2.06). *Case Report:* An 87 yr old woman was found comatose with a serum glucose 25mg/dl. PMH: + DM type 2; on 10 mg of glipizide/day. 8 hrs PTA she ingested 400 mg of po GAT for URT infection. She became awake with normal VS after receiving 2 boluses of D50 and A D10 infusion. Labs were normal except BUN 59/Cr 2.1 mg/dl. Her glucose levels were monitored q hr for next 8 hrs and maintained between 100–200 mg/dl over the next 24 hrs with an infusion of D10 which was tapered. Pt was discharged without sequale. Case 2: 56 yr old woman presented with lethargy/confusion. PMH: + DM type 2; on po glucophage, glimepiride and insulin. Pt was started on 400 mg of po GAT 16 hrs PTA for a UTI. Stat serum glucose level was 47 mg/dL. Electrolytes, BUN/Cr were normal. Pt received a bolus of D50 and a infusion of D5&0.45 NaCL which improved her mental status. Glucose levels were monitored closely over the next 24 hrs and maintained > 100 mg/dl. Pt was discharged without sequale. *Case Discussion:* Post marketing reports of serious disturbances of glucose homeostasis were reported in patients treated with GAT as early as 1993. Hypoglycemic episodes have been reported in patients with DM treated with either sulfonylurea or non-sulfonylurea oral hypoglycemic agents and insulin. These events frequently occurred on the first day and usually within 3 days following the initiation of GAT. One postulated mechanism involves the augmentation of insulin release via a direct effect of quinolones on the pancreatic beta cell membrane. Some of the reported hypoglycemic events were life-threatening. These reports lead the manufacturer to voluntarily discontinue this drug on 6.2.06. *Conclusion:* Two cases of hypoglycemia rapidly developed within 16 hrs of initiation of oral gatifloxacin on the same day that this drug was discontinued by the manufacturer.

73. A Two Year Review of Pediatric Eszopiclone Ingestions

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Background: Eszopiclone (S-zopiclone) is a nonbenzodiazepine hypnotic agent indicated for the treatment of insomnia. Published reports of clinical experience with acute ingestion of eszopiclone in children are minimal. *Methods:* A 24-month retrospective study was completed on all cases of pediatric ingestion of eszopiclone reported to CPCS. The parameters used in the case analysis were eszopiclone as the single substance, age 17 years or younger, sex, amount ingested, clinical symptoms, and patient outcome. *Results:* A total of 25 cases of eszopiclone ingestion without coingestants were identified. Of the 25 exposures, 64% were male, and 36% were female with a mean age of 7.2 years old (range 18 months - 17yo). 20 of the 25 exposures (80%) were due to accidental ingestions and 5 of the 25 exposures (20%) were due to intentional ingestions. The mean amount ingested was 8.7 mg (range 0.5 mg to 60 mg). Of the 25 patients, 9 patients (36%) developed drowsiness and lethargy, 6 patients (24%) developed nausea, 1 patient (4%) developed confusion, 1 13yo patient (4%) developed mild tachycardia (112 bpm). Of the 25 patients, 6 patients (24%) were treated in the ED. Activated charcoal was administered to 4 of the 6 patients (67%) in the ED. All 6 patients (100%) treated in the ED were discharged without sequelae. Outcome: Minor effect in 47 patients (96%) with tachycardia, nausea and vomiting, and CNS depression. Major effects in 2 patients (4%) with CNS depression and respiratory depression. *Discussion:* Eszopiclone toxicity manifested primarily as CNS depression. Supportive care and gastric decontamination with activated charcoal appear to be the mainstays of therapy for acute ingestions of eszopiclone. *Conclusion:* Continued evaluation of pediatric ingestions of eszopiclone is essential to determine more specific thresholds for toxicity.

74. Lead Poisoning in a Child with Landau-Kleffner Syndrome

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Background: Landau-Kleffner Syndrome (LKS) was first described in 1954 in young children with acquired aphasia, clinical seizures, and epileptiform discharges in sleep. While children with this rare disorder also have behavioral problems and attention deficits, childhood lead poisoning has not been previously described in LKS. *Case Report:* A 4 year-old Latino boy was referred to the Pediatric Environmental Health Center for an elevated blood lead level (BLL) discovered during a neurological evaluation for a new onset seizure disorder. He had normal infant development, including use of simple words by one year old. Thereafter he regressed in receptive and expressive language development, which his mother attributed to confusions in a bilingual English-Spanish household. At 4 years old, he had a 50-word vocabulary in both languages combined and used no sentences. He was hyperactive, irritable, difficult to discipline, and had a low frustration threshold for temper tantrums. Teachers observed him to be constantly putting objects in his mouth, including bark mulch, rocks, sand, dirt, twigs, and toys. An electroencephalogram (EEG) showed a left occipital spike abnormality. A BEAM EEG study showed frequent left occipital spikes and spike slow-wave tracings during sleep and some right mid-temporal and central paroxysmal theta in waking, consistent with the diagnosis of LKS. Although BLL were reportedly < 5 mcg/dL during his first three years, a BLL 22 mcg/dL [CDC threshold 10 mcg/dL] and a blood zinc protoporphyrin 155 mcg/mol of heme [nl 25–65]) were discovered during a neurological evaluation at 4 years of age. BLL's peaked at 35 mcg/dL. Repeated oral chelation with dimercaptosuccinic acid (DMSA) over 12 months reduced his BLL to 17 mcg/dL. *Case Discussion:* Children with LKS may retain oral exploratory behaviors and pica that put them at high risk for lead poisoning. Both LKS and childhood lead poisoning are associated with speech disorders and attention deficit hyperactivity disorder. The two disorders may act synergistically to worsen a child's neurocognitive and developmental outcomes. *Conclusion:* Clinicians following children with LKS should monitor their BLL and educate their parents regarding strategies to prevent childhood lead poisoning.

75. Two Cases of Poisoning with Monkshood Mistaken for Parsley

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Background: The cases occurred at a barbecue party of a family and their friends. A salad offered at the party contained leaves of garden monkshood that had been mistaken for parsley. Four persons developed health complaints. *Case Report:* Manifestations / course: Patient No. 1: Two hours after ingestion of the meal, a 19-year-old female complained of numbness in her

mouth and a tingling sensation in her entire body. Presumably, she had eaten the largest amount of salad. On arrival of the emergency physician, the patient's heart rate was 86/min and her systolic blood pressure, 100 mmHg. The ECG revealed a sinus rhythm associated with intermittent bigeminy. After i.v. administration of magnesium, a normal sinus rhythm was found in the follow-up examination some hours later. After two days, the patient could be discharged completely symptom-free and referred to her family doctor's care. Patient No. 2: Another female aged 20 years also complained of numbness in the region of her mouth and on both arms, and of meteorism, approximately two hours after the meal. She persistently suffered from numbness and a tingling sensation on both hands. The ECG revealed a sinus rhythm and first-degree AV block (PQ interval 0.34 sec). Intermittent bigeminus occurred. After i.v. administration of magnesium, cardiac arrhythmia persisted for three hours until it was followed by a normofrequent sinus rhythm. *Case Discussion:* The therapeutic approach was similar to that in the case of the first patient. The patient was symptom-free on the following day and could be discharged. *Conclusion:* As a consequence of the mix-up, four out of six persons who had eaten the salad developed health complaints. Two of them developed mild symptoms, another two had to be treated at ICU. These both patients could be discharged from hospital after two days.

76. Phytochemical and Toxicity Assessment of *Erythrophleum suaveolens* in Rabbits

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Background: Erythrophleum suaveolens is found Widespread in tropical Africa and Asia. Previous studies have revealed that *Erythrophleum suaveolens* was extremely toxic to livestock all over the world especially to goats, sheep and cows. Further investigations have reported cases of accidental human poisoning after the use of the bark of these plants for traditional uses. *Methods:* 1.2kg of the fresh leaves was macerated with 1.5L of methanol and allowed to stand for 24 hours. The crude methanolic extract was identified by phytochemical screening and TLC methods. Fifteen rabbits were divided into five groups, for acute toxicity study and twelve rabbits were divided into four groups for sub-acute toxicity. The extract at the doses of 25, 50, 100 and 200mg/kg bw for acute toxicity study while the doses of 2.5, 5, and 10mg/kg bw for sub-acute toxicity study were orally administered to the rabbits. *Results:* The phytochemical screening revealed that the chemical composition of *Erythrophleum suaveolens* include alkaloids, cardiac glycosides, saponins, tannins and steroids while elemental analysis by Atomic Absorption Spectrophotometry (AAS) showed presence of sodium, potassium and iron. The medium lethal dose (LD_{50}) was 100 mg/kg bw. For sub-acute toxicity study all the doses used had no effects on aspatate aminotransferase (AST), alanine aminotransferase (ALT), Alkaline phosphatase (ALP), albumin and total protein. Hematological, white blood cell (WBC), red blood cell (RBC), platelets, hemoglobin concentration (Hb) and Hematocrit (PCV) were not different from that of controls. *Discussion:* In the acute toxicity study showed some behavioral changes within 2 hours after oral administration. These changes included depression, drowsiness, dyspnea with laboured respiration, gasping, convulsion and death. The sub-acute toxicity study did not result in death of the animals and no sign of observable toxicity was detected during the experimental period. *Conclusion:* From the foregoing it could be concluded that the methanolic extract of *Erythrophleum suaveolens* at the doses administered in acute study were toxic to rabbit. However the doses for sub-acute study tend to be not toxic to the rabbit.

77. Determination of Ketamine from Urine Samples after Single Oral Dose by Using of Visible UV Spectrophotometer

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Background: Ketamine is an analgesic and anaesthetic drug. It has become more and more popular for drug abuse in recent years. Teenagers have abused it as a recreational and "club drug" because of its hallucinogenic and stimulant effects. It is also misused as a "date-rape" drug to facilitate sexual assaults. *Methods:* 10 volunteers who had received ketamine hydrochloride (100 mg) orally. Individual urine samples were collected at different periods (2, 6, 12, 18, 24, 36, 48 hours, 3, 4, 7, 10 and 15 days). Urine samples were hydrolyzed with concentrated HCl, extracted with chloroform at pH 9.2. The organic phase was treated with bromocresol green in the presence of acetate buffer (pH 2.8). *Results:* The coloured product is measured at 413 nm by visible UV spectrophotometer and the mean concentrations of 0.26 - 6.6 µg/mL. *Discussion:* Using the visible UV spectrohotometeric method based on the formation of coloured ion-pair complexes with bromocresol green, the total ketamine (and its metabolites) was detected up to seven days after drug administration, ranging in mean concentrations of 0.26 - 6.6 µg/mL. This is attributed to that ketamine metabolites are chemically able to react with bromocresol green to form colored complex easily detected in a closely related ketamine λ_{max}. *Conclusion:* It is concluded that, this method can be used for identification and determination of ketamine in the biological samples in cases of drug facilitated crimes.

78. Venlafaxine Overdose Characterized by Antimuscarinic Toxidrome, Rhabdomyolysis, and False Positive for Amphetamine on Urine Immunoassay

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Background: Venlafaxine (VF) is an antidepressant marketed as a reuptake inhibitor of seretonin and norepinephrine. *Case Report:* A 21 y/o male presented to the ED via EMS after intentional ingestion of approximately 40 tablets of VF. Prior to arrival he was combative and had a generalized seizure. Fingerstick glucose was 74 mg/dL. He was given D50 and naloxone with no response. On arrival he was somnolent but easily arouseable. He denied coingestants. He reportedly smoked marijuana and methamphetamine on occasion but not within 2 weeks. Initial vitals were 126/68, 137, 28, O2 sat 99%, and 101.5 F rectal temperature. Examination revealed a somnolent adult male with slow speech. Pupils were 6 mm and minimally reactive. Mucus membranes, axillae, and skin were dry. Lungs were clear and heart was tachycardic but regular. Bowel sounds were present. A foley catheter was placed with 1400 mL dark urine voided. EKG showed sinus tachycardia with rate 148, QRS 90 ms, and QTc 414 ms. A second generalized seizure was witnessed and lorazepam 2 mg IV was given. Chemistry panel revealed AST 428, ALT 105, CPK 3823, and total bilirubin 2.5. Salicylate, acetaminophen, and alcohol were undetectable. Urine immunoassay (UIS) was positive for amphetamine (AMP). However, only VF was identified on subsequent TLC and GC/MS. Based upon the patient's antimuscarinic (AM) presentation, physostigmine (PS) 1 mg was given IV with marked improvement in wakefulness, speech, orientation, and clock-drawing ability within minutes. He was admitted for observation. CPK peaked at 55,948, AST at 605, ALT at 169, and creatinine at 0.9. He was discharged to home 2 days later. *Case Discussion:* VF has been reported to cause seizures, rhabdomyolysis (RM), and centrilobular hepatic necrosis, but minimal AM effects. VF has caused false positivity for phencyclidine on UIS. *Conclusion:* This case adds to the increasingly reported association between VF overdose and RM. This is the first reported case of VF induced AM delerium reversed by PS, and the first case of VF causing false positive for AMP on UIS.

79. Argyria Caused by Intentional Chronic Silver Ingestion

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Background: Argyria is a cosmetic condition caused by the chronic internalization of silver in a colloidal and/or ionic form. Silver is used as an alternative medicine for purported antibacterial, immunological and anti-allergy properties. Skin discoloration is thought to be caused by silver chloride photoreduction to metallic silver that is then oxidized by tissue, finally forming permanent black silver sulfide skin deposits. *Case Report:* A 68-year-old man presented to his primary care physician for an acute foot injury. The physician noted a bluish metallic hue to the patient's skin, sclera, nail beds, and mucosal membranes. The patient gave a history of using "silver water" to treat his chronic disorders. The "silver water" was prepared by our patient using a machine purchased commercially that electrolyes silver into a water solution. This prompted his physician to contact the poison center. The results of routine medical tests showed our patient had no adverse health effects that could not be attributed to his chronic medical conditions. The patient's serum silver concentration was 172 mcg/dL (reference < 0.05 mcg/dL). *Case Discussion:* Argyria is a very rare condition. There is no known direct correllation between its visual presentation and any other medical condition. Our patient has been drinking 1–2 cups daily for over 8 years. It is his belief that it is a cure-all for his chronic medical conditions of arthritis, allergies, hypertension, hypercholesterolemia, memory deficit, diabetes, and hypothyroidism and, most recently, his injured foot. As recommended by his physician and the poison center, our patient agreed to stop drinking the silver-containing water, but but did so only temporarily. This case illustrates how health care practitioners can, at times, be confronted with strongly rooted cultural or traditional beliefs that may act as an obstacle to modern medical practice. *Conclusion:* The broad health benefits of silver ingestion, in either colloidal or ionic form, have not been proven. Our patient developed marked argyria by daily ingestion of a silver solution produced by an electrolysis device, but fortunately his condition appeared not to be life threatening, only life enduring.

80. Characteristics of Nisoldipine Overdoses: Deadly or Just Distracting?

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Background: Nisoldipine is a dihydropyridine calcium channel antagonist, most often used in a modified release form. Information on the toxicity and exposure patterns of nisoldipine is sparse. We studied the characteristics of nisoldipine exposures reported to the state of Texas Poison Control Centers over a 7-year period, from 2000–2006. *Methods:* 112 PCC records of nisoldipine exposures were identified. The type of medication involved, as well as the subject's age, gender, clinical course and outcomes were recorded. Data were analyzed to look at trends over the 7-year period. *Results:* 112 PCC records were identified. There were 27 hospitalizations, no deaths and a total of 18 patients who developed symptoms. During the first 4 years of analysis nisoldipine accounted for 8.25 calls/year. For 2004–2006, our poison centers received an average of 26.3 calls/year involving nisoldipine as the primary medication. 30 cases involved adults who mistakenly took double their daily dose of nisoldipine. In no cases of double dosing were any clinical symptoms recorded. 18 cases in children under 5 years of age were identified. Of these 18, 16 were referred to the hospital and 10 were hospitalized. One of the 18 patients developed major toxicity of bradycardia and hypotension but recovered. *Discussion:* Nisoldipine exposures in the state of Texas are increasing. We may see a continued trend towards increased exposures of this relatively new medication. The data support the use of stay at home precautions in those who inadvertently take an extra dose of their nisoldipine. Strategies to ensure appropriate medication use should be discussed among patients, pharmacists, and providers. A goal of this study was to identify a weight-based toxicity profile for patients exposed to nisoldipine. Due to a lack of cases as well as data on patient weights, we were unable to identify a dose/kilogram that delineates those likely to suffer toxicity from exposure. *Conclusion:* We report the characteristics of nisoldipine exposures in the state of Texas and note an increasing trend of exposures as well as benign effects of taking one extra dose of this medication.

81. Systematically Assessing Gamma Hydroxybutyrate (GHB) Effects during and after Acute Intoxication

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Background: GHB is a drug of abuse with a wide variety of sensory and cognitive effects. Systematic assessment of these effects has not been well studied. *Methods:* As part of a larger survey of GHB use, a new 15-item question battery eliciting GHB effects was developed. The battery was asked twice, first to assess symptoms during acute GHB intoxication (each respondent was allowed to determine the time frame, in hours, for this acute effect) and again for symptoms experienced following intoxication. Respondents were asked to rank symptoms, which included both physical sensations (e.g., muscle jerking, heightened touch) and cognitive changes (e.g., euphoria, amnesia) on a 5-point Likert-type scale. We calculated Cronbach's alpha (CA) to assess the internal consistency of the battery for each of the two time frames. We also compared item rankings over time to assess construct validity, anticipating that symptoms would decrease. *Results:* We surveyed 126 subjects; 11 were excluded due to missing responses for least 1 of the 30 items in the combined batteries. The remaining 115 subjects were 73% male, mean age 31 ± 9 years. The acute and post-use batteries both performed

excellently*:* the CA was 0.85 and 0.86, respectively. Each of the 15 items was statistically different comparing acute to post-use symptoms (paired t test < 0.05). Of these, 14 reflected a decreased symptom score post-use; only one (depression) increased at follow-up. This was also the only item with poor correlation within the battery at both the acute and follow-up time frames. The total adjusted CA increased with removal of this item. *Discussion:* The performance characteristics of this battery indicate that, with exclusion of a single item, it measures the changing symptoms of GHB intoxication over time in a consistent, valid manner. This battery, reduced to 14 items, should be tested in other cohorts of GHB users to assess its performance in different settings. *Conclusion:* Although designed to be specific to GHB, adaptation of the battery to other drugs of abuse by inclusion or exclusion of other selected items should be feasible.

82. A National Survey Profile of Medical Toxicology Fellowship Program Directors

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Background: The American College of Medical Toxicology website lists 29 Medical Toxicology Fellowship Training Programs. Per the Accreditation Council for Graduate Medical Education each program is required to have a Program Director (PD). To date, no profile of the professional responsibilities or work situations for PDs exists. We surveyed PDs regarding essential elements of, and resources for, PDs. PDs were queried regarding program operational issues as well as their opinions regarding developing a national in-service exam and a matching program for prospective fellows. *Methods:* All 29 PDs were surveyed via electronic mail to determine PD clinical duties, program duties, salary support, programmatic support and other issues. *Results:* 25 PDs (86.21%) responded to the survey. Table 1 summarizes selected data collected with regard to PDs stratified by academic rank. Additional collected data indicates that less than half of the PDs surveyed have adequate program cooordinator support and less than half enjoy departmental funding support. *Discussion:* Programmatic and PD support appears more robust based on the academic rank of the PD. Most PDs support the development of a national in-service exam for fellows in training as well as a national matching program for fellow candidates. *Conclusion:* It is essential that appropriate support be provided to each PD via departmental and institutional support. The current survey suggests that some program directors may lack important tools to optimally direct the training of medical toxicologists. Appropriate salary support and adequate protected time are essential.

83. A New Fab2 Antivenom for Widow Spider Envenomation (Latrodectism)

Stanford CF,[1] Bush SP,[2] Clark RF,[3] Arnold TA,[4] Haynes J,[5] Holstege CP,[6] Bogdan GM,[1] Garcia W,[7] Smith JP,[2] Dart RC.[1] *[1]RMPDC-Denver Health, Denver, CO, USA; [2]Loma Linda Univ, Loma Linda, CA, USA; [3]UCSD Med Ctr, San Diego, CA, USA; [4]LSU Health Sciences Ctr, Shreveport, LA, USA; [5]Texas Tech Univ, El Paso, TX, USA; [6]Univ of Virginia, Charlottesville, VA, USA; [7]Instituto Bioclon SA de CV, Mexico City, Mexico*.

Background: This multicenter Phase II clinical trial evaluated the safety and efficacy of Antivenin Latrodectus (Black Widow) Equine Immune Fab2 for treating latrodectism. *Methods:* Patients aged ≥10 years with latrodectism and moderate to severe pain, measured using the visual analog scale (VAS≥40mm), were enrolled in a randomized double-blind trial and received 50mL antivenom (AV) or saline control. VAS was measured every 30min after treatment for 2.5hrs. If pain worsened or did not improve clinically (≥13mm) by final VAS the subject was deemed a treatment failure (TF) and rescue therapy (commercially available AV) was administered. Patients requiring prescription pain medication ≤24hrs after discharge were also considered TFs. Adverse events (AEs) were recorded during observation and by phone at 2, 10, and 21 days post-infusion. Between-groups differences in ΔVAS (baseline–final) and rates of TFs and related AEs were compared (α = .05). *Results:* Twenty-four patients were enrolled by 8 sites in 5 states: 13 received AV, 11 received control. At baseline, mean VAS scores were 71 ± 21mm (AV) and 69 ± 17mm (control). ΔVAS was significantly greater in the AV group. TF rate was greater in the control group, but the difference was not statistically significant. The rate of related AEs was not significantly different between groups. No acute allergic reactions or serious AEs were reported. *Discussion:* The magnitude of pain relief in AV-treated subjects was almost twice that of control subjects. Twice as many control subjects were TFs. AEs associated with AV were infrequent (< 1 per subject); most (91%) were of mild or moderate intensity. *Conclusion:* This new Fab2 AV is a safe and effective alternative to supportive care. [Platform]

Variable	AV Group	Control Group	P-Value
Mean ΔVAS (SD)	55 (27)	29 (41)	.043
# of TFs (%)	3 (23)	6 (60)	.086
# of Subjects With a Related AE (%)	6 (46)	4 (36)	.697

84. Is Crotaline Fab Antivenom Efficacious for Severe Envenomations?

Stanford CF,[1] Bebarta VS,[2] Holstege CP,[3] Bush SP,[4] Richardson WH,[5] Olsen D,[6] Dart RC.[1] *[1]RMPDC-Denver Health, Denver, CO, USA; [2]Wilford Hall Med Ctr, San Antonio, TX, USA; [3]Univ of Virginia, Charlottesville, VA, USA; [4]Loma Linda Univ, Loma Linda, CA, USA; [5]Palmetto Health Richland, Columbia, SC, USA; [6]St Barnabas Hospital, Bronx, NY, USA*.

Background: Crotalidae Polyvalent Immune Fab (FabAV) is FDA approved for only mild and moderate envenomation. This study assessed the efficacy of FabAV in severely envenomated patients. *Methods:* Trained abstractors collected data from medical records of patients treated with FabAV in 17 U.S. hospitals. Clinical severity (SEV: 0–6 point scale) before and after FabAV was assessed using standard criteria. Patients with SEV > 4 were included. Initial control (IC) was determined by an expert panel as halting of progressive swelling and pain, reversal of systemic effects and a trend toward normalization of coagulation parameters. Recurrence (REC) was defined as a worsening of coagulation parameters

Table 1. Characteristics at Medical Toxicology Program Directors

PD Academic rank	n	EM as primary specialty	Service as PD > 3 years	Hours required to work in ED (average for rank)	Average salary stipend for PD role	In favor of national in-service exam for fellows	In favor of national matching for fellow slots
Full Professor	4	4	4	5	$86,250	4 (100%)	3 (75%)
Associate Professor	12	11	6	10	$43,500	10 (83.3%)	6 (50%)
Assistant Professor	7	6	4	12	$20,140	7 (100%)	3 (42.7%)
Instructor	0	N/A	N/A	N/A	N/A	N/A	N/A
No rank	2	2	0	19	0	1 (50%)	2 (100%)

after IC. Rates for SEV improvement, IC, REC, functional loss and death characterized efficacy. *Results:* Of 228 patients treated with FabAV, 28 (12%) were included. All patients were envenomated by a rattlesnake (RS) or unidentified snake in a RS endemic area. Mean SEV prior to FabAV was 5.3 ± 0.4. Twenty-three (82%) patients had PT > 50, INR > 2.0, PLT < 50 and/or FIB < 50. After FabAV (median of 2 doses, 12 total vials), SEV (mean: 1.3 ± 0.8) improved by a mean of 4.0 ± 1.0. Sixteen (57%) patients achieved IC. REC was found in 7 (63%) of 11 patients with lab results ≥24 hours after IC; one had an acute anemia requiring transfusion and had loss of joint mobility for 6mo–1yr. No fasciotomies were performed and no deaths occurred. *Discussion:* Severe envenomation was present in 12% of patients, all with suspected or confirmed RS bite. All patients improved after FabAV therapy; >50% of patients achieved control of all venom effects with FabAV. All patients recovered. REC was more common than in other post-marketing studies, which included less severely envenomated patients (8–22%). However, clinically significant bleeding and persistent functional loss were rare (<4%). *Conclusion:* FabAV is effective for treating the severely envenomated Crotaline snakebite patient. [Platform]

85. Prevalence of Expired Antivenin in AZA Antivenin Index

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Background: The Antivenin Index lists antivenin held by the American Zoo and Aquarium Association (AZA) members. In association with the American Association of Poison Control Centers (AAPCC), it was recently converted to an online database accessible to AZA and AAPCC members. *Methods:* Antivenin Index Queries. *Results:* On 3/27/07, the Index listed 44 antivenins (41 snake, 1 spider, 1 scorpion, 1 fish) reported by 53 AZA institutions, see Table. All lots of 18 types of antivenin were expired. *Discussion:* Many US hospitals stock FDA approved snake antivenin (often in limited supplies) for locally indigenous snakebites. The usual shelf lives of liquid versus lyophilized antivenin are 3 and 5 yrs, respectively. Many AZA institutions maintain stocks of many types of expired antivenin because of the cost and effort required for replacement and the widespread belief in the efficacy of expired antivenin. Sometimes expired antivenin is held after a venomous creature is no longer housed, in case it is needed by others. Published studies demonstrating the safety and efficacy of expired modern antivenin do not exist. *Conclusion:* The online Antivenin Index is an invaluable resource for poison centers and clinicians searching for antivenin for exotic snakebites. The AZA, AAPCC, AACT and ACMT professional organizations are urged to consider a joint position statement addressing the following concerns: Until appropriate studies have been published demonstrating the safety and efficacy of expired antivenin, institutions housing venomous creatures should be required to maintain stocks of unexpired antivenin suitable for their collection in case of exposures by their staff or visitors. When available FDA approved is preferrable to exotic antivenin. Health care facilities (HCF) must reimburse AZA institutions for replacement costs of unexpired antivenin. HCF should only be offer expired antivenin when unexpired is not available. [Platform]

FDA Approved & Most Common Antivenin Listed

	Unexpired	Expired
CroFab§	4/40	5/72
Antivenin Crotalidae Polyvalent*§	1/10	22/294
Antivipmyn Polyvalent	22/338	23/417
Black Widow Spider§	1/1	1/1
Antivenin Micrurus fulvius*§	0/0	7/33
Coralmyn Anticoral Serum	4/45	7/90
SAIMR Polyvalent	12/210	18/1,036
King Cobra	12/255	14/676
Green Pit Viper	13/139	4/65

Institutions/Vials, *Production ceased 2001, §FDA

86. Venom Lysis Syndrome: A Cause of Lethality in Rattlesnake Envenomations

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Background: Rattlesnake envenomations cause tissue necrosis, coagulopathy, and other effects. In an experimental model of rattlesnake envenomation, two pigs expired before receiving treatment. Analysis of cause of death is presented. *Methods:* Swine were sedated with Xylazine and Telazol and intubated. An ear vein catheter and external jugular vein line with subcutaneous port were established. Blood samples for PT, PTT, INR, CBC, electrolytes, and CK were obtained at the beginning of the experiment and every two hours for eight hours, and for signs of distress. Lypholized *Crotalus atrox* (Western diamondback rattlesnake) venom was obtained from Natural Toxins Research Center (Kingsville, TX) and resuspended in sterile water to a concentration of 200 mg/mL. Each pig received a subcutaneous injection of 1 mL of the venom solution in a distal hind paw with a 27 gauge needle, at a depth of 3 mm. General anesthesia was maintained for 6 hours. Fentanyl patches and morphine injections were given for pain. Euthanasia was available for distress not relieved with morphine and fentanyl. The protocol was approved by the institutional animal care and use committee. *Results:* Two pigs expired precipitously at 10 and 14 hours. From baseline to death, mean potassium rose from 3.9 to 14.9 meq/L. Mean CK rose from 571 to 8511 U/L. Mean INR rose from 1.0 to 2.95. Mean hemoglobin fell from 8.95 to 7.8 gm/dL. Mean platelet count fell from 326k to 116k/uL. Postmortem examination demonstrated extensive necrosis of subcutaneous tissue more than muscle, from the injection site onto the adjacent torso in both pigs. *Discussion:* Death occurred precipitously with hyperkalemia, elevations of CK, no life-threatening hematological abnormalities, and extensive tissue necrosis. The clinical picture is similar to tumor lysis syndrome that occurs with rapid tumor cell destruction from chemotherapy. The term 'venom lysis syndrome' is proposed for the phenomenon observed here. Ongoing investigations will further refine this syndrome. *Conclusion:* Cause of death in this experimental model of rattlesnake evenomation was hyperkalemia from extensive tissue necrosis before life-threatening hematological abnormalities developed. [Platform]

87. A Pilot To Increase Awareness of the Poison Control Center in Latino and Chinese Communities

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Background: A needs assessment showed that Latino and Chinese caregivers of young children were unaware of the local Poison Control Center (PCC). To increase awareness about the PCC, a pilot was developed using social marketing techniques. *Methods:* Two communities were chosen for the pilot based on low call rates to the PCC and significant Latino and Chinese populations. The intervention consisted of displaying a bilingual awareness poster at local businesses (N = 30), working with community pharmacists (N = 20) and pediatricians (N = 20) to distribute materials in each community, and running a newspaper ad in the native language for 3 weeks. The pilot was conducted between May and December 2006. *Results:* Pre (N = 50) and post (N = 50) surveys were conducted with a sample of caregivers of children in both the Latino and Chinese communities by the PCC health educators. Post-test survey questions were added to examine recall of PCC materials in the community. After the intervention, significantly more Latino caregivers identified children under 5 as highest risk for poisonings ($p < .001$); reported knowing the PCC number ($p = .013$), and had heard of the local PCC ($p. < 001$). There were no significant increases for the Chinese survey respondents. Calls to the PCC from the Latino community also increased when compared with the same time the previous year. *Discussion:* We had success increasing collaborations between the PCC and community-based agencies. The pilot was more effective in the Latino community compared with the Chinese. It is unclear if our findings were influenced by sample size, time frame, translation from English, and possible external bias. *Conclusion:* A sample of Latino caregivers showed positive results with this targeted intervention. More work is needed to better understand the differences between the findings in these communities. Other techniques to adequately measure education effectiveness on a community level will be explored.

88. Fatal Fall into a Volcanic Fumarole

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Background: Even though the United States (US) is one of the most concentrated sources of volcanic activity on earth; reported fatal exposures to volcanic gases are rare. A fumarole is a volcanic vent from which gases such as carbon dioxide, nitrogen gas and hydrogen sulfide are emitted. Fatalities secondary to inhalation of volcanic gases in the US have rarely been reported. We report the deaths of 3 ski patrol members at a ski resort. *Case Report:* After a snowstorm, a group of ski patrol members were fencing off a well-known fumarole when the snow collapsed. Two members slid into the hole and rapidly lost consciousness. A third member carrying oxygen containers descended in and lost consciousness within 30 seconds. A fourth member affixed a medical-type oxygen mask on himself but lost consciousness quickly upon descent. He was rescued after a colleague held his breath long enough to tie a rope around him so he could be pulled out. Unfortunately, the initial 3 victims were too far down the hole and could not be safely extracted for at least 25 minutes until fire personnel wearing self-contained breathing apparatus arrived. All 3 of the initial victims expired at the scene while the fourth victim survived. Autopsy results for all 3 were consistent with a suffocation/asphyxiation death. *Case Discussion:* Atmospheric sampling data of the this fumarole dating back decades shows carbon dioxide levels typically range from 97–99%, nitrogen gas 1–3 % and hydrogen sulfide .004–.07%. Given that carbon dioxide and nitrogen act as simple asphyxiants and that carbon dioxide levels above 10% are considered potentially lethal, the determined cause of death for all 3 ski patrollers is not surprising. Although atmospheric measurements were taken over one hour after the accident, the reported levels were deemed to be much lower than those likely at the time of the event due to significant venting that occurred during rescue efforts. *Conclusion:* During winter months, snow can build up over volcanic vents which hot gases can melt to form gas-filled snow caves/pits in deep snow. Recognizing such hazards is essential when trekking in volcanically active areas.

89. Integrating Poison Prevention Training and Outreach into the EMSC Program

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Background: As part of the 2007 National Poison Prevention Week (NPPW) campaign, and a larger 2006–2007 EMS Initiative, the Poison Control Center (PCC) collaborated with the Department of Human Services (DHS) to focus on educating school nurses on poison prevention and safety via the EMSC program. The goal of the EMSC program is to ensure that appropriate emergency medical care is available for ill and injured children at every point along the continuum of care, including primary prevention. Therefore, the PCC offered to present at DHS's one-day workshops held each fall to provide up-to-date information on current and relevant topics to school health professionals (nurses, social workers and health educators). *Case Report:* Utilizing the help of PCC staff and satellite coordinators, we set out to: 1. Deliver a 30 minute poison prevention presentation at the DHS *"2006 School Health Days"* workshops held at 6 different locations throughout the state from October through November, 2006 (1,000 attendees expected). 2. Recruit school nurses to complete the online Poison Prevention Educator Training Course (PPETC) before the end of NPPW 2007 (March 24). 3. Encourage trained school nurses to conduct a poison prevention event before the end of NPPW 2007. *Case Discussion:* In less than 6 months: 1. The PCC speakers educated more than 900 school health professionals via the *School Health Days* workshops. 2. A total of 259 school nurses completed the online PPETC, increasing the number of registered, trained school nurses by 301%. 3. Between October 1, 2006 and March 24, 2007, 82 school nurses from 31 counties ordered free poison prevention educational materials for 95 poison prevention education events reaching 22,330 students and their caregivers. *Conclusion:* The creation and action implementations have resulted in expanded opportunities for cooperation between the PCC and school nurses (and other school health professionals) in our state. School nurses have and will be given the training, tools and materials to be competent public poison prevention educators and advocates.

90. Methemoglobinemia from p-Chloroaniline Dust Exposure

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Background: We describe a patient who developed methemoglobinemia from a rare occupational exposure to p-chloroaniline. *Case Report:* A 20 year-old man was working at a chemical waste plant when he developed dizziness, abdominal pain, nausea and vomiting. He had been shoveling an unknown chemical prior to symptom onset. EMS found the patient lethargic and cyanotic with a normal glucose. At a local hospital the patient complained of abdominal pain, tinnitus and dizziness. The exam was remarkable only for tachycardia, cyanosis and pulse oximetry of 75%. Despite intubation and multiple ventilator changes, the patient remained cyanotic and hypoxic. Upon transfer to our facility, the vitals were T 37.0 C, HR 123, RR 14, BP 160/100 and pulse oximetry of 83%. The patient was unresponsive and exhibited diffuse cyanosis. The remainder of his exam was unremarkable. An EKG showed sinus tachycardia and a CXR was clear. Arterial blood appeared unusually dark. ABGs showed a pH 7.38, pCO_2 41 mmHg, pO_2 497 mmHg, bicarbonate 24 mEq/L and methemoglobin 69%. CBC, electrolytes and UA were normal. Methylene blue (2 mg/kg IV) was administered. Within 30 minutes, the cyanosis resolved and pulse oximetry was 92%. Methemoglobin fell to 30%. The patient awoke and vitals normalized. Four hours later, a repeat CXR was clear and the methemoglobin decreased to 6%. He was extubated and recovered without sequelae. P-chloroaniline was later identified as the chemical involved. He denied direct contact with the chemical and wore goggles, rubber gloves, boots and coveralls. He was, however, not wearing a dust mask or respirator. Both p-chloroaniline and metabolites were found in the patient's urine using GC-MS. *Conclusion:* P-chloroaniline is used in the chemical manufacturing of dyes and is a much more potent cause of methemoglobinemia than aniline. In contrast to aniline, this case shows that p-chloroaniline can cause life-threatening methemoglobinemia from dust exposure alone.

91. Is Haff Disease Hemlock Poisoning

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Background: Seasonal epidemics of *Haff* disease, characterized by severe myalgias and rhabdomyolysis, have been reported from Europe following consumption of cooked freshwater fish with fatality rates of 1–10%. Since 1984, 13 cases of an identical illness with similar fatalities have been reported in the US following consumption of cooked buffalo fish, *Ictiobus cyprinellus*, a freshwater herbivore indigenous to the Mississippi River basin. In 2001, 8 cases of a similar illness without fatalities were reported in Louisiana following consumption of boiled crayfish. *Methods:* A descriptive epidemiologic investigation of the Louisiana cases was conducted in order to compare local cases with other reported US cases. *Results:* All cases occurred during early spring and were characterized by*:* (1) 8-hr mean incubation periods; (2) stiffening muscular rigidity culminating in substernal pain, mimicing MI; (3) myoglobinuria and elevated serum CPK; (4) normal ECGs and serum cardiac injury biomarkers. The crayfish consumed by case-patients were purchased from a single vendor, who displayed crayfish and buffalo fish in the same bins. Observed feeding behaviors and necropsies confirmed that buffalo fish consumed floating hollow roots and stems of water hemlock growing along the banks of brackish surface waters during early spring. Mouse bioassays of buffalo fish secretions and tissues reproduced *Haff* disease-consistent histopathological findings of rhabdomyolysis and renal tubular damage. *Discussion:* Several animal species, including ciguatoxic saltwater fish and upland game birds, have been observed to bioconcentrate heat-stable toxins contained in their foodsources without being poisoned. Similarly, buffalo fish were observed to consume water hemlock during early spring when other shoreline vegetation was sparse. *Conclusion:* Epidemiologic comparisons, overlapping plant and animal habitats, buffalo fish feeding behaviors and necropsies during seasonal outbreaks, and mouse bioassay analyses of fish samples indicated that *Haff* disease following consumption of cooked buffalo fish and boiled crayfish exposed to buffalo fish was caused by a cicutoxin-like, heat-stable myotoxin from water hemlock. Nevertheless, further corroborating evidence of *Haff* disease as indirect water hemlock poisoning is recommended.

92. Does Overdose of Atypical Antipsychotic Medications Cause Ventricular Arrhythmias? A Systematic Review

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Background: Atypical antipsychotic medications (AAPM) block cardiac potassium channels and prolong the QT interval. QT interval prolongation is a risk factor for ventricular arrhythmias (VA) including Torsades de Pointes. The objective of this study is to determine if VAs occur in overdose with AAPM. *Methods:* We conducted a systematic review on reports of acute overdose of risperidone, olanzapine, ziprasidone, quetiapine and aripiprazole. MEDLINE was searched from 1966 to Nov 2006. In addition, bibliographies of identified reports, the abstracts of two international toxicology meetings and death summaries from the AAPCC annual reports (1994 - 2006) were searched. We double abstracted reports for demographics, AAPM, co-ingestions, QTc intervals, occurrence of VAs and death. *Results:* Our search yielded 133 reports (85 MEDLINE, 7 bibliographies, 33 abstracts, 8 death reports). From these reports, we identified 200 patients with case level data (Table) and 26 case series (total of 2791 patients) with summary data. For case level data, there were 11 fatalities, 7 with life-threatening co-ingestants. Two single agent quetiapine deaths had limited descriptions that have been due to a cardiac event, but no VA was reported. There were 2 patients with VA: one patient had terminal VA in a mixed overdose and the other patient had non-sustained VA after olanzapine ingestion. Both patients died. Only one patient with prolonged QTc died and it was in a mixed overdose with imipramine. VA was not reported in any of the cases with prolonged QTc. The case series reported 1 patient with fatal VA in a mixed ingestion with trimipramine. Prolonged QTc was reported in only 6 /26 case series (22 out of 258 patients in these 6 series). *Discussion:* Significant VA has not been reported following acute, single-agent AAPM overdose. Prolonged QTc does occur but is not predictive of VA. Our study is limited, as fatalities may have had VA prior to death that was not reported. *Conclusion:* This study suggests that VA are very unlikely to occur following AAPM overdose.

age gp	N	Long QTc	VA	Death
<7 yr	13	2	0	0
7–16 yr	21	1	0	1
>16 yr	166	31	2	10

93. Development of a Model Health Department Poison Safety Training

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Background: The role of Poison Control Centers within the context of the larger public health system is being examined and asked to develop a more systematic, coordinated approach to providing prevention services. It has even been suggested that in order to survive in this era of tightening budgets, Poison Control Centers must integrate and coordinate efforts across county and state lines. This study explores a specific area of integration and coordination with a critical health care agency, the local Department of Health. *Methods:* A needs assessment survey was mailed to the 24 counties of our Center's coverage area. The survey was used to determine what the Departments of Health perceived are the most crucial topics for a poison safety training. Based on the analysis of this data, the poison safety topics were compiled to develop a Poison Safety Training PowerPoint presentation. The training was offered to a sample size (n = 5) of Departments of Health. Pre-tests, post-tests and training evaluation forms were also given to assess poison knowledge and to evaluate the efficacy of such a training program. *Results:* The response rate from the 24 counties of Department of Health was 100% (24 out of 24 counties). The topics the Departments of Health reported as the most crucial poison safety topics included: 1) Lead Poisoning 2) Food Poisoning 3) Child Safety 4) Carbon Monoxide and 5) Poisons and Terrorism. The data from the pre-tests and post-tests were analyzed using the dependent t-test on Excel software. The percentage of respondents' (N = 59) knowledge on poison safety increased significantly after the training from 64.31% to 93.43%. *Discussion:* This poison safety training was our effort to interact, network and pool resources with a health care agency. Positive feedback from the evaluation forms point to this poison safety training becoming a model for other collaborative programs. *Conclusion:* The development of a Model Health Department Poison Safety Training is the first step towards the goal of integration and coordination with other health agencies and organizations. In addition, it may serve as a guide to how local Poison Control Centers can develop educational products that can be utilized across county and state lines.

94. Use of an Interactive Response (IR) System in Handling the Increased Demands of Public Health Emergencies

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Background: Our center operates an automated IR system which allows callers to retrieve information using a touch tone telephone, reducing their need to speak with personnel. We developed three inbound IR applications to assist in handling increased public informational demands during health emergencies: zip code-specific messaging (ZCSM) for locating established prophylaxis points of distribution (POD), drug identification (Drug ID) of antibiotic medications to be dispensed, and a frequently asked question (FAQ) library for health information retrieval. *Methods:* The IR applications were tested during an exercise involving public health workers (n = 100) from a 10-county region. Each application was evaluated by a third of participants on eight criteria including ease of use, trust, and recorded message quality (speed, volume, understandability) using a 5 point scale (1 = strongly disfavor, 5 = strongly favor). Accuracy of applications assessed from callers recording information provided based upon their entries (zip code) or their answers to assigned questions ("What is the pictured drug?"). *Results:* FAQ Library received the most favorable user ratings with a majority indicating preference in using it in lieu of speaking to a person during a health emergency. ZCSM and Drug ID were the most accurate, with 100% of users recording correct answers for their POD location or pictured drug. Users suggested improvements for all applications and many have been implemented. *Discussion:* Although all three applications were favorably rated, the FAQ library was the only one preferred by users rather than speaking directly with a person. Allowing callers to retrieve their own information in emergencies using IR technology should result prove accurate and acceptable. *Conclusion:* IR applications offer an automated solution for call centers in handling the increased demands of a public health emergency.

IR Application Evaluation

Application	N	Accuracy	Mean Score	Preferred?
FAQ Library	28	96%	4.5	Yes
ZCSM	36	100%	4.3	No
Drug ID	26	100%	4.3	No

95. Digitalis Toxicity from "Spinach": A Case of Mistaken Identity

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Background: Reports of poisoning from cardiac glycoside-containing plants are rare. We present a case of unintentional digitalis toxicity due to misidentification of a Foxglove plant as baby spinach. *Case Report:* A 32-year-old healthy female prepared and ate a salad of what she believed to be homegrown baby spinach. She ingested ten leaves of a plant that her husband, an amateur arborist, had planted one year earlier. While eating the salad, the patient noted that the leaves tasted bitter. Seven hours later, the patient experienced nausea, bilious emesis, and transient flashing spots in her peripheral vision. She took the remaining leaves to a local Emergency Department (ED), where the staff performed an internet image search and preliminarily identified the plant as Foxglove. The patient was bradycardic (54 beats/min) and hyperkalemic (5.2 mmol/L) upon ED presentation; premature atrial contractions were present on her

EKG. The patient's initial total digoxin level was 5.0 ng/mL. Ten vials of digoxin-specific Fab antibody fragments (Digibind) were administered after consultation with the regional poison control center, and she was admitted to the cardiac ICU. Two hours after Digibind administration, the patient's heart rate had normalized to 80 beats/min; a repeat serum potassium level was 4.5 mmol/L. The patient had no further symptoms; vital signs and electrolytes remained normal, and she was discharged home on hospital day #2. The remaining leaves were taken to a local horticulturist, who positively identified them as belonging to the Foxglove plant. *Case Discussion:* Both Foxglove and baby spinach leaves are oval in shape and dark green in color. However, Foxglove leaves are 6–12 inches long; they contain visible veins, a wrinkly texture, and hair-like filaments. Baby spinach leaves are smaller and smoother, with no veins. *Conclusion:* Misidentification of plant species can result in significant toxicity after ingestion. Improved recognition of commonly cultivated plants can minimize both medical complications and the use of costly antidotes. The internet can be a powerful tool for use in the identification of an unknown plant species, particularly when combined with expert opinion.

96. Non-Anion Gap Metabolic Acidosis (NAGMA) in Ethylene Glycol (EG) Toxicity

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Background: EG classically produces an elevated anion gap (AG) metabolic acidosis. We report a series of patients with EG toxicity with NAGMA without known associated confounding factors. *Case Report:* A retrospective review of PCC records were searched over 7 years (2000–2006) by unique AAPCC codes for EG and antifreeze. Cases were reviewed and excluded for miscoding, information calls, animal exposures, or non-ingestion exposures. The HCO_3 gap, or Delta Ratio (DR) was calculated using the formula: DR = [AG–12]/[24–measured serum HCO_3], where AG = Na–Cl–HCO_3, (all in mEq/L). A NAGMA was considered present when the DR < 1. Of 189 cases, 118 were excluded, largely because of non-ingestions, animal and information calls. Of the remaining 71 cases, 8 had a component of NAGMA at presentation. Their calculated AG was only 16–28, despite measured serum HCO_3 ranging from 4–10mEq/L. The DR ranged from 0.29–0.82. 5/8 patients had EG levels, and EG toxicity was presumed based on history and lab results in the remaining 3. 2/8 patients with NAGMA had elevated Cl levels: one patient with an ileal conduit had an initial serum Cl of 127 mEq/L, while another presenting with coma and renal failure 2 days post-ingestion had a serum Cl of 124 mEq/L, possibly due to resuscitation with normal saline. In the other 6 cases no explanation for the NAGMA could be determined. *Case Discussion:* The absence of a significant AG elevation in the setting of metabolic acidosis after EG ingestion without other confounding factors (such as ethanol, Li_2CO_3, or Br) has not previously been recognized to occur, and the mechanism is unknown. Hyperchloremic acidosis contributed to the low DR in only 2 patients from this series. The elevated DR caused by intracellular and bone buffering of glycolic acid may be normalized early in the course of EG toxicity as excess extracellular anions are excreted in the urine, as has previously been reported in DKA. *Conclusion:* The absence of a significant AG elevation cannot exclude EG poisoning. Clinicians should be aware of the potential for NAGMA in patients with significant EG toxicity. Further study is needed to determine the mechanisms by which this occurs.

97. Iatrogenic Respiratory Acidosis in Intubated Aspirin Poisoned Patients

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Background: Most texts discussing ASA poisoning warn about the risk of endotracheal intubation and mechanical ventilation (MV) despite little empirical support. Since ASA is a weak acid, neurotoxicity predictably worsens as the blood pH falls. In patients who are appropriately ventilated post-intubation, MV should not be harmful. However, if ASA-poisoned patients are mechanically ventilated at conventional settings, their respiratory alkalosis will be abolished, pH will decrease, and their condition may worsen. We reviewed our data to determine the clinical and acid/base effects of MV in ASA poisoning. *Case Report:* We searched our PCC database (2001–2006) for cases of ASA poisoning (defined as level >50 mg/dL) who had MV listed as a therapy. Free text entries were individually reviewed to identify those patients who had post-MV arterial blood gas results. The pH, PCO_2, and clinical course were recorded. Cases missing data were excluded. Of the 9 patients identified, 5 had post-MV data available. (Of the 4 who did not, 1 expired and 3 were eventually discharged home.) In all 5 patients, the post-MV pH was < 7.4. In 4/5, post-MV PCO_2 was >50 mmHg. Two of these 5 had pre- and post-MV blood gas available. In both there was a marked decrease in pH (7.47to 7.25; 7.42 to7.14) and increase in PCO_2 (24 to 67, 25 to 66) following intubation. One of the 5 patients died within 3 hours of intubation (ASA 85 mg/dL) and another sustained severe neurological injury requiring discharge to a long-term care facility (ASA 84mg/dL). The other 3 were discharged home. *Case Discussion:* In our series, MV was accompanied by respiratory acidosis and a fall in the blood pH. We did not have access to the ventilator setting to determine if the appropriate settings were chosen, though the observed respiratory acidosis likely was avoidable. In 2 of the 5 patients, MV was associated with death or permanent neurological disability. Because of the retrospective nature of our data collection, we cannot demonstrate that MV caused clinical deterioration. *Conclusion:* Patients with ASA poisoning were not adequately mechanically ventilated. A prospective data collection should be performed.

98. High Dose Insulin in Multiple Drug Overdose

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Background: High Dose Insulin (HDI) has been used in β-blocker (BB) and calcium channel blocker (CCB) overdose (OD) in doses up to 1u/kg/hr in humans. *Case Report:* A 65 year-old 100kg female presented via paramedics one hour after a multiple drug ingestion in respiratory arrest. Seizure activity and V Tach were noted. Dilated pupils, GCS of 3, BP 79/43, and HR 70 were present on arrival. Deterioration to PEA with a wide QRS with a HR of 40 ensued. Multiple doses of atropine, epinephrine, sodium bicarb and CaCl were given. Assuming a BB OD, glucagon 2 mg, D50, and insulin 10 units IV bolus were given. The patient was intubated and norepinephrine (NE) was started and titrated to a maximum dose of 40 mcg/min. Eighty units of insulin IV bolus was given and an insulin drip of 80u/hr was started. Initial lactate was 9.8 and pH was 6.85. In the MICU, vasopressin (VE) at 4 u/hr was also added to help maintain blood pressure. The EKG showed a QRS of 240 and a QTc of 700. The arterial pH was maintained at 7.5–7.55, with episodes of V Tach and persistent borderline hypotension. Cool extremities without pulses and poor capillary refill were noted. On day 2 over a 4 hour period of time the insulin infusion was increased by 1u/kg/hr increments while maintaining a blood glucose >100mg/dl and a MAP > 65, while simultaneously weaning off the VE and the NE. Over this time the patient developed peripheral pulses and warm extremities. At a dose of 600 units insulin/hr all vasopressors were discontinued. On day 3 the insulin was slowly weaned by 1u/kg/hr. The course was complicated by pulmonary embolism. The patient recovered with evidence of mild anoxic injury with planned discharge to a TCU. No events of hypoglycemia occurred. Citalopram and amitriptyline overdose was confirmed by quantitative analysis. *Case Discussion:* This case represents the highest reported dose of HDI in a human OD. Previous reports do not exceed 1u/kg/hr in cases of BB and CCB OD's. Even though the cardiotoxicity in this case was likely due to sodium and potassium channel blockade, HDI was effective in improving clinical and cardiovascular parameters. *Conclusion:* In this patient insulin at a dose of 6u/kg/hr demonstrated potent cardiovascular inotropic effects while eliminating the deleterious effects of vasopressors.

99. The Role of a Poison Center in Identifying and Limiting a Public Health Outbreak

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Background: Many poison centers partner with public health agencies to handle weekend and after-hours consultations and emergencies. We describe the effective use of poison center capabilities in identifying, treating, and limiting a public health outbreak of food-borne botulism. *Case Report:* On September 8th 2006, our poison center received a call regarding a 77 year old male admitted to a hospital neurology service with dysarthria, dysphagia, and generalized weakness. Within hours he developed respiratory failure and required intubation. Our poison center was contacted regarding a concern for possible botulism. Further information revealed that the patient's wife and a friend both had similar symptoms and had eaten together on the previous night. Furthermore, all three sought treatment at different hospitals. Given the clinical picture, a presumptive diagnosis of botulism was made. The poison center successfully located the other two patients and provided information regarding the treatment of botulism to their physicians. Additionally, our poison center notified the on-call local public health official and the Centers for Disease Control and Prevention to initiate the release of botulinum antitoxin. We also informed the state and local public health officials of our concerns for a food-borne outbreak due to the common meal these patients shared. Their investigation determined that the source of botulism was carrot juice produced in another state but purchased locally. *Case Discussion:* This case illustrates the important role that poison centers can play in the public health arena. While only one case was called into the poison center, we located the other two cases, coordinated care, and initiated antitoxin release. By identifying a common encounter for these patients, we provided a starting point for the epidemiologic investigation by public health officials. *Conclusion:* The contribution of poison centers to public health has traditionally centered around prevention and education. This report demonstrates that poison centers can also make a great impact by recognizing, treating, and limiting the severity of public health outbreaks.

100. A Pilot Program for Poison Control Center Pediatric Mushroom Ingestion Guidelines

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Background: Amanita phalloides is commonly found in our region and has been found in cultivated areas as well as in the wilderness. Most suspected mushroom ingestions were previously referred to the emergency department (ED) for treatment with activated charcoal (AC). The PCC developed a triage algorithm to decrease unnecessary ED referrals. *Methods:* After consulting with local mycologists, the PCC developed triage guidelines based on the physical description and amount of mushroom ingested. ED referral (and AC) was recommended for calls received within 2 hours of ingestion of more than a taste of a mushroom with white or cream colored gills. All other suspected ingestions were monitored at home, with PCC follow-up at 6–12 hours and 12–24 hours. Patients with delayed onset vomiting or diarrhea were referred to ED for evaluation. Mushroom ingestions involving patients aged 5 and under for year 2006 were reviewed for mushroom description, location, time from ingestion to PCC contact, amount ingested, symptoms, treatment, time of follow-up call from time of ingestion, disposition and outcome. Cases without follow-up after the initial consult, or in which follow-ups were at ≤ 4 hours post-ingestion, were not evaluated for outcome. *Results:* Of 157 cases reviewed, 72 (46%) and 85 (54%) were managed in the home and ED respectively. This compares with 80% who were managed in the ED prior to implementation of the protocol. AC was recommended in 78 cases. Of 74 cases that had follow-up performed at ≥4 hours post ingestion (average length of observation 19.7 h, range 4–49 h), 89.2% had no effect, 9.5% had minor effects (mainly self-limited vomiting and diarrhea), and only 1 (1.3%) developed an outcome beyond minor effect (transient vomiting and minor increase in liver enzymes). 61% of exposures were yard mushrooms, and 24% of exposures had white or cream colored gills. Overall guideline compliance was 78%. *Discussion:* More patients were observed at home with the implementation of the new triage algorithm. No patient suffered significant sequelae. *Conclusion:* Small ingestions of mushrooms without white or cream colored gills in our PCC region may be observed at home with referral to the ED only if symptoms develop.

101. Patient Outcomes in a Poison Center/EMS Collaborative Project

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Background: The West Texas Regional Poison Center (WTRPC) and El Paso Fire Medical Services (EMS) have a formal collaboration in which the WTRPC specialist provides toxicological and treatment information to EMS dispatchers and their 911 callers before an ambulance is dispatched. If the situation is determined to be a minor poisoning and all three parties agree that hospital treatment is not medically necessary, an ambulance is not dispatched and the patient is managed at home per WTRPC protocol (No Roll). Previously, we demonstrated the potential

cost savings this partnership has provided to patients, their families, and/or local taxpayers, in addition to the more efficient use of limited emergency resources. However, has this program affected patient safety? The objective of this study is to determine if any patient has been harmed by this cost-saving initiative. *Methods:* We reviewed WTRPC records for 2002 through 2006 and specifically focused on patients' clinical effects and outcomes. *Results:* 1753 poisoning calls to 911 were classified as No Rolls. There have been no cases resulting in severe effects or death as a result of an ambulance not being dispatched to the patient.

Patient Outcomes		
No Effect	380	21.7%
Minor Effect	563	32.1%
Moderate Effect	87	5%
Not Followed (non-toxic)	77	4.4%
Not Followed (minimal toxicity)	560	31.9%
Unable to Follow	53	3%
Unrelated Effect(s)	31	1.8%
Confirmed Non-exposure	2	0.1%

2002–2006 data.

Discussion: This partnership safely treats victims of minor poisonings at home as opposed to the region's EDs while allowing more EMS units to be available for other emergencies. A key factor that has helped ensure patients' safety is that if any of the three parties (WTRPC specialist, EMS dispatcher, or 911 caller) feels uncomfortable managing the case at home, an ambulance will be dispatched to evaluate and, if needed, transport the patient to an ED. *Conclusion:* The poison center-EMS partnership safely manages patients with accidental minor poisonings at home. Similar partnerships between poison centers and local EMS agencies could be replicated in other regions of the country and may result in significant cost savings to the country's health-care system.

102. Poisoning by Susumber Berries

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Background: Salt cod with Susumber berries (SB) is a native dish in Jamaica. When SB are picked in the unripe state they may be high in solanine alkaloids. *Case Report:* On 2 occasions, 5 Jamaican patients became sick after eating a meal of salt fish with SB. In the 1st episode, a 61 yr woman and man were admitted after consuming the meal. The woman complained of generalized weakness, had slurred speech, bilateral ptosis, dysphasia and dysarthria. Her labs became elevated on day 2: bilirubin 2.8, AST 319 and ALT 150. ABG: pH 7.25, pCO2 73, pO2 75 and O2 sat of 92%. Pt was intubated and placed on assisted ventilation (required for 10 days). Pt was hospitalized with a prolonged fluctuating course requiring a tracheotomy for 21 days. Analysis of the berries identified a solanine-like compound. Pt 2 consumed a lesser amount of SB experienced dry throat/dysarthria. He was diagnosed as having a suspected TIA and was discharged the following day. A 3rd pt who had also eaten a lesser amount of SB, experienced transient diarrhea and remained at home. A 4th pt who was a 36 yr old man, presented with slurred speech, confusion, muscle weakness, aches, headache and abdominal pain after ingesting a similar meal the night before. Initial lab tests including CBC, electrolytes, liver, renal and coagulation studies were normal. He was discharged 2 days later. Although the SB eaten by the patient was visually identified by the patient's MD, no lab confirmation was performed. A 5th pt who ate with the 4th pt was also hospitalized with similar symptoms but no other information was available. *Case Discussion:* Solanine poisoning can be produced from the ingestion of susumber berries used in a native dish from Jamaica. In the 1st case, botulism and demylinating diseases were originally suspected until various testing of blood, urine and stool cultures, EMG, LP, MRI, EEG and carotid doppler were conducted to rule these out. Patient 2 was misdiagnosed as having a TIA, and in patient 4, the laboratory confirmation for solanine was unavailable. *Conclusion:* Solanine poisoning following the ingestion of unripe susumber berries can produce significant toxicity including gastrointestinal and neurological effects that can be difficult to diagnose.

103 Massive Atenolol Ingestion with Highest Reported Plasma Concentration

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Background: Atenolol, generally considered the least toxic beta blocker, usually produces only mild toxicity in overdose. We report a case of massive atenolol ingestion causing severe toxicity with the highest reported atenolol level, 38,700 ng/mL. *Case Report:* A 67 y.o. male presented to an outside hospital after ingesting an estimated 5 grams of atenolol and unknown quantity of risperidone. He was obtunded with HR in the 30's and SBP in the 60's. The patient was intubated and started on glucagon and epinephrine drips. Upon arrival to our facility his physical exam showed evidence of hypoperfusion and he remained hypotensive and bradycardic (HR 50, SBP 70 mmHg, MAP 50 mmHg, T 94 F), despite epinephrine and glucagon drips. ECG revealed sinus bradycardia, rate 57bpm, PR interval 220msec, QRS duration 102msec, and QTc 530msec. ABG revealed pH 7.26, pCO_2 42 mmHg, HCO_3 17.7mmol/L. All other labs were normal. A pulmonary artery catheter was placed which revealed a CO of 7.4L/min and SVR of 497(dyne*sec)/cm^2. The addition of norepinephrine and phenylephrine were required for adequate BP support. Insulin therapy was instituted at 1U/kg/hr, but no clinical response was seen. Although initially oliguric, urine output normalized and renal function remained normal. A serum atenolol level obtained at the time of admission was 38,700 ng/ml (200–500 ng/ml). Total risperidone level (risperidone + 9-hydroxyrisperidone) at the time of admission was 204 ng/ml (70–110 ng/ml). Epinephrine, glucagon, insulin, and phenylephrine infusions were weaned off over the first 20 hours. The patient required 48 hours of dobutamine for ionotropic support, and 96 hours of norepinephrine for BP support. Approximately 80 hours after ingestion, the serum atenolol level was 680 ng/ml, and total risperidone level was 69 ng/ml. He was extubated on hospital day 4, but required another 6 days of diuresis and oxygen therapy secondary to persistent pleural effusions and pulmonary edema. The patient recovered completely. *Case Discussion:* Hemodialysis has been recommended in severe atenolol toxicity. This case demonstrates that aggressive supportive care can result in complete recovery. *Conclusion:* An atenolol level of 38,700ng/ml is the highest reported level associated with survival to date.

104. Outcomes Following Accidental Supratheraputic Aripiprazole (Abilify) Ingestions in Children and Young Adults

Sawyers B, Thole D, Lovecchio F. *Banner Poison Control Center, Phoenix, AZ, USA*.

Background: Outcomes following accidental aripiprazole ingestions are poorly reported. *Methods:* This was a prospective study based out of a poison control center (PCC). The study was prospective from 3/06–3/07. All calls were taken by poison control specialists whom followed the patients for an outcome. The inclusion criteria were an isolated aripiprazole ingestion that were non-suicidal and age less than 19 years old. Descriptive data such as age, amount ingested, time to onset of symptoms and outcomes (i.e. gastrointestinal, neurological, and cardiovascular) were recorded. *Results:* A total of ~ 56,000 exposure calls occurred during the study period and 32 cases fit the inclusion criteria. Mean age was 6.5 years with a range of [1.5–19] years old. A therapeutic dose of aripiprazole is 5–20 mg/day in children. The mean dose in our patients was 74 mgs with a range of 2–450mg. 22/32 cases were admitted for hospitalization. In 4/32, (12.5%) patients the exact dose was know. CNS depression described as lethargy occurred in 14/32 (44%) which lasted on average 20 hours. Tremor in 4/32 (12.5%) which lasted as long as 48 hours, ataxia in 3/32 (9.4%) and dystonia 2/32 (6.2%). Tachycardia on initial presentation occurred in 6/32 (19%). Vomiting occurred in 2/32 (6.2%). Included in these cases were Included were accidental misuse, adverse drug reactions, unintentional, general exposures and therapeutic errors. All intentional or multiple drug overdoses were excluded. No deaths were reported. All symptoms resolved within two days. *Discussion:* Accidental aripiprazole ingestions may result in lethargy, tremor and dystonia. Although tremor occurred in 12.5% of ingestions, it remained present for up to 48 hours. *Conclusion:* Most commonly, accidental aripiprazole ingestions may result in CNS symptoms and occasionally this toxicity is prolonged.

105. Delayed Hepatotoxicity from Combined Acetaminophen and Diphenhydramine Despite 21-Hour Intravenous N-Acetylcysteine

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Background: Anticholinergic (AC) medications slow gastrointestinal (GI) motility and may delay toxicity with oral overdoses. We report a case of an acute overdose of acetaminophen/diphenhydramine (AP/DP) in which significant transaminitis (TA) occurred following completion of 21-hour intravenous (IV) NAC. To our knowledge, there are no reports of hepatotoxicity developing in this situation. *Case Report:* A 21-year-old man presented 5 hours after an overdose of AP/DP, with an initial serum [AP] = 311 µg/mL. GI decontamination (GID) was not performed. Liver transaminases were normal. IV NAC was started with a 150 mg/kg load over 1 hour; then 50 mg/kg over 4 hours; then 100 mg/kg over 16 hours. Serial AP levels were obtained. Five hours later, he became delirious and combative. He was intubated for behavioral control. He was extubated 52 hours later, and received 1 gram/kg of activated charcoal orally. IV NAC was stopped after the 21-hour protocol. Thirty-four hours after NAC discontinuation, liver transaminases were elevated: AST = 395 U/L; ALT = 694 U/L. IV NAC was restarted at 150 mg/kg/day continuously. AP levels declined initially to 33 µg/mL 13 hours after presentation, but rose to 133 µg/mL 7 hours later; declined to 72 µg/mL 10 hours later, but rose to 140 µg/mL 8 hours later. AP levels declined thereafter. Renal function and pH remained normal. Transaminase peaks were: AST = 4442 U/L; ALT = 6152 U/L five days after initial presentation. He eventually recovered without sequelae. *Case Discussion:* This patient developed significant TA after acute ingestion of AP/DP despite 21-hour IV NAC. Serum [AP] peaked several times, presumably from altered GI motility. Due to concern for potential aspiration, GID was not initially performed. Perhaps more aggressive GID could have blunted the recurrent AP level peaks. Also, continuation of IV NAC may have prevented hepatotoxicity. *Conclusion:* Ingestions of AP combined with an AC drug should raise concern for potential delayed AP absorption. It may be necessary to lengthen the duration of IV NAC administration beyond the 21-hour course in these cases. Further work is needed to determine proper treatment of such patients.

106. Effect of Fish Consumption on Urine Hg Excretion after DMSA

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Background: Recent publicity and debate about the safety of methylmercury in fish has lead to increased testing for Hg poisoning. Some practitioners administer an oral dimercaptosuccinic acid (DMSA) chelation 'challenge' to patients prior to testing urine, even though DMSA has not been validated for diagnosis of alkylmercury poisoning. Expected values for urine Hg (UHg) excretion following DMSA in healthy persons who do and don't consume fish are not available in the medical literature. Our goal was twofold: 1) to measure UHg excretion before and after DMSA challenge in fish consumers and non-consumers; and 2) to determine if a high-fish diet is associated with a greater change in UHg excretion following DMSA challenge. *Methods:* 24 healthy subjects were placed into 3 groups based on fish consumption. Group 0: no fish, Group 1: 1–2 fish meals/week, Group 2: 3 or more fish meals/week. Each subject completed a questionnaire and kept a record of fish consumption for 30 days to confirm group assignment. A 12-hour urine sample was obtained for measurement of baseline (BL) Hg and creatinine excretion. 12 hours later, 30 mg/kg of DMSA was ingested and another 12-hour urine collection was obtained for repeat measurements. *Results:* 24 subjects completed the study, with results for 2 excluded (1 reported fish oil consumption, and 1 had samples mislabeled). No difference in BL UHg excretion could be detected between groups. All 3 groups demonstrated an increase in UHg excretion following DMSA. There was a significant difference in the rise in UHg excretion between groups, with Group 2 having a greater rise in UHg excretion after DMSA than Groups 0 or 1. *Discussion:* Our results serve as a reference for UHg levels in healthy adults with various levels of fish consumption. *Conclusion:* Healthy fish-eaters may experience greater increases in UHg excretion following DMSA than non-fish eaters.

Urine Hg Values

Group:	0*	1*	2*	p Value
mcgHg/gCr pre-DMSA	0.614	1.009	1.520	.368
mcgHg/gCr post-DMSA	3.149	8.855	11.358	.051
Rise in Hg (mcgHg/gCr)	2.467	7.344	9.485	.042

*median.

107. Predictive Value of Tracheobronchial Pro- and Anti-Inflammatory Mediator Ratios in Smoke Inhalation Victims

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Background: Smoke inhalation is a major cause of acute respiratory failure in patients admitted to burn centers. Our objectives were to assess early longitudinal changes in the ratios of tracheobronchial fluid anti- and pro-inflammatory mediators and determine their utility as predictors of subsequent lung injury. *Methods:* Partial pressure of arterial oxygen (PaO2) and the fraction of inspired oxygen (FIO2) were recorded approximately every six hours from intubated smoke inhalation patients admitted to a regional burn center, and tracheobronchial suction fluid was collected every two hours. Suctionate was assayed for interleukin-1 beta and interleukin-1 receptor antagonist (IL-1β:IL-1ra), IL-8 and alpha 2-macroglobulin (IL-8:α2-M), tumor necrosis factor-alpha and soluble TNF receptor 2 (TNF-α:TNFR2), and matrix metalloproteinase 9 and tissue inhibitor of metalloproteinase 1 (MMP-9:TIMP-1). Temporal trends in the first 36 hours after exposure and the relation between the earliest complement ratios and measure of oxygenation (PaO2/FIO2) during the first 72 hours were assessed using random coefficients modeling and cross-sectional analysis. *Results:* In 21 subjects with samples collected within 6.5 hrs of intubation, 14 (66.7%) developed acute hypoxemia (PaO2/FIO2 ≤200) within 72 hrs of exposure. Levels of each mediator and its complement were positively correlated. Only the log of the ratio of α2-M:IL-8 was a negative predictor of PaO2/FIO2 after adjustment for cumulative time since exposure (p = 0.029). *Discussion:* α2-M binds and inhibits proteinases, serves as a measure of lung permeability, and may also protect IL-8 from inactivation. The particular mechanism by which a decreased ratio of α2-M:IL-8 is associated with improved PaO2/FIO2 is not yet clear. *Conclusion:* In smoke inhalation victims, a lower concentration of α2-M in relation to IL-8 is associated with less severe lung injury.

108. Cluster of 1-Benzylpiperazine Poisonings Presenting to an Emergency Department

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Background: 1-Benzylpiperazine (BZP) is synthetic compound with a stimulant effects similar to that of amphetamine. Currently it is legally available and sold over the internet as 'herbal highs' and marketed to recreational drug users as having similar effects to controlled recreational drugs. *Case Report:* Seven patients aged 18–23years presented within a period of 30 minutes to the ED at a large city teaching hospital. All of them had been at a club in the local area and ingested tablets thought to be ecstasy or amphetamines. The number of tablets ingested per patient was 4–9. 2 patients had collapsed in the club with witnessed self-terminating grand mal seizures. On arrival in the ED, 5 patients had evidence of a sympathomimetic toxidrome with dilated pupils, anxiety, agitation and tachycardia. They were treated with IV/PO benzodiazepines and IV fluids. They were all asymptomatic between 4–6 hours later and were discharged. 2 patients attended the ED as their friends were unwell and they were concerned they might become unwell; neither had features of toxicity and they were discharged. *Case Discussion:* Tablets seized by the police were analysed using gas chromatography with mass-spectrometric detection and were shown to contain BZP as the only active ingredient. Serum samples from 4 patients were analysed and BZP was detected in all four samples (concentration 1.3–2.5mg/L). Toxicological screening of these serum samples did not detect any other drugs or ethanol. *Conclusion:* Here we report a series of 7 patients who presented following ingestion of tablets thought to contain illicit drugs. The clinical features were in keeping with a sympathomimetic toxidrome and required treatment with benzodiazepines in 5 patients. Analysis revealed that the presentations were due to a preparation containing BZP that is legally available in many countries. There are differences in the classification of BZP as a recreational drug around the world, and it may be time to consider whether these differences should be addressed.

109. Estimation of Volume in Liquid Chemical Ingestions – A Source of Systematic Error?

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Background: Many toxic chemicals, such as toxic alcohols and pesticides, are ingested intentionally or accidentally as liquid preparations. Knowledge of the ingested volume is important for accurate risk assessment and further management. In our experience patients and parents of children who ingest liquid preparations will generally estimate the volume left in a bottle, rather than actually measuring it. Commonly they present to the ED with the bottle of liquid that was ingested, with its remaining contents. The aim of this study was to determine how good people, including physicians, are at estimating the volume of liquid in a bottle. *Methods:* Individuals were asked to estimate the remaining volume in 2L and 1L opaque and transparent bottles of antifreeze or windscreen wash. The volume of the liquid in each bottle was measured before the study and participants could estimate the volumes in any order. The volumes in the bottles were the same in both the opaque and transparent bottles: 1820, 1440, 650mL in the 2L bottles and 840, 630, 210mL in the 1L bottles. *Results:* 30 individuals (15 physicians, 15 members of the public) completed the study. There was a large variation in the estimates for all 3 volumes, with overestimations of up to 66.7% and underestimations of up to 69.2% of actual volume. Overall only 41.7%, 63.6% and 82.5% were within 5, 10, 20% of actual volume respectively. There was no significant difference in the estimations in the transparent and opaque bottles or in the ability of members of the public and physicians to accurately estimate volume. *Discussion:* Ingestion of liquids (toxic and non-toxic) is commonly seen in the ED and estimation of the volume ingested may alter patient management. Physicians and members of the public are equally poor at accurately estimating the volume remaining in a bottle, whether it is transparent or opaque. This could have significant implications on patient management. *Conclusion:* Clinical Toxicologists and Emergency Department staff actively involved in managing patients with suspected ingestion of liquid chemicals should make every effort to accurately measure rather than estimate the volume left in containers.

110. Antenatal Exposure to Selective Serotonin Reuptake Inhibitors Prolongs the QT Interval in Neonates

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Background: Prolongation of the QT interval is a risk factor for sudden death. Selective serotonin reuptake inhibitor (SSRI) antidepressants can prolong the QT interval, and are widely used by pregnant women. Whether antenatal exposure to SSRI causes QT prolongation in neonates is unknown. *Methods:* Between January 2000 and December 2005, we conducted a prospective cohort study of all newborns born at a single tertiary care hospital and who were exposed to SSRI antidepressants immediately prior to delivery. The electrocardiograms of these newborns were compared to those of healthy control newborns matched on gestational age, and the tracings interpreted by a pediatric cardiologist unaware of drug exposure. *Results:* We identified 52 newborns exposed to SSRI antidepressants in the immediate ante-partum period and 52 matched controls. The mean QTc was significantly longer in newborns exposed to antidepressants as compared to controls (409 ± 42 milliseconds vs. 392 ± 29 milliseconds; p = 0.02). Five newborns (10%) exposed to SSRI antidepressants had a prolonged QTc interval (> 460 milliseconds), compared with none of the unexposed newborns. The longest QTc interval observed among exposed newborns was 543 milliseconds. In all newborns with a prolonged QTc interval following antenatal exposure to SSRI antidepressants, the abnormalities normalized shortly after delivery. *Discussion:* Antepartum use of SSRI antidepressants is commonly associated with QTc interval prolongation in exposed offspring. The repolarization abnormalities are sometimes dramatic. *Conclusion:* Maternal use of SSRI antidepressants may predispose offspring to malignant arrhythmias in the first days of life.

111. Probable Benefit of Hyperinsulinemia-Euglycemia and Hyperventilation Oxygenation on Aluminium Phosphide Poisoning

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Background: Aluminium phosphide through liberating phosphin which is a protoplasmic poison and by interferering cellular enzymes and protein synthesis causes high mortality rates. Severe hypotension, metabolic acidosis, cardiac disturbances and adult respiratory distress syndrome are common in deadly subjects. Histopathology of various organs shows changes suggestive of cellular hypoxia. *Case Report:* This case series documents the clinical courses of 5 patients after ALP poisoning. All subjects had hypodynamic circulatory shock, metabolic acidosis or cardiac disturbances. The mean ingested dose and minimum systolic blood pressure was 5.1 ± 4.2 gr and 68 ± 9 mmHg respectively. After initiation of insulin-dextrose infusion and hyperventilation oxygenation beside the other usual treatment modalities, 4 patients survived. The mean insulin dose was 0.5 IU/kg/h. The mean time delay before ALP consumption and initiation of insulin-dextrose was 4.8 ± 3.5 hours while the mean time elapsed during insulin-dextrose administration was 38.2 ± 19.4 hours. The mean minimum pH, base excess and bicarbonate concentrations were 7.16 ± 0.16, −16.6 ± 6.1 mmol/l, and 10.1 ± 3.3 mmol/l respectively. All five subjects underwent intubation and mechanical ventilation. All three ECG abnormalities resolved finally. *Case Discussion:* The inotropic effect of insulin has been long established. Insulin administration switches cell metabolism from fatty acids to carbohydrates and restores calcium fluxes, resulting in improvement in cardiac contractility.In some severe poisonings in human, the administrations of high-dose insulin produce cardiovascular stabilisation, decrease the catecholamine vasopressor infusion rate and improve the survival rate.During shock, substrate preference shifts from free fatty acid to carbohydrate oxidation. In ALP poisoning, the inotropic effect of insulin when combine with hyperventilation and oxygenation can resolve acidemia and further difficulty in oxygen affinity and tissue delivery. *Conclusion:* This report provides preliminary evidence toward a larger trial of insulin-dextrose with hyperventilation to treat shock, cardiac disturbances and metabolic acidosis from ALP poisoning.

112. Survival Following Acute Chloroform Ingestion with Subsequent Hepatotoxicity Treated with N-Acetyl-Cysteine

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Background: Chloroform, a halogenated hydrocarbon, causes central nervous system depression, cardiac dysrhythmias, and hepatotoxicity. Most chloroform toxicity reported results from inhalational overexposure. We describe a case of chloroform ingestion with a confirmatory serum level and resultant hepatotoxicity successfully treated with IV N-acetyl-cysteine (NAC). *Case Report:* A 19 year old male attempting suicide ingested approximately 75 mL of chloroform. He was unresponsive and intubated upon arrival to the emergency department. Intravenous NAC therapy was initiated shortly thereafter. His vital signs were otherwise normal. Admission laboratory values revealed normal serum electrolytes, AST, ALT, INR, BUN, creatinine, and bilirubin. The serum ethanol level was 15 mg/dl. Aspirin and acetaminophen levels were undetectable. The patient was extubated on hospital day 2 but developed moderate hepatotoxicity with a peak AST = 224 IU/L, ALT = 583 IU/L, and bilirubin level = 16.3 mg/dL by hospital day 5. NAC therapy was continued until the liver function tests began improving on

hospital day 6. A serum chloroform level obtained on admission was 91 mcg/mL. The patient was subsequently discharged to psychiatry without permanent sequelae. *Case Discussion:* There are few reports describing ingestion of chloroform. A literature review failed to discover any report of acute chloroform ingestion with a confirmatory serum level. The average serum chloroform level in cases of fatal inhalational chloroform poisoning is 64 mcg/mL; lower than that of our case patient. The toxicity of chloroform is believed to be similar in inhalational overexposure and ingestion, and mortality is believed predominantly to result from anoxia secondary to central nervous system depression. Chloroform-induced hepatocellular toxicity is thought to result from free radical and oxidative damage, and several anecdotal case reports describe survival after treatment with NAC. *Conclusion:* Acute oral ingestion of chloroform is extremely rare. This case illustrates that with appropriate supportive care patients can recover from chloroform ingestion, and that IV NAC may be of benefit in such cases.

113. Rapid Clinical Improvement after Carnitine Administration in Valproate-Induced Hyperammonemic Encephalopathy (VHE)

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Background: Hyperammonemia is a well known complication of chronic valproic acid (VPA) therapy and may be associated with encephalopathy in the absence of hepatic failure or extremely high VPA levels. It is believed to occur as result of relative carnitine deficiency. Prophylactic carnitine supplementation in children on VPA has been shown to prevent hyperammonemia. Although recommended in acute VPA overdose, its clinical efficacy is often obscured by direct CNS depressant effects of VPA toxicity. We describe rapid clinical response to IV carnitine administration in an adult patient with chronic VPA-induced hyperammonemic encephalopathy (VHE). *Case Report:* A 41 yo male presented with 3 days of increasing confusion, slurred speech, and ataxia. His reported list of medications included VPA, benztropine, trazadone, and clonazepam. Physical exam in the emergency department revealed HR 88, BP 135/90, RR 15, T 98°. The patient was somnolent, but arousable to voice. He was not oriented to person, place, or time, but did follow simple commands. He was severely ataxic, without focal neurologic deficits, asterixis, rigidity, dysreflexia or clonus. His CBC, electrolytes, and renal function were normal. The remainder of his lab tests were remarkable for: serum Li < 0.1mmol/L; VPA 143mcg/ml (normal 50–100); serum ammonia level 270µmol/L; AST and ALT 18 and 13 IU/L, respectively; total bilirubin 0.7mg/dL. Comprehensive urine drug screen by EMIT, TLC, and GC/MS revealed only VPA and caffeine. He was admitted and treated with 100mg/kg of IV levocarnitine in 4 divided doses over 24 hours. Within 12 hours, his serum ammonia and VPA levels had declined to 53µmol/L and 84 mcg/ml respectively, and his clinical status had markedly improved to the extent that he was awake, alert, and oriented with very mild residual ataxia. *Case Discussion:* There is limited published case experience with supplemental carnitine therapy in patients with isolated VHE. Dramatic clinical improvement and resolution of hyperammonemia after 12 hours of carnitine administration supports treatment efficacy in this setting. *Conclusion:* Our case provides compelling support for supplemental carnitine administration as a useful adjunct in the treatment of VHE.

114. Poison Center Syndromic Surveillance Using a Cyanide Drill

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Background: By studying trends and atypical clinical patterns, poison centers (PCs) can monitor for sentinel events. Carolinas Poison Center (CPC) uses computer-based syndromic surveillance (SS) to monitor for potential weapons of mass destruction (WMD) events by screening PC cases against definitions built on clinical effects (CEs) of prospective agents. CPC evaluated the ability of SS to detect a WMD event and identify flaws in the current system using a real-time cyanide (CN) drill. *Methods:* Six mock CN poisoning cases were called to CPC in a prospective observational study. Non-CPC toxicologists, blinded to CPC WMD definitions, wrote the cases. Independent physicians and nurses role-played as health care providers. Providers used case data, arranged into charts, verbatim. The data was called in to CPC based on realistic timelines of the clinical courses. Specialists in poison information (SPIs) and the on-call toxicologist were unaware that the cases were mock. Case clinical courses depended on proper CPC antidote advice. All PC cases were screened against SS definitions every 12 hours. Two researchers independently coded case CEs using standardized data fields. Resulting gold standard (GS) coding was compared to SPI coding. Outcome measures were case detection rate and reasons for missed detection. *Results:* Five of 6 cases met the CN definition after GS coding. Only two of 6 cases met the CN definition after SPI coding. One case was excluded by GS and SPI coding because hematemesis, a CN definition exclusion criterion, was a CE in the case. Two SPI cases were excluded due to not coding cardiac arrest and acidosis. One case was excluded due to an error in coding the reason for exposure, which triggered an exclusion criterion. *Discussion:* Three cases were inappropriately excluded from meeting the CN definition due to SPI coding errors. Multiple issues may affect coding accuracy, including SPI distraction, SPI training, PC call volume, or lack of coding assistance. *Conclusion:* PC SS can potentially monitor for WMD events. Some cases did not yield expected WMD SS alerts due to SPI coding errors. Syndromic surveillance may be improved by focused SPI training and refinement of WMD SS exclusion criteria.

115. Longitudinal Trends in Spatial and Temporal Clustering of Pesticide Exposure Incidents: Applications of GIS

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Background: Geographical Information Systems (GIS) have been used to spatially display epidemiological data collected by Poison Control Centers (PCCs). This study builds upon a previous 1-year study of pesticide exposure incidents reported to a regional PCC. In the current study, GIS and spatial scan statistics were applied to five consecutive years of PCC data. *Methods:* Pesticide exposure incidents reported to a regional PCC during 2001–2005 were analyzed. The data set excluded calls probably not responsible for the medical effect. GIS was used to spatially display population (by county), number of pesticide incident cases, and cumulative incidence rate per 10,000 population. SATScan Software was used to determine whether the pesticide exposure incidents were randomly distributed over space and time. *Results:* Most (98%) of the 6479 pesticide exposure incidents reported to the regional PCC included data on caller location. Spatial display revealed a higher number of pesticide incidents in more highly populated counties. The number of exposure incidents in each county correlated with its population ($R^2 = 0.95, p < 0.05$), while there was no association with the incidence rate. Regional variation was observed in incidence rates by county. Spatial-temporal scan statistics identified a cluster of incidents during 5/12/2005–9/13/2005, covering a wide geographic area served by the PCC. The population in this cluster was twice more likely (RR = 2.3, $p < 0.05$) to report an incident than other times during 2001–2005. Further analysis is being conducted to assess possible explanations for this cluster. *Conclusion:* PCC data contains the necessary spatial data for GIS mapping and spatial-temporal scan statistical analyses. These tools can be applied to study exposures of public health relevance, including pesticides. Further investigation is warranted to better understand applications of GIS and spatial scan statistics to PCCs in the recognition and management of human exposures.

116. Evaluation of Terazosin Ingestions as Reported to Three U.S. Poison Centers

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Background: Terazosin is a postsynaptic alpha-1 selective antagonist. Despite decades of use and continued inclusion in the top 175 of dispensed medications in the US, there is very limited data with regard to the acute toxicity. *Methods:* A retrospective review of all terazosin ingestions reported to three US poison centers from 2000–2006 was conducted. Exclusion criteria were chronic, polydrug, and no documented outcome exposures. *Results:* Of 49 patients, 34 (69.4%) were male. Mean age was 31.8 yrs (SD +/– 31.6, range 0.92–81 yrs). Children < 3 yrs accounted for 19 (38.8%) records and patients 50–70 yrs made up 17 (34.7%) reports. Reason of exposure included: unintentional general (n = 23, 46.9%), therapeutic error (n = 21, 42.9%) and suspected suicide (n = 5, 10.2%). Nineteen patients (38.8%) were treated in a HCF and eight (16.3%) were admitted (3 CCU, 5 non-CCU). Symptoms occurred in 25 (51%) patients: dizziness/vertigo (n = 11), drowsy/lethargy (n = 8), hypotension (n = 7), tachycardia (n = 5) and vomiting (n = 4), with duration of < 8 hours in 69.6% experiencing symptoms. Decontamination included: charcoal (n = 12), cathartic (n = 4), lavage (n = 1). Eight patients (16.3%) required supportive measures: IV fluid (n = 8), oxygen (n = 1), vasopressor (n = 1). Outcomes included: no effect (n = 26, 53.1%), minor effect (n = 16, 32.7%) and moderate effect (n = 7, 14.3%). There were no deaths or major outcomes. Suspected suicides excluded, mean dose associated with symptoms was 13.9 mg (SD +/–13.2, range 2–20 mg) vs. the mean without symptoms of 5.7 mg (SD +/–4.9, range 1–20 mg) (p = < 0.02). In children < 6yrs mean dose associate with symptoms was 11.4 mg (SD+/–6.7 mg) vs. 4.1 mg (SD+/–2.9) (p = 0.03) without symptoms. *Discussion:* While majority of patients experienced no or mild effect, reliance upon dosing upper limits may impart a false sense of assurance. A large portion of patients were >50 yrs and likely to have conditions or concurrent medications that put them at increased risk. *Conclusion:* Doses less than 10 mg are unlikely to cause more than mild effects. Evaluation of a larger number of records should be performed.

117. Yohimbine Adverse Drug Events

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Background: Yohimbine is an α-2 antagonist commonly formulated into herbal products for sexual enhancement, improved energy, body building, and weight loss. Increasing availability and use of yohimbine products is concerning because of a potential association with significant adverse effects. However, such effects have not been studied extensively. Our objective was to determine (and identify any trends over time) the prevalence, patient demographics, product use patterns, and symptoms of yohimbine adverse drug events (ADEs). *Methods:* We conducted a cross-sectional study of yohimbine ADEs reported to a statewide poison control system between 2000 and 2006 using the search terms, "yohimbine" or "yohimbe". Cases of adult patients with symptomatic yohimbine exposure and an ADE causality score of "possible" or better (Naranjo scale) were included. Linear regression and chi-squared analyses were performed on continuous and nominal variables, respectively, where appropriate. *Results:* Over the span of 7 years, 238 case reports met the inclusion criteria. Most (99%) cases involved herbal (vs. prescription) yohimbine products. There was a significant increase in the annual prevalence of yohimbine ADEs between 2000 and 2006 ($p = 0.01$; $r^2 = 0.76$). Common ADEs included GI distress (46%), tachycardia (43%), anxiety/agitation (33%), and hypertension (25%). 30% of patients experienced moderate ADEs and 2% suffered major (life-threatening) ADEs. There were no fatalities. Serious ADEs included hypertensive crisis, acute MI, atrial fibrillation, and seizure. The majority (57%) of patients required management at a healthcare facility. Patients were predominantly male (77%) with a mean age of 39 years, who ingested a small number of tablets (mean of 3), and used the product for sexual enhancement (28%) or as a stimulant (9%). *Conclusion:* ADEs associated with yohimbine have risen steadily in recent years and largely involved herbal formulations. Small dose amounts were sufficient in producing serious, even life-threatening, ADEs. These findings warrant a policy review to consider added restrictions on yohimbine availability to consumers.

118. Transplacental Acetaminophen Exposure with Toxic Blood Levels in a Preterm Infant

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Background: To our knowledge this may be the first report of toxic acetaminophen (APAP) serum concentrations in a preterm infant following transplacental transfer exposure. *Case Report:* A 29-week premature, 1,240 gram, appropriate for gestational age neonate was exposed just prior to delivery to maternal overdose of twenty to twenty-five 500mg acetaminophen tablets. The neonate had acetaminophen blood levels of 204 µg/mL. The neonate received N-acetylcysteine dose of 40 mg/kg, i.v. over 30 minutes every 12 hours for 4-½ days

until acetaminophen levels decreased to less than 9 µg/mL. The neonate had seizures, treated with phenobarbital, and hyperbilirubinemia in the first week of life. Peak liver neonate AST 149 IU/L and ALT 20 IU/L occurred on day 1 post birth. Total bilirubin peaked at 12.1 mg/dL (207 µmole/L) on day 7 of life. There were no long term sequelae from this exposure based upon follow-up at 6 months. *Case Discussion:* Based on very sparse blood sampling, the initial plasma t½ of 29 hours remained elevated for the first 34 hours until the plasma APAP concentration fell to less than 93 µg/mL (3 time point measurements). The t½ fell to 17 hours for the next 36.5 hours (3 time point measurements). The t½ fell to 9.75 hours over the final 10.5 hours (2 time point measurements). The calculated t½ for the entire 81 hour period that APAP concentrations were measured averaged to be 18 hours. Pharmacokinetic elimination half times (t½) were calculated utilizing APAP concentrations measured in serum samples collected twice a day at time intervals varying from 10.5 to 13 hours. *Conclusion:* The serum APAP half lives in this neonate are longer than previously reported for term or preterm newborns with therapeutic serum APAP concentrations. These data may suggest Michaelis-Menten or saturation kinetics were exhibited by this patient until the APAP concentrations declined to less than 93 µg/mL.

119. Phenelzine Induced Myocardial Injury: A Case Report

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Background: Phenelzine is an irreversible monoamine oxidase inhibitor (MAOI) with the potential for drug-food interaction. An acute cardiac event could be anticipated but has never been reported in the literature. We report a case of myocardial infarction (MI) secondary to the interaction of phenelzine and ingestion of a tyramine-rich food. *Case Report:* A 34 year-old woman with no cardiac history, on phenelzine 37.5 mg daily, had eaten aged cheese. Approximately 1.5 hours post ingestion, she developed chest-pain, headache, nausea and vomiting. In the ED, she was hypertensive (BP 164/100 mmHg) with a heart rate of 60/min. Serial electrocardiograms showed ST depression and mild sinus bradycardia (ventricular rate 54/min). Initial troponin was normal but serial repeat levels showed a rising trend (peak 4.89 ug/L) that indicated a non-ST elevation MI. Her symptoms were relieved by morphine, aspirin, and nitroprusside. She subsequently developed hypotension (65/30 mmHg) which was successfully treated with intravenous fluids. After 3 days of hospitalization, she made a complete recovery and was discharged home. *Case Discussion:* We believe this to be the first reported case of MI secondary to interaction between therapeutic use of MAOI and ingestion of a tyramine-rich food. Cases of cerebral hemorrhage, headaches, hyperthermia and seizures secondary to MAOI-food interaction have been established in the literature. Although ischemic cardiac injury may occur following hypertensive crisis, to the author's knowledge, there have been no cases reported to date resulting from MAOI-food interaction. Electrocardiographic effects associated with phenelzine toxicity include shortening of QTc interval and sinus bradycardia (apparently due to baroreceptor reflex response to hypertension). However, none of the patients developed ST depression or had evidence of MI. Although our patient had not taken an overdose, she developed hypertension followed by hypotension; a toxidrome that is consistent with irreversible MAOI intoxication. *Conclusion:* MI should be considered in the spectrum of potential complications when patients on therapeutic doses of MAOIs ingest tyramine-rich foods.

120. What Types of Studies Are Used To Support Treatment Recommendations in Medical Toxicology?

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Background: There are few controlled clinical trials in medical toxicology to guide treatment decisions. Given the relative paucity of "definitive" data, we determined the types of evidence used to support treatment recommendations given in three major toxicology textbooks. *Methods:* One author reviewed the acetaminophen (APAP), tricyclic antidepressant (TCA), calcium channel blocker (CCB) plus any relevant "antidote" chapters in three textbooks: Goldfrank's Toxicologic Emergencies, Critical Care Toxicology, Medical Toxicology. We identified statements that gave a treatment recommendation and classified the citation using the following system: No citation, general review article, in vitro study, animal study, case reports ($n < 3$), case series ($n > 2$), retrospective study, prospective observational study, controlled clinical trial. Proportions for each type of citation with 95% confidence intervals were determined and comparisons between chapters were made using rate ratios (RR) and X^2. *Results:* We identified 469 treatment recommendations. We could not classify 57/742 citations. A large number of statements were not referenced (14%, 95% CI 12–17%). The most common citation types were case reports (28%, 95% CI 25–31%) and animal studies (18%, 16–21%). The proportions for the remaining types of citations were: Review article (9%, 7–11%), clinical trials (9%, 7–11%), retrospective studies (8%, 6–10%), prospective observational studies (5%, 3–6%) and case series (4%, 3–6%). Prospective studies or clinical trials were more common for APAP than for CCB and TCA (RR = 4.0 and 3.9, $p < 0.001$ for both) and animal studies were more common for CCB and TCA than for APAP (RR = 9.2 and 8.7, $p < 0.001$ for both). *Discussion:* There is a need for more systematic studies of poisoned patients. As case reports are commonly used to support treatment recommendations, they should be held to rigorous scientific standards and include information to assess the validity of the Conclusions. *Conclusion:* Case reports and animal studies are commonly used as evidence to support treatment recommendations in medical toxicology textbooks.

121. Do PCs Meet the Language Needs of LEP Spanish Speakers? A National Survey

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Background: Nearly 14 million Americans have limited English proficiency (LEP). About 1 in 5 Spanish speakers do not seek health care due to language barriers. This study evaluated Spanish language accessibility in a national sample of Poison Centers (PCs). *Methods:* The study design was a one-time 20-minute cross sectional telephone survey. It was approved by the IRB and conducted in fall 2006. The survey had 26 questions and was pilot tested by former PC directors. Questions assessed current PC practices & policies regarding Spanish speakers and barriers to improving services to them. Of the 61 accredited PCs, a sample of 41 was selected using a three tiered stratified sampling plan. One respondent provided data from each participating PC. *Results:* 37 PCs completed the survey, for a 90% response rate. Respondents had been employed in a PC for a mean of 14 yrs. The top two Spanish resources available to PCs included AT&T Language Line Services (100%) and bilingual PC staff which were available to 57% of PCs. Among PCs with access to bilingual PC staff, 86% preferred them over Language Line. Nearly half (47%) of PCs rated themselves as "very effective" at meeting the needs of Spanish-speaking callers. Of these PCs, 71% use bilingual PC staff instead of Language Line. Barriers to improving Spanish speaker penetrance exist. Additional Spanish PC staff/volunteers were the top outreach resources suggested by PCs to improve penetrance. Budgetary instability was the leading barrier to improving penetrance according to 65% of PCs. *Discussion:* PCs face growing demands for services in Spanish. PCs prefer Spanish staff to manage toxic exposure calls, and they are also thought to be more effective at meeting Spanish speaking caller's needs. PCs indicated that additional Spanish staff/volunteers would best help improve Spanish speaker penetrance. *Conclusion:* Hiring additional Spanish staff may be fiscally difficult for many PCs. Further studies on the effectiveness of Spanish PC staff and Language Line may help improve Spanish services. As a low cost alternative, PCs with limited capacities to hire Spanish staff should consider partnering with PCs specialized in serving Spanish speakers.

122. Intentional Intravenous Injection of a Cocktail of Copperhead Venom & Methamphetamine

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Background: Intravenous (IV) dissemination of venom is a known but rare event following a snake bite. Intentional IV self-administration of venom is exceedingly rare. We report a case of recreational IV administration of copperhead venom and methamphetamine that recovered despite severe manifestations. *Case Report:* A 35 y.o. female with a history of drug abuse mixed and injected methamphetamine along with copperhead venom into an antecubical vein in attempt to "get high." Her social group tried unsuccessfully to treat her combativeness and fever by soaking her in the local creek bed. She arrived in the ED within 12 hours of the injection with a BP 103/57 mm Hg, HR 108 bpm, temperature 98.2°F. Because she was unresponsive she was intubated and ventilated. The injected arm was noticeably swollen with slight bruising in the antecubital fossa. Initial blood work revealed hemoconcentration (Hgb 19.1 g/dL) and minimally elevated coagulation parameters. Crofab® was started approximately 19 hours post injection. Despite extensive fluid replacement (21 liters in 24 hours), the central venous pressure remained < 3 cm and systolic pressure about 90 mm Hg. The patient developed hypothermia, electrolyte abnormalities, hemodilution and massive peripheral edema. Her hemodynamic status improved by the end of the second hospital day. She was extubated the following day, able to follow commands although still somewhat confused. *Case Discussion:* IV administration of copperhead venom resulted in a delayed, generalized vascular permeability but no coagulation abnormalities. Absence of coagulopathy is a notable difference from IV rattlesnake venom as reported in the literature. Because of methamphetamine co-exposure, her prolonged agitation cannot be attributed to the venom. *Conclusion:* The contributory roles of aggressive treatment with Crofab® and supportive care in this patient's survival are not clear.

123. QT Dispersion and Risk Factors for Poison Related Cardiotoxicity

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Background: Acute poison related cardiotoxicity is a major cause of morbidity and mortality, but clinical predictors of cardiovascular events (CVE) are unclear. We determined risk factors associated with CVE and evaluated QT dispersion (QTD) in patients with suspected acute poisoning. *Methods:* This retrospective case-control study evaluated patients referred to a regional PCC over an 8-month period (8/06–3/07) with suspected acute poisoning. We included 18 cases who suffered at least one CVE (VT/VF, shock requiring vasopressors, MI, SVT >150 beats/min, asystole) in whom the presentation ECG was available. We identified 39 controls without CVE who had bedside medical toxicology consultation over the same time period. Data included demographics, history, vital signs, lab confirmation, and presentation ECG. QTD was defined as the difference between the maximum and minimum QT interval of the 12 lead ECG. Univariate analysis with odds ratios (OR), 95% confidence intervals (CI), and 2-tailed p-values (alpha 0.05) were calculated. *Results:* Subjects were 51% female with mean age 39.1 ± 18.3 years; poisoning was laboratory confirmed in 70.2%. Out of 18 cases, there were 6 VT/VF, 8 shock, 6 MI, 3 SVT, and 6 who developed asystole (some cases had >1 CVE). Factors associated with CVE were age ($p = 0.03$) and multi-drug ingestion ($p = 0.03$); initial vital signs, gender, hypertension, diabetes, or suicidal intent all demonstrated no significance. Using the presentation ECG, QTc >500 ms (OR 24.2, CI 2.7–218, $p < 0.001$), QRS >120 ms ($p < 0.01$) and terminal 40-ms rightward axis (OR 9.6, CI 2.1–43, $p < 0.01$) were all significant predictors of CVE. QTD was highly predictive of CVE using continuous data ($p < 0.001$) and using a cutoff QTD >50 ms (OR 60.1, CI 9.8–367.8, $p < 0.001$). QTD was >50 ms in 6/6 cases of asystole, 6/6 cases of VT/VF, and 5/6 cases of MI. *Discussion:* We have derived a set of clinical risk factors for CVE using elements of the history and presentation ECG in undifferentiated patients with suspected acute poisoning. QTD, demonstrated as a marker of MI and VT/VF in normal individuals, appears to be an important predictor of CVE in patients with suspected poisoning. *Conclusion:* If validated, these predictive criteria may aid the initial triage of patients with suspected acute poisoning.

124. Acute Median Nerve Entrapment Requiring Surgery after Snakebite to the Hand

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Background: Crotaline envenomation may cause significant swelling but neurovascular injury is uncommon. Surgery has been used to treat suspected neurovascular compromise, like compartment syndrome. Today, the timely use of antivenom has decreased complications such as swelling associated with envenomation and surgery is rarely indicated. However, there may be special circumstances requiring surgical intervention. We describe a case of a patient with a snakebite to the hand who developed acute median nerve entrapment requiring carpal tunnel release surgery. *Case Report:* A 42 yo male was bitten by a Blacktail rattlesnake (Crotolus molossus) while working at a public aquarium. He was bitten on the dorsum of the left hand while attempting to give the snake an antibiotic shot to treat an infected venom gland. He pre-

sented to a healthcare facility within 1 hour and received 18 vials of Crotalidae Polyvalent Immune Fab (AV) over the next 5 hours to successfully achieve control of swelling that had progressed to his face. Three hours after the bite, the patient complained of decreased sensation in the thumb, index, and middle fingers, and completely lost sensation over the next 24 hours. Pulses were intact and there was no pain on passive range of motion. Compartment pressures were not measured. The patient was evaluated by an orthopedic surgeon and diagnosed with acute median nerve entrapment. Carpal tunnel release surgery was performed 31 hours after the bite. Sensation in the hand was restored. The patient remained in the hospital for 3 weeks due to sepsis from Salmonella and Morganella, late fasciotomy for upper forearm compartment syndrome, and persistent thrombocytopenia for which he received 18 more vials of AV. Despite these complications, he was discharged with intact median nerve sensation. *Case Discussion:* Surgery is rarely indicated after Crotaline envenomation. However, carpal tunnel release surgery appeared effective in relief of median nerve compression in our patient. *Conclusion:* Clinicians caring for similar patients should be mindful of this potential complication and closely follow a detailed neurovascular exam to promptly diagnose nerve injuries.

125. Profound Sialorrhea following Therapeutic Dosing of Aripiprazole

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Background: Aripiprazole, a second generation atypical antipsychotic, has been gaining in popularity with its off label use to treat pediatric psychiatric disorders. We describe a case of profound sialorrhea from the therapeutic use of aripiprazole in a teenager that was refractory to antimuscarinic agents and led to hospitalization. *Case Report:* 13 year-old male presented to the ED due to 3 days of increased drooling that began 24 hours after starting 5 mg of daily aripiprazole. Neither dose of his maintenance medications of over 2 years (quetiapine and valproic acid) had been changed. Physical exam revealed an alert male with normal vital signs who was drooling profusely despite a benign oropharyngeal examination. Lab tests, serum ammonia, and lateral neck soft tissue x-ray were normal. His valproic acid level was in the therapeutic range. Interventions included self-administered suctioning, discontinuation of aripiprazole, and serial doses of antimuscarinic medications. None of the medications given were effective. Over the course of 3 days, the salivation progressively resolved. One month after discharge, the patient remained asymptomatic while continuing on his maintenance medications of quetiapine and valproic acid. *Case Discussion:* Drooling can be caused by sialorrhea (excessive salivation) or difficulty swallowing. The only published case of drooling associated with aripiprazole appeared to be from flaccid facial muscles resulting in swallowing difficulties. In our case, the etiology appeared to be from excessive saliva production. The temporal association of sialorrhea after oral intake of aripiprazole and resolution with its discontinuation suggested strongly that aripiprazole was responsible. Interestingly, the use of multiple antimuscarinic agents did not appear to help. The mechanism responsible for the excessive salivation is unclear but it may involve complex interactions of cholinergic and adrenergic neural systems. *Conclusion:* Sialorrhea appears to be a clinically significant but rare side effect of aripiprazole. With its increasing use in the pediatric population, clinicians need to be aware of this potential adverse reaction.

126. Is the AAPCC Amitriptyline Ingestion Guideline Valid for Pediatric Patients?

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Background: The AAPCC 2006 practice guideline on management of antidepressant poisoning recommends that patients who ingest less than 5 milligrams per kilogram (mg/kg) of amitriptyline do not need to be referred to an emergency department (ED). Since there has not been extensive research done in this area, we sought to aid in validating this guideline by applying it to actual pediatric cases. *Methods:* This was a retrospective chart review of patients who presented to poison centers between 2001 and 2006. Subjects were drawn from the Texas Poison Center Network Database and met the following inclusion criteria: children under the age of 6; single, acute, unintentional amitriptyline exposures; documentation of body weight, dose ingested, effects, symptoms, treatment, and disposition. *Results:* 153 children met the inclusion criteria. Ages ranged from 7 months to 6 years with an average ingestion of 3.32 mg/kg. Poison control centers recommended that 83 (54%) could be observed safely at home. Of those transported, 15 (10%) were admitted to the hospital for further care. There were no deaths reported and only 5 experienced major or moderate symptoms (3.3%, 95% 1.4–7.4%). 31 patients showed symptoms from their ingestion with drowsiness being most common. Of those transported, most received activated charcoal. Only 3 required alkalinization. 23 children (15%) ingested amounts that exceeded the guideline dose. *Discussion:* Only 1 patient (0.8%) who ingested less than the guideline had moderate or major symptoms. Conversely, 4 out of 23 patients (17%) with ingestions above the guideline showed moderate or major symptoms. Using the 2006 guideline, an additional 39 children could have been kept at home. *Conclusion:* The level set in the 2006 AAPCC guideline appears to provide safe triage doses in children under 6 years old with unintentional amitriptyline exposures. Based on the paucity of patients with levels higher than 5 mg/kg who experienced severe symptoms, the guideline may be somewhat conservative. More research should be conducted to determine if this level should be increased in order to further decrease unnecessary ED visits.

127. A 5 Year Prospective Study of a Triage Protocol for out of Hospital Management of Unintentional Tricyclic Antidepressant Exposures Involving Children ≤6 Years

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Background: According to AAPCC 2005 data 13,804 children < 6 were exposed to cyclic antidepressants; most of which were amitriptyline, despramine, doxepin, imipramine and nortriptyline. Tricyclic antidepressants (TCA) remain one of the most prescribed psychotropic agents. The triage of unintentional TCA ingestions involving children < 6 years based on single cases or small studies resulted in referral to a health care facility (HCF); expensive and not without risk. While a definite threshold dose for toxicity hasn't been established, several retrospective studies suggest asymptomatic at doses < 5mg/kg can be safely managed at home. The AAPCC document "TCA poisoning: an Evidence Based Consensus Guideline for Out of Hospital Management" suggests using a combination of dose and information about intent, symptoms, coingestants, underlying medical history, time of exposure. *Methods:* Calls placed to PCC from 1/2002 – 12/2006; A prospective study of a triage protocol for the out-of-hospital management of children < 6 years with suspected TCA ingestions: Home management/observation was recommended if patient was assymptomatic, a dose threshold of < = 5 mg/kg from unintentional single TCA exposure. HCF referral for intentional, >5 mg/kg, multidrug and/or symptomatic exposures. *Results:* n = 22 cases; age 15 mo – 5 yr, 12 m/10 f. Single TCA 18; 6 referred to HCF [2 symptomatic (<5 mg/kg) sleepy or lethargic, 4 had >5 mg/kg (highest 9.1 mg/kg)]. 12 asymptomatic <5mg/kg, managed at home. 4 multidrug exposures referred to HCF. All patients had benign outcomes. *Discussion:* To our knowledge this is the first multiyear prospective study to evaluate the use of an out of hospital triage protocol based upon dose threshold < = 5 mg/kg, and history (intent/time of exposure, medical history, symptoms) for the triage of unintentional TCA ingestions involving children < 6. *Conclusion:* Our study results suggest healthy children <6 years old with unintentional single drug TCA ingestion < = 5 mg/kg without neurological or other symptoms can be safely managed at home. Large, multicenter studies are still necessary.

128. Pharmacokinetic/Pharmacodynamic Relationships in Human Gamma-Hydroxybutyrate Intoxications

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Background: Incidence of gamma-hydroxybuturate (GHB) intoxication is increasing in relation to its use as recreational or illicit agent in drug-facilitated assaults. Pharmacokinetic / pharmacodynamic (PK/PD) relationships have not been evaluated in this poisoning. Our objective was to study the relationship between the coma depth and plasma GHB concentrations. *Methods:* Patient admitted in 2006–2007 for a deep coma in the context of GHB intake were included. Coma depth was prospectively assessed using the Glasgow Coma Scale (GCS). Plasma GHB concentration was concomitantly measured using mass spectrometry (quantification threshold: < 1 mg/l). The results were presented as median [25%-75% percentiles]. The modeling of PK-PD relationships was performed using WinNonlin software. This study was approved by the Ethic Committee of the French Society of Intensive Care. *Results:* PK-PD relationships were studied in 4 patients (4M, age: 27 years [26–37], SAPS II: 40 [39–42]). Among them, two patients co-ingested ethanol (concentrations: 1.7 and 0.6 g/l), and one MDMA. One patient declared a usual intake of GHB. Another one was victim of GHB-facilitated assault. The GCS was 3 in all patients. Plasma GHB concentration was 152 mg/l [162–322]. PK-PD relationships between coma depth (E, E_{max} = 15, E_O = 3) and plasma GHB concentration (C) fit the sigmoidal E_{max} model $E = E_{max}.C^n / \left[C'_{50}{}^n + C^n \right] + E_0$ (Hill coefficient (n): 9.9 [9.6–9.9], C_{50} : 134 mg/l [116–165], R^2 : 0.98 [0.95–0.99]). *Discussion:* A maximal toxic effect (GCS: 3) was associated with a wide range of GHB concentrations, suggesting a saturation of the GHB receptors *in vivo*. The high values of the Hill coefficient demonstrated that a small decrease in GHB concentrations near the C_{50} was associated with a dramatic improvement in the level of consciousness (on/off curves). PK/PD relationships varied in relation to the existence of a tolerance in case of chronic GHB consumption or pharmacodynamic interactions, such as co-ingestions. *Conclusion:* Our results clearly showed that PK-PD relationships can be helpful to understand the individual variability of human response to GHB.

129. A Study of Acute Poisoning by P-Phenylenediamine (Hair Dye) Used Orally in Upper Egypt

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Background: p-Phenylenediamine is primarily used as a dye intermediate and as a dye. In upper Egypt black stone (commercial name) – *p*-phenelenediamine (chemical name)- is considered as one of the potent and cheap traditional material that utilized as hair dye. *Methods:* Along nearly three years (3\2004–2\2007), we followed up the reported cases of acute toxicity by black stone which had been admitted to hospitals in Upper Egypt. Thirty-nine toxic cases by *p*-phenylenediamine were recorded. Their ages were ranging from 2 years to the 6th decade of life. Twelve of the recorded cases were males while the remainders twenty-seven were females. *Results:* Thirty-five cases were suicidal, two cases were homicidal and two cases were accidental. All the toxic female cases were suicidal except the child which was accidental, while the two homicidal and the accidental cases were males. The common manifestations were severe edema of the face, eyes, mouth, pharynx and larynx, asthma, gastritis manifested by vomiting and abdominal pain, tremors, convulsions and coma. *Discussion:* Manifestations of acute renal failure were detected in the cases of longer survival. This came in agreement with death occurred within hours in most of cases while some cases lived for one day or more and the longest interval of life after toxicity was three days. Only one case of a male child was saved by the use of early hemodialysis. While the other cases were managed by administration of antihistamines, corticosteroids, fluids and other antishock measures. Tracheostomy was a common line of management. The post- mortem picture generally shows edema of the eyes, mouth, larynx and neck. Congestion and ulceration of the stomach. The kidneys appeared swollen and deeply black in color. Urine was scanty and black in color. Detection of *p*-phenylenediamine was done by TLC and HPLC. *Conclusion: p*-Phenylenediamine is considered as a tool for suicidal and homicidal crimes. It is recommended to do further researches for the value of the use of hemodialysis in the management or fined effective antidotes against that aggressive rapidly killing poison.

130. Case Series of 150 GHB Poisonings Seen at a Large Inner-City Teaching Hospital in 2006

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Background: Gamma-hydroxybutyrate (GHB) is a substance of misuse due to its euphoric and stimulant effects. GHB has a steep dose-response curve and in overdose significant respiratory and CNS depression can easily occur. *Methods:* Data on all poisonings presenting to a inner-city

teaching hospital ED is prospectively collected in a purpose designed clinical toxicology database. Demographic and clinical data relating to all GHB presentations in 2006 was extracted. *Results:* 150 patients were identified (146 recreational use, 3 deliberate self-harm and 1 'therapeutic misadventure'). There were 139 (93.1%) males, the mean ± SD age 28.7 ± 6.7years. The mean number of presentations per month was 12.5 ± 6, with an increase through the year from 5 in January, peaking at 23 in October. 52 (37.6%) had ingested GHB alone, 49 (33.6%) co-ingested ethanol, 46 (31.5%) co-ingested ecstasy, 31 (21.2%) co-ingested ketamine, 19 (13%) snorted/smoked cocaine and 7 (3.5%) took other drugs. 69% of patients were discharged within 4 hours, 91.8% within 12 hours and 95.2% within 24 hours of ED presentation. 69% were discharged from the ED, 22.8% required admission to a short-stay observation ward and 7.6% required ICU admission for intubation and ventilation. 1 patient was admitted to the medical floor and 1 patient died. 25 (17.1%) had at least one episode of vomiting and 14 (9.6%) had at least one seizure. There was no significant difference in the incidence of vomiting and seizures in those patients with a GCS of >8 and those with a GCS of < 8, although a low GCS score predicted an increased length of stay ($p = 0.003$). *Discussion:* GHB poisoning in the majority of patients is self-limiting, with the majority of patients able to medically discharged within 4 hours and nearly all within 24 hours of ED presentation. *Conclusion:* A significant minority of patients with GHB poisoning are currently managed with intubation and therefore require ICU admission. Further studies are required to determine whether a subgroup of these individuals could be managed conservatively to prevent unnecessary intubation and admission to the ICU.

131. Delayed Elevation in Carbamazepine Concentrations Is Common

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Background: Carbamazepine often exhibits erratic absorption after overdose resulting in serum concentrations subsequently rising over time. The aims of this study are to report the frequency of toxic carbamazepine concentrations continuing to rise post initial lab value, and to report how often an initially therapeutic or subtherapeutic concentration misrepresents the potential toxicity of an acute carbamazepine overdose. *Methods:* All carbamazepine exposures reported to our regional poison center between January 1, 2001 and December 31, 2005 were investigated. Inclusion criteria were acute poisonings with concentrations greater than 12 mcg/mL at any time. All cases with initial concentrations greater than 12 mcg/mL, which had subsequent levels that increased over time, were documented. In addition, those cases that initially had therapeutic (4–12 mcg/mL) or subtherapeutic (<4 mcg/mL) concentrations were identified. Descriptive statistics were used to analyze the data. *Results:* Of the 292 patients with concentrations greater than 12 mcg/mL, 41 (14%) had levels which were initially greater than 12 mcg/mL and subsequently continued to rise. The highest level recorded was 68 mcg/mL which resulted in intubation and hemodialysis. Ten hours prior, the patient was reported to be anxious with a level of 38 mcg/mL. 11 (4%) patients had initial concentrations that were therapeutic. One patient in this group presented with a level of 7.4 mcg/mL that rose to 33.8 mcg/mL 23 hours after presentation which required intubation. 5 (2%) patients had levels less than 4 mcg/mL or undetectable prior to subsequent levels climbing higher than 12 mcg/mL. One patient's initial level was 2.1 mcg/mL and subsequently rose to 23.9 mcg/mL with associated drowsiness. *Discussion:* Carbamazepine is a commonly prescribed medication for the treatment of seizures and bipolar disorder. After acute overdose, initial serum concentrations can be misleading as delayed rise and progressive toxicity might occur after acute ingestion. *Conclusion:* Delayed elevations in carbamazepine concentrations may occur when overdose patients present with initial levels reported as supratherapeutic, therapeutic, or subtherapeutic.

132. Survey of Chemical Exposure Preparedness for Emergency Departments in a Midwestern City

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Background: This study sought to determine if hospitals in a middle-size Midwestern city have the resources to treat 50 chemical exposure patients per hospital. Every year thousands of people are injured or die from chemical exposure, whether due to accidental release or malicious intent. With the enormous number of chemicals produced in the United States and the threat of terrorism, the need for planning, training, and resources to effectively treat chemical exposures is crucial. *Methods:* Surveys were sent out to all hospitals in a middle-size Midwestern city (population 700,000) to assess hospital preparedness for treating multiple chemical exposure victims. A survey was sent to the emergency department nursing supervisor, safety officer, and pharmacy director of each hospital for a total of 27 surveys. Each department was sent a different survey, but every survey asked the respondent to evaluate their emergency department and verify if the respondent felt qualified to evaluate the emergency department. *Results:* Twelve of the twenty-seven respondents returned the survey for a response rate of forty-four percent (5 emergency department nursing supervisors, 3 safety officers, and 4 pharmacy directors). None of the emergency departments reported a cooperative plan with the police or fire departments. Three of the hospitals reported a total of 35 ventilators for respiratory failure. Four of the pharmacies reported limited doses of pralidoxime, atropine, cyanide antidote, physostigmine, and succimer. Seven of the respondents (5 emergency department nursing supervisors and 2 safety officers) gave a mean score of 5.4 when asked, "On a scale of zero to ten, how prepared do you feel your emergency department is to treat fifty patients exposed at the same time?" *Discussion:* Limitations were that the hospitals had poor coordination with other organizations, limited doses of some antidotes, and limited numbers of ventilators to treat patients in respiratory failure. *Conclusion:* Despite hospital staff rating chemical exposure preparedness as 5.4 on a scale of 1–10, it is unlikely that each hospital could handle 50 patients exposed to some chemicals due to lack of antidotes and ventilators.

133. The Use of the National Incident Management System (NIMS) for Mass Carbon Monoxide Poisoning

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Background: NIMS was introduced in wake of geopolitical events to unify the command structure and coordination of multiple agencies in a concerted effort to prevent, respond to, and recover from incidents. We present a scenario of a mass carbon monoxide (CO) poisoning which incorporated these concepts. *Case Report:* A catering hall reported multiple patrons with nausea, vomiting, headache, and 2 with syncope. Astute pre-hospital workers then suspected a mass CO exposure and then detected elevated ambient CO levels. The emergency department (ED) was notified and activated Hospital Incident Command (HICS) Level I. The incident commander scaled the command structure in accordance with the number of victims and resources needed. When patient load in the ED began to escalate, HICS Level II was activated. All 17 patients received O2 and blood sampling for carboxyhemoglobin (COHb). All had elevated COHb levels (12.1–26.6%), 6 of which required hyperbaric oxygen (HBO) treatment. Multiple HBO facilities were contacted and all 6 received treatment within 24 hours. Regional health officials and media were contacted and bulletins were placed. Due to this dissemination of information from police, fire department (FD), and media, an additional 8 patrons presented to the ED with symptoms of CO poisoning 12 hours after the exposure. Their COHb levels ranged from 2–8.6%. They received supplemental O2 and 2 additional victims were transferred for HBO therapy due to neurologic symptoms and syncope. *Case Discussion:* This case highlights portions of the NIMS management command structure which include: incident command, multiagency coordination (MAC), and public information systems (PIS). The HICS was used to coordinate efforts; the MAC, involving pre-hospital providers, the hospital, and regional HBO centers, allowed for mutual aid; and the PIS, which included the police, FD, and media, assisted in identifying additional victims that required treatment. *Conclusion:* The combined effort of pre-hospital, medical care, neighboring agencies, and the media mirrored the intended usage of NIMS. To our knowledge, this is the first reported mass CO exposure using NIMS to coordinate care.

134. Early MRI Findings Do Not Appear Predictive of Outcome in Severe Ethylene Glycol-Induced Brain Injury

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Background: Severe brain injury has been reported after ethylene glycol (EG) ingestion when timely treatment is not provided. We report a case of late-presenting adult EG poisoning that is remarkable for the clinical outcome, as well as the early brain MRI findings not previously reported. *Case Report:* A previously healthy 42 yo man was brought to an ED after collapsing in police custody. He denied ingestion of any toxic substance. During ED observation the patient became increasingly agitated. Initial labs revealed: ABG pH 7.09, pCO_2 68, pO_2 104, HCO_3^- 2.1; serum Na 138, K 5.9, Cl 104, CO_2 7, AG 27, and creatinine 3.3. Serum APAP and salicylate were undetectable. His mental status subsequently deteriorated requiring intubation for airway protection. Initial brain CT was unremarkable. Given a high suspicion for toxic alcohol ingestion, intravenous EtOH infusion and supplemental thiamine and pyridoxine were initiated along with fluid resuscitation and NaHCO3 prior to interfacility transfer. Upon arrival he had stable vital signs, no response to mechanical stimulation, 3mm reactive pupils, and absent DTRs. Serum EG level was 6 mg/dL. Further treatment included IV fomepizole and hemodialysis. After a generalized seizure on hospital day 2, repeat brain CT demonstrated edema of the medial temporal lobes, basal ganglia, and thalami. MRI at 24 hours after initial ED presentation showed diffuse symmetrical edema of the basal ganglia, cerebral peduncles and brainstem. Clinical findings included decerebrate posturing and absent oculovestibular and corneal reflexes consistent with impending transtentorial brain herniation. However, with continued supportive care by hospital day 4 he was following commands and was extubated on day 5. He was transferred to the psychiatric unit on day 10, and discharged home on hospital day 21 without clinically evident neurological sequelae. *Case Discussion:* Brain imaging is often used to help predict neurological outcome. In this case it was misleading due to the reversibility of the severe brain dysfunction. *Conclusion:* Our case indicates that early brain CT and/or MRI findings after acute EG poisoning are of limited prognostic value.

135. Infantile Lead Poisoning from an Ethnic Tongue Powder

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Background: Lead poisoning from novel sources continues to present a challenge to clinicians treating infants and children. We present an infant whose lead poisoning was caused by an ethnic remedy brought from Thailand. *Case Report:* An asymptomatic 12 month old infant of Thai parents was discovered to have a blood lead level (BLL) 61 mcg/dL [CDC threshold 10 mcg/dL] at a well child visit. A zinc protoporphyrin was elevated at 880 mcg/mol of heme [nl 25–65 for Hct 35%]. Other RBC studies documented only iron deficiency. Bone radiographs showed metaphyseal sclerosis consistent with chronic lead poisoning. The family's apartment revealed no lead hazard. Neither parent had occupational or hobby exposures to lead. They used no imported cookware or spices, but had spent the previous two months in Bangkok visiting relatives. Upon further questioning, mother revealed that she used a Chinese patent remedy *Khao Gui* in tablespoon amounts for treatment of fever as needed. She acknowledged using a black powder, *Ya Kward Pak*, daily for the infant's first 7 months of life. The powder, purchased at a local shop in Bangkok, was intended to promote tissue healing, absorb toxins, and relieve 'white patches' on the tongue after breast milk feedings, in order to safeguard the baby's health. This ancient practice was handed down via their Chinese ancestry. *Case Discussion:* Samples of both remedies were analyzed at an EPA testing facility using energy dispersal x-ray fluorescence spectrometry. *Ya Kward Pak* was contaminated by Pb at 109,000 mg/kg; no As or Hg was detected. *Khao Gui* was not contaminated. The child received 5 days of parenteral CaNa2EDTA chelation which reduced the BLL to 33 mcg/dL. He then received oral chelation with dimercaptosuccinic acid (DMSA) for a rebound BLL to 39 mcg/dL. He had no evidence of developmental delays. Parents notified relatives in Bangkok of the potential dangers of *Ya Kward Pak*. Ramathibodi and Siriraj poison centers in Thailand were contacted to launch a public healh inquiry. More than 40 such remedies are registered with the Thai FDA. *Conclusion:* Asian ethnic remedies used to promote health by cleansing or healing the tongue may pose a potential hazard of lead contamination to infants so treated.

136. Demographic Survey of Emergency Department Patients with "Spider Bite" Lesions

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Background: Patients often ascribe otherwise unexplained skin lesions to spider bites. We sought to determine the incidence of actual spider bites versus other causes in emergency department (ED) patients reporting a "spider bite", and correlate the final diagnosis with risk factors for developing infections with community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA), a common cause of such lesions. *Methods:* Patients presenting to a suburban university ED with any complaint they spontaneously stated was due to a "spider bite" were prospectively enrolled to complete a voluntary, anonymous survey of 12 multiple-choice questions including: duration of symptoms, prior episodes and treatment, why it was believed to be a spider bite, whether a spider was seen or bite felt, what kind of spider, type of residence, recent use of injectable or stimulant drugs, and final ED diagnosis (spider bite; bite from other source; infection; or other diagnosis). *Results:* 130 patients were enrolled over 14 months. 112 patients (86.2%) were diagnosed with skin- or soft tissue-infections. 5 patients had a spider bite confirmed by the physician; 8 had bites from other animals; 3 had an "other" diagnosis; 5 had no category recorded. Three cases had dual diagnoses of infection and a bite (1 spider and 2 from other animals). We found no significant correlations between diagnosis and CA-MRSA risk factors. Only 28 patients reported feeling a "bite", and 19 reported seeing any spider. 36 patients felt no bite and were not certain anything had bitten them. 25 patients claimed a brown recluse spider bite, although they are not endemic in our area. *Discussion:* The lack of correlation between CA-MRSA risk factors and diagnosis is probably because nearly all patients were diagnosed with infections. "Spider bite" is a common layman's description for dermonecrotic wounds of unknown etiology, although many are diagnosed as infections on medical evaluation. *Conclusion:* Most patients complaining of a "spider bite" were diagnosed in the ED with skin- or soft tissue-infections. Confirmed spider bites were unusual (3.8% incidence). Most alleged "spider bites" in our patient population occur without corroborative clinical evidence.

137. Analytical Emergencies Arising from Atypical Exposures: Creative Problem Solving

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Background: Identification and quantification of chemical exposures resulting from attempted suicide, homicide or potential terrorism may exceed the capabilities or turnaround times of hospital and clinical laboratories. Collaboration among toxicologists (T), public health labs (PHL) and poison centers (PC) is essential to timely diagnosis and treatment and for the protection of public health. 4 recent cases occurring in 3 states highlight evolving rapid response roles of PHL and collaborations. *Case Report:* 1) Rapid analysis identified the substance, prevented unnecessary decon, anxiety, and transport to a crowded ED for >100 adults exposed to a white powder in a suspected terrorist incident. Established ties with PHL facilitated real-time analysis. 2) Intentional mass poisoning caused gastroenteritis-like illness. Collection/transport of forensic specimens must not delay transport/analysis of clinical specimens; T/PC correctly identified the toxin by syndrome; again ties facilitated response. 3) A state lab quantified accidental poisoning of 2 infants. 4) PHL confirmed self-poisoning with arsenic in an adult, affirming need for antidotal therapy and close supervision while preventing premature disposition. *Case Discussion:* Successful triage and treatment of patients exposed to unusual agents supports the value of upgrading PHL capabilities and strengthening ties between PHL and emergency responders including hospitals, T and PC. Syndromic approaches to disease recognition used by T and PC complement those employed by public health practitioners. PHL staff may adapt methods to suit clinical samples in emergencies. CDC and HRSA emergency preparedness grant programs yield dividends, enhancing PHL and PC when funds are shared. Real-time clinical problem solving tests capacities, reveals pitfalls in current emergency response plans, promotes improved use of scarce resources, and provides reinforcement for planners and responders. *Conclusion:* Advance knowledge of emergency communications pathways, after-hours call schedules, PHL capabilities and capacities, sample collection and transfer protocols, and mutual trust between T, PHL and PC facilitate emergent problem solving. T and PC should take active roles in emergency planning with PHL.

138. Methanol Intoxication in Cases of Pesticide Ingestion

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Background: Solvents has been noted to play a key role in cases of some pesticide intoxication. In literature, the surfactant polyoxyethyleneamine in herbicide Roundup is one of the well-known. As a solvent, methanol is commonly used in pesticides and noted to be highly toxic. In cases of pesticide intoxication, the solvent methanol may deteriorate patient's outcome. However, methanol poisoning in pesticide ingestion has not been described in literature. *Methods:* On August 2002, we detected high blood methanol level in a case of organophosphate intoxication presented with unexpected metabolic acidosis. Since then, we performed solvent screen in biological samples of patients with pesticide intoxication to find out the potential existence of methanol in pesticides that may worsen patients' condition and to improve the treatment. *Results:* From 2002 to 2006, totally we found 13 suicide patients, 6 male and 7 female, methanol was detected in their blood and/or urine. Six patients were found to be organophosphate intoxication, five carbamate, one butachlor and one hexaconazole. Seven patients with acetylcholinesterase inhibitors intoxication were dead in two days, and five of them were found to have high blood methanol level and high anion gap metabolic acidosis. Only one patient with high blood methanol level 3 hours after poisoning was successfully treated with hemodialysis. *Discussion:* The solvent of methanol added in pesticide played a vigorously detrimental role on the toxicity of these pesticides. Solvent screen might be valuable in cases of pesticide ingestion. In cases of pesticide ingestion, methanol intoxication must be considered and treated enthusiastically if metabolic acidosis developed. *Conclusion:* Awareness of the rare but lethal complication from methanol intoxication in pesticide ingestion should be addressed. The impetus of forced labeling of solvents with acute toxic potential might be driven to improve the quality of poisoning patients' care.

139. The Effects of Adenosine A_1 Selective Agonist on Metamidophos-Induced Cholinergic Symptoms and Brain Oxidative Stress in Rats

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Background: The aim of the study was to evaluate the effects of different doses of an adenosine A_1 selective agonist phenylisopropyl adenosine (PIA), on metamidophos-induced cholinergic symptoms, mortality, diaphragm muscle necrosis, brain antioxidant enzyme activities and thiobarbituric acid reactive substances (TBARS) levels. *Methods:* Metamidophos 20 mg/kg p.o. followed by 1 ml/kg 0.9 % sodium chloride, 1 mg/kg, 2 mg/kg, 3 mg/kg or 5 mg/kg PIA, i.p. were given to the rats (n = 8 in each group), respectively. Initial times for clinical signs and diaphragma necrosis were compared with Kruskal-Wallis Analysis. Clinical signs between groups were compared with Fisher's Exact Test. Survival analysis was based on the Kaplan Meier procedure. Mann-Whitney U test was used to compare brain antioxidant enzyme activities and TBARS levels in groups. *Results:* Initial time of clinical signs including chewing, salivation and convulsion were delayed in the groups that treated with 1 or 5 mg/kg PIA, 1 or 2 mg/kg PIA and 1 mg/kg PIA ($p 0.05$, $p < 0.01$, $p < 0.01$, $p < 0.01$, $p < 0.05$), respectively. PIA was effective to reverse the necrotic changes in diaphgram muscle induced by metamidophos significantly in all treatment groups ($p < 0.01$). Brain TBARS levels were significantly increased after the metamidophos poisoning ($p < 0.001$). PIA (2 to 5 mg/kg) significantly decreased in brain TBARS levels compared to 0.9 % sodium chloride treated rats ($p < 0.001$). *Discussion:* Although different doses of PIA reduced the OP- induced oxidative stress and diaphragm necrosis, a single dose of PIA was not able to recover cholinergic symptoms of metamidophos poisoning. *Conclusion:* Cumulative or repeated dose regimen of PIA might be more effective to prevent symptoms of metamidophos poisoning in rats.

140. Methemoglobinemia Responsive to Methylene Blue in a Child with G6PD Deficiency

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Background: G6PD deficiency predisposes to both methemoglobinemia and hemolysis. Methylene blue (MB) requires G6PD-derived NADPH to become activated. Controversy exists as to whether MB is effective or harmful in G6PD deficient patients with methemoglobinemia. We report a case in which MB had an immediate beneficial effect in a G6PD-deficient patient with naphthalene-induced methemoglobinemia. *Case Report:* A previously healthy, 20 month-old boy presented to the ED with irritability and an ashen skin color 4 days after being found eating naphthalene mothballs. On the day of ingestion he had self-limited watery diarrhea, followed three days later by dark colored urine. His initial vitals were: BP, 113/62 mmHg; HR, 150/min; RR, 26/min; O2 sat, 92% on room air; T, 101.5o F. He had mild cyanosis, scleral icterus, and dry mucous membranes, but an otherwise normal physical examination. Laboratory analysis revealed: metHb 6.5% by co-oximetry; WBC 29 × 109 cells/L; hemoglobin 5 g/L; hematocrit 13.9%; MCV 83.8 fL; reticulocyte count 4.1%; lactate dehydrogenase 2313 IU/L. His peripheral blood smear revealed Heinz bodies. Due to perceived clinical instability, he received MB 10 mg (1 mg/kg) intravenously over 5 minutes. Within minutes after the infusion, his oxygen saturation increased to 95% on room air. Soon thereafter his mental status and skin color improved with resolution of both cyanosis and irritability. Three hours later his repeat methemoglobin was 2.6%. He received a transfusion of packed red blood cells and his hematocrit responded appropriately. Subsequently, he had an unremarkable inpatient course. Several months after discharge, follow-up qualitative testing confirmed G6PD deficiency. *Case Discussion:* RBCs of G6PD deficient patients have reduced capacity to form NADPH, which is necessary for successful antidotal therapy with MB. Lack of NADPH is postulated to cause both antidotal failure and hemolysis due to oxidant effects. However, this patient's clinical course was not consistent with either antidotal failure or ongoing hemolysis. *Conclusion:* Naphthalene-induced methemoglobinemia in this patient with G6PD deficiency may have responded to MB.

141. Rapid Urine Drug Screens: Diphenhydramine and Methadone Cross-Reactivity

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Background: Rapid urine screens for drugs of abuse are often used in pediatric emergency departments (PED). A positive result may lead to further clinical testing, social evaluation, and increased stress/inconvenience. We present a case of a previously unreported false positive methadone result, clinical consequences, and in vitro laboratory evaluation of the kit for cross-reactivity with diphenhydramine (DPH). *Case Report:* A 9 year-old boy presented to a PED with report of access to DPH and an exam consistent with anticholinergic syndrome. Urine was tested using the rapid drug screen, One Step Multi-Drug, Multi-Line Screen Test Device (ACON Laboratories). Results were positive for methadone but parents denied risk of exposure. The patient was admitted for medical and social evaluation. Confirmatory testing using gas chromatography/mass spectroscopy failed to confirm the presence of methadone. *Case Discussion:* The same One Step urine drug screen was tested at an independent lab for cross-reactivity between methadone and DPH including the DPH metabolites. Drug-free urine was fortified with DPH, nordiphenhydramine (nDPH), or dinordiphenhydramine (dnDPH) at 0, 10, 25, 50 and 100 mcg/mL for each analyte. 100 mcL of the solutions were added to each of the four wells on test cassettes. Urine was allowed to migrate according to manufacturer instructions. Each cassette was interpreted by two analysts to ensure consistent interpretation and accurate data recording. Results showed cross-reactivity between methadone and DPH (see table) but not for nDPH or dnDPH. *Conclusion:* Rapid urine drug screens utilizing immunoassays based on the principle of competitive binding may show false positive methadone results for patients who have ingested diphenhydramine. Product information for urine drug screens may not include all cross-reacting agents and should be used with caution when interpreting drug screen results in PED patients.

Concentration of Diphenhydramine	One Step Multi-Drug, Multi-Line Screen Test Device
10 mcg/mL	Color reduction but clearly negative
25 mcg/mL	More color reduction but negative
50 mcg/mL	Further color reduction; potential positive
100 mcg/mL	Positive interpretation

142. The Outcome of Unintentional Pediatric Bupropion Ingestions: A TESS Database Review

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Background: Unintentional bupropion pediatric exposures uncommonly report severe effects. There is no clinical management consensus on these cases; many are referred to health care facility (HCF). We sought to determine the clinical effects, case outcomes & decontamination therapy effects for unintentional bupropion ingestions in children age ≤6 years. *Methods:* The 2000–2006 AAPCC Toxic Exposure Surveillance System (TESS) was queried for unintentional age ≤6 acute bupropion ingestions followed to a known outcome. Cases with > 1 substance were excluded. Decontamination was categorized into two groups: activated charcoal (AC), or no gastric decontamination. If amount was reported, a mg/kg dose was determined; when weight was absent, it was interpolated from the available data set. Adverse neurological effect (ANE) was defined as seizures (single, multi/discrete, status) or coma. For analysis, outcomes of no effect & mild outcome were grouped, and outcomes of moderate outcome, major outcome & death were grouped. The treatment groups were compared using two-tailed Fisher's exact test and Student's t-test. *Results:* 7118 cases met the inclusion criteria;1143 cases were excluded for multiple substances, resulting in 5975 cases. Of these, 2982 (49.9%) were treated with single dose AC and 2750 (46.0%) were not treated with any gastric decontamination. A total of 4563 cases (76.6%) were managed at or sent to a HCF. Most common clinical effects reported were: nausea/vomiting (4.3%), agitation (2.7%), drowsiness (2.3%), and seizures (1.5%). There were no deaths. Overall, there was a 3.4% rate of moderate/major outcomes; there was no difference between AC group (3.2%) and those without decontamination (3.5%) ($p = 0.62$). The rate of ANE was 1.5%; 1.1% in the charcoal group and 1.9% in the no decontamination group ($p = 0.01$). A mg/kg dose was calculable in 76.5% of cases; the average amount for the no effect/minor cases and moderate/major effect was 18.0 ± 31.1 mg/kg and 51.3 ± 140.5 mg/kg, respectively ($p < 0.0001$). *Discussion:* Treatment with AC does not appear to alter the case outcome, but may decrease the rate of ANE. *Conclusion:* Few children develop toxicity from unintentional bupropion ingestions.

143. Acute Dystonia after Intravenous Administration of Ziprasidone

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Background: Ziprasidone is FDA approved for oral and intramuscular use only. There is one case report of successful intravenous (IV) administration of ziprasidone given for delirium refractory to conventional therapy. There were no adverse effects noted in that patient. *Case Report:* A 37-year-old woman with schizoaffective disorder, being treated with quetiapine and dufloxetine, was admitted to the hospital for endoscopy after a foreign body ingestion. Ziprasidone 10mg intramuscular (IM) every six hours was ordered while the patient was fasting in preparation for the procedure. The medication was prepared by the hospital pharmacy per standard practice. The first 10mg dose was administered intravenously instead of intramuscularly. One hour later, the patient developed torticollis, upward ocular gaze, and tremor. The vital signs and an EKG were normal. Diphenhydramine 25mg IV was given, followed by benztropine 1mg IV one hour later. All symptoms subsequently resolved. There was no recurrence of symptoms and no development of cardiac abnormalities on telemetry monitoring. She received no further ziprasidone doses. *Case Discussion:* Ziprasidone is FDA approved for oral and intramuscular administration in the treatment of schizophrenia and acute agitation. There is limited data on intravenous administration. The one previous report demonstrated no adverse effects. This case resulted in an acute dystonic reaction that responded to conventional therapy. *Conclusion:* We report a case of an acute dystonic reaction following intravenous administration of ziprasidone.

144. Post-Mortem Blood Cadmium, Lead and Mercury Levels: Comparisons with Regard to Sampling Location and Reference Ranges for Living Persons

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Background: Public health investigations involving exhumations of deceased persons for presumed metal toxicity have occurred due to elevated post-mortem (PM) metal testing when compared to reference ranges in living persons. Our objectives were to gather data on PM blood cadmium (Cd), lead (Pb), and mercury (Hg) levels, determine if levels vary based on sampling location and compare PM concentrations using reference ranges as reported in the 3rd *National Report on Human Exposure to Environmental Chemicals*. *Methods:* We used a selected convenience sample of Medical Examiner's death cases and compared measured Cd, Pb and Hg levels in heart and femoral blood samples to national reference values in living persons from the 1999–2000 National Health and Nutrition Examination Survey for persons 20 years and older. Inclusion criteria were: 1) age 20 years or older; 2) no intravenous line or resuscitative medications given; 3) femoral (F) and/or heart (H) blood accessible; and 4) no penetrating trauma. Blood specimens were collected in metal free containers and stored at ~4°C until analysis. *Results:* Results on 31 subjects are available: recruitment is still ongoing. Twenty-two heart and 20 femoral specimens were suitable for analysis. Geometric mean concentration of each metal and range by site sampled was: Cd-F, 1.99 µg/L (0.41–33); Cd-H, 4.62 µg/L (0.44–140), U.S. 95th percentile Cd, 1.5 µg/L; Pb-F, 1.68 µg/dL (0.47–5.7); Pb-H, 1.52 µg/dL (<LOD-11), U.S. 95th percentile Pb, 5.2 µg/dL; Total Hg-F, 0.75 µg/L (<LOD-4.4); Total Hg-H, 1.66 µg/L (<LOD-15), U.S. 95th percentile Total Hg in women 16–49 years old, 7.1 µg/L. (<LOD is less than the Level of Detection) PM blood cadmium levels varied with sampling location ($p < 0.005$). PM blood Cd-F levels were higher than representative population values ($p < 0.0005$). *Discussion:* PM metal testing results must be interpreted carefully. Elevated PM Cd levels may be due to events that normally occur after death. *Conclusion:* Early results suggest that PM blood Cd levels may differ based on sampling location and PM blood Cd-F levels may differ in regard to representative population values.

145. Effect of Time of Presentation of Single Serious Acetaminophen Overdose on Serum Potassium, and the Relationship to Renal and Hepatic Damage

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Background: We have shown that acetaminophen overdose (OD) causes a dose-dependent increase in urinary excretion of potassium (K) at 12h, and fall in serum K at 24 hours in patients who did not suffer hepatic injury (1). *Aim*: We now report the effects of acetaminophen OD on serum K in patients presenting at different times after OD who developed hepatic damage. *Methods:* A retrospective study on 316 cases of single ingestion acetaminophen OD admitted with suspected severe hepatic damage to a national hepatology referral center between 1992 and 2004. Cases were categorised into three groups according to initial presentation time after OD: group (GP) 1: ≤12h; GP 2: 13–24h; and GP 3 >24h. Relationships between serum K, acetaminophen, creatinine and PT at first admission to hospital were examined. *Results:* Delay to first presentation was: GP 1, 8.08 ± 0.42 h; GP 2, 18.83 ± 0.31 h; GP 3, 44.86 ± 1.36 h. As expected serum acetaminophen level at first admission was significantly higher in GP 1 than GPs 2 and 3 (203.37 ± 23.92; 123.04 ± 11.91; 67.89 ± 8.02 mg/l, respectively, $p < 0.0001$). There was a significant effect of presentation time on serum K, creatinine, ALT, and PT ($p < 0.0001$). eg (K GP 1, 3.73 ± 0.08; GP 2: 3.95 ± 0.07; GP 3; 4.52 ± 0.08 mmol/l).In GP 1 serum K was in a significant negative correlation with serum acetaminophen (R^2: 0.08, $p < 0.05$) and did not correlate to creatinine or PT. In GPs 2 and 3 serum K was significantly positively correlated with serum creatinine and PT ($p < 0.01$) but not serum acetaminophen. *Discussion:* Relationships between serum acetaminophen level and change in serum K vary with time after exposure, suggesting different mechanisms at different times. *Conclusion:* In the early stages of toxicity fall in serum K is associated with serum acetaminophen level, and hence ingested dose. Later changes reflect renal injury. Measurement of renal effects of acetaminophen may allow greater understanding of mechanisms in acetaminophen toxicity. *References:* 1. N Pakravan, DN Bateman, J Goddard. Effects of acute paracetamol overdose on changes in serum and urine electrolytes. BJCP 2007 in press.

146. Poisoned to Deaf, Arsenic Induced Ototoxicity

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Background: Dimsodium methylarsenate is a salt of pentavalent arsenic. Following ingestion the first symptoms of arsenic toxicity develop after 30 to 60 minutes. Depending on the severity of the clinical symptoms, intoxication with arsenic is characterized by cardiovascular collapse, central nervous weakness and death may occur within hours. Characteristic of the gastrointestinal symptoms is a metallic or garlic-like taste, a dry mouth, burning lips, difficulties swallowing, headaches, dizziness and vomiting. Subsequent multi-organ failure can develop. *Case Report:* A 62 year old woman presented to a community emergency department within 2 hours of ingesting a weed killer containing disodium methylarsenate. The estimated amount was 15g or 300mg/kg. The LD50 for rats is 600mg/kg. She presented with nausea, abdominal pain and developed characteristic arsenic-induced prolonged Q-T interval and non specific S-T segment changes. The patient developed mild renal and liver impairment. She was treated with whole bowel irrigation and commenced on oral dimercaptosuccinic acid. After resolution of gastrointestinal symptoms and normalisation of her ECG, renal and liver function, she developed a profound deafness on day 4 of her admission. This has not been documented previously. Her initial urinary arsenic level was 6,730.0 umol/L (Ref Range < 1.3). *Case Discussion:* This paper will describe the pathogenesis of arsenic poisoning, discuss possible causes of the ototoxicity that developed in this patient and review the controversy in the literature regarding antidote administration for arsenic toxicity. *Conclusion:* Arsenic induced otoxicity has been rarely reported and documented. We have plotted serial arsenic levels and documented the nature of our patient's deafness suggesting a direct neurotoxic effect on the 8th cranial nerve. Physicians should be aware of this complication.

147. Serotonin Syndrome Associated with Ramelteon Overdose

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Background: Ramelteon (Rozerem™) is a highly selective melatonin receptor (subtype 1 and 2) agonist that displays no meaningful affinity for serotonin, GABA, opiate or dopamine receptors. It's primary metabolite, M-II, is active at the 5-HT2B receptor, thus the possibility of a ramelteon overdose causing a serotonin syndrome (SS) exists. *Case Report:* A 44 year-old woman with a history of depression took approximately thirty 8 mg ramelteon tablets, fifty acetaminophen/oxycodone tablets, and an unspecified number of aspirin tablets in a suicidal gesture. The patient's only prescribed medication was escitalopram 20 mg. She arrived at the emergency department 10 hours after the ingestion, and was observed to be diaphoretic, agitated, confused, and vomiting repeatedly. The patient received 10mg of metacloperamide, 2mg of lorazepam and 50mg of diphenhydramine intravenously for sedation and control of emesis. The patient was seen by the toxicology service six hours after hospital presentation and found her to be somnolent, tachycardic (110 bpm), hypertensive (150/90 mmHg), and confused upon arousal. On exam, the patient was diaphoretic, and exhibited symmetrical patellar hyperreflexia, ankle rigidity, and inducible ankle clonus. The rectal temperature at this time was 99.1°F. Lab work suggested an insignificant salicylate ingestion, but a potentially toxic acetaminophen ingestion. The patient was treated with Acetadote™, intravenous fluids, and made a full recovery. *Case Discussion:* SS is a clinical syndrome of serotonin excess characterized by mental status change, autonomic dysfunction, and neuromuscular disturbances. Although

multiple diagnostic criteria have been proposed for SS, the disease remains difficult to diagnose. This patient was taking therapeutic doses of a serotonin reuptake inhibiting drug (escitalopram) when she ingested a large amount of ramelteon. *Conclusion:* Given a lack of confounding serotonergic co-ingestion, we conclude that the M-II metabolite of ramelteon was responsible for precipitating a moderately severe SS in our patient. We believe that this is the first reported case of SS occurring in a patient associated with an overdose of ramelteon.

148. Catatonia Associated with Initiating Paliperidone Treatment

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Background: Catatonia can be caused by metabolic, neurologic, psychiatric, and toxic conditions. We report a case of catatonia that was precipitated by a single dose of paliperidone, a new antipsychotic. *Case Report:* An 84 year-old female, with a past history significant for major depression and anxiety, was brought to our Emergency Department in the early evening. According to previous psychiatric records, she had no prior episodes of catatonia. Earlier in the day the patient had been evaluated by her psychiatrist for worsening symptoms of anxiety and treated with a single dose of 3 mg of paliperidone. Approximately eight hours after administration of the medication, the patient became increasingly agitated and subsequently stopped speaking and responding. In the Emergency Department she was afebrile, with a pulse of 80 and blood pressure of 161/72, with oxygen saturations of 98% on room air. She exhibited stupor, mutism with fixed postures and waxing flexibility. Diphenhydramine and benztropine were given for a presumptive therapy for a dystonic reaction, without any change. A noncontrast head CT was performed and was normal. Sixteen hours after she received the paliperidone, the patient became conversant, responsive and interactive. She did not recall any events of the previous evening. *Case Discussion:* Paliperidone is the active major metabolite of risperidone. It was approved by the FDA in December 2006 and released to consumers in the United States in January 2007. Its therapeutic activity is believed to be a result of both central dopamine type 2 and serotonin type 2 receptor antagonism. It is also an antagonist at $\alpha_1$and α_2 adrenergic receptors and H_1 histaminergic receptors. Plasma concentrations are estimated to peak approximately 24 hours after dosing, with a terminal half-life of approximately 23 hours. Unlike risperidone, paliperidone is not extensively metabolized by the cytochrome P450 enzymes and is not expected to cause clinically relevant pharmacokinetic drug interactions. Risperidone has been reported to induce catatonia in several patients, although it has also been reported in the literature as being used as a treatment for catatonia. *Conclusion:* Paliperidone, a new antipsychotic, may be a cause of drug-induced catatonia.

149. Anaphylaxis to Sidewinder Rattlesnake Venom without Previous Snakebite

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Background: Anaphylaxis is a rare complication of rattlesnake envenomation and its development requires pre-sensitization to venom antigens. It most often occurs in patients previously bitten, but has been reported in a patient who ingested rattlesnake meat. We present a case of anaphylaxis in a snake handler with a first time envenomation. *Case Report:* A 35 yo male herpetologist with no significant medical history, was bitten on his left index finger by a captive sidewinder rattlesnake. He had no history of rattlesnake bite (RSB), but frequently handled snakes. Within 5 minutes, he had tingling in his lips and difficulty breathing. 10 min later, in the ED, he had diffuse wheezing, hypotension and periorbital edema. He was pale and diaphoretic with a blood pressure (BP) of 70/30 mmHg and a HR of 130 bpm. He received 2 doses of subcutaneous epinephrine and IV solumedrol, famotidine and diphenhydramine. His BP and perfusion quickly improved. Swelling developed in his left index finger and hand, as did a small bleb on the tip of the finger. He was given 16 vials of CroFab™ for swelling, after his BP stabilized. He never developed coagulopathy or thrombocytopenia. He was discharged on hospital day 3 on steroids. On follow-up 9 days post-RSB, he was healing well without recurrence of swelling or coagulopathy. He developed an erythmatous rash on the left arm upon cessation of steroids, which resolved after restarting prednisone. *Case Discussion:* We present a case of anaphylaxis following a sidewinder envenomation in a patient without previous RSB. Rapid onset of hypotension, wheezing and periorbital edema are consistent with acute IgE-mediated immune response to venom. Most reports of rattlesnake induced anaphylaxis involve patients with a previous bite. Our patient was a herpetologist and often handled this snake. We suspect this was the exposure that led to his sensitization. The patient was told of the dangers of further exposure, was given an EpiPen™ and advised to avoid rattlesnakes in the future. *Conclusion:* The development of anaphylaxis requires previous exposure to antigen. Dermal exposure to venom proteins through snake handling may allow for development of IgE antibodies leading to an anaphylactic reaction following envenomation.

150. Bradycardia and Hypotension Associated with Fomepizole during Hemodialysis

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Background: The antidote fomepizole (4-MP) has few known adverse effects. Although bradycardia and hypotension are listed in the product monograph, their causal link with 4-MP is uncertain. We present a case of recurrent bradycardia and hypotension associated with 4-MP infusion. *Case Report:* A 59-year-old, 53 kg, South Asian man unwittingly ingested ethylene glycol mixed with rum. He presented to hospital 10 hours later with ataxia, slurred speech, Glasgow coma scale 15, heart rate (HR, beats/min) 70, blood pressure (BP, mmHg) 160/100, serum bicarbonate 14 mmol/L, creatinine 0.97 mg/dL (86 µmol/L), ethanol undetectable. Stroke was suspected, but over the next 6 hours he progressed to coma with worsening acidosis: pH 7.17, pCO2 19 mmHg, bicarbonate 7 mmol/L. HR remained >88, BP >150/74. Ethylene glycol poisoning was diagnosed with admission serum level 118 mg/dL (19 mmol/L). Hemodialysis began 7.5 hours after admission and 4-MP (1020 mg) began 5 min later. Immediately following the 30 min 4-MP infusion, HR fell to 29 and BP to 69 systolic, both rapidly correcting with 1 mg atropine. Endotracheal intubation was performed. Dialysis continued uneventfully (HR 104–129, BP 105/74–165/90) until 530 mg 4-MP was given, 4 hours later. On completion of the 30 min 4-MP infusion, HR dropped to 48 and BP to 89/57. Vital signs normalized with plasma expander. Dialysis continued 3 more hours with stable HR >100, BP >150/77. No hypotension or bradycardia occurred after a post-dialysis dose of 530 mg 4-MP or during subsequent hemodialysis for renal failure. The patient recovered fully. *Case Discussion:* Due to overestimation of body weight, the first 4-MP dose was 19 rather than 15 mg/kg. Doses 2 and 3 were 10 mg/kg. Hemodialysis may cause a drop in BP and HR; however, the close temporal relationship with 4-MP infusions, dose-related symptom intensity and recurrence with rechallenge suggest a causal relationship with 4-MP. Hemodialysis, acidosis and high initial 4-MP dose may have enhanced patient susceptibility, as the post-dialysis dose was well tolerated. *Conclusion:* 4-MP may precipitate bradycardia and/or hypotension during hemodialysis.

151. Emerging Patterns of Adolescent Prescription Drug Abuse

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Background: Emerging patterns of adolescents drug abuse suggest decreases in illicit drug use are offset by increased rates of prescription drug abuse. Recent data suggest this trend may relate to differences in user objectives. We examined knowledge, attitudes, and beliefs regarding prescription drug abuse among adolescents. *Methods:* From a random sample of 100 patients ages 13–17 we obtained qualitative data utilizing a semi-structured interview. Respondent quotations (N = 12) were abstracted for consistent themes described by participants which were subsequently interpretated by independent reviews who assessed knowledge, attitudes, beliefs, and practices. Agreement between reviewers was assessed using the Kappa statistic. *Results:* Commonly mentioned drugs were analgesics, stimulants, and sedatives. In additional to recreational uses many respondents described use for modification of social pressures.

Selected Prescription Drug Behaviors

Drug Name	Indication	Motivation
Amphetamine/ Dextroamphetamine	Enhanced test performance	Scholastic
Amphetamine/ Dextroamphetamine	Improved study habits	Scholastic
Amphetamine/ Dextroamphetamine	Longer party endurance	Recreational
Amphetamine/ Dextroamphetamine	Stay awake in school	Scholastic
Amphetamine/ Dextroamphetamine	Used to "feel good"	Recreational
Hydrocodone	Better pain tolerance during football game	Scholastic
Hydrocodone	Continued football participation despite prior injury	Scholastic
Hydrocodone	"Chill out" at parties	Recreational
Hydrocodone/Oxycodone	Getting "high"	Recreational
Trazadone	Experience "crazy dreams"	Recreational
Butalbital	Escape stress	Recreational
Clonazepam	Getting "a buzz"	Recreational

There was high inter-rater agreement (K = 1) with respect to determining whether behaviors were directed toward scholastic achievement or recreational use. *Discussion:* Adolescents may use prescription medication to achieve specific scholastic goals. Such behaviors suggest that adolescent prescription misuse may be normative behavior. *Conclusion:* The misuse of prescription drugs for scholastic purposes creates new challenges for detection, education, and prevention.

152. CPSC NEISS-AIP and AAPCC TESS: A Comparison of Reports of Medication Exposure as Cause of ED Visits by Young Children

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Background: In January 2006 the MMWR published a National Electronic Injury Surveillance System – All Injury Program estimate on pediatric medication exposure to children less than 5 years of age that resulted in ED visits. We sought to generate a parallel estimate using AAPCC TESS data to see how these estimates compliment or reproduce one another. *Methods:* To match NEISS, AAPCC-TESS database was queried for the years 2001–2003. Search criteria included: human, age < 6 y/o, call type-exposure, reason-unintentional, call site or management site was at/referred to HCF, substance-pharmaceutical. Subsequent exclusions: age = 5 years; duplicate records; records for 2nd or higher substances (to generate a unique patient count, not substance count); calls in which the call site was an HCF, but the patient was managed onsite at non-HCF; calls from any call site for which the management site was referred to/already in an HCF and level of care was refused referral, null or lost–unless call site = HCF and the patient was already present. Finally, only unintentional-general cases were selected. *Results:* Of 265,922 records in the initial dataset, 168,086 met all of the inclusion and selection criteria. TESS data report that 53,885 children less than 5 years of age were seen in an ED following unintentional, general medication exposure in 2001; 56,612 in 2002; and 57,589 in 2003. NEISS estimated annual exposure of 52,517. Comparing NEISS v TESS: 10% v. 13% were hospitalized; 72% v. 70% were either 1 or 2 years of age. The substance distribution: (NEISS v TESS first substance) acetaminophen (8.1%, 6.8%), cough/cold (7.5%, 10.3%), CV (7.8%, 11.6%), anticonvulsant (3.6%, 2.9%), vitamins (4.5%, 3.7%). *Discussion:* NEISS data is based on an extrapolation from 66 representative hospitals. AAPCC data represent actual reports and a minimum count. If TESS database represents under-reporting (not all cases are called in), the NEISS extrapolation tool may need to be reassessed. *Conclusion:* NEISS-AIP and AAPCC-TESS provide remarkably similar estimates of the number and substance distribution of young patients treated annually at healthcare facilities following medication exposures.

153. "Dusting" – A New Inhalant of Abuse; Office Products Containing Difluoroethane. A Case Series Including a Fatality

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Background: Traditional abuse of volatile hydrocarbons-sniffing glue, bagging or huffing paints/ chemicals as euphoriants is common among young adolescents. A newer form of abuse "dusting" the inhalation of halogenated hydrocarbons difluoroethane (DFE) & tetrafluoroethane found in office products "Dust Off" is gaining popularity. Dust Off is marketed as a compressed air product; it is perceived to be safe yet increasing numbers of severe adverse reactions are being reported to our PCC. DFE can cause dysrrhythmias including ventricular fibrillation, central nervous system depression, respiratory irritation, hypoxemia and frost bite.Those who "dust" don't consider themselves inhalant abusers! A Medline search revealed isolated case reports; mostly fatal exposures.If prevention is possible, further characterization of this pattern of injury is necessary. *Case Report:* Case series of "Dust Off"exposures 2000–2006. n = 49, males 27/females 22. Age range 19 mo–48 years; ave. 17½ yr. All but the infant were intentional. >33% resulted in moderately severe clinical symptoms: loss of consciousness, seizures, 2nd/3rd degree burns/frostbite, & dysrrhythmias. There was 1 death. 29 were referred to health care facility. Ave. 5 cases/year until 2005 = 9 & 2006 = 15-a significant increase. *Case Discussion:* To our knowledge this is the first reported case series to characterize the practice of "dusting."A high percentage of cases resulted in significant symptoms & hospitalization. Unlike the epidemiology of traditional inhalant abuse involving 9–13yr olds, "dusting" includes teens, young and middle aged adults who admitted dusting weekly to get high. Youngsters tended to be experimenters. Of concern is the dramatic increase over the last 2 years. *Conclusion:* As with other inhalant abuse, it's difficult to predict who'll have an adverse outcome: at what dose or use. Most patients were surprised at the adverse effects; perceiving the practice to be safe. Additional studies are necessary in order to develop prevention strategies. PCC need to increase awareness among the public and health care professionals about the abuse potential of a seemingly harmless office product.

154. The Use of Dexmedetomidine in Delirium Tremens

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Background: Although benzodiazepines (BZ) are first-line therapy for delirium tremens (DT), additional medications may be required in severe cases. Dexmedetomidine (DX), a selective alpha-2-agonist, is used in the critical care setting for its sedative properties. To our knowledge, only one published human case report exists in which DX is used as adjuvant therapy for DT. *Case Report:* A 37-year-old man presented two days after voluntary cessation of ethanol intake. Vital signs were: blood pressure (BP) 142/95 mm Hg; heart rate 150 beats/minute (bpm); respirations 20 breaths/minute; temperature 99°F (37°C). He was tremulous and disoriented. His initial Clinical Institute Withdrawal Assessment-Alcohol, Revised (CIWA-Ar) score was 13. He was given 75 mg of intravenous (IV) diazepam over four hours. Sedation and improvement in vital signs occurred. Three hours later, his BP rose to 165/105 mm Hg with a pulse of 137 bpm, and a CIWA-Ar score of 26. He received 16 mg of IV Lorazepam (LZ) but still had persistent hypertension and tachycardia. He was started on DX with an initial IV loading dose of 1 µg/kg over one hour. His BP improved to 130/59 mm Hg with a pulse of 114 bpm. He was calm but disoriented. Fixed-schedule and as-needed LZ dosing were continued. Fifteen hours after DX loading, he was started on a continuous DX IV infusion at 0.4 µg/kg/hour for six hours. He remained awake but calm. His BP was 123/85 mm Hg with a pulse of 95 bpm. He continued to improve and required less BZ with time. He never exhibited convulsive activity. His mental status returned to baseline on hospital day # 4. He was discharged to home on hospital day # 6. *Case Discussion:* DX is shown to improve the clinical signs of ethanol withdrawal (EW) in rats. Its efficacy and safety in treating DT in humans is unknown. Animal studies with DX are conflicting with regard to its effects on the seizure threshold. To our knowledge, animal or human data regarding the effective use of DX and its safety in the treatment of EW and DT are extremely limited. *Conclusion:* In this single case, DX was effectively used as an adjunct to BZ in this patient with DT. Future studies in humans comparing DX to other medications is warranted before its use in DT can be recommended.

155. Tonic-Clonic Seizures Associated with Trimethobenzamide (Tigan) Use in a Child

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Background: Trimethobenzamide (Tigan) is an anti-emetic that has had very few side effects reported. Although the manufacturer has listed seizures as a potential side effect, we are unaware of any case reports documenting this association. We report a case of an infant who had two convulsions associated with its therapeutic use. *Case Report:* A 14 month-old, 10 kg, previously healthy male was brought to an urgent care for evaluation of a two-day history of vomiting and diarrhea. The infant had experienced no fevers or hematochezia, had not been administered an antipyretic, and was afebrile. Fifteen minutes following the rectal administration of a 100 mg trimethobenzamide (Tigan) suppository, the infant had a brief, spontaneously resolving generalized convulsion. He was transferred to a local hospital, where he experienced a second nearly identical convulsion four hours after drug administration. Subsequently he had a rectal temperature of 37.9°C but otherwise normal vital signs and physical exam, including hemoccult negative stool. Lab testing revealed a normal serum glucose and sodium, and stool studies revealed the absence of WBC's and the absence of rotavirus. A CT scan of the brain was normal. He was observed in the hospital for 36 hours, during which he had no further convulsions. He has been seizure-free since the episode. *Case Discussion:* Trimethobenzamide's therapeutic activity is thought to occur via inhibition of stimuli at the chemoreceptor trigger zone, and it is thought to have antimuscarinic properties. The exact mechanism that would be responsible for convulsions is unclear. Although we cannot definitively confirm that the convulsions were related to trimethobenzamide, the temporal association of its use with the convulsions, and the absence of another clear etiology are highly suggestive. *Conclusion:* Therapeutic trimethobenzamide administration may be associated with convulsions.

156. Seizure after Nasal Insufflation of Bupropion

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Background: Seizures have been reported with therapeutic bupropion use, as well as in overdose. Nasal insufflation of bupropion resulting in a seizure has not previously been reported. *Case Report:* A 17-year-old boy crushed four 150mg bupropion XR tablets into a powder to snort for recreation while on vacation. Within one hour the patient had a witnessed grand mal seizure that lasted 2–3 minutes and resolved spontaneously. He had no history of previous seizures. His last normal 150mg dose was taken 7 hours earlier. The pre-hospital vital signs included a normal temperature, HR 120s, BP 115/70, and normal O2 saturation. Capillary glucose was 84 mg/dL. In the emergency department, his pupils were 3–4 mm bilaterally and symmetrically reactive, and the skin was warm and dry. He had no focal neurologic deficits. The rest of the physical exam was unremarkable. Head CT, basic chemistry panel, and urine drug screen were normal. No form of intranasal or gastrointestinal decontamination was done. The patient was observed overnight with no further convulsive activity and discharged the following day. *Case Discussion:* Seizures have been reported following therapeutic bupropion use and in overdose. Pulverizing extended-release bupropion pills and altering the route of administration may alter the drug's pharmacokinetic and toxicokinetic profile. This report describes a seizure after nasal insufflation of pulverized bupropion extended-release pills. *Conclusion:* We report a case of a seizure after nasal insufflation of extended-release bupropion.

157. Pediatric Fenthion Exposure with Prolonged, Cyclical Symptoms

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Background: Fenthion is known to be highly lipophilic, resulting in waxing & waning of cholinergic symptoms over a period of time. How long is that period of time? *Case Report:* A 12 month old boy was found playing with a bottle of fenthion 20%. On presentation to the rural hospital, he was pale & clammy. He was initially treated with dermal decontamination, oral Activated Charcoal 50 gm & atropine 0.2 mg before transfer to a Children's Hospital. At 3 hours post exposure (PE) he was lethargic, salivating, hypotonic, with pinpoint pupils but no fasciculations. Despite treatment with atropine 0.2 mg & pralidoxime 250 mg IV, he was hypotonic, unable to hold up his head, sit up or hold a bottle without support at 5 hours PE. A second 250 mg dose of pralidoxime produced some improvement in muscle tone & strength. By 7 hours PE, his muscle strength decreased further, with poor head control & lethargy. He was given 2 more 250 mg doses of pralidoxime at 10 &10.5 hours PE. By 14 hours PE, he was alert, able to sit up & independently hold a bottle. He remained asymptomatic in hospital until 53 hours PE, when he became incoherent with pinpoint pupils,bradycardia & drooling. Treatment with atropine 0.2 mg and pralidoxime 250 mg, improved mental status and muscle strength. He remained asymptomatic, and was transferred to the local hospital at 92 hours PE for continued observation. when at 144 hours PE, he was unable to sit up on his own, lethargic, floppy, sweaty, febrile (40°C), lacrimating & salivating but with no fasciculations. He was treated with Atropine 0.2 mg & pralidoxime 250 mg and transferred back to the Children's hospital. The lacrimation & salivation improved immediately after atropine. Improvement in the lethargy was noted after administration of pralidoxime. At no time did he require ventilatory support. He then remained asymptomatic over a further 5 day observation period in hospital and at home. There are no known sequelae. *Case Discussion:* This pediatric case illustrates cyclical (day 1, day 3, day 6) cholinergic symptomatology (primarily nicotinic with some muscarinic features) responsive to atropine and pralidoxime, interspersed with prolonged asymptomatic periods. *Conclusion:* Symptomatic pediatric exposures to fenthion may require prolonged observation despite apparent asymptomatic periods.

158. Fungus Amonogus – Testing the Public's Ability To Identify Mushrooms

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Background: Identifying potentially poisonous mushrooms over the telephone can be a difficult task for poison specialists. Risk assessment is ultimately dependent on the ability of callers to provide details regarding the color and anatomical features of the given mushroom. This study was designed to test the public's capacity to correctly identify mushroom anatomical parts and toxic vs. non-toxic mushroom species. *Methods:* A booth with a variety of poisonous and non-poisonous mushrooms was set up at a public park. Random, voluntary participants were asked: to estimate their level of mushroom familiarity (high, moderate, low, little or none); to look at a large mushroom specimen and point to the: cap, ring, cup, gills, stem; and to identify the 2 toxic species out of a group of 6 mushrooms. *Results:* Of the104 individuals surveyed, 87 had little or no familiarity with mushrooms, 9 had some, 5 had a moderate amount and 3 had a lot. (see table for full results) *Discussion:* Most individuals were able to correctly identify some of the important anatomical features of a mushroom, but not all. The majority of people, regardless of their level of familiarity could not identify the toxic specimens. *Conclusion:* Future educational efforts may need to focus on informing the public about local toxic mushroom species as well as mushroom anatomy so that callers to a poison center can properly describe the characteristics of an ingested mushroom.

Identifying Mushrooms

Level of Familiarity	Cap	Stem	Gills	Ring	Cup/ volva	ID toxic species?
Little or none (N = 87)	80 (92%)	83 (95%)	77 (89%)	21 (24%)	21 (24%)	5 (6%)
Low (N = 9)	8 (89%)	8 (89%)	8 (89%)	6 (67%)	3 (33%)	1 (11%)
Moderate (N = 5)	5 (100%)	5 (100%)	5 (100%)	3 (60%)	2 (40%)	0 (0%)
High (N = 3)	3 (100%)	3 (100%)	3 (100%)	2 (67%)	1 (33%)	1 (33%)

159. Cocaine "Body-Stuffing" by Proxy: An Unusual Cause for a Sore Throat

Lamba S, Tewari M, Rella JG. *UMDNJ, Newark, NJ, USA*.

Background: "Body-stuffing" describes when a drug carrier attempts to hide drugs in an effort to avoid arrest or prosecution. Although there are several reports documenting resultant morbidity and mortality following the intentional ingestion of drug packets, we report an individual who was forced to swallow drugs against his will. *Case Report:* A 47 year old male cocaine user presented to the Emergency Room with a chief complaint of sore throat. He described pain on swallowing and a feeling of something stuck in his throat. Physical examination revealed a thin male frequently using a basin for his saliva but in no acute distress. His vital signs and pulse oximetry were normal. Further questioning revealed a history of being forced by his drug dealer to swallow about 10–12 vials of cocaine that were tied together in a bunch. He stated he initially resisted but his assailant restrained him and the vials were pushed into his throat with the use of a wooden cane approximately 3 hours prior to hospital arrival. Radiographs of the chest and neck revealed a cluster of vials in the thoracic esophagus at the level of the aortic knob. Although his vital signs remained stable, he was noted to have increasing difficulty swallowing his secretions with periods of agitation. Due to the proximity to the upper airway, as well as possible signs of cocaine toxicity, the patient was taken to the operating room for an endoscopic exploration and removal. Endoscopic retrieval was unsuccessful and surgical removal of vials via an open neck exploration was performed. Repeat radiographs revealed no further vials within his chest or abdomen. *Case Discussion:* The use of drug vials as a means of assault and their forcible insertion into the gastro-intestinal tract presents a unique clinical dilemma. Foreign body obstruction near the upper airway, risk of esophageal perforation and cocaine toxicity from ruptured packets are more likely as compared to intentional ingestions. *Conclusion:* We present a case of body-stuffing by proxy. In addition to the common complications of foreign body obstruction and assault, the added risk of acute cocaine toxicity from ruptured vials, either from their forcible insertion or during their removal, creates a challenging clinical problem.

160. Scombroid Poisoning after Consumption of Freshwater Carp (Aristichthys nobilis)

Simpson S, Greenberg MI. *Drexel University College of Medicine, Philadelphia, PA, USA*.

Background: Scombroid poisoning is a common form of marine food poisoning typically resulting from the consumption of spoiled, dark meat fish. Scombrotoxin is preformed histamine, produced by bacterial enzymatic conversion of histidine in the flesh of the fish. *Case Report:* A 77 year-old Asian male with a history of a syncopal episode presented to the emergency department (ED) soon after a syncopal event at a local restaurant. The patient had just eaten a whole, cooked fish identified by the family as "hua lian" (Aristichthys nobilis), when he become pale, vomited once, and then briefly lost consciousness. In the ED, the patient's vital signs were: rectal temperature 98.4°F, pulse 106, blood pressure 177/83 mmHg, blood glucose 134 mg/dL, with a Glascow Coma Score of 15. He had discernible skin flushing and an episode of uncontrollable diarrhea. An electrocardiogram (ECG) performed on presentation revealed sinus tachycardia with a first-degree atrioventricular (AV) node block. The patient was treated with diphenhydramine (25 mg), and famotidine (20 mg) intravenously, and within 4 hours his vital signs returned to normal. Extensive inpatient neurologic and cardiovascular evaluations were unremarkable. An ECG performed on hospital day 3 was normal and without any evidence of a conduction delay. *Case Discussion:* The role of histamine receptors in mammalian cardiovascular performance is well described. Stimulation of cardiac H1 receptors suppresses AV node conduction, while stimulation of H2 receptors increases cardiac myocyte automaticity. Anaphylaxis induced supraventricular tachycardias, ectopy, AV node and bundle branch blocks have all been described in humans. Similar arrhythmias have been experimentally generated in animal models of anaphylaxis, and successfully suppressed with anti-histamine therapy. H1 blocking and H2 blocking drugs have an often overlooked role in the modulation of histamine arrhythmogenesis. *Conclusion:* We believe this case represents the first reported case of scombroid poisoning attributable to Aristichthys nobilis, a commonly imported, freshwater carp from East Asia.

161. Student Partnerships: Making the Most of Your Outreach Dollars

Ferries HA,[1] Gallo AM,[1] Shimoji JT,[2] Chudak AA.[1] [1]*Ontario Poison Centre, Hospital for Sick Children, Toronto, ON, Canada;* [2]*Ontario College of Art and Design, Toronto, ON, Canada*.

Background: In 2005, the Ontario Regional Poison Information Centre at The Hospital for Sick Children (Toronto, Ontario) was informed that it's sister office, the Ontario Regional Poison Information Centre at the Children's Hospital of Eastern Ontario (Ottawa, Ontario) was set to close. The newly redesigned Ontario Poison Centre (OPC) in Toronto was suddenly the sole provider of poison information for the province. Nearly 600,000 Ontario households were affected by the closure of the Ottawa centre. The OPC was challenged to develop an effective communication strategy for the area formerly serviced by the Ottawa centre. *Case Report:* The OPC seized this opportunity to undertake a long overdue province-wide media and public awareness campaign. Realizing that financial and human resources could limit the scope of the campaign, the OPC approached a Bachelor of Design student at the Ontario College of Art and Design (OCAD), Canada's largest university of art and design, who was looking to develop an intelligent, effective and socially responsible graphic design solution for a complex design problem. *Case Discussion:* The partnership between the OPC and OCAD was a highly effective one that substantially lessened design, audio and video production costs, facilitated a connection to numerous pro bono services of professionals in the field of design and allowed for an increased investment in campaign materials. As a result, the OPC was able to undertake a complete rebranding and develop a comprehensive, province-wide multi-media advertising campaign. The campaign, which was in English and French included the creation of a new logo, a residential mail-out, educational materials for physicians' offices, print advertisements, transit ads, a television public service announcement, a Web-site facelift and numerous media appearances. *Conclusion:* The OPC successfully partnered with a local graphic design school, utilizing the expertise of students and faculty to eliminate design and production costs for a major media and public awareness campaign and effectively stretching a very limited public outreach budget.

162. "Cheese" (Starter Heroin) Exposures Reported to the Texas Poison Center Network 2005–2007

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Background: New methods and forms of drug abuse are a concern for health professionals, law enforcements officials, and school systems, as well as parents. In 2005, cheese or "cheeze" exploded onto the Dallas, Texas scene as starter heroin. Cheese is a mixture of a crushed powder, usually acetaminophen and diphenhydramine, laced with heroin that is snorted. At as little as $2 per dose, this drug is becoming increasingly popular amongst teens and pre-teens. *Methods:* The Texas Poison Center Network database was queried for heroin or cheese exposures from January 2005 through March 2007. Notes were reviewed to determine if heroin was used with acetaminophen/diphenhydramine. Heroin-only cases were excluded. *Results:* There were 22 cases of exposure in individuals aged 11–18. The patient was male in 64% of the cases. All exposures were intentional-abuse. The management site was health care facility in 91% of cases, with the additional 9% being unknown. In 18%, there were other substances of abuse involved. The most frequently listed specific treatments were fluids(50%), naloxone(36%), ventilator(23%), NAC(14%), and benzodiazepines(14%). Medical outcomes were no effect(9%), minor effect(18%), not followed–no/minor effect expected(5%), not followed–minimal clinical effects possible(9%), not followed–potentially toxic effect(4%), moderate effect(23%), major effect(23%); no deaths were reported. *Discussion:* 41% of cases had the term "cheese" only in the "Notes" field of the chart. Some cases had presumably had the route of exposure mis-coded as parenteral or ingestion, probably due to the common use of these routes of exposure for heroin and acetaminophen, respectively. *Conclusion:* Reported cases were concentrated in the Dallas area. NAC treatment may be over-utilized in cases of cheese exposure as specialists may not understand that the acetaminophen/diphenhydramine is snorted in combination with heroin rather than being co-ingestants by oral route. There is a need to educate poison information specialists about this relatively new drug of abuse, its route of exposure, and treatment modalities.

163. A Comparison of Poison Center Penetrance over a Ten-Year Period

Klemens J, Hovseth K, Glogan D, Lovecchio F. *Banner Poison Control Center, Phoenix, AZ, USA*.

Background: With regard to the AAPCC, penetrance is defined as a number of reported human poison exposure calls per 1,000 populations served. As a preliminary step in researching reasons for the continuing high penetrance ratio of our poison center, a mechanism was developed to evaluate resources utilized to obtain the poison center's emergency telephone number. In1996 Annual Report of the AAPCC, records a mean collective penetrance of 9.3 for all US centers. Our 1996 penetrance was slightly higher than the national average at 16.5 per 1000 population served. We repeated the study in 2007 and incorporated such changes as the 1–800 #. *Methods:* A 5 question survey for all patients calling the PCC. The survey was completed by specialists on all consecutive calls. *Results:* 610 callers were offered the survey and ten refused. Surveys were completed on 600 callers from 2/1–4/1/07. We found that 31% of callers obtained the number from the local telephone book. In 2007 362/600 (60%) used the 1–800#, 103/600 (17%) used the local phone #. Directly assistance (198/600) (60 %) was used a majority of the time. When callers were asked if the PCC was not available: 219/600 (37%) would have called 911 and 199/600 (33%) gone directly to the emergency department. In comparing the differences in the 10-year period with regard to how contact with the PCC was finally made. About ½ of callers (48%) of callers made at least one telephone call to obtain the poison center number. About 1/3 after (36%) of all callers interfaced with another health care resource, (veterinarian, physician, emergency department, pharmacist, etc.), before being referred to the poison center. *Discussion:* These numbers regarding ways of contact did not change on the 10-year interval. These results suggest challenges to maintain and increase utilization. Future direction should include means to increase PCC penetrance. If the PCC were not available about 2/3 of patients would call 911 or go directly to an emergency department. *Conclusion:* If the PCC were not available about 2/3 of patients would call 911 or go directly to an emergency department. During a ten-year period penetrance and telephone connection to the PCC did not change.

164. Safety and Efficacy of Acetadote for Acetaminophen Toxicity

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Background: Acetaminophen (APAP) toxicity is commonly encountered in the ED. Until 2004 treatment consisted of either oral N-acetylcysteine (NAC) or filtered oral NAC administered IV. Acetadote is a new FDA-approved IV formulation of acetylcysteine. As there has been little reported post-market data on the efficacy and safety of Acetadote, we performed a review of patients treated with Acetadote for APAP toxicity. *Methods:* A retrospective chart review was performed at our tertiary referral center. Patients were identified via search of medical records between March 2005 and June 2006 using the term "N-acetylcysteine"and then included if they received Acetadote for APAP toxicity. The primary outcome measures were both efficacy of and adverse reactions to Acetadote. Data collected included: comorbidities, allergies, intentionality, timing and dosing of Acetadote, hospital length of stay (LOS), transaminases >1000 IU/L, development of liver failure requiring transplant, development of renal failure requiring hemodialysis, death and anaphylactoid reactions. *Results:* 64 patients met our study criteria. Fifteen (23%) patients were treated within the recommended eight hours from time of ingestion. Overall, 17 (27%) patients developed transaminases >1000 IU/L; and, of these, four (6%) patients died and two (3%) patients received liver transplants. Of the 15 patients treated within eight hours, none died, none developed liver failure requiring transplant, none developed renal failure requiring hemodialysis and only one patient had a transient elevation of transaminases > 1000 IU/L. Although the overall average LOS was 4.9 days, the group treated within eight hours had an average LOS of only 1.7 days. Six (9%) patients developed anaphylactoid reactions, two of whom received the Acetadote bolus over 15 minutes. Five of these patients were treated pharmacologically and completed treatment, and one had treatment discontinued for undocumented reasons. *Conclusion:* Our experience with Acetadote suggests it is safe and efficacious. Morbidity, mortality and LOS all appeared to correlate with time to treatment.

165. Poison Center Awareness among Low-Income Minority Families

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Background: This study assesses public perceptions of the poison control center (PCC) among low-income minorities. Awareness of the PCC, knowledge of PCC attributes, barriers to calling the PCC, and awareness of poison prevention were measured. Results will guide future education planning and program implementation. *Methods:* A PCC educator worked closely with a research marketing company and urban social service agencies to conduct surveys and focus groups. Surveys were telephone and in-person interviews conducted in 4 geographic areas within the state. Participants were screened in by: 1) household income less than $20,000/year and 2) African American, Hispanic, or other minority. 463 surveys were conducted in English (350), Spanish (104), and Haitian Creole (9). Four focus group sessions were held in 2 geographic areas. Each group lasted 60–90 minutes and had 7–10 participants. *Results:* A total of 61.7% of consumers surveyed were not aware of the PCC and 38.3% showed some level of awareness. Most focus group respondents were not aware of the PCC, but were enthusiastic to learn about it. Of those aware, respondents knew the PCC recommends immediate treatments (40.4%), is open 24/7/365 (32%), is a confidential service (29%), has experts on staff (28.6), is a free service (23.9%), and is a multi-lingual service (23.6%). Although 43.4% said they knew how to contact the PCC, 52.2% said that they would call 911 as a method of getting the number. About one-third stated they would be concerned about language problems when calling the PCC. 74.7% felt very/somewhat informed as to what materials may be dangerous household substances. About ¾ indicated they had taken steps to protect children from being exposed to poisons. 58.4% had children under 18 living in the household. *Discussion:* Marketing research can help poison centers to develop an accurate picture of underserved populations to better target and serve these consumers. *Conclusion:* Most low-income minority consumers are not aware of the PCC nor the scope or breadth of services. Unique approaches to reaching underserved populations will be implemented based on direct input from participants. [Platform]

166. Depth of Awareness

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Background: In the Northeastern United States nearly 50% of poison center (PC) cases are for children under 6 years and 34% are for adults. However, most hospitalizations and deaths are for adults. Adults are more likely to call a PC for a child's exposure, than for their own. To properly target adult prevention efforts, educators need to understand why adults would or would not call a PC. *Methods:* A telephone survey was completed for randomly selected households in six states. One county with low adult penetrance (LP) and one with high (HP) were chosen in each state (exposures age 18+ / estimated population age 18+). The participants needed to live in their home for at least a year and could not be a parent or guardian of a child. The survey contained 6 poisoning scenarios and 8 poisoning circumstances. Chi-square analysis was used to compare responses from HP to LP; adults who know the PC phone number to those who did not; and previous PC callers to those who had not previously called. *Results:* LP ranged from (1.5 to 2.7) and the HP ranged from (2.4 to 9.5). 1140 calls were completed. The gender and age distribution were similar across counties. Most adults identified 5 out of 6 scenarios as poisonings. HP adults were statistically more likely to identify 2 of the 6 poisoning scenarios, previous PC callers 2 scenarios, those who knew the PC number 3 scenarios. Most adults stated they would not call the PC first for all of the 8 poisoning circumstances. HP adults were statistically more likely to call a PC first for only 2 circumstances, previous PC callers 7 circumstances, and those who knew the number all 8 circumstances. *Discussion:* One limitation was the small differences in some HP rates versus LP rates. *Conclusion:* Penetrance does not appear to be an indicator of people's awareness of poisoning scenarios or likelihood of calling the PC first for certain poisonings. Previous PC callers or knowing the PC number appear to be better indicators. This research will assist in developing appropriate education initiatives and evaluations of population-based education efforts. [Platform]

167. Is TESS Sometimes a Place Where the Plural of "Anecdote" Becomes "Data"?

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Background: While TESS (AAPCC Toxic Exposure Surveillance System) is one of the most-quoted sources for epidemiologic data re: US poisonings, its information is of unknown accuracy. TESS data are largely obtained by telephone, and recorded by those who have almost never examined the patient. Critically, poison center records often fail to record precisely why listed substances are under etiologic consideration at all. This study employs a unique "second chance" method to reevaluate the accuracy of poison center information after it has been submitted to TESS. *Methods:* All poison center records from CPCS Fresno/Madera used to prepare deaths abstracts from 1997 through 2006 are examined. Substances thought to have been causative for death are extracted from each record. These are then compared with causative substances from coroner reports. "Major Discrepancy", defined as a coroner cause of death completely different than what was documented at the time a completed record was submitted to TESS, is recorded. *Results:* 208 death cases were examined. Coroner reports were available for comparison in 83 of 208 cases (40%). Of the 83 cases, Major Discrepancy was found in 15 (18%). Discrepancies included a purported clonazepam/quetiapine overdose which actually died because of a ruptured thoracic aortic aneurism, a "Chinese herb" death which was actually inorganic cyanide and an "iron" death caused by propranolol. In 7 cases, the poison center record failed to record precisely why the listed substance was under etiologic consideration. *Discussion:* In this study, 18% of cases affording a "second chance" look at true causality via coroner's report were found to have submitted to TESS the wrong cause of death. Given that TESS "data" are derived from a game of "telephone", the finding of significant error is not surprising. One can only guess how many deaths in published TESS reports were actually caused by a substance other than that reported. *Conclusion:* This small study suggests that in as many as 18% of cases, the substance reported to TESS as the cause of poisoning is erroneous. Utilization of TESS data requires understanding its potential sources of error, including the use of second hand information. [Platform]

168. Improved Management of Poisoned Patients through the Use of Prospective Clinical Audit

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Background: The evidence-base in clinical toxicology is sparse compared to other disciplines. Initial management of poisoned patients is often by junior ED doctors and our experience is that management can sometimes be suboptimal. The aim of this study was to investigate whether prospective clinical audit could alter the management of poisoned patients. *Methods:* Data on all poisoned patients presenting to our inner city teaching hospital is collected prospectively on a purpose-designed database. All cases are graded on whether management is "optimum", or whether there are "minor" or "major" shortfalls. Major shortfalls are those that are or could be associated with increased morbidity/mortality or length of stay, minor shortfalls are those in which the management is not optimal but is unlikely to result in clinically significant harm. We hold bi-monthly audit meetings with toxicology and ED personnel to review all shortfalls. Significant clinical issues are fed back to ED clinicians. Educational reports highlighting suboptimal management are circulated to ED staff. We describe the impact of this system on the management of poisoned patients from December 2005 to January 2007. *Results:* Data was collected on 1280 patients over this period and we held 7 audit meetings. Optimal management improved from 74.4 to 91.1%, major shortfalls fell from 10 to 2.4% and minor shortfalls fell from 15.6 to 6.5%. Particular issues were identified with regards investigation and management of acetaminophen poisoning, inappropriate use of naloxone and flumazenil and management of cocaine related acute coronary syndrome. Teaching sessions were introduced to address these issues and an acetaminophen treatment guideline was introduced. *Discussion:* Systematic collection and analysis of data on the management of patients, regular audit of this data and the introduction of steps to address shortfalls that were identified resulted in a significant improvement in the management of poisoned patients. *Conclusion:* This model could be adopted more widely not only to improve the management of poisoned patients in other hospitals, but potentially for other groups of patients presenting to the ED. [Platform]

169. The Prevalence of Fentanyl in Drug-Related Deaths in Philadelphia 2004–2006

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Background: Fentanyl has been identified as a heroin adulterant in the illicit drug supply in Philadelphia. We evaluated the effect of fentanyl on drug-related mortality using medical examiner data. *Methods:* Data related to all drug-related deaths from 2004–2006 determined by the Philadelphia Medical Examiner's Office was reviewed. All cases that were reported to be positive for fentanyl were identified for the same time frame. *Results:* For the year of 2006 fentanyl was first detected in post-mortem specimens in Philadelphia in the month of April. Table 1 shows the monthly distribution of medical examiner diagnosed drug-related deaths (DRD's), the annual number of DRD's, the number of these deaths related to fentanyl and the percentage of DRD's tested positive for fentanyl for 2004–2006. *Discussion:* This data indicates the number of DRD's increased by 1.8 fold from March to April, 2006. The number of DRD's where fentanyl was identified in post-mortem specimens increased by 9 fold from 2005 to 2006. *Conclusion:* From 2004–2006 there was a substantial increase in drug related deaths in Philadelphia. We postulate that this increase is attributable to fentanyl adulterated street drugs.

Drug-Related Deaths in Philadelphia 2004–2006

	2004	2005	2006
January	31	46	32
February	37	33	30
March	30	36	35
April	30	28	63
May	44	38	55
June	31	36	53
July	20	34	62
August	30	46	78
September	29	49	54
October	33	32	35
November	38	48	35
December	38	36	26
Total number of drug-related deaths	391	462	558
Number of drug-related deaths which tested positive for fentanyl	19	22	239
Percentage of drug-related deaths tested positive for fentanyl	4.8%	4.8%	42.8%

170. Altered Acetaminophen Absorption Kinetics, Double Peaks, and Hepatotoxicity Associated with Premature Cessation of Intravenous N-Acetylcysteine Therapy

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Background: Acetaminophen (APAP) overdose is effectively managed with N-acetylcysteine (NAC). Substantial APAP ingestion may alter absorption kinetics and require longer therapy. We report a massive APAP ingestion resulting in prolonged absorption, double concentration peaks, and hepatotoxicity after premature discontinuation of IV NAC. *Case Report:* A 78-year-old man with vascular disease and chronic renal insufficiency (CRI) ingested 96 (500 mg) standard-release APAP tablets (48 g) over 1 hour (h). There was no reported anticholinergic or opioid ingestion. No GI decontamination was performed. Laboratory analysis showed baseline CRI, normal LFTs and PT, and no salicylates nor ethanol. Urine opioids were undetectable. APAP concentrations were 264 and 281 mcg/mL at 2.25 h and 6.25 h post-ingestion. IV NAC, started 5 h post-ingestion, was continued for 21 h. Therapy was discontinued despite a residual APAP concentration of 116 mcg/mL due to normal LFTs and the patient's well clinical appearance. A second peak APAP concentration of 228 mcg/mL occurred approximately 48 h post-ingestion. Continuous monitoring made re-ingestion unlikely in this non-ambulatory patient.

AST and ALT peaked 5 days post-ingestion at 4350 and 5621 U/L; PT and creatinine peaked at 51.4 seconds (INR 6.6) and 4.2 mg/dL (371 µmol/L). *Case Discussion:* Given the solubility of APAP, 2365 mL of GI luminal fluid was needed to dissolve the reported dose. Solubility was likely exceeded, leaving a pharmacobezoar of undissolved APAP available for later absorption. Biphasic peaks have been reported both in therapeutic doses and experimental high-dose APAP for malignancy. This is due to well-described variations in gastric emptying both in normal and overdose patients. The patient's vascular disease may have contributed to delayed gastric emptying and intestinal absorption. *Conclusion:* In massive APAP ingestion, serum concentrations may rise as late as 21 h post-ingestion. APAP concentrations and aminotransferases should be checked upon completing IV NAC therapy to ensure complete elimination of APAP and absence of hepatotoxicity.

171. Parenteral Ophthalmic Tropicamide or Cyclopentolate Protects Rats from Lethal Organophosphate Poisoning

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Background: Most hospitals lack a sufficient supply of atropine to treat multiple patients poisoned by an organophosphorous compound (OC) or nerve agent. Our objective was to evaluate the effect of parenteral ophthalmic antimuscarinic agents (Tropicamide Ophthalmic 1% and Cyclopentolate Hydrochloride Ophthalmic 1%) on survivability in a rat model of acute, lethal OC poisoning. *Methods:* Sprague-Dawley rats were sequentially pretreated and then poisoned five minutes later in order to obtain an appropriate dose response for study comparison. Administration of dichlorvos (15 mg/kg) subcutaneously (SC) resulted in 100% mortality, while pretreatment with intraperitoneal (IP) atropine (10 mg/kg) resulted in 90% survival. Rodents were then randomized to receive one of four IP antidotes (n = 10 per group); **1)** 0.3 mL normal saline (NS), **2)** atropine 10 mg/kg, **3)** ophthalmic tropicamide 20 mg/kg, or **4)** ophthalmic cyclopentolate 20 mg/kg. Five-minutes following pretreatment, 15 mg/kg of dichlorvos was administered SC. Mortality rates and time to death were compared using Fisher's exact test and the Kaplan-Meier method with logrank test respectively. If alive at 120 minutes, survival was assumed and the study was terminated. *Results:* Survival in rats pretreated with atropine (10 mg/kg) was 90%. Survival in rats pretreated with tropicamide (20 mg/kg) and cyclopentolate (20 mg/kg) were 90% ($p < 0.01$; 95% CI 0.71, 1.09) and 90% ($p < 0.01$; 95% CI 0.71, 1.09) respectively compared to controls (10% survival; 95% CI 0.04, 0.45). Time of death ranged between 6 and 13 minutes in nonsurvivors. Overall comparison of survival time revealed a statistically significant improvement in experimental groups compared to controls ($p < 0.0001$). *Discussion:* Concentrated ophthalmic antimuscarinic agents show promise as alternative sources of antidotal therapy for patients with OC or nerve agent poisoning. *Conclusion:* Pretreatment with parenteral ophthalmic solutions (tropicamide or cyclopentolate) was equivalent to standard atropine in preventing lethality in this rat model of acute, lethal OC poisoning.

172. A Rodent Model Comparing Lipid and Pressor Therapy for Local Anesthetic Toxicity

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Background: Laboratory and clinical reports indicate that lipid infusion is an effective treatment for systemic local anesthetic (LA) toxicity. There are currently no objective data to guide resuscitation from LA-induced cardiovascular (CV) collapse. We developed a rat model of bupivacaine-induced asystole to compare efficacy and outcomes of three therapeutic regimens. *Methods:* Male rats were ventilated with isoflurane in oxygen via tracheotomy placed under general anesthesia. One carotid and two internal jugular catheters were placed. Arterial pressure and ECG were continuously monitored. Bupivacaine 20mg/kg was delivered intravenously (IV) over 20s at which time isoflurane was stopped and one of three treatments was initiated. Ventilation with oxygen continued throughout the ten minute timecourse of the experiment; chest compressions were delivered until spontaneous rate pressure product (RPP) reached 20% of baseline. *Results:* Treatment limbs included IV infusion of L, (30% lipid emulsion,5 mL/kg); E (epinephrine,30 mcg/kg); or V (vasopressin,0.4 u/kg) given immediately after the bupivacaine and repeated at 2.5 and 5 minutes (min) for RPP < 20% baseline. RPP was expressed as a fraction of baseline and comparisons were made among the groups at 5 and 10 min by two-way ANOVA with Bonferroni posttests; n = 5 for all data points. Asystole was observed at 0 time in all animals. At 5 min, RPP for L ($p < 0.01$) and E ($p < 0.05$) significantly exceeded that for V. At 10 min RPP for L exceeded that of both E ($p < 0.001$) and V ($p < 0.001$). RPP for group E also exceeded that of V at 10 min ($p < 0.001$). *Discussion:* We demonstrate a reliable model for evaluating hemodynamic recovery from bupivacaine-induced asystole.We found that L was superior to both E and V therapy. *Conclusion:* This model will be useful to compare and optimize treatment regimens for LA toxicity and possibly other forms of toxin-induced CV collapse.

Rate Pressure Product, Fraction of Baseline

	5 min	10 min
L	0.23+/–.03	0.63+/–.07
E	0.20+/–.05	0.31+/–.04
V	0.07+/–.02	0.07+/–.01

173. Ethylene Glycol Content of Snow Globes

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Background: FPIC-Jacksonville was contacted concerning the death of a feline that ingested the contents of a snow globe. The caller was informed that, as listed in Poisindex, the usual concern of snow globes is bacterial contamination of the liquid content. It was discovered on toxicological analysis that the cat was exposed to a toxic amount of ethylene glycol. The purpose of this study was to verify the risk of exposure to snow globe contents by determining the prevalence and potential concentration of ethylene glycol found within the fluid content of snow globes. *Methods:* Snow globe manufacturers were contacted to determine the ethylene glycol concentration of the fluid within their snow globes. Domestic manufacturers were contacted via telephone. Foreign manufacturers were contacted via email or through their website. *Results:* Twenty snow globe manufacturers were contacted. It has been determined that manufacturers have and continue to produce snow globes that contain ethylene glycol. Ethylene glycol concentrations as high as 20% have been reported. *Discussion:* It was determined that an ingestion of the fluid content of certain snow globes can pose a risk of ethylene glycol poisoning. Poison centers should review and revise policies for snow globe exposures to consider the possibility of ethylene glycol exposure and react with appropriate management guidelines. *Conclusion:* Ethylene glycol toxicity is a potential risk following the ingestion of the fluid contents of certain snow globes. It is important for poison centers and toxicologists to be aware of this risk when determining triage and treatment criteria.

174. The e Factor: Rewarding Tenure, Productivity, and Experience

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Background: Organizational advancement, pay increase, and professional growth serve as the cornerstones of most career ladders. Our Regional Poison Center (RPC) placed a premium on tenure and Specialist in Poison Information (SPI) certification to promote SPIs by awarding them with a two-pay grade promotion after remaining employed at the RPC for five calendar years. This precipitated the RPC administration to question whether the current policy of strictly rewarding tenure and certification should be revised to also include productivity and experience. *Case Report:* Benner's (1984) model of skill acquisition by registered nurses was reviewed and found to be transferable to the role of SPIs. Information on the development of career ladders shared by other RPCs was also reviewed. The RPC identified the following measurable variables that assist in the development of expertise as a SPI: 1) # exposure and info calls, 2) # times consulted, 3) # chart reviews, and 4) # total hours worked. Using these variables, an expertise formula (e factor) was developed as an objective measurement to evaluate SPIs for promotion. Initial criteria established for promotion to Senior (Sr.) status include 1) certified SPI (CSPI), 2) approved chem/bio/hazmat course, 3) completion of coding module, 4) CSPI in good standing, and 5) e value >minimum threshold set by RPC administration. Criteria were also established for maintenance of Sr. CSPI status by awarding points for professional and educational activities performed within the year. Each Sr. CSPI is responsible for procural and documentation of activities and points. *Case Discussion:* Both full time (FT) and part time (PT) CSPIs that met the initial inclusion criteria were evaluated. Results indicate that FT CSPIs earn their promotion in less calendar time than PT CSPIs. Indications also suggest that promotion may be awarded in less time to a motivated, productive CSPI, regardless of FT or PT status. *Conclusion:* Promoting and rewarding a CSPI for tenure, productivity, and experience forms the basis of this career ladder, reflecting the values held by the RPC administration. This objective, quantifiable approach uses a set of measurable variables to define expertise, or the e factor, within the role of CSPI. *Conclusion:* Promoting and rewarding a CSPI for tenure, productivity, and experience forms the basis of this career ladder, reflecting the values held by the RPC administration. This objective, quantifiable approach uses a set of measurable variables to define expertise, or the e factor, within the role of CSPI.

175. Subcutaneous Silicone Injection Leading to Multi-System Organ Failure

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Background: Silicone is a chemically inert liquid polymer often chosen for cosmetic procedures due to its durability and thermal stability. The illicit use of silicone injections has become increasingly common, especially in transsexuals. Pulmonary and other organ toxicity can occur following silicone injection. We report 2 cases of multiorgan dysfunction following silicone injection. *Case Report:* Two transsexual males presented to the ED with altered consciousness after receiving multiple subcutaneous injections of silicone into the hip and buttock. Each had previously received silicone injections into the face and lips without complications. On the day of presentation, each had received injections totaling between 1–2 liters of silicone. Soon after the injections, each reported feeling nauseated and lethargic, and then lost consciousness. On arrival, each was somnolent, with tachycardia and hypotension. Lungs were clear and there were multiple injection sites of induration noted over the hips and gluteal regions. Laboratory screening showed leukocytosis and hemoconcentration in each, with no drugs found on urine toxicology screening. Chemistries were normal. Both were hypoxic on arterial blood gas analysis. Oxygenation worsened in each despite intubation and ventilator manipulation. Chest radiographs were initially clear but progressively showed ARDS. One patient gradually improved over several days, was extubated, and recovered neurologically. The second patient continued to be hypoxic, never regained neurologic function, and expired 3 weeks after presentation. Postmortem examination revealed clinical respiratory failure with organizing pneumonia, ARDS, and foreign body giant cell reactions to silicone. Additionally, multiple small subacute brain white matter infarcts consistent with silicone embolization were found. *Case Discussion:* Excessive silicone injection can lead to multisystem organ toxicity. It is unclear whether this is can result entirely from embolization, from an immune mediated cascade, or some other etiology. *Conclusion:* Clandestine application of silicone for body enhancement is common and clinicians should be aware of the potential complications.

176. Shortened Course of N-Acetylcysteine (NAC) for Acute Acetaminophen Poisonings

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Background: There are several approaches to treating acute acetaminophen (APAP) poisonings ranging from 20 hour IV N-acetylcysteine (NAC) to 72 hour oral NAC. No NAC dosing regimen has been proven to be superior in efficacy. We propose a shortened course of oral NAC (SCON) in all acute (ingestion over less than 2 hours) APAP ingestions at risk for hepatotoxicity. *Methods:* Acute APAP poisoning cases were prospectively collected and

retrospectively reviewed over a 17 month period. SCON therapy is defined as five 70 mg/kg maintenance doses of oral NAC after a 140 mg/kg oral loading dose. At the time of the last dose, labs were drawn for LFTs, coagulations studies (coags) and serum APAP concentration. If the 20-hour labs were normal and the serum APAP concentration was unmeasurable, NAC was discontinued. LFTs and coags were redrawn 34–36 hours after the time of the ingestion. In patients discharged before a 36-hour set of labs were obtained, the patient or their health care provider was contacted within 48–72 hours to assess clinical status by phone survey. Survey questions asked about the presence of abdominal pain, vomiting, jaundice or skin discoloration, or confusion. *Results:* 448 patients were identified at risk for hepatotoxicity during the study period. 44 were eliminated from review due to missing information. 57 (14%) received 20-hour oral NAC therapy, none developed hepatotoxicity by 36-hour labs or phone follow-up criteria. Of the 190 patients that received more than 20 hours of oral NAC, 70 (37%) had more than 5 doses secondary to transaminitis. 29 (38%) of these patients presented with elevated enzymes; 35 (46%) patients developed transaminitis by the 20th hour of therapy. 12 patients had detectable APAP levels despite normal LFTs. 108 patients (26%) were treated for greater than 20 hours by physician choice. 157 (39%) patients were treated with IV NAC. *Discussion:* In accordance with our preliminary data, SCON appears to be both safe and effective in treating acute APAP poisonings. *Conclusion:* Short course oral NAC therapy should be considered in patients who meet the outlined criteria.

177. Anaphylactic Reaction to Crotalidae Polyvalent Immune Fab (Ovine)

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Background: Since its FDA approval in October, 2000, there have been very few reported cases of anaphylaxis to Crotalidae Polyvalent Immune Fab (Ovine) antivenom. Additionally, there were no reports of anaphylaxis in the pre-release clinical trials. Reporting mechanisms for these events are voluntary and not widely utilized. Subsequently, the true incidence of this reaction is still unknown in this population. *Case Report:* A 36 year-old male patient presented to the ED thirty minutes after being bitten on his right thumb by what was tentatively identified as a pigmy rattlesnake. Physical exam was consistent with a crotaline envenomation with two puncture wounds oozing blood and edema progressing above the wrist at the time of presentation. The patient's medical history was only significant for mild hypertension, and smoking one pack of cigarettes per day. He reported an allergy to penicillin but denied any other known allergies. He received only one Lortab 10/500, tetanus prophylaxis and IV fluids initially. Six vials of Crotalidae Polyvalent Immune Fab (Ovine) in 250 mL of normal saline was administered one hour and fifteen minutes after initial presentation. After only fourteen mL of the antivenom was infused the patient began to cough and become tachypneic and diaphoretic, experience generalized shaking and swelling of his lips and tongue. Oxygen saturation briefly dropped to 88% and his blood pressure dropped to a systolic of 70 mmHg for a short time. All of these symptoms began to resolve over the next few hours with usual anaphylaxis measures. He recovered uneventfully and was discharged after hospital day two. *Case Discussion:* True anaphylaxis, although rare, should always be considered possible with any animal protein based antivenom. Though the incidence of this reaction appears to be extremely low, physicians should not become complacent especially during the first few minutes of the infusion. Only with continued use of these products and reporting of all adverse events will the true incidence of these reactions become known. *Conclusion:* We report a rare case of anaphylaxis in a patient being treated for a crotaline envenomation with Crotalidae Polyvalent Immune Fab (Ovine).

178. High Plasma Carvedilol Concentration in a Case of Severe Toxicity

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Background: Significant Carvedilol toxicity is rarely reported in the literature. We present a case of severe toxicity with a plasma concentration of 518 mcg/L in a patient with refractory hypotension. *Case Report:* A 39 year old man with a history of congenital dilated cardiomyopathy and pacemaker placement intentionally ingested fifty 25 mg tablets of carvedilol. Initial vital signs soon after ingestion at an outside hospital revealed a BP of 132/115 mmHg, HR 74 bpm paced, RR 22 O2 Sat 97% GCS 15. Approximately 6.5 hours post-ingestion the patient became hypotensive, 76/50 mmHg. The patient received an initial dose of glucagon 4 mg IV after which dopamine 6 mcg/kg/min was started. The patient's blood pressure (average 90/50 mmHg) was supported with additional 2 mg IV glucagon boluses while he was transported via helicopter to our facility. The patient required intubation on arrival. Epinephrine and glucagon drips were titrated to keep his systolic blood pressure above 90 mmHg. A specimen obtained 12 hours after ingestion revealed a plasma carvedilol level of 518 mcg/L. The patient required 5 days of vasopressors to maintain adequate blood pressure. An echocardiogram revealed a decrease in his ejection fraction from a baseline of 25% to 15%. Pacemaker interrogation on the day of admission disclosed no abnormalities or events since his last interrogation 45 days ago. *Case Discussion:* Carvedilol is both an alpha and beta adrenoceptor antagonist. The average steady state plasma carvedilol level dosed at 25 mg twice daily is 70 mcg/L, while our patient's plasma carvedilol level was 518 mcg/L 12 hr after ingestion. While carvedilol has an elimination half-life of 7–10 hours, one metabolite is 13 times more potent than the parent molecule and may have contributed to prolonged hypotension in our patient. *Conclusion:* Carvedilol is rarely reported as a causative agent in beta blocker toxicity. This report describes a patient with high plasma concentration correlating with severe clinical toxicity.

179. The Poisoning Indicators from the State Injury Indicators Report

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Background: Poisonings are a significant cause of morbidity and mortality in the United States. State-based hospitalization and death data can provide important population-based information regarding poisonings that can not be derived from poison control center data. The State Injury Indicators Report presents these data from multiple states providing additional insight into the descriptive epidemiology of poisonings across states. *Methods:* The State Injury Indicators project uses standardized methods and consensus case definitions to collect hospital discharge and mortality data for a variety of injury topics, including poisonings. Thirty-four state health departments submitted 2004 data to the Centers for Disease Control and Prevention's National Center for Injury Prevention and Control where the data were compiled into the 2004 State Injury Indicator Report. The poisoning fatality and hospitalization indicator rates were then examined by age, sex, and state. *Results:* The overall poisoning fatality rate varied substantially by state, ranging from an age-adjusted rate of 3.1 per 100,000 to 18.6 per 100,000, as compared with a national rate of 10.3. The male and female rates also varied by state, but in each reporting state, the male fatality rate was higher than the female fatality rate. The highest fatality rate was most commonly found among those in the 25–44 year age group, yet in approximately a third of the reporting states, the highest rate was for those 45–64 years of age. The overall poisoning hospitalization rate also varied substantially by state, ranging from 40.6 to 105.2 per 100,000. However, for most states, the poisoning hospitalization rate for females was higher than that for males. The highest hospitalization rate was most commonly found among those in the 35–44 year age. *Discussion:* Poisoning rates vary substantially by state. The State Injury Indicators demonstrate the usefulness of broad poisoning indicators to examine these differences. *Conclusion:* The State Injury Indicator Report provides summary data on poisoning death and hospitalization rates to help inform state-based prevention efforts.

180. Evaluation of Clinical Effect Coding for Simulated WMD Cases

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Background: Carolinas Poison Center (CPC) uses computer-based syndromic surveillance (SS) to monitor for potential weapons of mass destruction (WMD) by screening PC cases against definitions built on clinical effects (CEs) of prospective agents. Specialists in poison information (SPIs) may not appropriately code CEs, thus impeding detection of WMD by SS. CPC evaluated SPI coding accuracy after listening to audio cases representative of WMD agents. *Methods:* Non-CPC toxicologists wrote six cases each of cyanide and botulism poisoning. Additionally, six control cases were randomly selected from CPC's 2005 database. A researcher extracted pertinent case information and scripted it to simulate a conversation between a SPI and consulting physician for audio recording. During this process CE descriptors were used verbatim. Ten SPIs were randomly selected to listen to and code CEs from the recorded cases. Two researches (gold standard (GS)) independently coded case CEs. The overall level of agreement between GS and SPI coding was calculated using kappa score (κ) on individual CEs summed over all test cases. The reported κ is the mean kappa with corresponding confidence intervals (CI). Inclusion or exclusion CE criterion for the WMD definitions were chosen for κ analysis. *Results:* The table displays the mean κ and corresponding CI for individual CEs. A $\kappa \geq 0.6$ represents a substantial degree of agreement beyond chance. *Discussion:* SPI coding accurary varies with the CE coded. *Conclusion:* Success of SS depends on accurate SPI coding.

Kappa Scores for Clincal Effects

CE	Mean Kappa Score	95% CI
Constipation	0.76	(0.57, 0.95)
Dysphagia	0.50	(0.19, 0.81)
Nausea	0.84	(0.78, 0.91)
Vomiting	0.94	(0.78, 0.91)
Agitated	0.96	(0.85, 0.99)
Coma	0.67	(0.58, 0.77)
Confusion	0.26	(–0.002, 0.52)
Drowsiness	0.74	(0.60, 0.88)
Muscle Weakness	0.57	(0.40, 0.74)
Paralysis	0.80	(0.55, 0.99)
Tremor	0.92	(0.84, 0.99)
Blurred Vision	0.84	(0.87, 0.92)
Acidosis	0.81	(0.70, 0.92)
Hematemesis	0.70	(0.41, 0.99)
Visual Defect	0.09	(–0.10, 0.28)

181. Successful Use of CroFab® in a First Trimester Pregnancy

Mullen WH, Ngo AS, Olson KR. *California Poison Control System, San Francisco Division, San Francisco, CA, USA*.

Background: Crotalidae envenomations are an infrequent occurrence in pregnant women but have been associated with a high incidence of maternal death (10%) and fetal demise (43%) with miscarriage more common in the first trimester. We previously presented the first known use of CroFab® in a pregnant woman with good outcome. Here, we present the first known use of CroFab® in the first trimester of pregnancy. *Case Report:* A 19 year-old 8–10 week pregnant woman presented to a California hospital emergency department 2 hours after being bitten on her left 1st toe by a rattlesnake, described as a baby snake, while walking around an abandoned barn. There were two puncture marks on the digit. Initially she had swelling of the dorsum of the foot to the ankle and she complained of excruciating pain and tingling throughout the body. The determination was made to start CroFab® with an initial dose of 4 vials over 1 hour. She received a total of 11 vials of CroFab® over three days. Swelling did not progess beyond the ankle. Minor ecchymosis was noted on day 2. The prothrombin time peaked at 16.1 sec (9.7 – 11.7 sec). Platelet count and fibrinogen level remained normal. She was discharged after four days. No complications with the pregnancy have occurred to date. *Case Discussion:* Snakebite envenomations in the first trimester have had a poor fetal prognosis. A recent review of 10 snakebite poisonings in the first trimester showed fetal deaths in 5 of 10 cases with 4 of the 5 reported as occuring shortly after the bite. This case is notable for good outcome in spite of the very early state of gestation at 8–10 weeks. With this case and our previously presented case we report two successful uses of CroFab® in pregnant rattlesnake victims. There is an additional report of successful use of CroFab® in a 28 week pregnant copperhead victim. *Conclusion:* To our knowledge this is the first reported use of CroFab® during the first trimester of pregnancy. More case reports are needed to determine the maternal and fetal risk with the use of CroFab® in the pregnant snake bite victim.

182. Initial Doses of Crotalidae Polyvalent Immune Fab (CroFab) for Severe Crotalid Envenomation in Florida

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Background: CroFab is approved for the management of minor-moderate crotaline envenomation. Despite the absence of severe envenomation from its official indications, CroFab is still used as 1st line therapy in these cases. It is hypothesized that: 1) envenomations categorized as severe may require larger initial bolus doses of CroFab to attain control, and; 2) increased complications can result in cases where control is not gained quickly by use of normally recommended doses of antivenom. The objectives of this study are: 1) Compare the number of CroFab vials required to gain control and treat minor, moderate, and severe envenomations; 2) Compare the rate of establishing control between the 3 classifications, and; 3) Determine the clinical consequences of failing to gain control in a timely fashion. *Methods:* Retrospective, chart review of snake envenomation cases that were reported to the poison center and treated with CroFab between 10/00 and 4/06. *Results:* 226 of the 365 cases met inclusion criteria. On initial evaluation, 24 (10.6%) were minor, 181 (80.1%) moderate, and 21 (9.3%) severe. Cases characterized as minor on average required 5.1, moderate 6.9, and severe 10.5 vials to gain control. Mean total vials used were 7.2, 11.3, and 23.2 vials, respectively. Control was established in 100% of minor cases, 79.6% of moderate cases, and 57% of severe cases. These findings were statistically significant. Chart below characterizes consequences of failing to gain control. *Discussion:* Severe envenomations may require larger initial boluses of CroFab to control the bite. Failure to gain control rapidly appears to lead to higher rates of complications. *Conclusion:* A prospective trial evaluating the use of larger initial bolus doses (>6 vials) of CroFab for severe envenomations is warranted.

Consequences of Not Gaining Control

	Control (n = 180)	No Control (n = 46)
Total Vials	11.2 vials	15 vials
Time of Treatment	17.7 hours	35.2 hours
Length of Stay	50.5 hours	83 hours
Recurrence (n = 23)	16/180 (8.8%)	7/46 (15.2%)
Fasciotomy (n = 10)	6/180 (3.3%)	4/46 (8.7%)
Wyeth Antivenin (n = 10)	3/180 (1.6%)	7/46 (15.2%)

183. Breath Alcohol Analyzers Detect Methanol as Ethanol In Vitro

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Background: The Intoxilyzer® 5000 and 8000 are breath analyzers designed to quantify breath alcohol that correlates with blood concentrations. The cross-reactivity with toxic alcohols is unclear. The goal of this study is to characterize the analyzer's response to simulated breath concentrations of methanol with and without alcohol. *Methods:* Wet bath simulators at 34º C were used to simulate human breath. Five methanol only solutions (0.04%, 0.079%, 0.158%, 0.316% and 0.633%) and 4 methanol/ethanol (0.079%) solutions were compounded with distilled water. Three controls used were distilled water, ethanol 0.079%, and a certified alcohol reference (0.123%). Four measurements from each sample were averaged. The analyzers display a breath alcohol concentration and print either the value, the value with "interferent subtracted" or an interferent message only. *Results:* The Intoxilyzer® 5000 and 8000 printed breath ethanol concentrations of 0.028 and 0.029 g/210 L breath, respectively, with 0.040% methanol; and 0.045 and 0.049 g/210 L breath with 0.079% methanol. No interferent was detected. At 0.158%, 0.316%, and 0.633% methanol, the Intoxilyzer® 5000 printed alcohol values with an "interferent subtracted" notation. The Intoxilyzer® 8000 printed "interferent detected" only. From the combined 0.040% methanol/0.079% ethanol solution, the Intoxilyzer® 5000 and 8000 printed 0.110 and 0.099 g/210 L, respectively, without interferents. With 0.079% methanol/0.079% ethanol, the Intoxilyzer® 5000 printed 0.137 g/210 L with 1 of 4 values flagged as an "interferent subtracted". The Intoxilyzer® 8000 printed only 2 of 4 values as "interferent detected". With 0.158% methanol /0.79% ethanol solution, the Intoxilyzer® 5000 printed 0.158 g/210 L with no interferent noted. The Intoxilyzer® 8000 printed an interferent message with this solution. *Discussion:* Some of the simulated toxic methanol blood concentrations were detected as breath alcohol without an interferent message. Intoxication with methanol may be falsely read as ethanol intoxication by the Intoxilyzer® 5000 and 8000 breath analyzers. *Conclusion:* Methanol can be detected as alcohol in vitro by breath analyzers used by law enforcement.

184. Accidental Intrathecal Gadolinium Poisoning Treated with Serial CSF Drainage

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Background: Accidental intrathecal overdoses have occurred with various agents. We report, for the first time, a case of intrathecal gadolinium poisoning. *Case Report:* A 50-year-old male was accidentally administered 18 ml of OmniScan (gadodiamide) intrathecally instead of the similarly appearing OmniPaque (iohexol) for a CT myelogram. Within 10–15 minutes of injection, the patient had increasing confusion and developed a generalized convulsion. Initial management was supportive but because of persistent altered mental status and a brain MRI that revealed non-resolving contrast 36 hours post admission, serial CSF drainage was performed. Daily CSF removal was done for 5 days for a total of 134 mL. Subsequent analysis of the first 3 CSF samples revealed gadolinium concentrations of 0.89 mg/mL, 0.28 mg/mL, and 0.024 mg/mL respectively. By hospital day 8 the patient's mental status significantly improved and MRI revealed the absence of contrast material. One month after exposure he has mild short-term memory deficits. It is unclear if this differs from his prior baseline. *Case Discussion:* Gadodiamide and gadopentate are gadolinium containing MRI contrast agents. One mL of intrathecal gadopentetate (80 mg gadolinium) has been demonstrated to be safe. We are unaware of any literature detailing intrathecal gadodiamide in humans, but rat studies of intraventricular gadodiamide have shown neurotoxicity including myoclonus. Our patient had prolonged altered mental status and a convulsion after receiving 1368 mg of intrathecal gadolinium. Although serial measurements of CSF gadolinium concentrations demonstrated significant reductions, the total amount of gadolinium removed was only 29 mg. This suggests the patient's recovery was independent of the CSF removal. *Conclusion:* Intrathecal gadolinium resulted in prolonged altered mental status and convulsion. Serial CSF drainage removed a minimal amount of gadolinium. Clearly, mechanisms should be instituted to avoid such accidents.

185. The Serum Acetaminophen Multiplied by the Aminotransferase Is an Early Predictor of Mortality Following Acetaminophen Overdose

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Background: Early and accurate identification of patients who will die despite treatment following acetaminophen (APAP) overdose remains challenging. Because serum APAP concentrations fall more slowly and serum aminotransferase (AT) rise more quickly in patients with severe hepatic injury, we have proposed the APAPxAT multiplication product may allow early risk-stratification independent of time of ingestion. We describe the accuracy of this novel measure in a large cohort of patients treated for APAP overdose. *Methods:* All cases in the derivation subset of the Canadian Acetaminophen Overdose Study, a multicenter hospital record review of admissions for APAP overdose, were considered for this analysis. At each time point when serum AT was measured (AST or ALT, whichever greater), the corresponding serum APAP was recorded or estimated based on first-order kinetics. The APAPxAT multiplication product was then expressed relative to the start of *N*-acetylcysteine (NAC) therapy. *Results:* Of 3545 hospital admissions, 1951 received mostly iv NAC, and 1897 had usable data (4537 unique time points). 26 cases died of hepatic failure, 11 died of other causes, and 2 were referred for liver transplantation. The APAPxAT product was much higher (Table, median [IQR] in mM x IU/L) and fell more slowly in patients who died of hepatic failure (median decrease 65% [30%, 75%] vs 93% [79%, 97%] during 24 hr after NAC start). The accuracy was excellent, especially during the first day of NAC treatment (area under ROC curve 0.94 (0 hr), 0.97 (12 hr), 0.97 (24 hr), 0.96 (36 hr), 0.92 (48 hr)). *Discussion:* The APAPxAT product uses readily available lab tests, is simple to calculate, does not require graphical interpretation or plotting, and does not require that the overdose be taken at a single point in time. *Conclusion:* APAPxAT predicts death from hepatic failure with excellent accuracy within the first day of treatment.

time post NAC (hr)	Hepatotoxic death	Survived
0	706 [176, 1510]	15.2 [6.4, 32.1]
12	342 [73, 1330]	2.3 [0.8, 6.5]
24	325 [54, 1450]	0.8 [0.3, 3.1]

186. Superwarfarin Exposure and Severe Coagulopathy in Two Infants: Novel Biomarkers for Diagnosis and Prolonged Therapy

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Background: Superwarfarins are potent rodenticides. They prevent efficient γ-carboxylation of vitamin K-dependent (VKD) clotting factors, through inhibition of vitamin K 2,3-epoxide reductase (VKOR). Laboratories rely on insensitive markers of vitamin K status (e.g. INR) for diagnosis and management. We used novel assays to confirm superwarfarin exposure. *Case Report:* Two siblings (female- 31 months (P1), and male- 18months (P2)), presented with sudden-onset massive epistaxis and hematemesis. They both required volume replacement with fresh frozen plasma and packed red blood cells.Serum was collected on day 1 (post 40mg/d vitamin K supplementation) and 6 weeks later. We determined vitamin K1 2,3-epoxide (K1O, reference range (RR) < 0.05µg/L) and vitamin K1 (K1, RR = 0.15–1.55 µg/L) by HPLC and calculated the K1O: K1 ratio (typical ratio in healthy individuals ~0.1). A MAB (C4B6) was used to measure des-γ-carboxy prothrombin (<0.2AU/ml) and LC-ESI-MS/MS to screen directly for vitamin K-antagonists. *Case Discussion:* On presentation, both children had infinite INR values, and depressed levels of VKD clotting factors. K1O (P1 = 692.0, P2 = 814.8µg/L) exceeded K1 (P1 = 428.3, P2 = 379.4 µg/L) giving an abnormal K1O:K1 ratio (P1 = 1.6, P2 = 2.1), which is indicative of VKOR antagonism. Functional vitamin K deficiency was confirmed independently by highly elevated levels of des-γ-carboxy prothrombin (P1 = 40.3 and P2 = 30.2AU/ml). Bromadialone was detected in their serum. Six weeks after presentation, bromadialone was undetectable (LOD < 0.8 µg/L), however levels of des-γ-carboxy prothrombin remained elevated (P1 >10AU/ml, P2 = 10.3 AU/ml) and oral vitamin K supplementation (20 mg/day) was required in both children for a total of 6 weeks. *Conclusion:* Superwarfarin poisoning can cause life-threatening coagulopathy in children, that reverses with prolonged high dose oral vitamin K therapy. Vitamin K deficiency persists in the absence of detectable circulatory levels of superwarfarin. The unrestricted availability of superwarfarins is an ongoing public health concern.

187. Current Risk from an Antique Poison: Early Treatment of Severe Arsenic Poisoning from a 1930s Rodenticide

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Background: Humans and packrats occasionally share a common characteristic: some seem to retain items for which there is no beneficial use. Salvage often includes outmoded poisons and leftover or expired medications. Toxins occasionally fall into the wrong hands. The following is an illustrative case of severe poisoning with an outmoded antique rodenticide resulting in early treatment and an anticipated fortunate outcome. *Case Report:* A 35 yr. old presented to the ED after ingesting "a teaspoon of rat poison" during the night. He described immediate onset of vomiting after ingestion, but had no abdominal pain. BP was 98/D. After examining the poison container full of a greyish white powder and with an illegible decayed label presumptive treatment was initiated with supportive care and BAL followed by DMSA. STAT laboratory results revealed that the powder contained 41.8% arsenic. Spot urine at the time of presentation

revealed As 17.5 ppm and spot blood As 0.15 mcg/mL. Urine collected on the second day yielded volume 2280 ml/24 hr, inorganic As 8851 mcg/ specimen and organic As < 15mcg. *Case Discussion:* At present, the patient is continuing chelation therapy without overt signs of arsenic toxicity, in part due to immediate treatment. This arsenical poison, Rough on Rats, was distributed in the early 1900s. It has been implicated in documented poisonings including the poisoning/child abuse saga of Mary Frances Creighton (Northeastern U.S. in the 1920s and 30s), and Berrie vs. State (Oklahoma Court of Appeals, 1934). The alternative to safe disposal of hazardous materials may result in the need for emergent and expensive treatment, significant morbidity, environmental contamination or even death. *Conclusion:* Timely treatment of acute heavy metal poisoning may reduce morbidity. Poison prevention efforts should include information about the potential hazards of storage of old poisons and drugs. Methods of safe disposal should be shared with the public. Such educational efforts may best be timed to coincide with local and regional hazardous materials collection days when the public may dispose of materials at municipal waste disposal facilities for no cost.

188. Respiratory Depression Deja Vu? Pediatric Delayed Recurent Symptoms from a Suboxone® Ingestion

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Background: Buprenorphine is a μ-opioid receptor agonist-antagonist. Suboxone®, indicated for the treatment of opioid addiction, is formulated with a 4:1 buprenorphine:naloxone ratio. The drug has a high affinity for the μ-receptor and an elimination half-life of 37 hours in adults. Experience with overdose is limited. With therapeutic analgesic dosing, significant respiratory depression in adults is rare due to a "ceiling effect." It is unknown whether this protective effect remains in place when supra-therapeutic dosing is used in addiction treatment or in adult overdose. Furthermore, the expected clinical course in children following accidental Suboxone® ingestion has not been well defined. *Case Report:* A 2-year-old girl presented 1 to 2 hours after ingesting 1 Suboxone® (8mg/2mg) tablet with lethargy and a respiratory rate of 6 breaths/ min. There was initial response to 2 doses of naloxone (0.1 mg/kg). Activated charcoal was administered. She remained alert and hemodynamically stable until 36 hours post-ingestion, when recurrent oxygen desaturation, lethargy, hypotonia, and hypopnea recurred. Complete reversal required naloxone 1.2 mg IV. Passage of the first charcoal stool occurred later that day. There were no further relapses and she was discharged five days post-ingestion. *Case Discussion:* This is the first report of buprenorphine-related delayed, recurrent respiratory depression in a stable patient off naloxone therapy. The mechanism for the delayed, recurrent respiratory depression seen in this case is not clear. A similar course has been reported with another opiate agonist-antagonist, nalbuphine. Decreased GI motility was likely present in our patient, as evidenced by the delayed passage of charcoal. The long half-life of buprenorphine is another possible contributing factor. It is also notable that in our patient, naloxone successfully antagonized the respiratory depression associated with buprenorphine. *Conclusion:* Prolonged observation for children who ingest buprenorphine is warranted since they may be at risk for recurrent respiratory depression and prolonged drug absorption secondary to decreased gut motility.

189. The Appearance of Xylazine as an Adulterant in Drug-Related Deaths in Philadelphia — 2006

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Background: Xylazine (Rompun®, Sedazine®, AnaSed®, Xyla-Ject®, Proxylaz®) is a widely use veterinary sedative that acts in a manner similar to clonidine. It is a central alpha-2 agonist capable of causing bradycardia and transient hypertension followed by hypotension. In addition, it acts to block the release of norepinephrine causing bradycardia, reduced cardiac output and hypotension. Xylazine is reported to have affinity for H_2- histaminergic, serotonergic, cholinergic, dopaminergic and opioid receptors. Xylazine has recently appeared as an adulterant in drug-related deaths in Philadelphia. *Methods:* 234 drug-related deaths were identified by the Philadelphia Medical Examiner's Office between April, 2006 and August, 2006. Screening immunoassays were done in all cases and confirmatory drug testing (GCMS) performed on all positive cases. *Results:* Seven cases (2.9%) demonstrated GCMS peaks indicating the presence of xylazine in the decedent's blood or urine. *Discussion:* Following intravenous injection, xylazine rapidly distributes and concentrates in the central nervous system and kidneys. The half-life is approximately 3 hours and it is metabolized by the liver with 70% of the drug renally eliminated and 8% excreted unchanged. Previous case reports indicate ataxia, bradycardia, hypothermia, coma, acidosis and a variety of other findings may be seen in cases involving human xylazine toxicity. Tolazoline and yohimbine are reported in animal studies as possible antidotes for xylazine-induced toxicity, however, no human studies exist. Supportive care is the primary treatment modality. Atropine can be used as needed for symptomatic bradycardia. Naloxone has been reported to have no effect. *Conclusion:* Xylazine has recently been identified as a street drug adulterant in Philadelphia. Given the potential for adverse outcomes related to xylazine toxicity it is important for clinicians and medical examiners to be aware of the possible role xylazine adulteration may play in drug-related deaths.

190. Survival with Immunosuppressive Treatment in a Late-Presenting Case of Acute Paraquat Poisoning Following a Potential Lethal Dose

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Background: Acute paraquat poisonings carried a very high mortality. With ingestion volumes greater than 50 mL of a 24% wt/vol formulation, death results from multiple organ failure and cardiovascular collapse happened within 1 week after intoxication. The present report describes a survived late-presenting case of such poisoning. *Case Report:* A 26 -year-old male presented to our emergency department about 2 days after deliberate ingestion of 100ml paraquat (24%). He had sorethroat, nausea, anorexia and shortness of breath. Initial laboratory tests showed leukocytosis, acute hepatic failure, renal failure (serum creatinine level of 6.0 mg/dL) and severe hypoxemia (PaO_2, 58.3 mm Hg). Chest radiography showed increase infiltration over bilateral lungs, which progressed into a condition resembling adult respiratory distress syndrome 4 days later. His plasma paraquat level was 0.305 microg/mL at 50 hrs after ingestion. He was treated with 3-day pulse therapy with methylprednisolone, one course of 2-day cyclophosphamide. Oral prednisolone were given afterward. ABG and CXR were obtained regularly. Hyperbilirubinemia resolved on day 8, and serum creatinine level returned to normal on day 28. The arterial blood oxygen concentrations elevated from 58.3 mm Hg to 70.4 mm Hg on day 12, and serial chest radiographs improved significantly. Pulmonary function tests including spirometry, diffusing capacity were done regularly, which were normal at 8 weeks post-ingestion. *Case Discussion:* Our patient had taken a potential lethal dose. His plasma paraquat level suggested the bad prognosis. There is currently no true consensus on the indication of immunosuppressive treatment in acute paraquat poisonings. However, in face of late presenters who had ingested a potential lethal dose of paraquat, because gastrointestinal decontamination and extracorporeal removal were not effective, immunosuppressive treatment could be a reasonable option. *Conclusion:* This case alert us that the possibly useful effect of immunosuppressive treatment in a late presenter who had ingested a potential lethal dose of paraquat.

191. Lessepsian Immigration and Tetrodotoxin Poisoning in the Eastern Mediterranean

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Background: Since the opening of the Suez canal in 1869 more than 300 aquatic species migrated from the Red Sea to the Mediterranean Sea. This phenomenon, known as Lessepsian immigration, resulted in the appearance of poisonous fish in the Mediterranean Sea which were previously unrecognized in this region. Diagnosis and treatment of fish-borne poisoning in an atypical habitat is a clinical challenge. This report is about tetrodotoxin poisoning after consumption of *Lagocephalus sceleratus* (elongated puffer), an Indo-Pacific fish, caught on the eastern Mediterranean coast. *Case Report:* A 54 year old woman and a 70 year old man were brought to the emergency department because of progressive weakness, circumoral paresthesias and dsysarthria. The manifestations began 30 minutes after consuming fish liver and progressed over six hours prior to admission. The woman's vital signs were normal. Physical examination revealed dysarthria, paresthesias of hands and tongue, ataxia and symmetrical weakness of limbs. Within two hours of admission muscle weakness progressed until she was unable to walk, complained of severe headache and nausea, vomited and suffered from dyspnea. Hematological and biochemical evaluations, ECG and brain CT were normal. After a 4-day admission with supportive treatment in the ICU and medical ward gradual improvement ensued. She was discharged with slight headache only. The man had similar but milder manifestations which gradually improved over a 3-day observation period. The couple identified the fish they ate from pictures presented to them as *Lagocephalus sceleratus* (Tetraodontidae). *Case Discussion:* Typical clinical manifestations together with the temporal proximity to consumption of liver from fish known to carry tetrodotoxin strongly suggest the diagnosis of tetrodotoxin poisoning in these patients. *Conclusion:* Man made disruption of ecological balance results in distribution of tetrodotoxin-containing fish to a new region, the Mediterranean Sea. Increased awareness and a high index of suspicion are required to identify clinical cases of tetrodotoxin poisoning in the fauna of an atypical area.

192. Reimbursement Profile of a Private Toxicology Practice: The Sequel

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Background: We previously presented the initial two years of financial data (2001–2003) from our private practice Toxicology service. After several changes to our practice, we now present the data for the last two years. *Methods:* Financial and electronic record data for all patient visits from October 1, 2004 through September 30, 2006 were analyzed. Workers' compensation patients were excluded. Only diagnosis codes representing >30 visits were studied and correlated with reimbursement data. These results were compared with financial data from our previous study which analyzed the data from the years 2001 to 2003. The interventions between the two study periods were the addition of computerized charting/billing, changing to a different billing company, and the elimination of services from the two small hospitals with low reimbursement rates. *Results:* A total of 2362 patient charges were studied. Four percent of patients had public aid, compared to 9% in the previous study. The remaining patients had commercial insurance and/or Medicare. The top 5 patient diagnoses were inhalation exposures ($91,213 billed; 55% reimbursement rate [RR]), antidepressant exposure ($68,428; RR 51%) acetaminophen exposure ($63,301; RR 43%), drug/narcotic withdrawal ($42,982, RR 33%), and benzodiazepines exposure ($30,952 – RR 49%). The diagnosis with the lowest RR was drug-induced hepatitis (29%). The overall collection rate was 46.6% compared to 34% in the previous study. Compared to the previous study period, which had 3 diagnosis codes with RRs < 25% (coma, seizures, salicylates), there were no diagnosis codes with a RR under 29%. *Discussion:* Changes in our medical toxicology practice resulted in a collection rate gain of over 12%. Reimbursement rates were increased by using computerized charting/billing, changing billing companies, and eliminating services from institutions with poor reimbursement. *Conclusion:* Specific financial interventions can make a private practice toxicology service more financially efficient.

193. Spider Bites in the UK

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Background: To analyze the incidence of spider bites in Wales and the South West of England between 1997 and 2003 as reported to the NPIS (Cardiff). To discuss the potential toxicity of spiders indigenous to the UK. *Methods:* NPIS call records were reviewed and analyzed. Details of enquiries involving spider bites were collated, as were data on the total number of enquiries during the same period. *Results:* There were a total of 125 enquiries regarding spider bites to the NPIS (Cardiff). The annual percentage of NPIS enquiries regarding spider bites has risen from 1997 to 2003. Literature Review: There are three reports of toxicity resulting from spider bites in the UK: *Case 1: Sakka & Howse (1994)* describe a case of necrotic cutaneous arachnidism. *Case 2: Mohsen & McKendrick (2001)* describe a case of Pyoderma gangrenosum complicating a spider bite. *Case 3: Warrell et al. (1991)* describe a case of a

neurotoxic envenomation by Steatoda nobilis in Southern England. *Discussion:* Fortunately spiders that have medically significant venom are not indigenous to the UK. Spider envenomations can result in neurotoxic effects or dermonecrotic effects. Tegenaria agrestis (Hobo spider) has been reported to cause dermonecrotic injuries but many authors argue that there currently is no definitive evidence of this effect. The Steatoda nobilis has been reported to cause mild neurotoxic effects (*Case 3*). In the early 1990's there were numerous press reports of the spread of this species along the South coast of England. *Conclusion:* There have been no serious cases of poisoning caused by spiders reported to the NPIS (Cardiff). Only a very small proportion of enquiries involve spider bites. There are very few reports in the medical literature of spider bites in the UK leading to serious toxicity. However, we do report an increased frequency of enquiries regarding spider bites. We are unable to confirm the cause but pose the question whether trends in global temperatures may result in the UK becoming more habitable to exotic species.

Spider Bite Enquires

Year	1997	1998	1999	2000	2001	2002	2003
% Spider Enquiries	0.033	0.033	0.044	0.045	0.069	0.081	0.072

194. Maternally-Directed Methadone Treatment in a Toddler

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Background: Methadone has been studied to treat narcotic dependence in children. *Case Report:* A 13-month-old boy was brought to the ED by his parents for excessive irritability and concerns of methadone withdrawal. Everyday since a few days after his birth the mother had been surreptitiously giving her son a small fragment of her 40mg methadone tablet to treat what she thought were withdrawal symptoms because of her methadone use throughout pregnancy. Her pills had been discarded by the father the previous day. In the ED, the patient had a normal temperature, HR 140s, and RR 28. He was fussy, sneezing excessively, and had intermittent episodes of upper extremity tremors. There was no excessive lacrimation, rhinorrhea, yawning, or diarrhea. He was underweight (5th percentile), with a developmental stage at the 6–7 month-old level. CBC, urinalysis, and urine toxicology screen were normal. A serum methadone level sent on admission was .024 mg/L (0.01–1.10). The patient was successfully treated in the intensive care unit with clonidine and subsequently discharged on a clonidine taper. Detailed review of the medical record revealed a history of a fever at birth treated with antibiotics (negative blood cultures) and a description of being "fussy and gassy" at a six-day-old outpatient appointment. There was no mention of methadone in any note. *Case Discussion:* This is a case of chronic methadone administration, without medical direction, in a toddler by his mother. Abrupt cessation of the methadone resulted in symptoms suggestive of withdrawal that responded to clonidine therapy. The historical findings of neonatal fussiness and fever may have been signs of methadone withdrawal that was not diagnosed at the time. *Conclusion:* We present a complicated case of chronic methadone administration in a toddler, without medical direction, and subsequent symptoms of withdrawal after abrupt cessation of the methadone which were successfully treated with clonidine therapy.

195. Peanut Butter, Poison Center, & Customer Satisfaction: Food for Thought

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Background: A Regional Poison Center (RPC) averages 300 incoming calls per day to the emergency call center. On February 14, 2007, a RPC received 643 calls resulting in 924 cases related to possible salmonella poisonings from contaminated peanut butter. The unusually large call volume prompted the RPC to implement a telephone survey to assess customer satisfaction. *Methods:* A RPC conducted a telephone satisfaction survey between 3/8/07 and 3/15/07. The 6-item survey was designed to assess the reason for calling the RPC, timeliness in which the call was taken, satisfaction with the service, and whether or not a recorded message for such emergencies would be helpful in the future. *Results:* A total of 924 cases were reported to the RPC regarding a possible exposure. 126 (20%) callers took the telephone survey. Respondents indicated they called the RPC because they may have consumed some of the contaminated peanut butter (78%). 87% of the respondents indicated that the timeliness in which it took the RPC to answer the phone was excellent or good. The majority of those surveyed said the specialist was helpful (94%) and that they sounded competent and knowledgeable (97%). When asked if a recorded message with the same information would be more helpful, more than half said it would not be (71%). Overall, 88% of the respondents thought the service provided was excellent or good, with only 12% stated that the service was fair or poor. *Discussion:* Customer satisfaction should be evaluated periodically to assure that the patient is happy with the level of care provided and the information they receive is appropriate. *Conclusion:* The information gathered in this survey will assist the RPC in evaluating recorded messages as a means to provide information to the public. It will also be used to improve and maintain the quality of the RPC's emergency telephone service.

196. Fomepizole Alone in a Critically Ill 9-Month-Old with Ethylene Glycol Poisoning

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Background: Fomepizole(4-MP) has been used to treat ethylene glycol(EG) poisoning without hemodialysis. Safety and efficacy data for the application of this practice to the severely ill infant, however, is sparse. We report a case of a 9-month-old boy with severe acidosis, hypotension and renal insufficiency approximately 12 hours after EG ingestion who was successfully managed with fomepizole and intravenous (IV) bicarbonate alone. *Case Report:* A 9-month-old boy was evaluated for 'fast breathing' at 8am. He was obtunded, with vital signs of: temperature 37.2ºC, heart rate 183/min, respirations 73/min, BP 55/32mmHg. Serum chemistries revealed a sodium of 145mmol/L, potassium 4.7mmol/L, chloride 113mmol/L, bicarbonate < 5mmol/L (anion gap = 27 mg/dL), calcium 11.7mg/dL, glucose 165mg/dL, blood urea nitrogen 5mg/dL and creatinine 1.0mg/dL. A measured serum osmolality was 338mOsm/kg (osmolar gap = 37mOsm/kg). A venous blood gas showed pH 7.097, pCO2 7.9mmHg, and base excess –25mmol/L. Urinalysis revealed oxalate crystals. Although there was no clear history of EG ingestion, the patient's mother admitted to keeping antifreeze in the kitchen within the child's reach. 4-MP therapy was initiated (loading dose 15mg/kg) as well as three1mEq/kg IV bicarbonate boluses and crystalloid infusion with 0.3mEq bicarbonate/kg/hr. His vital signs improved, and repeat laboratory values 3 hours later showed a serum bicarbonate of 9mmol/L, creatinine 0.6mg/dL, anion gap 24, venous pH 7.24 and base excess –16mmol/L. An ethylene glycol level, drawn presumably at least 12 hours after ingestion, was 70mg/dL. The child's acidosis continued to improve, and he received a total of 6 doses of 4-MP. Neither hemodialysis nor ethanol therapy was ever initiated. He was discharged 5 days after admission with no sequelae. *Case Discussion:* Fompeizole and bicarbonate therapy were successful in treating this 9-month-old boy with severe EG poisoning-without hemodialysis. *Conclusion:* Fomepizole and supportive care alone have successfully supplanted hemodialysis in prior studies including adults and children with milder acidosis. This case extends this experience further to include the severely ill young child.

197. Delayed Sympathomimetic Toxidrome after a Phentermine Resin Overdose

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Background: Duromine® is an ionic resin complex of phentermine – a centrally-acting amphetamine-like appetite suppressant. In general, early onset and short-lasting toxicity is expected after overdose of amphetamine-like substances. We report here a case of Duromine® poisoning; delayed but prolonged sympathomimetic toxidrome and psychedelic syndrome are observed after overdose of this ion-exchange resins formulation. *Case Report:* A 20-year-old lady presented to the emergency department after intentionally ingesting 30 capsules (30 mg per capsule) of Duromine®. The patient started to have palpitation 6 hours after the drug intake. Restlessness, agitation and hallucination developed 12 hours after the ingestion. She presented to emergency room at 13 hours and received symptomatic treatment only without any gastro-intestinal decontamination. Frank psychosis, fever and tachycardia followed and the patient needed to have repeated doses of benzodiazepine and haloperidol for symptom control. Hospital stay was prolonged and it took 7 days for the delirium to subside. *Case Discussion:* Phentermine resin poisoning can cause persistent sympathomimetic toxidrome and psychedelic syndrome. Based on the prolonged toxicity observed in this case, gastro-intestinal decontamination such as multiple-dose activated charcoal plus/minus whole bowel irrigation may be useful in managing such ion-exchange resins overdose. *Conclusion:* To our knowledge, this is the first report case of phentermine resin overdose in the English published work.This case illustrates the importance of formulation in determining the toxicological properties of a pharmaceutical. As a clinician, we should be more alert on the substained-release property of ionic resin preparations.

198. Tizanidine Withdrawal

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Background: Tizanidine (TZD) is used as a muscle relaxant and to treat spasticity, but is not reported to produce a withdrawal syndrome following cessation of use. It has a similar mechanism of action to clonidine, for which withdrawal is well-described. We report a case of TZD withdrawal syndrome. *Case Report:* A 40 yo woman with a history of back pain was admitted for carbamazepine (CBZ) overdose. Home medications included valium 5 mg TID, TZD 2 mg TID, neurontin 300 mg TID, and CBZ. Her initial HR was 120 bpm, BP 172/90 mmHg, RR 22 bpm, and T 98°F. Physical exam was normal except for mild drowsiness. The initial CBZ level was 28 ug/ml. Over the next 12 hours she became awake and alert with declining CBZ level. 30 hours following admission she developed tremor, agitation, tachycardia (HR 120–130), and hypertension (BP 160/90mmHg). Diazepam 10 mg IV was given without effect. She repeatedly asked for Zanaflex (TZD). She denied history of ethanol abuse or of taking more than the prescribed amount of diazepam at home. Tachycardia, hypertension, and tremor worsened over the next 12 hours despite 30 mg diazepam in total. 32 hours after admission, HR was 145 bpm and BP was 185/95 mmHg. The diagnosis of TZD withdrawal was then considered, and a 2 mg oral dose of TZD was given. Within two hours her HR decreased to 85 bpm, and BP to 100/55 mmHg. Tremor and anxiety had completely resolved. 7 hours after the TZD dose, mild tachycardia and hypertension recurred, and the pt was given further doses of TZD and valium. Her tremor never returned. Over the next 12 hours her heart rate and blood pressure normalized, and evidence of withdrawal syndrome did not recur. She was discharged on the third hospital day. *Case Discussion:* TZD is a central alpha 2 agonist that may produce a withdrawal syndrome when abruptly discontinued. *Conclusion:* Practitioners should be aware of the potential for withdrawal when caring for patients who use tizanidine chronically.

199. Fentanyl Patch Abuse Using RADARS® System Poison Center (PC) Data

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Background: Matrix patches house fentanyl in the adhesive layer, allowing abusers to cut up and suck these pieces. In contrast, reservoir patches house fentanyl in a basin providing easy access to a high concentration of fentanyl for abusers. This research investigates the differences in abuse rates over time (slope) and associated medical outcomes between exposures to matrix and other fentanyl patches (both reservoir and unspecified) using RADARS System PC data. *Methods:* Fentanyl patch abuse and withdrawal (AW) calls from 43 participating PC during 2006 were analyzed. AW slopes (rates per year-quarter per 1,000 patients filling a prescription; surrogate for drug availability) were analyzed. Medical outcomes were compared between matrix and other patches. *Results:* The rank order of average year-quarter AW rates per 1,000 patients of monitored opioids is: buprenorphine(0.54) > methadone(0.53) > fentanyl(0.16) > hydromorphone(0.1) > morphine(0.1) > oxycodone(0.06) > tramadol(0.03) > hydrocodone(0.02). Matrix patches average AW rate per 1,000 patients (0.07) is lower than other patches (0.2, $p < 0.001$) and the AW rates are not significantly increasing or decreasing for matrix or other patches (–0.011, $p = 0.14$; 0.015, $p = 0.30$). The proportion of cases associated with a major effect or death is 36% for matrix patches and 30% for other patches ($p = 0.42$). Similar results were found when intentional exposure (IE - abuse, misuse, withdrawal, suicide, intentional unknown) medical outcomes were analyzed. In contrast to AW rates, matrix patch IE rates are

significantly decreasing (–0.022, p = 0.048). *Discussion:* Relative to other fentanyl patches, matrix patches are abused less often. The observed change in rate per year-quarter per 1,000 patients, though not significant for AW, is decreasing. Despite lower rates of abuse and misuse, severity of medical outcome does not differ significantly between matrix and other fentanyl patches. *Conclusion:* The observed variation in abuse patterns offers encouragement that drug design may discourage abuse and misuse of prescription drugs.

200. Pediatric Unintentional Fluoxetine Ingestion: Application of the AAPCC Consensus Guideline

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Background: Limited data exists on pediatric unintentional fluoxetine overdose. In 2006, AAPCC developed a consensus guideline (CGL) for SSRIs including fluoxetine (SSRI Poisoning: an Evidence-Based Consensus Guideline for Out-of-Hospital Management). Triage recommendations in this CGL suggest emergency department (ED) referral for fluoxetine ingestions > 100 mg. We characterized pediatric unintentional fluoxetine exposures and compared our management outcomes versus retrospective application of the CGL. *Methods:* We conducted a retrospective review querying our database for all cases between 1 Jan. 2002- 31 Dec. 2006 for unintentional fluoxetine ingestions as a single-agent, age < 6 years and known outcome. *Results:* We identified 157 exposures meeting the criteria. Ten were excluded because the call originated in the ED. An additional 24 were excluded for unknown dose. Of the remaining 123, 51% were male. The mean [min, max] age was 25.9 [8,60] months. The mean [min, max] dose was 84.7 [7,1540] mg, and a mode of 20 mg. 88% were asymptomatic. No severe symptoms were reported. The most common symptoms were: vomiting (6), drowsiness (5), and agitation (3). Applying our internal fluoxetine guideline, we referred 24 children to the ED for exceeding threshold dose (30 mg) and 1 child was referred in based on symptoms. Dose range was 20–1540 mg. Only 4 of these patients were symptomatic. Of these 4, 2 patients had moderate symptoms (fever, tachycardia). No major cardiac disturbances or seizures were noted. Symptoms resolved in < 6 hours. By applying the CGL, < 50% of the patients (n = 12) would have been referred to the ED and 13 patients would have been observed at home. Conversely, 3 patients with agitation were not referred to ED using our guideline but would have been referred in to the ED due to moderate symptom status if applying the CGL. *Discussion:* By applying the CGL, we would have kept 13 children at home out of the 25 we referred to the ED. Comparing our guideline to the CGL, only minor differences existed. *Conclusion:* We have implemented AAPCC's new CGL at our poison center based on this study, yet keeping in mind there is no substitute for clinical judgment.

201. Epidemiology of Snake Bite Exposures as Reported to a Poison Center, 2000–2004

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Background: We sought to describe the epidemiology and treatment patterns of all snake encounters called into one poison center over five years. *Methods:* A retrospective poison center chart review of all snake encounters called into a state poison center from January 2000 until December 2004 was assembled into a database. It was analyzed using SAS® 9.1. Categorical variables were evaluated using Chi square or Fishers Exact. A p value < 0.05 was considered statistically significant. *Results:* There were 1827 snake encounters; 82.2% resulted in a bite. Encounters were more frequent in the wild (93%); 5.5% were pet and 0.1% were zoo encounters (p < 0.0001). There are more males (73.6%) than females (26.4%) and more adults (≥ 19 years) (69.1%) than children (< 19 years) (30.9%) in the study population. Snake bites involving children were more likely to involve a non-venomous snake than snake bites in adults (p < 0.0001). Most bites occurred between April and October, with peak months being May to July. This distribution appeared consistent across all breeds of snakes. 64% of patients were treated at a health care facility (HCF), 17% were managed at the site of the bite and 18% either refused referral to a HCF or left the HCF against medical advice. There were 367 bites by non-venomous snakes and 465 bites were by a completely unknown snake. Of the 670 venomous bites, 53% were Copperhead, 21% Rattlesnake, 7% Cottonmouth, 17% Unknown Crotalid, and 1% Coral snake envenomations. Among Crotalid envenomations (N = 657) antivenom was administered to 42% patients. Fasciotomies were performed on 18 (2.7%) patients. Antivenom administration increased from 2000 to 2004, with 25% of Crotalid envenomations receiving antivenom in 2000 and 62% in 2004. *Conclusion:* Snake exposure calls are common. Adult males are most commonly bitten. The copperhead causes the largest number of envenomations. Antivenom was administered to less than 50% of Crotalid envenomations.

202. Northern Cat-Eyed Snake Bite Causing Moderate Envenomation

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Background: The Northern Cat-Eyed Snake (*Leptodeira septentrionalis septentrionalis*) is a threatened colubrid species found in the United States of America (USA) only in the southern coastal gulf region of Texas. It is a nocturnal carnivore that favors feeding on amphibian egg clutches. It has enlarged posterior maxillary grooved fangs and is considered a non-venomous to mildly venomous snake. We report the first case of significant envenomation by this snakes species in the USA. *Case Report:* A 46-year-old woman was bitten on her right index fingertip while cleaning her pet snakes' cage. She presented to the emergency department 24 hours later exhibiting 2+ edema up to the wrist, ecchymosis at the puncture site, and severe axillary pain. She denied metallic taste sensation, nausea, dizziness, or headache. She received tetanus prophylaxis, opiates, and wound care. Labs drawn showed a normal CBC, coagulation profile and UA, that remained normal upon repeat during her 24-hour admission. Contrary to poison center recommendations, she also received and was discharged on corticosteroid and antibiotic therapy. A one-week follow up call to the patient at home found her to have developed flu like symptoms post-discharge, including body aches, fever, and chills, that had resolved during the week. *Case Discussion:* Most colubrid snakebites in the USA are termed nonvenomous, although they often produce local symptoms of pain with minor swelling. *L. septentrionalis* snake bites are anecdotally reported rarely but we found no case reports in our scientific literature search. *L. annulata ashmeadii*, a colubrid of the same genus, possesses venom with proteolytic, hemorrhagic, and neurotoxic properties. Our patient developed prolonged local and systemic signs and symptoms consistent with significant envenomation with a venom possessing these same properties. *Conclusion:* We report the first case of envenomation by an *L. septentrionalis* snakebite in the U.S.A. In Latin America, other *L.* spp. are managed supportively and with wound care, as there is no specific antivenom for these snakes. Little is known regarding Western colubrid venoms and their effects on humans. Systemic symptoms have not previously been reported in bites from native colubrid species in the USA.

203. False Positive Elevation of Serum Acetaminophen Levels in a Pediatric Oncology Patient

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Background: Oncology patients have multiple reasons for major organ dysfunction, including alterations in liver metabolism as well as hepatotoxic drug regimens. *Case Report:* A 15-year-old female with acute myelogenous leukemia status post bone marrow transplantation had a serum acetaminophen (APAP) level of 33.1 mcg/ml in the setting of therapeutic APAP dosing 3 days prior. Her transaminases were also elevated (see table); because of her complicated medication regimen that included pharmaceuticals such as diphenhydramine that would slow gut motility, she was started on N-Acetylcysteine(NAC) therapy. There was no appreciable change in her APAP levels after 24 hours of the antidote. Synthetic liver function tests were normal. Cognizant of the patient's elevated total bilirubin level, a confirmatory test for APAP was run by gas chromatography/mass spectrometry(GC/MS); simultaneously, APAP determination with the inhouse enzymatic assay was performed. The GC/MS method reported serum levels at less than 10 mcg/ml while the enzymatic method revealed a level of 27.5 mcg/ml. NAC was discontinued as the lab results indicated a false positive acetaminophen elevation. *Case Discussion:* The most frequently used method to determine APAP serum concentrations is the enzymatic assay which measures a series of enzymatic conversion reactions: acetaminophen→ p-aminophenol → o-cresol→ indophenol. Indophenol is a blue colored compound which is detected by a change in absorbance at 600 nm. Since bilirubin and indophenol share the same photospectrum level absorption, falsely elevated acetaminophen levels are often seen in patients with elevated bilirubin levels. *Conclusion:* Oncology patients have multiple reasons for hepatic dysfunction. However, the astute clinician should be aware of bilirubin's interferance with actual serum acetaminophen values measured by the enzymatic method, particularly in the cholestatic patient.

	Day 3¶	Day 4	Day 5*	Day 7
APAP (mcg/ml)	15.8	33.1	37.7	34.0
AST/ALT (IU/L)	163/146	122/145	126/171	122/168
Bilirubin (mg/dl)	62.6	64.0	64.5	67.6

¶Days since the last Tylenol tablet was administered *N –Acetyl cysteine was started.

204. Clinical Characteristics of Pediatric Abusers of Black Tar Heroin/Tylenol PM® (Cheese) in Dallas, Texas

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Background: Beginning on August 15, 2005, the Dallas Independent School District Police Department began reporting arrests involving "cheese", which is an insufflated form of black tar heroin cut with acetaminophen (APAP) and diphenhydramine (DPH). Subsequently, increasing numbers of youths have presented to our hospitals for acute heroin intoxication or withdrawal. *Case Report:* Our Poison Center database was searched for patients less than 18 years of age presenting to 2 large urban hospitals with heroin/Tylenol PM® intoxication from August 2005 to the present. The clinical characteristics of 9 patients are summarized in the table. In all cases the ethnicity was Hispanic, and no APAP or DPH toxicity resulted. The elevated transaminases in patient 1 were judged secondary to global hypoxic injury.

Clinical Characteristics of Pediatric Heroin/Tylenol PM® (Cheese) Abusers

Age (yrs)	Sex	Complications	Narcan	Intubation	APAP (mg/dL)	Transaminases	ED Disposition
11	M	AMS	+	–	<8	AST 25 ALT 25	Home
13	M	AMS	+	–	<8	ND	Home
14	M	AMS, RD, Cardiac Arrest, arrhythmia, pneumothorax, renal failure, liver injury	+	+	1	AST 546 ALT 638	ICU
15	F	AMS, RD, Seizure	+	+	<1	AST 72 ALT 72	ICU
15	M	AMS, RD	+	–	ND	AST 20 ALT 17	Home
16	F	AMS, RD, Pulmonary Edema, ARDS, anemia	+	+	2.2	AST 24 ALT 18	ICU
16	M	Withdrawal	–	–	<8	AST 65 ALT 49	Inpatient Psych
17	M	AMS	–	–	<8	AST 26 ALT 16	Rehab
17	M	Withdrawal	–	–	ND	ND	Home

AMS: Altered Mental Status; RD: Respiratory Depression; ND: not done.

Case Discussion: Our case series documents an alarmingly young population with life-threatening heroin toxicity and withdrawal resulting from insufflation of heroin/Tylenol PM®. The continuing spread of this form of heroin abuse will lead to increasing numbers of children presenting with severe complications. *Conclusion:* Insufflation of heroin/Tylenol PM® (cheese) is an emerging epidemic among Hispanic youths in Dallas, Texas. We report a series of pediatric patients with severe heroin toxicity without APAP or DPH toxicity.

205. Fatal Fulminant Hepatic Failure from Sulfonamide Hypersensitivity Syndrome

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Background: A delayed-onset hypersensitivity reaction may occur in some patients taking sulfonamides. It is characterized by fever, lymphadenopathy, rash, and signs of systemic organ involvement, most commonly hepatitis. We present a rare case of fulminant hepatic failure in a patient with sulfonamide hypersensitivity syndrome (SHS). *Case Report:* A 21 yo woman was prescribed Bactrim to treat acne. After 2 weeks, she developed an erythemetous rash, fever to 101°F, and malaise. She presented to an ED where AST and ALT measured approximately 300 IU/L. Bactrim was stopped and predisone 40mg daily was begun. The rash worsened over the next few days and she developed lymphadenopathy and fever to 103°F. She was admitted to a hospital with AST and ALT approximately 1200 IU/L, then transferred to our facility for worsening hepatic function. Physical exam revealed HR 121, BP 91/47, RR 30, T 103.1°. Pertinent findings included scleral icterus, tender enlarged cervical and inguinal lymph nodes, and a diffuse macular rash with superficial peeling, but no desquamation. Labs revealed normal electrolytes and renal function. Hgb was 9.9g/dL, platelets 40,000/mm^3, AST and ALT 1647 and 2631IU/L respectively, bilirubin 11.9mg/dL, and PT 26s. Over the next 2 days she developed hepatic encephalopathy. Despite aggressive supportive care, liver function worsened and intracranial pressure rose. Liver transplant was performed on hospital day 5. Hepatic function improved with transplant. However, the patient suffered intractable seizures, a cerebral vascular accident, and never regained consciousness. She died on hospital day 51. Serologies for CMV, EBV, and hepatitis A, B, and C were negative. Pre-transplant liver biopsy showed panlobular necrosis with vague centrilobular distribution. Lymphocytes, histiocytes, and plasma cells were noted consistent with drug effect. *Case Discussion:* Fatal fulminant hepatic failure from SHS is exceedingly rare. SHS is usually a self-limiting phenomenon that resolves with discontinuation of the drug and supportive care. However, our patient continued to deteriorate despite early discontinuation of Bactrim and treatment with steroids. *Conclusion:* Abnormal liver function tests in the setting of sulfonamide use must be taken seriously.

206. Clinical Outcomes after Suicidal Ingestion of Glyphosate Surfactant Herbicide: Severity of Intoxication According to Amount Ingested

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Background: Glyphosate surfactant herbicides consist of an aqueous mixture of the glyphosate salts and surfactants. Although accidental ingestion of small amount is related to mild clinical manifestation, suicidal ingestion of large amount may cause serious clinical outcome. This study aimed to evaluate the severity of intoxication according to amount ingested. *Methods:* A 12-month prospective study with cases related to suicidal ingestion of glyphosate surfactant herbicides from 28 hospitals in Korea was analyzed. Patients who completed their therapy in the hospitals were only included. The main parameters used in this analysis were amount ingested, initial vital sign, initial mental status and outcome. *Results:* A total of 63 patients who met the inclusion criteria were identified. Their mean age was 52 ± 16 and 68% were men. The average amount ingested was 191 ± 135 ml. Examinations for initial mental status revealed alert state(A) in 79%, verbal stimulus response(V) in 8%, painful stimulus response(P) in 8% and unresponsiveness(U) in 5%. The amounts ingested between different mental states were significantly different ($p = 0.014$, ANOVA). The mean amount ingested in patients with systolic blood pressure 80 mmHg or lower was large, compared to that in patients higher than 80 mmHg (303 ± 103 ml vs. 179 ± 132 ml, $p = 0.04$). 7 patients (11%) died after the admission and the amounts ingested were 200 ml or larger. Among 32 patients who ingested more than 200 ml, the mean amount of glyphosate surfactant herbicide in patients who died was larger than that of patients who survived, although there was no statistical significance (360 ± 177 ml vs. 278 ± 68 ml, $p = 0.07$). Regarding the mental status, while 5 of 7 patients who died showed P or U, the rest of patients who survived showed either A (88%) or V. *Discussion:* The patients who died ingested larger amount, showed worse clinical outcomes. *Conclusion:* Although a dose-response relationship is not clear and the minimal lethal dose is not established, the clinical outcomes of glyphosate surfactant herbicide intoxication may be associated with the amount ingested in terms of mental status, vital sign and mortality.

207. Inadvertent Intravenous Pediatric Administration of Oral Polyethylene Glycol Solution

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Background: Polyethylene glycol (PEG) iso-osmotic solutions are routinely administered orally for bowel preparation. We present a case of a large inadvertent intravenous administration of a PEG solution in a child. *Case Report:* An 8 month old boy with history of prematurity, tracheo-esophageal repair, and colostomy was admitted for repair of imperforate anus. A PEG solution (GoLytely®) was placed on an infusion pump for administration via the child's naso-gastric feeding tube. Because of the pump setup and verbal order confusion, the nurse inadvertently administered the PEG solution intravenously at 83 cc per hour for 3 hours and 40 minutes (304 cc or 18 grams of PEG 3350). The patient remained asymptomatic during and after the infusion; his vital signs remained in the normal range for 36 hours. Serum osmolality 2.5 hours after halting the infusion was 285 mosm/kg (calculated osmolality was 285 mosm/kg). Serum glucose was checked frequently for 20 hours after the infusion and remained normal. No treatment was provided except for maintenance administration of non-bicarbonate containing intravenous fluid. Electrolytes are presented below as time after PEG infusion:

	+2.5 hours	+8.5 hours	+20 hours	+32 hours	+38 days	+64 days	+ 8 months
Sodium (mmol/L)	139	140	138	142	138	140	138
Potassium (mmol/L)	4.2	5.2	4.3	5.2	4.7	4.8	4.3
Chloride (mmol/L)	107	111	108	112	108	110	103
Bicarbonate (mmol/L)	21	19	23	22	23	23	25
BUN (mg/dL)	5	3	2	3	11	4	7
Creatinine (mg/dL)	0.3	0.4	0.3	0.4	0.5	0.2	0.3
Calcium (mg/dL)	10.2	10.0	10.2	10.1	8.8	9.4	10.0
Phosphorus (mg/dL)	5.2	–	–	6.4	–	5.9	6.7

Case Discussion: The PEGs in this case had an average molecular weight of 3350 Daltons. When ingested, higher molecular weight PEGs are not systemically absorbed and do not result in significant fluid or electrolyte shifts. However, lower molecular weight PEGs are absorbed and have resulted in significant injury. It appears that even when intravenously administered, larger molecular weight PEGs do not result in morbidity. *Conclusion:* This is the largest (in mg/kg) inadvertent IV administration of PEG in the literature. A single intravenous administration of PEG with average molecular weight of 3350 Daltons does not appear to cause significant morbidity.

208. A 24 Month Retrospective Study of Adult Modafinil Ingestions

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Background: Modafinil a benzhydrylsulfinyl acetamide derivative is a wakefulness-promoting agent acting as a central nervous system stimulant. It is chemically and pharmacologically unrelated to other CNS stimulants, such as methylphenidate, amphetamine, or pemoline. Published reports of clinical experience with acute overdose in adults of modafinil are minimal. *Methods:* A 24-month retrospective study was completed on cases of adults (18 years and older) having ingestions of modafinil reported to CPCS. The parameters used in the case analysis were modafinil as the single substance, age 18 years or older, sex, reason for exposure, amount ingested, and clinical symptoms. *Results:* A total of 29 cases of modafinil ingestion without coingestants were identified. Of the 29 exposures, 38% were male, and 62% were female with a mean age of 40.8 years old (range 18–72 yo, SD 16 years). 17 of the 29 exposures (59%) were due to accidental ingestions and 12 of the 29 exposures (41%) were due to intentional ingestions. The mean amount ingested was 1,272 mg (range 100–6,000 mg, SD 1,402 mg). Of the 29 patients, 19 patients (66%) developed CNS Stimulation, 6 patients (21%), developed tachycardia (range 103–168 bpm, SD 51.2 bpm), 3 patients developed chest pains (10%), 3 patients developed mild dystonias (10%), 3 patients (10%) developed nausea, 2 patients (7%) developed headaches, and 2 patients (7%) developed dry mouth. Of the 29 patients, 14 patients (48%) were treated in the ED. Activated charcoal was administered to 2 (14%) of the 14 patients. All of the 14 patients treated in the ED were discharged without sequelae. Outcome: No effects in 9 patients (31%), minor effects in 16 patients (55%), and moderate effects in 4 patients (14%). *Discussion:* Modafinil toxicity manifested primarily as CNS and cardiovascular stimulation. Supportive care and gastric decontamination with activated charcoal appear to be the mainstays of therapy for acute ingestions of modafinil. *Conclusion:* Continued evaluation of ingestions of modafinil is essential to determine specific thresholds for toxicity.

209. Toxic Exposure Surveillance System (TESS)-Based Characterization of Antibiotic Use in Native US Venomous Snakebite

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Background: Antibiotics (ABX) are commonly prescribed after snake envenomation. Characterization of risk factors for and associations with ABX use are limited. *Methods:* Retrospective analysis of American Association of Poison Control Center Toxic Exposure Surveillance (TESS) data from 2001–2005 of all venomous snakebites. Cases were analyzed using Chi-Squared and Odds Ratios. *Results:* 23,735 cases were identified. Overall, 12% received ABX. ABX were significantly more likely to be used in women (12.7% v. 11.3%; $p = 0.003$; OR 1.142; 95%CI 1.047–1.247) and in patients ≥ 60 years ($p < 0.0001$; OR 1.350; 95%CI 1.172–1.554), and less likely to be used in patients < 13 years ($p = 0.001$; OR 0.8292; 95%CI 0.7419–0.9268). Patients with no or minor effects were less likely to receive ABX (NO: 1.3%; $p < 0.0001$; OR 0.073; 95%CI 0.03777 - 0.1411; MINOR: 11.7%; $p < 0.0001$; OR 0.5408; 95%CI 0.4954 - 0.5904) while those with moderate effects or greater were more likely to receive ABX (23.6%; $p < 0.0001$; OR 1.951; 95%CI 1.824–2.087). Associations between ABX use and snake type are listed in the table.

ABX Use By Snake Type

Snake Type	ABX Use (%)	Significance
Copperhead (n = 5151)	23.4	OR 2.219; 95%CI 2.038 - 2.417
Coral snakes (n = 400)	2.6	OR 0.1925; 95%CI 0.1026 - 0.3611
Cottonmouth (n = 865)	13.8	NS
Rattlesnakes (n = 5981)	9.3	OR 0.6395; 95%CI 0.5780 - 0.7076
Unknown, venomous (n = 11338)	11.3	OR 0.7639; 95%CI 0.7049 - 0.8279

All significance results with $p < 0.0001$ unless noted.

Discussion: The true incidence of infection after venomous snakebite is not known, but rates between 4% and 10% are reported. At least two prospective studies of prophylactic ABX have shown no outcome differences. ABX use differences may reflect snake type or

geographic-based practices. *Conclusion:* Female gender, those ≥ 60 years, those with moderate effects or greater, and copperhead bites are all associated with increased use of ABX. Age less than 13 years, coral snakebite, rattlesnake bite, and unknown venomous snakebite are associated with decreased ABX use.

210. Program Satisfaction of EMS Continuing Education

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Background: EMS personnel are required to take CE, creating a need for new and interesting topics. Faced with increased interest from EMS for CE from the poison control center (PCC), the educator and lead CSPI created a CE program designed specifically for EMS. A comprehensive power point presentation, case studies, audience interaction strategies and program satisfaction survey were developed. *Methods:* The presentation covered PCC basics; public education; poisoning data; pre-hospital poisonings, trends and treatment; and red flag exposures. Multiple RN/CSPIs were trained in giving the presentation. EMS CE attendees voluntarily completed program satisfaction evaluations at the Conclusion of each CE session. Questions were structured using an inverted funnel format, with 5 Likert-type scale questions and 2 open ended ones. *Results:* 105 program satisfaction evaluations were completed by participants in 7 EMS CE program sessions. Audiences were mostly EMT-Paramedics (45) with some EMT-Basics (17), EMT-Intermediates (13), MRTs (10), other (4), and EMT-Paramedic students (16). Participants found the length of the presentation (96), the amount of information (98), and the level of information (100) to be about right. Information in the presentation was very useful (53), useful (49), somewhat useful (3), and not useful (0). Participants found the presentation interesting, and focused their positive comments on the presenters, their experience and their ability to answer questions. Some liked the case studies (CS) while others commented that the CS were geared to the EMT-P level and not appropriate for the EMT-B level. *Discussion:* The PCC was able to promote the EMS CE program which is sustainable and can be duplicated easily. Professional education was addressed by collaboration of CSPI and educator. Many EMS organizations highly recommended the PCC educational sessions to their colleagues. Program changes were made to reflect survey results. *Conclusion:* Overall, participants were satisfied with the PCC CE program, which expanded the scope of PCC professional outreach.

211. Alcohol Hand Rubs: Balancing Hygiene with the Risk of Hazard

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Background: Hospital acquired infections occur in up to 10% of in-patients. Alcohol hand rubs have been widely introduced over the last few years in hospitals and other health care facilities to try to reduce the rate of hospital acquired infections. *Case Report:* A 25 year old man presented with alcohol withdrawal, he was tachycardic (95bpm), tremulous and sweaty and was commenced on IV pabrinex (2-pairs three times a day) and chlordiazepoxide (50mg as required) under the hospital alcohol withdrawal protocol. The following morning he was found collapsed having vomited in the bathroom with 2 empty 1L bottles of alcohol hand rub. His GCS was 3/15, BP 130/70, HR 97, blood glucose 90 mg/dL. He was intubated and ventilated and transferred to ICU. His blood ethanol concentration at the time of collapse was 700mg/dL. Following extubation the next day, he denied any intent to self-harm, stating that he had "just wanted a drink". Over the last 3 months, he had had 5 episodes of ingestion of alcohol hand rub, and on 2 occasions he had required intubation for airway protection. During the sixteen months following the widespread introduction of alcohol hand rubs in April 2005, the number of enquiries to our poisons center regarding ingestion of these products doubled from the previous 16 months and 88% of cases occurred within healthcare facilities. *Case Discussion:* Although poisoning due to alcohol hand rub ingestion remains relatively uncommon, it has increased since their widespread introduction in April 2005. This case report demonstrates that serious clinical effects can occur following ingestion of these products. *Conclusion:* The potential for toxicity of these products when ingested presents a major patient safety and risk management challenge, which is particularly important in areas where patients thought to be at high-risk of ingestion are managed. A multidisciplinary and co-ordinated approach, involving clinical toxicologists, is required to ensure safe storage and use of these products.

212. Review of Sole Lamotrigine Exposures Reported to Texas Poison Centers during a Seven-Year Period

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Background: There is limited data reported on patients' clinical effects with adverse exposures of the anticonvulsant lamotrigine. The objective of this study is to categorize these effects to enable poison center specialists to better manage these ingestions. *Methods:* We performed a retrospective chart review of all cases involving only lamotrigine with known outcomes that were reported to a state-wide poison center network during 2000 through 2006. *Results:* A total of 269 cases with known outcomes were identified, of which 151 (56%) had known doses. For cases with a known dose, the mean dose was 980 mg (range 2.5 to 10,000 mg). Suspected suicides accounted for 38% of cases, while general unintentional and unintentional therapeutic errors represented 33.1% and 22% respectively. Only 32% were managed on site as 55% were already in/enroute to a health care facility when the poison center was contacted and 12% were referred to a health care facility by the poison center. Half of all identified cases had no effects reported, 32% had only minor effects, 14% had moderate effects, and only 4% had major effects. There were no deaths reported from isolated lamotrigine ingestions during this seven-year time frame. The most common clinical effects reported include drowsiness/letharginess (23%), vomiting (10%), tachycardia (9%), nausea (7%), dizziness/lightheadedness (6%), ataxia (6%) and agitation/irritability (4%). *Discussion:* CNS effects are most prevalent with lamotrigine ingestions followed by nausea/vomiting and tachycardia. A limitation of this study is that it excluded cases with mixed ingestions. The potential for drug-drug interactions and increased severity or duration of clinical effects with other CNS depressant agents is possible. *Conclusion:* Although we were able to identify the most likely clinical effects noted with lamotrigine exposures, further research is required in order to determine if it is possible to predict risk of toxicity based on a mg/kg dosage or other dosing parameter.

213. Profound Hypotension in a Fatal Bupropion Overdose

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Background: Bupropion, a structurally unique antidepressant, is used for depression, smoking cessation, and other off-label uses. We report a fatal case of a patient who rapidly developed hypotension unresponsive to traditional and extraordinary measures. Previously published literature have not show significant hypotension in bupropion overdose. *Case Report:* A 20 year-old female was brought to the emergency department (ED) approximately 3 hours after ingestion of up to 60 tablets of her 150 mg Wellbutrin XL®. In the ED, she was orotracheally intubated, heart rate (HR) was 95 BPM, and she was normotensive. Electrocardiogram revealed sinus rhythm, normal QRS complex and normal QTc duration. In the intensive care unit, SBP was 78 mmHg, HR 110 BPM, temperature 92°F, and pupil size 8mm bilaterally. Intravenous crystalloids, norepinephrine, and Bair Hugger® were all initiated resulting in a BP of 149/25 mmHg, HR 123 BPM, and improved temperature. Serum pH was 7.1, bicarbonate 17 mEq/L, and alcohol 150 mg/dL. Lorazepam was given for twitching. Twelve hours after ingestion, BP was 90/60 mmHg on norepinephrine. A pentobarbital coma controlled the recurrent seizures. The QRS complex was now 154 msec and sodium bicarbonate was given. Despite high doses of norepinephrine, phenylephrine and vasopressin, hypotension continued to worsen with BP 70/50 mmHg and HR 80's BPM. Approximately 17 hours after ingestion, cardiac ejection fraction was 40%; intraaortic balloon pump and pacemaker were placed. The patient's condition continued to deteriorate and she died on hospital day two. *Case Discussion:* In overdose, bupropion may cause various neurologic changes. Less frequently, cardiac toxicity is seen with intraventricular conduction delays. In addition to these symptoms, although initially normotensive, our patient rapidly developed hypotension which was unresponsive to aggressive management. A previously published cases series of bupropion overdoses showed only one case of hypotension in which benzodiazepine was a coingestant. *Conclusion:* Although rare, severe hypotension may be a life threatening complication of bupropion overdose. Clinicians need to be aware of this effect since it may alter the disposition of the patient.

214. Survival with an Extremely High Salicylate Level

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Background: Salicylate toxicity is associated with significant morbidity and mortality unless recognized early and treated aggressively. We report a case of severe acute salicylate toxicity with an excellent outcome despite having the highest salicylate level reported in a survivor.

Case Report: A 39 year-old female presented to an outside hospital with complaints of nausea and tinnitus after reportedly ingesting more than 400 tablets of 325mg Aspirin. An initial salicylate level was 75 mg/dl 4 hours after ingestion. The ABG at that time was: pH 7.47, pCO_2 23, HCO_3 16. The patient was admitted to the intensive care unit and started on a bicarbonate infusion with the plan to repeat the salicylate level in 6 hours. However, 3 hours later, a toxicology consult was requested secondary to the development of confusion, hallucinations, and diaphoresis. A repeat salicylate level 7 hours post-ingestion was 121 mg/dl, and transfer to our facility for emergent dialysis was arranged. Upon arrival to our facility the patient's vital signs were: HR 153, RR 44, BP 101/53, T 101.7°. She was diaphoretic, delirious, and agitated. Three amps of $NaHCO_3$ were immediately given and the bicarbonate drip was increased to 500cc/hr while a femoral hemodialysis catheter was placed. Repeat labs were drawn and dialysis was initiated. Her labs revealed a pH 7.5, pCO_2 19, HCO3 18, anion gap 24, and a salicylate level of 152 mg/dl. The patient subsequently developed hypotension which did not respond to aggressive fluid resuscitation. Consequently, norepinephrine was required for the next 8 hours. After 12 hours of continuous hemodialysis, the patient was asymptomatic with normal vital signs and a clear mental status. The salicylate level was 15 mg/dl at that time, and continued to progressively decline. The CK and PT rose mildly peaking at 3673 IU/L and 13.7 s, respectively. The patient was transferred to an inpatient psychiatric facility 2 days later. *Case Discussion:* To our knowledge, a salicylate level of 152 mg/dl represents the highest level reported in a patient who survived without morbidity. *Conclusion:* This case emphasizes the importance of aggressive treatment and frequent clinical and laboratory assessments early in the course of salicylate toxicity.

215. Effects on a Poison Center's (PC) Triage and Follow up after Implementing the No Ipecac Use Policy

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Background: For years, The American Academy of Pediatrics (AAP) had supported home use of Ipecac Syrup. However, due to mounting evidence that Ipecac use did not improve outcome nor reduce Emergency Department (ED) referrals, the AAP in November of 2003 issued a statement that Ipecac not be used for the home management of poison ingestion. *Objective:* To determine if the cessation of the use of Ipecac for home ingestions is associated with an increased number of follow up calls, an increased time of observation at home and an increase in the number of ED referrals for care by poison center staff. *Methods:* 50 randomly selected pediatric (<6 y) cases that received ipecac (ipecac group) from 1/1/2003–10/31/2003 were selected for study. Up to two controls (no ipecac group) were matched by age, amount ingested and by toxin. Controls were selected from the 2004–2006 time period. (ipecac no longer in use). *Results:* 50 ipecac cases and 84 no ipecac controls were analyzed. The groups had no significant differences with respect to percent symptomatic, median time post ingestion, mean age and distribution of toxin categories (e.g. antidepressants, beta blockers, etc). The no ipecac group had nearly 10 times the odds of ED referral compared to the ipecac group, (OR = 9.9, 95%CI 3.3, 32.2). The mean total hours of follow up was not significantly different between the groups (diff = −1.1, t = −1.8, p = 0.07). The mean number of follow up calls was significantly less in the no ipecac group (diff = −1.4calls, t = −6.8, p < 0.001). Toxicology consults were greater in the no ipecac group (chi sq 4.05, p = 0.04), however consults were not associated with ED

referral. *Discussion:* While prior studies have shown that not using ipecac does not affect clinical outcome, our research suggests it may affect triaging outcome, thus evaluation of follow-up practices and ED referrals is indicated. *Conclusion:* The no ipecac policy resulted in an increase in ED referrals at our center.

216. A 60s Buzz Recycled: Teens Rediscover Morning Glories Can Be Used as a Hallucinogen

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Background: Consumption of Morning Glory seeds (MGS) (Ipomoea species) was popularized in the 1960s by teens who ingested the seeds for their hallucinogenic properties. A 16 yr old male was found hallucinating at school 2 days after ingesting a handful of MGS. These seeds are legally available in many places and appear to have been rediscovered as a hallucinogen by teens in our locality. *Case Report:* A 16 year old man was noted to be acting "strange "by his teacher at school 2 days after ingesting a handful of MGS. In the ED, he was found to be making up words and expressing illogical thought patterns. Psychiatry described his condition as "a compensated psychological disturbance" 2o to a possible "LSD hallucinogen". PE, PMH, SMA6 and urine tox screen for substances of abuse were (-). Pt was admitted to a psych unit where his effects continued for 4 days before he was discharged asymptomatic. *Case Discussion:* Common street names of MGS include: Heavenly Blue, Blue Star and Flying Saucers. The seeds must be chewed for absorption of the alkaloids to occur. Restlessness, increased awareness and socialization followed by relaxation for several hours are typical effects reported with ingestions of 20–40 seeds. A dose of 100–150 seeds has produced effects similar to ingestion of 75–150 ug/kg of LSD. This amount has been associated with spatial distortions, hallucinations, and enhanced imagery and mood elevations for 1–5 days. Ingestions of 200–250 seeds have produced additional effects of nausea, vomiting, abdominal pain, lethargy and paresthesias. In a published case, a 24-year old who took 300 seeds had effects which allegedly led him to commit suicide. The victim in our case stated that he "decided to try the seeds because he had heard it was like LSD and was legal." We have consulted on 8 cases of MGS ingestions in adolescents between the ages of 16–20 years of age since the year 2000. Live plants and seeds of the Ipomoea species are legal to buy, sell or possess in many places. *Conclusion:* A teenager was recently was found hallucinating at school after ingesting a handful of morning glory seeds. These seeds are readily available and appear to have been rediscovered as a hallucinogen by teens in our locality.

217. A Two Year Retrospective Study of Pediatric Monafidil Ingestions

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Background: Modafinil, a benzhydrylsulfinyl acetamide derivative, is a wakefulness-promoting agent acting as a central nervous system stimulant. It is chemically and pharmacologically unrelated to other CNS stimulants. Published reports of clinical experience with acute ingestion of modafinil in children are minimal. *Methods:* A 24-month retrospective study was completed on all cases of pediatric ingestion of modafinil reported to CPCS. The parameters used in the case analysis were modafinil as the single substance, age 17 years or younger, sex, amount ingested, and clinical symptoms. *Results:* A total of 27 cases of modafinil ingestion without coingestants were identified. Of the 27 exposures, 52% were male, and 48% were female with a mean age of 6.4 years old (range 12 months – 17 yo, SD 7.3 years). 23 of the 27 exposures (85%) were due to accidental ingestions and 4 of the 28 exposures (15%) were due to intentional ingestions. The mean amount ingested was 342 mg (range 100 mg to 2000 mg, SD 437 mg). Of the 27 patients, 4 patients (15%) developed agitation, 3 patients (11%) developed mild tachycardia (2 yo at 160 bpm, 16 yo at 130 bpm, and a 17 yo at 126 bpm), 2 patients (7%) developed headache, 1 patient (4%) complained of dizziness, and 1 patient (4%) developed a rash. Of the 27 patients, 10 patients (37%) were treated in the ED. Activated charcoal was administered to 4 of the 10 patients (40%) treated in the ED. One patient (10%) was treated with lorazepam for agitation in the ED. All 10 patients (36%) treated in the ED were discharged without sequelae. *Discussion:* Outcome: no effect in 20 patients (74%), minor effects in 7 patients (16%) with agitation, rash, and mild tachycardia. Modafinil toxicity manifested primarily as CNS stimulation. Pediatric modafinil ingestions showed favorable outcomes with observation and minimal supportive care and gastric decontamination with activated charcoal. *Conclusion:* Continued evaluation of pediatric ingestions of modafinil is essential to determine specific thresholds for toxicity.

218. Toxic Exposure Surveillance System (TESS)-Based Characterization of Human Tilmicosin Exposures, 2001 – 2005

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Background: Tilmicosin is a veterinary macrolide antibiotic used in large animals. Fatalities in humans can occur even after small parenteral doses. Demographic and dose-related effects categorization of human tilmicosin exposure is limited. *Methods:* Single-substance human tilmicosin exposures in the Toxic Exposure Surveillance System (TESS) database from 2001–2005 were reviewed. Parenteral exposure doses were verified by reporting poison centers, separated into dose increments, and correlated with clinical effects and outcomes. *Results:* Over a 5 year period, there were 1,291 single-substance human exposures to tilmicosin. Mean age was 39.1 y (range 18 m–81 y) and 80% were male. 99.5% were acute exposures. There were 10 (1%) adverse drug reactions, one intentional misuse, 10 (1%) intentional suicides, and 1266 (98%) unintentional exposures. More than 40% of unintentional exposures occurred in the workplace. 25% of the initial calls to the poison center originated at a healthcare facility. By route there were 264 (20%) dermal, 291 (22.5%) ingestion, 71 (5.5%) ocular, and 768 (59%) parenteral exposures. Almost half (49.9%) of the parenteral exposures were managed in a HCF v. 37% of non-parenteral exposures ($p < 0.0001$). Patients with a parenteral exposure were more likely to be admitted (9.8% v. 3.6%; $p < 0.0001$) and to be admitted to an ICU (5.6% v. 1.2%; $p < 0.0001$) v. non-parenteral exposures. By non-parenteral routes there were no major effects or deaths. With parenteral exposure, moderate effects occurred in 46 (6%), major effects in 2 (0.3%) and there were 4 (0.5%) deaths. Two of the four deaths were suicides. Dose-relationships to clinical effects, effects durations, and outcomes were seen, with major effects and death associated with doses greater than 10 mL, but with moderate effects possible even in exposures estimated to be less than 1 mL. *Discussion:* Parenteral human exposures to tilmicosin can result in serious cardiac effects and death. The case-fatality rate in parenteral exposures is 10 times that of all human exposures in TESS. *Conclusion:* Over 150 parenteral human exposures are reported to poison centers annually. Any parenteral exposure should be evaluated at a healthcare facility.

219. Severe Methanol Poisoning and Organ Transplantation

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Background: Poisoned patients with brain death are at times considered for organ donations. Less than 1% of organ donations originate from poisoned patients. Successful multiple organ transplantations from a patient with severe methanol poisoning and unusually high serum level is reported herein. *Case Report:* A 49 years old man was admitted to the emergency department (ED) due to acute confusion and CNS depression several hours after drinking from a bottle labeled "denatured alcohol". At home he was agitated, stared around and fainted. In the ED he was hemodynamically stable, drowsy and disoriented. During the evaluation in the ED he had respiratory arrest and was mechanically ventilated. No signs of brain edema or bleeding were seen in brain CT. Laboratory tests showed severe metabolic acidosis (pH 6.81, HCO_3 5.7mEq/L, anion gap 58), osmolarity 556mOsm/KgH_2O, and osmolar gap 240. Toxic alcohol poisoning was suspected. The patient was treated with IV sodium bicarbonate, fomepizole and folic acid, and hemodialysis. Although the severe metabolic acidosis resolved the patient remained unconscious. Further laboratory evaluation revealed serum methanol and formic acid levels well in the fatal range (524mg/dL and 78mg/dL, respectively). When brain death was determined, the family consented to donating his heart, lungs, kidneys, liver and corneas. On a 9 months follow up, all organs were found to function adequately, except in two patients with lung transplantation who died from postoperative complications. *Case Discussion:* Timely decision of organ procurement resulted in successful outcome of the transplanted organs. Numerous case reports and case series report successful transplantations after various poisonings, including methanol. To the best of our knowledge this report is about one of the highest serum methanol and formic acid levels associated with successful organ transplantation. *Conclusion:* It is suggests that organ procurement should be considered from potential donors with methanol poisoning even in the presence of extremely high levels of serum methanol and formic acid.

220. Mining Poison Center Data To Develop Poison Prevention Education Strategies

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Background: Unlike the preponderance of exposures that are reported to poison centers, ethylene glycol and methanol poisoning are associated with significant morbidity and mortality. The purpose of this project was to investigate human and animal ethylene glycol and methanol exposure data from a poison center to determine whether the statistical profile and subsequent analysis would identify trends that could be used to develop prevention and awareness strategies that reduce exposures and the associated morbidity and mortality. *Methods:* The electronic medical record data base of an AAPCC certified regional poison information center was queried for a six year period (2001–2006) to identify all human and animal exposures to products that contained either ethylene glycol or methanol. Data analysis included a comparison of exposures by human/animal, year, month of the year and reason. Descriptive statistics and chi square analysis characterized the data. *Results:* Ethylene glycol (851) and methanol (445) exposures accounted for 1296 exposures. The mean monthly number of all exposures was 108 (SD ± 15.46; median 105). Compared to the mean, there was no statistical difference for any month. The monthly human exposure mean was 83.58 (SD ± 14.36; median 79) with no statistical differences. Unintentional human exposures (86.1%) were significantly more prevalent than those that were intentional (13.9%). The majority of animal exposures occurred in dogs (87.8%) as compared to cats (12.2%). In animals a mean of 6.4 (R 3–13) and median of 6 methanol exposures were reported each month compared to a mean of 17.6 (R 14–25) and a median of 16 ethylene glycol exposures. *Discussion:* Data mining revealed that ethylene glycol and methanol exposures occurred with high frequency in every month, not just those associated with extremes of weather or seasonal changes. The vast majority of human exposures were unintentional and there was a higher incidence of exposure among dogs than cats. *Conclusion:* These data help to identify aspects of ethylene glycol and methanol exposures upon which to base educational awareness and prevention strategies.

221. Osmolar Gap Method for Detecting Diethylene Glycol

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Background: Measurement of toxic alcohols (methanol, ethylene glycol, etc) cannot be performed by most hospital laboratories. The use of the osmolar gap method to estimate toxic alcohol concentrations can be helpful when specific levels are not available. While a low or normal osmolar gap is not useful for estimating toxic alcohol concentrations, a high osmolar gap can be very suggestive of toxic alcohol poisoning, in the proper clinical setting. Diethylene glycol (DEG) is a toxic alcohol which has been responsible for several poisoning epidemics due to contamination of pharmaceuticals (Panama 2006, Haiti 1995, etc), and is a component of numerous consumer products (antifreeze, brake fluids, wallpaper stripper, etc). Virtually no hospital laboratory can perform DEG levels on an emergent basis. Since DEG is an osmotically active toxic alcohol, we theorized that the osmolar gap method might be useful for estimating DEG levels. *Methods:* The principle author's blood was put into five tubes. A known quantity of methanol, ethanol, ethylene glycol, and DEG was added to the first 4 tubes with a microliter pipette in order to achieve a toxic alcohol concentration >200mg/dL The fifth tube served as the control. On each sample, sodium, BUN, glucose, and serum Osm were measured via

standard hospital laboratory methods; the toxic alcohols were measured via GC/FID. The resultant osmolar gaps were used to estimate the toxic alcohol concentrations. *Results*:

	Control	Methanol	Ethanol	Ethylene Glycol	Diethylene Glycol
Sodium	142	140	141	141	141
BUN	16	15	15	15	15
Glucose	99	100	100	100	93
Calculated Osm	295	291	293	293	293
Measured Osm	299	375	349	370	384
Osm Gap	4	84	56	77	91
Estimated Toxic Alcohol		269	258	477	965
Measured Toxic Alcohol		197	199	380	764
Error (% > measured)		36	29	25	26

Discussion: These results indicate that this experimental method was a valid approximation of what might be seen in toxic alcohol poisonings. *Conclusion:* The osmolar gap method for estimating DEG levels appears to be just as accurate as it is for estimating methanol, ethanol, and ethylene glycol levels. It may be a useful adjunct when managing patients with a possible DEG ingestion.

222. Elevated Troponin I in Pediatric Carbon Monoxide Poisoning

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Background: Carbon monoxide (CO) poisoning is commonly associated with elevated cardiac markers in adult patients. We present the first reported case of a pediatric patient with no cardiac complaints, no ECG evidence of myocardial ischemia, and significantly elevated troponin I. *Case Report*: A 13-year-old male with history of autism was found unresponsive and incontinent of bowel and bladder at home. He had an elevated carboxyhemoblogin level (Cohgb) of 25.8%, a serum bicarbonate of 16 mmol/L and was transferred to our ED. The patient's mother had been using a gas-powered generator intermittently for the past 3 days in their house. He had complained of a headache and had one episode of emesis prior to presentation. The patient's mother experienced nausea, headache, body weakness, an episode of urinary incontinence, and had an initial Cohgb of 28% and a serum bicarbonate of 17 mmol/L. On presentation to our ED the patient was awake and alert with no complaints. His vital signs were: T-97.8 F, P-120/min, BP-101/69, biox-100% on 100% non-rebreather mask. He had no abnormal physical exam findings. His bedside co-oximetery showed a COhgb of 1%. His labs included a basic metabolic panel which was normal except a bicarbonate of 20 mmol/L and elevated cardiac markers. His ECG showed sinus tachycardia. He was treated with hyperbaric oxygen therapy at 3 ATA for 30 minutes, then 2.5 ATA for 60 minutes. The patient's tachycardia resolved and his serum bicarbonate normalized. He did not have any arrhythmias and had no evidence of myocardial ischemia on serial ECGs. An echocardiogram on the day of admission showed no structural or motion abnormalities. He was discharged in good condition. His cardiac marker trend was:

Hours post presentation	4	13	20	26	66
Troponin I	3.58 ng/mL	7.1	4.6	3.57	0.62
CK	643 U/L	1850	1335	1163	283
CK-MB	24 ng/mL	45.2	30.9	21.6	2.8
Index	4%	2%	2%	2%	1%

Conclusion: We present a pediatric patient with significantly elevated troponin I following CO exposure with transient tachycardia and no evidence of myocardial ischemia on ECG. Management included cardiac monitoring, serial cardiac enzymes and ECGs, and echocardiogram.

223. Acute Iron Toxicity from Liquid Ferrous Sulfate in a Premature Infant

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Background: Iron overdose has been one of the leading causes of fatal poisoning among young children. The candy-like appearance makes it quite attractive to younger children. Newer packaging requirements have limited the number of iron exposure in children. Ferinsol® is a highly concentrated liquid iron formula prescribed to most premature and young infants. Despite the prevalent use, there are no previous published cases of serious iron toxicity from liquid iron preparations. *Case Report:* We report a unique case of iron toxicity in a 7 week premature infant who was inadvertently given Ferinsol® in a baby bottle by the grandmother thinking it was water. The patient suddenly developed severe acidosis, hypotension, and respiratory failure, requiring prompt intubation, aggressive fluid hydration, and vasopressors. Her initial vitals included pressure - 66/35 mm Hg; pulse – 160; respiratory rate of 24; oxygen saturation of 93%. Her serum iron level was 671 µg/dL and her labs were significant for serum pH of 7.18, anion gap of 15, and leukocytosis (13,300). Because of her persistent hypotension, deferoxamine (DFO) was limited to a dose of 5 mg/kg/hr throughout the course of her treatment. The next day, her serum iron levels was 61 µg/ dL. On the third day of admission, her labs and vitals returned to baseline, DFO was discontinued and the patient had recovered fully. *Case Discussion:* Acute iron intoxication can result in decreased mental status, metabolic acidosis, hepatic injury, respiratory failure, and shock. Chelation with DFO is critical; however, DFO may be difficult to administer in young patients who already present with acute lung injury and cardiovascular shock from iron poisoning. The literature regarding DFO dosing in similar cases is limited. *Conclusion:* Liquid iron preparations are marketed in fragile glass containers that can be broken and placed in an alternative "look-alike" containers by caregivers, resulting in serious poisoning. Given her premature age, her critical symptoms, and her elevated serum iron levels, DFO had to be administered to our patient at a suboptimal dose but was still successful.

224. Difficulty in the Forensic Laboratory Assessment of "Cheese" – A New Form of Heroin

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Background: In 2005 a new type of heroin appeared in Dallas, "Cheese." It is black tar heroin cut with acetaminophen [APAP] 500 mg + diphenhydramine 25mg. Heroin content is ~8%. Cheese is a tan powder that can be insufflated. It has caused a new problem in the field identification of the heroin that is the basis of this report. *Case Report:* Chemical Spot tests (CST) provide criminalists & toxicologists with a field tool for the presumptive identification of drugs. They are commonly used because they produce visible results, the reagents are available in prepackaged forms, & extensive training is not required. Positive reactions (specific color changes) are dependent on the functional groups present of the tested analytes. Sensitivity of CSTs is generally high. The detection limit for heroin is 200 mcg. For black tar heroin, this is ~ the size of a period at the end of a sentence. CSTs are not always specific for a single drug or class. Thus, a battery of CSTs is done for identification of unknown agents. The CST most commonly used to detect heroin is the Mecke reagent. It sequentially adds different acids to the analyte. Black tar heroin, even after dilution with a variety of cutting agents, yields consistent, green-colored, "positive" result. The very high concentration of APAP in cheese causes the Meckes CST to yield false (-) results. With cheese, the final color is a brown -to-purple. A different CST also commonly used to detect heroin is the Marquis reagent. Use of this test with heroin results in a reddish-purple color. Cheese, however, yields an orange color. *Case Discussion:* CSTs are very sensitive for the detection of heroin. However, cheese consistently results in false (-) tests for heroin in the most commonly used CSTs. This problem slowed the initial evaluation of cheese in Dallas. The heroin is detectable when using GC-MS. *Conclusion:* Cheese, a new form of heroin that is combined with large amounts of APAP, results in false (-) CST for heroin.

225. Pediatric Copperhead Envenomations

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Background: Hundreds of children are victims of snake envenomation every year. Although mortality is rare with copperhead envenomation, local tissue injury can cause serious morbidity. We report the incidence and treatment of copperhead envenomation in the pediatric population managed by one center. *Case Report:* All snake bite cases were reviewed from the medical toxicology consultation service and the poison center databases from Jan 2001 until March 2006. Data was then abstracted by a single reviewer and compiled for analysis. Severity of bite was coded according to Toxicall outcome standards. *Results:* A total of 68 cases were identified. The age range was 1.5 to 17 years (mean 10). Females accounted for 29% of bites and 54% of bites were on the lower extremity. Outcomes were coded as moderate in 71% of cases; 2 (3%) were severe. Ovine polyvalent Fab immunoglobulin fragments (CroFab ®) was administered in 49% of cases; 4 to 6 vials were used as the initial dose for those treated. One adverse event was reported during CroFab ® infusion, (flushing), which was not considered serious or life-threatening. The CroFab ® infusion was continued in that case after treatment with diphenhydramine and steroids. 39 bites (57%) were admitted to general ward beds, 6 (9%) were admitted to an ICU setting, and 22 (32%) were discharged. One case left against medical advice. *Case Discussion:* Copperheads are part of the crotalidae family with venom similar to, but reportedly less potent, than that of rattlesnakes. Although systemic, life-threatening signs are rare after copperhead bites, inflicted tissue damage can cause significant morbidity. The majority of the bites in this study occurred on the lower extremity, which differs from historical data on adult bites. Based on this review, CroFab ® remains a safe treatment option for children. *Conclusion:* This represents one of the largest studies of the incidence and treatment of children sustaining copperhead envenomation. More research is needed to determine the optimal treatment for pediatric victims of copperhead envenomation.

226. Adolescent Methamphetamine Exposures

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Background: Methamphetamine abuse is reaching epidemic proportions. We sought to determine the characteristics of adolescent methamphetamine exposures reported to the California Poison Control System over a 4 year period. *Methods:* This is a retrospective review of California Poison Control System records for methamphetamine exposures from January 2000 through December 2004. Records of patients identified as 11 through 18 years of age were reviewed and abstracted. *Results:* The median age of exposure in this cohort was 16 years (Interquartile range of 15 to 17.75 years) with 58% female, 40% male and 2% not noted. 92% of exposures were intentional with 5% of these occurring during arrest by police; 5% were noted as accidental. 15% of exposures were reportedly associated with suicidal ideation or a suicide attempt. Routes of exposure were reported as ingestion (70%), inhalation (27%), or injection (1%). Coingestants were reported in a minority of the cases (7% marijuana; 5% cocaine; 5% opioids; 2% barbiturates; 1% phencyclidine; 1% gamma-hydroxybutyrate). Findings in this cohort included hyperthermia (defined as a notation of "hyperthermia" in the poison center record or a documented temperature >100.4°F) in 4%, and tachycardia was noted in 47% (mean heart rate of 114 bpm (95% CI 99–119). No EKGs were reported to show abnormalities other than sinus tachycardia and there were no reported dysrhythmias. Seizures were present in 3% and noted to be absent in 79% of cases. No deaths were reported in this cohort. Disposition was not recorded in 43% of the cases; 34% were seen in the Emergency Department and released, 23% were admitted to the hospital with 45% of these admitted to the Intensive Care Unit. *Discussion:* Life-threatening hyperthermia and dysrhythmias were not common. Suicidal ideation or attempts were reported in 15% of the exposures. Of the reported dispositions, most were evaluated in the Emergency Department and discharged with a fewer number hospitalized. *Conclusion:* This series of adolescent methamphetamine exposures demonstrates relatively benign presentations and findings.

227. Diagnostic Utility of Flumazenil in Zopiclone Poisoning

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Background: Zopiclone is a cyclopyrrolone hypnotic, which is structurally unrelated to benzodiazepines. Its pharmacological effects, however, are similar to those of benzodiazepines and it binds to a site close to the benzodiazepine-binding site. Flumazenil, an antidote specific for the treatment of benzodiazepine overdose, has been previously reported to successfully reverse zopiclone-related coma in two patients. We conducted a retrospective analysis to better understand the efficacy and safety of flumazenil in zopiclone poisoning. *Methods:* All human zopiclone poisonings reported to the Taiwan National Poison Control Center between 1994 and 2006 were reviewed. Patients' demographic data, severity of poisoning, clinical management, and outcomes were collected and analyzed. *Results:* A total of 119 patients with zopiclone poisoning were identified. Among them, 25 patients received flumazenil therapy. In a multivariate regression analysis, patients receiving the antidote were more likely to be of moderate-to-severe poisoning (88% vs. 17%) and were more frequently admitted to a specific medical center (92% vs. 32%), as compared to those subjects without flumazenil therapy. Coma was noted in 21 out of the 25 patients with flumazenil therapy and marked drowsiness was recorded in the remaining 4 patients. Except for two patients with concomitant tricyclic antidepressant poisoning or hypoglycemia, all of the patients became transiently clear after the administration of 0.25mg to 1mg of flumazenil. None of them developed adverse effects to the therapy. Urine toxicological screen revealed the coexistence of routine benzodiazepine medications in 5 patients. *Discussion:* Given the similar binding sites and pharmacological effects between zopiclone and benzodiazepines, flumazenil is expected to be effective in the reversal of zopiclone-related toxic effects. Our findings supported the above proposition by demonstrating the efficacy of flumazenil in antagonizing central nervous system depression among patients with zopiclone poisoning. *Conclusion:* Flumazenil seems to be effective and safe in the treatment of zopiclone poisoning. The short-lived response of flumazenil, however, limits its use to diagnostic purpose in zopiclone poisoning.

228. Public Health Use of Poison Center Data

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Background: In 2004 the Institute of Medicine recommended that Poison Center real-time call data (Toxic Exposure Surveillance System) become an integral part of the public health surveillance system. The Northern New England Poison Center (NNEPC) is currently collaborating with New Hampshire Department of Health and Human Services (NH DHHS) to evaluate the usefulness of NNEPC data as a public health monitoring tool. *Methods:* To develop a monitoring system with high sensitivity, the 2006 NNEPC data for NH were analyzed to establish an expected number of cases per week for over 25 indicators. Indicators include pesticide and mushroom exposures; substance abuse, suspected suicide and occupational-related calls; and medications identified in information calls. Education-related efforts, such as material requests and number of calls from senior citizens, were also analyzed. The expected numbers per week were compared to weekly data in 2007 to identify if more cases occurred than expected during the week. *Results:* Medication identification was one of the indicators assessed. The expected number of cases per week for sedatives were between 2 – 14 (mean +/– 2 S.D.; 8.34 +/– 2.98) for 2006. Within the first 10 weeks of 2007, there were 4 weeks with more cases than expected. Because of these results, public health professionals are analyzing other data to better understand this possible increase. During this same period of time there were 2 weeks when NNEPC had more food poisoning cases than expected (range of 0–5). Seasonal call patterns for mushroom, pesticide and carbon monoxide exposures have also been identified. *Discussion:* Ideally this monitoring system would be part of a comprehensive surveillance system. *Conclusion:* Using a weekly monitoring system has increased NNEPC's collaboration with various NH DHHS Departments. Officials are better able to interpret NNEPC data. The continued use of this monitoring system will alert NH DHHS of a possible outbreaks or data trends. The NH experience can serve as a model for other jurisdictions to use Poison Center real-time data as an integral part of the public health surveillance system.

229. Transdermal Patches: New Era in Toxicology!

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Background: Many TTS-related (transdermal therapeutic systems) poisonings have been reported recently. In Quebec, the number of poisonings with fentanyl patches reported to the CAPQ has increased to 16 cases in 2005 and 14 in 2006, from approx. 4 in previous years. Since 2005, the INSPQ Toxicology Laboratory has identified toxic levels of fentanyl in blood of 16 post-mortem cases. Nicotine patches have also been involved in poisonings in children as well as adults. TTS contain large amounts of active ingredient with the potential of causing acute poisonings. In order to determine which TTS may cause acute poisonings, we sought to determine the total amount of medication in commercial patches and the residual amount of drug left in used patches. *Methods:* Online and manual searches were performed to identify TTS available in Canada and USA. Technical information was retrieved via Internet and/or direct contact with pharmaceutical companies. The total amount of active ingredient in a new patch and residual amount in used patches were calculated to estimate the risk of acute poisoning by oral or parenteral use of a single dose. *Results:* TTS were found for clonidine, fentanyl, methylphenidate, nicotine, nitroglycerin, hormones, selegeline and scopolamine. The TA present in each patch was up to 14 times the amount actually delivered : clonidine: 3.5; estrogens 2–12; fentanyl: 1.4–2.3; methylphenidate : 2.75; nicotine: 2.5–5; nitroglycerin: 9–14; scopolamine: 1.5; selegiline: 3.3; testosterone: 4.9. The ratio of residual amount/ daily delivered dose in used TTS varies from 1.2 to 73. *Discussion:* Only a small part of the drug dissolved in the reservoir or the matrix of the patch will be absorbed through the skin by osmosis and reach bloodstream. Thus, the amount of drug in unused TTS is well above the total amount delivered, which may cause toxic effects if swallowed or misused parenterally. Used as well as unused patches of clonidine, fentanyl, nicotine and methylphenidate can induce toxic symptoms in children and adults after oral or parenteral use. *Conclusion:* Considering the increasing number of available TTS, health professionals should be aware that poisonings with used as well as new patches will be more frequent.

230. Fatal Acute Occupational Exposure to Nitric Acid

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Background: Occupational chemical exposures that result in death are very rare (21 in the last two years of TESS data). None of the 14 deaths due to inhalation (only) involved nitric acid. Nitric acid vapor is a strong irritant, however immediate clinical effects may be absent. Dyspnea and evidence of acute lung injury may not occur for several hours, and can be rapidly progressive. Therapy is non-specific. *Case Report:* A healthy 66-year-old man developed shortness of breath 4 hours after cleaning a vat in a waste treatment facility for 45 minutes with a solution of 50–70% nitric acid. He had not been wearing a mask. On arrival to ED, he was alert and oriented with labored breathing (24 breaths/minute), scant rales, productive cough and O_2 saturation of 96% on a non-rebreather mask. He had no evidence of caustic injury to mucous membranes. His symptoms progressed over the next 3–4 hours, and he developed pulmonary edema. His first ABG obtained on the non-rebreather mask was pH 7.27, pCO_2 52, pO_2 74, HCO_3 24. He was intubated and received methylprednisolone, dopamine, norepinephrine, sodium thiosulfate, disulfiram, and nitric oxide. The patient failed to respond to all therapies and died 48 hours after exposure. *Case Discussion:* This case involves fatal pulmonary injury following inhalation of nitric acid fumes for 45 minutes. The patient stated that he had perfomed similar work on many occasions, but this day was the only time that he had not worn respiratory protection. He noted no odors or mucous membrane irritation while working in the vat, and therefore did not relate his symptoms to the exposure. Therapy is supportive and no antidotes are available. This patient was treated unsuccessfully with nitric oxide via inhalation to preferentially vasodilate the pulmonary bed. *Conclusion:* Severe toxicity from nitric acid exposure is rare, and fatalities from acute occupational exposures are exceedingly rare. It is imperative that EMS providers, occupational nurses, ED staff and specialists in poison information recognize the delay in symptoms and potential severe toxicity of occupational exposures to nitric acid fumes.

231. Elevated Blood Mercury Concentrations in People Consuming Fish from Areas with a High Environmental Burden of Mercury

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Background: Mercury (Hg) is an environmental toxicant that is released from natural and anthropogenic sources. Plankton convert Hg to methyl Hg, which bioaccumulates up the food chain leading to high concentrations in predatory fish. Consumption of contaminated fish is the major source of exposure to methylmercury in the U.S. In 2005, the EPA issued a final Clean Air Mercury Rule to regulate mercury emissions from coal-fired power plants and reduce emissions of mercury by 2022. The study objective is to assess blood Hg levels of participants that live near and consume fish from areas of high Hg emissions and deposition. The long term goal is to follow a cohort of people living in areas where regulatory efforts will reduce the amount of Hg emissions and monitor their Hg levels over time. *Methods:* We employed a cross-sectional survey to assess Hg blood levels. We administered food history questionnaires and collected blood samples. We enrolled a convenience sample in southeastern coastal North Carolina of 100 people, excluding pregnant women, who consumed at least six ounces of locally caught fish twice a week. *Results:* We sampled 73 males and 27 females. The geometric mean total Hg levels was 2.02 µg/L (range < LOD to 44 µg/L). The geometric mean for organic Hg was 0.33 µg/L (range < LOD to 42 µg/L). *Discussion:* Seventy one percent of the population had total Hg levels above the National Health and Nutrition Examination Survey (NHANES) 50th percentile (0.86 µg/L) and 23% had levels greater than NHANES 95th percentile (6.04 µg/L). The geometric mean was significantly lower for females than males (p-value < 0.0001). *Conclusion:* Hg levels were elevated in some of the population compared to the NHANES levels. Using this sampling plan, a cohort of people with measurable levels of blood Hg that live near and consume fish from areas with a high environmental burden of Hg could be identified. By tracking blood Hg levels in this group over time, the effects of regulatory efforts to reduce Hg emissions could be observed.

232. Medication Safety Profile Changes Often Involve the Most Commonly Prescribed Medications

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Background: Various med errors occur including dosing mistakes, use in patients where a contraindication exist, and the combining of some medications inappropriately. It seems that the safety profiles of available meds are constantly changing. The purpose of this study was to better quantify the task faced by clinicians in "keeping up" with safety profile changes. This was done by assessing all safety profile changes in 2006 & comparing the changes with the most commonly written prescriptions in 2005. *Methods:* A list of the top 200 drugs prescribed in the USA in 2005 was obtained from RxList (http://www.rxlist.com/top200.htm). The safety-related drug labeling changes for 2006 were obtained from the Medwatch website. Each med was categorized into common groups such as analgesic, cardiovascular, etc. The lists were crossed-referenced & tabulated within Microsoft Excel so as to assess the frequency of safety changes involving the most commonly prescribed meds. *Results:* The top 200 agents prescribed represented 2,319, 314 scripts. Cardiovascular (24%), analgesic (12%), and antiinfective (11%) meds were the most commonly prescribed. There were 517 safety label changes, affecting 261 different drugs (the difference due to varied formulations of the same drug). The most common safety change was precautions (38%). The most significant safety change, Black Box warnings, were added to 8% of the meds. Safety changes affected 45% of the prescriptions written for the 200 most commonly written medications. Among the 200 most commonly prescribed medications, 67 had a safety label change. Safety label changes occurred in 86% of the analgesics and 78% of the diabetes meds. *Discussion:* The large number of safety profile changes involving the most commonly prescribed medications was surprising. This is particularly impressive considering that the study does not include medwatch warnings, new medications, or new indications for current medications. *Conclusion:* The most commonly prescribed medications in 2005 commonly had safety profile changes. The task faced by physicians in "keeping up" with meds is overwhelming.

233. The Misuse and Abuse of Medications Prescribed for Attention Deficit Hyperactivity Disorder (ADHD) in the State of Texas

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Background: Medications for Attention Deficit Hyperactivity Disorder (ADHD) are commonly prescribed to children and adults in the United States. Prescription rates have increased over the past 5 years, and with them, the likelihood of misuse/abuse. *Methods:* A search of the Texas Poison Control Centers Toxic Exposure Surveillance System from 2000–2005 was performed to extract data pertaining to the incidence of intentional misuse or abuse of Methylphenidate, Dextroamphetamine, Amphetamine/Dextroamphetamine and Atomoxetine, the method with which they were abused (i.e. ingested, inhaled), the age and gender of abusers as well as associated signs/symptoms, therapies administered, disposition and clinical outcomes. *Results:* There were 466 incidences of ADHD medication misuse/abuse reported to Poison Control Centers (PCC) in Texas between 2000 and 2005. The number of reports increased each year. Eighty two percent of incidents occurred in children and teenagers, with an average abuser age of 15 years. Seventy nine percent of reported abusers were evaluated and managed in healthcare facilities, 38% of whom were treated and released from point of initial care. The most common method of abuse was ingestion (98%) with insufflation being reported in the remainder (2%). Thirty nine percent of abusers had no related signs/symptoms. Of the remainder, the most common sign/symptoms were tachycardia (40%), followed by agitation (22%). No major effects or deaths were reported. Most patients (51%) required no therapy. Of the remainder, the most common treatments provided were Charcoal (52%), followed by IV Fluids (26%) and Sedative/Hypnotics (20%). *Conclusion:* The misuse and abuse of AHDH medications is increasing in Texas based on this limited Poison Center database convenience sample. Based on this small sample, morbidity appears to be low. The authors are presently pursuing annual prescription information to allow calculation of estimated rates of abuse. Insufflation is a novel method of ADHD medication abuse that requires continued surveillance.

234. Safety and Efficacy of Intramuscular Ziprasidone for Acute Undifferentiated Agitation

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Background: Ziprasidone mesylate is an atypical antipsychotic agent approved for intramuscular administration in the treatment of acute schizophrenic agitation. Its adverse effect profile and efficacy have been described in psychiatric unit patients, but such information is limited in general emergency department patients with acute undifferentiated agitation. Objective*:* To describe the general safety and efficacy of intramuscular administration of ziprasidone as initial therapy for acute undifferentiated agitation in a general emergency department patient population. *Methods:* A retrospective review of pharmacy records for a 113-day period identified 87 consecutive cases of intramuscular ziprasidone administration as initial therapy. Corresponding patient records were analyzed for additional sedative medication administration due to inadequate sedation and for recorded instances of oversedation, dysrhythmia or vital sign abnormalities subsequent to sedative therapy. *Results:* Average patient age was 46 years (range 15–90), 72% were male and 28% were female. 60 (69%) patients received ziprasidone alone as initial therapy. Of these, 9 (15%) required additional medication for undersedation. 27 (31%) patients received ziprasidone plus lorazepam as initial therapy. Of these, 3 (11%) required additional medication for undersedation, one of which required continuous lorazepam infusion. No other patients needed further sedation. No instances of oversedation, dysrhythmia or vital sign abnormalities subsequent to sedative therapy were recorded. *Discussion:* Limitations of this study include retrospective analysis, under-recording of adverse effects, and power insufficient to draw meaningful inferences regarding lack of adverse effects. *Conclusion:* In this cohort of patients with acute undifferentiated agitation, 15% of patients administered ziprasidone alone as initial therapy required additional sedation. 11% patients administered ziprasidone plus lorazepam as initial therapy required additional sedation. No instances of oversedation, dysrhythmia or vital sign abnormalities subsequent to sedative therapy were recorded.

235. A 5-Year Retrospective Review of Acute Amiodarone Exposures

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Background: Amiodarone (AM) is a widely used Type III antiarrhythmic with sodium, potassium and calcium channel blocking effects, in addition to α- and β-blocking properties. Although chronic toxicities from AM are well-known, information from acute exposures is limited. *Methods:* We conducted a retrospective review of acute human AM exposures reported to the California Poison Control System from 1/1/2000 to 6/15/2005. *Results:* We identified 177 case reports of acute AM exposures. 55.9% of patients were male. Ages ranged from 2 months to 93 years. 23.2% of patients were ≤18yo. Reason for exposure was "unintentional therapeutic error" in 62.1% of cases, "unintentional general" in 29.4% and "intentional suspected suicide" in 8.5%. All but two exposures were oral. In 55.4% of cases AM was the only substance ingested. The dose of AM ingested was known or strongly suspected in 92.1% of cases, ranging from 2.6 mg (in a 2 month old) to 20 gm. For the 24 cases where dose and patient weights were known, the lowest was 0.54 mg/kg and the highest 50 mg/kg. In 69.5% cases, calls were initiated from non-health care facilities (HCF), of which 7 were referred to a HCF. No follow-up was documented for 88 patients. Of patients for whom follow-up was available, no symptoms were reported in 69.7%. Symptoms were documented in 29 patients. Mild symptoms (dizziness, nausea) were reported by 11 patients, all from unintentional therapeutic errors. Of the 39 pediatric patients (≤6yo), only two were symptomatic (bradycardia of 88bpm after an unknown amount and QT prolongation after 50 mg/kg IV dose). Moderate to major effects (bradycardia, hypotension, EKG abnormalities) occurred in 19 patients and death in one patient. *Discussion:* All but 3 patients with moderate to major effects ingested multiple drugs (e.g. calcium channel- and beta blockers, digoxin). The 3 patients with AM alone include the 2 pediatric cases described above and an adult suicide attempt with 15gm resulting in bradycardia. The one fatality was a 91yo female who ingested 10gm of AM with 900mg of nifedipine. *Conclusion:* Acute overdose of AM alone rarely results in serious toxicity. Most unintentional exposures or therapeutic misadventures can be safely observed at non-HCF sites.

236. Survival after Unintentional Dibucaine Ingestion Resulting in Severe Toxicity

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Background: The potent topical anesthetic dibucaine sold over-the-counter (OTC) can cause danger to children. We describe a small unintentional ingestion resulting in respiratory arrest, seizures and cardiac arrhythmias in a 19 month old. *Case Report:* A healthy 19 month old female was found unresponsive on the floor seizing with an opened tube of dibucaine 1% ointment. During transport, seizures continued necessitating intubation. Seizures terminated with diazepam. Other symptoms included a heart rate of 40 beats per minute(bpm) which increased to 90 bpm after atropine. In the emergency department vital signs included blood pressure, 100/50 mmHg; heart rate, 90 bpm; respirations, 16 breaths per minute (on ventilator); rectal temperature, 95.7 F. Fingerstick glucose 214 mg/dL. Electrocardiogram revealed QRS complex duration of 140 milliseconds and QTc complex duration of 560 milliseconds with intermittent runs of ventricular tachycardia. Three Sodium bicarbonate boluses and an infusion were given with improvement in QRS complex. Within 8 hours, she was hemodynamically stable and extubated. Discharge occured the following day without sequelae. *Case Discussion:* This case demonstrates the severe, life-threatening toxicity after minimal exposure to the OTC topical anesthetic, dibucaine. The intravenous form of this drug was removed by the FDA due to its extreme toxicity. The Consumer Product Safety Commission mandated child resistant packaging of topical dibucaine in 1995 after 3 pediatric fatalities from accidental ingestions. Despite aggressive supportive measures including sodium bicarbonate for the prolonged QRS complex duration, previous cases of cardiovascular collapse and shock were refractory leading to fatality. The most promising recent approach to local anesthetic cardiotoxicity is the use of a lipid emulsion infusion. *Conclusion:* We describe a case of survival after a potentially fatal ingestion of OTC dibucaine. It is our hope that this report will highlight the toxicity of dibucaine and prompt a review of its OTC status.

237. Reaction of Nitric Acid with Metal, Delayed Type Lung Oedema

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Background: A 69-year old female had stored a bottle of nitric acid in her bathroom. When the bottle broke, its contents spread over the floor and came into contact with a metal shelf. The reaction between metal and nitric acid resulted in a formation of nitrogen oxides. The patient was found sitting in her living room with severe dyspnoea. Later, she had to be administered artificial respiration and transferred into hospital. *Case Report:* Manifestations/course: Findings made by the emergency physician included cyanosis, a rattling respiration and an oxygen saturation level of 78%. In addition, hypertension up to 220 mmHg was found. Initial treatment included administration of glycerol trinitrate and furosemide. On the next morning, i.e. 18 hours after the accident had happened, the patient required artificial respiration due to lung oedema of delayed type. In the further course, placing of a central venous catheter into her right jugular vein was followed by pneumothorax requiring intercostal drainage. *Case Discussion:* Due to her severe pulmonary problems, the patient was transferred to a specialized hospital with drained pneumothorax and in a reduced general condition. The respiratory situation rapidly improved under administration of high doses of corticosteroids. In the further course, the patient developed peak blood pressure values of more than 300 mmHg followed by rapid falls in blood pressure. This was followed by signs of hemiparesis on the left side of her body. After nine days the patient got a total atelectasis of the left lung due to a mucous plug. *Conclusion:* After a total of 12 days of intensive therapy with different complications, the patient could be transferred to her regional hospital and could be discharged two weeks later. From the therapeutic aspect, the early oxygen supply is the most important measure. A central role has also been attributed to the early administration of corticosteroids.

238. Trends in Volatile Substance Abuse (VSA)

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Background: Social, geographic and demographic factors may have a relationship to trends in VSA. *Methods:* Two sets of data were obtained. Dataset-1 was all patients reported to US poison centers for the years 2000 through 2005 with the definitions: route of exposure = inhalation only AND reason for exposure = intentional abuse AND substance = a non-pharmaceutical. Dataset-2 was annual data from the US Dept of Labor and US Census Bureau for the years 2000 through 2005 for each of the 50 states for unemployment rate, population density, poverty rate, high school graduation rate and percentage of population with bachelor degree. The two data sets were compared for geographic (by state) and temporal (by year) relationships using US government demographic categories. *Results:* 12,428 patients with VSA were reported to US poison centers with a mean of 2071 patients annually. A strong negative trend was found with VSA and population density, with VSA increasing as population density decreased. This trend remained consistent over the six years of evaluation. A negative trend was found with percentage of population with bachelor degree and VSA. No trend was found when comparing VSA and poverty rate, unemployment rate or high school graduation rate. *Discussion:* Use of available demographic datasets may be valuable in helping to better understand VSA. *Conclusion:* VSA appears to increase as population density decreases, following a previously suggested relationship with a rural setting. VSA appears to increase as percentage of population with a bachelor degree decreases.

239. Treatment of Flecainide Overdose with Intravenous Magnesium Sulphate

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Background: There are no reported cases of Flecainide toxicity treated with intravenous magnesium sulphate (i.v. $MgSO_4$) in English literature. Flecainide blocks sodium channels. Flecainide overdose causes ventricular tachycardia that is treated with sodium bicarbonate ($NaHCO_3$). We propose treatment with i.v. $MgSO_4$ for persistent VT unresponsive to $NaHCO_3$. *Case Report:* A

37 year old intubated, unconscious man with history of depression and drug abuse was transferred due to overdose of flecainide. $NaHCO_3$ drip for ventricular tachycardia and pressors for hypotension were begun enroute. An EKG showed profound QRS widening and QTc of 722 msec, flecainide levels were 1800ng/dl. Other labs were normal and serum drug screen was negative. Due to recalcitant QRS widening and QT_c prolongation associated with hypotension, he was given 2gm $MgSO_4$. His EKG normalized after $MgSO_4$ infusion. The EKG remained normal and vital signs stablized. Heart catheterization showed normal coronary arteries. *Case Discussion:* Flecainide, a class 1C antiarrhythmic drug, acts on phase 0 of the action potential blocking fast sodium channels. This results in decreased amplitude, increased duration and to lesser extent, increased effective refractory period that appear as markedly widened QRS complex and slightly widened QT interval. Overdose exaggerates these effects and result in various dysarhythmias. Although rare mortality rate in overdose is approximately 10%. $NaHCO_3$ has been used in animal studies and some human case reports. $NaHCO_3$ probably interacts with sodium channels in cardiac conduction tissue increasing extracellular sodium concentration. We believe i.v. $MgSO_4$ shortened QRS and QT interval normalizing action potential. Miller et al. used intravenous $MgSO_4$ in refractory cardiac arrest, but excluded poisoned patients. *Conclusion:* We are the first to report Flecainide kinetics in an overdose treated with i.v. $MgSO_4$. Utilization of intravenous $MgSO_4$ normailzed the EKG and stabilized this critically ill patient, something that multiple vials of $NaHCO_3$ had not done. We believe that $MgSO_4$ is useful for refractory ventricular tachycardia and hypotension associated with Flecainide toxicity.

240. Epidemiology of Poisoning in Hong Kong

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Background: To study the epidemiology of poisoning in Hong Kong. *Methods:* The Hong Kong Poison Information Centre (HKPIC) maintained a local poisoning database since its establishment in July 2005. Data was collected from voluntary reporting in six Accident and Emergency Departments of Hospital Authority major hospitals and consultation from all healthcare professionals in Hong Kong. The data in the first year was analyzed and it represented an up-to-date acute poisoning pattern in Hong Kong. *Results:* From 1st July 2005 to 30th June 2006, there were 2543 poisoning cases in the database, involving the exposure to 3838 toxic substances. 2346 (61.1%) toxic substances were pharmaceutical products with hypnotics-sedatives, analgesics and antidepressants being the 3 commonest groups involved. 1211 (31.6%) toxic substances were non-pharmaceutical products with toxic food poisoning, ethanol and household products being the 3 commonest groups involved. 213 (5.5%) toxic substances were Chinese medicine. 30% of poisoning cases involved the exposure to more than one toxic substance. About half of the poisoning cases (53.3%) occurred in patients' own home. Suicidal intent was the reason of exposure to a poison in 38.7% of all poisoning cases. A female predominance was noted with a female to male ratio of 1.43 to 1. The majority (57%) of poisoning cases presented with mild symptoms and uneventful recovery. There were 22 deaths (0.9%), and 121 critically ill cases (4.8%). Half of the poisoning cases (50.6%) were managed as in-patients. *Discussion:* Most of the poisoning cases presented with mild symptoms, with the majority not requiring admission and an overall mortality of less than 1%. The commonest groups of drugs involved were hypnotics-sedatives, analgesics and antidepressant. Chinese medicines also accounted for a significant proportion of cases. *Conclusion:* These epidemiological data is useful for toxicovigilance purpose and forms the basis for the development of local poison database.

241. 4-Chloro-2,5-Dimethoxy Amphetamine (DOC) – A Rarely Reported Rave Scene Drug of Abuse

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Background: 4-chloro-2,5-dimethoxy amphetamine (DOC) is a synthetic ring-substituted phenethylamine amphetamine derivative controlled by the generic Misuse of Drugs legislation, that has rarely been reported previously as a recreational drug of abuse. *Case Report:* A 20 year old male was brought to the ED after a witnessed tonic-clonic seizure at a rave event. He was reported to have ingested a variety of recreational drugs which, in addition to ecstasy (MDMA) and ketamine, included a paper product (blotter) thought to contain a hallucinogenic substance similar to LSD. On arrival he was tachycardic (160 bpm) with a normal blood pressure (140/80 mmHg) and temperature. His GCS was 3/15 and his pupils were dilated. He was intubated and ventilated. Following admission to the ICU he was managed with supportive care, IV fluids and ventilation. He made a full recovery within 26 hours with no long-term sequelae. *Case Discussion:* A sample of the paper product was seized by the police and sent for analysis. It was shown to contain 4-chloro-2,5-dimethoxyamphetamine (DOC) by gas chromatography-mass spectrometry (GC-MS) and this was confirmed by proton and carbon 13 nuclear magnetic resonance (NMR) spectroscopy. There was no reference compound available for quantification. Qualitative analysis of serum and urine samples confirmed the presence of DOC. Toxicological screening of these samples also showed the presence of MDMA, MDA and ketamine. *Conclusion:* We report a patient who presented following ingestion of DOC together with other recreational drugs at a rave event. Surveillance using self-reported drug ingestion and confirmatory screening is necessary to monitor trends in recreational drug use and the emergence of novel recreational drugs of abuse.

242. Treatment of Life Threatening Digoxin Toxicity with Digoxin Immune Fab

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Background: Previous studies have described the safety and efficacy of one brand of Digoxin Immune Fab (FAB). In 2001, a second manufacturer began marketing a FAB. This study assessed the safety and efficacy of the new product in patients with life-threatening digoxin (DIG) toxicity. *Methods:* Patients treated at 2 U.S. hospitals during 2003–06, with serum DIG > 2ng/mL and life-threatening cardiotoxicity (ventricular rate < 45 bpm, ventricular tachycardia or fibrillation, asystole, or 2° or 3° heart block) were included. Trained investigators abstracted data from medical records and assessed changes in gastrointestinal, neurological, and general clinical condition at 0–4, >4–12, >12–24, and >24–72hrs after FAB. An expert panel reviewed all EKGs to identify life-threatening manifestations before and after FAB. Efficacy was assessed as rates of improvement in cardiotoxic and clinical effects at each time interval; only patients with effects present before FAB were included in each rate (e.g., neurological). The rate of adverse drug reactions (ADRs) characterized safety. *Results:* 14 patients (age = 71 ± 10yrs), all treated for chronic DIG toxicity, were included: 12 had a rate < 45, 1 had 3° heart block and 1 had asystole. Serum DIG before FAB was 3.6 ± 1.5ng/mL. After FAB (median = 2 vials), DIG toxic effects improved over time in all patients; no patient worsened at any time interval. By >12–24hrs, life-threatening cardiotoxicity resolved in 7/9 (78%) evaluable patients and most patients improved clinically. By >24–72hrs, all documented DIG effects resolved except for dizziness in 1 patient. Two ADRs occurred (rate = 0.14/patient); both resolved with simple therapeutic measures. There were 2 deaths, both due to unrelated conditions. *Discussion:* Available data showed progressive improvement and reversal of life-threatening cardiotoxicity after FAB. These results suggest a favorable risk/benefit profile for FAB and are similar to outcomes reported for the original approved product. *Conclusion:* The new FAB product is safe and effective for life-threatening DIG toxicity.

243. Two Cases of Drug-Induced Torsade De Pointes Successfully Managed with Overdrive Pacing

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Background: Drug-induced torsade de pointes (TdP) is a rare complication from medications associated with prolongation of the QT interval. We report two cases of patients with drug-induced TdP successfully managed with overdrive pacing. *Case Report:* Patient #1 is a 53-year-old female admitted after an ingestion of trandolapril/verapamil, citalopram and alprazolam. The time of ingestion is unknown. The patient had two witnessed seizures within six hours of admission and then developed TdP. A transvenous pacemaker was placed in the patient with successful capture of the cardiac rhythm. On day five of hospitalization the pacer was discontinued and the patient was noted to be in normal sinus rhythm with a heart rate of 84 beats per minute but a QT interval > 500 msec. On day six, the patient experienced another episode of TdP and a transvenous pacer was replaced. By day 10 of hospitalization, the patient had again stabilized with a normal sinus rhythm and QT interval of 400 msec. The pacer was eventually removed from the patient prior to her discharge, with the patient experiencing no further episodes of TdP. Patient #2 is a 49-year-old female admitted for a toxic ingestion of 10 grams of diphenhydramine. By day two of admission, the patient was intubated, hypotensive with a systolic blood pressure in the 80–90s mm Hg, and a wide complex sinus tachycardia. The patient rapidly deteriorated into TdP. Intravenous boluses of magnesium and sodium bicarbonate were administered and a transvenous pacemaker was placed in the patient. After successful capture of the cardiac rhythm, the patient required pacing for less than 24 hours. The pacer was removed on day 4 of hospitalization. The patient also received intravenous lidocaine during hospital days two through six. The patient was extubated on day 8 of hospitalization and transferred to a psychiatric facility on day 9. *Case Discussion:* ACLS protocol recommends intravenous magnesium and overdrive pacing for TdP. *Conclusion:* Although rarely encountered, patients with drug-induced TdP can be successfully managed with overdrive pacing.

244. Pseudo-Subarachnoid Hemorrhage: A CT-Finding in a Case of Carbon Monoxide Induced Anoxic Encephalopathy

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Background: Subarachnoid hemorrhage (SAH) appears on nonenhanced computed tomography (CT) as hyperdensity in the subarachnoid space. In rare circumstances a similar appearance may occur in the absence of subarachnoid blood, a finding that has been termed "pseudo-subarachnoid hemorrhage. We report a case of anoxic encephalopathy (AE) from carbon monoxide in whom CT falsely suggested SAH. *Case Report:* A 40-year-old male with history of depression was found unresponsive in a van with exhaust inside the van. There was no evidence of trauma. He had cardiac arrest and was resuscitated with return of spontaneous circulation. He was on pressors and was intubated. His examination showed no spontaneous movement or response to pain. His pupils were fixed and dilated. The patient carboxyhemoglobin was 40%. CT scan showed diffuse brain edema bilaterally throughout the brain with subarachnoid hemorrhage around the falx, tentorium, and pons into the basilar cisterns. Further work up the SAH was stopped after it was felt that the findings were characteristic of changes secondary to brain edema. He underwent hyperbaric oxygen therapy. His examination was consistent with clinical brain death and further intervention was stopped at family's request. *Case Discussion:* Anoxic encephalopathy occurs as a result of cardiac arrest, respiratory distress, or carbon monoxide poisoning. Nonenhanced computed tomography images showed increased density on the falx, on the tentorium, and in the basal cisterns, all of which falsely suggested subarachnoid hemorrhage. *Conclusion:* Anoxic encephalopathy can mimic diffuse subarachnoid hemorrhage on CT, a finding that has been termed "pseudo-subarachnoid hemorrhage. Toxicologists should be aware of this potential mimic of SAH when evaluating patients with diffuse cerebral edema. Recognition of this radiological feature is important to avoid unnecessary testing and delay in diagnosis.

245. Incidence and Onset of Delayed Seizures Following Overdoses of Bupropion (XL)

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Background: Delayed seizures have been reported with overdoses of bupropion XL. This study systematically evaluates the frequency and time of seizures as well as the association between other toxic effects (i.e., agitation, tremors, hallucinations) and seizures. *Methods:* A two year multi-poison center observational study of hospitalized patients with known ingestions of

bupropion XL ≥ 600 mg in adults and > 4 mg/kg in toddlers was performed. Patients with co-ingestants or a medical history that could affect seizure occurrence were excluded. A data collection form captured onset time of seizure(s), other symptoms and treatment. *Results:* There were 93 patients that met inclusion criteria; median age of 24 years (range, 1.7–65) with 11 cases < 7 years. Seizures occurred in 31 (33.3%) patients, with initial seizure at 0.5 to 24 hours after ingestion; 7 patients had initial seizure at > 12 hours. More than one seizure occurred in 54.8%. Two children < 7 years developed seizures. Median dose in patients > 7 years of age with seizures was 4200 mg (range, 600–54000) compared to a median dose of 2325 mg (range, 600–9000) in patients without seizures. Agitation, tremors, and hallucinations occurred in 32%, 35%, and 19% of patients with seizures, respectively, compared with 11%, 18%, and 8% in patients without seizures. Statistical analysis indicated only agitation occurred more frequently ($p < 0.02$). *Discussion:* Onset of seizures can be delayed up to 24 hours, with 23% occurring at > 12 hours. Seizures occur with doses as low as 600 mg (> 7 years old) and recur in a significant number of cases. Other CNS toxic effects may occur more frequently in patients that develop seizures. *Conclusion:* Delayed seizure onset suggests a minimum observation period of 24 hours after bupropion XL overdose. Although agitated patients may be at greater risk, seizures can occur without preceding CNS toxicity. [Platform]

246. Wound Botulism in Parenteral Drug Abusers: Time to Antitoxin Administration Correlates with Intensive Care Unit Length of Stay

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Background: Our aim was to describe parenteral drug abusers with wound botulism (WB) and to identify factors associated with need for mechanical ventilation (MV), intensive care unit (ICU) stay, hospitalization time, and poor outcomes. *Methods:* This is a retrospective cohort study of WB patients admitted between 1991 and 2005. Parenteral drug users with a confirmed diagnosis of botulism were included. Confirmed cases had symptoms of WB as well as serum detection of botulinum toxin, EMG findings consistent with botulism, and/or isolation *C. botulinum* from wound culture. Primary outcome variables were the need for MV, length of ICU stay, length of hospital stay, hospital-related complications, and death. *Results:* 29 patients were included. 22 patients (76%) admitted to using heroin. The most common presentation CCs were visual changes in 27 patients (88%). 21 patients required MV (72%). MV patients stayed in the ICU a mean of 637 hours (CI 188, 548) vs. 36 hours (CI 0, 75) for non-MV patients. Antitoxin (AT) was given to 26 patients (93%). Mean time from presentation to AT was 42 hours. Only 2 patients received AT in the ED. Mean time from presentation to AT was 47 hours in the MV group (CI 5, 89) and 28 hours in the non-MV group (CI –9, 65). Linear regression analysis of presentation to AT vs. length of ICU stay showed a highly significant relationship. *Discussion:* This is the largest series of parenteral drug users with confirmed WB to date. Patients identified with WB usually require MV and prolonged ICU stay. In this series, presentation to AT time and ICU length of stay were highly correlated. Very few patients received AT early in the ED. *Conclusion:* Time to AT is associated with time in the ICU in WB. AT should be given as early as possible, preferably in the ED. [Platform]

247. Dietary Supplement Adverse Events: Report of a One Year Prospective Poison Center Study

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Background: The safety and efficacy of dietary supplements is of growing concern to regulators, health care providers and consumers. Few scientific data exist on clinical effects and potential toxicities of marketed products. Harmful supplements may not be identified for months or years with existing adverse event monitoring mechanisms. Retrospective review of poison center statistics to capture supplement-associated toxicity also has limitations. *Methods:* We collaborated with the FDA Center for Food Safety and Nutrition to conduct a one-year prospective surveillance study of dietary supplement-related poison control center calls in 2006. Prompt follow-up of symptomatic cases, laboratory analysis of implicated dietary supplements, and causality assessment by a case review expert panel were performed. *Results:* Of 275 dietary supplements calls, 41% involved symptomatic exposures, and two-thirds were rated as probably or possibly related to supplement use. Eight adverse events required hospital admission. Sympathomimetic toxicity was most common, with caffeine products accounting for 47%, and yohimbe products accounting for 18% of supplement-related symptomatic cases. Suspected drug-herb interactions occurred in 6 cases including yohimbe co-ingested with buproprion (1) and methamphetamine (3), and additive anticoagulant/antiplatelet effects of NSAIDs taken with fish oils (1) and ginkgo (1). Laboratory analysis identified a pharmacologically active substance in 4 cases; supplement toxicity was ruled unlikely when analytical testing was negative in 5 cases. *Discussion:* Most supplement-related adverse events were minor. Clinically significant toxic effects were most frequently reported with caffeine and yohimbe-containing products. *Conclusion:* Active surveillance of poison control center reports of dietary supplement adverse events enables rapid detection of potentially harmful products, which may facilitate regulatory oversight. [Platform]

248. Adverse Drug Events Associated with Ethanol and Fomepizole

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Background: There are no studies comparing the safety of ethanol (EtOH) and fomepizole (4-MP) therapy for toxic alcohol poisoning. Our objectives were to compare adverse drug event (ADE) rates between EtOH and 4-MP and characterize ADEs for these antidotes. *Methods:* The study included patients ≥13 years, hospitalized between 1996–2005 for methanol or ethylene glycol poisoning and treated with ≥1 dose of EtOH or 4-MP. Charts from 10 BC hospitals were identified by ICD-9 & 10 codes. Two abstractors independently reviewed each chart and identified new onset symptoms during antidote treatment. A consensus panel of 3 medical toxicologists determined which symptoms were antidote ADEs. ADEs were classified by body system. The primary outcome was ≥1 ADE. Each case contributed treatment-days from antidote start to first ADE or antidote completion. Cox regression was used to evaluate the association between ADE rate and antidote, using EtOH as the reference group. *Results:* There were 130 EtOH and 42 4-MP treated cases. Abstractors identified symptoms in 114 (88%) EtOH and 26 (62%) 4-MP and toxicologists identified ≥1 ADE in 74 (57%) EtOH and 5 (12%) 4-MP treated cases. Central nervous system (CNS) ADEs occurred in 48% EtOH and 2% 4-MP, cardiovascular ADEs in 7% EtOH and 1% 4-MP, gastrointestinal ADEs in 9% EtOH and 7% 4-MP. EtOH was associated with minor hypoglycemia in 4%, phlebitis in 4% and diuresis in 6% of cases. The unadjusted ADE rate (95%CI) per treatment-day was 0.93 (0.87, 0.98) for EtOH and 0.13 (0.02, 0.24) for 4-MP. A significantly higher ADE rate for EtOH was evident by 2 hours after antidote start and was sustained throughout treatment. The Cox regression model adjusted for baseline severity of illness gave a rate ratio of 0.17 (0.07, 0.42), showing a six-fold reduction in ADE rate with 4-MP relative to EtOH. *Discussion:* EtOH-related CNS ADEs accounted for most of the difference between antidotes. Serious ADEs requiring intervention occurred in 11 (8%) of EtOH treated cases (respiratory depression, hypotension, cardiac arrest) and 1 (2%) of 4-MP treated (hypotension, bradycardia). *Conclusion:* Our results show that 4-MP produced significantly fewer ADEs than EtOH. [Platform]